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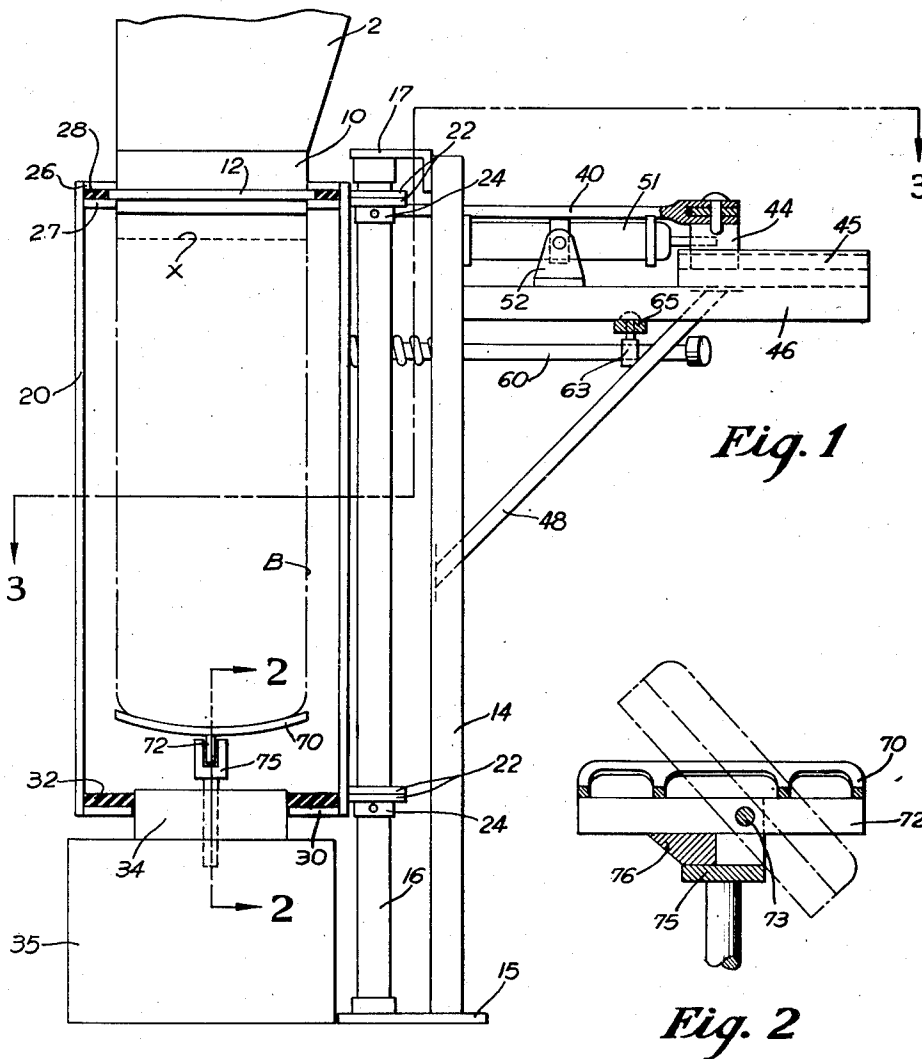
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MACHINE FOR BAGGING CEREALS OR GRAIN

Filed Jan. 21, 1949

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

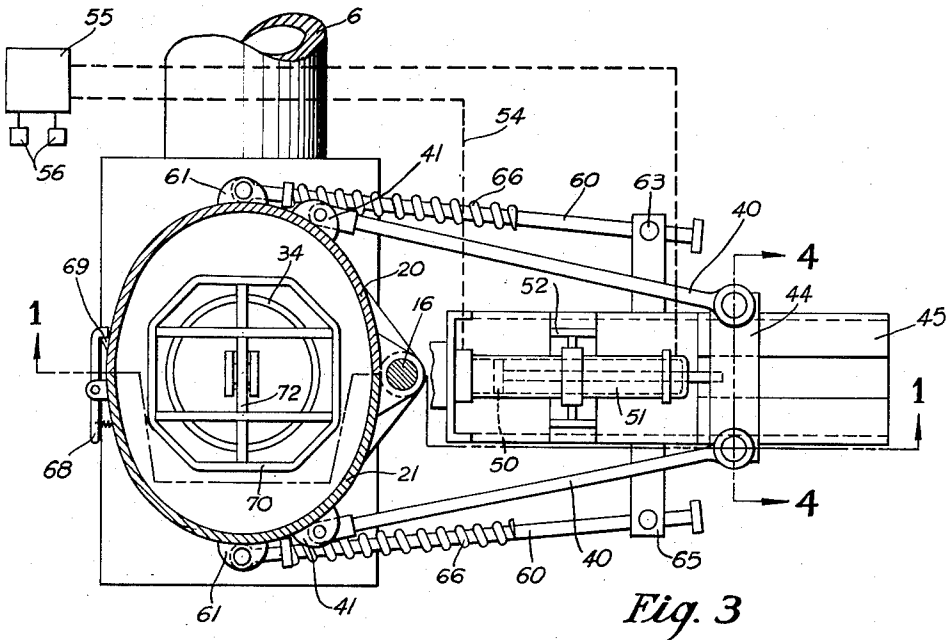


Fig. 3

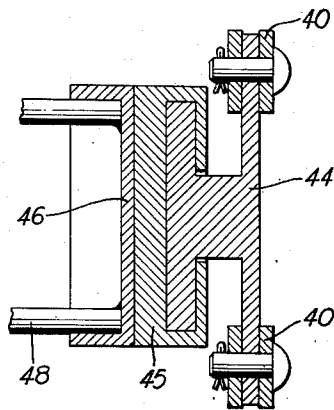


Fig. 4

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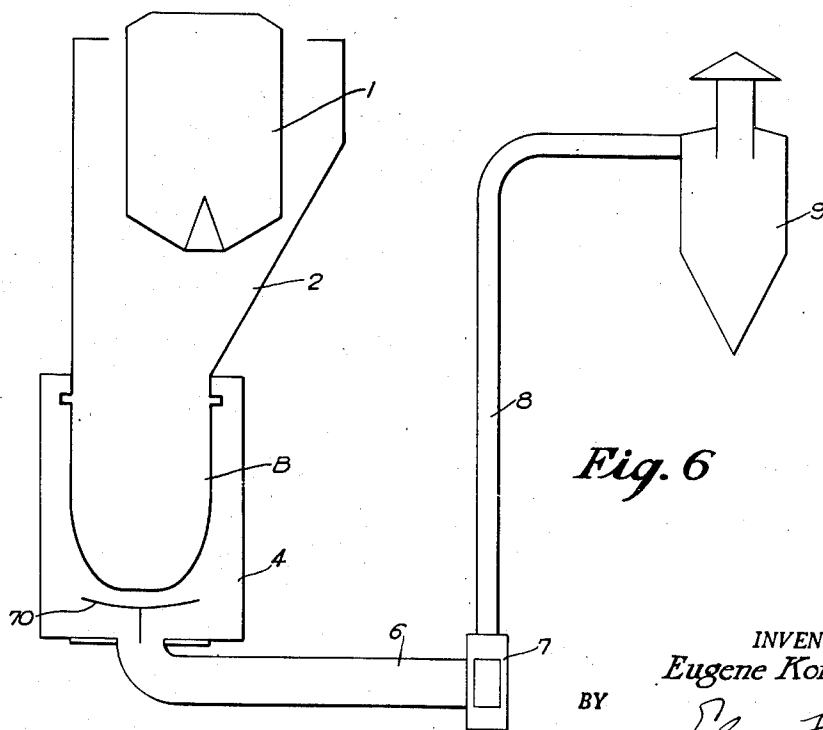
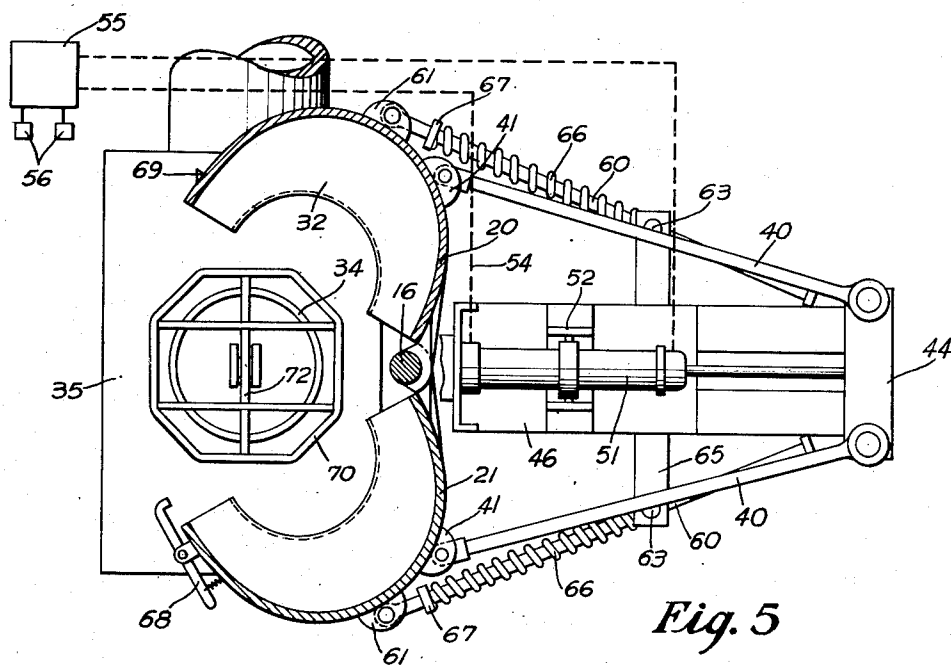
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MACHINE FOR BAGGING CEREALS OR GRAIN

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3 Sheets-Sheet 3



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MACHINE FOR BAGGING CEREALS OR GRAIN

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5 Claims. (Cl. 226—58)

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The present invention relates to an apparatus for packaging loose granular material in bags or sacks which has been developed especially for the bagging of cereals, grains, feeds and other commodities of a like nature which have heretofore been bagged on auger packing machines.

The objects of the invention are to provide a machine for the purpose which will alleviate many of the disadvantages inherent in the use of existing machines. One of the advantages of the present invention is the elimination of much of the dust which is created by existing types of machines, the bagging operation taking place in a closed casing from which the air is withdrawn and delivered to a dust separator located outside of the mill. Another object is the attainment of greater compactness so that bags or sacks of any standard weights are substantially smaller. This is due to the fact that air is withdrawn from the chamber about the bag which causes the contents of the bags to be tightly packed.

Other advantages are simplicity and economy of operation and saving in initial cost.

These and other advantages are obtained by the use of bagging machines such as shown and described herein. It will be understood, however, that while the machine is shown and described in sufficient detail to enable one skilled in the art to understand the invention, the invention is not limited to those details, but may be modified or altered without departing from the principles thereof.

It will also be understood that while the invention is described as it has been developed for the bagging of grains (specifically in the bagging of feeds) it is not limited to the packaging of that commodity, but may be used wherever light granular material is packed in bags or sacks which are pervious to air, and in which it is desirable to remove air from the contents of the bag during packaging and where it is also desirable to eliminate dust from the surrounding air.

In the drawings which illustrate a practical embodiment of the invention:

Fig. 1 is a partial sectional view through the machine with the casing closed, the outline of a full sack being shown in dotted lines in this view.

Fig. 1a is an enlarged detail section at the point where the bag is clamped between the casing and the mouth of the hopper.

Fig. 2 is a section through the bag support on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1.

Fig. 4 is a section on the line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 3, but showing the casing open.

Fig. 6 is a diagrammatic layout of a complete organization such as would be employed with a machine embodying the invention.

In a complete installation there will be employed a device which weighs out a charge of the grain. Such devices are well known in the art and the location of one of these devices is shown at 1 in Fig. 6. Such a device functions to discharge a supply of the commodity for one bag and is usually provided with a manually operated discharge which empties the weighed contents of the device 1 into a feed chute or hopper 2, at the lower end of which is clamped the bag B. The upper end of the hopper is not closed about the measuring device so that air may flow into the upper end of the hopper.

Bags for granular commodities of the type which this machine is designed to handle are usually made of heavy, coarsely woven fabric which is pervious to air. Surrounding the bag is a casing 4 which is provided with sealing means to be described which holds the bag in position to receive the charge and also provides an airtight seal about the mouth of the bag. In Fig. 6 the bag is shown in about the position it assumes before the weighed charge is delivered by the device 1.

The casing is usually in two parts which close about the bag and this casing is connected to a source of vacuum here indicated as a conduit 6 which leads to a suction fan 7 from which the air evacuated from the casing is discharged in the conduit 8 and thence to a dust separator here shown as a separator 9 of the centrifugal type.

In the form of the invention shown herein, the discharge end of the chute 2 is provided with a band 10 about which is located a circular rib 12 by which the upper end of the bag is clamped to the mouth of the chute.

At one side of the chute is the stand or support for the casing 4. This comprises an upright 14 rising from a base plate 15 and a vertical shaft 16, the lower end of which is mounted on the plate 15 and the upper end of which is fixed to the upright 14 by a bracket 17. The shaft 16 is the pivot about which the two parts of the casing move from the open position shown in Fig. 5 to the closed position shown in Fig. 3.

Each section of the casing is shown as a semi-circular or semi-elliptical shell 20 or 21 having a

pair of bearing brackets 22 near the top and bottom of the casing section, these brackets being pivotally mounted on the shaft 16. Collars 24 attached to the shaft support the casing sections.

The upper, inner edge of each casing section is provided with two spaced ribs 26 and 27, which, when the casing is closed, fit above and below the rib 12 on the lower end of the chute. Between the collars 26 and 27 is a soft rubber gasket 28 which is of a sufficient depth so that when the casing is closed about the mouth of the chute the mouth of the bag will be firmly held in position and the passage occupied by the bag will be air-sealed. Fig. 1a shows this feature in detail.

The lower end of each casing section is provided with a flange 30 to the upper side of which is secured a rubber gasket 32, the inner edge of which may project slightly beyond the flange 30 so as to make an airtight seal with the outer surface of an outlet pipe 34 projecting above a base 35 and connected to the duct 6.

The two-part casing 20-21 is opened and closed about the bag by the two operating links 40, one end of each link being pivotally connected to a lug 41 fixed at a point substantially halfway around and near the top of a casing section.

The operating links extend rearwardly of the machine where they are forked and pivotally connected to a cross head 44 which is slidably mounted in a guideway 45 fixed to the upper surface of a platform 46. The platform 46 is secured to the rear face of the upright 14 and is supported at its outer end by the diagonal brace rod 48.

The cross head 44 is attached to the rod of a piston 50 located in the cylinder 51 pivotally supported on a bracket 52 fixed on the upper surface of the platform 46. Pressure lines 54 lead from opposite ends of the cylinder to a valve unit 55 located at a point convenient to the operator as he stands at the front of the machine. Valves within the unit 55 and operated by pedals 56 control the admission and exhaust of fluid pressure from opposite ends of the cylinder 51 to open and close the casing.

To assist in guiding the casing sections in their movement, rods 60 are provided which are pivotally mounted at their outer ends in lugs 61 attached to the casing sections at points intermediate the upper and lower edges of the sections. The other ends of the rods 60 are slidably received in guides 63 depending from and swivelly mounted in the ends of cross arm 65 attached to the underside of platform 46. To cushion the opening movement of the casing sections a coil spring 66 is located about each rod, the forward end of each spring lying against a collar 67 on the rod near the lug 61. As the casing sections move toward open position, the coil springs are compressed between the guides 63 and the collar 67.

Spring locking means is provided for holding the sections of the casing together at the moment that the casing is closed. A simple form of lock for this purpose is illustrated in the drawings as a spring held latch 68 located on the section 21 and a keeper 69 located on the section 20.

Located inside the casing 4 and over the outlet 34 is a cradle-like bag support 70. This is an open framework which is elevated somewhat above the duct 34 on the top of a cross member 72 which is pivoted at 73 on an upright support 75 rising through the pipe 34. As shown in Fig. 2, the pivot 73 is located at one side of the center of

the cradle so that the cradle normally assumes the horizontal position shown in full lines in that view and rests upon a stop 76. The cradle may be tilted downwardly as shown in dotted lines in Fig. 2 so that the filled bag may be more easily removed from the machine, but when the bag is removed the cradle returns to its horizontal position.

In the operation of the apparatus, the suction fan 7 may be run continuously. The casing being open, the operator inserts a bag mouth over the band 10, the mouth usually being stretched sufficiently so that the empty bag will be suspended on the rib 12. The operator now steps on the appropriate treadle 56 and the casing sections 20 and 21 close over the mouth of the bag making an airtight seal at the mouth of the bag. The lower end of the casing is also sealed about the pipe 34.

The bag being empty at this moment will act as a partial closure for the lower end of the hopper and because air is thus prevented from flowing freely into the top of the casing, the air pressure within the casing will be substantially reduced. At the same time, the bag will belly out due to the reduced pressure in the casing so that the charge may fall freely to the bottom of the bag.

The operator now releases the charge in the measuring device and it falls through the chute and into the bag. As the stream of grain or feed falls into the bag, the suction created about the bag will cause the contents to settle compactly in the bag. The full charge for a bag does not completely fill the bag so that the upper level of the grain will be at a point somewhat below the mouth of the hopper as indicated by the line x in Fig. 1.

The contents of the bag therefore leave a substantial area around the exposed top of the bag through which air may flow to relieve the vacuum within the casing about the bag. The operator now releases the latch 68 and steps on the proper pedal 56 and the casing opens up. The interval required for the operator to release the latch and operate the casing opening means is sufficient so that the differential between the inside of the casing and the outside air is not sufficient to prevent the casing from opening freely.

The opening of the casing releases the top of the bag and the bag settles on the cradle 70 from which it may be removed.

It will be seen that when the casing is closed about the bag, the reduction in air pressure within the casing withdraws air from the stream of grain while the charge is falling into the bag. This action causes the contents of the bag to settle in a more compact form than is possible with existing types of bag filling machines.

The movement of air from the interior of the casing draws the dust out of the casing and delivers it to the separator so that when the casing is opened, little or no dust will be released to the room.

While it may be desirable to operate the fan 7 continuously it may be operated only during the period that the casing is closed, in which event the valve mechanism which opens and closes the casing may also be employed to start and stop the fan, mechanism to accomplish this purpose being readily designed.

What is claimed is:

1. A machine for filling bags with grain or the like comprising a chute for delivering a charge of grain, means to suspend a bag from the chute with the mouth of the bag surrounding the deliv-

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ery end of the chute, an expansible casing, sealing means around the upper edge of the casing to grip the mouth of the bag when the casing is contracted about the delivery end of the chute, means to close the casing around the bag while it is suspended from the chute, said casing when closed forming a chamber about the bag, and means to evacuate air from the interior of the chamber while the bag is receiving the charge of grain.

2. A machine for filling bags with grain or the like comprising a chute for delivering a charge of grain, means to suspend a bag from the chute with the mouth of the bag surrounding the delivery end of the chute, an expansible casing, sealing means around the upper edge of the casing to grip the mouth of the bag when the casing is contracted about the delivery end of the chute, means to close the casing around the bag while it is suspended from the chute and to open the casing, said casing when closed forming a chamber about the bag, means to evacuate air from the interior of the chamber while the bag is receiving the charge of grain, and a support to receive the bag when the casing is opened.

3. A machine for filling bags with grain or the like comprising a chute for delivering a charge of grain to the interior of the bag, a band on the discharge end of the chute insertable in the mouth of the bag, an expansible casing the upper edge of which is in register with the band, a bag gripping and sealing formation around the upper inner periphery of the casing, means to expand and contract the casing, said casing when contracted forming a closed chamber surrounding but spaced from the bag, with the gripping and sealing formation providing an airtight engagement with the mouth of the bag on the band, and air evacuating means communicating with the interior of the casing when the casing is contracted.

4. A machine for filling bags with grain or the

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like comprising a chute for delivering a charge of grain to the interior of the bag, a band on the discharge end of the chute insertable in the mouth of the bag, an expansible casing, a bag gripping and sealing gasket on the upper edge of the casing in register with the band, means to expand and contract the casing, said means bringing the gasket into airtight, gripping relation with the mouth of the bag on the band and forming an airtight seal about the mouth of the bag when the casing is closed, said casing when closed forming a closed chamber about the bag, and air evacuating means communicating with the interior of the casing.

5. A machine for filling bags with grain or the like comprising a chute for delivering a charge of grain to the interior of the bag, an expansible casing the upper edge of which is in register with the discharge end of the chute, a compressible gasket around the inner periphery of the casing at its upper edge, a second compressible gasket around the inner periphery of the casing at its lower end, a duct at the lower end of the casing in register with the second named gasket, said casing when closed constituting a closed chamber surrounding the bag and having its upper and lower ends in airtight sealing relation with the mouth of the bag on the chute and with the duct, respectively, and means communicating with the duct for withdrawing air from the interior of the casing when the casing is closed.

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