Sept. 3, 1963 E. M. LAU 3,102,561

SELF VENTING SPOUT

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FIG. 1

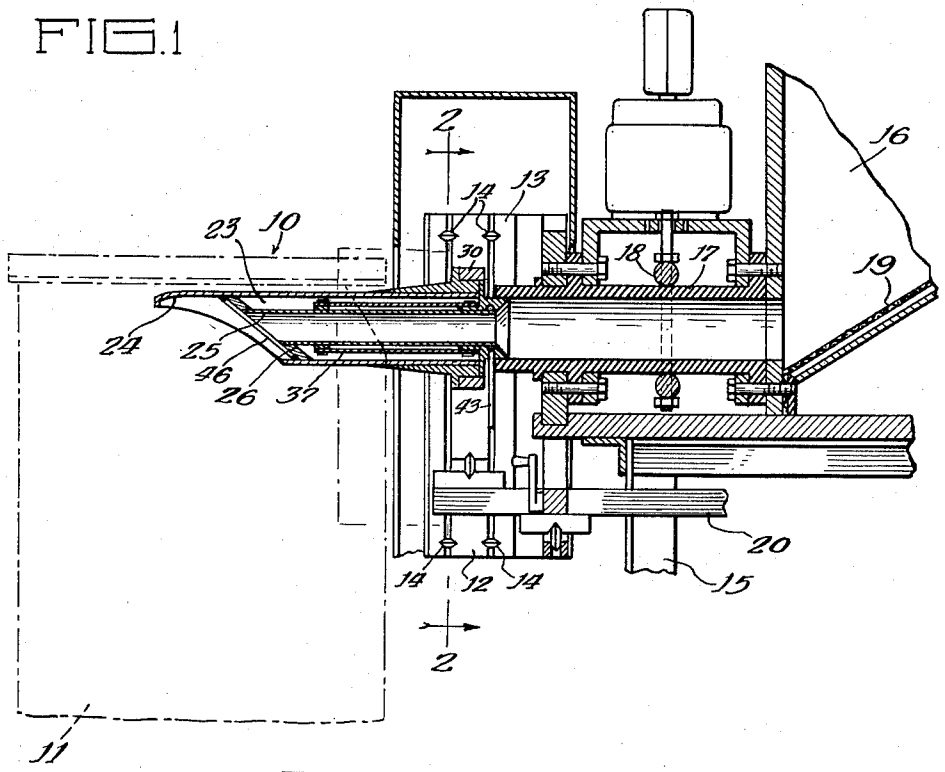
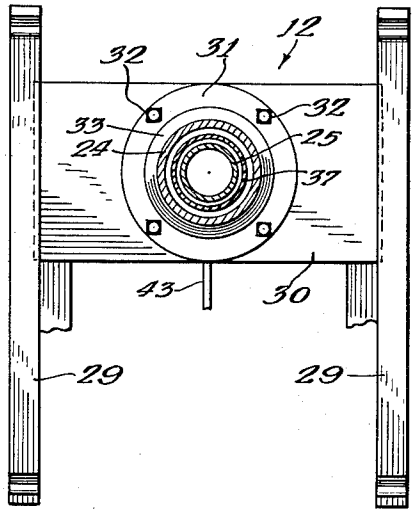


FIG. 2



Inventor:
Erwin M. Lau
By: Zabel, Baker, York, Jones & Dithmar
Attorneys

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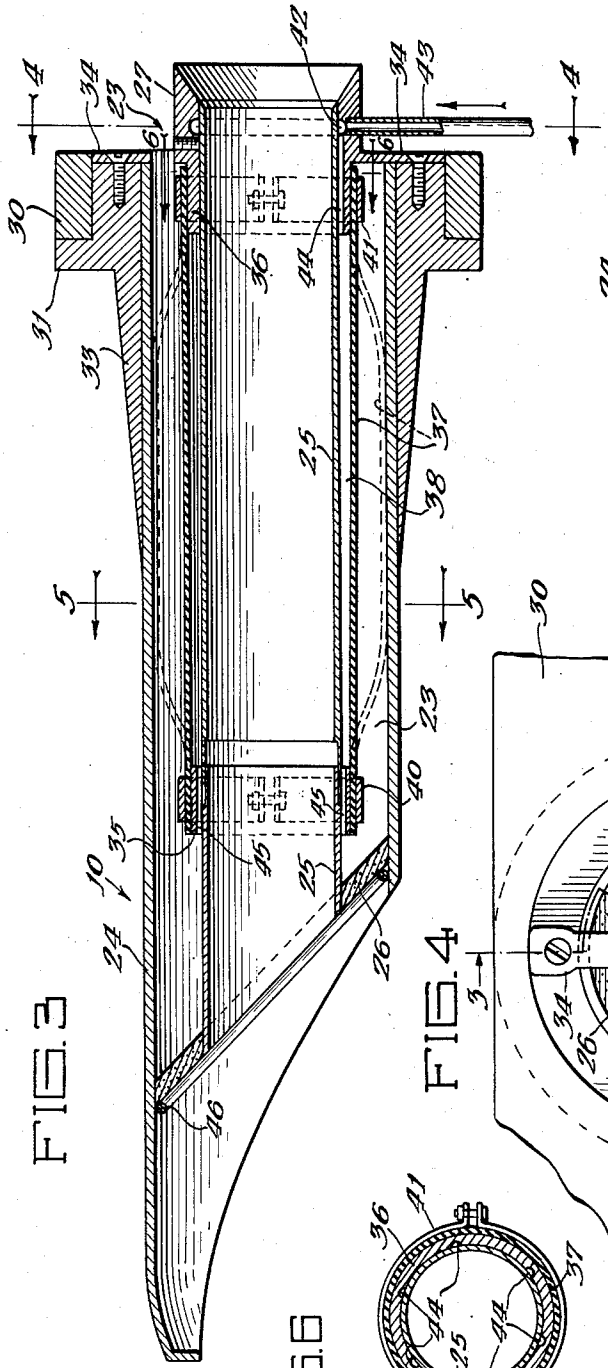


FIG. 3

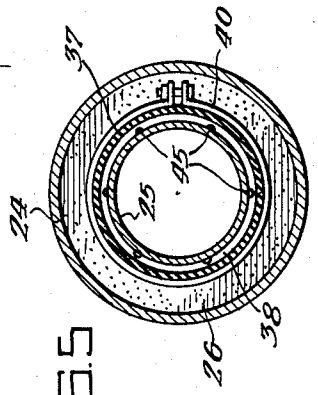


FIG. 5

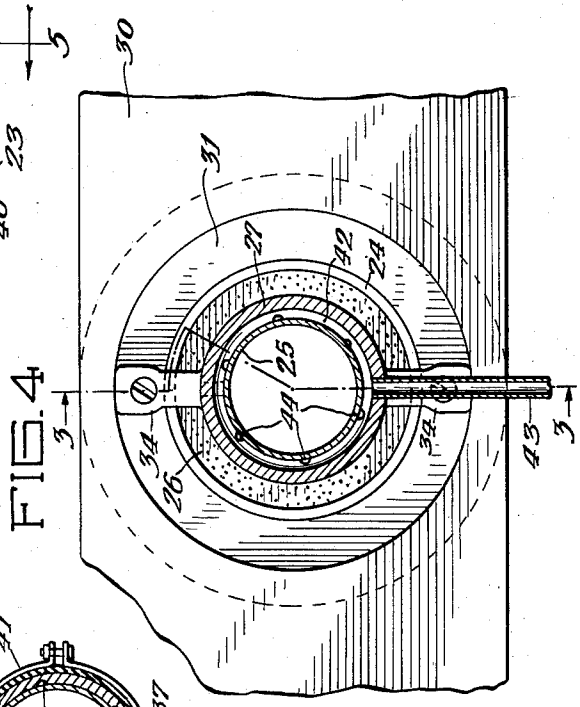


FIG. 4

FIG. 6

Inventor:
Erwin M. Lau
By: Zahl, Baker, York, Jones & Dichmar
Attorneys

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SELF VENTING SPOUT

Erwin M. Lau, Dolton, Ill., assignor to Black Products Co., Chicago, Ill., a corporation of Illinois

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7 Claims. (Cl. 141—286)

This invention relates to a self venting spout for a bag filling machine.

During the operation of a bag filling machine it is desirable to prevent the building up of a back pressure within the bag. This is particularly true in the case of a fluidizing type of machine, such as shown in my Patent No. 2,936,994, granted May 17, 1960.

It is an object of this invention to provide for a bag filling machine an improved spout which permits the rapid filling of bags by providing an outlet for the escape of air from the bag.

The invention is illustrated as applied to a machine of the type shown in the aforesaid patent, although it is also applicable to other types of bag filling machines.

It is a further object of my invention to provide an improved bag venting means which embodies a filter so as to provide a cleaner operation.

A further object is to provide an improved bag venting means which is in the form of a self venting spout which includes a self cleaning filter, the self venting spout including a vent passageway in which a filter is located, in combination with a novel arrangement for closing the vent passageway so that air can be supplied to the vent passageway to flow through the filter in a reverse direction so as to clean the same.

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings in which like reference numerals designate like parts:

FIG. 1 is a sectional elevation showing a preferred embodiment of my invention, as applied to a bag filling machine of the fluidizing type;

FIG. 2 is a section taken along line 2—2 of FIG. 1 showing the floating frame on which the spout is mounted;

FIG. 3 is an enlarged vertical sectional elevation showing the spout itself taken along line 3—3 of FIG. 4;

FIG. 4 is a rear elevation taken along line 4—4 of FIG. 3;

FIG. 5 is a vertical section taken along line 5—5 of FIG. 3; and

FIG. 6 is a detailed sectional view taken along line 6—6 of FIG. 3.

With reference now to FIGS. 1 and 2, the bag filling machine includes a spout 10 which is adapted to project through the opening of a valve bag 11. The spout 10 is mounted on a floating frame 12 which is supported in a support structure 13 by means of spacer points 14. The arrangement is such as to permit limited vertical movement of the floating frame with respect to the support structure 13 so that when a predetermined amount of material has been fed into the bag, the weight of the bag and its contents will actuate a scale mechanism 20 to terminate the bag filling operation. The floating frame 12 is connected to the scale mechanism 20, as pointed out in the aforementioned Lau patent.

The bag filling machine includes a framework 15 on which the support structure 13 is mounted, and which framework also supports a chamber 16 which receives the material that is fed into the bag 11. A flexible tube

17, of rubber or the like, extends between the chamber 16 and the spout 10 so that the material within the chamber 16 can pass through the spout and into the bag. The flexibility of the tube 17 permits the up and down motion of the spout 10 and the floating frame 12 which is incident to the operation of the scale mechanism 20.

The flexible tube is engaged by an air-actuated pinch valve 18 which serves to cut off the flow of material through the spout. The conditioning chamber 16 also includes a diffuser pad 19 located near the outlet for fluidizing the material contained within the chamber 16 so that it will be caused to flow through the spout into the bag.

As shown in FIGS. 1 and 3, the spout 10 includes an outer shell 24 and an inner tube 25, the space between the two serving as a vent passageway 23. A filter 26 is located in the vent passageway 23, and may be made of any suitable porous material, such as sintered bronze. The rear end of the inner tube 25 terminates in a collar 27 to which the front end of the flexible tube 17 is connected as shown in FIG. 1.

The floating frame 12 is an H-shaped structure, as shown in FIG. 2, and comprises a pair of vertically disposed rails 29 together with a transverse apertured plate 30. The outer shell 24 is mounted on the plate 30 by means of a support collar 31 and suitable screws 32. The support collar has integrally formed therewith a tapering shank portion 33 which forms a tight fit with the opening of the bag 11.

The arrangement is such that the weight of the bag is taken up by the outer shell 24 and the floating frame 12 and is thus transmitted to the scale mechanism 20. As the fluidized material passes through the inner tube 25 into the bag, the excess fluidizing air is permitted to escape to the atmosphere through the vent passageway 23, and it is filtered so that suspended particles of the material, referred to herein as dust, will be entrapped by the filter and will not pass into the surrounding atmosphere.

The filter 26 serves to space the inner tube from the outer shell at its front end, and suitable lugs 34 (FIG. 4) serve to support the rear end of the inner tube, the lugs being suitably connected to the rear surface of the support collar 31.

Since the dust entrapped by the filter 26 will tend to clog the same, means are provided to blow out the filter at suitable intervals. This involves causing a blast of air to pass through the filter 26 in the reverse direction.

The blow-out means includes an inflatable sleeve 37 for sealing off the vent passageway 23 in combination with means for introducing air into the vent passageway to a point forwardly of the sleeve 37. As shown in FIG. 3, a front spacer ring 35 surrounds the inner tube 25 at its front portion, and the collar 27 has a portion 36 of reduced diameter which serves as a rear spacer ring.

The inflatable sleeve 37 is secured at its front and rear ends to the spacer rings 35 and 36 by means of clamping rings 40 and 41. The inflatable sleeve 37 is preferably made of rubber, and it will be seen that it cooperates with the spacer rings to provide an expansible chamber 38, which is surrounded by the vent passageway 23.

The rear collar 27 is provided with a manifold groove 42 which is connected to a source of air pressure by a radially extending tube 43. A plurality of openings 44 extend between the manifold groove 42 and the expansible chamber 38, which openings may be in the form of grooves formed on the inner surface of the spacer ring

portion 36. Thus blow-out air from the air supply tube 43 may flow into the expansible chamber 38 to inflate the sleeve 37 into its dotted line position as shown in FIG. 3, thus sealing off the vent passageway 23.

The front spacer ring 35 is provided with a plurality of openings 45, which may also be in the form of grooves, which provide communication between the expansible chamber 38 and the front portion of the vent passageway 23. The total cross section of the openings 45 is less than the total cross section of the openings 44 so that suitable pressure will be maintained within the expansible chamber 38 to maintain the seal. In other words, the clean-off air passes into the front portion of the vent passageway 23 so that it will flow through the filter 26 in the reverse direction to clean the same, but the air pressure in the front portion of the vent passageway 23 is less than the air pressure in the expansible chamber 38 so that the seal will be maintained during the filter blow-out operation.

The openings 45, of which there may be six or more, also serve to provide a jet action.

The sintered bronze filter 26 is preferably formed in situ on the end of the inner tube 25, which end may be made in a separate piece for this purpose. The joint between the outer edge of the filter 26 and the shell 24 may be sealed by a rubber O-ring 46 and rubber cement. The ring shaped filter 26 is disposed at an angle and faces downwardly so that the entrapped particles will drop downwardly into the bag 11 at the end of the bag filling operation, and the outer ends of the shell 24 and tube 25 are cut at a generally similar angle to avoid as much as possible surfaces which would catch the downwardly dropping material.

To summarize the operation which has been set forth in connection with the description of the various parts and subassemblies, during the filling operation excess fluidizing air will be vented from the bag and escape into the atmosphere at the rear or outlet end of the vent passageway 23 at a point adjacent the collar 27. Even though the vent outlet is immediately adjacent the sensitive bearing and scale mechanism, represented by the spacer points 14, the arrangement will not diminish the sensitivity due to the provision of the filter 26.

The air supply tube 43 is preferably connected to a push button type of valve which is located close to the starting button of the machine, where it is accessible to the operator's hand. Thus, after the tripping of the scale mechanism a glancing blow of the operator's hand on the push button will clean the filter, after which the bag is removed.

Alternatively, the filter may be blown off after the bag has been removed and after an empty bag has been placed on the spout. The advantage of this arrangement is that the filter blow-out air partially inflates the bag so as to facilitate the positioning of the bag opening over the tapered shank portion 33 of the outer shell 24. Also this enables one to make sure that the fit over the tapered shank portion is tight prior to the time that the flow of material through the spout is initiated.

In some installations it may be preferred to actuate the filter blow-out means automatically as by the use of a solenoid air valve for the air supply tube 43, in combination with a time delay switch so that a definite quantity of air will be supplied to the inflatable sleeve an instant or so after the scale mechanism has been tripped, and prior to the removal of the bag.

Although only a preferred embodiment of my invention has been shown and described herein, it will be understood that various modifications and changes may be made in the construction shown without departing from the spirit of my invention as pointed out in the appended claims.

I claim:

1. A spout for a bag filling machine comprising an outer shell adapted for cooperation with a bag to be filled, an inner tube communicating with the chamber of the bag filling machine, the space between said inner tube and said outer shell comprising a vent passageway to permit the escape of air from said bag during the filling operation, said vent passageway having an inlet end and an outlet end, a filter disposed in said passageway and extending between said inner spout and said outer shell, means disposed between said filter and said outlet end for closing said passageway, and air supply means located between said passageway closing means and said filter to supply air to said passageway so that said air will pass through said filter in the reverse direction to clean the same.

2. A self venting spout as claimed in claim 1 in which said filter is a ring shaped element and in which the outer ends of said inner tube and said outer shell are cut at an angle such that said ends face downwardly, and in which said ring shaped element is located flush with the said outer end of said inner tube and faces downwardly, whereby the powdered material entrapped by said ring shaped element will drop downwardly into said bag after the conclusion of a filling operation.

3. A self venting spout for a bag filling machine comprising a spout through which the material passes from the bag filling machine into a bag, an inflatable sleeve surrounding said spout, a shell surrounding said inflatable sleeve and providing a vent passageway, a filter disposed between said spout and said shell forwardly of said inflatable sleeve whereby air may escape from said bag to the atmosphere through said filter and said vent passageway, and air supply means connected to said inflatable sleeve for inflating the same into contact with said shell to seal off said vent passageway and to supply air to the front portion thereof so that it will pass through said filter in the reverse direction to clean the same.

4. A spout for a bag filling machine comprising an outer shell adapted for cooperation with a bag to be filled and for supporting the same, an inner tube communicating with the chamber of a bag filling machine, the space between said inner tube and said outer shell comprising a vent passageway to permit the escape of air from said bag during the filling operation, a filter disposed in the front end of said passageway and extending between said inner spout and said outer shell, an inflatable sleeve surrounding said inner tube, means securing the ends of said inflatable sleeve to said inner tube to provide an expansible chamber, a manifold located at the rear end of said inflatable tube and communicating with said expansible chamber, a plurality of passageways located at the front end of said expansible chamber adjacent to the front end of said inflatable sleeve, and air supply means communicating with said manifold and adapted for periodic operation so that air will be supplied to said expansible chamber to inflate said sleeve and seal off said vent passageway, and so that air will also pass through said plurality of passageways into said vent passageway, and will be caused to pass through said filter in the reverse direction to clean the same.

5. In a self venting spout which includes an inner tube, an outer shell providing a vent passageway, and a filter located in said vent passageway, an inflatable sleeve surrounding said inner tube, means securing the ends of said inflatable sleeve to said inner tube to provide an expansible chamber, a manifold located at the rear end of said inflatable tube and communicating with said expansible chamber, an air outlet located at the front end of said expansible chamber adjacent to the front end of said inflatable sleeve, and air supply means communicating with said manifold and adapted for periodic operation so that air will be supplied to said expansible chamber to inflate said sleeve and seal off said vent passageway, and so that air will also pass through said air outlet into the front part of said vent passageway, and will be caused to pass through said filter in the reverse direction to clean the same.

6. A self venting spout for a bag filling machine comprising means for dividing said spout longitudinally into

two passageways, one of said passageways communicating with the chamber of said bag filling machine, and the other comprising a vent passageway to permit the escape of air from a bag during the filling operation, a filter disposed in said vent passageway, passageway closing means located in said vent passageway between said filter and the outlet end thereof, and air supply means located between said vent closing means and said filter to blow out said filter when said vent passageway is closed.

7. A spout as claimed in claim 1 in which said filter comprises a ring of porous metal.

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