

May 29, 1923.

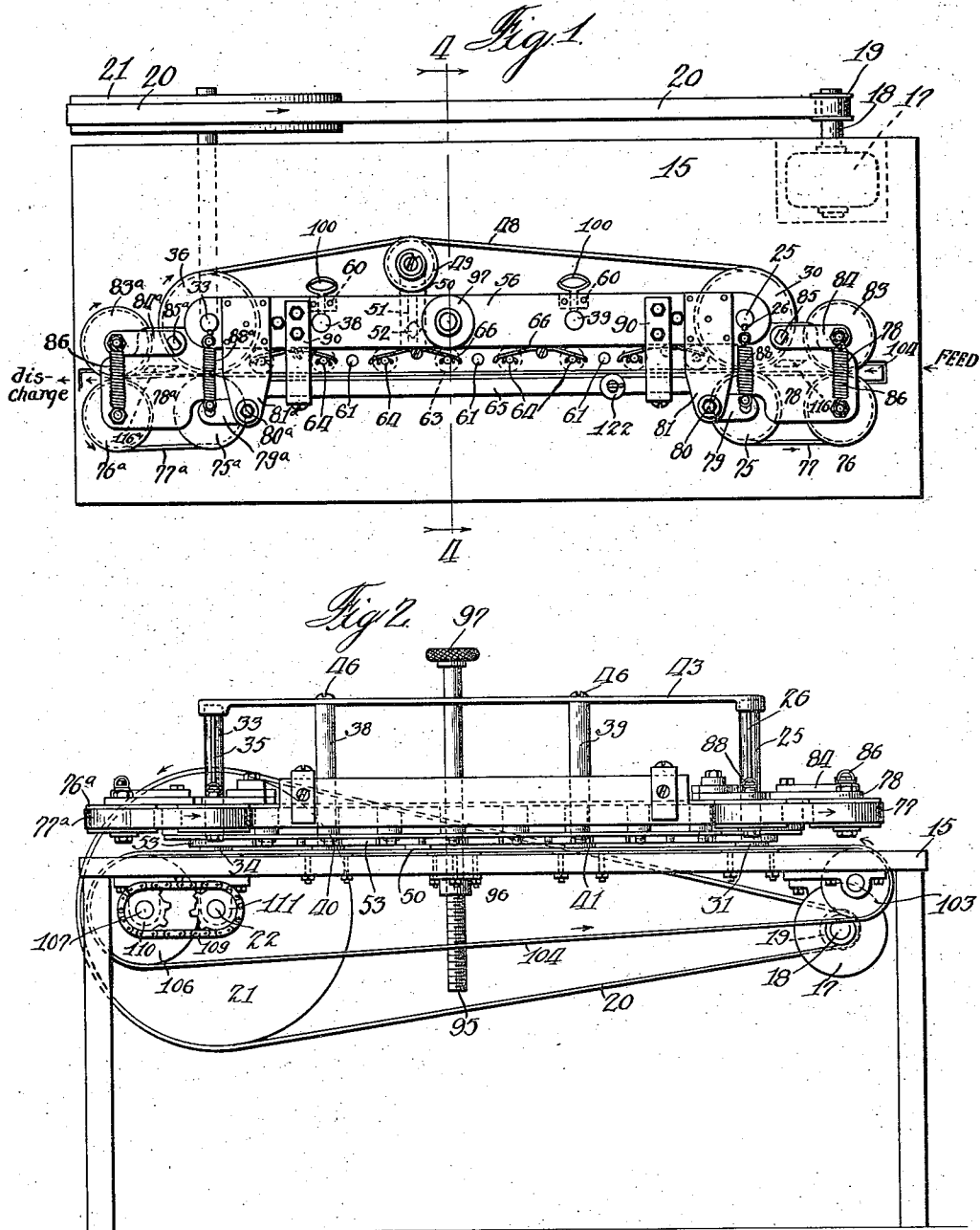
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V. SLEZAK

BAG FOLDING AND SEALING DEVICE

Filed Nov. 21, 1921

3 Sheets-Sheet 1



Witness:
Oscar S. Magnusson.

Inventor:
Vincent Slezak
By Luther Johns Atty:

May 29, 1923.

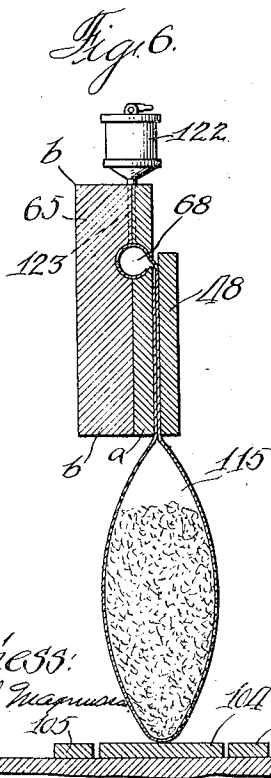
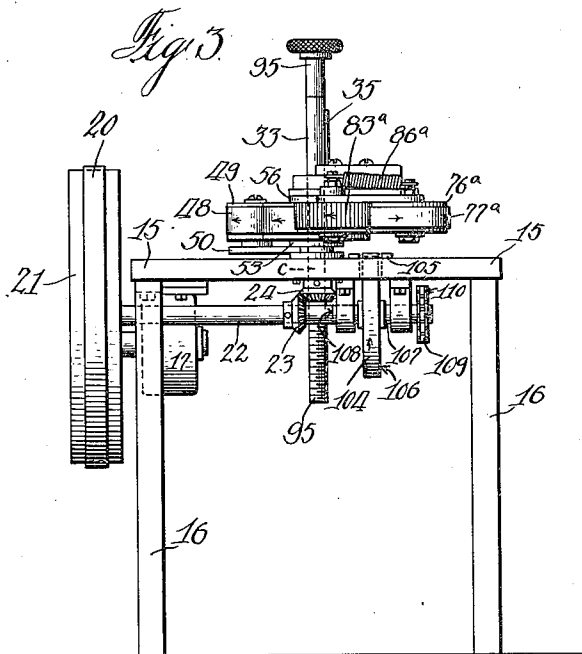
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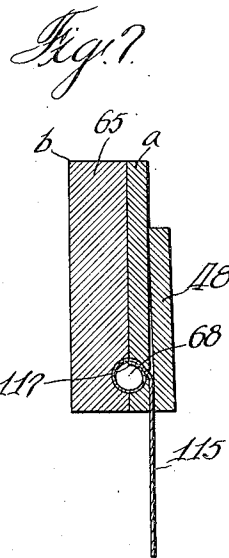
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3 Sheets-Sheet 2



Witness:

David S. Magnuson



Inventor:

Vincent Slezak

By Luther John Setty:

May 29, 1923.

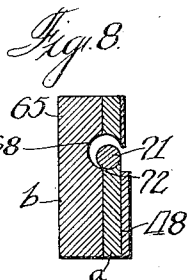
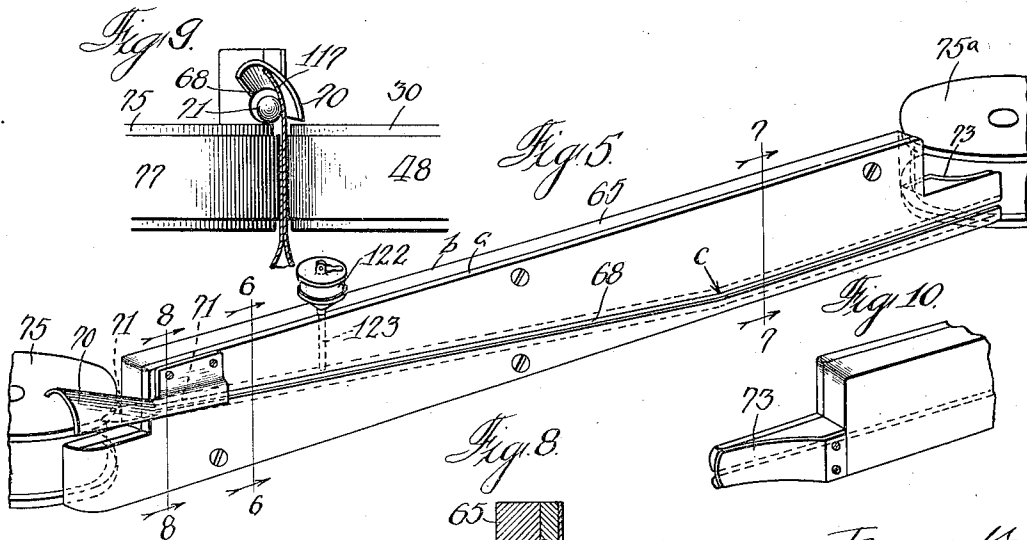
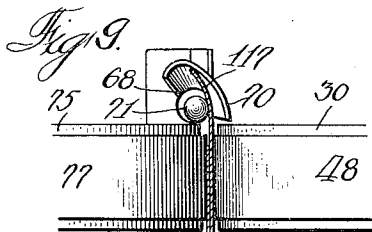
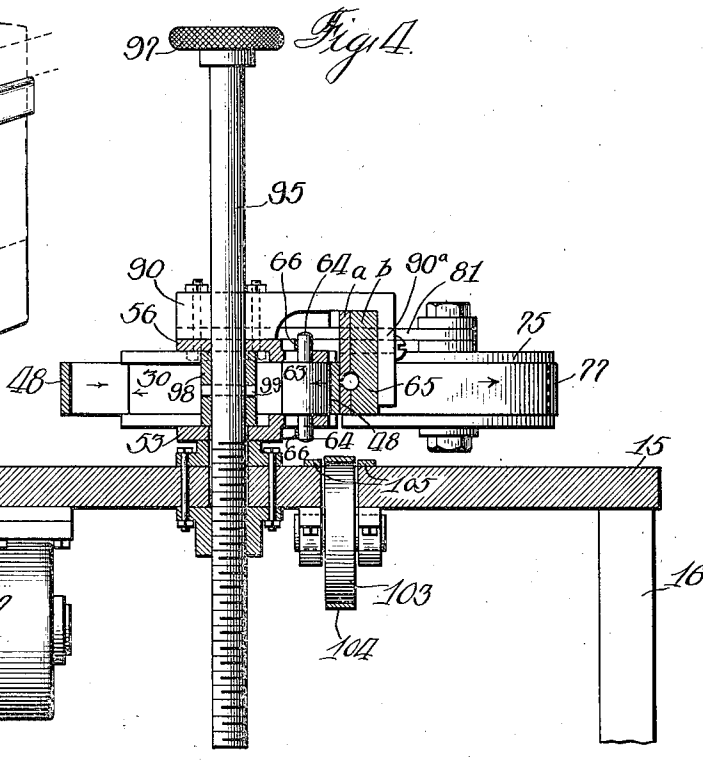
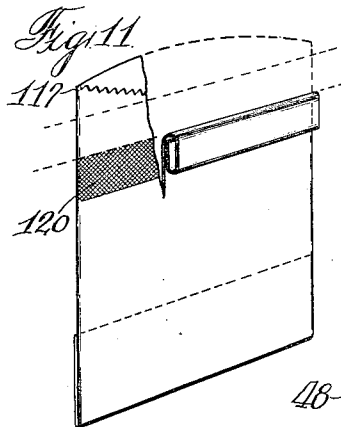
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BAG FOLDING AND SEALING DEVICE

Filed Nov. 21, 1921

3 Sheets-Sheet 3



Witness:
Dave. S. Magnusson.

Inventor:
Vincent Slezak
By Luther Johns Atty.

UNITED STATES PATENT OFFICE.

VINCENT SLEZAK, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO NICHOLAS E. FORD, OF CHICAGO, ILLINOIS.

BAG FOLDING AND SEALING DEVICE.

Application filed November 21, 1921. Serial No. 516,788.

To all whom it may concern:

Be it known that I, VINCENT SLEZAK, a citizen of the United States, residing at Chicago, Cook County, Illinois, have invented certain new and useful Bag Folding and Sealing Devices, of which the following is a specification.

The present improvements in the art mentioned have more particular reference to machines or devices for folding an open edge portion of a bag of paper or similar flexible material, and, when desired, to seal or secure the folded parts in folded position.

Its principle object is to provide simple and efficient mechanism for automatically folding such bags, or for folding and sealing them, after being positioned on the machine by the operator in an easy and convenient way.

In the accompanying drawings, which form a part of this specification, Figure 1 is a top view of a device containing these improvements in a practical and advantageous form; Fig. 2 is a side elevation of the machine of Fig. 1; Fig. 3 is a view from the left-hand end of Fig. 2; Fig. 4 is a larger and sectional view as on the line 4—4 of Fig. 1 in the direction of the arrows; Fig. 5 is a greatly enlarged perspective of the device which folds the open end of the bag, together with some associated parts; Fig. 6 is a still further enlarged and sectional view as on the line 6—6 of Fig. 5, this figure showing also a charged bag, conveyor parts, etc.; Fig. 7 is a similar sectional view as on the line 7—7 of Fig. 5, the figure showing an adjacent belt and a fragment of a bag partly in the folding groove or recess; Fig. 8 is a sectional view as on the line 8—8 of Fig. 5; Fig. 9 is a front end view of the left-hand end of Fig. 5 showing a bag about to enter the forming recess, and conveyors in fragment; Fig. 10 is a fragmentary view of the right-hand end of Fig. 5 viewed from the opposite direction; and Fig. 11 is a perspective of a bag with a portion partially broken away and folded and sealed as by the machine.

The present machine is shown as mounted on a table 15 carried by legs 16. An electric motor 17 is secured to the table and upon its armature shaft 18 is mounted a small pulley 19 carrying a belt 20 traveling upon the larger pulley 21 on the shaft 22.

This driving shaft 22 carries the beveled pinion 23 in mesh with the corresponding pinion 24 (Fig. 3), the latter being rigidly secured upon the vertical shaft 25, which shaft contains a spline 26 (Fig. 2).

A pulley 30 (Fig. 1) is splined upon the shaft 25 for adjusting movements in up-and-down directions while being carried rotatively by the shaft. The shaft 25 is mounted to rotate in a bearing 31 (Fig. 2) rigidly secured upon the table 15. A shaft 33 similar to the shaft 25 is similarly mounted to rotate in a bearing 34 and has a similar spline 35 adopted to rotate the pulley 36 while permitting up-and-down adjustments of it.

Vertical guides 38 and 39 are rigidly secured at 40 and 41 respectively to the table 15. A bar 43 (Fig. 2) having cup-shaped ends adapted to receive the free ends of the shafts 25 and 33 for rotation is secured by screws 46 to the upright rods or guides 38 and 39, thus stabilizing these guides and shafts. This tie member or bar 43 is omitted from Fig. 2 and other figures for clearness of illustration.

An endless bolt 48 (in my practice made partly of rubber and having yielding properties) passes around the pulleys 30 and 36 and is maintained taut by an idler 49 adjustably mounted on a bracket 50 having a slot 51 and bolt 52 (Fig. 1), and being carried on a longitudinal plate 53.

This plate 53 lies beneath the pulleys 30 and 36 and has holes loosely accommodating the upright shafts 25 and 33, and the two guides 38 and 39. A similar longitudinal plate 56 is positioned above the pulleys 25 and 36, and is similarly loosely mounted on the uprights 25, 33, 38 and 39 for vertical movement. The two plates 53 and 56 are held together as a rigid frame by metal spacing blocks 60, shown by dotted lines in Fig. 1, held in position by screws, and also by spacing bars 61 (Fig. 1) rigidly secured to the top and bottom plates.

From Fig. 4 it will be observed that the plates 53 and 56 accommodate between them a roller 63 having a trunnion or shaft 64 bearing in each plate. Fig. 1 shows four pairs of such rollers 63 and leaf springs 66 pressing against the upper trunnions to press the rollers, and thereby the belt 48 against the face surface of the bag or fold-

ing or forming device 65 (Fig. 4). Fig. 4 sectionally shows that such leaf springs 66 operate against the lower trunnions 64 also.

The bag-folding bar or member 65 is shown as comprising two plates *a* and *b* held rigidly together as by screws. It is made of two plates to facilitate the cutting of the long bag-engaging groove 68 therein. This groove 68 is preferably circular in cross view throughout its length and it opens into the face or bag-engaging surface of the bar 65 from one end of the groove to the other. The groove or recess 68 is at a relatively high elevation at the front end of the bar and declines to a lower elevation as at *c* and then continues in a horizontal direction to the rear end. The slant of the groove 68 has thus been specifically described in relation to other parts which are horizontally dis-

posed. At the front end of the groove 68 a flaring guide device 70 is secured by screws to the bar 65 and has the function of engaging the upper free edge portion of the bag and leading it into the slot or groove 68. The groove 68 continues to turn the bag part therein into tubular form, and to insure such tubular turning-over of the free edge portion of the bag at the beginning a short rounded-end stud or cylindrical member 71 is secured, as by brazing at 72, to the member 65 in the groove 68 (Fig. 8). It is to be noted that the round stud 71, projecting a short distance from the groove 68, is of such diameter and is so positioned in the groove as to leave free space for the bag above and well around that part of it lying in the groove. (Fig. 8.)

At the rear end of the forming bar or member 65 (see right-hand end of Fig. 5 and Fig. 10) the groove 68 is substantially closed by a leaf spring 73 which yields when the tubularly-turned part of the bag comes against it and this spring initially presses the convolutions flat, one upon the other before they have opportunity to change their rolled condition.

Mechanism carried by the upper and lower frame plates 56 and 53 is provided for assisting in carrying the bags to the forming member 65 and similar mechanism for carrying them therefrom. One description will suffice for both, and for convenience the corresponding parts at the discharge end of the machine will be distinguished by the letter *a* added to the otherwise corresponding identifying numerals.

Considering then, for description, the right-hand end of Fig. 1, the pulley 76 is rotatably mounted on a plate-like integral extension 78 of the upper longitudinal plate 56. The pulley 75 is mounted on a link 79 pivotally mounted at 80 upon the plate-like extension 81, riveted to the upper longitudinal plate 56. The endless belt 77 travels

upon these pulleys 75 and 76. The roller 83 is mounted for rotation on a link 84 pivoted at 85, upon the plate-extension 78. A coiled spring 86 draws the roller 83 against the belt 77 at the roller 76, and the coiled spring 88 draws the roller 75 and with it the belt 77 into contact with the belt 48 at the roller 30. Friction between the contacting belts 48 and 77 drives the latter.

Also carried by the upper longitudinal plate-like frame part 56 is the bag-turning or forming bar 65, which is held by a pair of brackets 90 bolted to this top plate 56, each bracket having a downwardly-extending part 90^a (Fig. 4) to which the forming member 65 is attached as by screws. The arrangement is such that the belt 48 travels parallel with and frictionally upon the face of this forming member 65, being held in close contact therewith by the spring-pressed rollers 63.

I have thus far described, among other parts, a unitary mechanism consisting of the upper and lower plates 56 and 53, the belts 48, 77 and 77^a and the pulleys carrying them, the spring-controlled rollers 83, 83^a and the forming member 65 and connected parts, this unitary mechanism being shown as mounted for up and down adjustment on upright members projecting from the table. This unitary mechanism is raised and lowered through the medium of a screw shaft 95 threaded into a nut 96 secured upon the table, the screw shaft projecting upward and having the hand wheel 97 at the top. Between the upper and lower plates 56 and 53 (Fig. 4) is a collar 98 loosely occupying the space between the plates 56 and 53 and being rigidly secured, as by the pin 99, to the shaft 95. The rotation of the shaft therefore raises or lowers the shaft bodily and the sleeve 98 carries the unitary mechanism mentioned in one direction or the other. When this mechanism is adjusted to the height desired to accommodate a bag of some particular height it may be held there by means of the thumb screws 100 (Fig. 1) passing through the spacing blocks 60 and impinging the guide rods 38 and 39.

Mounted upon the underside of the table 15 is the pulley 103 (Figs. 2 and 4) on which travels the bag-conveying endless belt 104 between a pair of guides 105 upon the table. The belt 104 passes over a pulley 106 (Figs. 2 and 3) at the discharge end of the machine. The pulley 106 is mounted upon a short shaft 107 which terminates at 108, Fig. 3, and is shown as being on the same horizontal plane as is the driving shaft 22. The shaft 107, and with it the pulley 106 is rotated by means of the chain 109 passing over the sprocket 110 on the shaft 107, this chain being driven by the sprocket 111 mounted on the driving shaft 22.

In view of the foregoing description the operation of the machine may be understood as follows:

A bag 115 (Fig. 6) partially filled with the desired quantity of roasted peanuts, seeds for planting, or any other commodity suitable for such containers, is placed upon the horizontally-traveling belt 104 which rests upon the table top and is thus maintained at a constant elevation throughout the travel of its upper part. The upper and open end portion of the bag to be sealed is placed upon the belt 104 and guided by the operator between the roller 83 and the belt 76 shown at the right-hand end of Fig. 1. The small guide 116 (Fig. 1) and the belt 77 maintain the bag upright as it progresses forward and it is then engaged by the belt 48 at the wheel 30 and is continued forward both by the action of that belt and that of the horizontal conveyor belt 104, both belts traveling at the same rate. Immediately on its passing from between the pulleys 75 and 30 the upper front end 117 of the bag (Figs. 9 and 11) is caught by the flaring guide device 70 (Fig. 9) and as the bag travels forward this device 70 bends the upper edge of the bag over and around the pin or stud 71 and conducts this bent-over end into the recess 68, and the bag part is thus started with a tubular roll as illustrated in Fig. 6. The bottom conveyor 104 as well as the belt 48, both being timed to travel at the same rate, convey the bag forward, and inasmuch as the groove 68 slants toward the bottom conveyor, or toward the path of travel of that part of the bag which is opposite the part being folded, the free edge portion of the bag is caused to roll more and more upon itself in the recess 68 until the rear end of the bag has reached the point *c* (Fig. 5), whereupon no further rolling takes place.

The bag is preferably made to continue to travel along a further distance, however, so to allow all parts of the rolled portion to adjust themselves to the desired tubular condition shown in Fig. 7, with the open end of the bag at 117 rolled around to the top and within another turn of the material.

In this tubular shape the turned part of the bag impinges the leaf spring 73, which flattens these convolutions, substantially as shown by the folded part of Fig. 11 giving the material a set in that shape. Thereupon the so-folded upper end of the bag is promptly pressed between the belt 77^a and the belt 48 at the pulleys there and is carried forward between the roller 75^a and pulley 76^a, the pressure of the springs 88^a and 86^a flattening the convolutions more tightly upon each other, and thereupon the bag is discharged.

It is probable that under some conditions it may be desirable simply to fold such bags to close the ends, without sealing them, or

with a view to sealing them by a subsequent operation; but in most instances it will be found desirable to seal, at the same time, the folded end to preserve the contents against moisture or to maintain the package closed. In my practice I first pass the bags or envelopes through a gumming machine which applies a strip of gummy material, such as glue, at 120, Fig. 11, from one side of the bag to the other. In order to moisten this substance for automatic sealing I provide the drip-water receptacle 122 (Figs. 5 and 6) with the duct 123 leading therefrom to the groove 68. The small amount of water thus allowed to drip into the groove moistens the back or outside portion of the bag from one side to the other progressively as it travels and this portion is subsequently turned into contact with the gummed portion which is on the inner surface of the bag and therefore out of contact with the walls of the groove or channel 68, thus preserving the channel from being gummed. The pressure of the rollers at the discharge end of the machine seals the bag effectively from side to side.

It should be noted that the unitary mechanism adjustably raised and lowered by the screw shaft 95 is illustrated in Figs. 1, 2, 3 and 4 at substantially its lowest position, in which case it would be possible to put into the bags only a small quantity of the commodity to be packed. Adjustment is required only for the height of the bag, the device being such as to operate equally upon bags of greater or less width.

The machine illustrated is capable of folding and sealing bags in a highly satisfactory manner at a high rate of production, being limited only by the capacity of the operator to place bags upon the belt 104.

By giving the bag a double fold a greater degree of security to the contents is obtained both from the mechanical standpoint and with respect to the exclusion of moisture in the air. This end of the bag is also thereby greatly strengthened for handling.

I contemplate as being within the scope of the invention herein set forth various changes, modifications and departures from what is specifically illustrated and described, as indicated in the appended claims

I claim:

1. In a bag-folding machine, the combination of means for carrying a bag with the edge portion to be folded in proximity to a forming member having an inclined recess therein substantially circular in cross view and opening toward the bag as it passes along said forming member, means for conducting into said recess the edge of the bag to be folded, means for holding the bag in contact with the former as the bag travels thereagainst, the inclined recess being so arranged that as the bag normally travels for-

ward, more and more of the bag edge to be folded enters the recess and is rolled tubularly therein, and means for pressing flat the tubularly-shaped portion of the bag.

2. In a bag-folding machine, the combination of a horizontally-disposed traveling conveyor on which a bag to be sealed may be placed for movement forward with the open edge of the bag to be sealed upward, a traveling belt conveyor at one side of the path of travel of the bag, a former at one side of the path of travel of the bag, said former having means for turning the bag edge over progressively as the bag travels in association with it, and means for pressing the folded portion of the bag flat.

3. In a bag-folding machine, the combination of an endless belt conveyor having its top portion horizontally disposed, traveling means associated with said conveyor for receiving a bag resting on the conveyor and holding it upright with the free edge thereof to be sealed uppermost, a former for turning the free edge of the bag over, means for guiding such free edge into association with the former, the former having provisions for turning over the free edge of the bag progressively as the bag is carried forward on the conveyor.

4. In a bag-folding machine, the combination of means for carrying a bag forward in a substantially horizontal direction with its free edge uppermost, said means including an endless belt conveyor substantially vertically disposed and adapted to press against the side of the bag in its forward travel, forming means in the path of travel of the upper edge of the bag to be folded and adapted to turn over said upper edge progressively as the bag travels.

5. In a bag-folding machine, the combination of an endless belt conveyor arranged with a portion thereof traveling horizontally and arranged to receive a bag to be sealed and carry it in a path of travel, a former in the path of travel of the free edge of the bag, said former including means for turning the edge of the bag over progressively as it travels, said means including the provision of an inclined recess adapted to receive more and more of the free edge portion of the bag as the bag travels, means for holding the bag in association with said former, means for pressing the turned portions flat, and means for automatically fastening together flattened portions of the bag.

6. In a bag-folding machine, the combination of means for carrying a bag with the free edge portion thereof to be folded moving in a given path of travel, a forming device adapted to engage such free edge portion of the bag and fold it over progressively as the bag travels, means for adjusting said former in directions toward and away from the conveyor whereby bags of

different proportions may be folded by the same machine.

7. In a bag-folding machine, the combination of means for carrying a bag in a substantially horizontal direction with its upper free edge to be folded moving in a path of travel, a former in the path of travel of the upper free edge portion of the bag, said former having a groove therein adapted to form tubularly such free edge portion of the bag progressively as the bag travels, said groove being inclined from a point at a given distance from the conveyor to a point at a less distance from the conveyor in the direction of bag travel, means for guiding the free edge portion of the bag into said recess, means for maintaining the bag in association with the former in its course of travel, and means for pressing flat the tubularly-formed free edge portion of the bag.

8. A forming device for turning over the free edge portion of a bag to be folded comprising a bar having a recess therein which is substantially circular in cross view, said recess opening from end to end into the face surface of the former whereby a bag may travel alongside the former from end to end against said face surface with a free edge portion of the bag extending into said recess, said former being inclined with respect to the bag-carrying means whereby the recess approaches the carrying means in the direction of bag travel.

9. The combination with a bag-folding device having a recess adapted to turn the free edge of a bag into tubular form, of a flaring guide adapted to engage an advancing free edge portion of a bag to be folded and bend it over and lead it into said recess, and means associated with the guide for providing that the free edge portion of the bag shall turn into tubular form at the beginning of the operation.

10. A bag-forming device having a recess therein substantially circular in cross view, the recess opening throughout its length into an outer surface of the former, a guide device at the front end of the former at the beginning of said recess formed to engage the free edge of a bag to be folded and conduct it to said recess, a cylindrical member extending from the recess and spaced therefrom where the recess opens into said outer surface whereby the free edge of a bag may extend through the opening of the recess and partially around said member at the beginning of the recess.

11. In a bag-folding machine, the combination of a horizontally-disposed conveyor adapted to receive a bag and carry it with its upper edge to be sealed moving in a substantially horizontal path of travel, a former extending alongside of the path of travel of the upper portion of the bag, the former having a groove inclined downwardly from

a forward portion to a more rearward portion of the former, the groove being substantially circular in cross view and opening into the surface of the former from end to end of the groove adjacent to the path of travel of the bag, means for holding the upper edge portions of the bag in engagement with the former as the bag travels, and means for adjusting the former in vertical directions.

12. In a bag-folding machine, the combination of means for carrying a bag in a given path of travel with the free edge thereof to be folded extending in a direction away from the carrier, traveling belts opposed to each other at two places in the path of travel for holding the bag upright, means in the path of travel of the free edge portion of the bag for turning such free edge portion over progressively as the bag travels, and means for sealing the turned-over edge portions of the bag.

13. In a bag-folding machine, the combination of means for carrying a bag whereby the bag has a free edge portion to be folded moving in a path of travel, a former in the path of travel of such free edge portion and adapted to fold such portion over progressively as the bag travels, means for applying a substance to the bag progressively for sealing the turned-over portions as the bag

travels, a traveling belt arranged to hold the bag upright during its travel, spring-pressed rollers for holding said belt in contact with the bag as it travels, and means for pressing the turned-over portions of the bag one upon the other for flattening and sealing the same.

14. The combination of an endless belt conveyor having its upper part horizontally disposed and adapted to receive a bag to be sealed with the free edge portion of the bag uppermost, means including an endless belt for holding the bag upright until it substantially reaches a former, a former in the path of travel of the upper edge portion of the bag, said former having a forming groove opening to a side surface of the former, means for leading the free edge portion of the bag in said groove, said former extending longitudinally in the direction of the conveyor and being so positioned that the bag is in association with the former as it travels in the conveyor, the groove in said former being inclined downwardly from a forward portion to a more rearward portion of the former, endless belt means for holding the bag in association with the former as it travels, and means for adjustably varying the distance between the former and the horizontal conveyor to accommodate bags of different dimensions.

VINCENT SLEZAK.