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2,712,475

AIRGUN MATERIAL FEEDER

Filed Dec. 23, 1949

2 Sheets-Sheet 1

FIG. 1.

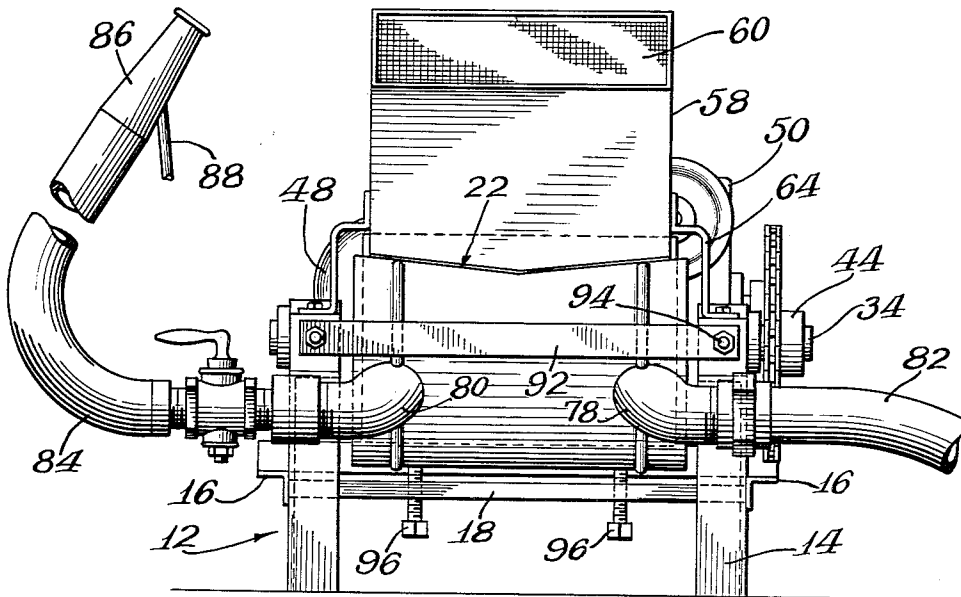
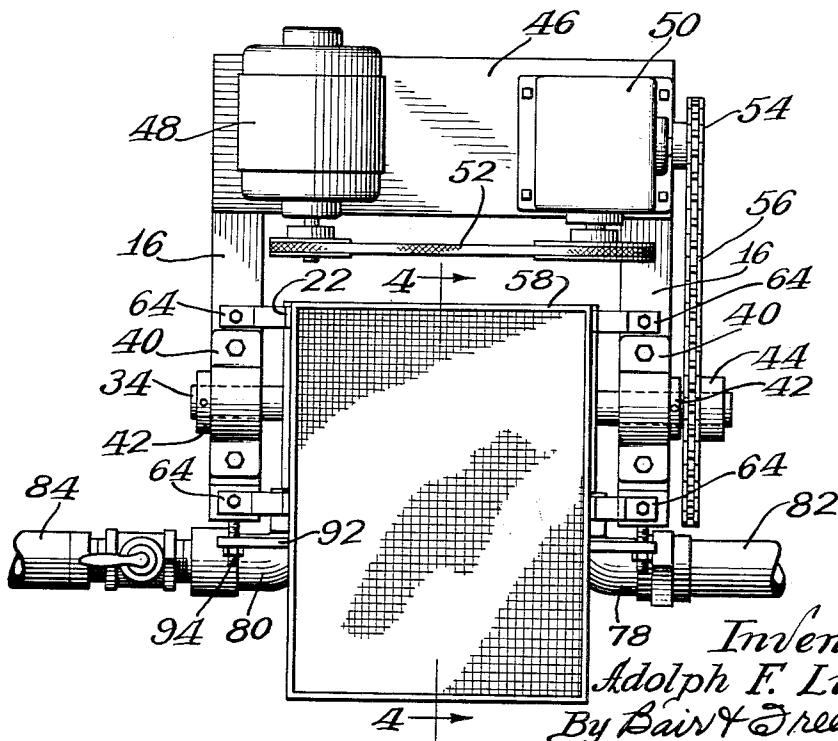


FIG. 2.



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FIG. 3.

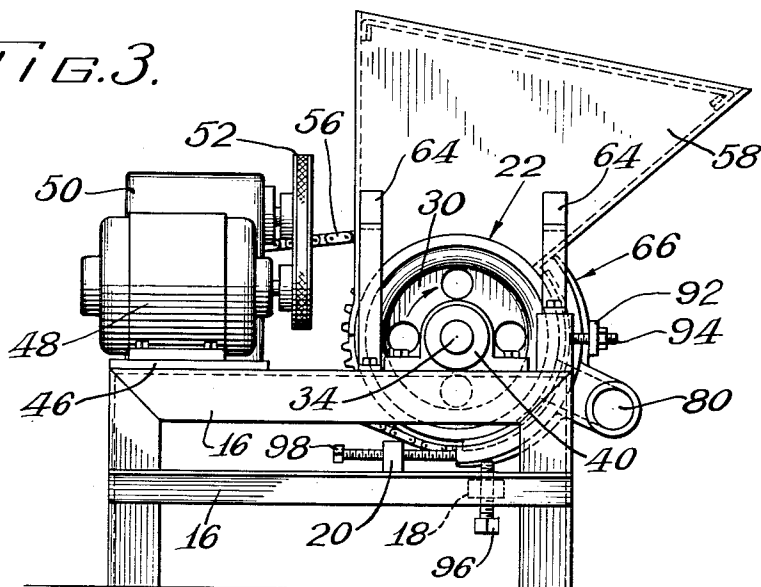


FIG. 4.

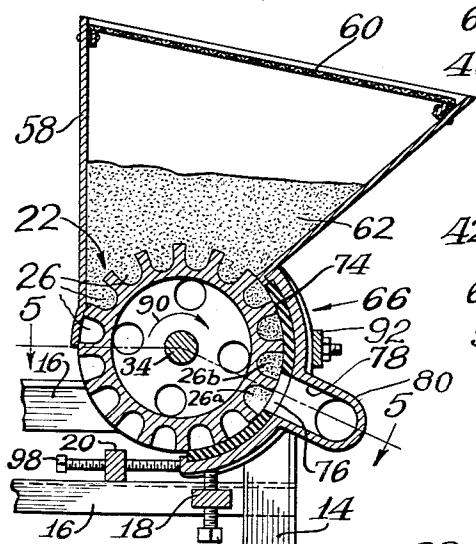


FIG. 5.

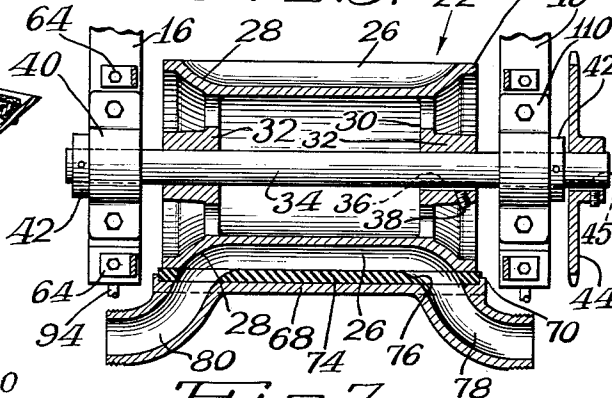


FIG. 7.

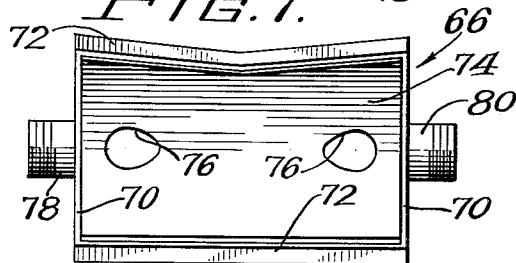
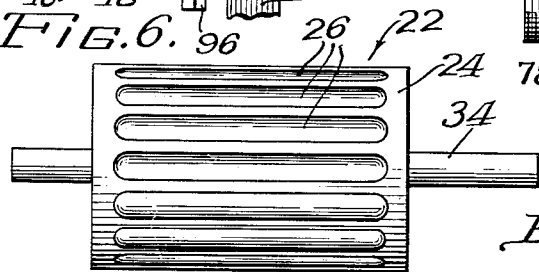


FIG. 6.



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AIRGUN MATERIAL FEEDER

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3 Claims. (Cl. 302—49)

This invention relates to apparatus for applying cementitious material to a wall or other place of use and consists essentially of a mechanism for discharging material into an air stream and the air stream carries the material to the point of use.

The machine includes a rotatable drum having a plurality of pockets in its peripheral surface and a hopper or container for the material to be conveyed; the material is deposited from the hopper into the pockets and the drum rotates for carrying the material in the pockets and discharging it into an air stream, whereupon the air stress carries the material to the point of use.

An object of the present invention is the provision of a mechanism of the general character above referred to in which a novel type of rotatable drum is employed.

Another object is the provision of a mechanism of the character referred to in which a curved plate or shoe is positioned in engagement with the drum and in which the shoe retains the material in pockets in the drum through a portion of the rotation of the drum, the shoe being provided with air passages which communicate with the pockets and are adapted for conveying an air stream through the pockets for carrying the material to the point of use.

Another object of the present invention is the provision of a rotatable drum and shoe in which the shoe is provided with a resilient surface for engagement with the drum whereby an effective and efficient air seal is attained.

Still another object is the provision of a machine having a rotatable drum and shoe as above referred to in which the danger of the material becoming clogged in the air line is minimized.

Still another object of the invention is the provision of a mechanism of the character above referred to, which is made up of a minimum of parts all detachable from one another so that the machine can be readily cleaned.

Another object is the provision of a novel construction mechanism for conveying material into an air stream in which the material is substantially uniformly discharged into the air stream.

With these and other objects in view, my invention consists in the construction, arrangement, and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, wherein:

Figure 1 is a front elevational view of the machine of the present invention;

Figure 2 is a plan view of the machine;

Figure 3 is an end view from the left of Figure 1;

Figure 4 is a sectional view taken on line 4—4 of Figure 2;

Figure 5 is a sectional view taken on line 5—5 of Figure 4;

Figure 6 is a view of the drum of the machine; and

Figure 7 is a view of the inner surface of the shoe that engages the drum.

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Referring now in detail to the drawings, the machine includes a supporting stand or framework indicated generally at 12, which is made up of supporting legs 14, top supporting braces 16, and transverse bars 18 and 20, the latter being mounted on certain of the horizontal braces 16.

The drum of the material discharging mechanism is indicated as a whole at 22 in Figure 6, and in section in Figure 5. The drum 22 includes an outer peripheral cylindrical wall 24 having a plurality of pockets 26 which are spaced peripherally around the drum, extending longitudinally thereof, parallel with the axis of the drum. The pockets 26 extend substantially the full length of the drum and are of a depth as indicated in Figure 5, that is, a depth relatively small with respect to the radius of the drum. The outer ends of the pockets 26 slope as indicated at 28, from the floor of the pocket upwardly and outwardly away from each other and merge with the outer peripheral surface of the drum which is smooth outside the contour of the pockets. The surfaces 28 are preferably curved as indicated clearly in Figure 5. The drum 22 includes end plates 30 provided with hubs 32 in which is mounted a shaft 34. One of the hubs 32 may be provided with key means 36 for securing the drum for rotation with the shaft. A set screw, such as 38, may be employed for securing the key in place.

The drum 22 may be fabricated by any preferred practical manufacturing methods and the particular detailed construction thereof, beyond that above specifically referred to, may be as desired.

The ends of the shaft 34 extend outwardly beyond the drum and are mounted in bearing means 40, which in turn are mounted on the horizontal braces 16. Collars such as 42 may be employed for retaining the shaft against axial thrust. Mounted on one end of the shaft 34 is a sprocket 44 secured by key means 45 or by other means.

A deck or supporting plate 46 is mounted on the braces 16 in the rear of the drum and the main mechanism of the machine. The plate 46 supports an electric motor 48 and a speed reducer 50. The motor and speed reducer are provided with shafts and pulleys, a driving belt 52 being trained over the pulleys. The driven shaft of the speed reducer 50 is provided with a sprocket 54 over which is trained a drive chain 56, the latter being also trained over the sprocket 44 for driving the drum. The drive means just described may be altered to suit conditions and does not form an essential of the present invention, but is referred to for the purpose of fully describing the complete machine.

A hopper is shown at 58 having an open upper end in which is mounted a screen 60. The hopper 58 preferably slopes downward from the rear to the front for convenience in filling the hopper which is ordinarily done manually.

The hopper 58 tapers inwardly downwardly and its bottom open end fits over the drum 22, the end wall members of the hopper having curved openings to conform to the curvature of the drum, and the other walls of the hopper being of such shape as to fit relatively close to the drum to prevent the inadvertent escape of material out of the hopper and spilling around the drum. The material to be conveyed is indicated at 62 in Figure 4. Brackets such as 64 are secured to the end walls of the hopper and detachably secured to the frame 12 of the machine for mounting the hopper in position. The transverse dimension of the hopper is greater than the length of the pockets 26, but less than the length of the drum.

The numeral 66 indicates generally the plate or shoe which cooperates with the drum for controlling the discharge of material from the drum. The plate 66 is

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substantially the same length as the drum, as illustrated in Figure 1, and includes an outer metallic shell element 68 which determines the size and shape of the plate. The plate is curved to conform to the curvature of the drum and partially surrounds the drum, as illustrated in Figure 4. The shell element 68 has flanges 70 at its ends and flanges 72 in its sides, all extending in from its concave side defining a shallow pocket in which is fitted a resilient liner 74, which is preferably of rubber or rubber product; the liner may be of other materials having the desired resilient characteristics. The liner 74 is of sufficient dimensions to snugly fit the flanges so that it is normally retained in the shell, and is of sufficient thickness to extend radially inwardly beyond the flanges. The inner concave surface of the liner 74 is smooth and provided with holes 76 in register with pipe fittings 78 and 80. The fittings 78 and 80 are indicated as being integral with the shell element 68 but of course they may be separate from and secured to the shell element by any preferred means. The pipe fittings 78 and 80 are secured to the outer side or surface of the shell element 68 and are adapted for securement thereto of conduits 82 and 84 which are preferably flexible hoses. Convenient coupling means are employed for securing the hoses to the pipe fittings. The hose 82 is adapted to be connected with a source of compressed air and the hose 84 is provided with a mixing nozzle 86 having a water intake element 88 through which water is adapted to flow and mix with the material in the mixing nozzle.

The plate or shoe 66 is fitted against the drum 22 closely adjacent the hopper 58 on the posterior side thereof with respect to the rotation of the drum as indicated by the arrow 90. The plate is retained in position by a transverse bar 92 which is mounted on the frame by means of bolt and nut means 94. The bar 92 directly engages the shoe and the nuts are tightened up to bias the plate into engagement with the drum, there being a space between the ends of the bar and the framework to permit all of the biasing force to be received by the drum. The bottom portion of the plate or shoe 66 is secured in tight engagement with the drum by means of set screws 96 threaded through tapped holes in the transverse bar 18 and tightened up against the shoe. The set screws 96 also are effective for directing all of the biasing force exerted against the plate onto the drum. Additional set screws 98 are threaded through the transverse bar 20 and positioned horizontally for engaging the lower peripheral edge of the plate 66 to prevent rotation of the plate that the rotation of the drum tends to cause. The plate or shoe 66 is, therefore, demountably held in place by the bar 92 and by the set screws 96 and 98. By removing the nuts on the bolts 94, the bar 92 can be removed and thereafter loosening of the set screws 96 permits the pressure shoe to be readily demounted from the remainder of the mechanism. The individual adjustability of the set screws 98 accommodates any slight misalignment of the frame.

The openings 76 and the interior of the pipe fittings 78 and 80 are identical in size and these openings have a peripheral dimension greater than the peripheral dimension of any one of the pockets 26 and are sufficient in width to overlie portions of two adjacent pockets, under certain conditions, as indicated in Figure 4. The interiors of the pipe fittings 78 and 80 are shaped and inclined so as to form smooth and direct linear extensions of the pockets 26 as determined by their sloped end portions 28. The outer ends of the pipe fittings are rebent for convenience in attaching the hoses thereto.

The material to be conveyed is placed in the hopper 58. Assume first that the material is mixed sand and cement for forming concrete after the addition of water thereto. The drum 22 is rotated clockwise (Figures 3 and 4) and the material in the hopper 58 deposited in the pockets is carried around with the drum. As the

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pockets reach the openings 76, the air stream passing through the intake hose 82 flows through one or more of the pockets and carries the material out of the pockets. It is to be noted that the material is not first discharged from the pockets and later picked up by the air stream, but instead the air is directed through the pockets and the material is carried out of the pockets. The air stream continuing through the pipe fitting 80 and hose 84 carrying the material with it, reaches the mixing nozzle 86. The flow of air causes an inspirator effect for drawing water through the fitting 88 which is attached to a source of water. The dry material is suspended in the air stream and the inspirator effect causes the water to be dispersed and it thoroughly wets and mixes with the material. The nozzle is then directed to the point of use, such as a wall in a plastering operation.

Attention is directed particularly to Figure 4 in which it is noted that two of the pockets 26 which, for convenience, are indicated as 26a and 26b, have portions in register with the holes 76. The leading pocket 26a is in receding position with respect to the holes 76 and in that position it is nearly emptied of the material. In the same position, the succeeding pocket 26b has only a small portion in register with the holes 76, and the air stream flows through that pocket to a limited extent, carrying the material with it. As the pocket 26b moves forward for complete registration with the holes, the material in that pocket continues to be carried out. Thus, material from each pocket begins to be carried out before all of the material is carried out of the preceding pocket, causing a substantially uniform flow or discharging action of the material from the pockets. The linear extension of the pipe fittings 78 and 80 with the end portions of the pockets is effective for producing an even flow of the air stream and a resulting even discharging action of the material from the pockets. The pockets may also be known as dispersion throats or chambers because of the function they perform.

The resilient liner 74 is brought into relatively tight engagement with the drum so that the air from the air stream does not accidentally escape from its intended course.

The above description considers the mechanism as a device for applying cementitious material. The device also can be used for sand blasting operations, in which case only sand is deposited in the hopper and the fitting 88 is eliminated from the nozzle 86. In that case, sand is blown in dry form directly onto the surface that is being cleaned by the sand blasting operation.

It will be evident from the above description that clogging is reduced to a minimum because of the tight engagement of the plate or shoe 66 with the drum and the manner in which the air stream is caused to flow into and through the pockets. There is no discharge chamber into which the material is deposited and from which the air stream picks it up. In the latter case, such an arrangement constituted an objection to the previous types of mechanisms. In the present case that objection is overcome because the material is not discharged from the pockets except by the action of the air stream itself and therefore there is substantially no opportunity for clogging of the air stream conduits.

The plate or shoe 66 and the hopper 58 are both readily removable from the machine, after which the drum is exposed; all of the parts can then be readily cleaned. An exceedingly simple machine for the desired purpose is thus produced. The machine is relatively small and conveniently portable. If desired, the machine can be built or mounted on a portable truck.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

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I claim as my invention:

1. A device for use in effecting transfer of material in bulk to a substantially continuous discharge stream thereof comprising, a supporting frame, a drum rotatably mounted on said frame with its axis substantially horizontal, said drum having elongated axially extending pockets spaced circumferentially in its periphery, means above said drum for feeding material into said pockets as said drum rotates, an arcuate discharge plate registering with a portion of the periphery of said drum, a resilient liner positioned between said discharge plate and said drum and engaging said drum, said discharge plate and resilient liner having spaced apart inlet and outlet openings therethrough with which the material filled pockets register as the drum rotates, said openings being adapted for connection with conduits for conveying an air stream through said openings and registering pockets, said resilient liner having a leading and trailing edge respectively across which a pocket first and last passes as the drum rotates, said leading edge of the liner being inclined with respect to the longitudinal edges of said elongated pockets, whereby different portions of the longitudinal edges of the pockets successively pass the leading edge of the liner to provide for smoother movement between the drum and the liner.

2. A device for use in effecting transfer of material in bulk to a substantially continuous discharge stream thereof comprising, a supporting frame, a drum rotatably mounted on said frame with its axis substantially horizontal, said drum having elongated axially extending pockets spaced circumferentially in its periphery, means above said drum for feeding material into said pockets as said drum rotates, an arcuate discharge plate registering with a portion of the periphery of said drum, a resilient liner positioned between said discharge plate and said drum and engaging said drum, said discharge plate and resilient liner having spaced apart inlet and outlet openings therethrough with which the material filled pockets register as the drum rotates, said openings being adapted for connection with conduits for conveying an air stream through said openings and registering pockets, said resilient liner having a leading and trailing edge respectively across which a pocket first and last passes as the drum rotates, said leading edge of the liner being inclined symmetrically from both its axially spaced edges to an apex located substantially midway between said axially spaced edges and being inclined with respect to the longitudinal edges of said elongated

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pockets, whereby different portions of the longitudinal edges of the pockets successively pass the leading edge of the liner to provide for smoother movement between the drum and the liner.

3. A device for use in effecting transfer of material in bulk to a substantially continuous discharge stream thereof comprising, a supporting frame, a drum rotatably mounted on said frame with its axis substantially horizontal, said drum having elongated axially extending pockets spaced circumferentially in its periphery, means above said drum for feeding material into said pockets as said drum rotates, an arcuate discharge plate registering with and extending over substantially one entire lower quadrant of the drum and over only a portion of the adjacent upper quadrant, said discharge plate having a leading and trailing edge respectively across which a pocket first and last passes as the drum rotates, a first clamping means carried by said supporting frame and positioned closer to the leading edge than the trailing edge of said discharge plate engaging said discharge plate and clamping it substantially radially against said drum, stop means carried by said supporting frame engaging the trailing edge of said discharge member and applying restraining force thereto in a direction substantially opposite to the direction of the clamping force applied to said discharge plate by said first clamping means, and a second clamping means carried by said supporting frame engaging the discharge plate adjacent said trailing edge and applying forces to said discharge plate in a direction substantially normal to the direction of the restraining force of the stop means and substantially radially against said drum, whereby said second clamping means restrains any attempt of the trailing edge of said discharge plate to be pulled away from said drum by the engagement thereof with said stop means.

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