Dec. 13, 1960 G. A. V. TOMBU 2,964,302

APPARATUS FOR PLASTERING WALLS BY MEANS OF COMPRESSED AIR

Filed June 14, 1956 2 Sheets-Sheet 1

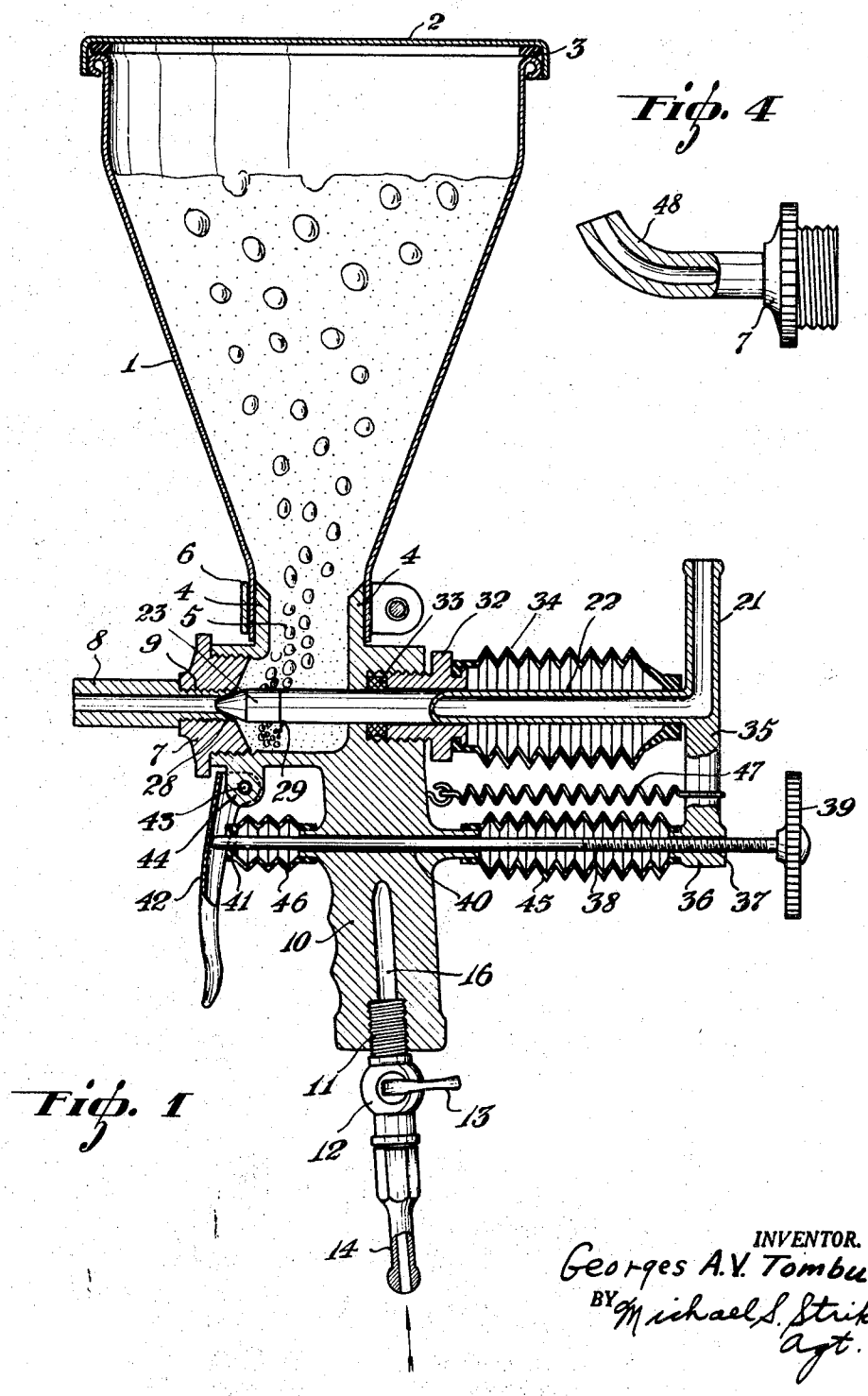

Fig. 1

Fig. 4

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Fig. 2

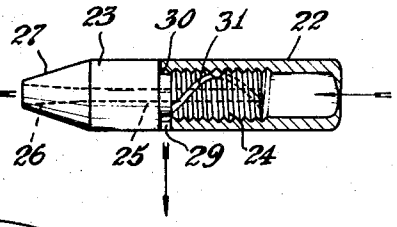

Fig. 3

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APPARATUS FOR PLASTERING WALLS BY MEANS OF COMPRESSED AIR

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1 Claim. (Cl. 259—151)

The present invention refers to "improvements in apparatus for plastering walls, by means of compressed air" and its object is to distribute its constitutive elements in a particular manner which will permit the application, in a rapid and efficient manner, of a uniform layer of wall plaster or the like, firmly adhered to the surface on which it is blown.

As is known, the plaster is generally applied directly on the surfaces to be overcoated, by means of the normal procedure with trowel and planer, but this work takes considerable time to be executed and requires specialized labour, all of which involves relatively high costs.

The mechanical methods used up to the present to accomplish the above mentioned work, although they facilitate it in part, have the inconvenience that they project the mortar, or plastering material, at a slow rate, and due to this the adherence of said material to the surface on which it is applied is brought about as a consequence of the adhesive properties of same so that the layer of wall plaster is not intimately joined with the material of the surface plastered, thus becoming easily detached or loosened from it.

One object of the present invention is the provision of an improved apparatus by means of which the mortar is violently thrown against the surface on which it is to be applied, so that the constitutive particles of the plastering material are embedded firmly in said surface forming with it a single unit. This fact allows the application of a relatively thin layer of wall plaster which due to its compactness, is practically waterproof, a condition which gives an additional advantage to the adoption of the apparatus in question.

It should also be noted that the use of the apparatus claimed does not require specialized labour, so that in the hands of any user it will give a plastering of good quality.

A fundamental feature of the apparatus described herein, is the provision of a feeding funnel for the mortar or plastering material to be applied, which funnel communicates by its lower extremity with a chamber, where by gravity, the plastering material accumulates and in which chamber, internally, the ejector end of a tubular rod slides, joined by its opposite end and outside of the chamber, with a supply of compressed air. The ejector end of said rod faces a frontal opening of said chamber and is provided with an outlet nozzle for the mortar to pass by, disposed in a substantially reverse position with respect to the above mentioned rod.

In this manner, when the mortar drops into the interior of the chamber, the air blown in by the ejector end already mentioned, will carry the mortar through the nozzle or frontal opening of the chamber, driving it with great force against the surface to be plastered, into which it will be firmly embedded.

Another important feature of the invention is that the ejector end is capable of sliding axially with respect to the outlet nozzle of the chamber, from a position adjacent to the outlet of said nozzle to a position separated from same, at the opposite end of said chamber.

This possibility of adjusting the end of the ejector with respect to the nozzle of the chamber, presents two capital advantages: in the first place, for a given degree of liquidness of the mortar and a uniform pressure of the inblown air, on altering the separation between the end of the ejector of said air and the outlet nozzle of the chamber, will modify accordingly the quantity of mortar projected in a given time. This is naturally due to the fact that the air blown through the end of the ejector inside the chamber, will encounter and will carry a greater quantity of mortar, as the distance, within certain limits, to the outlet nozzle of the chamber is greater. By this means the thickness of the layer of applied plaster can be adjusted, as also the speed at which it is applied along the surface to be plastered.

The second important advantage, mentioned in the previous paragraph, is the fact that it will suffice to place the end of the ejector against the mouth of the outlet nozzle of the chamber, to blow only compressed air through this nozzle. This is, naturally, due to the fact that the outgoing air does not encounter any mortar in this passage, and this possibility of obtaining at will a simple flow of compressed air during the process of applying the plaster, is extremely useful in order to make the layer uniform and obtain an even greater adhesion of the mortar already applied on the surface to be plastered, since on receiving the jet of air, this mortar will be pressed against said surface and extended along same.

Another very important and fundamental condition for the good operation of the apparatus is to obtain and maintain, within the feeding funnel and chamber below, a homogeneous mass of plastering material or the like, in order to obtain a regular surface throughout the covering layer applied. This fact represents a great advantage for the perfect finishing of the work.

This homogeneity is necessary since the plastering material is formed of a watery mixture of elements whose specific weights are greater than water, so they normally tend to deposit on the bottom of the chamber, the mixture thus acquiring a consistency of excessive pastiness at the lower level, whereas it will result excessively liquid at the upper part of the batch, so that, under these conditions, the density of the blown mixture would vary from the beginning to the end of the operation.

In accordance with the invention, the said homogeneity is obtained by providing an additional by-pass from the duct of compressed air, capable of projecting a jet of air under pressure, through the body of the mass of mortar or mixture in the proximity of the lower zone of the chamber, so that said air, on rising through the mass of mortar, acts as an agitator and produces an intense movement of same thereby making it homogeneous, so that the density of the mixture blown out is always uniform.

It is to be noted that in the utilization of this apparatus, when the plastering to be carried out is of the rustic type, the rough surface comprising this style is finished without requiring any ulterior operation, and in general, a wall plastering done with the new apparatus adapts itself much more to the different types of ornamental raised work, it being also worthy of note, the facility with which one may place the mortar in those zones in which moldings must be placed later. Furthermore, when it is desired to obtain a finished surface completely smooth, the plastering obtained with the apparatus is more fit or appropriate and requires less finishing work.

Other objects and advantages not hereinbefore pointed

out will appear from the following detailed description and the accompanying drawings; in which:

Figure 1 represents a longitudinal sectional view of the invention, showing the sliding rod closing the communication between the chamber and the discharge nozzle.

Figure 2 represents a view of the head of the ejector rod of compressed air, where the additional by-pass for the air can be seen and which projects inside the chamber, in order to make the mixture homogeneous.

Figure 3 represents an elevation view of the apparatus, partially cut away, showing the communicating passage between the chamber and the discharge nozzle.

Figure 4 represents a section of the discharge nozzle for the mixture, which adopts a curved shape.

Referring to said drawings, the reference numeral 1 indicates the funnel for the charge of mortar or plastering material or the like, which, once loaded, is closed by means of a lid 2 which rests on the edge of the funnel through a packing 3. The lower part of the funnel 1 is inserted in the walls 4 of a chamber 5, being fixed to same by means of a clamp 6. The frontal mouth of said chamber is closed by means of a piece 7 in which a removable nozzle 8 having a threaded portion 9, is fixed.

Towards the lower part of the bottom of chamber 5, a handle 10 protrudes and constitutes the means for handling the apparatus.

As a continuation of the handle, on the lower face of same, a threaded tubular piece 11 is fixed and this carries a stopcock 12, operated by means of the handle 13, which cock intercepts the compressed air arriving through the nozzle 14, and the conduit 15 (Fig. 3) from the supplying source. The said piece 11 is disposed in alignment with a perforation 16 made in the body of the handle 10, which perforation is continued by an elbowed tubular piece 17, fixed to one of the lateral faces of the handle.

In the said elbowed piece 17 the end 18 of a flexible tube 19 is inserted, and whose end 20 is fixed to the nozzle 21, which forms an integral part with the sliding tubular rod 22, the free end of which penetrates into chamber 5 and is disposed in alignment with the discharging nozzle 8.

Said tubular rod 22 terminates at the end in front of the nozzle, in a head 23 (Fig. 2), provided at one end with a thread 24 which screws entirely into the end of the rod; said piece having a longitudinal perforation 25 through which the compressed air flows.

As this head is removable, it is possible to change it in accordance with the type of mixture to be applied, as for instance, when it is intended to use a coarse grained mixture, a head whose longitudinal perforation 25 broadens out towards the outlet mouth is used, such as indicated by the dotted lines 26, in Figure 2, so that the jet of compressed air has a larger section in order to carry a greater number of coarse grains. To blow out mixtures with medium or fine grains, heads with smaller perforations than the previous one are employed.

The end of said head terminates in a conical surface 27 intended to make a perfect fit against the internal surface 28 of the nozzle 8 which is also conical.

Furthermore the end of the tubular rod 22 that enters into chamber 5 has a perforation 29 oriented towards the bottom of the chamber, constituting a passage of compressed air to the interior of the chamber in order, as was stated before, to maintain the mass of the mixture in agitation so as to avoid that the heavy bodies that constitute it be deposited in the bottom of said chamber. The said perforation 29 is related to a small annular enclosure 30 formed by a reduction made internally around the mouth of the rod 22 and closed in front by the base of head 23, said enclosure 30 communicating with a helicoid groove 31 made in the threaded portion 24, and by which groove the compressed air passes from the interior of the rod 22 to the perforation 29, projecting into the interior of chamber 5 with a swirling movement.

As can be understood, the agitative effect which the compressed air produces in bubbling through the mixture, maintains its consistency homogeneous. This effect is not only produced when the apparatus is working, that is, when it is blowing out the mixture, but also when the communication between the chamber 5 and the nozzle 8 is closed, since the compressed air flows just the same.

The sliding rod 22 which is prolonged outside the chamber 5 passes through its outer wall and also through a threaded bushing 32 which presses the packing 33 that avoids the possible filtration of the mixture. Furthermore, said rod 22 is protected by an elastic covering 34 capable of keeping it exteriorly clean from plaster which would impede its easy sliding movement.

At the back end of the rod 22 and forming an integral part with same, an extension 35 is provided in line with the nozzle 21 and whose free end 36 has a threaded perforation 37 into which a rod 38 screws and is adjusted by means of the knob 39. This rod passes through the perforation 40 made in the handle 10 of the apparatus; this perforation constitutes a guide for the sliding movement of the rod. The front end of this rod rests freely on a trigger 42, articulated on a pin 43 supported on the lug 44 which forms part of the handle of the apparatus. In order to maintain this rod 38 in a perfect state of cleanliness, it is protected by the elastic coverings 45 and 46.

A helical spring 47 is secured by one end to the body 10 of the handle and by the other to the extension 35 which forms part of the rod 22. This spring tends to maintain the head 23 of the rod, applied against the conical surface 28 of the nozzle 8, thus closing the passage of the mixture, as is shown in Figure 1.

The nozzle 8, as was mentioned before, is mounted in the piece 7 and is changeable, and in Figure 4 a type of nozzle is shown whose body 43 is bent to form an elbow and represents the preferable type for applying mortar or similar material to ceilings, maintaining the apparatus in its normal position. As can readily be understood, the shape of the nozzle can be varied utilizing in each case the one which is best adapted to the working conditions, and nature of the job to be carried out.

The operation of the apparatus is very simple and may easily be deduced from the drawings. The mortar or plastering material which is deposited in the funnel 1 fills the lower chamber 5; the duct 15 of compressed air is connected to the nozzle 14 and on opening the main air cock 12, said air will circulate through the perforation 16, elbow 17, flexible tube 19 and tubular rod 22, so that on pressing the trigger 42, it will press the rod 38 moving it together with the arm 35, which in turn will make the tubular rod 22 slide back, allowing the head 23 to separate from the internal mouthpiece 28 of the nozzle 8, as shown in Figure 3, and the compressed air will carry the material of the mixture which it finds in its passage and will project or blow it out through the nozzle 8 as may be seen in said figure. At the same time the jet of compressed air coming out of the perforation 29 of rod 22, will maintain the mixture in agitation, so that the apparatus will expel a mixture of the plastering material which is always of uniform consistency. To stop the operation of plastering, it is sufficient to let go of the trigger 42, which, due to the action of spring 47, will return the rod 22 to its primitive position and its head 23 will rest against the surface 28 of the nozzle closing the passage of the mixture.

As described, the sliding of the rod 22 is prefectly guided and adjusted, so that the work progresses with all precision, with the consequent economy in time and labour.

What I claim is:

An apparatus for plastering walls by means of compressed air comprising, in combination, a charging funnel adapted to contain mortar or the like for plastering walls; a chamber located below said charging funnel and communicating therewith so that mortar in said funnel may pass into said chamber; a handle portion integrally

formed with said chamber and extending therefrom in a direction opposite to said funnel; a spray nozzle protruding from said chamber and being formed with a passage therethrough communicating with said chamber, said passage having a conically shaped rear portion directed towards said chamber; a tubular rod having one end portion located in said chamber and protruding with the other end portion thereof outside of said chamber in a direction away from said spray nozzle; an ejecting head removably mounted on said one end portion of said tubular rod and having a conically shaped free end directed toward and matching said conically shaped rear portion of said nozzle passage, said one end portion of said tubular rod being formed adjacent said head with an aperture therethrough extending transversely through said end portion and communicating with the interior thereof, said tubular rod being mounted in said chamber for sliding movement between a closing position in which said conically shaped end of said head engages into the conically shaped rear portion of said nozzle passage so as to close communication between said nozzle passage and the interior of said chamber and a plurality of opening positions in which said conically shaped end of said head is spaced from said conically shaped rear portion of said nozzle passage; connecting means for connecting said other end of said tubular rod to a source of compressed air; an operating rod substantially parallel to

said tubular rod and mounted for movement in longitudinal direction in said handle portion, said rod having a front end extending in the direction of said nozzle and a rear end adjustably connected to said rear portion of said tubular rod; spring means operatively connected to said rear end portion of said tubular rod and tending to move said tubular rod to said closing position thereof; and trigger means pivotally mounted on said chamber and engaging said front end of said operating rod so that upon tilting of said trigger means said operating rod will be moved in longitudinal direction thereof and said tubular rod connected thereto will be moved against the force of said spring means from said closing position to said opening positions.

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