To all whom it may concern:

Be it known that I, OLAUS C. WOLD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Air-Brushes, of which the following is a specification.

In the art to which the present invention relates it is necessary to so arrange the parts that the ink or pigment discharged from the brush will be evenly and smoothly distributed and so that there will be no fluttering of the valve mechanism for regulating the discharge.

It has hitherto been the practice to construct air-brushes having a needle-valve provided with a movable needle; but great difficulty has been experienced with brushes of this character because of the fact that the needle must be of such fine formation that it is difficult or impossible to so position it that it will be movable for regulating the discharge-opening and at the same time be so mounted that it will be properly centered and free from vibration when in use. I have overcome this difficulty by providing a stationary or fixedly-mounted needle in conjunction with a movable sleeve, thereby enabling the discharge-opening to be regulated and at the same time enabling the needle to be materially shortened and fixedly mounted when in use. At the same time this arrangement simplifies the construction and greatly decreases the number of parts which it is necessary to employ and decreases the cost of manufacture. By decreasing the number of parts and simplifying their operation there is less liability of the brush becoming impaired if any of the parts become clogged with ink or otherwise, since such parts can be readily removed for cleansing or substitution.

A further object of the invention is to so arrange the ink-receptacle that the possibility of leakage will be reduced to a minimum, which leakage would tend to clog the air-supply valve and impair the operation of the brush.

The invention consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings illustrating the invention, Figure 1 is a side elevation of the brush; Fig. 2, a longitudinal central view showing all the parts in section; Fig. 3, a view showing the exterior casing in section and the interior mechanism in elevation; Fig. 4, a cross-sectional view showing the ink-supply tube, and Fig. 5 a cross-sectional view showing the operating-lever and parts adjacent thereto.

The brush is constructed to have a handle A, preferably formed of hard rubber or other similar material, and at the rear end of the handle is a cap a, of metal or other suitable protective material. As shown, the handle is hollow and is provided at its forward end with a screw-threaded neck a', on which is screw-threaded a metal collar A', having at its forward end a neck a'', on which is screw-threaded a shell or casing B, having on its interior a chamber b, adapted to contain the operative mechanism. The shell or casing is constructed to have a section b' of less diameter than the main portion of the shell or casing, and this shell or casing is tapered at its forward end and provided on its interior with a longitudinally-extending hole or opening b'', which connects the chamber b with a recess b' of larger diameter than the hole or opening. The walls are provided at their outer end with interior screw-threads b', into which is screw-threaded a cap C, provided with a collar c, adapted to abut against the forward edge of the shell or casing when the cap has been screw-threaded into place, and said cap is provided with tapered walls c' at its forward end, leaving the chamber c' on its interior, and the cap is provided at its end with an outwardly-flaring discharge hole or opening c''. On the interior of the cap is an annular flange c', having a hole or opening therein, and the inner end of the cap is provided with a tapered recess c'', opening into the chamber b'.

Slidably mounted within the opening b'' is a sleeve D, provided at its forward end with a tube d', having a tapered end d'', and said tapered end when in retracted position, as shown in Fig. 2, lies substantially in line with the discharge-opening in the closing-cap and when in projected position, as shown in Fig. 3, lies inside of the discharge-opening. The sleeve is provided on its interior with a longi-
tudinally-extending passage $d^2$ for the supply of ink or pigment, and the sleeve is provided at its rear end with a rearwardly-projecting stem $d'$, having a shoulder or abutment $e'$, formed therein, and said stem is provided with a bore $d''$ through its interior of slightly lesser diameter than the passage in the sleeve and connected therewith.

The opening in the tapered end $d'$ of the tube $d$ is regulated and controlled by means of a needle $E$, the point of which projects through the opening in the tube and the body of which extends through the inner passage in the sleeve and through the bore in the stem, and the needle at its rear end terminates in a screw-threaded stem $f'$, to the end of which is attached a regulating-handle or thumb-piece $g'$, and the stem $g'$ is screw-threaded into and rigidly held within a plug $g''$ within the interior of the casing. The plug affords a firm and rigid mounting for the needle throughout its entire extent, but enables the needle to be removed or regulated by turning the thumb-piece on the end of the screw-threaded stem, thereby projecting or retracting the needle without throwing its point off center, and the opening around the needle can be enlarged or diminished by moving the sleeve and attached tube in a manner which will be hereinafter explained.

Within the chamber $d$ is a lever $G$, provided on its outer end with a contact-plate $f$, and said lever projects from the casing through an elongated slot or opening $f''$, which allows the lever to be moved or swung, and said movement forward and back may be regulated by means of a set-screw $f'''$, projected through a support $f''$, which allows the set-screw to be projected or retracted, thereby regulating the return movement of the lever. The lever is provided on its neck with a yoke $G$, having side arms $a$, which straddle the rearwardly-projecting stem $d'$ and bear against the shoulder $e''$ of the movable sleeve, and the side arms are provided at their lower ends with laterally-projecting studs $g''$, which studs are positioned between ears $g''$, which arrangement allows the lever to be swung forward and back upon the studs as a pivotal mounting or to be moved up and down at the will of the operator. As the lever is moved forward the yoke will bear against the shoulder on the stem of the sleeve, thereby projecting the sleeve forward and increasing the opening around the point of the needle, and when pressure is released from the lever the sleeve will be returned to normal position by the action of a spring $g''$, which is coiled around the forwardly-projecting tube $d$ and abuts against the sleeve and the annular flange $e'$ and serves to thrust back the sleeve after its forward projection. The sleeve is provided in one side with a hole $k$, communicating with the passage therein, and into the hole is screw-threaded a laterally-projecting tube $H$, which passes through an elongated slot $h'$ in the wall of the shell or casing, and on the outer end of the tube is an ink-receptacle $h$ at substantially right angles to the tube, and said receptacle is fixedly secured to and adapted to move with the sleeve. Immediately below the lever is a plug $I$, which is provided with a recess $i$ in its outer end, and through the plug is screw-threaded a tubular stem $i'$, provided with an enlarged head $i''$ and having a flange $i'''$, adapted to contact the recessed end of the plug $I$ and form an annular chamber in the end of the plug, and the enlarged head is provided on its interior with a bore $i''$ of larger diameter than the passage through the tubular stem $i'$, leaving a shoulder or abutment $i''$, which serves as a valve-seat, as will hereinafter appear. The enlarged head terminates in a nipple $i'''$, within which is screw-threaded a nut $i'''$, having an air-port $i''''$ passing through its center. Within the stem and the enlarged head is located a plunger $J$, having a contact-head $j$ at its upper end adapted to reciprocate within the tubular stem, and said contact-head is normally upwardly projected and held in contact with a cross-rod $j'$, which connects the two arms of the yoke on the lever and is adapted to bear at all times against the contact-head, and said contact-head may be depressed against the tension of a spring $j''$, which surrounds an enlarged stem $j'''$ on the end of the plunger and bears against a collar $j'$, which collar in turn bears a rubber or leather washer $j''$, which surrounds the plunger and is adapted to seat against the ledge or shoulder $e'$ and prevent the passage of air into the hollow stem. The air-passage within the tubular stem communicates with the recessed air-chamber in the end of the plug $I$ through a slot or opening $j''''$ in the wall of the tubular stem, and the plug $1$ is provided with an upwardly-extending passage $k$, which passage connects with a longitudinally-extending passage $K$ in the wall of the casing, which latter passage opens into the chamber $b'$, whence the air is discharged around the tube $d$ as it passes through the annular flange $e''$. The air then enters the tapered recess in the cap and is discharged therefrom around the tapered end $d''$ of the tube $d$ and through the discharge-aperture $e''$ in the end of the cap.

In use the ink is supplied to the ink-receptacle and the brush is connected with a suitable source of compressed-air supply, after which the device is ready for use. The thumb-screw $f'''$ may then be adjusted to limit the return movement of the lever, after which the operator presses the contact-piece on the lever to open the valve regulating the air-supply, which allows the air to pass through the air-passages hitherto described and be discharged from the orifice in the closing-cap. The ink or pigment may then be admitted by forwardly moving the lever, which slides forward the sleeve and connected parts, thereby...
providing an opening around the tapered point of the needle, and said opening will be of greater or less extent, depending upon the forward thrust of the lever. The movement is one which will not vibrate or displace the needle-point, but said needle-point will remain stationary and perfectly centered at all times, and the sleeve and tube can be reciprocated upon the needle, increasing or decreasing the size of the opening to increase or decrease the amount of ink discharged therethrough to change the character of the line produced thereby. By mounting the sleeve in the manner indicated it will be firmly supported by the walls of the casing and allowed to reciprocate therein without imparting any vibratory movement whatever to the tip of the needle, which is a feature of great importance in the art to which the present invention relates.

By projecting the stem thereof, the sleeve beyond the air-supply valve and by decreasing the bore of the stem so as to closely contact the needle the danger of leakage of ink is reduced to a minimum, and the parts are so arranged that if any leakage does occur the ink will flow down into the space beyond the air-valve and not flow therethrough or injure the parts thereof contained. By providing the needle with a screw-threaded stem at its rear end the forward projection of the needle can be varied or regulated, if desired, so as to increase or decrease the maximum opening around the needle-point, thereby enabling the air-brush to be regulated to perform the character of work required.

It will be seen from the foregoing description that the device is simple in construction and yet so arranged that the parts may be so adjusted as to meet the requirements of every character of work and that the parts are so arranged that the ink will be discharged perfectly at all times without vibration or fluttering and that the arrangement of parts is such that the brush may be easily disassembled for the purpose of regulating, cleansing, or repair.

What I claim as new, and desire to secure by Letters Patent, is:

1. In an air-brush, the combination of a needle rigidly mounted, a movable sleeve surrounding the needle and provided at its forward end with a discharge-opening, a casing surrounding the sleeve and provided with an air-passage therethrough, means for supplying air to the air-passage, and means for reciprocating the sleeve to enlarge or diminish the space around the needle, substantially as described.

2. In an air-brush, the combination of a casing provided with an air-passage, a discharge-opening for the casing, a needle rigidly mounted to have its point in line with the discharge-opening, a sleeve surrounding the needle and slidably mounted within the casing, an ink-supply passage through the sleeve for discharging ink around the rigidly-mounted needle, means for supplying air to the air-passage, and means for reciprocating the sleeve, substantially as described.

3. In an air-brush, the combination of a casing provided with an air-passage, a discharge-opening for the casing, a needle rigidly mounted to have its point in line with the discharge-opening, a sleeve surrounding the needle and slidably mounted within the casing, an ink-supply passage through the sleeve for discharging ink around the rigidly-mounted needle, a valve regulating the supply of air, to the air-passage, and a lever adapted to reciprocate the sleeve and control the air-supply valve, substantially as described.

4. In an air-brush, the combination of a casing provided on its forward end with a cap having therein a discharge-opening, a needle rigidly mounted within the casing, an air-supply passage leading through the casing to the discharge-opening, a sleeve surrounding the needle and slidably mounted within the casing and provided with an ink-supply passage adapted to discharge ink around the point of the needle, a stem on the rear end of the sleeve, a lever adapted to bear against the stem and reciprocate the sleeve and means for supplying air to the air-passage in the casing, substantially as described.

5. In an air-brush, the combination of a casing provided on its forward end with a cap having a discharge-opening and provided with an air-supply passage leading to the discharge-opening, a needle rigidly mounted within the casing in line with the discharge-opening, a sleeve slidably mounted within the casing and surrounding the needle, a tube on the sleeve provided with a discharge-opening around the point of the needle, an ink-supply passage through the tube, an ink-receptacle carried by the sleeve, means for reciprocating the sleeve, and means for supplying air to the air-passage in the casing, substantially as described.

6. In an air-brush, the combination of a casing provided on its forward end with a cap having a discharge-opening and provided with an air-supply passage leading to the discharge-opening, a needle rigidly mounted within the casing in line with the discharge-opening, a sleeve slidably mounted within the casing and surrounding the needle, a tube on the sleeve provided with a discharge-opening around the point of the needle, an ink-supply passage through the tube, an ink-receptacle carried by the sleeve, an air-supply valve communicating with the passage in the casing, and a lever adapted to press against and regulate the air-supply valve and adapted to reciprocate the sleeve, substantially as described.

7. In an air-brush, the combination of a casing provided with a discharge-opening and provided with an air-passage leading thereto, a needle rigidly mounted within the casing.
a sleeve slidably mounted within the casing and surrounding the needle and provided on its forward end with a tube through which the point of the needle projects, an ink-supply passage through the sleeve and tube adapted to discharge ink around the point of the needle, an ink-receptacle carried by the sleeve and adapted to reciprocate therewith, a stem on the rear end of the sleeve, a lever provided on its inner end with a yoke adapted to straddle the stem and reciprocate the sleeve, a mounting for the yoke adapting the lever to be swung and moved up and down, and an air-supply valve adapted to be opened by the depression of the lever for supplying air to the air-passage in the sleeve, substantially as described.

8. In an air-brush, the combination of a casing provided on its forward end with a cap having therein a discharge-opening, an air-passage leading to the discharge-opening, a needle rigidly held within the casing and provided on its rear end with an adjustable stem, a sleeve surrounding the needle and slidably mounted within the casing and provided with an ink-passage adapted to discharge around the point of the needle when the sleeve is in projected position, a spring adapted to retract the sleeve, and a lever adapted to advance the sleeve, substantially as described.

9. In an air-brush, the combination of a casing provided on its forward end with a cap having therein a discharge-opening, an air-passage leading to the discharge-opening, a needle rigidly held within the casing and provided on its rear end with an adjustable stem, a sleeve surrounding the needle and slidably mounted within the casing and provided with an ink-passage adapted to discharge around the point of the needle when the sleeve is in projected position, a spring adapted to retract the sleeve, a valve member mounted on the plunger and adapted to depress the plunger and project the sleeve for regulating the air and ink supply passages, substantially as described.

10. In an air-brush, the combination of a casing provided on its forward end with a cap having therein a discharge-opening, an air-passage leading to the discharge-opening, a needle rigidly held within the casing, a sleeve surrounding the needle and slidably mounted within the casing and provided with an ink-passage adapted to discharge around the point of the needle when the sleeve is in projected position, a spring adapted to retract the sleeve, a valve member carried by the plunger and adapted to regulate the passage in the plug, and a lever adapted to depress the plunger and project the sleeve for regulating the air and ink supply passages, substantially as described.

Witnesses:

William P. Bond,
Samuel W. Banning.