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(71) Applicant *(for all designated States except US)*: **HOMAX PRODUCTS, INC.** [US/US]; 1835 Barkley Blvd., Suite 101, P.O. Box 5643, Bellingham, WA 98227 (US).

(72) Inventors; and

(71) Applicants : **HANSON, Randal, W.** [US/US]; 1835 Barkley Blvd., Suite 101, PO Box 5643, Bellingham, WA 98227 (US). **VANDER GRIEND, Darrel** [US/US]; 1835 Barkley Blvd., Suite 101, PO Box 5643, Bellingham, WA 98227 (US). **MORRIS, Jason** [US/US]; 1835 Barkley Blvd., Suite 101, PO Box 5643, Bellingham, WA 98227 (US). **HARDWICK, Gray** [US/US]; 1835 Barkley Blvd., Suite 101, PO Box 5643, Bellingham, WA 98227 (US). **KORDOSH, John** [US/US]; 1835 Barkley Blvd., Suite 101, PO Box 5643, Bellingham, WA 98227 (US).

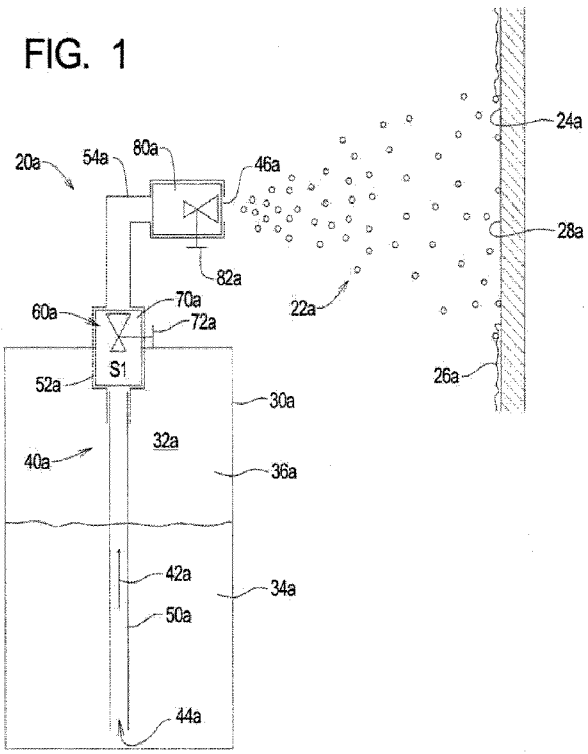
(74) Agent: **SCHACHT, Michael R.**; Schacht Law Office, Inc., 2801 Meridian Street, Suite 202, Bellingham, Washington 98225, United States of America (US).

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[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR DISPENSING TEXTURE MATERIAL USING DUAL FLOW ADJUSTMENT

FIG. 1



(57) Abstract: An aerosol dispensing system for dispensing stored material in a spray, comprising a container, a conduit, a first adjustment system, and a second adjustment system. The container defines a chamber containing the stored material and pressurized material. The conduit defines a conduit passageway having a conduit inlet and a conduit outlet. The conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber. The first adjustment system arranged to vary a flow of stored material along the conduit passageway. The first adjustment system is arranged between the conduit inlet and the conduit outlet. A second adjustment system arranged to vary the flow of stored material along the conduit passageway. The second adjustment system is arranged between the first adjustment system and the conduit outlet.

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SYSTEMS AND METHODS FOR DISPENSING TEXTURE MATERIAL USING DUAL FLOW ADJUSTMENT

RELATED APPLICATIONS

[0001] This application (Attorney's Ref. No. P217007PCT) claims benefit of U.S. Provisional Application Serial Nos. 61/513,382 filed July 29, 2011, 61/513,401 filed July 29, 2011, and 61/664,678 filed June 26, 2012, the contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] This application relates to the dispensing of texture material and, more particularly, to systems and methods for dispensing small amounts of texture material to an un-textured portion of a target surface such that an applied texture pattern of the texture material substantially matches a preexisting texture pattern on a textured portion of the target surface.

BACKGROUND

[0003] The present invention generally relates to systems and methods for applying texture material to an interior surface such as a wall or ceiling. In particular, buildings are typically constructed with a wood or metal framework. To form interior wall and ceiling surfaces, drywall material is attached to the framework. Typically, at least one primer layer and at least one paint layer is applied to the surface of the drywall material to form a finished wall surface.

[0004] For aesthetic and other reasons, a bumpy or irregular texture layer is often formed on the drywall material after the drywall material has been primed and before it has been painted. The appearance of the texture layer can take a number of patterns. As its name suggests, an "orange peel" texture pattern generally has the appearance of the surface of an orange and is formed by a

spray of relatively small droplets of texture material applied in a dense, overlapping pattern. A "splatter" texture pattern is formed by larger, more spaced out droplets of texture material. A "knockdown" texture patter is formed by spraying texture material in larger droplets (like a "splatter" texture pattern) and then lightly working the surfaces of the applied droplets with a knife or scraper so that the highest points of the applied droplets are flattened. In some situations, a visible aggregate material such as polystyrene chips is added to the texture material to form what is commonly referred to as an "acoustic" or "popcorn" texture pattern. The principles of the present invention are of primary significance when applied to a texture material without visible aggregate material.

[0005] For larger applications, such as a whole room or structure, the texture layer is typically initially formed using a commercial texture sprayer. Commercial texture sprayers typically comprise a spray gun, a hopper or other source of texture material, and a source of pressurized air. The texture material is mixed with a stream of pressurized air within the texture gun, and the stream of pressurized air carries the texture material in droplets onto the target surface to be textured. Commercial texture sprayers contain numerous points of adjustment (e.g., amount of texture material, pressure of pressurized air, size of outlet opening, etc.) and thus allow precise control of the texture pattern and facilitate the quick application of texture material to large surface areas. However, commercial texture sprayers are expensive and can be difficult to set up, operate, and clean up, especially for small jobs where overspray may be a problem.

[0006] For smaller jobs and repairs, especially those performed by non-professionals, a number of "do-it-yourself" (DIY) products for applying texture material are currently available in the market. Perhaps the most common type of DIY texturing products includes aerosol systems that contain texture material and a propellant. Aerosol systems typically include a container, a valve, and an actuator. The container contains the texture material and propellant under

pressure. The valve is mounted to the container selectively to allow the pressurized propellant to force the texture material out of the container. The actuator defines an outlet opening, and, when the actuator is depressed to place the valve in an open configuration, the pressurized propellant forces the texture material out of the outlet opening in a spray. The spray typically approximates only one texture pattern, so it was difficult to match a variety of perhaps unknown preexisting texture patterns with original aerosol texturing products.

[0007] A relatively crude work around for using an aerosol texturing system to apply more than one texture pattern is to reduce the pressure of the propellant material within the container prior to operating the valve. In particular, when maintained under pressure within the container, typical propellant materials exist in both a gas phase and in a liquid phase. The propellant material in the liquid phase is mixed with the texture material, and the texture material in the gas state pressurizes the mixture of texture material and liquid propellant material. When the container is held upright, the liquid contents of the container are at the bottom of the container chamber, while the gas contents of the container collect at the top of the container chamber. A dip tube extends from the valve to the bottom of the container chamber to allow the propellant in the gas phase to force the texture material up from the bottom of the container chamber and out of the outlet opening when the valve is opened. To increase the size of the droplets sprayed out of the aerosol system, the container can be inverted, the valve opened, and the gas phase propellant material allowed to flow out of the aerosol system, reducing pressure within the container chamber. The container is then returned upright and the valve operated again before the pressure of the propellant recovers such that the liquid contents are forced out in a coarser texture pattern. This technique of adjusting the applied texture pattern result in only a limited number of texture patterns that are not highly repeatable and can drain the can of propellant before the texture material is fully dispensed.

[0008] A more refined method of varying the applied texture pattern created by aerosol texturing patterns involved adjusting the size of the outlet opening formed by the actuator structure. Initially, it was discovered that the applied texture pattern could be varied by attaching one of a plurality of straws or tubes to the actuator member, where each tube defined an internal bore of a different diameter. The straws or tubes were sized and dimensioned to obtain fine, medium, and coarse texture patterns appropriate for matching a relatively wide range of pre-existing texture patterns. Additional structures such as caps and plates defining a plurality of openings each having a different cross-sectional area could be rotatably attached relative to the actuator member to change the size of the outlet opening. More recently, a class of products has been developed using a resilient member that is deformed to alter the size of the outlet opening and thus the applied texture pattern.

[0009] Existing aerosol texturing products are acceptable for many situations, especially by DIY users who do not expect perfect or professional results. Professional users and more demanding DIY users, however, will sometimes forego aerosol texturing products in favor of commercial texture sprayers because of the control provided by commercial texture sprayers.

[0010] The need thus exists for improved aerosol texturing systems and methods that can more closely approximate the results obtained by commercial texture sprayers.

SUMMARY

[0011] The present invention is an aerosol dispensing system for dispensing stored material in a spray, comprising a container, a conduit, a first adjustment system, and a second adjustment system. The container defines a chamber containing the stored material and pressurized material. The conduit defines a conduit passageway having a conduit inlet and a conduit outlet. The conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the

chamber. The first adjustment system is arranged to vary a flow of stored material along the conduit passageway. The first adjustment system is arranged between the conduit inlet and the conduit outlet. The second adjustment system is arranged to vary the flow of stored material along the conduit passageway. The second adjustment system is arranged between the first adjustment system and the conduit outlet.

[0012] The present invention is also a method of dispensing stored material in a spray, comprising the following steps. The stored material and pressurized material are arranged in a chamber. A conduit is arranged such that a conduit inlet is arranged within the chamber and a conduit outlet is arranged outside of the chamber. A flow of stored material is varied at a first location along the conduit passageway. The first location is arranged between a conduit inlet defined by the conduit passageway and a conduit outlet defined by the conduit passageway. The flow of stored material is varied at a second location along the conduit passageway. The third location is arranged between the first location and the conduit outlet

[0013] The present invention is also an aerosol dispensing system for dispensing stored material in a spray comprising a container, a conduit, a valve assembly, a first adjustment member, and a second adjustment member. The container defines a chamber containing the stored material and pressurized material. The conduit defines a conduit passageway having a conduit inlet and a conduit outlet. The conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber. The valve assembly is arranged selectively to allow and prevent flow of stored material along the conduit passageway. The first adjustment member is arranged to vary a flow of stored material along the conduit passageway. The first adjustment member is arranged between the conduit inlet and the conduit outlet. The second adjustment member is arranged to vary a flow of stored material along the

conduit passageway. The second adjustment member is arranged between the first adjustment member and the conduit outlet.

[0014] The present invention may also be an aerosol dispensing system for dispensing stored material in a spray comprising a container, a conduit, a valve system, a first adjustment system, and a second adjustment system. The container defines a chamber containing the stored material and pressurized material. The conduit defines a conduit passageway having a conduit inlet and a conduit outlet. The conduit inlet is arranged within the chamber, and the conduit outlet is arranged outside of the chamber. The valve system is arranged selectively to allow and prevent flow of stored material along the conduit passageway. The first adjustment system is arranged to control flow of stored material along the conduit passageway. The first adjustment system is arranged between the conduit inlet and the conduit outlet. The second adjustment system is arranged to control flow of stored material along the conduit passageway. The second adjustment system is arranged between the first adjustment system and the conduit outlet.

[0015] The present invention may also be a method of dispensing stored material in a spray comprising the following steps. The stored material and pressurized material are arranged in a chamber. A conduit passageway having a conduit inlet and a conduit outlet is defined such that the conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber. A first cross-sectional area of the conduit passageway is selectively altered to allow and prevent flow of stored material at a first location along a conduit passageway. Flow of stored material is controlled at a second location along the conduit passageway. The second location is arranged between the first location and a conduit outlet defined by the conduit passageway. Flow of stored material is controlled at a third location along the conduit passageway. The third location is arranged between the second location and the conduit outlet.

[0016] The present invention may also be an aerosol dispensing system for dispensing stored material in a spray comprising a container, a conduit, a valve assembly, a first adjustment system, and a second adjustment system. The container defines a chamber containing the stored material and pressurized material. The conduit comprises an inlet tube defining a conduit inlet, a valve housing, an actuator member, an outlet member defining a conduit outlet, and a conduit passageway. The conduit passageway extends through conduit inlet defined by the inlet tube, the valve housing, the actuator member, and the conduit outlet defined by the outlet member. The valve assembly is supported by the valve housing. The valve assembly is normally in a closed configuration in which fluid is substantially prevented from flowing along the conduit passageway. The actuator member is supported relative to the valve assembly such that displacement of the actuator member towards the container places the valve assembly in an open configuration in which fluid is allowed to flow along the conduit passageway. The first adjustment system comprises a first adjustment member and a seal member. The first adjustment member is supported for movement relative to the actuator member. A valve portion of the first adjustment member is arranged within the conduit passageway. Movement of the first adjustment member relative to the actuator member causes the valve portion of the first adjustment member to alter an effective cross-sectional area of the conduit passageway at a first location. The seal member is arranged to prevent fluid flow between the first adjustment member and the actuator member. A second adjustment member is supported for movement relative to the actuator member. Movement of the second adjustment member relative to the actuator member deforms the outlet member to alter an effective cross-sectional area of the conduit passageway at a second location.

[0017] The present invention is also a texture material for forming a coating having a desired texture pattern on a target surface comprising first, second, and third solvents, a binder, a pigment, fumed silica, a dispersant, and first and second filler extenders. The first solvent has a first evaporation rate, the second

solvent has a second evaporation rate, and the third solvent has a third evaporation rate. The second evaporation rate is lower than the first evaporation rate, and the third evaporation rate is higher than the first evaporation rate.

DESCRIPTION OF THE DRAWINGS

[0018] Figure 1 schematically represents a first example general class of aerosol texturing system of the present invention;

[0019] Figure 2 is a side elevation view of a second example aerosol texturing system of the present invention;

[0020] Figure 3 is a side elevation, partial section view a first adjustment system of the second example aerosol texturing system in a closed configuration;

[0021] Figure 3A is a front elevation view of a second adjustment member of the second example aerosol texturing system;

[0022] Figure 4 is a partial section view of the first adjustment system of the second example aerosol texturing system in an intermediate configuration;

[0023] Figure 5 is a partial section view of the first adjustment system of the second example aerosol texturing system in a fully open configuration;

[0024] Figure 6 is a side elevation view of a third example aerosol texturing system of the present invention;

[0025] Figure 7 is a side elevation, section view of an actuator member and first and second adjustment systems of the third example aerosol texturing system, with the second adjustment system including a plurality of straw members;

[0026] Figure 8 is top perspective view illustrating an example actuator assembly of the third example aerosol texturing system;

[0027] Figure 9 is a top plan view of the example actuator assembly of the third example aerosol texturing system;

[0028] Figure 10 is a top perspective, assembly view illustrating a portion of the first example adjustment system of the third example aerosol texturing system;

[0029] Figure 11 is a bottom perspective view illustrating an adjustment plate of the first example adjustment system of the third example aerosol texturing system;

[0030] Figure 12 is a rear elevation view of a portion of the actuator assembly of the third example aerosol texturing system;

[0031] Figures 13 and 14 are a rear elevation view of a portion of Figure 12 illustrating the movement of the adjustment plate;

[0032] Figures 15A and 15B are partial section views illustrating movement of an actuator member from a closed position to a first intermediate position;

[0033] Figures 16A and 16B are partial section views illustrating movement of the actuator member from a closed position to a second intermediate position;

[0034] Figures 17A and 17B are partial section views illustrating movement of the actuator member from a closed position to a fully open position;

[0035] Figure 18 is a side elevation view of a fourth example aerosol texturing system of the present invention;

[0036] Figure 19 is a side elevation section view of an actuator member and first and second adjustment systems of the fourth example aerosol texturing system, with the actuator member in a closed position;

[0037] Figure 19 is a side elevation section view of the actuator member and first and second adjustment systems of the fourth example aerosol texturing system, with the first adjustment system in a fully open configuration and the actuator member in a closed position;

[0038] Figure 20 is a side elevation section view of the actuator member and first and second adjustment systems of the fourth example aerosol texturing system, with the first adjustment system in a fully open configuration and the actuator member in a fully open position;

[0039] Figure 21 is a side elevation section view of the actuator member and first and second adjustment systems of the fourth example aerosol texturing system, with the first adjustment system in an intermediate configuration and the actuator member in a closed position;

[0040] Figure 22 is a side elevation section view of the actuator member and first and second adjustment systems of the fourth example aerosol texturing system, with the first adjustment system in a fully open configuration and the actuator member in an intermediate position;

[0041] Figure 23 schematically represents a second example general class of aerosol texturing system of the present invention;

[0042] Figure 24 is a side elevation view of a fifth example aerosol texturing system of the present invention;

[0043] Figure 25 is a side elevation section view of an actuator member and first and second adjustment systems of the fifth example aerosol texturing system taken along lines 25-25 in Figure 26, with the actuator member in a closed position;

[0044] Figure 26 is a front elevation section view of an actuator member and first adjustment system of the fifth example aerosol texturing system taken along

lines 26-26 in Figure 25, with the actuator member in a closed position and the first example adjustment system in an intermediate configuration;

[0045] Figure 27 is a side elevation section view of an actuator member and first and second adjustment systems of the fifth example aerosol texturing system, with the actuator member in a closed position and the first example adjustment system in a terminal configuration;

[0046] Figure 28 is a side elevation view of a sixth example aerosol texturing system of the present invention;

[0047] Figure 29 is a side elevation section view of an actuator member and first and second adjustment systems of the sixth example aerosol texturing system taken along lines 29-29 in Figure 30, with the actuator member in a closed position;

[0048] Figure 30 is a front elevation section view of an actuator member and first adjustment system of the sixth example aerosol texturing system taken along lines 26-26 in Figure 25, with the actuator member in a closed position and the first example adjustment system in an intermediate configuration;

[0049] Figure 31 is a side elevation section view of an actuator member and first adjustment systems of the sixth example aerosol texturing system, with the actuator member in a closed position and the first example adjustment system in a terminal configuration;

[0050] Figure 32 is a side elevation view of a seventh example aerosol texturing system of the present invention;

[0051] Figure 33 is a side elevation section view of an actuator member and first and second adjustment systems of the seventh example aerosol texturing system, with the first adjustment system in a fully open configuration and the actuator member in a closed position;

[0052] Figure 34 is a side elevation section view of the actuator member and first and second adjustment systems of the seventh example aerosol texturing system, with the first adjustment system in an intermediate configuration and the actuator member in a closed position;

[0053] Figure 35 is a side elevation view of a eighth example aerosol texturing system of the present invention;

[0054] Figure 36 is a side elevation section view of an actuator member and first and second adjustment systems of the eighth example aerosol texturing system, with the first example adjustment system in a terminal configuration;

[0055] Figure 37 is a front elevation section view of an actuator member and first adjustment system of the eighth example aerosol texturing system taken along lines 37-37 in Figure 36, with the first example adjustment system in the terminal configuration;

[0056] Figure 38 is a side elevation section view of an actuator member and first and second adjustment systems of the eighth example aerosol texturing system, with the first example adjustment system in an intermediate configuration;

[0057] Figure 39 is a side elevation view of a ninth example aerosol texturing system of the present invention;

[0058] Figure 40 is a side elevation section view of an actuator member and first and second adjustment systems of the ninth example aerosol texturing system, with the first example adjustment system in a full open configuration;

[0059] Figure 41 is a front elevation section view of an actuator member and first adjustment system of the ninth example aerosol texturing system taken along lines 46-46 in Figure 40, with the first example adjustment system in the fully open configuration; and

[0060] Figure 42 is a side elevation section view of an actuator member and first and second adjustment systems of the ninth example aerosol texturing system, with the first example adjustment system in an intermediate configuration.

[0061] Figure 43 is a side elevation view of an eleventh example aerosol texturing system of the present invention;

[0062] Figure 44 is a side elevation, partial section view of the eleventh example aerosol texturing system in a closed configuration;

[0063] Figure 45 is a section view taken along lines 45-45 in Figure 44;

[0064] Figure 46 is a side elevation, partial section view showing the eleventh example aerosol texturing system in an open configuration;

[0065] Figure 47 is a top plan view of an actuator member and first and second adjustment members of the second example aerosol texturing system;

[0066] Figure 48 is a side elevation, partial section view of an actuator member and first and second adjustment members of the eleventh example aerosol texturing system, with the first adjustment member in a fully open position;

[0067] Figure 49 is a section view taken along lines 49-49 in Figure 48;

[0068] Figure 50 is a side elevation, partial section view of an actuator member and first and second adjustment members of the eleventh example aerosol texturing system, with the first adjustment member in a partially open position;

[0069] Figure 51 is a section view taken along lines 51-51 in Figure 50;

[0070] Figure 52 is a top plan, partial section view taken along lines 52-52 in Figure 48;

[0071] Figure 53 is a top plan, partial section view taken along lines 53-53 in Figure 48;

[0072] Figure 54 is a section view taken along lines 54-54 in Figure 53;

[0073] Figure 55 is a side elevation view of a twelfth example aerosol texturing system of the present invention;

[0074] Figure 56 is a side elevation, partial section view of the twelfth example aerosol texturing system in a closed configuration;

[0075] Figure 57 is a side elevation, partial section view of an actuator member and first and second adjustment members of the twelfth example aerosol texturing system, with the first adjustment member in a fully open position;

[0076] Figure 58 is a section view taken along lines 58-58 in Figure 16;

[0077] Figure 59 is a side elevation, partial section view of an actuator member and first and second adjustment members of the twelfth example aerosol texturing system, with the first adjustment member in a partially open position;

[0078] Figure 60 is a side elevation view of a thirteenth example aerosol texturing system of the present invention;

[0079] Figure 61 is a side elevation, partial section view of the thirteenth example aerosol texturing system in a closed configuration;

[0080] Figure 62 is a side elevation view of an example first adjustment member of the thirteenth example aerosol texturing system;

[0081] Figure 63 is a section view of an actuator member and first and second adjustment members of the thirteenth example aerosol texturing system, with the first adjustment member in a fully open position;

[0082] Figure 64 is a section view taken along lines 64-64 in Figure 63;

[0083] Figure 65 is a top plan, partial section view taken along lines 64-64 in Figure 63 of an actuator member and first and second adjustment members of the thirteenth example aerosol texturing system, with the first adjustment member in a first intermediate position;

[0084] Figure 66 is a top plan, partial section view taken along lines 64-64 in Figure 22 of an actuator member and first and second adjustment members of the thirteenth example aerosol texturing system, with the first adjustment member in a second intermediate position;

[0085] Figure 64A is a section view taken along lines 64A-64A in Figure 64;

[0086] Figure 65A is a section view taken along lines 65A-65A in Figure 65;

[0087] Figure 66A is a section view taken along lines 66A-66A in Figure 66;

[0088] Figure 67 is a side elevation view of a fourteenth example aerosol texturing system of the present invention;

[0089] Figure 68 is a side elevation, partial section view of the fourteenth example aerosol texturing system in a closed configuration;

[0090] Figure 69 is a side elevation view of an example first adjustment member of the fourteenth example aerosol texturing system;

[0091] Figure 70 is a side elevation, section view of the example first adjustment member of the fourteenth example aerosol texturing system;

[0092] Figure 71 is a section view taken along lines 71-71 in Figure 69;

[0093] Figure 72 is side elevation, section view an actuator member, first and second adjustment members, grip housing, and trigger member of the fourteenth example aerosol texturing system, with the first adjustment member in a first intermediate position;

[0094] Figure 73 is a top plan, partial section view taken along lines 73-73 in Figure 72 of an actuator member and first and second adjustment members of the fourteenth example aerosol texturing system, with the first adjustment member in a fully open position;

[0095] Figure 74 is a top plan, partial section view taken along lines 73-73 in Figure 72 of an actuator member and first and second adjustment members of the fourteenth example aerosol texturing system, with the first adjustment member in a first intermediate position;

[0096] Figure 75 is a top plan, partial section view taken along lines 73-73 in Figure 72 of an actuator member and first and second adjustment members of the fourteenth example aerosol texturing system, with the first adjustment member in a second intermediate position;

[0097] Figure 73A is a section view taken along lines 73A-73A in Figure 73;

[0098] Figure 74A is a section view taken along lines 74A-74A in Figure 74; and

[0099] Figure 75A is a section view taken along lines 75A-75A in Figure 75.

DETAILED DESCRIPTION

[00100] The present invention may be embodied in many forms, and several examples of aerosol dispensing systems of the present invention will be discussed below. In particular, the Applicant will initially describe a first example class of aerosol systems and a number of example aerosol dispensing systems within the first class. The Applicant will then describe a second example class of aerosol systems and a number of example aerosol dispensing systems within that second class.

I. First Example Class of Aerosol Dispensing Systems

[00101] Referring initially to Figure 1 of the drawing, depicted at 20a therein is a first example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. The first example dispensing system is adapted to spray droplets of dispensed material 22a onto a target surface 24a. The example target surface 24a has a textured portion 26a and an un-textured portion 28a. Accordingly, in the example use of the dispensing system 20a depicted in Figure 1, the dispensed material 22a is or contains texture material, and the dispensing system 20a is being used to form a coating on the un-textured portion 28a having a desired texture pattern that substantially matches a pre-existing texture pattern of the textured portion 26a.

[00102] Figure 1 further illustrates that the example dispensing system 20a comprises a container 30a defining a chamber 32a in which stored material 34a and pressurized material 36a are contained. The stored material 34a is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase.

[00103] A typical texture material forming a part of the dispensed material 22a and/or stored material 34a will comprise a base or carrier, a binder, a filler, and, optionally, one or more additives such as surfactants, biocides and thickeners.

Examples of the base or carrier include water, solvent (oil-based texture material) such as xylene, toluene, acetone, methyl ethyl ketone, and combinations of water and water soluble solvents. Examples of binders include starch, polyvinyl alcohol and latex resins (water-based systems) and a wide variety of polymers such as ethylene vinyl acetate, thermoplastic acrylics, styrenated alkyds, etc. (solvent-based systems.). Examples of fillers include calcium carbonate, titanium dioxide, attapulgite clay, talc, magnesium aluminum silicate, etc.

[00104] The stored material 34a will also comprise a liquid phase propellant material, and the pressurized material will typically comprise a gas phase propellant material. The following propellant materials are appropriate for use as the propellant material forming the stored material 34a and the pressurized material 36a: dimethyl ether, propane, butane, isobutene, difluoroethane, and tetrafluoroethane.

[00105] The following Tables A-1, A-2, and A-3 and Tables A-4 and A-5 attached hereto as Exhibit A contain example formulations of the texture material that may be used to form the dispensed material 22a and stored material 34a of the first example aerosol dispensing 20a.

TABLE A-1 (Solvent Based)

Material	Purpose	First Example	Second Example	Third Example
Solvent	Base	35%	30 - 40%	20 - 60%
Pigment	Filler	60%	55 – 65%	40 – 80%
Resin	Binder	2.5%	1 – 5%	0.5 – 15%

[00106] To the example texture material described in Table A-1 is added propellant material in the form of a propane/butane/isobutane blend. A first

range of approximately 10-20% by weight of the propellant material is added to the example texture material of Table A-1, but the propellant material should in any event be within a second range of approximately 5-25% by weight of the propellant material.

TABLE A-2 (Knockdown)

Material	Purpose	First Example	Second Example	Third Example
Water	Base	48%	45 – 55%	40 – 60%
Pigment	Filler	50%	45 – 55%	40 – 60%
Resin	Binder	2%	1 - 5%	0.5 - 10%

[00107] To the example texture material described in Table A-2 is added propellant material in the form of DME. A first range of approximately 7-15% by weight of the propellant material is added to the example texture material of Table A-2, but the propellant material should in any event be within a second range of approximately 5-25% by weight of the propellant material.

TABLE A-3 (No Prime)

Material	Purpose	First Example	Second Example	Third Example
Water	Base	42%	40 – 50%	30 – 60%
Pigment	Filler	47%	40 – 50%	30 – 60%
Resin	Binder	10%	5 – 15%	2.5 – 20%

[00108] To the example texture material described in Table A-3 is added propellant material in the form of DME. A first range of approximately 10-15% by weight of the propellant material is added to the example texture material of Table A-3, but the propellant material should in any event be within a second range of approximately 5-25% by weight of the propellant material.

[00109] With reference to Tables A-4 and A-5 in Exhibit A, that table contains examples of a texture material composition adapted to be combined with an aerosol and dispensed using an aerosol dispensing system in accordance with the principles of the present invention. Each value or range of values in Tables A-4 and A-5 represents the percentage of the overall weight of the example texture material composition formed by each material of the texture material composition for a specific example, a first example range, and a second example range. The composition described in Table A-5 is similar to that of Table A-4, but Table A-5 contains a number of additional materials that may optionally be added to the example texture material composition of Table A-4.

[00110] One example of a method of combining the materials set forth in Table A-4 is as follows. Materials A, B, C, and D are combined to form a first sub-composition. The first sub-composition is mixed until material D is dissolved (e.g., 30-40 minutes). Materials E and F are then added to the first sub-composition to form a second sub-composition. The second sub-composition is mixed until materials E and F are well-dispersed (e.g., at high speed for 15-20 minutes). Material G is then added to the second sub-composition to form a third sub-composition. The third sub-composition is mixed well (e.g., 10 minutes). Typically, the speed at which the third sub-composition is mixed is reduced relative to the speed at which the second sub-composition is mixed. Next, materials H, I, and J are added to the third sub-composition to form the example texture material composition of the present invention. The example texture material composition is agitated. Material K may be added as necessary to adjust (e.g., reduce) the viscosity of the example texture material composition.

[00111] The example texture material composition of the present invention may be combined with an aerosol propellant in any of the aerosol dispensing systems described herein to facilitate application of the example texture material composition to a surface to be textured.

[00112] Figure 1 further illustrates that the first example aerosol dispensing system 20a comprises a conduit 40a defining a conduit passageway 42a. The conduit 40a is supported by the container 30a such that the conduit passageway 42a defines a conduit inlet 44a arranged within the chamber 32a and a conduit outlet 46a arranged outside of the chamber 32a. The conduit outlet 46a may alternatively be referred to herein as an outlet opening 46a. The example conduit 40a is formed by an inlet tube 50a, a valve housing 52a, and an actuator structure 54a. The conduit passageway 42a extends through the inlet tube 50a, the valve housing 52a, and the actuator structure 54a such that the valve housing 52a is arranged between the conduit inlet 44a and the actuator structure 54a and the actuator structure 54a is arranged between the valve housing 52a and the conduit outlet 46a.

[00113] Arranged within the valve housing 52a is a valve system 60a. A first flow adjustment system 70a having a first adjustment member 72a is arranged to interface with the valve system 60a. A second flow adjustment system 80a having a second adjustment member 82a is arranged in the conduit passageway 42a to form at least a portion of the conduit outlet 46a.

[00114] The valve system 60a operates in a closed configuration, a fully open configuration, and at least one of a continuum or plurality of partially open intermediate configurations. In the closed configuration, the valve system 60a substantially prevents flow of fluid along the conduit passageway 42a. In the open configuration and the at least one intermediate configuration, the valve system 60a allows flow of fluid along the conduit passageway 42a. The valve system 60a is normally in the closed configuration. The valve system 60a engages the actuator member structure 54a and is placed into the open

configuration by applying deliberate manual force on the actuator structure 54a towards the container 30a.

[00115] The first flow adjustment system 70a is supported by the container 30a to engage the actuator structure such that manual operation of the first adjustment member 72a affects operation of the valve system 60a to control the flow of fluid material along the conduit passageway 42a. In particular, the first adjustment system 70a and the valve system 60a function as a flow restrictor, where operation of the first adjustment member 72a results in a variation in the size of the conduit passageway 42a within the valve system 60a such that a pressure of the fluid material upstream of the first flow adjustment system 70a is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 70a.

[00116] In general, a primary purpose of the first flow adjustment system 70a is to alter a distance of travel of the dispensed material 22a. The first flow adjustment system 70a may also have a secondary affect on the pattern in which the dispensed material 22a is sprayed.

[00117] The second adjustment system 80a is supported by the actuator structure 54a downstream of the first adjustment system 70a. Manual operation of the second adjustment member 82a affects the flow of fluid material flowing out of the conduit passageway 42a through the conduit outlet 46a. In particular, the second adjustment system 80a functions as a variable orifice, where operation of the second adjustment member 82a variably reduces the size of the conduit outlet 46a relative to the size of the conduit passageway 42a upstream of the second adjustment system 80a.

[00118] A primary purpose of the second flow adjustment system 80a is to alter a pattern in which the dispensed material 22a is sprayed. The first flow adjustment system 70a may also have a secondary affect on the distance of travel of the dispensed material 22a.

[00119] To operate the first example aerosol dispensing system 20, the container 30a is grasped such that the finger can depress the actuator structure 54a. The conduit outlet or outlet opening 46a is initially aimed at a test surface and the actuator structure 54a is depressed to place the valve system 60a in the open configuration such that the pressurized material 36a forces some of the stored material 34a out of the container 30a and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion 26a of the target surface 24a. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment systems 70a and 80a are adjusted to alter the spray pattern of the droplets of dispensed material 22a.

[00120] The process of spraying a test pattern and comparing it to the pre-existing pattern and adjusting the first and second adjustment members 72a and 82a is repeated until the dispensed material forms a desired texture pattern that substantially matches the pre-existing texture pattern.

[00121] Leaving the first and second adjustment systems 70a and 80a as they were when the test texture pattern matched the pre-existing texture pattern, the aerosol dispensing system 20a is then arranged such that the conduit outlet or outlet opening 46a is aimed at the un-textured portion 28a of the target surface 24a. The actuator structure 54a is again depressed to operate the valve system 60a such that the pressurized material 36a forces the stored material 34a out of the container 30a and onto the un-textured portion 28a of the target surface to form the desired texture pattern.

A. Second Example Aerosol Dispensing System

[00122] Referring now to Figures 2-5 of the drawing, depicted at 120 therein is a second example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20, the second example dispensing system 120 is adapted to spray droplets of dispensed material 122 onto a target surface (not shown). In the example use of the dispensing system 120 depicted in Figures 2-5, the dispensed material 122 is or contains texture material, and the dispensing system 120 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00123] Figure 2 further illustrates that the example dispensing system 120 comprises a container 130 defining a chamber 132 in which stored material 134 and pressurized material 136 are contained. Like the stored material 34 described above, the stored material 134 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 138 is mounted on the container assembly 130 to facilitate the dispensing of the dispensed material 122 as will be described in further detail below.

[00124] Figure 3 illustrates that the second example aerosol dispensing system 120 comprises a conduit 140 defining a conduit passageway 142. The conduit 140 is supported by the container 130 such that the conduit passageway 142 defines a conduit inlet 144 arranged within the chamber 132 and a conduit outlet or outlet opening 146 arranged outside of the chamber 132. The example conduit 140 is formed by an inlet tube 150, a valve housing 152, and an actuator member 154. The conduit passageway 142 extends through the inlet tube 150, the valve housing 152, the actuator member 154, and the outlet member 156. The valve housing 152 is arranged between the conduit inlet 144 and the actuator member 154, and the actuator member 154 is arranged between the

valve housing 152 and the conduit outlet 146. The outlet member 156 is supported by the actuator member 154 to define the conduit outlet 146. A grip assembly 158 is supported by the container assembly 130, and the grip assembly 158 in turn supports the actuator member 154 for movement relative to the container assembly 130.

[00125] Arranged within the valve housing 152 is a valve assembly 160. The example valve assembly 160 comprises a valve member 162, a valve seat 164, and a valve spring 166. The valve assembly 160 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 166 forces the valve member 162 against the valve seat 164 such that the valve assembly 160 substantially prevents flow of fluid along the conduit passageway 142. In the open configuration, the valve member 162 is displaced away from the valve seat 164 against the force of the valve spring 166 such that the valve assembly 160 allows flow of fluid along the conduit passageway 142 between the valve member 162 and the valve seat 164. Because the valve spring 166 biases the valve member 162 towards the valve seat 164, the example valve assembly 160 is normally closed. The valve assembly 160 engages the actuator member structure 154 such that the application of deliberate manual force on the actuator member 154 towards the container 130 moves the valve member 162 away from the valve seat 164 and thus places the valve system 160 in the open configuration.

[00126] A first flow adjustment system 170 comprising a first adjustment member 172 is arranged selectively to limit movement of the actuator member 154 relative to the container assembly 130. In particular, the first adjustment member defines an adjustment axis A_A and a stop surface 174. The stop surface 174 extends along a varying or substantially helical path relative to the adjustment axis A_A.

[00127] Rotation of the first adjustment member 172 relative to the grip assembly 158 thus alters a position of the stop surface 174 relative to the

actuator member 154. With the first adjustment member 172 in a first angular position as shown in Figures 3 and 4, the actuator member 154 travels a first distance relative to the valve assembly 160. With the first adjustment member 172 in a second angular position as shown in Figure 5, the actuator member 154 travels a second distance relative to the valve assembly 160. The first distance is longer than the first distance as can be seen by a close inspection of Figures 4 and 5, so the valve system 160, in cooperation with the first adjustment system 170, thus forms a bigger restriction in the conduit passageway 142 when the first adjustment member 172 is in the second angular position than when the first adjustment member 172 is in the first angular position.

[00128] Further, the first adjustment member 172 is configurable in any one of a plurality or continuum of angular positions between the first and second positions shown. The first adjustment system 170 thus allows the user to obtain a range of restrictions in the conduit passageway as necessary for a particular desired texture pattern.

[00129] A second flow adjustment system 180 having a second adjustment member 182 is arranged in the conduit passageway 142 to form at least a portion of the conduit outlet or outlet opening 146. In particular, the second adjustment member 182 defines a plurality of adjustment openings 184a, 184b, and 184c (Figure 3A). The second adjustment member 182 is further rotatably supported by the actuator member 154 such that an axis of rotation A_R of the second adjustment member 182 is offset from an outlet axis A_O defined by the conduit outlet 146. Accordingly, rotating the second adjustment member 182 relative to the actuator member 154 allows any selected one of the outlet openings 184a, 184b, and 184c to be arranged to define a cross-sectional area of the outlet opening defined by the conduit outlet 146.

[00130] Manual operation of the first adjustment member 172 affects the flow of fluid material along the conduit passageway 142 upstream of the second adjustment system 180. In particular, the first adjustment system 170 functions

as a flow restrictor, where operation of the first adjustment member 172 variably reduces the size of the conduit passageway 142 such that a pressure of the fluid material upstream of the first flow adjustment system 170 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 170 (towards the second adjustment system 180).

[00131] The second adjustment system 180 is supported by the actuator member 154 downstream of the first adjustment system 170. The selected one of the adjustment openings 184a, 184b, and 184c thereby affects the flow of fluid material flowing out of the conduit passageway 142. The second adjustment system 180 thus functions as a variable orifice system. Operation of the second adjustment member 172 variably reduces the size of the conduit outlet or outlet opening 146 relative to the size of the conduit passageway 142 upstream of the second adjustment system 180.

[00132] The first adjustment member 172 and second adjustment member 182 are supported as described above to define a control system 190. Figure 3 further shows that the grip assembly 158 comprises a grip housing 192 and that the actuator member 154 defines a trigger portion 194. Additionally, the grip assembly 158 is combined with the control system 190 to form the actuator assembly 138, and the actuator assembly 138 is supported by the container assembly 130 as generally described above. In the example actuator assembly 138, the actuator assembly 138 is pivotably connected to the grip housing 192. Accordingly, to operate the second example aerosol dispensing system 120, the container 130 and grip housing 192 are grasped such that the user's fingers can squeeze the trigger portion 194, thereby allowing the actuator member 154 to be depressed.

[00133] In use, the conduit outlet or outlet opening 146 is initially aimed at a test surface and the actuator member 154 is depressed to place the valve assembly 160 in the open configuration such that the pressurized material 136 forces some of the stored material 134 out of the container 130 and onto the test

surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 122.

[00134] The process of spraying a test pattern and adjusting the first and second adjustment members 172 and 182 is repeated until the test pattern formed by the dispensed material 122 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00135] Leaving the first and second adjustment members 172 and 182 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 120 is then arranged such that the conduit outlet or outlet opening 146 is aimed at the un-textured portion of the target surface. The trigger member 194 is again squeezed to place the valve assembly 160 in the open configuration such that the pressurized material 136 forces the stored material 134 out of the container 130 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00136] The following Table B represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 170:

Table B

Config.	Units	Example	First Range	Second Range
First Angular Position	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Second Angular Position	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

B. Third Example Aerosol Dispensing System

[00137] Referring now to Figures 6-17 of the drawing, depicted at 220 therein is a third example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20, the third example dispensing system 220 is adapted to spray droplets of dispensed material 222 onto a target surface (not shown). In the example use of the dispensing system 220 depicted in Figures 6-17, the dispensed material 222 is or contains texture material, and the dispensing system 220 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00138] Figure 6 further illustrates that the example dispensing system 220 comprises a container 230 defining a chamber 232 in which stored material 234 and pressurized material 236 are contained. Like the stored material 34 described above, the stored material 234 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 238 is mounted on the container assembly 230 to facilitate the dispensing of the dispensed material 222 as will be described in further detail below.

[00139] Figure 7 illustrates that the second example aerosol dispensing system 220 comprises a conduit 240 defining a conduit passageway 242. The conduit 240 is supported by the container 230 such that the conduit passageway 242 defines a conduit inlet 244 arranged within the chamber 232 and a conduit outlet or outlet opening 246 arranged outside of the chamber 232. The example conduit 240 is formed by an inlet tube 250, a valve housing 252, and an actuator member 254. The conduit passageway 242 extends through the inlet tube 250, the valve housing 252, the actuator member 254, and the outlet member 256. The valve housing 252 is arranged between the conduit inlet 244 and the actuator member 254, and the actuator member 254 is arranged between the valve housing 252 and the conduit outlet 246. The outlet member 256 is supported by the actuator member 254 to define the conduit outlet 246. A grip assembly 258 is supported by the container assembly 230, and the grip assembly 258 in turn supports the actuator member 254 for movement relative to the container assembly 230.

[00140] Arranged within the valve housing 252 is a valve assembly 260. The example valve assembly 260 comprises a valve member 262, a valve seat 264, and a valve spring 266. The valve assembly 260 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 266 forces the valve member 262 against the valve seat 264 such that the valve assembly 260 substantially prevents flow of fluid along the conduit passageway 242. In the open configuration, the valve member 262 is displaced away from the valve seat 264 against the force of the valve spring 266 such that the valve assembly 260 allows flow of fluid along the conduit passageway 242 between the valve member 262 and the valve seat 264. Because the valve spring 266 biases the valve member 262 towards the valve seat 264, the example valve assembly 260 is normally closed. The valve assembly 260 engages the actuator member structure 254 such that the application of deliberate manual force on the actuator member 254 towards the container 230

moves the valve member 262 away from the valve seat 264 and thus places the valve system 260 in the open configuration.

[00141] A first flow adjustment system 270 comprising a first adjustment member 272 is arranged selectively to limit movement of the actuator member 254 relative to the container assembly 230. In particular, the first adjustment member 272 is a plate or disc defining an upper surface 274 and a plate axis A_P, and, optionally, comprises at least one stop surface 276. The at least one example stop surface 276 is arranged in an arcuate segment on the upper surface 274 and define a stop radius R_S relative to the plate axis A_P. In the example first adjustment member 272, two pairs of stop surfaces 276a and 276b are formed in opposing locations relative to the plate axis A_P.

[00142] The example flow adjustment system 270 further comprises at least one engaging surface 278 formed on the actuator member 254. The example actuator member 254 defines an actuator axis A_A, and the at least one engaging surface 278 is arranged in an arcuate segment on the lower edge of the actuator member 254 and defines an actuator radius R_A relative to the actuator axis A_A. The actuator radius R_A and the stop radius R_S are substantially the same in the example flow adjustment system 270.

[00143] In general, the actuator member 254 is arranged relative to the first adjustment member 272 such that rotation of the first adjustment member 272 relative to the grip assembly 258 alters an angular position of the at least one stop surface 276 relative to the at least one engaging surface 278 of actuator member 254. The angular relationship of the at least one stop surface 274 relative to the at least one engaging surface 278 determines an amount of travel of the actuator member 254 relative to the container assembly 230 and the valve system 260 supported thereby.

[00144] In particular, with the first adjustment member 272 in a first angular position relative to the actuator member 254 as shown in Figures 15A and 15B,

the actuator member 254 travels a first distance relative to the valve assembly 260. With the first adjustment member 272 in a second angular position as shown in Figures 16A and 16B, the actuator member 254 travels a second distance relative to the valve assembly 260. With the first adjustment member 272 in a third angular position as shown in Figures 17A and 17B, the actuator member 254 travels a second distance relative to the valve assembly 260. The third distance is longer than the second distance and the second distance is longer than the first distance, as can be seen by a close inspection of Figures 15B, 16B, and 17B. Travel of the actuator member 254 determines the size of the opening defined by the valve system 260. The example valve system 260, in cooperation with the first adjustment system 270, thus allows the size of the restriction in the conduit passageway 242 formed by the valve system to be varied depending upon the angular position of the first adjustment member 272.

[00145] Further, the first adjustment member 272 may configurable in any one of a plurality or continuum of angular positions by using slanted stop and engaging surfaces rather than the arrangement of stop surfaces 276 and engaging surfaces 278 of the example first adjustment system 260. The first adjustment system 270 thus allows the user to obtain a range of restrictions in the conduit passageway as necessary for a particular desired texture pattern.

[00146] A second flow adjustment system 280 having a second adjustment member 282 is arranged in the conduit passageway 242 to form at least a portion of the conduit outlet or outlet opening 246. In particular, the second adjustment member 282 of the example second flow adjustment system 280 takes the form of at least one adjustment straw or tube (Figure 7). Each second adjustment member 282 defines an outlet orifice 284. The example second flow adjustment system 280 comprises three second adjustment members 282a, 282b, and 282c defining outlet orifices 284a, 284b, and 284c, respectively. Each of the outlet orifices 284a, 284b, and 284c defines a different cross-sectional area.

[00147] A selected one of the second adjustment members 282a, 282b, and 284c is detachably attached to the actuator member 254 such that the outlet orifice 284a, 284b, or 284c associated with the selected second adjustment member 282a, 282b, or 282c is aligned with the conduit outlet 246. Accordingly, any selected one of the outlet orifices 284a, 284b, and 284c may be selected and arranged to define a cross-sectional area of the outlet opening defined by the conduit outlet 246.

[00148] Manual operation of the first adjustment member 272 affects the flow of fluid material along the conduit passageway 242 upstream of the second adjustment system 280. In particular, the first adjustment system 270 functions as a flow restrictor, where operation of the first adjustment member 272 variably reduces the size of the conduit passageway 242 such that a pressure of the fluid material upstream of the first flow adjustment system 270 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 270 (towards the second adjustment system 280).

[00149] The second adjustment system 280 is supported by the actuator member 254 downstream of the first adjustment system 270. The selected one of the outlet orifices 284a, 284b, and 284c thereby affects the flow of fluid material flowing out of the conduit passageway 242. The second adjustment system 280 thus functions as a variable orifice system. Operation of the second adjustment member 272 variably reduces the size of the conduit outlet or outlet opening 246 relative to the size of the conduit passageway 242 upstream of the second adjustment system 280.

[00150] The actuator member 254, the first adjustment member 272, and the selected one of the second adjustment members 282 supported to define a control system 290. Figure 7 further shows that the grip assembly 258 comprises a grip housing 292. Additionally, the grip assembly 258 is combined with the control system 290 to form the actuator assembly 238, and the actuator

assembly 238 is supported by the container assembly 230 as generally described above.

[00151] In the example actuator assembly 238, grip housing 292 defines a cylindrical interior surface 292a and the actuator member 254 defines a cylindrical outer surface 254a. The outer surface 254a is sized and dimensioned to allow the actuator member 254 to fit within a grip chamber defined by the interior surface 292a such that the grip housing 292 supports the actuator member 254 for substantially linear movement along a container axis A_C defined by the container assembly 230.

[00152] Accordingly, to operate the second example aerosol dispensing system 220, the container 230 and grip housing 292 are grasped such that the user's fingers can depress an upper surface of the actuator member 254, thereby allowing the actuator member 254 to be depressed.

[00153] Further, Figures 11-14 illustrate a locator system 294 that may be used to locate the first adjustment member 272 in the plurality of angular positions represented by Figures 15A and 15B, 16A and 16B, and 17A and 17B. In particular, the example lock system 294 comprises at least one locator recess 296 formed on the first adjustment member 172 and at least one locator projection 298 formed on the grip housing 292. In particular, the grip housing 292 defines a housing slot 292b through which a grip portion 272a of the first adjustment member 272 extends. By pushing on the grip portion 272a, the first adjustment member 272 may be rotated through the plurality of angular positions. The locator recess(es) 296 receives a locator projection 298 to positively hold the first adjustment member 272 in one of the plurality of angular positions. The shapes, locations, and relative positions of the locator recess(es) 296 and the locator projection(s) 298 may be altered. One locator recess 296 and three locator projections 298a, 298b, and 298c are employed by the example locator system 294.

[00154] In use, the conduit outlet or outlet opening 246 is initially aimed at a test surface and the actuator member 254 is depressed to place the valve assembly 260 in the open configuration to allow the pressurized material 236 to force some of the stored material 234 out of the container 230 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 222.

[00155] The process of spraying a test pattern and adjusting the first and second adjustment members 272 and 282 is repeated until the test pattern formed by the dispensed material 222 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00156] Leaving the first and second adjustment members 272 and 282 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 220 is then arranged such that the conduit outlet or outlet opening 246 is aimed at the un-textured portion of the target surface. The actuator member 254 is again depressed to place the valve assembly 260 in the open configuration such that the pressurized material 236 forces the stored material 234 out of the container 230 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00157] The following Table C represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 270:

Table C

Config.	Units	Example	First Range	Second Range
First Angular Position	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Second Angular Position.	% Passageway	60	55-65	40-70
	Square Inches	.00230	0.00253-0.00207	0.00345-0.00115
Third Angular Position	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

C. Fourth Example Aerosol Dispensing System

[00158] Referring now to Figures 18-22 of the drawing, depicted at 320 therein is a fourth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20, the fourth example dispensing system 320 is adapted to spray droplets of dispensed material 322 onto a target surface (not shown). In the example use of the dispensing system 320 depicted in Figures 18-22, the dispensed material 322 is or contains texture material, and the dispensing system 320 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00159] Figure 18 illustrates that the example dispensing system 320 comprises a container 330 defining a chamber 332 in which stored material 334 and pressurized material 336 are contained. Like the stored material 34 described above, the stored material 334 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 338 is mounted on the container assembly 330 to facilitate the dispensing of the dispensed material 322 as will be described in further detail below.

[00160] Figure 19 illustrates that the second example aerosol dispensing system 320 comprises a conduit 340 defining a conduit passageway 342. The conduit 340 is supported by the container 330 such that the conduit passageway 342 defines a conduit inlet 344 arranged within the chamber 332 and a conduit outlet or outlet opening 346 arranged outside of the chamber 332. The example conduit 340 is formed by an inlet tube 350, a valve housing 352, an actuator member 354, and an outlet member 356. The conduit passageway 342 extends through the inlet tube 350, the valve housing 352, the actuator member 354, and the outlet member 356. The valve housing 352 is arranged between the conduit inlet 344 and the actuator member 354, and the actuator member 354 is arranged between the valve housing 352 and the conduit outlet 346. The outlet member 356 is supported by the actuator member 354 to define the conduit outlet 346. A grip assembly 358 is supported by the container assembly 330, and the grip assembly 358 in turn supports the actuator member 354 for movement relative to the container assembly 330.

[00161] Arranged within the valve housing 352 is a valve assembly 360. The example valve assembly 360 comprises a valve member 362, a valve seat 364, and a valve spring 366. The valve assembly 360 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 366 forces the valve member 362 against the valve seat 364 such that the valve assembly 360 substantially prevents flow of fluid along the conduit

passageway 342. In the open configuration, the valve member 362 is displaced away from the valve seat 364 against the force of the valve spring 366 such that the valve assembly 360 allows flow of fluid along the conduit passageway 342 between the valve member 362 and the valve seat 364. Because the valve spring 366 biases the valve member 362 towards the valve seat 364, the example valve assembly 360 is normally closed. The valve assembly 360 engages the actuator member structure 354 such that the application of deliberate manual force on the actuator member 354 towards the container 330 moves the valve member 362 away from the valve seat 364 and thus places the valve system 360 in the open configuration.

[00162] A first flow adjustment system 370 comprising a first adjustment member 372 is arranged selectively to limit movement of the actuator member 354 relative to the container assembly 330. In particular, the first adjustment member defines an adjustment axis A_A and a stop surface 374.

[00163] Rotation of the first adjustment member 372 about the adjustment axis A_A relative to the grip assembly 358 thus alters a position of the stop surface 374 relative to the actuator member 354. In particular, the first adjustment member 372 defines an externally threaded surface 376 adapted to engage a similar internally threaded surface defined by the grip assembly 358. Rotating the first adjustment member 372 displaces the first adjustment member 372 towards and away from the actuator member 354 between a fully open position and a terminal position. In a first position as shown in Figures 19 and 20, the actuator member 354 travels a first distance relative to the valve assembly 360. With the first adjustment member 372 in a second position as shown in Figures 21 and 22, the actuator member 354 travels a second distance relative to the valve assembly 360. The first distance is longer than the second distance as can be seen by a close inspection of Figures 20 and 22, so the valve system 360, in cooperation with the first adjustment system 370, thus forms a smaller restriction in the

conduit passageway 342 when the first adjustment member 372 is in the first position than when the first adjustment member 372 is in the second position.

[00164] Further, the first adjustment member 372 is configurable in any one of a plurality or continuum of positions between the first and second positions shown. The first adjustment system 370 thus allows the user to obtain a range of restrictions in the conduit passageway as necessary for a particular desired texture pattern.

[00165] A second flow adjustment system 380 having a second adjustment member 382 is arranged in the conduit passageway 342 to form at least a portion of the conduit outlet or outlet opening 346. In particular, the second adjustment system 380 comprises, in addition, a plurality of fingers 384 extending from the actuator member 354 and an externally threaded surface 386 formed on the actuator member 354. The second adjustment member 382 defines an internally threaded surface 382a that is adapted to engage the externally threaded surface 386 such that rotation of the second adjustment member 382 about an axis of rotation A_R displaces the adjustment member in both directions along the axis of rotation A_R. As the second adjustment member 382 is displaced along the axis of rotation A_R, the second adjustment member 382 engages the fingers 284 to deform the outlet member 356. Deformation of the outlet member 356 alters a cross-sectional area of the conduit outlet or outlet opening 346. Accordingly, rotation of the second adjustment member 382 relative to the actuator member 354 allows any the cross-sectional area of the outlet opening defined by the conduit outlet 346 to be made larger and/or smaller within a predetermined range of cross-sectional areas.

[00166] Manual operation of the first adjustment member 372 affects the flow of fluid material along the conduit passageway 342 upstream of the second adjustment system 380. In particular, the first adjustment system 370 functions as a flow restrictor, where operation of the first adjustment member 372 variably reduces the size of the conduit passageway 342 such that a pressure of the fluid

material upstream of the first flow adjustment system 370 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 370 (towards the second adjustment system 380).

[00167] The second adjustment system 380 is supported by the actuator member 354 downstream of the first adjustment system 370. Adjustment of the first adjustment system 370 (e.g., selecting one of the adjustment openings 384a, 384b, and 384c) thereby affects the flow of fluid material flowing out of the conduit passageway 342. The second adjustment system 380 thus functions as a variable orifice system. Operation of the second adjustment member 372 variably reduces the size of the conduit outlet or outlet opening 346 relative to the size of the conduit passageway 342 upstream of the second adjustment system 380.

[00168] The first adjustment member 372 and second adjustment member 382 are supported as described above to define a control system 390. Figure 19 further shows that the grip assembly 358 comprises a grip housing 392 and that the actuator member 354 defines a trigger portion 394. Additionally, the grip assembly 358 is combined with the control system 390 to form the actuator assembly 338, and the actuator assembly 338 is supported by the container assembly 330 as generally described above. In the example actuator assembly 338, the actuator assembly 338 is pivotably connected to the grip housing 392. Accordingly, to operate the second example aerosol dispensing system 320, the container 330 and grip housing 392 are grasped such that the user's fingers can squeeze the trigger portion 394, thereby allowing the actuator member 354 to be depressed.

[00169] In use, the conduit outlet or outlet opening 346 is initially aimed at a test surface and the actuator member 354 is depressed to place the valve assembly 360 in the open configuration such that the pressurized material 336 forces some of the stored material 334 out of the container 330 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the

pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 322.

[00170] The process of spraying a test pattern and adjusting the first and second adjustment members 372 and 382 is repeated until the test pattern formed by the dispensed material 322 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00171] Leaving the first and second adjustment members 372 and 382 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 320 is then arranged such that the conduit outlet or outlet opening 346 is aimed at the un-textured portion of the target surface. The trigger member 394 is again squeezed to place the valve assembly 360 in the open configuration such that the pressurized material 336 forces the stored material 334 out of the container 330 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00172] The following Table D represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 370:

Table D

Config.	Units	Example	First Range	Second Range
Fully Open Position	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal Position	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

II. Second Example Class of Aerosol Dispensing Systems

[00173] Referring now to Figure 23 of the drawing, depicted at 20b therein is a fifth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. The fifth example dispensing system is adapted to spray droplets of dispensed material 22b onto a target surface 24b. The example target surface 24b has a textured portion 26b and an un-textured portion 28b. Accordingly, in the example use of the dispensing system 20b depicted in Figure 23, the dispensed material 22b is or contains texture material, and the dispensing system 20b is being used to form a coating on the un-textured portion 28b having a desired texture pattern that substantially matches a pre-existing texture pattern of the textured portion 26b.

[00174] Figure 23 further illustrates that the example dispensing system 20b comprises a container 30b defining a chamber 32b in which stored material 34b and pressurized material 36b are contained. The stored material 34b is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase.

[00175] A typical texture material forming a part of the dispensed material 22b and/or stored material 34b will comprise a base or carrier, a binder, a filler, and, optionally, one or more additives such as surfactants, biocides and thickeners. Examples of the base or carrier include water, solvent (oil-based texture material)

such as xylene, toluene, acetone, methyl ethyl ketone, and combinations of water and water soluble solvents. Examples of binders include starch, polyvinyl alcohol and latex resins (water-based systems) and a wide variety of polymers such as ethylene vinyl acetate, thermoplastic acrylics, styrenated alkyds, etc. (solvent-based systems.). Examples of fillers include calcium carbonate, titanium dioxide, attapulgite clay, talc, magnesium aluminum silicate, etc.

[00176] The stored material 34b will also comprise a liquid phase propellant material, and the pressurized material will typically comprise a gas phase propellant material. The following propellant materials are appropriate for use as the propellant material forming the stored material 34b and the pressurized material 36b: dimethyl ether, propane, butane, isobutene, difluoroethane, and tetrafluoroethane.

[00177] The following Tables E-1, E-2, and E-3 contain example formulations of the texture material that may be used to form the dispensed material 22b and stored material 34b of the second example aerosol dispensing 20b:

TABLE E-1 (Solvent Based)

Material	Purpose	First Example	Second Example	Third Example
Solvent	Base	35%	30 - 40%	20 - 60%
Pigment	Filler	60%	55 – 65%	40 – 80%
Resin	Binder	2.5%	1 – 5%	0.5 – 15%

[00178] To the example texture material described in Table E-1 is added 10-20% by weight of propellant material in the form of a propane/butane/isobutane blend.

TABLE E-2 (Knockdown)

Material	Purpose	First Example	Second Example	Third Example
Water	Base	48%	45 – 55%	40 – 60%
Pigment	Filler	50%	45 – 55%	40 – 60%
Resin	Binder	2%	1 - 5%	0.5 - 10%

[00179] To the example texture material described in Table E-2 is added 7-15% by weight of propellant material in the form of DME.

TABLE E-3 (No Prime)

Material	Purpose	First Example	Second Example	Third Example
Water	Base	42%	40 – 50%	30 – 60%
Pigment	Filler	47%	40 – 50%	30 – 60%
Resin	Binder	10%	5 – 15%	2.5 – 20%

[00180] To the example texture material described in Table E-3 is added 10 - 15% by weight of propellant material in the form of DME.

[00181] Figure 23 further illustrates that the first example aerosol dispensing system 20b comprises a conduit 40b defining a conduit passageway 42b. The conduit 40b is supported by the container 30b such that the conduit passageway 42b defines a conduit inlet 44b arranged within the chamber 32b and a conduit outlet 46b arranged outside of the chamber 32b. The conduit outlet 46b may

alternatively be referred to herein as an outlet opening 46b. The example conduit 40b is formed by an inlet tube 50b, a valve housing 52b, and an actuator structure 54b. The conduit passageway 42b extends through the inlet tube 50b, the valve housing 52b, and the actuator structure 54b such that the valve housing 52b is arranged between the conduit inlet 44b and the actuator structure 54b and the actuator structure 54b is arranged between the valve housing 52b and the conduit outlet 46b.

[00182] Arranged within the valve housing 52b is a valve system 60b. A first flow adjustment system 70b having a first adjustment member 72b is arranged to interface with the valve system 60b. A second flow adjustment system 80b having a second adjustment member 82b is arranged in the conduit passageway 42b to form at least a portion of the conduit outlet 46b.

[00183] The valve system 60b operates in a closed configuration, a fully open configuration, and at least one of a continuum or plurality of partially open intermediate configurations. In the closed configuration, the valve system 60b substantially prevents flow of fluid along the conduit passageway 42b. In the open configuration and the at least one intermediate configuration, the valve system 60b allows flow of fluid along the conduit passageway 42b. The valve system 60b is normally in the closed configuration. The valve system 60b engages the actuator member structure 54b and is placed into the open configuration by applying deliberate manual force on the actuator structure 54b towards the container 30b.

[00184] The first flow adjustment system 70b is supported by the container 30b to engage the actuator structure such that manual operation of the first adjustment member 72b controls the flow of fluid material along the conduit passageway 42b. In particular, the first adjustment system 70b functions as a flow restrictor, where operation of the first adjustment member 72b results in a variation in the size of a portion of the conduit passageway 42b such that a pressure of the fluid material upstream of the first flow adjustment system 70b is

relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 70b.

[00185] In general, a primary purpose of the first flow adjustment system 70b is to alter a distance of travel of the dispensed material 22b. The first flow adjustment system 70b may also have a secondary affect on the pattern in which the dispensed material 22b is sprayed.

[00186] The second adjustment system 80b is supported by the actuator structure 54b downstream of the first adjustment system 70b. Manual operation of the second adjustment member 82b affects the flow of fluid material flowing out of the conduit passageway 42b through the conduit outlet 46b. In particular, the second adjustment system 80b functions as a variable orifice, where operation of the second adjustment member 72b variably reduces the size of the conduit outlet 46b relative to the size of the conduit passageway 42b upstream of the second adjustment system 80b.

[00187] A primary purpose of the second flow adjustment system 80b is to alter a pattern in which the dispensed material 22b is sprayed. The first flow adjustment system 70b may also have a secondary affect on the distance of travel of the dispensed material 22b.

[00188] To operate the fifth example aerosol dispensing system 20b (of the second example class of dispensing systems), the container 30b is grasped such that the finger can depress the actuator structure 54b. The conduit outlet or outlet opening 46b is initially aimed at a test surface and the actuator structure 54b is depressed to place the valve system 60b in the open configuration such that the pressurized material 36b forces some of the stored material 34b out of the container 30b and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion 26b of the target surface 24b. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second

adjustment systems 70b and 80b are adjusted to alter the spray pattern of the droplets of dispensed material 22b.

[00189] The process of spraying a test pattern and comparing it to the pre-existing pattern and adjusting the first and second adjustment members 72b and 82b is repeated until the dispensed material forms a desired texture pattern that substantially matches the pre-existing texture pattern.

[00190] Leaving the first and second adjustment systems 70b and 80b as they were when the test texture pattern matched the pre-existing texture pattern, the aerosol dispensing system 20b is then arranged such that the conduit outlet or outlet opening 46b is aimed at the un-textured portion 28b of the target surface 24b. The actuator structure 54b is again depressed to operate the valve system 60b such that the pressurized material 36b forces the stored material 34b out of the container 30b and onto the un-textured portion 28b of the target surface to form the desired texture pattern.

A. Sixth Example Aerosol Dispensing System

[00191] Referring now to Figures 24-27 of the drawing, depicted at 420 therein is a sixth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the fifth example aerosol dispensing system 20b, the sixth example dispensing system is adapted to spray droplets of dispensed material 422 onto a target surface (not shown). In the example use of the dispensing system 420 depicted in Figure 24, the dispensed material 422 is or contains texture material, and the dispensing system 420 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00192] Figure 24 further illustrates that the example dispensing system 420 comprises a container 430 defining a chamber 432 in which stored material 434

and pressurized material 436 are contained. Like the stored materials (e.g., stored materials 34a and 34b) described above, the stored material 434 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 438 is mounted on the container assembly 430 to facilitate the dispensing of the dispensed material 422 as will be described in further detail below.

[00193] Figure 25 illustrates that the sixth example aerosol dispensing system 420 comprises a conduit 440 defining a conduit passageway 442. The conduit 440 is supported by the container 430 such that the conduit passageway 442 defines a conduit inlet 444 arranged within the chamber 432 and a conduit outlet or outlet opening 446 arranged outside of the chamber 432. The example conduit 440 is formed by an inlet tube 450, a valve housing 452, an actuator member 454, and an outlet member 456. The conduit passageway 442 extends through the inlet tube 450, the valve housing 452, the actuator member 454, and the outlet member 456. The valve housing 452 is arranged between the conduit inlet 444 and the actuator member 454, and the actuator member 454 is arranged between the valve housing 452 and the conduit outlet 446. The outlet member 456 is supported by the actuator member 454 to define the conduit outlet 446.

[00194] Figure 25 further shows that a valve assembly 460 is formed within the valve housing 452. The example valve assembly 460 comprises a valve member 462, a valve seat 464, and a valve spring 466. The valve assembly 460 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 466 forces the valve member 462 against the valve seat 464 such that the valve assembly 460 substantially prevents flow of fluid along the conduit passageway 442. In the open configuration, the valve member 462 is displaced away from the valve seat 464 against the force of the valve spring 466 such that the valve assembly 460 allows flow of fluid along the conduit passageway 442 between the valve member 462 and the valve seat 464.

Because the valve spring 466 biases the valve member 462 towards the valve seat 464, the example valve assembly 460 is normally closed. As will be described in further detail below, the valve assembly 460 engages the actuator member structure 454 such that the application of deliberate manual force on the actuator member 454 towards the container 430 moves the valve member 462 away from the valve seat 464 and thus places the valve system 460 in the open configuration.

[00195] A first flow adjustment system 470 having a first adjustment member 472 having a valve surface 474 and an externally threaded surface 476 is arranged to intersect the conduit passageway 442 at an intermediate location 442a between the valve assembly 460 and the conduit outlet 446. The conduit passageway has a first portion 442b and a second portion 442c. The first passageway portion 442b defines an actuator axis A_A aligned with a container axis A_C defined by the container assembly 430, and the second actuator passageway portion is aligned with an outlet axis A_O defined by the outlet member 456. The example intermediate location 442a is located in the second passageway portion 442c.

[00196] An internally threaded surface 478 is formed in the actuator member 454. The threaded surfaces 476 and 478 are adapted to engage each other such that rotation of the first adjustment member 472 relative to the actuator member 454 causes the valve surface 474 to enter the conduit passageway and thus alter a cross-sectional area of the conduit passageway 442 between the valve system 460 and the second flow adjustment system 480.

[00197] A second flow adjustment system 480 comprises a second adjustment member 482 and a plurality of fingers 484 extending from the actuator member 454. The second flow adjustment system 480 is arranged relative to the conduit passageway 442 to form at least a portion of the conduit outlet (or outlet opening) 446. The second adjustment member 482 defines an internal threaded surface 486 that engages an external threaded surface 488 of the actuator member 454

such that rotation of the second adjustment member 482 relative to the actuator member 454 deforms the fingers and thus the outlet member 456, thereby altering a cross-sectional area of the conduit outlet or outlet opening 446.

[00198] The first flow adjustment system 470 is supported by the actuator member 454 between the valve assembly 460 and the second adjustment system 480 such that manual operation of the first adjustment member 472 affects the flow of fluid material along the conduit passageway 442. In particular, the second adjustment system 480 functions as a flow restrictor, where operation of the first adjustment member 472 variably reduces the size of the conduit passageway 442 such that a pressure of the fluid material upstream of the first flow adjustment system 470 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 470. The example first adjustment member 472 is movable between a fully open configuration (smallest amount of restriction) and a terminal configuration (largest amount of restriction).

[00199] The second adjustment system 480 is supported by the actuator member 454 downstream of the first adjustment system 470. The outlet member 456 is a resiliently deformable tube, and manual operation of the second adjustment member 482 deforms the walls of the outlet member 456 and thereby affects the flow of fluid material flowing out of the conduit passageway 442 through the conduit outlet or outlet opening 446. The second adjustment system 480 thus functions as a variable orifice. Operation of the second adjustment member 482 variably reduces the size of the conduit outlet or outlet opening 446 relative to the size of the conduit passageway 442 upstream of the second adjustment system 480.

[00200] The outlet member 456, first adjustment member 472, and second adjustment member 482 are supported by the actuator member 454 to define a control assembly 490. Figure 25 further shows that the grip assembly 458 comprises a grip housing 492 and that the actuator member 454 defines a trigger portion 494. To form the actuator assembly 438, the grip assembly 458 is

combined with the control assembly 490 by pivotably attaching the actuator member 454 to the grip housing 492. The actuator assembly 438 is supported by the container assembly 430 as generally described above. An elongated slot 496 is formed in the grip housing 492 to allow the second adjustment member 482 to extend through the grip housing 492 without interfering with operation of the actuator member 454 as described herein.

[00201] To operate the sixth example aerosol dispensing system 420, the container 430 and grip housing 492 are grasped such that the user's fingers can squeeze the trigger portion 494, thereby depressing the actuator member 454. The conduit outlet or outlet opening 446 is initially aimed at a test surface and the actuator member 454 is depressed to place the valve assembly 460 in the open configuration such that the pressurized material 436 forces some of the stored material 434 out of the container 430 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 422.

[00202] The process of spraying a test pattern and adjusting the first and second adjustment members 472 and 482 is repeated until the test pattern formed by the dispensed material 422 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00203] Leaving the first and second adjustment members 472 and 482 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 420 is then arranged such that the conduit outlet or outlet opening 446 is aimed at the un-textured portion of the target surface. The trigger member 494 is again squeezed to place the valve assembly 460 in the open configuration such that the pressurized material 436 forces the stored material 434 out of the container 430 and onto the un-textured portion of the

target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material.

[00204] The following Table F represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 470:

Table F

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

B. Seventh Example Aerosol Dispensing System

[00205] Referring now to Figures 28-31 of the drawing, depicted at 520 therein is a seventh example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the fifth example aerosol dispensing system 20b, the seventh example dispensing system is adapted to spray droplets of dispensed material 522 onto a target surface (not shown). In the example use of the dispensing system 520 depicted in Figure 28, the dispensed material 522 is or contains texture material, and the dispensing system 520 is being used to form a coating on an un-textured portion of the

target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00206] Figure 28 further illustrates that the example dispensing system 520 comprises a container 530 defining a chamber 532 in which stored material 534 and pressurized material 536 are contained. Like the stored materials (e.g. 34a and 34b) described above, the stored material 534 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 538 is mounted on the container assembly 530 to facilitate the dispensing of the dispensed material 522 as will be described in further detail below.

[00207] Figure 29 illustrates that the seventh example aerosol dispensing system 520 comprises a conduit 540 defining a conduit passageway 542. The conduit 540 is supported by the container 530 such that the conduit passageway 542 defines a conduit inlet 544 arranged within the chamber 532 and a conduit outlet or outlet opening 546 arranged outside of the chamber 532. The example conduit 540 is formed by an inlet tube 550, a valve housing 552, an actuator member 554, and an outlet member 556. The conduit passageway 542 extends through the inlet tube 550, the valve housing 552, the actuator member 554, and the outlet member 556. The valve housing 552 is arranged between the conduit inlet 544 and the actuator member 554, and the actuator member 554 is arranged between the valve housing 552 and the conduit outlet 546. The outlet member 556 is supported by the actuator member 554 to define the conduit outlet 546.

[00208] Figure 29 further shows that a valve assembly 560 is formed within the valve housing 552. The example valve assembly 560 comprises a valve member 562, a valve seat 564, and a valve spring 566. The valve assembly 560 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 566 forces the valve member 562 against the valve seat 564 such that the valve assembly 560 substantially prevents flow of fluid along the

conduit passageway 542. In the open configuration, the valve member 562 is displaced away from the valve seat 564 against the force of the valve spring 566 such that the valve assembly 560 allows flow of fluid along the conduit passageway 542 between the valve member 562 and the valve seat 564. Because the valve spring 566 biases the valve member 562 towards the valve seat 564, the example valve assembly 560 is normally closed. As will be described in further detail below, the valve assembly 560 engages the actuator member structure 554 such that the application of deliberate manual force on the actuator member 554 towards the container 530 moves the valve member 562 away from the valve seat 564 and thus places the valve system 560 in the open configuration.

[00209] A first flow adjustment system 570 having a first adjustment member 572 having a valve surface 574 and an externally threaded surface 576 is arranged to intersect the conduit passageway 542 at an intermediate location 542a between the valve assembly 560 and the conduit outlet 546. The conduit passageway has a first portion 542b and a second portion 542c. The first passageway portion 542b defines an actuator axis A_A aligned with a container axis A_C defined by the container assembly 530, and the second actuator passageway portion 542c is aligned with an outlet axis A_O defined by the outlet member 556. The example intermediate location 542a is located in the first passageway portion 542b.

[00210] An internally threaded surface 578 is formed in the actuator member 554. The threaded surfaces 576 and 578 are adapted to engage each other such that rotation of the first adjustment member 572 relative to the actuator member 554 causes the valve surface 574 to enter the conduit passageway 542 and thus alter a cross-sectional area of the conduit passageway 542 between the valve system 560 and the second flow adjustment system 580.

[00211] A second flow adjustment system 580 comprises a second adjustment member 582 and a plurality of fingers 584 extending from the actuator member

554. The second flow adjustment system 580 is arranged relative to the conduit passageway 542 to form at least a portion of the conduit outlet (or outlet opening) 546. The second adjustment member 582 defines an internal threaded surface 586 that engages an external threaded surface 588 of the actuator member 554 such that rotation of the second adjustment member 582 relative to the actuator member 554 deforms the fingers and thus the outlet member 556, thereby altering a cross-sectional area of the conduit outlet or outlet opening 546.

[00212] The first flow adjustment system 570 is supported by the actuator member 554 between the valve assembly 560 and the second adjustment system 580 such that manual operation of the first adjustment member 572 affects the flow of fluid material along the conduit passageway 542 as generally described above. In particular, the second adjustment system 580 functions as a flow restrictor, where operation of the first adjustment member 572 variably reduces the size of the conduit passageway 542 such that a pressure of the fluid material upstream of the first flow adjustment system 570 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 570. The least amount of restriction created by the first flow adjustment system 570 is associated with a fully open configuration, while the least amount of restriction created by the first flow adjustment system 570 is associated with a terminal configuration.

[00213] The second adjustment system 580 is supported by the actuator member 554 downstream of the first adjustment system 570. The outlet member 556 is a resiliently deformable tube, and manual operation of the second adjustment member 582 deforms the walls of the outlet member 556 and thereby affects the flow of fluid material flowing out of the conduit passageway 542 through the conduit outlet or outlet opening 546. The second adjustment system 580 thus functions as a variable orifice. Operation of the second adjustment member 582 variably reduces the size of the conduit outlet or outlet opening 546

relative to the size of the conduit passageway 542 upstream of the second adjustment system 580.

[00214] The outlet member 556, first adjustment member 572, and second adjustment member 582 are supported by the actuator member 554 to define a control assembly 590. Figure 27 further shows that the grip assembly 558 comprises a grip housing 592 and that the actuator member 554 defines a trigger portion 594. To form the actuator assembly 538, the grip assembly 558 is combined with the control assembly 590 by pivotably attaching the actuator member 554 to the grip housing 592. The actuator assembly 538 is supported by the container assembly 530 as generally described above. An elongated slot 596 is formed in the grip housing 592 to allow the second adjustment member 582 to extend through the grip housing 592 without interfering with operation of the actuator member 554 as described herein.

[00215] To operate the seventh example aerosol dispensing system 520, the container 530 and grip housing 592 are grasped such that the user's fingers can squeeze the trigger portion 594, thereby depressing the actuator member 554. The conduit outlet or outlet opening 546 is initially aimed at a test surface and the actuator member 554 is depressed to place the valve assembly 560 in the open configuration such that the pressurized material 536 forces some of the stored material 534 out of the container 530 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 522.

[00216] The process of spraying a test pattern and adjusting the first and second adjustment members 572 and 582 is repeated until the test pattern formed by the dispensed material 522 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00217] Leaving the first and second adjustment members 572 and 582 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 520 is then arranged such that the conduit outlet or outlet opening 546 is aimed at the un-textured portion of the target surface. The trigger member 594 is again squeezed to place the valve assembly 560 in the open configuration such that the pressurized material 536 forces the stored material 534 out of the container 530 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material.

[00218] The following Table G represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 570:

Table G

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

C. Eighth Example Aerosol Dispensing System

[00219] Referring now to Figures 32-34 of the drawing, depicted at 620 therein is a eighth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the fifth example aerosol dispensing system 20b, the eighth example dispensing system is adapted to spray droplets of dispensed material 622 onto a target surface (not shown). In the example use of the dispensing system 620 depicted in Figure 32, the dispensed material 622 is or contains texture material, and the dispensing system 620 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00220] Figure 32 further illustrates that the example dispensing system 620 comprises a container 630 defining a chamber 632 in which stored material 634 and pressurized material 636 are contained. Like the stored materials (e.g., 34a and 34b) described above, the stored material 634 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 638 is mounted on the container assembly 630 to facilitate the dispensing of the dispensed material 622 as will be described in further detail below.

[00221] Figure 33 illustrates that the eighth example aerosol dispensing system 620 comprises a conduit 640 defining a conduit passageway 642. The conduit 640 is supported by the container 630 such that the conduit passageway 642 defines a conduit inlet 644 arranged within the chamber 632 and a conduit outlet or outlet opening 646 arranged outside of the chamber 632. The example conduit 640 is formed by an inlet tube 650, a valve housing 652, an actuator member 654, and an outlet member 656. The conduit passageway 642 extends through the inlet tube 650, the valve housing 652, the actuator member 654, and the outlet member 656. The valve housing 652 is arranged between the conduit inlet 644 and the actuator member 654, and the actuator member 654 is arranged between the valve housing 652 and the conduit outlet 646. The outlet

member 656 is supported by the actuator member 654 to define the conduit outlet 646.

[00222] Figure 33 further shows that a valve assembly 660 is formed within the valve housing 652. The example valve assembly 660 comprises a valve member 662, a valve seat 664, and a valve spring 666. The valve assembly 660 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 666 forces the valve member 662 against the valve seat 664 such that the valve assembly 660 substantially prevents flow of fluid along the conduit passageway 642. In the open configuration, the valve member 662 is displaced away from the valve seat 664 against the force of the valve spring 666 such that the valve assembly 660 allows flow of fluid along the conduit passageway 642 between the valve member 662 and the valve seat 664. Because the valve spring 666 biases the valve member 662 towards the valve seat 664, the example valve assembly 660 is normally closed. As will be described in further detail below, the valve assembly 660 engages the actuator member structure 654 such that the application of deliberate manual force on the actuator member 654 towards the container 630 moves the valve member 662 away from the valve seat 664 and thus places the valve system 660 in the open configuration.

[00223] A first flow adjustment system 670 having a first adjustment member 672 having a valve surface 674 and an externally threaded surface 676 is arranged to intersect the conduit passageway 642 at an intermediate location 642a between the valve assembly 660 and the conduit outlet 646. The conduit passageway has a first portion 642b and a second portion 642c. The first passageway portion 642b defines an actuator axis A_A aligned with a container axis A_C defined by the container assembly 630, and the second actuator passageway portion 642c is aligned with an outlet axis A_O defined by the outlet member 656. The example intermediate location 642a is located in the second passageway portion 642c.

[00224] An internally threaded surface 678 is formed in the actuator member 654. The threaded surfaces 676 and 678 are adapted to engage each other such that, as shown in Figure 34, rotation of the first adjustment member 672 relative to the actuator member 654 causes the valve surface 674 to engage and deform the outlet member 656 and thus alter a cross-sectional area of the conduit passageway 642 between the valve system 660 and the second flow adjustment system 680.

[00225] A second flow adjustment system 680 comprises a second adjustment member 682 and a plurality of fingers 684 extending from the actuator member 654. The second flow adjustment system 680 is arranged relative to the conduit passageway 642 to form at least a portion of the conduit outlet (or outlet opening) 646. The second adjustment member 682 defines an internal threaded surface 686 that engages an external threaded surface 688 of the actuator member 654 such that rotation of the second adjustment member 682 relative to the actuator member 654 deforms the fingers and thus the outlet member 656, thereby altering a cross-sectional area of the conduit outlet or outlet opening 646.

[00226] The first flow adjustment system 670 is supported by the actuator member 654 between the valve assembly 660 and the second adjustment system 680 such that manual operation of the first adjustment member 672 affects the flow of fluid material along the conduit passageway 642 as generally described above. In particular, the second adjustment system 680 functions as a flow restrictor, where operation of the first adjustment member 672 variably reduces the size of the conduit passageway 642 such that a pressure of the fluid material upstream of the first flow adjustment system 670 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 670. The first flow adjustment system 670 defines a fully open configuration (smallest restriction) and a terminal configuration (largest restriction).

[00227] The second adjustment system 680 is supported by the actuator member 654 downstream of the first adjustment system 670. The outlet member

656 is a resiliently deformable tube, and manual operation of the second adjustment member 682 deforms the walls of the outlet member 656 and thereby affects the flow of fluid material flowing out of the conduit passageway 642 through the conduit outlet or outlet opening 646. The second adjustment system 680 thus functions as a variable orifice. Operation of the second adjustment member 682 variably reduces the size of the conduit outlet or outlet opening 646 relative to the size of the conduit passageway 642 upstream of the second adjustment system 680.

[00228] The outlet member 656, first adjustment member 672, and second adjustment member 682 are supported by the actuator member 654 to define a control assembly 690. Figure 33 further shows that the grip assembly 658 comprises a grip housing 692 and that the actuator member 654 defines a trigger portion 694. To form the actuator assembly 638, the grip assembly 658 is combined with the control assembly 690 by pivotably attaching the actuator member 654 to the grip housing 692. The actuator assembly 638 is supported by the container assembly 630 as generally described above. An elongated slot 696 is formed in the grip housing 692 to allow the first adjustment member 672 to extend through the grip housing 692 without interfering with operation of the actuator member 654 as described herein.

[00229] To operate the eighth example aerosol dispensing system 620, the container 630 and grip housing 692 are grasped such that the user's fingers can squeeze the trigger portion 694, thereby depressing the actuator member 654. The conduit outlet or outlet opening 646 is initially aimed at a test surface and the actuator member 654 is depressed to place the valve assembly 660 in the open configuration such that the pressurized material 636 forces some of the stored material 634 out of the container 630 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first

and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 622.

[00230] The process of spraying a test pattern and adjusting the first and second adjustment members 672 and 682 is repeated until the test pattern formed by the dispensed material 622 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00231] Leaving the first and second adjustment members 672 and 682 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 620 is then arranged such that the conduit outlet or outlet opening 646 is aimed at the un-textured portion of the target surface. The trigger member 694 is again squeezed to place the valve assembly 660 in the open configuration such that the pressurized material 636 forces the stored material 634 out of the container 630 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material.

[00232] The following Table H represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 670:

Table H

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

D. Ninth Example Aerosol Dispensing System

[00233] Referring now to Figures 35-38 of the drawing, depicted at 720 therein is a ninth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the fifth example aerosol dispensing system 20b, the ninth example dispensing system is adapted to spray droplets of dispensed material 722 onto a target surface (not shown). In the example use of the dispensing system 720 depicted in Figure 35, the dispensed material 722 is or contains texture material, and the dispensing system 720 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00234] Figure 35 further illustrates that the example dispensing system 720 comprises a container 730 defining a chamber 732 in which stored material 734 and pressurized material 736 are contained. Like the stored materials (e.g., 34a and 34b) described above, the stored material 734 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 738 is mounted on the container assembly 730 to facilitate the dispensing of the dispensed material 722 as will be described in further detail below.

[00235] Figure 36 illustrates that the ninth example aerosol dispensing system 720 comprises a conduit 740 defining a conduit passageway 742. The conduit 740 is supported by the container 730 such that the conduit passageway 742 defines a conduit inlet 744 arranged within the chamber 732 and a conduit outlet or outlet opening 746 arranged outside of the chamber 732. The example conduit 740 is formed by an inlet tube 750, a valve housing 752, an actuator member 754, and an outlet member 756. The conduit passageway 742 extends through the inlet tube 750, the valve housing 752, the actuator member 754, and the outlet member 756. The valve housing 752 is arranged between the conduit inlet 744 and the actuator member 754, and the actuator member 754 is arranged between the valve housing 752 and the conduit outlet 746. The outlet member 756 is supported by the actuator member 754 to define the conduit outlet 746.

[00236] Figure 36 further shows that a valve assembly 760 is formed within the valve housing 752. The example valve assembly 760 comprises a valve member 762, a valve seat 764, and a valve spring 766. The valve assembly 760 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 766 forces the valve member 762 against the valve seat 764 such that the valve assembly 760 substantially prevents flow of fluid along the conduit passageway 742. In the open configuration, the valve member 762 is displaced away from the valve seat 764 against the force of the valve spring 766 such that the valve assembly 760 allows flow of fluid along the conduit passageway 742 between the valve member 762 and the valve seat 764. Because the valve spring 766 biases the valve member 762 towards the valve seat 764, the example valve assembly 760 is normally closed. As will be described in further detail below, the valve assembly 760 engages the actuator member structure 754 such that the application of deliberate manual force on the actuator member 754 towards the container 730 moves the valve member 762 away from the valve seat 764 and thus places the valve system 760 in the open configuration.

[00237] A first flow adjustment system 770 having a first adjustment member 772 having a valve surface 774 and an externally threaded surface 776 is arranged to intersect the conduit passageway 742 at an intermediate location 742a between the valve assembly 760 and the conduit outlet 746. The conduit passageway has a first portion 742b and a second portion 742c. The first passageway portion 742b defines an actuator axis A_A aligned with a container axis A_C defined by the container assembly 730, and the second actuator passageway portion 742c is aligned with an outlet axis A_O defined by the outlet member 756. The example intermediate location 742a is located at the juncture of the first and second passageway portions 742b and 742c. A juncture surface 742d having a profile that matches that of the valve surface 774 is arranged at the intermediate location 742a as perhaps best shown in Figure 37.

[00238] An internally threaded surface 778 is formed in the actuator member 754. The threaded surfaces 776 and 778 are adapted to engage each other such that, as shown in Figure 34, rotation of the first adjustment member 772 relative to the actuator member 754 causes the valve surface 774 move into the conduit passageway 742 and thus alter a cross-sectional area of the conduit passageway 742 between the valve system 760 and the second flow adjustment system 780.

[00239] A second flow adjustment system 780 comprises a second adjustment member 782 and a plurality of fingers 784 extending from the actuator member 754. The second flow adjustment system 780 is arranged relative to the conduit passageway 742 to form at least a portion of the conduit outlet (or outlet opening) 746. The second adjustment member 782 defines an internal threaded surface 786 that engages an external threaded surface 788 of the actuator member 754 such that rotation of the second adjustment member 782 relative to the actuator member 754 deforms the fingers and thus the outlet member 756, thereby altering a cross-sectional area of the conduit outlet or outlet opening 746.

[00240] The first flow adjustment system 770 is supported by the actuator member 754 between the valve assembly 760 and the second adjustment system 780 such that manual operation of the first adjustment member 772 affects the flow of fluid material along the conduit passageway 742 as generally described above. In particular, the second adjustment system 780 functions as a flow restrictor, where operation of the first adjustment member 772 variably reduces the size of the conduit passageway 742 such that a pressure of the fluid material upstream of the first flow adjustment system 770 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 770. The example first flow adjustment system 770 operates in a fully open configuration (least amount of flow restriction) and a terminal configuration (largest amount of flow restriction).

[00241] The second adjustment system 780 is supported by the actuator member 754 downstream of the first adjustment system 770. The outlet member 756 is a resiliently deformable tube, and manual operation of the second adjustment member 782 deforms the walls of the outlet member 756 and thereby affects the flow of fluid material flowing out of the conduit passageway 742 through the conduit outlet or outlet opening 746. The second adjustment system 780 thus functions as a variable orifice. Operation of the second adjustment member 782 variably reduces the size of the conduit outlet or outlet opening 746 relative to the size of the conduit passageway 742 upstream of the second adjustment system 780.

[00242] The outlet member 756, first adjustment member 772, and second adjustment member 782 are supported by the actuator member 754 to define a control assembly 790. Figure 36 further shows that the grip assembly 758 comprises a grip housing 792 and that the actuator member 754 defines a trigger portion 794. To form the actuator assembly 738, the grip assembly 758 is combined with the control assembly 790 by pivotably attaching the actuator member 754 to the grip housing 792. The actuator assembly 738 is supported

by the container assembly 730 as generally described above. An elongated slot 796 is formed in the grip housing 792 to allow the first adjustment member 772 to extend through the grip housing 792 without interfering with operation of the actuator member 754 as described herein.

[00243] To operate the ninth example aerosol dispensing system 720, the container 730 and grip housing 792 are grasped such that the user's fingers can squeeze the trigger portion 794, thereby depressing the actuator member 754. The conduit outlet or outlet opening 746 is initially aimed at a test surface and the actuator member 754 is depressed to place the valve assembly 760 in the open configuration such that the pressurized material 736 forces some of the stored material 734 out of the container 730 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 722.

[00244] The process of spraying a test pattern and adjusting the first and second adjustment members 772 and 782 is repeated until the test pattern formed by the dispensed material 722 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00245] Leaving the first and second adjustment members 772 and 782 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 720 is then arranged such that the conduit outlet or outlet opening 746 is aimed at the un-textured portion of the target surface. The trigger member 794 is again squeezed to place the valve assembly 760 in the open configuration such that the pressurized material 736 forces the stored material 734 out of the container 730 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target

surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material.

[00246] The following Table I represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 770:

Table I

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

E. Tenth Example Aerosol Dispensing System

[00247] Referring now to Figures 39-42 of the drawing, depicted at 920 therein is a tenth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the fifth example aerosol dispensing system 20b, the tenth example dispensing system is adapted to spray droplets of dispensed material 922 onto a target surface (not shown). In the example use of the dispensing system 920 depicted in Figure 39, the dispensed material 922 is or contains texture material, and the dispensing system 920 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00248] Figure 39 further illustrates that the example dispensing system 920 comprises a container 930 defining a chamber 932 in which stored material 934 and pressurized material 936 are contained. Like the stored materials (e.g., 34a and 34b) described above, the stored material 934 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 938 is mounted on the container assembly 930 to facilitate the dispensing of the dispensed material 922 as will be described in further detail below.

[00249] Figure 40 illustrates that the tenth example aerosol dispensing system 920 comprises a conduit 940 defining a conduit passageway 942. The conduit 940 is supported by the container 930 such that the conduit passageway 942 defines a conduit inlet 944 arranged within the chamber 932 and a conduit outlet or outlet opening 946 arranged outside of the chamber 932. The example conduit 940 is formed by an inlet tube 950, a valve housing 952, an actuator member 954, and an outlet member 956. The conduit passageway 942 extends through the inlet tube 950, the valve housing 952, the actuator member 954, and the outlet member 956. The valve housing 952 is arranged between the conduit inlet 944 and the actuator member 954, and the actuator member 954 is arranged between the valve housing 952 and the conduit outlet 946. The outlet member 956 is supported by the actuator member 954 to define the conduit outlet 946.

[00250] Figure 40 further shows that a valve assembly 960 is formed within the valve housing 952. The example valve assembly 960 comprises a valve member 962, a valve seat 964, and a valve spring 966. The valve assembly 960 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 966 forces the valve member 962 against the valve seat 964 such that the valve assembly 960 substantially prevents flow of fluid along the conduit passageway 942. In the open configuration, the valve member 962 is displaced away from the valve seat 964 against the force of the valve spring 966

such that the valve assembly 960 allows flow of fluid along the conduit passageway 942 between the valve member 962 and the valve seat 964. Because the valve spring 966 biases the valve member 962 towards the valve seat 964, the example valve assembly 960 is normally closed. As will be described in further detail below, the valve assembly 960 engages the actuator member structure 954 such that the application of deliberate manual force on the actuator member 954 towards the container 930 moves the valve member 962 away from the valve seat 964 and thus places the valve system 960 in the open configuration.

[00251] A first flow adjustment system 970 having a first adjustment member 972 having a valve surface 974 and a shaft portion 976 is arranged to intersect the conduit passageway 942 at an intermediate location 942a between the valve assembly 960 and the conduit outlet 946. The conduit passageway has a first portion 942b and a second portion 942c. The first passageway portion 942b defines an actuator axis A_A aligned with a container axis A_C defined by the container assembly 930, and the second actuator passageway portion is aligned with an outlet axis A_O defined by the outlet member 956. The example intermediate location 942a is located in the second passageway portion 942c.

[00252] A support opening 978 is formed in the actuator member 954. The shaft 976 extends through the opening 978 such that, as shown in Figures 45 and 47, rotation of the first adjustment member 972 relative to the actuator member 954 causes the valve surface 974 to engage and deform the outlet member 956 and thus alter a cross-sectional area of the conduit passageway 942 between the valve system 960 and the second flow adjustment system 980. In particular, the valve surface 974 defines a valve axis A_V that is offset from a shaft axis A_S defined by the shaft portion 976. Accordingly, rotation of the first adjustment member 972 about the shaft axis A_S causes eccentric rotation of the valve surface 974. Because of this eccentric rotation, a distance between the portion of the valve surface 974 in contact with the outlet member 956, relative to

the shaft axis A_S, increases and decreases based on an angular position of the first adjustment member 972.

[00253] A second flow adjustment system 980 comprises a second adjustment member 982 and a plurality of fingers 984 extending from the actuator member 954. The second flow adjustment system 980 is arranged relative to the conduit passageway 942 to form at least a portion of the conduit outlet (or outlet opening) 946. The second adjustment member 982 defines an internal threaded surface 986 that engages an external threaded surface 988 of the actuator member 954 such that rotation of the second adjustment member 982 relative to the actuator member 954 deforms the fingers and thus the outlet member 956, thereby altering a cross-sectional area of the conduit outlet or outlet opening 946.

[00254] The first flow adjustment system 970 is supported by the actuator member 954 between the valve assembly 960 and the second adjustment system 980 such that manual operation of the first adjustment member 972 affects the flow of fluid material along the conduit passageway 942 as generally described above. In particular, the second adjustment system 980 functions as a flow restrictor, where operation of the first adjustment member 972 variably reduces the size of the conduit passageway 942 such that a pressure of the fluid material upstream of the first flow adjustment system 970 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 970. The example first flow adjustment system 970 thus is operable in a fully open configuration (least amount of flow restriction) and a terminal configuration (greatest amount of flow restriction).

[00255] The second adjustment system 980 is supported by the actuator member 954 downstream of the first adjustment system 970. The outlet member 956 is a resiliently deformable tube, and manual operation of the second adjustment member 982 deforms the walls of the outlet member 956 and thereby affects the flow of fluid material flowing out of the conduit passageway 942 through the conduit outlet or outlet opening 946. The second adjustment system

980 thus functions as a variable orifice. Operation of the second adjustment member 982 variably reduces the size of the conduit outlet or outlet opening 946 relative to the size of the conduit passageway 942 upstream of the second adjustment system 980.

[00256] The outlet member 956, first adjustment member 972, and second adjustment member 982 are supported by the actuator member 954 to define a control assembly 990. Figure 40 further shows that the grip assembly 958 comprises a grip housing 992 and that the actuator member 954 defines a trigger portion 994. To form the actuator assembly 938, the grip assembly 958 is combined with the control assembly 990 by pivotably attaching the actuator member 954 to the grip housing 992. The actuator assembly 938 is supported by the container assembly 930 as generally described above. An elongated slot 996 is formed in the grip housing 992 to allow the first adjustment member 972 to extend through the grip housing 992 without interfering with operation of the actuator member 954 as described herein.

[00257] To operate the tenth example aerosol dispensing system 920, the container 930 and grip housing 992 are grasped such that the user's fingers can squeeze the trigger portion 994, thereby depressing the actuator member 954. The conduit outlet or outlet opening 946 is initially aimed at a test surface and the actuator member 954 is depressed to place the valve assembly 960 in the open configuration such that the pressurized material 936 forces some of the stored material 934 out of the container 930 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 922.

[00258] The process of spraying a test pattern and adjusting the first and second adjustment members 972 and 982 is repeated until the test pattern

formed by the dispensed material 922 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00259] Leaving the first and second adjustment members 972 and 982 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 920 is then arranged such that the conduit outlet or outlet opening 946 is aimed at the un-textured portion of the target surface. The trigger member 994 is again squeezed to place the valve assembly 960 in the open configuration such that the pressurized material 936 forces the stored material 934 out of the container 930 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface in a desired texture pattern that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material.

[00260] The following Table K represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 970:

Table K

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	0	0-16	0-20
	Square Inches	0.0000	0.00000-0.00041	0.00000-0.00023

[00261] Each of the embodiments described herein contains a first adjustment system and one of several example second adjustment systems. Any one of the example second adjustment systems disclosed herein may be combined with any one of the unique first adjustment systems associated with each of the embodiments discussed above. Accordingly, the specific pairings of example first and second adjustment systems as described above are for illustrative purposes only, and, in one form, the principles of the present invention may be implemented by using any pair of example first and second adjustment systems whether that particular pairing is disclosed explicitly above or disclosed implicitly herein.

F. Eleventh Example Aerosol Dispensing System

[00262] Referring now to Figures 43-54 of the drawing, depicted at 1120 therein is an eleventh example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20a, the eleventh example dispensing system is adapted to spray droplets of dispensed material 1122 onto a target surface (not shown). In the example use of the dispensing system 1120 depicted in Figure 43, the dispensed material 1122 is or contains texture material, and the dispensing system 1120 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00263] Figure 43 further illustrates that the example dispensing system 1120 comprises a container 1130 defining a chamber 1132 in which stored material 1134 and pressurized material 1136 are contained. Like the stored material 34a described above, the stored material 1134 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 1138 is mounted on the container

assembly 1130 to facilitate the dispensing of the dispensed material 1122 as will be described in further detail below.

[00264] Figure 43 illustrates that the eleventh example aerosol dispensing system 1120 comprises a conduit 1140 defining a conduit passageway 1142. The conduit 1140 is supported by the container 1130 such that the conduit passageway 1142 defines a conduit inlet 1144 (Figure 44) arranged within the chamber 1132 and a conduit outlet or outlet opening 1146 arranged outside of the chamber 1132. The example conduit 1140 is formed by an inlet tube 1150 (Figures 43 and 44), a valve housing 1152 (Figures 43 and 44), an actuator member 1154 (Figures 44 and 48), and an outlet member 1156 (Figure 48). The conduit passageway 1142 extends through the inlet tube 1150, the valve housing 1152, the actuator member 1154, and the outlet member 1156. The valve housing 1152 is arranged between the conduit inlet 1144 and the actuator member 1154, and the actuator member 1154 is arranged between the valve housing 1152 and the conduit outlet 1146. The outlet member 1156 is supported by the actuator member 1154 to define the conduit outlet 1146.

[00265] Arranged within the valve housing 1152 is a valve assembly 1160. The example valve assembly 1160 comprises a valve member 1162, a valve seat 1164, and a valve spring 1166. The valve assembly 1160 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 1166 forces the valve member 1162 against the valve seat 1164 such that the valve assembly 1160 substantially prevents flow of fluid along the conduit passageway 1142. In the open configuration, the valve member 1162 is displaced away from the valve seat 1164 against the force of the valve spring 1166 such that the valve assembly 1160 allows flow of fluid along the conduit passageway 1142 between the valve member 1162 and the valve seat 1164. Because the valve spring 1166 biases the valve member 1162 towards the valve seat 1164, the example valve assembly 1160 is normally closed. The valve assembly 1160 engages the actuator member structure 1154 such that the

application of deliberate manual force on the actuator member 1154 towards the container 1130 moves the valve member 1162 away from the valve seat 1164 and thus places the valve system 1160 in the open configuration.

[00266] A first flow adjustment system 1170 having a first adjustment member 1172 and a seal member 1174 is arranged at an intermediate location along the conduit passageway 1142 between the valve assembly 1160 and the conduit outlet 1146. In particular, rotation of the first adjustment member 1172 relative to the actuator member 1154 alters a cross-sectional area of the conduit passageway 1142 between the valve system 1160 and the second flow adjustment system 1180.

[00267] A second flow adjustment system 1180 having a second adjustment member 1182 is arranged in the conduit passageway 1142 to form at least a portion of the conduit outlet or outlet opening 1146. In particular, the second adjustment member 1182 defines a threaded surface 1184 that engages the actuator member 1154 such that rotation of the second adjustment member 1182 relative to the actuator member 1154 deforms the outlet member 1156 and thereby alters a cross-sectional area of the conduit outlet or outlet opening 1146.

[00268] The first flow adjustment system 1170 is supported by the actuator member 1154 between the valve assembly 1160 and the second adjustment system 1180 such that manual operation of the first adjustment member 1172 affects the flow of fluid material along the conduit passageway 1142. In particular, the second adjustment system 1180 functions as a flow restrictor, where operation of the first adjustment member 1172 variably reduces the size of the conduit passageway 1142 such that a pressure of the fluid material upstream of the first flow adjustment system 1170 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 1170.

[00269] The second adjustment system 1180 is supported by the actuator member 1154 downstream of the second adjustment system 1180. The outlet

member 1156 is a resiliently deformable tube, and manual operation of the second adjustment member 1182 deforms the walls of the outlet member 1156 and thereby affects the flow of fluid material flowing out of the conduit passageway 1142 through the conduit outlet or outlet opening 1146. The second adjustment system 1180 thus functions as a variable orifice. Operation of the second adjustment member 1172 variably reduces the size of the conduit outlet or outlet opening 1146 relative to the size of the conduit passageway 1142 upstream of the second adjustment system 1180.

[00270] The outlet member 1156, first adjustment member 1172, seal member 1174, and second adjustment member 1182 are supported by the actuator member 1154 to define a control assembly 1190. Figure 43 further shows that the grip assembly 1158 comprises a grip housing 1192 and a trigger member 1194. Additionally, the grip assembly 1158 is combined with the control assembly 1190 to form the actuator assembly 1138, and the actuator assembly 1138 is supported by the container assembly 1130 as generally described above.

[00271] To operate the eleventh example aerosol dispensing system 1120, the container 1130 and grip housing 1192 are grasped such that the user's fingers can squeeze the trigger member 1194, thereby depressing the actuator member 1154. The conduit outlet or outlet opening 1146 is initially aimed at a test surface and the actuator member 1154 is depressed to place the valve assembly 1160 in the open configuration such that the pressurized material 1136 forces some of the stored material 1134 out of the container 1130 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 1122.

[00272] The process of spraying a test pattern and adjusting the first and second adjustment members 1172 and 1182 is repeated until the test pattern

formed by the dispensed material 1122 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00273] Leaving the first and second adjustment members 1172 and 1182 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 1120 is then arranged such that the conduit outlet or outlet opening 1146 is aimed at the un-textured portion of the target surface. The trigger member 1194 is again squeezed to place the valve assembly 1160 in the open configuration such that the pressurized material 1136 forces the stored material 1134 out of the container 1130 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00274] With the foregoing general understanding of the operation of the first example aerosol dispensing system 1120 in mind, the details of construction and operation of this example aerosol dispensing system 1120 will now be described in further detail.

[00275] Referring now to Figures 44-46 and 48, the example actuator member 1154 of the eleventh example aerosol dispensing system 1120 will now be described in further detail. The example actuator member 1154 comprises an inlet portion 1220 (Figures 44 and 49), an outlet portion 1222 (Figure 48), a socket portion 1224 (Figures 44 and 48), a guide portion 1226 (Figures 44-46), and a link portion 1228 (Figures 44-46). The actuator member 1154 further defines an actuator inlet 1230 (Figures 44 and 46), an actuator outlet 1232 (Figure 48), and an actuator passageway 1234 having a first portion 1236 and a

second portion 1238 (Figures 44, 46, and 48). As perhaps best shown in Figure 48, the outlet portion 1222 of the actuator member 1154 defines a threaded external surface 1240, two or more fingers 1242, a mounting projection 1244 through which the actuator outlet 1232 extends, and a mounting recess 1246 formed around at least a portion of the mounting projection 1244.

[00276] Figures 48, 50, and 54 illustrate that the socket portion 1224 of the actuator member 1154 defines a socket chamber 1250 (Figures 48, 50, and 54), at least one socket window 1252 (Figure 54), and a support surface 1254 (Figures 48 and 50). Figure 45 illustrates that the guide portion 1226 of the actuator member 1154 defines at least one guide slot 1256 and that the link portion 1228 defines at least one link projection 1258.

[00277] As perhaps best shown in Figure 50, the example first adjustment member 1172 comprises a handle portion 1260, a plug portion 1262, a valve portion 1264, and at least one detent projection 1266. Intersecting shoulder surfaces 1268 are formed on the plug portion 1262 adjacent to and surrounding the valve portion 1264. A valve blade 1270 extends from the valve portion 1264. The example valve blade 1270 defines first and second blade surfaces 1272 and 1274 and a perimeter surface 1276. As will be described in further detail below, the actuator member 1154 defines an actuator opening 1278 that is in fluid communication with the socket chamber 1250.

[00278] Referring now to Figures 44and 46, it can be seen that the example grip housing 1192 defines a grip wall 1280 shaped to provide an ergonomic surface for grasping the dispensing system 1120 during use. Extending around a bottom edge of the grip wall 1280 is a latch projection 1282 for detachably or removably attaching the grip housing 1192 to the container assembly as shown in Figures 44 and 46. Figures 44-46 illustrate that at least one guide rail 1284 extends radially inwardly from the grip wall 1280. The grip wall 1280 defines a trigger slot 1286. Figures 43 and 46 illustrate that at least one pivot opening 1288 is formed in the grip wall 1280.

[00279] Figures 44-46 illustrate that the trigger member 1194 defines a trigger wall 1290 and that at least one link flange 1292 extends from the trigger wall 1290. Figures 44-46 further illustrate that a link opening 1294 is formed in each link flange 1292. Figures 44-46 further illustrate that at least one pivot projection 1296 extends outwardly from the trigger member 1194.

[00280] The example dispensing system 1120 is assembled as follows. The outlet member 1156 and the first and second actuator members 1172 and 1182 are first assembled to the actuator member 1154 to form the actuator assembly 1138. The outlet member 1156 is arranged between the fingers 1242 such that a portion of the outlet member 1156 extends over the mounting projection 1244 and within the mounting recess 1246. Friction is typically sufficient to hold the outlet member 1156 in the position shown in Figure 48, but adhesive may be used to ensure that the outlet member 1156 is securely attached to the actuator member 1154.

[00281] The second adjustment member 1182 may then be attached to the actuator member 1154 by engaging the threaded surface 1184 on the second adjustment member 1182 with the threaded surface 1240 on the outlet portion 1222 of the actuator member 1154. At some point, continued rotation of the second adjustment member 182 relative to the actuator member 154 causes the adjustment member 1182 to force the fingers 1242 radially inwardly. When forced radially inwardly, the fingers 1242 in turn act on the outlet member 1156, pinching or deforming the outlet member 1156 to reduce the cross-sectional area of the conduit outlet or outlet opening 1146.

[00282] The first adjustment member 1172 may then be attached to the actuator member 1154. The seal member 1174 is first placed into the socket chamber 1250, and then first adjustment member 1172 is displaced such that the valve portion 1264 enters the socket chamber 1250 and the detent projections 1266 in their original positions contact the socket portion 1224 of the actuator member 1154. Continued displacement of the first adjustment member 1172 into

the socket chamber 1250 causes the detent projections 1266 to resiliently deform slightly towards each other into a deformed position such that the plug portion 1262 enters the socket chamber 1250. When the plug portion 1262 is fully within the socket chamber 1250, the shoulder surfaces 1268 engage and compress the seal member 1174 to seal the annular space between the plug portion 1262 and the socket portion 1224, and the detent projections 1266 move outwardly to their original positions and into the socket windows 1252. At this point, the valve blade 1270 extends through the actuator opening 1278 and into the actuator passageway 1234.

[00283] When returned to their original positions relative to the plug portion 1262, the detent projections 1266 engage the socket portion 1224 around the socket windows 1252 to inhibit movement of the first adjustment member 1172 out of the socket chamber 1250 (and thus maintain the valve blade 1270 within the second portion of the actuator passageway 1234). However, the socket windows 1252 are slightly oversized relative to the detent projections 1266, so the first adjustment member 1172 is capable of rotating within a limited range of movement relative to the socket portion 1224 about a longitudinal axis defined by the socket chamber 1250. If necessary, the first adjustment member 1172 may be removed from the actuator member 1154 by pushing the detent projections 1266 through socket windows 1252 such that the detent projections 1266 no longer engage the socket portion 1224.

[00284] The control assembly 1190 is formed when the outlet member 1156, first adjustment member 1172, seal member 1174, and second adjustment member 1182 are secured to the actuator member 1154 as described above. At this point, the control assembly 1190 is attached to the grip assembly 1158 to form the actuator assembly. In particular, the pivot projections 1296 on the trigger member 1194 are inserted into the pivot openings 1288 of the grip housing 1192 such that the trigger wall 1290 extends or is accessible through the

trigger slot 1286. The trigger member 1194 rotates relative to the grip housing 1192 about a pivot axis $A1_P$.

[00285] As is perhaps best shown in Figure 45, the actuator assembly 1138 is then formed by displacing the control assembly 1190 into the space between the grip housing 1192 and the trigger member 1194 such that the link projections 1258 extend into the link openings 1294 in the link flanges 1292 of the trigger member 1194. Accordingly, as the trigger member 1194 pivots relative to the grip housing 1192, the link flanges 1292 around the link openings 1294 engage the link projections 1258 to displace the control assembly 1190 relative to the grip assembly 1158. Because the link openings 1294 are slightly elongated and angled with respect to a container axis $A1_C$ defined by the container assembly 1130, however, the control assembly 1190 is capable of linear, in addition to (at this point) pivoting, movement relative to the grip assembly 1158, as will be described in further detail below.

[00286] The actuator assembly 1138 is then attached to the container assembly 1130 by inserting the inlet portion 1220 of the actuator member 1154 through the valve seat 1164 such that the inlet portion 1220 engages the valve member 1162 as shown in Figure 3. At the same time, the latch projection 1282 on the grip housing 1192 snaps into place around a lip on the container assembly 1130.

[00287] With the actuator assembly 1138 attached to the container assembly 1130, the grip housing 1192 supports the trigger member 1194 for pivoting movement relative to the container assembly 1130, and the control assembly 1190 is supported by the trigger member 1194 and the valve seat 1164 for linear movement relative to the container assembly 1130. Squeezing the trigger member 1194 relative to the grip member 1192 towards the control assembly 1190 results in movement of the control assembly 1190 towards the container assembly 1130 from a first position (e.g., Figure 44) and into a second position (e.g., Figure 46). When the control assembly 1190 is in the first position, the

valve system 1160 is in its closed configuration. When the control assembly 1190 is in the second position, the valve system 1160 is in its open configuration. The valve spring 1166 returns the valve member 1162 towards the valve seat and thus forces the control assembly 1190 from the second position and into the first position when the trigger member 1194 is released.

[00288] The example second actuator member 1182 operates to deform the outlet member 1156 and alter a cross-sectional area of the conduit outlet or outlet opening 1146 as generally described in U.S. Patent Nos. 6,116,473 and 7,845,532, which are incorporated herein by reference, and thus will not be described or depicted herein in detail. The Applicant notes that other systems and methods for altering the cross-sectional area of a conduit outlet or outlet opening may be used in place of the resiliently deformable outlet member 156, second adjustment member 182, and fingers 242 described herein. U.S. Patent No. 7,500,621, which is incorporated herein by reference, discloses a number of examples of systems and methods for adjusting the outlet opening of an aerosol system in the context of dispensing texture material. Systems and methods for altering a cross-sectional area of an outlet orifice include the use of multiple straws, each having a different internal diameter, the use of a rotating plate in which holes are formed, the use of a rotating cap in which holes are formed, the use of a deformable tube that is pinched down from an original configuration, and/or the use of a deformable tube that is pulled open from an original configuration.

[00289] The operation of the first adjustment system 1170 is perhaps best understood with reference to Figures48-54. Figures 48, 49, and 54 illustrate the first adjustment system 1170 in a maximum opening configuration, while Figures 50 and 51 illustrate the first adjustment system 1170 in a minimum opening configuration. As shown, the valve blade 1270 extends into the actuator passageway 1234 such that the valve blade 1270 restricts flow of fluid flowing through the actuator passageway 1234, in this example embodiment the second

portion 1238 of the passageway 1234. As will be described in further detail below, the amount of restriction depends on the angular position of the valve blade 1270 with respect to an outlet axis $A1_O$ defined by second portion 1238 of the actuator passageway 1234. The angular position of the valve blade 1270 with respect to the outlet axis $A1_O$ can be altered by displacing the handle portion 1260 of the first adjustment member 1172 relative to the actuator member 1154.

[00290] In the example first adjustment system 1170, a projection 1224a extending from the socket portion 1224 (Figure 52) engages the interior surfaces of side walls 1260a and 1260b of the handle portion 1260 to determine the limits of rotation of the first adjustment member 1172 relative to the actuator member 1154. Optionally, the size and shape of the socket windows 1252 in relation to the size and shape of the detent projections 1266 may be used to may determine the limits of rotation of the first adjustment member 1172 relative to the actuator member 1154 to a predetermined adjustment range.

[00291] Additionally, Figure 54 perhaps best shows that the perimeter edge 1276 of the valve blade 1270 is configured to follow the curvature of the actuator passageway second portion 1238 where the adjustment opening 1278 intersects this passageway second portion 1238. Accordingly, the first adjustment member 1172 is capable of being rotated such that the valve blade 1270 rotates between a fully open position of Figures 48, 49, 54 and a terminal (partly open) position in which the blade surfaces 1272 and 1274 are extend at approximately a 45 degree angle with respect to the outlet axis $A1_O$. In practice, it is typically not required that the valve blade 1270 be operable in the fully closed position given that the valve system 1160 is more appropriately configured to prevent flow of fluid through the actuator passageway 1234 in a fluid tight manner.

[00292] In one example implementation of the first flow adjustment system 1170, the first adjustment system 1170 is operable in a plurality or continuum of configurations ranging between a fully open configuration and a terminal configuration. The fully open configuration typically represents no restriction of

the cross-sectional area of the conduit passageway 1142 and may be numerically represented as 100% open (i.e., the cross-sectional area defined by the first adjustment system is substantially the same as the cross-sectional area of the conduit passageway upstream of the first adjustment system). The terminal configuration typically represents the greatest amount of restriction of the cross-sectional area of the conduit passageway 1142 and may be numerically represented as a fraction of the cross-sectional area of the conduit passageway, such as 12% open (i.e., the cross-sectional area defined by the first adjustment system is approximately 12% of the cross-sectional area of the conduit passageway upstream of the first adjustment system).

[00293] In general, the predetermined adjustment range associated with the example first adjustment system 1170 will be determined for a particular dispensing system 1120. With respect to the first example adjustment system 1180, the system variable controlled by this first adjustment system 1170 may be referred to as percentage closure of the cross-sectional area of the actuator passageway 1234. Relative to the cross-sectional area of the unobstructed actuator passageway second portion 1238, the fully open position of the valve blade 1270 will be block, for example, a percentage of this cross-sectional area. The predetermined adjustment range allowed by the first adjustment member allows the valve blade 1270 to rotate from the fully open position (Figures 48, 49, 54) to a terminal position (e.g., Figures 50 and 51) in which, for example, another percentage of the cross-sectional area the unobstructed actuator passageway second portion 1238 is blocked.

[00294] The following Table L represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment

Table L

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

[00295] In this context, the actual cross-sectional area of the unobstructed passageway second portion 1238 will be determined by such factors as the characteristics of the stored material 1134 (e.g., composition, viscosity) and of the propellant material (e.g., composition, percentage by weight used), and the nature and physical shapes of the desired texture patterns to be obtained using the dispensing system 1120.

G. Twelfth Example Aerosol Dispensing System

[00296] Referring now to Figures 55-59 of the drawing, depicted at 1320 therein is a twelfth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20a, the twelfth example dispensing system is adapted to spray droplets of dispensed material 1322 onto a target surface (not shown). In the example use of the dispensing system 1320 depicted in Figure 55, the dispensed material 1322 is or contains texture material, and the dispensing system 1320 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00297] Figure 55 further illustrates that the example dispensing system 1320 comprises a container 1330 defining a chamber 1332 in which stored material 1334 and pressurized material 1336 are contained. Like the stored material 34 described above, the stored material 1334 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant

material in gas phase. An actuator assembly 1338 is mounted on the container assembly 1330 to facilitate the dispensing of the dispensed material 1322 as will be described in further detail below.

[00298] Figure 56 illustrates that the twelfth example aerosol dispensing system 1320 comprises a conduit 1340 defining a conduit passageway 1342. The conduit 1340 is supported by the container 1330 such that the conduit passageway 1342 defines a conduit inlet 1344 (Figure 55) arranged within the chamber 1332 and a conduit outlet or outlet opening 1346 arranged outside of the chamber 1332. The example conduit 1340 is formed by an inlet tube 1350 (Figures 55 and 56), a valve housing 1352 (Figures 55 and 56), an actuator member 1354 (Figures 55-59), and an outlet member 1356 (Figures 57 and 59). The conduit passageway 1342 extends through the inlet tube 1350, the valve housing 1352, the actuator member 1354, and the outlet member 1356. The valve housing 1352 is arranged between the conduit inlet 1344 and the actuator member 1354, and the actuator member 1354 is arranged between the valve housing 1352 and the conduit outlet 1346. The outlet member 1356 is supported by the actuator member 1354 to define the conduit outlet 1346.

[00299] As shown in Figure 56, arranged within the valve housing 1352 is a valve assembly 1360. The example valve assembly 1360 comprises a valve member 1362, a valve seat 1364, and a valve spring 1366. The valve assembly 1360 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 1366 forces the valve member 1362 against the valve seat 1364 such that the valve assembly 1360 substantially prevents flow of fluid along the conduit passageway 1342. In the open configuration, the valve member 1362 is displaced away from the valve seat 1364 against the force of the valve spring 1366 such that the valve assembly 1360 allows flow of fluid along the conduit passageway 1342 between the valve member 1362 and the valve seat 1364. Because the valve spring 1366 biases the valve member 1362 towards the valve seat 1364, the example valve assembly 1360 is normally

closed. As will be described in further detail below, the valve assembly 1360 engages the actuator member structure 1354 such that the application of deliberate manual force on the actuator member 1354 towards the container 1330 moves the valve member 1362 away from the valve seat 1364 and thus places the valve system 1360 in the open configuration.

[00300] A first flow adjustment system 1370 having a first adjustment member 1372 and a seal member 1374 is arranged at an intermediate location along the conduit passageway 1342 between the valve assembly 1360 and the conduit outlet 1346. In particular, rotation of the first adjustment member 1372 relative to the actuator member 1354 alters a cross-sectional area of the conduit passageway 1342 between the valve system 1360 and the second flow adjustment system 1380.

[00301] A second flow adjustment system 1380 having a second adjustment member 1382 is arranged in the conduit passageway 1342 to form at least a portion of the conduit outlet or outlet opening 1346. In particular, the second adjustment member 1382 defines a threaded surface 1384 that engages the actuator member 1354 such that rotation of the second adjustment member 1382 relative to the actuator member 1354 deforms the outlet member 1356 and thereby alters a cross-sectional area of the conduit outlet or outlet opening 1346.

[00302] The first flow adjustment system 1370 is supported by the actuator member 1354 between the valve assembly 1360 and the second adjustment system 1380 such that manual operation of the first adjustment member 1372 affects the flow of fluid material along the conduit passageway 1342. In particular, the second adjustment system 1380 functions as a flow restrictor, where operation of the first adjustment member 1372 variably reduces the size of the conduit passageway 1342 such that a pressure of the fluid material upstream of the first flow adjustment system 1370 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 1370.

[00303] The second adjustment system 1380 is supported by the actuator member 1354 downstream of the second adjustment system 1380. The outlet member 1356 is a resiliently deformable tube, and manual operation of the second adjustment member 1382 deforms the walls of the outlet member 1356 and thereby affects the flow of fluid material flowing out of the conduit passageway 1342 through the conduit outlet or outlet opening 1346. The second adjustment system 1380 thus functions as a variable orifice. Operation of the second adjustment member 1382 variably reduces the size of the conduit outlet or outlet opening 1346 relative to the size of the conduit passageway 1342 upstream of the second adjustment system 1380.

[00304] The outlet member 1356, first adjustment member 1372, seal member 1374, and second adjustment member 1382 are supported by the actuator member 1354 to define a control assembly 1390. Figure 56 further shows that the grip assembly 1358 comprises a grip housing 1392 and a trigger member 1394. Additionally, the grip assembly 1358 is combined with the control assembly 1390 to form the actuator assembly 1338, and the actuator assembly 1338 is supported by the container assembly 1330 as generally described above.

[00305] To operate the twelfth example aerosol dispensing system 1320, the container 1330 and grip housing 1392 are grasped such that the user's fingers can squeeze the trigger member 1394, thereby depressing the actuator member 1354. The conduit outlet or outlet opening 1346 is initially aimed at a test surface and the actuator member 1354 is depressed to place the valve assembly 1360 in the open configuration such that the pressurized material 1336 forces some of the stored material 1334 out of the container 1330 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 1322.

[00306] The process of spraying a test pattern and adjusting the first and second adjustment members 1372 and 1382 is repeated until the test pattern formed by the dispensed material 1322 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00307] Leaving the first and second adjustment members 1372 and 1382 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 1320 is then arranged such that the conduit outlet or outlet opening 1346 is aimed at the un-textured portion of the target surface. The trigger member 1394 is again squeezed to place the valve assembly 1360 in the open configuration such that the pressurized material 1336 forces the stored material 1334 out of the container 1330 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00308] With the foregoing general understanding of the operation of the first example aerosol dispensing system 20a in mind, the details of construction and operation of this example aerosol dispensing system 1320 will now be described in further detail.

[00309] Referring now to Figures 56-59, the example actuator member 1354 of the twelfth example aerosol dispensing system 1320 will now be described in further detail. The example actuator member 1354 comprises an inlet portion 1420 (Figure 56), an outlet portion 1422 (Figures 57 and 59), a socket portion 1424 (Figures 56, 57 and 59), a guide portion 1426 (Figure 56), and a link portion 1428 (Figure 56). The actuator member 1354 further defines an actuator inlet

1430 (Figure 56), an actuator outlet 1432 (Figures 57 and 59), and an actuator passageway 1434 having a first portion 1436 and a second portion 1438 (Figures 57 and 59). As perhaps best shown in Figures 57 and 59, the outlet portion 1422 of the actuator member 1354 defines a threaded external surface 1440, two or more fingers 1442, a mounting projection 1444 through which the actuator outlet 1432 extends, and a mounting recess 1446 formed around at least a portion of the mounting projection 1444.

[00310] Figures 57 and 59 illustrate that the socket portion 1424 of the actuator member 1354 defines a socket chamber 1450, at least one socket window 1452 (Figures 56, 57, and 59), and a support surface 1454 (Figures 56, 57, and 59). As shown in Figure 56, the guide portion 1426 of the actuator member 1354 defines at least one guide slot 1456, and the link portion 1428 defines at least one link projection 1458.

[00311] As perhaps best shown in Figures 56, 57, and 59, the example first adjustment member 1372 comprises a handle portion 1460, a plug portion 1462, a valve portion 1464, and at least one detent projection 1466. Intersecting shoulder surfaces 1468 are formed on the plug portion 1462 adjacent to and surrounding the valve portion 1464. A valve blade 1470 extends from the valve portion 1464. The example valve blade 1470 defines a valve surface 1472 and a bottom surface 1474. A transition surface 1476 is formed on the actuator member 1354 at the juncture of the first and second portions 1436 and 1438 of the actuator passageway 1434.

[00312] Referring now to Figure 56, it can be seen that the example grip housing 1392 defines a grip wall 1480 shaped to provide an ergonomic surface for grasping the dispensing system 1320 during use. Extending around a bottom edge of the grip wall 1480 is a latch projection 1482 for detachably attaching the grip housing 1392 to the container assembly as will be discussed further below. Figure 56 illustrates that at least one guide rail 1484 extends radially inwardly

from the grip wall 1480. The grip wall 1480 defines a trigger slot 1486. At least one pivot opening 1488 is formed in the grip wall 1480.

[00313] Figure 56 illustrates that the trigger member 1394 defines a trigger wall 1490 and that at least one link flange 1492 extends from the trigger wall 1490. A link opening 1494 is formed in each link flange 1492. Figures 56 further illustrates that at least one pivot projection 1496 extends outwardly from the trigger member 1394.

[00314] The example dispensing system 1320 is assembled as follows. The outlet member 1356 and the first and second actuator members 1372 and 1382 are first assembled to the actuator member 1354 to form the actuator assembly 1338. The outlet member 1356 is arranged between the fingers 1442 such that a portion of the outlet member 1356 extends over the mounting projection 1444 and within the mounting recess 1446. Friction is typically sufficient to hold the outlet member 1356 in the position shown in Figures 57 and 59, but adhesive may optionally be used to adhere the outlet member 1356 to the actuator member 1354.

[00315] The second adjustment member 1382 may then be attached to the actuator member 1354 by engaging the threaded surface 1384 on the second adjustment member 1382 with the threaded surface 1440 on the outlet portion 1422 of the actuator member 1354. At some point, continued rotation of the second adjustment member 1382 relative to the actuator member 1354 causes the adjustment member 1382 to force the fingers 1442 radially inwardly. When forced radially inwardly, the fingers 1442 in turn act on the outlet member 1356, pinching or deforming the outlet member 1356 to reduce the cross-sectional area of the conduit outlet or outlet opening 1346.

[00316] The first adjustment member 1372 may then be attached to the actuator member 1354. The seal member 1374 is first placed into the socket chamber 1450, and then first adjustment member 1372 is displaced such that the

valve portion 1464 enters the socket chamber 1450 and the detent projections 1466 in their original positions contact the socket portion 1424 of the actuator member 1354. Continued displacement of the first adjustment member 1372 into the socket chamber 1450 causes the detent projections 1466 to resiliently deform slightly towards each other into a deformed position such that the plug portion 1462 enters the socket chamber 1450. When the plug portion 1462 is fully within the socket chamber 1450, the shoulder surfaces 1468 engage and compress the seal member 1374 to seal the annular space between the plug portion 1462 and the socket portion 1424, and the detent projections 1466 move outwardly to their original positions and into the socket windows 1452. At this point, the valve blade 1470 extends through the adjustment opening 1478 and into the actuator passageway 1434.

[00317] When returned to their original positions relative to the plug portion 1462, the detent projections 1466 engage the socket portion 1424 around the socket windows 1452 to inhibit movement of the first adjustment member 1372 out of the socket chamber 1450 (and thus maintain the valve blade 1470 within the second portion of the actuator passageway 1434). However, the socket windows 1452 are slightly oversized relative to the detent projections 1466. As shown by a comparison of Figures 57 and 59, the first adjustment member 1372 is capable of rotating within a limited range of movement relative to the socket portion 1424 about a socket axis A_S defined by the socket chamber 1450. If necessary, the first adjustment member 1372 may be removed from the actuator member 1354 by pushing the detent projections 1466 through socket windows 1452 such that the detent projections 1466 no longer engage the socket portion 1424.

[00318] The control assembly 1390 is formed when the outlet member 1356, first adjustment member 1372, seal member 1374, and second adjustment member 1382 are secured to the actuator member 1354 as described above. At this point, the control assembly 1390 is attached to the grip assembly 1358 to

form the actuator assembly. In particular, the pivot projections 1496 on the trigger member 1394 are inserted into the pivot openings 1488 of the grip housing 1392 such that the trigger wall 1490 extends or is accessible through the trigger slot 1486. The trigger member 1394 rotates relative to the grip housing 1392 about a pivot axis $A1_P$.

[00319] As is perhaps best shown in Figure 56, the actuator assembly 1338 is then formed by displacing the control assembly 1390 into the space between the grip housing 1392 and the trigger member 1394 such that the link projections 1458 extend into the link openings 1494 in the link flanges 1492 of the trigger member 1394. Accordingly, as the trigger member 1394 pivots relative to the grip housing 1392, the link flanges 1492 around the link openings 1494 engage the link projections 1458 to displace the control assembly 1390 relative to the grip assembly 1358. Because the link openings 1494 are slightly elongated and angled with respect to a container axis $A1_C$ defined by the container assembly 1330, however, the control assembly 1390 is capable of linear, in addition to (at this point) pivoting, movement relative to the grip assembly 1358, as will be described in further detail below.

[00320] The actuator assembly 1338 is then attached to the container assembly 1330 by inserting the inlet portion 1420 of the actuator member 1354 through the valve seat 1364 such that the inlet portion 1420 engages the valve member 1362 as shown in Figure 56. At the same time, the latch projection 1482 on the grip housing 1392 snaps into place around a lip on the container assembly 1330.

[00321] With the actuator assembly 1338 attached to the container assembly 1330, the grip housing 1392 supports the trigger member 1394 for pivoting movement relative to the container assembly 1330, and the control assembly 1390 is supported by the trigger member 1394 and the valve seat 1364 for linear movement relative to the container assembly 1330. Squeezing the trigger member 1394 relative to the grip member 1392 towards the control assembly

1390 results in movement of the control assembly 1390 towards the container assembly 1330 from a first position and into a second position. When the control assembly 1390 is in the first position, the valve system 1360 is in its closed configuration. When the control assembly 1390 is in the second position, the valve system 1360 is in its open configuration. The valve spring 1366 returns the valve member 1362 towards the valve seat and thus forces the control assembly 1390 from the second position and into the first position when the trigger member 1392 is released.

[00322] The example second actuator member 1382 operates to deform the outlet member 1356 and alter a cross-sectional area of the conduit outlet or outlet opening 1346 as generally described in U.S. Patent Nos. 6,116,473 and 7,845,532, which are incorporated herein by reference, and thus will not be described or depicted herein in detail. The Applicant notes that other systems and methods for altering the cross-sectional area of a conduit outlet or outlet opening may be used in place of the resiliently deformable outlet member 356, second adjustment member 382, and fingers 442 described herein. U.S. Patent No. 7,500,621, which is incorporated herein by reference, discloses a number of examples of systems and methods for adjusting the outlet opening of an aerosol system in the context of dispensing texture material. Systems and methods for altering a cross-sectional area of an outlet orifice include the use of multiple straws, each having a different internal diameter, the use of a rotating plate in which holes are formed, the use of a rotating cap in which holes are formed, the use of a deformable tube that is pinched down from an original configuration, and/or the use of a deformable tube that is pulled open from an original configuration.

[00323] The operation of the first adjustment system 1370 is perhaps best understood with reference to Figures 57-59 of the drawing. Figures 57 and 58 illustrate the first adjustment system 1370 in a maximum opening configuration, while Figure 59 illustrates the first adjustment system 1370 in a minimum

opening configuration. As shown, the valve blade 1470 extends into the second portion 1438 of the actuator passageway 1434 such that the valve blade 1470 restricts flow of fluid flowing through the actuator passageway second portion 1438. As will be described in further detail below, the amount of restriction depends on the angular position of the valve blade 1470 with respect to at least one of the transition surface 1476 and an outlet axis $A1_O$ defined by the actuator passageway second portion 1438. The angular position of the valve blade 1470 can be altered by displacing the handle portion 1460 of the first adjustment member 1372 relative to the actuator member 1354.

[00324] In the example first adjustment system 1370, a projection 1424a extending from the socket portion 1424 (Figures 56, 57, and 59) engages the interior surfaces of side walls 1260a and 1260b of the handle portion 1260 to may determine the limits of rotation of the first adjustment member 1172 relative to the actuator member 1154. Optionally, the size and shape of the socket windows 1452 in relation to the size and shape of the detent projections 1466 may determine the limits of rotation of the first adjustment member 1372 relative to the actuator member 1354 to a predetermined adjustment range.

[00325] Additionally, Figures 57 and 59 perhaps best show that the bottom surface 1474 of the valve blade 1470 is configured generally to conform to a contour or shape of the actuator passageway 1434 where the adjustment opening 1478 intersects this passageway 1434. Accordingly, the first adjustment member 1372 is capable of being rotated such that the valve blade 1470 rotates between a fully open position (Figure 57) and a terminal (partly closed) position (Figure 59) in which a cross-sectional area of the actuator passageway 1434 adjacent to the transition surface is minimized, but not necessarily fully blocked. In practice, the valve blade 1470 need not be operable in the fully closed position given that the valve system 1360 is more appropriately configured to prevent flow of fluid through the actuator passageway 1434 in a fluid tight manner.

[00326] In general, the predetermined adjustment range associated with the example first adjustment system 1370 and the shape of the valve surface 1472 will be determined for a particular dispensing system 1320. The example valve surface 1472 is a curved surface that cooperates with the transition surface 1476 to define the minimum cross-sectional dimensions of the actuator passageway 1434.

[00327] In general, the predetermined adjustment range associated with the example first adjustment system 70 will be determined for a particular dispensing system 1320. With respect to the first example adjustment system 80, the system variable controlled by this first adjustment system 1370 may be referred to as percentage closure of the cross-sectional area of the actuator passageway 1434. Relative to the cross-sectional area of the unobstructed actuator passageway second portion 1438, the fully open position of the valve blade 1470 will be block a first percentage of this cross-sectional area. The predetermined adjustment range allowed by the first adjustment member allows the valve blade 1470 to rotate from the fully open position to a terminal position in which, for example, a second percentage of the cross-sectional area the unobstructed actuator passageway second portion 1438 is blocked.

[00328] The following Table M represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 1370:

Table M

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	75	70-80	60-95
	Square Inches	0.00385	0.00424-0.00347	0.00578-0.00193
Terminal	% Passageway	12	8-16	5-20
	Square Inches	0.00045	0.00050-0.00041	0.00068-0.00023

[00329] In this context, the actual cross-sectional area of the unobstructed passageway second portion 1438 will be determined by such factors as the characteristics of the stored material 1334 (e.g., composition, viscosity) and of the propellant material (e.g., composition, percentage by weight used), and the nature and physical shapes of the desired texture patterns to be obtained using the dispensing system 1320.

H. Thirteenth Example Aerosol Dispensing System

[00330] Referring now to Figures 60-66 of the drawing, depicted at 1520 therein is a thirteenth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20a, the thirteenth example dispensing system is adapted to spray droplets of dispensed material 1522 onto a target surface (not shown). In the example use of the dispensing system 1520 depicted in Figure 60, the dispensed material 1522 is or contains texture material, and the dispensing system 1520 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00331] Figure 60 further illustrates that the example dispensing system 1520 comprises a container 1530 defining a chamber 1532 in which stored material

1534 and pressurized material 1536 are contained. Like the stored material 34 described above, the stored material 1534 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 1538 is mounted on the container assembly 1530 to facilitate the dispensing of the dispensed material 1522 as will be described in further detail below.

[00332] Figure 61 illustrates that the thirteenth example aerosol dispensing system 1520 comprises a conduit 1540 defining a conduit passageway 1542. The conduit 1540 is supported by the container 1530 such that the conduit passageway 1542 defines a conduit inlet 1544 (Figure 60) arranged within the chamber 1532 and a conduit outlet or outlet opening 1546 arranged outside of the chamber 1532. The example conduit 1540 is formed by an inlet tube 1550 (Figures 61 and 62), a valve housing 1552 (Figures 61 and 62), an actuator member 1554 (Figures 61, 63-66), and an outlet member 1556 (Figures 62-66). The conduit passageway 1542 extends through the inlet tube 1550, the valve housing 1552, the actuator member 1554, and the outlet member 1556. The valve housing 1552 is arranged between the conduit inlet 1544 and the actuator member 1554, and the actuator member 1554 is arranged between the valve housing 1552 and the conduit outlet 1546. The outlet member 1556 is supported by the actuator member 1554 to define the conduit outlet 1546.

[00333] As shown in Figure 60, arranged within the valve housing 1552 is a valve assembly 1560. The example valve assembly 1560 comprises a valve member 1562, a valve seat 1564, and a valve spring 1566. The valve assembly 1560 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 1566 forces the valve member 1562 against the valve seat 1564 such that the valve assembly 1560 substantially prevents flow of fluid along the conduit passageway 1542. In the open configuration, the valve member 1562 is displaced away from the valve seat 1564 against the force of the valve spring 1566 such that the valve assembly 1560 allows flow of fluid along

the conduit passageway 1542 between the valve member 1562 and the valve seat 1564. Because the valve spring 1566 biases the valve member 1562 towards the valve seat 1564, the example valve assembly 1560 is normally closed. As will be described in further detail below, the valve assembly 1560 engages the actuator member structure 1554 such that the application of deliberate manual force on the actuator member 1554 towards the container 1530 moves the valve member 1562 away from the valve seat 1564 and thus places the valve system 1560 in the open configuration.

[00334] A first flow adjustment system 1570 having a first adjustment member 1572 and a seal member 1574 is arranged at an intermediate location along the conduit passageway 1542 between the valve assembly 1560 and the conduit outlet 1546. In particular, rotation of the first adjustment member 1572 relative to the actuator member 1554 alters a cross-sectional area of the conduit passageway 1542 between the valve system 1560 and the second flow adjustment system 1580.

[00335] A second flow adjustment system 1580 having a second adjustment member 1582 is arranged in the conduit passageway 1542 to form at least a portion of the conduit outlet or outlet opening 1546. In particular, the second adjustment member 1582 defines a threaded surface 1584 that engages the actuator member 1554 such that rotation of the second adjustment member 1582 relative to the actuator member 1554 deforms the outlet member 1556 and thereby alters a cross-sectional area of the conduit outlet or outlet opening 1546.

[00336] The first flow adjustment system 1570 is supported by the actuator member 1554 between the valve assembly 1560 and the second adjustment system 1580 such that manual operation of the first adjustment member 1572 affects the flow of fluid material along the conduit passageway 1542. In particular, the second adjustment system 1580 functions as a flow restrictor, where operation of the first adjustment member 1572 variably reduces the size of the conduit passageway 1542 such that a pressure of the fluid material upstream

of the first flow adjustment system 1570 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 1570.

[00337] The second adjustment system 1580 is supported by the actuator member 1554 downstream of the second adjustment system 1580. The outlet member 1556 is a resiliently deformable tube, and manual operation of the second adjustment member 1582 deforms the walls of the outlet member 1556 and thereby affects the flow of fluid material flowing out of the conduit passageway 1542 through the conduit outlet or outlet opening 1546. The second adjustment system 1580 thus functions as a variable orifice. Operation of the second adjustment member 1582 variably reduces the size of the conduit outlet or outlet opening 1546 relative to the size of the conduit passageway 1542 upstream of the second adjustment system 1580.

[00338] The outlet member 1556, first adjustment member 1572, seal member 1574, and second adjustment member 1582 are supported by the actuator member 1554 to define a control assembly 1590. Figure 61 further shows that the grip assembly 1558 comprises a grip housing 1592 and a trigger member 1594. Additionally, the grip assembly 1558 is combined with the control assembly 1590 to form the actuator assembly 1538, and the actuator assembly 1538 is supported by the container assembly 1530 as generally described above.

[00339] To operate the thirteenth example aerosol dispensing system 1520, the container 1530 and grip housing 1592 are grasped such that the user's fingers can squeeze the trigger member 1594, thereby depressing the actuator member 1554. The conduit outlet or outlet opening 1546 is initially aimed at a test surface and the actuator member 1554 is depressed to place the valve assembly 1560 in the open configuration such that the pressurized material 1536 forces some of the stored material 1534 out of the container 1530 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture

pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 1522.

[00340] The process of spraying a test pattern and adjusting the first and second adjustment members 1572 and 1582 is repeated until the test pattern formed by the dispensed material 1522 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00341] Leaving the first and second adjustment members 1572 and 1582 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 1520 is then arranged such that the conduit outlet or outlet opening 1546 is aimed at the un-textured portion of the target surface. The trigger member 1594 is again squeezed to place the valve assembly 1560 in the open configuration such that the pressurized material 1536 forces the stored material 1534 out of the container 1530 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00342] With the foregoing general understanding of the operation of the first example aerosol dispensing system 1520 in mind, the details of construction and operation of this example aerosol dispensing system 1520 will now be described in further detail.

[00343] Referring now to Figures 61 and 63-66, the example actuator member 1554 of the thirteenth example aerosol dispensing system 1520 will now be described in further detail. The example actuator member 1554 comprises an

inlet portion 1620 (Figure 61), an outlet portion 1622 (Figures 63-66), a socket portion 1624 (Figures 61 and 63-66), a guide portion 1626 (Figure 61), and a link portion 1628 (Figure 61). The actuator member 1554 further defines an actuator inlet 1630 (Figure 61), an actuator outlet 1632 (Figures 63-66), and an actuator passageway 1634 having a first portion 1636 and a second portion 1638 (Figure 63). As perhaps best shown in Figures 63-66, the outlet portion 1622 of the actuator member 1554 defines a threaded external surface 1640, two or more fingers 1642, a mounting projection 1644 through which the actuator outlet 1632 extends, and a mounting recess 1646 formed around at least a portion of the mounting projection 1644.

[00344] The socket portion 1624 of the actuator member 1554 defines a socket chamber 650 (Figure 63), at least one socket window 1652 (Figure 63), and a locator projection 1654 defining a plurality of locator recesses 1654a, 1654b, and 1654c (Figures 64-66). As shown in Figure 63, the guide portion 1656 of the actuator member 1554 defines at least one guide slot 1656, and the link portion 1628 defines at least one link projection 1658.

[00345] As perhaps best shown in Figures 62-66, the example first adjustment member 1572 comprises a handle portion 1660, a plug portion 1662, a valve portion 1664, and at least one detent projection 1666. A shoulder surface 1668 is formed on the plug portion 1662 adjacent to and surrounding the valve portion 1664. A locator arm 1669 defining a locator bump 1669a extends from the handle portion 1660. A valve blade 1670 extends from the valve portion 1664. The example valve blade 1670 defines a valve surface 1672 and a bottom surface 1674. A notch 1676 is formed in the valve blade adjacent to the valve surface 1672. A transition surface 1678 is formed on the actuator member 1554 at the juncture of the first and second portions 1636 and 1638 of the actuator passageway 1634.

[00346] Referring again to Figure 61, it can be seen that the example grip housing 1592 defines a grip wall 1680 shaped to provide an ergonomic surface

for grasping the dispensing system 1520 during use. A bottom edge 1680a of the grip wall 1680 is sized and dimensioned to frictionally engage the container assembly 1530 to detachably attach the grip housing 1592 to the container assembly 1530 as will be discussed further below. A protection wall 1682 extends in an arc between two portions of the grip wall 1680. Figure 61 illustrates that at least one guide rail 1684 extends radially inwardly from the grip wall 1680. The grip wall 1680 defines a trigger slot 1686. At least one pivot opening 1688 is formed in the grip wall 1680.

[00347] Figure 61 illustrates that the trigger member 1594 defines a trigger wall 1690 and that at least one link flange 1692 extends from the trigger wall 1690. A link opening 1694 is formed in each link flange 1692. At least one pivot projection 1696 extends outwardly from the trigger member 1594.

[00348] The example dispensing system 1520 is assembled as follows. The outlet member 1556 and the first and second actuator members 1572 and 1582 are first assembled to the actuator member 1554 to form the actuator assembly 1538. The outlet member 1556 is arranged between the fingers 1642 such that a portion of the outlet member 1556 extends over the mounting projection 1644 and within the mounting recess 1646. Friction is typically sufficient to hold the outlet member 1556 in position, but adhesive may optionally be used to adhere the outlet member 1556 to the actuator member 1554.

[00349] The second adjustment member 1582 may then be attached to the actuator member 1554 by engaging the threaded surface 1584 on the second adjustment member 1582 with the threaded surface 1640 on the outlet portion 1622 of the actuator member 1554. At some point, continued rotation of the second adjustment member 1582 relative to the actuator member 1554 causes the adjustment member 1582 to force the fingers 1642 radially inwardly. When forced radially inwardly, the fingers 1642 in turn act on the outlet member 1556, pinching or deforming the outlet member 1556 to reduce the cross-sectional area of the conduit outlet or outlet opening 1546.

[00350] The first adjustment member 1572 may then be attached to the actuator member 1554. The seal member 1574 is first placed into the socket chamber 1650, and then first adjustment member 1572 is displaced such that the valve portion 1664 enters the socket chamber 1650 and the detent projections 1666 in their original positions contact the socket portion 1624 of the actuator member 1554. Continued displacement of the first adjustment member 1572 into the socket chamber 1650 causes the detent projections 1666 to resiliently deform slightly towards each other into a deformed position such that the plug portion 1662 enters the socket chamber 1650.

[00351] When the plug portion 1662 is fully within the socket chamber 1650, the shoulder surface 1668 engages and compresses the seal member 1574 to seal the annular space between the plug portion 1662 and the socket portion 1624, and the detent projections 1666 move outwardly to their original positions and into the socket windows 1652. At this point, the valve blade 1670 extends through the adjustment opening 1678 and into the actuator passageway 1634. Additionally, the locator arm 1669 extends from the handle portion 1660 of the first adjustment member 1572 adjacent to the locator projection 1654 on the socket portion 1624 such that the locator bump 1669a is capable of being positively received by any one of the locator recesses 1654a, 1654b, or 1654c as shown in FIGS. 64-66.

[00352] When returned to their original positions relative to the plug portion 1662, the detent projections 1666 engage the socket portion 1624 around the socket windows 1652 to inhibit movement of the first adjustment member 1572 out of the socket chamber 1650 (and thus maintain the valve blade 1670 within the second portion of the actuator passageway 1634). However, the socket windows 1652 are slightly oversized relative to the detent projections 1666. The first adjustment member 1572 is thus capable of rotating within a limited range of movement relative to the socket portion 1624 about a socket axis $A1_S$ defined by the socket chamber 1650. If necessary, the first adjustment member 1572 may

be removed from the actuator member 1554 by pushing the detent projections 1666 through socket windows 1652 such that the detent projections 1666 no longer engage the socket portion 1624.

[00353] The control assembly 1590 is formed when the outlet member 1556, first adjustment member 1572, seal member 1574, and second adjustment member 1582 are secured to the actuator member 1554 as described above. At this point, the control assembly 1590 is attached to the grip assembly 1558 to form the actuator assembly 1538. In particular, the pivot projections 1696 on the trigger member 1594 are inserted into the pivot openings 1688 of the grip housing 1592 such that the trigger wall 1690 extends or is accessible through the trigger slot 1686. The trigger member 5194 rotates relative to the grip housing 1592 about a pivot axis $A1_P$.

[00354] As is perhaps best shown in Figure 61, the actuator assembly 1538 is then formed by displacing the control assembly 1590 into the space between the grip housing 1592 and the trigger member 1594 such that the link projections 1658 extend into the link openings 1694 in the link flanges 1692 of the trigger member 1594. Accordingly, as the trigger member 1594 pivots relative to the grip housing 1592, the link flanges 1692 around the link openings 1694 engage the link projections 1658 to displace the control assembly 1590 relative to the grip assembly 1558. Because the link openings 1694 are slightly elongated and angled with respect to a container axis $A1_C$ defined by the container assembly 1530, however, the control assembly 1590 is capable of linear, in addition to (at this point) pivoting, movement relative to the grip assembly 1558, as will be described in further detail below.

[00355] The actuator assembly 1538 is then attached to the container assembly 1530 by inserting the inlet portion 1620 of the actuator member 1554 through the valve seat 1564 such that the inlet portion 1520 engages the valve member 1562 as shown in Figure 61. At the same time, the perimeter edge 1680a of the grip housing 1592 frictionally engages the container assembly 1530.

[00356] With the actuator assembly 1538 attached to the container assembly 1530, the grip housing 1592 supports the trigger member 1594 for pivoting movement relative to the container assembly 1530, and the control assembly 1590 is supported by the trigger member 1594 and the valve seat 1564 for linear movement relative to the container assembly 1530. At the same time, the protection wall 1682 extends over the top of the actuator assembly 1538 to prevent inadvertent contact with the actuator assembly 1538 that might place the valve system 1560 in the open configuration.

[00357] Squeezing the trigger member 1594 relative to the grip member 1592 towards the control assembly 1590 results in movement of the control assembly 1590 towards the container assembly 1530 from a first position and into a second position. When the control assembly 1590 is in the first position, the valve system 1560 is in its closed configuration. When the control assembly 1590 is in the second position, the valve system 1560 is in its open configuration. The valve spring 1566 returns the valve member 1562 towards the valve seat and thus forces the control assembly 1590 from the second position and into the first position when the trigger member 1594 is released.

[00358] The example second actuator member 1582 operates to deform the outlet member 1556 and alter a cross-sectional area of the conduit outlet or outlet opening 1546 as generally described in U.S. Patent Nos. 6,116,473 and 7,845,532, which are incorporated herein by reference, and thus will not be described or depicted herein in detail. The Applicant notes that other systems and methods for altering the cross-sectional area of a conduit outlet or outlet opening may be used in place of the resiliently deformable outlet member 556, second adjustment member 582, and fingers 642 described herein. U.S. Patent No. 7,500,621, which is incorporated herein by reference, discloses a number of examples of systems and methods for adjusting the outlet opening of an aerosol system in the context of dispensing texture material. Systems and methods for altering a cross-sectional area of an outlet orifice include the use of multiple

straws, each having a different internal diameter, the use of a rotating plate in which holes are formed, the use of a rotating cap in which holes are formed, the use of a deformable tube that is pinched down from an original configuration, and/or the use of a deformable tube that is pulled open from an original configuration.

[00359] The operation of the first adjustment system 1570 is perhaps best understood with reference to Figures 63-66A of the drawings. Figures 64 and 64A illustrate the first adjustment system 1570 in a maximum opening configuration. Figures 65 and 65A illustrate the first adjustment system 1570 in an intermediate opening configuration. Figures 66 and 66A illustrate the first adjustment system 1570 in a minimum opening configuration. The valve blade 1670 thus extends into the actuator passageway 1634 such that the valve blade 1670 is capable of restricting flow of fluid flowing through the actuator passageway 1634. As will be described in further detail below, the amount of restriction depends on the angular position of the valve blade 1670 with respect to at least one of the transition surface 1678, an outlet axis $A1_O$ defined by the actuator passageway 1634, and/or the socket axis $A1_S$.

[00360] The angular position of the valve blade 1670 can be altered by displacing the handle portion 1660 of the first adjustment member 1572 relative to the actuator member 1554. The use of the optional locator projection 1654 and locator arm 1668 allows the first adjustment member 1572 to be locked into any one of a plurality (two or more, three in this case) of positions relative to the actuator member 1554. Optionally, the size and shape of the socket windows 1652 in relation to the size and shape of the detent projections 1666 or other structure may be used to determine absolute limits of rotation of the first adjustment member 1572 relative to the actuator member 1554.

[00361] Additionally, the bottom surface 1672 of the valve blade 1670 is configured to follow the curvature of the actuator passageway 1634 where the adjustment opening 1678 intersects this passageway 1634. The example valve

surface 1672 is configured to cooperate with the transition surface 1678 to define a plurality of discrete cross-sectional dimensions of the actuator passageway 1634.

[00362] In the example first adjustment system 1570, the first adjustment member 1572 is capable of being rotated such that the valve blade 1670 rotates between a fully open position (Figure 64A), an intermediate position (Figure 65A, and a terminal position (Figure 66A). Figure 64A shows that the fully open position leaves the actuator passageway substantially unrestricted. Figure 65A shows that the intermediate position reduces the size of the actuator passageway by a first predetermined amount. Figure 65A shows that the intermediate position reduces the size of the actuator passageway by a second predetermined amount determined substantially by the dimensions of the notch 1676 in the valve blade 1670.

[00363] Accordingly, as the first adjustment member moves from the fully open position to the terminal position through the intermediate position, a cross-sectional area of the actuator passageway 1634 adjacent to the transition surface becomes smaller but is never fully blocked. Each of the three positions allowed by the first adjustment member 1572 are predetermined or tuned for a particular aerosol dispensing system.

[00364] Accordingly, in the example first adjustment system 1570, the system variable controlled by this first adjustment system 1570 may be referred to as percentage closure of the cross-sectional area of the actuator passageway 1634. Relative to the cross-sectional area of the unobstructed actuator passageway 1634, the fully open position of the valve blade 1670 will be block a first predetermined percentage (e.g., 0%) of this cross-sectional area. The predetermined adjustment range allowed by the first adjustment member allows the valve blade 1670 to rotate from the fully open position to the terminal position in which a second predetermined percentage of this cross-sectional area the unobstructed actuator passageway 1634 is blocked. In the intermediate position

a third predetermined percentage of this cross-sectional area the unobstructed actuator passageway 1634 is blocked.

[00365] The following Table N represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 1570:

Table N

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Intermed.	% Passageway	60	55-65	40-70
	Square Inches	.00230	0.00253-0.00207	0.00345-0.00115
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

[00366] In this context, the actual cross-sectional area of the unobstructed passageway second portion 1638 will be determined by such factors as the characteristics of the stored material 1534 (e.g., composition, viscosity) and of the propellant material (e.g., composition, percentage by weight used), and the nature and physical shapes of the desired texture patterns to be obtained using the dispensing system 1520.

I. Fourteenth Example Aerosol Dispensing System

[00367] Referring now to Figures 67-75A of the drawings, depicted at 1720 therein is a fourteenth example aerosol dispensing system constructed in accordance with, and embodying, the principles of the present invention. Like the first example aerosol dispensing system 20a, the fourteenth example dispensing system is adapted to spray droplets of dispensed material 1722 onto a target surface (not shown). In the example use of the dispensing system 1720

depicted in Figure 67, the dispensed material 1722 is or contains texture material, and the dispensing system 1720 is being used to form a coating on an un-textured portion of the target surface having a desired texture pattern that substantially matches a pre-existing texture pattern of a textured portion of the target surface.

[00368] Figure 67 further illustrates that the example dispensing system 1720 comprises a container 1730 defining a chamber 1732 in which stored material 1734 and pressurized material 1736 are contained. Like the stored material 34 described above, the stored material 1734 is a mixture of texture material and propellant material in liquid phase, while the pressurized material is propellant material in gas phase. An actuator assembly 1738 is mounted on the container assembly 1730 to facilitate the dispensing of the dispensed material 1722 as will be described in further detail below.

[00369] Figure 68 illustrates that the fourteenth example aerosol dispensing system 1720 comprises a conduit 1740 defining a conduit passageway 1742. The conduit 1740 is supported by the container 1730 such that the conduit passageway 1742 defines a conduit inlet 1744 (Figure 67) arranged within the chamber 1732 and a conduit outlet or outlet opening 1746 arranged outside of the chamber 1732. The example conduit 1740 is formed by an inlet tube 1750 (Figures 67 and 68), a valve housing 1752 (Figures 67 and 68), an actuator member 1754 (Figures 68, 72), and an outlet member 1756 (Figures 72-75). The conduit passageway 1742 extends through the inlet tube 1750, the valve housing 1752, the actuator member 1754, and the outlet member 1756. The valve housing 1752 is arranged between the conduit inlet 1744 and the actuator member 1754, and the actuator member 1754 is arranged between the valve housing 1752 and the conduit outlet 1746. The outlet member 1756 is supported by the actuator member 1754 to define the conduit outlet 1746.

[00370] As shown in Figure 68, arranged within the valve housing 1752 is a valve assembly 1760. The example valve assembly 1760 comprises a valve

member 1762, a valve seat 1764, and a valve spring 1766. The valve assembly 1760 operates in a closed configuration and an open configuration. In the closed configuration, the valve spring 1766 forces the valve member 1762 against the valve seat 1764 such that the valve assembly 1760 substantially prevents flow of fluid along the conduit passageway 1742. In the open configuration, the valve member 1762 is displaced away from the valve seat 1764 against the force of the valve spring 1766 such that the valve assembly 1760 allows flow of fluid along the conduit passageway 1742 between the valve member 1762 and the valve seat 1764. Because the valve spring 1766 biases the valve member 1762 towards the valve seat 1764, the example valve assembly 1760 is normally closed. As will be described in further detail below, the valve assembly 1760 engages the actuator member structure 1754 such that the application of deliberate manual force on the actuator member 1754 towards the container 1730 moves the valve member 1762 away from the valve seat 1764 and thus places the valve system 1760 in the open configuration.

[00371] A first flow adjustment system 1770 having a first adjustment member 1772 and a seal member 1774 is arranged at an intermediate location along the conduit passageway 1742 between the valve assembly 1760 and the conduit outlet 1746. In particular, rotation of the first adjustment member 1772 relative to the actuator member 1754 alters a cross-sectional area of the conduit passageway 1742 between the valve system 1760 and the second flow adjustment system 1780.

[00372] A second flow adjustment system 1780 having a second adjustment member 1782 is arranged in the conduit passageway 1742 to form at least a portion of the conduit outlet or outlet opening 1746. In particular, the second adjustment member 1782 defines a threaded surface 1784 that engages the actuator member 1754 such that rotation of the second adjustment member 1782 relative to the actuator member 1754 deforms the outlet member 1756 and thereby alters a cross-sectional area of the conduit outlet or outlet opening 1746.

[00373] The first flow adjustment system 1770 is supported by the actuator member 1754 between the valve assembly 1760 and the second adjustment system 1780 such that manual operation of the first adjustment member 1772 affects the flow of fluid material along the conduit passageway 1742. In particular, the second adjustment system 1780 functions as a flow restrictor, where operation of the first adjustment member 1772 variably reduces the size of the conduit passageway 1742 such that a pressure of the fluid material upstream of the first flow adjustment system 1770 is relatively higher than the pressure of the fluid material downstream of the first flow adjustment system 1770.

[00374] The second adjustment system 1780 is supported by the actuator member 1754 downstream of the second adjustment system 1780. The outlet member 1756 is a resiliently deformable tube, and manual operation of the second adjustment member 1782 deforms the walls of the outlet member 1756 and thereby affects the flow of fluid material flowing out of the conduit passageway 1742 through the conduit outlet or outlet opening 1746. The second adjustment system 1780 thus functions as a variable orifice. Operation of the second adjustment member 1782 variably reduces the size of the conduit outlet or outlet opening 1746 relative to the size of the conduit passageway 1742 upstream of the second adjustment system 1780.

[00375] The outlet member 1756, first adjustment member 1772, seal member 1774, and second adjustment member 1782 are supported by the actuator member 1754 to define a control assembly 1790. Figure 68 further shows that the grip assembly 1758 comprises a grip housing 1792 and a trigger member 1794. Additionally, the grip assembly 1758 is combined with the control assembly 1790 to form the actuator assembly 1738, and the actuator assembly 1738 is supported by the container assembly 1730 as generally described above.

[00376] To operate the fourteenth example aerosol dispensing system 1720, the container 1730 and grip housing 1792 are grasped such that the user's fingers can squeeze the trigger member 1794, thereby depressing the actuator

member 1754. The conduit outlet or outlet opening 1746 is initially aimed at a test surface and the actuator member 1754 is depressed to place the valve assembly 1760 in the open configuration such that the pressurized material 1736 forces some of the stored material 1734 out of the container 1730 and onto the test surface to form a test texture pattern. The test texture pattern is compared to the pre-existing texture pattern defined by the textured portion of the target surface. If the test texture pattern does not match the pre-existing texture pattern, one or both of the first and second adjustment members is/are adjusted to alter the spray pattern of the droplets of dispensed material 1722.

[00377] The process of spraying a test pattern and adjusting the first and second adjustment members 1772 and 1782 is repeated until the test pattern formed by the dispensed material 1722 corresponds to a desired texture pattern that substantially matches the pre-existing texture pattern.

[00378] Leaving the first and second adjustment members 1772 and 1782 as they were when the test texture pattern corresponded to the desired texture pattern, the aerosol dispensing system 1720 is then arranged such that the conduit outlet or outlet opening 1746 is aimed at the un-textured portion of the target surface. The trigger member 1794 is again squeezed to place the valve assembly 1760 in the open configuration such that the pressurized material 1736 forces the stored material 1734 out of the container 1730 and onto the un-textured portion of the target surface to form the desired texture pattern on the un-textured portion of the target surface, perhaps overlapping slightly with the textured portion of the target surface. Since the desired texture pattern substantially matches the pre-existing texture pattern, the dispensed material forms a coating on the previously un-textured portion of the target surface that substantially matches a physical appearance of the textured portion. One or more layers of primer and/or paint may next be applied over the cured layer of dispensed material on the target surface.

[00379] With the foregoing general understanding of the operation of the first example aerosol dispensing system 20a in mind, the details of construction and operation of this example aerosol dispensing system 1720 will now be described in further detail.

[00380] Referring now to Figures 68 and 72-75, the example actuator member 1754 of the fourteenth example aerosol dispensing system 1720 will now be described in further detail. The example actuator member 1754 comprises an inlet portion 1820 (Figure 68), an outlet portion 1822 (Figures 72-75), a socket portion 1824 (Figures 68 and 72-75), a guide portion 1826 (Figure 68), and a link portion 1828 (Figure 68). The actuator member 1754 further defines an actuator inlet 1830 (Figure 68), an actuator outlet 1832 (Figures 72-75), and an actuator passageway 1834 having a first portion 1836 and a second portion 1838 (Figure 72). As perhaps best shown in Figures 72-75, the outlet portion 1822 of the actuator member 1754 defines a threaded external surface 1840, two or more fingers 1842, a mounting projection 1844 through which the actuator outlet 1832 extends, and a mounting recess 1846 formed around at least a portion of the mounting projection 1844.

[00381] The socket portion 1824 of the actuator member 1754 defines a socket chamber 1850 (Figure 72), at least one socket window 1852 (Figure 68), and a locator projection 1854 (Figures 73-75). As shown in Figure 68, the guide portion 1856 of the actuator member 1754 defines at least one guide slot 1856, and the link portion 1828 defines at least one link projection 1858.

[00382] As perhaps best shown in Figures 69-75, the example first adjustment member 1772 comprises a handle portion 1860, a plug portion 1862, a valve portion 1864, and at least one detent projection 1866. A frustoconical shoulder surface 1868 is formed on the plug portion 1862 adjacent to and surrounding the valve portion 1864. A locator arm 1869 defining a plurality of locator recesses 1869a, 1869b, and 1869c extends from the handle portion 1860. A valve blade 1870 extends from the valve portion 1864.

[00383] As perhaps best shown in Figures 70 and 71, the example valve blade 1870 defines a valve slot 1872 and a bottom surface 1874. A side notch 1876 is formed in the valve blade adjacent to the valve slot 1872. A transition surface 1878 is formed on the actuator member 1754 at the juncture of the first and second portions 836 and 838 of the actuator passageway 1834. As will be explained in further detail below with reference to Figures 73-75 and 73A-75A, the valve slot 1872 and associated side notch 1876 define a valve blade shape that, when oriented with respect to the transition surface 1878, yields a continuum of restriction profiles for the cross-sectional area of the actuator passageway 1834 and also to allow the actuator member 1754 easily to be injection molded from plastic.

[00384] Referring back to Figure 68, it can be seen that the example grip housing 1792 defines a grip wall 1880 shaped to provide an ergonomic surface for grasping the dispensing system 1720 during use. A bottom edge 1880a of the grip wall 1880 is sized and dimensioned to frictionally engage the container assembly 1730 to detachably attach the grip housing 1792 to the container assembly 1730 as will be discussed further below. A protection wall 1882 extends in an arc between two portions of the grip wall 1880. Figure 68 illustrates that at least one guide rail 1884 extends radially inwardly from the grip wall 1880. The grip wall 1880 defines a trigger slot 1886. At least one pivot opening 1888 is formed in the grip wall 1880.

[00385] Figure 68 illustrates that the trigger member 1794 defines a trigger wall 1890 and that at least one link flange 1892 extends from the trigger wall 1890. A link opening 1894 is formed in each link flange 1892. At least one pivot projection 1896 extends outwardly from the trigger member 1794.

[00386] The example dispensing system 1720 is assembled as follows. The outlet member 1756 and the first and second actuator members 1772 and 1782 are first assembled to the actuator member 1754 to form the actuator assembly 1738. The outlet member 1756 is arranged between the fingers 1842 such that a

portion of the outlet member 1756 extends over the mounting projection 1844 and within the mounting recess 1846. Friction is typically sufficient to hold the outlet member 1756 in position, but adhesive may optionally be used to adhere the outlet member 1756 to the actuator member 1754.

[00387] The second adjustment member 1782 may then be attached to the actuator member 1754 by engaging the threaded surface 1784 on the second adjustment member 1782 with the threaded surface 1840 on the outlet portion 1822 of the actuator member 1754. At some point, continued rotation of the second adjustment member 1782 relative to the actuator member 1754 causes the adjustment member 1782 to force the fingers 1842 radially inwardly. When forced radially inwardly, the fingers 1842 in turn act on the outlet member 1756, pinching or deforming the outlet member 1756 to reduce the cross-sectional area of the conduit outlet or outlet opening 1746.

[00388] The first adjustment member 1772 may then be attached to the actuator member 1754. The seal member 1774 is first placed into the socket chamber 1850, and then first adjustment member 1772 is displaced such that the valve portion 1864 enters the socket chamber 1850 and the detent projections 1866 in their original positions contact the socket portion 1824 of the actuator member 1754. Continued displacement of the first adjustment member 1772 into the socket chamber 1850 causes the detent projections 1866 to resiliently deform slightly towards each other into a deformed position such that the plug portion 1862 enters the socket chamber 1850.

[00389] When the plug portion 1862 is fully within the socket chamber 1850, the shoulder surface 1868 engages and compresses the seal member 1774 to seal the annular space between the plug portion 1862 and the socket portion 1824, and the detent projections 1866 move outwardly to their original positions and into the socket windows 1852. At this point, the valve blade 1870 extends through the adjustment opening 1878 and into the actuator passageway 1834. Additionally, the locator arm 1869 extends from the handle portion 1860 of the

first adjustment member 1772 adjacent to the locator projection 1854 on the socket portion 1824 such that the locator bump 1854 is capable of being positively received by any one of the locator recesses 1869a, 1869b, or 1869c as shown in Figures 73-75.

[00390] When returned to their original positions relative to the plug portion 1862, the detent projections 1866 engage the socket portion 1824 around the socket windows 1852 to inhibit movement of the first adjustment member 1772 out of the socket chamber 1850 (and thus maintain the valve blade 1870 within the second portion of the actuator passageway 1834). However, the socket windows 1852 are slightly oversized relative to the detent projections 1866. The first adjustment member 1772 is thus capable of rotating within a limited range of movement relative to the socket portion 1824 about a socket axis $A1_S$ defined by the socket chamber 1850. If necessary, the first adjustment member 1772 may be removed from the actuator member 1754 by pushing the detent projections 1866 through socket windows 1852 such that the detent projections 1866 no longer engage the socket portion 1824.

[00391] The control assembly 1790 is formed when the outlet member 1756, first adjustment member 1772, seal member 1774, and second adjustment member 1782 are secured to the actuator member 1754 as described above. At this point, the control assembly 1790 is attached to the grip assembly 1758 to form the actuator assembly 1738. In particular, the pivot projections 1896 on the trigger member 1794 are inserted into the pivot openings 1888 of the grip housing 1792 such that the trigger wall 1890 extends or is accessible through the trigger slot 1886. The trigger member 1794 rotates relative to the grip housing 1792 about a pivot axis $A1_P$.

[00392] As is perhaps best shown in Figure 68, the actuator assembly 1738 is then formed by displacing the control assembly 1790 into the space between the grip housing 1792 and the trigger member 1794 such that the link projections 1858 extend into the link openings 1894 in the link flanges 1892 of the trigger

member 1794. Accordingly, as the trigger member 1794 pivots relative to the grip housing 1792, the link flanges 1892 around the link openings 1894 engage the link projections 1858 to displace the control assembly 1790 relative to the grip assembly 1758. Because the link openings 1894 are slightly elongated and angled with respect to a container axis $A1_C$ defined by the container assembly 1730, however, the control assembly 1790 is capable of linear, in addition to (at this point) pivoting, movement relative to the grip assembly 1758, as will be described in further detail below.

[00393] The actuator assembly 1738 is then attached to the container assembly 1730 by inserting the inlet portion 1820 of the actuator member 1754 through the valve seat 1764 such that the inlet portion 1820 engages the valve member 1762 as shown in Figure 68. At the same time, the perimeter edge 1880a of the grip housing 1792 frictionally engages the container assembly 1730.

[00394] With the actuator assembly 1738 attached to the container assembly 1730, the grip housing 1792 supports the trigger member 1794 for pivoting movement relative to the container assembly 1730, and the control assembly 1790 is supported by the trigger member 1794 and the valve seat 1764 for linear movement relative to the container assembly 1730. At the same time, the protection wall 1882 extends over the top of the actuator assembly 1738 to prevent inadvertent contact with the actuator assembly 1738 that might place the valve system 1760 in the open configuration.

[00395] Squeezing the trigger member 1794 relative to the grip member 1792 towards the control assembly 1790 results in movement of the control assembly 1790 towards the container assembly 1730 from a first position and into a second position. When the control assembly 1790 is in the first position, the valve system 1760 is in its closed configuration. When the control assembly 1790 is in the second position, the valve system 1760 is in its open configuration. The valve spring 1766 returns the valve member 1762 towards the valve seat and

thus forces the control assembly 1790 from the second position and into the first position when the trigger member 1794 is released.

[00396] The example second actuator member 1782 operates to deform the outlet member 1756 and alter a cross-sectional area of the conduit outlet or outlet opening 1746 as generally described in U.S. Patent Nos. 6,116,473 and 7,845,532, which are incorporated herein by reference, and thus will not be described or depicted herein in detail. The Applicant notes that other systems and methods for altering the cross-sectional area of a conduit outlet or outlet opening may be used in place of the resiliently deformable outlet member 756, second adjustment member 782, and fingers 842 described herein. U.S. Patent No. 7,500,621, which is incorporated herein by reference, discloses a number of examples of systems and methods for adjusting the outlet opening of an aerosol system in the context of dispensing texture material. Systems and methods for altering a cross-sectional area of an outlet orifice include the use of multiple straws, each having a different internal diameter, the use of a rotating plate in which holes are formed, the use of a rotating cap in which holes are formed, the use of a deformable tube that is pinched down from an original configuration, and/or the use of a deformable tube that is pulled open from an original configuration.

[00397] The operation of the first adjustment system 1770 is perhaps best understood with reference to Figures 72-75A of the drawings. Figures 73 and 73A illustrate the first adjustment system 1770 in a maximum opening configuration. Figures 74 and 74A illustrate the first adjustment system 1770 in an intermediate opening configuration. Figures 75 and 75A illustrate the first adjustment system 1770 in a minimum opening configuration. The valve blade 1870 thus extends into the actuator passageway 1834 such that the valve blade 1870 is capable of restricting flow of fluid flowing through the actuator passageway 1834. As will be described in further detail below, the amount of restriction depends on the angular position of the valve blade 1870 with respect

to at least one of the transition surface 1878, an outlet axis $A1_O$ defined by the actuator passageway 1834, and/or the socket axis $A1_S$.

[00398] The angular position of the valve blade 1870 can be altered by displacing the handle portion 1860 of the first adjustment member 1772 relative to the actuator member 1754. The use of the optional locator projection 1854 and locator arm 1869 allows the first adjustment member 1772 to be locked into any one of a plurality (two or more, three in this case) of positions relative to the actuator member 1754. Optionally, the size and shape of the socket windows 1852 in relation to the size and shape of the detent projections 1866 may determine the limits of rotation of the first adjustment member 1772 relative to the actuator member 1754 to a predetermined adjustment range.

[00399] Additionally, the bottom surface 1872 of the valve blade 1870 is configured to follow the curvature of the actuator passageway 1834 where the adjustment opening 1878 intersects this passageway 1834. The example valve slot 1872 is configured to cooperate with the transition surface 1878 to define a plurality of discrete cross-sectional dimensions of the actuator passageway 1834.

[00400] In the example first adjustment system 1770, the first adjustment member 1772 is capable of being rotated such that the valve blade 1870 rotates between a fully open position (Figure 73A), an intermediate position (Figure 74A, and a terminal position (Figure 75A). Figure 73A shows that the fully open position leaves the actuator passageway unrestricted (0% blocked). Figure 74A shows that the intermediate position reduces the size of the actuator passageway by a first predetermined amount. Figure 74A shows that the terminal position reduces the size of the actuator passageway by a second predetermined amount determined substantially by the dimensions of the notch 1876 in the valve blade 1870.

[00401] Accordingly, as the first adjustment member moves from the fully open position to the terminal position through the intermediate position, a cross-

sectional area of the actuator passageway 1834 adjacent to the transition surface becomes smaller but is never fully blocked. Each of the three positions allowed by the first adjustment member 1772 are predetermined or tuned for a particular aerosol dispensing system.

[00402] Accordingly, in the example first adjustment system 1770, the system variable controlled by this first adjustment system 1770 may be referred to as percentage closure of the cross-sectional area of the actuator passageway 1834. Relative to the cross-sectional area of the unobstructed actuator passageway 1834, the fully open position of the valve blade 1870 will block a first predetermined percentage (e.g., 0%) of this cross-sectional area. The predetermined adjustment range allowed by the first adjustment member allows the valve blade 1870 to rotate from the fully open position to the terminal position in which a second predetermined percentage of this cross-sectional area the unobstructed actuator passageway 1834 is blocked. In the intermediate position a third predetermined percentage of this cross-sectional area the unobstructed actuator passageway 1834 is blocked.

[00403] The following Table O represents example ranges and dimensions for constructing a physical embodiment of a flow adjustment system that may be used as the example first flow adjustment system 1770:

Table O

Config.	Units	Example	First Range	Second Range
Fully Open	% Passageway	100	95-100	90-100
	Square Inches	.00385	0.00424-0.00347	0.00578-0.00193
Intermed.	% Passageway	60	55-65	40-70
	Square Inches	.00230	0.00253-0.00207	0.00345-0.00115
Terminal	% Passageway	12	8-16	5-20
	Square Inches	.00045	0.00050-0.00041	0.00068-0.00023

[00404] In this context, the actual cross-sectional area of the unobstructed passageway second portion 1838 will be determined by such factors as the characteristics of the stored material 1734 (e.g., composition, viscosity) and of the propellant material (e.g., composition, percentage by weight used), and the nature and physical shapes of the desired texture patterns to be obtained using the dispensing system 1720.

[00405] Accordingly, the embodiments described herein may be embodied in other specific forms without departing from their spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrative and not restrictive. The scope of the invention is, therefore, indicated by the claims to be appended hereto rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

TABLE A-4

Ref.	Material	Commercial Example	Function/Description	Example	First Range	Second Range
A	Diacetone alcohol		Medium-evaporating, low odor solvent	3.85	3.85±5%	3.85±10%
B	Propylene Carbonate		Slow evaporating, low odor solvent	2.31	2.31±5%	2.31±10%
C	Denatured Ethanol	PM 6193-200	Fast evaporating, low odor solvent	13.33	13.33±5%	13.33±10%
D	Resin	TB-044 resin (Dai)	Acrylic resin/binder (soluble in "weak" solvents)	4.93	4.93±5%	4.93±10%
E	Clay Pigment	Bentone 34	Anti-settle/anti-sag clay pigment	1.26	1.26±5%	1.26±10%
F	Fumed Silica	Aerosil R972	Anti-settle fumed silica	0.08	0.08±5%	0.08±10%
G	Dispersant	Byk Anti-Terra 204	Dispersing aid	0.51	0.51±5%	0.51±10%
H	Calcium carbonate	MarbleWhite 200 (Specialty Minerals)	filler/extender	33.87	33.87±5%	33.87±10%
I	Nepheline syenite	Minex 4	filler/extender	33.87	33.87±5%	33.87±10%
J	Denatured Ethanol	PM 6193-200	Fast evaporating, low odor solvent	4.00	4.00±5%	4.00±10%
K	Denatured Ethanol	PM 6193-200	Fast evaporating, low odor solvent	1.99	1.99±5%	1.99±10%
				100		

TABLE A-5

Ref.	Material	Commercial Example	Function/Description	Example	First Range	Second Range
A	Diacetone alcohol		Medium-evaporating, low odor solvent	13.73	5 – 15%	0 – 20%
B	Propylene Carbonate		Slow evaporating, low odor solvent	2.11	1 – 3%	0 – 5%
C	Denatured Ethanol	PM 6193-200	Fast evaporating, low odor solvent	10.56	5 – 15%	0 – 20%
D	Resin	TB-044 resin (Dai)	Acrylic resin/binder (soluble in "weak" solvents)	4.93	2 – 6%	1 – 10%
E	Clay Pigment	Bentone 34	Anti-settle/anti-sag clay pigment	1.26	0.5 – 1.5%	0.1 – 2.0%
F	Fumed Silica	Aerosil R972	Anti-settle fumed silica	0.08	0 – 0.20%	0 – 0.50%
G	Dispersant	Byk Anti-Terra 204	Dispersing aid	0.51	0.3 – 0.7%	0.1 – 1.5%
H	Calcium carbonate	MarbleWhite 200 (Specialty Minerals)	filler/extender	33.87	20 – 40%	0 – 70%
I	Nepheline syenite	Minex 4	filler/extender	33.87	20 – 40%	0 – 70%
J	Titanium Dioxide		White pigment	0.00	0 – 5%	0 – 20%
K	Calcined clay	Optiwhite	White extender pigment	0.00	0-10%	0 – 20%
L	Hexane		Very fast evaporating, low odor solvent	0.00	0 – 10%	0 – 20%

What is claimed is:

1. An aerosol dispensing system for dispensing stored material in a spray, comprising:

a container defining a chamber containing the stored material and pressurized material;

a conduit defining a conduit passageway having a conduit inlet and a conduit outlet, where the conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber;

a first adjustment system arranged to vary a flow of stored material along the conduit passageway, where the first adjustment system is arranged between the conduit inlet and the conduit outlet; and

a second adjustment system arranged to vary the flow of stored material along the conduit passageway, where the second adjustment system is arranged between the first adjustment system and the conduit outlet.

2. An aerosol dispensing system as recited in claim 1, in which the stored material is texture material.

3. An aerosol dispensing system as recited in claim 1, in which the first adjustment system is arranged to define an effective cross-sectional area of the conduit passageway.

4. An aerosol dispensing system as recited in claim 1, in which the second adjustment system is arranged to define an effective cross-sectional area of the conduit outlet.

5. An aerosol dispensing system as recited in claim 3, in which the second adjustment system is arranged to define an effective cross-sectional area of the conduit outlet.

6. A method of dispensing stored material in a spray, comprising the steps of:

arranging the stored material and pressurized material in a chamber;

arranging a conduit such that a conduit inlet is arranged within the chamber and a conduit outlet is arranged outside of the chamber;

varying a flow of stored material at a first location along the conduit passageway, where the first location is arranged between a conduit inlet defined by the conduit passageway and a conduit outlet defined by the conduit passageway; and

varying the flow of stored material at a second location along the conduit passageway, where the third location is arranged between the first location and the conduit outlet.

7. A method as recited in claim 6, in which the stored material is texture material.

8. A method as recited in claim 6, in which the step of controlling the flow of stored material at the second location comprises the step of altering an effective cross-sectional area of the conduit passageway at the second location.

9. A method as recited in claim 6, in which the step of controlling the flow of stored material at the second location comprises the step of restricting flow of fluid along the conduit passageway.

10. A method as recited in claim 6, in which the step of controlling the flow of stored material at the second location comprises the step of creating a pressure differential between the fluid material upstream of the second location and pressure of the fluid material downstream of the second location.

11. A method as recited in claim 6, in which the step of controlling the flow of stored material at the third location comprises the step of altering an effective cross-sectional area of the conduit outlet.

12. A method as recited in claim 6, in which the step of controlling flow of stored material at a first location along the conduit passageway comprises the step of selectively altering a first cross-sectional area at the first location of the conduit passageway to allow and prevent flow of stored material along a conduit passageway at the first location.

13. An aerosol dispensing system for dispensing stored material in a spray, comprising:

a container defining a chamber containing the stored material and pressurized material;

a conduit defining a conduit passageway having a conduit inlet and a conduit outlet, where the conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber;

a valve assembly arranged selectively to allow and prevent flow of stored material along the conduit passageway;

a first adjustment member arranged to vary a flow of stored material along the conduit passageway, where the first adjustment member is arranged between the conduit inlet and the conduit outlet; and

a second adjustment member arranged to vary a flow of stored material along the conduit passageway, where the second adjustment member is arranged between the first adjustment member and the conduit outlet.

14. An aerosol dispensing system as recited in claim 13, in which the stored material is texture material.

15. An aerosol dispensing system as recited in claim 13, in which the first adjustment member is arranged to define an effective cross-sectional area of the conduit passageway.

16. An aerosol dispensing system as recited in claim 13, in which the second adjustment member is arranged to define an effective cross-sectional area of the conduit outlet.

17. An aerosol dispensing system as recited in claim 15, in which the second adjustment member is arranged to define an effective cross-sectional area of the conduit outlet.

18. An aerosol dispensing system for dispensing stored material in a spray, comprising:

a container defining a chamber containing the stored material and pressurized material;

a conduit defining a conduit passageway having a conduit inlet and a conduit outlet, where the conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber;

a valve system arranged selectively to allow and prevent flow of stored material along the conduit passageway;

a first adjustment system arranged to control flow of stored material along the conduit passageway, where the first adjustment system is arranged between the conduit inlet and the conduit outlet; and

a second adjustment system arranged to control flow of stored material along the conduit passageway, where the second adjustment system is arranged between the first adjustment system and the conduit outlet.

19. An aerosol dispensing system as recited in claim 18, in which the stored material is texture material.

20. An aerosol dispensing system as recited in claim 18, in which the first adjustment system is arranged to define an effective cross-sectional area of the conduit passageway.

21. An aerosol dispensing system as recited in claim 18, in which the second adjustment system is arranged to define an effective cross-sectional area of the conduit outlet.

22. An aerosol dispensing system as recited in claim 20, in which the second adjustment system is arranged to define an effective cross-sectional area of the conduit outlet.

23. A method of dispensing stored material in a spray, comprising:

arranging the stored material and pressurized material in a chamber;

a conduit defining a conduit passageway having a conduit inlet and a conduit outlet, where the conduit inlet is arranged within the chamber and the conduit outlet is arranged outside of the chamber;

selectively altering a first cross-sectional area of the conduit passageway to allow and prevent flow of stored material at a first location along a conduit passageway;

controlling flow of stored material at a second location along the conduit passageway, where the second location is arranged between the first location and a conduit outlet defined by the conduit passageway; and

controlling flow of stored material at a third location along the conduit passageway, where the third location is arranged between the second location and the conduit outlet.

24. A method as recited in claim 23, in which the stored material is texture material.

25. A method as recited in claim 23, in which the step of controlling the flow of stored material at the second location comprises the step of altering an effective cross-sectional area of the conduit passageway at the second location.

26. A method as recited in claim 23, in which the step of controlling the flow of stored material at the second location comprises the step of restricting flow of fluid along the conduit passageway.

27. A method as recited in claim 23, in which the step of controlling the flow of stored material at the second location comprises the step of creating a pressure differential between the fluid material upstream of the second location and pressure of the fluid material downstream of the second location.

28. A method as recited in claim 23, in which the step of controlling the flow of stored material at the third location comprises the step of altering an effective cross-sectional area of the conduit outlet.

29. An aerosol dispensing system for dispensing stored material in a spray, comprising:

a container defining a chamber containing the stored material and pressurized material;

a conduit comprising

an inlet tube defining a conduit inlet,

a valve housing,

an actuator member,

an outlet member defining a conduit outlet, and

a conduit passageway, where the conduit passageway extends through conduit inlet defined by the inlet tube, the valve housing, the actuator member, and the conduit outlet defined by the outlet member;

a valve assembly supported by the valve housing, where

the valve assembly is normally in a closed configuration in which fluid is substantially prevented from flowing along the conduit passageway, and

the actuator member is supported relative to the valve assembly such that displacement of the actuator member towards the container places the valve assembly in an open configuration in which fluid is allowed to flow along the conduit passageway;

a first adjustment system comprising

a first adjustment member supported for movement relative to the actuator member, where

a valve portion of the first adjustment member is arranged within the conduit passageway, and

movement of the first adjustment member relative to the actuator member causes the valve portion of the first adjustment member to alter an effective cross-sectional area of the conduit passageway at a first location, and

a seal member arranged to prevent fluid flow between the first adjustment member and the actuator member; and

a second adjustment member supported for movement relative to the actuator member, where movement of the second adjustment member relative to the actuator member deforms the outlet member to alter an effective cross-sectional area of the conduit passageway at a second location.

30. An aerosol dispensing system as recited in claim 29, in which the stored material is texture material.

31. An aerosol dispensing system as recited in claim 29, in which the actuator member supports the first and second adjustment systems.

32. An aerosol dispensing system as recited in claim 29, in which the adjustment portion of the first adjustment member is shaped such that rotation of the first adjustment member relative to the actuator structure alters the cross-sectional area of the actuator passageway.

33. An aerosol dispensing system as recited in claim 29, in which the actuator structure defines a plurality of fingers that support the outlet member, where the second adjustment member deforms the fingers to deform the outlet member.

34. An aerosol dispensing system as recited in claim 29, in which the valve portion defines a valve blade shaped to alter an effective area of the conduit passageway as the first adjustment member moves relative to the actuator member.

35. A texture material for forming a coating having a desired texture pattern on a target surface, comprising:

a first solvent having a first evaporation rate;

a second solvent having a second evaporation rate, where the second evaporation rate is lower than the first evaporation rate;

a third solvent having a third evaporation rate, where the third evaporation rate is higher than the first evaporation rate;

a binder;

a pigment;

fumed silica;

a dispersant;

a first filler extender;

a second filler extender.

36. A texture material as recited in claim 35, further comprising a pigment.

37. A texture material as recited in claim 35, further comprising a pigment extender.

38. A texture material as recited in claim 35, further comprising a fourth solvent having a fourth evaporation rate, where the fourth evaporation rate is higher than the third evaporation rate.

FIG. 1

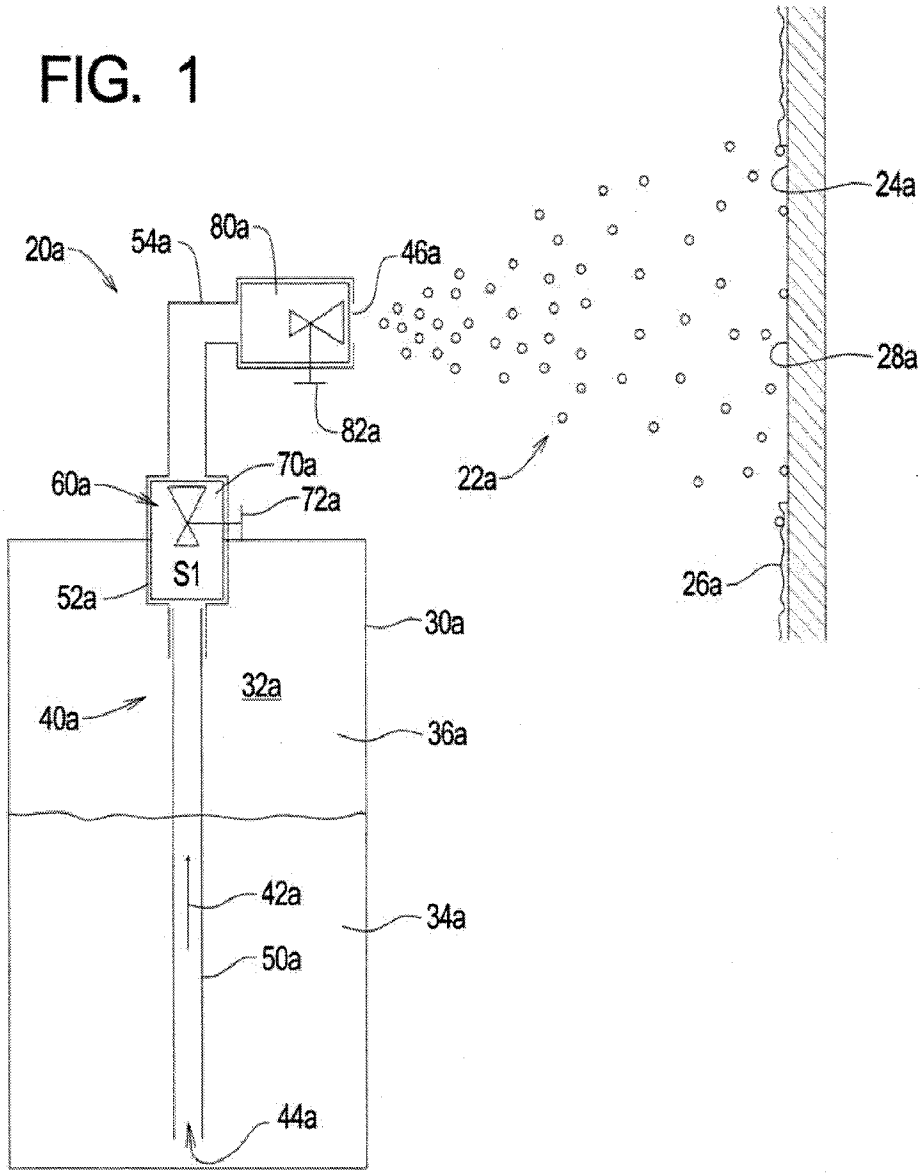

20a
54a
80a
46a
24a
28a
82a
22a
60a
70a
72a
S1
52a
26a
30a
32a
40a
36a
42a
34a
50a
44a

FIG. 2

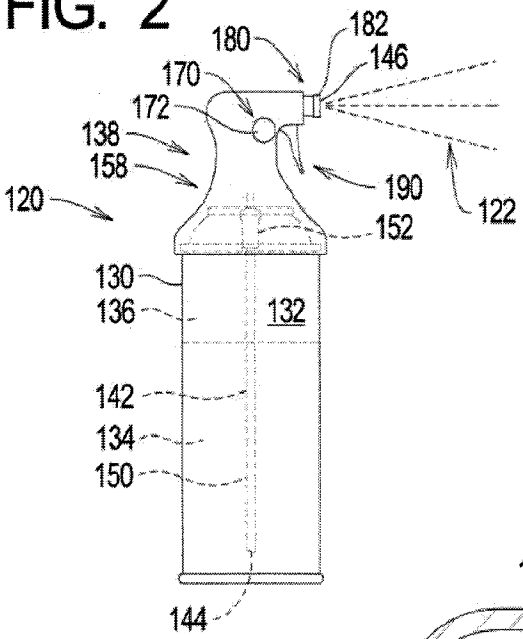


FIG. 3A

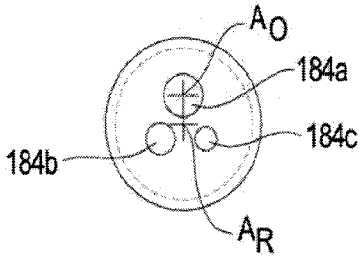


FIG. 3

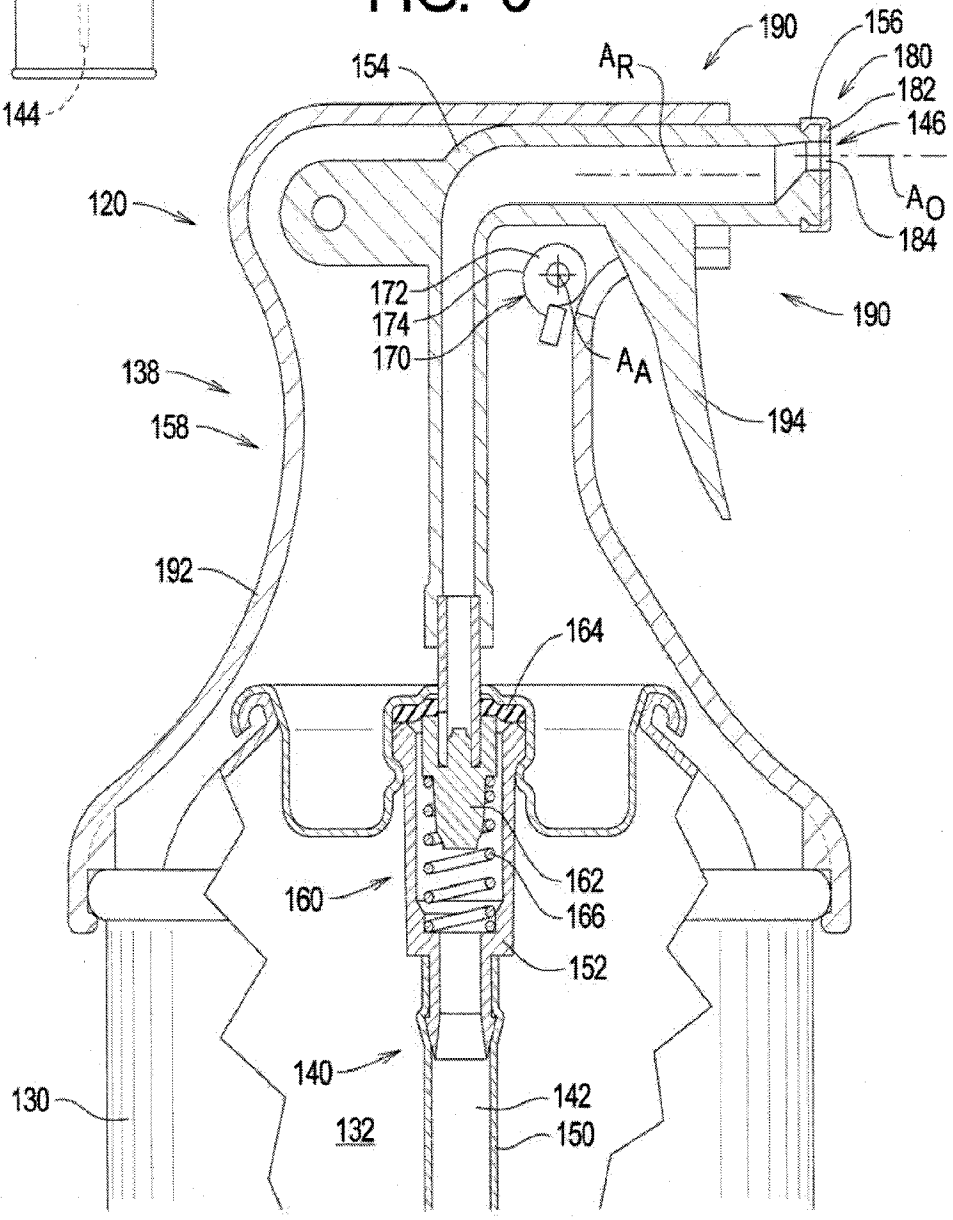


FIG. 4

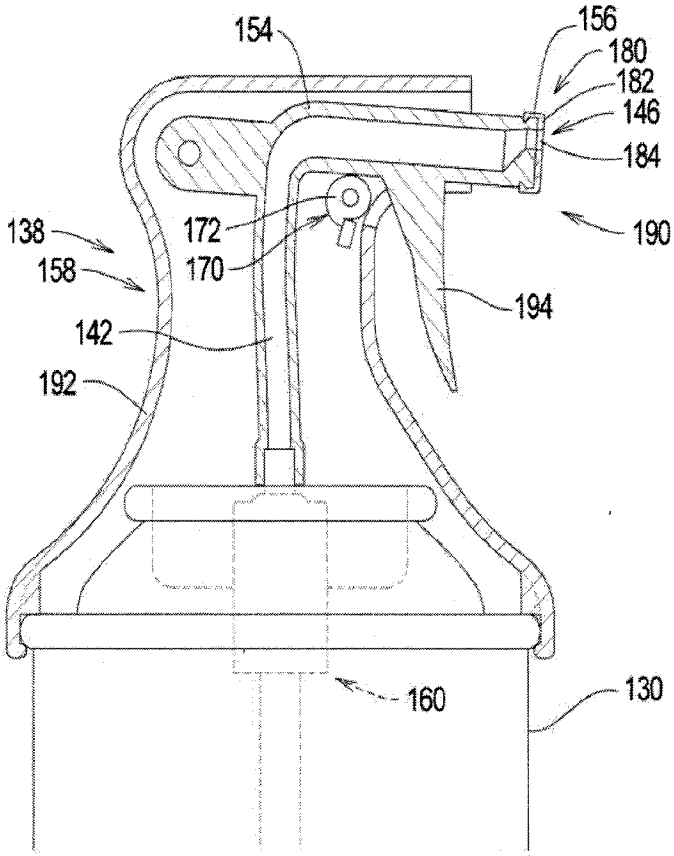

154
156
180
182
146
184
190
138
158
172
170
194
142
192
160
130

FIG. 5

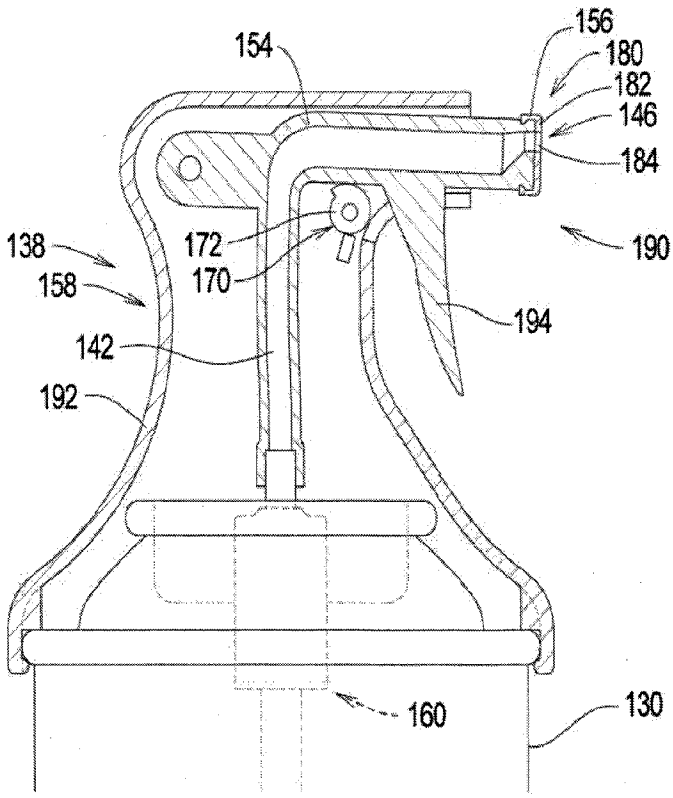

154
156
180
182
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184
190
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158
172
170
194
142
192
160
130

FIG. 6

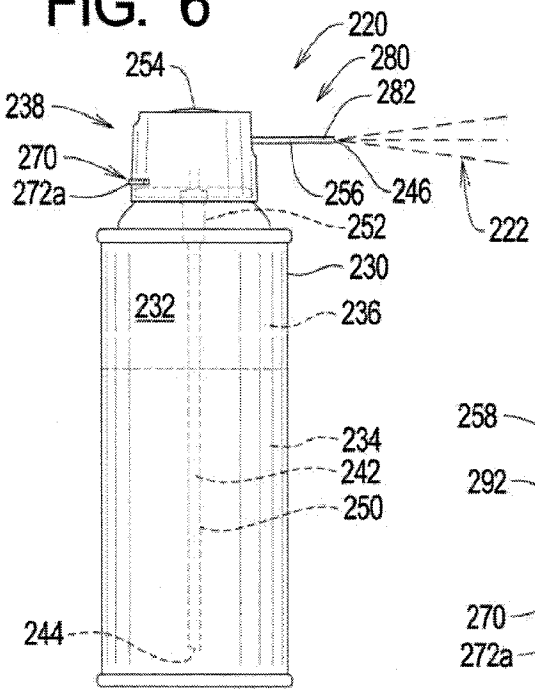


FIG. 8

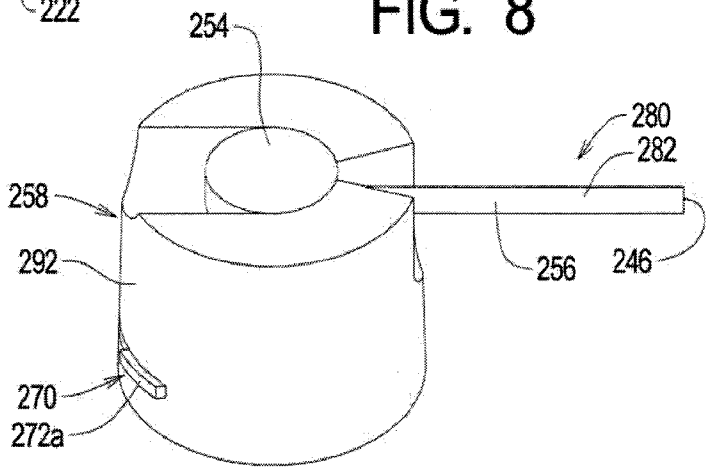


FIG. 7

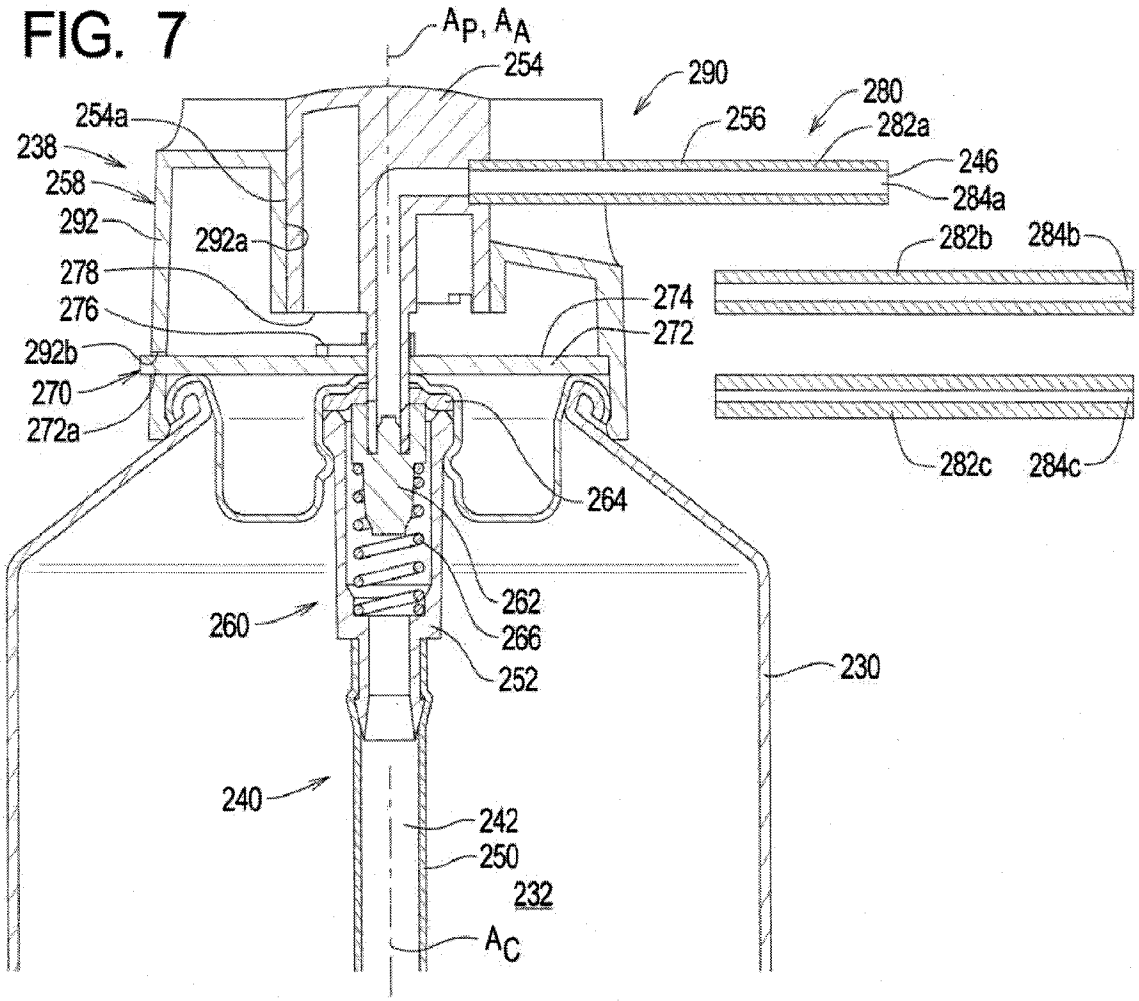


FIG. 9

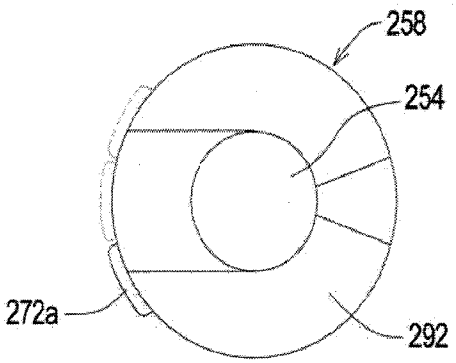


FIG. 10

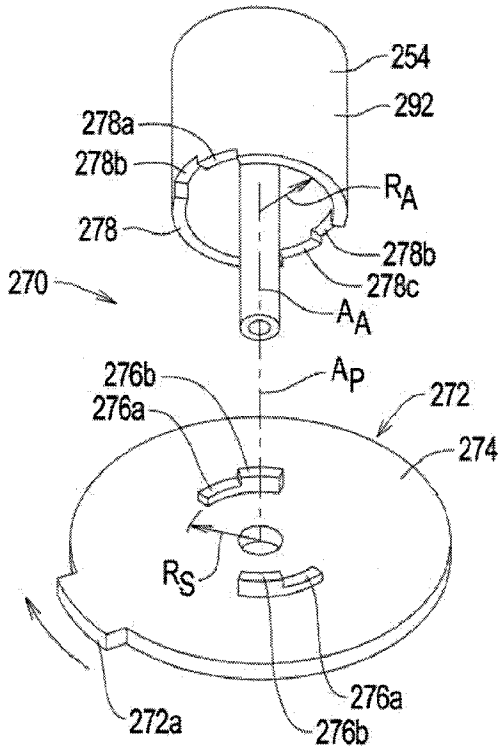


FIG. 11

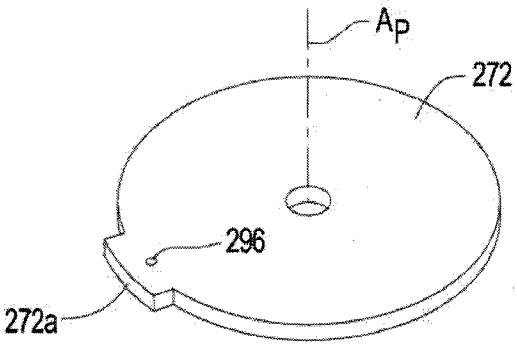


FIG. 12

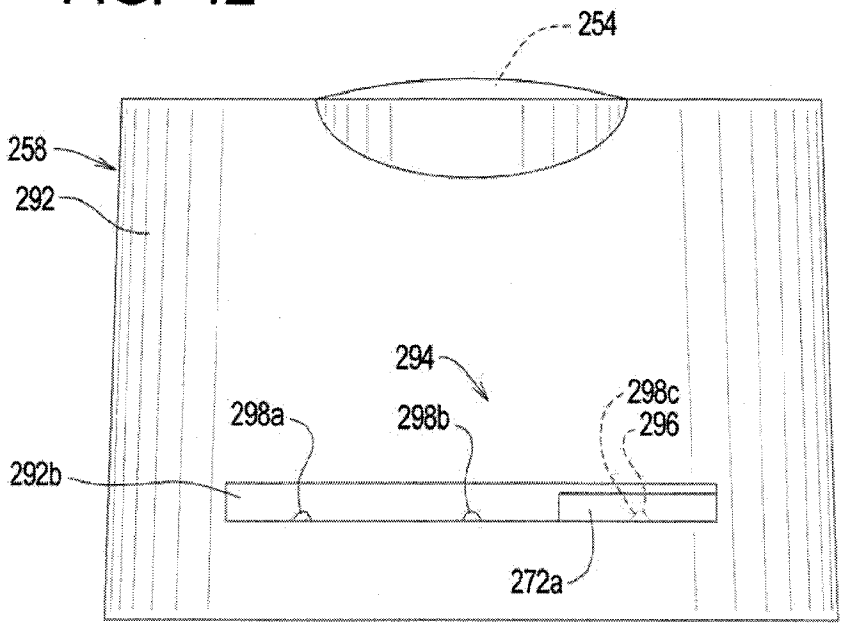


FIG. 13

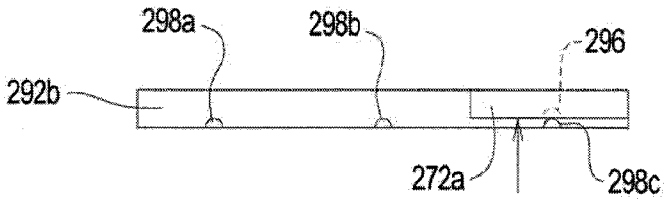


FIG. 14

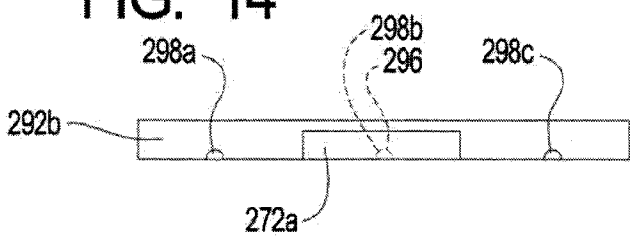


FIG. 15A

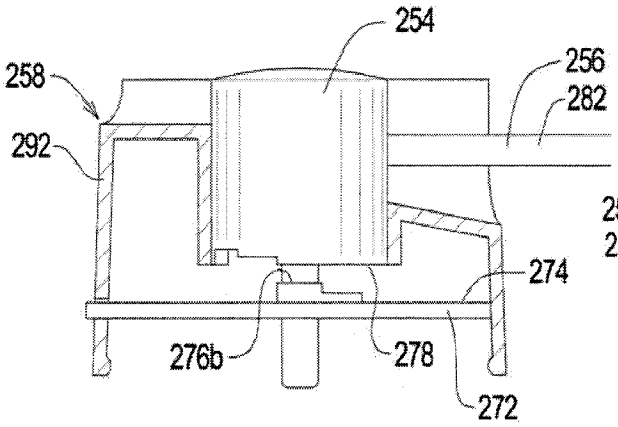


FIG. 15B

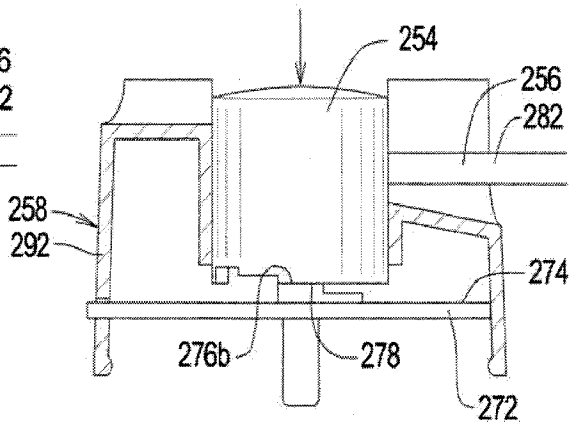


FIG. 16A

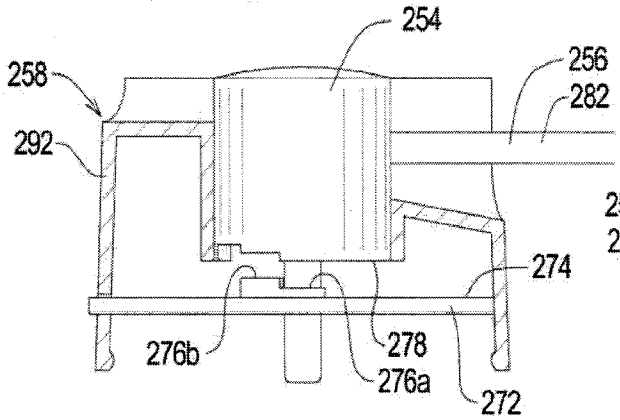


FIG. 16B

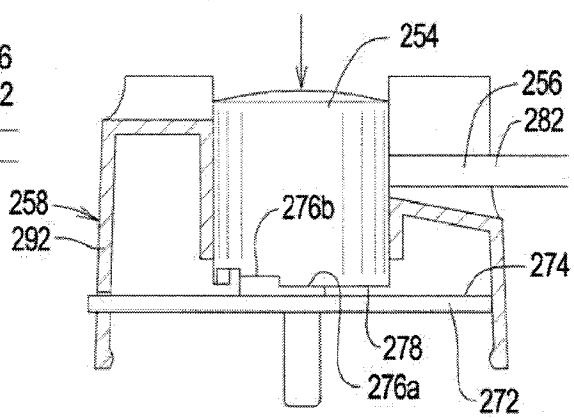


FIG. 17A

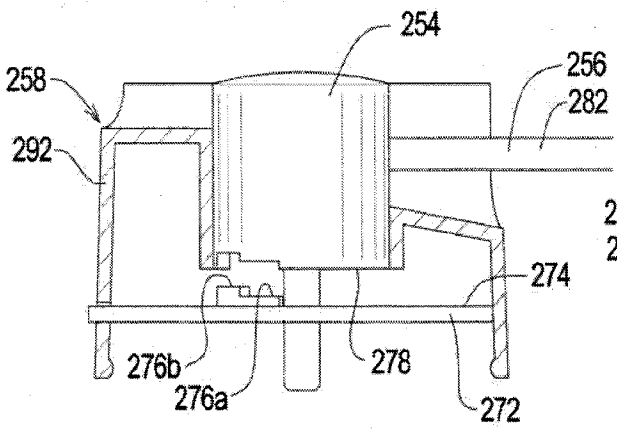


FIG. 17B

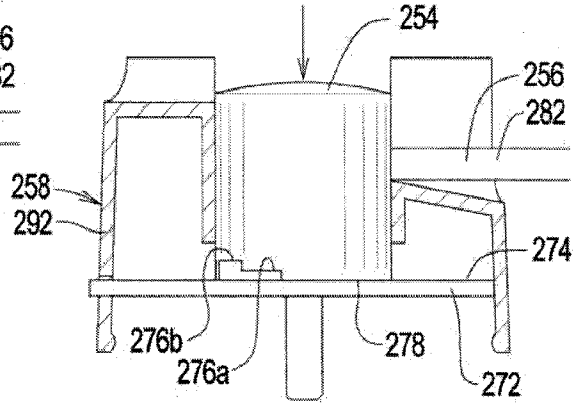


FIG. 18

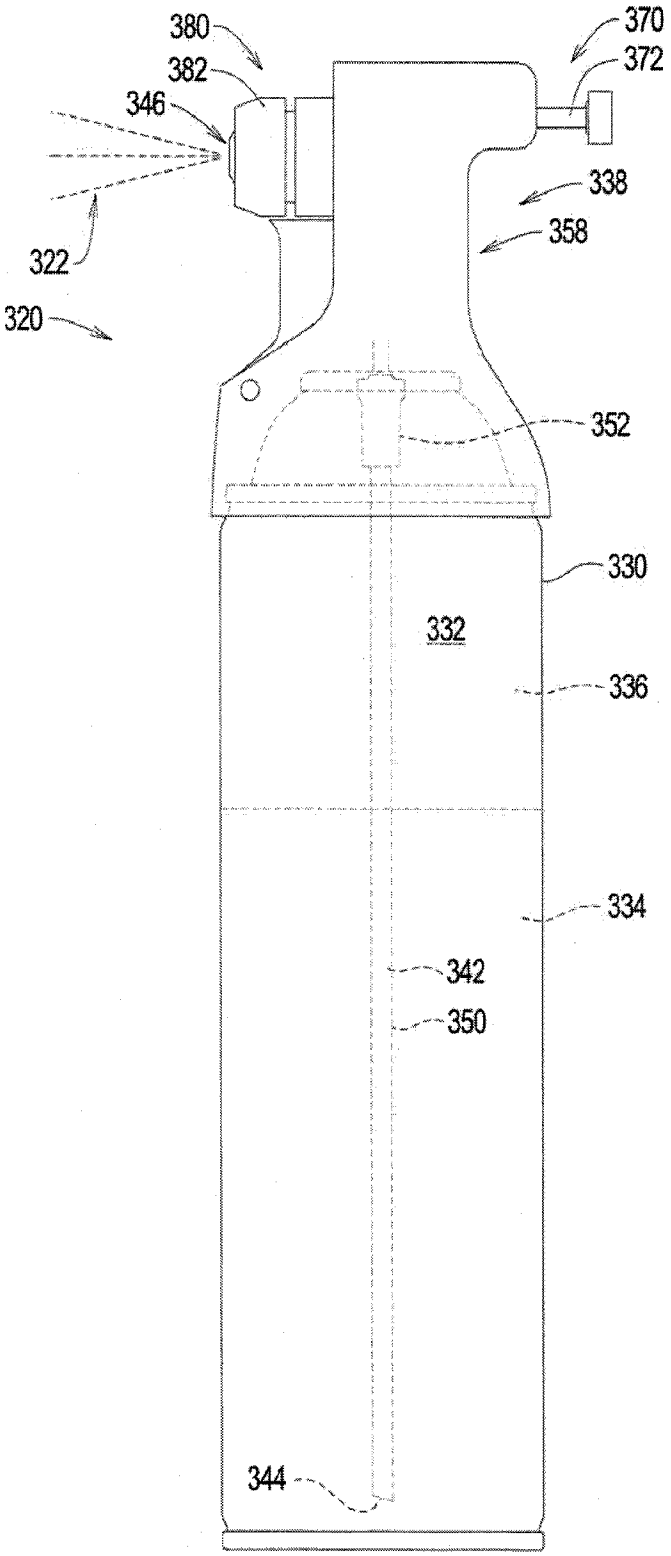

380
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346
322
320
370
372
338
358
352
330
332
336
334
342
350
344

FIG. 19

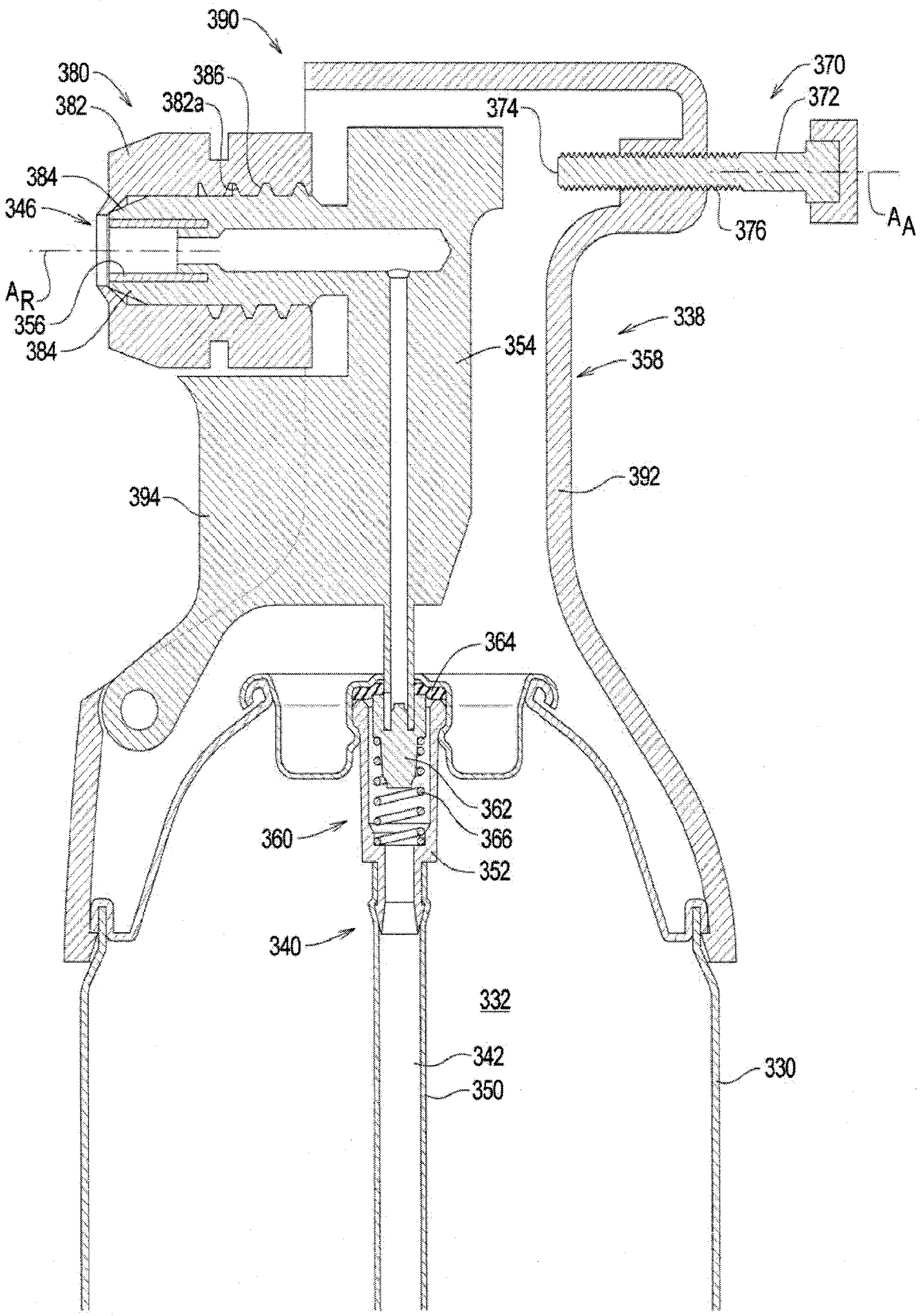

390
380
386
382
382a
374
370
372
384
346
376
A_A
A_R
356
384
338
354
358
394
392
364
362
360
366
352
340
332
342
330
350

FIG. 20

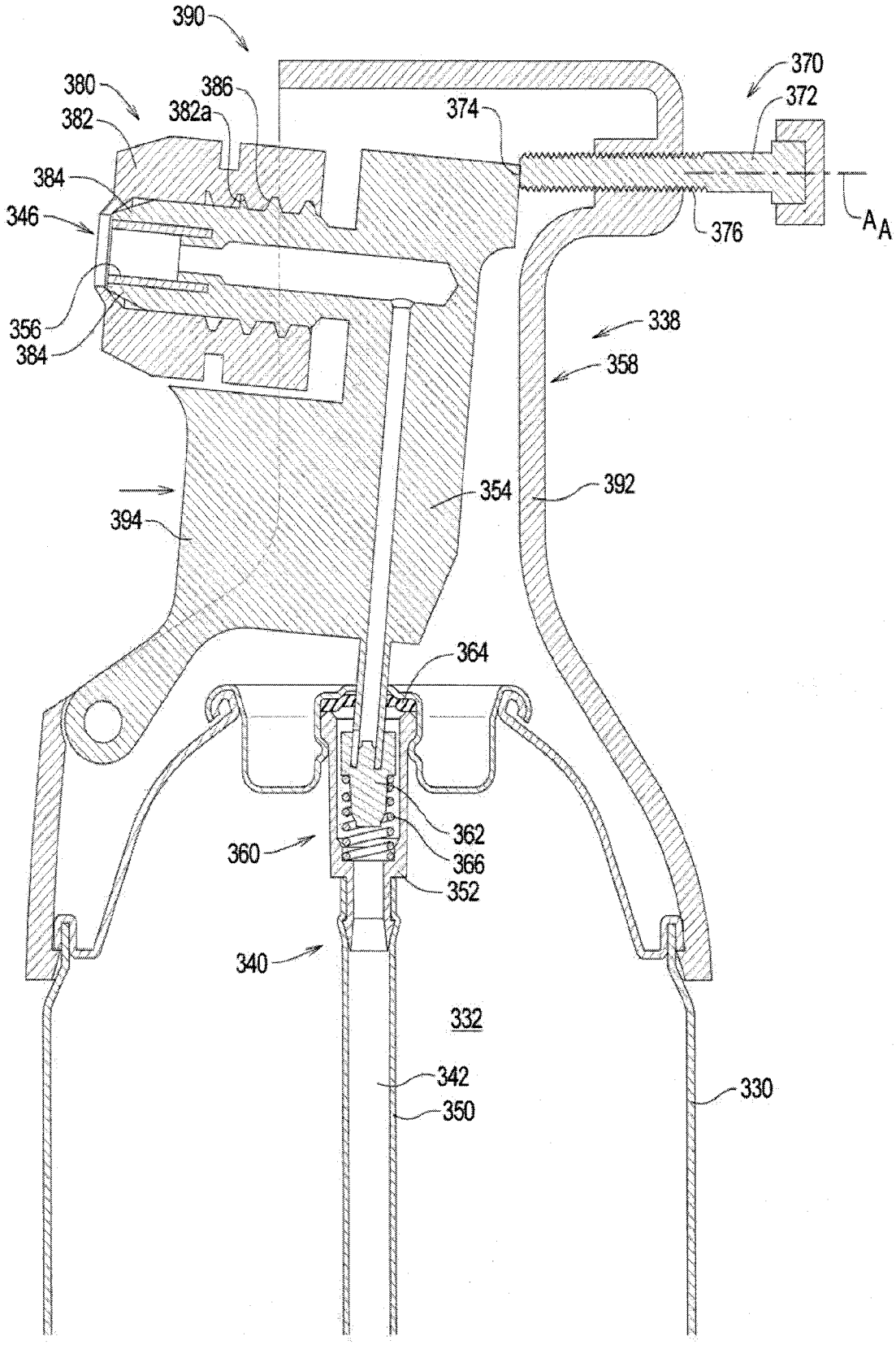

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380
386
382
382a
374
370
372
384
346
376
A
A
356
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358
354
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394
364
362
360
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332
342
330
350

FIG. 21

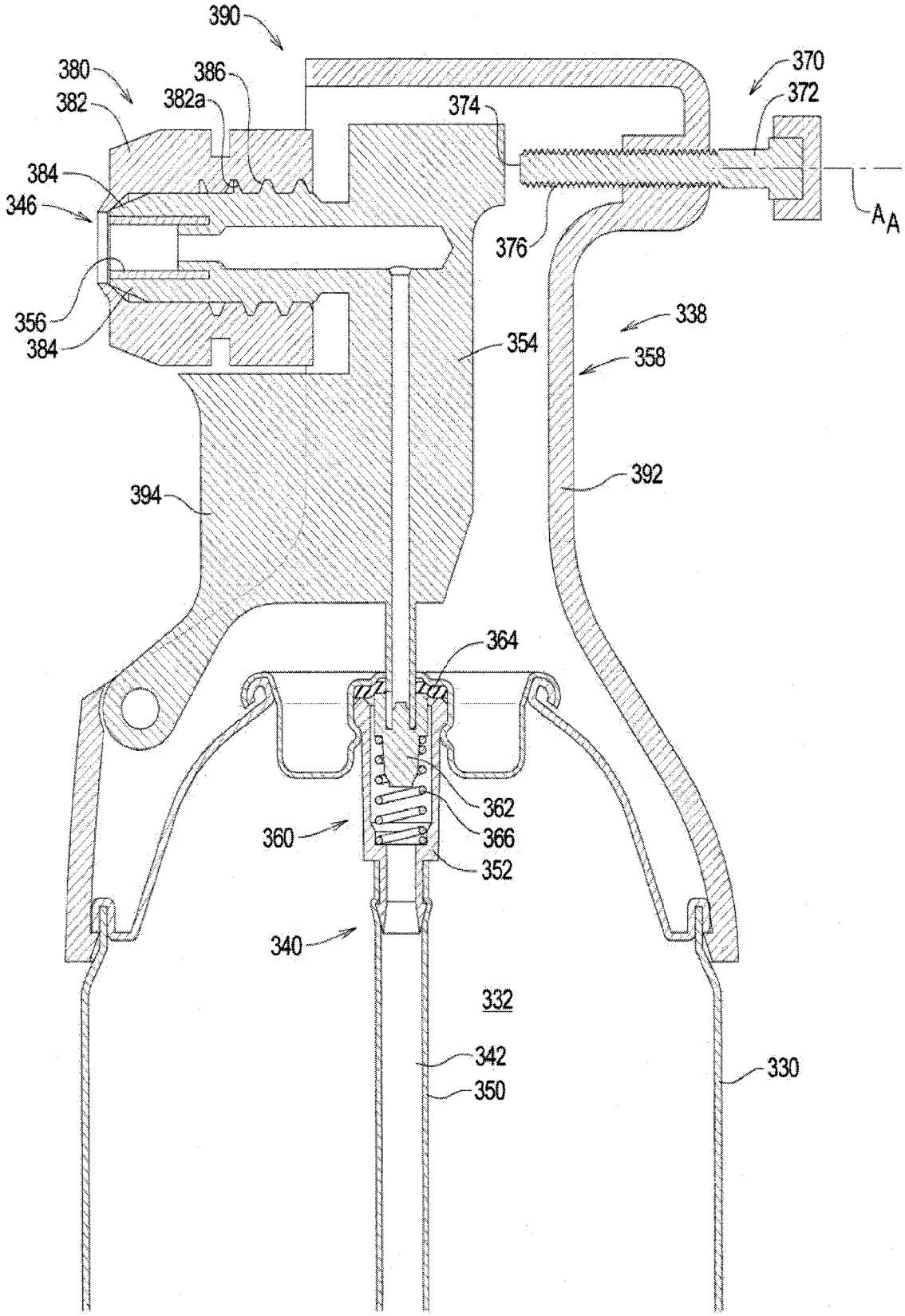

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380
386
382
382a
374
370
372
384
346
376
A_A
356
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338
354
358
394
392
364
362
360
366
352
340
332
342
350
330

FIG. 22

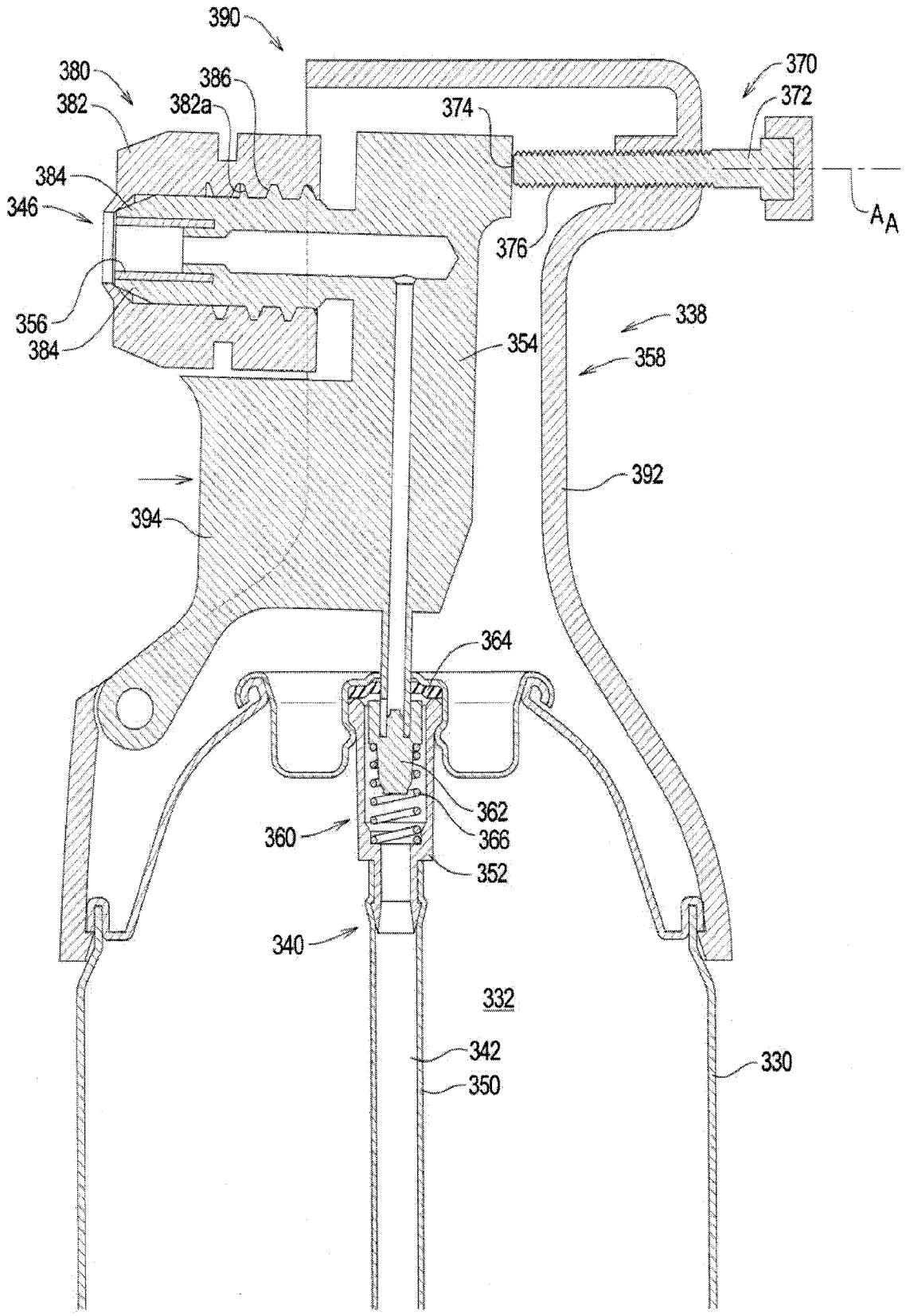

390
380
382
386
382a
374
370
372
384
346
376
A_A
356
384
338
354
358
392
394
364
362
360
366
352
340
332
342
330
350

FIG. 23

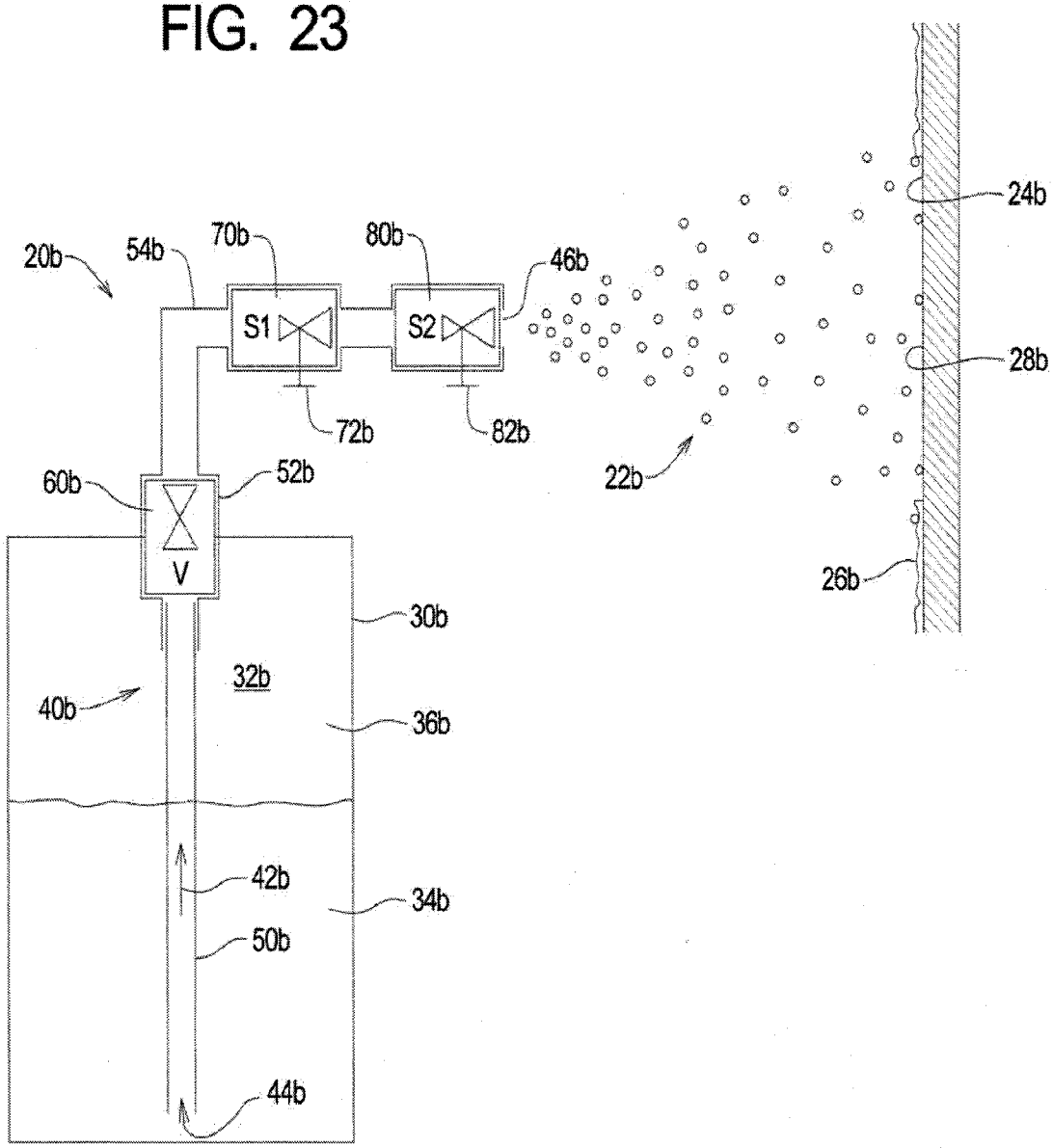

20b
54b
70b
80b
46b
24b
S1
S2
28b
72b
82b
22b
60b
52b
V
26b
30b
32b
40b
36b
42b
34b
50b
44b

FIG. 24

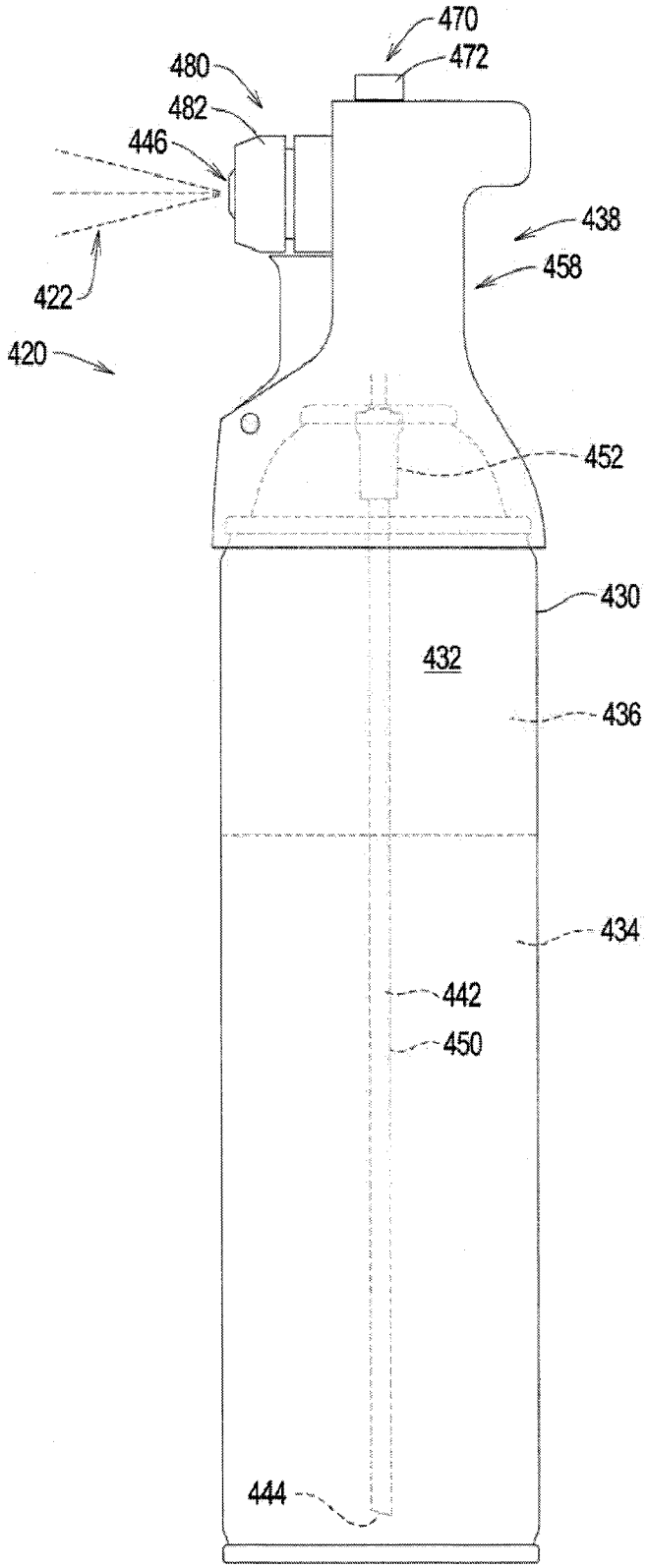

470
472
480
482
446
438
458
422
420
452
430
432
436
434
442
450
444

FIG. 25

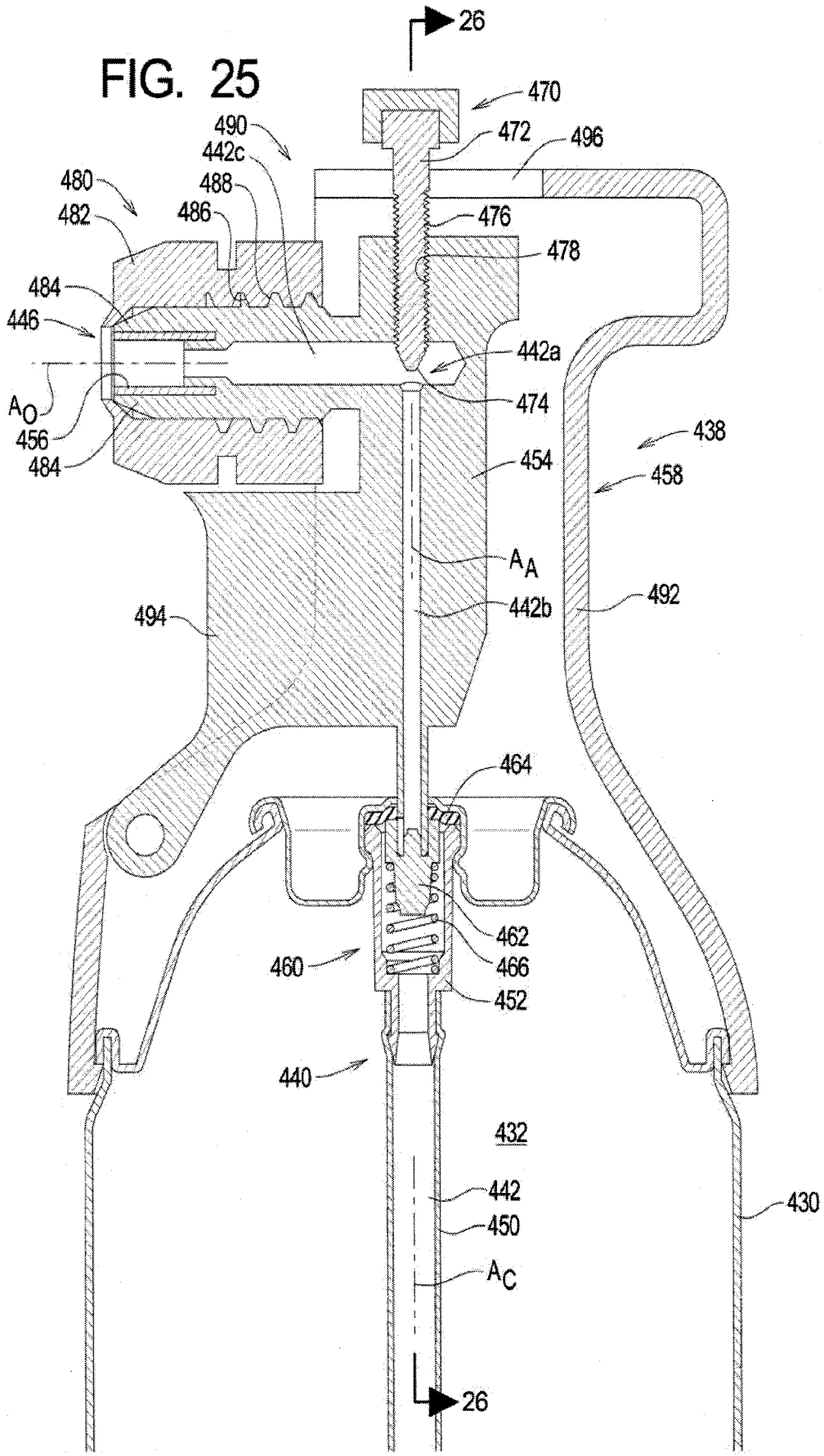

26
470
472
496
490
442c
488
480
482
486
476
478
484
446
442a
A_O
474
456
484
438
454
458
A_A
494
442b
492
464
462
460
466
452
440
432
442
450
430
A_C
26

FIG. 26

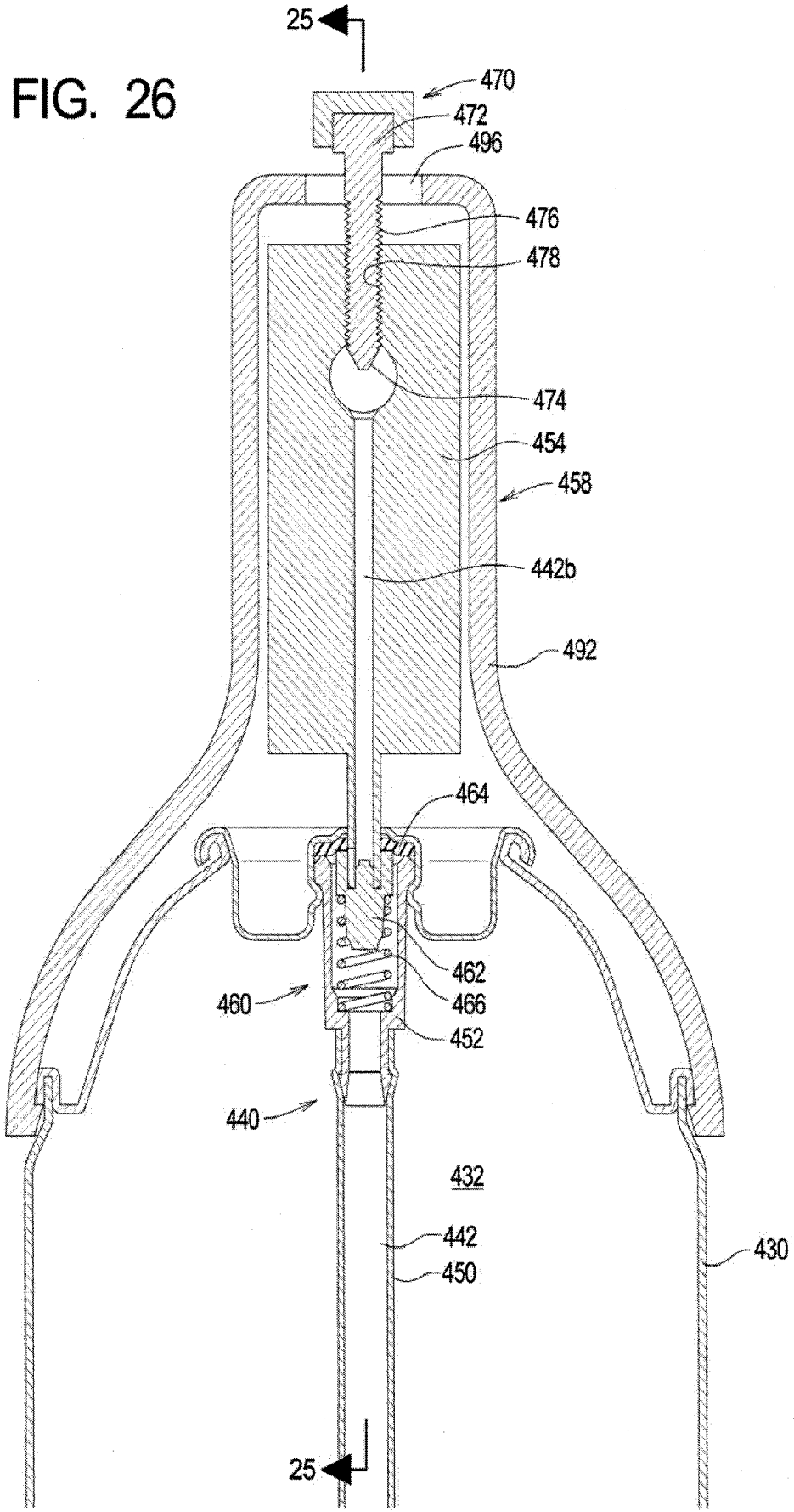

25
470
472
496
476
478
474
454
458
442b
492
464
462
466
460
452
440
432
442
450
430
25

FIG. 27

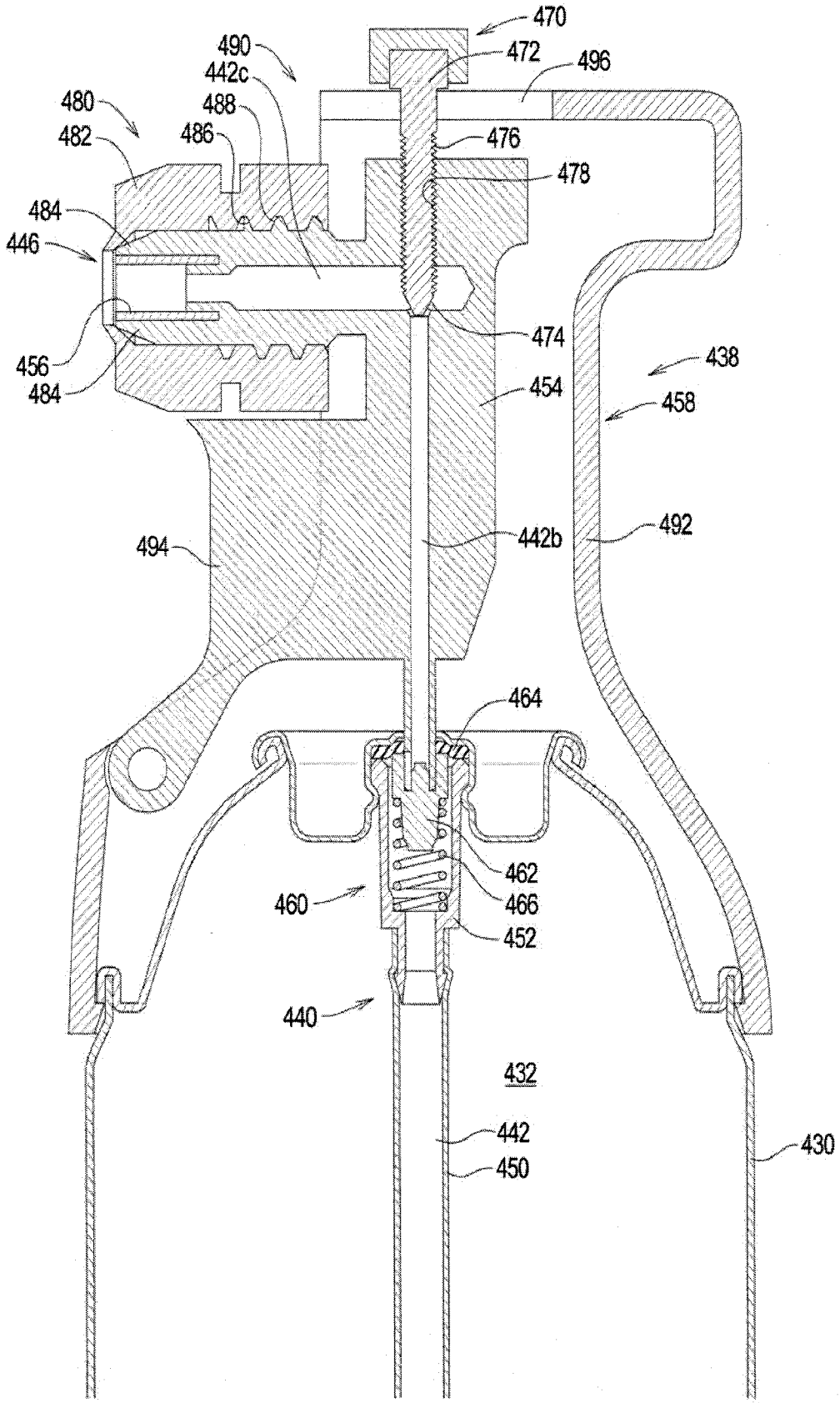

470
490
472
496
442c
480
488
482
486
476
478
484
446
474
438
456
484
454
458
494
442b
492
464
462
460
466
452
440
432
442
430
450

FIG. 28

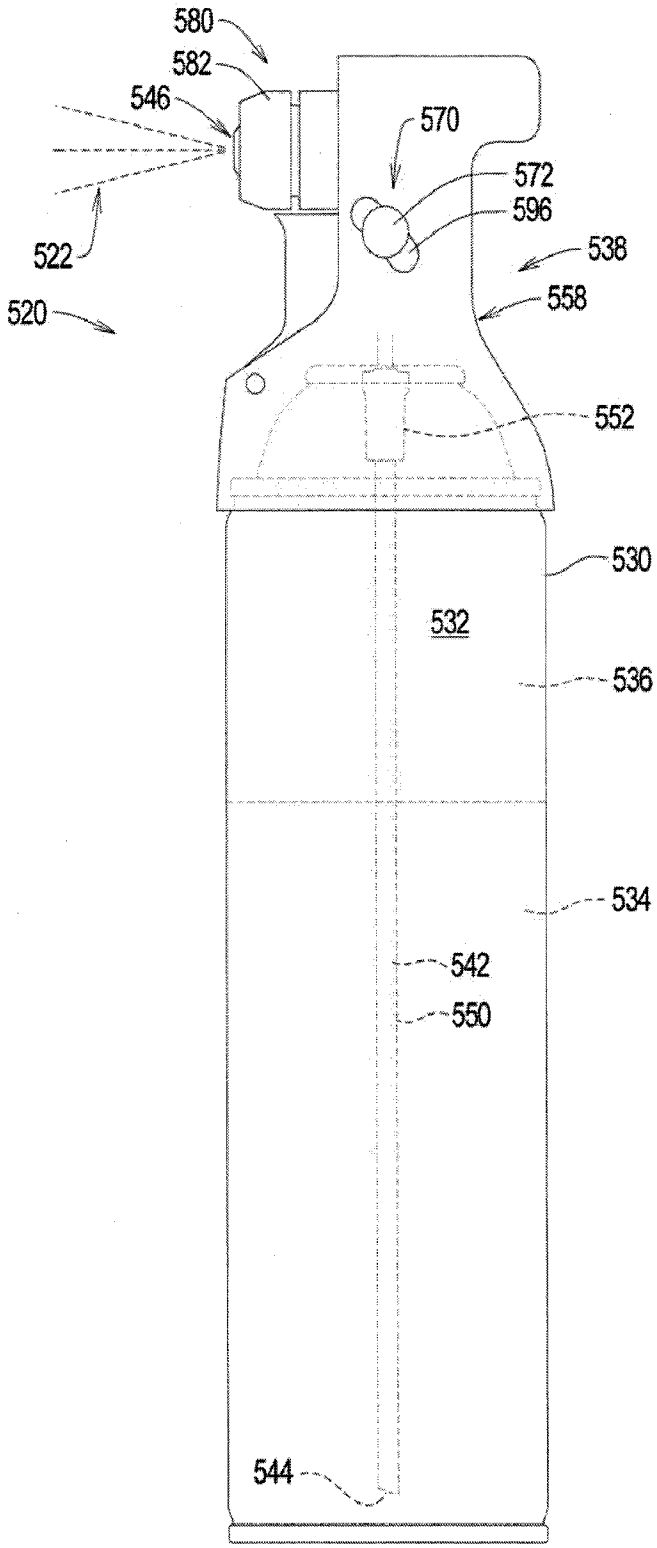

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596
538
522
558
520
552
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532
536
534
542
550
544

FIG. 29

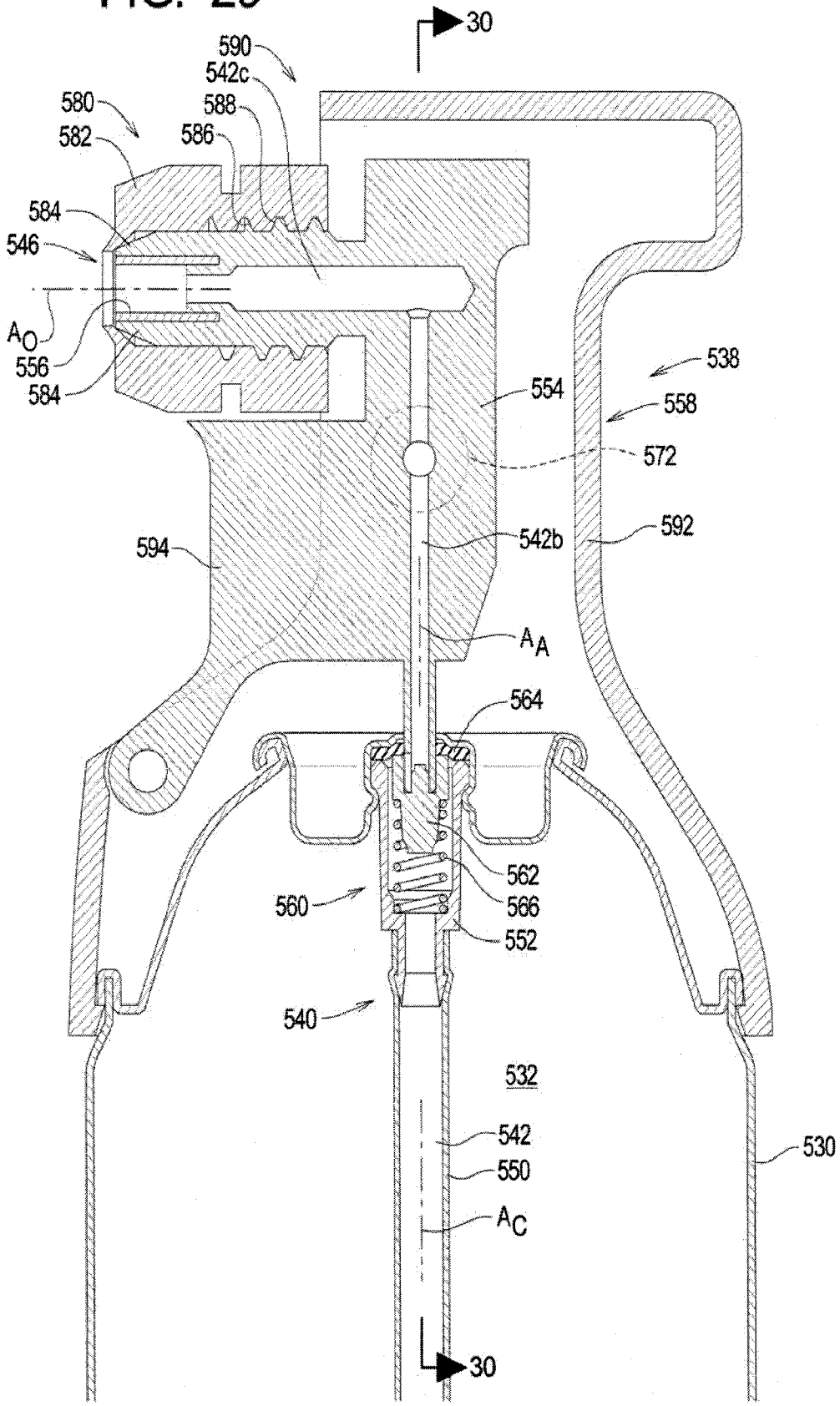

30
590
542c
580
588
582
586
584
546
A_O
556
584
538
554
558
572
592
542b
594
A_A
564
562
566
560
552
540
532
542
550
530
A_C
30

FIG. 30

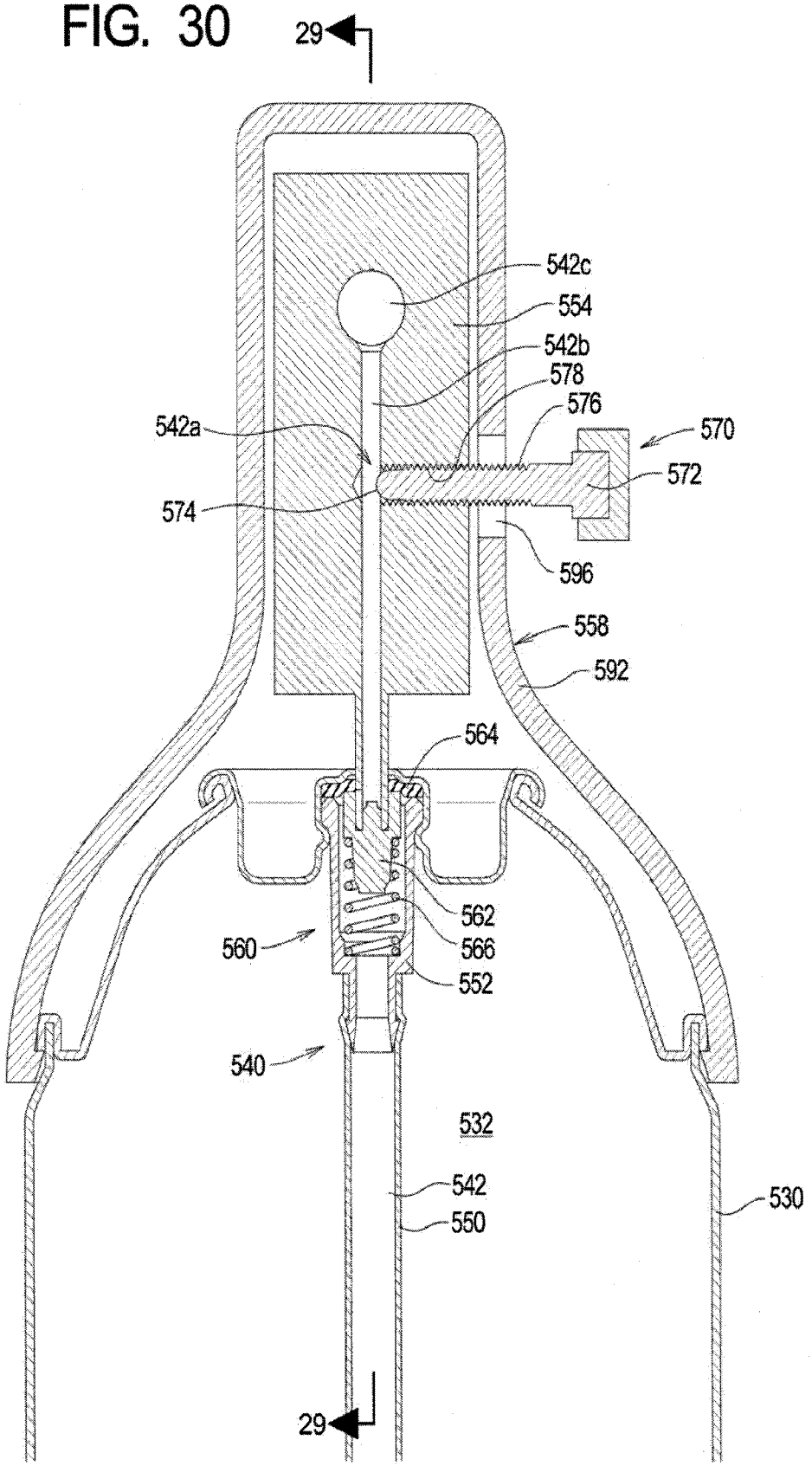

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542c
554
542b
578
576
542a
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596
558
592
564
562
566
560
552
540
532
542
550
530
29

FIG. 31

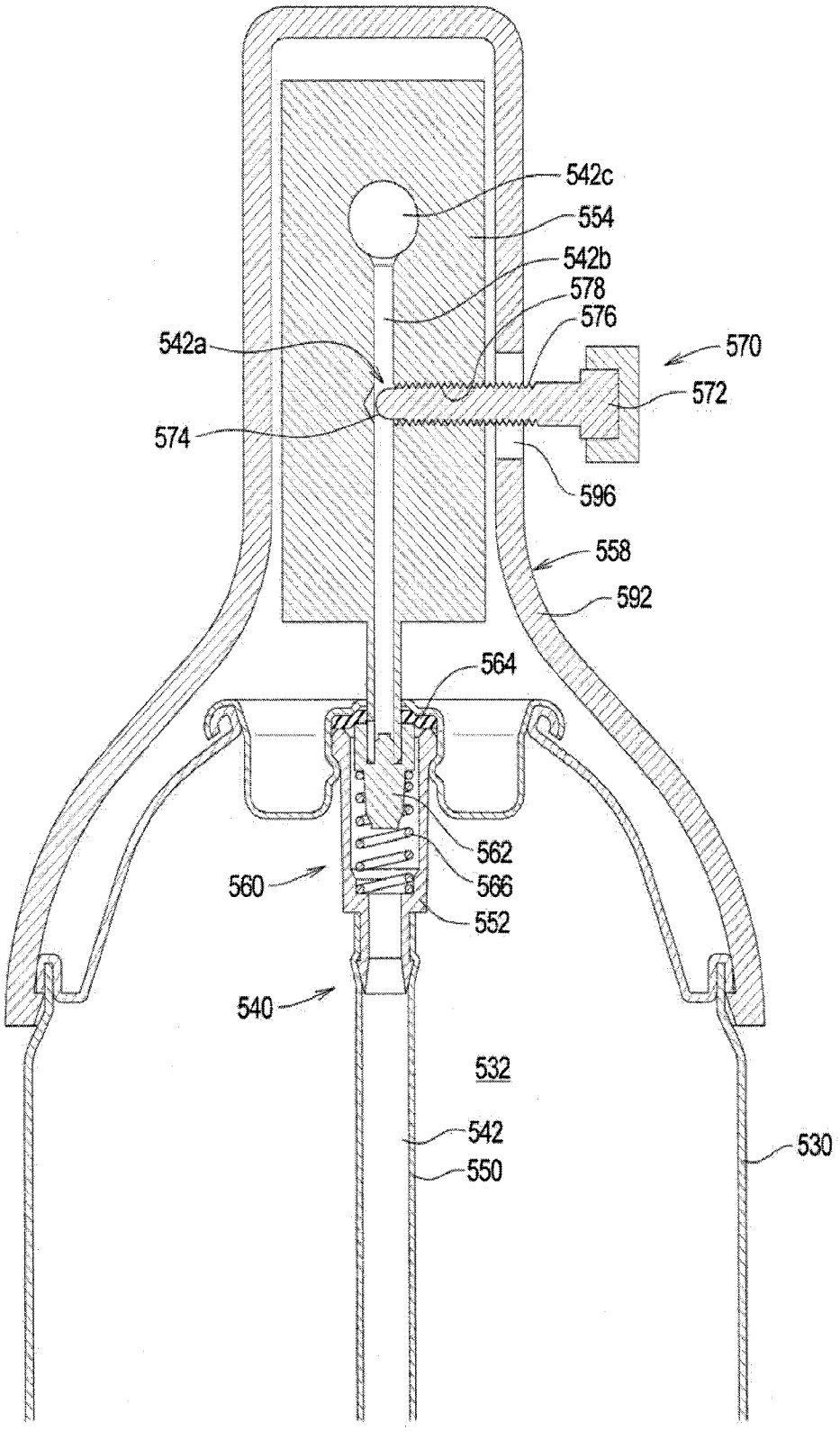

542c
554
542b
578
576
542a
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574
596
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564
562
566
560
552
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550
530

FIG. 32

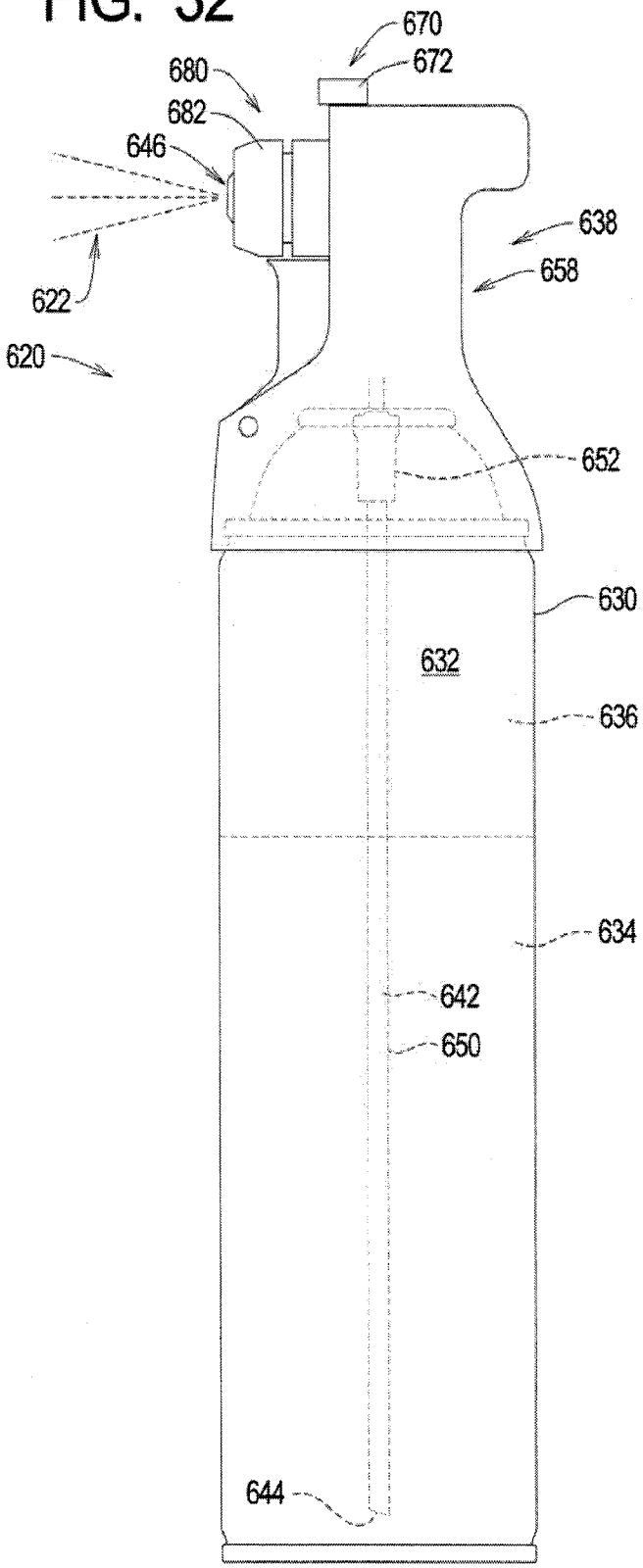

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658
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620
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630
632
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642
650
644

FIG. 33

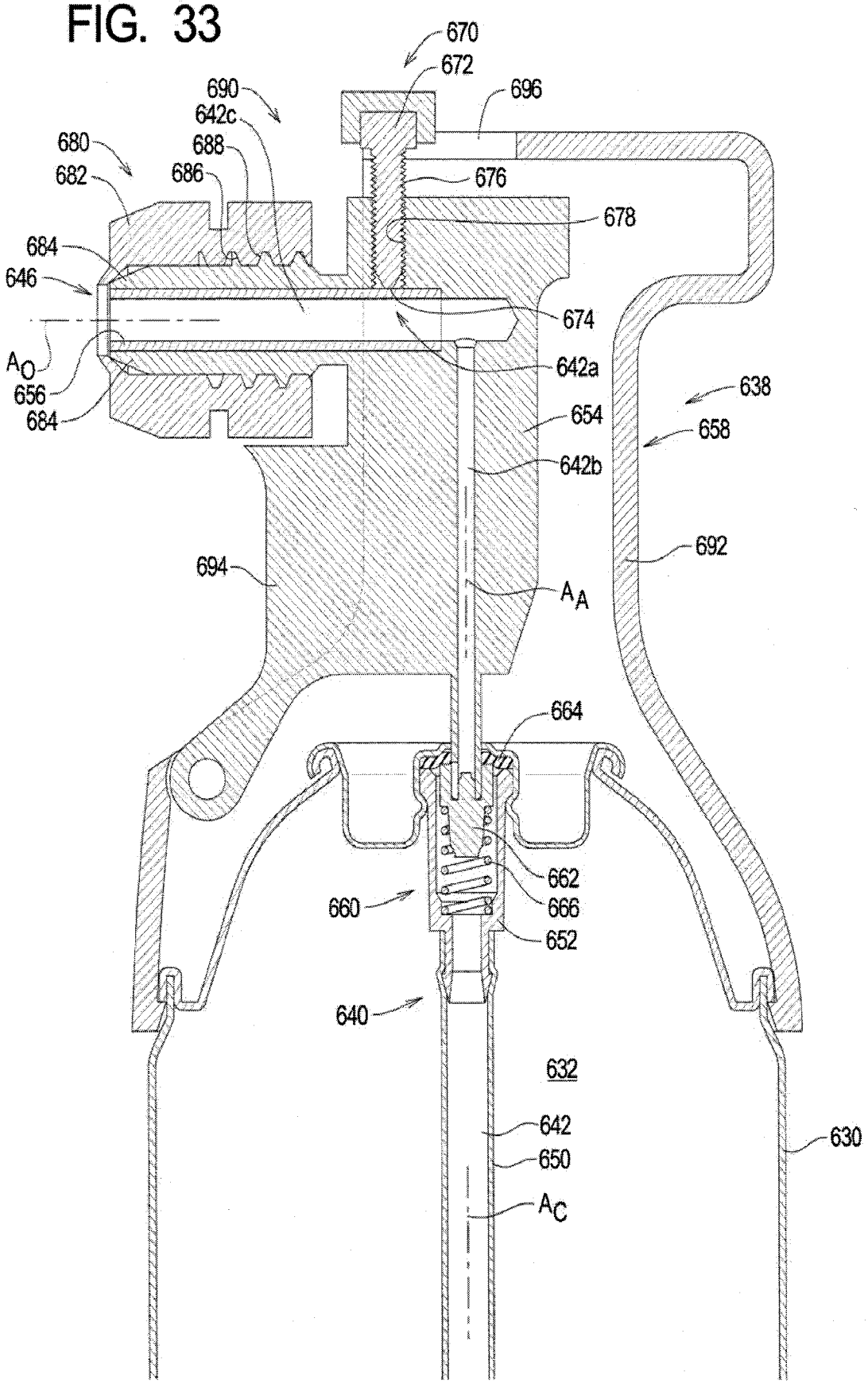

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672
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642c
696
680
688
682
686
676
678
684
646
674
A_O
642a
656
684
638
654
658
642b
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692
A_A
664
662
660
666
652
640
632
642
630
650
A_C

FIG. 34

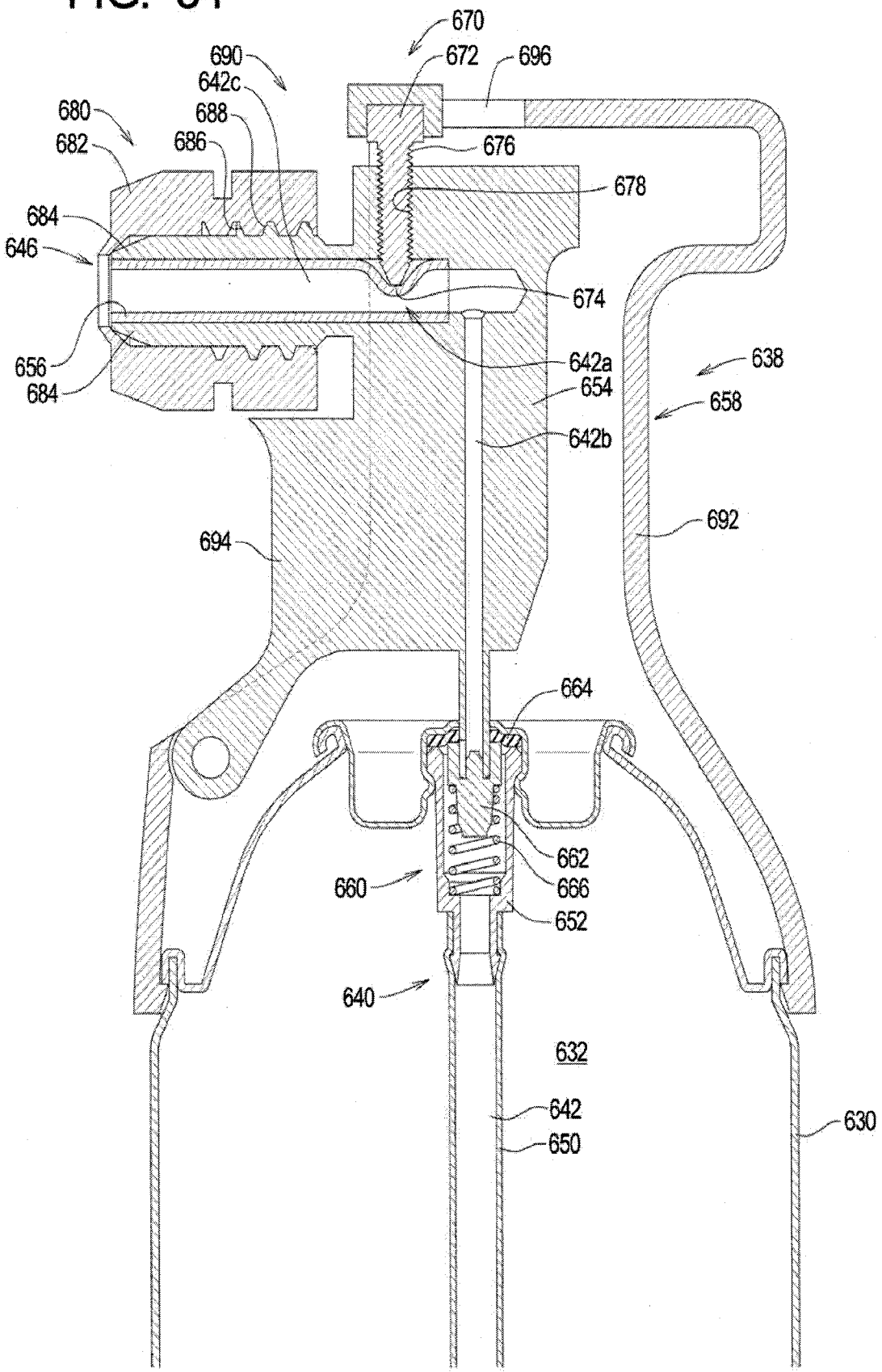

670
672
696
690
642c
680
688
682
686
676
678
684
646
674
656
642a
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642b
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664
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666
652
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632
642
630
650

FIG. 35

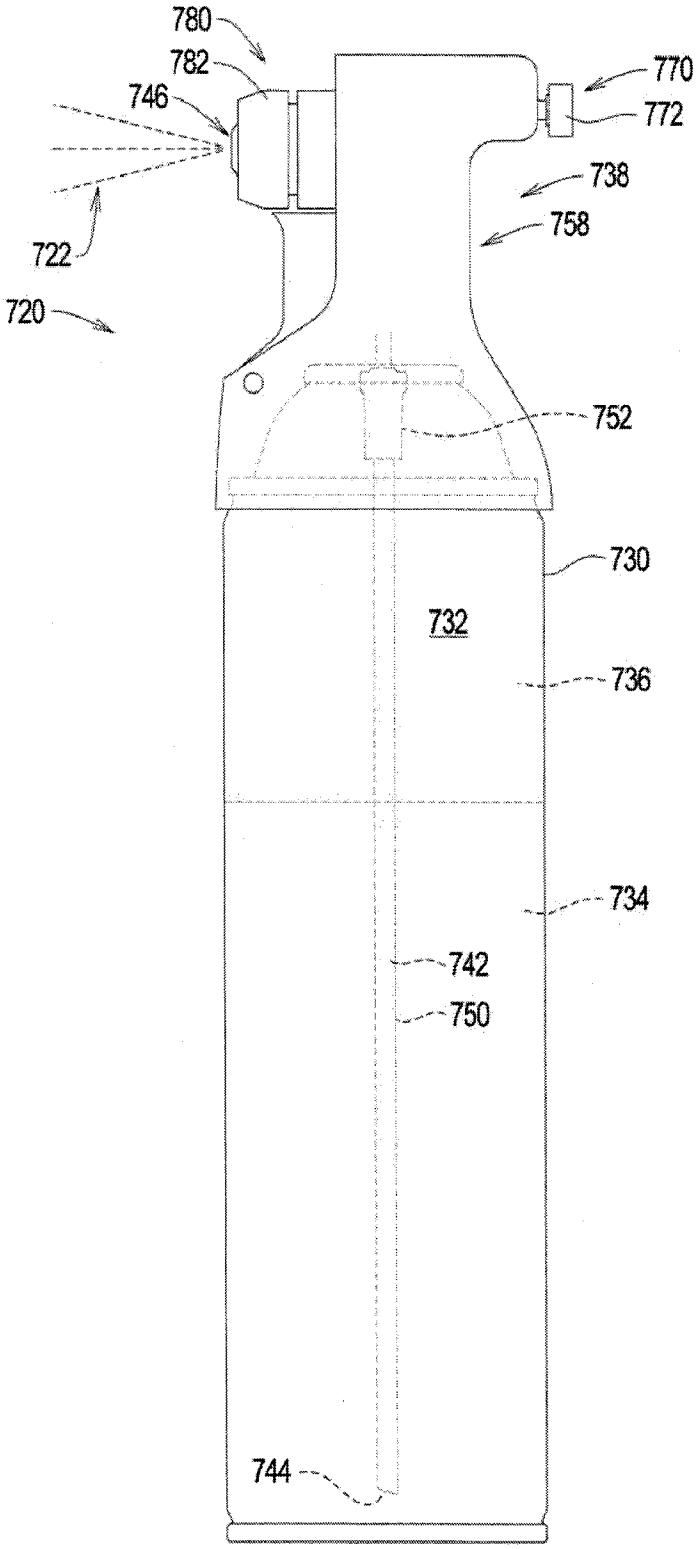

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746
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772
738
758
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752
730
732
736
734
742
750
744

FIG. 36

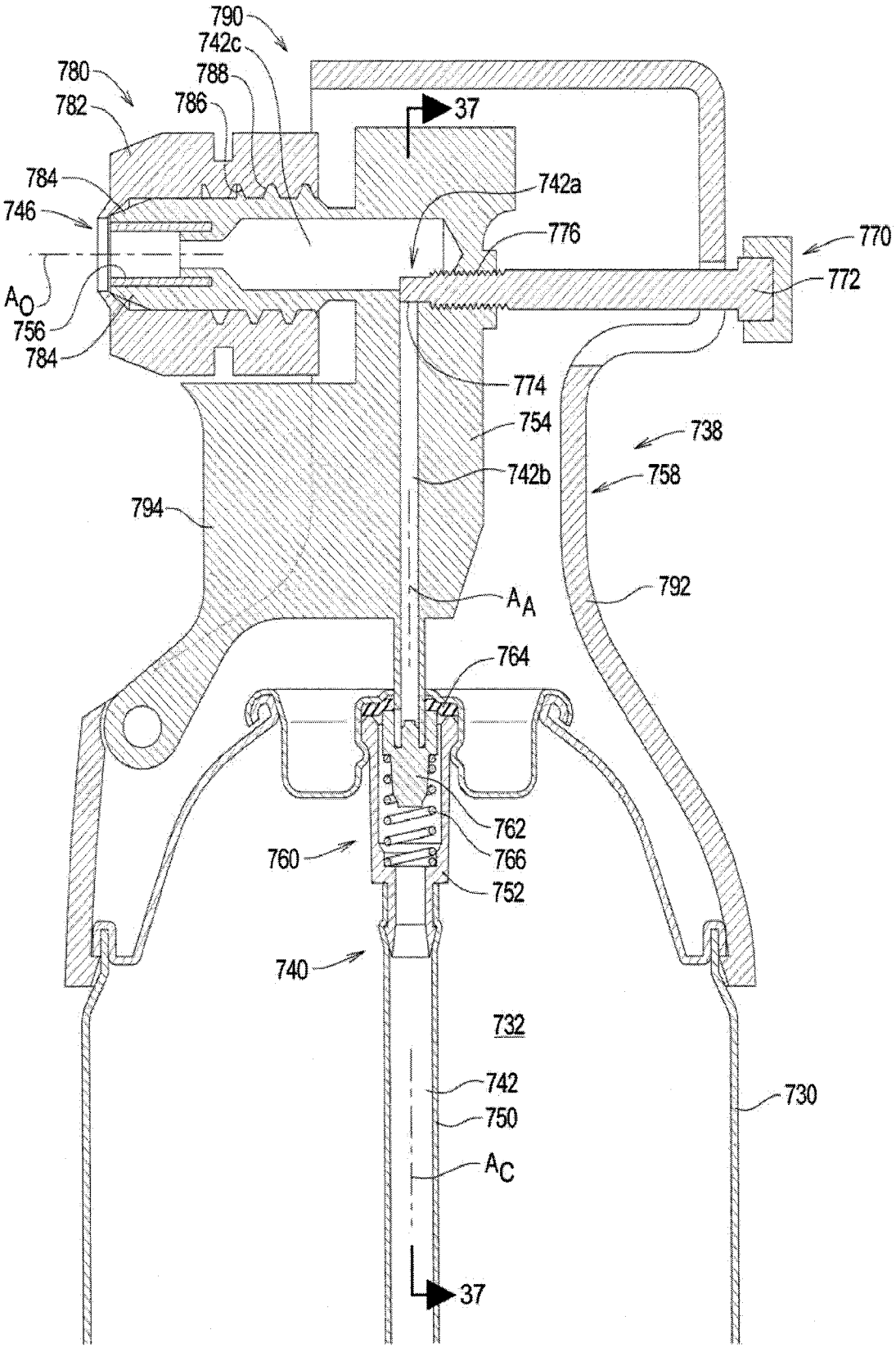

790
742c
780
788
782
786
37
784
742a
746
776
770
772
A_O
756
784
774
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738
742b
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762
760
766
752
740
732
742
730
750
A_C
37

FIG. 37

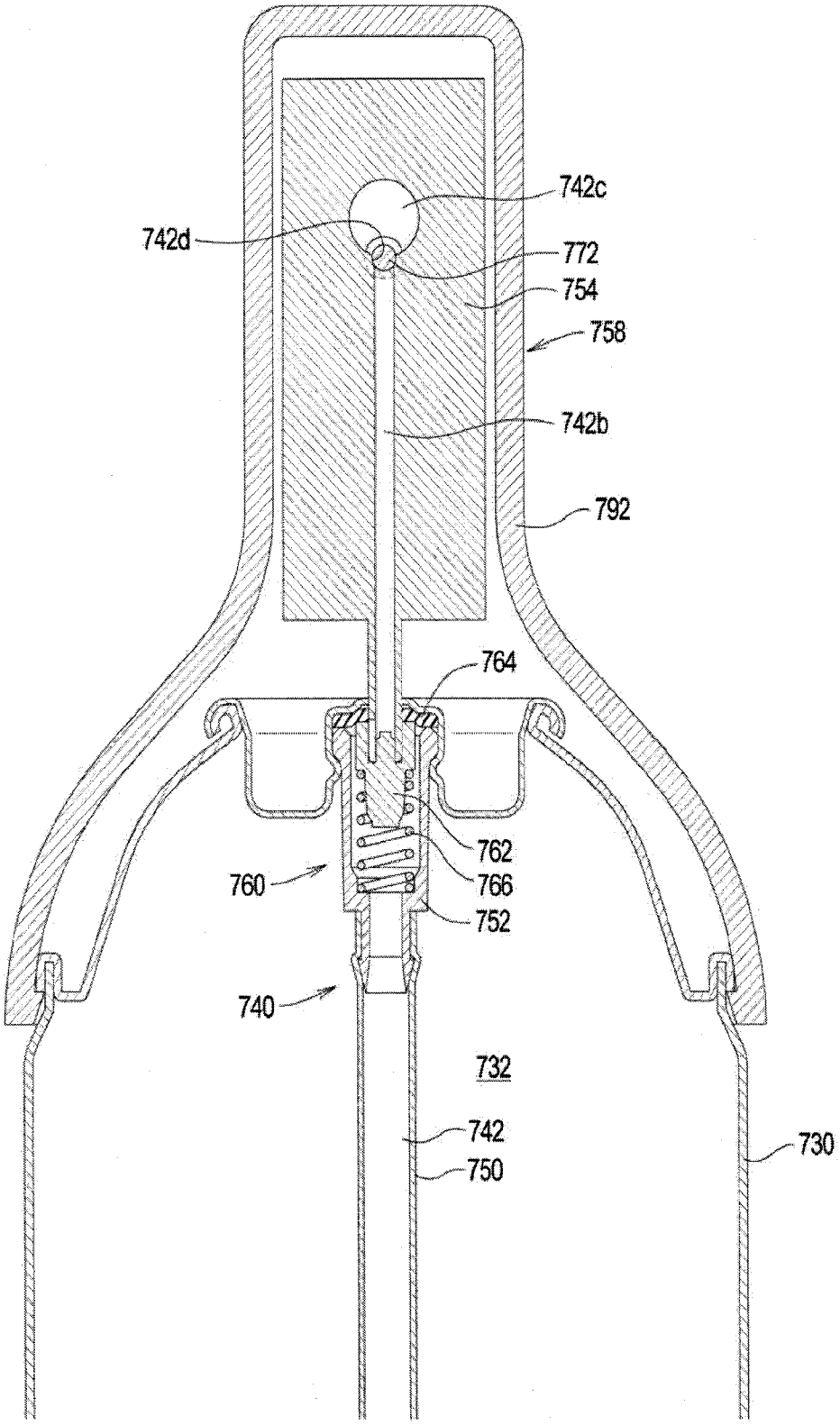

742c
742d
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758
742b
792
764
762
760
766
752
740
732
742
750
730

FIG. 38

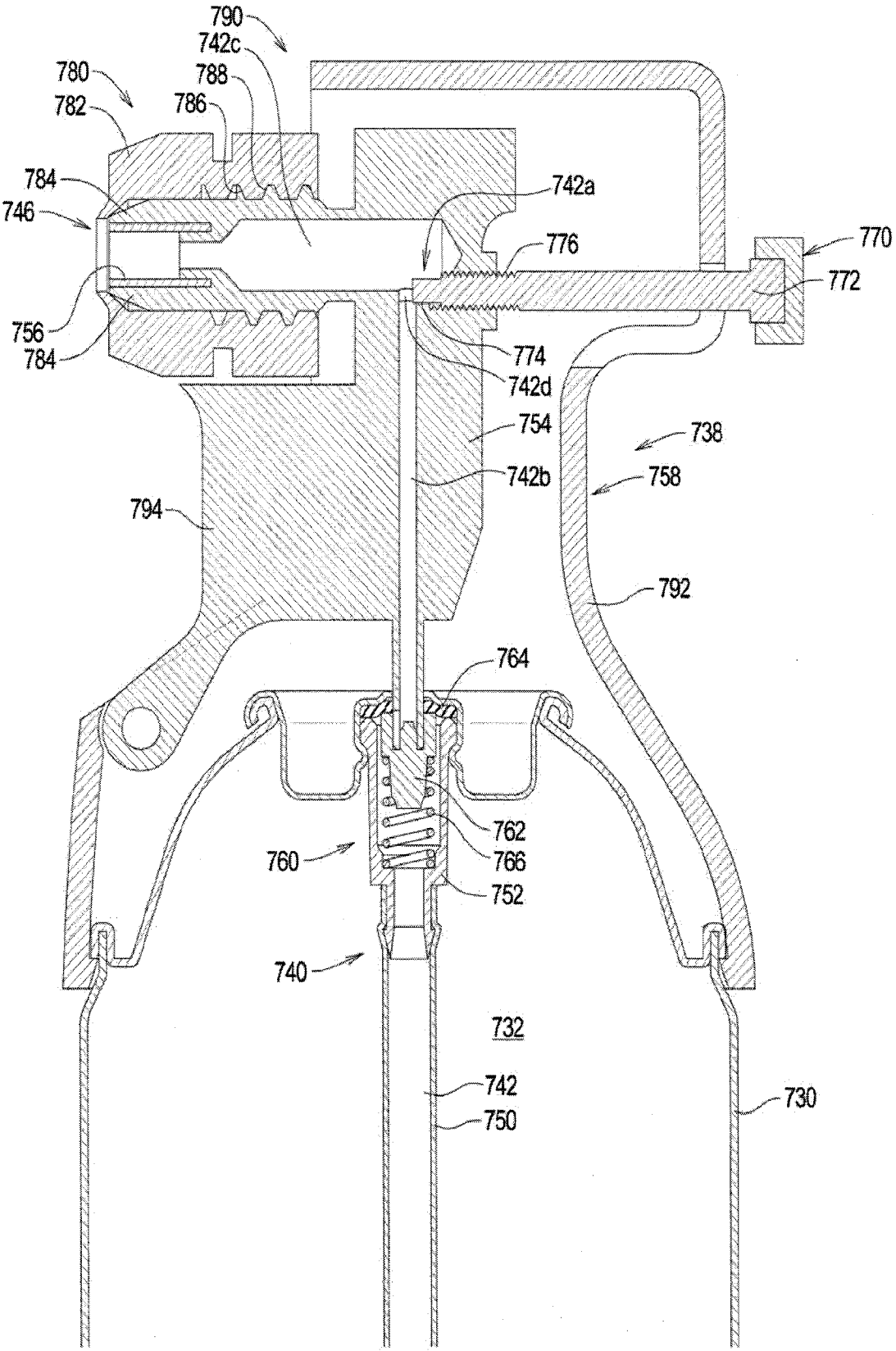

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742c
780
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782
786
784
742a
746
776
770
772
756
784
774
742d
754
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742b
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794
792
764
762
760
766
752
740
732
742
750
730

FIG. 39

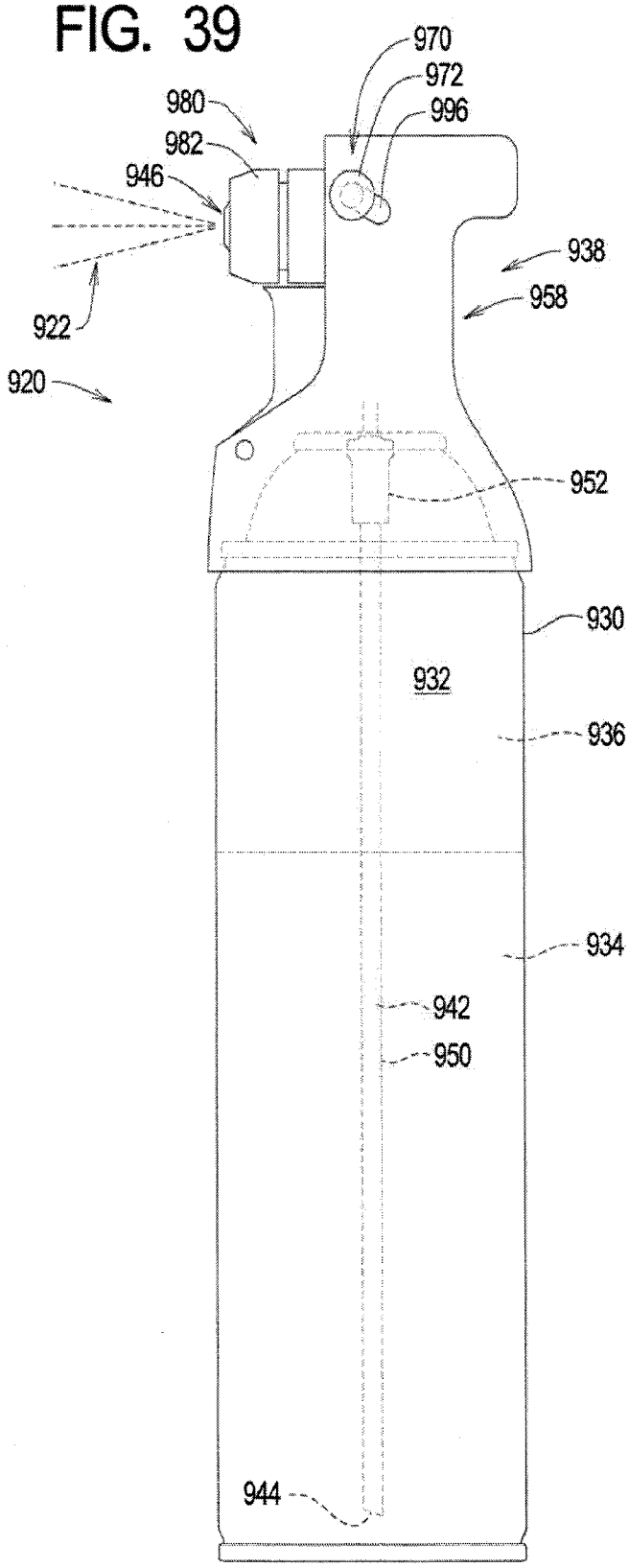

970
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950
944

FIG. 40

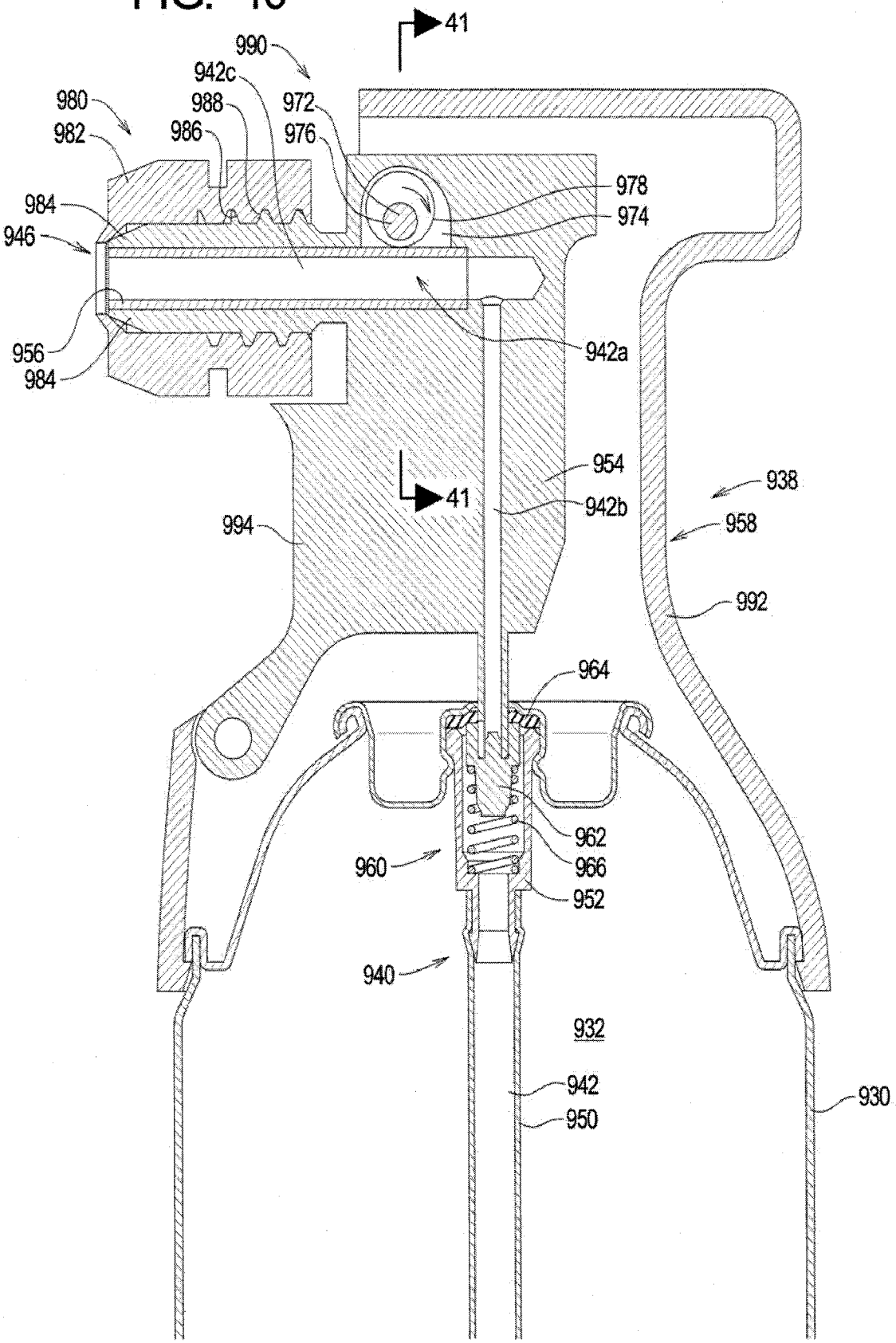

41
990
942c
980
988
972
982
986
976
978
984
974
946
956
942a
984
954
41
938
994
942b
958
992
964
962
960
966
952
940
932
942
930
950

FIG. 41

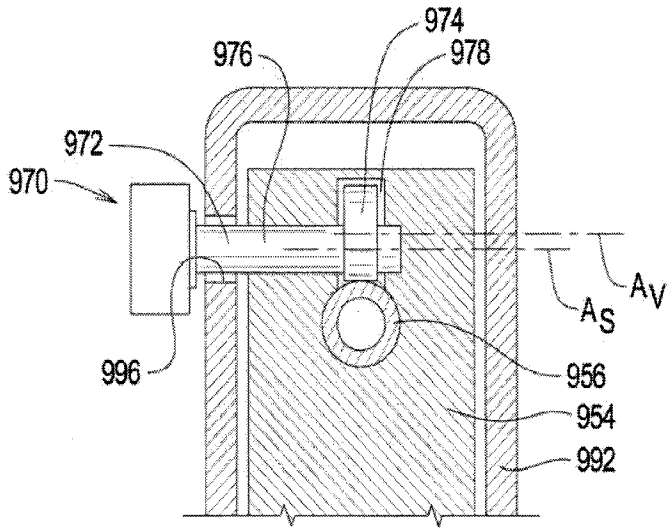


FIG. 42

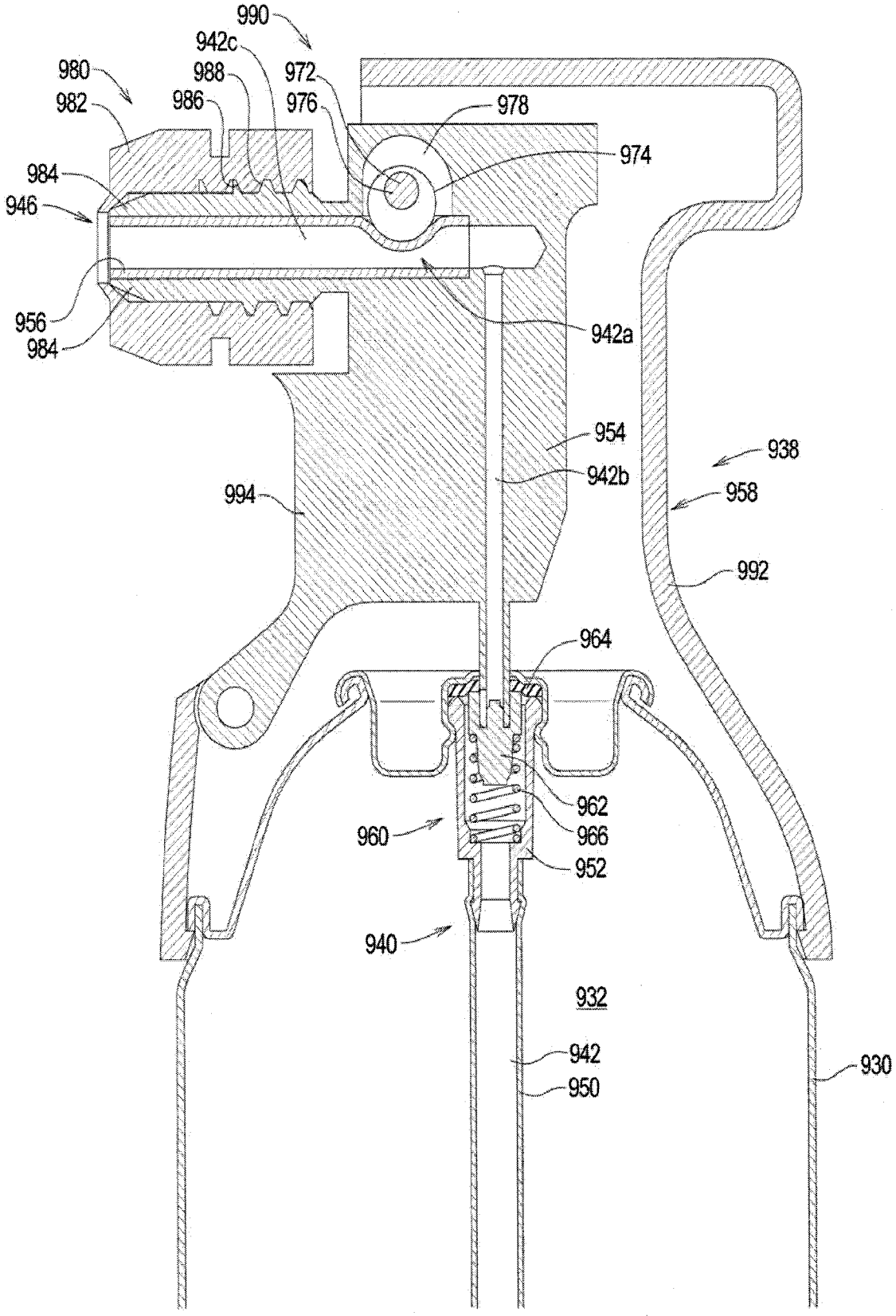

990
942c
980
988
972
982
986
976
978
974
984
946
956
984
942a
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938
942b
994
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992
964
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966
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940
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942
930
950

FIG. 43

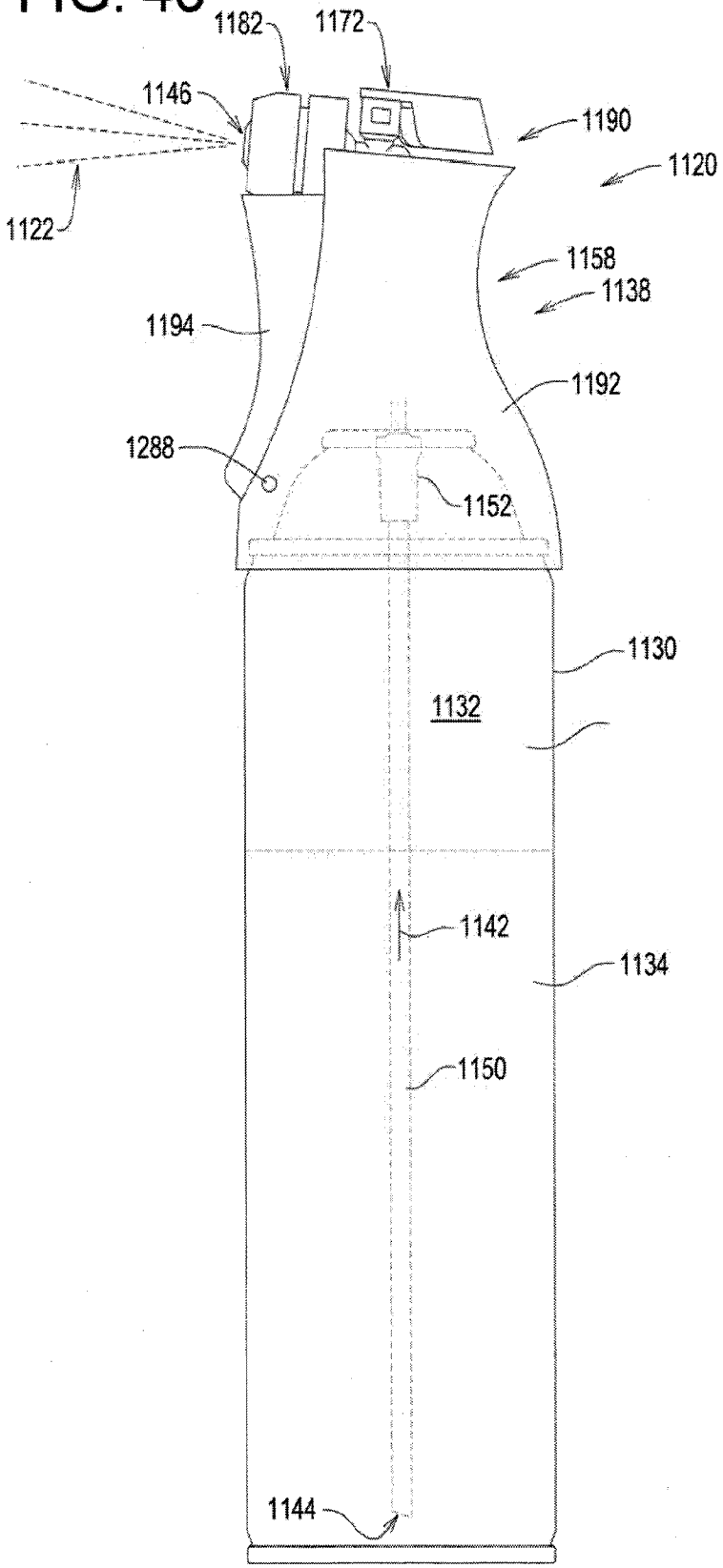

1182
1172
1146
1190
1120
1122
1158
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1194
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FIG. 44

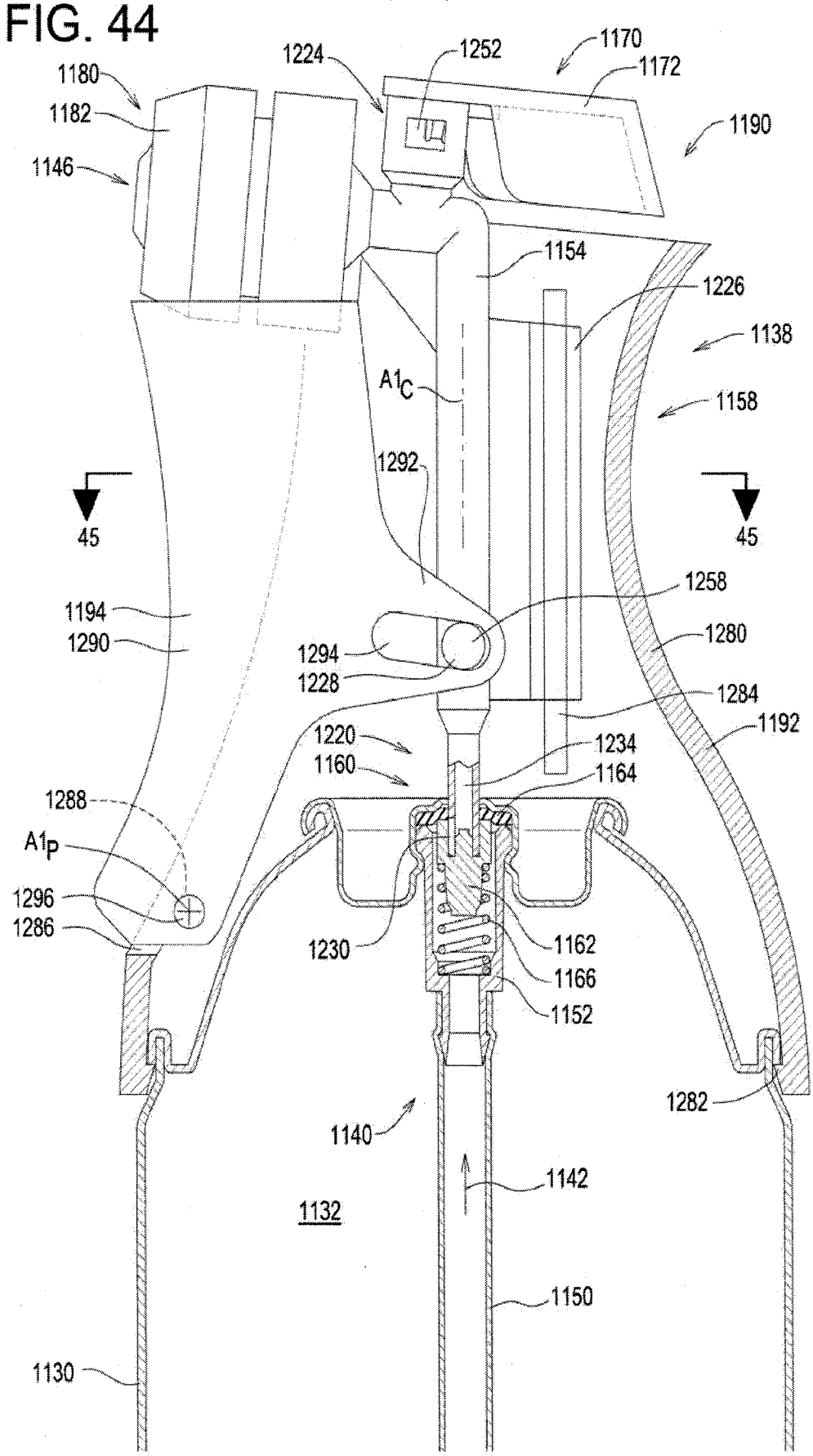

1180
1182
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1224
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1172
1190
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1158
A1C
1292
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45
1194
1290
1258
1280
1294
1228
1284
1192
1220
1160
1234
1164
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A1P
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1286
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FIG. 45

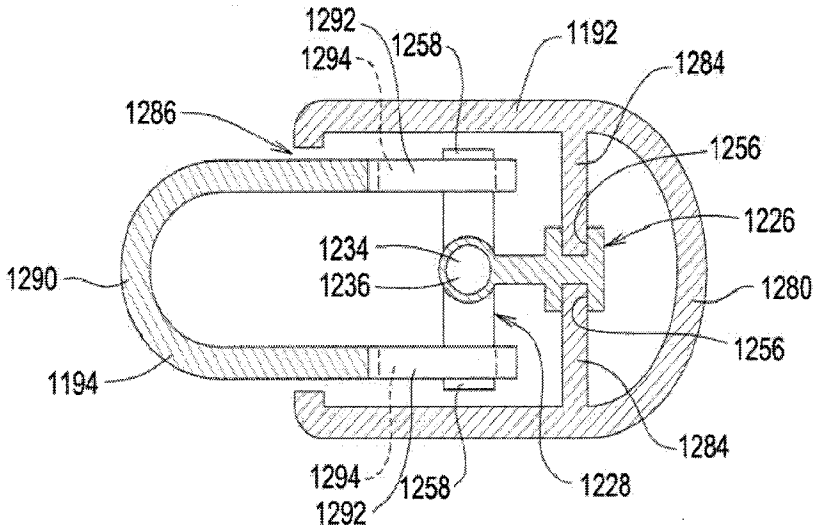

1292
1294
1258
1192
1284
1286
1256
1226
1234
1236
1290
1280
1256
1194
1284
1294
1258
1228
1292

FIG. 46

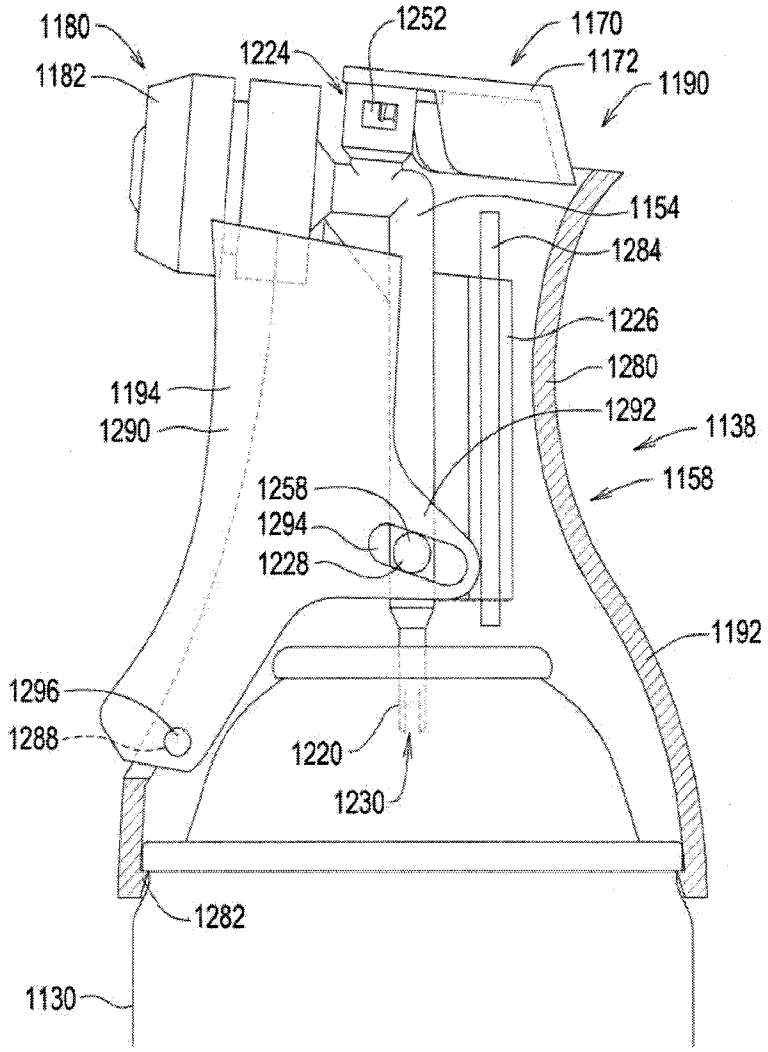

1180
1182
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1252
1170
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1190
1154
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1226
1280
1194
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1258
1294
1228
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1282
1130

FIG. 47

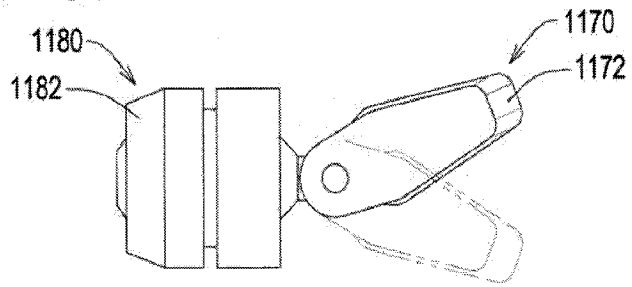

1180
1182
1170
1172

FIG. 48

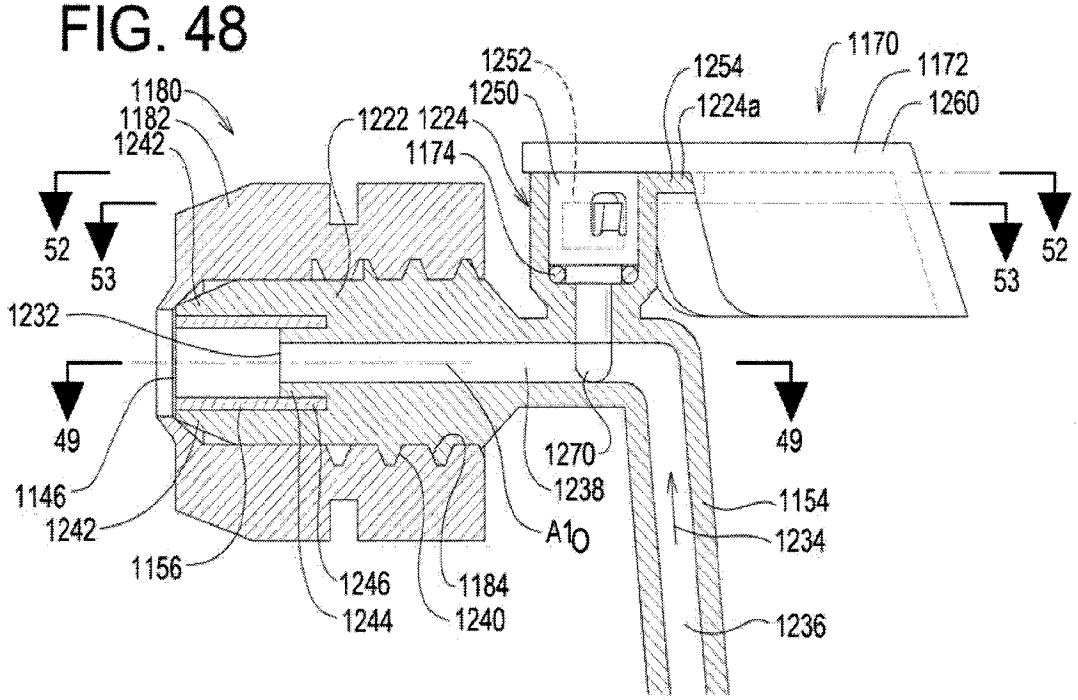

1180
1182
1242
1222 1224
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1224a
1170
1172
1260
52
53
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1232
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1184
1240
1270
1238
A1
1154
1234
1236

FIG. 49

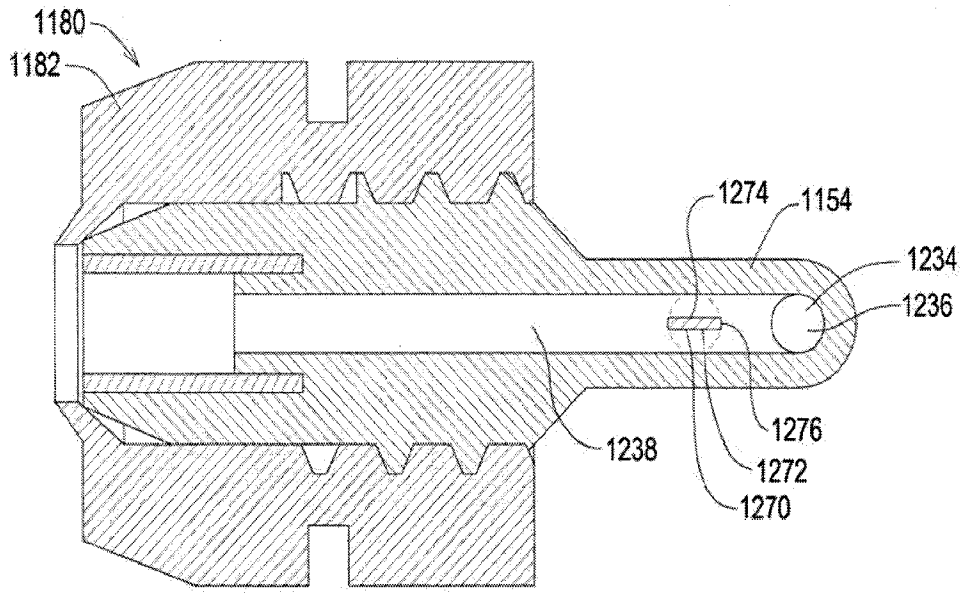

1180
1182
1274
1154
1234
1236
1276
1272
1270
1238

FIG. 50

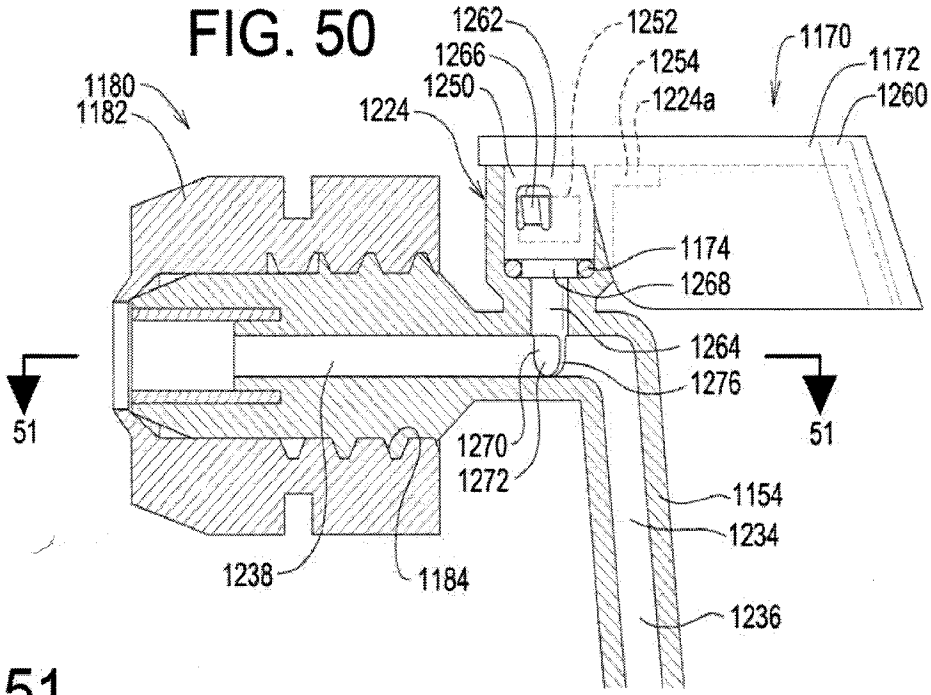


FIG. 51

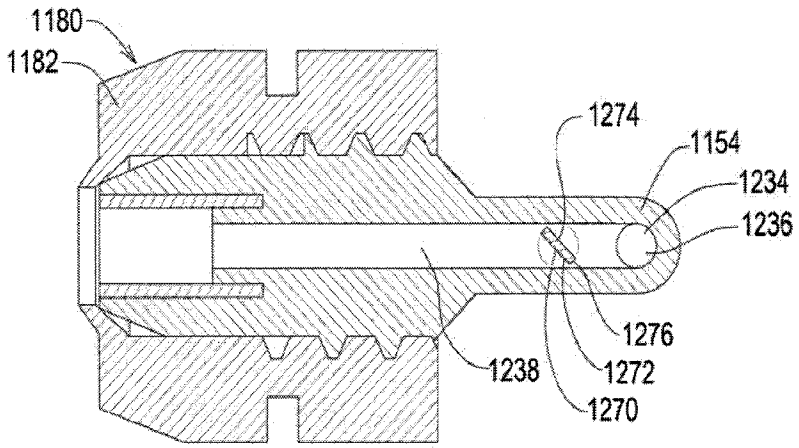


FIG. 52

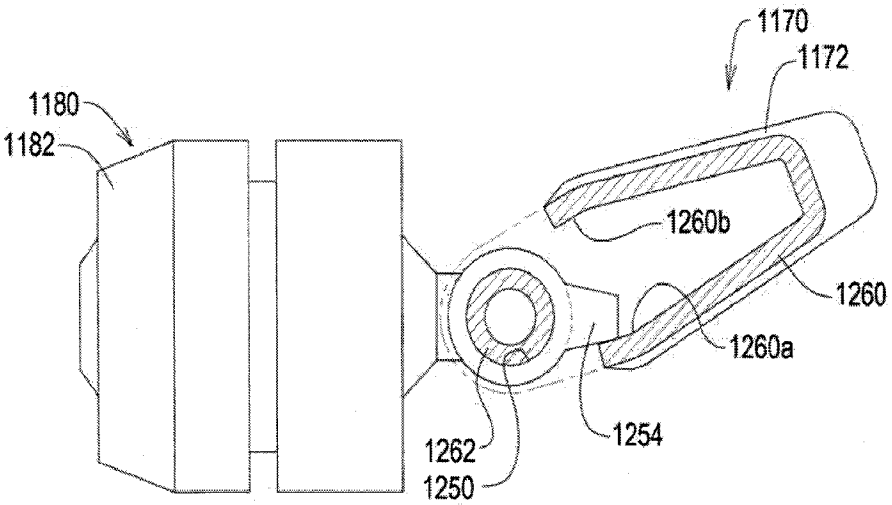


FIG. 53

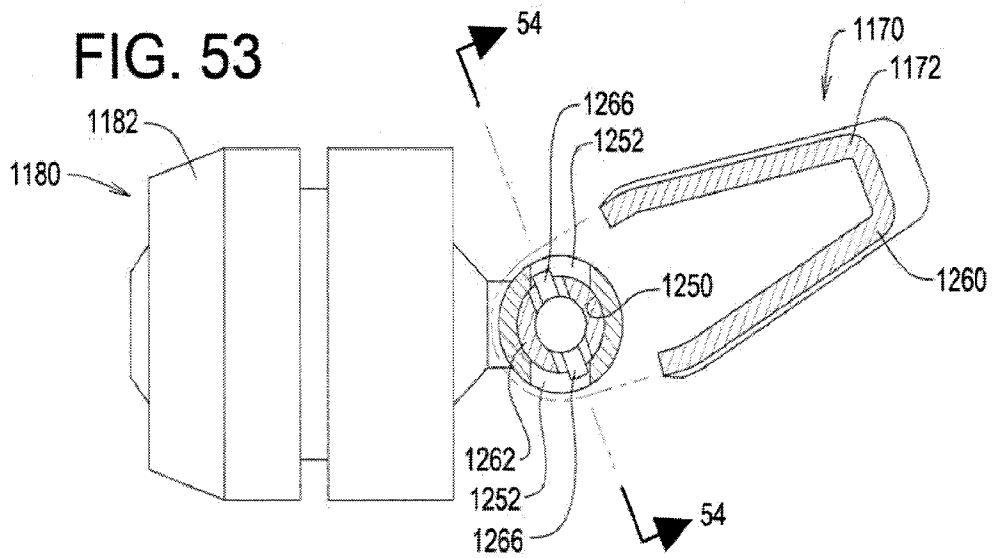

54
1170
1172
1182
1266
1252
1180
1250
1260
1262
1252
1266
54

FIG. 54

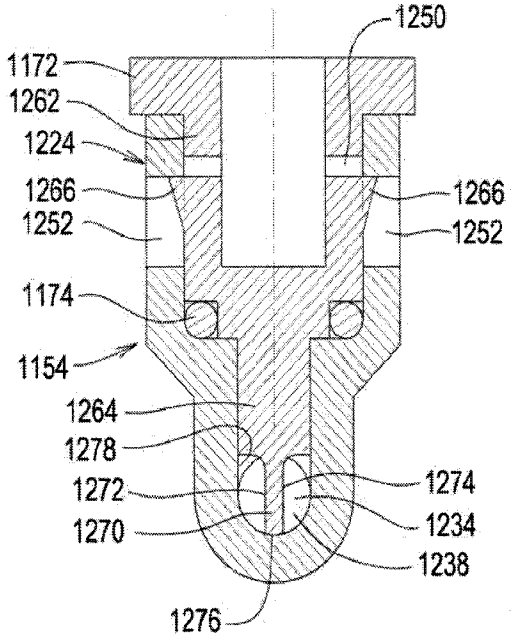

1250
1172
1262
1224
1266
1252
1266
1252
1174
1154
1264
1278
1272
1270
1274
1234
1238
1276

FIG. 55

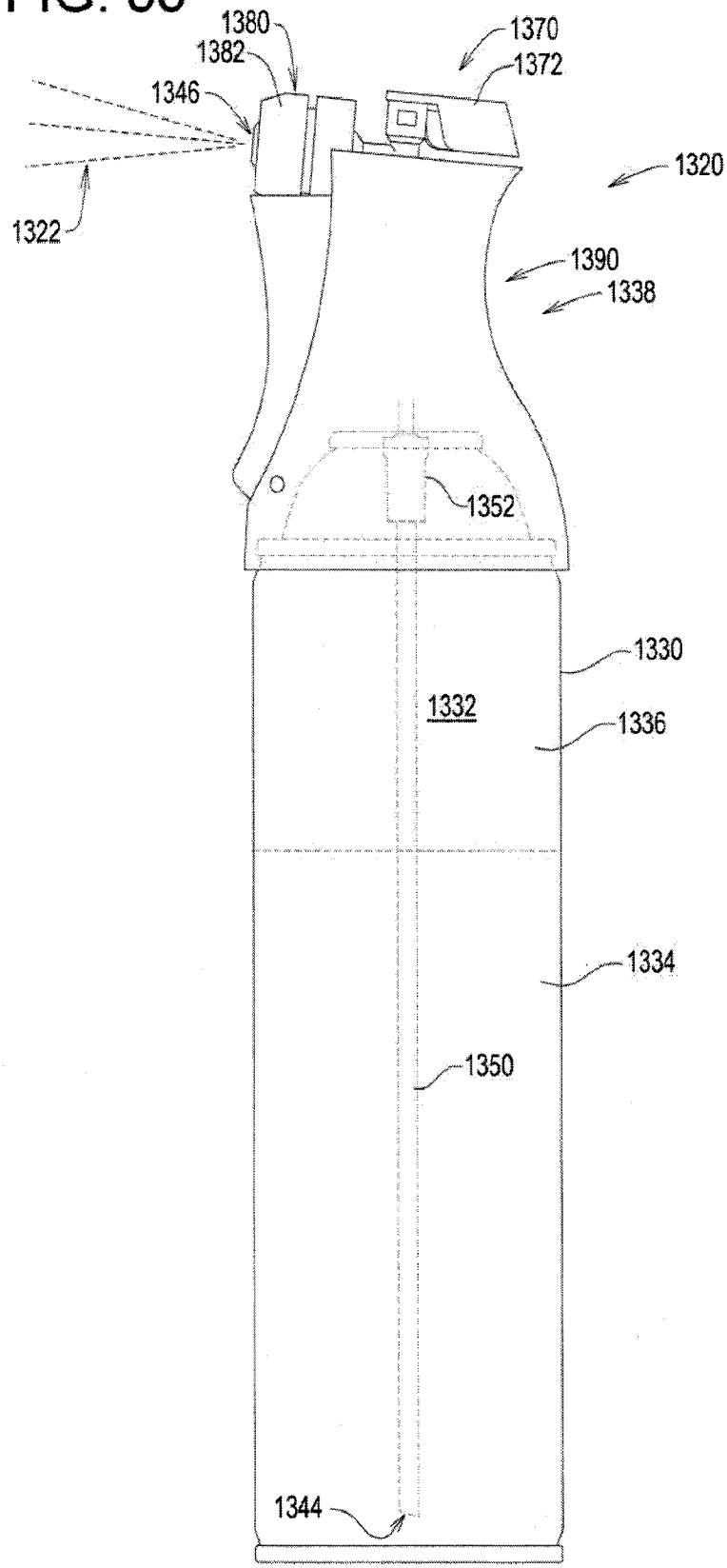

1380
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1344

FIG. 56

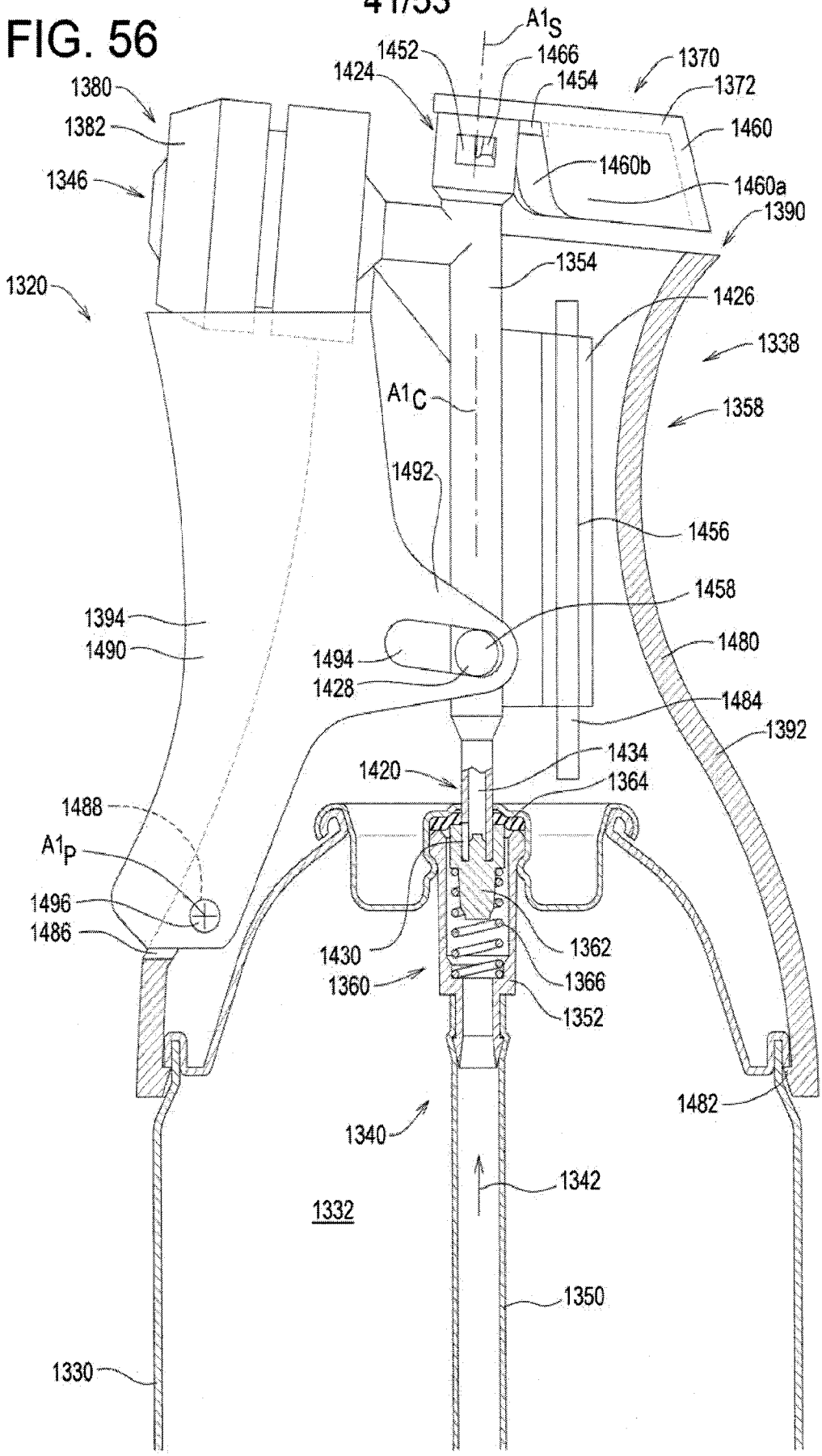

A1S
1452
1466
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1382
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1460b
1460a
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1354
1320
1426
1338
A1C
1358
1492
1456
1458
1394
1490
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1480
1428
1484
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1364
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A1P
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FIG. 57

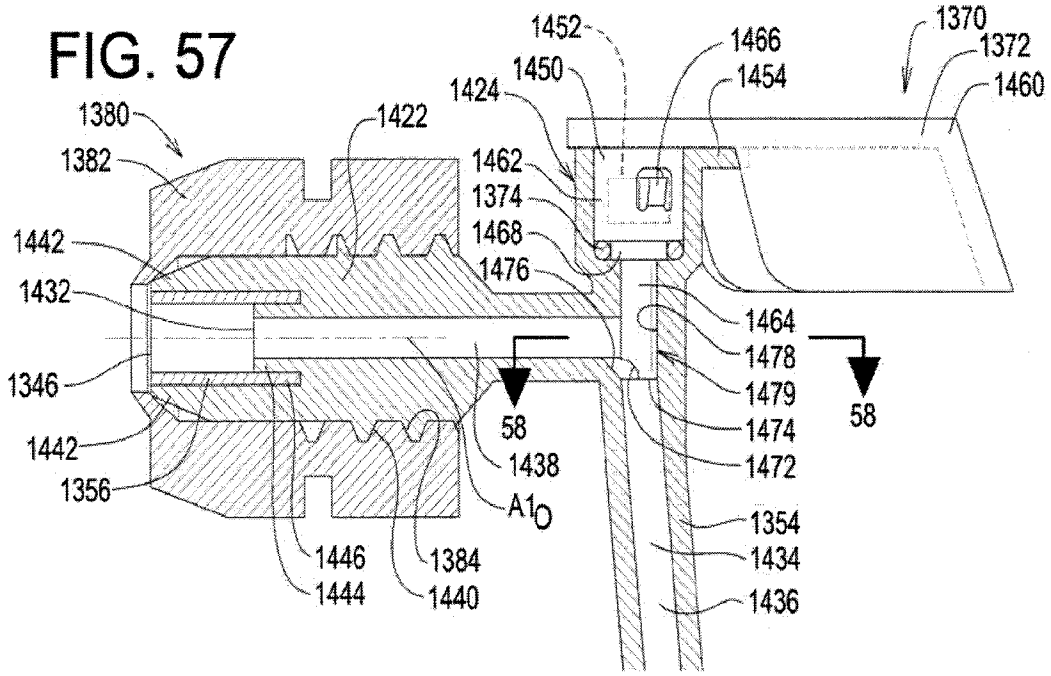


FIG. 58

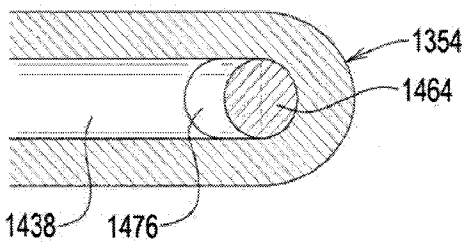


FIG. 59

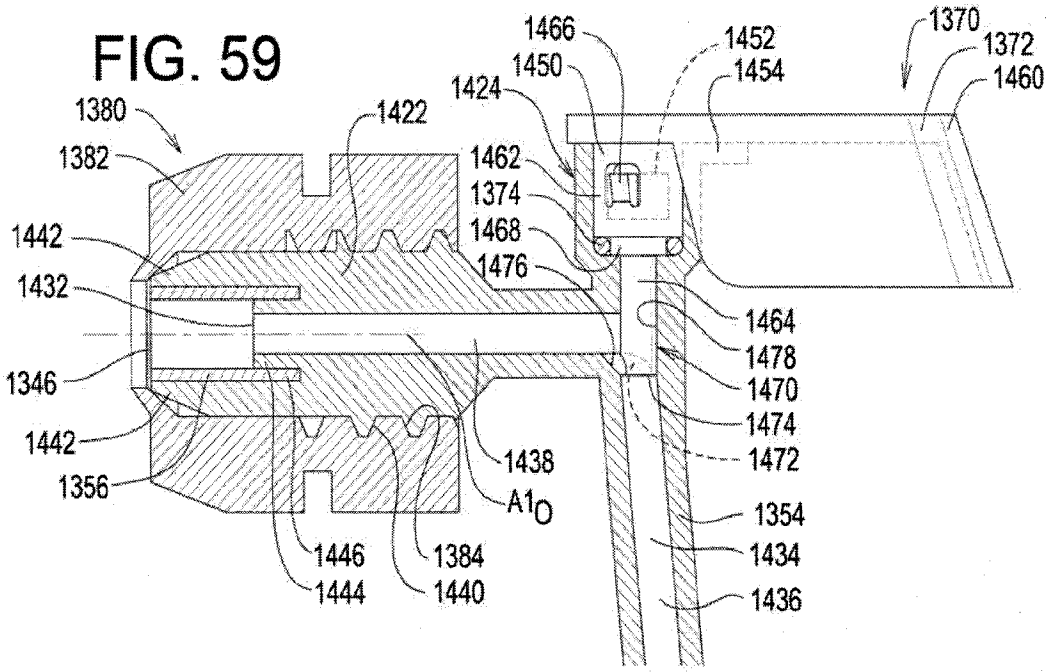


FIG.60

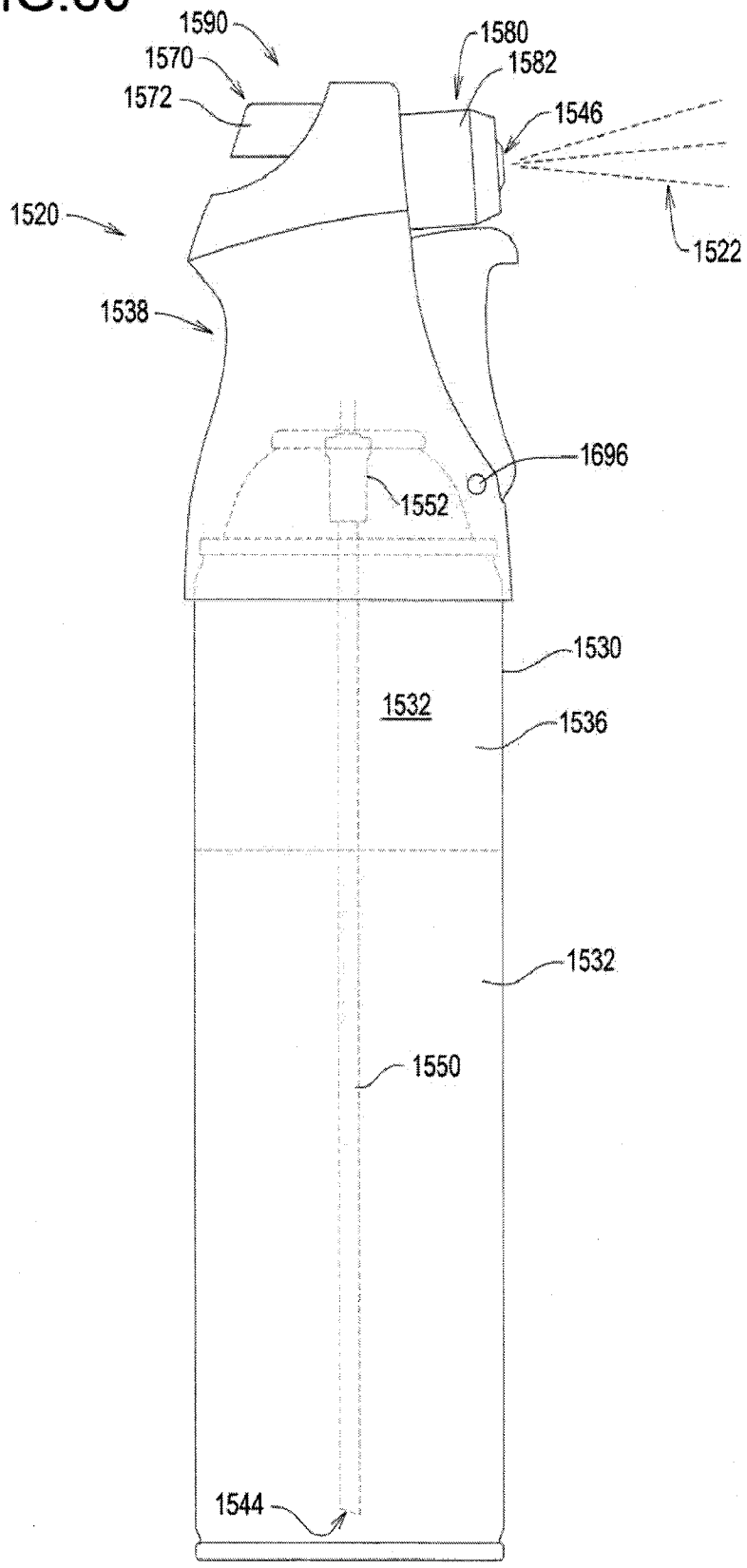

1590
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1696
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1544

FIG. 61

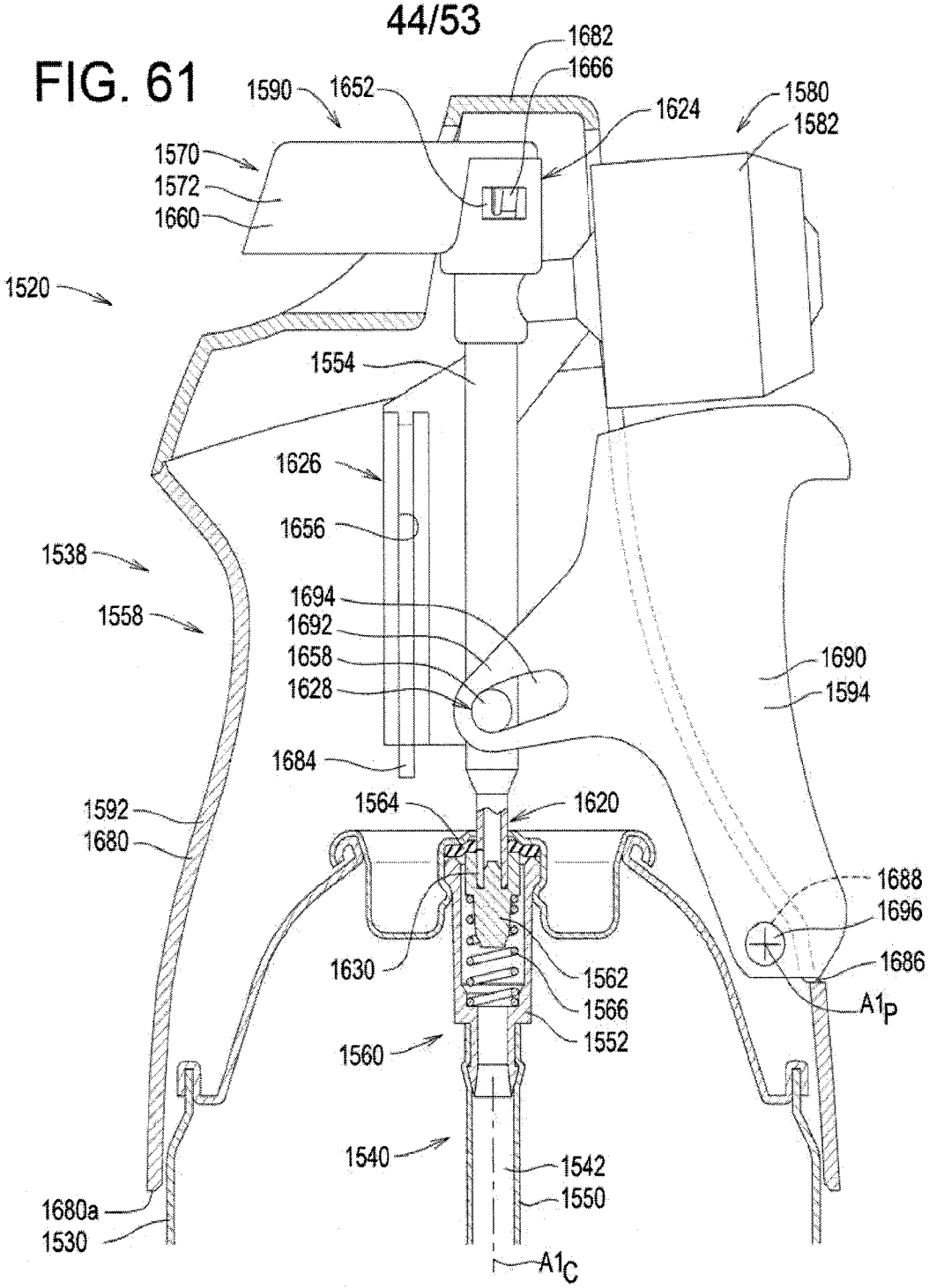

1682
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1554
1626
1656
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1558
1694
1692
1658
1628
1690
1594
1684
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1620
1592
1680
1688
1696
1630
1562
1686
1566
A1P
1560
1552
1540
1542
1550
1680a
1530
A1C

FIG. 62

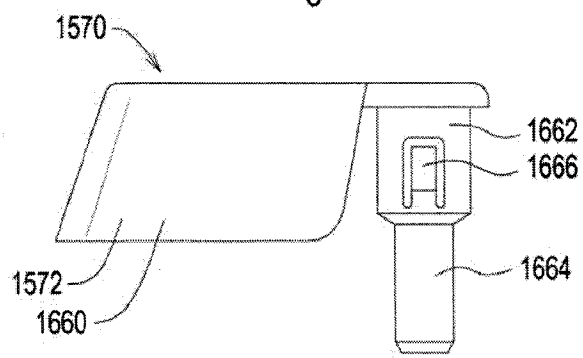

1570
1662
1666
1664
1572
1660

FIG. 63

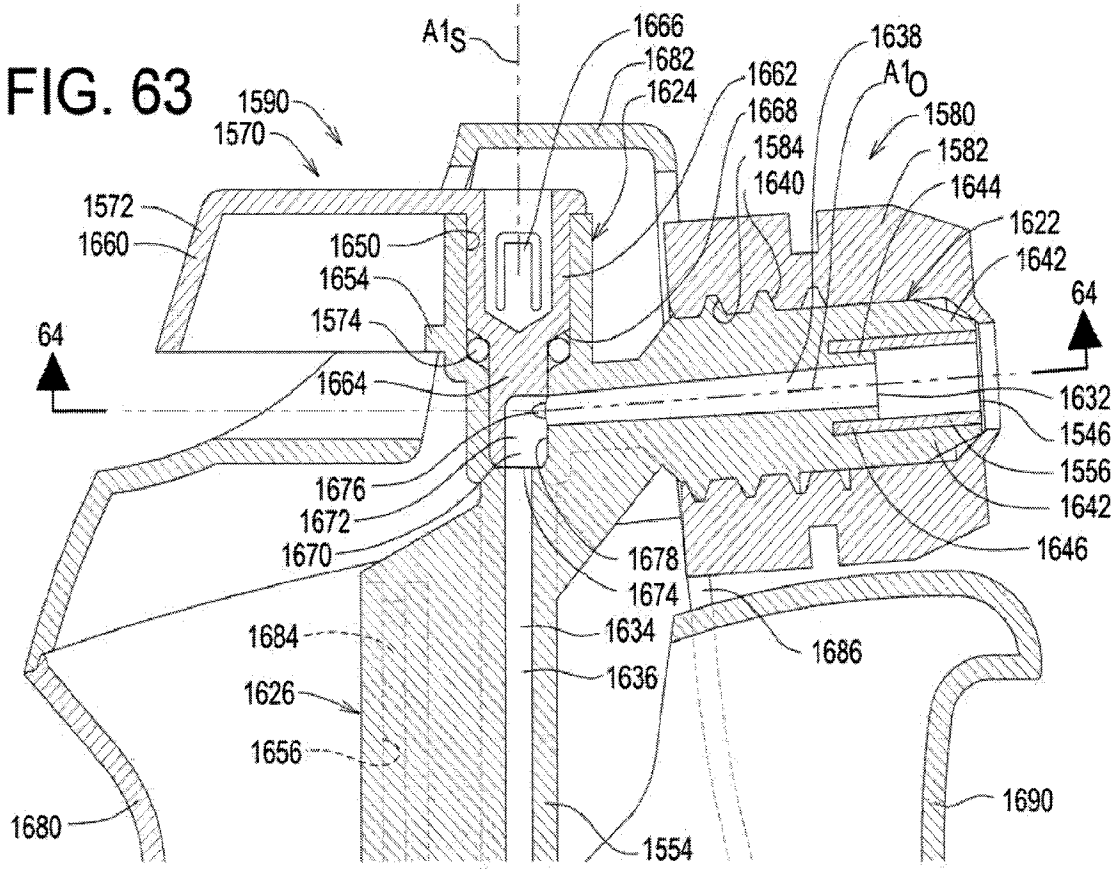

A1S
1666
1682
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1638
A1O
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1642
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1590
1570
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1574
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1676
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1686
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1690
1554

FIG. 64

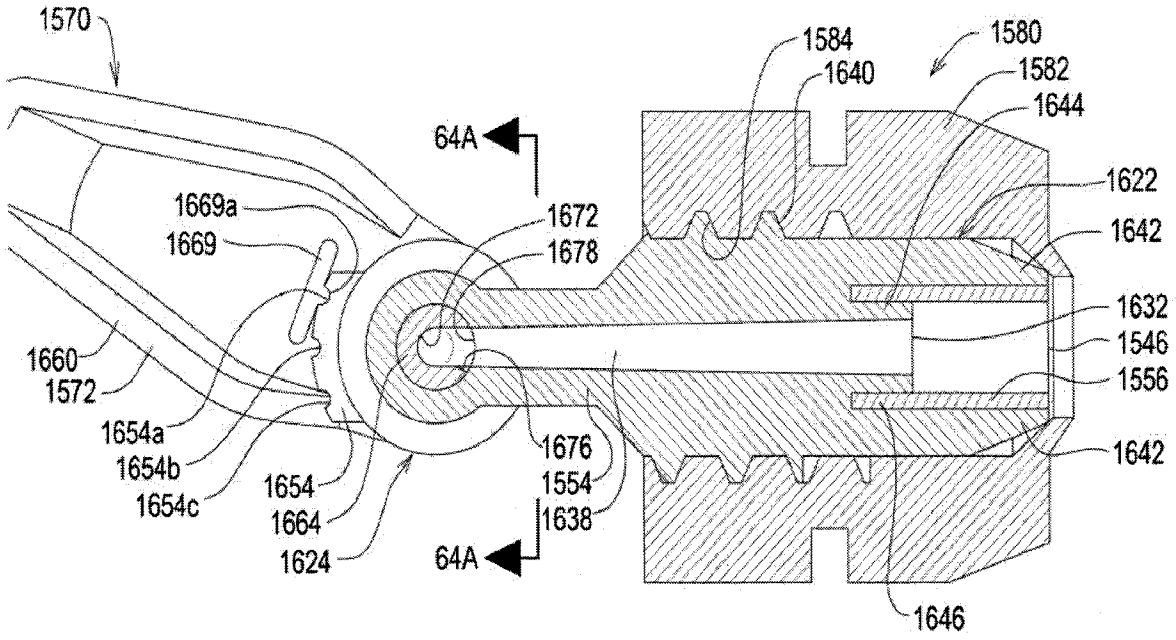

1570
64A
1669a
1669
1672
1678
1660
1572
1654a
1654b
1654c
1654
1664
1624
1676
1554
1638
1584
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1580
1582
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1642
1632
1546
1556
1646

FIG. 65

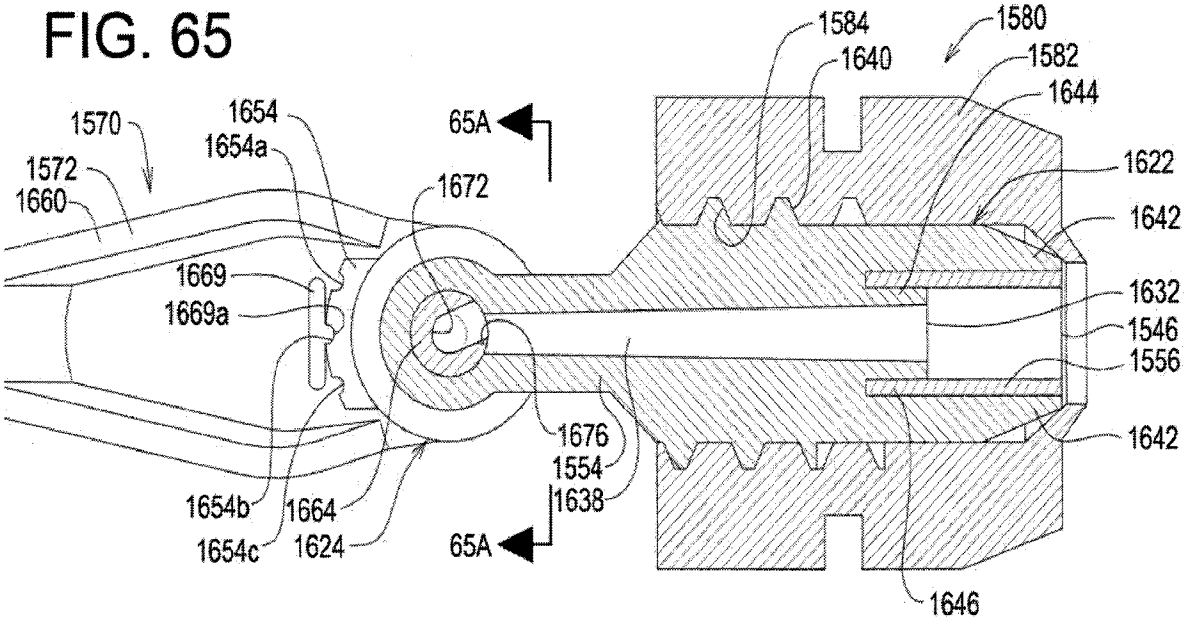

1584
1580
1640
1582
1644
1570
1654
65A
1654a
1572
1672
1622
1660
1642
1669
1632
1669a
1546
1556
1676
1642
1554
1638
1654b
1664
65A
1654c
1624
1646

FIG. 66

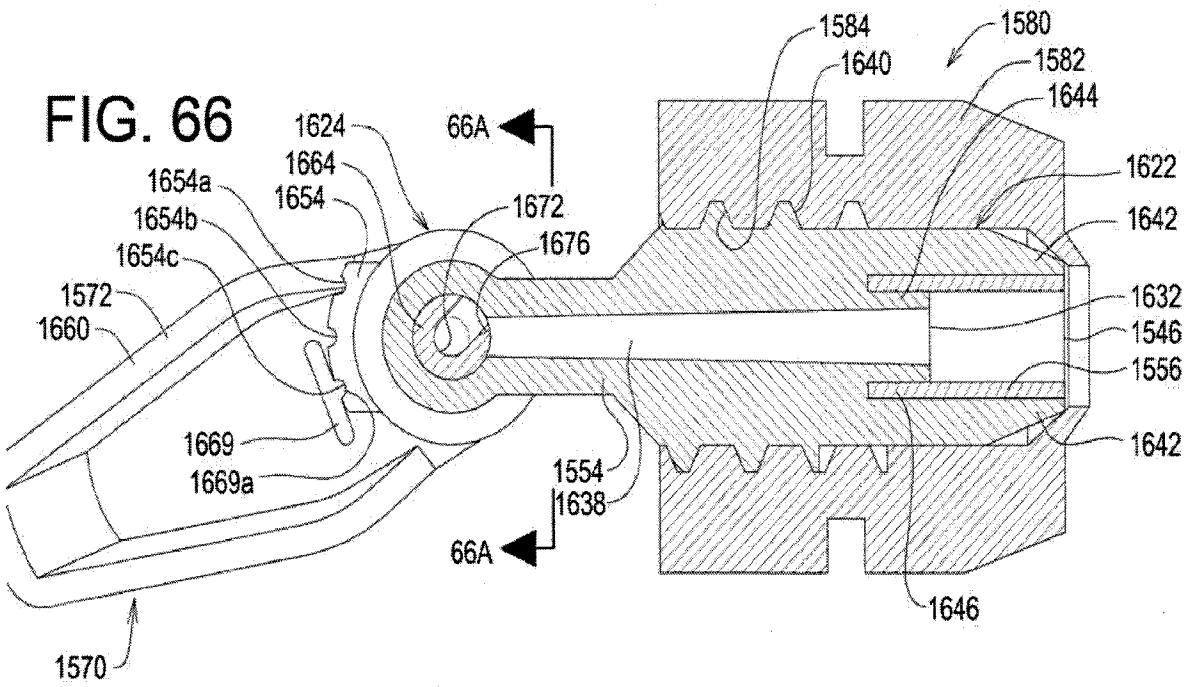

1584
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1624
66A
1664
1654a
1654
1672
1622
1654b
1676
1642
1654c
1572
1632
1660
1546
1556
1669
1642
1669a
1554
1638
66A
1646
1570

FIG. 64A

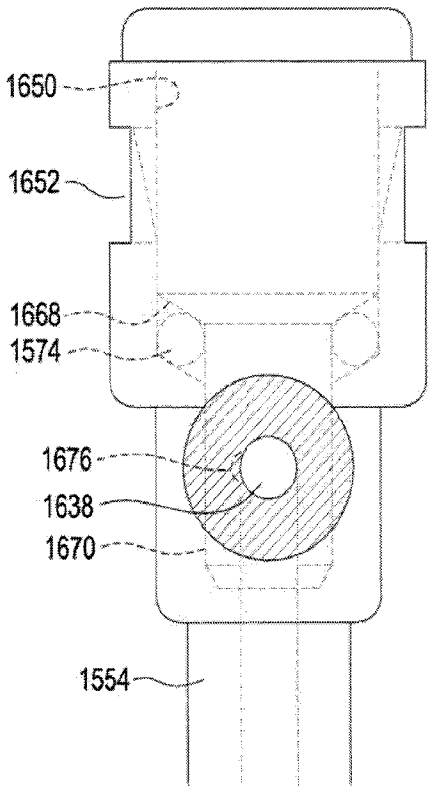


FIG. 65A

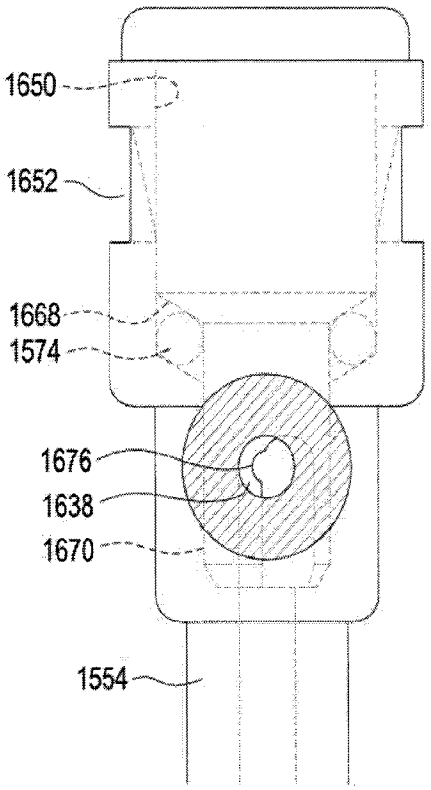


FIG. 66A

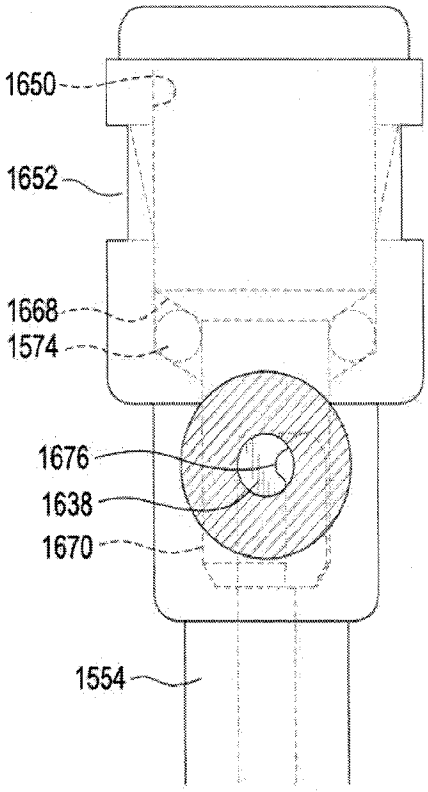


FIG. 67

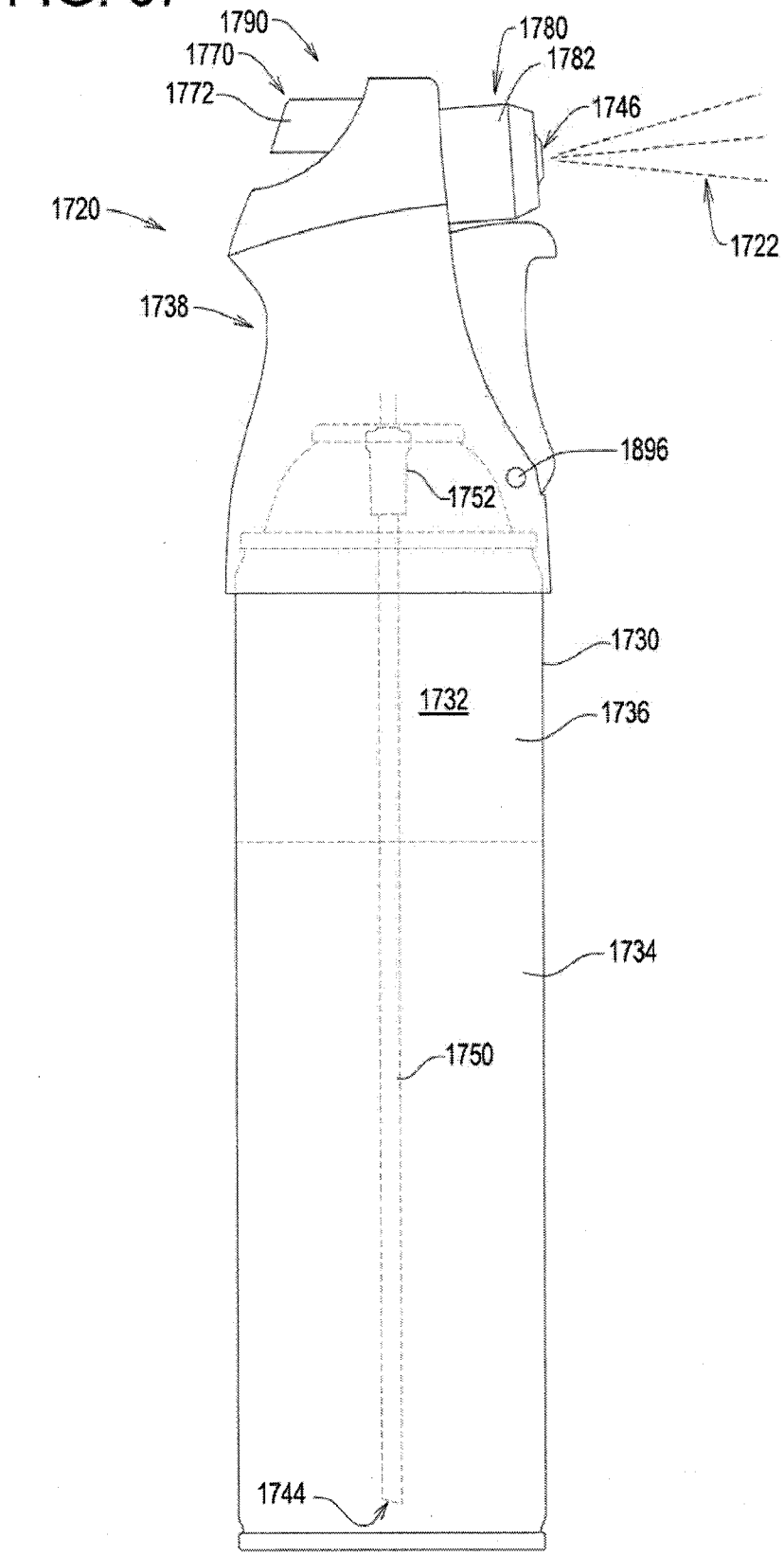

1790
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FIG. 68

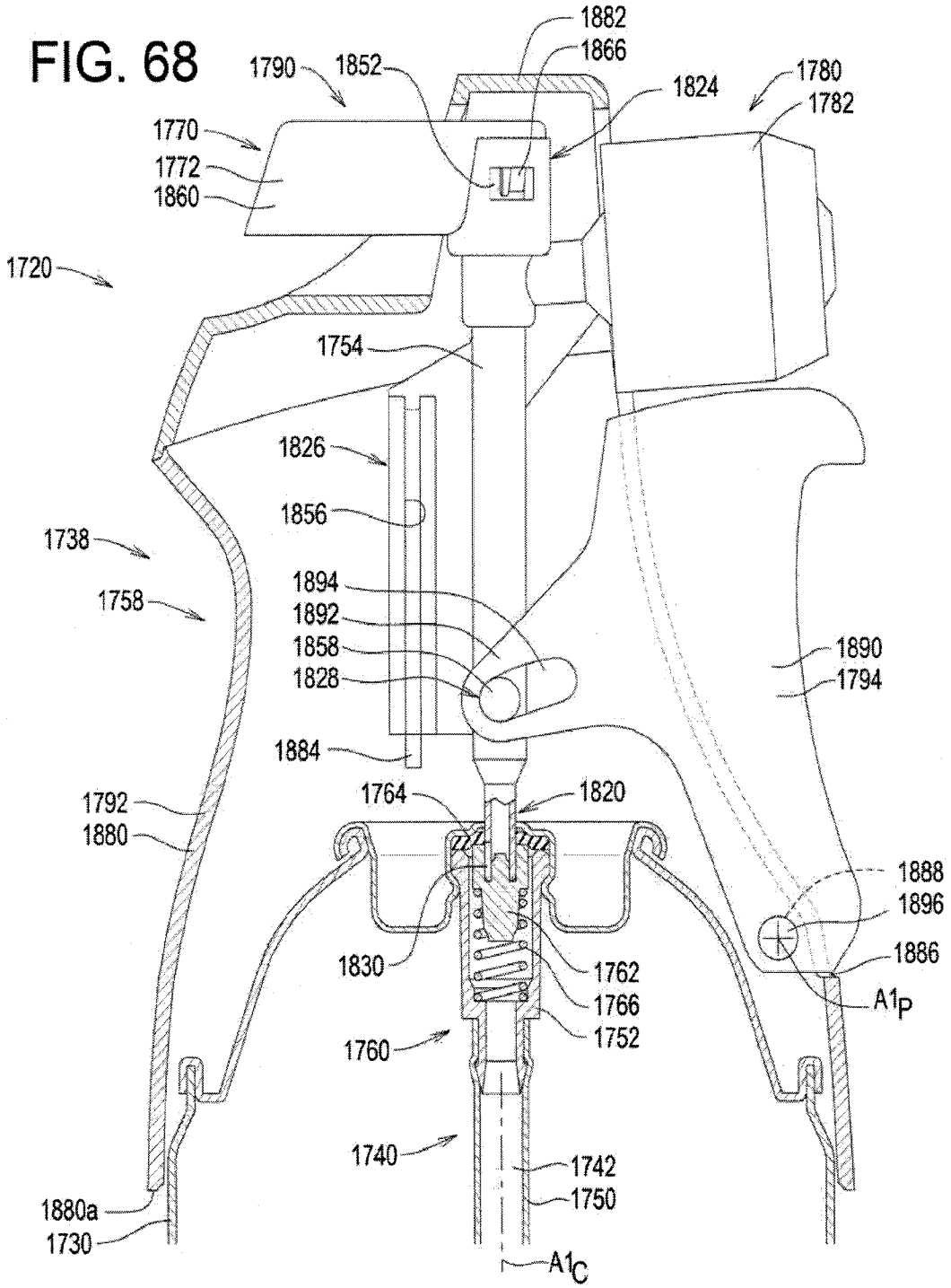

1882
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1764
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1766
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1740
1742
1750
1880a
1730
A1P
A1C

FIG. 69

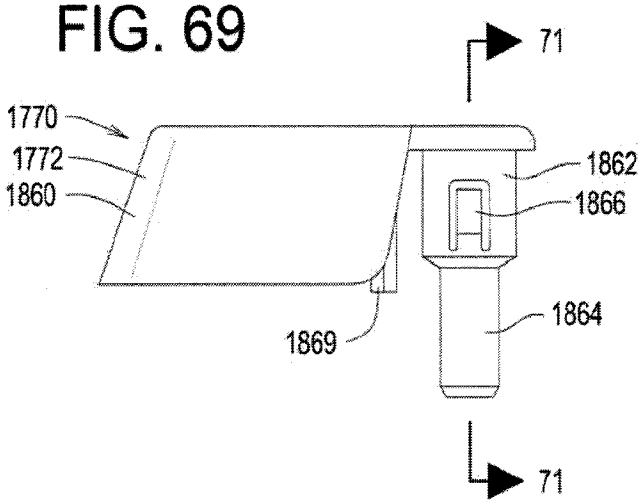


FIG. 70

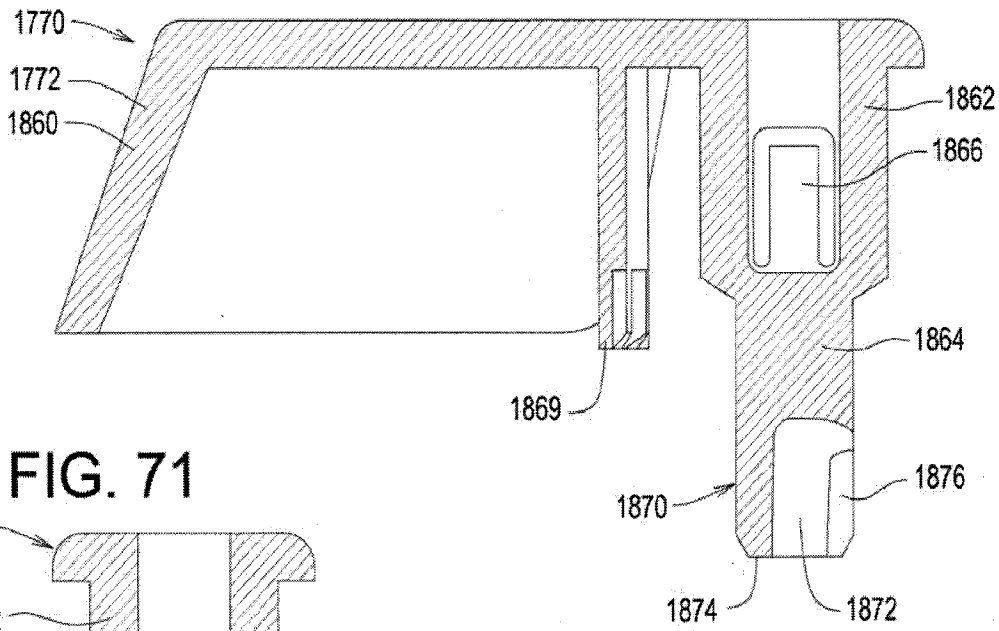


FIG. 71

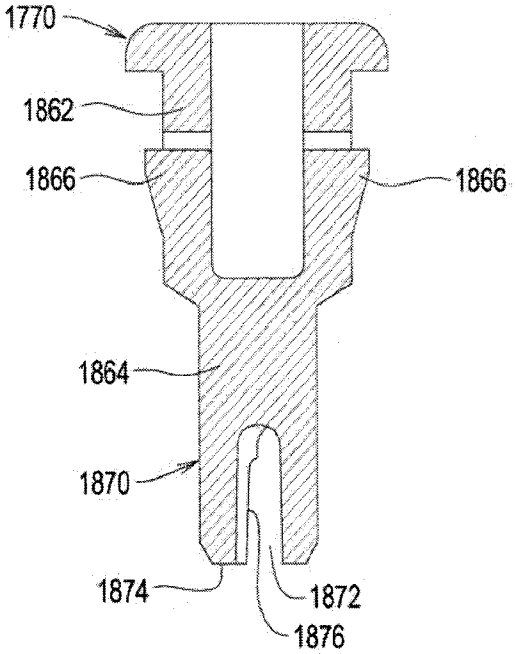


FIG. 72

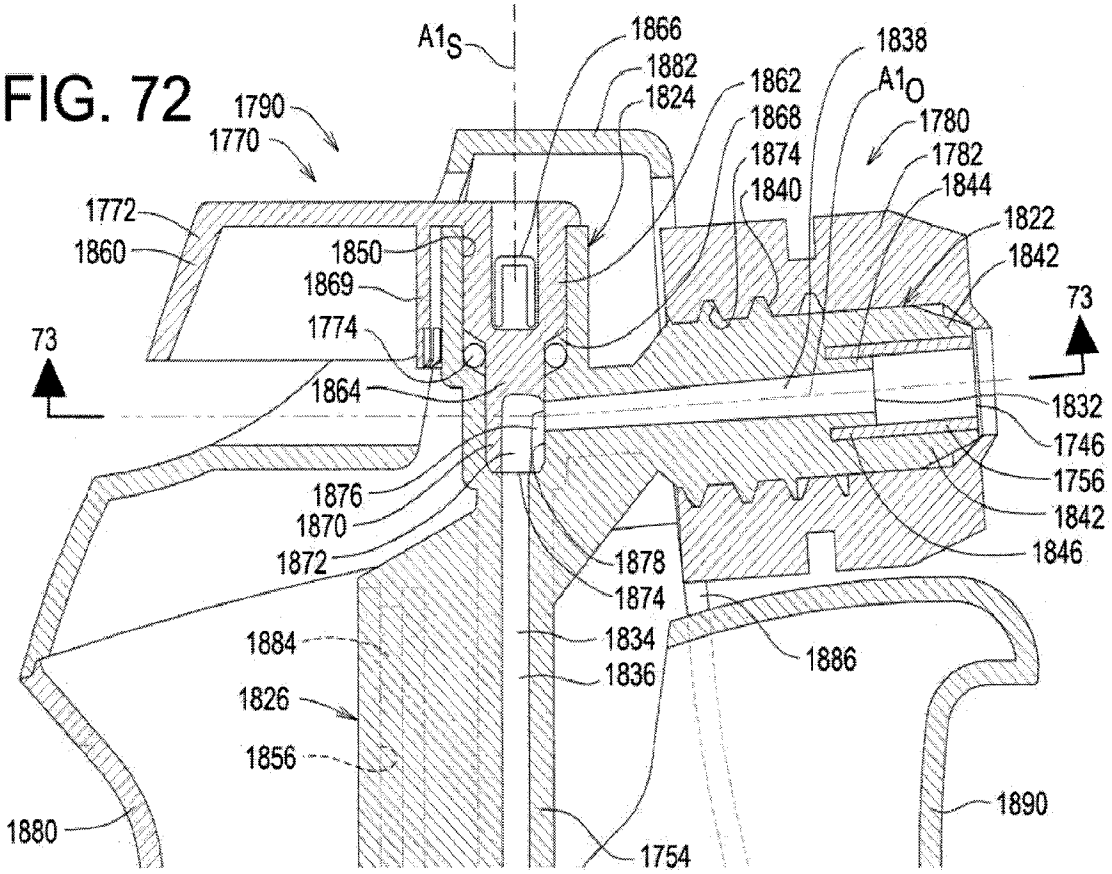

A1S
1866
1882
1824
1862
1868
1874
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1838
A1O
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1842
1790
1770
1772
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1874
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73

FIG. 73

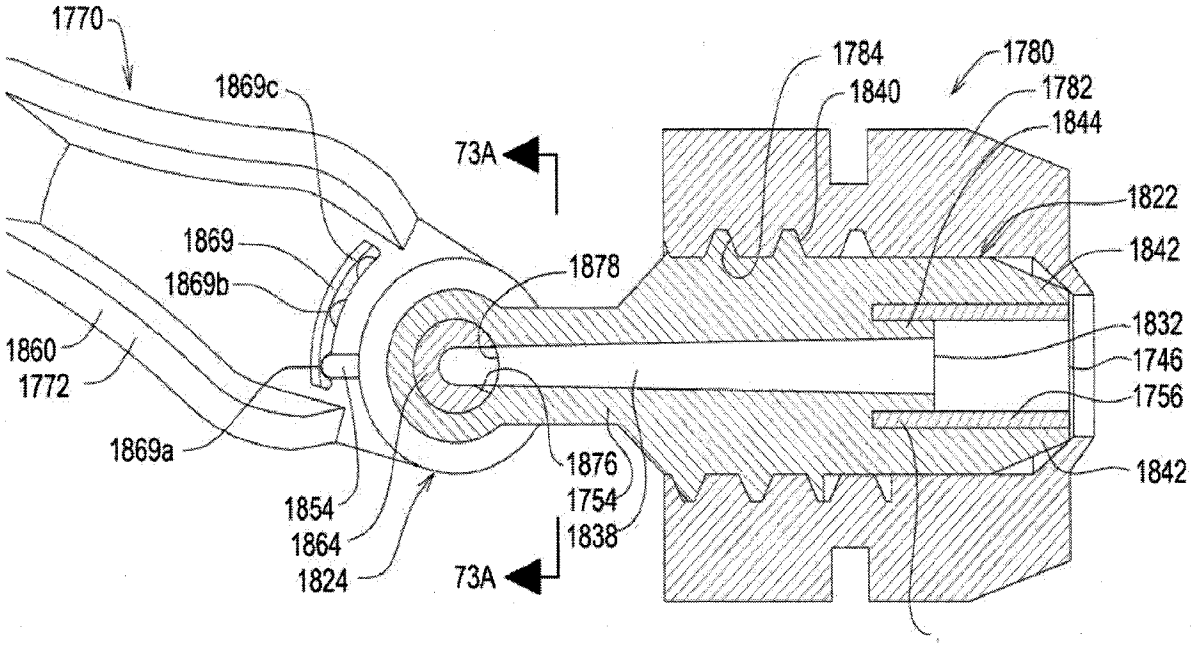

1770
1869c
1784
1780
1840
1782
1844
73A
1822
1842
1869
1869b
1878
1832
1746
1756
1860
1772
1869a
1876
1754
1838
1854
1864
1824
73A
1842

FIG. 74

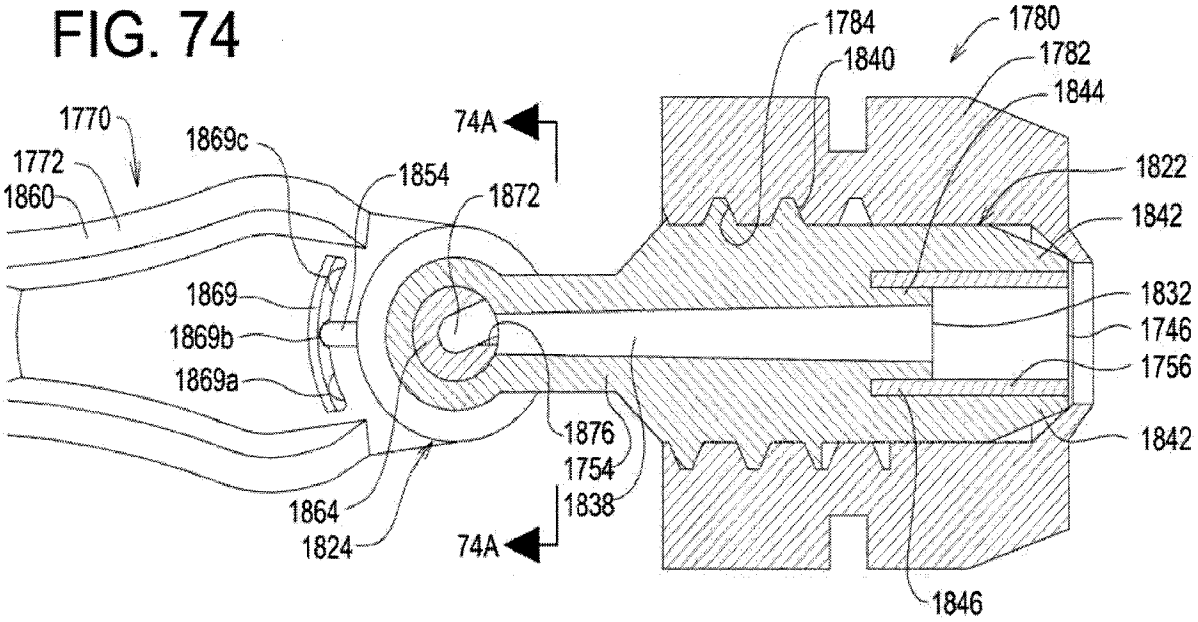

1770
1772
1860
1869c
1854
1872
74A
1784
1840
1780
1782
1844
1822
1842
1832
1746
1756
1842
1869
1869b
1869a
1876
1754
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1864
1824
74A
1846

FIG. 75

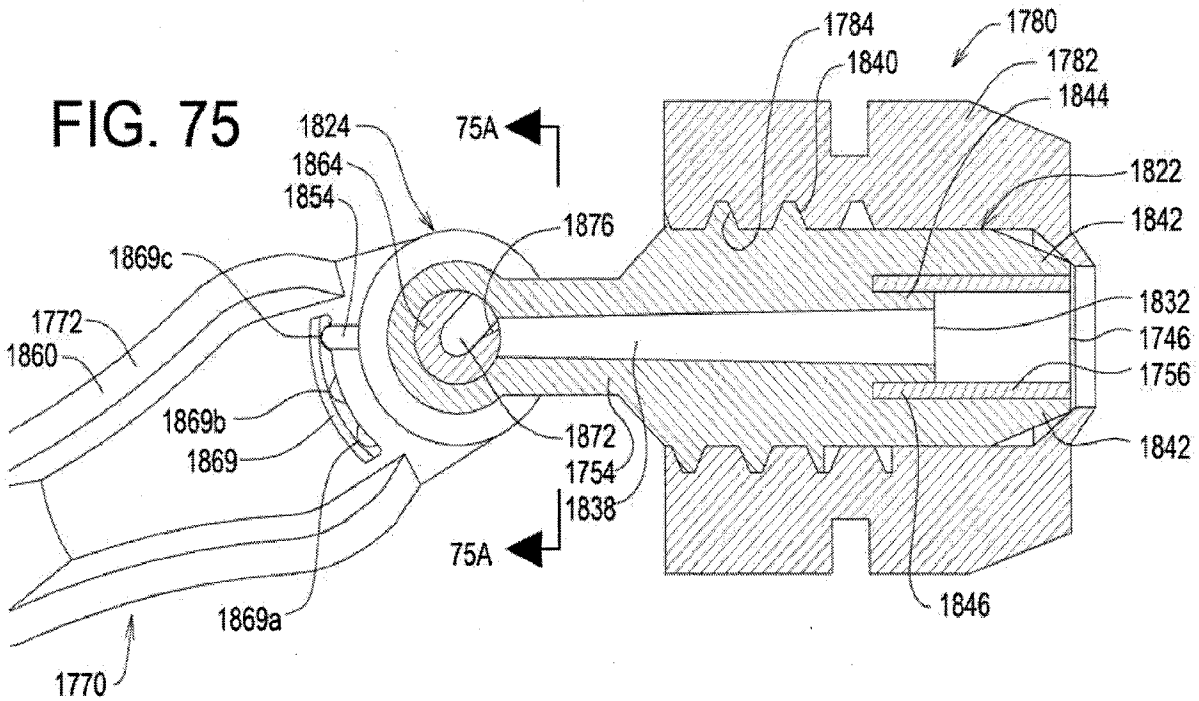

1824
1864
1854
75A
1784
1840
1780
1782
1844
1822
1842
1876
1869c
1772
1860
1832
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1869b
1869
1872
1754
1838
1842
75A
1846
1869a
1770

FIG. 73A

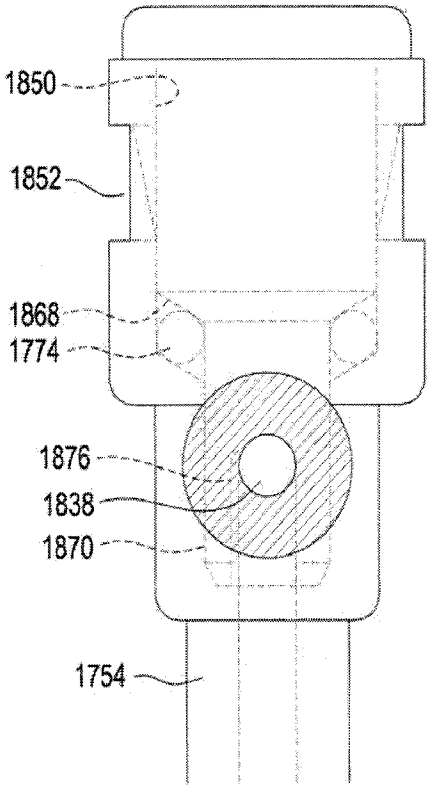


FIG. 74A

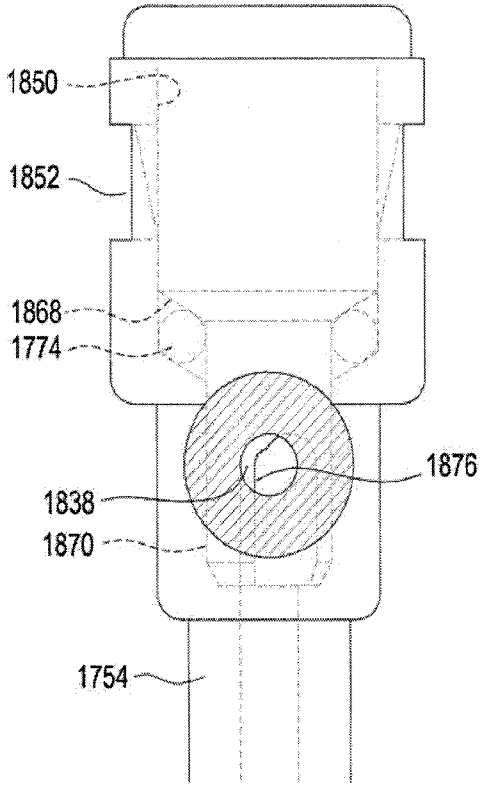
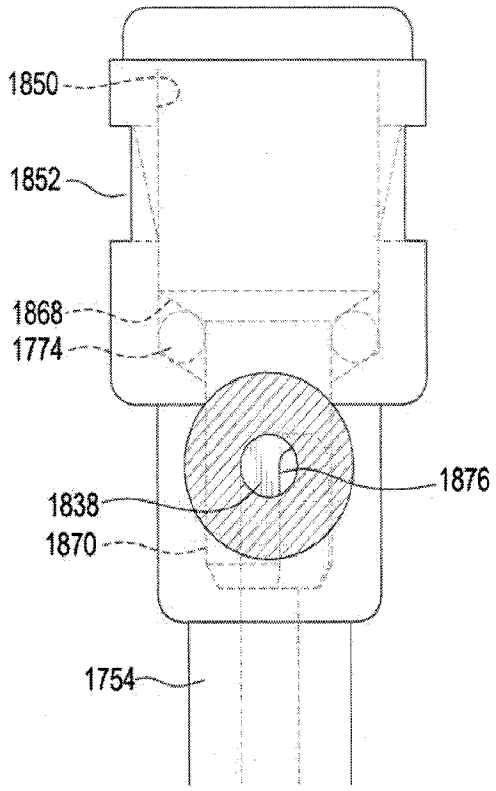


FIG. 75A



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 2012/048736

A. CLASSIFICATION OF SUBJECT MATTER

B65D 83/14 *(2006.01)*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D 83/14, 83/44, 83/48, 83/52, 83/54, B05D 1/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatSearch (RUPTO internal), Esp@cenet, PAJ, USPTO

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6328185 B1 (HOMAX PRODUCTS, INC.) 11.12.2001, col. 1, lines 26-67, col. 2, lines 1-37, col. 9, lines 3-44	35-38
A		1-34
A	US 2007/0272765 A1 (PETER KWASNY) 29.11.2007, 0027-0042, fig. 1-7	1-38
A	US 3653558 A (SCOVIL MANUFACTURING COMPANY) 04.04.1972	1-38
A	WO 1994/018094 A1 (JONSSON LARS-ERIK) 18.08.1994	1-38

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
01 October 2012 (01.10.2012)	25 October 2012 (25.10.2012)
Name and mailing address of the ISA/ FIPS Russia, 123995, Moscow, G-59, GSP-5, Berezhkovskaya nab., 30-1 Facsimile No. +7 (499) 243-33-37	Authorized officer E. Mikhailova Telephone No. 499-240-25-91

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Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
(see extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

The claim contains two groups of inventions, which are not so linked as to form a single general inventive concept, namely:

The inventions of independent claims 6, 13, 18, 23 and 29 can be referred to the first group, and the invention of independent claim 35 can be referred to the second group.

Using two adjustment systems for altering the material flow is the special technical feature for the first group of inventions.

The material of claim 35 does not comprise the above mentioned special technical features, describing just the material composition.

There is no technical relationship among those inventions involving one or more of the same or corresponding special technical features defining a contribution which each of the claimed inventions, considered as a whole, makes over the prior art, the requirement of unity of invention is not fulfilled for the claimed groups of inventions.