June 15, 1943. A. C. HOBBIE 2,322,090

BAG FILLING APPARATUS

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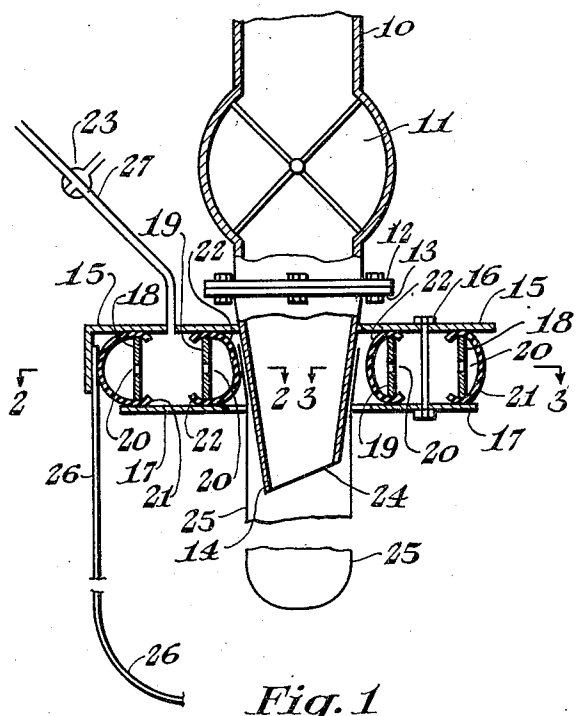

Fig. 1

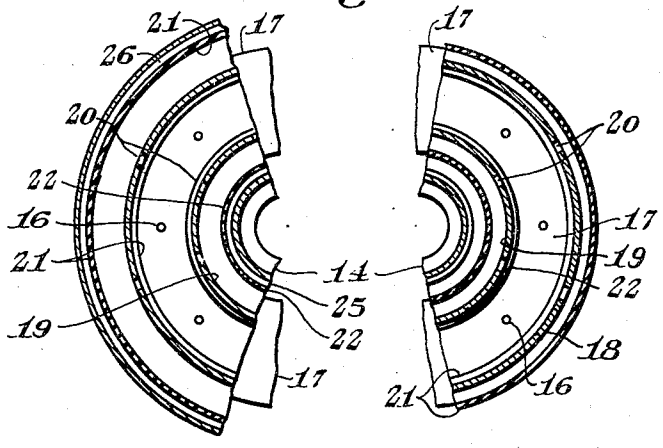

Fig. 2

Fig. 3

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BAG FILLING APPARATUS

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1 Claim. (Cl. 226—58)

This invention relates to a bag holder for use on bag filling machines. It relates in particular to a means for holding limp or non-rigid bags or similar cartons on the nozzle or filling spout of machines delivering bulk goods to be packaged, especially machines delivering such goods under slight pressure, or delivering materials of noxious or toxic nature where dust must be eliminated.

The problem of holding limp bags, sacks or other non-rigid cartons in position beneath the delivery spout of bulk commodity handling equipment has long been acute. Numerous devices have been proposed in an attempt to solve the problem, but none have been particularly successful. Many of the proposed means have relied on mechanical clamps, supporting frames, and the like, but these have all been defective, either in being adapted only to one size of bag, or in not providing sufficient grip, or in failing to seal the bag around the delivery spout during the delivery of finely divided, powdery material. The problem exists today in grinding mills of all sorts, on threshing machines, and in numerous other machines where bulk goods are delivered to be put up in limp or semi-rigid cartons.

The present invention is directed to a solution of the above-stated problems, and has among its objects the provision of a bag holder adapted to handle bags or cartons of any reasonable size larger than the delivery spout from which they are to be filled. Another object is to provide bag holding means as aforesaid which will form a substantially dust tight seal between the bag to be filled and the filling spout. Yet a further object is to provide such a bag holder as above indicated, which may be adjusted at will to provide the requisite tension to hold a bag in position, regardless of the load charged into the bag, up to its capacity and bursting strength. Still another object is to provide a pneumatically operated and controlled bag holder. Other and related objects are also in view, and will become apparent to the reader from the following detailed description.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described, and particularly pointed out in the appended claim, the annexed drawing and the following description setting forth in detail but one of the various forms in which the invention may appear.

In the single sheet of the said annexed drawing, wherein like parts are designated throughout by like numerals,

Fig. 1 is a side elevation, partly in section, illustrating the new bag holder at rest and in operation;

Fig. 2 is a fragmentary plan view, in horizontal section, taken along the line 2—2 of Fig. 1, and showing the bag holder in operation; and

Fig. 3 is a similar fragmentary sectional view taken along the line 3—3 of Fig. 1, showing the bag holder when idle.

In the preferred embodiment, illustrated in the drawing, any conventional bulk goods delivery tube 10, suitably provided with a barrel valve or other delivery controlling or measuring means, is secured, as by matched flanges 12 and 13, to spout member 14, which may be tapered suitably in the shape of a conic frustum, as shown, and having a delivery port 24 at its lower extremity. Spout 14 is provided with a horizontal, peripherally disposed, and preferable snugly fitting plate flange 15, which may be welded or otherwise secured to the spout member 14. Plate 15 is provided with several bolt holes, drilled on a circle concentric with the spout 14. Dependent from plate 15, and supported therefrom by bolts 16, is a horizontally disposed flat ring member 17, concentric with spout 14 and having an internal diameter somewhat larger than the outside diameter of spout 14, thus providing an annular space between ring 17 and spout 14. Between plate 15 and ring 17 are two rings 18 and 19 with vertical walls, serving as spacers between plate 15 and ring 17. Rings 18 and 19 are cylindrical sections, concentric with one another and with spout 14, which they encircle. Two continuous i. e., circular bands of pure gum rubber, or like yieldable material, are provided, of a width suitably about 1¼ to 1¾ times the distance between plate 15 and ring 17, one band 21 being of a diameter somewhat greater than that of ring 18, and the other band 22 being of normal, i. e., undistended, diameter somewhat less than that of ring 19. Band 21 may be of a diameter substantially the same as or slightly less than ring 18 so that when pressure is released, as hereinafter described, band 21 will deflate more rapidly. Likewise band 22 may be of substantially the same diameter as the inside periphery of ring 19 and may be installed under slight axial tension to make a snug fit to the inside of ring 19 when pressure in said band is released, as hereinafter described. Band 21 is put in position outside of ring 18 with its upper rim folded over that ring and its lower rim folded under that ring, the upper and lower said rims being held securely in place between ring 18 and plate 15 above it and ring 17 below it. Similarly, the gum rubber

sheet 22 is positioned inside ring 19, and is folded and secured in the manner just described. Rings 18 and 19 are each provided with a series of holes 20 to permit equalizing pressure on their inner and outer surfaces. An air supply tube 27 passes through plate 15 and leads into the annular space between rings 18 and 19. Tube 27 is preferably provided with a 3-way valve 23 so that pneumatic pressure may be applied or released at will. The two positions of said valve are air-in and air-out. Pressure regulating means (not shown) are preferably installed ahead of valve 23.

In operation, the bag holder is assembled as above-described and a bag 25, of substantially the same diameter as the tapered spout member 14 its junction with plate 15, is slipped over the opening 24 of spout 14. Valve 23 is turned to admit a suitable fluid under pressure, such as water or air, through tube 24 into the space between rings 18 and 19. The pressure is distributed through holes 20 and distends the gum rubber bands or sheets 21 and 22. Fluid pressure is adjusted until band 22 is expanded and fits snugly around the mouth of bag 25, holding firmly against spout 14. Valve 11 is opened to admit bulk material to bag 25. When bag 25 is full, valve 11 is closed, and the grip of band 22 on bag 25 is released by opening valve 23 to the "air-out," or vent, position, thereby allowing bands 21 and 22 to relax or contract to their normal positions. Filled bag 25 is thus dropped from the spout and the next bag moved into place, and the operations repeated.

When a bag 26 is employed of diameter greater than that of ring 17, the operation is much the same, except that bag 26 is slipped over the outside ring 17 and band 21 is expanded to hold the bag 26 open from within. If desired, when using a bag 26 of larger mouth opening than the diameter of ring 17, a depending skirt may be provided on plate 15 to cooperate with expanded band 21 in holding the bag, though this is ordinarily not necessary.

It is to be understood that numerous modifications may be made in the device disclosed and changes made in the elements thereof without departing from the scope of the present invention. Such alterations, adjustments, and changes are within the skill of a packaging expert or a mechanic after having read the foregoing description.

The expansible bands 21 and 22 have been described as being of pure gum rubber. While this is the preferred material most commonly available commercially, other forms of rubber, and numerous rubber-like materials may be substituted in its stead. Similarly, retaining means for the bag holder may be provided other than the plate 15, ring 17, and spacer rings 18 and 19, provided that pneumatic pressure be employed to expand a peripherally disposed tube-like member into engagement with the bag or carton to be filled, holding the container in substantially dust tight relationship with a delivery spout.

The device described is operative on paper or cloth bags, or sacks, semi-rigid box-like structures, and the like, and, while it has been described as of circular cross-section, it need not be so limited, the principle being applicable as well to rectangular, square, and various polygonal or oval types of spouts or containers or both and to rigid containers such as glass bottles or tin cans.

The description has had particular reference to a holder comprised of two distensible container holders, one capable of expanding inwardly to secure a container against the delivery spout, and the other capable of expanding outwardly to hold a larger container open from within. It is to be understood that either of the distensible tube-like members may be used alone, being selected and positioned, according to its radius of distension, near the imaginary circle representing the open mouth of the particular size of bag concerned in position to be filled.

Having now described a preferred embodiment of the invention, and a manner in which the same may be operated I declare that what I desire to secure by Letters Patent of the United States is:

A container holder, for use during the filling of non-rigid containers with bulk material, comprising a vertically disposed bulk goods delivery spout, a horizontally disposed, rigid supporting member about said spout, a horizontally disposed, flat, ring-like member of internal diameter greater than that of the spout dependent from said rigid supporting member, and spaced therefrom, a rigid, vertically walled ring concentric with the spout for spacing the horizontally disposed rigid supporting member from the flat ringlike member, a continuous band of distensible, rubber-like material secured along its upper rim between the first said rigid supporting member and the vertically walled rigid ring member and at its lower rim between said vertical ring member and the horizontally disposed dependent ring, forming a continuous pocket between said band and the vertically walled ring, and means for introducing fluid under pressure into said pocket whereby the rubber-like material may be distended into engagement with a container in position to be filled.

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