

Oct. 5, 1937.

E. P. GASSMAN ET AL

2,094,839

PLASTERING MACHINE

Filed March 3, 1936

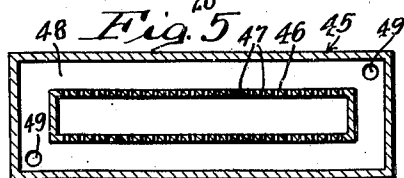
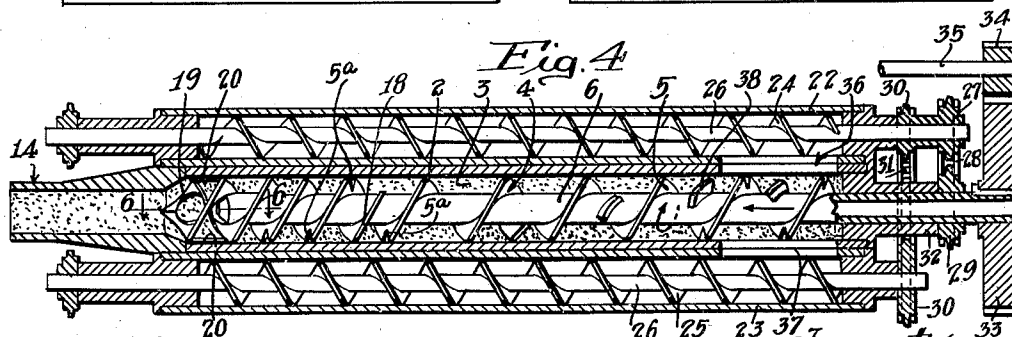
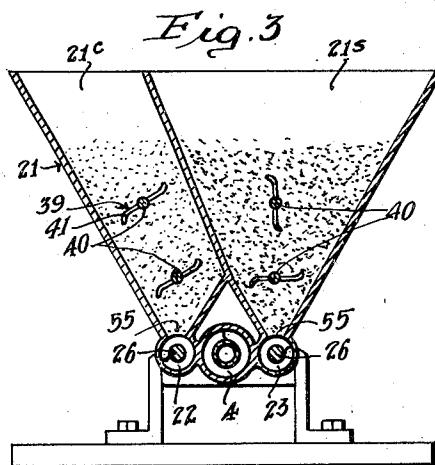
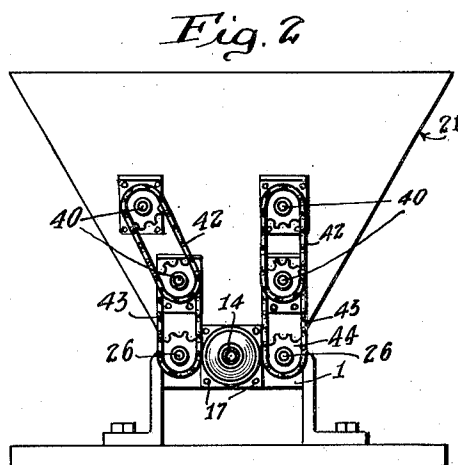
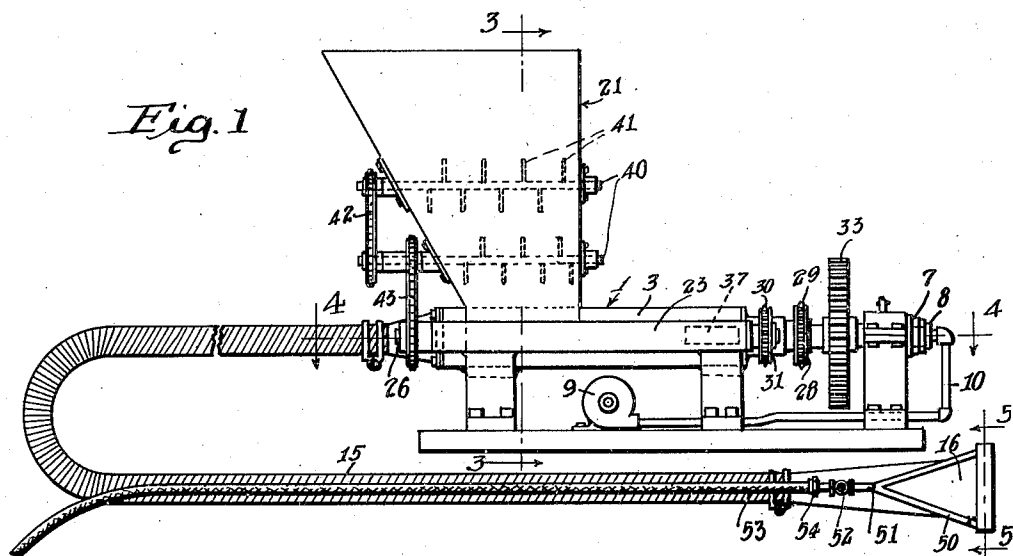


Fig. 6

Inventors
Edward P. Gassman
George J. McCaughey
By your attorneys

UNITED STATES PATENT OFFICE

2,094,839

PLASTERING MACHINE

Edward P. Gassman, Compton, and George J. McCaughey, Los Angeles, Calif.; Madge E. Gassman administratrix of said Edward P. Gassman, deceased

Application March 3, 1936, Serial No. 66,854

14 Claims. (Cl. 72-130)

This invention relates to a plastering machine, and while the machine may be used for placing cement or plaster in any situation, it is intended particularly for facilitating the application of plaster to walls and ceilings.

The general object of the invention is to provide a machine for this purpose, having means for employing an air blast to carry the plaster through the hose to the plastering nozzle from which the plaster is delivered onto the vertical wall; and one of the objects of the invention is to provide a construction, which will operate to substantially prevent any backward flow of the air in the barrel of the machine that carries the plaster into the hose.

A further object of the invention is to construct the machine so that the air nozzle can readily be adapted to heavy or light materials employed to form the plaster "mix".

A further object of the invention is to provide a machine of this kind in which the machine will operate to mix the ingredients of the plaster in any desired proportions.

A further object of the invention is to improve the general construction of machines of this kind; also to improve the construction of the forward end of the feed screw in the vicinity of the air nozzle.

Further objects of the invention will appear hereinafter.

The invention consists in the novel parts and combination of parts to be described hereinafter, all of which contribute to produce an efficient plastering machine.

A preferred embodiment of the invention is described in the following specification, while the broad scope of the invention is pointed out in the appended claims.

In the drawing:

Figure 1 is a side elevation with certain parts broken away, illustrating the complete apparatus with the hose and also the water connections leading to the plastering nozzle.

Fig. 2 is a rear elevation of the machine; that is to say, as viewed from the left side of Fig. 1 but with the hose detached. This view particularly illustrates the driving means for the agitators in the cement and sand bins.

Fig. 3 is a vertical section taken on the line 3-3 of Fig. 1, and further illustrating the general arrangement of the bins and the feed apparatus.

Fig. 4 is a horizontal section taken about on the line 4-4 of Fig. 1, and further illustrating details of the means for feeding the plaster into the hose,

and the means for feeding in the ingredients of the plaster mix.

Fig. 5 is a vertical section taken on the line 5-5 of Fig. 1, and further illustrating details of the plastering nozzle.

Fig. 6 is a vertical section taken about on the line 6-6 of Fig. 4 at the forward end of the feed screw, and particularly illustrating the details of the air nozzle and the worm head.

Before proceeding to a more detailed description of the invention, it should be stated that in practicing the invention, we provide a barrel or cylinder with means within the same for feeding forward the plaster "mix". The forward end of this barrel delivers to the flexible conduit, such as a hose, which carries the plastering nozzle. At the forward end of the barrel we admit an air stream flowing in the direction in which the plaster mix is discharged from the barrel, and this air assists in carrying the plaster through the hose and out of the plaster nozzle. The feeding means in the barrel is preferably in the form of a feed screw, or worm, which has a tubular shaft through which the air current flows. In the vicinity of the air nozzle, means is provided for insuring that the air stream will not tend to flow back toward the rear end of the barrel, and we provide a construction forward of the air nozzle, which facilitates the acceleration of the plaster by the air blast as it passes into the hose, and at the same time, enables the air nozzle to be accessible to change the same when desired to adapt the air blast to the particular requirements of the plaster mix with which the machine is employed.

Although the machine is capable of being used for plastering with plaster that has already been mixed, in the present specification we have described it as embodying mixing means, which will enable the ingredients of the plaster to be mixed directly together in the barrel into which they are separately introduced; and the mechanism also enables the relative proportions of the ingredients of the plaster to be readily altered as may be desired.

Referring more particularly to the parts, 1 indicates the casing of the machine which is constructed so as to support a cylinder or barrel 2 of elongated form, said barrel carrying means for advancing the plaster 3 through the same, and this means is preferably in the form of a feed screw 4 in the form of a worm carrying a helical blade or thread 5. The feed screw 4 has a tubular shaft 6 that carries the blade 5, and at the rear end of this shaft 6 we introduce an air blast through a swivel connection 7, including a stuff-

ing box 8 to prevent escape of the air. This air blast is preferably provided from a fan 9 connected through the swivel connection by means of suitable piping 10. The forward end of the barrel 2 preferably projects beyond the forward end of the feed worm 4, said worm being provided with an air nozzle 11, which may be in the form of a cap or plug screwed into the end of the bore 12 of the shaft of the feed screw.

In some cases this nozzle 11 may be a reducing nozzle, and provided with a bore 13 of reduced diameter. Such a nozzle would be preferable where the machine is operating upon plaster of relatively light weight.

It should be understood that the feed screw 4 is rotated in the direction indicated by the arrow in Fig. 4, so that it will push the plaster along the inside of the barrel and past the air nozzle 11, at which point the plaster comes under the influence of the air blast issuing from the air nozzle, and is carried through a delivery nozzle 14. This delivery nozzle is connected by a flexible conduit such as a hose 15, with a plastering nozzle 16, which will be described more in detail hereinafter. The delivery nozzle 14 is preferably removably mounted on the outer face of the casing 1 by means of removable bolts 17 so as to render the air nozzle 11 accessible.

In order to insure that the air blast will not tend to "kick back" into the back of the barrel, we provide means just to the rear of the nozzle for preventing this. This may be accomplished by decreasing the pitch of the blade 5 toward the front to cause the plaster to pack tighter at this point, but in the present instance, this means consists of an intermediate helical blade 18 that we use at this point, which is disposed preferably half way between the successive coils or threads of the helical blade 5. In other words, at the forward end of the worm it has a double thread; that is to say, it is a double worm. Furthermore, these two helical blades 18 and 5 are extended forwardly beyond the air nozzle 11, so as to form a worm head 19 composed of these two blades; and these two blades (or more blades if desired) are connected together by longitudinal braces in the form of bars 20, so as to increase the rigidity at this point. Furthermore, in order to facilitate the expansion of the air into a forwardly moving cone as it issues from the nozzle 11, we prefer to give the inner diameter of the blades 5 and 18 at the head 19, an increasing diameter toward the delivery end of the barrel. This is illustrated in Fig. 4.

The machine is preferably provided with means for mixing the plaster directly in the barrel 2. For this purpose we prefer to provide a duplex hopper 21 comprising a cement bin 21c and a sand bin 21s, and the lower portions of these bins 21c and 21s deliver the cement and sand respectively, into feed barrels 22 and 23, in each of which a feed screw 24 or 25 is located. The shafts 26 of these feed screws project outwardly at the rear end of the casing, and are provided with sprocket wheels 27, and one of the shafts 26 is provided with a driving sprocket wheel 27 that is driven by a sprocket chain 28 off of a sprocket wheel 29 rigidly mounted on the tubular shaft 6 of the worm 4. In order to drive the other shaft 26 from the one that carries the sprocket wheel 27, both of the shafts 26 are provided with sprocket wheels 30 carrying a driving chain 31. The runs of this chain straddle a tubular neck 32 that extends out from the adja-

cent end of the casing, and against which the sprocket wheel 29 seats.

The tubular shaft 6 is provided with a driven gear wheel 33 driven by a driving pinion 34 on a countershaft 35 (see Fig. 4).

The feed screws 24 and 25 are driven in such a way that they will feed forward the cement and sand at a speed proportional to the proportion of these ingredients in the mix. For this purpose, if the feed screws 24 and 25 have the same pitch, the sprockets 30 would have different diameters, and by choosing these diameters at different ratios, the relative proportions of the cement and sand in the mix can be regulated as desired.

At the rear end of the barrel 22 a cement inlet opening 36 is provided for admitting the cement into the rear end of the barrel 2, and on the opposite side of the barrel 2 a similar opening 37 is provided, which is a sand inlet. With this arrangement it will be evident that sand and cement in the proper proportions are delivered into the rear end of the barrel 2. As this sand and cement is moved forwardly by the rotation of the worm 4, it is thoroughly mixed by suitable means such as mixer blades 38 that are preferably in the form of fins that project out from the wall of the tubular shaft 6. As illustrated, these mixer fins 38 have the same pitch as the screw blade 5, but if desired, they may have a reversed pitch so as to increase their mixing effect.

In order to insure that the cement and sand will feed down properly into their corresponding feed barrels, we provide rotary agitators 39 in the form of shafts 40 respectively, that pass through the bins and carry beaters 41. These shafts project at the forward end of the machine, and are driven by sprocket chains 42 and 43, the latter of which is driven by a sprocket wheel 44 on the forward end of the corresponding feed screw (see Fig. 2).

The plastering nozzle 16 is preferably formed with an elongated oval or rectangular mouth 45 (see Fig. 5) having an inner wall 46 with a plurality of small perforations 47, and this wall is surrounded by a water chamber or duct 48, which water chamber is provided with water preferably at two inlets 49 located at diagonally opposite corners of the nozzle (see Fig. 5). These inlets 49 are supplied with water from the forks 50 of the Y-connection 51, the shank of which is connected through a valve 52 mounted on the nozzle with a water hose 53 through a suitable coupling 54.

It will be noted from Fig. 3, that the upper side of each feed barrel 22 or 23 is provided with a longitudinal slot 55, through which the sand and cement passes down. In order to increase the mixing effect on the cement and sand as they pass through the mixing barrel 2, the blade 5 is preferably provided with a plurality of notches 5a.

The forward end of the coil head projects into the outlet nozzle 14 (see Fig. 4) and keeps it from clogging up.

The general mode of operation of the plastering machine will now be described. The plaster is introduced into the rear end of the barrel 2. In the present instance the two ingredients, the cement and the sand, are forced into the barrel through their corresponding inlets by their corresponding feed screws, and the mixture of the cement and sand is forced forwardly by the rotating feed screw or worm 4. The construction of this worm is such that the plaster 3 tends to

become packed toward the forward end of the feed worm, and just to the rear of the air nozzle 11. As the plaster passes the air nozzle, the absence of the central shaft 6 gives more room for the plaster, and it loosens up. At this point it encounters the air blast issuing from the air nozzle, which carries the plaster through the delivery nozzle 14, which nozzle is preferably slightly tapered as shown in Fig. 4. This air blast carries the plaster through the hose 15 to the plastering nozzle 16 where it passes through the mouth 45 of the nozzle. As the plaster arrives at the mouth, it becomes mixed with small streams of water coming through the perforations 47. In using the plastering nozzle, it may be held a slight distance from the wall, and the air blast drives the wet cement forward at a considerable velocity to spread itself evenly over the wall. In using plasters of lighter weight, the nozzle 11 should have a considerably restricted reducing bore, as indicated at 13 in Fig. 6. This nozzle is accessible through the delivery end of the barrel 2, by removing the delivery nozzle 14.

By reason of the increasingly large inner diameter of the worm head 19, opportunity is given for the air blast to expand as it issues from the nozzle 11, thereby increasing its effectiveness in carrying the plaster forward into the delivery nozzle 14.

It is understood that the embodiment of the invention described herein is only one of the many embodiments this invention may take, and we do not wish to be limited in the practice of the invention, nor in the claims, to the particular embodiment set forth.

What we claim is:

1. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, means for feeding plaster into the barrel at the rear end of the feed screw, an air nozzle adjacent the forward end of the feed screw, means for delivering a current of air to the said nozzle through the feed screw for carrying the plaster through the forward end of the barrel, a plastering nozzle, flexible means for conducting the air stream and plaster to the last named nozzle, and means for mixing water with the plaster at the plastering nozzle.

2. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, means for forcibly feeding plaster into the barrel, an air nozzle adjacent the forward end of the feed screw, means for delivering a current of air to the said nozzle through the feed screw for carrying the plaster through the forward end of the barrel, a plastering nozzle, flexible means for conducting the air stream and plaster to the last named nozzle, and means for mixing water with the plaster at the plastering nozzle, the forward end of said feed screw adjacent the air nozzle having means for substantially preventing air issuing from the air nozzle from blowing back toward the rear end of the feed screw.

3. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of

the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, an air nozzle adjacent the forward end of the feed screw, means for delivering a current of air to the said nozzle through the feed screw for carrying the plaster through the forward end of the barrel, a plastering nozzle, flexible means for conducting the air stream and plaster to the last named nozzle, and means for mixing water with the plaster at the plastering nozzle, said feed screw consisting of a worm, said worm having an increased number of coils at the forward end of the feed screw and just to the rear of the air nozzle for causing the plaster to pack itself in the barrel, thereby substantially preventing the air current from blowing back through the said barrel.

4. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, an air nozzle having its only outlet at the forward end of the feed screw, and delivering compressed air only longitudinally in line with the axis of the feed screw so that the interior of the barrel back of the nozzle is devoid of air under pressure, means for delivering a current of air to the rear end of the feed screw for carrying the plaster through the forward end of the barrel, a plastering nozzle, flexible means for conducting the air stream and plaster to the last named nozzle, means for mixing water with the plaster at the plastering nozzle, said feed screw being in the form of a worm with a helical blade extending forwardly in the barrel beyond the air nozzle and forming a coil head beyond the air nozzle, and means for feeding the plaster into the barrel at the rear of the same.

5. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, an air nozzle adjacent the forward end of the feed screw, means for delivering a current of air to the said nozzle through the feed screw for carrying the plaster through the forward end of the barrel, a plastering nozzle, flexible means for conducting the air stream and plaster to the last named nozzle, and means for mixing water with the plaster at the plastering nozzle, said feed screw being in the form of a worm with a helical blade extending forwardly in the barrel beyond the air nozzle and forming a coil head beyond the air nozzle, the inner diameter of said coil head being increased toward the delivery end of the barrel.

6. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, an air nozzle adjacent the forward end of the feed screw, means for delivering a current of air to the said nozzle through the feed screw for carrying the plaster through the forward end of the barrel, a plastering nozzle, flexible means for conducting the air stream and plaster to the last named nozzle, and means for mixing water with the plaster at the plastering nozzle, said feed screw being in the form of a worm having a double helical blade in the vicinity of the air nozzle, said

double blade projecting beyond the air nozzle and toward the delivery end of the barrel to form a coil head, and braces connecting together the blades forming the coil head.

7. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, an air nozzle adjacent the forward end of the feed screw, said feed screw having a tubular shaft; and a blower mounted on the machine frame for blowing air through the bore of the tubular shaft and through the said nozzle for carrying plaster through the forward end of the barrel.

8. In a plastering machine, the combination of a barrel for carrying plaster, a feed screw mounted in the barrel, said barrel projecting beyond the end of the feed screw at the delivery end of the barrel, means for rotating the feed screw to force the plaster through the end of the barrel, an air nozzle adjacent the forward end of the feed screw, means for delivering ingredients to form a plaster mixture, through the side wall of the barrel toward the rear end thereof, means formed on the feed screw for mixing the ingredients as the same are moved forwardly by the feed screw, said feed screw having a tubular shaft, means for blowing an air current through the said shaft and through the air nozzle, a hose leading from the delivery end of the barrel, a plastering nozzle carried by the end of the hose, and means for mixing water with the plaster at the plastering nozzle.

9. In a plastering machine, a plastering nozzle having a delivery mouth with an annular wall surrounding the delivery mouth and having a water duct therein extending along the outer side of said wall, said wall having a plurality of perforations therethrough located adjacent the tip of the nozzle for admitting small streams of water into the said mouth as the plaster passes from the same, and means for delivering water to said duct.

10. In a plastering machine, the combination of a cement bin and a sand bin, a barrel extending under the same, a feed screw mounted in the barrel, said barrel having a cement inlet and a sand inlet toward its rear end, means for forcing cement from the cement bin through the cement inlet, and means for forcing sand from the sand bin through the sand inlet, said feed screw having a tubular shaft with means on the outside of the shaft for mixing the sand and cement as the same are moved forwardly by the feed screw,

means for delivering an air blast through the tubular feed screw, said feed screw having an air nozzle at its forward end, a hose connected with the forward end of the barrel, a plastering nozzle attached to the forward end of the hose, and means for delivering a plurality of small streams of water into the plaster at the plastering nozzle.

11. In a plastering machine, the combination of a cement bin and a sand bin, a barrel, a feed screw mounted in the barrel, said barrel having a cement inlet and a sand inlet for delivering cement from the cement bin through the cement inlet, and means for delivering sand from the sand bin through the sand inlet, said feed screw having a tubular shaft and an air nozzle at the forward end of the barrel, means for delivering an air blast through the tubular shaft and through the air nozzle, and means for mixing the sand and cement in the barrel before the same are delivered by the feed screw to the forward end of the barrel.

12. In a machine for delivering a composition composed of different ingredients, the combination of a barrel, feed means within the barrel for delivering the mixture from the same, said barrel having an inlet for one of the ingredients and an inlet for another ingredient, means for positively delivering a measured quantity of the different ingredients through their corresponding inlets into the interior of the barrel, said feed means within the barrel having means for mixing the ingredients delivered thereto.

13. In a machine for delivering a composition composed of different ingredients, the combination of a barrel, feed means within the barrel for delivering the mixture from the same, said barrel having an inlet for one of the ingredients and an inlet for another ingredient, means for positively delivering a measured quantity of the different ingredients through their corresponding inlets into the interior of the barrel, said feed means within the barrel having means for mixing the ingredients delivered thereto, a hose attached at the forward end of the barrel to receive the mixture from the same, and means for delivering an air blast through the said feed means and into the hose for carrying forward the mixture into the hose.

14. A machine constructed as described in claim 12, having means for varying the ratio of the drive for the means that delivers the different ingredients into the barrel so as to enable the proportions of the ingredients to be altered.

EDWARD P. GASSMAN.

GEORGE J. McCAUGHEY.