

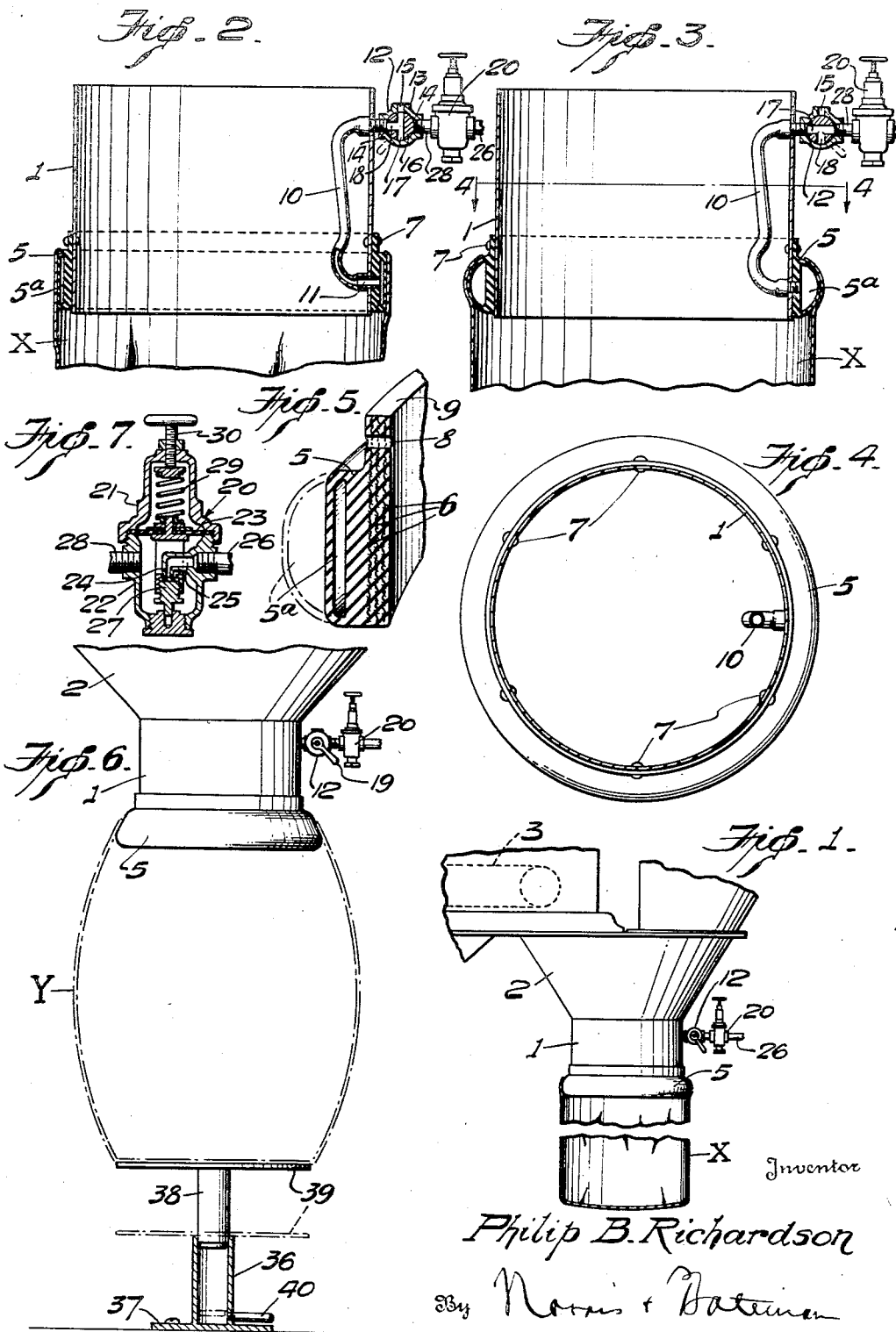
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RECEPTACLE HOLDER

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RECEPTACLE HOLDER

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The present invention relates to filling means for bags, barrels or other open mouth receptacles, and the primary object of the invention is to provide novel means for holding the bag or other receptacle in filling relation to a filling tube or hopper and prevent the escape of dust during the filling operation and to quickly release the receptacle when the filling operation has been completed.

Heretofore, in the filling of open mouth receptacles, especially bags, from a filling tube which may be supplied from a bin, scale or other source, it has been necessary for an attendant to either hold the bag in filling relation to the filling tube by hand during the filling operation or to apply the bag manually to the filling tube until it is gripped and held by gripping means which must be brought into engagement with the exterior of the bag mouth and to clamp it to the exterior of the filling tube, but such arrangements involve laborious operations on the part of the attendant which consume a considerable amount of time and are otherwise objectionable.

The present invention overcomes the objections heretofore experienced, it providing means, preferably in the form of an inflatable member which surrounds the filling tube and which when deflated or collapsed, enables the mouth or other receptacle to be easily and quickly placed in filling position around the filling tube and which, when inflated or expanded, seals and grips the mouth of the receptacle to retain it in filling relation with the filling tube and to form a joint therewith which will prevent the escape of dust from grain, feed or other dusty material which may be introduced into the receptacle, subsequent deflation or collapse of said member releasing the receptacle and permitting the immediate removal thereof.

A more particular object of the invention is to provide means of this character for stretching the mouths of bags applied to a filling tube so as to not only grip and hold bags securely thereon and prevent the escape of dusty materials during the filling operation but to draw the bag mouth tightly around the filling tube so that there will be no folds in the bag mouth during the filling operation through which dust might escape.

Another object of the invention is to provide a receptacle holder for filling tubes which will accommodate itself to variations in the sizes and points of unevenness of the mouths of the receptacles.

A further object of the invention is to provide means for controlling the extent to which the inflatable member is expanded, thereby adapting it to the holding of receptacles having mouths of different sizes.

To these and other ends, the invention consists in certain improvements and combinations and arrangements of parts, all as will be hereinafter described, the features of novelty being pointed out particularly at the end of this specification.

In the accompanying drawing:

Fig. 1 is an elevation of a portion of a bag filling apparatus embodying a filling tube constructed in accordance with the present invention;

Fig. 2 is a vertical section, on an enlarged scale, taken centrally through the filling tube, showing the bag holding and sealing member thereon in collapsed or deflated condition to receive a bag;

Fig. 3 is a view similar to Fig. 2 but showing the bag holding and sealing member in expanded condition to hold and seal a bag on the filling tube;

Fig. 4 is a horizontal section taken on the line 4—4 in Fig. 3;

Fig. 5 is an enlarged detail section through the bag holding and sealing member, showing the same in deflated and inflated conditions respectively by the full and dotted lines;

Fig. 6 shows the invention applied to a barrel filling apparatus; and

Fig. 7 is a detail sectional view of the pressure regulating valve.

Similar parts are designated by the same reference characters in the several figures.

The present invention is applicable generally to apparatus for filling bags, barrels or other open-mouth containers through a filling tube which may be supplied with granular or other fluent material from a storage bin, weighing machine or any other suitable source of supply, it providing an annular or ring-like member which is fixed to and surrounds the outlet of the filling tube and is capable of expansion and contraction to increase or decrease its diameter and circumference, said member, while contracted, enabling the open mouth of a bag or other container to be easily and quickly placed thereon, and when expanded, serving to grip and hold the bag or receptacle securely in filling relation with the filling tube and sealing the mouth of the bag or receptacle against the escape of dust arising from the dropping of the material into the bag

or receptacle. Contraction of said member, upon completion of the filling operation, releases its grip upon the filled bag or receptacle, so that the latter will drop or may be immediately removed from the filling tube.

In the embodiment of the invention shown in the accompanying drawing, 1 represents the filling tube of a filling apparatus which may be of any suitable or well known kind, it for example being provided with and supported by a hopper 2 at its upper end to receive grain, feed or any other granular or fluent material from either a storage bin or from a feeder 3 which may be part of or receive material from a weighing machine which may be of any usual or well known kind.

The lower end of the filling tube, which is open for the discharge of the material therefrom into the bag or other receptacle X, is surrounded, according to the present invention, by an expansible member 5 which is composed preferably of a hollow ring of rubber or elastic material which is expansible and inherently contractible in a direction transversely of its cross section, as indicated by the full and dotted lines in Fig. 5. The rubber or elastic portion of the ring is preferably reinforced by a backing composed of a suitable number of layers of canvas duck 6 or other fabric to which it is vulcanized, and the member is fixed to the filling tube in any suitable manner, as by rivets 7 which may extend through holes suitably spaced circumferentially in the lower portion of the filling tube and through correspondingly located holes 8 extending through an upward extension 9 of the reinforcing backing of the expansible member, the latter being thus secured in fixed position on the filling tube and having a suitable fit around its discharge opening. For example, if the expansible member, when deflated, is relatively loose on the filling tube, it will, when inflated, swell inwardly against the substantially rigid filling tube within it and thereby form a dust-tight fit therewith. The outer elastic portion of said member however is free to expand or contract.

The member 5 is expanded by introducing air or other fluid under pressure into its interior to inflate it, and it is contracted by permitting such fluid to escape therefrom, through a pipe 10 which is preferably extended through the filling tube 1 to the interior thereof and is connected to the interior chamber 5^a of the member 5 by a nipple 11 which may extend through and be fixed in an aperture in the adjacent wall of the filling tube and vulcanized or otherwise provided with a fluid tight fit in the inner wall of the member 5, as shown in Figs. 2 and 3.

The admission of air or other fluid under pressure to the interior chamber 5^a and the release of such fluid therefrom may be controlled in any suitable way, manual control means being shown in the present instance comprising a 3-way valve 12 which may be of any suitable or well-known construction, it embodying, as shown, a casing 13 having aligned ports 14 and a vent port 15 at a right angle thereto, and a rotatable valve member 16 having a diametrical port 17 and a lateral port 18 at a right angle thereto, the valve member 16 having a handle 19 for rotating it. When the valve member 16 is in the position shown in Fig. 2 the supply of fluid pressure will be cut off and the interior chamber 5^a of the expansible member 5 will be vented to the atmosphere through the ports 15, 17 and 18 and the member 5 will be collapsed as shown in this figure, and

when said valve member is in the position shown in Fig. 3 the vent 15 will be closed and fluid under pressure will be admitted, through the port 17 to the interior chamber 5^a of the member 5 and will expand it, as shown in this figure.

Preferably, means is provided for regulating the pressure admitted to the expansible member 5 to govern the extent to which it is expanded, to accord with the mouths of bags or other receptacles of different ranges of sizes. Such regulating means, as shown in the present instance, comprises an automatic pressure regulating valve 20 which may be set at will for any desired pressure of air or fluid to be admitted to the member 5 and thereby predetermine the extent to which it will expand. Pressure regulating valves of different kinds may be employed to accomplish these results, the regulating valve shown in the present instance as an example comprising a casing composed of upper and lower sections 21 and 22 respectively which are secured together, as by screw threads but are divided interiorly into upper and lower compartments by an interposed flexible diaphragm 23. The lower casing section 22 has a valve seat 24 provided with an inlet port 25 which may be connected by a pipe 26 to a source of compressed air or other fluid under pressure, and the diaphragm 23 has a yoke-shaped valve member 27 fixed to it, the interior of the lower valve casing section 22 being connected by a pipe 28 to the inlet port 14 of the 3-way valve. The upper casing section 21 contains a coiled compression spring 29 which bears on the upper side of the diaphragm 23 and tends to move it and the valve member 27 downwardly to open the inlet port 25, and the power of this spring, and consequently the pressure within the lower casing section, may be adjusted as desired by a screw 30 which is threaded through the top of the upper casing section 21 and bears on the upper end of the spring 29. Air or other fluid under pressure entering the valve through the inlet 25 will flow into the lower casing section until the pressure therein, acting on the underside of the diaphragm 23, is sufficient to overcome the power of the spring 29 and thus cause closing of the valve member 27 against the valve seat 24, and by adjusting the power of said spring by the screw 30, the pressure in the lower valve casing section may be regulated so that it will not exceed any predetermined pressure for which the regulating valve is set. Since the air or other fluid is supplied from the outlet pipe 28 of the regulating valve to the 3-way valve which admits the air or fluid to the interior of the inflatable member 5, the extent of expansion of said member will be governed in accordance with the regulation of pressure of the air or fluid by the regulating valve, thus causing the inflatable member to expand to a predetermined extent for bags or other receptacles having mouths of a given size, and enabling the extent of expansion of the inflatable member to be varied to accord with bag or receptacle mouths of different ranges of sizes.

Fig. 6 shows the invention applied to a barrel filling apparatus, in which the barrel Y may be lifted to bring its open mouth into filling position by a pneumatic or other suitable table 36 which may be mounted on a floor, it comprising a base 37 embodying a cylinder and a piston or plunger 38 reciprocable vertically in the cylinder and carrying a table 39 on which the barrel may rest, compressed air or other fluid under pressure

being admitted from any suitable source to the lower end of the cylinder through a pipe 40 to lift the barrel so that its mouth surrounds the inflatable member 5 which is then deflated, after which the member 5 is inflated and expanded within the barrel mouth, thereby holding the barrel firmly in filling relation with the filling tube and accommodating itself to the shape of the barrel mouth and sealing the barrel mouth against the escape of dust arising from the material dropping into the barrel.

The operation is as follows: The bag X, barrel Y or other receptacle to be filled is lifted so that its mouth surrounds the inflatable member 5 while the latter is deflated, as shown in Fig. 2, the 3-way valve 12 being then set to vent the interior 5^a of said member to the atmosphere. The valve 12 is then rotated into the position shown in Fig. 3, thereby admitting compressed air or other fluid under pressure to the interior chamber of the member 5 and causing the latter to expand within the mouth of the bag, barrel or other receptacle until it firmly grips the same and forms a dust-tight seal between it and the filling tube. While the receptacle is thus held in filling position and sealed, the charge of material for the receptacle is introduced into it. The filled receptacle is released from the filling tube by returning the valve 12 to the position shown in Fig. 2, the compressed air or fluid being thereby vented from the interior chamber of the member 5 and allowing the latter to deflate or contract under the elastic action of the rubber or material composing this member, and the receptacle thus released from the filling tube may drop by gravity or be otherwise removed therefrom and the filling tube will be ready to receive the next receptacle to be filled.

A filling tube according to the present invention is not only capable of securely gripping and holding bags, barrels, pails, drums or other receptacles of either flexible or inflexible material in filling position but its elastic nature enables it to accommodate itself to variations in the shapes and sizes of the receptacle mouths, and since it is expansible around the entire circumference of the filling tube, it forms an effective seal with the receptacle to prevent the escape of dust arising from the dropping of grain, feed or other dusty materials into the receptacles.

The improved filling tube according to the present invention is especially advantageous when applied to the filling of bags composed of flexible material, such for example, as burlap, cotton or paper, since the inflatable member, when expanded, will not only function to support the bag during filling, but it opens the bag mouth so that no folds are left through which dust might escape during the filling operation, the expansion of the inflatable member taking up all slack or folds in the bag mouth. When the inflatable member is deflated, the filled bag is released immediately from the filling tube and may drop by gravity therefrom or be otherwise removed, and an empty bag to be filled may be easily and quickly placed in filling position on the filling tube by an attendant, the inflatable member, while deflated, having a diameter and circumference much smaller than while inflated.

By providing a pressure regulating valve for automatically limiting the pressure attained within the inflatable member, undue expansion thereof, which might damage it or split the mouth of a receptacle, especially a flexible bag

of paper or fabric, is precluded, and by providing a variable pressure regulator, the pressure attained by the air or fluid admitted to the inflatable member may be set to different predetermined degrees to accord with different ranges of sizes of the mouths of the receptacles to be filled.

The inflatable member may be readily made either by molding it in the form of an endless tubular piece of elastic rubber vulcanized to its duck or fabric backing, or it may be made of a tubular strip of elastic rubber vulcanized to its duck or fabric backing and formed into a ring and closed at its ends by a single plug of rubber cemented therein, or in any other suitable way. Obviously, while the inflatable member is shown as circular in form, it may be made in any other form according to the shape of the mouth of the receptacle or container to be held.

I claim as my invention:

1. In or for filling means for bags and other receptacles, a filling tube having a closed annular inflatable member surrounding its discharge to enter and expand within the mouth of the receptacle, means for admitting fluid pressure to said member to inflate it and for exhausting fluid pressure therefrom to permit deflation thereof, and means adjustable to predetermine the maximum pressure of the fluid admitted to the inflatable member.

2. In or for filling means for open mouth receptacles, a filling tube having an inflatable member surrounding its discharge to enter and expand within a receptacle mouth, means for admitting fluid pressure to said member to inflate and expand it within the mouth of a receptacle, and means for regulating the maximum pressure of the fluid admitted to said member.

3. In or for filling means for open mouth receptacles, a filling tube having an inflatable member surrounding its discharge to enter and expand within a receptacle mouth, means operable at will for admitting fluid pressure to said member to inflate and expand it within the mouth of a receptacle, and means for automatically limiting the pressure of the fluid admitted to said member and for thereby limiting the expansive force exerted by said member within the mouth of the receptacle.

4. In or for filling means for open mouth receptacles, a filling tube having an inflatable member surrounding its discharge to enter and expand within a receptacle mouth, means for admitting fluid pressure to said member to inflate and expand it within the mouth of a receptacle, and means settable at will to automatically limit the pressure of the fluid admitted to said member to one or another pressure to control the extent of expansion of said member and thereby accommodate said member to receptacle mouths of different sizes.

5. In or for filling means for open mouth receptacles, a filling tube having an inflatable member surrounding its discharge to enter and expand within a receptacle mouth, means for admitting fluid pressure to and releasing it from said member to inflate and deflate it within a receptacle mouth, and pressure regulating means operative to automatically limit the pressure of the fluid admitted to said member and thereby predetermine the expansive action of said member.

6. Filling means for bags and other open mouth receptacles comprising a filling tube, an elastic annular normally collapsed tubular member hav-

ing a closed inner wall surrounding and lying against the periphery of said filling tube adjacent to the discharge end thereof, said tubular member being adapted to enter the mouth of the receptacle and having a flexible outer wall expand-
5 sible outwardly and engageable with the interior of the receptacle, and valve controlled means for admitting fluid pressure to the interior of said tubular member to expand its outer wall into
10 gripping engagement with the receptacle to hold the latter in filling relation with the filling tube and form a seal between the filling tube and the receptacle.

7. Filling means for bags and other open mouth
15 receptacles comprising a filling tube, an elastic annular normally collapsed tubular member having a closed inner wall surrounding and secured to but lying loosely against the periphery of said filling tube adjacent to the discharge end thereof,
20 said tubular member being adapted to enter the mouth of the receptacle and having a flexible outer wall expansible outwardly and engageable with the interior of the receptacle, and valve controlled means for admitting fluid pressure to the
25 interior of said tubular member to force its inner

wall into sealing engagement with the periphery of the filling tube and to expand its outer wall into gripping engagement with the receptacle to hold the latter in filling relation with the filling tube and form a seal between the filling tube and the receptacle.

8. Filling means for bags and other open mouth receptacles comprising a filling tube, an elastic annular normally collapsed tubular member having a fabric reinforcing backing vulcanized to its inner wall and surrounding and secured against the periphery of said filling tube adjacent to the discharge end thereof, said tubular member being adapted to enter the mouth of the receptacle and having a flexible outer wall expand-
15 sible outwardly and engageable with the interior of the receptacle, and valve controlled means for admitting fluid pressure to the interior of said tubular member to expand its outer wall into
20 gripping engagement with the receptacle to hold the latter in filling relation with the filling tube and form a seal between the filling tube and the receptacle.

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