

May 5, 1953

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2,637,477

FILLING AND HOLDING DEVICE FOR CONTAINERS

Filed Aug. 5, 1949

2 SHEETS—SHEET I

FIG. 1

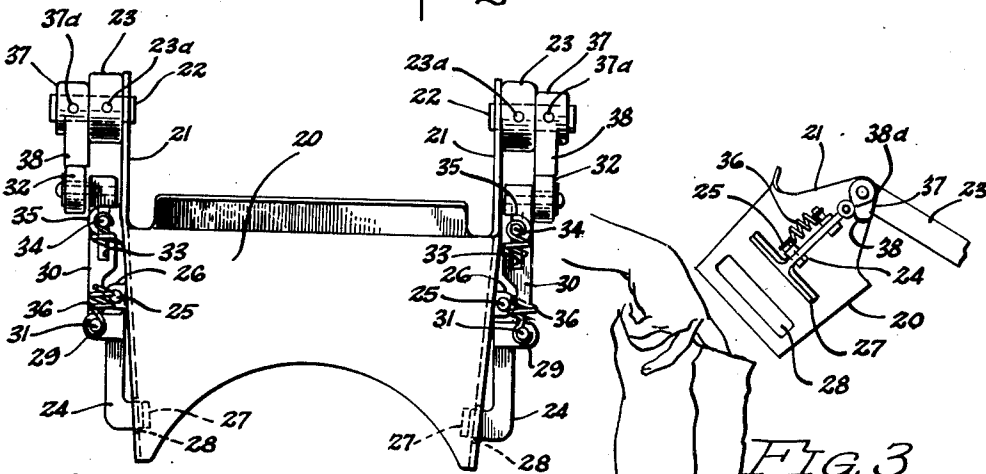
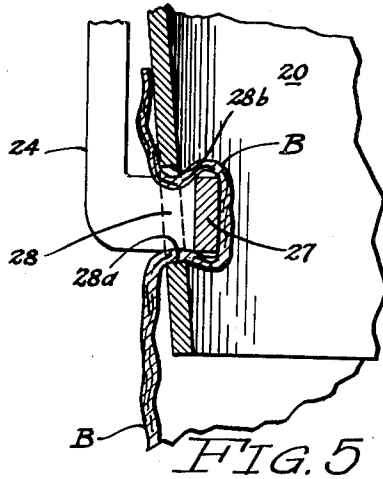
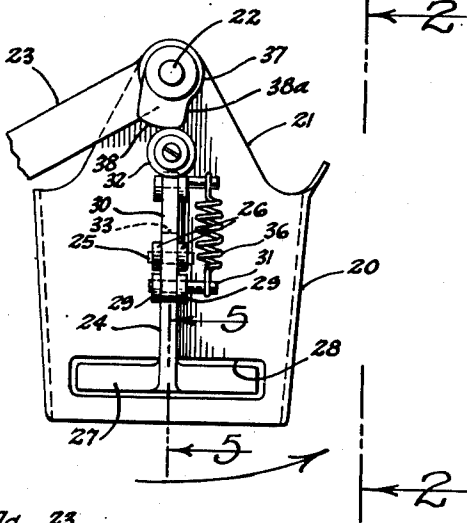


FIG. 2

FIG. 3

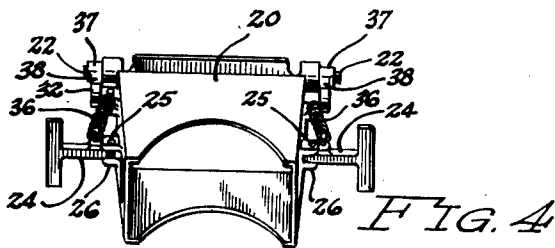
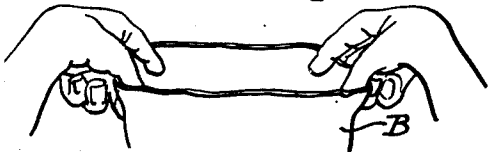


FIG. 4



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2 SHEETS—SHEET 2

FIG. 6

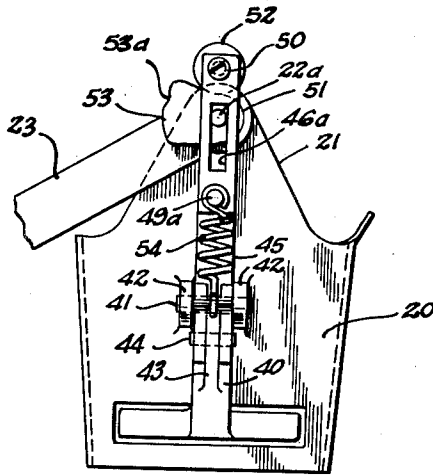


FIG. 7

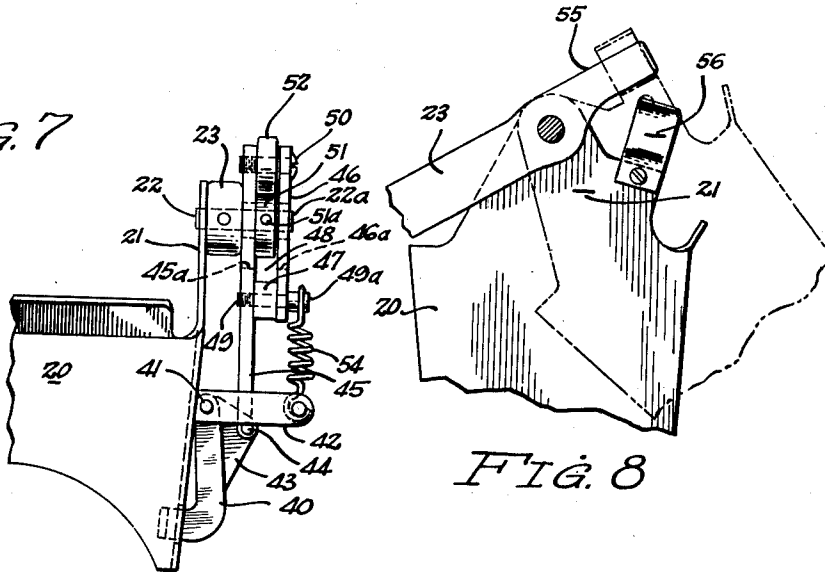


FIG. 8

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FILLING AND HOLDING DEVICE FOR CONTAINERS

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The present invention relates to a filling and holding device for containers and is directed more particularly to a simple device for supporting a flexible walled bag in open-mouthed, expanded condition in order to facilitate filling operations.

It is an object of the present invention to provide a mechanically simple device for holding any sort of a flexible walled container in open-mouthed, depending position during filling operations and for providing a chute or funnel through which the articles or material with which the container is to be filled are delivered to the interior thereof.

It is a further object to provide a device upon which bags, or containers of a similar type, may be quickly and easily placed, one at a time, by an operator and which device may then be moved into position for filling a bag, in which position the bag is securely gripped adjacent its mouth by clamping means which support the bag and its contents during the filling operations.

A further object is the provision of means for automatically effecting actuation of the clamping means whereby movement of the filling device between its limiting positions serves to move clamping members on said device into and out of clamping engagement with a bag or other container placed on the device. As mentioned above, such clamping members, in their bag engaging position, serve to support both the bag and its contents as the latter are delivered to the bag, and to release the bag when the device is moved to its alternate position.

In a desirable embodiment of the invention, a funnel or spout, adapted for reception in the mouth of an expanded bag or sack, is supported from a frame so that the axis of its opening is normally disposed substantially vertically. The spout is provided with clamping means at its sides for gripping the margins of the bag adjacent the mouth thereof when the latter is placed over the spout, thus supporting the bag and its contents in depending position while articles or materials are fed into the upper end of the spout and flow by gravity down into the bag itself.

In order to facilitate the operation of placing the bag over the spout and clamping it in such position, the spout is so supported on its frame that it may be moved from an empty-bag receiving position to a position in which the filling of the bag actually occurs. Such motion of the spout may be either translational, or it may be

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rotational about a horizontal axis on the supporting frame; or in some instances it may be a combination of both. In any event, movement of the spout between its two limiting positions is utilized, by means of linkages operatively connecting the clamping means to the spout supporting frame, to operate such clamping means, and as the spout is moved from a bag filling position, for example, in which clamping members grip the bag to support it during filling operations, to a bag discharging and receiving position, the clamping members are moved to an open position, free and clear of any engagement with a bag, thus allowing the discharge of a filled bag and the reception of a new, empty bag. Return movement of the spout to its original position again moves the clamping members, this time into gripping contact with the upper margins of the bag mouth so as to firmly support the bag in depending position, ready for the reception of the articles or material delivered to the spout.

By proper arrangement of the clamp actuating linkages, only slight movement of the spout is needed to operate the clamping mechanism in a positive manner in order to grip a bag securely and at the same time assure that the clamping members are moved to an open position in which they entirely avoid any interference with the placement of an empty bag on the spout. A particularly suitable arrangement which has proved in practice to possess a number of desirable features is one in which the spout is pivotally supported from its frame for swinging movement about a horizontal axis. In such arrangement, the spout is disposed so that its longitudinal axis is normally substantially vertical, in which position the clamping members securely grip the bag, but upon swinging movement to an inclined position these members are actuated to disengage them from the bag and thus allow that bag to be removed and another placed on the spout. An operator can thus simply shake open an empty bag into its expanded condition and, while holding the mouth open with either one or both of his hands as may be necessary, place the bag over the spout while the latter is in its inclined position. Then, while the operator temporarily supports the bag with one hand so that the mouth encircles the lower portion of the spout, the spout is swung back to its normal, vertical position and clamping members then engage and support the bag while it is being filled.

As can be seen from the foregoing, the present device is capable of handling various sorts of

flexible walled bags, such as ordinary paper bags, mesh bags of the type commonly employed in shipping citrus fruit, and heavier sacks such as the multiple wall paper bags and cloth bags used for cement, flour and similar materials. Because of the type of clamping members employed, the present invention has found particular utility in the filling of bags made of Pliofilm and similar plastic materials which are relatively easily ruptured.

Other advantages will become apparent from the following description of a typical embodiment by which the invention is illustrated but by which it is not, of course, limited.

In the drawings:

Fig. 1 is a view in side elevation of a typical bag-filling spout of the present invention, the spout being here shown in its bag-filling position;

Fig. 2 is a partial view in front elevation of the spout shown in Fig. 1;

Fig. 3 is a view in side elevation of the spout in bag-receiving or discharging position;

Fig. 4 is a partial view in front elevation of parts shown in Fig. 3;

Fig. 5 is a fragmentary view in cross section, on an enlarged scale, of the bag clamping means shown in Fig. 1;

Fig. 6 is a view in side elevation of a modified form of the bag clamping mechanism shown in Fig. 1;

Fig. 7 is a partial view in front elevation of the arrangement shown in Fig. 6; and

Fig. 8 is a fragmentary view in side elevation showing means for holding the spout in bag-receiving position.

Referring now to the drawings, it will be seen that the device comprises a generally rectangular slightly funnel-shaped four walled spout 20 having an open top and a smaller open bottom to facilitate its reception within the open mouth of a bag B and which spout, together with the bag-gripping mechanism presently to be described in detail, serves both to hold the mouth of the bag open for easy filling as well as to support the bag and its contents in depending position during a filling operation.

As shown more particularly in Figs. 1 and 2, spout 20 is provided with upstanding cheek portions 21 at opposite sides by which it is pivotally depended from pivots 22 on the pair of supporting arms 23. Arms 23 may be fixedly mounted on any suitable supporting frame, not here shown, or may, as is quite customary, form part of a weighing mechanism, as for example the arms of a conventional Ahlburg weigher. Such weighing mechanism forms no part of the present invention.

In order to obtain a secure gripping engagement on the margin of the bag adjacent the mouth thereof, a pair of inverted T-shaped friction clamps 24 is disposed on opposite sides of spout 20. These clamps are adapted and arranged for pivotal movement between an open and a closed position in cooperation with the respective side or wall of spout 20. For this purpose the stem of each clamp 24 is pivoted at its upper end upon a pin 25 which is carried between bosses 26, the latter projecting laterally from the side of spout 20. At its free end, the stem of each clamp 24 is provided with a laterally inwardly offset shoe 27 which extends generally transversely of the axis of the spout, and as shown more particularly in Figs. 2 and 5, shoe 27 is adapted, in the closed position of clamp 24, for

reception in an aperture or slot 28 provided in the wall of spout 20.

Movement of clamps 24 between their closed position, corresponding to the bag-filling position of the spout shown in Fig. 1, and their open position, corresponding to the bag-receiving or discharging position of the spout as shown in Fig. 3, is accomplished in the following manner: Each clamp 24 is provided with a boss 29 to which a connecting link or lever 30 is pivotally connected at one of its ends by a pin 31. A roller or cam follower 32 is mounted upon the opposite end of link 30, and the link is centrally slotted at 33 intermediate its ends for the reception of a guide pin 34. Pin 34 is mounted between a pair of lugs 35 which project horizontally from the sides of spout 20 a short distance above bosses 26. Pin 34 and its associated lugs 35, between which latter link 30 is positioned, serve as guides for link 30, slot 33 permitting up and down longitudinal movement of the link as well as any slight pivotal movement as may be necessary with respect to pin 34 while lugs 35 restrain side movement of the link during such longitudinal movement.

Each link 30 is normally retained in its upper position, as shown in Fig. 4, by means of an extension of spring 36 connected between pin 31 which latter moves in an arc about pivot 25, and pin 34 which is held immovable in lugs 35 with respect to the spout. In order to cause link 30 to be moved to its lower position and thus close clamp 24 against the tension of spring 36, roller 32 bears against the lower face of a cam 37 which is fixedly secured by a set screw 37a to pivot pin 22 from which the spout is suspended. Pin 22 in turn is prevented from rotating by a set screw 23a in arm 23. Cam 37 is provided with a lobe 38 on its working surface so that as spout 20 is swung forwardly in the direction of the arrow in Fig. 1 to an angle of approximately 30° to 45° from the vertical, for example, roller 32 rolls off of lobe 38, thus permitting extension spring 36 to move link 30 upwardly and thus swing clamp 24 into its open position. Upon returning the spout from its inclined to its vertical position, the passage of roller 32 over lobe 38 of cam 37 again effects the downward displacement of link 30, thus returning clamp 24 to its closed position.

It will be seen that the exact angle to which spout 20 must be tipped in order to effect the operation of clamps 24 will depend upon the contouring of cam 37 and the angular position with respect to supporting arms 23 at which the cam is placed. This may of course be arranged to suit the particular requirements, the above-mentioned angular limits being merely illustrative of an arrangement which has been found quite satisfactory in actual use.

In order to facilitate the placement of a bag on the spout, it is usually necessary to provide means for temporarily retaining the spout in its inclined or "open clamp" position. This may be conveniently accomplished in the device here illustrated by providing a dwell 38a on the surface of cam 37 corresponding to the position on the surface of the cam at which roller 32 rests when the spout is swung to its fully inclined position. The tension of spring 36 upon link 30 with the spout in this position must of course be sufficient to prevent the weight of the spout itself from forcing roller 32 up over lobe 38 of the cam. When it is desired to return the spout to its bag-filling position, however, it may simply be forced down by hand to overcome the tension of spring 36 and thus allow roller 32 to pass up onto lobe 38

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and effect the closure of clamps 24. Because of the relatively light weight of spout 20 and its associated parts, the tension necessary in spring 36 to effect this need not be very great and consequently only slight pressure in addition to the weight of the spout may be needed to force it into its vertical position.

As shown in greater detail in Fig. 5, a secure clamping engagement by clamps 24 upon the marginal portions of bag B is effected by aperturing spout 20 so that shoes 27 at the free extremities of clamps 24 pass into apertures 28 in the spout and assume positions slightly within the inner surfaces of the latter. In this manner, bag B is folded over the lower edge 28a and under the upper edge 28b of aperture 28 by the inward extension of shoes 27. This arrangement enables shoes 27 to effect a good frictional engagement with the bag and thus support a filled bag of considerable weight.

Referring now to the modification shown in Figs. 6 and 7, it will be seen that clamps 40, corresponding generally to clamps 24 in Fig. 1, are pivoted at each side of spout 20 upon pins 41 extending between and secured in the projecting arms of respective U-shaped brackets 42 which latter are mounted on spout 20 at each side thereof. Each clamp 40 is provided with an upstanding longitudinal fin 43 by which it is pivotally connected through a pin 44 to a longitudinally reciprocable link 45. In this instance, link 45 is provided with a cooperating member 46 which parallels link 45 along its upper portion and is spaced therefrom by a spacing sleeve 47 to form a guideway 48 between the two. Member 46 is secured to link 45 by a pin 49 which passes through member 46 adjacent its lower end, through spacing collar 47, and is threaded into link 45. A machine screw 50 also helps to secure member 46 in position, screw 50 passing through the member near its upper end and being threaded into link 45 also. Pin 49 has an elongated head 49a which bears at its under surface against the face of member 46 to clamp it tightly against collar 47. Both link 45 and member 46 are slotted longitudinally at 45a and 46a, respectively, as shown more particularly in Fig. 6, to permit an extension 22a of pivot pin 22 to project transversely through both the link and its associated member 46. A cam 51 is fixedly secured within the guideway 48 to pin extension 22a by a set screw 51a, and a cam follower 52 is journaled upon screw 50 at the upper end of guideway 48 so as to bear upon the contoured upper surface of cam 50. By reason of the fact that apertures 45a and 46a are of only sufficient width to pass pin 22, and since cam 51 is positioned between link 45 and member 46, link 45 is substantially constrained for longitudinal reciprocation only with respect to spout 20.

As explained in connection with the description of the modification shown in Figs. 1 through 4, angular motion of the spout 20 with respect to its supporting arms 23 is employed to effect the clamping and unclamping of a bag to the spout. In the mechanism shown in Figs. 6 and 7, this same movement is again employed and cam 51 is provided with a lobe 53 so disposed as to cause link 45 to be raised longitudinally of the spout by the passage of roller 52 over the lobe as the spout is tipped out of its vertical or bag-filling position. In this instance, an extension spring 54, which is connected between the elongated head 49a of pin 49 and an outer extension of bracket 42, urges link 45 into its lower position (corresponding to

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the closed position of clamps 40), and movement of the spout from the vertical to the inclined position places spring 54 under tension. Thus, as the spout is returned from its inclined to its vertical position, spring 54, acting through link 45, holds roller 52 against the upper surface of cam 51 and returns clamp 40 to its closed position.

As in the previous example, provision for temporarily restraining the spout in its "open clamp" position may be conveniently effected by means of a dwell 53a just behind lobe 53 on cam 51. Again, the tension of the spring, in this instance spring 54, must be sufficient to overcome the tendency of roller 52 to ride up over lobe 53 because of the leverage of spout 20 in its inclined position.

In both modifications hereinabove discussed, temporary retention of the spout may be accomplished, alternatively, by the provision of a spring clip 56 mounted on the cheek 21 of spout 20 as shown in Fig. 8, which clip engages a mating member 55 secured to arms 23 whenever the spout is swung forwardly into its "open clamp" position.

Other modifications of components of the specific example here given will become apparent from the foregoing illustration. For example, in place of rocker arms as clamping members, it would be possible to substitute cams which are disposed on axes parallel to the longitudinal axis of the spout and which are rotated by movement of the spout into contact with the sidewalls thereof so as to grip the bag placed over the discharge end of the spout. So also, cam means could be employed in place of the levers actuating the illustrated clamping arms so that the arms are moved into clamping engagement by rotation of such arms. And as mentioned hereinabove, translational movement of the spout may be substituted for or combined with the rotational movement specifically shown in the drawings in order to actuate the bag clamping mechanism. All such modifications as properly fall within the scope of the following claims are therefore contemplated and form a part of the present inventive concept.

What is claimed is:

1. In combination, a bag filling spout adapted for the reception of an open mouth bag, arms for supporting said spout above a depending bag, said spout being pivotally mounted on said arms for movement between a bag filling position in which said spout is disposed substantially vertically and a bag receiving or discharging position in which it is inclined to the vertical, clamping means carried by said spout each including a lever pivotally supported adjacent opposite sides of said spout and each having a free end adapted and arranged for movement into and out of clamping engagement therewith, a second lever connected at one of its ends to said first lever, a cam follower secured to the opposite end of said second lever, and a cam secured to said spout supporting arms, said cam follower being yieldingly held in engagement with the surface of said cam whereby pivotal movement of said spout between its alternate positions causes said cam follower to roll along the surface of said cam and to effect a movement of said second lever longitudinally of said spout whereby said clamping lever is pivoted into and out of clamping engagement with said spout.

2. A funnel-shaped open-ended spout for filling open mouth bags which comprises means for supporting said spout for pivotal movement about a horizontal axis between a bag filling position, in which the longitudinal axis of said

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spout is disposed substantially vertically, and a bag receiving or discharging position, in which the longitudinal axis of said spout is inclined to the vertical, bag clamping means mounted on said spout at opposite sides thereof and each having a T-shaped clamping member adapted and arranged for movement into and out of clamping engagement with the side of said spout, and means operatively connecting said clamping member to said spout supporting means at said horizontal axis, said connecting means including a cam held against rotation at said horizontal axis and a cam follower connected to the clamping means for moving said clamping member into clamping engagement with the side of said spout when the latter is moved to its bag filling position and to withdraw said clamping member from engagement with said spout when the latter is moved to said bag receiving or discharging position, and a recess adjacent the clamping member in the side of said spout, said recess being adapted for the reception therein of a portion of said clamping member when the spout is in its bag filling position.

3. In combination, a funnel-shaped open-ended bag filling spout adapted for the reception of an open mouth bag, arms for supporting said spout above a depending bag, said spout being pivotally mounted on said arms for movement between a bag filling position in which the longitudinal axis of said spout is disposed substantially vertically and a bag receiving or discharging position in which the longitudinal axis of said spout is inclined to the vertical,

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clamping means disposed at the sides of said spout and secured thereto, each of said clamping means including a rocker pivotally supported adjacent a side of said spout, and having a free end adapted and arranged for movement into clamping engagement with such side when said spout is in said bag filling position, a lever connected to said rocker intermediate ends of the rocker, and means connecting said lever to said bag supporting arms whereby the free end of said rocker is moved into and out of clamping position with pivotal movement of said spout between said filling position and said bag receiving or discharging position, respectively; and a recess in the side of said spout adjacent the free end of said rocker, said recess being adapted for the reception of said free end of said rocker when said spout is in its bag filling position to effect frictional engagement of the margin of a bag wall interposed between said spout and the free end of said rocker.

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