Feb. 22, 1949. E. GUSTAFSSON ET AL 2,462,262

DUAL SPRAY GUN

Filed March 9, 1944 4 Sheets-Sheet 1

Fig. 1.

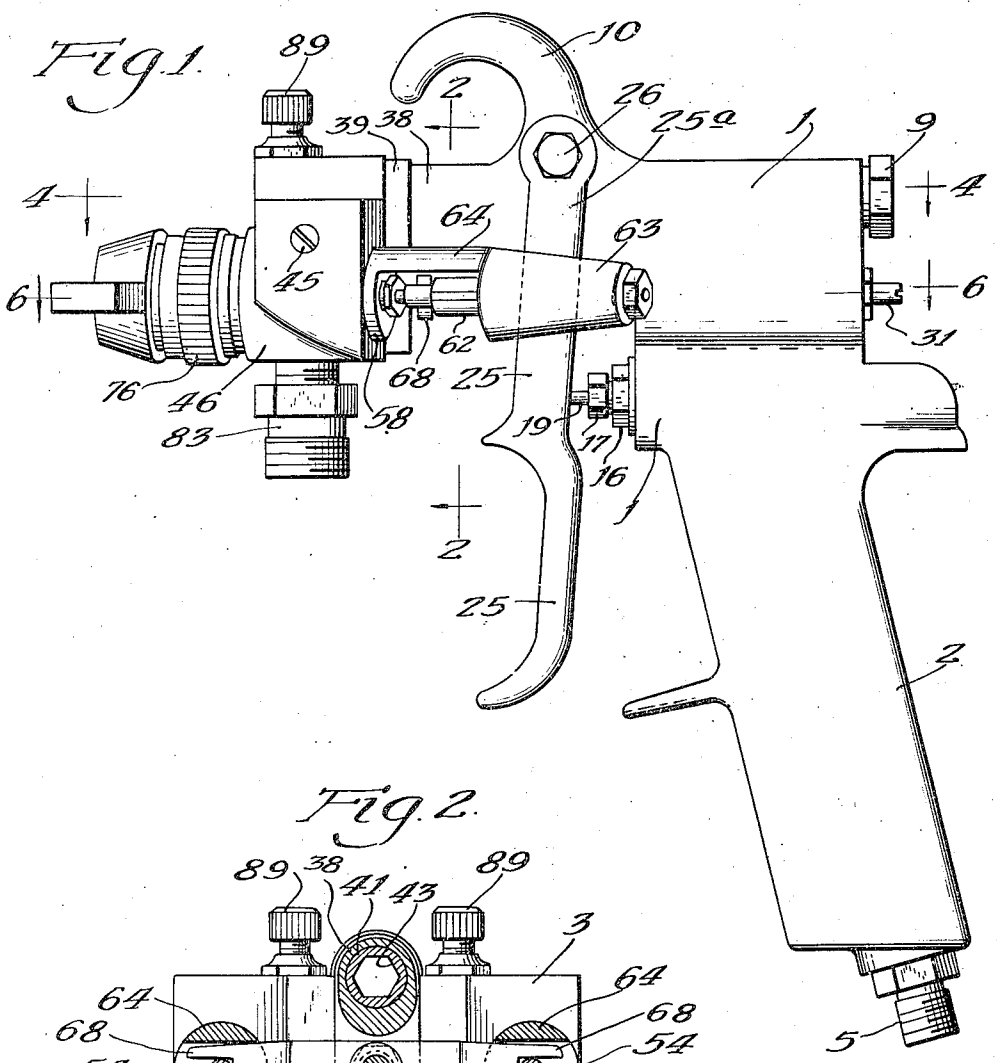


Fig. 2.

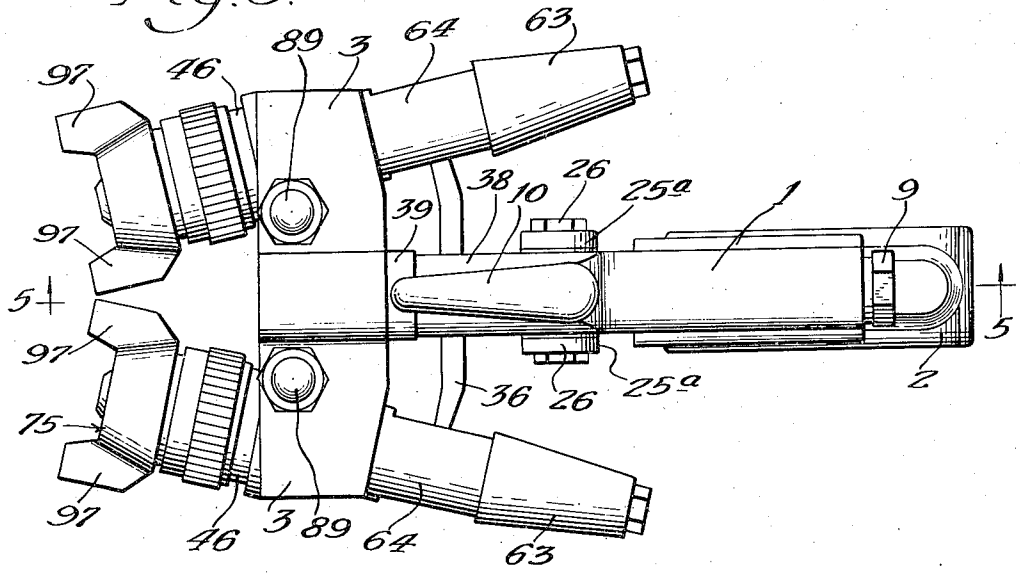
Inventors:
Eric Gustafsson
Harold L. Striegel
By: Louis A. Bisson,
Attorney.

Feb. 22, 1949. E. GUSTAFSSON ET AL 2,462,262

DUAL SPRAY GUN

Filed March 9, 1944 4 Sheets-Sheet 2

Fig. 3.



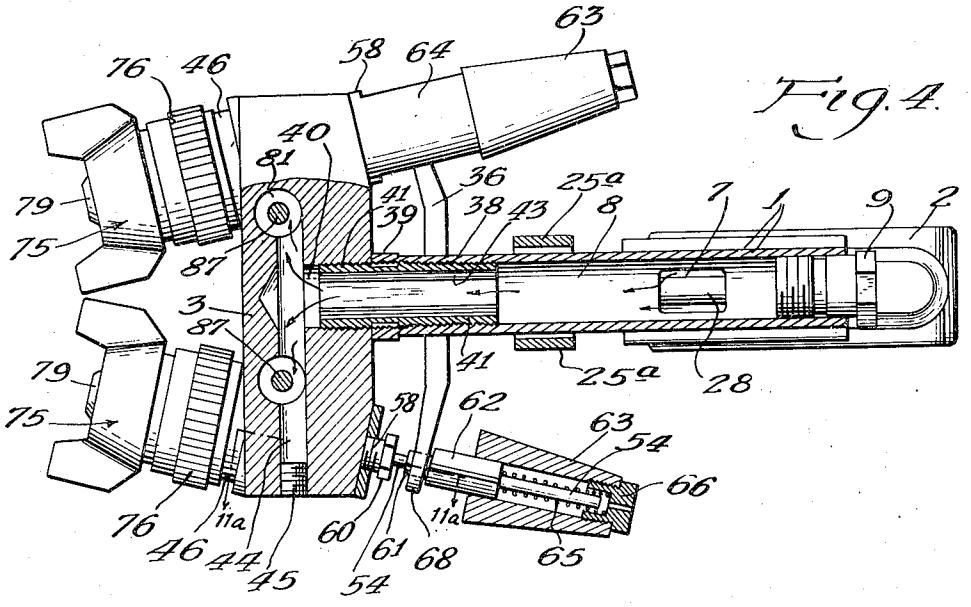


Fig. 4.

Inventors:
Eric Gustafsson
Harold L. Striegel
By Louis A. Bisson,
Attorney.

Feb. 22, 1949. E. GUSTAFSSON ET AL 2,462,262

DUAL SPRAY GUN

Filed March 9, 1944 4 Sheets-Sheet 3

Fig. 5.

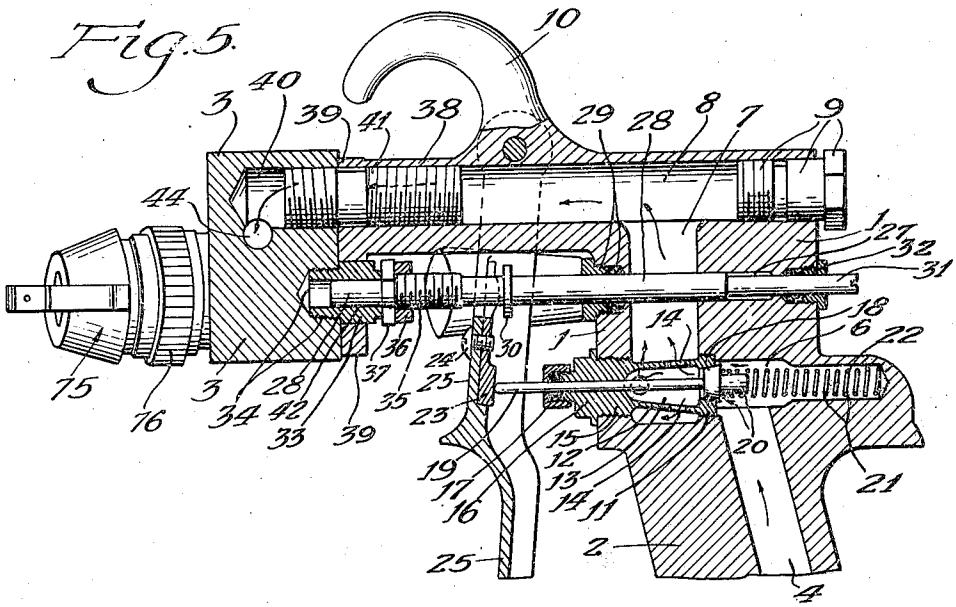
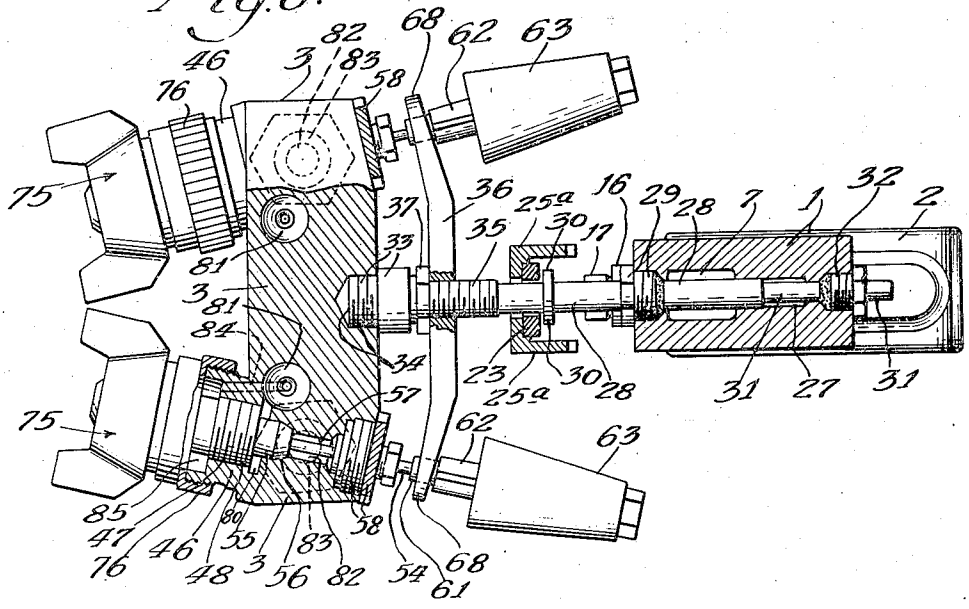


Fig. 6.



Inventors:
Eric Gustafsson
Harold L. Striegel
By: Louis A. Bisson,
Attorney.

Feb. 22, 1949. E. GUSTAFSSON ET AL 2,462,262

DUAL SPRAY GUN

Filed March 9, 1944 4 Sheets-Sheet 4

Fig. 7.

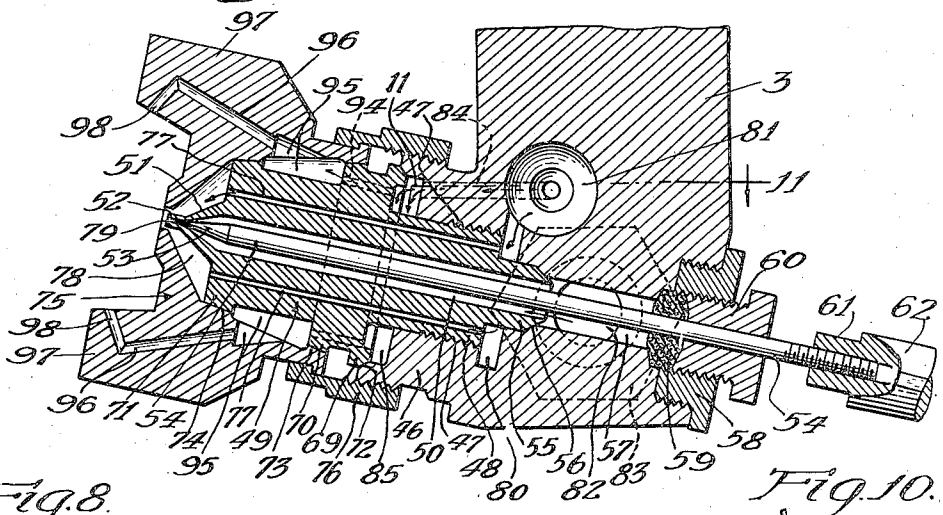
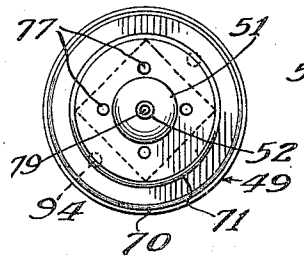


Fig. 8.



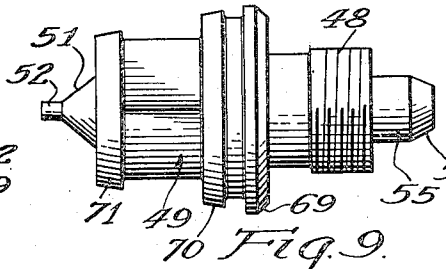


Fig. 9.

Fig. 10.

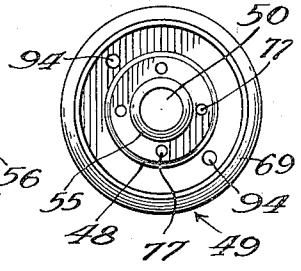
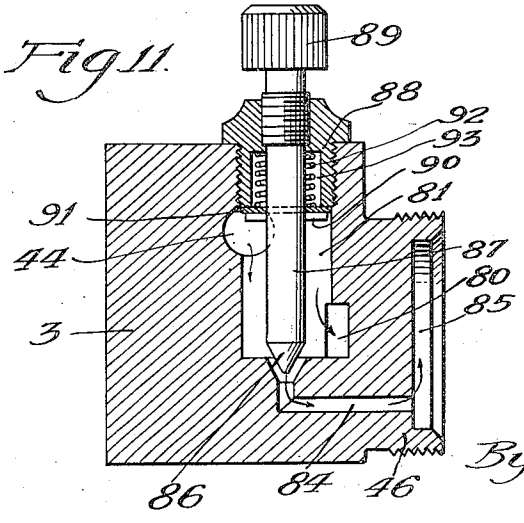


Fig. 11.



Inventors:
Eric Gustafsson
Harold L. Striegel
By: Louis A. Bisson,
Attorney.

Patented Feb. 22, 1949 2,462,262

UNITED STATES PATENT OFFICE

2,462,262

DUAL SPRAY GUN

Eric Gustafsson and Harold L. Striegel, Chicago, Ill., assignors to Binks Manufacturing Company, Chicago, Ill., a corporation of Delaware

Application March 9, 1944, Serial No. 525,636

4 Claims. (Cl. 299—140)

1

The present invention relates to a spray gun of the dual spray type.

Among the objects of the invention is to provide a novel spray gun device having plural spray gun units for spraying different liquids which blend at the surface being coated.

Another object of the invention is to provide a novel spray gun device having plural spray gun units which have individual liquid controls whereby one may be made to lag the other when opening, as by adjusting the needle valve guide and lock nut of each unit.

A further object of the invention is to provide a novel spray gun device having a common air supply means, a common air supply control, and a common liquid supply control.

Other objects, advantages, capabilities, features and the like are comprehended by the invention as will later appear, and as are inherently possessed by the invention.

Referring to the drawings:

Fig. 1 is a side view of an embodiment of the invention;

Fig. 2 is a transverse sectional view taken in a plane represented by line 2—2 in Fig. 1;

Fig. 3 is a top plan view of the same;

Fig. 4 is a horizontal sectional view taken in a plane represented by line 4—4 in Fig. 1;

Fig. 5 is a vertical sectional view taken in a plane represented by line 5—5 in Fig. 3;

Fig. 6 is a fragmentary horizontal sectional view taken in a plane represented by line 6—6 in Fig. 1;

Fig. 7 is a horizontal sectional view, on an enlarged scale, taken in a plane represented by line 6—6 in Fig. 1;

Fig. 8 is a forward end view of the liquid nozzle unit shown in Fig. 9;

Fig. 9 is a view in side elevation of the liquid nozzle unit;

Fig. 10 is a rear end view of the liquid nozzle unit shown in Fig. 9; and,

Fig. 11 is a fragmentary vertical sectional view taken in a plane represented by line 11—11 shown in Fig. 7, or in a plane represented by line 11a—11a shown in Fig. 4, with the nozzle unit, nozzle cap and coupling omitted in both cases, and looking in the direction of the arrows in both cases.

Referring more in detail to the drawings, an embodiment chosen to illustrate the invention is shown as comprising a body 1 having at its rear end a handle 2 and at its forward end a cross-head 3. The handle 2 is provided with an air passage 4 leading from a hose connection 5 at the lower end of the handle 2 and to a valve chamber 6 (Fig. 5) which communicates with a vertical air

2

passage 7 running to an upper air passage 8 extending longitudinally in the upper part of the body 1. The rear end of the passage 8 is closed by a suitable screw plug 9, as shown more particularly in Fig. 5. At the upper part of the body 1 is provided a hook 10 by which the device may be suspended.

Between the valve chamber 6 and the air passage 7 is provided a valve device (Fig. 5) comprising a valve seat member 11 having a hollow body 12 provided with a chamber 13 and openings 14. The body 12 has a threaded shank 15 fitting in the body 1, as shown in Fig. 5, and a head 16, the latter having suitable packing means 17. On the valve seat member 11 normally seats a valve element 18 having a valve stem 19 which extends through the chamber 13 and slidably through the shank 15, head 16 and packing means 17, as shown in Fig. 5. From the rear side of the valve element 18 extends a shank 20 in a spring 21 which extends through the valve chamber 6 and an extension 22 thereof with an end of the spring 21 pressing against the valve element 18 and its other end pressing against the rear end of the chamber 22, as shown in Fig. 5. The forward end of the valve stem 19 extends exteriorly to be contacted by a pressure plate 23 secured by way of a screw 24 to a trigger 25. The upper part of the trigger 25 is bifurcated to have arms 25a spanning the body 1, and being pivotally connected to pivot studs 26 screwed into the sides of the body 1 at the juncture of the hook 10.

Through an intermediate portion of the body 1 extends a guideway 27 (Figs. 5 and 6) in which is slidably mounted a plunger rod 28 which extends forwardly through the air passage 7 and a packing means 29 provided in the forward part of the body 1. The rod 28 carries a collar 30 adapted to be engaged by the upper end of the presser plate 23. The rear end of the rod 28 has a stem 31 which extends rearwardly through a packing means 32 and to the exterior of the body 1, as shown in Figs. 5 and 6. The rod 28 extends forward through the plate 23, the trigger 25, and slidably in a guide bushing 33 threaded into a socket 34 provided in the rear portion of the cross-head 3. The rod 28 is provided at an intermediate portion thereof with a threaded part 35 on which is adjustably mounted a yoke 36 backed by an adjusting nut 37 threaded on the threaded part 35, as shown in Figs. 5 and 6.

The body 1 has a forwardly extending tubular portion 38 (Fig. 5) having a forward head part 39 abutting the rear of the cross-head 3. Opposite the portion 38 the cross-head 3 has a

socket 40, and both the tubular portion 38 and the socket 40 are threaded to receive a coupling thimble or bushing 41 threaded therein to hold the cross-head 3 and the head part 39 in firm abutting relation. The lower part of the head part 39 is provided with an aperture 42 in which fits the guide bushing 33, and also for holding the cross-head 3 and the head part 39 in fixed relation, that is, from turning about the axis of the bushing 41. The bushing 41 is preferably provided with a non-circular, such as hexagonal, bore 43 (Fig. 2), for the use of a tool to screw the bushing 41 in place and for tightening the cross-head 3 and the head part 39 together. This bushing 41 preferably has oppositely pitched threads for drawing together, when it is turned in one direction, the cross-head 3 and the head part 39, and for separating them when the bushing is rotated in the opposite direction. In the cross-head 3 is provided a cross bore 44, which may be closed at its ends by suitable screw plugs 45 (Fig. 4), and which is in communication with the socket 40 by reason of its intersecting the socket 40, as shown in Fig. 5.

Each end of the cross-head 3 is provided with a forwardly extending socket 46 provided with an internally threaded portion 47 (see Fig. 7) for the engagement of a rear threaded end portion 48 of a nozzle unit 49, which sockets 46 are forwardly converging. The unit 49 has a longitudinally extending liquid passage 50, a forward tapered nozzle part 51 with an orifice tip 52 controlled by a valve tip 53 of a needle valve 54, and has at its rear end a tubular portion 55 provided with a tapered seating portion 56 to seat at the forward end of a liquid passage 57 provided in an end portion of the cross-head 3, as best shown in Fig. 7. The needle valve 54 extends through the passage 57 and rearwardly through and exteriorly of a packing means provided at the rear portion of the end portion of the cross-head 3, the packing means comprising a plug 58 screwed into said end portion of the cross-head 3, a packing 59 and a gland 60. The rear end portion of the needle valve stem 54 is threaded for adjustable connection with a nut part 61 from a reduced forward end portion of a tubular plunger 62 extending into a spring socket 63. See also Fig. 4. The member 63 has a forwardly extending bracket 64 forming a rigid part of the head of the packing plug 58. See Fig. 1. The needle valve stem 54 extends into the socket 63, as shown in Fig. 4, and is surrounded by a spring 65 bearing at its forward end against the rear end of the plunger 62 and at its rear end against a plug 66 screwed in the rear end of the socket 63. The plug 66 has a vent hole 67, as shown in Fig. 4. Each end of the yoke 36 has a fork 68 (see Fig. 2) for spanning the nut part 61 and for abutting against the forward end of the plunger 62. By adjusting the nut 61 with the plunger 62 on the threaded portion of the valve stem 54 the plunger 62 may be pressed more or less against the spring 65 and held with more or less space between the forward end of the plunger 62 and the fork 68 to govern the time of opening of the needle valve tip 53 when the yoke 36 is moved back by a manual pull on the trigger 25. In this way the spraying of the liquid may be effected from one of the spray nozzles ahead of the other.

The nozzle unit 49 has spaced annular or ring seating portions 69, 70 and 71 for seating respectively on seating portions 72, 73 and 74, of which seating part 72 is at the forward end of the socket 46, and the seating parts 73 and 74 are spaced parts of a nozzle cap 75. A suitable coupling ring 76 is connected to the cap 75 and the socket 46.

The nozzle unit 49 is also provided with air passages 77 leading to a forward chamber 78 provided between the forward end of the nozzle unit 49 and the frontal wall of the air cap 75, and to an air orifice 79 in the cap 75. At the rear end of the nozzle unit 49 and in the cross-head 3 is provided an annular air passage 80 for communicating with the air passages 77. The air passage 80 communicates (see Fig. 11) with a valve chamber 81 which in turn communicates with the air passage 44.

From the liquid passage 57 extends, downwardly, a passage 82 in which is screwed a fitting 83, see Figs. 2, 6, and 7.

From the chamber 81 (see Fig. 11) runs a passage 84 to an annular passage 85 provided in the forward end of the socket 46. The passage 84 is controlled by a valve 86 having a stem 87 threaded in a plug 88 in turn threaded into the upper part of the cross-head 3. The upper end of the stem 87 has a head 89. The stem 87 has a cross-pin 90 for supporting a washer 91 against an end of a spring 92 provided in a socket 93, provided in the plug 88. The spring 92 aids in the closing of the valve 86 on its seat.

The nozzle unit 49 has air ducts 94 which lead from the air channel 85 to an air channel 95 provided between the unit 49 and the air cap 75, and in the air cap 75 are provided air ducts 96 extending from the channel 95 and through horns 97 to side ports or orifices 98, for the projection of side jets of air to flatten the central stream of air and coating material issuing from the central orifices 52 and 79.

In operation spraying is effected by manually pressing back the trigger 25. This first causes the air valve 18 to open and air under pressure flows by way of the passages 4, 7, and 8, bore 43, socket 40, to cross bore 44 (in both directions), thence by way of valve chambers 81, air passages 80, air passages 77, air chambers 78, and air orifices 79. The air is projected ahead of the liquid. With the side port valves 86—87 open, air also passes from the valve chambers 81 by way of the passages 84, 85, 94, 95 and 96 to side jet orifices 98.

Further movements of the trigger 25 will cause it to engage the collar 30 on the rod 28 to move back the yoke 36. The bifurcations or forks 68 of the yoke 36 will then engage the tubular plungers 62 to move them rearwardly and, hence, the needle valves 54 to open up the liquid orifices in the tips 52 whereby the liquid is projected in a solid stream. The air from the orifices 79 will aerate the liquid streams, and the side jets of air from the orifices 98 will hit these streams and flatten them, as is well known in the art.

The liquid flows by way of hose connections 83 to passages 82, 57 and 50 to the nozzle tips 52.

When it is desired that the liquid to one of the spray nozzles 49 move subsequently to that of the other nozzle the tubular plunger 62 of the former may be adjusted back, by the adjusting nut 61 being screwed or set back on the threaded part of the needle valve 54 (see Fig. 4) so that when the yoke 36 is moved back, it will engage the plunger 62 (see lower part Fig. 6) later than the plunger 62 of the other spray gun unit (see upper part Fig. 6). The converse may be effected as is obvious from the above description.

Releasing the trigger 25 will cause first a shutting off of the liquid and then of the air.

While we have herein described and upon the drawings shown an illustrative embodiment of the invention it is to be understood that the invention is not limited thereto but comprehends other constructions, details, arrangements of parts, features and the like without departing from the spirit of the invention.

Having thus disclosed the invention, we claim:

1. In a dual type of spray gun, a gun body, a pair of spray nozzles supported on the gun body, a pair of needle valves to control the spray from the nozzles, spring means normally closing said valves, a yoke connected at its opposite ends to the needle valves so that when the yoke is moved in one direction the needle valves will open and when it is moved in the opposite direction said valves will be closed by their respective springs, a guide member, means on the gun body to mount the guide member so that it may reciprocate, said yoke being rigidly but adjustably connected to the guide member so as to reciprocate therewith, and means movably supported on the gun body and adapted to engage the guide member to move the same to effect opening of said needle valves.

2. In a dual type of spray gun, a gun body, a pair of spray nozzles supported on the gun body, a pair of reciprocable needle valves to control the spray from the nozzles, said needle valves having stems extending outside the nozzles, spring means acting to normally close said valves, a yoke connected at its opposite ends to the needle valves so that when the yoke is moved in one direction the needle valves will open and when it is moved in the opposite direction the needle valves will be closed by their respective springs, a guide member slidably mounted on the gun body, means rigidly but adjustably connecting the yoke at its center to the guide member so that the yoke will move with the guide member, means movably supported on the gun body and adapted to engage the guide member to move the same to effect opening of said needle valves, and means including a nut threaded on the stem of each needle valve and having a plunger engaged by one of said springs to increase or decrease the pressure with which the needle valve is held closed, said nut having a shoulder adapted to be engaged by the yoke end when the yoke is moved to valve-opening position, the position of each nut on its stem being variable to permit the opening of either one of the needle valves before the other.

3. In a dual type of spray gun, a gun body, a pair of spray nozzles supported on the gun body, a pair of needle valves to control the spray from the nozzles, said needle valves having stems extending outside the nozzles, spring means acting to normally close said valves, a yoke connected at its opposite ends to the needle valve stems, a guide member slidably mounted on the gun body, means securing the yoke at its center to the guide member so that the yoke may reciprocate with the guide member, means to deliver fluent material to each of the nozzles past the needle valves, the gun body having air passages therein leading to the nozzles, an air valve in the gun body for controlling the flow of air to the nozzles, and means movably supported on the gun body and adapted to engage the guide member to move the same to effect opening of said needle valves, the air valve having a part which is engaged by said last mentioned means to effect opening of said air valve prior to the opening of said needle valves.

4. In a dual type of spray gun, a gun body, a pair of spray nozzles on the gun body, a pair of reciprocable needle valves for controlling the spray nozzles and having stems extending outside the spray nozzles, a guide member slidably mounted on the gun body, a yoke secured by screw threads at its central portion to the guide member, the ends of the yoke embracing or straddling the two valve stems, a nut threaded on each valve stem, a pair of spring sockets secured to the gun body, each spring socket being aligned with one of the valve stems and housing the outer end of the same, a coil spring within each spring socket surrounding the valve stem, a plunger secured to each nut and movable into the spring socket against the resistance of the coil spring therein, said plunger providing a shoulder at the end where it is secured to the nut, said shoulder being engageable by the yoke, and means on the gun body to move the guide member and the yoke so as to cause said plungers to compress the coil springs and move the valve stems to open said needle valves.

ERIC GUSTAFSSON.
HAROLD L. STRIEGEL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
308,507	Maxwell	Nov. 25, 1884
868,023	Simpson	Oct. 15, 1907
1,559,790	Schneider	Nov. 3, 1925
1,819,117	Preble et al.	Aug. 18, 1931
1,910,673	Bramsen	May 23, 1933
1,950,779	Bramsen	Mar. 13, 1934
2,107,726	Bramsen et al.	Feb. 8, 1938
2,249,205	Hansen	July 15, 1941
2,249,771	MacMartin	July 22, 1941
2,255,189	Robinson et al.	Sept. 9, 1941
2,265,209	Thompson	Dec. 9, 1941
2,380,827	Downs	July 31, 1945