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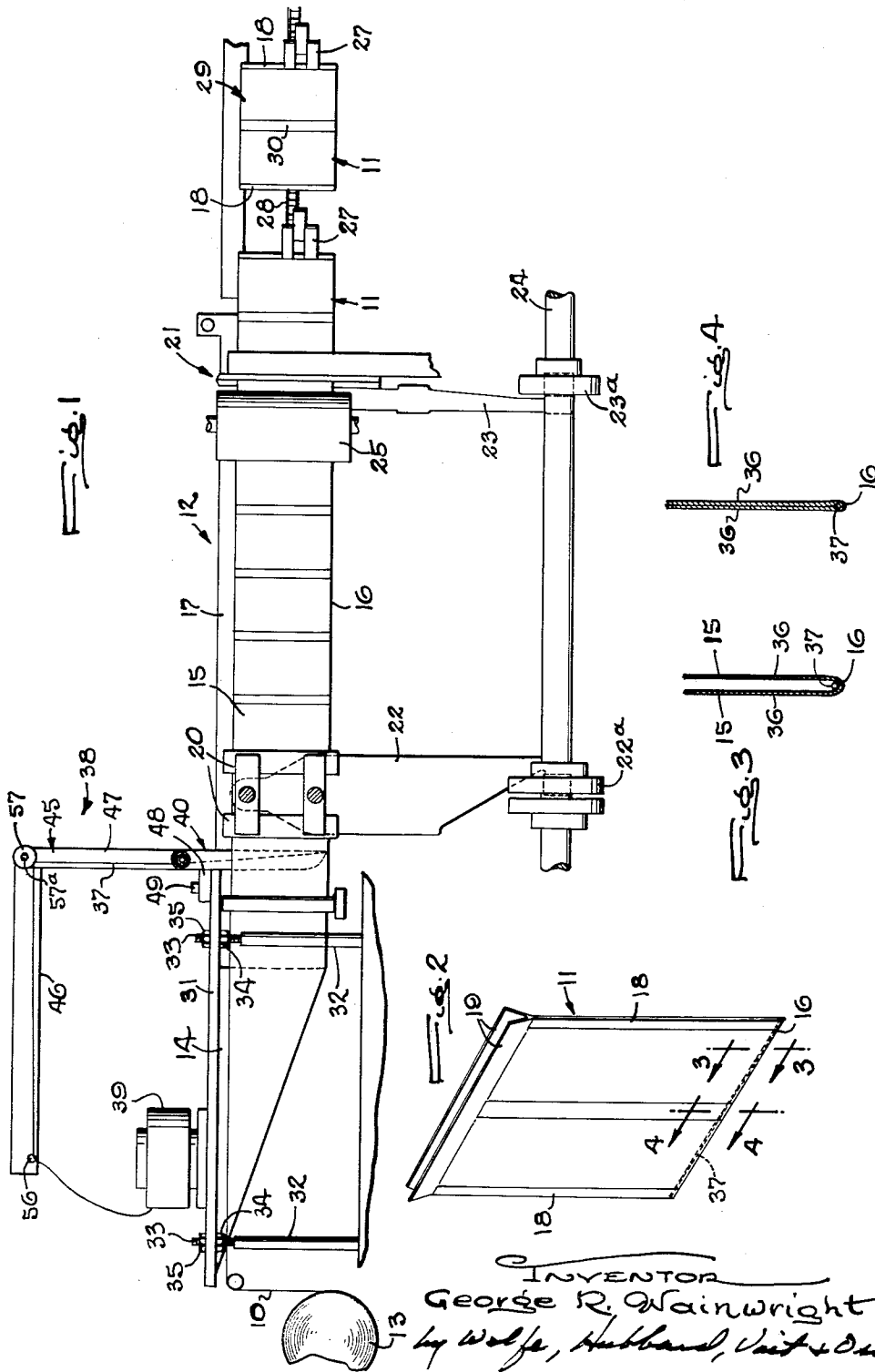
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MACHINE FOR FORMING PACKAGES WITH TEAR STRING

Filed June 15, 1959

2 Sheets-Sheet 1



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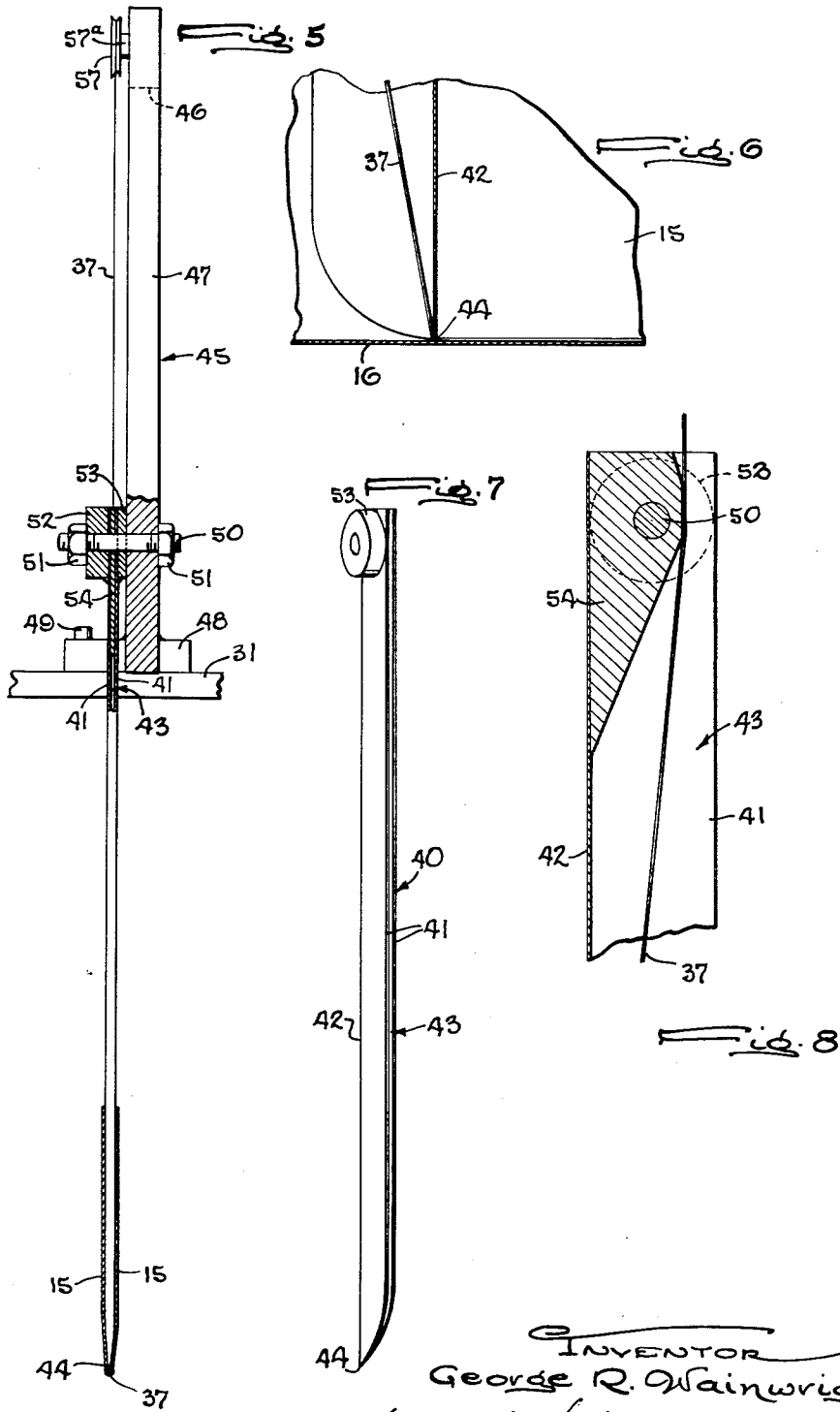
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MACHINE FOR FORMING PACKAGES WITH TEAR STRING

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3 Claims. (Cl. 53—133)

This invention relates to packaging machines in which a series of bags are formed from a sheet of flexible bag material folded into two strips disposed in a vertical plane and advanced horizontally step by step along a predetermined path through the machine. More particularly, the invention relates to a machine for forming, filling and sealing bags of a type closed by seals on three sides and on the remaining side by a fold and having a tear string disposed within the bag operable to be pulled through one edge of the latter to open the bag.

The general object of the invention is to provide, in a machine of the above character, a new and improved tear string guiding mechanism which introduces the string between the strips as the bags are being formed without interfering with the bag forming or packaging operations.

A more detailed object is to guide the string between the strips and to a point adjacent the fold at the bottom thereof whereby the string does not interfere with the filling and end sealing operations subsequently performed by the machine.

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 fragmentary side elevation of a packaging machine embodying the novel features of the present invention.

Fig. 2 is a perspective view of a unit of two bags as formed by the machine.

Fig. 3 is a sectional view taken along line 3—3 in Fig. 2.

Fig. 4 is a sectional view taken along line 4—4 in Fig. 2.

Fig. 5 is a side elevation of the guide mechanism with parts broken away and shown in section.

Fig. 6 is a fragmentary elevational view of the lower end of the guide shown in Fig. 1.

Fig. 7 is a perspective view of the thread guiding channel.

Fig. 8 is a fragmentary sectional view of the channel showing the spacer surrounding the mounting hole.

The present invention is shown in the drawings for purposes of illustration embodied in a bag making and packaging machine of the type disclosed in Bartelt Patent No. 2,649,674 on which reference may be had for the details of construction. In general, this machine converts a flexible sheet 10 of bag material into a series of bags 11 as the sheet is advanced step by step in an endwise direction along a predetermined path 12. The sheet 10 is drawn from a supply roll 13 and over a folder or "plow" 14 which folds it along its longitudinal center line to form two side strips 15 disposed in a vertical plane and joined at the lower edge as by a fold 16. The upper edges of the side strips straddle an elongated horizontal splitter bar 17 which holds the upper edges apart throughout the bag forming operation thus facilitating the filling operation which follows.

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The side strips 15 are made of or coated with a thermoplastic material and are sealed by heat and pressure to form side seals 18 crosswise at the strip 15 and at spaced intervals along the strip. The seals 18 extend from the bottom of the bag to a point adjacent to but short of the open upper end so that the upper ends are free and unsealed and form flaps 19 which facilitate the subsequent operations to be performed on the bags. The heat and pressure to form the seals 18 are applied to the strips 15 by shoes 20 mounted adjacent the path 12 to swing into and out of engagement with the sheet in timed relationship to the advancement of the sheet.

Formation of the seals 18 produces a succession of connected bags 11 which are moved along the path 12 through the machine open end up to a cutter 21 which cuts the seal 18 intermediate its edges to sever the bags from the leading edge of the strip. The cutter 21 and the shoes 20 are mounted on upright levers 22 and 23 whose upper ends are swung toward and away from the bag strips by cams 22^a and 23^a fast on a horizontal camshaft 24.

The folded sheet is drawn along the path 12 and past the sealing shoes 20 and is pushed past the cutter 21 by vertical rollers 25 which bear frictionally against opposite sides of the strips 15. The rollers 25 are driven through a suitable indexing mechanism (not shown) which turns the rollers intermittently to advance the strips step by step along the path. The sealing shoes 20 and the cutter 21 are actuated, during the dwell of the strip, to move into and out of engagement with the strips.

Prior to being severed from the strips 15, the end one of the connected bags 26 is gripped by a clip 27 attached to an endless conveyor 28 which moves the severed bags intermittently through the bag filling and end sealing operations (not shown). In the present instance, the bags are severed from the strips 15 in units 29 of two bags each and this unit is gripped by one of the clips 27 and moved by the conveyor through the filling and end sealing operations after which the completed bags are cut apart along the adjoining seal 30. In this manner the production rate of the filling and end sealing apparatus is increased.

The present machine is adapted to form bags of different sizes by varying the width of the sheet material used whereby side strips 15 of different heights are formed thus varying one dimension of the completed bag. In order to maintain the unsealed upper edges of the strips and the bags formed therefrom in a fixed horizontal plane whereby no adjustments need be made in the splitter bar 17, the mechanism applying the side seals or the filling and end sealing mechanism, the plow 14 is adjusted up or down relative to the path 12 so as to produce side strips with the top edges disposed in the same fixed plane regardless of the height of the strips. To this end, the plow 14 is fixed to the underside of a plate 31 mounted on the machine through the medium of upstanding posts 32 fixed to the base of the machine at their lower ends and having threaded upper portions 33 which project through holes bored in the plate. The plate 31 rests on nuts 34 threaded on the posts to underlie the plate. The plate 31 and the attached plow 14 are adjusted up or down relative to the fixed base of the machine by threading the nuts 34 up or down on the posts 32. After adjustment to the desired position, the plate 31 is secured in that position by threading additional nuts 35 on the ends of the posts to bear against the upper surface of the plate thus clamping the plate between the nuts 34 and 35. The bottom of the plow 14 can thus be adjusted to a position wherein the upper edges of the strips 15 are disposed in the desired plane and the various elements of the machine

such as the shoes 20, drive roller 25, cutter 21, splitter bars 17 and conveyor 28 may be maintained in a fixed position relative to the predetermined path 12 while forming bags of different depths.

The bags formed on a machine such as described comprise flat envelopes having two side walls 36 closed at the bottom as by the fold 16 and at the sides by seals 18. After the bag is filled, the open end is closed by an end seal similar to the side seals and formed in substantially the same manner. In the present instance, to facilitate opening the bag, a tear string 37 is disposed within the bag and extends across the end of the bag from one side seal to the other with the ends of the string secured by the side seals. When one end of the string is freed as by tearing off one corner of the bag, the string may be pulled through the end of the bag thereby tearing bag material and opening the bag.

In accordance with the present invention, the tear string 37 is inserted in an out-of-the-way position in the bags as the latter are being formed by the machine. The string 37 is placed so as not to interfere with the splitter bar 17 which holds the bag open or the filling and sealing operations to be performed on the bag as it is advanced through the machine. To this end, the mechanism 38 for guiding the string into the bag extends between the side strips 15 at a point adjacent the fold 16 so that, in the finished bag the string 37 is disposed along the fold 16 (Fig. 3) with the string gripped by the side seals 18 at spaced intervals (Fig. 4). Since the tear string 37 is disposed adjacent the fold 16, it need tear through but a single thickness of bag material to open the bag and therefore less force is required to pull the string through the end of the bag.

In the present instance, the mechanism 38 for guiding the string 37 into position is mounted between the plow 14 and the sealing shoes 20 whereby the string is inserted between the strips 15 prior to forming the side seals 18 and is gripped between the strips by the seals so that advance of the strips draws the string from a supply source 39 and through the guide mechanism.

The guide mechanism 38 which directs the string 37 between the side strips 15 and into the fold 16 comprises a thin, elongated channel member 40 having two side flanges 41 disposed side by side in substantially parallel planes and joined at one edge 42 to form a channel 43 opening outwardly opposite to the direction of movement of the sheet through the machine. The tear string 37 is drawn through the channel 43 between the side flanges 41 and past the closed edge 44 of the channel which rests against the fold 16 in the strips. In order to present a smooth surface to the sheet at it passes the member, the lower end of the side flanges are curved upwardly from the joined edge to the open edge of the flanges.

The string 37 is guided from the string supply 39 to the channel member 40 by an L-shaped bar 45 having a horizontal leg 46 extending from a point above the supply roll 39 to a point above the channel member 40 and a vertical leg 47 extending downwardly adjacent the channel and attached, at the lower end, to the plate 31 supporting the plow 14. The vertical leg 47 is welded to a block 48 which in turn is attached to the plate 31 at the desired position through the medium of screws 49 threaded into the plate. The leg 47 is positioned so as to project over the end of the plate with the block 48 extending toward the plate to facilitate attachment thereto (Fig. 1).

The channel member 40 is attached to the lower end of the vertical leg 47 of the L-shaped bar 45 through the medium of a rod 50 threaded at both ends and passing through the channel and the leg with a nut 51 threaded on each end to lock the parts together. Spacer elements 52 and 53 are welded to each side of the channel 40 to position the channel relative to the leg 47 and to absorb the compressive force of drawing the nuts 51 together.

To hold the side flanges 41 of the channel 40 apart, a spacer 54 disposed between the flanges 41 and encircling the rod 50 permits the channel 40 and the vertical leg 47 to be drawn together with sufficient force to hold them securely in position while maintaining sufficient clearance between the side flanges 41 for the string 37 to pass therethrough.

The tear string 37 is threaded upwardly from the supply roll 39 and through an eye 56 fixed to the free end of the horizontal leg 46 and extends along the horizontal leg to conventional friction disks 57 mounted at the intersection of the horizontal and vertical legs. The string passes between the disks and over pin 57^a holding the disk on the bar. The disks grasp the string thus maintaining it under tension as it is pulled from the guide mechanism 38 by the advancement of the strips. After passing between the disks 57, the string is drawn downwardly past the spacer 54 and off the closed edge 44 of the channel into the fold 16 in the sheet.

As noted above, different size bags are formed on the present machine by using sheet material of different widths and adjusting the plate 31 and the attached plow 14 up or down relative to the path 12. In order that the lower end of the thread guide 45 will at all times be disposed adjacent the fold 16 in the sheet, the thread guide is mounted on the plate 31 so as to move with the latter. It will be apparent, therefore, that the string guide 45 maintains a fixed position relative to the plow 14 whereby the string 37 is placed in the fold 16 regardless of the size of the bag being formed.

It will be apparent that the machine described above produces a package having a tear string opening means disposed within the bag adjacent a folded edge so that the package may be torn open by pulling the string through a single thickness of bag material. The string is placed at the bottom of the bag where it does not interfere with the remaining operations, such as filling and end sealing necessary to complete the packaging operation.

I claim as my invention:

1. A packaging machine having, in combination, forming means for folding a sheet into two flexible strips disposed side by side in a vertical plane and joined at the bottom by a fold, mechanism for supporting said strips along a predetermined path, said forming means including a member engaged by said sheet and adjustable up and down relative to said path to fold sheets of different widths, mechanism engageable with said strips and operable to advance the same endwise step by step along said path, sealing mechanism disposed along said path and engageable with said strips on opposite sides thereof to seal the strips together transversely at spaced points to form a succession of connected bags having the upper end open, a string supply adjacent said forming means, an elongated vertical guide disposed in the plane of said strips and projecting downwardly into said path in between said strips, said guide extending to a point closely adjacent said fold to guide string from said supply to the fold and between the strips whereby the string is held by said seals and drawn through said guide as an incident to the advance of the strips along said path, and means rigidly supporting said guide on said member for bodily adjustment therewith whereby the string is guided to the fold with sheets of varying widths.

2. A packaging machine having, in combination, means for forming sheet material into two flexible strips disposed side by side in a vertical plane and for supporting the latter along a predetermined path, mechanism engageable with said strips and operable to advance the same endwise step by step along said path, sealing mechanism disposed along said path and engageable with said strips on opposite sides thereof to seal the strips together transversely at spaced points to form a succession of connected bags having the upper end open, a string supply adjacent said forming means, and an elongated

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vertical guide disposed in advance of said sealing mechanism and in the plane of said strips and projecting downwardly into said path in between the strips, said guide extending to a point adjacent the bottom of said strips to guide string from said supply to the bottom of said strips and between the latter whereby the string is held by said seals and drawn through said guide as an incident to the advance of the strips along said path.

3. A packaging machine as defined in claim 2 wherein said guide comprises an elongated channel member having two side flanges joined along one edge and the channel opens away from said sealing mechanism whereby said string is drawn from said supply through said channel

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between the side flanges and into the bottom of said strips between the latter.

References Cited in the file of this patent

UNITED STATES PATENTS

2,248,471	Stroop -----	July 8, 1941
2,334,256	Eaton -----	Nov. 16, 1943
2,351,382	Williams -----	June 13, 1944

FOREIGN PATENTS

724,918	Great Britain -----	Feb. 23, 1955
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