

- [54] **METERED PRODUCT DISPENSING SYSTEM**
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- [73] Assignee: **Inpaco**, Allentown, Pa.
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- [21] Appl. No.: **389,472**

Related U.S. Application Data

- [63] Continuation-in-part of Ser. Nos. 205,692, Dec. 7, 1971, Pat. No. 3,758,005, and Ser. No. 301,076, Oct. 26, 1972, abandoned, and Ser. No. 312,485, Dec. 6, 1972, abandoned.
- [52] U.S. Cl. **222/309, 222/383**
- [51] Int. Cl. **G01f 11/30**
- [58] Field of Search 222/359, 361, 354, 21, 222/383, 105, 107, 206-210, 309, 94, 81, 82

[56] **References Cited**

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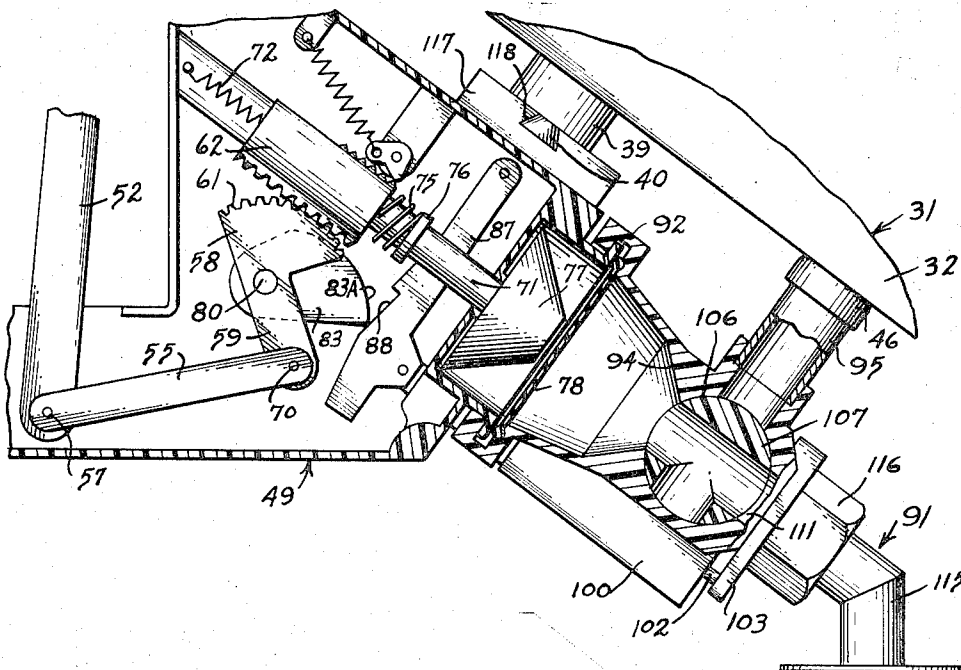
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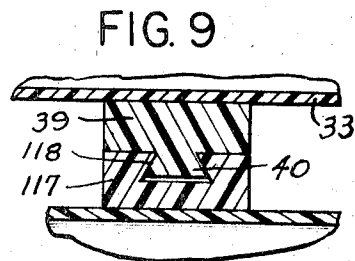
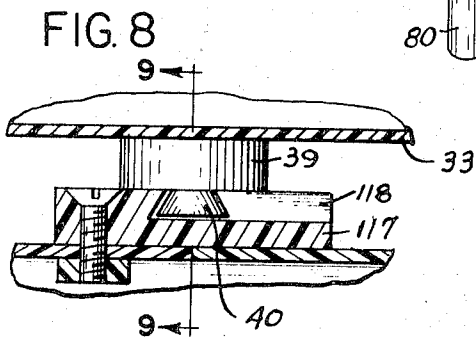
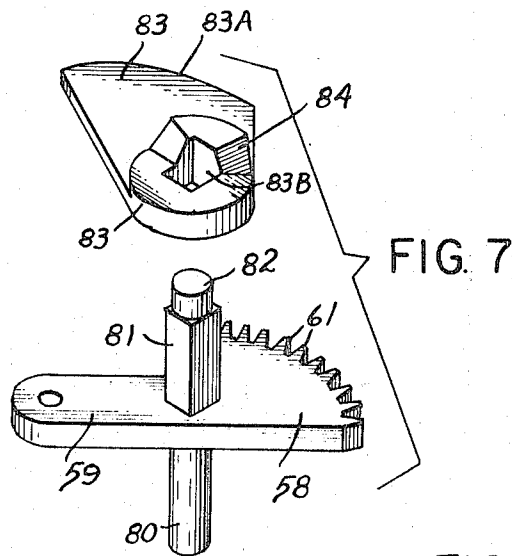
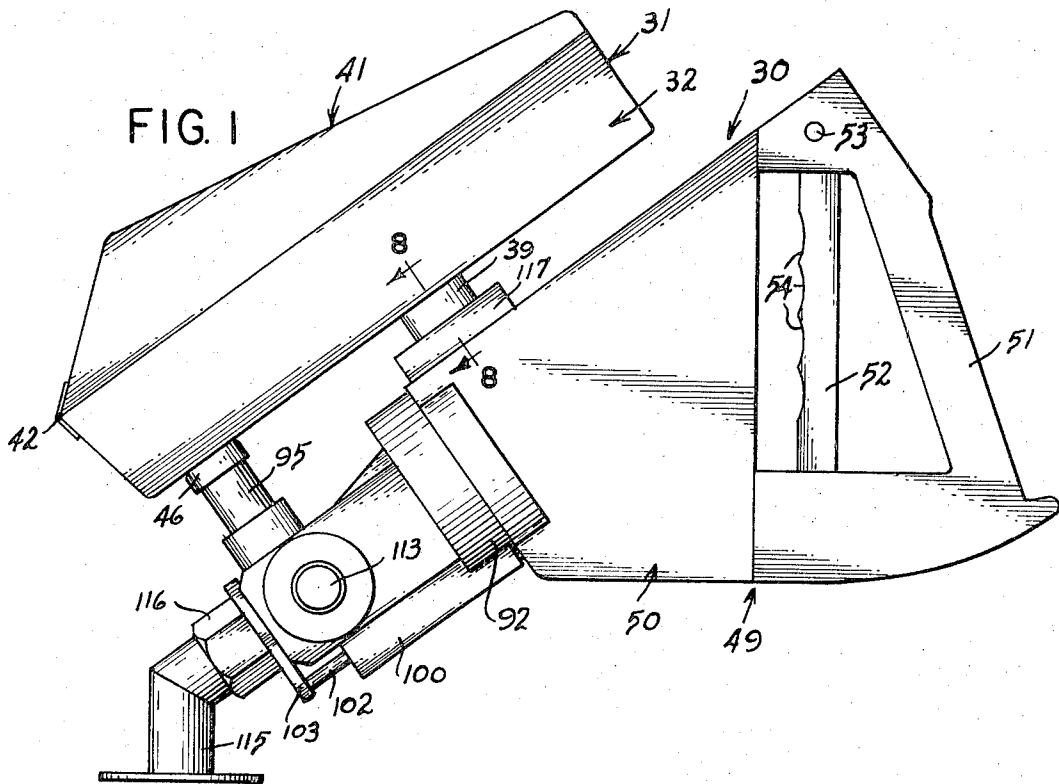
Primary Examiner—Richard A. Schacher
Assistant Examiner—James M. Slattery
Attorney, Agent, or Firm—Sherman Levy

[57] **ABSTRACT**

A metered product dispensing system that includes a pouch or container for holding a quantity of material to be dispensed, and a gun that can be manually actuated to dispense material from the pouch onto a desired location.

2 Claims, 14 Drawing Figures





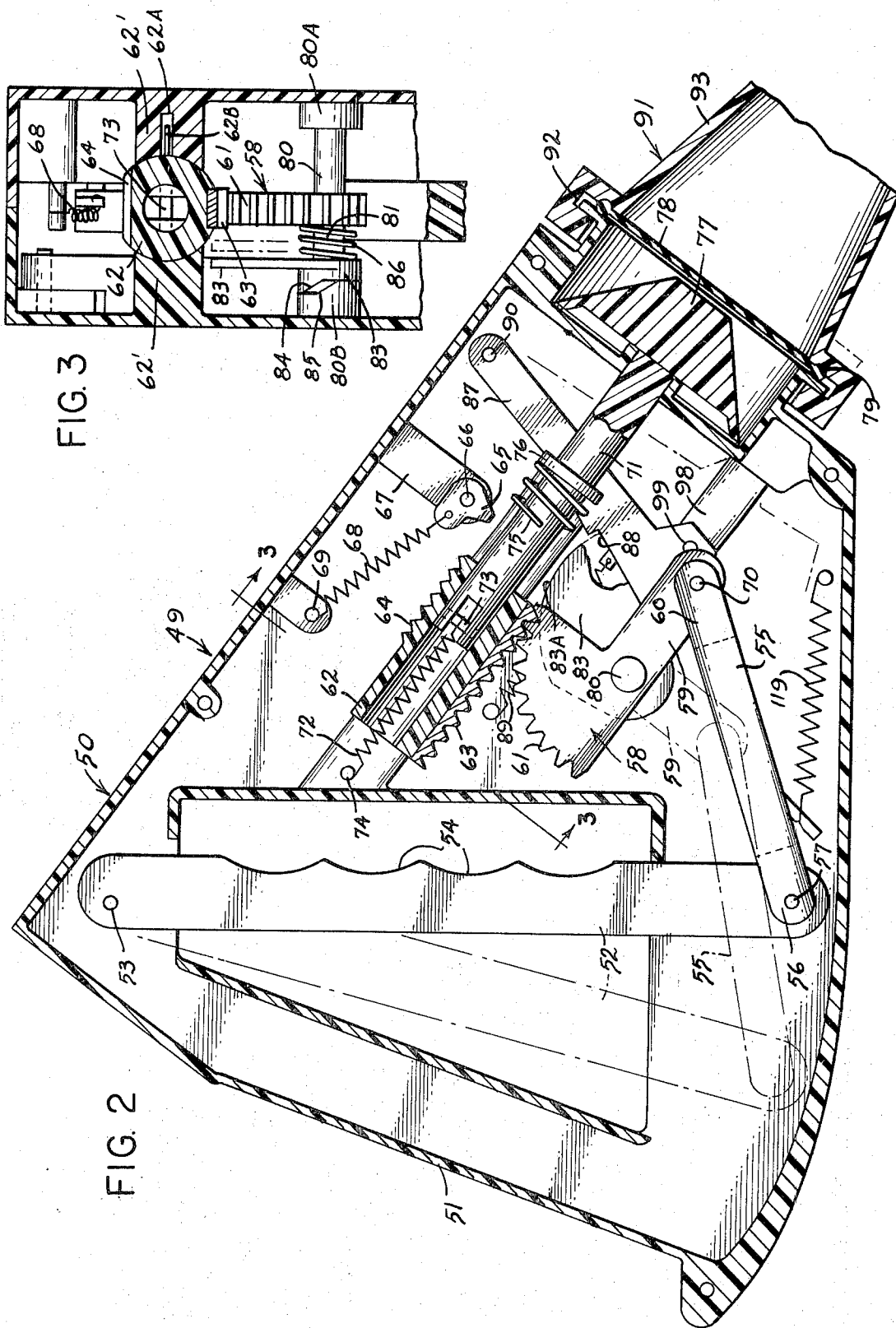


FIG. 3

FIG. 2

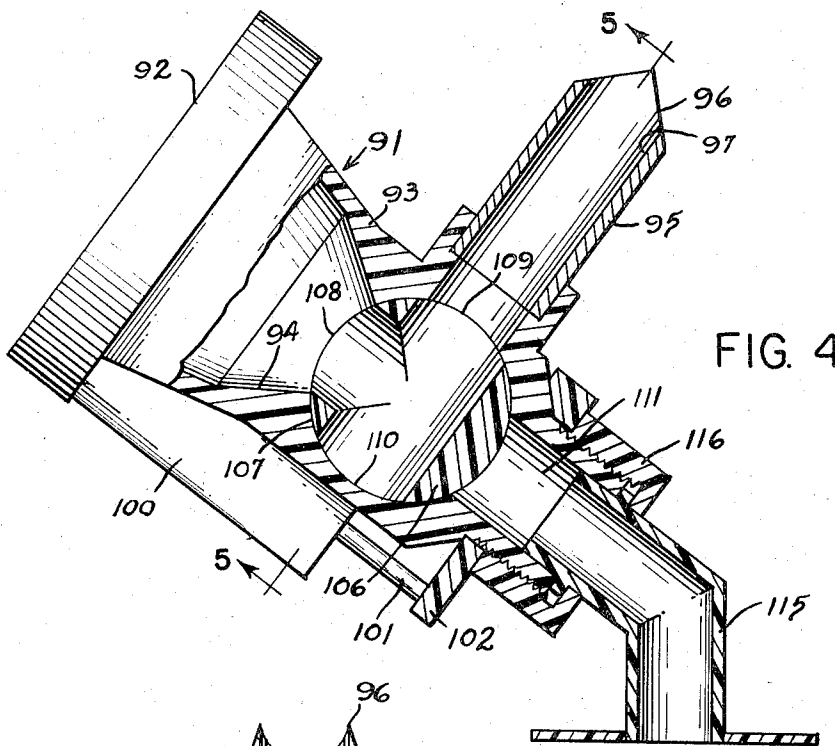


FIG. 4

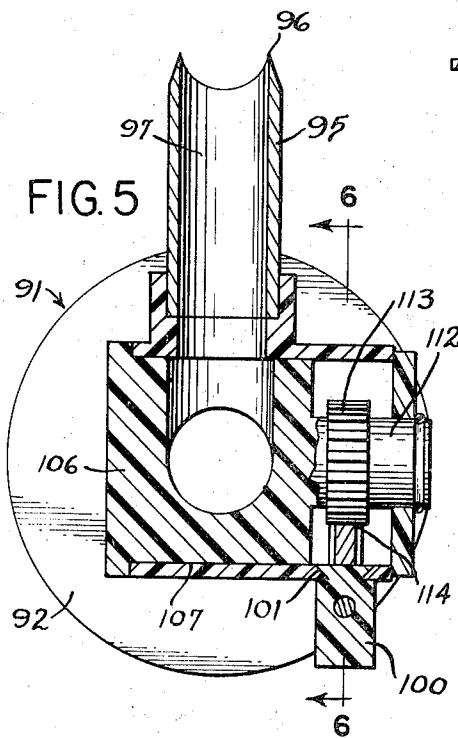


FIG. 5

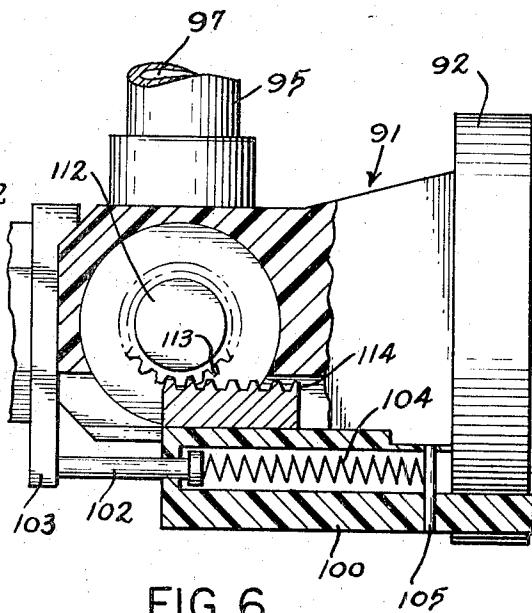


FIG. 6

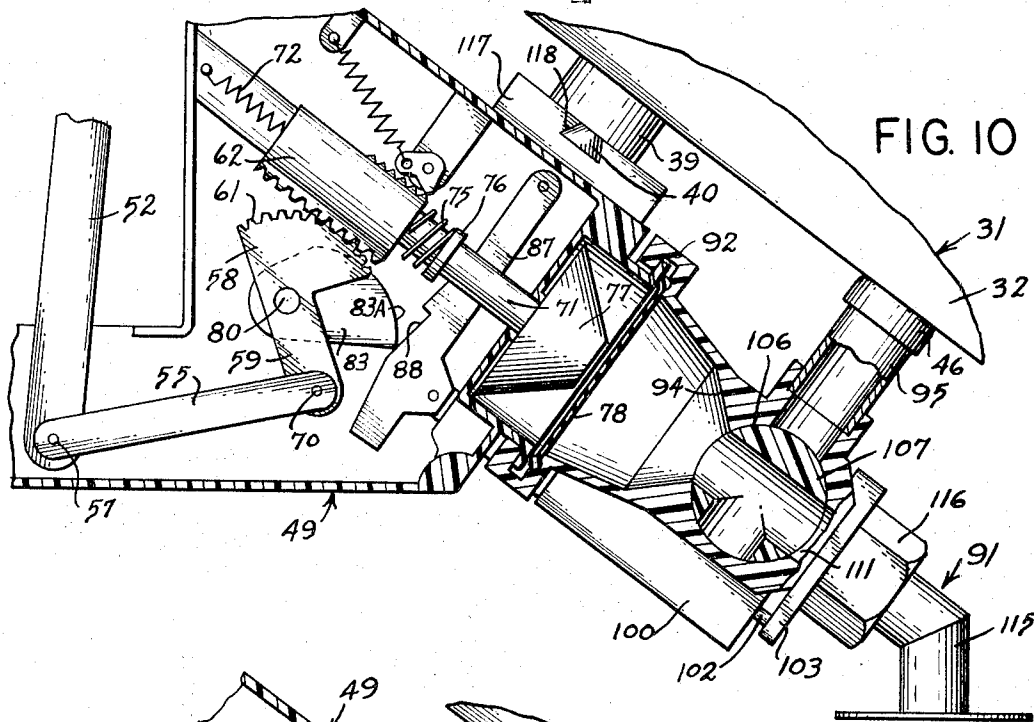


FIG. 10

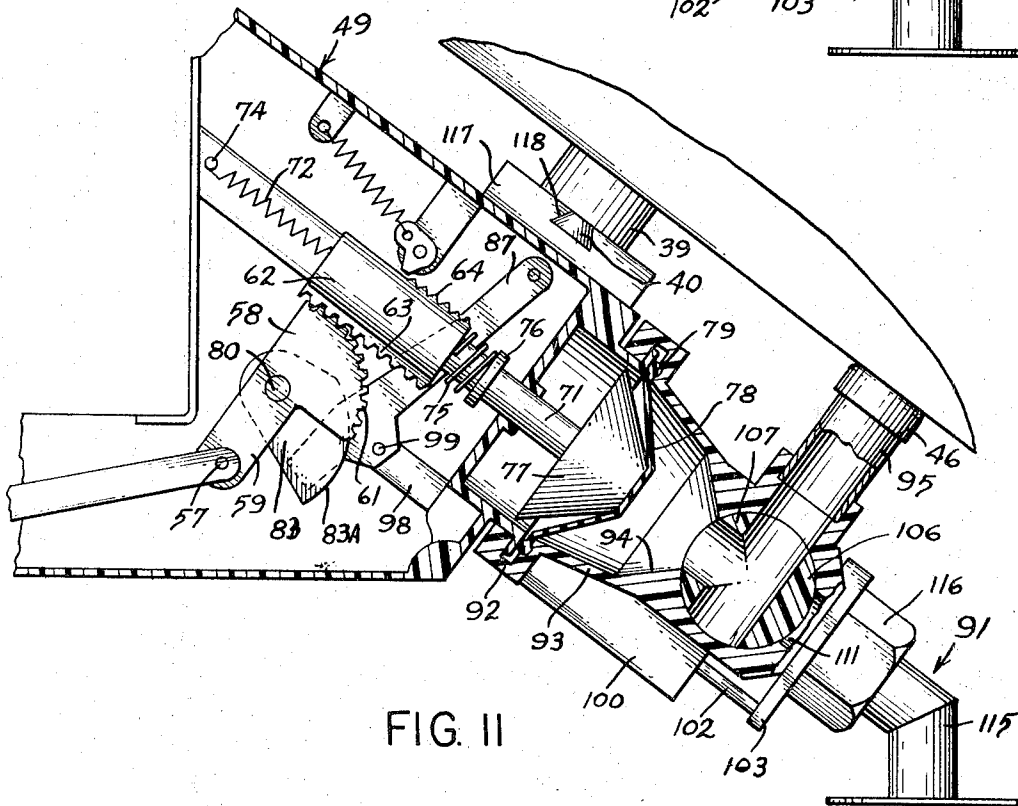
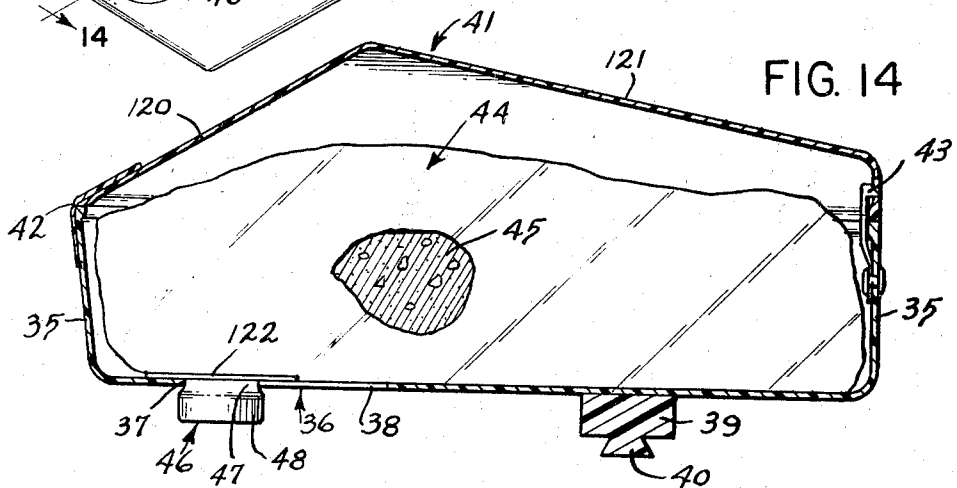
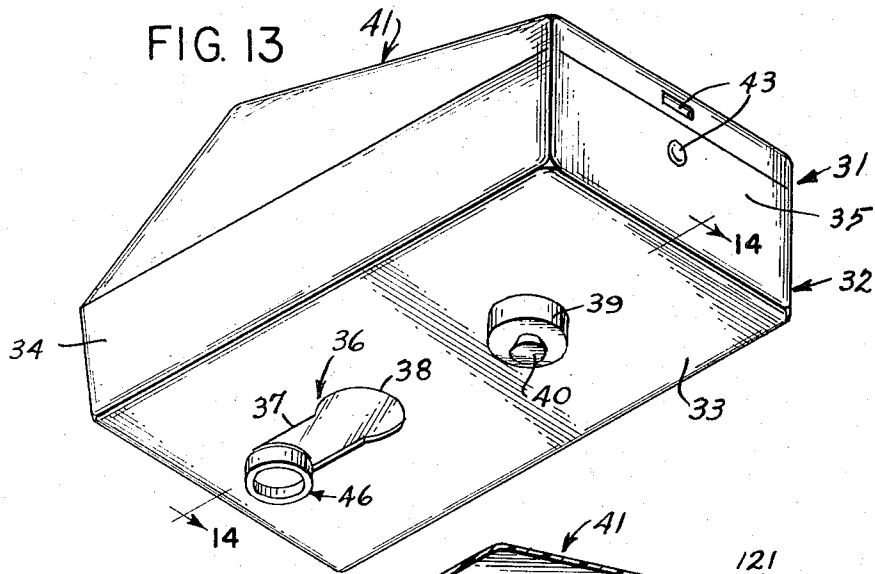
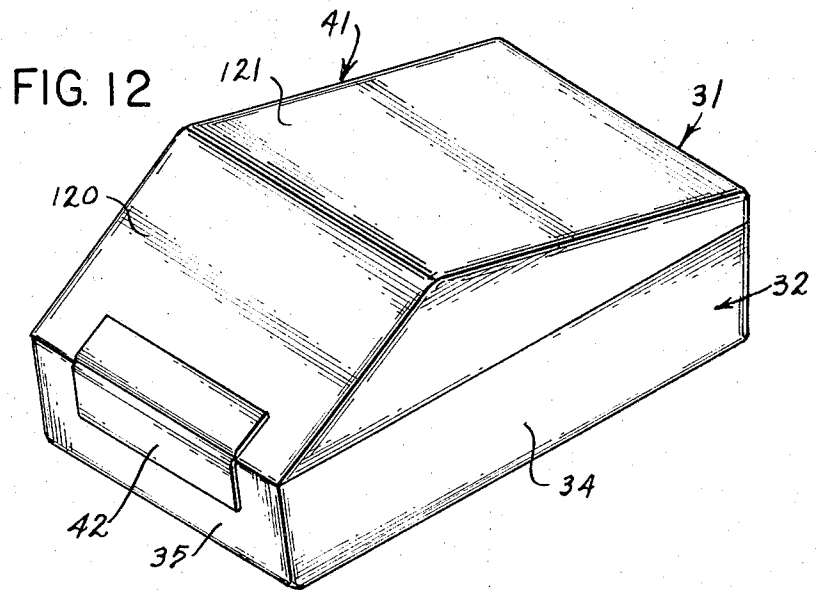


FIG. 11



METERED PRODUCT DISPENSING SYSTEM

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation in part of U.S. Pat. application Ser. No. 205,692, filed Dec. 7, 1971, now U.S. Pat. No. 3,758,005; Ser. No. 301,076, filed Oct. 26, 1972, now abandoned; and Ser. No. 312,485, filed Dec. 6, 1972, now abandoned.

This invention relates generally to a dispensing system, and more particularly to a method and means for dispensing measured quantities of material such as a fluent material from a pouch or container.

A principal object of the present invention is to provide a metered product dispensing system that includes a gun or actuating member that is adapted to be manually operated whereby material in a pouch or container will be dispensed through a nozzle in a desired manner.

Another object of the present invention is to provide a metered dispensing system that will dispense or eject a charge of material when a gun is manually actuated, and wherein the gun can be continuously operated in order to dispense repeated quantities of the material from the pouch or container.

Still another object is to provide a metered product dispensing system that is simple, efficient and rugged in construction and adaptable to various conditions of operation.

Other details, objects, and advantages of the present invention will become apparent from the following description of the novel features of the construction, arrangement and combination of the parts, taken in conjunction with the drawings, which accompany and form part of the specification.

Referring to these drawings,

FIG. 1 is a side elevational view illustrating one application of the present invention.

FIG. 2 is an enlarged sectional view taken through the body of the gun.

FIG. 3 is a sectional view taken on the line 3—3 of FIG. 2.

FIG. 4 is an enlarged sectional view taken through the head and nozzle of the gun.

FIG. 5 is a sectional view taken on the line 5—5 of FIG. 4.

FIG. 6 is a sectional view taken on the line 6—6 of FIG. 5.

FIG. 7 is an exploded perspective view illustrating a part of the operating mechanism.

FIG. 8 is an enlarged sectional view taken on the line 8—8 of FIG. 1.

FIG. 9 is a sectional view taken on the line 9—9 of FIG. 8.

FIG. 10 is a fragmentary view illustrating the first step in the operation.

FIG. 11 is a view similar to FIG. 10 and illustrating the second step.

FIG. 12 is a top perspective view of the container or the pouch.

FIG. 13 is a bottom perspective view of the device of FIG. 12.

FIG. 14 is a sectional view taken on the line 14—14 of FIG. 13.

Referring in detail to the drawings, the numeral 30 indicates the metered product dispensing system of the present invention, FIG. 1, and wherein there is provided a hollow container 31 that includes a base 32 that

has a bottom wall 33, FIGS. 13 and 14. The base 33 further includes spaced parallel side walls 34 and spaced apart end walls 35. The numeral 36 indicates a key slot that is arranged in the bottom wall 33, and such slot 36 includes a narrow portion 37 integrally connected to a wider arcuate portion 38. A spacer 39 depends from the bottom wall 33, and such spacer 39 has a tapered finger 40 depending therefrom for a purpose to be later described. The numeral 41 indicates a cover that is hingedly connected to the base 32 as at 42, and a latch mechanism 43 is provided for releasably connecting the other end of the cover to the base 32.

Arranged in the container 31 is a flexible pouch 44 that is adapted to be made of a collapsible thermoplastic material or the like, and the pouch 44 is filled with fluent material 45 that is to be dispensed or discharged in metered quantities. The material 45 may be a desired consistency capable of flowing and may be of any desired type, such as a food product, medicine, fluid, liquid or the like. A fitment 46 depends from the pouch 44 and is suitably affixed thereto or formed integral therewith, and the fitment 46 is adapted to extend through the slot 36 when the device is being used. The fitment 46 may have a construction similar to that shown in prior pending application Ser. Nos. 205,692; 301,076; and 312,485. The fitment 46 may include a reduced diameter portion 46 as well as enlarged end portion 48 so that the fitment will not accidentally come loose from the slot 36.

The numeral 49 indicates a gun and includes a hollow body member 50 that has a handle 51 formed thereon, and a manually operable trigger or lever 52 is pivotally connected to the handle as at 53.

The trigger 52 has recessed finger engaging portions 54 for facilitating the manual operation of the trigger, FIG. 2. A link 55 has a bifurcated end 56 which is pivotally connected by a pivot 57 to the end of the trigger 52 remote from the pivot 53. The numeral 58 indicates a segmental gear piece that has an extension 59 that is pivotally connected to a bifurcated end 60 of the link 55 by means of a pivot pin 70. The gear piece 58 is provided with teeth 61 that mesh with teeth 63 on a movable hollow sleeve 62, FIG. 2, and the sleeve 62 also has teeth 64 thereon that are arranged opposite the teeth 63. The sleeve 62 is slidably supported between a pair of tracks 62' extending inwardly from opposite sides of the body 50. One of the tracks 62' has a slot or grooves 62 A which slidably receives a pin 62 B carried by the sleeve 62 to prevent rotation of such sleeve and to limit movement thereof to a fixed plane. The numeral 65 indicates a pawl or dog that is pivotally connected to a support 67 as at 66, and a coil spring 68 has one end connected to the pawl 65, while the other end of the spring 68 is anchored in place as at 69. The numeral 71 indicates a rod that is slidably mounted adjacent to one end within a sleeve 71' formed in the end wall of the gun body, and the opposite end of the rod 71 receives and is slidably supported by the sleeve 62. A spring member 72 has one end anchored to the rod 71 as at 73, and the other end of the spring member 72 is anchored in place to the gun body as at 74. A coil spring 75 is circumposed on the rod 71 and the spring 75 abuts a collar 76 on the rod as shown in the drawings.

The numeral 77 indicates a plunger or piston that is mounted on the outer end of the rod 71, and the piston 77 has a frusto-conical shape so as to define a pump.

The numeral 78 indicates a flexible diaphragm that is arranged adjacent to the outer end of the pump 77, and the diaphragm 78 includes an outer enlarged bead or shoulder 79 on its outer periphery.

A cylindrical shaft 80 extends outwardly from one side of the gear piece 58, FIG. 7, and a shaft 81, which is generally square in cross section for most of its length and terminates in a cylindrical portion 82, extends from the other side of the gear piece. The shaft 82 is rotatably mounted in a socket 80 A attached to one side of the body 50 and the cylindrical portion 82 is rotatably mounted in a socket 80 B attached to the other side of such body. A cam member 83 having a cam surface 83 A is provided with a square opening 83 B for snugly receiving the square shaft 81. The cam member 83 includes a hub terminating in cam surfaces 84 that are adapted to coact with cam surfaces 85 on the socket 80 B. The numeral 86 indicates a spring member that is mounted on the square shaft 81, and the spring member 86 is interposed between the cam member 83 and the gear piece 58 to urge such cam member and gear piece away from each other.

The numeral 87 indicates a bar that has a flat portion 88 which is normally engaged by the cam member 83. A spring or other resilient member 89 has one end connected to the bar 87, and the other end of the spring member 89 is anchored in place to the gun body, as shown in the drawings. The bar 87 is pivotally connected at one end to the gun body as at 90.

The numeral 91 indicates a nozzle that is detachably connected to the front end of the gun by means of interlocking bayonette type coupling 92. The nozzle 91 includes a housing 93 and has a tapered inner recessed portion 94. Projecting upwardly from the nozzle 91 is a piercing member 95, FIG. 4, and the piercing member has sharpened, pointed, cutting portions 96 on its outer end, and the interior of the member 95 is hollow, as at 97. A removable cap (not shown) may be mounted on the cutting portion 96 when the device is not being used, in order to protect the cutting portion and provide a safety arrangement.

The numeral 98 indicates a pusher bar that is connected to the bar 87 by a pivot 99 and such pusher bar extends through an opening in the end wall of the hollow body member 50 into engagement with a slidable body element 100 carried by the nozzle 91. The body element is guided by a dovetail and groove 101 in the nozzle 91 and a guide pin 102 fixed to a flange portion 103 on the nozzle.

A coil spring 104 is located within a recess in the body element 100 and is maintained therein by a stop pin 105 as shown in FIG. 6. The numeral 106 indicates a rotary core or valve member that is mounted in a transverse chamber 107 in the nozzle 91. The rotary valve member 106 has spaced apart ports or passageways 108, 109 and 110 which can be selectively aligned with the recessed portion 94 and a discharge passageway 111 in the outer end of the nozzle 91. In order to selectively rotate the valve member 106, a reduced shaft 112 is integrally connected to the valve member 106 and extends outwardly therefrom. A gear 113 is mounted on the shaft 112 and such gear meshes with a toothed rack member 114 which is secured to or formed integral with the body member 100, FIG. 6. Material which passes through the rotary valve member 106 is discharged through a dispensing tip 115 which is detachably connected to the nozzle 91 as at 116.

There is further provided a means for detachably connecting the gun body to the pouch or container and this means comprises a clip 117 that is mounted on top of the gun body and has a dovetail slot 118 that is adapted to receive the tapered member 40.

In FIG. 2 the numeral 119 indicates a spring member that has one end anchored to the gun body, and the other end of the spring member 119 is connected to the link 55.

The following is given as a description of the operation of the present invention. The pouch 44 that is initially filled with a quantity of material 45 is arranged in the container 41 by releasing the latch 43 and swinging the cover 41 about its hinge 42. The cover 41 may have angularly arranged surfaces 120 and 121 on the upper portion thereof, FIG. 12. After the filled pouch 44 with material 45 therein has been placed in the container 31 with the fitment 46 of the pouch 44 projecting through the slot 36, and with the nozzle 91 connected to the gun 49 by means of the detachable coupling 92, the tapered finger 40 can be snugly received in the slot 118 of the retainer 117 so that the container and pouch will be properly arranged in their assembled position on the gun. It will be noted that with the container and pouch mounted on the gun that the piercing member 95 will have its sharp edges 96 extended through the temporary seal 122 adjacent the fitment 46 so that this temporary seal 122 will be pierced.

Then, when it is desired to dispense the material in metered portions or quantities from the pouch 44, it is only necessary to manually squeeze the trigger 52 whereby the trigger 52 will move from a position such as the solid line position of FIG. 2 to the broken line position of FIG. 2 so that the material will eventually be dispensed out through the tip 103 onto the desired location. The material 45 in the pouch 44 may be of any desired type, such as a food product, including condiments, mayonnaise, ketchup, or the like, or the pouch may contain a material of any other composition such as medicine to be dispensed in metered quantities.

Initially, the plunger 77 is in the position shown in FIG. 2, so that the plunger 77 is in retracted position relative to the flexible diaphragm 78 and there is a charge of material 45 from the pouch 44 in the housing 93 of the gun. When the trigger 52 is actuated or squeezed, initial movement of the link 55 rotates the gear piece 58 and causes the sleeve 62 to advance along the rod 71 due to the teeth 61 on the gear piece 58 meshing with the teeth 63 on the sleeve 62. Rotation of the gear piece 58 causes the square shaft 81 to rotate the cam member 83 and pivot the lever or bar 87, which it engages, about an axis extending through the pin 90. Swinging movement of the bar 87 pushes the pusher bar 98 downwardly through the front end of the gun body 50. As the pusher bar 98 is extended, it contacts or engages the adjacent end of the movable body element 100 to advance the element 100 against the tension of the spring 104 and advance the rack 114 because the rack 114 meshes with the teeth 113 carried by the shaft 112, the valve member 106 is rotated within the chamber 107 until the port 109 is in registration with the tapered portion 94 of the housing 93 and the port 110 is in alignment with the discharge passageway 111 as illustrated in FIG. 10. In this position, the cam surface 83 A of the cam member 83 engages the bar 87 and maintains the valve member 106 in discharge position.

Continued movement of the segmental gear 58 causes the sleeve 62 to engage the spring 75, FIG. 10, so as to advance the plunger 77 and thus extend the diaphragm 78 so as to force the material within the housing 93 through the dispensing nozzle 115 as illustrated in FIG. 11.

Just before the completion of the rearward movement of the handle 52, the cam surface 84 of the cam member 83 engages the cam surface 85 of the socket 80 B (FIG. 3) and moves the cam member 83 to the dotted line position of FIG. 3 against the tension of the spring 86. In this position, the cam member 83 moves out of registration and overlies the lever or bar 87 so that the lever 87 is released and is retracted by the spring 89. When the lever 87 is retracted, the pusher bar 98 is withdrawn into the gun body 50 and the spring 104 shown in FIG. 6 in the member 100 returns the gear carrier to its initial position and rotates the valve 106 to the position shown in FIG. 4. In this position, the port 109 is in registration with the hollow piercing member 95 and the port 108 is in registration with the tapered portion 94 of the housing 93 to provide communication between the pouch or container 44 of FIG. 14 and the interior of the nozzle 91 of the gun. When the operating handle 52 is released, the spring 119 shown in FIG. 2, returns the handle 52, and the spring 72 retracts the plunger 77 so that the diaphragm 78 creates a sub-atmospheric pressure within the nozzle 91 to suck another supply of material from the pouch 44 into position ready to be subsequently discharged or dispensed in metered quantities.

In addition to using the manually actuated system shown in the drawings, a power system can be used, such as a pneumatic, electric, or foot controlled arrangement. The parts can be varied so as to provide for different metered displacements.

Relative to the cutting positions 96 on the piercing member 95, one side of the cutting edge of such positions can be dulled so as to assure that the piercing is not complete, whereby the pierced portion of the pouch can be retained preventing it from entering into the product during dispensing.

As to the fitments, they may be injection molded, thermo-formed or may be made of metal, and in all arrangements of fittings, the sealing gland can be constructed to afford a pressure seal in conjunction with the piercing member 95. The fitment may be provided with a snap-on sanitary closure or the like and this closure may be mechanical and will prevent the film to be pierced from becoming contaminated during shipment and storage. The fitment may be provided with a locking groove for positioning in the pouch dispensing container whereby the segment will be held in place for piercing. The present invention also includes the pre-punching of the pouch and registering of a fitment over the pre-punched hole so that it is not necessary in some instances for the bayonet to actually pierce the film of the pouch.

Another feature that may be utilized is the punching and simultaneous sealing, and both approaches would require that the pouch film scrap be removed by some method such as a mechanical, air or vacuum system.

The present invention is thus a total concept that includes a gun, pouch, fitment, and method of fastening the fitment to the pouch.

The metered product dispensing system of the present invention can also be used with the pouch and fit-

ment with a special gland valve that can be tied into a pressure vessel and the pressure vessel can be pressurized and the product dispensed so that replacing of the pouch is the disposable feature in the system.

It will be noted that when the parts are in their assembled position, as shown in FIG. 1, for example, the piercing member 95 pierces the pouch, and at the same time the tapered projection 40 engages the recess 118 in the member 117 so that the container and pouch are locked on the gun. The dispensing nozzle is locked on the front end of the gun by means of the coupling 92. As previously noted, the edge of the piercing member may be dulled in the vicinity of the edge 96 to provide a means for retaining the uncut segment of the pouch film in place.

Although our invention has been illustrated and described with reference to the preferred embodiments thereof, we wish to have it understood that it is in no way limited to the details of such embodiments, but is capable of numerous modifications within the scope of the appended claims.

We claim:

1. In a metered product dispensing system, a hollow container including a base having a bottom wall, spaced apart side walls and spaced apart end walls, there being a slot in said bottom wall, said slot including a narrow portion and a wider portion, a bushing depending from said bottom wall, and having a tapered fitting depending therefrom, a cover hingedly connected to said base, and said cover including spaced apart side portions, and a top that includes angularly arranged surfaces, an end of said top being hingedly connected to said base, a latch releasably connecting the other end of said cover to said base, a flexible pouch arranged in said container for holding material to be dispensed, a fitment on said pouch projecting through the slot in said bottom wall; a gun including a hollow body member having a handle on an end portion thereof, a manually operable trigger pivotally connected to said handle, a link pivotally connected to said trigger, a gear piece pivotally connected to said link, a sleeve having teeth thereon meshing with teeth on said gear piece, a rod in said gun body and said rod having said sleeve slidably mounted thereon, a spring member connected to said gun body and said rod, a coil spring circumposed on said rod and abutting said sleeve, a frusto-conical plunger on the outer end of said rod, a flexible diaphragm adjacent the outer end of said plunger, a shaft connected to said gear piece, a cam member slidably mounted on said shaft, a spring member interposed between said gear piece and said cam member, a bar pivotally mounted in said gun body and said bar having a shouldered portion engaged by the cam member, a coil spring connected to said bar, a pusher connected to said bar, a nozzle connected to the front end of said gun and said nozzle including a housing having a tapered inner recessed portion, a bayonet piercing member on said nozzle, a slidable body element engaged by said pusher, a guide pin for said body element, a rotary valve member including first, second and third ports, a detachable tip for said nozzle, a shaft member connected to said valve member and said shaft member having gear teeth thereon, a rack on said body element engaging said last-named gear teeth, a coil spring engaging said guide pin, a coupling detachably connecting said nozzle to said gun, and detachable

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holding means on the top of said gun for receiving the tapered fitting on the lower portion of the container.

2. Apparatus for dispensing a metered quantity of fluent material comprising a hollow body having a nozzle at one end, said nozzle having a dispensing opening, a selectively rotatable valve mounted in said nozzle, means for selectively rotating said valve to a first position to provide communication between said nozzle and said dispensing opening, piston means movable within said nozzle, means for advancing said piston means after said valve is moved to said first position to discharge material from said nozzle through said dispensing opening, means for rotating said valve to a second position to provide communication between said nozzle and a source of supply of material to be dispensed, means for retracting said piston after said valve is moved to said second position to create a sub-atmospheric pressure within said nozzle and to draw material thereinto from said source of supply, whereby a metered quantity of material is discharged from said nozzle when said piston means is moved in one direction, and an equal quantity of material is introduced into said nozzle when said piston means is moved in an

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opposite direction, an operating lever swingably mounted on said body, means operatively connected to said lever for sequentially operating said means for rotating said valve to a first position and said means for advancing said piston means and said means for rotating said piston to a second position when said lever is moved in one direction, and for operating said means for selectively retracting said piston when said lever is moved in an opposite direction, and means for advancing said piston means including gear means rotatably mounted in said hollow body and connected to said operating lever, a rod connected to said piston and said rod extending into said hollow body, a collar fixed to said rod in spaced relationship to said piston, spring means carried by said rod adjacent to said collar, a sleeve slidably mounted on the end of said rod remote from said piston, and said sleeve having a toothed rack meshing with said gear means, whereby rotation of said gear means moves said sleeve along said rod into engagement with said spring means to cause said piston to be advanced.

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