Sept. 3, 1963 H. J. ZENKE 3,102,602

VENTING MEANS FOR A BAG FILLING MACHINE

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FIG. 1

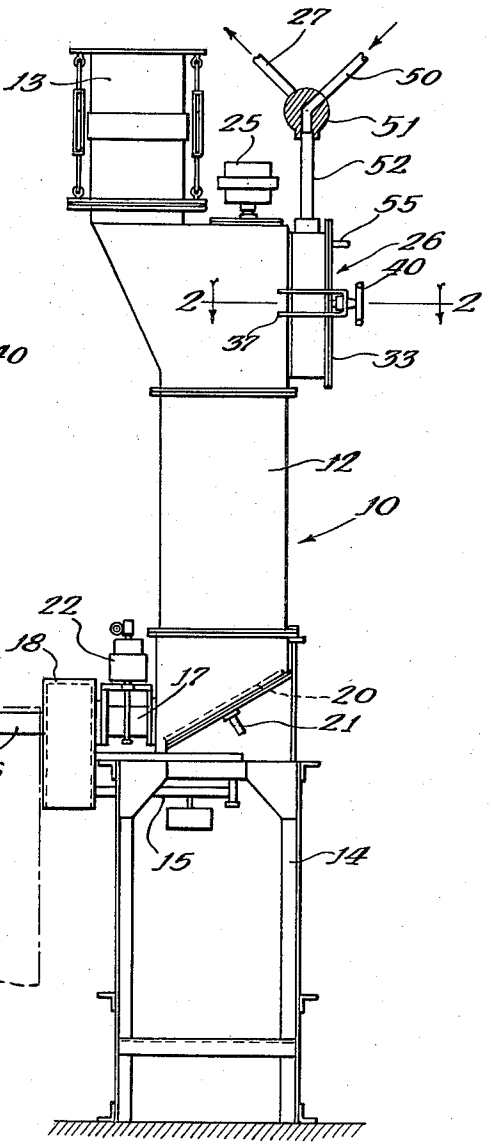
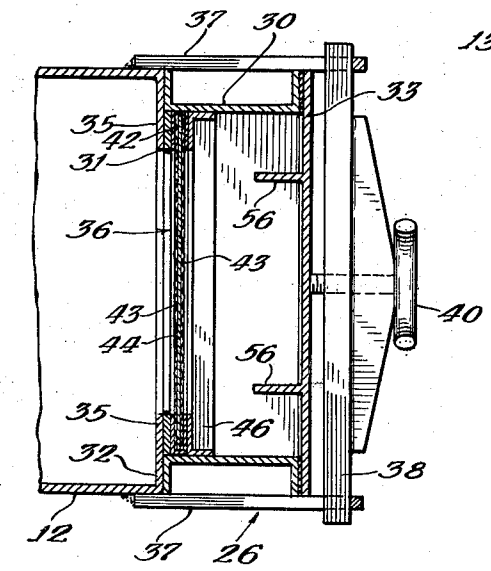


FIG. 2



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FIG. 3

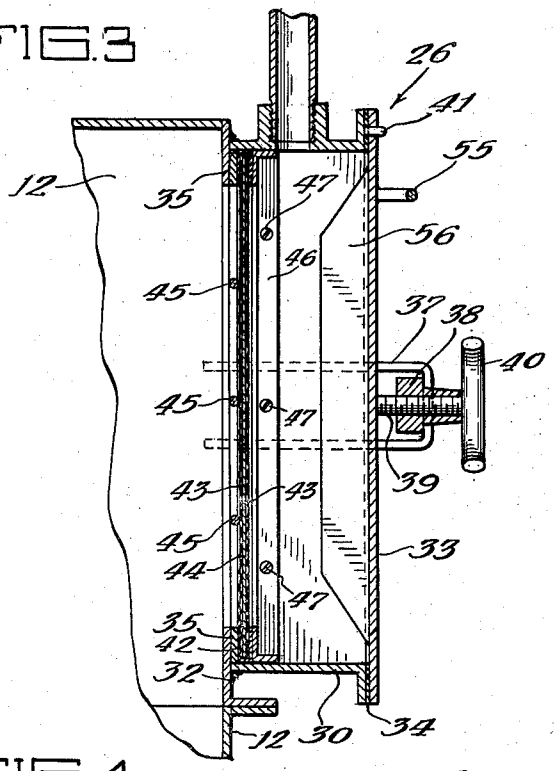


FIG. 5

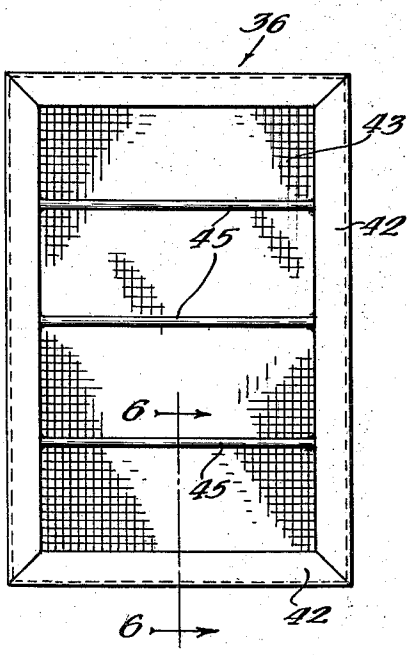


FIG. 4

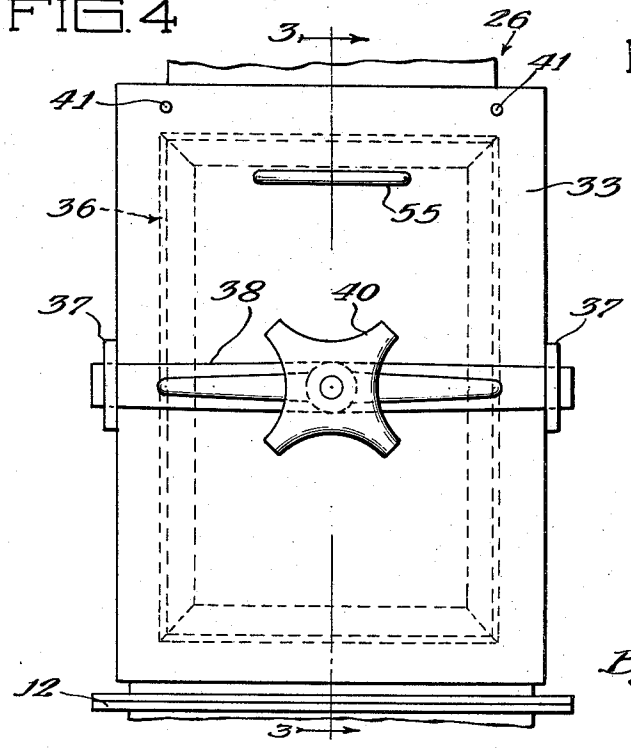
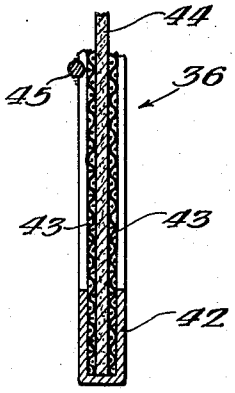


FIG. 6



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3,102,602
VENTING MEANS FOR A BAG FILLING MACHINE

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Filed June 26, 1961, Ser. No. 119,707
3 Claims. (Cl. 177—60)

This invention relates to an improved vent arrangement and for a bag filling machine and is a continuation-in-part of my copending application, Serial No. 737,146, filed May 22, 1958, now Patent No. 3,073,401.

In the packing of certain types of material it has been proposed to use a closed conditioning chamber in order to promote the fluidization of the material, and in such instances it is sometimes desirable to vent the conditioning chamber during the period that the material flows from a storage hopper into the conditioning chamber of the bag filling machine.

As pointed out in the aforementioned copending application, it is also desirable, with certain types of material, to supply air to the free space in the conditioning chamber, this air being referred to as "top air."

It is an object of this invention to provide a combined vent and top air arrangement which includes a self cleaning vent filter.

One of the difficulties encountered in the filling of bags with powdered substances is that it is a dusty operation, and considerable efforts have been exerted in the past to avoid this. I have found that one source of the difficulty is that considerable amounts of material are suspended within the conditioning chamber and are carried by the venting means out of the conditioning chamber and into the surrounding atmosphere. I have also found that this source of dust in the air can be eliminated by providing a filter in the vent means. However, such a filter is very quickly clogged and therefore according to the present invention, I utilize the top air which is provided in certain installations to clean the vent filter.

Another object of my invention is to provide an improved filter structure for the vent of a bag filling machine, which includes a replaceable filter unit.

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 side elevation of a bag filling machine embodying my invention;

FIG. 2 is a horizontal section taken along line 2—2 of FIG. 1 showing the structure of my improved vent filter;

FIG. 3 is a vertical section taken along line 3—3 of FIG. 4;

FIG. 4 is a rear elevation of the vent structure shown in FIG. 1;

FIG. 5 is an elevation of the replaceable filter; and

FIG. 6 is a detailed section taken along line 6—6 of FIG. 5 showing the construction of the filter unit.

In FIG. 1, the reference numeral 10 designates generally a bag filling machine which is disposed beneath a supply hopper, not shown. The bag filling machine 10 includes a conditioning chamber 12 located beneath the outlet of the hopper 11, and communicating therewith by means of an inlet valve 13 which may be in the form of a sleeve valve.

The bag filling machine 10 also includes a supporting framework 14, and scale mechanism generally indicated by the reference numeral 15. A spout 16 communicates with the lower end of the conditioning chamber 12 by a flexible rubber tube 17, and suitable spout supporting mechanism 18 is provided which also provides a connection with the scale mechanism 15.

A diffuser pad 20 is located at the bottom of the conditioning chamber 12 and has a suitable connection to an air conduit 21. A bag 19 may be supported from the spout 16.

When air is caused to flow through the conduit 21 and the diffuser pad 20, the material within the conditioning chamber 12 is fluidized and will flow in a horizontal direction through the spout 16 into the bag 19. When the weight of the bag and contents reaches a predetermined amount, the scale mechanism 15 is tripped and a pinch valve 22 engages the tube 17 to cut off the flow of material through the spout 16 in order to terminate the filling operation. The fluidizing air to the pad 20 is preferably cut off at this time also.

Material is permitted to flow from a hopper into the conditioning chamber 12 by operation of the inlet valve 13, which is automatically opened at the conclusion of each filling operation for an interval sufficient to permit the required charge of material to flow from the hopper 11 into the conditioning chamber.

The machine also includes a suitable level responsive device 25 which serves to close the inlet valve 13 when the material in the conditioning chamber reaches a predetermined level, the nature of said level responsive device being more fully described in the aforesaid copending application.

In order to facilitate the flow of material through the feed valve 13 into the conditioning chamber, vent means are provided in the form of a vent chamber 26 which is connected to a vent line 27, as shown in FIG. 1.

The vent chamber 26 comprises a rectangular frame 30 which surrounds an opening 31 formed in the wall 32 of the conditioning chamber 12. The rectangular frame is provided with a cover plate 33. A suitable gasket 34 provides a seal between the cover plate 33 and the frame 30.

The opening 31 is of generally rectangular shape but is enough smaller than the frame 30 so as to provide a flange 35 against which a filter unit 36 can be seated, so that air moving from the conditioning chamber 12 into the vent chamber 28 necessarily passes through the filter unit 36.

Means are provided for clamping the cover plate 33 securely to the rectangular frame 30. As shown in FIGS. 1 and 2, a stirrup 37 is provided at each side of the frame 30, and is suitably welded to the flanges thereof and to the body of the conditioning chamber 12. A horizontal clamp bar 38 overlies the cover plate 33, and its ends project through the stirrup 37. A suitable screw 39 extends through the clamp bar and bears against the cover plate 33, the screw being provided with a hand knob 40, so that when the screw is tightened up, the plate will be brought into engagement with the gasket 34. Suitable locating pins 41 are mounted on the upper edge of the frame 30 and project through the upper portion of the cover plate 33 to facilitate the positioning of the cover plate.

The cover plate 33 is provided with a handle 55 to facilitate manipulation. Also, it is provided with vertical stiffening ribs 56.

The filter unit 36, as shown in FIGS. 5 and 6, comprises a rectangular frame 42 which supports a pair of screens 43 between which is located a suitable filter material 44 such as a fabric of the type used in cloth dust collectors. Cross bars 45 may be welded to the frame 42 and overlie one of the screens on the conditioning chamber side of the filter chamber unit. The filter unit 36 is maintained in its operative position by a retaining frame 46 and screws 47.

According to my invention, the filter unit 36 is blown out or cleaned at periodic intervals. By using the top air supply as the source of blow-out air, this blow out is

effected automatically in the course of each filling operation by connecting the top air supply line **51** to the vent chamber **26**.

As shown in FIG. 1 the top air supply line **50** is connected to the vent chamber **26** by means of a two-way valve **51**. A short length of pipe **52** connects the two-way valve **51** with the vent chamber **26**.

In operation, the two-way valve **51** is moved between a blow-out position, shown in FIG. 1, and a venting position in which the vent line **27** communicates with the pipe **52** and the vent chamber **26**. When moved into the blow-out position as shown, compressed air will enter the vent chamber **26** and flow through the filter unit **36** in a reverse direction, thereby cleaning the same.

As pointed out in the aforesaid copending application, the vent is closed during the bag filling operation, which is to say, during the time that the pinch valve **22** is open and the fluidizing pad **20** is energized so that the material flows from the conditioning chamber **12** through the spout **16** and into the bag **19**.

The operation of the scale mechanism **15**, in addition to closing the pinch valve **22** and cutting off the fluidizing air supply through the conduit **21**, opens the inlet valve **13** and opens the vent, and it also shuts off the supply of top air. Initiation of another feeding cycle closes the vent and opens the top air supply.

According to the arrangement shown herein, the two-way valve **51** controls both the venting operation and the top air supply so that when the bag filling operation is initiated, the two-way valve **51** will be moved by a suitable solenoid or air cylinder into its blow-out position. When the scale mechanism **15** trips, the two-way valve **51** will be moved into the vent position.

Thus, the air displaced by the material flowing through the inlet valve **13** is vented from the conditioning chamber **12** and it is filtered as it is vented so as to provide a clean operation. Then, during the bag filling operation, the flow of the fluidized material through the spout **16** is facilitated by the introduction of top air. The top air also blows out the filter so that it will provide a low resistance path for the displaced air during the next venting operation.

The subject matter of my aforementioned copending application, Serial No. 737,146, is incorporated herein by reference, insofar as consistent with the present disclosure.

Although only a preferred embodiment of my invention is 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. Apparatus for filling bags from a hopper comprising a bag filling machine which includes a conditioning chamber, a filling spout disposed at the lower end of said conditioning chamber for filling a bag, inlet means for said conditioning chamber, a diffuser pad located at the bottom of said conditioning chamber for fluidizing the material in said conditioning chamber to cause same to flow through said spout, first valve means for closing said inlet means to prevent reverse flow of air from said conditioning chamber into said hopper, level responsive means disposed in said conditioning chamber, and being operative to close said first valve means when the material being fed into said conditioning chamber reaches a predetermined level, second valve means disposed between said filling spout and said conditioning chamber, bag weight responsive means for closing said second valve means when the predetermined amount of material has been fed into said bag, vent means for said conditioning chamber, means for rendering said vent means inoperative during the time that material is flowing through said spout, top air supply means for supplying air to the upper portion of said conditioning chamber when said vent means is inoperative, a filter for said vent means, said top air supply means being connected to said vent means so that top air will be caused to pass through said filter in the reverse direction for cleaning same, and means controlled by the operation of said weight responsive means for opening said vent means and for cutting off said top air supply means at the time that the flow of material through said spout is discontinued.

2. Bag filling apparatus as claimed in claim 1 in which said conditioning chamber has a wall with an opening formed therein, said vent means including a vent chamber and a vent line connected thereto, said vent chamber comprising a rectangular frame mounted on said wall and surrounding said opening, and a removable cover plate cooperating with said frame, said filter comprising a replaceable filter unit disposed in said vent chamber and overlying said opening.

3. Bag filling apparatus as claimed in claim 2 in which said means for opening said vent means and for cutting off said top air supply means comprises a two-way valve connected between said vent line and said vent chamber and between said top air supply means and said vent chamber.

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