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SPRAY PLASTERING MACHINE

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Fig. 2

Fig. 1

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This invention relates to improvements in spray plastering machines. In this type of machine, plaster is mixed in a rotary drum and then discharged or delivered into a hopper from which it may be pumped by a plater pump to an applicator nozzle which is used to apply the plaster to the surfaces to be plastered.

Prior art machines of this type have been subject to certain deficiencies and shortcomings which it is the object of this invention to overcome.

The machine of this invention features a combination and arrangement of parts which improves the compactness of the over-all assembly and reduces its over-all height thereby increasing its adaptability to various types of service.

Particularly, the machine features an improved arrangement wherein the mixer is directly over the hopper with novel hinged chute attachments whereby the contents of the mixer can be discharged either directly into the hopper or alternatively into a wheel-barrow adjacent to the machine. Accordingly, the machine adapts itself to different types of service wherein the plastering may be performed using the nozzle fed from the plater pump or the plastering may conveniently be performed from the wheel-barrow.

The machine is provided with a variable speed drive for the plater pump which is remotely controlled from a control at the spray nozzle. In this manner, the machine is made highly adaptable to different types of service where in the length of the delivery hose may, for example, be very long with the spray nozzle at a considerable distance from the mixing machine. The arrangement facilitates the adjustment of plaster pumping pressure as may be necessary in accordance with variations in the density of the mix.

Accordingly, a primary object of the invention is to provide an improved spray plastering machine wherein a mixer is provided directly over a discharge hopper with a hinged adjustable chute whereby the contents of the mixer can be dumped or discharged directly into the hopper or alternatively, with the hinged chute in another position into a wheel-barrow.

Another object of the invention is to provide an improved spray plastering machine as in the foregoing, wherein hinged adjustable chutes are provided which in one position enable discharge of the mixer contents directly into the hopper and in another position in which one of the chutes is reversed, the same chutes deliver the mixer contents into a wheel-barrow, or the like.

Another object of the invention is to provide an improved spray plastering machine having a remotely controlled variable speed drive for the plater pump associated with the machine, the variable speed drive being controlled from the spray nozzle.

Another object is to provide a spray plastering machine having an improved arrangement of parts wherein the machine is more compact and has a lower over-all height and is otherwise more adaptable to varying types of service.

Further objects and numerous additional advantages of the invention will become apparent from the following detailed description and annexed drawings wherein:

FIG. 1 is a side elevational view of the machine of the invention;
FIG. 2 is a plan view of the machine of FIG. 1;
FIG. 3 is a side elevational view partly in section of the machine, and also showing diagrammatically the spray nozzle and connections thereto;
FIG. 4 is a front end view of the machine; and
FIG. 5 is a detail sectional view of the hopper of the machine.

Referring now to the various figures of the drawing, the machine comprises a frame or chassis indicated generally at 10. The machine is supported for transportability on side wheels, as designated at 11 and 12.

The mixing drum is designated generally at 15 and it is supported over a discharge or receiving hopper designated at 16. The mix from the hopper 16 is discharged or delivered into a plater pump in the form of a screw conveyor designated generally at 19.

The mix and the plater pump are driven by a prime mover shown as an internal combustion engine indicated at 21 which is supported within an engine housing 23 carried on the frame of the machine. Within the housing 23 are also carried the transmissions to the mixer rotor and the plater pump or conveyor and the variable speed controls as will be described.

The mixing drum 15 is circular and it is rotatably mounted on a shaft 25. The shaft 25 is rotatably journaled in bearings 27 and 28 at its ends. The shaft 25 has mounted on it within the mixing drum 15 the mixer or impeller blades as designated at 30. These blades are curved and angularly arranged to give a spiral mixing action to insure thorough agitation and mixing within the drum.

The mixer rotor comprising the shaft 25 and the blades 30 is driven by the prime mover 21, as will be described.

The drum 15 has on its ends supporting brackets 32 and 33 which are bolted to the ends of the drum and in which the shaft 25 is journaled.

The mixing drum 15 is open at the top, as may be seen in FIG. 2. At one side it has a flared angular loading opening as may be seen at 36. The plater is loaded into the drum through this loading opening. It has within it a group of baffles, as shown at 37 in the figures which are in staggered relationship as may be seen in FIG. 3. The machine is characterized in that it may be loaded by a single operator dumping a sack of plaster into the loading opening. The corners of the loading opening 36 are partly covered over as shown at 38.

At the other side of the upper part of the mixing drum 15, it has an outwardly flared discharge spout, as indicated at 46, which is of less length than the drum as shown. Numerical 41 designates a hinged discharge spout or chute which is adjustable about a hinge or pivot as shown at 42. The spout 41 is adjustable from the position shown to a clockwise rotated position wherein the contents of the mixer drum are discharged directly into the hopper, as will be described.

Numerical 45 designates an upright handle whereby the drum 15 may be rotated in a counter-clockwise direction looking at FIG. 4, to a position as shown wherein the handle is shown in broken lines. Clockwise rotation of the drum is limited by a limit stop 46 which engages with an upright supporting column 47 which will be described presently. Counter-clockwise rotation of the drum is limited by a limit stop 49 on the end of the drum which engages with the upright column 47.

The end bearing 27 is supported by the upright column 47 which is attached to the frame 10 at a lower part thereof. The column 47 extends below the frame 10 and at its lower end there is provided a hinged or foldable leg 52 which can be folded down to rest upon the ground to give stability to the machine during operation. The leg 52 can be latched in its extended position by way of bolt 53 moving through loops 54, as shown.

The other end bearing 28 is supported from an up-
standing post or column 55 upstanding from an angle bar within the engine housing 23, as may be seen in FIG. 3. The hopper 16 is rectangular in shape and is directly beneath the mixing drum, as may be seen in the figures. At the lower part, the hopper has inwardly tapered side-walls forming a funnel, as may be seen at 57, the hopper having a flanged opening 58 at the lower part so that it acts as a funnel discharging into this opening. The flanged opening 58 is bolted to a pipe elbow 60, which is also flanged and which is in turn attached by way of its flanged end to the conveying pipe 59 connecting the hopper 16 to the conveyor 19.

The hopper 16 is supported over the frame or chassis 10 of the machine, the funnel-shaped part of the hopper being within the frame as shown. The column 47 is adjacent the front of the hopper and on opposite sides of the column there are bracing strips 56 attached to the hopper, as may be seen in FIG. 3 and in FIG. 4.

The wheels are rearward of the mixer and hopper and they are mounted on axles upwardly offset from a transverse member 48 which may be welded to the under sides of the frame 10.

As may be seen in FIGS. 4 and 5, the upper part of the hopper 16 is curved at one side to conform to the curvature of the mixing drum 15. The inlet to the hopper for contents dumped or discharged from the mixing drum 15 is at the upper left side of the hopper, as may be seen in FIGS. 4 and 5. The contents of the mixing drum 15 may be dumped or discharged from the discharge spout or opening 40 directly into the hopper or into a wheel-barrow adjacent to the machine. This is accomplished by way of an adjustable hinged chute or spout, as designated at 61. This spout is arcuate, as shown, and is hinged by way of a piano hinge, as shown at 62, to the upper outer edge at the top of the hopper 16. The piano hinge has a hinge pin 63. The inner edges of the spout or chute 61 conform to the curvature of the mixing drum and in its position, as shown in full lines in FIGS. 4 and 5, its lower end registers with the inlet opening at the upper left side of the hopper 16. With the spout or chute 61 in the position shown in full lines for delivery or dumping into the hopper, the machine is operated with the chute 41 rotated to its broken line position shown in the upper part of FIG. 4, wherein the discharge spout 40 of the mixing drum 15 discharges directly into the chute 61 and into the inlet opening of the hopper 16. Thus when the mixing drum is rotated to the broken line position of handle 45, the material is discharged through spout 40, the chute 41 forming a baffle over the discharge spout 40. During this operation the discharge spout 40 and chute 41 move down through chute 61 to the hopper inlet.

When the type of service being performed is such that it is not appropriate to use the spray nozzle or in the event of breakdown of the platter pump, the hinged chutes are adjustable to a position for delivering or dumping the hopper contents into a wheel-barrow. For this operation, the chute 61 is rotated in a counter-clockwise direction about its hinge to the broken line position, as shown in FIG. 4. Chute 41 is held in the counter-clockwise rotated position shown in FIG. 4 so that in a dumping operation when the mixing drum 15 is rotated counter-clockwise by the handle 45, the chute 41 comes into the broken line position shown in FIG. 4 and the spout 40 will now discharge into the chute 41 and thereto into the chute 61 for delivery into a wheel-barrow.

The chute 61 has an extending arm 65 which in the full line position of FIG. 4 engages with a spring clip 66 on the front end of the hopper 16 to hold the chute in position.

The conveyor 19 is of a known type comprising a cylindrical housing as shown, which is supported by way of hanger brackets 70 and 71 bolted to parts of the frame 10, as may be seen in FIGS. 3 and 4. The front part of the frame is of triangular structure generally, as may be seen in FIG. 2, comprising angular side members 74 and 75 and a transverse member 76 with a central draw bar or draft tongue attached to the transverse member 76 and extending forwardly through a shorter transverse member 77 extending between the ends of the angular members 74 and 75. The draft tongue is designated at 80.

The platter pump or conveyor 19 is at one side of the machine and the pipe 59 taking the discharge from the hopper 16 feeds into the side of the platter pump. The platter pump comprises a internal screw conveyor driven by a shaft 82 which has mounted on it a sprocket wheel 83 driven through a link chain 84 from another sprocket wheel 85. The platter pump 19 discharges into a conduit 90 leading to a spray nozzle 91 which is powered by compressed air fed to it through a conduit 92, the spray nozzle operating as an aspirator to discharge the platter therefrom for plating purposes. Provided at the nozzle 91 is a push-button switch 93 which controls the variable speed drive for the platter pump 19.

The prime mover for the equipment as shown is the internal combustion engine 21 having an exhaust stack 94 and an air intake 95. At the left end of the engine 21 is a housing 96 containing a speed-reducing gear transmission or speed changer, whereby power at reduced speed may be delivered to the mixer or rotor within the mixing drum 15.

Extending from the variable speed transmission 96 is a shaft 98 having on it a sprocket wheel 99 which through a link chain 100 drives another sprocket wheel 102 mounted on a counter-shaft 103. The counter-shaft 103 is journaled in pedestal bearings 105 and 106 supported on angle bars within the engine housing 23, as shown. Mounted on the counter-shaft 103 is a planetary gear 107 which meshes and drives a large gear 108 on the shaft 25 of the rotor within the mixing drum 15.

The speed reduction within the transmission 96 may be adjusted by a control handle 110 which is on the outside of the equipment housing 23 as may be seen in FIG. 4.

The shaft 112 of the engine 21 at the right end has mounted on it a pulley 113 which drives another pulley 114 through a belt 115. The pulley 114 is on the shaft of an air compressor 116 which discharges air under pressure through the conduit 92 which is delivered to the nozzle 91 for operating the platter spray nozzle, as previously described.

Numerical 120 designates a counter-shaft which with axially aligned shaft 119 is journaled in pedestal bearings 121 and 122 supported from angle bars within the equipment housing 23, as shown. Mounted on the counter-shaft 120 is a variable speed transmission 125 which may be of conventional type. The counter-shaft 120 has a sprocket wheel 127 on the end thereof which is driven through a link chain 128 from a sprocket wheel 129 also on the shaft 112 of the engine 21.

The speed changer 125 is controlled by a bushing 132 which is slidably on the counter-shaft 119 and translates in and out with respect to the housing of the speed changer 125. The bushing 132 is adjusted by a control arm 134 which has a yoke at the lower part pivoted to the bushing 132 by a pivot 135. At an intermediate part of the arm 134, it has a screw-threaded coupling 137 pivotally attached to it and engaged with this coupling is a screw-threaded rotatable stem 138. The stem 138 is driven by an electric motor 140 through a coupling 141.

The arm 134 has an upwardly extending part 143 which operates between limit switches 145 and 146 having stems with rollers at their ends engageable with the part 143 of the control arm. The limit switches 145 and 146 control separate fields of the motor 140 so that either one field or the other can be energized through its respective limit switch by way of circuits, not shown,
for thereby reversing the field of the motor and thus reversing its direction of operation. The armature of the motor 140 is controlled from the push button switch 93 through a circuit, as shown at 150, supplied with power from a suitable power source, as indicated at 151.

As can be understood, the speed-changer 125 is adapted for varying the speed of its output shaft 119 on the end of which is a sprocket wheel 155 which drives a sprocket wheel 156 through a link chain, the sprocket wheel 156 being on the end of a counter-shaft 159 supported in bearings 160 and 161 attached to angle bars, as shown within the equipment housing 23. On the other end of the counter-shaft 159 is the previously described sprocket wheel 85 through which the plaster pump is driven. From the foregoing, it can be seen that the operator can control the speed at which the plaster pump is driven and, accordingly, can control the pressure at the spray nozzle from the push-button control at the nozzle. In operating the motor 140, the arm 134 can be driven to any desired point intermediate the limit switches and stopped in that position with the speed-changer 125 thus adjusted to that point. The arm 134, in other words, can at any time be driven to the limit of its travel in either direction and then driven back to any desired intermediate point.

Summarizing the overall operation, the plaster to be mixed is loaded into the mixing drum 15 as described and mixed by the rotor therewithin operating at a speed which may be adjusted to a suitable value by way of the adjusting handle 110.

While the mix is to be dumped into the hopper, the drum is manually rotated by the handle 45 and the mix is dumped directly into the hopper, if the hopper is to be used. If the hopper and the plaster pump are not to be used, the chutes 41 and 61 are appropriately positioned in the manner previously described and when the mix is dumped into the chute 61 it is reversed so that the mix goes through the chute in the opposite direction into a wheel-barrow.

During operation, when the plaster pump is being used, the operator may at any time from the nozzle which may be at a remote point, adjust the speed of the plaster pump and accordingly the rate at which the plaster is delivered through the nozzle.

From the foregoing, those skilled in the art will observe that there has been provided a novel spray plastering machine having the advantages of compactness and limited over-all height and great adaptability to various types of service without the use of the hopper or plaster pump, adjustments can be made in the attachments described for providing maximum convenience in discharging the plaster into a wheel-barrow for that type of service.

While the instant invention has been shown and described herein in which it is conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of the invention which is therefore not to be limited to the details described herein but is to be accorded the full scope of the claims.

We claim:
1. In a spray plastering machine in combination: means comprising a rotary mixing drum; means comprising a hopper directly below said drum, said hopper having a receiving opening at one side thereof; means comprising a discharge spout adapted to discharge contents of the drum upon rotation thereof; and means comprising a hinged chute associated with the delivery opening of said drum; a second hinged chute associated with the inlet opening of said hopper; and said hinged chute having a position adapted to receive the discharge from the delivery opening of the rotary drum and to deliver said discharge outside of said hopper.
2. In a spray plastering machine in combination: means comprising a rotary mixing drum; means comprising a hopper directly below said drum, said hopper having a receiving opening at one side thereof; said mixing drum having a discharge spout adapted to discharge contents of the drum upon rotation thereof; a hinged chute associated with the delivery opening of said drum; and a second hinged chute associated with the inlet opening of said hopper; said second hinged chute having a reverse position about its hinge wherein it is adapted to deliver material outside of said hopper; and said first hinged chute having a position with respect to the discharge spout of said drum wherein upon rotation of the drum it is adapted to deliver material into said second chute in the other position of the second chute wherein said second chute delivers the material outside of said hopper.
3. The structure of claim 2 wherein said second hinged chute is of curved conformation conforming to the curvature of said drum whereby in its position for delivery of material into hopper, the said discharge spout and first hinged chute move downwardly through it to the hopper inlet opening.
4. In a spray plastering machine in combination: means comprising a rotary mixing drum; said drum having a discharge spout through which material is adapted to be discharged upon rotation of the drum; means comprising a hinged delivery chute having a curvature conforming to that of the drum and adapted to receive material discharged from the discharge spout of the drum; said hinged chute being rotatable about its hinge to a reverse position disposed outwardly from the drum; and means comprising a second hinged chute associated with the discharge spout of the drum movable to a position about its hinge wherein it delivers material from the discharge spout of the drum to the hinged delivery chute in the reverse position of the chute.
5. The structure of claim 4 wherein said second hinged chute has a position forming a baffle over said discharge spout.
6. In a spray plastering machine, in combination: a frame; a cylindrical mixing drum mounted on said frame for selective tilting about a horizontal axis; rotary plaster mixing means mounted in said drum; a receiving hopper fixedly mounted on said frame directly below said drum and having an inlet opening; said drum having a discharge spout for discharging material therefrom when said drum is tilted about said axis; a delivery chute mounted on said hopper and extending upwardly along said drum to receive material discharged from said spout and positioned to direct said material into said inlet opening of said hopper.
7. The structure of claim 6 including a chute movably mounted on said drum adjacent said discharge spout, said second-mentioned chute being movable from a first position wherein it directs material from said spout away from said inlet opening to a second position wherein it forms a baffle over said discharge spout.

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