Nov. 4, 1930. W. C. BEACH 1,780,738

SPRAY NOZZLE

Filed March 30, 1927

Fig. 1.

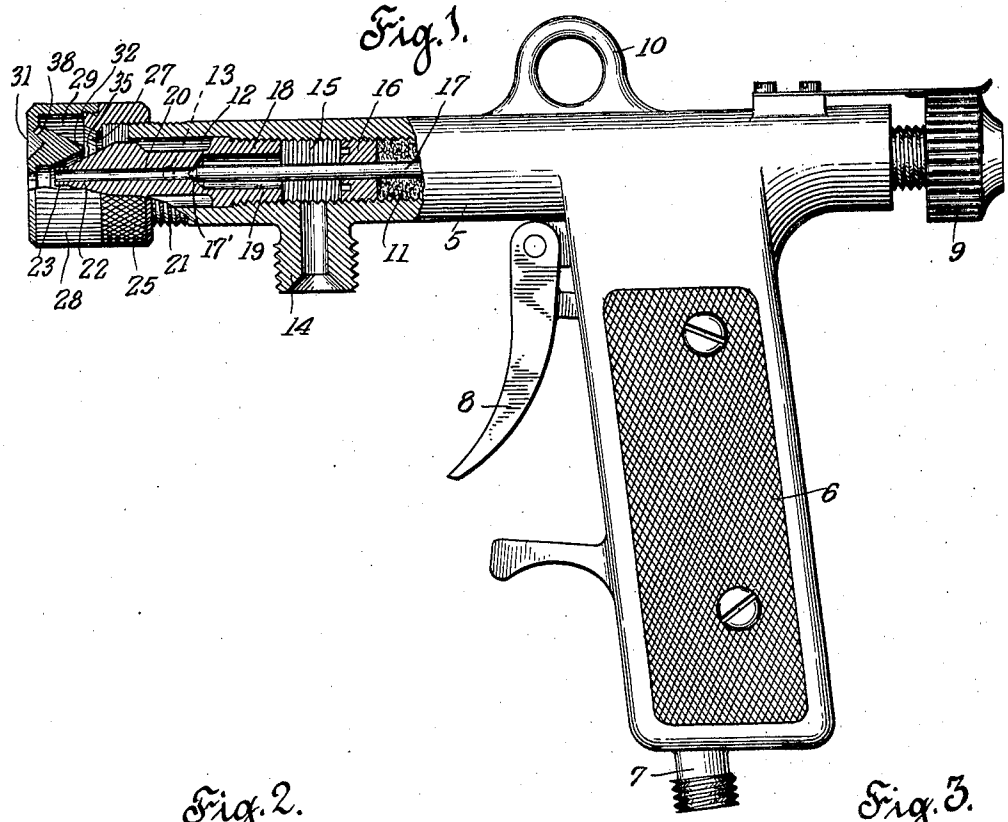


Fig. 2.

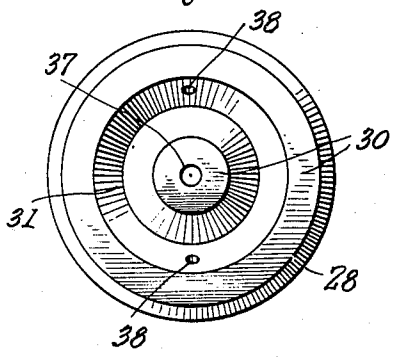
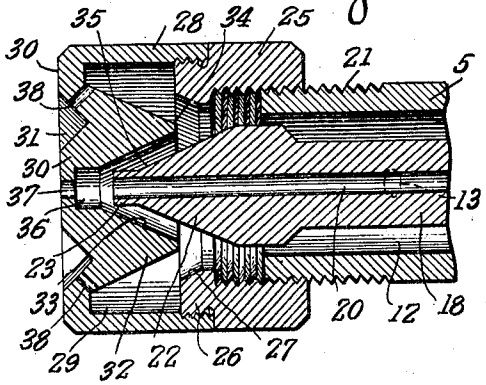


Fig. 3.



INVENTOR.

Willard C. Beach

BY

Leslie C. Fischer

ATTORNEY

Patented Nov. 4, 1930 1,780,738

UNITED STATES PATENT OFFICE

WILLARD C. BEACH, OF NEWARK, NEW JERSEY

SPRAY NOZZLE

Application filed March 30, 1927. Serial No. 179,428.

This invention relates to spray nozzles, by which term is included any device used in directing the effluent of apparatus used in delivering a stream of fluid or semi-fluid material in connection with air or gases under pressure whereby a fine jet or spray is produced, and more particularly to air brushes for distributing paints and like material.

Ordinary types of spray nozzles, whether of single central delivery or paired angular jets, are easily clogged with the paint or other semi-viscid material passed through them, necessitating frequent change of nozzles and consequent loss of production, to the extent that an experienced operator usually keeps a can of solvent at hand to soak out accumulations from dirty, plugged nozzles in order to have a convenient supply of clean nozzles for substitution.

It is therefore one of the objects of this invention to provide a nozzle capable of performing all the functions of any known nozzle and which is substantially free from becoming clogged due to its peculiar construction.

A further feature is in the provision of a nozzle that distributes the material in an elongated rectangular field rather than a circle as is common and by the use of which uneven distribution, as light and dark spots or voids, called holidays, are avoided.

Another purpose is to produce a spray nozzle that is adjustable to suit the fluidity and nature of the material, whether thick and viscid, or thin and free flowing, thus serving all reasonable requirements.

These important advantages are accomplished by the novel design construction and combination of simple parts hereinafter described and shown in the annexed drawing, forming a material part of this disclosure, and in which:—

Figure 1 is a side elevational view of a conventional type of air brush head, partially in section and illustrating the application of the invention.

Figure 2 is an enlarged front elevational view of the spray nozzle.

Figure 3 is a longitudinal sectional view taken on the center line thereof.

The paint gun or air brush head shown in Figure 1 is of a well known type consisting of a barrel 5 having a hilt or pistol grip 6 provided with an inlet 7 for compressed air, the same being delivered to the barrel by actuation of a valve controlled by a trigger 8.

The valve is adjusted by a screw device 9 at the outer end of the barrel 5, which may be supported partially or wholly by the ring 10, the air passing through a filter 11 to a side extension containing a port 13 and then delivered to an annular chamber 12 in the front part of the barrel which is provided with external screw threads 21 as shown.

The paint or other material to be sprayed enters an orifice in a lug 14 extending downward from the barrel to pass into a threaded bore 15 in which is an adjustable guide 16 for a valve rod 17, controlled by the trigger 8.

Set in the forward end of the barrel is a valve body 18 having a conical seat at the inner end of its recess 19 against which the valve 17′ may engage thus controlling a straight axial passage 20 through the valve body.

The body 18 is reduced in diameter near the end of the chamber 12 and the outer portion 22 of the valve body is tapered conically, terminating in a cylindrical tip 23.

With the exception of the valve body all of the described parts are of old and well known construction, being given only for the purpose of illustrating the invention, a description of which now follows:

Adjustably engaged on the barrel threads 21 is an externally knurled hollow annulus 25 having a reduced threaded forward portion 26 and containing a conical bore 27 leading to the interiorly threaded portion, the larger diameter of the bore being outward or away from the barrel and in open communication with the air chamber 12.

Screwed tight on the threads 26 is the smooth surfaced outer element 28 of the nozzle, the same containing an annular air equalizing chamber 29 open to the bore 27 and having an integrally closed front end wall 30 in which is formed a circular groove 31 of triangular cross section, the sharp angled bottom of which is deeper than the thickness of

the front wall 30 at its juncture with the cylindrical portion.

Extending inwardly from the wall 30 is a truncated conical projection or guard 32, its inner end terminating in a plane coincident with the adjacent end of the element 26.

Within the projection 32 is a conical bore 33 producing, in connection with the wall of the truncated cone 32, a substantially sharp edge 34 disposed essentially midway between the wall of the bore 27 and outer surface of the conical element 22 of the valve body, the conicity of which and that of the bore 33 being alike so that a uniform annular space 35 exists between them.

At the apex of the conical bore 33 is a short cylindrical recess 36 acting as an atomizing chamber slightly larger than the valve body tip 23 and leading to this recess is an axial perforation or discharge port 37 in register with the valve controlled passage 20 in the body 18.

At two opposite points in the element 28 are port perforations or fan jets 38 reaching through the outer wall of the angular recess 31 to the annular chamber 29, close to the wall 30, the diameter of these perforations being less than half their length, or thickness of the material through which they are formed.

It will now be understood that the course of compressed air is through the chamber 12 to the conical bore 27, thence to be diverted by the edge 34 partially into the chamber 29 and out of the perforations 38, and partially into the space 35 to mix with the effluent passing out of the passage 20 to be delivered outward of the nozzle through the perforation 37.

It is also to be noted that the chamber 29 is more than double the capacity of the space 35 therefore delivering powerful air streams through the fan jet ports 38 which, striking the effluent from the central jet port 37, causes it to spread fan-wise in an effective manner, this jet being under approximately half the pressure of the jets 38, which pressure can be varied by adjusting the nozzle on the barrel.

Due to the air pressure in the several annular chambers, none of the material being sprayed is permitted to enter and by reason also of the pressure clogging is avoided.

From the foregoing it will be seen that a simple device for this purpose has been disclosed in the preferred form of its embodiment, but it is not desired to restrict the details to the exact instruction shown, it being obvious that changes, not involving the exercise of invention, may be made without conflicting with the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A spray nozzle comprising a two part body, one of said parts having means to engage the barrel of a spray gun and containing an annular recess bevelled outwardly at its outer edge, the other part being connected to the first part and containing an annular air equalizing chamber, a conical guard on the last named part entering the chamber, said guard containing an inverted conical cavity presenting a thin annular edge midway the mentioned bevelled recess, a mixing chamber at the bottom of said cavity, a port leading outwardly from the mixing chamber, an angularly walled annular recess in the face of the second part, and two ports disposed diametrically opposite to lead from the outer wall of the recess to the air equalizing chamber.

2. A spray nozzle adapted for attachment to a spray gun having a barrel and a hollow conical extension therebeyond, said nozzle comprising a hollow annulus adjustably threaded on the end of said barrel to receive compressed air therefrom, a cap fixed to the end of said annulus, said cap having an air chamber, a conical guard extending from the inner face of said cap into the chamber, said guard having a reversed conical bore spaced from the conical extension of the gun, the space and chamber receiving air from the barrel, a mixing chamber at the apex of the conical bore, a port leading outwardly from the mixing chamber in register with the axis of said hollow conical extension, and a pair of inclined opposed ports leading through the face of said cap from the compressed air chamber, said paired ports being disposed to intercept effluent from the central port.

3. In a spray nozzle, a two part body, one of said parts having means to engage the barrel of a spray gun and containing an annular recess bevelled outwardly at its outer edge, the other part being connected to the first part and containing an annular air equalizing chamber, a conical guard on the last named part entering the chamber, said guard containing an inverted conical cavity, and a mixing chamber at the bottom of said cavity, said mixing chamber having a port leading outwardly therefrom.

4. In a spray nozzle. a hollow annulus adapted to be threaded on the end of the barrel of a spray gun to receive compressed air therefrom, a cap fixed to the end of said annulus, said cap having an air chamber, a conical guard extending from the inner face of said cap into the chamber, said guard having a reversed conical bore, and a mixing chamber at the apex of the conical bore, said mixing chamber having a port leading outwardly therefrom.

This specification signed and witnessed this 23rd day of March, 1927.

WILLARD C. BEACH.