May 15, 1956 C. B. HARKER 2,745,583

PACKAGING MACHINE

Filed June 16, 1952 2 Sheets-Sheet 1

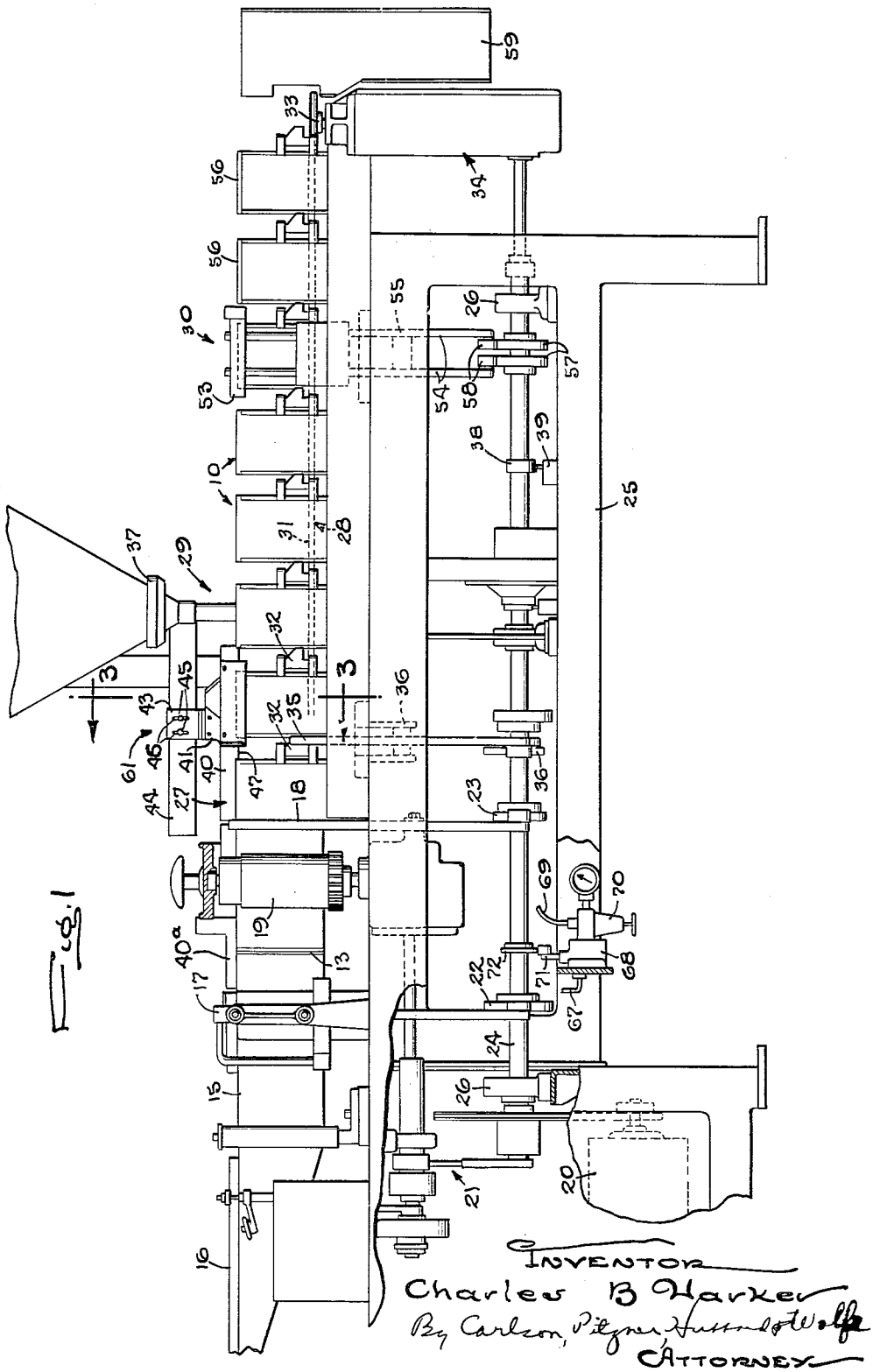

Fig. 1

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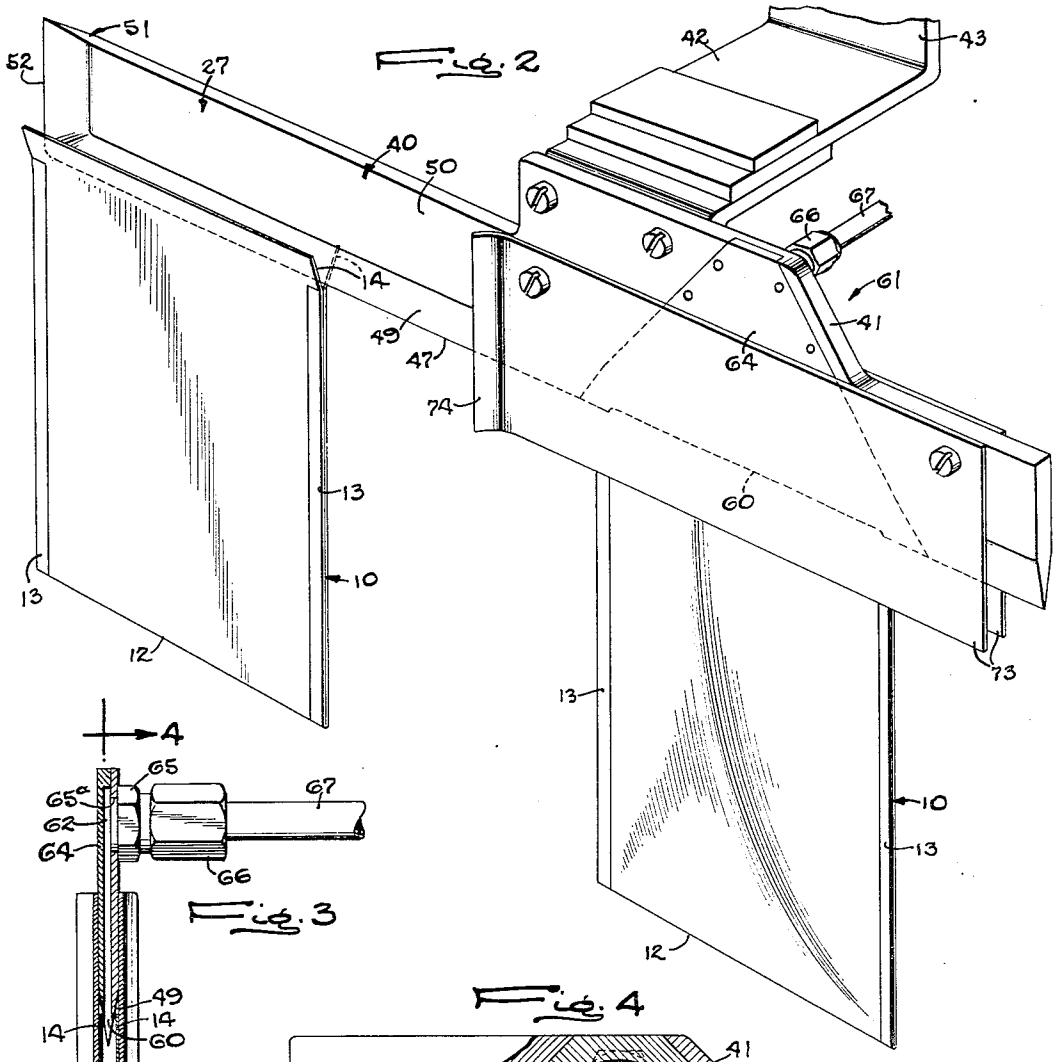


Fig. 2

Fig. 3

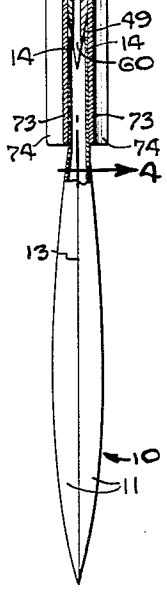
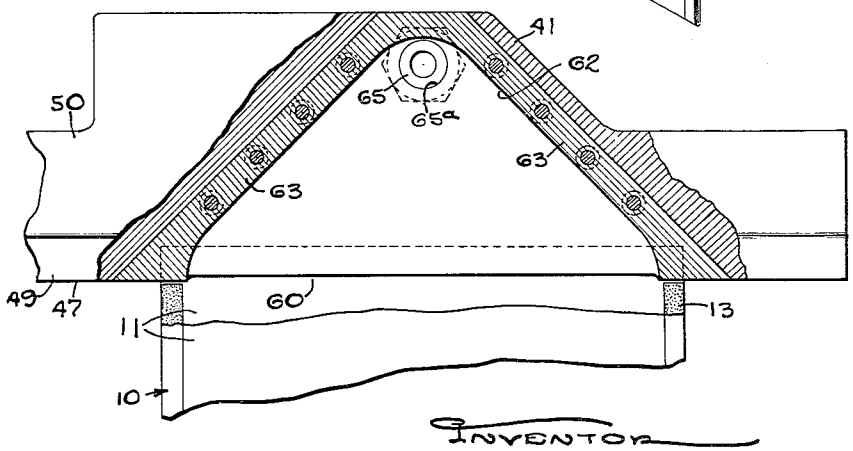


Fig. 4



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PACKAGING MACHINE

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Application June 16, 1952, Serial No. 293,778

8 Claims. (Cl. 226—59)

This invention relates to a packaging machine of the type in which the bags to be filled are advanced to successive stations at which various packaging operations are performed. More particularly, the invention relates to a machine for filling a bag which comprises front and back walls joined together along their side edges to points short of the open upper end of the bag so as to leave the upper ends of the walls free. In such machines, an elongated straight splitter bar is disposed above the bags, and the bags are advanced along the bar which is straddled by the upper free ends of the bag walls and holds the mouth of the bag open preparatory to the performance of a packaging operation at one of the stations.

One object of the invention is to provide a packaging machine of the above character with a new and improved splitter bar which serves to vary the volume of the bags in preparation for a succeeding operation at one of the stations of the machine.

A more detailed object is to provide the splitter bar with an orifice communicating with the interior of the bag and forming a passage for the flow of gas which varies the spacing between the bag walls and hence the volume of the bag.

Another object is to direct a stream of air through the orifice and into the bag to spread the walls of the bag so that the bag is open and ready to be filled at the next station.

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 side elevation with parts broken away of a packaging machine with a splitter bar constructed in accordance with the present invention.

Fig. 2 is a perspective view of the splitter bar.

Fig. 3 is a sectional view taken along the line 3—3 in Fig. 1.

Fig. 4 is a fragmentary sectional view taken along the line 4—4 in Fig. 3.

For the purposes of illustration, the invention is shown embodied in a machine for packaging material in a bag **10** which comprises two flexible walls **11** (Fig. 2) of sheet material closed at the bottom as by a fold **12** and sealed along the side edges as indicated at **13**. The seals **13** are formed by joining the adjacent margins of the walls **11** together and extend from the bottom of the bag to a point adjacent but short of the open upper end of the bag so that the upper ends of the walls are free and unsealed and form flaps **14**. Bags of this type may be made conveniently on an automatic machine such as the one disclosed in an application of Harold L. Bartelt, Serial No. 98,660, filed June 13, 1949, now Patent No. 2,649,674, dated August 25, 1953, to which reference may be had for the details of construction.

In general, the bag making apparatus converts a strip **15** (Fig. 1) of flexible material into a series of bags **10** as the strip is advanced step by step in an endwise direction. The strip, which is composed of or coated with a thermosensitive or heat sealable material, is led off from a supply roll (not shown), folded along its longitudinal center line as it passes a folder **16**, is heat sealed crosswise by heat and pressure applied by shoes **17** which form the side seals **13**, and the seals are cut by a knife **18** at a subsequent station to separate the bags **10**.

The folded strip **15** is pulled forwardly through the folder **16** and between the shoes **17** and is pushed on past the cutter **18** by vertical rollers **19** bearing frictionally against opposite sides of the folded strip. The rollers are driven by a motor **20** through an indexing mechanism **21** which turns the rollers intermittently to advance the strip **15** in successive steps through distances corresponding to the width of the bags **10**. During a dwell of the strip, the shoes **17** and the cutter **18** are actuated by cams **22** and **23** on a shaft **24** journaled on the frame **25** of the machine in spaced bearings **26** and driven continuously by the motor **20**.

Before the cutter **18** is actuated, the bag **10** at the end of the strip **15** is disposed at a station **27** where it is picked up by a conveyor **28** and, after being separated from the strip by the cutter, is advanced step by step first to a filling station **29** where a quantity of material to be packaged is deposited in the bag and then to a closing station **30** where the upper ends **14** of the walls **11** are sealed together to close the bag. Herein, the conveyor **28** is in the form of an endless chain **31** carrying a plurality of clamps **32** spaced at equal intervals along the chain and opening rearwardly to grip the leading edges of the bags. The chain is passed around a sprocket wheel **33** which is driven by the shaft **24** through a Geneva mechanism **34** to advance the chain intermittently through successive steps somewhat longer than the width of the bags.

To pick up the bag on the end of the strip **15**, the operation of the Geneva mechanism is timed to alternate the advance of the conveyor **28** with the advance of the strip so that a clamp **32** is dwelling at the station **27** and is ready to grip the leading end of the leading bag before the latter is delivered to the pick-up station. The clamp at the station **27** is opened by an upright lever arm **35** which is fulcrumed intermediate its ends at **36** on the frame **25** and is turned to open the clamp by a cam **36** on the camshaft **24**. When the clamp is open, the feed rollers **19** push the end bag into the pick-up station with the forward seal **13** disposed between the jaws of the clamp. Before the cam **23** operates the cutter **18**, the cam **36** permits the lever **35** to swing back closing the clamp so that bag is held on the conveyor **28** before being severed from the strip **15**. As shown in Fig. 1, the clamps grip the leading edges of the bags below the upper ends of the seals **13** so that the flaps **14** are free to spread apart.

From the pick-up station **27**, each bag **10** is advanced by the conveyor **28** to the filling station **29** where a dispensing device **37** deposits a predetermined quantity of material to be packaged in the bag. Preferably, the dispensing device is operated in timed relation with the movement of the conveyor by a cam **38** carried by the shaft **24** and closing a switch **39** to operate the dispenser during a dwell of the bags.

To hold the mouths of the bags **10** open preparatory to filling, the flaps **14** on the upper ends of the bag walls **11** straddle an elongated narrow splitter bar **40** as they are advanced to the filling station **29**. An enlargement **41** (Fig. 2) on the upper edge of the bar is bolted to a bracket **42** which projects outwardly perpendicular to the path of the bags and a vertical leg **43** of the bracket is bolted to a horizontal bar **44** (Fig. 1) fast on the frame **25** of the machine. The bolts **45** securing the bracket **42** to the stationary bar **43** pass through vertical slots **46** in the leg **43** so that the splitter bar may be raised or lowered to place its lower edge **47**

immediately above the upper ends of the side seals 13 when a different sized bag is being packaged.

The splitter bar 40 extends over the pick-up station 27 and along the path of the bags 10 to a point short of the spout 48 of the dispensing device 37. Preferably, the lower edges 49 of the sides 50 of the bar are beveled to give the bottom of the bar a V-shaped cross section which is straddled by the flaps 14. The end 51 of the splitter bar first engaged by the flaps may also be sharpened to a narrow edge 52 as shown in Fig. 2 to insure that the flaps spread apart and pass on opposite sides of the bar.

It is desirable to employ a second splitter bar 40a alined with the first and extending between the folder 16 and the knife 18 to hold the upper edges of the folded strip 15 apart as the bags are being made. With this construction, the flaps 14 are spread when the bag is delivered to the pick-up station 27 and are held apart as the bag is advanced to the filling station so that the mouth of the bag will be open when the bag is dwelling under the filling spout 48.

After being filled, each bag 10 is advanced to the closing station 30 where a pair of horizontal heated shoes 53 press and seal the flaps 14 together to close the bag across the top. The shoes 53 are mounted on the upper ends of vertical levers 54 which are fulcrumed on the frame 25 at 55 intermediate their ends and are swung together to form the closing seal 56 when, during a dwell of the bags, the rises on cams 57 on the camshaft 24 engage follower rollers 58 carried on the lower ends of the levers. The bags then are advanced to the end of the machine where the clamps 32 are opened to release the bags which fall into a chute 59.

In accordance with the present invention, the splitter bar 40 is formed with an orifice 60 (Fig. 3) which, when the splitter is engaging the flaps 14 of a bag, communicates with the interior of the bag and provides a passage for the flow of a gas into or out of the bag to vary the spacing of the bag walls 11 and hence the volume of the bag in preparation for a succeeding packaging operation. Preferably, the orifice 60 opens through the bottom edge 47 of the splitter bar and faces downwardly toward the bottom of a bag dwelling under it. In the present instance, the orifice is disposed at a station 61 in advance of the filling station 29 and air under pressure is blown through it and into the bag to separate the bag walls 11 so that the bag will be fully opened and ready to be filled.

While the orifice 60 may be formed by a plurality of small holes spaced along the splitter bat 40, it is preferred to employ a narrow slit substantially equal in length to the width of a bag 10 as shown in Figs. 2 and 4. For this purpose, one side of the splitter bar is hollowed out to form in the vertical plane of the bag a generally triangular recess 62 extending from the bottom edge 47 of the bar up into the enlargement 41. Around the recess along the two legs of the triangle, the bar is cut away leaving narrow shoulders 63 on which is seated a triangular plate 64 riveted to the splitter bar along the shoulders and closing the recess 62 to form the orifice 60. The outer surface of the triangular plate is flush with the side 50 of the splitter bar to provide a smooth guide surface for the flap 14.

To connect the orifice 60 with a suitable source of air under pressure, a nipple 65 is welded or otherwise fastened in place in a hole 65a in the bar at the apex of the recess 62 and receives a threaded connector 66 on one end of an air pipe 67. The other end of the pipe is connected to a valve 68 (Fig. 1) to which compressed air is supplied from a suitable source (not shown) through a supply hose 69 and a pressure regulator 70. The valve 68 is mounted on the frame 25 of the machine near the camshaft 24 and its actuator 71 is moved to open the valve during a dwell of the conveyor 28 by a cam 72 on the camshaft. Preferably, the cam 72 holds the valve open during a major portion of the dwelling period to supply a relatively large volume of air and the pressure regulator 70 is adjusted to supply the air at a comparatively low pressure such, for example, as 20 p. s. i.

For certain applications it is desirable to provide means for holding the flaps 14 against the beveled edges 49 of the splitter bar 40 as the air is admitted to the bag 10 and thereby obtain wide separation of the bag walls or shaping of the bag to a desired contour. Herein this means comprises a pair of rectangular plates 73 bolted flat against opposite sides of the splitter bar and projecting down beyond the lower edge 47 of the bar. The plates 73 extend beyond both ends of the orifice 60 so that the flaps of a bag dwelling at the opening station 61 are held between the beveled edges 49 of the splitter bar and the plates as shown in Fig. 3. If desired, the ends 74 of the plates near the pick-up station 27 may be flared outwardly away from the bar to guide the flaps into the spaces between the plates and the beveled edges 49 of the bar.

In operation, the feed rollers 19 deliver a bag 10 on the end of the strip 15 to the pick-up station 27 where a clamp 32 is dwelling and held open by the cam operated lever 35. As the bag enters this station, the flaps 14 are spread apart by the sharpened end 51 of the splitter bar 40 and straddle the beveled edges 49 of the bar. When the leading edge of the bag is disposed between the jaws of the clamp, the cam 36 permits the lever 35 to swing back closing the clamp and then the cam 23 actuates the cutter 18 to sever the bag from the strip 15. Next, the conveyor 28 is indexed carrying the bag to the opening station 61 below the orifice 60 in the splitter bar. As the bag is moved to the opening station, the flaps 14 move along opposite sides of the splitter bar and are guided along the inner sides of the plates 73.

With the bag dwelling under the orifice 60, the cam 72 opens the valve 68 to place the orifice in communication with the supply of compressed air. The air flows through the orifice toward the bottom of the bag and, since the flaps 14 are held against the splitter bar by the plates 73, the air is held in the bag and, therefore, is effective to separate the bag walls 11. In the next advance of the conveyor 28, the bag is moved to the filling station 29, and, while it is dwelling under the spout 48, the cam 38 closes the switch 39 to start the dispensing device 37 in operation. Since the walls 11 of the bag are separated, the volume of the bag is greater than the volume of the material to be packaged in the bag eliminating the possibility of the dispensed material overflowing during the filling operation. The material drops from the spout to the bottom of the bag which thus fills from the bottom up. After being filled, the bag is advanced step by step to the station 30 where the shoes 53 seal the mouth of the bag closed and then, at the end of the machine, the clamp 32 is opened to drop the bag into the chute 59.

I claim as my invention:

1. In a packaging machine having stations disposed successively along a predetermined path, the combination of, means for gripping and supporting a row of bags open end up in edge to edge but laterally spaced relation, each of said bags comprising front and back walls joined at their edges to points short of the top of the bag whereby to leave the upper ends of the walls free, mechanism for advancing said gripping means horizontally step by step to move said bags edgewise along said path and present said bags one by one to said stations, a dispensing device disposed at one of said stations and operable during a dwell of the bags to discharge a quantity of material into the bag at said one station, an elongated straight splitter bar longer than the width of a bag stationarily supported above said gripping means and disposed along said path in advance of said one station and between said wall ends of at least one of said bags over the full width and length of said ends whereby to hold the ends sep-

arated, said bar having an orifice opening downwardly at the lower edge of the bar and along a substantial part of the width of the bag dwelling under the orifice, and mechanism operated in timed relation to the advance of said gripping means and operable to initiate a flow of gas through said orifice and into the bag engaging said bar to spread the walls of the bag preparatory to filling at said one station.

2. In a packaging machine, the combination of, means for gripping and supporting a row of bags open end up in edge to edge but laterally spaced relation for movement along a predetermined path, each of said bags comprising front and back walls joined at their side edges to points short of the top of the bag whereby to leave the upper ends of the walls free, an elongated straight splitter bar longer than the width of a bag fixedly supported above said gripping means and along said path and disposed between said wall ends of at least one of said bags over the full width and length of said wall ends whereby to hold the latter separated, said bar having an orifice opening downwardly at the lower edge of the bar and along a substantial part of the bag width, mechanism for advancing said gripping means horizontally step by step to move said bags along said path and present the same one by one to a position in which said bar orifice is disposed between the side edges of a bag, means for supplying gas under pressure into said bar and through said orifice, and mechanism for initiating the flow of gas to the orifice in timed relation to the movement of said bags.

3. In a packaging machine, the combination of, means for supporting a generally flat bag for movement edgewise along a predetermined path, said bag having an open end and opposing flaps on the walls at said open end with the flaps extending throughout the width of the bag, a stationary elongated splitter bar longer than the width of the bag disposed along said path and having portions of its sides beveled to a narrow edge, means defining an orifice in said bar and opening through said edge, mechanism for gripping said bag and advancing the same along said bar with the flaps straddling said beveled portions to present the bag to a position in which said orifice opens into the bag, a gas supply line communicating at one end with said orifice and adapted to be connected at the opposite end to a supply of gas under pressure, a valve disposed in said line, and mechanism operated in timed relation with the advance of said bag for opening said valve to initiate a flow of gas through said orifice and into the bag when the bag is disposed at said position.

4. In a packaging machine, the combination of, means for gripping and supporting a row of bags open end up in edge to edge but laterally spaced relation, each of said bags comprising front and back walls joined at their side edges to points short of the top of the bag whereby to leave the upper ends of the walls free, an elongated straight splitter bar longer than the width of a bag stationarily supported above said gripping means and disposed between said wall ends of at least one of said bags over the full width and length of said wall ends whereby to hold the latter separated, said bar having an orifice opening downwardly at the lower edge of the bar and along a substantial part of the bag width, mechanism for advancing said gripping means horizontally step by step to present said bags one by one to a position in which said bar orifice is disposed between the side edges of a bag, power actuated means externally of said bar communicating with said orifice and operable when activated to initiate a flow of gas through said orifice and thereby change the volume of the bag then communicating therewith, and mechanism for activating said flow producing means in timed relation to the movement of said bags.

5. In a packaging machine, the combination of, means for gripping and supporting a row of bags open end up in edge to edge but laterally spaced relation, each of said bags comprising front and back walls joined at their side edges to points short of the top of the bag whereby to leave the upper ends of the walls free, an elongated straight splitter bar longer than the width of a bag stationarily supported above said gripping means and disposed between said wall ends of at least one of said bags over the full width and length of said ends whereby to hold the latter separated, said bar having an orifice opening downwardly at the lower edge of the bar and along a substantial part of the bag width, mechanism for advancing said gripping means horizontally step by step to present said bags one by one to a position in which said bar orifice is disposed between the side edges of a bag, and mechanism operated in timed relation to the advance of said gripping means and operable to initiate the flow of gas through said orifice whereby to vary the spacing of the walls of the bag dwelling in engagement with said bar.

6. In a packaging machine, the combination of, means for supporting a generally flat bag having an open end and opposing flaps on the walls at said open end, said flaps extending throughout the width of the bag, a stationary elongated splitter bar longer than the width of the bag and having portions of its sides beveled to a narrow edge, means defining an orifice in said bar and opening through said edge, two flat plates mounted on said bar alongside said orifice and lying against the sides of the bar, said plates extending beyond said edge and spaced from the beveled portions of the splitter bar sides, mechanism for advancing said bag along said bar with the flaps straddling said beveled portions and with each flap disposed between the adjacent side portions of said bar and the extended portion of the corresponding plate to present the bag to a position in which said orifice opens into the bag, means for guiding said flaps in between said beveled portions and said plates, and mechanism operated in timed relation with the advance of said bag for initiating a flow of gas under pressure through said orifice and into the bag when the bag is disposed at said position.

7. In a packaging machine, the combination of, means for supporting a generally flat bag having an open end and opposing flaps on the walls at said open end, said flaps extending throughout the width of the bag, a stationary elongated splitter bar longer than the width of the bag and having portions of its sides beveled to a narrow edge, means defining an orifice in said bar and opening through said edge, two flat plates mounted on said bar alongside said orifice and lying against the sides of the bar, said plates extending beyond said edge and spaced from the beveled portions of the splitter bar sides, mechanism for advancing said bag along said bar with the flaps straddling said beveled portions to present the bag and with each flap disposed between the adjacent side portion of said bar and the extended portion of the corresponding plate to a position in which said orifice opens into the bag, and mechanism operated in timed relation with the advance of said bag for initiating a flow of gas under pressure through said orifice and into the bag when the bag is disposed at said position.

8. In a packaging machine, the combination of, means for gripping and supporting a row of bags open end up in edge to edge but laterally spaced relation, each of said bags comprising front and back walls joined at their side edges to points short of the top of the bag whereby to leave the upper ends of the walls free, an elongated straight splitter bar longer than the width of a bag stationarily supported above said gripping means and disposed between said wall ends of at least one of said bags over the full width and length of said ends whereby to hold the same separated, said bar having an orifice opening downwardly at the lower edge of the bar and along a substantial part of the bag width, mechanism for advancing said gripping means horizontally step by step to present said bags one by one to a position in which said bar orifice is disposed between the side edges of a bag, mechanism operated in timed relation to the

advance of said gripping means and operable to initiate the flow of gas through said orifice whereby to vary the spacing of the walls of the bag dwelling in engagement with said bar, and means for holding said wall ends against the sides of said splitter bar.

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