

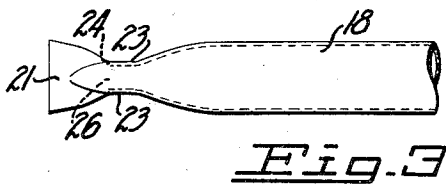
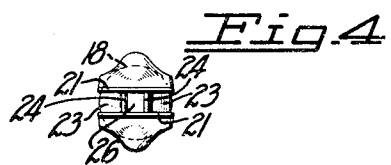
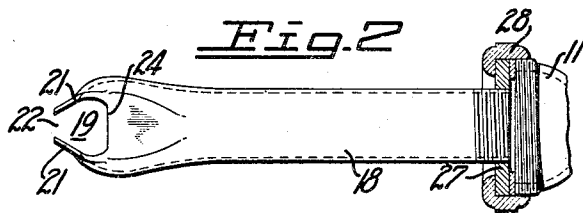
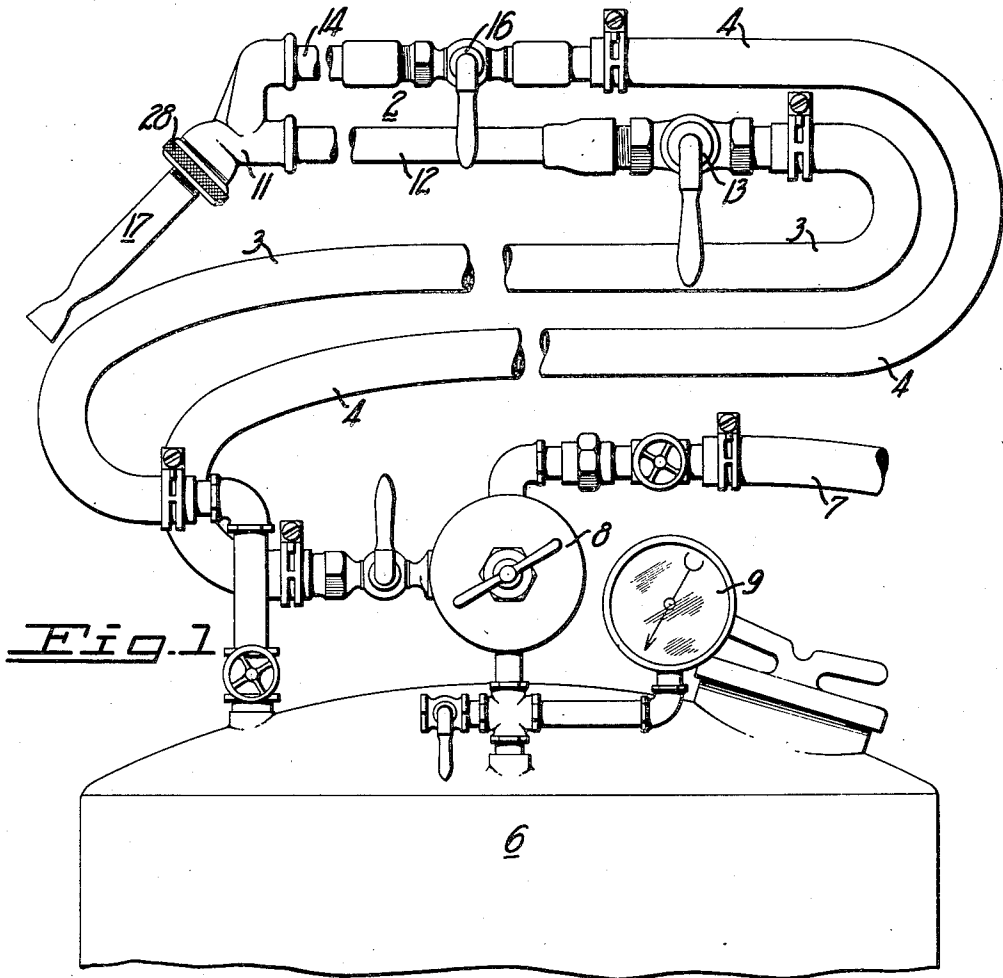
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APPARATUS FOR SPRAYING MATERIALS

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APPARATUS FOR SPRAYING MATERIALS

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3 Claims. (Cl. 299—153)

My invention relates to a spray gun for applying coatings of viscous materials, and more particularly to the spray nozzle of such a gun.

It is among the objects of my invention to provide apparatus for applying spray coats of low viscosity materials, such as the asphaltic coating compounds used on roofs.

Another object of my invention is to provide a means for applying a coating compound containing fibrous material, so that the fibres are uniformly distributed throughout the applied coating.

Still another object of my invention is to provide apparatus of the character described which will readily convert a stream of low viscosity material into a spray sheet having the uniform fan-shaped flow desired in application of spray coatings.

Another object of my invention is to accomplish the above named objects by means of an improved spray gun nozzle.

A further object of my invention is to provide a nozzle of the character described which will pass the spray material without clogging, even though the material has a low viscosity and contains a comparatively large proportion of fibre.

A still further object of my invention is to provide a nozzle of the character described which is simple in its construction, yet positive and fool-proof in its action.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of my invention. It is to be understood that I do not limit myself to this disclosure of species of my invention, as I may adopt variant embodiments thereof within the scope of the claims.

Referring to the drawing:

Figure 1 is a side elevational view showing the apparatus for spraying materials embodying my invention; portions of the several connecting ducts being omitted to shorten the view.

Figure 2 is a side view, partly in section and partly in elevation, showing the spray nozzle and its mounting.

Figure 3 is an elevational view showing another side of the nozzle; and

Figure 4 is an end view of the same.

In terms of broad inclusion, the apparatus embodying my invention includes a spray gun preferably comprising a mixing chamber having a duct opening therein and communicating with a supply of the material or liquid to be sprayed; this liquid being under pressure. A second duct

is also provided opening into the chamber and communicates with a source of air pressure. A spray nozzle is provided and is also connected with the mixing chamber. This nozzle embodies the improvements of my invention and preferably comprises a tube having a tip portion restricted to provide an elongated orifice and having opposed lip portions extending outwardly and inwardly over the orifice; the forward edges of the lips being spaced to provide an elongated restricted opening positioned adjacent to and crosswise of the orifice.

In greater detail, and referring particularly to Figure 1, the apparatus for spraying materials embodying my invention includes a spray gun 2 connected by means of the flexible hoses 3 and 4 with the spray liquid supply tank 6 and with a flexible hose 7 communicating with a suitable source of air under pressure. The source of air pressure is not shown, but may conveniently be a compressor mounted on a truck. The air hose 7 is preferably connected directly to the hose 4 leading to the gun, and is connected to the tank 6 through the reducing valve 8, so that the air in the tank may be maintained at a lower pressure than that supplied to the gun. A gauge 9 is preferably provided for indicating the pressure on the spray liquid in the tank.

The gun hose 3 communicates directly with the liquid in the tank 6, and is connected with the mixing chamber 11 of the gun through a rigid pipe or duct 12; a valve 13 being preferably included in this connection for regulating the amount of spray liquid admitted to the mixing chamber. The air hose 4 also opens into the chamber 11, and is connected therewith through a rigid pipe or duct 14; a valve 16 also being preferably included in this connection for regulating the amount of compressed air admitted to the mixing chamber.

As shown in Figure 1, the compressed air is directed into the chamber 11 so that it is injected at substantially right angles into the incoming stream of liquid. This arrangement results in a violent agitation of the liquid as it is driven hard toward the head end of the mixing chamber and into the spray nozzle 17. The nozzle is preferably connected with the chamber 11 so that it extends in the direction of the resultant flow of the mixed fluids.

The details of the nozzle and its mounting are best shown in Figures 2 to 4. The preferred form of nozzle comprises a tube 18, preferably cylindrical in shape, having a rectangularly-shaped recess 19 cut in its tipped end. The opposed lips 21 pro-

vided on the tube by the formation of the recess are flattened out to provide plane surfaces and are bent inwardly with their forward edges spaced to provide an elongated restricted opening 22. By this construction a pair of opposed inclined planes are provided with their converging edges spaced to form a restricted opening over the end of the tube. The side portions 23 of the tube adjacent the base edges 24 of the recess are flattened to provide an elongated restricted orifice 26 at the discharge end of the tube. It is to be noted that the elongated opening 22 defined by the forward edges of the lips 21 is positioned crosswise of the elongated orifice 26. This is probably best shown in Figure 4.

Referring particularly to Figure 2, the tube 18 of the nozzle is threaded into a base plate 27 which seats over the open head end of the mixing chamber 11 and is held in place by a threaded collar 28. This removable mounting gives ready access to the interior of the mixing chamber for purposes of cleaning, and also provides means for attaching nozzles having differently proportioned tip constructions. That is, for different types of liquid to be sprayed it is often desirable to use nozzles having different sizes of restricted passages. For example, a spray liquid having a very low viscosity would ordinarily require a larger orifice 26 and opening 22 than would a lighter fluid.

A clear understanding of the invention will be gained in the following description of the operation of my apparatus. In practice the air hose 7 is preferably connected with a compressor adapted to develop an air pressure of from 100 to 125 pounds per square inch. Considering that the gun valves 13 and 16 are closed and that the material to be sprayed has been placed in the tank 6, the reducing valve 8 is preferably adjusted to maintain a pressure of from 75 to 100 pounds per square inch in the tank. The apparatus is now ready for applying the material.

A workman operates the gun by grasping the pipes 12 and 14 and the hose connections 3 and 4 so that the nozzle 17 extends to a point where the spray fluid is to be applied. In the drawing sections of the pipes 12 and 14 are removed to shorten the view, but in the actual construction these pipes are preferably of considerable length, say about four feet, to enable an operator to work in the standing position. When spraying is to commence the operator opens the valves 13 and 16. This action admits the liquid and compressed air into the mixing chamber 11. The intersecting streams of liquid and air result in a violent agitation within the mixing chamber and cause the fluid mixture to be driven hard toward the head end of the chamber. The condition of turbulence in the mixing chamber operates to thoroughly break up the material to be sprayed.

At the head end of the chamber the spray mixture passes into the tube 18 and travels rapidly toward the tip end of the nozzle. When the fluid reaches the tip it is forced through the restricted orifice 26 in the form of a sheet. This flow is immediately altered however as the fluid strikes the inner surfaces of the lips or baffles 21, and is abruptly changed into a flow moving in substantially the same direction but changed in form to a sheet disposed at substantially right angles to the sheet flow issuing from the orifice 26. The flow or spray issuing from the opening 22 is fan-shaped and uniform and is well adapted for applying the material on the surface to be coated.

The spray gun of my invention is capable of

handling a material having a viscosity which is much lower than that usually handled by spray guns. This is due largely to the improved method in which the nozzle of my invention operates. I have found that the low viscosity fluids, such as the fibrous matted asphaltic compounds used on roofs, may be sprayed without difficulty by the use of my gun. The long asbestos fibres used in the roofing compounds are thoroughly broken up by the turbulent action in the mixing chamber and pass readily through the gun without clogging the nozzle.

These types of compounds have previously been mopped or squeegeed in place, but these methods of application were faulty in that they tended to roll up the fibres and concentrate them on certain areas of the surface being coated. By the use of a spray gun this is avoided, and the compounds are laid down with the fibres uniformly distributed throughout the coating. Furthermore, the spray gun sets the material down hard in the place where it is to stay, with the result that the material stays in place with the fibres interlaced through the bituminous material as the spraying proceeds. Not only is the resulting coating a better one, but it is applied much more rapidly than the older methods of mopping.

While I have described a particular type of material for use in the apparatus of my invention, it is to be understood that any type of fluid may be applied with my spray gun. The particular value of my invention however lies in the fact that the improved action of my spray nozzle permits the gun to handle much heavier fluid than has heretofore been possible.

I claim:

1. A spray gun nozzle comprising a tube having a rectangularly-shaped recess cut in its tip end, the lips formed on the tube by the recess being flattened and bent inwardly with their forward edges spaced to provide an elongated restricted opening, and the sides of the tube adjacent the base of the recess being flattened to provide an elongated restricted orifice positioned crosswise of the elongated opening defined by the forward edges of the lips.

2. A spray gun nozzle comprising a tube having a recess in its tip end, the lips formed on the tube by the recess being flat and directed inwardly with their forward edges spaced to provide an elongated restricted opening for spreading the spray, the sides of the tube adjacent the rearward edges of the recess forming the side edges of an elongated orifice for the material to be sprayed, said orifice being positioned crosswise of the elongated opening defined by the forward edges of the lips.

3. A nozzle for spraying a high viscosity material, comprising a tube through which the material may be forced and having a portion adjacent its discharge end restricted to provide an elongated orifice for directing the material in a flattened stream, and a pair of opposed inclined planes positioned ahead of said orifice with their edges converging outwardly and spaced to provide an elongated opening crosswise of the orifice, so that the plane of the flattened stream is abruptly changed to a position at substantially right angles to its first position, the planes being openly spaced from said orifice to their converging edges to provide free access of air to the abruptly changing stream.

REUBEN M. STEPHENSON.