O. C. WOLD.

AIR BRUSH.

APPLICATION FILED APR. 7, 1908.

910,341. Patented Jan. 19, 1909.

Fig. 1.

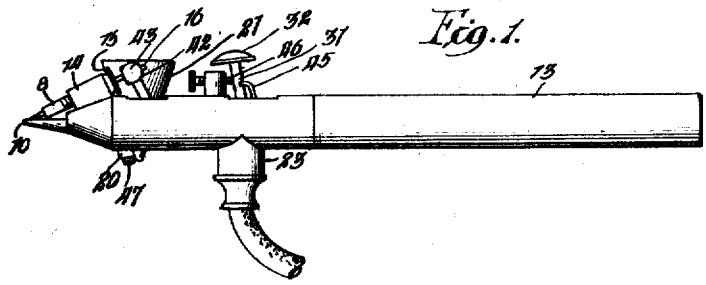


Fig. 2.

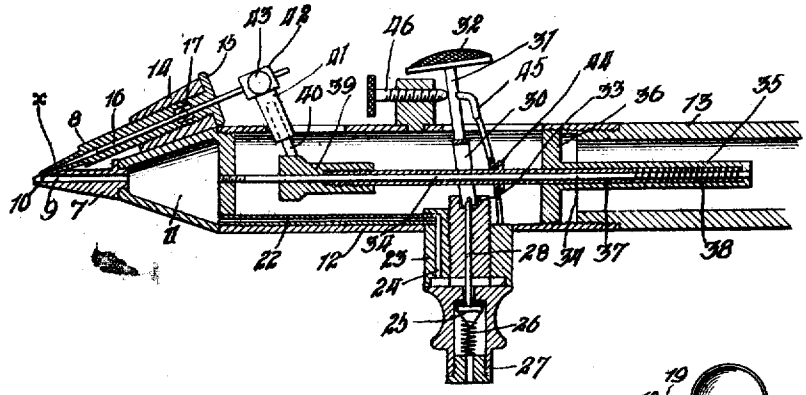


Fig. 3.

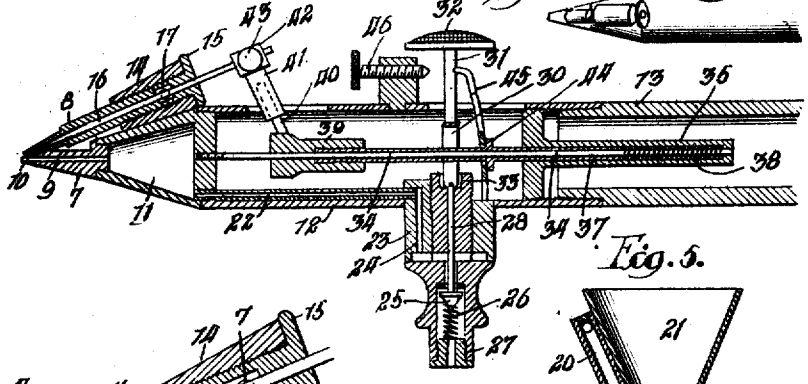


Fig. a.

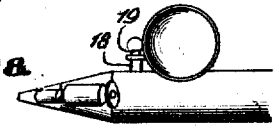


Fig. 4.

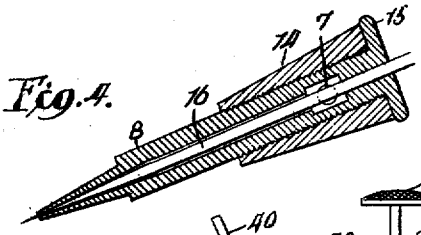


Fig. 5.

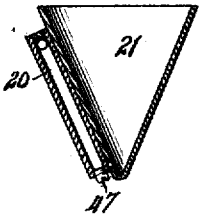


Fig. 6.

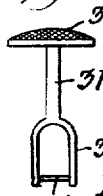
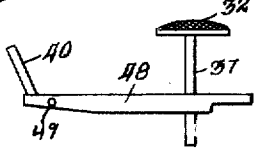


Fig. 7.



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UNITED STATES PATENT OFFICE.

OLAUS C. WOLD, OF CHICAGO, ILLINOIS.

AIR-BRUSH.

No. 910,341. Specification of Letters Patent. Patented Jan. 19, 1909.

Application filed April 7, 1908. Serial No. 425,748.

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.

The present invention is in the form of a small instrument, resembling a pencil or fountain pen in size and shape, which, like a pen, is adapted to be held in the hand and manipulated by the fingers to atomize and distribute paint or pigment over the intended surface, either in the form of a fine line or a spray; and the objects of the present invention are, to simplify the construction and arrangement of the operating mechanism and to locate the ink distributing mechanism at such a point that the ink cannot possibly clog the air discharge orifice nor leak back into the mechanism controlling the movement of the needle valve; to so construct and mount the operating mechanism that it will operate freely and perfectly under the action of the finger lever and in a manner to permit perfect manipulation while held in working position; to simplify the action of the needle valve and obviate the necessity for using spring mechanism located at a point where the ink is likely to corrode it; and to improve generally the construction and arrangement of the several devices constituting the air brush as a whole.

In numerous prior constructions air brushes have had the ink and air nozzles concentric and the ink has been atomized by being sucked out of the center ink nozzle by a surrounding blast of air discharged through an annular opening around the ink nozzle. The present invention departs from this principle of operation in that the nozzles converge together at the front end of the brush and are not concentric at all, the ink nozzle delivering ink at a point where it will be blown forwardly therefrom by a blast of air delivered from behind the nozzle and in alinement with the end thereof. These results are obtained without impairing the balance of the instrument when held between the thumb and first finger of the hand and without impairing its ease and perfection of manipulation. This mode of distribution insures a clean, perfect, and uniform discharge of ink without the possibility of clogging, spattering or bubbling, which are likely to occur in the use of air brushes having concentric nozzles.

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

In the drawings, Figure 1 is a side elevation of the air brush; Fig. 2 a longitudinal sectional elevation showing both of the valves closed; Fig. 3 a similar view showing both of the valves open; Fig. 4 an enlarged detail of the ink discharge nozzle and needle valve; Fig. 5 a sectional view of the ink cup; Fig. 6 a detail showing the stirrup for operating the air valve; and Fig. 7 a modified form of operating lever.

The brush comprises, essentially, an air nozzle 7 and an ink nozzle 8 set in oblique relation and converging toward one another at their forward ends. The air nozzle is in the form of a tapered nipple provided in its center with an air passage 9, and the upper face of the nipple is channeled or cut away sufficiently to allow the tip of the ink nozzle 8 to extend diagonally through the wall of the nipple so that its extreme point occupies a position in alinement with the air discharge passage 9. The tip 10 of the nipple serves as a trough or channel for directing the travel of the ink after it is discharged from the ink nozzle, although the air is released behind the extreme tip of the ink nozzle and at the point X where such nozzle breaks through the upper wall of the nipple. The nipple is screw threaded into the forward end of a conical hollow plug 11, the interior of which provides an air chamber for storing up and equalizing the distribution of air, which hollow plug is screw threaded into a cylindrical shell 12 into the end of which is entered a handle 13 of vulcanite or other suitable material.

The ink nozzle 8 is in the form of a screw threaded sleeve or tube tapered at its forward end to provide a very fine opening, which sleeve or tube is screw threaded through a socket 14 braced or otherwise rigidly secured to the top of the tapered plug; and the sleeve or tube terminates, at its rear end, in a milled head 15 whereby it can be adjusted. The ink nozzle has entered therethrough a needle valve 16 which is adapted to regulate the discharge of ink admitted through an opening 17, which opening communicates with an intake passage 18 laterally extending from the side of the socket 14, into the end of which is en-

tered a tube 19 which extends inwardly from a tube 20 secured to the forward side of a conical ink cup 21 which occupies a position behind the intake passage 18 and in close proximity to the side of the shell or casing. The air chamber 11 has entered thereinto the end of an air supply pipe 22, the rear end of which is entered into a plug 23 which depends from the shell 12. The plug has formed therein an air passage 24, the intake end of which is controlled by a valve 25 bearing against a spring 26. The plug terminates in a nipple 27 adapted to have a rubber hose attached thereto. The valve 25 has upwardly extending therefrom a stem 28 upon which rests the cross pin 29 of a stirrup 30, which stirrup has upwardly extending therefrom a finger lever 31 terminating in a finger button 32 which is preferably milled or roughened. The cross pin of the stirrup works within a slot 33 formed in the upper end of the plug 23, into which slot or recess the end of the stem 28 normally projects.

The plug 11 has screw threaded thereinto the forward end of a guide rod 34, the rear end of which is entered through a socket sleeve 35 having at its forward end a disk shaped head 36 screw threaded into the end of the shell 12. The sleeve 35 has entered thereinto the rear end of a reciprocating tube 37 which rides upon the guide rod and bears against a spring 38 located within the socket sleeve 35. The reciprocating tube has screw threaded to its forward end a head 39 from which extends a finger 40 in a line at right angles to the needle valve 16, and the finger 40 is slidably entered into the end of a socket arm 41 having a head 42 through which the end of the needle valve is entered, being held therein by means of a small thumb screw 43. The reciprocating sleeve is entered through the stirrup 30 and has located thereon, immediately behind the stirrup, an abutment 44 against which bears a bifurcated lever 45, the lower end of which straddles the reciprocating sleeve and the upper end of which bears against the finger lever 31 and is held in slidable contact therewith by the action of the spring 38. The movement of the finger lever can be limited by means of a thumb screw 46 located forwardly of the finger lever. In order to permit cleaning of the ink cup tube 20 the latter is provided, at its lower end, with a screw plug 47 which permits the insertion into the tube of a suitable instrument adapted to clean out the same in case of clogging.

In operation, ink is poured into the cup 21 and a blast of air supplied to the rubber hose from a suitable source of supply for compressed air. The operator preferably holds the brush in the hand in the manner of a pencil with the index finger upon the finger button of the lever. By depressing the lever the cross pin of the stirrup will bear down upon the stem of the air valve, thereby opening said valve for the admission of compressed air which will pass through the pipe 22 into the air chamber 11, whence it will be discharged from the tapered nipple forming the air nozzle. By moving back the finger lever the sleeve 37 will be retracted, drawing back the pin 40, which in turn retracts the socket arm 41 into which the pin is slidably entered. This retracts the needle and opens the ink nozzle to the desired degree, thereby supplying ink from the ink cup, which ink will be blown or driven off the tip of the ink nozzle by the current of air directed against it. Since the tip of the ink nozzle is in the direct path of travel of the current of air the latter will be utilized to a greater extent than is possible in constructions in which the ink is sucked out of the ink nozzle by the action of a surrounding current of air, and at the same time the action of the air will be more uniform and certain than is ordinarily the case in previous constructions of the class referred to. The operating parts being all located inside of the shell and to the rear of the ink nozzle no difficulty will be experienced by reason of the ink spattering or working back into the operating mechanism and clogging the same. Furthermore, the operating mechanism being all carried by the guide rod can be readily positioned in or removed from the casing. Another difficulty incident to the employment of concentric nozzles is due to the fact that unless the latter are adjusted with extreme exactness the air pressure, instead of carrying ink forward, will find its way back, at least in part, through the ink nozzle and, instead of blowing the ink forward and atomizing it, will block the discharge of ink and possibly back into the ink receptacle. By locating the nozzles in oblique relation with one another this danger will be entirely obviated, even though the nozzles be mal-adjusted to a very considerable extent. The arrangement is one which permits the needle valve to be removed without disassembling any of the other parts of the brush and permits the ink nozzles to be thereafter cleaned without the slightest difficulty; and the location of the ink nozzle and the method of discharging the ink obviate the necessity for cleaning the air passages at all, which is frequently necessary in brushes of the old style previously referred to.

Although the invention has been described with considerable particularity as to detail, it is obvious that the mechanical means provided for regulating the discharge of ink and air can be changed or modified to a considerable extent without departing from the spirit of the invention. For instance, in place of the finger lever hung for two movements, like that previously described, a finger lever 48 can be employed which is pivoted to the

casing at the point by means of a pivot pin 49. A lever of this character has but a single swinging movement, the forward end of the lever engaging the socket arm 41 for actuating the needle, and the rear end of the lever engaging the stem of the air valve for opening the latter, whereby a single movement of the finger will serve to open both of the valves regulating the supply of ink and air.

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

1. In an air brush, the combination of an elongated handle having secured thereto a brush casing provided at its forward end with an air discharge nozzle forwardly projecting in alinement with the casing and provided with an air passage leading thereto, a tubular ink discharge nozzle mounted upon the forward end of the casing and extending in oblique relation to the air discharge nozzle and having its mouth in close proximity to the air discharge nozzle, an ink receptacle in communication with the ink discharge nozzle, a needle valve within the tubular ink discharge nozzle adapted to control the flow of ink therefrom by enlarging or diminishing the size of the annular opening around the needle, means under the control of the operator during the employment of the brush for controlling the ink discharge as above indicated, and an air valve for controlling the flow of air through the air passage, substantially as described.

2. In an air brush, the combination of an elongated pencil like handle having secured thereto a brush casing having at its forward end an air discharge nozzle and provided with an air passage leading thereto, a tubular ink discharge nozzle mounted upon the casing and extending in oblique relation to the air discharge nozzle and having its mouth in close proximity to the air discharge nozzle, an ink receptacle in communication with the ink discharge nozzle, a needle for controlling the flow of ink from the ink discharge nozzle, an air valve for controlling the flow of air through the air passage, and a finger lever pivoted within the casing and adapted to actuate the needle and the air valve, substantially as described.

3. In an air brush, the combination of an elongated pencil like handle having secured thereto a brush casing having at its forward end an air discharge nozzle provided with an air passage leading thereto, a tubular ink discharge nozzle in oblique relation to the air discharge nozzle and terminating in line with the discharge therefrom, an ink receptacle in communication with the ink discharge nozzle, a needle valve within the tubular ink discharge nozzle, a socket arm connected with the needle and depending therefrom into the casing, a reciprocating member engaging the socket arm, an air valve, and a lever having two movements, one movement adapted to control the air valve and the other movement adapted to move the reciprocating member for regulating the position of the needle valve, substantially as described.

4. In an air brush, the combination of a brush casing having at its forward end an air discharge nozzle provided with an air passage leading thereto, a tubular ink discharge nozzle in oblique relation to the air discharge nozzle and terminating in line with the discharge therefrom, an ink receptacle in communication with the ink discharge nozzle, a needle valve within the tubular ink discharge nozzle, a socket arm connected with the needle and depending therefrom into the casing, a reciprocating member engaging the socket arm, an air valve, and a lever mounted to have an up and down movement adapted to actuate the air valve and having a fore and aft movement adapted to move the reciprocating member for actuating the needle valve, substantially as described.

5. In an air brush, the combination of a brush casing having at its forward end an air discharge nozzle provided with an air passage leading thereto, a tubular ink discharge nozzle in oblique relation to the air discharge nozzle and terminating in line with the discharge therefrom, an ink receptacle in communication with the ink discharge nozzle, a needle valve within the tubular ink discharge nozzle, a socket arm connected with the needle and depending therefrom into the casing, a reciprocating member engaging the socket arm, an air valve, a finger lever having a bifurcated lower end which bears against the air valve, and a secondary lever actuated by the finger lever and engaging the reciprocating member for imparting a fore and aft movement thereto when the finger lever is swung back and forth, substantially as described.

6. In an air brush, the combination of a brush casing having at its forward end an air discharge nozzle provided with an air passage leading thereto, a tubular ink discharge nozzle in coöperative relation to the air discharge nozzle, an ink receptacle in communication with the ink discharge nozzle, a needle for controlling the flow of ink from the ink discharge nozzle, a guide rod, a sleeve slidably mounted upon the guide rod and connected with the needle, a spring bearing against the rear end of the sleeve, an air valve controlling the flow of air through the air passage, a bifurcated finger lever bearing against the upper end of the air valve and adapted to actuate the same by an up and down movement, and a secondary lever engaging the reciprocating sleeve and adapted to be actuated by a fore and aft movement of the finger lever, substantially as described.

7. In an air brush, the combination of an

elongated pencil like handle having secured thereto a brush casing having at its forward end a contracted air discharge nozzle and an enlarged air reservoir to the rear of the nozzle, an air passage leading to the air reservoir, an air valve controlling the flow of air to said passage, an ink nozzle set in oblique relation to the air discharge nozzle and terminating in line with the discharge therefrom, a needle valve within the ink discharge nozzle, an ink receptacle in communication therewith, and means for actuating the air valve and the needle valve, substantially as described.

8. In an air brush, the combination of a brush casing having at its forward end a contracted air discharge nozzle and an enlarged air reservoir to the rear of the nozzle, an air passage leading to the air reservoir, an air valve controlling the flow of air to said passage, an ink nozzle set in oblique relation to the air discharge nozzle and terminating in line with the discharge therefrom, a needle valve within the ink discharge nozzle, an ink receptacle in communication therewith, a guide rod extending longitudinally within the casing, a reciprocating sleeve mounted upon the guide rod, a finger connected with and upwardly projecting from the sleeve in transverse relation to the needle valve, a socket arm connected with the needle valve into which the end of the finger is slidably entered, a spring bearing against the reciprocating sleeve, a finger lever adapted to actuate the air valve by an up and down movement, and a secondary lever bearing against the finger lever and engaging the reciprocating sleeve for imparting a fore and aft movement to the latter when the finger lever is swung back and forth, substantially as described.

9. In an air brush, the combination of an air discharge nozzle channeled or recessed on one side, an ink discharge nozzle in oblique relation to the discharge air nozzle and having its tip entered through the channeled or recessed portion of the air discharge nozzle and terminating in line with the discharge orifice thereof, a needle valve within the ink discharge nozzle, an ink receptacle communicating with the ink discharge nozzle, an air passage leading to the air discharge nozzle, and means for regulating the flow of ink and air to the respective nozzles, substantially as described.

10. In an air brush, the combination of an air discharge nozzle channeled or recessed on one side, an ink discharge nozzle in oblique relation to the air discharge nozzle and having its tip entered through the channeled or recessed portion of the air discharge nozzle and terminating in line with the discharge orifice thereof, a needle valve within the ink discharge nozzle, an ink receptacle provided with a supply pipe on its forward side terminating in a tube extending inwardly at right angles to the end of the pipe and in communication with the ink discharge nozzle, and means for regulating the position of the needle valve and regulating the air supply, substantially as described.

11. In an air brush, the combination of an air discharge nozzle, an ink discharge nozzle in oblique relation to the air discharge nozzle and having its tip in line with the discharge therefrom, a needle valve within the ink discharge nozzle, an ink receptacle provided with a supply pipe on its forward side terminating in a tube extending inwardly at right angles to the end of the pipe and in communication with the ink discharge nozzle, and means for regulating the position of the needle valve and regulating the air supply, substantially as described.

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