July 9, 1935. H. ANDERSON 2,007,788

MECHANISM FOR INVERTING FILLED CONTAINERS

Filed July 5, 1933 3 Sheets-Sheet 1

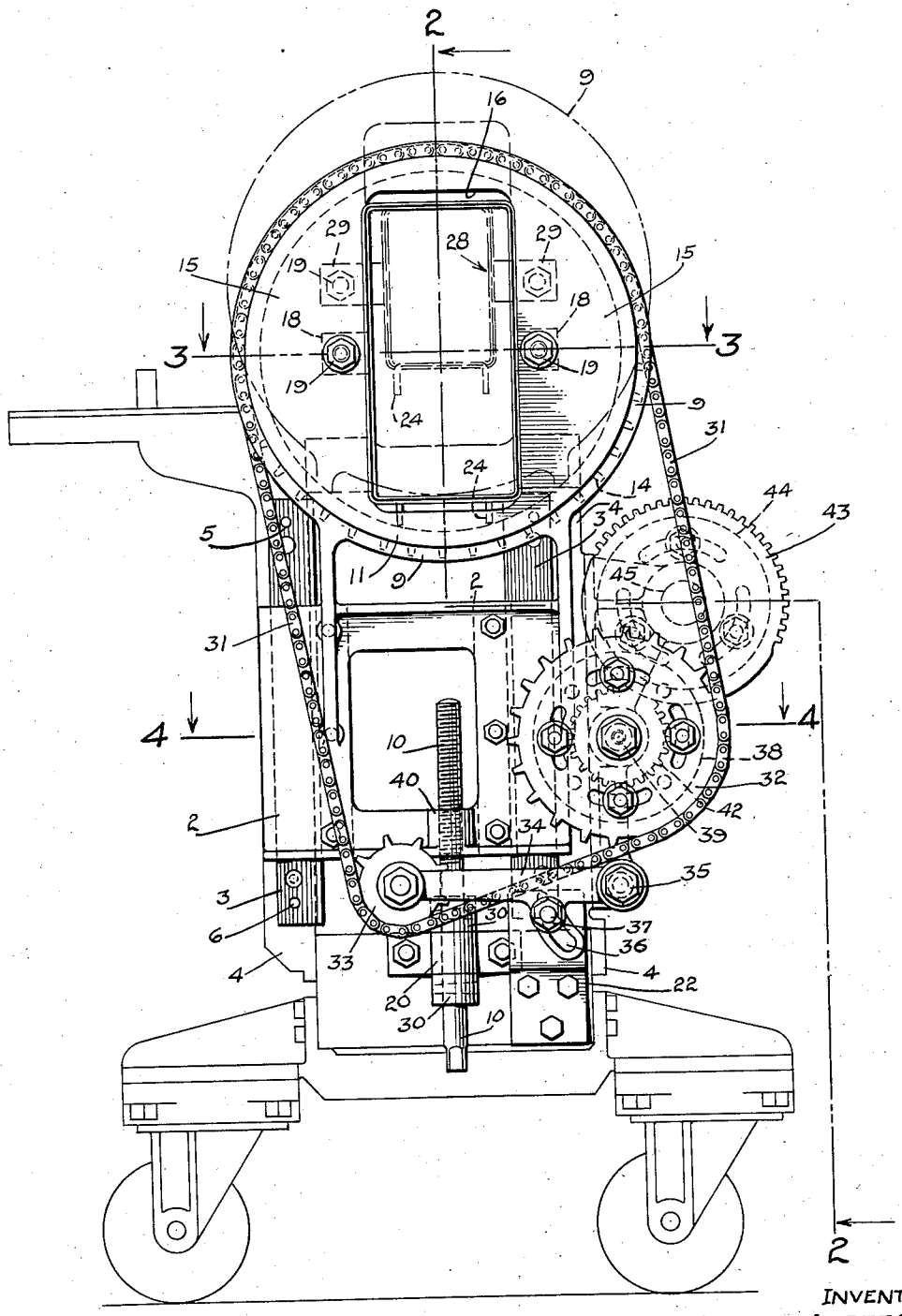

Fig. 1

INVENTOR
HELMER ANDERSON
By Paul, Paul & Woods
ATTORNEYS

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MECHANISM FOR INVERTING FILLED CONTAINERS

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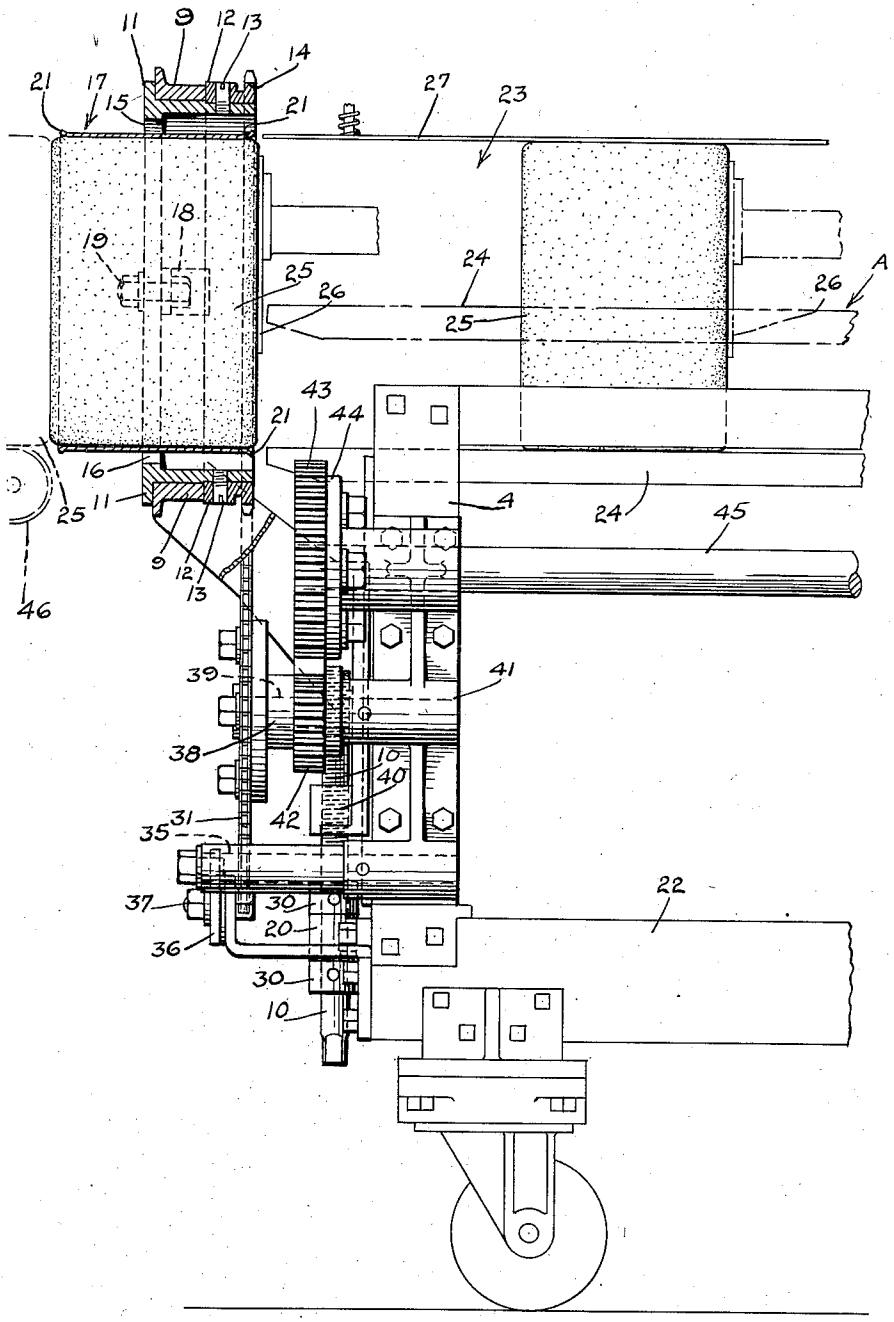

Fig. 2

INVENTOR.
HELMER ANDERSON
BY Paul, Paul & Moore
ATTORNEYS.

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MECHANISM FOR INVERTING FILLED CONTAINERS

Filed July 5, 1933 3 Sheets-Sheet 3

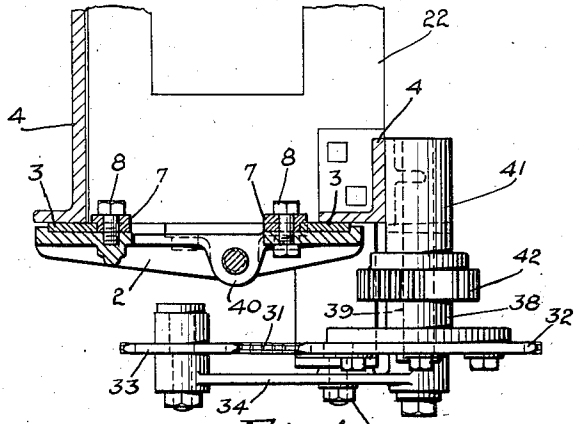

Fig. 4

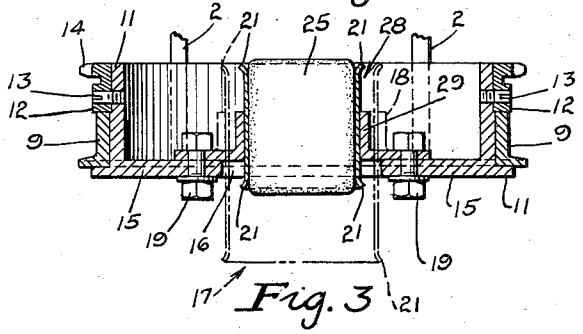

Fig. 3

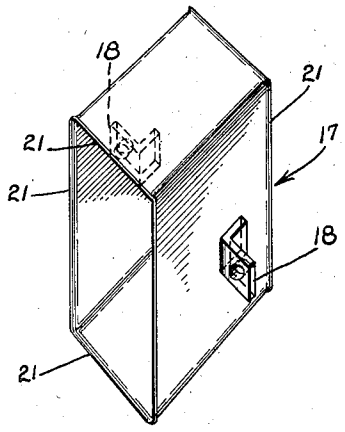

Fig. 5

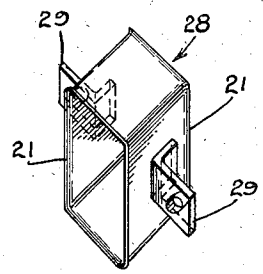

Fig. 6

INVENTOR.
HELMER ANDERSON
BY Paul, Paul & Woon
ATTORNEYS.

Patented July 9, 1935 2,007,788

UNITED STATES PATENT OFFICE

2,007,788

MECHANISM FOR INVERTING FILLED CONTAINERS

Helmer Anderson, Minneapolis, Minn., assignor to General Mills, Inc., Minneapolis, Minn., a corporation of Delaware

Application July 5, 1933, Serial No. 679,043

9 Claims. (Cl. 93—6)

This invention relates to an improved mechanism for inverting filled containers, such as paper bags, after they have been charged with material and the open tops thereof folded into closing relation and suitably gummed.

The invention is particularly applicable for use in connection with bag closing and sealing machines of the general character disclosed in my pending application, Serial No. 615,827 filed June 7, 1932, and my co-pending application, Serial No. 679,045, filed July 5, 1933.

When closing and sealing the open tops of containers or paper bags by folding the bag top walls upon themselves and applying a suitable gum thereto to secure the folded wall portions in position, it is usually necessary to provide some means for holding the folded bag top walls in closed position immediately after the bags have been sealed, because of the inability of the gum to thus retain the folded wall portions in position before it has set. To prevent the bag tops from thus infolding, it is now common practice to discharge the sealed bags from the bag closing and sealing machine onto a suitable receiving conveyer or table, having means arranged thereover for engaging the folded tops of the bags to thereby prevent them from unfolding while the gum is still wet. When a bag closing and sealing machine is operated at a comparatively high rate of speed, the sealed bags are discharged therefrom in rapid succession, and it therefore requires considerable room or space at the discharge end of the machine for temporarily supporting the bags while the gummed tops thereof become set, as they cannot be handled immediately after being discharged from the sealing machine because of the gum not having set sufficiently to permit such handling of the bags. The bags are therefore retained upon a suitable conveyer or table in an upright position beneath a suitable member which engages the folded tops thereof and temporarily holds them in sealing relation until the gum has set sufficiently to positively secure the bag tops against opening when handled.

The above described method of handling the sealed bags immediately after they have been discharged from the sealing machine is objectionable because of the necessary room or space required for supporting the bags during the period that the gum is setting. To overcome this objection, I have found that if the bags are inverted and positioned upon their closed tops, the weight of the filled bag body will prevent the freshly gummed folded top walls from unfolding. When thus supported, the bags may be conveyed over an ordinary conveyer while their gummed tops are still wet, and without the use of separate or mechanical means for temporarily holding the folded bag top walls in sealing relation.

The novel mechanism herein disclosed may readily be attached to the discharge end of a bag closing and sealing machine in position to receive each bag or container discharged therefrom. The operation of the mechanism may be so coordinated with the operation of the bag closing machine that each time a bag is delivered into the holder of the inverting mechanism, it will be rotated one-half revolution, so that when the bag supported therein is discharged therefrom, it will be positioned in an inverted position upon a suitable receiving conveyer or table so that the folded top thereof cannot unfold.

An object of the invention, therefore, is to provide a container inverting mechanism of simple and inexpensive construction, is positive in operation, and may readily be attached to a bag closing and sealing machine, or to any other suitable feeding mechanism capable of successively delivering the bags thereto.

Other objects of the invention reside in the provision of a bag turning mechanism capable of handling bags of varying sizes and shapes; in the means provided whereby each bag is rotated about its horizontal axis; in the means provided for vertically adjusting the bag holder supporting member whereby the lower portion of the holder may be alined with the bag feeding means such, for example, as the conveyer of a bag closing machine along which the closed filled bags are advanced to the turning mechanism; and, in the means provided for intermittently operating said mechanism.

Other objects of the invention will appear from the following description and accompanying drawings and will be pointed out in the annexed claims.

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 an end view of the improved bag turning mechanism showing it attached to a bag closing and sealing machine;

Figure 2 is a vertical sectional view on the line 2—2 of Figure 1, showing a bag positioned in the holder;

Figure 3 is a sectional plan view on the line 3—3 of Figure 1, showing in full lines a holder for small bags secured in the rotatable member, and indicating in broken lines a relatively larger holder;

Figure 4 is a detail sectional view on the line 4—4 of Figure 1, showing the guides for the vertically movable frame;

Figure 5 is a perspective view showing one of the holders removed from the mechanism; and

Figure 6 is a similar view showing a relatively smaller holder.

The novel bag inverting mechanism featured in this invention comprises a suitable frame 2, here shown mounted for vertical sliding movement upon suitable guides 3 secured to a suitable support such, for example, as the frame 4 of a bag closing and sealing machine. Suitable stops 5 and 6 are provided upon the guide rails 3 to limit the vertical traveling movement of the frame 2. To support the frame upon the guides 3, suitable bars 7 are shown secured to the frame 2 by bolts 8, which bars are provided at their outer edges with longitudinally extending recesses adapted to receive the inner edges of the guides 3, as clearly shown in Figure 4.

The frame 2 is provided at its upper end with a circular portion 9 bored to receive a member 11 which is mounted for rotary movement therein, as will be clearly understood by reference to Figure 2. The member 11 is retained in the circular frame portion 9 by an annulus 12 secured thereto by suitable screws 13. The annulus 12 is shown provided with a sprocket wheel 14, whereby it may be driven, as will subsequently be explained.

An important feature of this invention resides in the means provided for supporting the filled bags or containers in the rotatable member 11. This member, as shown in Figures 1, 2, and 3, comprises a wall 15 which has an opening 16 therein adapted to receive a holder 17, in which the bag is supported while being inverted. The holder 17 is open at both ends so that the bags or containers may pass therethrough. The holders are secured to the wall 15 by suitable angle brackets 18, suitably secured to the side walls of the holder and adapted to be secured to the wall 15 by suitable bolts 19. The opposite edges of the holder 17 are preferably slightly outwardly flared, as shown at 21 in Figures 2 and 5, to prevent damage to the bags or containers when they pass through the holder.

In Figures 1 and 2, I have shown the inverting mechanism mounted upon a bag closing and sealing machine such as illustrated in my pending application, Serial No. 679,045, filed July 5, 1933. This bag closing machine comprises a main supporting frame 22 upon the upright portion 4 of which the inverting mechanism is secured, as shown. The bag closing machine is also shown comprising a guideway 23 comprising a bottom plate 24 along which the closed bags 25 are advanced by suitable means such as pushers 26, shown in Figure 2. The bottom wall of the holder 17 is substantially alined with the top surface of the bottom member 24 of the guideway so that the bags may be readily fed from the member 24 into the holder, as shown in Figure 2. A suitable spring-actuated member 27 is shown provided over the guideway 23 to retain the folded bag top walls in closing relation until the bags are delivered to the holder 17.

The holders are shaped so as to substantially fit the outline or contour of the bags, as will be clearly understood by reference to Figure 2, wherein a bag is shown positioned in the holder 17. When relatively smaller bags are to be inverted, a smaller holder 28 is substituted for the holder 17. This holder is provided with angle brackets or clips 29, whereby it may be supported in the opening 16 of the member 15 by the bolts 19, as shown in full lines in Figure 3.

The means provided for operating the holder supporting member 15 is shown in Figures 1 and 2, and comprises a chain 31 operatively connected to the sprocket wheel 14 upon the member 15, and having a running connection with a sprocket 32 and an idler 33. The idler 33 is supported upon an arm 34 pivotally supported upon a stud 35 and having a slotted projection 36 receiving a lock screw 37 whereby the arm 34 may be secured in adjusted position.

The sprocket wheel 32 is adjustably secured to a hub 38 mounted upon a suitable stud 39 secured in a bracket 41 which, in turn, may be bolted to the upright portion 4 of the bag closing and sealing machine, as shown in Figure 2. The hub 38 is rotated by a pair of intermittent gears 42 and 43, the former being secured to said hub and the latter being adjustably secured to a disk 44 provided upon one end of a drive shaft 45. The shaft 45 is shown constituting a part of the bag closing and sealing machine, and may be driven from a suitable source of power, not shown. The intermittent gear 43 is shown provided with teeth around one-half of its circumference, whereby the pinion 42 which is substantially one-half the diameter of the gear 43, will make one complete revolution while the teeth of the gear 43 are engaged therewith. The balance of the time the gear 42 and sprocket 32 will remain at rest, whereby it will be noted that while the gear 43 rotates continuously, the gear 42 and sprocket 32 will be operated intermittently. By adjustably securing the sprocket 32 to the hub 38, and by similarly securing the gear 43 to the disk 44, the holder supported in the member 15 may be vertically alined with the guideway 23 of the bag closing and sealing machine, as will readily be understood by reference to Figure 1.

Another important feature of the invention resides in the provision of means whereby the member 15 may be vertically adjusted so as to aline the bottom wall or the holder 17 with the bottom plate 24 of the guideway of the bag closing machine, and whereby the bag may always be rotated about its horizontal axis, regardless of its height.

Such a means is shown in Figures 1 and 2, and comprises a threaded adjusting screw or rod 10, rotatably mounted in a bearing 20 provided upon a suitable fixed support such as the frame of the bag closing machine. Collars 30 are secured to the rod 10 at opposite sides of the bearing 20 to prevent longitudinal movement of the rod. The upper end portion of the rod is received in threaded engagement with a hub 40 on the vertically movable frame 2 of the inverting mechanism. The lower terminal of the rod is shown squared to receive a suitable crank or wrench whereby the rod may be conveniently rotated to relatively adjust the position of the frame 2, and therefore the bag holder supported in the rotatable member 11.

When the bag inverting mechanism is used in connection with a bag closing and sealing machine arranged for handling relatively large bags, the holder 17 will be mounted in the rotatable

member 15, and the bracket 2 is then vertically adjusted upon the guide rails 3 to aline the bottom wall of the holder 17 with the top surface of the bottom member 24 of the guideway, as clearly illustrated in Figure 2. Should the bag closing and sealing machine be arranged for handling relatively smaller bags, the bottom member 24 of the guideway may be vertically adjusted to the elevated position indicated at A in Figure 2. The smaller holder 28 is then substituted for the relatively larger holder 17, and the frame 2 is adjusted to horizontally aline the bottom wall of the holder 28 with the member 24 of the guideway. By thus vertically adjusting the rotatable member 15, the horizontal axis of the bag in a direction lengthwise of the machine. will coincide with the axis of the rotatable member 15, so that for each half revolution of the member 15, one wall of the holder will be horizontally alined with the bottom member 24 of the guideway 23.

In the operation of the novel bag turning mechanism herein disclosed, the filled bags, after their top wall portions have been folded into closing relation and suitably gummed, are fed into the holder in the rotatable member 15, as shown in Figure 2. The member 15 is then rotated one-half revolution, whereby the bag supported in the holder is inverted. The inverted bag is then ejected from the holder onto a suitable receiving means such as a conveyer 46, and because of being supported upon the closed tops thereof, the weight of the bag and the material therein will retain the folded top wall portions in closing relation and allow the gum to set before the bags are removed from said receiving means.

When used in connection with a bag closing and sealing machine, such as diagrammatically illustrated in the drawings, the closed bags are successively fed into the holder 17 by the pushers 26. Each time a bag is fed into the holder, the bag supported therein in an inverted position, will be ejected or discharged therefrom by the incoming bag, as will be readily understood by reference to Figure 2. The length of the holder in the direction of travel, is relatively less than the horizontal length of the bag, whereby the bag will project slightly beyond the open ends of the holder, as shown in Figure 2, so as to permit the bag supported therein to be rotated without the ends of the holder interfering with or engaging a bag supported upon the receiving conveyer 46. The operation of the inverting mechanism is timed to the movement of the pushers 26 so that each time a pusher advances a bag towards the inverting mechanism, the holder thereof will be vertically alined with the guideway 23 of the bag closing machine so that the advancing bag may readily be fed directly into the holder by the action of the pusher. It will thus be seen that the operation of the inverting mechanism may be entirely automatic when used in connection with such a bag closing and sealing machine. While I have shown the bag inverting mechanism as being used in connection with a bag closing and sealing machine, it is to be understood that it may be used independently of such a machine as, for example, the bags may be manually fed into the holder 17 from a suitable table or guideway and the rotatable member 15 may be operated by any suitable means applicable for the purpose.

By using a plurality of holders of different sizes, the mechanism may readily be adapted for bags of different sizes and shapes by simply changing the holders in the rotatable member 15, as hereinbefore described. The apparatus is very simple and inexpensive in construction, and when operatively connected to a bag closing and sealing machine, as shown in Figures 1 and 2, its operation will be positive and it will operate in timed relation to the movement of the pushers 26 so that each bag discharged from the machine will be inverted and placed in an inverted position upon the receiving conveyer 46, in which position they may remain until the gum has set sufficiently to seal the folded top wall portions thereof.

I claim as my invention:

1. In a mechanism for inverting filled bags whose top wall portions have been folded into closing relation and suitably gummed, a member mounted for rotary movement, an open ended, one piece holder, angle brackets removably supporting the holder in said member, and into which holder the filled bags are delivered, right side up from a suitable supporting plate, said holder substantially fitting the shape of the bags, and means for actuating the member to invert the bag supported in the holder, whereby when the bag is discharged therefrom, it will be positioned upon its closed top whereby the weight of the bag and its contents will be exerted against said folded top wall portions to thereby retain them in closing relation until the gum has set, one of the walls of said holder always being alined with said supporting plate when the member is at rest.

2. In a mechanism for inverting filled bags whose top wall portions have been folded into closing relation and suitably gummed, a member mounted for rotary movement, means by which holders of different sizes may be interchangeably supported in said member to adapt the mechanism for handling bags of different sizes and shapes, and means for intermittently rotating said member to invert the bag supported in the holder secured therein, whereby each bag discharged therefrom will be positioned upon its closed top to thereby prevent it from opening.

3. In a mechanism for inverting filled bags, a member mounted for rotary movement, means by which holders of different sizes may be interchangeably supported in said member to adapt the mechanism for handling bags of different sizes and shapes, a plate over which the bags are fed to the holder, and means whereby said member may be vertically adjusted to horizontally aline the lower wall of the holder with said plate.

4. In a mechanism for inverting filled bags, a circular member mounted for rotary movement and having an opening therein, means by which holders of different sizes may be interchangeably supported in said member to adapt the mechanism for handling bags of different sizes and shapes, and means whereby the holder supported in the member is axially alined therewith.

5. The combination with a bag closing and sealing machine comprising means for advancing the bags, and a drive shaft, of a bag inverting mechanism disposed to receive the closed bags from said advancing means, said mechanism comprising a member mounted for rotary movement, a holder removably supported in said member and disposed in axial alinement therewith, means for vertically adjusting said member to aline the holder with said advancing means, and means for operatively connecting said rotatable member to said drive shaft whereby said member and holder will operate in timed relation to said advancing means.

6. The combination with a bag closing and sealing machine comprising a conveyer for feeding the bags, said conveyer comprising side and bottom walls and having a plate yieldably supported thereover for temporarily retaining the folded bag tops in closing relation, of a bag inverting mechanism comprising a circular frame located adjacent the discharge end of the bag closing machine and having a member mounted for rotation therein, a holder removably supported in said member and having its side walls substantially alined with the corresponding walls of the conveyer, means for relatively adjusting said member to aline another of the walls of said holder with the bottom wall of the conveyer whereby the bags may be fed from the latter directly into said holder, without danger of the tops unfolding, means whereby the holder is axially alined with said member, and means for intermittently rotating said member to invert the bag supported therein, the inverted bag being discharged from said holder by the delivery of a following bag thereinto.

7. In an apparatus for inverting filled paper bags whose top wall portions have previously been gummed and folded into closing relation, a fixed support, a frame mounted for vertical adjustment on said support and having a bore therein, a member rotatably mounted in said bore and having an opening adapted to detachably receive a holder into which the bag to be inverted is delivered, said holder comprising four walls adapted to engage the top, bottom and side walls of the bag to thereby support the same, and means for relatively rotating said member whereby the bag supported in said holder is inverted.

8. In an apparatus for inverting filled bags whose upper wall portions have previously been gummed and folded into closing relation, a fixed support having vertically disposed guides thereon, a frame mounted for vertical adjustment on said guides and having an enlarged bore at its upper end, a member rotatably mounted in said bore and having a holder secured therein, said holder being open at each end and adapted to be alined with the discharge end of a bag closing and sealing machine, whereby the bags discharged therefrom are delivered into said holder, and a driving mechanism for said member adapted to be operatively connected to the driving means of the bag closing machine, whereby said member will be operated in timed relation thereto and thereby invert each bag discharged from the bag closing machine.

9. In a mechanism for inverting filled bags whose top wall portions have been folded into closing relation and suitably gummed, a member mounted for rotary movement, a holder axially mounted in said member and adapted to receive a bag to be inverted, means for delivering the bags to be inverted into said holder, comprising a vertically adjustable plate, means for detachably supporting the holder in said member, whereby said holder may readily be detached therefrom and a holder of a different size substituted therefor, thereby to adapt the mechanism for handling bags of different sizes, and the means for detachably securing the holder in the member being so arranged that all holders, regardless of size, will be axially supported in the member.

HELMER ANDERSON.