Dec. 30, 1947. A. J. LAMPE 2,433,463

SPRAY GUN AND METHOD OF SPRAYING

Filed Oct. 5, 1944 2 Sheets-Sheet 1

Fig. 1.

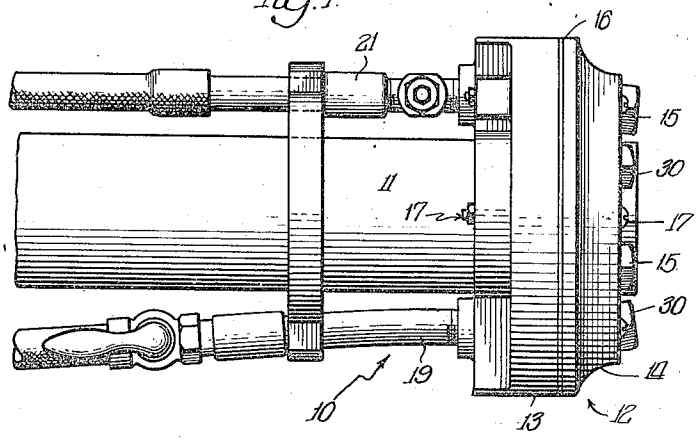
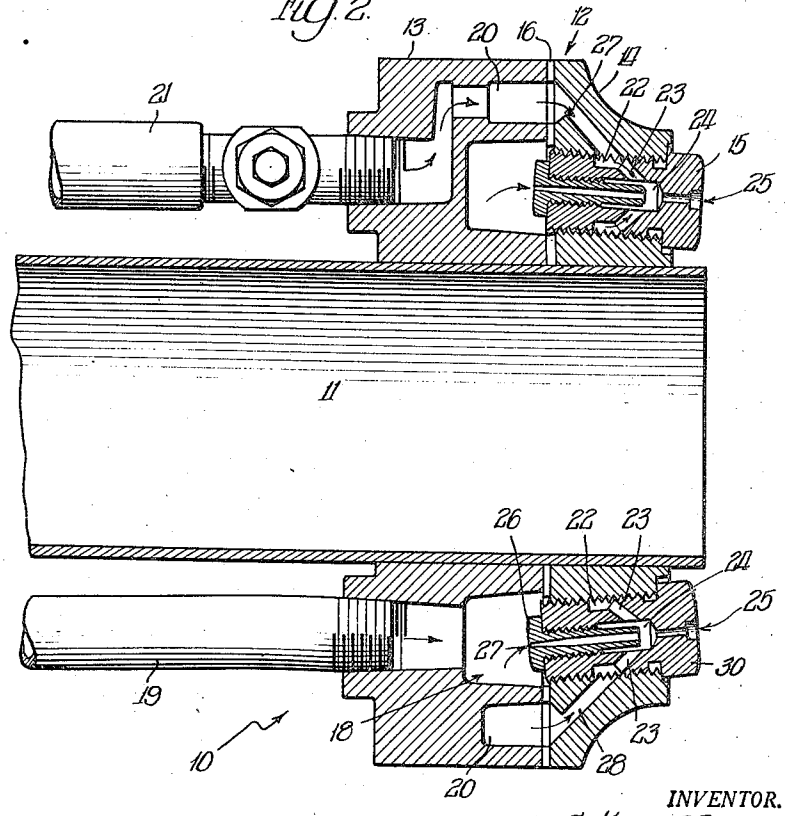


Fig. 2.



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Fig. 3

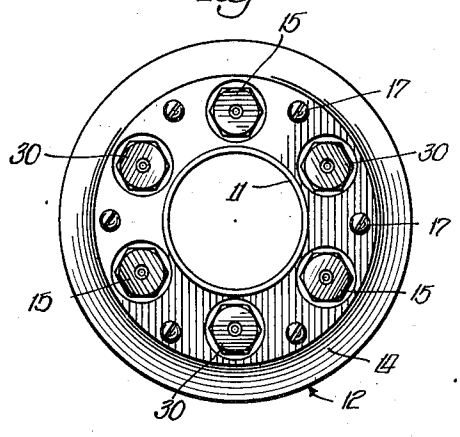
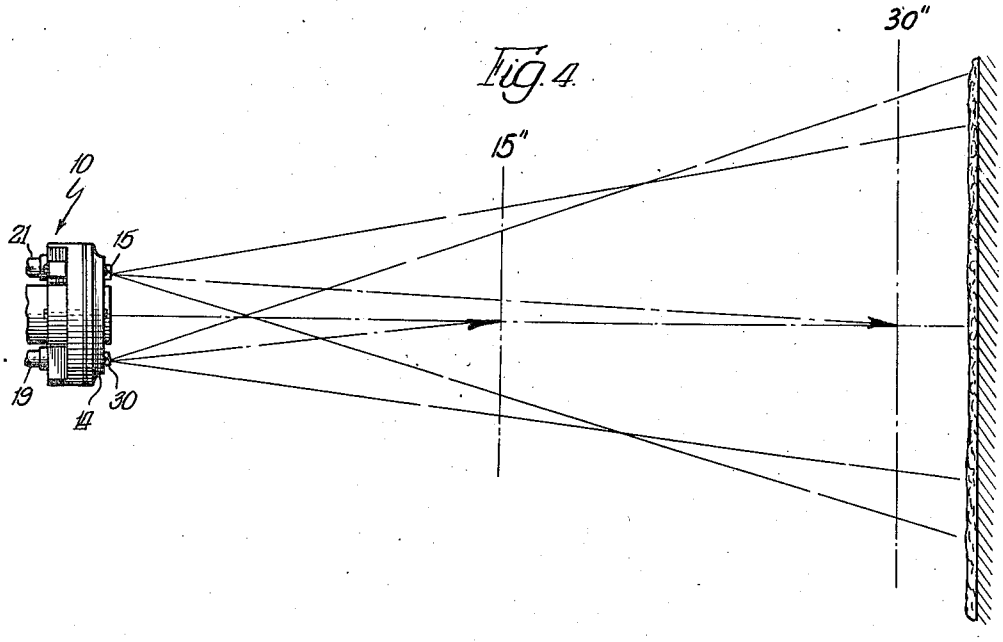


Fig. 4



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SPRAY GUN AND METHOD OF SPRAYING

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6 Claims. (Cl. 117—104)

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The present invention relates to improvements in spray guns. More particularly, it pertains to a spray gun adapted simultaneously to project particles of material and sprays of adhesive into a chosen path, each spray converging in different areas more effectively to render the comminuted particles adherent for application to selected surfaces, and the provision of such a spray gun is a principal object of the invention.

More specifically, it is an object of the invention to provide a spray gun, and new method of operating the same, adapted to project particles of material from a nozzle equipped with a multiple-jet spray gun head, the jets being circumferentially arranged in alternately pitched relationship around the end of the nozzle, whereby simultaneously to project a plurality of converging sprays of adhesive against the material in a manner such that one of the sprays will converge in advance of the other more effectively to render the particles adherent for application to selected surfaces.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention reference should be had to the following detailed description, taken in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of the operating end of a spray gun embodying the present invention;

Fig. 2 is a sectional plan view, similar to Fig. 1, somewhat enlarged for purpose of illustration;

Fig. 3 is a front view of the spray gun shown in Fig. 1; and

Fig. 4 is a diagrammatic illustration of the manner in which the spray gun is adapted simultaneously to project comminuted material and cone-like sprays of adhesive.

The type of spray gun herein depicted is particularly useful, for example, for heat insulation purposes, and otherwise building up mats of comminuted materials on selected surfaces, as illustrated in the patents to Wenzel et al., Nos. 1,718,507, 1,888,841, 2,179,678; the patent to Fix, No. 1,837,422; and the patent to Bennett, No. 1,978,125.

Referring more particularly to the drawings,

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there is indicated generally at 10 a preferred embodiment of the spray gun contemplated by the present invention. This comprises a cylindrical pipe, or nozzle, 11. A granular, comminuted, or macerated material, the latter being preferably of a fibrous nature, is projected through the pipe by means of a motor driven blower. The blower and associated means are not shown in the drawings since they are all fully disclosed in the above mentioned patents and the description in this respect needs no further elaboration.

Attached to the end of the pipe is a multiple-jet spray gun head indicated generally at 12. This head preferably comprises a cylindrical member 13 having secured thereto a suitable cap 14, separated by a gasket 16. The cap 14 may be secured to the member 13 by any suitable means, for example, a bolt and nut arrangement 17. The cylindrical member 13 is chambered as indicated at 18 to receive a suitable adhesive fed through a pipe 19 under variable pressure. The member 13 also contains an air chamber 20 which is fed with compressed air through a pipe 21.

Mounted in the face of the cap 14 are a number of alternately pitched atomizing jets 15 and 30. Preferably, these jets are screw-threaded into the cap 14. Around the intermediate portion of each jet is an annular orifice 22 leading to channels 23, 23 which communicate with a central aperture 24 in the jet which has a spray outlet 25. Preferably the outlet 25 is countersunk in any suitable manner in order to expand the cone-like spread of the spray. Screw-threaded into the rear of each jet 15 and 30 is a member 26 having a longitudinal opening 27 therein connecting the adhesive chamber 18 with the central aperture 24. The annular orifice 22 is brought into communication with the compressed air chamber 20 through channels 27. By this arrangement the compressed air, as it is by-passed through the jets 15 and 30, atomizes the adhesive coming from the chamber 18 and projects the same in a cone-like spray. Simultaneously therewith the comminuted material is blown, or projected, into space through a chosen path traversed by a plurality of converging sprays of adhesive wherein one spray is adapted to converge in advance of the other, as more fully indicated in Fig. 4 of the drawings.

The spray gun herein described is illustrated as having six spray jets in the head 12 surrounding the nozzle 11 in which the three alternate jets 15 are pitched preferably to converge approximately thirty inches from the head. The other three

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alternate jets 30 preferably are pitched to converge fifteen inches from the head. Obviously, the gun need not necessarily have a total of six jets but must have at least two to produce the novel effect described.

Of particular significance is the spacing and pitching arrangement of the jets 15 and 30, as is more fully disclosed diagrammatically in Fig. 4 of the drawings. For example, by pitching the jets 15 so that they converge with the spray of comminuted material at a point about thirty inches from the opening of the pipe 11, and by pitching the jets 30 so that they converge with the spray of comminuted material at a point about fifteen inches from the pipe 11, an ideal arrangement for suitably coating the comminuted material will be obtained. These distances are conveniently indicated at 15'' and 30''. There is thus provided a means to project comminuted material into space through a chosen path and simultaneously to project a plurality of converging sprays of adhesive into the same path so that one of the sprays will converge in advance of the other, whereby the material can be rendered suitably adherent for application to selected surfaces.

In practice it has been found that a gun embodying the principles of the present invention has many advantages. For example, there is provided a distinct converging cone-like spray of adhesive through which the fibrous material must pass, thereby suitably to be coated with the adhesive before it reaches a selected surface on which it is to be adheringly projected. This multi-coating process insures a considerable reduction in waste in coating the particles of comminuted material which normally would not be coated in passing through a single spray area. In addition to economy, better workmanship is assured, because the particles are more uniformly and thoroughly coated, or impregnated, with adhesive than would be the case with a single spray. An additional advantage in having at least two such converging sprays at different distances from the end of the gun is that the gun becomes more universal in operation. That is, the distance at which the head of the gun is held from the surface on which the application of fibrous material is being made does not become so critical. Normally, with a single spray converging at about thirty inches, the head of the gun must be held about thirty-six inches away afrom the selected surface to be coated to obtain a proper coating. A multiple-jet gun can be brought much closer and still obtain a proper coating of particles, thereby making it possible to get much better results when working in restricted spaces.

Another important advantage of the present invention is that it provides a novel method of operation. For instance, as the gun is directed toward and along a selected surface an outer advancing wall of the cone-like spray primes the selected surface for the reception of the adherent particles regardless of any horizontal or vertical movement of the gun, including rotation of the gun around its own longitudinal axis. At an intermediate stage the fibers themselves are rendered adherent in passing through the spray. Thereafter a following wall of the cone-like spray primes or coats, i. e. oversprays successive layers of the deposited fibrous material.

A further advantage possessed by the multiple-jet gun is that greater speed of application can be obtained because more particles of comminuted material per minute can be handled and satisfactorily coated than would be possible with a single-jet gun.

It should be noted that different types of comminuted material would normally require a different technique and a different type of gun in conventional practice. However, the gun herein described is versatile in that all six alternate pitch jets can be operated at once where a considerably greater proportion of adhesive to fiber is desired with a fiber capable of being applied in large quantities over a very short period of time. By inserting blank jets in either of the three alternately pitched holes in place of the jets 15 and 30, the gun is immediately adaptable to handling fibrous materials requiring a much lesser quantity of adhesive concentration. Also, either set of pitched jets 15 or 30 can be blocked out, thereby making it possible to operate with the gun at a greater distance from the surface or quite close if so desired, adapting it to almost all working conditions usually encountered. Of course, it will be appreciated that different sized nozzles or jets can be used to vary the flow of adhesive instead of blocking out some of them.

It will thus be seen that the objects hereinbefore set forth may readily and efficiently be attained, and since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description, or shown in the accompanying drawings, shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

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

1. In a gun of the type adapted to spray a divided material and a liquid adhesive whereby said material is rendered adherent for application to selected surfaces, the improvement comprising means to project said divided material into space through a chosen path, and means simultaneously to project a plurality of cone-like sprays of said adhesive, said adhesive sprays being differently pitched relative to the chosen path of said material and converging with the chosen path of said material at different points.

2. In a gun of the type adapted to spray a divided material and a liquid adhesive whereby said material is rendered adherent for application to selected surfaces, the improvement comprising means to project said divided material into space through a chosen path, and means, including a series of differently pitched jets cooperatively associated with said first named means, simultaneously to project a plurality of cone-like sprays of said adhesive, said adhesive sprays being differently pitched relative to the chosen path of said material and converging with the chosen path of said material at different points.

3. In a gun of the type adapted to spray a divided material and a liquid adhesive whereby said material is rendered adherent for application to selected surfaces, the improvement comprising a nozzle adapted to project said divided material into space through a chosen path, and

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means, including a multiple-jet spray gun head having jets circumferentially arranged around the end of said nozzle, simultaneously to project a plurality of cone-like sprays of said adhesive, said adhesive sprays being differently pitched relative to the chosen path of said material and converging with the chosen path of said material at different points.

4. In a gun of the type adapted to spray a comminuted material and a liquid adhesive whereby said material is rendered adherent for application to selected surfaces, the improvement comprising a cylindrical nozzle adapted to project said material into space through a chosen path, and means, including a multiple-jet spray gun head mounted on the end of said nozzle, which head has a liquid adhesive chamber and a compressed air chamber, with a series of differently pitched atomizing jets alternately arranged in said head communicating with said adhesive and air chambers simultaneously to project a plurality of cone-like sprays of said adhesive, said adhesive sprays being differently pitched relative to the chosen path of said material and converging with the chosen path of said material at different points.

5. In a gun of the type adapted to spray a divided material and a liquid adhesive whereby said material is rendered adherent for application to selected surfaces, the improvement comprising means to project said divided material into space through a chosen path, and means, including a series of differently pitched jets cooperatively

associated with said first named means, simultaneously to project a plurality of cone-like sprays of said adhesive, said adhesive sprays being differently pitched relative to the chosen path of said material and converging with the chosen path of said material at different points, each of said jets having an outlet terminating in an expanded orifice, whereby to provide an expanded cone-like spread of said spray.

6. In the art of spraying a divided material and an adhesive, whereby the material is rendered adherent for application to selected surfaces, the improvement comprising simultaneously projecting a spray of said material and a plurality of cone-like sprays of said adhesive, said adhesive sprays being differently pitched relative to the chosen path of said material and converging with the chosen path of said material at different points.

ARTHUR J. LAMPE.

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