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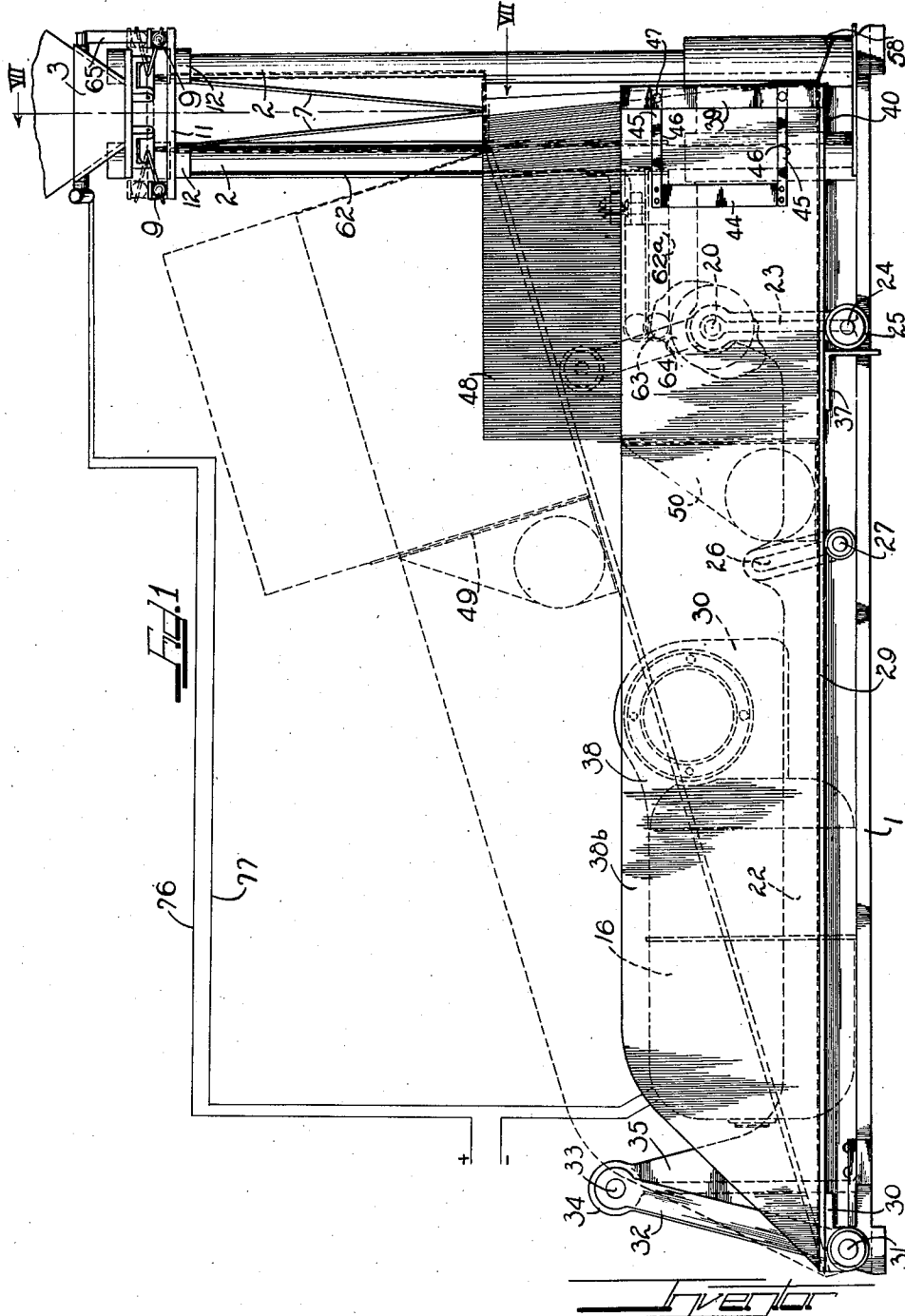
L. J. NOWAK, JR

2,254,384

APPARATUS FOR FEEDING AND OPENING BAGS AND CONTAINERS

Filed Dec. 30, 1937

5 Sheets-Sheet 1



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Sept. 2, 1941.

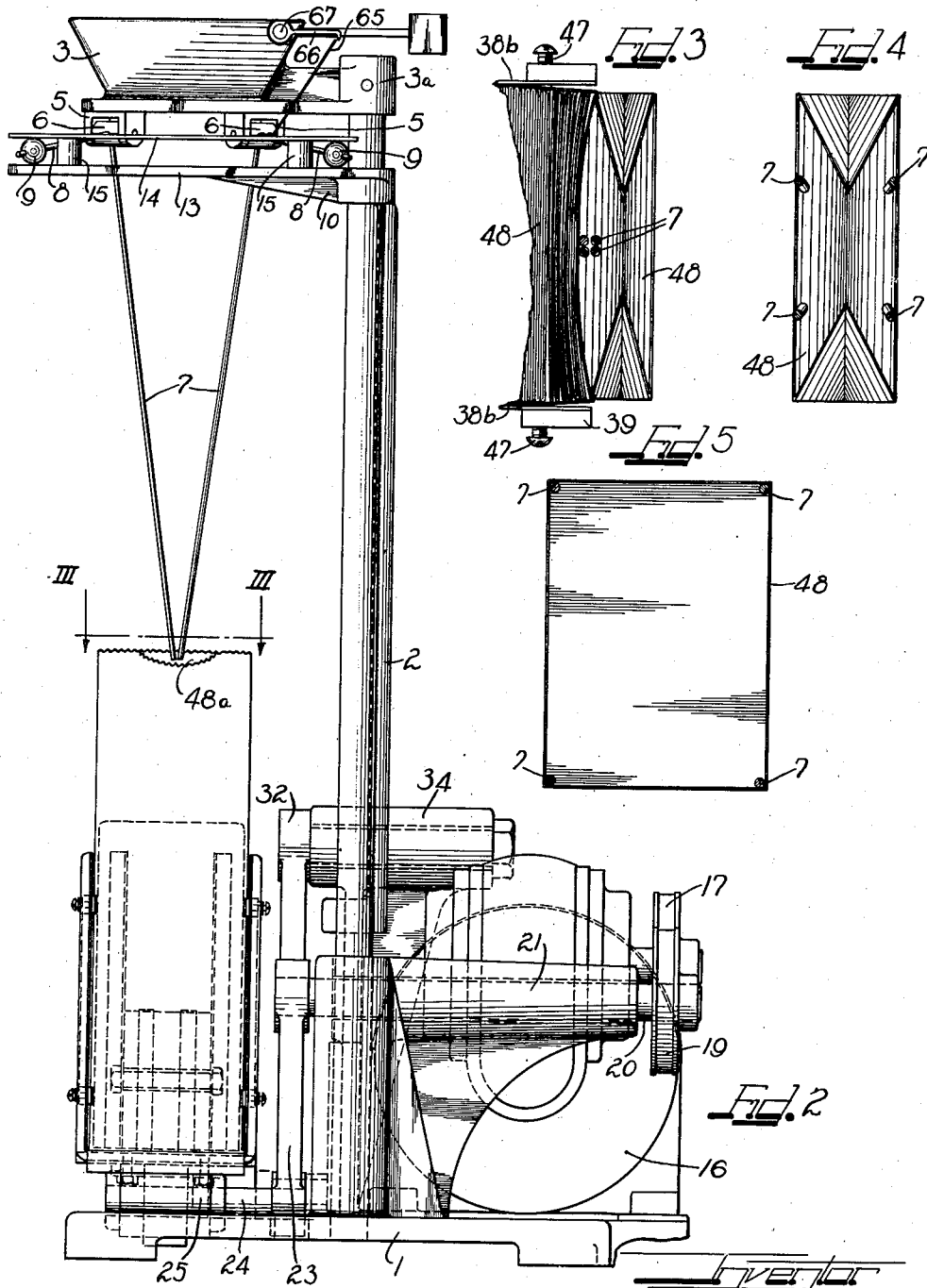
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5 Sheets-Sheet 2



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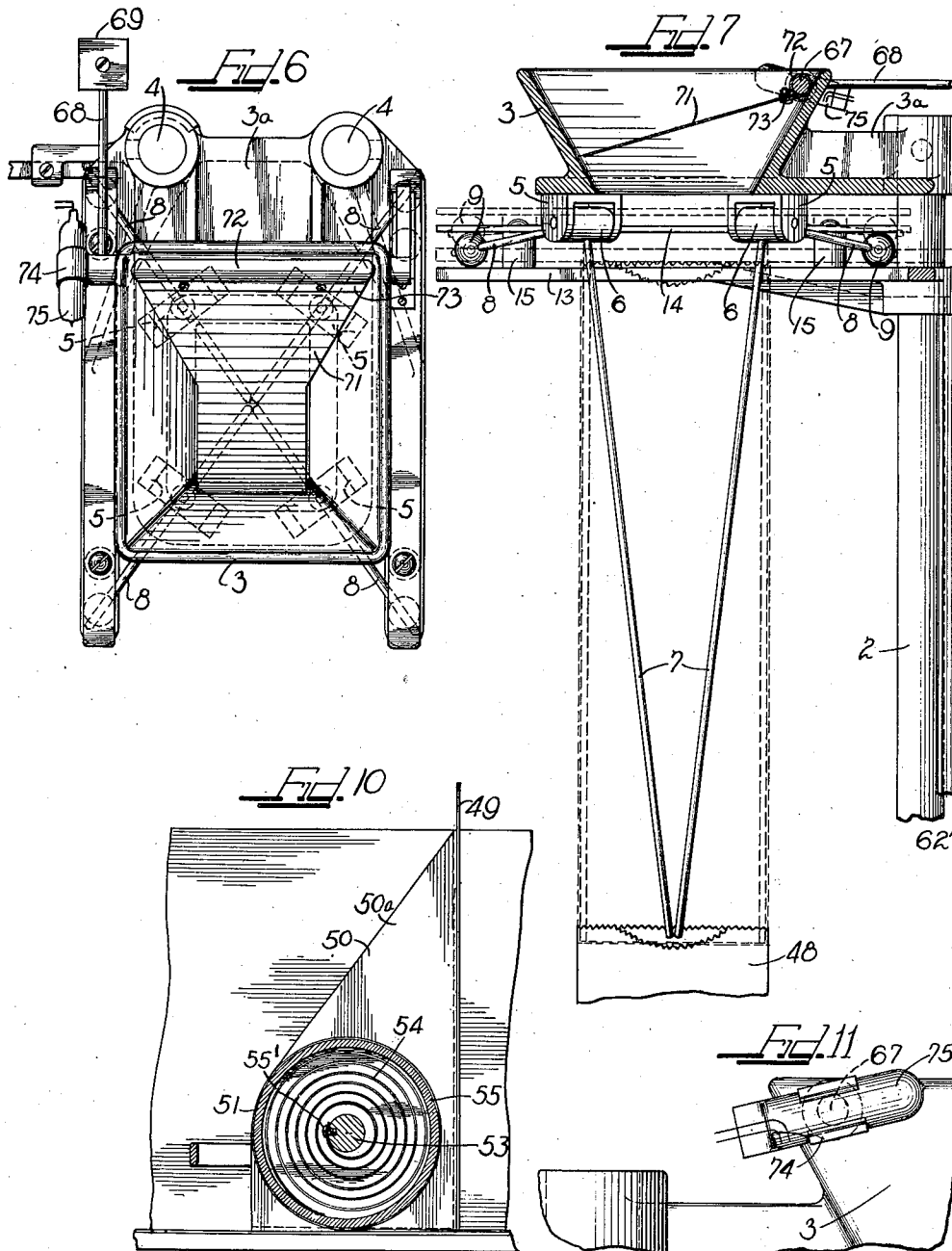
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5 Sheets-Sheet 3



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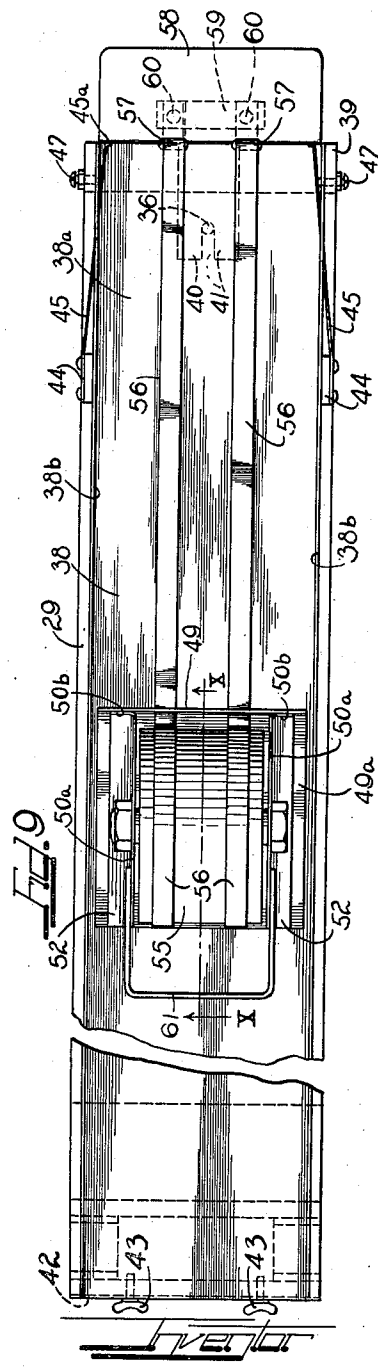
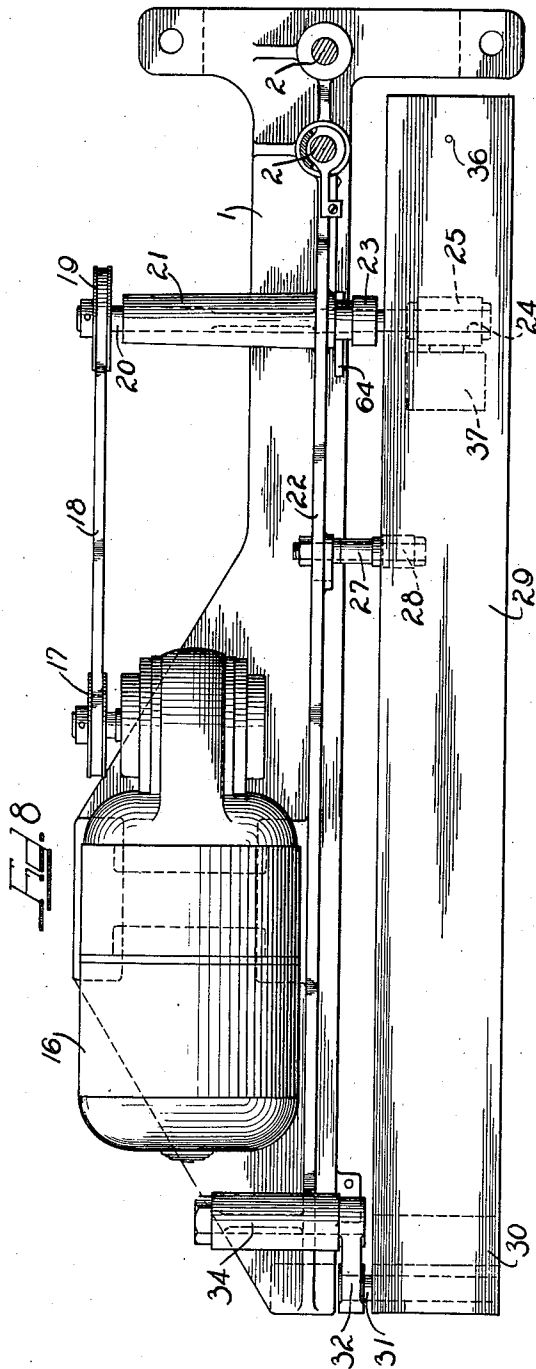
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5 Sheets-Sheet 4



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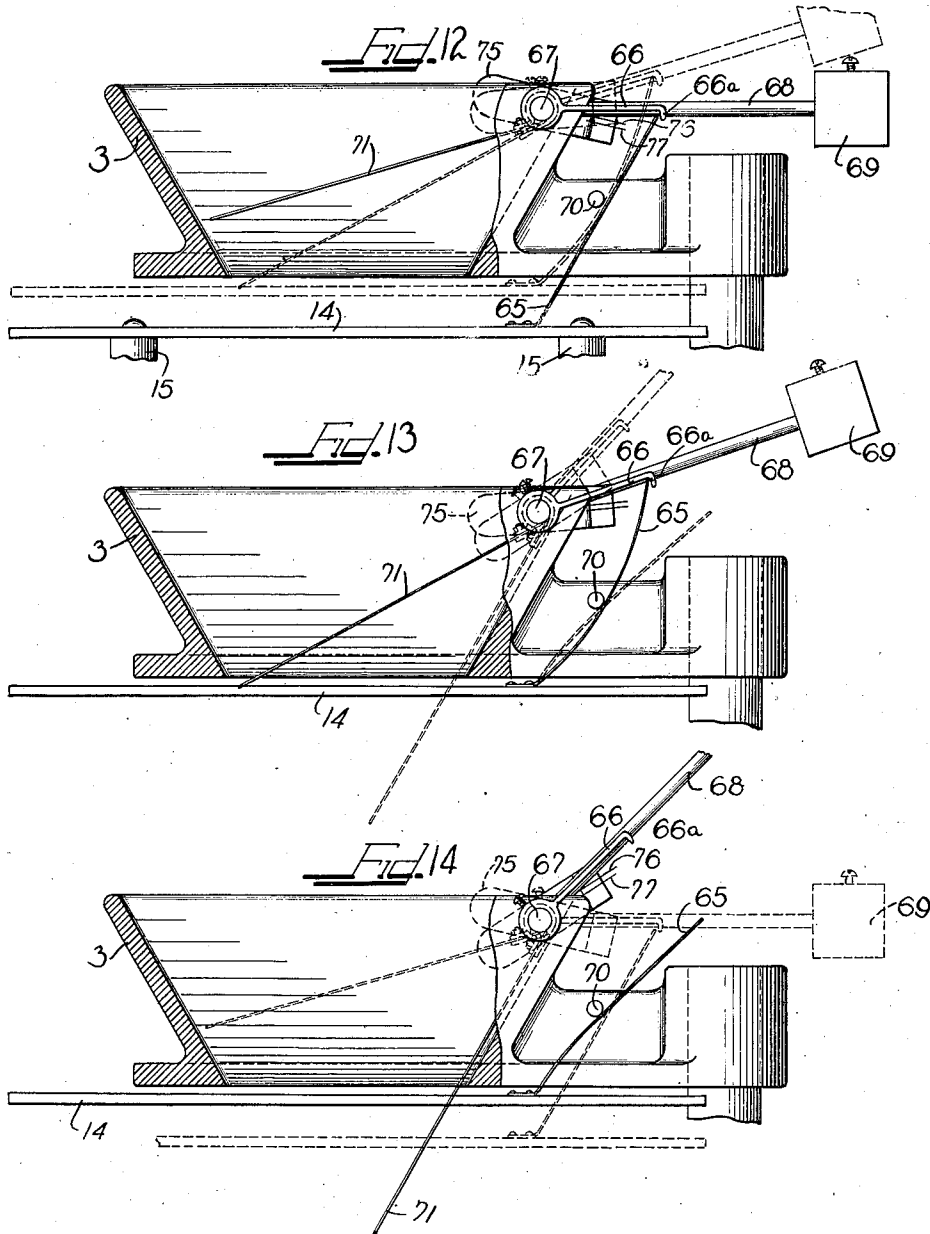
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APPARATUS FOR FEEDING AND OPENING BAGS AND CONTAINERS

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5 Sheets-Sheet 5



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APPARATUS FOR FEEDING AND OPENING BAGS AND CONTAINERS

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Application December 30, 1937, Serial No. 182,439

21 Claims. (Cl. 226—49)

This invention relates to an apparatus for opening bags or containers and concerns itself primarily with spreading fingers and a magazine having relative movement with respect to the spreading fingers for automatically telescoping a bag on such fingers.

The invention further contemplates the use of bags having a notch or depression in the top wall thereof or having one side wall higher than the other whereby an entrance will be provided for the fingers through a relative lateral movement of the fingers and magazine.

It is an object of this invention to provide such an apparatus that is automatic in its action for opening bags, sustaining the same while they are being filled and moving the filled bags.

It is a further object of this invention to provide proper controls for such a machine whereby the relative movement between the fingers and magazine may be governed.

With these and other objects in view which will become more apparent as the description proceeds, this invention comprises the novel structure and combination of parts hereinafter described and more particularly pointed out in the appended claims.

In the accompanying drawings which illustrate a preferred form of this invention and in which similar reference numerals refer to similar features in the different views:

Figure 1 is a rear elevational view of a bag opening machine involving this invention.

Figure 2 is an end elevational view of the machine.

Figure 3 is an enlarged fragmentary view partly in section and looking at the top of the bag magazine taken substantially upon the line III—III of Figure 2.

Figure 4 is an enlarged top plan view of a bag as it is being opened or expanded.

Figure 5 is an enlarged top plan view of a bag in its fully expanded condition.

Figure 6 is an enlarged top plan view of the head part of this machine.

Figure 7 is an enlarged fragmentary sectional view taken upon the line VII—VII of Figure 1 looking in the direction of the arrows.

Figure 8 is an enlarged top plan view of a part of the base portion of the machine with the bag magazine removed.

Figure 9 is an enlarged top plan view of the bag magazine.

Figure 10 is an enlarged fragmentary sectional view taken upon the line X—X of Figure 9 looking in the direction of the arrows.

Figure 11 is an enlarged fragmentary elevational view of the feed hopper.

Figure 12 is an enlarged sectional view through the hopper with adjacent parts in elevation.

Figure 13 is a view similar to Figure 12 but showing parts in different positions.

Figure 14 is a view similar to Figure 13, but showing the parts in different positions.

In referring to the drawings which illustrate the chosen embodiment of this invention, it will be noted that the machine comprises a supporting base 1 provided with a pair of upstanding standards 2. Adjacent the top portion of the standards there is secured thereon a feed hopper 3. The hopper 3 is provided with a laterally extending bearing 3a (Fig. 6) having apertures for receiving the standards. The bearing 3a may be rigidly secured to the standards in some suitable manner.

Upon the bottom portion of the hopper adjacent the throat thereof are secured four bifurcated bearings 5 and in each of these bearings there is journaled a cylindrical member 6. A pendant finger 7 is secured to each cylindrical member 6. Each cylindrical member 6 also has an arm 8 extending in a lateral direction that carries a ball or spherical member 9.

Slidably mounted upon the standards 2, there is a member 10 which is in the form of a bifurcated frame consisting of a bridging strip 11 (Fig. 1) provided with a bearing 12 slidably mounted upon the standards 2 and a pair of spaced forwardly extending arms 13. It will be noted that the balls 9 rest upon the arms 13.

The balls 9 are held against the arms 13 of the member 10 by means of flat strips 14 which extend in parallel relation to the arms 13 in superposed relation to the balls and these strips 14 are secured to the arms 13 by means of studs 15 which may be welded or secured between the arms and the strips. The parts 13 and 14 are, however, sufficiently spaced apart to allow the balls 9 to freely slide therebetween. The member 10 together with the strips 14 constitutes in effect an actuator for operating the fingers 7. When the actuator is lowered the fingers 7 converge to receive a bag and when the actuator is elevated the fingers are spread apart.

Mechanism has been provided for telescoping an empty bag over the fingers 7 and automatically actuating the fingers to expand the bag sufficiently so that it will be supported upon the fingers while it is being filled. This mechanism will now be set forth.

In referring to Figs. 1, 8 and 9, it will be noted

that a motor 16 is mounted upon the base 1 and this motor has a driving connection with a pulley 17 that is connected by a belt 18 with a pulley 19 and a shaft 20 which is journaled in a suitable bearing 21 projecting from a vertical wall 22 extending lengthwise of the base on one side of the motor 16. This shaft 20 extends beyond the wall 22 and has fixed upon its outer end a crank arm 23. Upon the lower end of the crank arm, there is a pintle 24 upon which a roller 25 is journaled.

In the wall 22, there is a sloping slot 26 shown in dotted lines in Fig. 1 in which a stub shaft 27 is adjustably mounted that supports a roller 28.

An elongated platform 29 rests upon the rollers 25 and 28. Upon the left hand end of the platform 29 there is secured a bearing 30 in which a crank pin 31 is journaled. This crank pin 31 is connected to the lower end of a link 32 which is pivoted at its upper end on a pivot pin 33 mounted in a bearing 34 on the rear end of the wall 22 which it will be noted extends upwardly at its rear end as indicated at 35 to provide a post or standard for such a purpose. Thus the platform 29 is pivotally anchored at its rear end to the base 1. At the forward end of the platform, there is a pendant pin 36 (Fig. 9) for a purpose that will later appear. An angle member 37 is secured to the bottom of the platform rearward of the roller 25 for coaction with said roller in a predetermined position as will later appear.

The bag magazine 38 is supported upon the platform 29 as shown in Fig. 1. This magazine may consist of a sheet metal plate bent to provide a bottom 38a and parallel side walls 38b. A U-shaped member 39 is welded or secured externally of the front end of the magazine so as to extend down the sides and across the bottom thereof. A plate 40 is secured to the bottom of the U-shaped member and extends rearwardly and provides a gap between it and the bottom of the magazine for receiving the front end of the platform 29. This plate has a slot 41 (Fig. 9) in its free end for receiving the pendant pin 36 on the platform. This construction will maintain the forward end of the magazine against shifting movements. The rear end of the magazine has a downwardly turned flange 42 through which screws 43 extend that are threaded into the bearing 30. Thus the magazine is firmly attached to the platform 29.

Spaced a short distance from the forward end of the magazine are side braces 44 that are attached to the exterior surfaces of the side walls of the magazine. Leaf springs 45 are attached to these braces and these leaf springs extend through long slots 46 cut in the side walls of the magazine. The leaf springs 45 extend to the forward end of the magazine where they are provided with inturned lips 45a for retaining the bags. Adjustable screws 47 which extend through the sides of the U-shaped member 39 abut the leaf springs 45 for adjusting the inward deflection thereof as is apparent.

The empty bags 48 are confined in the magazine between the inturned lips 45a and the forward wall 49 of a movable abutment or carriage 50 that is adapted to be automatically advanced by a spring motor 51, best shown in Figs. 9 and 10. The carriage 50 is preferably formed from sheet metal and consists of side plates 50a having flanges 50b welded or secured to the plate 49 which is an angle plate having a lower flange 49a riding upon the base of the magazine. These side

plates 50a are provided with flanges 52 at their lower ends which are welded to the flange 49a of plate 49.

A shaft 53 is secured in the side walls 50a of the carriage and supports the spring motor 51 which consists of a coil or clock spring 54 secured at its inner end to the shaft 53 at 55' and secured at its outer end to a drum 55 surrounding the coil spring. The tendency of the spring 54 is to unwind and rotate the drum 55.

A pair of spaced flexible straps 56 (Fig. 9) are secured at their rear end to the drum and wound therearound and then extended along the bottom of the magazine to the front end thereof where they extend through slots 57 in a downwardly sloping extension 58 on the bottom of the magazine. The forward ends of these straps are anchored to the bottom of the extended bottom 58 of the magazine by means of a strip 59 and screws 60.

It might be here mentioned that when the forward end of the magazine is tilted upwardly as shown in dotted lines in Fig. 1, the sloping extension 58 will be in a substantially horizontal plane and will be pressing against the bottom of the bag so as to maintain the same substantially horizontal. This extended bottom 58 may also serve to support the bag while it is being filled.

The tendency of the spring 54 is to rotate the drum 55 in a clockwise direction and wind up the straps 56, and thuswise cause the carriage to advance as the bags are removed from the magazine. The carriage is provided with a handle 61 whereby it may be manually pulled rearwardly when it is desired to replenish the magazine with empty bags.

In referring now to Fig. 1, it will be noted that a rod 62 is secured at its upper end to one of the bearings 12 of the actuator. The lower end of this rod has an arm 62a attached thereto as shown in dotted lines in Fig. 1. A roller 63 is journaled upon the end of the arm for engagement by a cam 64 secured to the shaft 20.

It will be evident that when the motor rotates shaft 20 in an anti-clockwise direction, the arm 23 will rotate in an anti-clockwise direction and elevate or tilt the magazine upwardly. In the position shown in Figs. 1, 3 and 7 the fingers 7 are in their converging relation and within the mouth of the foremost bag in the magazine as shown more clearly in Fig. 2. The bags 48 are formed with a depression 48a (Fig. 2) in the top of one side thereof. By positioning the bags in the magazine with the depression 48a foremost, it will be evident that as the bags in the magazine are gradually advanced the foremost side of the foremost bag will pass beyond the fingers 7 through the depression 48a so that when the magazine is elevated, the fingers 7 will be in proper position within the mouth of the foremost bag. While the depression 48a is shown as a notch, it is intended to include a bag structure in which one side wall is higher than the other.

As the magazine is elevated by the crank arm 23, the foremost bag will be telescoped over the fingers 7. When the bag has been telescoped over the fingers, the cam 64 will elevate the rod 62 and the actuator for expanding the bag to open position. This expanding force will hold the bag on the fingers while it is being filled. The bag, however, may also rest upon the extended bottom 58 of the magazine when it is being filled as shown in Fig. 1.

Substantially at the time that the bag has been

expanded, the motor will be stopped for a predetermined period as will now be set forth. Upon one of the upper bars 14 of the actuator, there is secured at its lower end a leaf spring 65 best shown in Figs. 12 to 14. The upper end of this spring engages a trip lever 66 having a downwardly hooked end 66a for confining the upper end of the spring. The trip lever 66 is secured to one end of a shaft 67 journaled in the hopper and extending beyond both sides thereof. The trip lever 66 is secured to the shaft upon one side of the hopper while an arm 68 is secured to the shaft upon the other side of the hopper. The arm 68 carries an adjustable counterweight 69. A pin 70 projecting from the bearing on the hopper forms a fulcrum for leaf spring 65 as will later more fully appear.

It will be noted that the shaft 67 extends across the mouth of the hopper. A plate 71 within the hopper has one edge secured to the shaft 67. While the plate 71 may be attached to the shaft in various ways, in the present instance, a sheet metal sleeve 72 is secured upon the shaft with its edges brought together as indicated at 73 for forming a flange to which the plate 71 is attached. The plate 71 is fashioned in accordance with the interior contour of the hopper so that it can pass from the full line position shown in Fig. 12 to the full line position shown in Fig. 14.

Upon the end of the shaft 67 adjacent the weight arm 68, there is secured a clamp 74 (Figs. 6 and 11) which carries a mercooid switch 75 connected by conductors 76 and 77 to one side of a supply circuit to the motor.

When the parts are in the position shown in Fig. 12, the mercooid switch will be closed and the motor will be operating. When the actuator is elevated for expanding a bag, the spring 65 will flex or fulcrum against the pin 70 as shown in Fig. 13 and elevate the trip lever 66 imparting a partial rotation to shaft 67 which will be sufficient for opening the mercooid switch and stopping the motor when the magazine is in the position shown in dotted lines Fig. 1 in which position the bottom of the bag rests upon the extension plate 58.

The bag may now be filled by pouring the material into the hopper 3. As the material descends through the hopper, it will swing the plate 71 substantially to the position shown in Fig. 14, an operation which will disengage the trip lever 66 from the spring 65 as shown in Fig. 14. When the weight of the material passing through the hopper ceases to act upon plate 71, the counterweight 69 will come into action for restoring the parts to the full line positions shown in Fig. 12. When the parts are thuswise restored, the hooked trip lever 66 will engage over the end of the leaf spring 65 and the motor will be set in operation for returning the magazine to its lowered position. During this operation, the roller 25 on crank arm 23 will strike the angle 37 and shift the magazine rearwardly from under the bag which may then descend of its own weight and drop upon the base or floor. As the magazine is lowered and brought to its original position, its final movement will be in a horizontal forward direction. This forward movement will cause the magazine to shift or slide the filled bag forward, in front of the magazine. This forward movement of the filled bag produced by the magazine may be utilized for feeding the filled bags away from the apparatus to a conveying belt or the like. Thus it will be apparent that the means for feeding the empty bags to the ex-

panding fingers, is also utilized to feed the bags in a direction away from the machine.

It will be appreciated that a simple and novel mechanism has been provided for opening and sustaining bags while they are filled that is automatic in its action and that is adapted for use in the packaging and other arts and that eliminates much manual labor. The machine may also be used for opening collapsed cartons or containers, and it will be understood that the term bag is used in a generic sense to include cartons, containers and the like.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the scope and spirit of the appended claims.

I claim as my invention:

1. In an apparatus of the class described, a plurality of pivoted fingers converging substantially to a point, a bag magazine, means for shifting said magazine for telescoping a bag over said fingers and bringing their converged ends substantially to the bag bottom, and means for pivotally moving and spreading said fingers for opening said bag.

2. In an apparatus of the class described, a plurality of pivotally mounted fingers normally converging substantially to a point, a magazine adapted for containing bags, means for tilting said magazine for telescoping a bag upon said fingers and bringing the converged ends of the fingers to a position adjacent the bag bottom, and means for swinging and spreading said fingers for forcibly opening said bag substantially throughout its length.

3. In an apparatus of the class described, a stationary support, a plurality of fingers having bearings pivoted to said support, said fingers having weighted arms extending laterally from said bearings and effective for normally causing said fingers to converge, an actuator having a connection with said arms and means for operating said actuator for moving said arms for spreading said fingers.

4. In an apparatus of the class described, a stationary support, fingers adapted to extend into a bag, each of said fingers having a bearing at its uppermost end pivoted on said support, arms laterally extending from said bearings and having their outermost ends lying in a common plane, an actuator connected to said arms, and means for operating said actuator for swinging said arms and spreading said fingers.

5. In an apparatus of the class described, a plurality of pendant bag opening fingers, a magazine for confining containers, means including a motor for elevating said magazine for telescoping a container upon said fingers, means for spreading said fingers for opening said container, and means for temporarily rendering said motor ineffective when said fingers are spread apart.

6. In an apparatus of the class described, a plurality of pendant bag opening fingers, a magazine adapted for confining bags, means including a motor for elevating said magazine for telescoping a bag on said fingers, means actuated by said motor for spreading said fingers, and means for shutting off said motor when said fingers are spread and a bag is being filled, said means acting to start said motor when said bag is substantially filled for lowering said magazine.

7. In an apparatus of the class described, a

plurality of pendant bag opening fingers normally in converging relation, a magazine adapted for containing bags, means including a motor for elevating said magazine for telescoping a bag on said fingers, means actuated by said motor for operating said fingers for expanding said bag and means responsive to the actuation of said fingers for terminating the operation of said first and second means.

8. In an apparatus of the class described, a plurality of pendant bag opening fingers normally in converging relation, a magazine adapted for containing bags, means including a motor for causing relative movement between said magazine and fingers for telescoping a bag on said fingers, means actuated by said motor for spreading said fingers when said bag is telescoped thereon, and means responsive to the actuation of said fingers for shutting off said motor while said bag is being filled, said magazine supporting said bag while it is being filled.

9. A bag opening apparatus comprising bag opening fingers, a magazine adapted for containing bags, means for moving said magazine for telescoping a bag over said fingers, said magazine including a member for supporting said bag while it is being filled with material.

10. A bag opening apparatus comprising bag opening fingers normally in converging relation, a magazine for containing empty bags, means for moving said magazine for telescoping an empty bag over said fingers, means for spreading said fingers for opening said bag and means movable with said magazine for sustaining said bag while it is being filled.

11. In a bag opening apparatus, a plurality of pendant bag opening fingers, a magazine for containing bags and having an extended inclined bottom portion, means for elevating said magazine for telescoping a bag over said fingers and bringing the inclined bottom portion to a substantially horizontal position, and means for spreading said fingers for opening said bag, said bag moving upon the extended portion of said bottom and being supported thereby while being filled.

12. In an apparatus for opening a bag having a notch in its upper edge, a plurality of rod-like fingers normally in converging relation and having spaced apart supports at one set of their corresponding ends, a magazine adapted for retaining a stack of empty bags with the notched portion foremost for receiving the converging ends of said fingers, and means for elevating said magazine for telescoping the foremost bag in said magazine upon said fingers with the fingers extending substantially to the bag bottom, and means for spreading said fingers.

13. In an apparatus of the class described, a plurality of pendant bag opening fingers, a magazine adapted for containing a stack of empty bags, means including a motor for elevating said magazine for telescoping the foremost bag in said stack upon said fingers, means actuated by said motor for spreading said fingers for opening said bag, a feed hopper above said bag, a shaft journaled on said hopper, a mercoild switch carried by said shaft and connected to said motor, means for rocking said shaft when said fingers are spread for tilting said switch for stopping said motor, a plate secured upon said shaft within said hopper and responsive to material passing through said hopper for maintaining said switch inoperative, and means connected to said shaft for rocking said shaft for closing said switch

when the material ceases passing through said hopper.

14. In a bag opening apparatus, a plurality of pendant bag opening fingers normally in converging relation, a magazine adapted for containing empty bags, means for pivotally securing one end of said magazine for longitudinal and upward pivotal movement, means including a motor for elevating said magazine for telescoping a bag upon said fingers, means actuated by said motor for spreading said fingers for opening said bag, means for stopping said motor when said bag is expanded and being filled, and means for causing said motor to start when said bag is filled for lowering said magazine and moving the same to its original position.

15. In a bag opening apparatus, pendant fingers, a magazine for containing empty bags, means for pivotally anchoring the rear end of said magazine for arcuate swinging movement, means including a motor for elevating the forward part of said magazine for telescoping a bag on said fingers, means actuated by said motor for spreading said fingers for opening said bag and temporarily stopping said motor while said bag is being filled, means for starting the motor for causing said magazine to move away from said filled bag and allowing said filled bag to drop in the path of said magazine, said magazine upon its return movement moving said filled bag in the direction of its longitudinal axis.

16. In a bag opening apparatus, pendant fingers normally in converging relation, a magazine adapted for containing empty bags, a swingable support pivotally connected to the rear end of said magazine, means for elevating said magazine for telescoping a bag on said fingers, means for spreading said fingers for opening said bag, means for filling said bag and causing the same to drop in the path of said magazine, said elevating means returning said magazine to a horizontal position and moving said filled bag.

17. In a bag apparatus, bag opening members, a magazine for containing empty bags, means for moving said magazine in a given path to and from said bag opening members, and means releasing a filled bag for descent from said bag opening members independently of said magazine, said magazine having a movement in said given path for propelling a filled bag after it has descended from said bag opening members.

18. In a bag opening apparatus, a plurality of pendant bag opening fingers, a magazine containing bags, means for alternately elevating and returning said magazine, said magazine when being elevated telescoping a bag over said fingers and moving the bag to a filling position, means for spreading the fingers for opening said bag, a member for supporting the bag during filling, and means for withdrawing said member from underneath said filled bag and allowing the filled bag to drop in the path of said magazine, said magazine upon its return movement moving said filled bag in a lateral direction.

19. In an apparatus of the class described, a bag magazine, means for successively elevating and returning the magazine to a normal position, movement of said magazine to its elevated position delivering a bag to a filling position, and means operative at the elevated position of said magazine for interrupting its movement and releasing a quantity of material into said bag, said latter means being operable in response to

the cessation of flow of material into said bag for re-establishing movement of said magazine, whereby said magazine is returned to normal position.

20. In an apparatus of the class described for opening a collapsed bag having a lateral entrance in its upper edge, a plurality of pivoted fingers converging substantially to a point and adapted to enter said lateral entrance in the bag, a bag magazine, means for shifting said magazine for telescoping a bag over said fingers and bringing their converged ends substantially to the bag bottom, and means for pivotally moving and spreading said fingers for opening said bag, the movement of said fingers being such as to open

a bag in at least two directions disposed at an angle to each other.

21. In an apparatus of the class described, a plurality of pivoted fingers converging substantially to a point, a bag magazine, means for shifting said magazine for telescoping a bag over said fingers and bringing their converged ends substantially to the bag bottom, and means for pivotally moving and spreading said fingers for opening said bag, said fingers having free ends for first engaging an edge of the mouth of the bag and said means thereafter spreading said fingers in a multiple of directions to open forcibly said bag thereon.

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