No. 797,315. PATENTED AUG. 15, 1905.

J. A. PAASCHE.

AIR BRUSH.

APPLICATION FILED JAN. 27, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

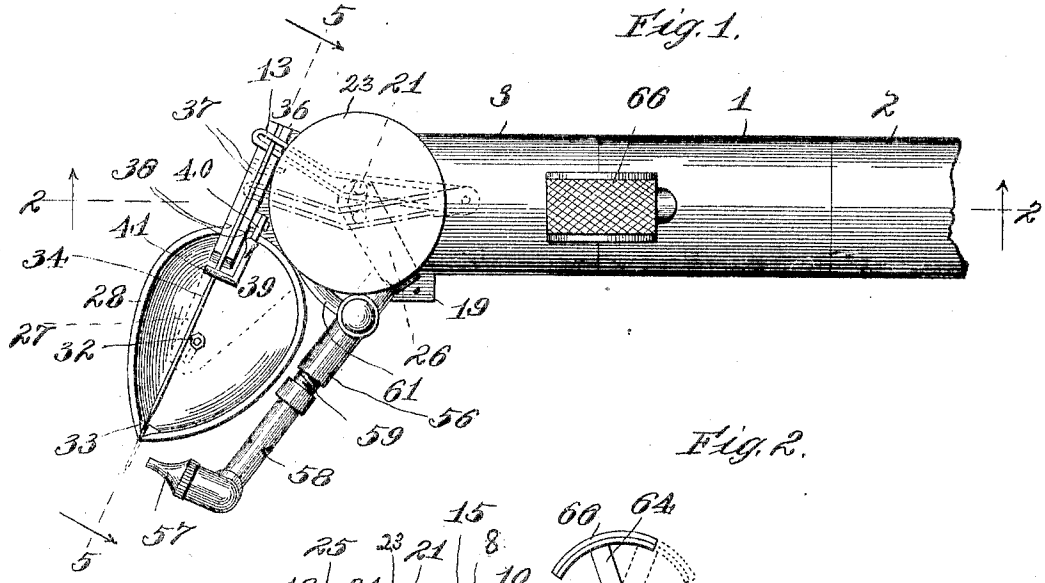



Fig. 2.

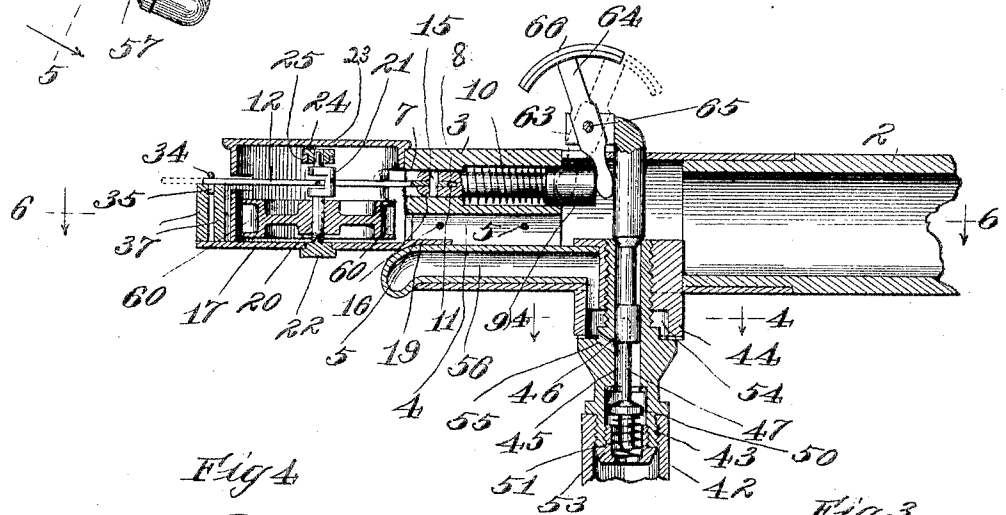



Fig 4

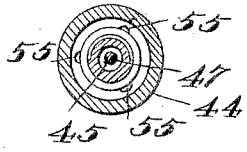
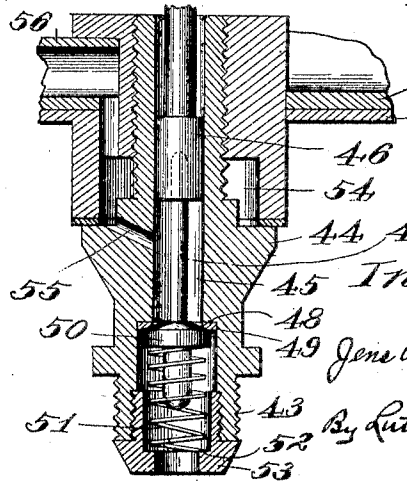



Fig. 3.




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2 SHEETS—SHEET 2.

Fig. 5.

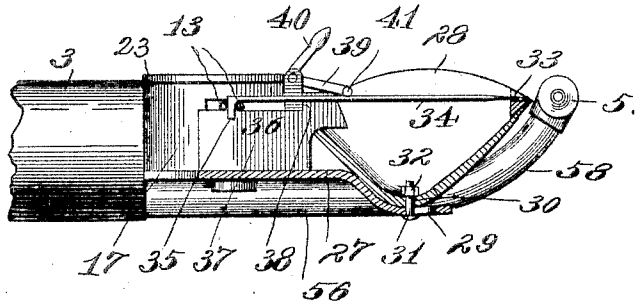



Fig. 6.

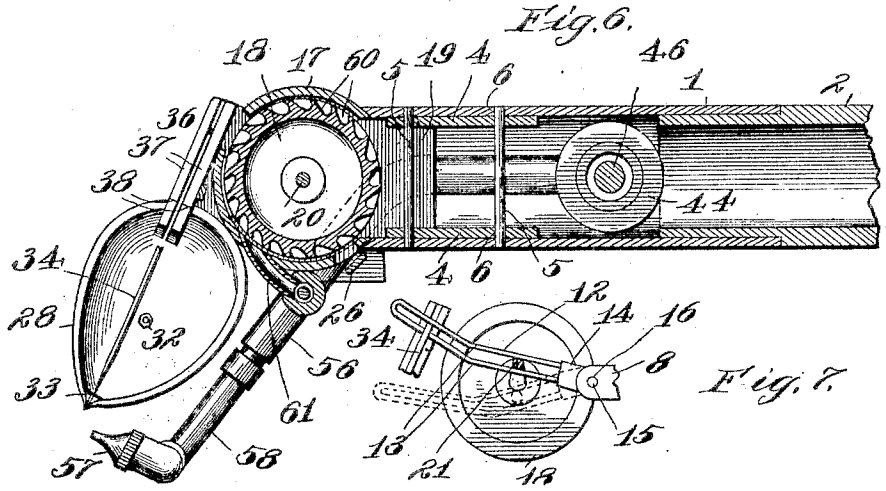



Fig. 7.

Fig. 9.

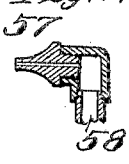
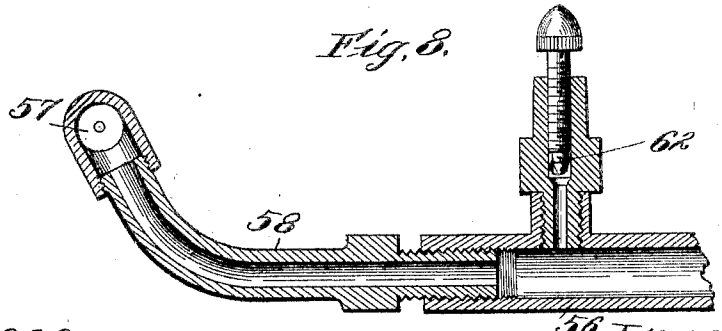



Fig. 8.




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# UNITED STATES PATENT OFFICE.

JENS A. PAASCHE, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO OLOF G. PAASCHE, OF ELGIN, ILLINOIS.

## AIR-BRUSH.

No. 797,315. Specification of Letters Patent. Patented Aug. 15, 1905.

Application filed January 27, 1905. Serial No 242,926.

*To all whom it may concern:*

Be it known that I, JENS A. PAASCHE, 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.

This invention relates to air-brushes, and has for its object the simplification of the air-brush by remodeling its form and reducing the number of its parts, producing a brush so proportioned as to be easily held and manipulated and to permit the work to be visible during its operation, a brush that is considerably lighter in weight, more durable, more delicate in its action, and one that spreads ink more rapidly and evenly than brushes heretofore made.

The invention further refers to an improved means for regulating the reciprocatory vibration of the needle; further, to a means for steadying the action of said needle to prevent lateral springing thereof, which springing causes an uneven distribution of the pigment; also, to a means for providing a jewel-bearing for the forward end of said needle.

The invention further refers to an improved air-valve for the pressure-air supply, also to a means for regulating the flow of air to the wind-wheel.

The invention further refers to an improved form of wind-wheel, to the means for supporting said wheel in its casing, and to a means for providing a removable cover for the wheel-casing.

The invention further refers to a means for adjusting the pigment-spoon with relation to the body of the air-brush, also to various improvements in detail hereinafter more fully brought out.

In the accompanying drawings, Figure 1 is a top plan view of an air-brush embodying the features of my invention, the needle-arm being shown in dotted lines at the extremity of each stroke. Fig. 2 is a longitudinal section through the brush, taken on dotted line 2 2 of Fig. 1. Fig. 3 is an enlarged section through the air-valve shown in Fig. 2. Fig. 4 is a transverse section through the air-valve on dotted line 4 4 of Fig. 2. Fig. 5 is a transverse diagonal section on dotted line 5 5 of Fig. 1. Fig. 6 is a horizontal section on dotted line 6 6 of Fig. 2. Fig. 7 is a detail view of the wind-wheel, the crank, and the needle-arm, showing the latter in its opposite positions. Fig. 8 is a diagonal section on dotted line 8 8 of Fig. 6. Fig. 9 is an enlarged detail sectional view taken through the air-discharge nozzle.

In the construction of an air-brush embodying the features of this invention I provide a tubular portion 1, the rear end of which is provided with a handle 2. At its forward end the upper half of the body portion is cut away and a semicylindrical block 3 put in place of said cut-away portion. This semicylindrical block is secured with relation to the tubular body portion by means of two side flanges 4, lying within the walls of the body portion 1 and held in position by means of pins 5, extending through coinciding openings 6 in said flanges 4 and said walls. The semicylindrical block 3 is provided with a longitudinal opening 7, counterbored at its rear end for about one-half the length of the block. A spring-plunger 8 is adapted to lie within the opening 7, its enlarged rear end 9 fitting within the counterbored portion of said opening, and a coiled spring 10, surrounding the plunger 8, tends to hold said plunger rearward. In the forward end of the plunger 8 is a transverse opening 11 for receiving the inner end of the needle-arm 12. This needle-arm is of skeleton form and is bent at an angle about midway of its length. It comprises a wire 13, doubled to form two side bars, said side bars extending almost parallel with each other and being secured in any suitable manner, as by solder, to a pivot-block 14. This block is adapted to lie within the opening 11 of the plunger 8, a pivot-pin 15 extending through suitable openings 16 in said block and plunger.

A cylindrical casing 17 for the wind-wheel 18 is secured at the forward end of the tubular body portion 1 by means of an ear 19, projecting within and secured at its side edges to the walls of said tubular body portion. The ear 19 is cut away at its side edges to receive the securing-flanges 14 of the semicylindrical block 3. The side wall of the casing 17 closes the forward end of the body portion 1.

The wind-wheel 18 is supported upon a crank-shaft 20, cupped at its lower end and having a crank 21 near its upper end. The bottom of the casing 17 is provided with a bearing-screw 22, having a central cone pro-

jection for entering the cupped lower end of the shaft 20. A removable cap 23 closes the wheel-casing 17. The upper end of the shaft 20 finds a bearing in a sleeve 24, screwed into an opening 25 in the arbor 26, secured in any suitable manner to the ear 19. An arm 27 for supporting the pigment-spoon 28 extends diagonally forward from the casing 17, said arm being formed integral with the lower wall of said casing. The forward end of the arm 27 is provided with an elongated opening 29, through which opening and an opening 30 in the lower side of the spoon a screw 31 is adapted to pass, said screw entering a threaded block or nut 32 in the lower part of the bowl of the spoon. This securing means permits an adjustment of the spoon toward and from the casing 17. The forward side of the spoon is pointed and is fitted with a jewel-bearing 33 for the needle 34. Said needle has a downturned rear end 35, adapted to lie between the side bars of the needle-arm 12. Forward of the wheel-casing 17 and at the rear edge of the spoon is a needle-guide 36, secured in any suitable way to the casing 17 and comprising two side walls 37, slightly spaced apart. Near its forward end the needle-guide 36 has stop-shoulders 38 to limit the forward movement of the needle-arm 12. The downturned rear end 35 of the needle 34 lies between the sides 37 of the needle-guide. At its side the needle-guide 36 supports a pivotal needle-retaining arm 39, having an integral upwardly-extending operating-lever 40 and an offset portion 41 for overlying the needle. The needle-retaining arm 39 is pivoted tightly to said needle-guide 36, its free movement being prevented by the friction in its pivotal bearing.

The air-pressure supply for the operation of the brush is conducted to the brush by means of the usual flexible pipe 42, which pipe is connected with the brush at the nipple 43. This nipple 43 forms the lower end of the valve-casing 44, the upper end of which has a screw-thread connection with the body portion 1. Within the casing 44 is a vertical opening 45 for receiving an operating-plunger 46, having a cupped lower end in which the upper end of the valve-stem 47 is adapted to lie. A valve-seat 48 is provided with the usual rubber or other suitable packing-ring 49. A valve-closure 50, formed rigid with the valve-stem 47, is arranged to be held upward in contact with the packing-ring 49 by means of a coiled spring 51, the lower end of which is seated upon a shoulder 52, formed in a sleeve 53, said sleeve having a screw-thread connection with the lower end of the nipple 43. The valve-casing 44 has an air-chamber 54, with which the central opening of said valve-casing is in communication by means of ports 55. An air-tube 56, lying within and extending longitudinally of the body portion 1, communicates with said air-chamber 54, said tube extending diagonally outward from the forward end of the tubular body portion and lying beside the pigment-spoon 28. Near its forward end said tube is bent upwardly and is provided with a nozzle 57, projecting inwardly toward the point of said spoon. The length of the air-tube 56 is adjustable, the forward portion 58 thereof having a screw-thread connection 59 with the rear portion of said tube. The nozzle 57 also has a screw-thread connection with the forward portion of the tube to provide an adjustment toward and from the point of the spoon. By means of these screw-thread connections the forward end of the air-tube 56 may be adjusted so that the air-blast discharged from the nozzle will have any desired direction. The wind-wheel 18 is driven by air introduced from the air-tube 56 into the wind-wheel casing 17 in line with the peripheral pockets 60 of said wheel by means of a duct 61, a valve 62 in said duct regulating the flow of air to the wheel.

At its upper end the operating-plunger 46 is bent forward at a right angle and is bifurcated to form two ears 63, between which an operating-lever 64 is pivotally mounted upon a pin 65, projecting through said ears. The lower end of the lever 64 is somewhat of spherical form and is adapted to contact the rear end of the spring-plunger 8. The upper end of said lever carries a curved roughened finger-piece 66, upon which the forefinger of the operator is intended to be placed. By a forward and backward movement of the operating-lever 64 the distance between the pivot 15 of the needle-arm 12 and the connection of said needle-arm with the crank 21 is varied, thereby changing the amplitude of oscillation of said needle-arm, and consequently the extent of reciprocatory movement of the needle 34. The valve 50 is opened and closed by an up-and-down movement of the operating-lever 66 to regulate the volume of air supplied to the brush.

In use the brush is grasped by the operator in the same manner as a pen is held, the forefinger of the grasping-hand resting upon the roughened finger-piece. The quantity of pigment discharged by the brush is regulated by oscillating the lever 64. The quantity of air admitted to the brush is regulated by depressing said lever 66, depressing the closure from the packing-ring 54. The conformation of the brush is such that the line or shading being formed is visible to the operator. The adjustability of the pigment-spoon permits said spoon to be moved with relation to the movement of the needle. The nozzle 57 is adjustable with relation to the spoon by means of its screw-thread connection with the portion 58 of the air-tube 56.

I have described with some particularity the various parts of my device; but it is obvious that the constructions described and

shown may be considerably modified without departing from the spirit and scope of my invention, wherefore I do not wish to limit myself to the precise devices and constructions herein set forth.

I claim as my invention—

1. In an air-brush, in combination, a pivoted needle-arm; a crank for pivotally moving said needle-arm; means for moving the pivotal center of said needle-arm toward and from said crank to vary the extent of the pivotal movement of said arm; a needle-guide; and a needle adapted to be moved by said needle-arm.

2. In an air-brush, in combination, a slidable supporting member; a needle-arm pivotally connected with said supporting member; means for pivotally moving said needle-arm; means for moving said needle-arm-supporting member toward and from said means for pivotally moving said needle-arm; a needle-guide; a needle adapted to be moved by said needle-arm; a pigment-receptacle; a bearing on said receptacle for the forward end of said needle; and an adjustable device for retaining the needle in position.

3. In an air-brush, in combination, a reciprocatory needle; a pigment-receptacle adjustably movable in the line of movement of said needle; an air-tube extensible in length; and a nozzle for said air-tube adjustable on said air-tube toward and from said pigment-receptacle.

4. In an air-brush, in combination, a valve-casing; an air-valve in said casing; a plunger for operating said air-valve; a spring tending to close said air-valve and lift said plunger; a finger-lever for depressing said plunger to open said air-valve; a pigment-feeding needle; means for reciprocating said feeding-needle; and means adapted to be operated by said finger-lever for varying the extent of reciprocation of said needle.

5. In an air-brush, in combination, a body portion; a handle therefor; a needle slidably supported by said body portion; means, carried by said body portion, adapted to be continuously actuated, for reciprocating said needle; a pigment-receptacle located forward of said actuating means; and an air-tube adapted to direct an air-blast to a point forward of said pigment-receptacle, in the general direction of the length of said body portion and said handle.

6. In an air-brush, in combination, a body portion; a handle therefor; a needle slidably supported by said body portion; a crank rotatably mounted in said body portion for reciprocating said needle; a wind-wheel carried by said body portion for actuating said crank; a pigment-receptacle located forward of said wind-wheel; and an air-tube adapted to direct an air-blast to a point forward of said pigment-receptacle in the general direction of the length of said body portion and said handle.

7. In an air-brush, in combination, a needle; a pivoted arm for moving said needle; a wind-wheel for pivotally moving said arm; an air-valve; a plunger for operating said air-valve; a spring tending to close said air-valve and lift said plunger; a finger-lever for depressing said plunger to open said air-valve; and means adapted to be operated by said finger-lever for moving the pivotal center of said needle toward and from said wind-wheel.

8. In an air-brush, in combination, a needle-arm bent at an angle between its ends; means for pivotally mounting said needle-arm at one of its ends; a crank having a sliding engagement with one of the angular portions of said needle-arm; a needle having a sliding engagement with the other angular portion of said needle-arm; means for rotating said crank; means for shifting the pivotal center of said needle-arm; and a stationary guide for said needle.

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