

Nov. 25, 1958

E. S. WHITMIRE

2,861,604

BAG FILLING SPOUT

Filed May 22, 1956

2 Sheets-Sheet 1

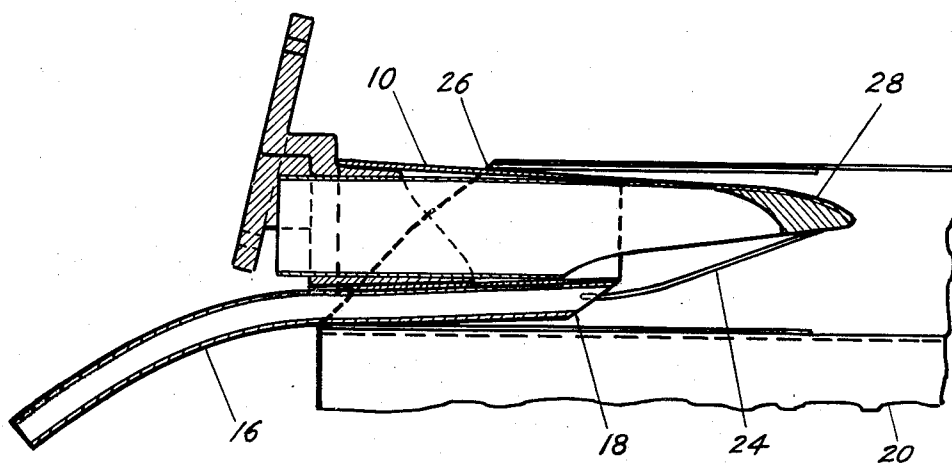


FIG. 1

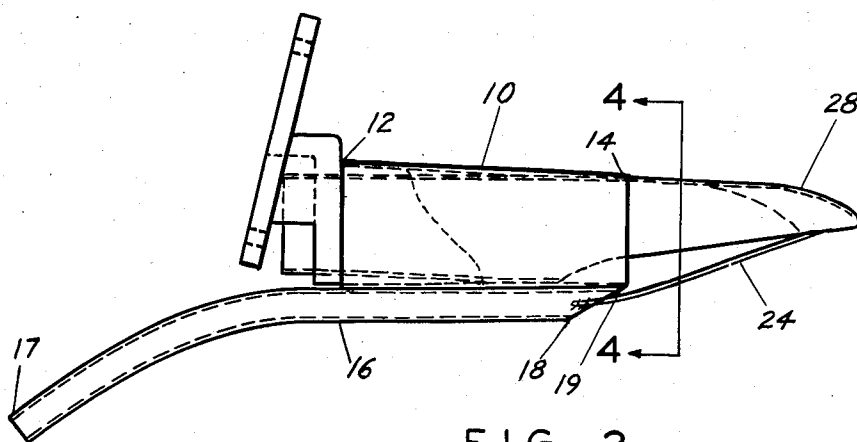


FIG. 2

Emmett S. Whitmire INVENTOR

BY *Cushman, Darby & Cushman*

ATTORNEYS

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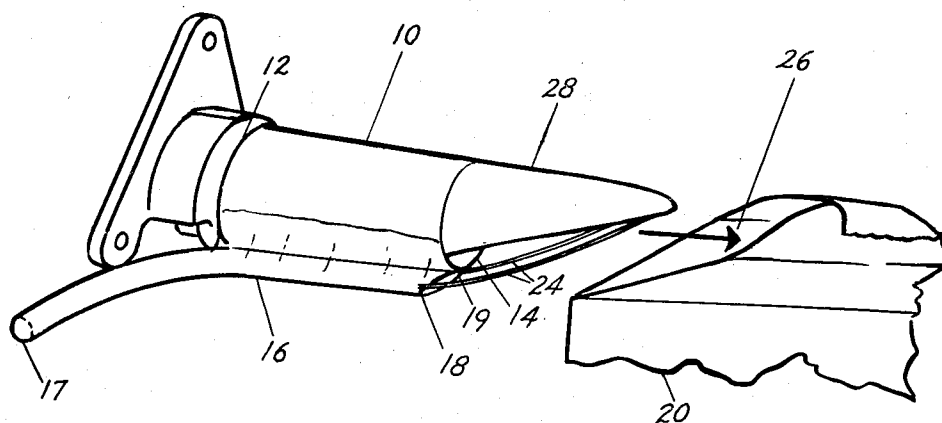


FIG. 3

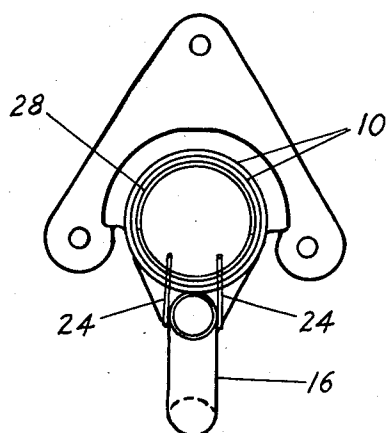


FIG. 4

Emmett S. Whitmire INVENTOR

BY *Cushman, Darby & Cushman*

ATTORNEYS

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BAG FILLING SPOUT

Emmett S. Whitmire, Knoxville, Tenn., assignor to Volunteer Portland Cement Company, Knoxville, Tenn., a corporation of Delaware

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4 Claims. (Cl. 141—285)

This invention relates to spouts used in filling valve bags with pulverulent material and more particularly to improved means for exhausting trapped air from the interior of the bags.

The cement and other industries which package powdery, or pulverulent materials have in the past encountered great difficulty in quickly and efficiently packaging these materials without the escape of large quantities of dust into the surrounding air. Loss of material occurs principally when the bag is removed from the loading spout and the bag valve does not close quickly enough to prevent the lightly compressed air in the bag from blowing out a quantity of the cement or other dust. The escaping dust dirties the exterior surfaces of the bags, the floor below, and produces a generally dusty atmosphere which in many instances presents serious health and safety hazards. The cement industry, which makes widespread use of valve bags, is particularly vulnerable to the escape of dust, due to the extreme fineness of the product. In the past, many methods have been attempted to control the escape of trapped air to prevent the escape of powdery materials, such as the use of porous cloth bags, perforated paper bags or sacks which permit the air to seep through the walls and, in the case of valve bags, the use of filling nozzles or spouts which vent the gas either to the atmosphere or to suitable collecting means. However, these means have generally proven inadequate either because they continued to permit escape of dust, or fines, to the atmospheres or because they required an inordinate amount of time to effect the exhausting or venting operation, thus rendering them economically unfeasible.

It is therefore one of the principal objects of this invention to provide exhausting means for use on valve bags which effectively prevents escape of pulverulent material into the atmosphere.

Another object of this invention is to provide exhausting means permitting rapid and effective discharge of trapped gas by virtue of its own pressure.

Still another object of this invention is the provision of a filling spout attachment, for exhausting trapped gas, which is readily and easily applied to existing spout structures.

Yet another object of this invention is the provision of an exhausting spout attachment in which the relief tube extends inwardly into the bag beyond the terminal of the valve flap.

Other objects and advantages of the present invention will be in part obvious and in part explained by reference to the accompanying specification and drawings, in which:

Figure 1 is a longitudinal sectional view illustrating the manner in which the attachment and filler spout fit into the bag valve.

Figure 2 is a side elevation showing the filling spout equipped with the exhausting attachment.

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Figure 3 is a perspective view showing an exhausting attachment prior to being positioned within the bag.

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 2.

Referring to the drawings, in particular Figure 3, the present exhausting or venting attachment comprises a generally cylindrically-shaped spout encircling body 10 which is open at both ends, as indicated at 12 and 14, an independent gas exhausting tube 16 and bag valve operating means 24. Obviously in those instances where pulverulent materials such as cement powder or the like are being packaged, the gas being exhausted through tube 16 will be air, whereas in those situations involving packaging of more reactive materials the gas will advantageously be a more inert one such as nitrogen. The three principal parts of the attachment are discussed separately below.

Body 10, as previously mentioned, is generally cylindrical in shape. However, it will be seen that the body has a slight tapering off in diameter from the outer toward the inner end. By outer end is meant that end which normally remains outside of the bag valve when the filling operation is being carried on. Conversely, the inner or forward end is that which is disposed within the bag during the filling operation. The tapered construction is evidenced by the size difference in diameters existing between openings 12 and 14, opening 14 being of a smaller diameter than opening 12. Thus, while body 10 is described as being generally cylindrical, it may more properly be described as a frustum of a hollow cone. While the tapered shape is preferred due to the improved sealing between it and the bag valve, it is of course feasible to utilize a true cylinder.

Secured to the outer wall of body 10 is the gas exhausting tube 16. This tube which may be constructed of a variety of materials, such as steel, aluminum, copper or other acceptable metals, or of flexible material, such as rubber or plastic, is, in this instance, constructed of copper and secured to the side of body 10 by soldering or brazing. The inner or forward end 18 of tube 16 is preferably, although not necessarily, angularly formed as shown in Figures 1, 2 and 3. The longer side of the tube, identified by numeral 19, is preferably the one that is secured to body 10 so that angular end 18 is directed rearwardly from below the opening 14 of the body 10. End 18 of the tube is angularly formed to materially reduce or effectively eliminate passage of incoming material through the exhausting tube. That is, using cement as an example, it is desirable that the incoming cement fall into the bag 20 and that only the air above the settled material, along with any dust that may be circulating therein, escape through tube 16. After the slightly pressurized air enters tube 16, it flows into a rearwardly extending tube portion 17 so as to be directed to suitable separating and collecting means, such as a cyclone separator (not shown).

Attached to the forward end of tube 16 is a pair of forwardly and upwardly extending spaced fingers 24. These fingers, as will be seen by referring to the drawings, are deformed upwardly in such a manner as to extend toward the center line of body 10 to help guide the bag valve, indicated as numeral 26, past the forward end of body 10 and tube 16.

Referring now to Figure 1, the attachment is shown in its assembled position with a filling spout 28 inserted into valve 26 of bag 20. As will be noted, body 10, due to its increasing diameter from front to rear, lies in tight sealing engagement with valve 26. The forward or inner end 18 of the exhausting tube lies well inside of the inner edge of the bag valve so that gas may easily escape. Since the exhausting means 16 is located on the

underside of filling spout 28, it is impossible for the upper portion of bag 20 to seal the exhausting means when the bag becomes filled and settles down onto the upper surface of the filling means. Fingers 24, when the attachment is applied to a filling spout, extend upwardly in such a manner that their outer ends contact the filling spout at the inner end thereof. These fingers are instrumental in insuring that valve 26 is opened easily when the spout and attachment are to become disposed therein.

Thus, it will be seen that simple, efficient, and positive means are provided for withdrawing the air from the bag and in such a manner as to prevent the emission of dust. The attachment is such as not to require a re-designing of the standard type of filling tubes and can be applied quickly with ease to devices of this character. Further, the attachment, when applied, does not reduce the speed with which bags can be filled and the exhaust tube is so positioned that the air compressed in the bag collects under the spout and not on top thereof where the weight of the bag makes a tight seal, thus insuring the efficient withdrawal of the confined air or gas without causing a discharge of the dust or other fine particles into the room with the consequent waste of the material and the collecting of the dust on exterior surfaces of the bags and the floor and walls of the room, as well as contaminating the atmosphere in which the filling operation is taking place. It will be understood that the gas exhausting tube 16 extends into the bag beyond the valve flap, so as not to be sealed off by the flap when the bag is positioned on the spout. Moreover, the exhaust tube or pipe 16 is arranged so as to allow the excess air to escape from the bag by its own pressure both during the filling process as well as at the end thereof. The tube 16 is of such a length as to extend through the packing machine to an inlet of a dust collector without requiring any alterations or modification in the construction of the packer machine or its operating cycle. Thus, the novel association of the gas exhauster 16 with the spout 10 provides means for successfully solving the dust problem which heretofore has been the cause of considerable damage and expense in industries where pulverulent materials, such as cement and the like, are packed and in which large quantities of dust have been allowed to escape into the surrounding air.

By use of the present spout, bleeding off of dust-laden compressed gas is completed in the one or two seconds between the filling of the bag and its removal from the packer, the shrinkage of the bag during this interval being quite visible. Since almost a complete discharge of compressed gas is accomplished and the dust is carried beyond the packer to a dust collector, the bags are for all practical purposes completely clean as they leave the packer. An item of prime importance is that no time delay is needed for this device. The bags are filled, the gas pressure bled off and the bag dropped from the machine in an average time of about five seconds per bag.

It will thus be seen that there has been provided by this invention a structure in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved. As various possible arrangements may be made of the above invention, all

without departing from the scope thereof, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. An attachment for filling valve bags with pulverulent material including an elongated cylindrical spout having opened inner and outer ends, the inner end of said spout having a downwardly directed discharge opening, an independent exposed gas exhausting tubular member below and outside of said spout and connected to the underside thereof, said tubular member extending longitudinally of said spout and having an outer end arranged to communicate with a dust collector and an inner end adjacent to and below the inner end of said spout, the inner end of said tubular member being shaped so that when the spout and tubular member are inserted into a valve bag, the gas and dust particles in the bag above the pulverulent material are withdrawn through said tubular member and the pulverulent material in the bag is prevented from escaping into the atmosphere.
2. An attachment as called for in claim 1 in which the spout is longitudinally tapered so as to be of smaller diameter at its inner end than at its outer end in order to facilitate its entrance into a valve bag and provide a tight sealing engagement therewith.
3. An attachment for filling valve bags with pulverulent material, including an elongated cylindrical spout having opened inner and outer ends, the inner end of said spout having a downwardly directed discharge opening, an independent gas exhausting tubular member below and outside of said spout, said tubular member having an inner end and provided with an inclined edge diverging outwardly towards the outer end of the spout so as to provide a long upper side and a shorter lower side, the long side of said tubular member being connected to the underside of said spout and the short side of tubular member being spaced below the spout and shaped to provide means when the spout is inserted into a valve bag for insuring the compressed gas and dust circulating in the bag above the settled material to be discharged through said tubular member and preventing the escape of the pulverulent material in the bag through the tubular member and into the atmosphere.
4. An attachment as called for in claim 3 in which said independent tubular member at its inner end has spaced fingers extending outwardly and upwardly therefrom towards the spout to facilitate the opening of the valve bag.

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