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C. F. SPARKS

FLOUR PACKING

Original Filed Nov. 1, 1920

Fig. 1.

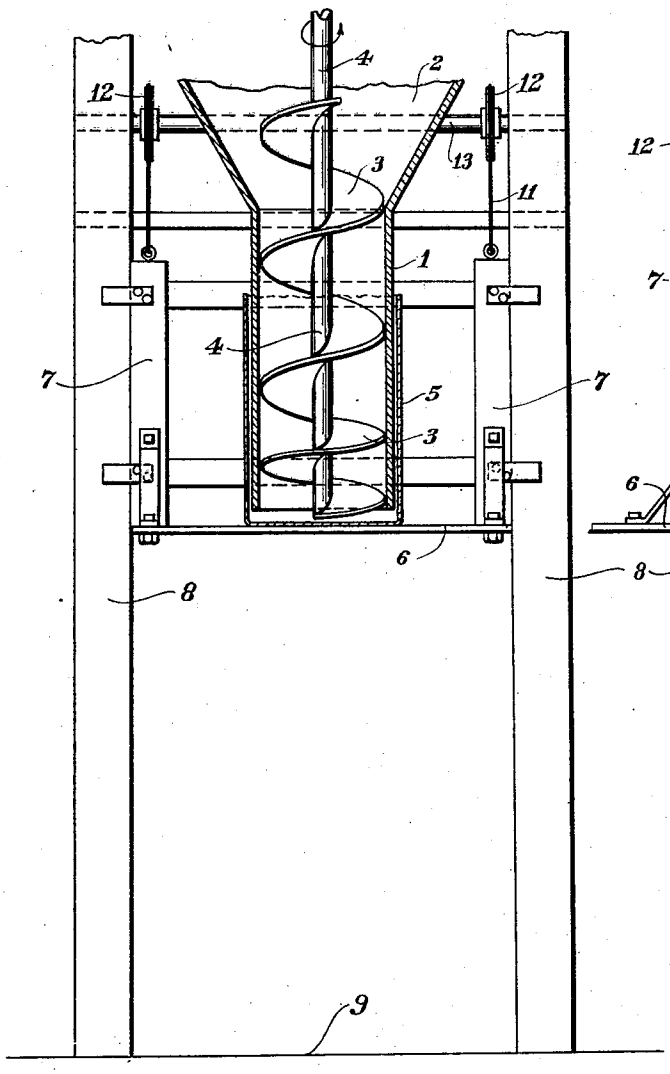
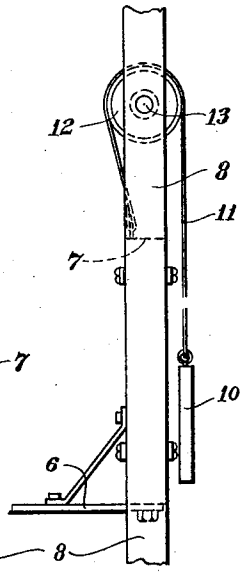


Fig. 2.



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FLOUR PACKING.

Application filed November 1, 1920, Serial No. 420,964. Renewed December 15, 1924.

To all whom it may concern:

Be it known that I, CHARLES F. SPARKS, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented new and useful Improvements in Flour Packing, of which the following is a specification.

This invention relates to flour packing. The apparatus generally employed for this purpose includes a substantially conical receiver or holder for the flour which terminates in a downwardly extending cylindrical spout. Within this spout means is provided for forcing the flour downwardly at the mouth or lower end of the spout, so that it passes into the bag which is to be filled. When the filling operation commences, the bag completely telescopes the lower end of the spout, being held in this position by a counter-weighted platform upon which the bottom of the bag rests. As the flour is forced down into the bag the platform yields and permits the bag to descend under the downward pressure of the flour passing into the bottom of the bag from the delivery mouth of the spout. One of the objections to this method arises from the fact that if the apparatus is operated at a high speed, flour dust will be emitted from the mouth of the bag.

The general object of the present invention is to overcome this difficulty and to provide a simple method and apparatus for packing the flour at an increased speed, but without raising flour dust, that is to say, according to my apparatus and method I increase the capacity of a given flour packer and at the same time avoid producing flour dust in the atmosphere around the bag.

Further objects of the invention will appear hereinafter.

The invention consists in the novel method and novel apparatus to be described hereinafter and particularly set forth in the claims.

In the drawing,

Figure 1 is a front elevation of a common form of apparatus, the central portion of the same being shown in vertical section, and illustrating my novel apparatus by means of which my novel method may be practiced; and

Figure 2 is a side elevation of the upper portion of the guide way showing the platform broken away and particularly illustrating the means for counter-weighting the platform.

In practicing my invention I provide any suitable means for supporting the bag and I provide means for compressing the flour before or at the time that the flour is delivered into the bag. I prefer to compress the flour to such an extent that its volume will be about forty or fifty per cent of its normal volume when not under pressure. The effect of this is that the velocity of accumulation of the flour in the bag is greatly increased and at the same time, due to the compressed condition of the flour, it has very little tendency to take the form of dust issuing from the mouth of the bag. Any suitable means may be provided for compressing the flour. In the present embodiment of the apparatus I simply provide a substantially cylindrical filling spout 1 which extends down from a fixed substantially conical upper portion or hopper 2. I provide means within the delivery spout 1 for compressing the flour which falls from above into the hopper 2. For this purpose I prefer to provide a feed screw, or conveyor, the blade 3 of which is carried on a vertical shaft 4 disposed on the central axis of the tube or spout 1. The lower portion of the screw, preferably comprising one or two turns of the blade 3, is constructed of relatively low pitch as compared with the upper portion of the screw. The effect of this is that a relatively large quantity of flour passing into the screw at each revolution is compressed at the lower part of the spout into substantially half the volume that it had at the point where it entered the screw. For example, I prefer to give the upper portion of the screw approximately a pitch of 1—1; at its lower portion the screw gradually decreases in pitch until its pitch is approximately 2½ to 4, that is to say, a screw 4 inches in diameter would have a pitch of 2½ inches. In this way a very considerable compression in the flour takes place as it passes into the delivery mouth or lower end of the spout 1. I employ the usual apparatus for holding the bag 5 telescoped over the spout when the operation commences. For this purpose the bottom of the bag may rest upon a vertically movable platform or shelf 6 having side bars 7 sliding on suitable guide posts 8, 8. These

posts extend up from the floor 9. The platform 6 is preferably counter-balanced by means of counter-weights 10 supported each by a cord 11 which runs over a sheave 12 (see Figure 2). These sheaves are carried on a horizontal shaft 13. The counter-weights are slightly heavier than the platform with a full bag of flour upon it, and hence while the bag is being filled it will be yieldingly supported against the downward pressure of the flour which is being forced into the bag. It should be understood that in practicing my invention I do not limit myself in any way to such apparatus as this in which the platform yields, for obviously if desired the platform could be fixed and the spout and conveyor mounted to move upwardly in a well known manner. In operating the apparatus the attendant telescopes a bag 5 over the lower end of the spout and pulls it up as far as possible, at the same time permitting the platform 6 to ascend to the limit of its upward movement. As the shaft 4 rotates in the direction of the arrow indicated in Figure 1, the upper end of the blade 3 revolves in the lower portion of the conical hopper 2 and this forces the flour downwardly into the filling spout 1. This flour is caused to progress downwardly by the constant entrance of flour into the upper part of the spout, and as the flour recedes toward the lower portion of the spout it is compressed into the relatively small space between the successive turns of the blade where the pitch is lower. Hence the flour is delivered into the bag in a relatively compressed state with the incidental advantages referred to above, that is to say, the flour may be pushed into the bags with greater rapidity because the flour pushed into the bag weighs more than if it had not been compressed; and furthermore, the compressed state of the flour tends to prevent its being emitted in dust form through the mouth of the bag.

As the flour passes into the container or bag, of course a slight expansion of the flour takes place, but the flour is maintained in a tightly packed state in the bag by the underface or driving side of the lower end of the screw as it revolves.

I am aware that flour packing apparatus has been used which employs a feed screw operating in conjunction with a feed hopper and spout. In one type of such apparatus the upper portion of the feed screw is of tapered form so as to fit closely to the interior of a conical hopper. When an apparatus is constructed in that way the result is that a large amount of compression occurs in the hopper, and the amount of this compression depends largely upon the height of the flour within the hopper. My invention is distinguished by the fact that substantially all the compression of the flour occurs within the cylindrical spout. That is to say, the spout receives the flour in a substantially uncompressed state and hence the degree of compression of the flour as delivered from the lower end of the spout is uniform and does not depend upon the level of the flour in the hopper or the speed at which flour is being fed into the hopper. In other words, my compressing device produces a uniform amount of compression and this compression occurs within the spout. In one aspect my compressing device may be considered to comprise a shaft extending down into a bottomless cylindrical spout from the hopper, the upper end of the spout receiving uncompressed flour, the shaft having upper convolutions which force the flour down into the spout and having lower convolutions of less pitch at the bottom of the spout which operate to deliver all the flour at a substantially uniform pressure from the lower end of the spout.

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

What I claim and desire to secure by Letters Patent is:—

1. In a flour packer, the combination of a hopper having a bottomless cylindrical feeding spout below the same to extend into the bag to be filled, a rotatable feed screw of uniform diameter having its upper end located in the lower portion of said hopper and extending down into the spout for moving the flour toward the lower end thereof, said hopper operating to deliver the flour in a substantially uncompressed state to the upper end of the spout, the diameter of said screw being substantially the same as that of the spout, and the lower portion thereof being of lower pitch than the upper portion, thereby producing a substantially uniform compression in all the flour delivered from the lower end of the spout.

2. In a flour packer, the combination of a hopper having a bottomless cylindrical feeding spout below the same to extend into the bag to be filled, a rotatable feed screw of substantially the diameter of said spout and of smaller diameter than the hopper so as to feed the flour downwardly uncompressed into the lower portion of the hopper, the feed screw being of uniform diameter and extending from a point within the hopper down into the spout for moving the flour toward the lower end thereof, the lower portion of said screw being of lower pitch than the upper portion, thereby producing a substantially uniform compression in all the flour delivered from the lower end of the spout.

3. In a flour packer, the combination of a bottomless cylindrical filling spout to extend into the bag to be filled, a rotatable feed-screw of uniform diameter extending down into the spout for moving the flour toward the lower end thereof, a hopper of larger diameter than the spout and from which the spout extends downwardly, said feed-screw having a blade extending through the spout and into the hopper and having a decreased pitch at its lower end.

In testimony whereof, I have hereunto set my hand.

CHARLES F. SPARKS.