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METHOD OF APPLYING LACQUER OR THE LIKE

Filed April 27, 1929

Fig. 1

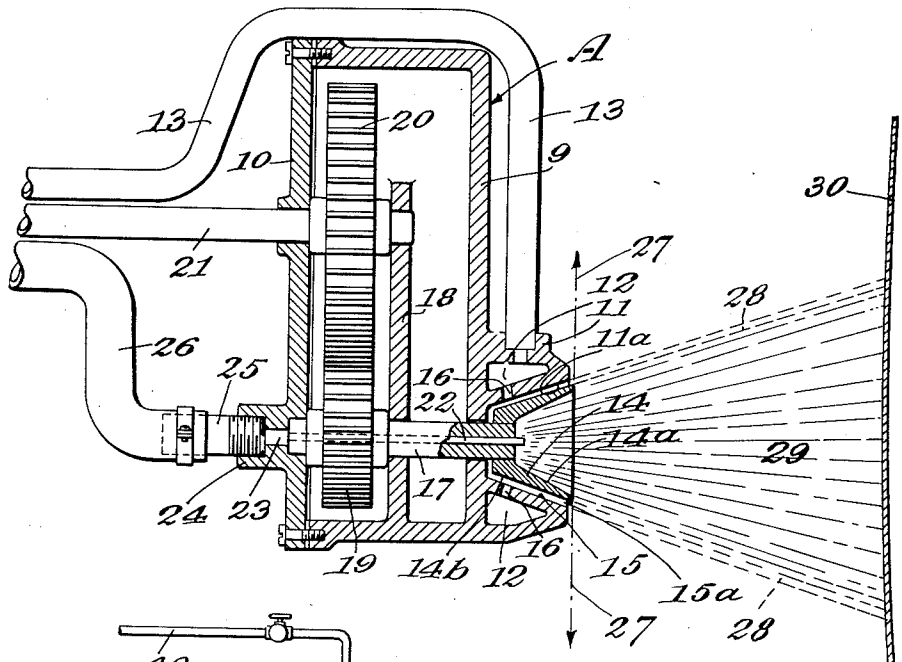
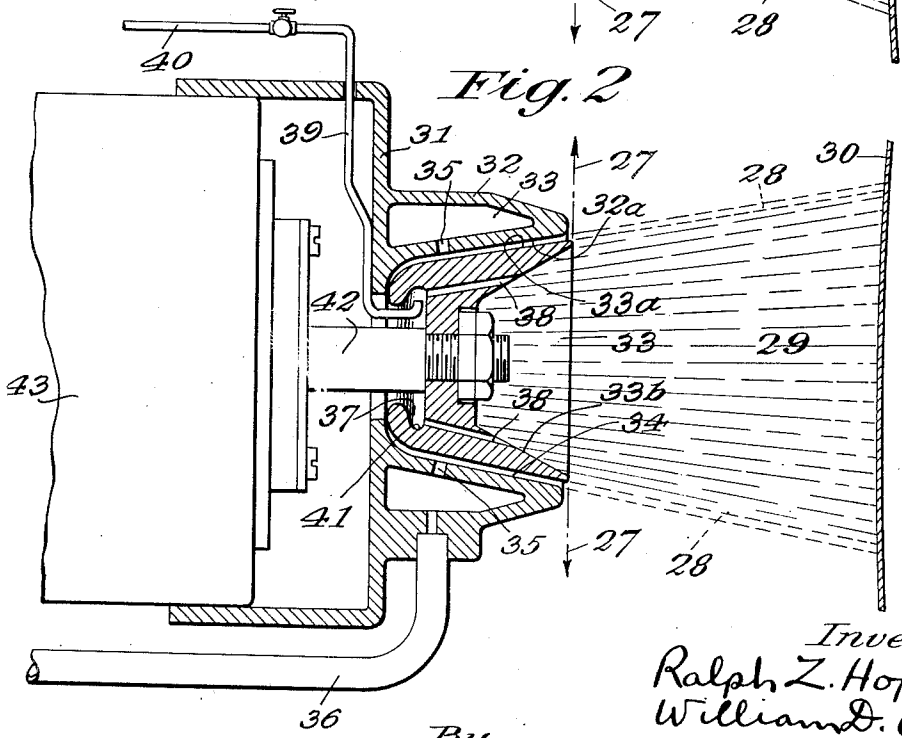


Fig. 2



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UNITED STATES PATENT OFFICE

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METHOD OF APPLYING LACQUER OR THE LIKE

Application filed April 27, 1929. Serial No. 358,564.

This invention relates to the art of so-called spray painting, and particularly to the atomization of paint or lacquer and its application to a surface to be coated, such as that of an automobile body.

Heretofore it has been customary, in applying paint to automobile bodies by spray devices, or so-called spray guns, to employ compressed air as a means for atomizing or reducing the paint into fine particles or comminuted condition and also as a carrying medium in spraying it on the surface of the body.

Upon general adoption of the so-called spray gun for spray-painting automobile bodies, resulting in large economies due largely to the speeding up of this work, compressed air was used to considerable advantage as a combined atomizing and carrying medium, enabling the paint to be properly directed in a finely divided mist.

The use of compressed air as an atomizing and carrying medium, however, has the disadvantage, particularly when employed in connection with the lacquer now extensively used, of producing what is called a "dry spray", and in causing "orange peel". Due to the fact that a great amount of air is in the spray, when compressed air is used, an entirely smooth and uniform surface cannot always be obtained, and frequently air cells or pockets are formed in or under the lacquer coating which eventually produces a peeling condition. Under present day conditions it is the practice to use to a considerable extent lacquers having a substantial percentage of volatile constituents or solvents which evaporate rapidly when exposed to the air. In using compressed air as an atomizing medium, and its consequent intimate admixture with the atomized liquid, this evaporation is very marked, causing what is termed a relatively dry spray. We have found that by eliminating the use of compressed air a much smoother coating is provided; the tendency to "orange peel" has been minimized very noticeably; and the evaporation of the lacquer before striking the surface to be painted is less pronounced, thereby enabling us to produce a wetter coating.

In accordance with the primary feature of the present invention, the liquid lacquer or the like is atomized mechanically, and without the direct action of compressed air thereon or its admixture therewith, as by subjecting it to the action of centrifugal force, and a spray of the atomized liquid is directed and deposited upon the surface to be covered. The spray thus produced mechanically, as by centrifugal action, or by means of a high pressure nozzle, and which therefore tends to fly in all directions, is, in accordance with another feature of the invention, so controlled and directed upon the work as to eliminate waste. This change in the normal direction of movement of the spray is preferably accomplished by projecting a hollow jet or stream of compressed air from the gun in the direction of the work and surrounding the spray, so as to form in a sense a sheath or envelope which encloses the spray and causes it to follow a certain course. The compressed air does not constitute an atomizing medium, nor does it even form a carrying medium in the usual sense, in that there is no intimate admixture thereof with the atomized lacquer, but is merely a guiding medium for the lacquer, and in use the compressed air has the further advantage of facilitating drying of the lacquer after it has been applied to the surface.

The invention will best be understood from the following description of the construction and operation of certain forms of apparatus by which it may be practiced, reference being had to the accompanying drawing in which:

Fig. 1 is a sectional view illustrating one form of spray gun or device operating in accordance with the invention.

Fig. 2 is a sectional view showing another form of spray gun by which the invention may be practiced.

The spray device is shown herein as of the portable type, commonly called a spray gun, and is constructed so that it can be readily handled by the workman at the job, such as in paint-spraying automobile bodies. It is important, therefore, in this connection that the gun be relatively small, light and

compact, and capable of being moved at will from point to point.

Referring to Fig. 1 the device may comprise a suitable casing A which may be in the form of a single casting providing a housing 9 and a removable back plate 10. The casting at one side thereof is preferably provided with a handle (not shown) to permit the workman to grasp the device. The casing 9 may be provided at the front face thereof with an integral projection or boss 11, the walls of which form a jacket enclosing an annular compressed air chamber 12. The outer wall of this member 11 is drilled and counterbored to receive the end of a flexible tube or pipe 13 which supplies air to the chamber 12 from a source of supply, such as a pump, which forces air under pressure through the flexible connection 13 into the chamber 12. The inner annular face 11*a* of the boss 11 is tapered to flare outwardly, this wall being preferably conical in shape.

Located within the conical chamber 11*a* is an atomizing cup 14, of which the outer wall 14*b* tapers outwardly and is parallel to the wall 11*a* and spaced therefrom to provide an air space 15 terminating in an annular discharge orifice 15*a* around the outer edge of the cup 14. The member 14 is chambered at 14*a* the walls of which preferably flare outwardly. The compressed air chamber 12 communicates with the passage 15 by means of a series of ducts 16. From this construction it will be seen that the compressed air in the chamber 12 will escape through the small ducts or ports 16 into the passage 15 which surrounds the atomizing device and which has a discharge orifice or outlet 15*a* preferably surrounding the discharge mouth of the atomizing cup 14.

The atomizing device 14 is carried at the end of a shaft 17 journalled in the rear wall 10 and an intermediate wall 18 of the casing. This shaft carries a small gear 19 in mesh with a large gear 20, the latter being carried by a shaft 21 journalled in the casing walls 10 and 18. The shaft 21 is a flexible shaft and is operated from a suitable electric motor so as to operate the gearing and drive the shaft 17 at high speed, such as about 10,000 R. P. M.

The shaft 17 is drilled centrally to receive a tube 22 which projects somewhat into the chamber 14*a* of the spray device 14. This tube extends entirely through the shaft 17 and communicates with a hole 23 drilled through a boss 24 projecting from the rear wall 10 of the casing. This boss is counterbored and tapped to receive a coupling member 25 to which is connected a flexible tube 26 for supplying the liquid lacquer.

In the operation of the device above described in accordance with the invention, the liquid lacquer may be force fed in the proper amount through pipe 26 whence it is fed centrally through the shaft 17 into the rotary cup 14. The inner wall 14*a* of the cup picks up the lacquer from the end of the tube 22. It will be seen that as the device 14 rotates at high speed the lacquer will travel outwardly along the flaring face 14*a* and will be discharged from the device in comminuted or atomized condition. The lacquer, or other liquid, will be discharged from the spray device in a fine mist or spray, and a part of this spray normally will be thrown outwardly and laterally in a direction shown by the arrow 27. The compressed air however issuing from the orifice 15*a* will form a sheath or wall substantially in the shape of a cone, as indicated at 28. This air sheath, while of such a form as not to cause substantial admixture of the air with the atomized lacquer, will direct and guide the spray in the manner shown at 29 so that it may be properly controlled in coating the surface 30.

Referring to Fig. 2, the device illustrated therein comprises a casing 31 having a projecting portion or boss 32 provided with an annular compressed air chamber 33. The inner wall 32*a* is outwardly tapered or flaring and is suitably spaced from the outer parallel face 33*a* of a rotary cup 33*c* so as to provide an air passage 34. The construction in this respect is similar to that described above in connection with Fig. 1. The compressed air chamber 33 communicates with the air passage or space 34 by means of a series of small air ducts or ports 35. Compressed air is supplied to the chamber 33 by means of a flexible conduit 36. The rear face of the cup member 33*c* is chambered at 37, and this chamber communicates with the face 33*b* of the cup by means of a series of ducts 38. A pipe 39 is carried by the casing and terminates within the chamber 37. This pipe is connected by a flexible tube 40 with a suitable source of lacquer supply, whence the lacquer is force fed through pipes 40 and 39 to the device. It will be seen that as the lacquer is discharged from the end of the pipe 39 it will be picked up in the groove 41, and held therein by centrifugal action, being discharged therefrom through the ducts 38.

The cup shaped device 33*c* is carried by the armature shaft 42 of a high speed electric motor 43 which is also mounted in the casing 31. This motor is supplied with current by means of a flexible cable (not shown) from a source of electrical energy.

The device illustrated in Fig. 2 operates to atomize and apply the lacquer spray in substantially the same manner as described above in connection with that shown in Fig. 1. Air is pumped under pressure through the tube 36 into the compressed air chamber 33. Thence the compressed air escapes through the ducts 35 into the outwardly flaring passage 32*a* which surrounds the atomiz-

ing cup 33*c*. The latter is operated at a very high speed and breaks up the lacquer into minute particles by centrifugal action. As described above the spray or mist, thus formed and projected from the rotary cup, is formed into a stream and properly directed substantially in the manner shown in Fig. 2 upon the surface 30 to be painted by means of the enveloping stream or jet of compressed air.

We claim:

1. The hereindescribed method of applying lacquer or the like to a surface to be coated thereby which consists in atomizing the liquid lacquer mechanically and directing a spray of the atomized lacquer against said surface by enclosing the same in an envelope or hollow jet of compressed air while so controlling the form of said jet as to avoid substantial admixture of the air with the atomized lacquer.

2. The hereindescribed method of applying lacquer or the like to a surface to be coated thereby which consists in atomizing the liquid lacquer without the direct action of compressed air thereon or its admixture therewith and directing a spray of the atomized lacquer against said surface by enclosing the same in an envelope or hollow jet of compressed air while so controlling the form of said jet as to avoid substantial admixture of the air with the atomized lacquer.

3. The hereindescribed method of applying lacquer or the like to a surface to be coated thereby which consists in atomizing the liquid lacquer by centrifugal action and directing a spray of the atomized lacquer against said surface by enclosing the same in an envelope or hollow jet of compressed air while so controlling the form of said jet as to avoid substantial admixture of the air with the atomized lacquer.

In testimony whereof we affix our signatures.

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