Jan. 7, 1936. G. E. JOHNSON ET AL 2,027,103

SPRAYING DEVICE

Filed Nov. 17, 1930 2 Sheets-Sheet 1

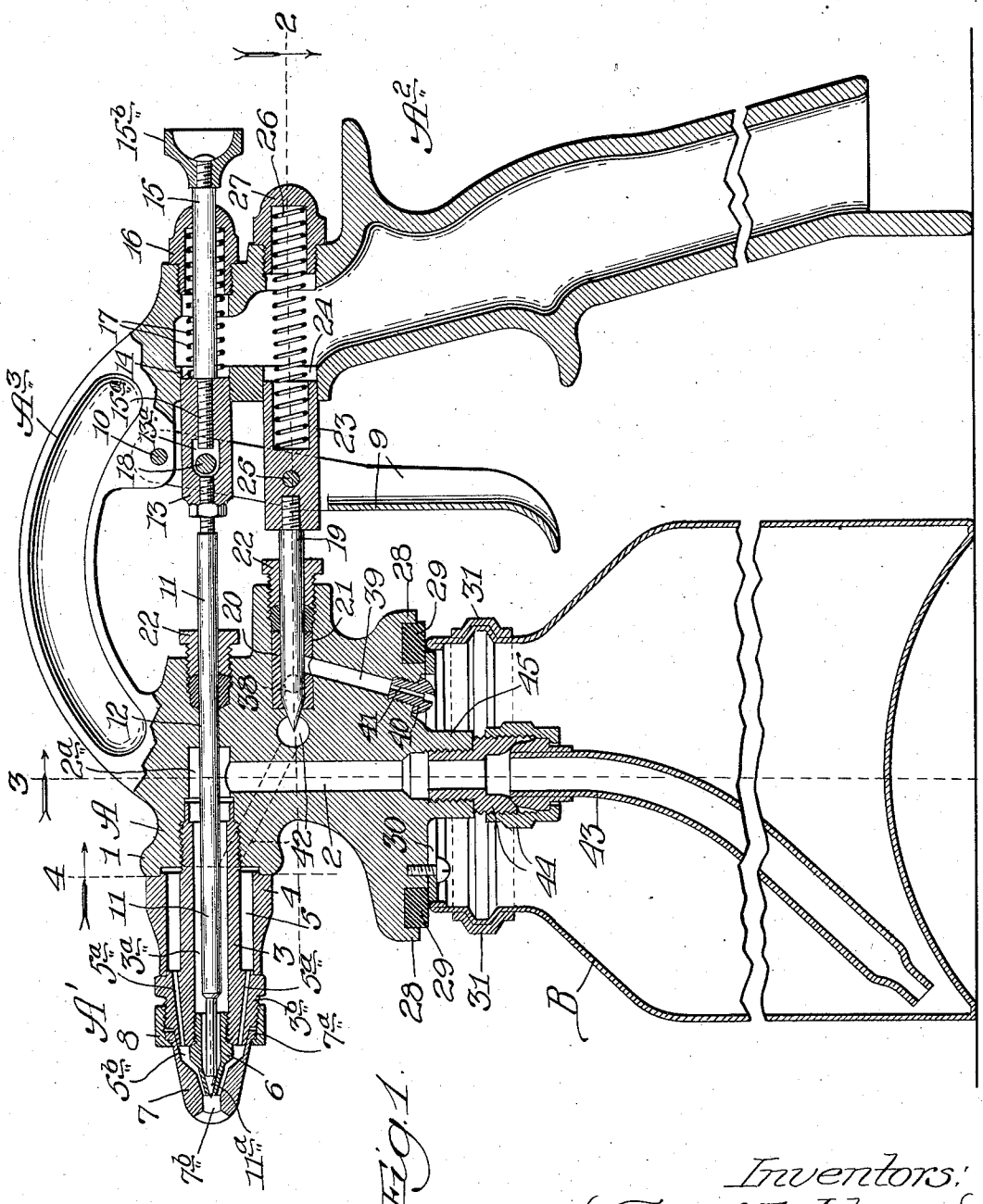


Fig. 1.

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SPRAYING DEVICE

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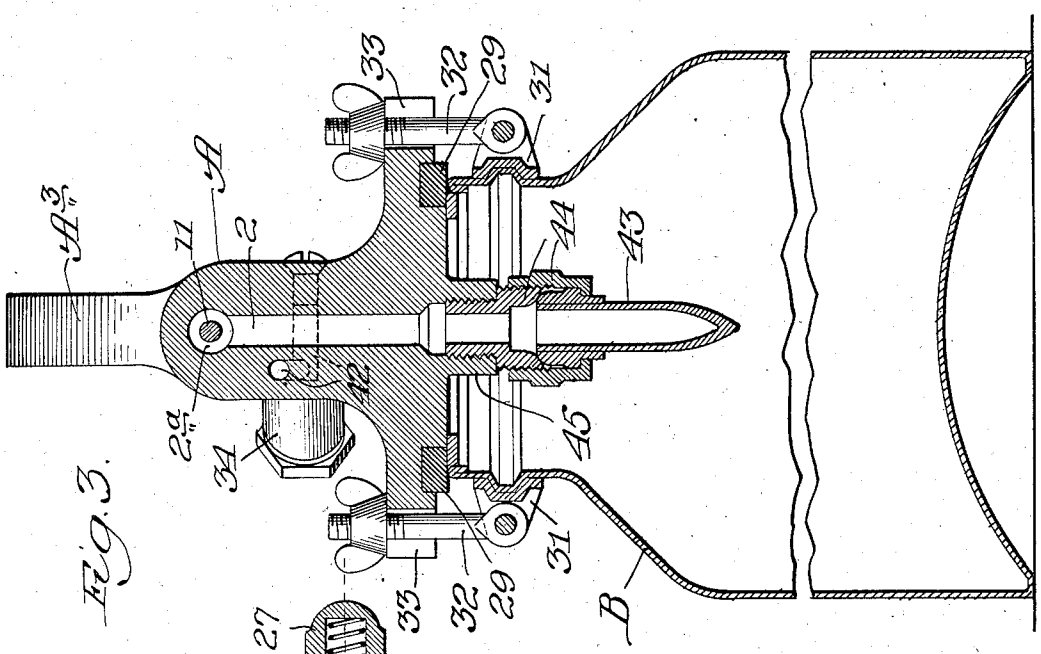


Fig. 3.

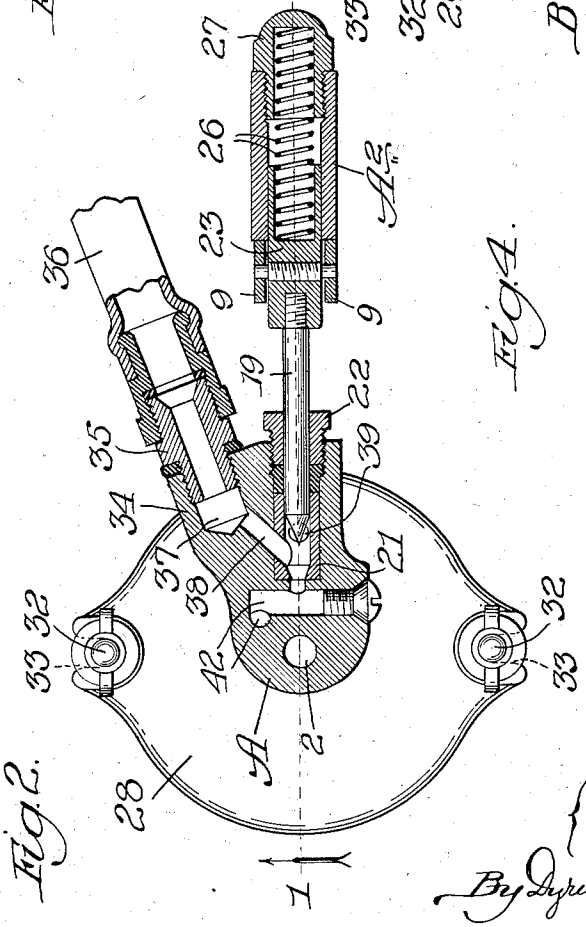


Fig. 2.

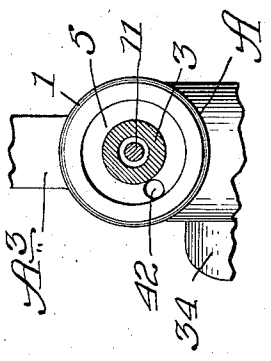


Fig. 4.

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UNITED STATES PATENT OFFICE

2,027,103

SPRAYING DEVICE

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Application November 17, 1930, Serial No. 496,299

5 Claims. (Cl. 299—89)

This invention relates particularly to a spraying device adapted to spray liquids, including paints, lacquers, varnishes, etc.

The primary object is to provide an improved spraying device operating in an improved manner.

The invention is illustrated in a preferred embodiment in the accompanying drawings, in which—

Fig. 1 is a broken vertical sectional view of a spraying device embodying the invention; Fig. 2, a plan sectional view taken as indicated at line 2 of Fig. 1; Fig. 3, a broken vertical sectional view taken as indicated at line 3 of Fig. 1; and Fig. 4, a broken vertical sectional view taken as indicated at line 4 of Fig. 1.

In the illustration given, A designates a head equipped at its front side with a nozzle A′ and at its rear side with a handle A^2, the handle being connected, in the illustration given, with the head by means of an arched member, or bridge, A^3; and B designates a liquid container depending from the head A.

The head A, the bridge A^3, and the handle A^2, preferably are connected integrally with each other. They may, for example, be of cast aluminum.

The head is provided at its front side with a nipple-portion 1 to which the nozzle is attached. It is provided, further, with a vertical bore or passage 2 and an intercepting horizontal bore, or passage 2^a, forming a liquid passage leading to the nozzle.

The nozzle A′ preferably comprises an inner nozzle-member 3 having a central liquid passage 3^a, the member 3 being equipped at its front or outer end with a head 3^b; a sleeve 4 interposed between the head 3^b and the face of the nipple-portion 1 and forming an annular air-passage 5; an inner nozzle-tip 6 secured to the free extremity of the member 3 and affording a seat for the liquid-valve; an outer nozzle-tip 7 provided at its rear end with an external flange 7^a; and a flange tubular nut 8 removably connecting the outer nozzle-tip 7 to the head 3^b of the liquid-tube 3.

The inner end of the tube 3 is threaded and connected with a tapped portion of the bore 2^a. It will be noted that the sleeve 4 is clamped between the head 3^b and the front face of the part 1 of the head A.

Air-passages 5^a communicate at their rear ends with the annular passage 5 and at their front ends with an annular air-space 5^b which is located between the inner and outer tips.

The handle A^2 is disposed some distance in the rear of the head A, being separated therefrom by a space in which is located a trigger 9 which has its upper end connected by a pivot 10 to a lug with which the rear portion of the bridge A^3 is equipped.

A liquid-controlling valve 11 extends through a bore 12 in the casting A, through the liquid-tube 3 and into the internal tip 6, the front end of said valve having a conical extremity 11^a which fits into a conical opening with which the member 6 is provided. The tip 7 is provided with an outlet passage 7^b which registers with the opening through the inner tip.

The needle-valve 11 has a reduced threaded extremity which screws into a sleeve 13 which is slidably received in a bore 14 with which the upper portion of the handle is provided. A guide stem 15 has a reduced front end-portion 15^a screwed into the rear end-portion of the sleeve 13. The member 15 extends through a plug 16 which is screwed into a tapped bore which is in alignment with the bore 14. A spring 17 is interposed between the member 16 and the rear end of the sleeve 13. The rear end of the guide stem 15 projects and is equipped with a fixedly secured knob 15^b.

The front end of the reduced extremity 15^a extends into a transverse slot 13^a of the sleeve 13, affording a stop for a trigger-pin 18 which works freely in the slot 13^a.

Below the liquid-valve 11 is located a parallel air-valve 19, which extends into a sleeve 20 which is located in the front portion of a bore 21 with which the casting A is provided at its rear side. The member 20 may be formed of brass or steel. It constitutes a combined guide and seat for the air-valve 19.

The valves 11 and 19 extend through stuffing boxes 22.

The rear end of the valve 19 is adjustably connected with a guide-member 23 which is slidable through a perforation 24 in the front wall of the hollow handle. The member 23 is connected with the trigger by means of a pivot-pin 25. A spring 26 is interposed between the member 23 and a plug 27 which is detachably connected with a bore which extends through the rear wall of the handle.

It is desirable that the spring 17 should be considerably stronger than the spring 26. It will be noted that the leverage of the trigger upon the valve 11 is correspondingly large.

The head A has formed integrally with its lower portion a disk, or cap-member, 28 equipped with a gasket 29, which is secured in a recess by means of a detachable ring 30. The paint-container B is shown equipped at its upper portion with a divided ring 31, which is equipped with pivoted bolts 32 which connect with slotted portions 33 of the disk 28.

The casting A is equipped at one side with an integral tapped lug 34 with which is connected a nipple 35 to which is attached an air hose 36.

The bore in the lug 34 is designated 37 from which extends a passage 38 which communicates with the interior of the sleeve 21 back of the valve seat with which said sleeve is provided.

An air passage 39 leads from the interior of the sleeve 21 to the lower face of the cap-disk 28. The lower end of the passage 39 is tapped and fitted with a screw 40 which has a small passage 41 communicating with the interior of the vessel B.

The passage in which the air-valve 19 is located communicates with a passage 42 which serves to permit passage of compressed air to the annular space 5 in the nozzle.

A liquid tube 43 is located in the vessel B. It is connected by nipple connections 44 with a tapped boss 45 with which the head A is equipped centrally at its lower side. Liquid may pass through the tube 43 to the passage 2, and thence through the passage 3^a to the interior of the inner nipple 6.

In cases where the spray-gun is to be used without carrying the container B, the tube 43 may be replaced by a hose through which paint or lacquer may be delivered from a suitable pressure tank (not shown), which may be independently supplied with air pressure. When the spray-gun is so used, the screw 40 may be removed and an imperforate screw may be substituted therefor, thus fully closing the passage 39.

It is preferred to have the parts so related and have the stop 15^a so adjusted that the air-valve 19 will open in advance of the liquid-valve 11 and will close after the closing of the liquid-valve.

It will be noted that the valve 19, when seated, closes the air-passages 38 and 39. Closure of the passage 39 prevents the air which is trapped in the container B from forcing the paint or spray through the passage 39 at the end of the spraying operation; and closure of the passage leading to the conduit 42 shuts off the passage of air to the nozzle, thereby preventing waste of air.

By the timing of the valves in the manner stated, the air is admitted to the nozzle in advance of the opening of the paint valves; and, what is probably more important, the air continues to pass through the nozzle for a short interval after the closing of the paint valve, thus tending to keep the nozzle clean.

The feature of preventing passage of spray or mist through the passage 39 by the action of pressure remaining in the container after the paint valve has been closed is extremely important. That is, this feature prevents the clogging of the passages in the interior of the head A and at the nozzle and at the valve seats.

It will be understood that in the operation of the device paint emerges from the inner tip 6 under moderate pressure and is met by air pressure within the outer nozzle 7, where the paint is effectively atomized. The atomized liquid emerges through the passage 7^b of the outer nozzle.

The construction described is simple, durable and highly efficient and effective for the intended purpose. The device may be manufactured at a moderate cost. The head, handle and connecting bridge A^3 may comprise a die casting, if desired. On the other hand, integral formation of these members is by no means an absolute essential.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom, but the appended claims should be construed as broadly as permissible, in view of the prior art.

What we regard as new, and desire to secure by Letters Patent, is:

1. In a spray-gun: a head equipped at one side with a nozzle; a handle at the opposite side spaced from said head; a bridge piece connecting the upper portion of the handle to the upper portion of said head; a lateral air inlet connected with said head and communicating with an air passage leading to the nozzle; a liquid-passage in said head leading to the nozzle; a liquid-passage leading from the lower side of the head and communicating with the liquid-passage leading to the nozzle; an upper liquid-controlling valve and a lower air-controlling valve; and a trigger depending from said bridge having lost-motion connections with the liquid-controlling valve and having pivotal connection with the air-controlling valve.

2. A device as specified in claim 1, in which said valves are equipped with guide-members working in openings in the upper portion of the handle and in which springs are housed in the upper portion of the handle and bear against said guide-members.

3. A device as specified in claim 1, in which said valves are equipped with guide-members working in openings in the upper portion of the handle and in which springs are housed in the upper portion of the handle and bear against said guide-members, and in which an adjustable stop extends through the upper portion of the handle and has threaded connections with the guide-member connected with the liquid-controlling valve.

4. A spray-gun comprising a head equipped with a nozzle and handle, said handle being connected with said head by a bridge-piece; a liquid passage and an air-passage in said head leading to the nozzle; a valve controlling said liquid passage; a second valve disposed below said liquid-controlling valve controlling said air-passage; a trigger depending from said bridge-piece having lost motion connections with the liquid-controlling valve and having pivotal connections with the air-controlling valve; said valves having portions extending across the space between said head and handle with which portions the trigger connections are made.

5. A spray-gun comprising a head having its upper portion equipped with a bridge-piece which projects at one side of the head and carries a depending handle separated from said head by a space, said head having a nozzle projecting from the side opposite the handle; a liquid-passage in the head leading through the nozzle; an air-passage in the head leading through the nozzle; a liquid-controlling valve reciprocable in said head and controlling said liquid-passage and having a stem projecting into the space below said bridge-piece; an air-controlling valve reciprocable in said head in a plane below the liquid-controlling valve and having a stem projecting into said space below said first-mentioned stem, both of said valves moving toward said handle in the action of opening the same; a trigger depending from said bridge-piece to a point below said stems; and connections between said trigger and said stems serving to open first the air-controlling valve and then the liquid-controlling valve.

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