July 28, 1931. H. S. JOHNS 1,816,587

BAG FILLING AND WEIGHING MACHINE

Filed Oct. 5, 1929

Fig. 1.

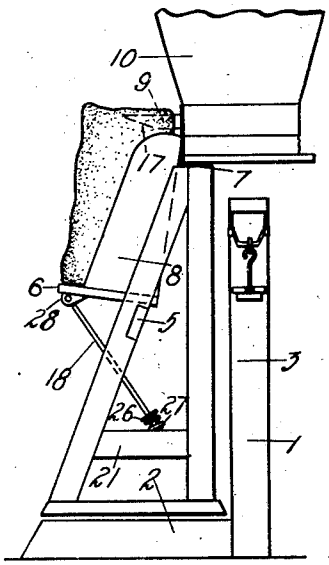


Fig. 2.

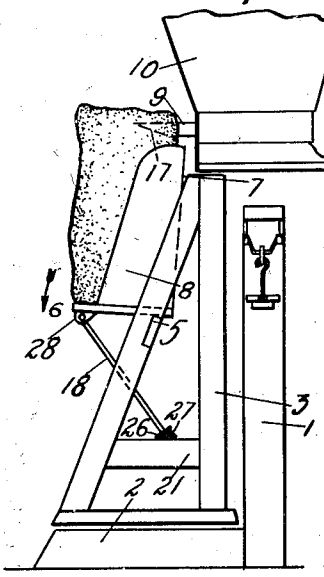


Fig. 3.

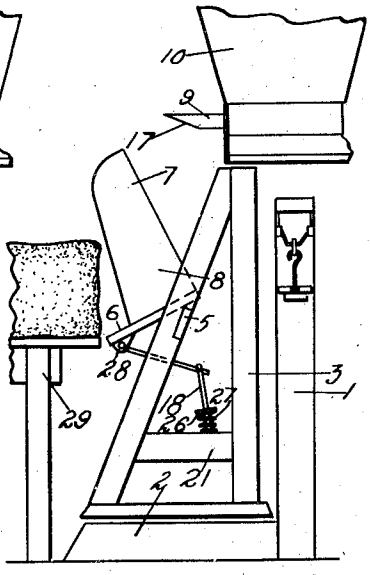


Fig. 4.

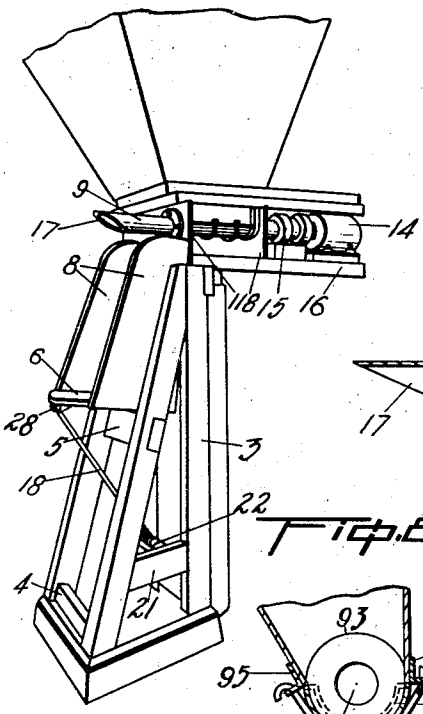


Fig. 5.

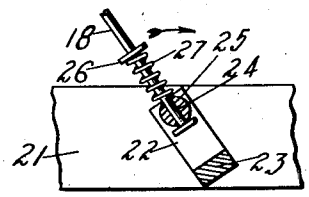


Fig. 6.

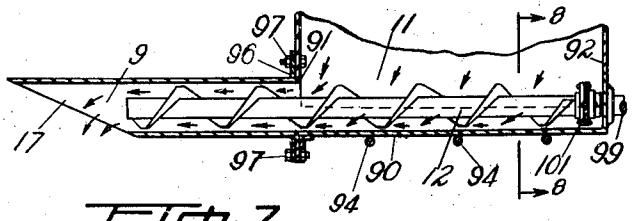


Fig. 7.

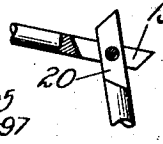
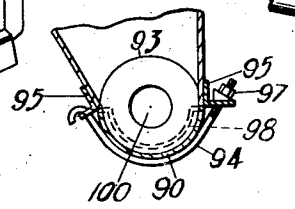


Fig. 8.



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UNITED STATES PATENT OFFICE

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BAG FILLING AND WEIGHING MACHINE

Application filed October 5, 1929. Serial No. 397,609.

My invention relates to improvements in bag filling and weighing machines, and the object of my invention is to construct a machine of this type which is particularly adapted for handling granular material such as dry plaster in which coarse substances such as gravel or finely broken stones are contained.

The standard machines in general use utilize a flipper or swinging blade mechanism as the means for delivering the powdered material from the machine hopper into the bag and whilst these machines are quite satisfactory for the purpose of delivering powdered or similar material they are unsuitable for the delivering of granulated material in which crushed stone or other pieces of comparative large size are contained, as the blades of the flipper become very quickly damaged through recurrent contact with the larger pieces of material contained in the powdered or granulated material.

To overcome this objection and to provide a positive and sturdy device I utilize a screw conveyer and nozzle as the means for feeding the material from the hopper into the bag, and also provide a bag supporting mechanism whereby the bag being filled is at no time suspended from the nozzle. It is to be understood, of course that the bags used for this purpose are of the self sealing type wherein a small orifice is provided in one of the upper corners of the bag for the reception of the delivery nozzle.

Another object of my invention is to so mount my screw conveyer that it freely extends through the bottom of the hopper and the nozzle without bearing support so that the material has an unobstructed passage through the nozzle and whereby the material in being fed through the nozzle in itself constitutes a bearing for the conveyer, such conveyer being permitted a flexible movement so that it centres itself within the material passing through the nozzle. Another object of my invention is to utilize such unsupported screw conveyer as a vibratory means for shaking down any material that may become lodged upon the sides or in the corners of the hopper when the residue material is being removed from the hopper.

A further object of my invention is to provide a construction wherein nozzles and screw conveyers of various diameters may be replaced within the bottom of the hopper.

A still further object of my invention is to so construct the bag supporting member of my device that it tilts and adjusts itself in relation to the nozzle as the material is gradually fed thereinto, and a further object of my invention is to provide a means whereby the bag supporting member is finally tilted so that it removes the bag from the nozzle and delivers such filled bag upon a receiving conveyer or bench.

My invention consists of a bag filling and weighing device constructed and arranged all as hereinafter more particularly described and illustrated in the accompanying drawings, in which:—

Figs. 1, 2 and 3 are three similar side elevational views of my device showing the bag as it is placed on the machine to be filled, showing the bag partially filled, and also showing it after it is filled and being delivered.

Fig. 4 is a perspective view of my device.

Fig. 5 is a cross sectional view through a fragmentary portion of my device showing the resilient part of the bag supporting member.

Fig. 6 is a vertical longitudinal view through a fragmentary portion of the hopper and also through the material delivery nozzle.

Fig. 7 is a side elevational view of a fragmentary portion of the jointed elbow rod adapted to support the bag supporting member, and

Fig. 8 is a vertical cross-sectional view taken through the line 8—8, Fig. 6.

Like characters of reference indicate corresponding parts in the different views.

The bag supporting portion of my device is mounted upon a standard weighing scales 1, so that the material passing from the device into the bag is weighed, and a suitable electrical control is made between the movable portion of the scales and the motor for actuating the screw conveyer whereby the motor

stops when a certain predetermined weight of material has been delivered into the bag.

Upon the stand 2 of the scales I mount a pair of substantially A-shaped frames 3 which are supported in spaced apart relation and connected by cross members 4 and 5, the cross member 5 being positioned intermediately of the height of the frames 3 and is adapted to receive the bag supporting member which is hingedly mounted thereon.

The bag supporting member consists of a bottom platform 6 and back portion 7 together with side members 8 which are attached to the edges of the bottom and back member, thus forming an open front and open top receptacle. The bag supporting member extends upwardly from the cross member 5 to a point directly underneath the delivery nozzle 9 and normally lies in a rearwardly inclined position as illustrated in Fig. 1.

As it is very often required from time to time to fill bags of various capacities I propose to so construct my bag supporting member that it is capable of adjustment and to attain this end I intend to movably mount the back portion 7 and side members 8 upon the platform 6, and also to permit the height of the platform 6 to be adjusted I intend to adjustaby mount the cross member 5 so that it may be moved either up or down the frames 3. I do not deem it necessary to illustrate or describe my adjustable means as such practice is common in many types of machines and can be readily constructed by those skilled in the art, for example by the use of adjusting screws.

10 is the hopper of my device for containing the material which is being filled into the bags and such hopper follows general conventional practice in design. That is, its sides slope downwardly from a comparatively large top to a comparatively narrow bottom 11. Extending longitudinally of this bottom I furnish a screw conveyer 12 which is contained within the nozzle member and projects into the nozzle proper 9 thereof. The nozzle member is of unitary form comprising the nozzle 9 and a semi-cylindrical portion 90 the diameter of which is approximately the same as the distance between the lower edges of the side walls of the hopper so that a joint is made therewith as illustrated in Fig. 8, the nozzle 9 extending into an orifice 91 in the front wall of the hopper. The rear end 92 of the semi-cylindrical portion 90 is of circular form and fits the semi-circular lower edge 93 of the back wall of the hopper. For retaining the nozzle member 90 in place I furnish a plurality of straps 94 which extend between angle members 95 secured to the outer faces of the lower portions of the side walls of the hopper, such straps extending around the nozzle member 90. Upon the front wall of the hopper surrounding the orifice 91 I provide a plate 96 having an orifice therein of the same diameter as the nozzle 9 and which is secured to the front wall of the hopper by bolts 97.

If it is desired to replace the nozzle member and screw conveyer by a nozzle member and screw conveyer of smaller diameter I furnish such smaller nozzle member 98 as illustrated in dotted lines in Fig. 8 with flanges 99 which extend to the bottoms of the side walls of the hopper and compensate for the reduced diameter of the smaller nozzle member. I also then furnish another plate 96 having a smaller orifice therein corresponding in size to the diameter of the smaller nozzle 9. The upper portions of the end plates 92 of the various sized nozzle members are of a standard diameter to fit the back wall of the hopper. It will thus be seen that my nozzle members and screw conveyers can be very readily replaced.

The rear end of the screw conveyer 12 is connected to the forward end of a drive shaft 99 which extends through an orifice 100 in the end plate 92 of the nozzle member, and as a connecting means between the screw conveyer and such drive shaft I utilize a flexible connection or universal joint 101 of any standard construction such as illustrated wherein a fabric centre disc is provided and to which cross members upon the screw conveyer and shaft are attached. By this construction the screw conveyer is freely mounted within the nozzle member having a certain amount of play within the nozzle 9 which is necessarily of a slightly larger interior diameter than the diameter of the conveyer screw. As the material is passed along the nozzle by the conveyer such conveyer rides in the material in the nozzle and centres itself as the material forms a bearing thus permitting the screw conveyer to run freely and quietly.

When, however, there is only a residue of material within the hopper the screw conveyer will gradually lose the support of the volume of material passing through the nozzle and will consequently vibrate, setting up a vibration through the hopper which shakes down any remaining material which may become lodged within corners or upon the sloping sides of the hopper. The production of this vibration is an important feature as in machines where dry plasters of different tints are being bagged it is essential that the plaster of one particular tint be entirely cleaned out of the hopper before another plaster of different tint is inserted.

My screw conveyer has also a particularly important secondary function in that it constitutes an agitator for the material contained in the hopper as well as a conveying means. As powdered or granulated material is dropping down the converging sides of a hopper it is very apt to cake and become lodged over the conveying means. It is therefore customary to provide an agitating device within

the hopper in order to prevent the material contained therein from becoming caked. In my device, however, my screw conveyer constitutes in itself an agitator, for as soon as the material starts to cake and stops feeding into the conveyer, such conveyer immediately commences to vibrate and sets up a vibration through the hopper which immediately shakes the material down so that to all intents and purposes there is a continuous feeding of the material irrespective of its tendency to cake as the necessary moments of vibration if any are momentary.

The drive shaft 99 is connected to an electrical motor 14 and contained within a pair of bearings 15. The motor and shaft assembly are supported upon a pair of longitudinally extending members 16 which are supported by a pair of plates 118 connected to the bottom of the hopper. The forward end 17 of my delivery nozzle 9 is formed at an angle so that the orifice therein is presented downwardly as will be clearly seen upon reference to the drawings. The forward end of the screw conveyer projects into the vicinity of such end 17 so that the delivery material can never become packed within the nozzle as it remains within the conveyer until it is on the point of dropping out of the nozzle.

The bag supporting member which is hingedly mounted in the vicinity of its rear edge upon the frame cross member 5 is supported by an angularly inclined elbow rod 18 which is in two parts and hingedly connected at the centre as illustrated in Fig. 7 so that it is free to bend upwardly as illustrated in such figure, but retained against bending in the opposite direction. This is attained by forming a groove 19 in one abutting portion of the rod and a flat piece 20 in the other abutting portion of the rod, such flat piece being contained within the groove, the ends of the groove and the flat piece being inwardly inclined as illustrated so that the rod is free to bend in one direction but not in the other.

Between the rungs 21 of the A-shaped frames I provide a cross member 22 having a downwardly extending slot 23 in the centre thereof. Across this slot I pivotally mount a spindle 24 having an orifice 25 therein into which the lower end of the rod 18 freely projects and 26 is a collar secured upon such rod intermediately of its height, a spiral spring 27 being interposed upon the shaft between such collar and the upper face of the spindle 24. The upper end of the rod 18 is pivotally connected to a pair of lugs 28 on the bottom of the platform 6. The spring 27 is so adjusted that when the bag supporting member is empty or supporting an empty bag it is inclined rearwardly substantially in the position illustrated in Fig. 1.

When an empty bag to be filled is placed upon the bag support the nozzle 9 is, of course, inserted into the upper corner orifice of the bag and the motor 14 started to actuate the screw conveyer 12 whereby the material is delivered into the bag. When the bag is placed empty upon the support and the nozzle inserted thereinto it is of a more or less flat form as it is received from the factory and the closed top of the bag does not rest upon the nozzle, but as the material enters the bag, such bag commences to swell and in doing so decreases in height which brings its top into nearer contact with the top of the nozzle. If no adjustable means were provided in the support the bag would, when partly filled, swing from the nozzle thus putting a strain thereon and also upon the bag and prevent the bag being completely filled.

In my construction, however, as the bag receives the material the weight is increased, and the bag supporting member swings downwardly in the direction indicated by the arrow in Fig. 2. As such movement occurs the bag which was originally inclined rearwardly in the support swings towards the vertical and in doing so its top gradually lifts further away from the nozzle until such time as the bag is completely filled when the movement of the weighing scales cuts off the passage of electric current to the motor.

The bag is then ready for delivery from the device and such delivery is obtained by pushing the supporting rod 18 rearwardly when it will assume the position illustrated in Fig. 3 and the bag support swings forwardly delivering the filled bag therefrom on to a bench 29, or a conveyer belt as the case may be. The width of my bag support is so proportioned to the width of the filled bag that the sides 8 constitute a support for the sides of the bag and prevent it swelling to too great a width which of course, would also tend to bring the top of the bag into closer contact with the nozzle.

My machine is also particularly adaptable for use in filling ordinary open-topped bags as such bags can be placed within the bag support and their tops folded back over the upper edges of the back portion 7 and the side members 8 thereof, and if necessary any suitable means such as a bracket may be provided upon one of the front edges of the side members 8 for extending forwardly against the forward portion of such open-topped bag to prevent it from coming into contact with and catching upon the point of the nozzle, as any accidental support of the bag by the nozzle would of course interfere with the correct weighing of the material contained within the bag.

When the filled bag has been delivered, the rod 18 is tilted forwardly so that its two sections go back into alignment and the bag support is returned to its orignial position when the device is now ready for the reception of another bag.

By the provision of the screw conveyer ex-

tending to the open end of the nozzle, I have eliminated any possibility of the material becoming packed within the nozzle which might possibly be the case if such conveyer only extended intermediately of the length of the nozzle, especially when granular material was being packed, and also by shaping the end of the nozzle as shown in the drawings, I provide a means whereby the delivered material is prevented from heaping within the bag. By shaping the end of the nozzle in an angular direction I have also increased the area of the delivery orifice without interfering with the length of the nozzle or the length of which projects into the bag, and also provided a means whereby the nozzle can be readily inserted into the orifice in the bag.

My machine has been found particularly adaptable for bagging material known as acoustic plaster in which granulated pumice stone is contained as it in no way tends to break up the pumice granules and thus spoil the acoustic qualities of the plaster as is the case in the flipper type of machine in which the recurrent contact of the blades crushes the pumice. Furthermore, in my machine the bags are delivered therefrom upon their sides in a swinging motion so that no great strains are put upon the corners of the bags as would be the case if the bags were dropped out of the machine upon their bottom edges.

From the foregoing description it will be apparent that I have constructed an extremely simple and efficient type of bag filling device which is capable of handling all classes of material and in which no strain is at any time put upon the bag being filled, and furthermore by finally tilting the bag support downwardly for delivery I have provided a means whereby the bags can be automatically removed from the device without the necessity of manually lifting them up as is the case in the type of device in which the bag is suspended from the nozzle, and although I have shown and described a particular embodiment of my invention it is to be understood that I can make such changes and alterations as I may from time to time deem necessary without departing from the spirit of my invention as set forth in the appended claims.

What I claim as my invention is:—

1. In a bag filling device, a hopper, a nozzle member projecting therefrom, a fulcrumed bag supporting member positioned underneath the nozzle, its rearward end being adapted to swing upwardly towards the nozzle as the bag contained thereon is being filled.

2. In a bag filling device, a hopper, a nozzle extending therefrom and adapted to project into the bag being filled, a bag supporting member swingably fulcrumed underneath the nozzle and resiliently inclined in a rearward and downward direction its rear end being adapted to swing upwardly against the resilient means under the increasing weight of the filling bag into a substantially horizontal plane, whereby the supported bag swings forwardly and upwardly.

3. In a bag filling device, a hopper, a nozzle extending therefrom through which the bag is filled, a bag supporting platform resiliently inclined in a rearward direction swingably positioned underneath the nozzle and adapted to swing forwardly against the resilient means into a substantially horizontal plane whereby the supported bag swings forwardly and upwardly, back and side members extending upwardly from the platform and against which the bag rests, and an elbow rod extending upwardly to support the platform on a substantially horizontal plane when the elbow and members are in alignment and to permit the platform to swing downwardly and forwardly to deliver the bag when such members are swung into angular relation with one another.

4. In a bag filling device, a hopper, a screw conveyer extending across the bottom thereof, a nozzle member extending from the side of the hopper and into which the screw conveyer extends, a bag supporting platform resiliently inclined in a rearward direction swingably positioned underneath the nozzle and adapted to swing forwardly against the resilient means into a substantially horizontal plane, whereby the supported bag swings forwardly and upwardly, back and side members extending upwardly from the platform and against which the bag rests, and an elbow rod extending upwardly to support the platform on a substantially horizontal plane when the elbow rod members are in alignment and to permit the platform to swing downwardly and forwardly to deliver the bag when such members are swung into angular relation with one another.

5. In a bag filling device, a hopper, a horizontal nozzle member projecting therefrom, a bag supporting platform fulcrumed underneath the nozzle, the fulcrumed point being rearwardly of the centre of the platform and the forward portion of the platform adapted to swing downwardly, and resilient means supporting the forward portion of the platform.

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