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Germunson et al.

[11] **3,822,527**

[45] **July 9, 1974**

[54] **CONTAINER HANDLING APPARATUS**

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[73] Assignee: **Yakima Wire Works, Inc.,** Yakima, Wash.

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[52] **U.S. Cl.** **53/189,** 53/266, 53/385

[51] **Int. Cl.** **B65b 43/36,** B65b 51/04

[58] **Field of Search** 53/37, 52, 187, 188, 189, 53/190, 384, 385, 266

[56] **References Cited**

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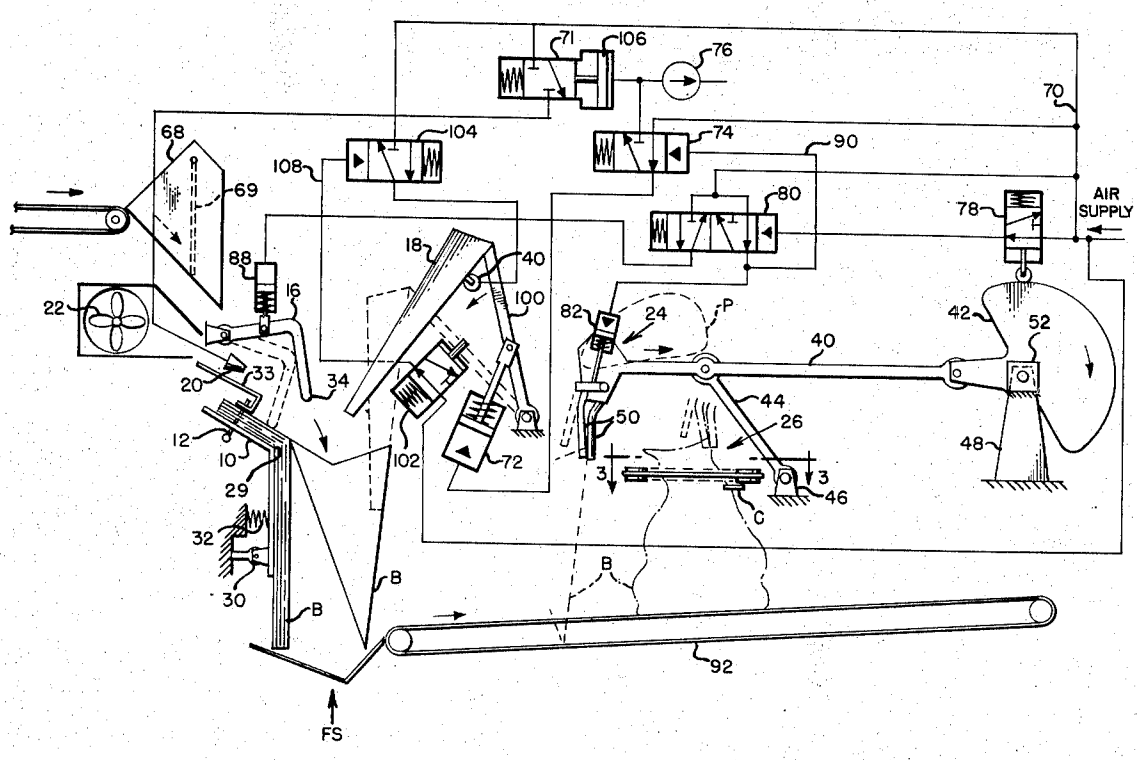
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Primary Examiner—Robert L. Spruill

[57] **ABSTRACT**

Flexible containers, such as polyethylene bags, are held on a standard wicket and are individually opened by a blast of air and the insertion of an expandable scoop. The bag is then filled with material and after a predetermined time a two finger gripping device engages the top edge of the filled bag and the scoop is removed. The bag is then simultaneously released and pulled from the wicket by the gripping means which further pulls the filled bag directly into a bag closing device or a pocket of a collecting conveyor.

10 Claims, 5 Drawing Figures



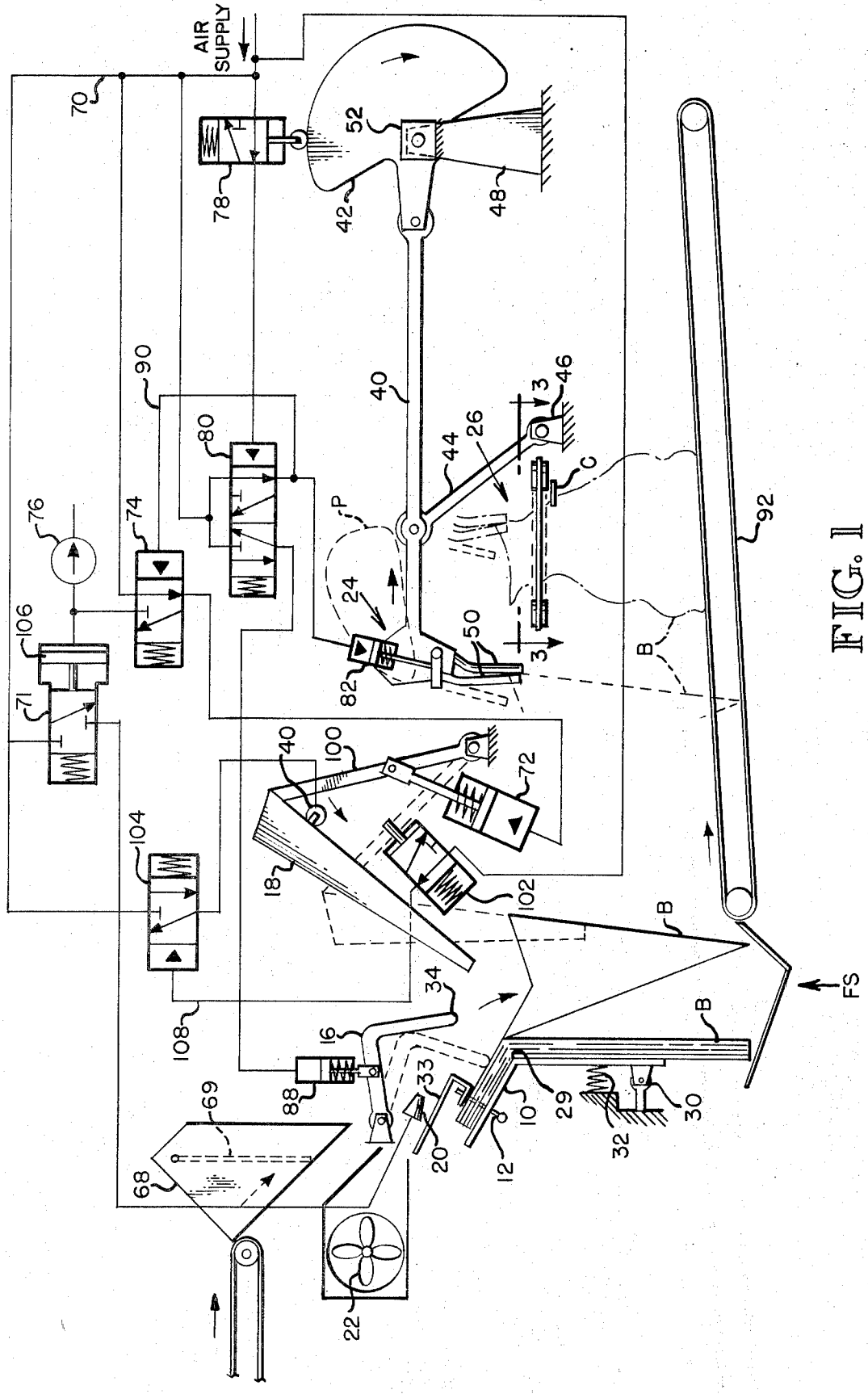

AIR SUPPLY
70
78
52
42
48
90
80
40
46
3
26
44
C
P
24
50
82
76
74
106
71
92
B
100
72
104
18
102
34
108
16
88
33
20
12
10
29
30
32
FS
69
68
22

FIG. 1

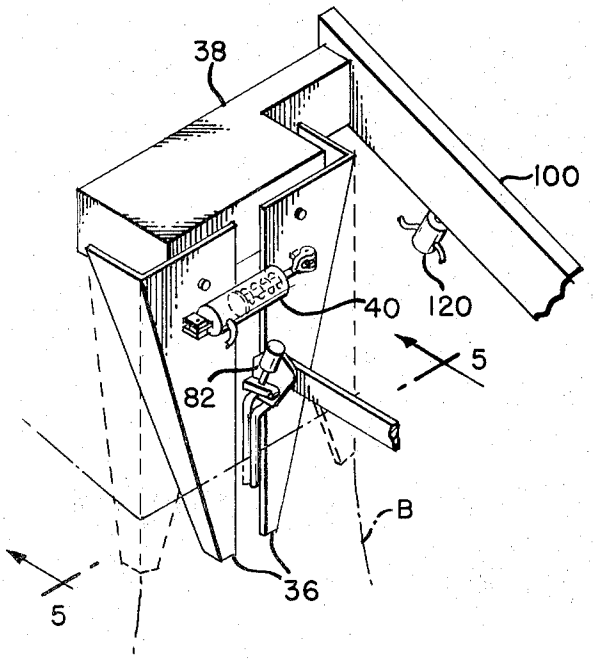


FIG. 2

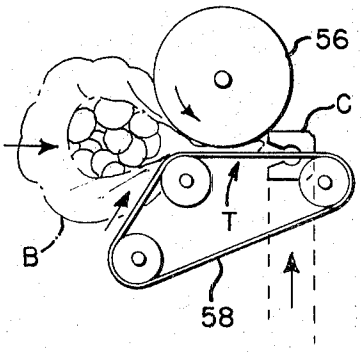


FIG. 3

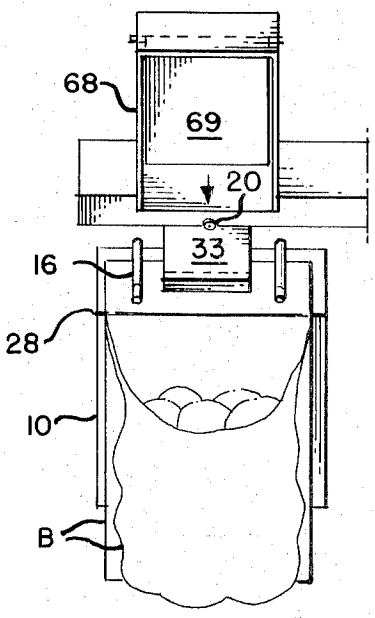


FIG. 5

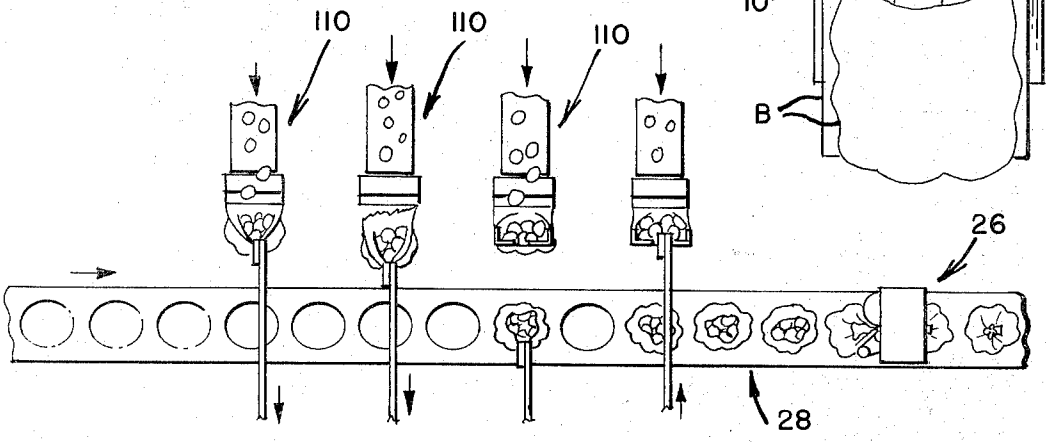


FIG. 4

CONTAINER HANDLING APPARATUS

BACKGROUND OF THE INVENTION

This invention pertains to container handling apparatus and more particularly to apparatus and method for filling and moving a flexible bag into a closing device.

DESCRIPTION OF THE PRIOR ART

Various types of commercial equipment is available for filling flexible bags with oranges, apples and the like. In general, this prior art equipment first fills the bag and after filling the bag is manually fed into a bag closing device or manually placed on a conveyer of some kind for delivery to the bag closing device. The filling and closing procedure requires the use of manual labor and frequently results in the bag being tipped over and its contents spilled.

SUMMARY OF THE INVENTION

It is an object of this invention to provide an in-line filling and closing apparatus and method for flexible containers.

It is another object of this invention to provide a bag handling device in which the bag is automatically filled and pulled by its upper edge directly into the throat of a bag closing device or into a pocket of a collecting conveyor.

It is another object of this invention to provide a bag handling apparatus which is inexpensive to operate and is completely automatic in operation.

Basically these objects are accomplished by providing means for releasably holding a plurality of flexible containers of the type suitable for handling solid articles such as apples, oranges or the like, means for opening the container, means for guiding the articles past the upper edge of the opened container, container closing means, means for gripping the upper edge of the container, pulling the container off the releaseable holding means while supporting the container against falling and moving the container into the pocket of a collecting conveyor or preferably into a container closing means, and control means for releasing said holding means as said gripping means engages the edge of the container and for releasing the gripping means upon delivery of the container into the collecting conveyor or preferably into the container closing apparatus.

The inline feature of the apparatus, that is, the direct movement of the container from the filling position to the closing position as in the preferred embodiment advantageously saves time and unnecessary movements in handling of the container. Where the container will be pulled to a collecting conveyor which delivers the containers from several filling and handling apparatuses to a single bag closing means, the apparatus advantageously operates quickly and with far less mechanisms than prior art handling apparatus.

In the preferred apparatus, the container, a plastic bag, is opened by a blast of air and is held open by an expandable scoop. The scoop is collapsed prior to insertion in the bag and thus has the advantage of avoiding the edges when being inserted in the bag and is then expanded to hold the bag in the open position.

The most important advantage results from movement of the bag by gripping its upper edge with a gripping mechanism. The gripping mechanism holds the bag up while it is moved to the closing apparatus or collecting conveyor thus preventing tipping of the bag and pulls the bag directly between the nip rollers of a conventional bag closing device. The movement is thus direct, simple and positive.

BRIEF DESCRIPTION OF THE FIGURES OF THE DRAWINGS

FIG. **1** is a schematic diagram illustrating the control circuit and components of a container handling apparatus employing the principles of the invention.

FIG. **2** is a fragmentary perspective of the embodiment illustrated in FIG. **1.**

FIG. **3** is a schematic illustration showing placement of a container in a container closing apparatus.

FIG. **4** is a schematic illustration of a modified form of the invention in which several container handling apparatuses feed a pocket-type collecting conveyor.

FIG. **5** is a fragmentary view looking in the direction of the arrows **5—5** in FIG. **2.**

DESCRIPTION OF THE PREFERRED EMBODIMENT

As best shown in FIGS. **1** and **2** the handling apparatus includes a platform **10** for supporting a plurality of flexible containers, such as polyethylene bags B. Bags of this type are normally manufactured and sold to the customer in bundles joined together by a U-shaped wicket **12.** In the handling apparatus of this invention the bags and wicket are then placed against the platform **10** with the open ends of the wicket placed through holes in the platform to hold the bags on the platform. The platform is located at the discharge end of a conveyor **14** which delivers pre-weighed batches of apples, organes or the like to a bag filling station FS. A pair of releasable clamps **16** hold one edge of the bag as the bag is being filled. A two-piece expandable scoop means **18** enters the bag and supports the opposite edge to provide a wide opening for the fruit to enter the bag. The bags are initially opened by a blast of high pressure air from a nozzle **20** and are continually held open by the scoop **18** and air from a fan **22.** Finally the filled bags are removed from the filling area by a gripping means **24** that grasps the edge of the bag, supporting and pulling the bag free of the filling area into either a bag closing device **26** or into a collecting conveyor **28** (FIG. **4**).

The platform **10** is provided with a sharp corner **29** which allows the shorter edge of the bag to be exposed to a stream of air from the nozzle **20** so that the edge is caught by the air and billows outwardly to open the bag. As is well known the conventional bag B in this field has one edge extending up several inches from the opposite edge at the open top of the bag. The longer sides of the bags are then secured together by the wicket **12** and are pressed against the top surface of the platform **10** when installed in the handling apparatus. The supporting platform is hinged at **30** and biased outwardly by a spring **32** so that the bags are continually moved outwardly against a ramp **33** to expose the uppermost bag to the air blast from the nozzle **20.**

The clamps **16** include a pair of legs **34** which are bent to provide a substantial surface in engagement with the top edge of the bag but allow access to the open top of the bag. The clamps support the bag as the articles are introduced into the bag but are lifted when the bag is removed from the filling station.

The scoop means **18** is provided with a pair of scoop halves **36** which are pivoted at their upper ends on a bracket **38.** A cylinder and piston **40** are extendible to open the scoop halves into the position shown in phantom lines in FIG. **2** and upon retraction will draw the scoop halves together to collapse the scoop. When the scoop halves are collapsed they fit easily inside the opened top of the bag and when expanded into the phantom line position the scoop halves support and hold the bag open as well as guide the articles into the bag.

As best shown in FIG. **1,** the gripping means **24** includes an elongated arm **40** which is pivoted at one end on a cam **42** and slightly in from its free end is pivoted to a link **44.** The link **44** and the cam **42** are respectively pivoted on bases **46** and **48.** The free end of the arm **40** is secured to a pair of gripping fingers **50** that can be opened into the phantom line position shown in FIG. **1** for engagement with the edge of a bag and are closed as in the solid line position to tightly grip the edge of the bag. The gripping means is shown in FIG. **1** spaced to the right of the bag filling station for purposes of clarity in the drawings. It should be understood, however, that in actual construction the bases **46** and **48** are placed closer to the bag supporting platform **10** so that the gripping fingers **50** are movable into engagement with the upper edge of the bag B in the filling station FS. A motor through a conventional gear reduction and single revolution clutch unit **52** drives the cam **42** to position the fingers for movement along a path P. As is apparent the fingers move downwardly over the exposed edge of the bag between the scoop halves **36** and, after closing, draw the bag outwardly from the platform **10** in a straight line motion into the bag closing device **26.**

The bag closing device **26** can be of any conventional construction. A preferred closure being a unit manufactured by Qwik Lok Corporation of Yakima, Washington. As is well known this type of closure employs a rubber disc **56** and a belt **58** which come together in a throat T (FIG. **3**). The fingers **50** pull the opened bag into the throat allowing the disc and belt to gather the neck of the bag and force it into a plastic clip C of the type employed with this type of bag closing equipment. The fingers draw the bag positively well into the throat before releasing the bag so that there is little possibility of the neck of the bag not being properly fed into the bag closing machine.

The operation of the apparatus will now be described with reference to the pneumatic circuit shown in FIG. **1.** Articles, such as apples, are pre-weighed and batched upstream on the conveyor **14** in any conventional manner and are fed off the conveyor when a bag is in position to be filled. The batch of apples pass through a tray **68** and lift a flap **69.** The flap is connected to a switch which sends a signal to operate the clutch for one revolution of the cam **42.** The cycle is started with the clamps **34** down holding the edge of the bag and the clutch is energized to begin revolving the cam **42** in a clockwise direction. At this time the fingers **50** will be opened and the arm **40** pulled back from the feeding station FS. Air is fed from a high pressure supply line **70** through a valve **71** to the jet nozzle **20** directing a high pressure blast of air against the exposed shorter edge of the bag **80,** opening the bag. The fan **22** is continuously operating to maintain the bag in an open position. The scoop halves **18** are collapsed and placed in the bag.

Once the cycle is continuously being repeated, the scoops will thenceforth be slowly lowered by a spring in a valve **72** forcing air through a valve **74** and thence out through a restriction valve **76.**

When cam **42** engages a main control valve **78,** as in the solid line illustration of FIG. **1,** air from the supply line **70** is passed through the valve **78** to a spring biased pilot controlled valve **80.** The valve **80** is shifted to the left to allow pressurized air to enter the cylinder **82** pivoting the fingers into a closed position engaging the edge of the filled bag. Air is simultaneously allowed to vent from the cylinder **88** raising the clamps **34.** Air from the valve **80** also passes through a bypass line **90** to the spring biased pilot operated valve **74** to admit air to the cylinder **72** to quickly raise the scoops **18.** Thus at this point in the cycle a filled bag is gripped by the gripping means **24** and is being pulled onto a conveyor **92** with both the clamps **34** and the scoop **18** removed from the bag. When the scoop halves are raised, the lever arm **100** which carries the halves releases a spring biased valve **102,** moving the valve core to the right to connect line pressure to a spring biased pilot operated valve **104,** thus moving its core to the right, and venting the cylinder **40** to allow the spring within the cylinder **40** to close the scoop halves **36.** The scoop halves are closed quickly as the scoops begin to rise to avoid damaging the bag. The controls stay in this position while the fingers gripping the bag are pulled away from the feed station along the conveyor **92** into the throat of the bag closing device.

Assuming a continuous recycling of single revolution clutch, the cam **42** then comes away from the valve **78.** The core of valve **78** moves downward, venting valve **80,** again directing line pressure to cylinder **88** to lower the clamps on the next bag, the cylinder **82** is vented through valve **80** to open the fingers **50** and cylinder **72** is connected to the restriction valve **76.** Air from cylinder **72** immediately moves a low pressure piston **106** to the left in valve **71** connecting air jet nozzle **20** with the air supply line **70.** As the air continues to bleed out of cylinder **72,** through valve **74** and the restriction valve **76** the low pressure piston remains to the left but as the supply of air in cylinder **72** is exhausted the spring of valve **71** moves the low pressure piston to the right terminating the supply of air to the nozzle **20.** When the air is exhausted from cylinder **72** the scoops **18** will be fully inserted into the bag and the arm **100** will have moved the valve **102** to the left thus connecting line **108** to vent through valve **102.** Venting the pilot of valve **104** will move the valve to the left directing high pressure air into the cylinder **40** opening the scoops inside the bag. When the cam **42** again engages the valve **78** the cycle is repeated as earlier described.

In some installations it may be more desirable to use several bag handling apparatuses **110** identical in construction with that of the preferred embodiment. Rather than pull the filled bags to the throat of a bag closing, however, the bags will be pulled into pockets of a conventional pocket conveyor **28.** This type of conveyor has a plurality of downwardly extending pockets which are slightly less in depth than the height of the bag so that once the bag is delivered to the pockets of a conveyor the fingers are released and the bag can then be collected and moved to a single bag closing device **26.**

While the preferred embodiment of the invention has been illustrated and described it should be understood that variations and modifications will be apparent to one skilled in the art without departing from the principles of the invention. Accordingly, the invention is not to be limited to the specific embodiments described.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Container handling apparatus comprising means for releasably holding a plurality of flexible containers adapted for holding solid articles and having a closed bottom and opposite upper edges, means for opening the container, means for feeding the articles past the upper edges into the opened container, container closing means, means for gripping an upper edge of the container and pulling the container off the releasable holding means while supporting the container against falling and moving the container toward said container closing means, and control means for releasing said holding means as said gripping means engages the edge of the container.

2. The handling apparatus of claim **1** said container opening means including scoop means insertable into said container and expandable to enlarge the interior of the container.

3. The handling apparatus of claim **1** said gripping means including a set of fingers engageable on the inner and outer sides of said upper edge.

4. The handling apparatus of claim **1** said container holding means holding one said upper edge of said container, said gripping means gripping the opposite edge, and said gripping means being movable in a vertical plane at right angles to said holding means, whereby said container is adapted to be moved in a straight line to said container closing means.

5. The handling apparatus of claim **4** said bag opening means including air blast means for separating said opposite edges, fan means for holding the container open and scoop means insertable into said container and expandable to enlarge the interior of the container.

6. The handling apparatus of claim **5** said gripping means including a set of fingers engageable on the outer and inner sides of said upper edge.

7. The handling apparatus of claim **1** said releasable holding means including a platform having a bend over which the containers are laid and clamp means engageable with the containers for pressing them against said platform.

8. The handling apparatus of claim **1** said container closing means including a collecting conveyor for carrying a plurality of filled containers.

9. The handling apparatus of claim **1,** said container holding means holding one said upper edge of said container, said gripping means gripping the opposite edge, and said gripping means being movable to pull said container directly to said container closing means.

10. Container handling apparatus comprising means for releasably holding a plurality of flexible containers adapted for holding solid articles and having a closed bottom and opposite upper edges, means for opening the container, means for feeding the articles past the upper edges into the opened container while being held by said releasable holding means, container closing means, means for moving the container to said container closing means, said moving means including means for gripping by squeezing the inside and outside surfaces of an upper edge of the container and pulling the container off the releasable holding means while supporting the container against falling, and control means for releasing said holding means as said gripping means engages the edge of the container.

* * * * *