March 3, 1936. S. BRAMSEN 2,032,789

SPRAY GUN FOR ASPHALT OR THE LIKE

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Fig. 1

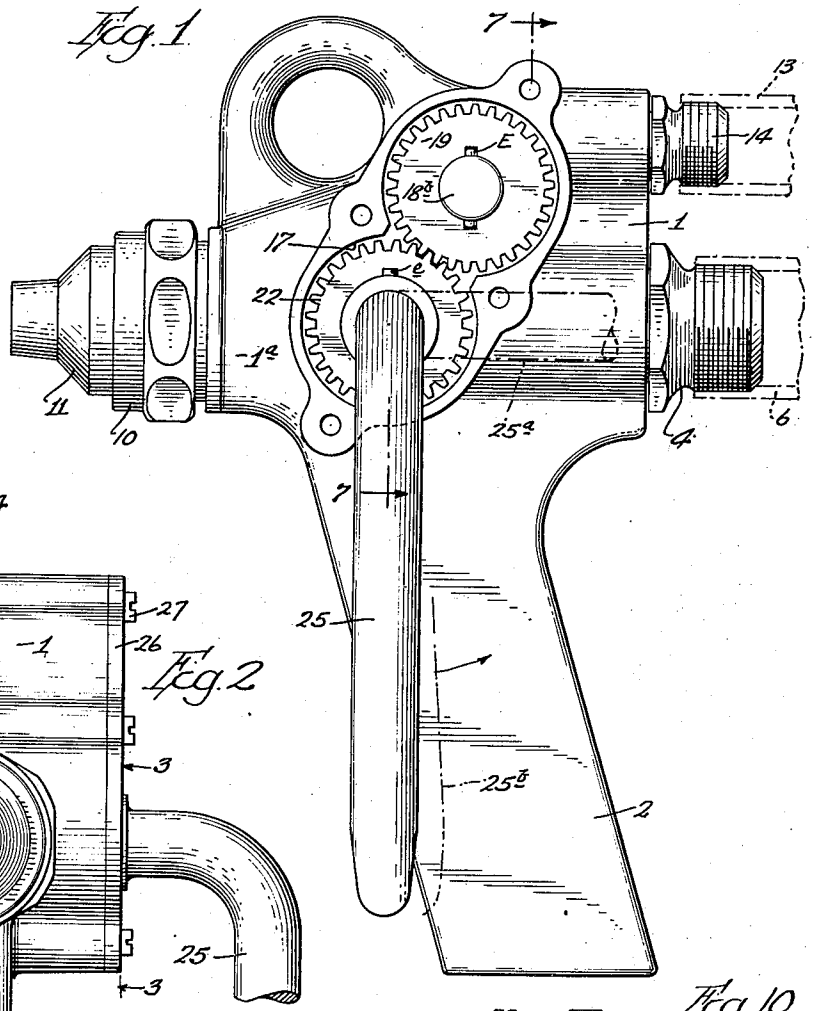



Fig. 2




Fig. 10

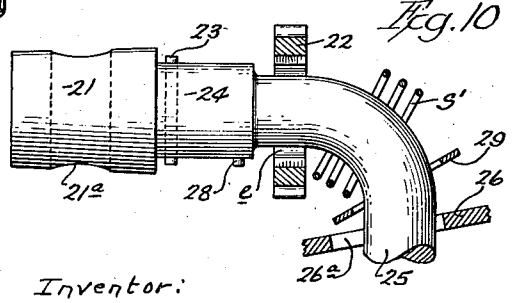
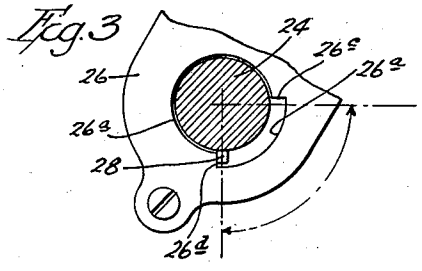



Fig. 3




Inventor:
Svend Bramsen
by Albert Scheibli
Attorney

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Fig. 4

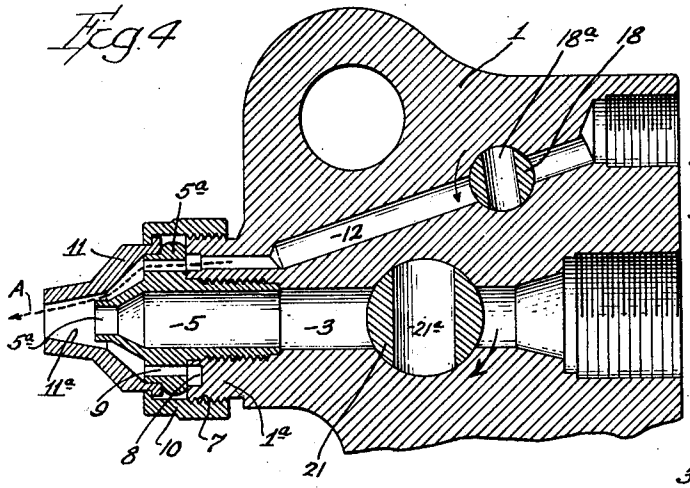



Fig. 8

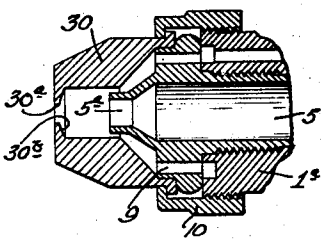



Fig. 9

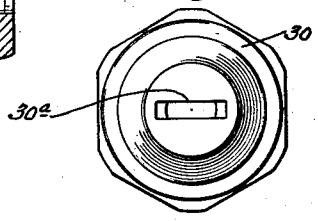



Fig. 5

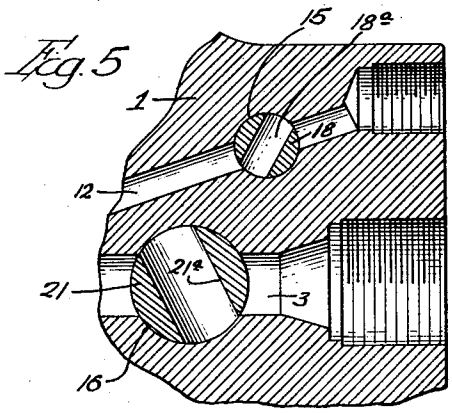



Fig. 6

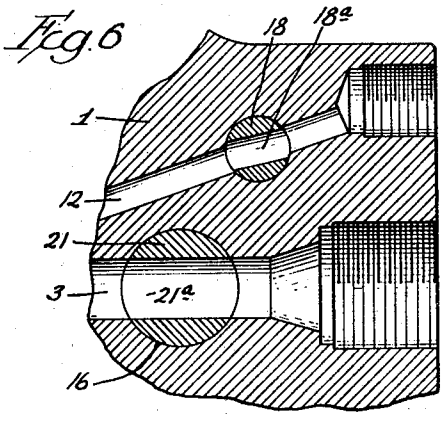
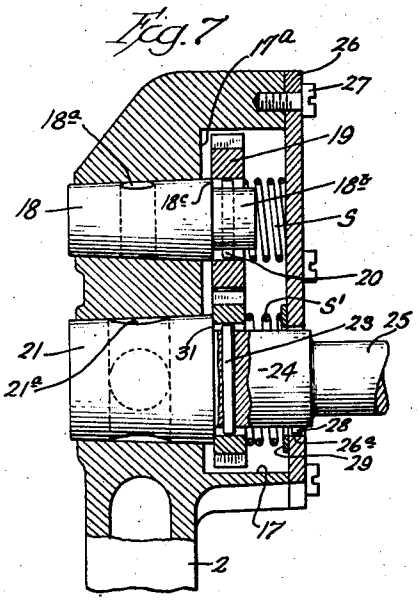



Fig. 7




Inventor:
Svend Bramsen
by Albert Scheibli
Attorney

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# UNITED STATES PATENT OFFICE

2,032,789

## SPRAY GUN FOR ASPHALT OR THE LIKE

Svend Bramsen, Chicago, Ill., assignor to Binks Manufacturing Company, Chicago, Ill., a corporation of Delaware

Application May 4, 1935, Serial No. 19,779

7 Claims. (Cl. 299—140)

My invention relates to a pneumatic appliance for spraying heavy or other sluggishly flowing materials, as for example asphalt, cement paints, or tar roof-coating materials.

In general, the objects of my invention are those of providing a simple, durable, easily operable and easily cleanable spray appliance of this class which will not be clogged by the drying of liquid material in it, which will operate with a relatively low air pressure in proportion to the specific gravity of the material and to the rate at which this is to be sprayed, and which can readily be constructed in the form of a spray gun.

More particularly my invention aims to provide an appliance of this class having the following advantageous characteristics:

(1) A straight passageway for the material through the appliance, to reduce the required air pressure and to facilitate a cleaning of the appliance; also, a generally straight air passageway through the appliance.

(2) A simple and positively actuating mechanism whereby a single and conveniently disposed handle will simultaneously actuate a material control valve and an air control valve in such timed relation to each other that the air valve always opens first and closes last.

(3) An arrangement of this mechanism will readily permit all parts thereof, as well as the valve-actuating mechanism, to be removed and detached from one another manually, after detaching a lateral cover plate.

(4) An arrangement whereby simple formations on this detachable cover plate positively limit the movement of the valve-actuating handle to the two extreme positions in which the flow of both material and air is either "full open" or entirely shut off.

(5) An arrangement whereby two springs, interposed between respectively the cover plate and the two gears, simultaneously insure a firm seating of both valves, and whereby the resulting friction normally holds both valves in any adjusted position.

Illustrative of the manner in which I accomplish the above objects,

Fig. 1 is a full-sized side elevation of an asphalt-spraying gun embodying my invention, showing this as equipped with nozzles for projecting a spray of circular cross-section, with portions of an air supply hose and a material supply hose shown in dotted lines.

Fig. 2 is a front elevation of the upper portions of the same spray gun.

Fig. 3 is a fragmentary section along the line 3—3 of Fig. 2, showing the interengaging stop elements on the detachable side plate and the handled actuating member.

Fig. 4 is a vertical and longitudinal section taken along the line 4—4 of Fig. 2, with both the material valve and the air valve in their fully closed positions.

Fig. 5 is a section allied to Fig. 4, showing how the air valve is already partly open when the material valve is just about to open.

Fig. 6 is a section also allied to Fig. 4, showing the full open positions of both valves.

Fig. 7 is a transverse vertical section through the same spray gun, taken along the line 7—7 of Fig. 1.

Fig. 8 is a section allied to the left-hand end portion of Fig. 4, showing another type of discharge nozzle.

Fig. 9 is a front elevation of the discharge nozzle shown in Fig. 8.

Fig. 10 is a view showing the upper portion of the handled member and the parts associated with the latter, as these parts may appear during the assembling of my spray gun.

In the illustrated spray gun, the gun body 1 has an integral gun handle 2 depending from it, and has an axially straight bore 3 extending entirely through this body. An inlet nipple 4 is threaded into the rear end, and a material-discharge nozzle 5 into the forward end of this bore 3, thereby affording a straight passage for material from a hose 6 attached to the inlet nipple 4.

The forward portion 1*a* of the gun body, into which the material nozzle 5 is threaded, has an exterior thread 7 coaxial with the said nozzle, and also has its frontal face provided with a groove 8; and the discharge nozzle 5 has a peripheral flange 5*a* disposed in front of this groove this flange being provided with circumferentially distributed longitudinal air passages 9. Detachably fitted on the said thread 7 is a retainer ring 10 which clamps a discharge nozzle 11 against the radially outer portion of the flange 5*a* on the material nozzle while leaving the frontal portion of the said discharge nozzle freely spaced from the material nozzle. Moreover, the discharge nozzle 11 preferably extends considerably forward beyond the tip of the material nozzle 5, so that air flowing from the passage 9 through the annular space around the tip of the material discharge nozzle will flow through the major portion of the length of the bore 11*a* of the tip 5*a* of the material nozzle 5, as indicated by the arrow line A in Fig. 4.

In addition to the aforesaid straight passageway 3 for the material, the gun body also has a generally straight longitudinal air passage 12 through which compressed air can flow from an air hose 13 (attached to the rear end of the gun body by a nipple 14) to the groove 8 in the front end of the gun body, for distribution by that groove to the several air passages 9 in the material nozzle.

Extending through the gun body, transversely of the plane in which the section of Fig. 4 was taken, are two bores 15 and 16 (Fig. 5) both of which lead from the upright bottom 17*a* of a lateral recess 17 in the gun body as shown in Fig. 7. Both of these bores taper away from that recess and open at the other side of the gun body to facilitate the making of these bores, and these transverse bores have their axes respectively intersecting the axes of the air passage 12 and the material passage 3.

Seated in, and fitting the upper transverse bore 15 is a tapering valve 18 which has a cross-bore 18*a* corresponding in diameter to that of the air passage 12, this cross-bore being disposed so that it will substantially aline with the said air passage (as in Fig. 6) when the said air valve is in its "full open" position. The valve member 18 has an axial stem 18*b* extending into the recess 17 of the gun body for only part of the depth of that recess, this stem being of considerably smaller diameter than the adjacent end of the main portion of the said valve member, so as to expose an annular shoulder 18*c*, as shown in Fig. 7.

Normally bearing against the said shoulder 18*c* is an upper gear 19, the bore of which slidably fits the said stem 18*b*, and which bore has opposed enlargements E (Fig. 1) normally housing the two end portions of a cross-pin 20 extending transversely through the said stem to afford a splined connection between the upper gear and the air-controlling valve 18.

The companion tapering valve 21 normally seats in and fits the lower transverse bore 16 of the gun body, and this (material-controlling) valve has a cross-bore 21*a* corresponding in diameter to that of the adjacent portion of the material passage 3, as in Fig. 6. This valve 21 is desirably formed as an integral part of a handle member which includes a shank 24 extending through the body recess 17, the said shank being adjoined to the said valve member by an annular shoulder 31 against which a lower gear 22 normally bears. The said lower gear having its bore provided with opposed enlargements *e* (Fig. 1) which normally house the end portions of a cross-pin 23 extending through the shank, to afford a splined connection between this lower gear 22 and the material-control valve 21.

In addition, the handled member includes a handle 25 extending freely through a bore 26*a* in a detachable side plate 26 which normally closes the mouth of the said recess, which plate is fastened to the gun body by screws 27. Projecting radially from the shank 24 of the handled member is a stop pin 28 which extends into an arcuate enlargement 26*b* of the said bore in the side plate, this bore enlargement having its ends 26*c* and 26*d* (Fig. 3) disposed for engaging the said stop pin when both valve members are respectively in their "full open" position of Fig. 6 and in their closed position of Fig. 4.

Interposed respectively between the side plate 26 and the said two gears are two compression springs, S and S[1], each of which effectively presses the adjacent valve into seating relation to the corresponding transverse bore in the gun body, these springs being sufficiently strong so that resulting friction (between the valves and the bores in which these respectively seat) will resist accidental displacement of the two valves from any adjusted positions thereof. Since the major portion of such a displacement tendency may be due to the weight of the handle 25, spring S[1] adjacent to this handle is desirably larger and stiffer than the other spring, and a washer 29 as desirably interposed between the said stronger spring S[1] and the detachable side plate 26.

Illustrative of the assembling of my spray gun, the air-controlling valve member 18 may first be slipped through the body recess 17 into the upper transverse bore 15 and turned to the full open position of Fig. 6, which position can be sighted from the rear end of the air passage before the air nipple 14 is attached to the gun body, after which the upper gear 19 can be slipped over the handled member to interlock it with the cross-pin 20 of Fig. 7.

The valve end of the handled member is then slid successively through the perforation 26*a* in the side plate 26, the washer 29, the stronger spring S[1] and the gear 22, to form a loose assemblage, as in Fig. 7. In this temporary assembly, the valve 21 projects freely beyond the other just recited parts, so that this can readily be inserted in the lower transverse bore 16 (Fig. 6) of the body and turned so that the cross-bore 21*a* of that valve alines with the material passage 3, this alinement being easily determined by looking through the said passage. The other parts shown in Fig. 10 can then be consecutively slid into their normal positions of Fig. 7, after which the fastening of the side plate 26 to the gun body by the screws 27, together with the attaching of the two inlet nipples 6 and 13 and of the two nozzles completes the assembly.

With the cross-pins 20 and 23, the stop pin 28 on the handled member, and the stop shoulders 26*c* and 26*d* on the side plate suitably located with respect to one another and to the relative directions of the axes of the two passages in the gun body, I obtain the following advantageous effect:

When the handled member is moved in a counterclockwise direction in Fig. 1, the material control valve 21 rotates in the same direction, and the intermeshing of the two gears 19 and 22 rotates the air control valve in a clockwise direction, as indicated for both by the arrows in Fig. 4. With the aforesaid suitable relative position, the air valve 18 opens (as in Fig. 5) before the material valve 21 begins to open. Consequently, when the gun begins to operate, it at first emits air only, and the sweep of this air along the bore 11*a* of the air nozzle prevents the material (if sticky) from adhering to this bore when the handle is moved further (in the valve opening direction) so as to open the material valve also, as in Fig. 6.

Likewise, when the handled member is moved in the opposite direction after my spray gun has been used the two valves at first rotate from the "full open" position of Fig. 6 to the intermediate position of Fig. 5 in which the flow of material is shut off. But air then still flows through the cross-bore 18*a* of the air nozzle, thereby effecting such a forward suction in the tip of the material nozzle 5 as to draw residual material out of that tip for ejection by the continued flow of air. Consequently, I avoid the serious clogging of the material nozzle by the drying of material

in its tip, as encountered with heretofore commercial guns for spraying asphalt and other sticky materials.

Moreover, it will readily be seen from the drawings that when the material hose **6** is detached from the gun and the handle is turned to its "on" position, shown in dotted lines in Fig. 1 and corresponding to the valve positions of Fig. 6, solvent can readily be flown through the material passage **3** and the material nozzle **5** for speedily and completely cleaning these as well as the cross-bore **21***a* of the material nozzle. So also, it will be evident from my previous description of the assembling that my spray gun can easily be entirely disassembled for inspecting and cleaning all parts thereof, and likewise thereafter reassembled, the only tool required being a simple screw-driver.

This automatic cleaning of the air nozzle during the shutting off of my spray gun is all the more advantageous when the discharge nozzle has its discharge orifice formed for flattening the emitted spray of material, as for example when the discharge nozzle **30** of Figs. 8 and 9 is substituted for the nozzle **11** of Fig. 4. In this "slitted orifice" type of nozzle **30**, the discharge outlet is a slot **30***a*, which slot is desirably of greater length and smaller width than the diameter of the outlet bore **5***a* of the material nozzle. Thus formed, the discharge nozzle presents two shoulders **30***b* forwardly of the material nozzle, which shoulders deflect air toward the axis of the material stream and also would have material deposit on them if the flow of air was not continued (in the above described manner) after the flow of material has been shut off. In practice, the user of my here presented gun soon learns that by first halting the closing movement of the handle in an incompletely closed position (as indicated by dotted line **25***b* in Fig. 1) for a brief time, he can effectively cause residual material to be sucked out of the material nozzle, and he can easily determine the needed position of the handle by noting when the ejection of material has nearly ceased.

However, while I have described my here presented spray gun in connection with illustrations of a hand-held type, I do not wish to be limited in this respect, or with respect to other here described details, since many changes might be made without departing either from the spirit of my invention or from the appended claims.

In the claims, the term "body member" is used to denote the gun body together with the recess cover fastened to that body.

I claim as my invention:

1. A material spraying appliance comprising a body member provided with a longitudinal material passage and a longitudinal air passage, both of which passages open at the forward end of the body member; the body member also having two parallel transverse bores each crossed by one of the said passages; two axially parallel valve members respectively disposed within and rotatable in the said two bores; two intermeshed gears respectively coaxial with and interlocked with the two valve members; and an actuating member fast with respect to one of the valve members and presenting a handle portion outside the body member; the body member including a body having a recess through the bottom of which both of the transverse bores open, and each valve member including an axial stem extending into the said recess, both of the said gears being disposed in the said recess and each gear being splined to one of the said stems; the appliance including also a detachable cover member normally closing the mouth of the said recess, and two compressible elements respectively interposed between the cover member and the two gears.

2. A material spraying appliance comprising a body member provided with a longitudinal material passage and a longitudinal air passage, both of which passages open at the forward end of the body member; the body member also having two parallel transverse bores each crossed by one of the said passages; two axially parallel valve members respectively disposed within and rotatable in the said two bores; two intermeshing gears respectively coaxial with and interlocking with the two valve members; and an actuating member fast with respect to one of the valve members and presenting a handle portion outside the body member; the body member having a recess through the bottom of which both of the transverse bores open, and each valve member including an axial stem extending into the said recess, both of the said gears being disposed in the said recess and each gear being splined to one of the said stems; the appliance including also a detachable cover member normally closing the mouth of the said recess, and two compressible spiral springs respectively interposed between the cover member and the two gears; each stem having at least a portion thereof disposed within a portion of the adjacent spring for approximately centering the spring with respect to the axis of the stem.

3. A material spraying device adapted to be supported by the hand of its user, comprising a metal body including an upper portion through which two superposed and generally horizontal passages extend, the said passages presenting their outlets adjacent to each other at the forward end of the body; the body having a recess in one side thereof and having two transverse bores extending respectively across the said two passages and both opening at the other side of the body; two valves respectively rotatably disposed in the two transverse bores, each of the valves tapering away from the said recess and having a stem extending into the said recess; two intermeshed gears disposed within the said recess and respectively splined to the stems of the two valves; a side plate detachably fastened to the side of the body at which the recess opens and normally closing the mouth of the said recess, the side plate having an aperture coaxial with the one of the said valves; annular yielding means interposed between the side plate and the gear adjacent to the last named valve; and a handle fast with respect to the last named stem and presenting its manually actuable portion outside the said body and side plate.

4. A material spraying device as per claim 3, in which the aperture in the side plate has an enlargement presenting two shoulders spaced circumferentially of the said aperture, the appliance including a stop pin projecting from the stem of the last named valve and adapted to be engaged by the said shoulders; whereby the stop pin and shoulders cooperate for limiting the rotational movement of the said valves in both directions.

5. A material spraying device as per claim 3, in which the bores of the said yielding means, of the gear adjacent to the latter, and of the aperture in the side plate are all of larger diameter than all portions of the handle; so as to permit the last named gear, the yielding means and the side plate to be slid over the free end of the handle and into their operative positions after the valve attached to the handle has been

inserted in the corresponding cross-bore of the body.

6. In a spraying device, a two-part body member comprising a main body part provided with two longitudinal passages and having two cross-bores respectively intercepting the said passages, and a second body part detachably fastened to the main body part; the two body parts being formed for affording a chamber from which the said cross-bores lead, and the second body part having a perforation in axial alinement with one of the said cross-bores; and each cross-bore tapering away from the said chamber; two passage control members each including a tapering valve rotatably disposed in one of the cross-bores and a stem coaxial with the valve and disposed within the said chamber; two intermeshed gears disposed within the said chamber and respectively splined to the two valve stems; and an actuating member including a handle disposed outwardly of the second body part and a portion extending through the said perforation and connected to one of the valve stems.

7. A spraying device as per claim 6, in which each valve presents a shoulder at the juncture of the valve with the corresponding stem, against which shoulders the gears splined to the said stems respectively bear; and in which the appliance includes compression spring means interposed between the said gears and the second body part and continually pressing the gears in the direction in which the valves and cross-bores taper, whereby the spring means cause the gears to socket the two valves firmly in their respective bores.

SVEND BRAMSEN.