Dec. 12, 1950 S. FJELDSTAD 2,534,116

APPARATUS FOR SPRAYING CEMENTITIOUS COMPOSITIONS

Filed July 16, 1948

Fig. 1.

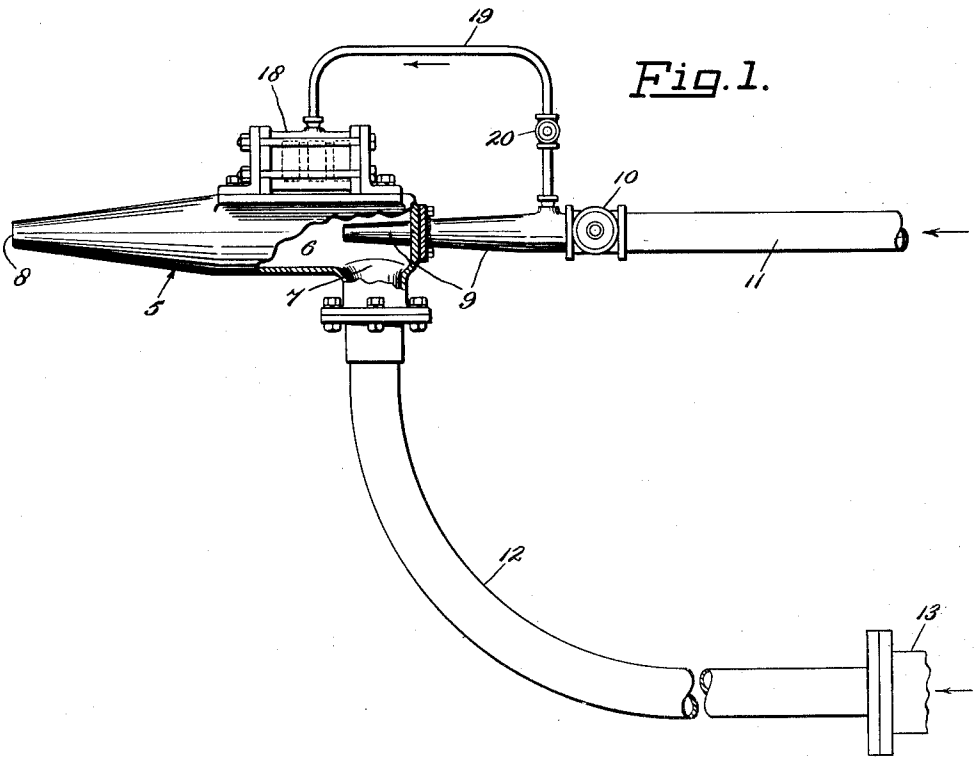
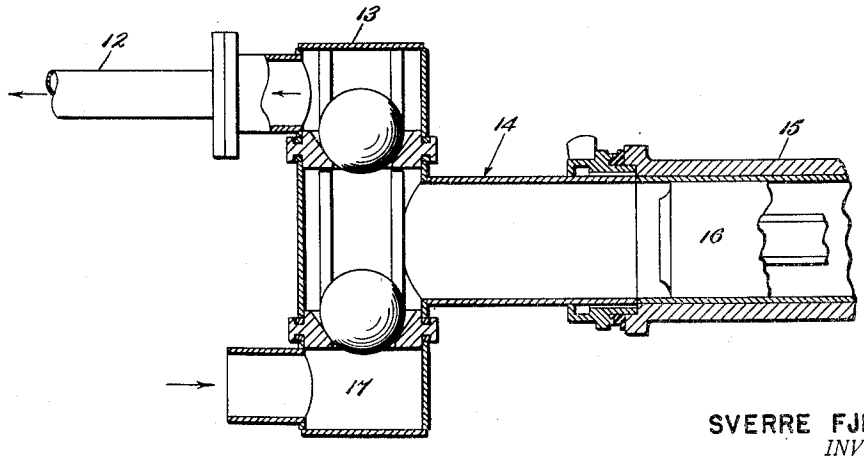


Fig. 2.



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APPARATUS FOR SPRAYING CEMENTITIOUS COMPOSITIONS

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2 Claims. (Cl. 259—147)

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The invention relates to the placement of cementitious compositions, and has for its principal object the provision of an improved apparatus for spraying or projecting plastic mixtures such as stucco, plaster, concrete and the like.

It has been heretofore proposed to project such compositions from nozzles by means of compressed air, and in many instances it has been the practice to pass a stream of air-borne dry solid constituents such as sand and cement through a conduit to the nozzle chamber, and to introduce the liquid constituent such as water into said chamber through a separate conduit, with intermixing of the solids and liquid taking place within the nozzle. Sometimes the air which conveyed the solids to the nozzle has provided the sole means for ejecting the mixture therefrom, while in other cases additional air under pressure has been supplied to the nozzle chamber through still another conduit to aid in the projection of the composition.

While compositions produced in the above manner may possess satisfactory properties if the liquid be uniformly incorporated into the solids, it is virtually impossible to secure such uniformity in practice, even though more or less complicated devices be provided in the nozzle to facilitate the mixing. While it is possible to regulate the supply of liquid with some degree of accuracy, the supply of air-borne solids to the nozzle will fluctuate widely under even the best conditions, with resultant highly undesirable variations in both the consistency of the mixture and its rate of ejection from the nozzle. It is also impossible to secure a uniform water-cement ratio throughout the mixture, which ratio, as is now well known, largely determines the strength of the composition after it has set.

The above mentioned difficulties inherent to nozzle-mixed compositions may be largely avoided by the use of pre-mixed compositions, i. e., those in which the solid and liquid constituents have been completely intermixed prior to introduction into the nozzle. Such mixtures may be readily prepared in well known forms of plaster and concrete mixers, wherein by employing accurately measured quantities of aggregates, cement and water, compositions of highly uniform consistency and definite constituent ratios may be produced. These pre-mixed compositions however present a problem of their own, in that it is difficult to maintain a proper fluidity of the mixture to enable it to be discharged uniformly from the nozzle by means of the compressed air.

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The present invention employs such a pre-mixed composition, which is preferably (although not necessarily) supplied to the nozzle by means of a known form of mechanical pump whereby a continuous and uniform supply is assured. The composition is ejected from the nozzle by means of a jet of compressed air introduced into the nozzle chamber, and to insure proper fluidity of the mixture whereby the air jet may discharge it as a uniform spray, the nozzle is equipped with a device for imparting relatively rapid vibrations to it and/or the composition therein. This vibration of the mixture has the effect of increasing the fluidity thereof, and in practice has been found to permit the use of much drier mixtures than has been heretofore possible in this kind of device.

In the accompanying drawing forming a part of this specification there is illustrated one form of apparatus for carrying out the above described method. In the said drawing:

Figure 1 is a side elevational view, partly broken away and in section, of a nozzle and associated mechanism constructed and arranged in accordance with the invention; and

Fig. 2 is a longitudinal sectional view of a portion of a mechanical pump suitable for supplying a continuous stream of mixture to the nozzle shown in Fig. 1.

The nozzle structure 5 provides a chamber 6 having an inlet port 7 and a discharge port 8. An air jet nozzle 9 extends into the rear of chamber 6 and is provided with a control valve 10 through which compressed air may be supplied to the jet from an air hose or other conduit 11 leading from any appropriate source of supply. As here shown, the pre-mixed cementitious composition is supplied to the nozzle chamber 6 through a conduit 12 connected to the inlet port 7 of said chamber and to the valve controlled outlet chamber 13 of a known form of grout or plaster pump 14 having a working cylinder 15, a piston 16 reciprocatable therein, and a valve-controlled inlet chamber 17.

Mounted upon or connected to the nozzle structure 5 is a mechanism 18 adapted to impart relatively rapid vibrations to the said nozzle and/or the plastic composition therein, whereby to enhance the fluidity of such composition. The details of this vibrating device constitute no part of the invention, and various forms thereof suitable for the present purpose are available in the open market. The particular vibrator here shown is of a type that is pneumatically operated, and the fluid for actuating the same is supplied thereto

through a pipe 19 leading from the jet nozzle 9 and having a control valve 20.

While as above indicated, it is preferred to feed the plastic composition to the nozzle 5 by means of the pump 14, obviously it may be supplied in other ways.

What is claimed is:

1. Apparatus for the placement of pre-mixed plaster, stucco, mortar and like plastic cementitious compositions by spraying, comprising a translatable nozzle structure having inlet and discharge ports for the composition; a vibrating device carried by said nozzle structure for imparting vibrations to the composition therein whereby to enhance its fluidity; and means for injecting a gas into the nozzle structure to spray the fluidized composition from said discharge port.

2. Apparatus for the placement of plaster, stucco, mortar and like plastic cementitious compositions by spraying, comprising a manipulatable nozzle having inlet and discharge ports for the composition; means for supplying the premixed composition to said inlet port; a fluid-

actuated vibrating device mounted by the nozzle for imparting vibrations thereto whereby to increase the fluidity of the composition therein; means for injecting a gas into the nozzle to spray the fluidized composition from said discharge port; and connections between said gas injecting means and the vibrating device for supplying actuating fluid to the latter.

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