March 16, 1971 M. SALWASSER 3,570,209

CASING APPARATUS AND METHOD

Filed Oct. 15, 1969 2 Sheets-Sheet 1

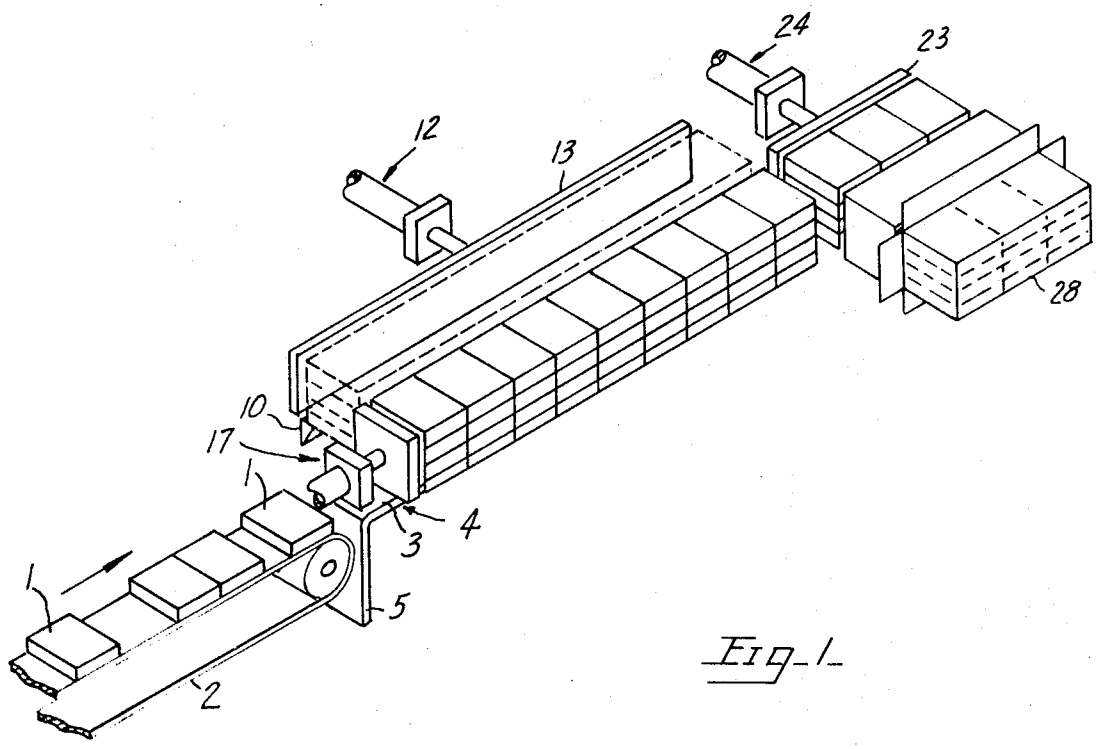


Fig. 1

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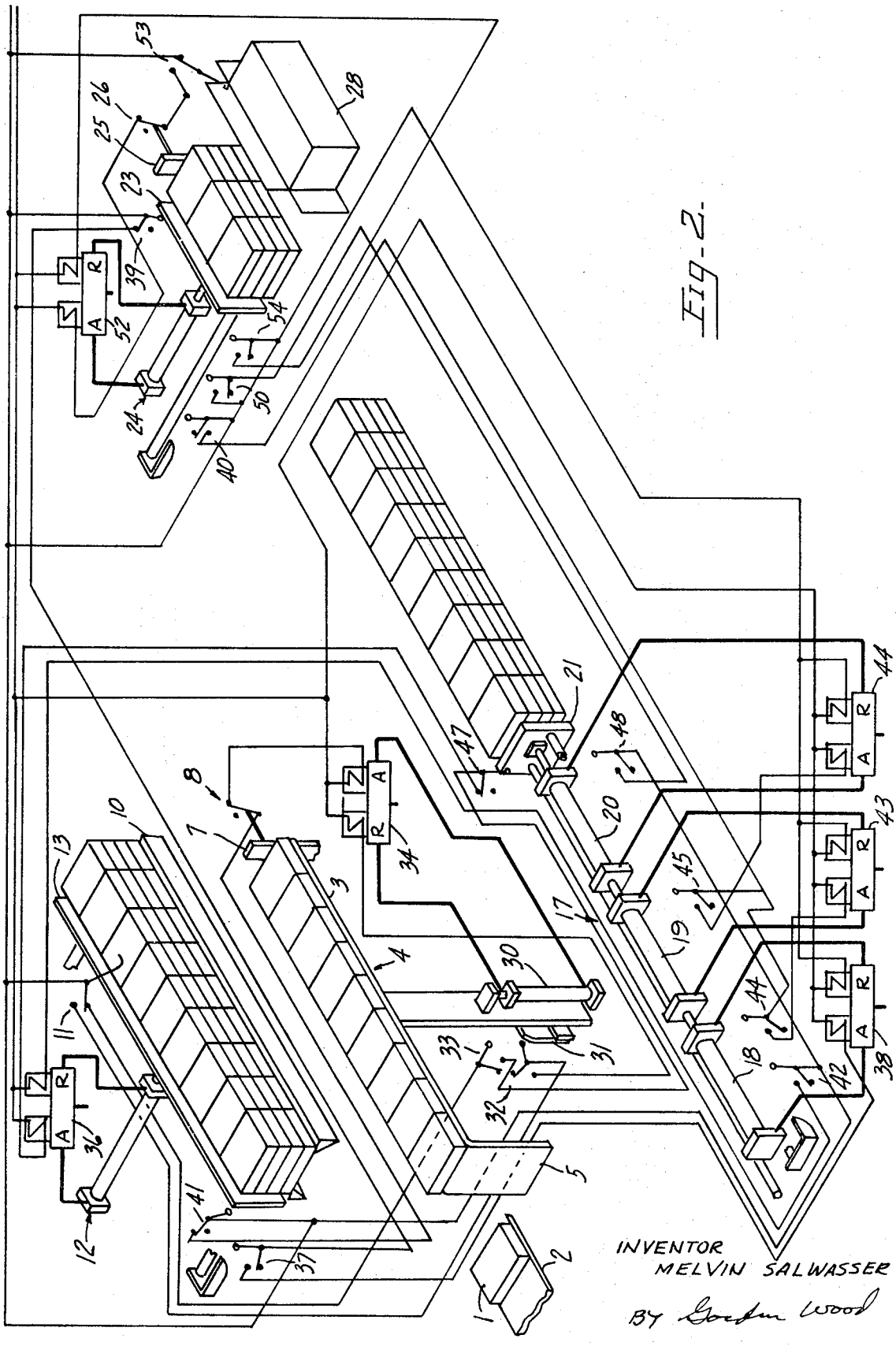


FIG. 2.

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CASING APPARATUS AND METHOD

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ABSTRACT OF THE DISCLOSURE

A case load of stacked articles is provided by elevating a plurality of articles in a horizontally extending row and repeating the elevating step until a row of stacks is formed. The row of stacks is then shifted laterally to an offset position as a unit and then moved in a direction longitudinally of the offset row to provide caseloads of stacked articles. By providing means for elevating a relatively large number of articles at one time and collecting a number of stacks in an offset position a relatively high casing speed is achieved.

This invention relates to a method and apparatus for casing similarly shaped articles such as cartons. It is customary to arrange a caseload of articles in stacks and insert such caseload into a paperboard case by means of a power driven case loading ram. See, for example, U.S. Pat. Nos. 2,941,339 and 3,097,577. However, in order to achieve a high speed in loading the cases it is necessary to be able to accumulate at the same speed or an ever higher speed the number of articles constituting the contents of the case.

The main object of the present invention is the provision of a method and apparatus for collecting, at a relatively high rate of speed, the contents of a case and providing stacks of articles so that a number of stacks constituting a caseload may be arranged at the case loading ram for insertion into the case.

Another object of the invention is the provision of a method and apparatus for conveying articles at a high speed to an orientation station at which they are arranged into stacks so as to be readily available for insertion into the case by the case loading ram.

Other objects and advantages of the invention will be apparent from the following specification and from the drawings.

FIG. 1 is a semischematic perspective showing a preferred embodiment of the apparatus.

FIG. 2 is a schematic piping and wiring diagram for the apparatus of FIG. 1 with the various portions of the apparatus expanded relative to each other for clarity.

Articles such as cartons indicated at **1** are conveyed to the apparatus of the present invention by a conventional conveyor **2** which feeds the articles onto the platform **3** of a lift generally designated **4** which includes downwardly extending rear flange **5** to act as a stop for the articles **1** when the lift **4** is elevated out of its normal lower position.

When the number of articles for which the lift **4** is designed have been loaded on the lift from conveyor **2** the forward article of the row actuates a lever **7** (FIG. 2) which closes a switch **8** to initiate upward movement of the lift. The vertical stroke of lift **4** is sufficient to urge the row of articles thereon to a position past a pair of spring urged pivoted detents **10** which serve to hold the elevated row while the lift **4** returns to its lower position.

After a plurality of rows have been elevated to form stacks having a predetermined number of tiers, a switch **11** is actuated by one of the top cartons of the stacks to cause the advance of cylinder **12** provided with a pusher plate **13**. The stroke of cylinder **12** is suffiicent to offset the stacks on detents **10** to a position spaced from the vertical plane of the conveyor **2** and detents **10**. The cylinder **12** is then retracted to await the completion of the next row of stacks.

When the stacks of cartons are in their offset position they are acted upon by a plural stage ram which may consist of two or more cylinders arranged in series. In the embodiment disclosed herein three cylinders are connected in alignment to constitute the feeding ram **17** and said cylinders are designated **18, 19** and **20**. The details of ram **17** are not shown, but it will be understood that means are provided for supporting cylinders **19, 20** for axial translation so that cylinders **19, 20** as a unit may be pushed by the advance of the piston of cylinder **18** and similarly cylinder **20** may be pushed by the advance of the piston of cylinder **19**. In the particular arrangement disclosed, all three cylinders are returned to their retracted position simultaneously. The first actuation of ram **17** is the advance of cylinder **18** which has a sufficiently long stroke to cause the pusher plate **21** of ram **17** to engage the trailing stack of cartons in the offset position and move the row of stacks to a position so that the first three stacks in this case are in registration with the pusher plate **23** of a case loading ram generally designated **24**. The presence of the forward stack of the row is detected by a pivoted lever **25** which actuates a switch **26** to close a circuit to advance ram **24** so as to load the forward stack into a case **28**.

Upon retraction of the case loading ram **24** the next three stacks of the row are pushed by ram **17** to case loading position and the above described operation is repeated. In a similar manner the last three stacks are advanced to the case loading position.

Considering the apparatus in somewhat greater detail, the lift **4** is actuated by a vertically disposed cylinder **30** and includes a switch actuator **31** which, in the advanced position of cylinder **30**, closes a pair of switches **32, 33**. The closing of switch **32** completes a circuit through the retract end of a four-way valve **34** which reverses the cylinder **30** and causes the lift **4** to move downwardly to its lower position. (In FIG. 2 the "Retract" and "Advance" ends of four-way valves are marked "R" and "A" respectively.) When the above mentioned switch **11** has been actuated by a complete stack of cartons a circuit is completed through switch **33** which is closed by the advance movement of cylinder **30** so as to complete a circuit through the advance end of four-way valve **36** to advance the cylinder **12** moving the row of stacks to their offset position. Advance of lift **4** is prevented, except when cylinder **12** is retracted, by means of switch **41** which is closed by pusher plate **13** of cylinder **12** in its retracted position.

The advance of cylinder **12** causes a switch **37** to be closed which completes the circuit through the advance end of valve **38** thereby advancing cylinder **18** of the ram **17**. However, the circuit of the advance end of cylinder **18** also includes a safety switch **39** which is closed by the pusher plate **23** of cylinder **24** when said pusher plate is in its retracted position. By this arrangement it is impossible for the ram **17** to advance until the case loading cylinder **24** has been retracted. The circuit of the retract end of four-way valve **36** includes a switch **42** actuated by the first advance of ram **17** thus holding the cylinder **12** in retracted position while ram **17** is operating. The advance side circuit of cylinder **12** includes a switch **47** which is closed by the pusher plate **21** of ram **17** in its retracted position.

After the first group of three stacks has been inserted in the case **28** the return of case loading cylinder **24** to its retracted position causes actuation of switch **40** to complete a circuit through the advance end of the second stage valve **43**. Actuation of valve **43** is prevented, except after completion of the first stage, by a switch **44** which is closed when the ram **17** has completed its first stage through actuation of cylinder **18**.

The last group of three stacks is advanced to the case loading station by the third cylinder **20** of ram **17** which in turn is actuated by a four-way valve **44** also controlled by safety switch **40** and by a switch **45** which is actuated by the ram **17** completing the second stage.

Reversal of the ram **17** to its retracted position is initiated by the closing of a switch **48** when the ram **17** has been advanced to its most advanced position. Also in the circuit that energizes the retract ends of valves **38**, **43** and **44** is a switch **50** which is closed by movement of the case loading cylinder to its advance position.

The circuit which energizes the advance end of four-way valve **52** controlling cylinder **24** includes, in addition to the above noted switch **26**, a switch **53** which is closed by case **28** when the latter has been positioned in its proper position for receiving the caseload. The retract end of valve **52** controlling cylinder **24** is actuated by the engagement of the ram of cylinder **24** with a switch **54** signalling the completion of the case loading step.

The embodiment of the invention disclosed herein is obviously only one of many patterns which may be employed in using the invention. Instead of feeding three stacks to the case loading ram at each step more or less stacks may obviously be fed, the important advantage provided by the invention being the fast orientation of caseloads at an intermediate point between the conveyor **2** and the case loader. Instead of one row of cartons on conveyor **2** it will be apparent that a plurality of rows may be provided for to further increase speed.

I claim:

1. In the method of casing stacks of articles, the steps of:

conveying articles in single file to an elevating station to form a row of articles of a predetermined number,

successively elevating rows of articles to form a row of stacks having a predetermined number of tiers,

offsetting said row of stacks as a unit horizontally to an intermediate position,

successively and intermittently moving said row as a unit from said intermediate position in a direction

longitudinally of said row and in an amount equal to a predetermined group of articles constituting a fractional part of said row, and

successively and intermittently offsetting each group horizontally out of the vertical plane of said row.

2. The method of claim **1** wherein said group is inserted into a case at said last mentioned offsetting step.

3. The method of claim **1** wherein said row has at least twice the number of articles as a group.

4. The method of claim **2** wherein two rows of articles are conveyed in single file to said elevating station and simultaneously elevated to form two rows of stacks, and wherein said two rows are simultaneously moved as a unit and two groups offset to case two layers of articles.

5. Casing apparatus comprising:

conveyor means for conveying articles in single file to form a row of articles of a predetermined number,

elevator means for successively elevating rows from said conveyor means to form a row of stacks having a predetermined number of tiers,

first pusher means for offsetting said row of stacks horizontally to an intermediate position,

second pusher means for intermittently moving said row of stacks in a direction longitudinally of said row and in an amount at each movement equal to a fractional part of the length of said row,

third pusher means for inserting said amount equal to a fractional part of the length of said row into a case.

References Cited

UNITED STATES PATENTS

2,924,051	2/1960	More	53—26
2,956,381	10/1960	Chauvin et al.	53—26

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