

March 8, 1955

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2,703,671

BAG HOLDER

Filed Sept. 16, 1949

4 Sheets-Sheet 1

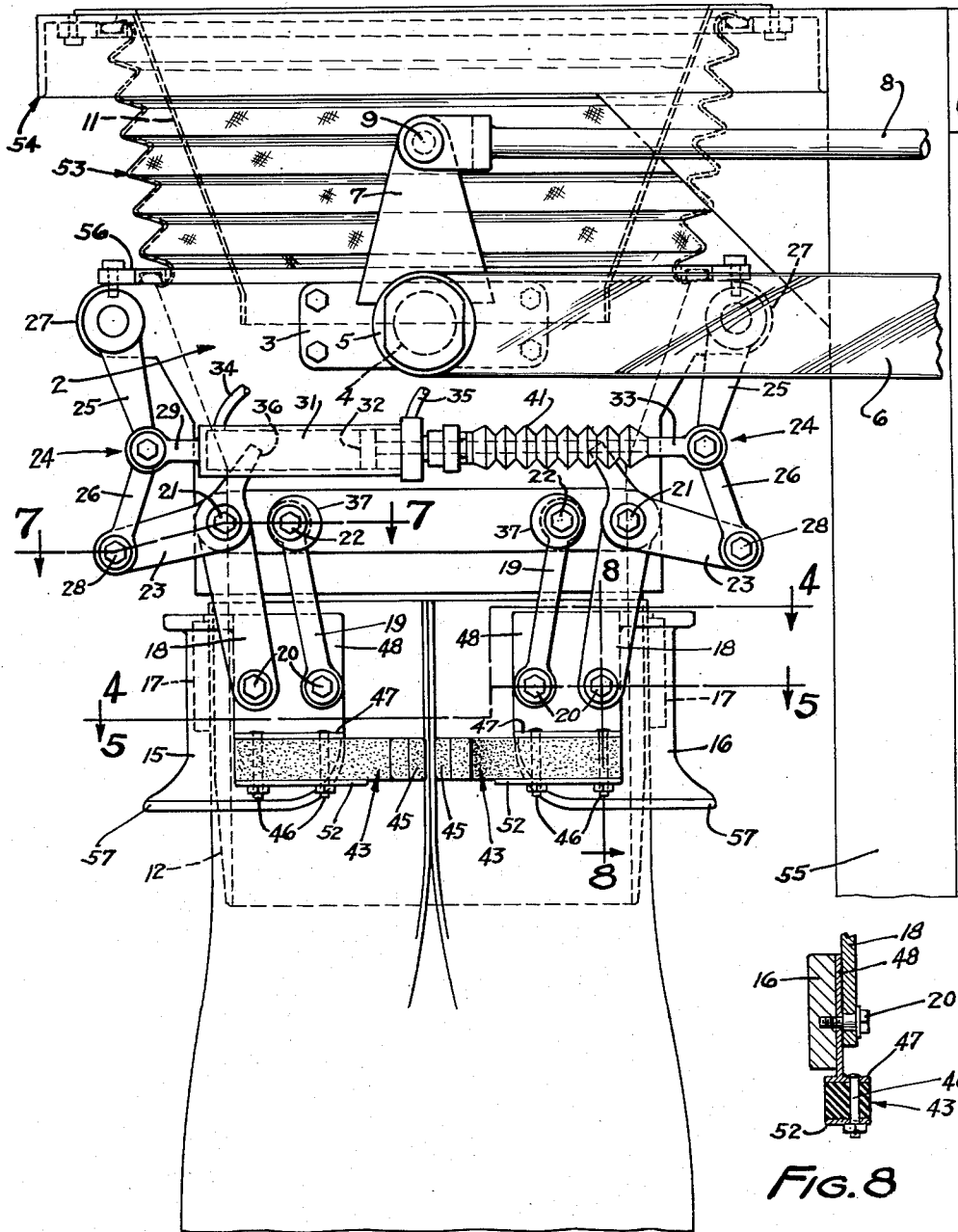


FIG. 1

FIG. 8

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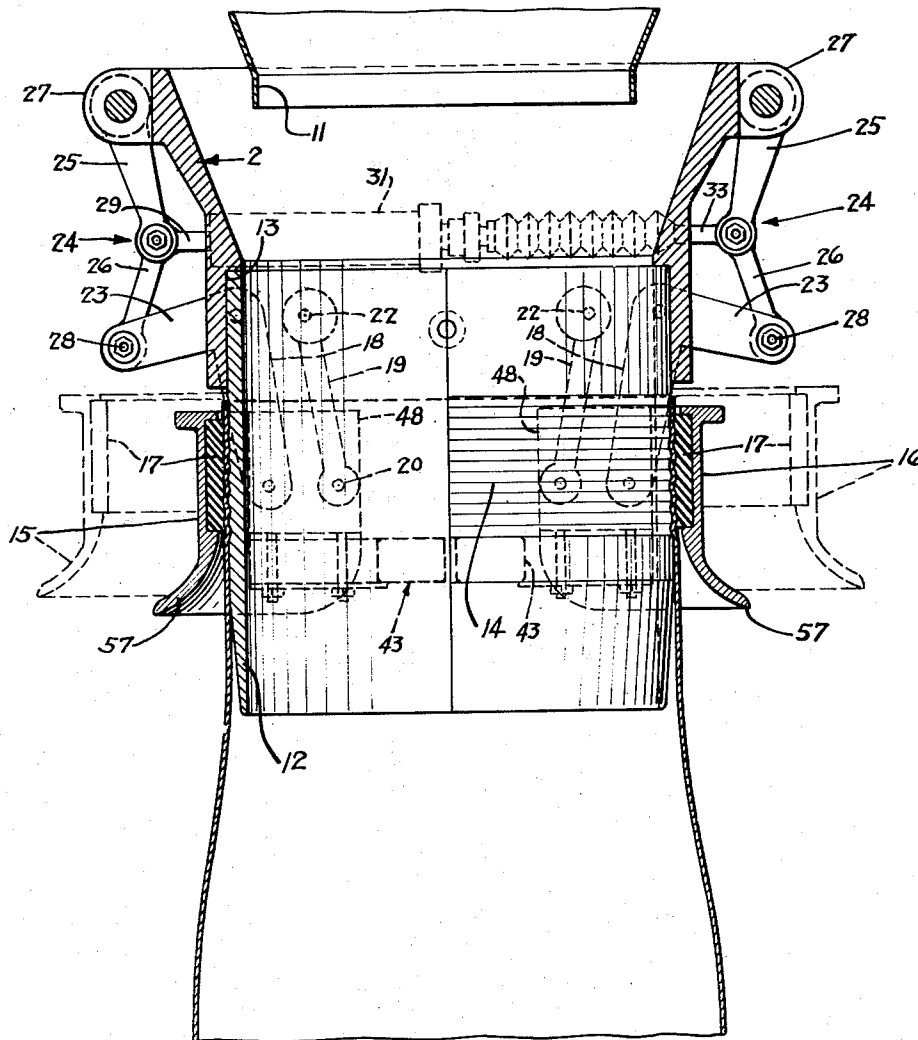


FIG. 3

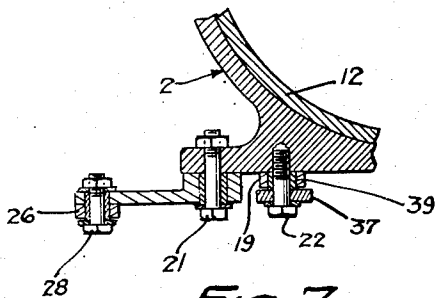


FIG. 7

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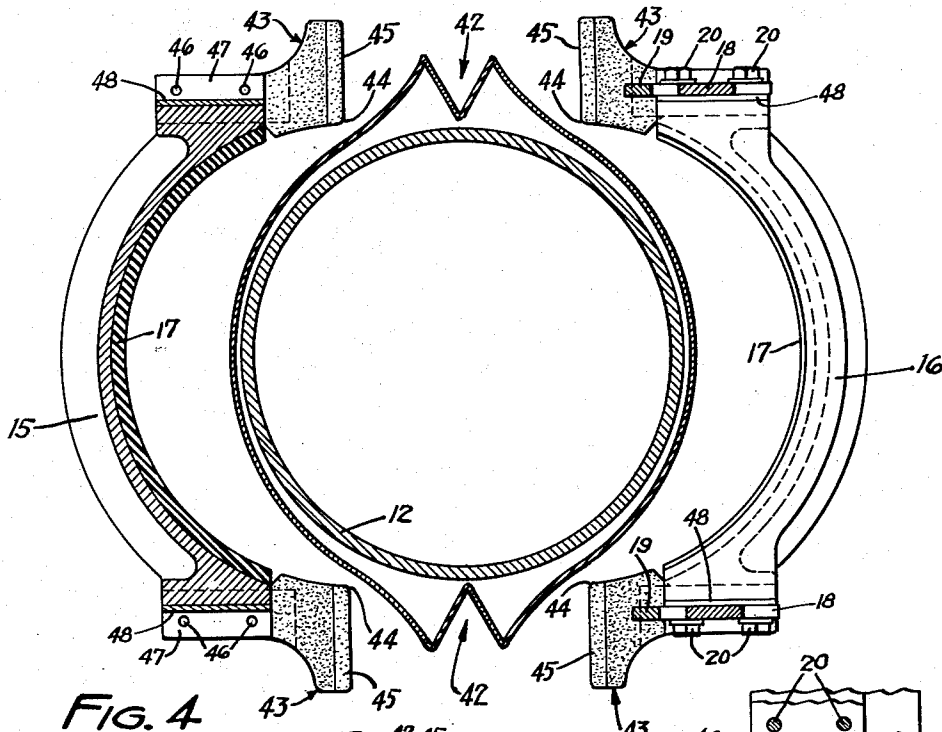


FIG. 4

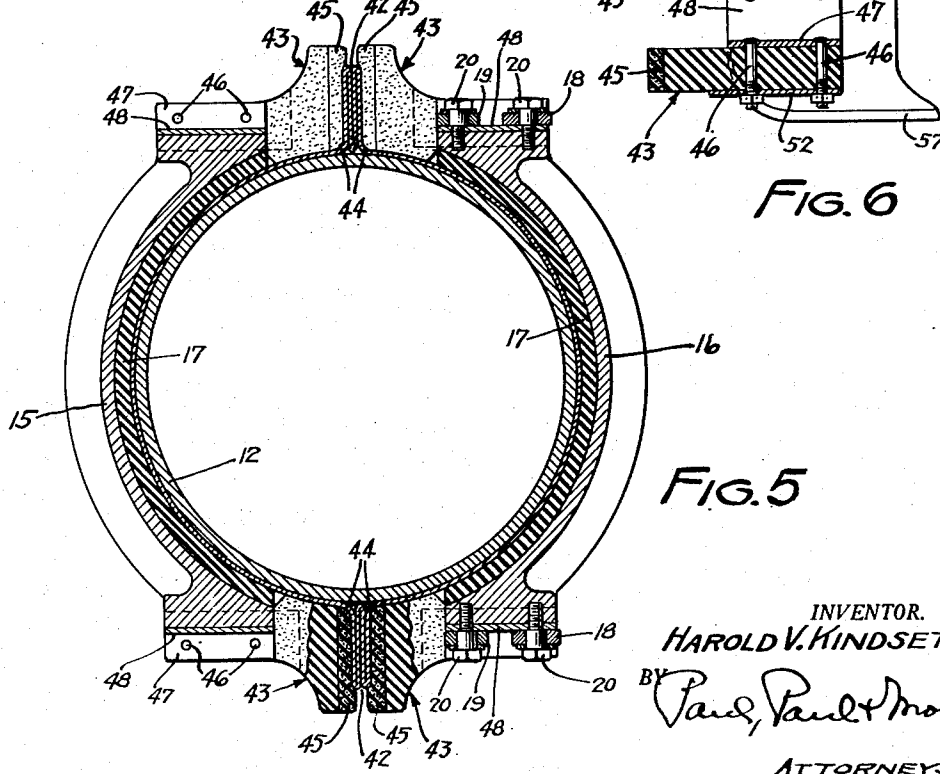


FIG. 6

FIG. 5

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2,703,671

BAG HOLDER

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Application September 16, 1949, Serial No. 115,990

12 Claims. (Cl. 226—58)

This invention relates to new and useful improvements in bag holders, and more particularly to an apparatus for supporting flexible walled bags or containers by their upper ends while delivering a charge of material into each bag.

The invention is directed more particularly to an apparatus comprising a hollow member having means for pendently supporting large flexible walled paper bags from their upper ends, while said bags are being filled, the means for engaging the bag top walls being so constructed that the walls of the bag tops are retained in close contact with the wall of said hollow bag supporting member, whereby the material cannot spout from the bag during the filling operation.

A further and more specific object of the invention is to provide a bag holder of the class described comprising a tubular member connected at its upper end to a source of material supply, and having its lower end so arranged that the top of an empty bag may readily be fitted over said member preparatory to delivering a charge into the bag, and a pair of complementary jaws being mounted adjacent to said member and having means for simultaneously moving them into engagement with the bag top walls from opposite sides thereof, whereby the bag top walls are firmly held in leaktight engagement with the walls of said tubular member during the bag filling operation.

A further object is to provide a bag holder comprising diametrically opposed complementary jaws provided at each end with resilient bag top engaging members adapted to engage the walls of the bag top in advance of the jaws, whereby said resilient elements may cooperate with said jaws to draw the bag top walls into close contact with the periphery of the tubular member over which the mouth of the bag is fitted, and whereby the slack portions of the bag top walls are received between the resilient members at the ends of said clamping members and are pressed into firm contact with one another, thereby to firmly and tightly secure the bag top to the periphery of the tubular member from which the material is delivered into the bag, whereby spouting of the material from the bag top cannot occur.

A further object is to provide an apparatus of the class described comprising a pair of jaws having their lower marginal edges outwardly flared to facilitate guiding the bag top over the tubular member in the operation of applying a bag top to the bag holder preparatory to filling the bag.

A further and more specific object is to provide a bag holder comprising a tubular member over which the open mouth of a bag to be filled is fitted, and said member having a portion of its periphery provided with a plurality of closely spaced horizontal grooves and ridges which simulate corrugations, and said corrugated portion being aligned with the gripping faces of the jaws whereby when the jaws engage the walls of a bag top fitted over said tubular member, the bag top walls may be firmly compressed into said corrugations by the resilient faces of the jaws, whereby bags of larger sizes, such as fifty and one hundred pounds, may readily be supported from the bag holder without danger of becoming disengaged therefrom during the filling operation, even though a shaking motion may be imparted to the bag body during the filling operation, to cause the material to settle more firmly therein.

Other objects of the invention reside in the specific arrangement of the parallel links which support the bag

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top engaging jaws; in the means provided for adjustably limiting the outward movement of said jaws; in the hydraulically operated mechanism for actuating the jaws, and which comprises suitable toggles so arranged that adequate pressure may be exerted upon the bag tops by the simple manipulation of the jaw operating mechanism; in the provision of a textile skirt between the upper end of the bag holder and a fixed portion of the material supply hopper, which serves to seal the connection between the bag holder and the hopper to prevent leakage and dusting of the material therefrom, particularly when the bag holder is mounted for vibratory or shaking movement to cause the contents to settle in the bags during the filling operation; in the provision of eccentric means for limiting the outer movement of the jaws; in the unique mounting of the resilient elements at the ends of the jaws whereby they may readily be detached when necessary, and which minimize the danger of the operator accidentally inserting his fingers between the jaws when they are moved into engagement with the gussets or slack portions of the bag top; in the unique arrangement of the various parts of the apparatus, whereby the flattened bag tops of the filled bags are aligned with the direction of travel of the filled bags, thereby to facilitate guiding the bag top of each bag into proper position in the bag top sealing means; and in the simple and inexpensive construction of the bag holder whereby it may be manufactured in quantity production at very low cost.

These and other objects of the invention and the means for their attainment will be more apparent from the following description taken in connection with the accompanying drawings.

In the accompanying drawings there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown, as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a side view of the novel bag holder herein disclosed showing a bag suspended therefrom in position to receive a charge;

Figure 2 is a front view of Figure 1;

Figure 3 is a sectional elevation on the line 3—3 of Figure 2, showing the annularly grooved periphery of the hollow member of the apparatus to which the walls of each bag top are secured by the jaws, when the latter are operated to secure a bag to the holder;

Figure 4 is a sectional plan view on the line 4—4 of Figure 5, showing the jaws in open position, and a gusset type bag being positioned over the tubular member of the bag holder, about to be secured thereto;

Figure 5 is a view similar to Figure 4, but showing the jaws engaged with a bag top to secure it in position on the hollow member;

Figure 6 is a detail sectional view on the line 6—6 of Figure 3, showing the means provided for securing the resilient elements to the ends of the jaws;

Figure 7 is a detail sectional view on the line 7—7 of Figure 1, showing the means for securing the adjustable eccentrics in adjusted position, and also the pivotal mounting of the main supporting arms on the supporting structure; and

Figure 8 is a fragmentary sectional view on the line 8—8 of Figure 6, showing the preferred manner of securing the resilient elements to the ends of the jaws.

The novel apparatus herein disclosed is shown comprising a hopper like supporting member, generally designated by the numeral 2, which in the present instance is shown having brackets 3 secured to the opposite sides thereof, each provided with a trunnion 4. The trunnions are adapted to be received in suitable bearings 5 secured to the forward or swingable ends of a pair of arms 6 having their opposite ends pivotally mounted upon a suitable structure, not shown in the drawings.

The brackets 3 are shown provided with upstanding portions 7, to which the forward ends of a pair of rods 8 are pivotally connected by suitable pivot bolts 9. The rods 8 are disposed in parallel relation to the arms 6, and may have their opposite ends pivotally mounted on the sup-

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port to which the arms 6 are mounted. The arms 6 and rods 8 thus cooperate to support the member 2 in a vertical position throughout its up and down movement. If desired, means may be provided for imparting a vibratory motion to the bag holder to more thoroughly settle the contents in each bag during the bag filling operation.

The apparatus shown in the present application is somewhat similar to the structure disclosed in my co-pending application, Ser. No. 86,552, filed April 9, 1949, now Pat. No. 2,654,518. The chief distinction in the present structure resides in the arrangement of the parallel arms 6 and 8, and in other constructional details of the apparatus such as the means for supporting the jaws, and the specific construction of the jaws herein shown.

The hopper like member 2, it will be noted by reference to Figures 1 and 3, has its upper open end in communication with the discharge end of a hopper 11 which may represent the discharge hopper of a conventional gravity type packer, well known in the packing industry. A tubular member 12, preferably cylindrical in cross section, has its upper end received in a counterbore 13 provided in the member 2, and is secured therein whereby it becomes, in effect, an integral part of the hopper-like member 2. It will be noted by reference to Figure 3 that the diameter of the counterbore 13 with respect to the minimum diameter of the discharge end of member 2 is such that the inside diameter of the tubular member 12 is substantially equal to the inside diameter of the member 2, thereby to eliminate the formation of a shoulder at the juncture between the upper end of the member 2 and the bottom of the counterbore 13. The tubular member 12 is adapted to be received in the mouth of each empty bag to be filled, and means is therefore provided on the periphery of said member to facilitate securing the bag top walls thereto, whereby the bag being filled is not likely to become detached from the filling member 12 during the filling operation.

In the drawings I have shown the member 12 as being cylindrical in cross section, but it is to be understood that it may be otherwise shaped, if desired, without departing from the scope of the invention.

To thus prevent accidental release of the bag top from the member 12, the central portion or area of the exterior surface thereof is provided with a plurality of closely spaced horizontal annular corrugations, shown at 14 in Figure 3. The corrugations 14 are aligned with a pair of jaws, generally designated by the numerals 15 and 16, which have their bag top engaging faces lined with a suitable resilient material 17, such as rubber, clearly illustrated in Figures 4 and 5. The jaws 15 and 16 are preferably provided with recessed seats for receiving the linings 17, whereby the operation of securing the rubber facings in position on their respective jaws is facilitated.

The jaw 15 is shown supported by parallel links 18 and 19, having their lower ends pivotally connected to the jaw 15 by pivot bolts 20. The upper ends of the links 18 and 19 are pivoted to the member 2 by suitable bolts 21 and 22, respectively. A horizontal arm 23 is secured to the upper end of arm 18, and has its outer end connected to a suitable toggle mechanism, generally designated by the numeral 24. The toggle mechanism comprises links 25 and 26, the link 25 being pivoted to an outwardly extending projection 27 provided on the member 2, and the lower end of link 26 being pivotally connected to the arm 23, as shown at 28. The opposite ends of links 25 and 26 are pivotally connected to a member 29 secured to one end of an pneumatic cylinder 31 having a piston 32 mounted therein provided with a piston rod 33 to which the links 25 and 26 of the toggle mechanism 24 of the jaw 16 are connected.

As the toggle mechanisms and the supporting links of the two jaws 15 and 16 are alike in construction, like parts thereof will be identified by like numerals. Suitable conduits 34 and 35 provide means whereby air under pressure may be circulated to and from the cylinder 31 to simultaneously actuate the toggle mechanisms 24, as will be understood.

To limit outward swinging movement of the jaws 15 and 16, each arm 23 is shown provided with a finger 36 adapted to engage abutments or limit stops 37, here shown in the form of eccentrics. The eccentrics are secured in adjusted position by the pivot bolts 22, as best shown in Figure 7, wherein it will be noted that collars

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or sleeves 39 are received in the bores provided in the upper ends of arms 19. These sleeves are slightly greater in length than the thickness of the adjacent end portions of the arms 19, whereby when the bolts 22 are tightened, the eccentrics 37 are firmly clamped between the heads of the bolts 22 and the adjacent ends of their respective sleeves 39, as clearly illustrated in Figure 7.

Suitable flexible bellows-like tubular members 41 enclose the piston rods 33 to protect them against dust and other foreign matter. Each member 41 has one end secured to the adjacent end of the cylinder and its opposite end to the piston rod adjacent to its toggle 24, whereby dust and other foreign matter cannot accumulate on the piston rod when the apparatus is in operation.

Another important feature of the invention resides in the novel construction of the jaws, particularly the means thereof which directly engage the walls of the bag top and presses them into firm contact with the periphery of the tubular member 12. The bag holder herein disclosed is particularly well suited for handling gusset-type bags, such as illustrated on Figures 4 and 5, although it is to be understood that it may be used equally well in connection with flat type bags. Large bags may be more or less difficult to support on a tubular or cylindrical member while being filled, because the slack portions of the bag top walls shown at 42 in Figures 4 and 5, if not firmly pressed together, may allow a portion of the contents of the bag to spout therefrom, as the material is suddenly dumped into the lower portion of the bag. The means provided for thus causing the bag top walls to become firmly and smoothly pressed into contact with the periphery of the tubular member 12, resides in the provision of a plurality of resilient gripping elements, generally designated by the numeral 43.

As best shown in Figures 4 and 5, the elements 43 are so shaped that when the jaws are moved inwardly to compress the bag walls against the periphery of the tubular member 12, the heels 44 of the members 43 engage the walls of the bag top adjacent to the gussets 42 before the jaws 15 and 16 engage the bag top walls, and thereby stretch the bag top walls smoothly around the opposed sides of the cylindrical member 12, until they come to rest with the gussets or slack portions of the bag top firmly compressed between the coating faces 45 of the elements 43, as illustrated in Figure 5.

The bag top engaging surfaces of the elements 43 are preferably constructed of a soft resilient material such as sponge rubber, which readily yields when the walls of the bag top are compressed therebetween.

The bodies of the elements 43 may be constructed of a rubber material similar to the rubber used in the construction of the facings of the jaws, and may be detachably secured to the jaws by stud bolts 46. The upper ends of the bolts 46 are shown permanently secured to the horizontal flanges 47 provided on a bracket 48 secured to the ends of the jaws, as shown in Figures 4, 5, 6 and 8. To simplify construction, the brackets 48 may be secured to the jaws by the pivot pins 20 of the parallel links 18 and 19 of each jaw, as shown in Figure 6. When the brackets are so secured to the jaws, the studs 20 are preferably shouldered as shown in Figure 8, whereby the bolts may be drawn up tightly against the brackets 48 without securing the lower ends of the links 18 and 19 against pivotal movement.

The lower end of each bracket 48 is shaped as shown in Figure 8, whereby the jaws elements 43 may be clamped between the lower faces of said brackets and a clamping plate 52. The clamping plates 52 are preferably vulcanized to the bottom faces of the rubber elements 43 to facilitate securing the elements to the jaws or removing them therefrom.

The sponge rubber facings 45 of the elements 43 are of ample thickness to provide adequate resiliency when the jaws are moved into bag top securing engagement with the peripheries of the member 12, as shown in Figure 5. In such cases the gusseted wall portions of the bag top are firmly pressed into flatwise relation and are so retained during the bag filling operation. To prevent the escape of dust and pulverized material from the upper end of the hopper 11, a suitable textile skirt-like member 53 is shown closing the gap between the hopper 11 and the upper end of the member 2.

In Figure 1 of the application drawings, the supporting member 54 is shown extending laterally from the upper end of an upright frame member 55. The lower

end of the textile skirt 53 may be secured to the upper end of the member 2 by suitable clamping elements 56. Suitable bellows or folds may be provided in the member 53 to permit relative up and down movement of the bag holder with respect to the supporting structure 54 and hopper 11, whereby the bag may be freely vibrated or shaken in a vertical direction during the filling operation to cause the material to become firmly compacted therein, if desired.

Another feature of the invention resides in the unique construction of the jaws 15 and 16, which it will be noted by reference to Figures 1 and 3, are provided at their lower end with outwardly flared portions 57 which facilitate the operation of fitting a bag mouth over the cylindrical member 12, in that the outwardly flared portions assist in guiding the bag top wall into position around the member 12 to correctly position the empty bag thereon. The wall portions 57 also serve as guards to warn the operator not to insert his fingers between the jaws and member 12 when applying a bag top thereto. The unique arrangement of the jaws and flared wall portions 57 also function to align the bag tops with the direction of movement of the bags whereby they may be accurately guided into the bag top sealing means, not shown.

The horizontally disposed corrugations in the periphery of the hollow or tubular member 12 co-act with the rubber facings 17 of the jaws to positively eliminate all danger of the bag top walls becoming detached from the jaws and filling spout during the filling operation, even when handling bags of large capacity such as fifty and one hundred pound bags.

The toggles 24 are important in that their inherent construction makes it possible to actuate the jaws with a minimum of effort, and with the assurance that adequate pressure is applied to the bag top wall to prevent the bag, when filled, from accidentally becoming detached from the bag holder. Also by detachably mounting the bag top engaging elements 43 on their respective jaws 15 and 16, such elements may readily be detached and others substituted therefor, should that become desirable.

It will be apparent to those skilled in the art that I have accomplished at least the principal objects of my invention, and it will also be apparent to those skilled in the art that the embodiments herein described may be variously changed and modified without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiments are illustrative only, and that my invention is not limited thereto.

What I claim is:

1. In a bag holding and filling apparatus, a filler tube, a pair of horizontally operated jaws suspended from said bag filler tube by parallel links, toggle means for simultaneously closing said jaws, and a skirt on each jaw shaped as a flare away from the filler tube for guiding the bag top walls between said jaws and the walls of the filler tube, when said jaws are in opened position.

2. In a bag filling and holding apparatus, a filler tube, horizontal ridges around said filler tube, a pair of simultaneously operating horizontally moving jaws provided with resilient faces for the clamping of bags to said filler tube, said jaws being suspended from said filler tube by parallel links, pneumatically operated individual toggle means for simultaneously closing said jaws in clamping relation with said filler tube, adjustable limit means disposed on said links for determining the open position of said jaws, said jaws being flared outwardly from the filler tube for facilitating the introduction of the bag therebetween.

3. An apparatus for holding and filling bags comprising a hollow cylindrical spout through which solid material to be bagged is adapted to be fed downwardly, a clamping arrangement for holding a bag on said spout in sufficiently tight relation so as substantially to prevent outflow of dust from the bag as it is filled while the bag is clamped on the spout, said clamping arrangement comprising a pair of clamp jaws each suspended from the ends of a pair of parallel links, means provided on one of each of said pairs of parallel links comprising a crank for the operation of said links and said clamp jaws, and toggle means connected with said crank for the operation thereof.

4. The apparatus of claim 3 further characterized in that said crank means is provided with a limit means for cooperation with a stop means on the other of said parallel links for limiting the movement of the clamp jaws in an open direction.

5. The apparatus of claim 4 further characterized by said limit means including a pair of adjustably mounted eccentrics for varying swinging movement of the jaws.

6. The apparatus of claim 3 further characterized by a delivery chute positioned above said cylindrical spout and an expansible bellows connected between said delivery chute and said cylindrical spout whereby said cylindrical spout may be vertically oscillated for agitation while the bag is clamped thereto.

7. The apparatus of claim 2 further characterized by a pair of parallel supporting arms pivoted at one end to a frame for supporting said apparatus and pivoted at the other end to said cylindrical spout, for supporting said spout from vertical oscillatory movement.

8. An apparatus for holding and filling bags comprising a delivery chute through which solid material to be bagged is adapted to be fed downwardly, a hollow cylindrical spout positioned beneath said delivery chute, said hollow cylindrical spout and said delivery chute being connected by an expansible bellows, a pair of supporting arms pivoted at one end to said cylindrical spout and at the other end to a frame means whereby said cylindrical spout may be oscillated during the filling of a bag while said bag is attached thereto, a clamping arrangement for holding a bag on said spout in sufficiently tight relation so as substantially to prevent the outflow of dust from the bag as it is filled while the bag is clamped on the spout, said clamping arrangement comprising a pair of semi-cylindrical clamp jaws, link means connecting said clamp jaws to said cylindrical spout for clamping operation, crank means associated with said link means for the opening and closing of said clamp jaws, limit means comprising movable means and stop means for limiting the opening movement of said clamp jaws associated with said link means, and toggle means connected with said crank means for the operation thereof.

9. The apparatus of claim 8 further characterized by said limit means comprising adjustably mounted eccentrics provided at the upper ends of certain of said links adapted to be engaged by stop means carried by the other of said links.

10. A machine for filling bags with bulk material comprising downwardly terminating spout means for discharging bulk material to be bagged, a pair of clamps, each shaped to engage opposite partial circumferential segments of said spout, said segments being symmetrical about a longitudinal plane of division through said spout, said clamps when in clamping position engaging all of the periphery except spaced minor segments at said plane of division, auxiliary clamping wings attached to the ends of each clamp, each said wing being shaped to conform to a surface extending along the spout surface from the end of the clamp to the plane of division and thence outwardly along said plane of division, said clamps with auxiliary clamping wings on each end thereof being mounted for movement toward and away from the spout for clamping action thereagainst.

11. In an apparatus for holding and filling bags comprising a hollow cylindrical spout through which the material to be bagged is adapted to be fed downwardly, a clamping arrangement for holding a bag on said spout in sufficiently tight relation so as substantially to prevent outflow of dust from the bag as it is filled while the bag is clamped on the spout, said clamping arrangement comprising a pair of clamp jaws having flat ends for gripping the intucked wall portions of the bag top, means mounting said jaws for movement toward and away from each other in a plane transverse of the spout, said jaws when moved into contact with the spout forming a clamping ring resiliently embracing the outer surface of said spout, the flat ends of said jaws engaging and compressing the projecting wall portions of the bag top into flatwise relation, and parallel links supporting said jaws and having operative connections with pneumatically operated toggles.

12. A machine for filling bags with bulk material comprising a downwardly delivering spout, a pair of clamps mounted to move toward and away from each other transversely of said spout, said clamps engaging against said spout, said clamps being shaped so that when in

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clamping position each of the clamps resiliently engages approximately one-half the periphery of the spout and resiliently engages against the other cooperating clamp, said clamps in bag clamping relation forming a complete ring around said spout and engaging said spout, said clamps forming said ring being formed with portions movable resiliently away from the spout adjacent each of the ends of the clamps.

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