

Oct. 17, 1944.

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2,360,313

APPARATUS FOR PACKING CEMENT OR THE LIKE MATERIAL

Filed Aug. 2, 1940

2 Sheets-Sheet 2

Fig. 3.

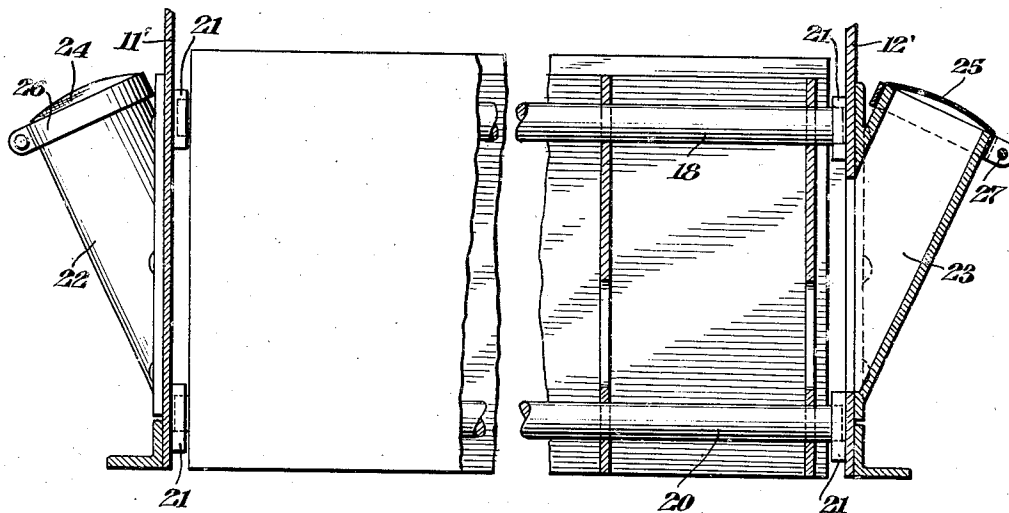


Fig. 4.

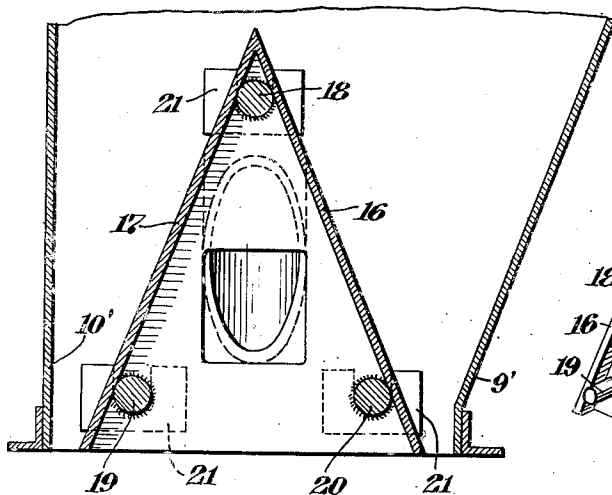
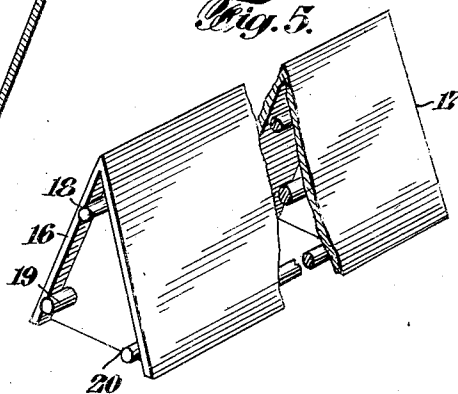


Fig. 5.



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UNITED STATES PATENT OFFICE

2,360,313

APPARATUS FOR PACKING CEMENT OR THE
LIKE MATERIAL

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Application August 2, 1940, Serial No. 349,852

4 Claims. (Cl. 226—48)

The invention relates to apparatus for packing pulverulent material; and since the invention is especially useful for packing cement and the like materials it will be described with specific reference to an embodiment especially adapted for this use, as illustrative of the usefulness of the novel features of the invention.

In packing cement, or the like materials, it is customary to fill and weigh containers, such as bags, by means of machines, herein termed packers, to which the material is fed from a relatively large reservoir or bin; the material being fed into the bags by suitable means such as an impeller, feed screw or the like. These feed bins sometimes hold several hundred barrels of material and, especially where the material is of a density such as cement, the great weight causes the material to become tightly packed in the throat of the bin leading into the packer: with poorly designed bins this condition being aggravated. The feeding of such material from the outlets of the packer into the bags is difficult at best in view of the inherent density of the material, and is made much worse when the material is compressed under the weight imposed by the volume in the bin.

Heretofore, it has been proposed to loosen the material by placing a supplemental rotary feeder between the bin and the packer feeder or impeller, such, for example, as shown in L. H. Hartman Patent No. 1,667,858, where the supplemental rotary feeder is designated 30 while the packer feeder is designated as 33—34. This in addition to being expensive requires a separate drive, and is otherwise not sufficiently effective. For example, the distribution of material to the packer feeder by the supplementary rotary feeder is not equalized as between the separate blades of the packer feeder; nor does the auxiliary rotary feeder maintain an equal pressure with varying height of material in the bin.

It has also been proposed to inject compressed air into the packer inlet adjacent to the feeder impeller; but this also is unsatisfactory. Among other things, it supplies an undesirable excess of air in the material which passes into the bags and must then be vented from the bags.

An object of this invention is to provide apparatus in which material is delivered from a supply bin to a packer feeder impeller in a loose condition and under substantially equalized pressure.

Another object is to provide apparatus of the character described capable of accomplishing this result without the use of moving parts and without excess air.

Another object is to provide a simple, sturdy and economical means for effecting the desired result without the usual disadvantages above described.

Further objects and advantages of the inven-

tion will more fully appear from the following description taken in connection with the accompanying drawings which show, by way of example, the present preferred embodiment of the invention.

The invention consists in the novel features, arrangements, and combination of parts embodied by way of example in the apparatus hereinafter described as illustrating the preferred form of the invention, and the invention will be more particularly pointed out in the appended claims.

In the drawings,

Fig. 1 is a front elevation of the apparatus;

Fig. 2 is a side elevation of the apparatus;

Fig. 3 is a side elevation of a relatively enlarged detail of the baffle section, partly in section;

Fig. 4 is a front elevation of the structure shown in Fig. 3, partly in section; and

Fig. 5 is a perspective view showing the baffle means.

A suitable packer is designated 1 and in the present embodiment is a valve bag filling and weighing machine, of which numerous suitable structures are well known in the art; the one illustrated being of the character described in my copending application Ser. No. 322,733, filed March 7, 1940. Accordingly, and since the details of such packer are not claimed herein per se, only such details will be described herein as will facilitate an understanding of this invention. The packer is provided with one or more (in the present embodiment four) feeding tubes or outlets 2 through which material is fed by the feeder impeller 3, having a plurality of blades 4, positioned in the housing 5 provided with an inlet opening or throat 6 formed in a hopper 7, which in effect forms a continuation of a feed bin 8. While the hopper 7 in the present embodiment is formed as an integral part of the packer, it is obvious that it may equally as well be considered a part of the bin 8. The bin 8 extends upwardly, from its lower or restricted throat, in progressively increased cross section; in front elevation (Fig. 1) the side walls 9—10 extending upwardly and outwardly, while in side elevation (Fig. 2) the front wall 11 extending first vertically for a substantial distance and then upwardly and forwardly at about 30° from the vertical, and the rear wall 12 extending upwardly and rearwardly at a substantially less angle than the front wall and then vertically. This particular shape of bin greatly reduces surging of the material, which when present in cement bins of this size normally creates troublesome difficulties of serious proportions. However, even with the less desirable form of bins heretofore used such surging is prevented by applicant's invention.

The bin is supported by suitable framework designated in general as 13 erected on a foundation 14 on which the packer 1 is also mounted.

Suitable means (not shown) for elevating material into the bin is provided as is well understood to those skilled in the art.

A part of the reduced portion or feed throat, such as the section 15 (Figs. 1 and 2) is preferably made as a separate part for ease of manufacture and assembly, and in the present embodiment is considered as a part of the bin. Accordingly, the section walls are designated 9', 10', 11' and 12' as parts of the respective walls 9, 10, 11 and 12. The section 15 carries the baffle means to be more particularly described following and which is one of the main features of the present invention.

Referring more particularly to Figs. 3 and 4: two relatively thick steel plates 16 and 17 are positioned within the section 15 in the form of a wedge, which preferably is in the form of a horizontally disposed hollow triangular prism open at the bottom side. These plates extend substantially the full width of the packing machine and therefor their ends lie closely adjacent the two walls 11'—12' of the section 15. The plates are secured together and to the walls 11'—12' by means of heavy steel rods 18, 19 and 20 whose ends are set in cradle blocks such as 21; the rods being welded to the blocks and the blocks welded to the walls as indicated. The plates in turn are also securely fastened to the rods as by welding, to thus provide an extremely rigid strong baffle whose strength is indicated by the fact that in the embodiment illustrated (where the bin capacity is over 200 barrels) the plates 16—17 have a thickness of $\frac{1}{4}$ " and the rods 18, 19 and 20 a diameter of $1\frac{1}{4}$ ", while the blocks 21 are approximately $\frac{1}{2}$ " thick.

The triangular form of the wedge preferably is an isosceles triangle whose apex is substantially equidistant from the walls 9'—10' and whose base is spaced substantially equidistant from said walls; thus serving to divide the material into two substantially equal spaced-apart streams along the respectively opposite walls 9'—10' so as to equalize the feed of material against the uppermost feed impeller blades 4 respectively adjacent the hopper walls forming a continuation of said walls 9'—10'. Upwardly and outwardly extending vent pipes 22 and 23 are secured at their lower ends to the side walls 11'—12', which are cut out in register with the pipe openings and are provided at their outer ends with suitable porous filter covers such as 24—25 removably held in place by suitable means such as bands 26—27. These vents serve to place the open space beneath the wedge apex and between its sides in communication with the exterior of the tank, thereby venting the tank to atmosphere. The filter covers 24—25 permit the escape of entrapped air while preventing the substantial escape of cement.

It will be understood that the foregoing structure serves several purposes:

1. It permits entrapped air in the material to escape, thus reducing internal pressure.

2. It permits a larger storage space for material above since it greatly reduces the dead weight on the rotor blades.

3. It more evenly distributes the flow of material to all packing blades.

4. It breaks the direct fall of material onto the blades when the bin is nearly empty.

Having thus described my invention with particularity with reference to the preferred embodi-

ment of the same, it will be obvious to those skilled in the art, after understanding my invention, that changes and modifications may be made therein without departing from the spirit and scope of the invention, and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What I claim is:

1. In apparatus of the character described, the combination of a valve bag filling and weighing machine having a feed inlet, a stationary supply bin in communication with the feed inlet, baffle means disposed intermediate said bin and machine, said baffle means comprising two plates whose upper edges are secured together and whose opposite lower edges are spaced apart to form two sides of an isosceles triangle, the lower edges of said plates being spaced from the respectively adjacent bin walls to provide two spaced-apart passages and the ends of said plates lying closely adjacent to respectively adjacent bin walls, and venting means extending from the space beneath and between said plates to the exterior of said bin and being provided with filter means to prevent substantial passage of material therethrough while permitting entrapped air to escape.

2. In apparatus of the character described, the combination of a valve bag filling and weighing machine having an upwardly and downwardly disposed feed inlet and a transversely disposed feed outlet, an impeller means disposed intermediate said inlet and outlet, a stationary supply bin disposed above said feed inlet and secured thereto, baffle means disposed above said inlet and below said bin being so constructed and arranged as to divide material passing from said bin toward said inlet into two spaced-apart streams, and means disposed intermediate said streams for venting the intervening space to the exterior of said bin.

3. In apparatus of the character described, the combination of a valve bag filling and weighing machine having an upwardly and downwardly disposed feed inlet and a plurality of transversely disposed feed outlets, an impeller means disposed intermediate said inlet and outlets and extending transversely thereof for feeding material through said outlets, a stationary supply bin disposed above said feed inlet and secured thereto, baffle means disposed above said inlet and below said bin being so constructed and arranged as to divide material passing from said bin toward said inlet into two spaced-apart streams extending in a longitudinal direction substantially the full width of the machine, and means disposed intermediate said streams for venting the intervening space to the exterior of said bin.

4. In apparatus of the character described, the combination of a valve bag filling and weighing machine having an upwardly and downwardly disposed feed inlet and a transversely disposed feed outlet, an impeller means disposed intermediate said inlet and outlet, a stationary supply bin disposed above said feed inlet and secured thereto, baffle means disposed above said inlet and below said bin being so constructed and arranged as to divide material passing from said bin toward said inlet into two spaced-apart streams and to deliver the material from said two streams directly to said impeller, and means disposed intermediate said streams for venting the intervening space to the exterior of said bin.

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