March 30, 1954 C. B. HARKER 2,673,431

PACKAGING MACHINE

Filed April 30, 1953 3 Sheets-Sheet 1

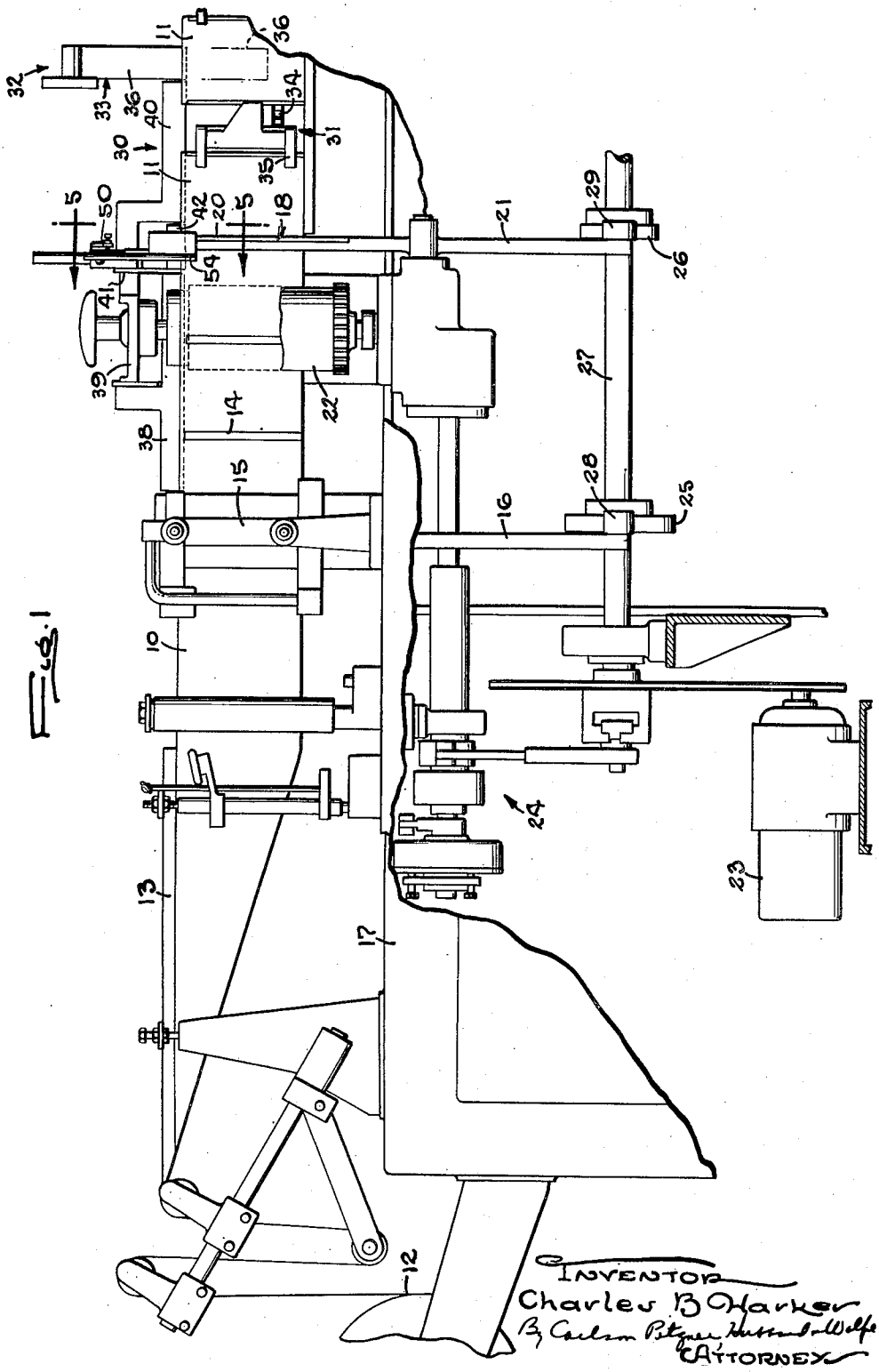

Fig. 1

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Fig. 2

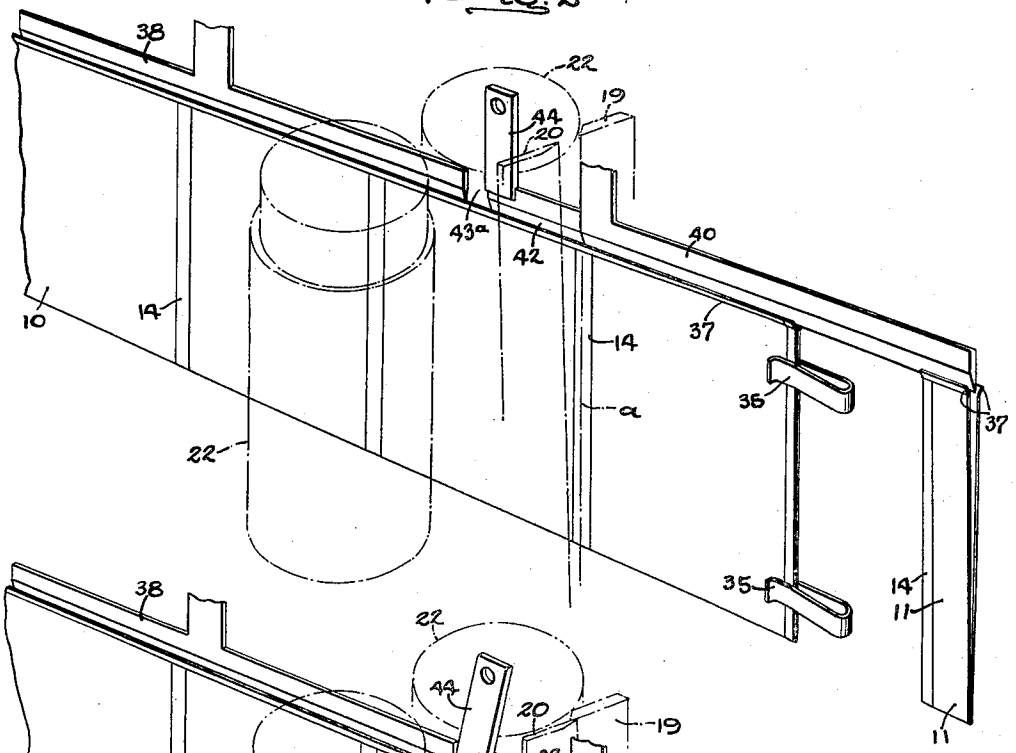
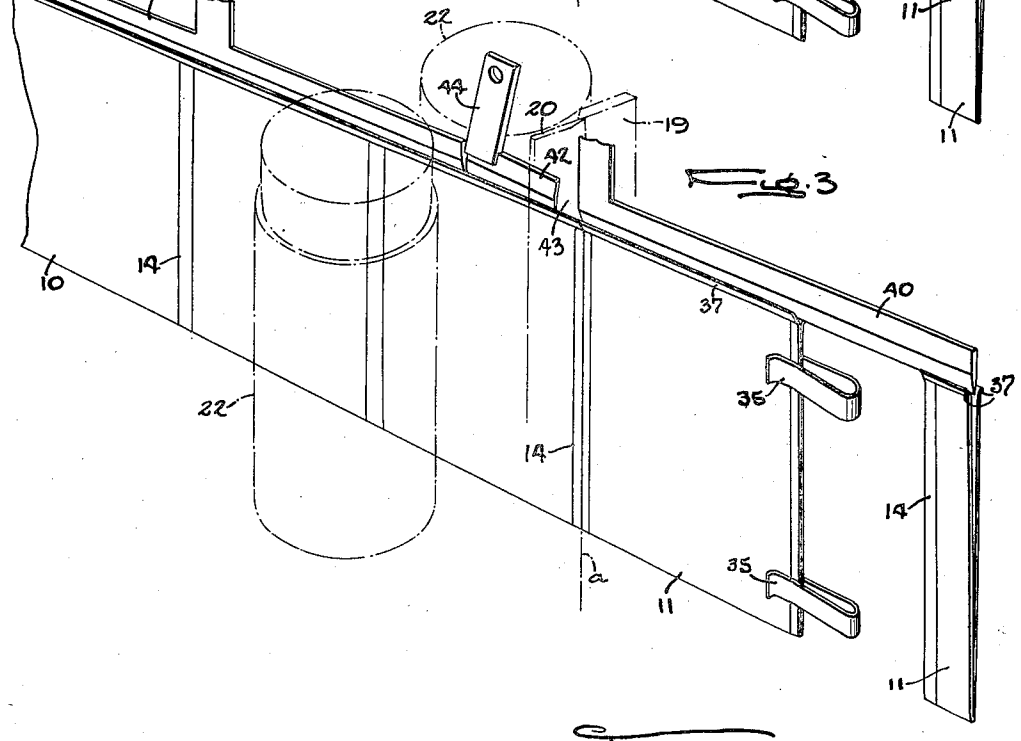


Fig. 3



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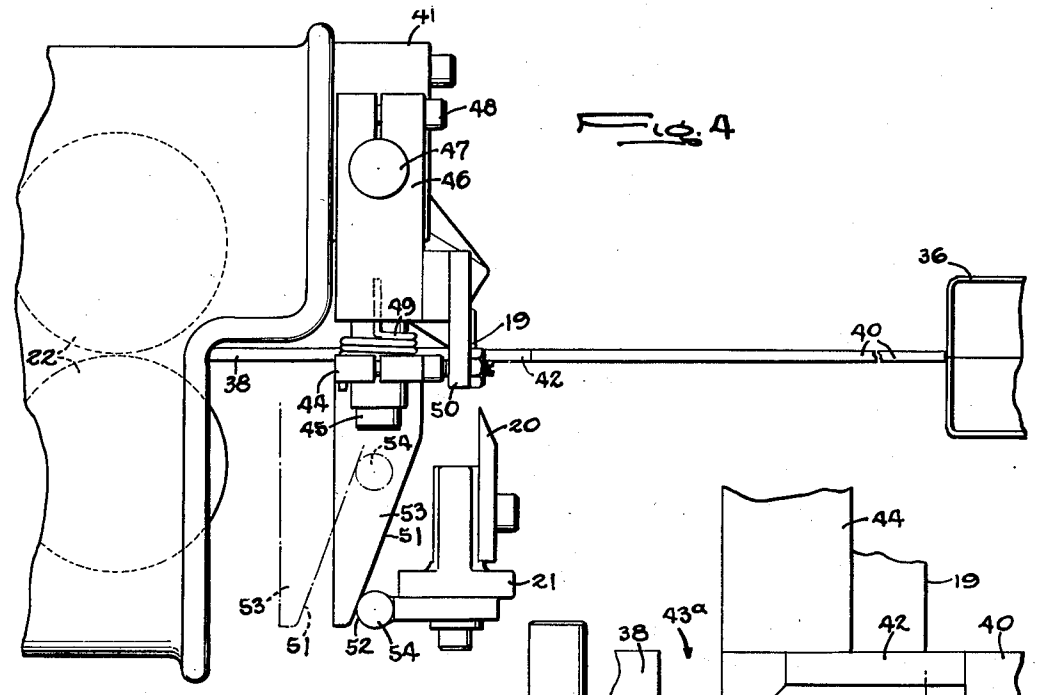


Fig. 4

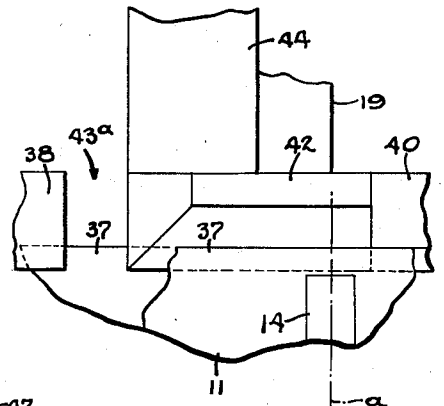
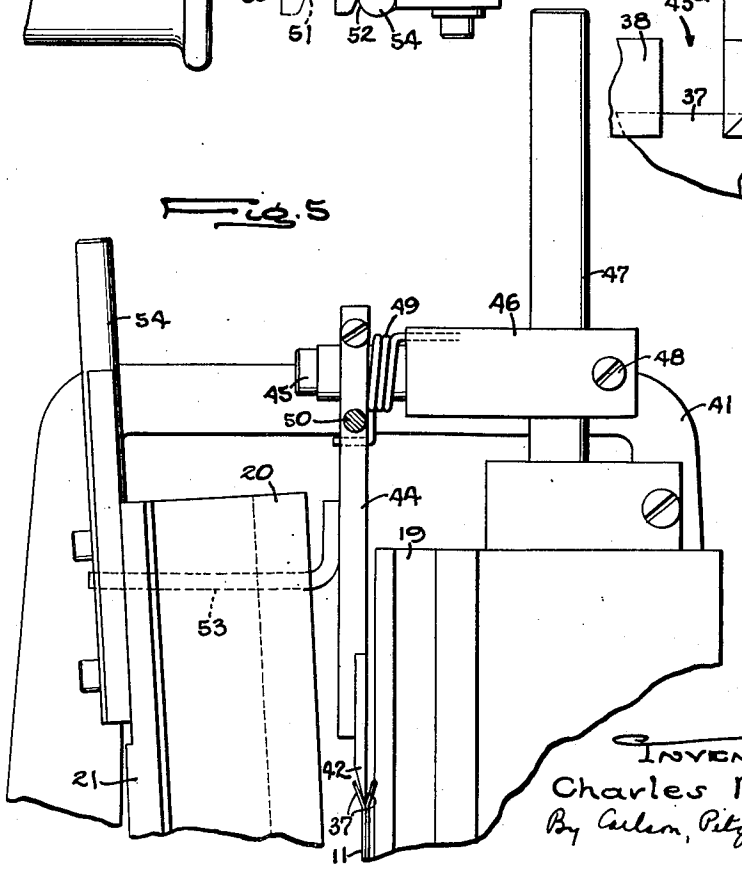


Fig. 6

Fig. 5



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UNITED STATES PATENT OFFICE

2,673,431

PACKAGING MACHINE

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Application April 30, 1953, Serial No. 352,101

11 Claims. (Cl. 53—89)

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This invention relates to packaging machines in which a series or strip of bags connected at adjacent edges is advanced endwise to present the leading end bag to a gripping position and in which the end bag is separated and advanced individually to a filling station by a carrier or conveyor. In such machines, the end bag is gripped by the carrier before being separated from the strip and then a cutter severs the connection between the leading bag and the next succeeding bag. Often it is desirable to fill the separated bag by lowering the spout of a dispensing device into the bag. In order to insure proper entry of the spout into the bag, the latter is formed with opposed flaps across the open upper end and, as the bags are advanced through the machine to the filling station, the flaps of the separated bags straddle an elongated stationary splitter bar which thus holds the mouth of the bag open preparatory to entry of the spout.

The general object of the present invention is to provide a novel means which retains positive control of the flaps on the bag strip and guides the ends of the flaps of the leading bag onto the splitter bar without interfering with the operation of the cutter.

The principal object is to achieve the desired control of the flaps through the use of two splitter bars which are disposed substantially in end to end abutment while the strip of bags is being advanced and which, after the advance, are separated to provide a space into which the cutter may move to sever the end bag.

A more detailed object is to employ a movable splitter bar which normally is in an active position across the line of cut-off to guide the flaps onto the stationary splitter bar but which is shifted to an inactive position to one side of the cut-off line before operation of the cutter.

The invention also resides in the novel means for shifting the movable bar in timed relation to the advance of the bags and the operation of the cutter.

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 schematic perspective view of the machine and shows the movable splitter bar in the active position.

Fig. 3 is a view similar to Fig. 2 but showing the movable splitter bar in the inactive position.

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Fig. 4 is a fragmentary top view of a part of the machine.

Fig. 5 is a sectional view taken along the line 5—5 in Fig. 1.

Fig. 6 is a fragmentary side view of the movable splitter bar.

As shown in the drawings for purposes of illustration, the invention is embodied in an automatic bag making and packaging machine which may be of the type disclosed in an application of Harold L. Bartelt, Serial No. 98,660, filed June 13, 1949, to which reference may be had for details of construction. In general, such a machine converts a strip 10 of flexible sheet material into a series of bags 11 as the strip is advanced step by step in an endwise direction. The strip, which may be composed of or coated with a heat sealable material, is led off from a supply roll 12, is folded along its longitudinal center line as it is drawn across a folder 13 and is heat sealed crosswise to form a seal 14 by heat and pressure applied by a shoe 15. The latter may be carried on the upper end of an upright lever 16 which is fulcrumed intermediate its ends on the frame 17 of the machine to swing the shoe toward and away from the bag strip. After the formation of the cross seal, the leading end bag is separated from the strip 10 by a cutter 18 which cuts the seal intermediate its edges and which herein comprises opposed relatively movable knife blades 19 and 20 (Fig. 4) disposed on opposite sides of the bag strip. The knife 19 may be stationarily mounted on the frame 17 while the knife blade 20 is supported for movement toward and away from the stationary blade by a lever 21 similar to the lever 16.

The folded strip 10 is pulled forwardly through the folder 13 and between the shoes 14 and is pushed on past the cutter 16 by vertical rollers 22 bearing frictionally against opposite sides of the strip. The rollers are driven by a motor 23 through an indexing mechanism 24 which turns the rollers intermittently to advance the strip 10 in successive steps through distances corresponding to the width of the bags 11. During dwelling of the strip, the shoes 15 and the movable knife blade 20 are actuated by cams 25 and 26 on a shaft 27 journaled on the frame and driven continuously by the motor 23. The cams engage follower rollers 28 and 29 on the lower ends of the levers 16 and 21 and rock the latter to swing the sealing shoe 15 and the knife blade 20 into engagement with the strip 10, the levers being swung back away from the strip by suitable springs (not shown).

Before the cutter 18 is actuated, the bag 11 at the leading end of the strip is disposed in a gripping position 30 where it is picked up by a conveyor 31 and, after being separated from the strip by the cutter, is advanced to a filling station 32 where a dispensing device 33 deposits a quantity of material in the bag. Herein, the conveyor 31 is in the form of an endless chain 34 carrying a plurality of clamps 35 spaced at equal intervals along the chain and opening rearwardly to grip the leading edges of the bags. The conveyor is driven intermittently by a suitable mechanism and the advance is timed so that a clamp 35 is dwelling at the gripping position 30 and is open during the advance of the strip 10, the leading bag thus being received between the jaws of this clamp. While both the strip and the conveyor are dwelling, the clamp is closed and the cutter 18 is actuated to free the end bag and complete the transfer of this bag from the strip 10 to conveyor 31.

In packaging certain materials, it is desirable to employ a filling device 33 of the type in which its spout 36 is lowered down into the bag 11, as shown in broken lines in Fig. 1, before the material is discharged. To insure proper entry of the spout into the bag, opposed flaps 37 (Figs. 2 and 3) are formed across the upper ends of the bag walls and are held apart as the bags are advanced from the vicinity of the folder 13 to the filling station 32 so that the mouth of the bag is open when the bag is presented to the filling device 33. Herein, the flaps are formed by stopping the seals 14 short of the top of the bags to leave narrow end portions which are unsealed and constitute the flaps 37. The flaps of the bags on the strip 10 are held apart by an elongated splitter bar 38 mounted on a stationary bracket 39 and straddled by the flaps. The bar extends from the sealing shoes 15 to a point short of the cutter 18, the lower edge of the bar being disposed just above the tops of the seals 14 as shown in Figs. 2 and 3. If desired, the sides of the bar may converge downwardly to facilitate straddling of the bar by the flaps 37.

To separate the flaps 37 of the bags 11 carried by the conveyor 31, a similar splitter bar 40 is secured to a stationary bracket 41 on the machine frame 17 adjacent the point at which the end bag is cut from the strip 10. This bar is alined with the first splitter bar 38 and extends from a point just beyond the cutter 18 to the filling station 32. Preferably, the filling spout 36 is disposed immediately adjacent the splitter bar 40 and, in its upper position as shown in full lines in Fig. 1, projects down between the flaps 33 to form, in effect, a continuation of the splitter bar.

The present invention contemplates guiding the ends of the flaps 37 on the bag strip 10 across the line a (Fig. 6) of cut-off and onto the splitter bar 40 without interfering with the operation of the cutter 18. For this purpose, a third elongated splitter bar 42 retains positive control of the flaps of the end bag on the strip as the latter is advanced to move this bag into the gripping position 30 but is out of the path of the movable knife blade 20 while the end bag is being severed from the bag strip. Herein, such control is obtained by disposing the third splitter bar in advance of the splitter bar 40, that is, between the adjacent ends of the two bars 38 and 40, and by mounting the third bar for movement between a normal guiding or active position across the line a and an inactive position to one side of the cut-off line.

In the present instance, the third or movable splitter bar 42 when in the active position is alined with and abuts against the end of the splitter bar 40 so that the two bars are in end to end relation as shown in full lines in Fig. 6. With the two bars thus disposed relative to each other, the movable bar extends across the cut-off line a and is straddled by the flaps 37 on the end bag of the strip 10. As this bag is moved toward the gripping position 30, its flaps pass directly from the movable splitter bar to the bar 40 without crossing any gaps and therefore are guided properly onto the stationary splitter bar.

After the advance of the bag strip 10 but before the operation of the cutter 18, the movable bar 42 is shifted endwise to the inactive position at one side of the line a of cut-off. Preferably, the bar is moved back away from the stationary bar 40 in the direction opposite the advance of the bag strip so as to leave a small space 43 (Fig. 3) between the two bars into which space the knife blade 20 swings when severing the end bag from the strip. To permit shifting of the movable bar to the inactive position illustrated in broken lines in Fig. 6, the bar when in the active position is spaced a short distance from the adjacent end of the first stationary splitter bar 38. Although there is a small gap 43^a (Fig. 2) between the bars 38 and 42, this does not interfere with the guiding of the flaps 37 since the flaps on the bag strip are continuous and always straddle the movable bar whether the latter is in the active or inactive position. As a result, the movable bar when in the inactive position is between the flaps on the strip and when it is returned to the active position, it is still between these flaps and is correctly disposed for proper guiding of the flaps of the next bag to be presented to the gripping position 30.

To mount the movable splitter bar 42 for endwise shifting, the bar may be pivoted on the bracket 41. For this purpose, the bar is rigidly secured to the lower end of an upright arm 44 (Figs. 4 and 5) which at its upper end is pivoted on a pin 45 projecting forwardly from a horizontal block 46. The latter slides on a post 47 upstanding from the bracket 41 to adjust the vertical position of the splitter bar for bags of different heights, the block being clamped on the post in the desired position by tightening a screw 48. A torsion spring 49 wound around the pin 45 is secured at one end to the block 46 and at the other end to the arm 44 to urge the movable splitter bar 42 to the right, as viewed in Figs. 4 and 6, toward the active position. If desired, a stop 50 bolted on the bracket 41 may limit shifting of the movable bar 42 under the action of the spring 49 and locate the bar properly in the active position.

Means is provided to shift the movable splitter bar 42 to the inactive position in timed relation to the operation of the cutter 18 so that the bar is out of the way of the knife blade 20 when the end bag is cut from the strip 10. Preferably, this means operates in response to the initial movement of the blade 20 in the cutting direction and herein comprises cam and follower surfaces 51 and 52 (Fig. 4) rigid with the movable splitter bar 42 and the knife blade 20 respectively. The cam surface 51 is formed along the forward edge of a flat horizontal plate 53 secured to and projecting outwardly from the side of the arm 44 adjacent the movable knife blade and is in-

clined outwardly and rearwardly as shown in Fig. 4. The follower surface 52 may be provided by a generally upright round rod 54 welded to one side of the lever 24 which carries the movable knife blade and bearing against the cam edge 51 of the plate 53. With this arrangement, the rod 54 moves with the knife blade 20 along a straight line toward the bag strip 10 as shown in broken lines in Fig. 4. Thus, due to the inclining of the cam surface 51, the rod as it swings in forces the plate 53 rearwardly to the broken line position. As a result, the arm 44 is rocked back against the action of the spring 49 and this shifts the movable splitter bar 42 to the inactive position.

In operation, assuming the parts to be in the positions shown in Fig. 1 and both the strips 10 and the conveyor 31 to be dwelling, the shoe 15 and the knife 20 are retracted away from the bag strip. In this position of the knife, the follower 54 engages the outer end of the cam surface 51 permitting the spring 49 to hold the movable splitter bar 42 in the active position across the cut-off line *a*. As a result, the movable splitter bar abuts against the end of the second stationary splitter bar 40 and the two bars, in effect, form one continuous splitter. Since the bag in the gripping position 30 has been separated from the bag strip, the next bag on the end of the strip is disposed on the opposite side of the cutter with its flaps 37 straddling the first splitter bar 38 and the movable bar 42. The conveyor 31 then is indexed to advance the separated bag to the filling station 32 and bring an empty clamp 35 into the gripping position. While the conveyor is dwelling, the feed rollers 22 advance the bag strip one step through a distance equal to the width of the bags 11 thus moving the end bag into the gripping position.

Since the ends of the splitter bars 40 and 42 abut against each other, the leading ends of the flaps 37 of the end bag are guided across the joint between the latter bars and pass easily from the movable bar 42 to the stationary bar as this bag is presented to the gripping position 30. When the strip comes to rest and before the next advance of the conveyor 31, a rise on the cam 25 engages the follower roll 28 swinging the shoe 15 in to form the cross seal 14. At the same time, the follower roll 29 is engaged by a rise on the cam 26 so that the knife blade 20 is swung in to cut the end bag from the strip 10. As the knife blade swings in, the follower 54 on the knife blade lever arm 21 forces the cam plate 53 back shifting the movable splitter bar 42 endwise in the direction opposite the bag advance and away from the stationary splitter bar 40. Upon continued inward swinging of the blade 20, the latter enters the space 43 between the bars 40 and 42 and coacts with the stationary blade 19 to sever the end bag from the strip 10. As the knife swings back away from the bag strip, the shape of the cam 53 permits the movable splitter bar to be swung back to the active position by the spring 49 preparatory to the next advance of the strip. Since the flaps 37 of the separated bag have been guided properly by the movable splitter bar 42 along opposite sides of the second stationary splitter bar 40, the latter holds the flaps apart as the bag is advanced by the conveyor 31 to the filling station 32. As a result, the mouth of the bag is open when the bag is presented beneath the dispensing device 33 so that the filling spout 36 when lowered passes between the flaps and into the bag.

It will be observed that, with the foregoing arrangement, the movable splitter bar 42 effectively guides the ends of the flaps 37 of the leading one of the connected bags as the latter is presented to the gripping position 30. Thus, positive control over the flaps is retained during transfer to the second stationary splitter bar 40 insuring that the flaps properly straddle the latter bar and are held apart for entry of the filling spout 36 into the bag 11. At the same time, this control is obtained without interfering with the operation of the cutter 16 since the movable bar 42 is shifted out of the path of the knife blade 20 while the bag strip 10 is dwelling but before the end bag is cut off. Thus, although the knife may curl the end of the bag strip, the movable bar, as it returns to the active position, straightens the ends of the flaps on the strip and guides the flaps properly onto the bar 40. By moving the bar 42 endwise back toward the first stationary splitter bar 38, the movable bar remains between the flaps of the next bag to be presented to the gripping position so that there is no chance of losing control of the flaps of this bag. The over-all construction of the machine is simplified and exact timing of the shifting of the movable bar is obtained by utilizing the movement of the knife blade 18 to shift the bar.

I claim as my invention:

1. In a machine for packaging material in bags having opposed flaps at the open end, the combination of, means for supporting a strip of bags connected at adjacent edges and advancing the same endwise along a predetermined path, a cutter disposed along said path opposite the connection between the two leading bags of said strip and movable into engagement with the strip between the two bags thereby to sever the end bag from the strip, a carrier engaging the leading bag and advancing the same along a continuation of said path to a filling station, a stationary elongated splitter bar disposed above said path and between the flaps of a bag held by said carrier and extending from a point beyond said cutter to said filling station, a second splitter bar disposed between the flaps of both the leading bags on said strip and alined with said first bar, means supporting said second bar for endwise movement away from said first bar and out of the way of said cutter, and mechanism actuated in timed relation to the movement of said cutter to move said second bar before the cutter engages said strip.

2. In a machine for packaging bags having opposed flaps at the open end, the combination of, means for supporting a strip of bags connected at adjacent edges and advancing the strip endwise to present the leading bag to a predetermined position, an elongated splitter bar straddled by the flaps of the bags and extending across the connection between said leading bag and the next succeeding bag when the leading bag is in said position, means supporting said bar for endwise movement to dispose the bar wholly to one side of the connection between said two bags, a cutter operable when the leading bag is in said position and having a blade movable toward and into engagement with the connection between said two bags, and cam and follower surfaces on said bar and said cutter cooperating during the initial movement of said blade toward said connection to shift said bar before the blade severs said connection.

3. In a machine for packaging bags having opposed flaps at the open end, the combination

of, means for supporting a strip of bags connected at adjacent edges and advancing the strip endwise to present the leading bag to a predetermined position, a cutter having a blade movable toward and into engagement with the connection between said leading bag and the next suceeding bag when the leading bag is in said position and operable to sever the two bags, an elongated splitter bar straddled by the flaps of the bags and extending across the connection between said two bags when the leading bag is in said position, and mechanism responsive to the initial movement of said blade toward said connection and operable to shift said bar endwise and to one side of the connection before the blade engages the connection.

4. In a machine for packaging bags having opposed flaps at the open end, the combination of, an elongated splitter bar mounted in a fixed position, an elongated movable splitter bar normally disposed in an active position closely adjacent and alined with said fixed bar and shiftable endwise to an inactive position spaced from the fixed bar, mechanism for supporting a strip of bags connected at adjacent edges and advancing the strip endwise step by step successively past said movable and fixed bars with the bag flaps straddling the bars, said mechanism being operable to dwell the strip with the connection between two adjacent bags alongside said movable bar when the latter is in said active position, means operable during dwelling of said strip to shift said movable bar to said inactive position and to one side of said connection, a cutter actuated during dwelling of said strip and after shifting of said movable bar and operable to engage and cut said connection, and means to return said movable bar to said active position after operation of said cutter but before the next advance of said strip.

5. In a machine for packaging bags having opposed flaps along adjacent ends of the bag walls, the combination of, an elongated splitter bar supported for endwise shifting between active and inactive positions, mechanism for supporting a series of bags connected at adjacent edges and advancing the bags edgewise step by step with the bag flaps straddling said bar, said mechanism being operable to dwell said bags with the connection between two adjacent bags disposed alongside said bar when the latter is in said active position, a cutter operable during dwelling of the bags to engage and sever the connection between said two bags, means operable during dwelling of the bags and before operation of said cutter to shift said bar to said inactive position at one side of said connection and out of the way of the cutter, and means operable after operation of said cutter but before the next advance of the bags to return said bar to said active position.

6. In a machine for packaging bags having opposed flaps at the open end, the combination of, an elongated splitter bar mounted in a fixed position, an elongated movable splitter bar normally disposed in an active position closely adjacent and alined with said fixed bar and shiftable endwise to an inactive position spaced from the fixed bar, mechanism for supporting a strip of bags connected at adjacent edges and advancing the strip endwise step by step successively past said movable and fixed bars with the bag flaps straddling the bars, said mechanism being operable to dwell the strip with the connection between two adjacent bags alongside said movable bar when the latter is in said active position, means operable during dwelling of said strip to shift said movable bar to said inactive position and to one side of said connection, and a cutter actuated during dwelling of said strip and after shifting of said movable bar and operable to engage and cut said connection.

7. In a machine for packaging bags having opposed flaps along adjacent ends of the bag walls, the combination of, first and second elongated splitter bars disposed end to end and alined with each other, mechanism for supporting a strip of bags connected at adjacent edges and advancing the strip endwise successively past said first and second bars with the bag flaps straddling the bars, means supporting said second bar in a fixed position, means supporting said first bar for endwise movement away from said second bar to leave a space between the two bars, mechanism operated in timed relation to the advance of said strip to shift said first bar away from said second bar when the connection between two adjacent bags is alined with said space, and a cutter actuated when said bars are apart and movable into said space to engage and sever the connection between said two bags.

8. In a machine for packaging bags having opposed flaps along adjacent ends of the bag walls, the combination of, means for supporting a series of bags connected at adjacent edges and advancing the bags edgewise to present the leading bag to a predetermined position, an elongated splitter bar straddled by the flaps of the bags and extending across the connection between said leading bag and the next succeeding bag when the leading bag is in said position, means supporting said bar for endwise movement in the direction opposite the advance of the bags to dispose the bar wholly behind the connection between said two bags, a cutter operable when the leading bag is in said position to engage and sever the connection between said two bags, and mechanism operable in timed relation to said cutter to move said bar behind said connection before the cutter severs the connection.

9. In a machine for packaging bags having opposed flaps along adjacent ends of the bag walls, the combination of, two elongated splitter bars disposed end to end and alined with each other, means supporting one of said bars in a fixed position, means supporting the other of said bars for endwise movement away from said fixed bar, mechanism for supporting a strip of bags connected at adjacent edges and advancing the strip endwise successively past said bars with the bag flaps straddling the bars, a cutter having relatively movable blades disposed on opposite sides of said movable bar and strip and operable to move together and cut the connection between two adjacent bags on said strip when said connection is between the blades, and means operated in timed relation to said cutter to shift said movable bar away from said fixed bar and out of the path of said blades when the blades move together to cut said connection.

10. In a machine for packaging bags having opposed flaps at one end, the combination of, two elongated splitter bars disposed end to end and mounted for relative endwise movement away from each other to form a space, means for supporting a series of bags connected at adjacent edges and advancing the bags edgewise successively past said bars with the flaps of the bags straddling the bars, means operable in timed

relation to the advance of said bags to move said bars apart and dispose the connection between two adjacent bags alongside said space, and a cutter movable into said space when said bars are apart and operable to sever said connection.

11. In a machine for packaging bags having opposed flaps along adjacent ends of the bag walls, the combination of, means for supporting a series of bags connected at adjacent edges and advancing the bags edgewise to present the leading bag to a predetermined position, a cutter operable to engage the connection between said leading bag and the next succeeding bag and sever the connection between the two bags when the leading bag is in said position, an elongated splitter bar straddled by the flaps of the bags and extending across the connection between said two bags, and means operable in timed relation to said cutter to shift said bar endwise and to one side of the connection between said two bags before the cutter severs the connection.

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No references cited.