Dec. 30, 1924. 1,520,820

J. L. ISAACS

NOZZLE

Filed Aug. 20, 1921

Fig. 1.

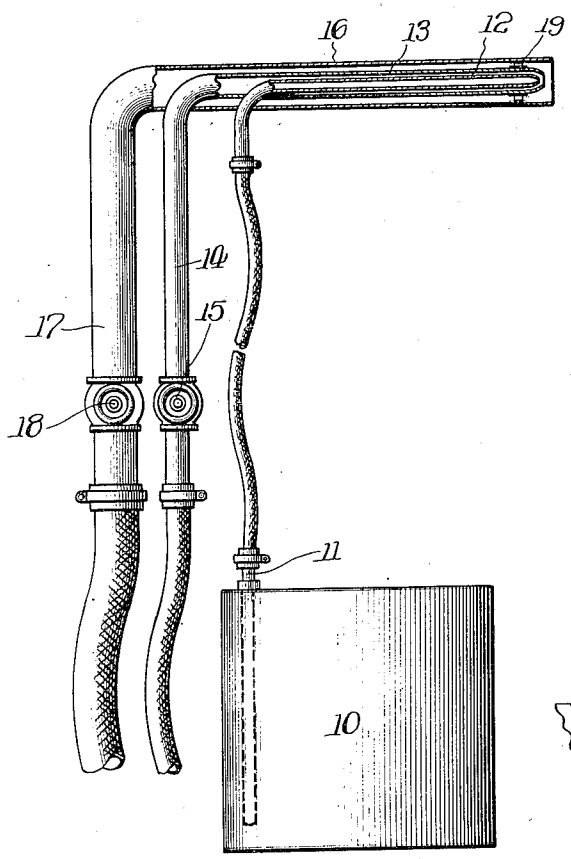


Fig. 4.

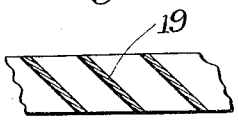


Fig. 2.

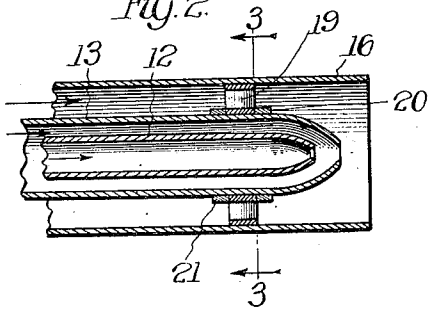
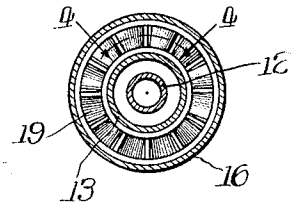


Fig. 3.



Witness:
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UNITED STATES PATENT OFFICE.

JOEL L. ISAACS, OF MILWAUKEE, WISCONSIN.

NOZZLE.

Application filed August 20, 1921. Serial No. 493,927.

To all whom it may concern:

Be it known that I, JOEL L. ISAACS, a citizen of the United States, and resident of the city of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Nozzles, of which the following is a specification.

My invention pertains to features of novelty and improvement, both structural and functional, in nozzles and similar discharge appliances, employed for various purposes, such as those used for the application of paint or varnish in the form of a spray, those employed for the projection of flames or "liquid fire", those used as burners in furnaces and elsewhere, and in many other relations.

The leading aim and prior purpose of the present invention is to equip or supply the nozzle with means for delivering or discharging a tube of air, gas or liquid around and enclosing another fluid or fluids projecting from the nozzle, whereby such surrounding, more or less intangible, traveling tube or hollow body confines the internal spray and prevents its undue spreading or dispersion.

Thus this supplemental feature of construction of the nozzle delivers a restraining, encasing, fluid tubing which overcomes or materially reduces the tendency of the internal spray to detrimentally expand or become dissipated, thereby enabling a more precise and exact delivery of the contents from the nozzles to the place required.

In my earlier Patent No. 1,219,642, sprayer, issued March 20, 1917, I fully disclosed and claimed a structure of this general type designed especially, but not restrictedly, for the spraying of articles of furniture with paint or varnish, but, of course, adapted also for many other satisfactory and effective uses.

The invention at hand constitutes an improvement of the nozzle therein presented and aims to make more efficient the function of the surrounding layer of air or other gas or liquid for performing its confining and restraining action on the encased spray delivered from the nozzle.

To enable those schooled in this art to have a full and complete understanding of the present invention and its various benefits and advantages, a desirable embodiment of the same is illustrated in the accompanying drawing, forming a part of this specification, and throughout the several views of which like reference characters refer to the same parts.

In this drawing:

Figure 1 illustrates the new nozzle in section and shows its several connections in elevation;

Figure 2 is an enlarged, fragmentary, vertical section of the end portion of the nozzle;

Figure 3 is a vertical cross-section on line 3—3 of Figure 2, the parts being viewed in the direction indicated by the arrows; and

Figure 4 is a fragmentary, enlarged section on the curved line 4—4 of Figure 3.

Referring to the drawing, it will be perceived that the appliance includes a chamber or tank 10 adapted to contain any fluid such as varnish, paint, hydrocarbon fuel, etc., designed to be discharged in the form of a spray through the nozzle.

Such compartment is provided with a tube 11 extended into the chamber to a point near its bottom so that it will always be substantially immersed in the fluid or liquid therein, the tube at its upper end being connected to the inner pipe or spout 12 of the nozzle which is surrounded by or encased in an intermediate pipe or tube 13, spaced radially away from the inner pipe and connected by a pipe or hose 14 to any suitable source of fluid under pressure, such as compressed-air, not illustrated.

Such intermediate nozzle 13, which, as well as the inner one, may be tapered at its discharge end if desired, has a control valve 15 in its connection 14, whereby the flow or discharge of compressed-air or other fluid may be easily regulated or governed.

These two concentric nozzles 12 and 13, forming a duplex structure, may be of the usual or any suitable form, it being merely necessary for the compressed-air passing through the nozzle 13 to draw up the liquid in the chamber 10 and discharge the same through its nozzle in the usual way forming a suitable spray so that such liquid is finely subdivided and delivered from the nozzle under pressure in such condition.

This compound nozzle, atomizer, or ejector 12—13 is surrounded by a third nozzle or discharge appliance 16 connected by an appropriate hose or pipe 17 to a source of compressed-air or other fluid or liquid under pressure, preferably, but not necessarily, of

greater pressure than that in the connection 14.

Such outer nozzle or discharge device is also equipped with a control-valve 18.

Near the discharge end of this triplex nozzle, I provide a fan 19 with oblique inclined vanes rotatable either on the exterior of the nozzle 13 or on the interior of the nozzle 16, or on both, such fan being confined against longitudinal or axial movement by a pair of collars 20 and 21 located on opposite sides thereof and secured to the outside of nozzle 13.

The purpose of this fan is to provide a resistance to the discharge of the compressed fluid through the annular passage between the nozzles 13 and 16, it having been found that an unobstructed passage at this point in some cases requires too great a pressure exerted on the fluid to cause its discharge in a manner proper to confine and restrict the sprayed or atomized liquid and to prevent its dispersion and dissipation.

By the employment of such a fan or an equivalent structure a resistance to the flow of the fluid is provided so that no difficulty is encountered in subjecting such fluid to a proper pressure for an efficient performance of its function as it issues from the nozzle.

It will be appreciated that the rapidly revolving jets or blasts of air issuing from the nozzle between the blades or vanes of the fan provide a surrounding layer or annular stratum of air or other fluid in such a manner as to adequately limit, circumscribe, or bound the spread or dispersion of the inner spray, whereby the latter may be directed to the exact position desired without loss through dissipation.

The valves 15 and 18 give full control of the operation of the appliance since they govern respectively the operation of the spray and the actuation of the spray constraining and restricting medium.

This invention is not limited to the precise and exact details of construction shown and described, since many minor mechanical changes may be incorporated therein without departure from the essence of the invention and without the sacrifice of any of its material and practical benefits and advantages. The invention is not restricted to the use of any particular gases, fluids, liquids or solids since the improved nozzle is susceptible of a variety of employments in many arts.

I claim:

1. In an appliance of the character described, the combination of a nozzle having means for delivering a discharge under pressure, a pipe surrounding and spaced from said nozzle, and movable means between and adapted to restrict and direct a fluid flow under pressure through the passage between said nozzle and said pipe.

2. In an appliance of the character described, the combination of a nozzle having means for delivering a discharge under pressure, a pipe surrounding and spaced from said nozzle, and rotary means between and adapted to restrict the flow of fluid through the passage between said nozzle and pipe.

3. In an appliance of the character described, the combination of the nozzle for delivering a discharge under pressure, a pipe surrounding and spaced from said nozzle, and a rotary fan in and adapted to restrict the flow of fluid through the passage between said nozzle and said pipe.

JOEL L. ISAACS.