

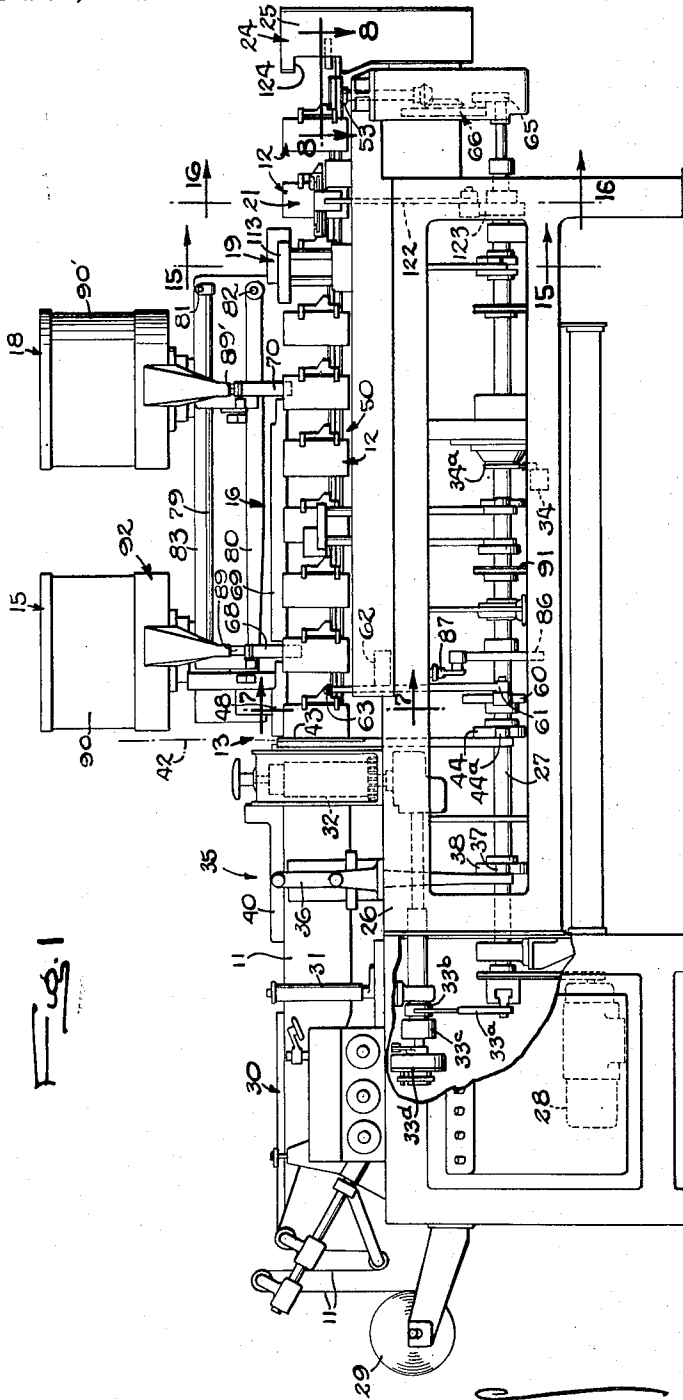
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 1



INVENTOR

Harold L. Bartelt

By Carlem, Pitzner, Hunsand & Wolfe  
ATTORNEYS

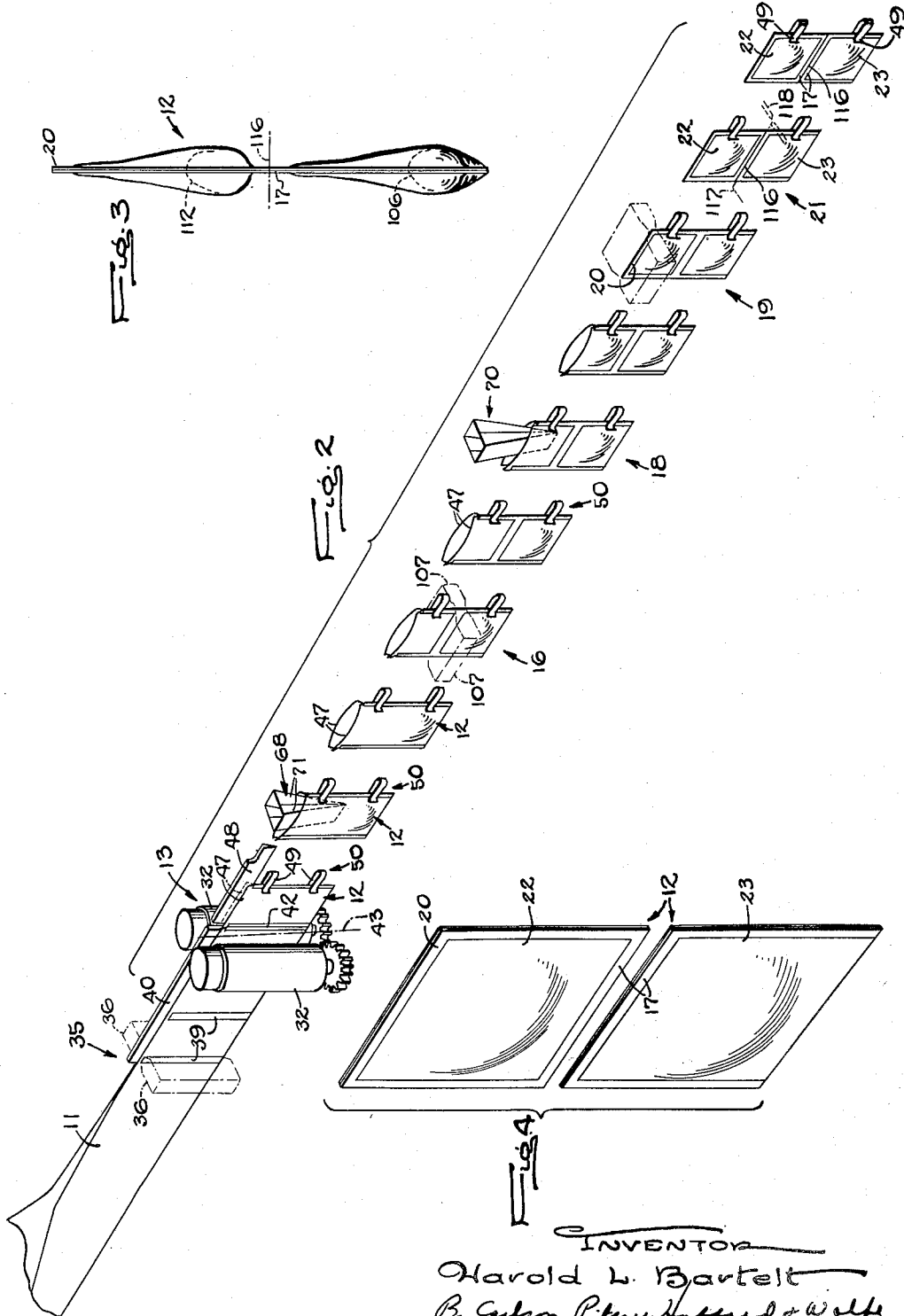
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets—Sheet 2



INVENTOR  
 Harold L. Bartelt  
 By Carlson, Pitney, Husted & Wolfe  
 ATTORNEYS

Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 3

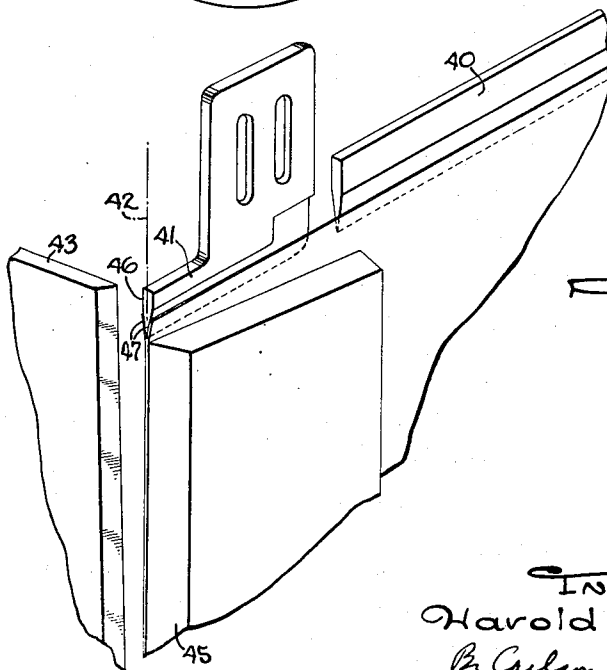
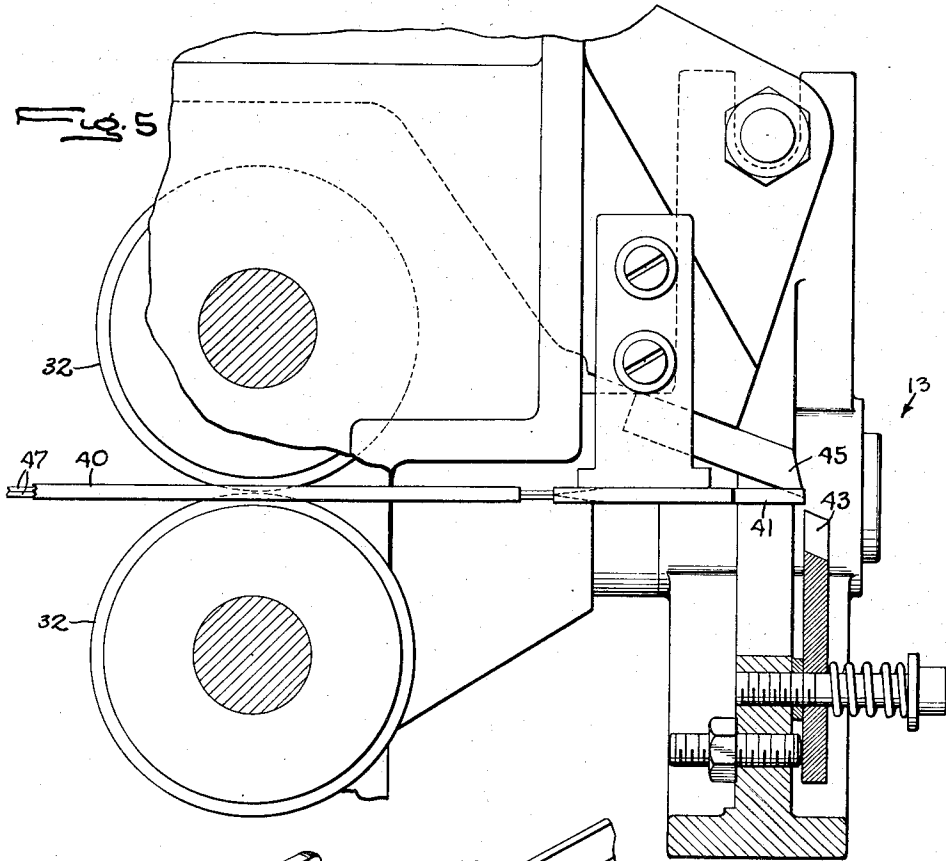


Fig. 6

INVENTOR  
Harold L. Bartelt  
By Carlen, Pitzner, Husband & Wolfe  
ATTORNEYS

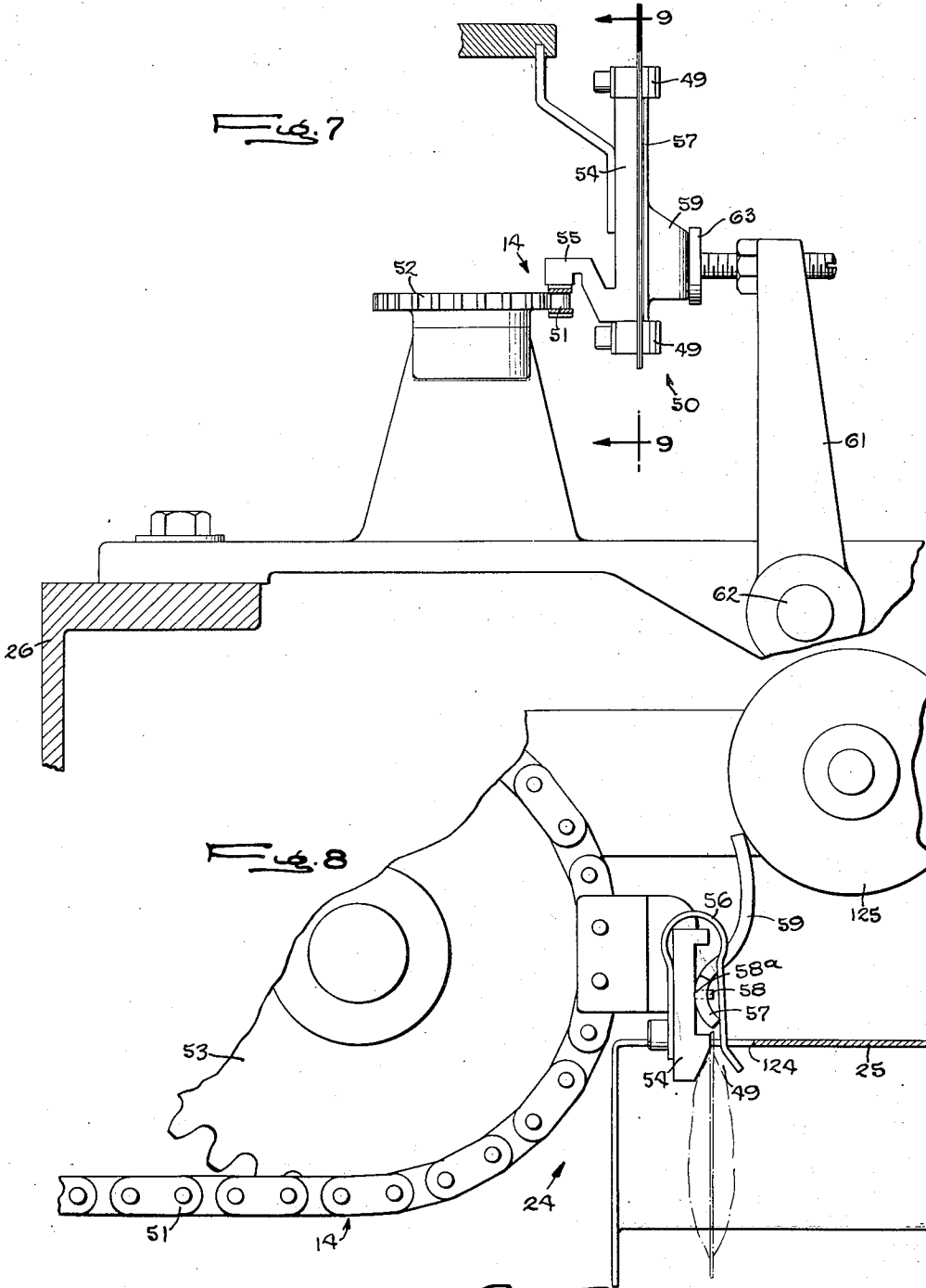
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 4



INVENTOR  
Harold L. Bartelt  
By *Carlson, Pitman, Hunsicker & Wolfe*  
ATTORNEYS

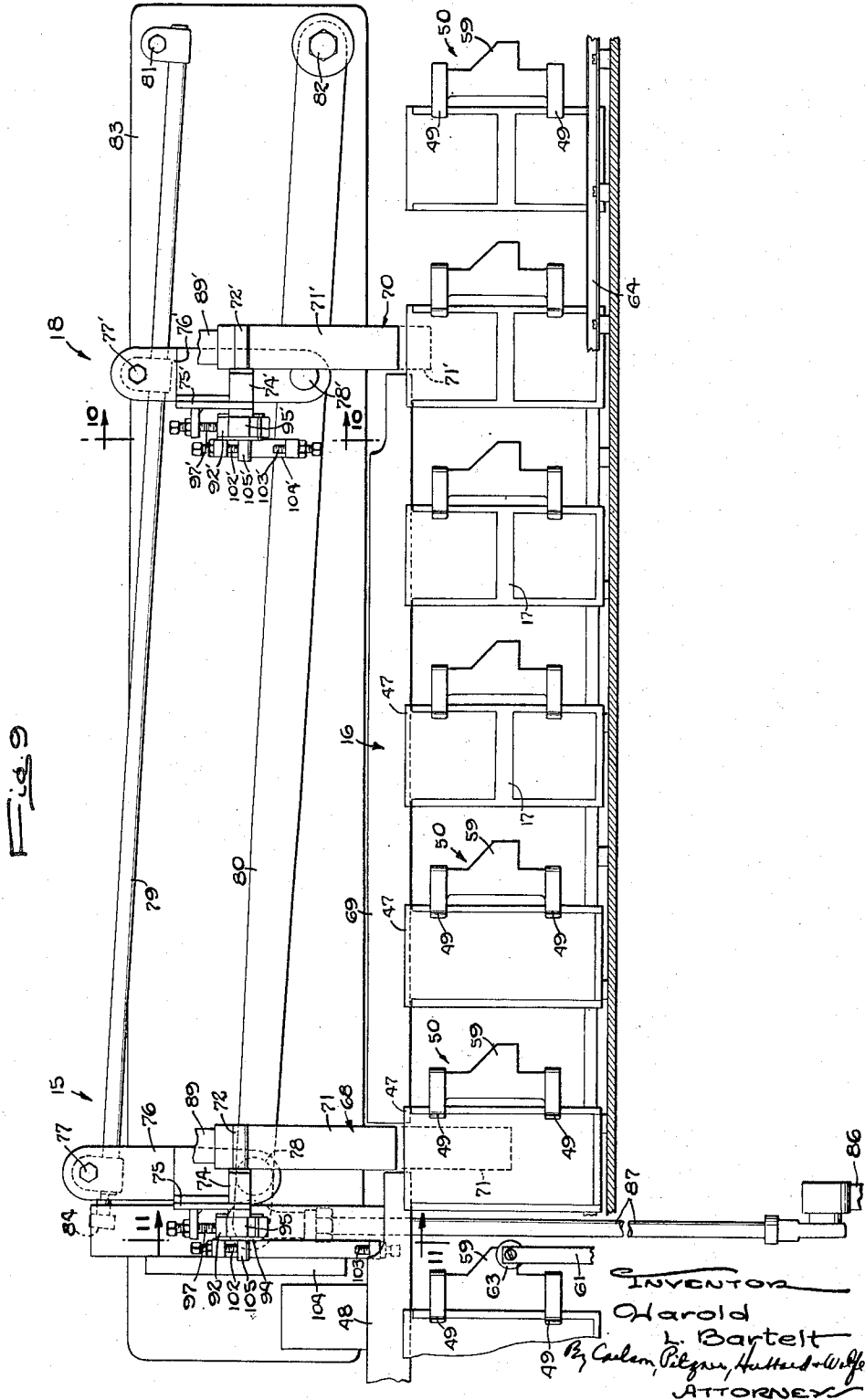
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 5



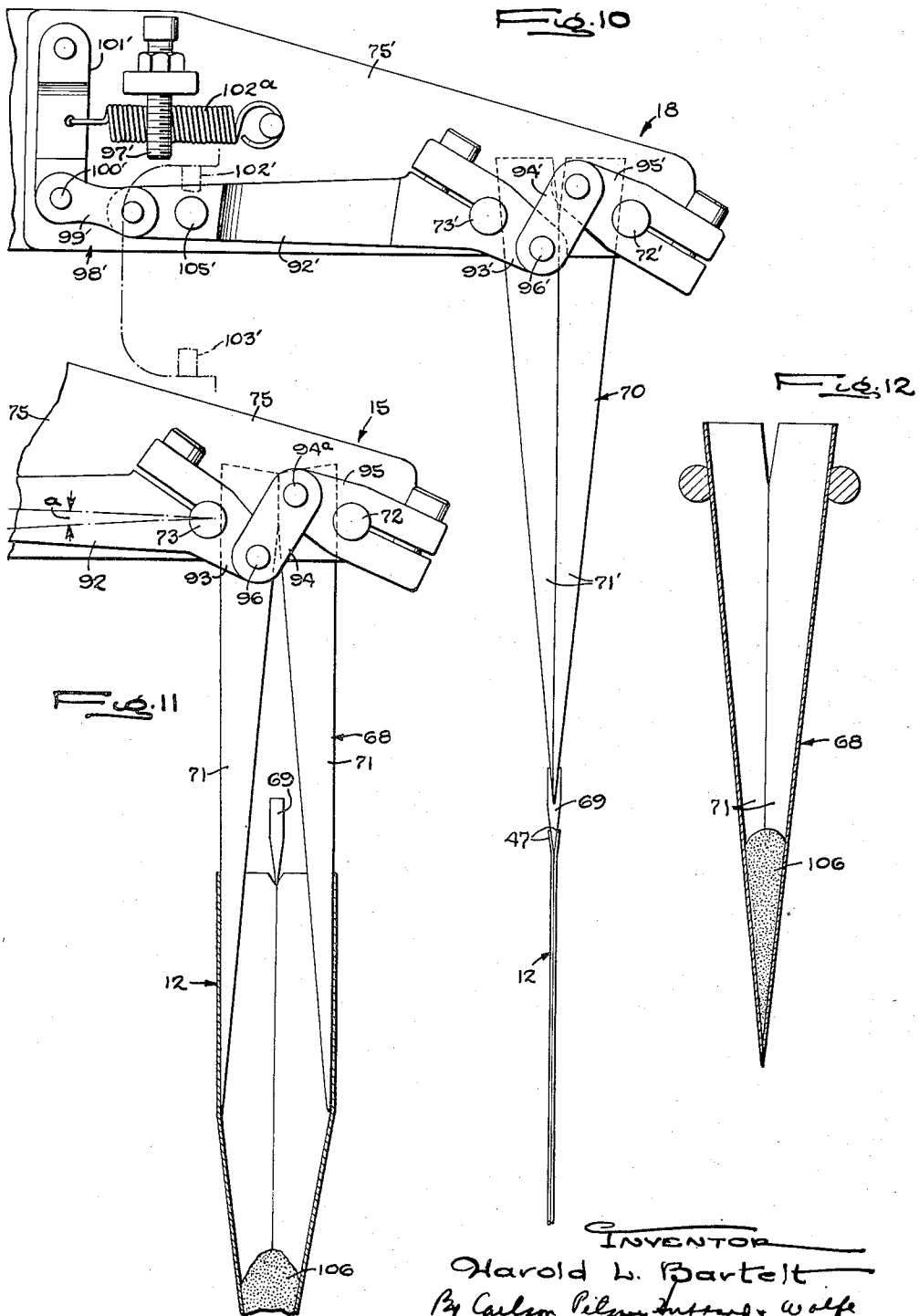
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 6



INVENTOR  
Harold L. Bartelt  
By Carlson, Pelgrum, Furrer & Wolfe  
ATTORNEYS

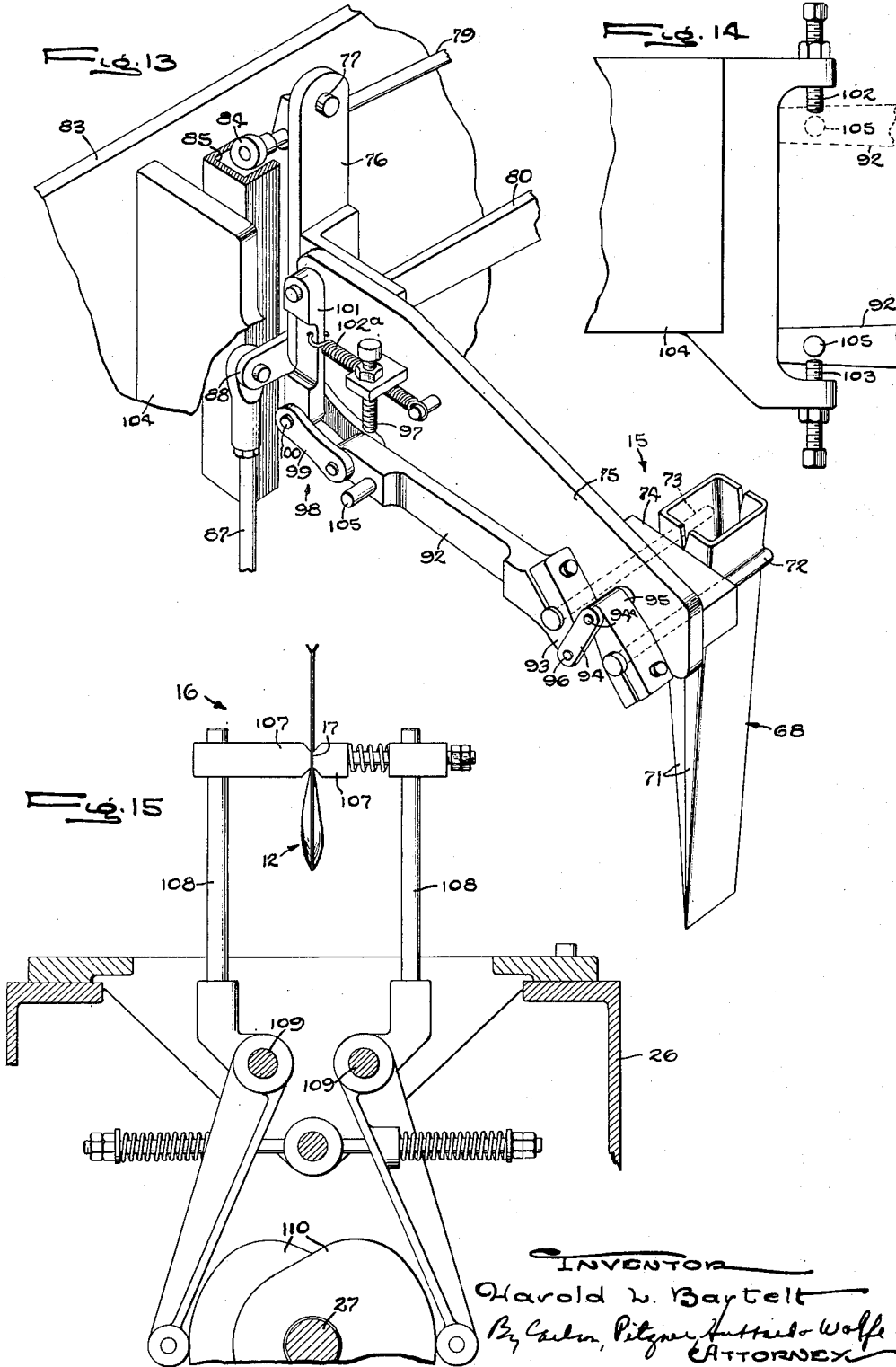
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 7



INVENTOR  
Harold W. Bartelt  
By *Carlson, Pitman, Furrer & Wolfe*  
ATTORNEYS

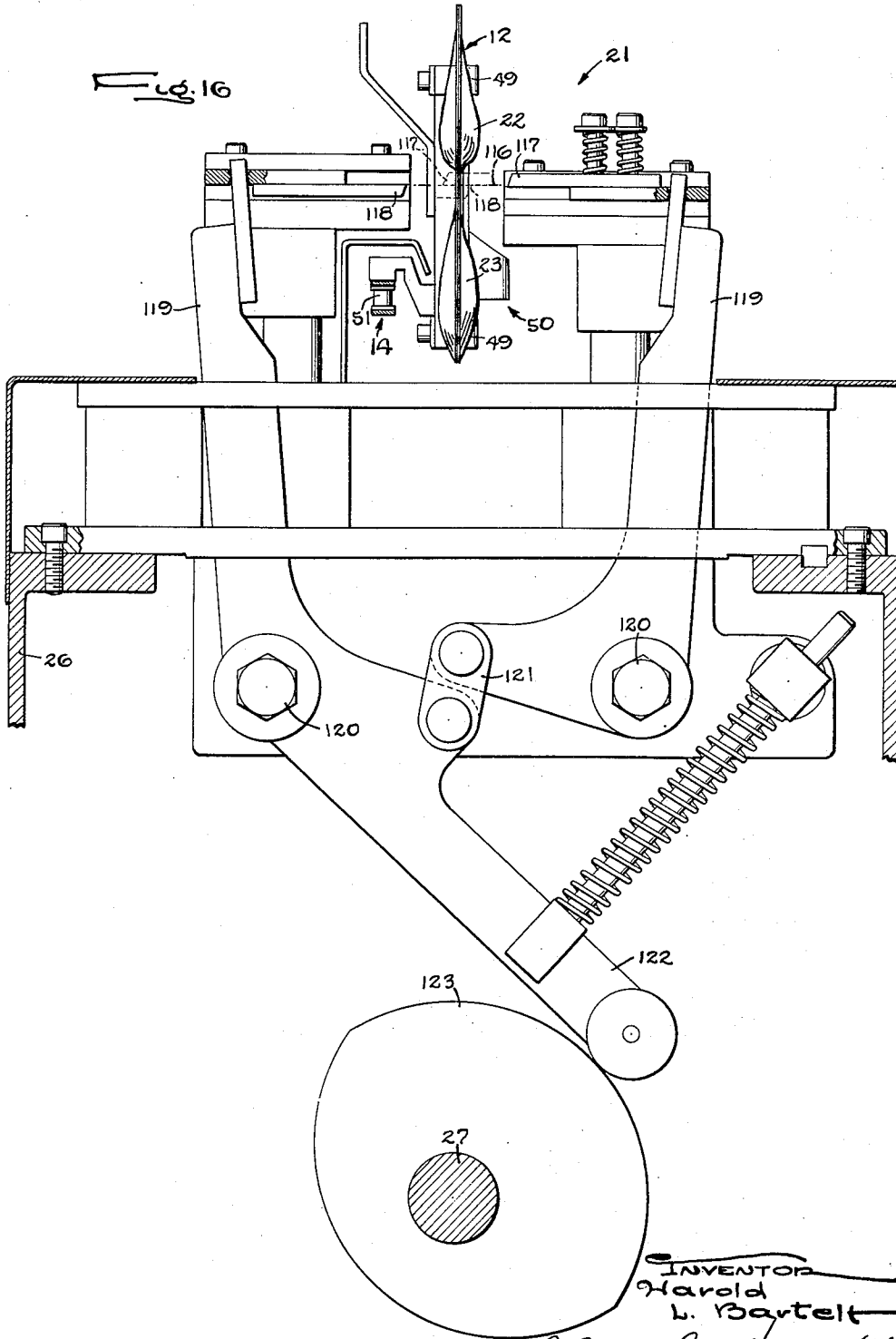
Aug. 25, 1953

H. L. BARTELT  
PACKAGING MACHINE

2,649,673

Filed April 23, 1952

8 Sheets-Sheet 8



INVENTOR  
Harold  
L. Bartelt  
By Carlson, Peterson, Huttar & Wolfe  
ATTORNEYS



# UNITED STATES PATENT OFFICE

2,649,673

## PACKAGING MACHINE

Harold L. Bartelt, Rockford, Ill., assignor of forty-five per cent to Donald E. Bartelt

Application April 23, 1952, Serial No. 283,962

5 Claims. (Cl. 53—86)

1

This invention relates to packaging machines of the general type disclosed in my copending application Serial No. 98,660, filed June 13, 1949, for converting strip material into a row of spaced bags supported open end up and advanced step by step to present each bag successively to and dwell the same in a station at which a charge of material is deposited in the bag and a subsequent station at which the bag is closed by a seal. One object is to substantially increase the production capacity of a machine of the above character without correspondingly increasing the cost or complexity of the machine.

A more detailed object is to increase the height of the bags formed from the strip material and deposit charges of material into the upper and lower half portions of each bag in separate filling operations between which these portions are separated by a cross-seal which is later severed intermediate its edges to separate the filled and sealed packages.

A further object is to provide novel mechanisms for handling the bags to insure proper opening when presented to the fillers, full and accurate closure, and sealing thereof so as to form neat rectangular packages.

The invention also resides in the novel and simple character of the bag spreading mechanism and the grippers for holding the bags properly positioned throughout their advance.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

Figure 1 is a front elevational view of the improved machine.

Fig. 2 is a fragmentary perspective illustrating the steps in the formation of the bag.

Fig. 3 is a side view of the double bag before separation of the parts.

Fig. 4 is a perspective view of the finished pair of bags.

Fig. 5 is a fragmentary plan view of the feed rolls and the cut-off station with certain parts broken away and shown in section.

Fig. 6 is a fragmentary perspective view of the strip severing mechanism.

Figs. 7 and 8 are fragmentary sections taken respectively along the lines 7—7 and 8—8 of Fig. 1.

Fig. 9 is a fragmentary sectional view taken along the line 9—9 of Fig. 7 and showing the filling station in elevation.

Figs. 10 and 11 are fragmentary cross sections taken along the lines 10—10 and 11—11 of Fig. 9

2

showing the filling spout in different positions.

Fig. 12 is a fragmentary sectional view similar to Fig. 11 showing another position of the filling spout.

Fig. 13 is a fragmentary perspective view of the mechanism for actuating the filling spout.

Fig. 14 is a fragmentary view of the stops for actuating the filling spout.

Figs. 15 and 16 are fragmentary sections taken respectively along the lines 15—15 and 16—16 of Fig. 1.

Generally stated, the improved packaging machine comprises a mechanism for converting a flexible strip 11 of heat sealable wall material into a succession of bags 12 delivered one by one at a loading station 13 to a carrier 14 for gripping and supporting the bags in spaced relation open end up and advancing the same edgewise step by step through a filling station 15, a station 16 at which a horizontal seal 17 is formed across the center of the bag, a second filling station 18, a closing station 19 where a top seal 20 is formed, and a cut-off station 21 where the cross seal 17 is severed intermediate its edges to divide the bag into separate sealed packages 22 and 23 containing the charges of material deposited therein at the respective filling stations. Finally, the separated packages, while still attached to the carrier, are moved to an unloading position 24 (Fig. 1) where they are released from the carrier into a chute 25 and directed into a storage receptacle.

The various mechanisms for operating on the strip 11 and the bags 12 are mounted on an elongated horizontal frame 26 and operated in timed relation to each other from a horizontal camshaft 27 driven continuously by a motor 28 through a suitable speed reducer. As disclosed more fully in the aforesaid application, the strip 11, as unwound from a supply roll 29, is folded along its longitudinal center line by a suitable former 30 and flattened between rolls 31 as it is led along a guideway and in between two feed rolls 32 that grip opposite walls of the folded strip. Through suitable mechanism driven by the motor 28, the feed rolls 32 are turned periodically to advance the folded strip edgewise in increments equal to the width of the bags to be formed. The actuating mechanism may be of the type forming the subject matter of an application of Kenneth R. Johnson, Serial No. 261,226, filed December 12, 1951, said mechanism including a yieldable link 33<sup>a</sup> (Fig. 1), a crank 33<sup>b</sup>, a one way clutch 33<sup>c</sup> and a magnetic brake 33<sup>d</sup> and operating in cycles timed by a switch 34 actuated by a cam 34<sup>a</sup> on the shaft 27.

At a station 35 which may be in advance of the rolls 32, the folded strip passes between shoes 36 one heated to a sealing temperature and one movable with a follower 37 actuated by a cam 38 during dwelling of the strip to form a cross seal 39. The upper end of the latter stops short of the edges of the folded strip leaving edge portions 47 which are split and held apart by a bar 40 of V-shaped cross section. The latter and an extension 41 thereof (see Fig. 6) terminate beyond the rolls 32 at a line 42 of cut-off at which a knife 43 carried by a follower 44<sup>a</sup> and actuated by a cam 44 moves transversely of the strip and coacts with a backing blade 45 and the end 46 of the stripper to sever the edge portions 47 and the seal 39 intermediate its edges and thus separate the leading pocket from the remainder of the strip to form one bag 12. At this time, the bag is disposed in the loading position 13 above referred to and the edge portions 47 are held apart by a splitter blade 48.

In each advance of the folded strip, the leading edge thereof formed by the previous cut-off operation is received between the vertically spaced jaws 49 of a gripper 50 then dwelling in the loading position 13. A series of the grippers are equally spaced along an endless chain 51 extending around sprockets 52 and 53 to form the carrier 14 above referred to, the sprockets being mounted on the frame 26 and disposed in a horizontal plane. As best shown in Figs. 7 and 8, the fixed jaws 49 of each gripper are formed by a flange on an upright plate 54 having an arm 55 secured rigidly to the chain 51. A U-shaped spring 56 straddles and is bolted to the plate 54 and one leg thereof forms the movable jaw of the pair. A bar 57 of curved cross section lying alongside the plate 54 is suitably positioned by pins 58 and cooperates with an arm 59 to form a lever tiltable about a fulcrum 58<sup>a</sup> to separate both of the spring jaws 49 from the fixed jaws when the arm is pressed inwardly toward the plate as shown in Figs. 7 and 8. The spring jaws are located and spaced apart vertically to engage the leading edge of the bag about midway between the upper and lower half portions by which the two packages are formed.

As each of the grippers reaches the loading position preparatory to receiving the leading end of the folded and cross-sealed strip in the next advance of the feed rolls, a cam 60 (Fig. 1) acts on a follower lever 61 to rock the latter about a fulcrum 62 and move the end 63 (Fig. 7) thereof toward and against the arm 59 of the gripper at the loading station thus opening the latter as shown in Fig. 7. In the next advance of the folded strip, the leading and sealed edge of the strip is advanced in between the open jaws 49 of the gripper and the latter is allowed to close by the cam 60 just before the leading bag is cut off from the end of the strip by the action of the cam 44 as described above. The bag is gripped at widely spaced points and firmly held in upright position above a horizontal guide rail 64.

Through a suitable mechanism which may include a crank 65 (Fig. 1) on the shaft 27 and a Geneva movement 66, the sprocket 53 may be turned intermittently to advance the chain 51 through steps equal in length to the spacing of the grippers 50. Each movement occurs during a dwell of the folded strip 11 so that during each advance of the chain, the last bag to be cut off from the strip is carried out of the loading station 13 and a new gripper is moved around the

sprocket 52 and opened in readiness to receive the end of the folded strip in the next advance of the latter. Since the upper edge portions 47 of the strip are held apart adjacent the cut-off line 42 by the bar 41, these portions remain separated after cut-off and, in the next advance of the folded strip are transferred into straddling engagement with opposite sides of the blade 48 whose end is disposed close to the cut-off line and tapered somewhat to enter properly between the edge portions 47 as the end of the folded strip is advanced.

In the first step of advance of the bag out of the loading position, the upper open end is presented to the first filling station 15 beneath a filling spout 68 which is disposed in an opening between the end of the splitter blade 48 and a similar blade 69 mounted on the machine frame and engaging the edge portions 47 all the way to the second filling station 18. In the present instance the latter is spaced four steps ahead of the first filler 15 and includes a spout 70 disposed at the end of the blade 69.

Preferably, the two spouts 68 and 70 are of the so-called clam-shell type adapted to receive successive charges of the material to be packaged and mounted for vertical movement into and out of the bag during which the spouts are respectively opened and closed. Referring now to Figs. 9, 11, 12 and 13, the spout 68 comprises two clam-shell buckets 71 of channel cross section gradually tapering downwardly to a point and opening toward each other to form a closed and relatively elongated receptacle when the flanges abut each other as shown in Figs. 12 and 13. Near their upper ends the buckets are welded or otherwise secured to parallel rockshafts 72 and 73 projecting through and journaled in a block 74 on the end of an arm 75 which projects forwardly from a link 76. The upper and lower ends of the latter are joined through pivots 77 and 78 to the free ends of elongated parallel arms and 79 and 80 which extend longitudinally of the machine between the two filling stations and are fulcrumed at 81 and 82 on an upright frame plate 83 beyond the second filling station 18. A roller 84 on the end of the arm 79 (Fig. 13) rides in a channel 85 on the plate to guide the arms and maintain the lower end of the spout 68 when closed in the plane of the bag dwell in the filling station 15.

The arms 79 and 80 move downwardly by gravity and are raised by a cam 86 acting on the roller of a follower link 87 pivotally connected at its upper end to a lug 88 on the spout carrying arm 75. In the upper position of the arms 79 and 80, the lower or sharpened end of the spout 68 is disposed as shown in full in Fig. 9 slightly above the upper open end of the bag dwelling in the station 15 with its edge portions 47 held apart by the bars 48 and 69. As the spout is lowered, the lower end of the spout enters between the bag portions 47 and the bag walls to separate the latter.

In the upper position of the spout, the upper open end is disposed immediately below and alined with the lower end of a tube 89 by which the charges of material to be packaged are delivered into the spout. The material is stored in a hopper 90 and by suitable mechanism indicated generally at 92 and of well known construction is measured out and delivered to the tube periodically and in timed relation to the movements of the spout. Proper timing is

5

achieved by driving the filler mechanism from a part 91 on the camshaft 27.

Means is provided for opening the spout 68 after entry into the bag at the filling station and closing the spout as it is retracted from the bag. In the present instance, this means utilizes the up and down motions of the spout support and preferably operates with an over-center action so that the spout is held either open or closed during its movements into and out of the bag. For this purpose, an elongated lever 92 lies alongside the spout support 75 and near its forward end is secured to the rockshaft 73 which forms the lever fulcrum. The outer short end 93 of the lever is pivotally connected at 96 to one end of a link 94 inclined upwardly and across the dividing line between the buckets 71 and pivoted at 94<sup>a</sup> to the free end of a crank 95 fast on the other rockshaft 72 and of a length equal to that of the arm 93. By rocking the lever 92 vertically through a small angle  $\alpha$ , the rockshafts 72 and 73 and the buckets 71 will be swung between the open and closed positions shown in Figs. 11 and 12. The spout closing movement is limited by engagement of the bucket edges while the stop 97 engages the lever 92 to determine the extent of the opening movement.

To open and close the buckets 71 with a snap or over-center action, the rear end portion of the lever 92 constitutes one link of a toggle 98 including a second link 99 pivotally connected at 100 to the lever and at its other end to the end of an arm 101 pivotally suspended from the support 75. A contractile spring 102 acts on the arm 101 to hold the toggle flexed with the spout 68 either open or closed. Flexing of the toggle links 92, 99 past dead center position is effected by opposed stops 102 and 103 adjustably mounted in vertically spaced relation on a projection 104 extending forwardly from the plate 83. Near the upper limit of the retracting movement of the spout 68, a pin 105 on the lever 92 encounters the stop 102 thus causing the lever to be swung downwardly relative to the arms 75 and past the dead center position in the final retracting movement of the spout. Thereupon the lever is swung downwardly on over-center as shown in phantom in Fig. 14 until the buckets 71 come into full engagement at their adjacent edges as shown in Fig. 12. In a similar way, the stop 103 blocks the movement of the pin 105 as the arms 79, 80 are swinging downwardly to lower the spout 68 into the bag, the toggle links being flexed upwardly and then moved over-center as shown in full in Fig. 14 to a position against the stop 97. The spout is thus opened allowing the charge 106 of material carried thereby as shown in Fig. 12 to fall by gravity into the bag as shown in Fig. 11.

The spout 70 at the second filling station 18 is constructed, mounted, and actuated in the same manner as the spout 68 and the parts thereof are indicated by the same but primed reference numerals. Since the link 76' is secured to the arms 79 and 80 closer to the fulcrums 81 and 82, the spout 70 is moved through a correspondingly shorter distance and therefore enters the open end of the bag to a point above the cross seal 17. Thus, the spout moves up and down between the positions shown in full and dotted outline in Fig. 9 and receives successive charges of material from the hopper 99' the same as the spout first described.

After the second advance of the bag after receiving the charge 106 at the station 15, the bag dwells in the station 16 at which the cross seal

6

17 is formed by momentary compression of the center part between heated shoes 107 mounted as shown in Fig. 15 on the upper ends of levers 108 fulcrumed intermediate their ends at 109 with the lower ends bearing against cams 110 on the shaft 27. The lower half portion of the bag is sealed closed thus isolating the charge 106 of material therein.

After the second advance of the bag following formation of the seal 17, the bag dwells in the second filling station 18 where the spout 70 is as described above lowered to a point above the seal and opened to deliver a second charge 112 of material into the upper half portion of the bag. As before, the spout is retracted out of the bag and closed before the next advance of the bag carrier.

The bag containing the two charges 106 and 112 is then advanced to the station 19 at which heated shoes 113 are constructed and mounted in the same manner as the shoes 107 are pressed together into engagement with the upper end portions of the bag by the action of a cam 114 on followers 115. The top seal 20 thus formed overlaps the previously unsealed edge portions 47 so that the upper compartment of the bag containing the charge 112 is closed.

At the subsequent dwell position of the bag, the upper and lower portions containing the charges 106 and 112 are separated from each other by severing the seal 17 intermediate its edges and along a horizontal line 116. This is accomplished by knife blades 117 and 118 (Fig. 14) movable horizontally past each other from the positions shown in full to those shown in phantom. The blades are mounted on the upper ends of levers 119 fulcrumed at 120 and interconnected by a link 121. A follower 122 rigid with one of the levers rides the periphery of a cam 123 and is moved thereby to advance and retract the knives 117 and 118 while the bag is dwelling in the station 21.

The packages thus separated and containing the charges 106 and 112 are separated from each other but remain held by the two clamps in vertically spaced relation. In the next advance of the chain carrier, the two packages move through a side opening 124 in the chute 25 at which time the arm 59 of the clamps engages a roller 125 and is pressed inwardly thereby in the continued advance of the carrier. The clamping jaws 49 are thus separated as shown in Fig. 8 thus releasing the two packages and allowing the same to fall off from the carrier and down through the chute. After passing out of engagement with the roller 125, the jaws 49 close together and are carried along the other run of the chain 50 back toward the loading position.

From the foregoing, it will be apparent that the production capacity of the former machine has been doubled simply by increasing the width of the folded strip 11 and by adding the sealing station 16, the second filling station 18, and the cutting station 21. The added mechanisms are actuated and properly timed from the camshaft 27 so that the increase in capacity is large as compared to the increased cost of the machine.

The mechanism for raising and lowering the dispensing spouts 68 and 70 forms the subject matter of a co-pending application of Charles B. Harker, Serial No. 311,905, filed September 27, 1952.

The mechanism for opening and closing the spouts constitutes the subject matter of a co-pending application of Charles B. Harker, Serial No. 313,145, filed October 4, 1952.

I claim as my invention:

1. A packaging machine, having in combination, means for supporting a row of spaced bags open end up and advancing the bags step by step to present each bag to and dwell the same in a plurality of positions uniformly spaced along the path of travel of the bags, mechanism disposed at one of said positions to deposit in the bag at such position a charge of material partially filling the lower half portion of the bag, means operable on the bag dwelling in a succeeding position to seal the bag closed along a line disposed between the top and bottom edges and above the level of the material in the bag, filling mechanism operable to deposit into the bag dwelling in a subsequent one of said positions a charge of material partially filling the remaining upper part of the bag, means at a subsequent position to form a seal across the open end of the bag, and mechanism at a subsequent position to divide the bag into two separate parts along a line intermediate the edges of said cross seal whereby to preserve the seal at the upper end of the lower bag portion and at the lower end of the upper bag portion.

2. A packaging machine having, in combination, a plurality of gripping devices each comprising vertically spaced horizontally opening clamps adapted to receive and grip the upper and lower portions of one edge of a bag whereby to support the bag open end up, means for supporting said devices and advancing the same as a group step by step to present the bag carried by each device successively to a loading position, a filling station, a cross-sealing station, a second filling station, a top sealing station, a cut-off position, and an unloading position, means operable in timed relation to the advance of said devices to open each device dwelling in said loading position, close the device before the end of such dwelling, and then open the device during dwelling thereof in said unloading position, mechanisms at said stations for depositing a charge of material into the bottom of the bag, cross-sealing the bag above such material, depositing a second charge of material into the bag above the cross-seal, and sealing the top of the bag, a cutter at said cut-off station including elements engageable with the full width of the bag along a line disposed between said clamps and the edges of the cross-seal of the bag, and mechanism operable during dwelling of the bag in said cross-sealing position to actuate said elements and cut the bag into two parts.

3. A packaging machine having, in combination, a plurality of gripping devices each comprising vertically spaced horizontally opening clamps adapted to receive and grip the upper and

lower portions of one edge of a bag whereby to support the bag open end up, means for supporting said devices and advancing the same as a group step by step to present the bag carried by each device successively to a loading position, a filling station, a cross-sealing station, a second filling station, and a top sealing station, means operable in timed relation to the advance of said devices to open each device dwelling in said loading position and close the device before the end of such dwelling, and mechanisms at said stations for depositing a charge of material into the bottom of the bag, cross-sealing the bag above such material, depositing a second charge of material into the bag above the cross-seal, and sealing the top of the bag.

4. A packaging machine, having in combination, means for supporting a row of spaced bags open end up and advancing the bags step by step to present each bag to and dwell the same in a plurality of positions uniformly spaced along the path of travel of the bags, mechanism disposed at one of said positions to deposit in the bag at such position a charge of material partially filling the lower half portion of the bag, means operable on the bag dwelling in a succeeding position to seal the bag closed along a line disposed between the top and bottom edges and above the level of the material in the bag, filling mechanism operable to deposit into the bag dwelling in a subsequent one of said positions a charge of material partially filling the remaining upper part of the bag, and means at a subsequent position operable to form a seal across the open end of the bag.

5. A packaging machine, having in combination, means for supporting a row of bags open end up and advancing the bags along a predetermined path, mechanism acting successively on each bag during its progress along said path to deposit a charge of material partially filling the lower half portion of the bag, to seal the bag closed along a line disposed between the top and bottom of the bag, to deposit a charge of material partially filling the remaining upper part of the bag, and to form a seal across the open end of the bag, and mechanism at a subsequent position of the bag along said path to divide the bag into two separate parts along a line intermediate the edges of said cross seal whereby to preserve the seal at the upper end of the lower bag portion and at the lower end of the upper bag portion.

HAROLD L. BARTELT.

No references cited.