May 3, 1927. 1,627,117

J. J. PREBLE ET AL

APPARATUS OR TOOL FOR APPLYING COATING MATERIAL

Filed March 13, 1925 2 Sheets-Sheet 1

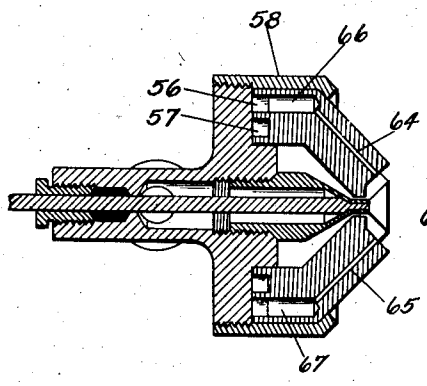


Fig. 3

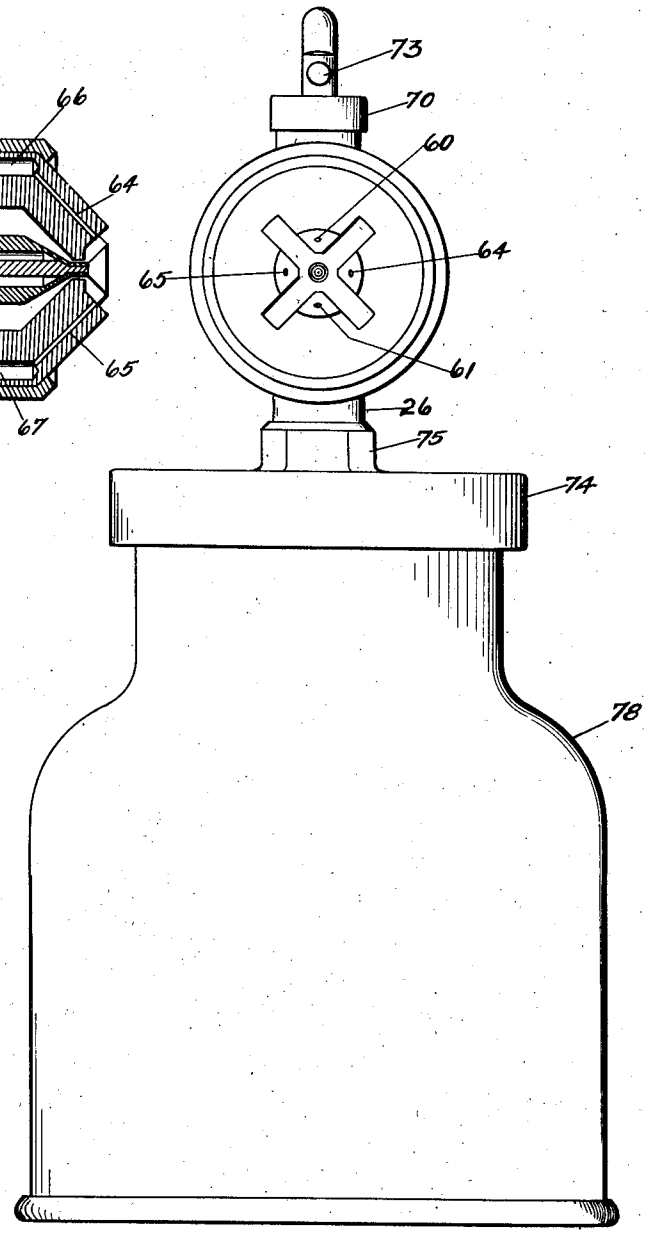


Fig. 1

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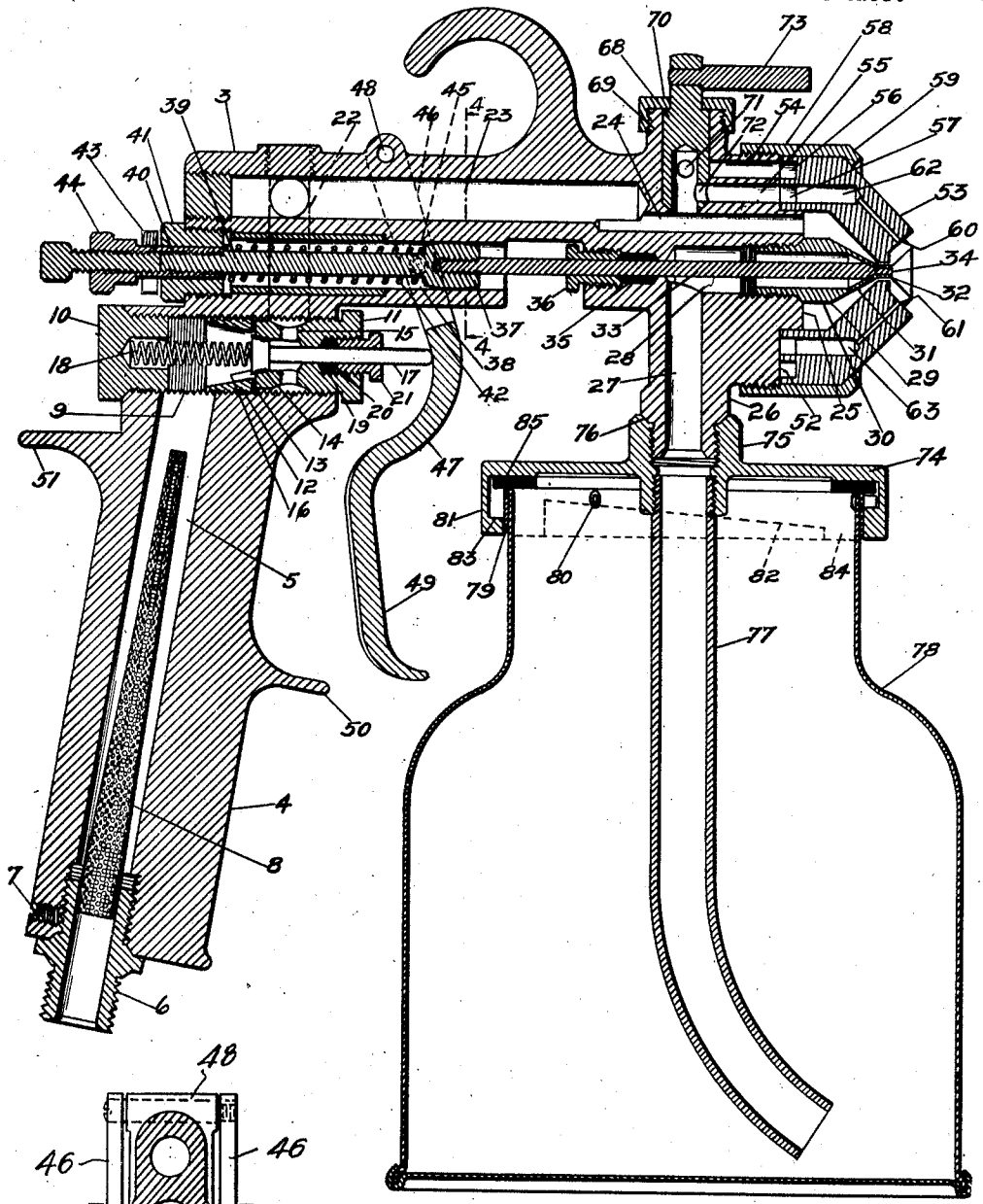


Fig. 2

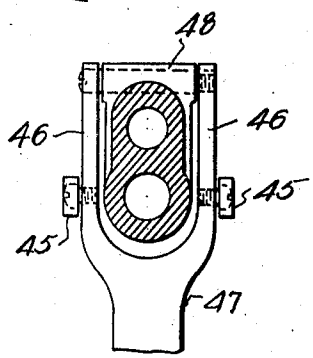


Fig. 4

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Patented May 3, 1927. 1,627,117

UNITED STATES PATENT OFFICE.

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APPARATUS OR TOOL FOR APPLYING COATING MATERIAL.

Application filed March 13, 1925, Serial No. 15,283.

The present invention relates to coating apparatus and more particularly to spray guns.

Heretofore it has been proposed to eject coating material from the spray gun under pressure and to change its formation after ejection by directing diametrically opposite and converging jets thereagainst to effect the flattening, spreading or fan-shaping thereof. Usually it is desirable to flatten the discharged coating material in either a vertical or a horizontal plane as a slight twist of the operator's wrist takes care of intermediate planes. In order to flatten the discharged coating material in one of a plurality of planes it has been proposed heretofore to rotate the member carrying the supplemental discharge jets. To change the supplemental discharge from one plane to another involves the unlocking of the supplemental discharge member, its rotation to bring the supplemental discharge into the new plane, and the relocking of the member. After the supplemental discharge member is relocked it is often found that the member has not been rotated into the desired plane or that the air ports are not properly registered with the supplemental air passages necessitating another unlocking, adjusting and relocking operation.

The object of the present invention is to provide a spray gun which will be adapted to flatten the discharged coating in one of a plurality of planes in a quick, reliable and certain manner.

To the accomplishment of this object, and such others as may hereinafter appear, the features of the present invention relate to certain devices, combinations and arrangements of parts hereinafter described and then set forth broadly and in detail in the appended claims which possess advantages which will be apparent to those skilled in the art.

The various features of the present invention will be readily understood from an inspection of the accompanying drawings illustrating the best form of the invention at present devised, in which,

Figure 1 is a front elevation of the spray gun;

Fig. 2 is a left side sectional elevation,

Fig. 3 is a detail in sectional plan of the supplemental discharge member, and

Fig. 4 is a detail in sectional elevation on the line 4—4, Fig. 2 with the parts within the spring chamber removed.

Referring to the drawings, the apparatus or tool for applying coating material is preferably provided with a metallic body 3 which has integral therewith or suitably attached thereto a handle or extension 4. The motive agent, which may be air under pressure, is preferably introduced into the body portion 3 through the handle 4 and for that purpose we have herein shown an air passage 5 which is connected to an air hose (not shown) through an air-hose coupling 6 fitted to the lower end of the passage 5 and held in place on the handle 4 by a set screw 7. To remove particles of dirt or other foreign matter from the inflowing motive agent and prevent their entrance into the body of the tool, the coupling carries a perforated conical member 8, which extends into the passage 5.

At its upper or leading end the air passage 5 communicates with a horizontal passage 9 extending completely through the upper portion of the handle 4. The passage 9 is interiorly threaded to receive three parts, namely, a plug 10 which closes one end of the passage, a valve casing 11 which closes the other end of the passage, and a central hollow stop 12 which determines the operative position of the valve casing 11 within the passage. The interior of the stop 12 is frusto-conical in shape in order to permit the insertion into the stop of an expanding tool which expands the stop to wedge its exterior threads into the threads in the passage 9 and thus lock the stop in a fixed position. Interposed between the valve casing 11 and stop 12 is a lead washer 13 which prevents the air leaking out between the casing and the stop into the threads between the casing 11 and passage 9. The valve casing 11 is provided with a valve seat 14 and with transverse air passages 15. The valve seat 14 is adapted to receive and seat a suitable air valve 16 having a spindle 17. The valve 16 is normally held upon the seat 14 by a coiled spring 18 interposed between the valve 16 and the plug 10. Near its outer end the spindle 17

passes through suitable packing shown as a gland packing 19, mounted in a cavity 20, formed in the valve casing 11, and held in place therein by a gland or plug 21 threaded into the cavity 20. The motive agent, such as air under pressure entering through the passages 5 and 9, passes through the air valve 16 when open, and enters a passage 22 which conducts the air to a longitudinal chamber 23 having a passage 24 which opens on the front face 25 of the body portion.

The coating material, such as paint, lacquer, and the like, may be introduced into the body 3, under pressure, by threading a hose coupling (not shown) to a pipe 26 depending from the body portion. The pipe 26 is provided with a passage 27 which conducts the coating material into a chamber 28 opening upon the face 25 of the body portion. With this construction the air chamber 23 and the paint chamber 28 are always out of communication with each other within the body of the gun.

The forward or discharge end of the chamber 28 is internally threaded to receive a threaded nozzle 29 through which the coating material is discharged from the gun. The nozzle 29 is provided with a substantially hexagonal surface 30, a tapered portion 31, and a cylindrical or conical discharge tip 32.

Extending longitudinally through the chamber 28 and substantially axially thereof is a needle or spindle 33 having a tip 34 formed on its forward end provided with surfaces shaped to engage the surfaces 31 and 32, respectively, and thus act as a valve to shut off the discharge of coating material.

The rear end of the chamber 28 is closed by packing 35 through which the spindle 33 extends. The packing 35 is held in place by a packing or gland plug 36 threaded into the body 3. The spindle 33 may be withdrawn from or inserted into the chamber 28 while the packing 35 is in place as the reduced end of the spindle passes through the packing without picking up strands thereof. The rear end of the spindle 33 is secured to a guide 37 arranged to move in a longitudinal bore or spring chamber 38 formed in the body 3. The guide 37 is provided with a stem 39 threaded at its free end to engage threads on an adjusting sleeve 40 rotatably mounted in a plug 41 threaded into the body 3. The spindle 33 is actuated in a direction to keep the coating material discharge orifice normally closed by a spring 42 coiled about the stem 39 and interposed between the inside faces of the plug 41 and guide 37.

In order to move the spindle 33 in a direction to open the coating material discharge orifice against the tension of the spring 42 the central portion of a strap yoke 43 is loosely interposed between an adjusting nut 44, on the sleeve 40, and the plug 41. The free ends of the yoke extend along the opposite sides of the body portion and are connected by pivot pins 45 to the arms 46 of a yoke or lever arm 47 embracing the body 3 and pivoting on a horizontal pin 48 carried by the body 3.

The inner face of the lever arm 47 engages the spindle 17 of the air valve 16. The yoke arm 47 thus operates to open both the air and coating material valves when the arm 47 is actuated against the tensions of the springs 18 and 42 which close the valves when the yoke-arm 47 is released. As sufficient play is provided for the yoke 43 before it engages the nut 44 the air valve will be opened before the coating material valve opens and the air valve will be closed after the coating material valve is closed.

In order to actuate the yoke arm 47 its lower end is curved to form a grip 49 for a plurality of the fingers of the hand of the operative grasping the tool handle, which is provided with a conveniently located finger rest and positioning member 50. The tool handle is also provided with a smooth under face 51 which is adapted to seat upon the hand of the operative grasping the handle to assist him in supporting the tool. From an inspection of Fig. 2 it will be apparent that the handle 4 below the finger rest 50 is narrower than the portion of the handle above the rest by substantially the width of the grip 49. This construction is provided so that when the grip 49 is drawn towards the handle 4 in actuating the valves 16 and 34 the combined handle and grip engaged by the index and second finger will have substantially the same width or girth as the portion of the handle engaged by the little and adjacent fingers.

In order to provide a discharge nozzle for the air the front face of the body 3 is provided with a vertical seat 52 of reduced diameter upon which a main air discharge nozzle 53 is seated concentric with the inner nozzle 29. The nozzle 53 has an internal surface spaced from the external surface of the nozzle 29 throughout its length so that air can pass out of the passage 24 and be discharged from the gun.

The spray gun embodying our present invention preferably includes means for supplementally discharging air under pressure upon the discharged mist or cloud of material and main discharged air to effect the flattening, spreading or fan-shaping thereof when desired and accordingly there is formed in the body 3 a pair of supplemental air passages 54 and 55 parallel to the passage 24 and terminating at the seat 52. In the rear face of the nozzle 53 is a pair of concentric annular grooves constituting, with the adjacent portion of the body, a pair of circular air passages 56 and 57 communi-

cating with the supplemental air passages 54 and 55, respectively.

The nozzle 53 is held in a fixed position flatwise against the forward end of the tool body by a suitable locking means shown as an internally threaded collar or nut 58 having an inturned flange 59 to engage the nozzle 53. The outer face of the nozzle 53 is provided with a pair of diametrically opposed jet members 60 and 61 arranged in a vertical plane and having the inwardly directed air passages 62 and 63 in communication with the air passage 57. The outer face of the nozzle 53 is also provided with a pair of diametrically opposed jet members 64 and 65 (Fig. 3) arranged in a horizontal plane and having the inwardly directed air passages 66 and 67 in communication with the air passage 56.

In order to determine readily the plane of the supplemental discharge, that is, whether the supplemental air is to be discharged through the jet members 60 and 61 or through the jet members 64 and 65, we interpose between the passage 24 and supplemental air passages 54 and 55 a hollow valve 68 rotatably mounted in a boss 69 on the body 3 and held therein by a cap 70 internally threaded to engage a thread on the boss. The valve 68 is provided with a port 71 arranged in the same horizontal plane as the passage 54. The valve 68 is also provided with a port 72 arranged in the same horizontal plane as the passage 55 but offset at an angle of ninety degrees from the port 71. The valve 68 is provided with a lateral handle 73 through which the operative may rotate the valve and thus register the port 72 with the passage 55 to provide for the supplemental discharge through the vertical jet members 60 and 61. By turning the valve 68 through an arc of ninety degrees the port 72 may be withdrawn from the passage 55 and the port 71 registered with the passage 54 to provide for the supplemental discharge through the horizontal jet members 64 and 65.

The valve 68 also provides means for readily controlling the volume of the supplemental air discharge as the handle 73 may be moved into a position where it extends at an angle of forty-five degrees from the position illustrated in Fig. 1. In this position the supplemental discharge is shut off. After either of the ports 71 or 72 is brought into registry with the passages 54 or 55 the handle 73 may be manipulated to partially close the open port and thus vary the amount of air passing to the supplemental discharge jets.

When it is desired to admit coating material not under pressure to the spray gun the material hose (not shown) is disconnected and a vented closure 74 is threaded on the lower end of the pipe 26. To this end the closure 74 is provided with a central hollow boss 75 threaded interiorly on opposite sides of the closure. Near its lower end the pipe 26 is shaped to fit a seat 76 formed on the boss 75 to insure a tight joint. The lower threads on the boss 75 are engaged by outer threads on a pipe 77 extending down towards the bottom of a container 78 which contains the coating material. The lower end of the pipe 77 is bent towards the front of the container 78 so that the open end of the pipe is directed towards the angle between the bottom of the container and that portion of the front wall of the container which lies in the vertical plane passing through the longitudinal axis of the gun. With this construction the operative may continue to operate the gun with its nose pointed downwardly, when the material in the container becomes low, without danger of uncovering the open end of the pipe 77 and thus breaking the suction.

In order to attach the container 78 to the closure 74 we have provided a turned over or otherwise reinforced portion 79 at the upper end of the container whereon are provided a plurality of preferably equally spaced, laterally projecting lugs 80. The lugs 80 are shown as rivets or may be formed integrally with the container, if desired, and are adapted to cooperate with a suitable receiving formation on the closure 74. To this end the closure 74 is provided with a circumferentially depending skirt 81 having a series of partial threads, wedge formations or the like 82, forming slightly inclined tracks or grooves 83 in which the lugs 80 may be received. The grooves 83 terminate at their lower ends in a downwardly open notch or recess 84, spaced similarly to the lugs 80 and of a dimension to receive the same. The tracks 83 may be formed by a thread the continuity of which is broken by the recesses 84. The thread may therefore be what is usually called a mutilated thread.

To secure the container to the closure 74 it is necessary merely to insert the container within the skirts of the closure with the lugs 80 positioned in the respective notches 84 and then relatively to rotate slightly the container and closure in a direction to cause the lugs 80 to ride up the tracks or grooves 83, whereby the mouth of the container is wedged up against a gasket 85 on the under side of the closure 74. Removal of the container may be subsequently readily effected by a similar but reverse operation. The gasket 85 has a larger diameter than the smallest diameter of the skirt 81 so that the gasket 85 may not drop out of position when the container is removed.

While in the preferred form of our invention we have provided four supplemental discharge jets with means for selecting at

will the plane of the discharge, it will be apparent to those skilled in the art that the supplemental jet member may be provided with a greater number of supplemental air jets controlled by a valve having an increased number of ports if it should be desired to provide for the flattening of the discharged coating material in more than two planes.

What is claimed as new, is:

1. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a member through which the motive agent may be discharged supplementally upon the discharged coating material, and means independent of the member for determining the plane of the supplemental discharge.

2. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a member through which the motive agent may be discharged supplementally upon the discharged coating material in one of a plurality of planes, and means independent of the member for determining the plane of the supplemental discharge.

3. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a member through which the motive agent may be discharged supplementally upon the discharged coating material and provided with supplemental discharge passages occupying discharging positions in two planes or lines which are substantially normal to each other, and means independent of the member for determining the plane of the supplemental discharge.

4. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a member through which the motive agent may be discharged supplementally upon the discharged coating material and provided with a plurality of pairs of discharge passages, and means independent of the member for determining the pair of discharge passages through which the motive agent is supplementally discharged.

5. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a fixed member through which the motive agent may be discharged supplementally upon the discharged coating material, said member having opposed supplemental discharge passages occupying discharging positions in two planes or lines which are substantially normal to each other, and means to vary the supplemental discharge of the motive agent.

6. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a fixed member through which the motive agent may be discharged supplementally upon the discharged coating material, said member having opposed supplemental discharge passages occupying discharging positions in two planes or lines which are substantially normal to each other, and means for determining the plane of the supplemental discharge.

7. A spray gun, having, in combination, means to supply coating material, means to subject the same to the action of a motive agent thereby effecting the discharge of the coating material, a fixed member through which the motive agent may be discharged supplementally upon the discharged coating material, said member having opposed supplemental discharge passages occupying discharging positions in two planes or lines which are substantially normal to each other, and means for determining the plane of the supplemental discharge and for varying the supplemental discharge of the motive agent.

8. An apparatus or tool for applying coating material comprising a body having means to admit coating material and a motive agent, an inner hollow member forming a discharge nozzle for the coating material, an outer hollow member concentrically mounted with relation to the inner hollow member and spaced therefrom to form a discharge nozzle for the motive agent, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a pair of supplemental motive agent passages in said body, two pairs of opposite jet members on said outer member having continuous communication with at least one of said supplemental motive agent passages, and means for selectively controlling said supplemental motive agent passages.

9. An apparatus or tool for applying coating comprising a body having passages admitting coating material and a motive agent, an inner hollow member forming a discharge nozzle for the coating material, an outer hollow member concentrically mounted with relation to the inner hollow member and spaced therefrom to form a discharge nozzle for the motive agent, means for supplementally discharging motive agent upon the main discharge to flatten or spread the same including a pair of supplemental motive agent passages in said body, two pairs of opposite jet members on said outer member having a continuous communication

with at least one of said supplemental motive agent passages, a hollow valve member having continuous communication with the main motive agent passage and having ports arranged to connect the main motive agent passage with at least one of the supplemental motive agent passages.

10. An apparatus or tool for applying coating comprising a body having passages admitting coating material and a motive agent, and a fixed supplemental discharge member having opposed supplemental discharge passages occupying in pairs discharging positions in two planes or lines which are substantially normal to each other, said member having two pairs of motive agent passages leading respectively to the pairs of discharge passages, and said body having a number of spaced supplemental motive agent passages constituting a multiple of two, and respectively in communication with the pairs of motive agent passages in said member.

11. An apparatus or tool for applying coating comprising a body having passages admitting coating material and a motive agent, and a fixed supplemental discharge member having opposed supplemental discharge passages occupying in pairs discharging positions in two planes or lines which are substantially normal to each other, said member having two pairs of motive agent passages leading respectively to the pairs of supplemental discharge passages, and said body having a number of spaced supplemental motive agent passages constituting a multiple of two, and respectively in communication with the pairs of motive agent passages in said member, and a valve having at least two ports controlling the supplemental motive agent passages in the body for determining the plane of the supplemental discharge.

In testimony whereof we have signed our names to this specification.

JAMES JARVIS PREBLE.
WAYNE B. THOMPSON.