J. H. WITT.

MACHINE FOR CLOSING AND SEALING THE TOPS OF FILLED CARTONS.

APPLICATION FILED FEB. 14, 1911.

1,036,399.

Patented Aug. 20, 1912.

2 SHEETS—SHEET 1.

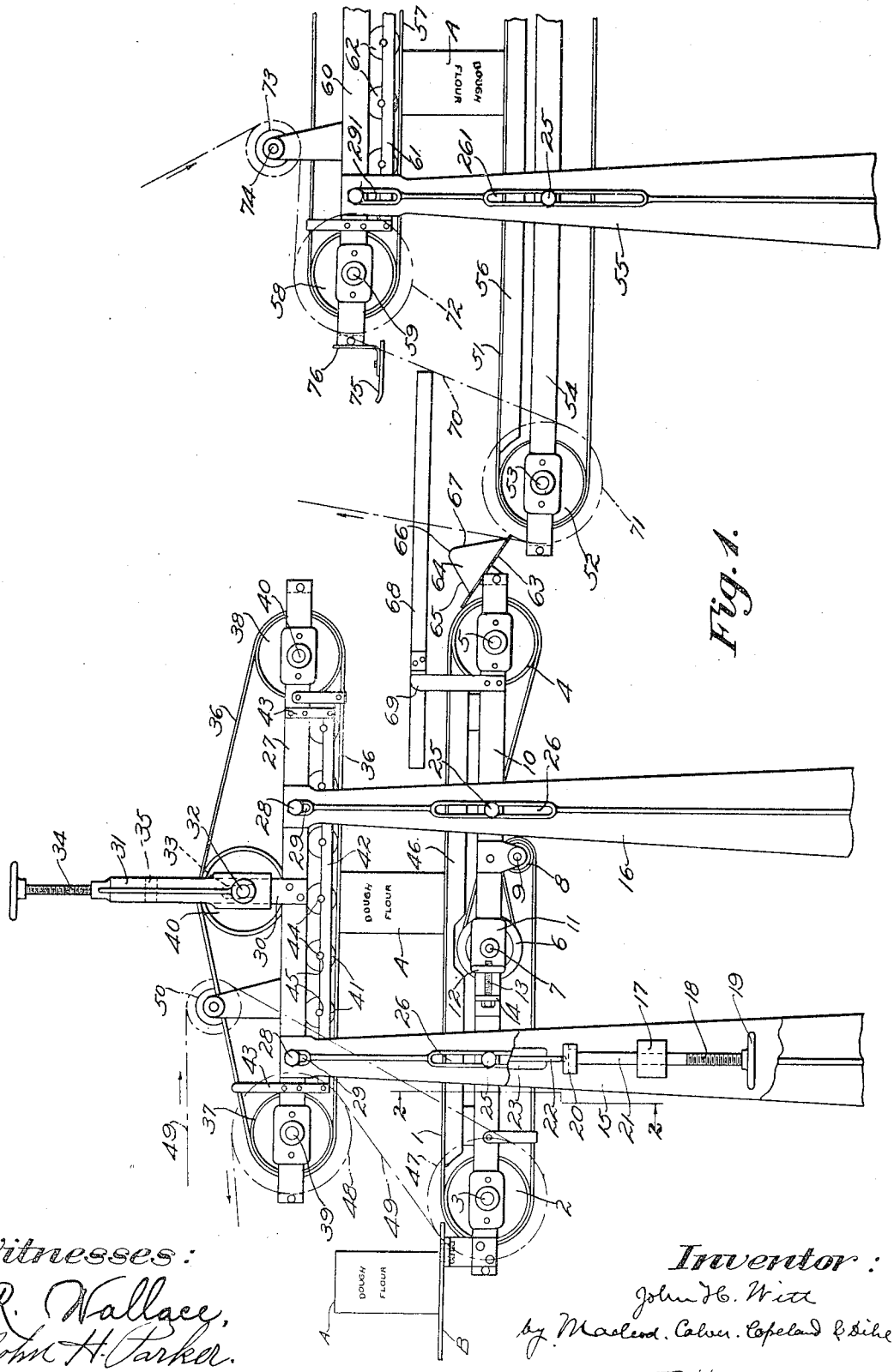

Fig. 1.

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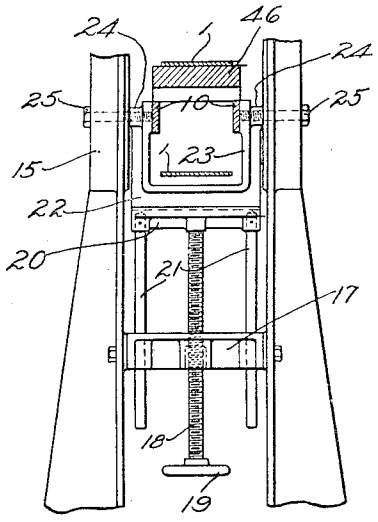

Fig. 2.

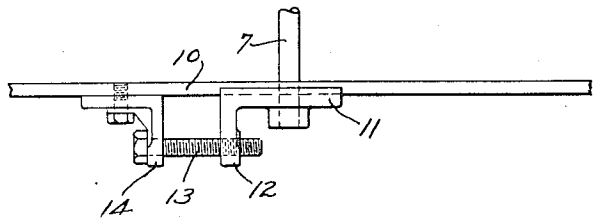

Fig. 3.

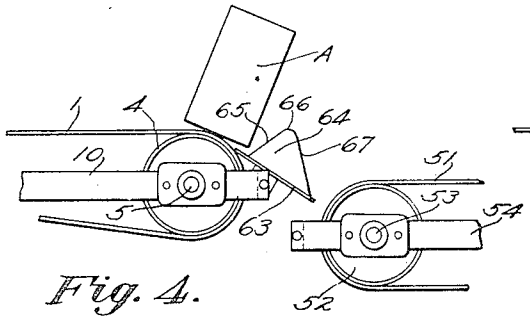

Fig. 4.

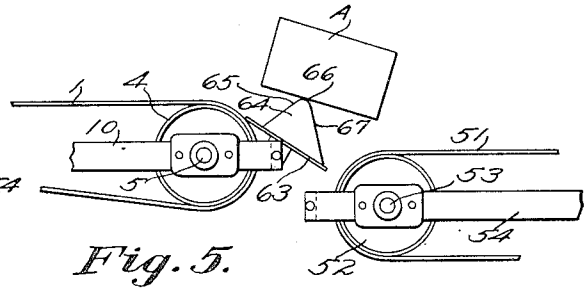

Fig. 5.

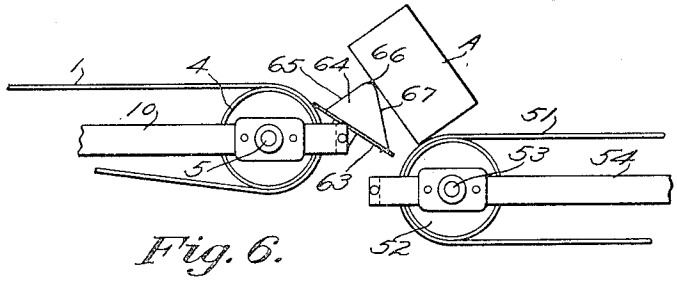

Fig. 6.

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UNITED STATES PATENT OFFICE.

JOHN H. WITT, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO PNEUMATIC SCALE CORPORATION LIMITED, OF QUINCY, MASSACHUSETTS, A CORPORATION OF MAINE.

MACHINE FOR CLOSING AND SEALING THE TOPS OF FILLED CARTONS.

1,036,399. Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed February 14, 1911. Serial No. 608,590.

To all whom it may concern:

Be it known that I, JOHN H. WITT, a citizen of the United States, residing at Boston, in the county of Suffolk, State of Massachusetts, have invented a certain new and useful Improvement in Machines for Closing and Sealing the Tops of Filled Cartons, of which the following is a specification, reference being had therein to the accompanying drawings.

In putting up package goods in cartons by machine after the carton has been filled it is necessary to fold in and seal the top closing flaps of the carton. Mechanism for doing this has been heretofore employed and after the flaps are glued and folded it is important that the flaps should be held in folded contact with each other by pressure for a period of time so that the flaps will not spring back before the glue sets. Mechanism for doing this has sometimes been employed. One form of mechanism for closing and sealing the flaps and holding them under pressure while the glue sets is shown in United States Patent, No. 930,090, dated August 3, 1909, granted to Pneumatic Scale Corporation Limited, on the application of William S. Scales. This pressure mechanism is usually applied to the flaps while the carton is being conveyed away from the filling mechanism for economy so as not to interfere with the filling and sealing and removing of the following packages. The apparatus for conveying and pressing the filled cartons is usually termed the drier.

There are usually four flaps which form the top end of the carton, that is two end flaps and two side flaps. It has been found by experience that sometimes on account of the carton not being filled solid full or sometimes on account of the yielding character of the contents of the carton, when pressure is applied to the outermost folded and gummed flap to press it down upon the others for sealing, the under flaps yield slightly under the pressure on account of the hollow space or softness of the material in the top of the package and thus the under flaps are pressed down away from the outermost flaps, whereas there should be a solid inside backing or support to prevent the innermost flap from yielding under the pressure upon the outermost flap.

The object of the present invention is to provide mechanism whereby the filled carton while passing through the drier mechanism may be inverted so that the top of the carton containing the freshly glued and folded flaps will then be at the bottom and outside pressure will be again applied while the weight of the material in the package will form a downward pressure opposed to the resistance or upward pressure on the under side. The main purpose is to have two opposing surfaces against opposite ends of the carton and to apply pressure to one of them for a period while the carton is in motion, then to automatically invert the carton and again apply pressure to one of two opposing surfaces bearing against opposite ends of the inverted carton. It is not of so much importance as to whether the presser mechanism is applied directly on the top or bottom, as it will be transmitted to the other end by reason of the squeezing effect between the two opposing top and bottom surfaces. As shown in the drawings and described in the specification, the direct pressure is applied in both instances from above, but it is to be understood that it may be applied on the reverse end and still be within the scope of the invention and claims.

The invention will be fully understood from the following description taken in connection with the accompanying drawings, and the novel features will be pointed out and clearly defined in the claims at the close of the specification.

In the drawings,—Figure 1 is a side elevation of a machine embodying the invention. Fig. 2 is a partial end elevation from the left of Fig. 1. Fig. 3 is a detail plan view, enlarged showing the means for tightening the belt. Figs. 4, 5 and 6 are detail views in side elevation showing different stages in the tumbling movement of the carton.

Referring now to the drawings;—A represents a carton which is delivered by any suitable means from the shelf B of a filling and sealing portion of the machine, (which is not shown) onto a traveling belt 1 which conveys the packages part way through the drier. Said belt 1 is a continuously traveling belt and may be supported and driven in any suitable manner. As shown in the drawings the belt passes around a pulley 2 mounted on shaft 3, a pulley 4 mounted on the shaft 5, around an idler pulley 6 mount-

ed on shaft 7 and around an idler pulley 8 mounted on shaft 9. The pulleys 6 and 8 are for the purpose of giving tension to the belt, the pulley 6 being adjustable with relation to the pulley 8 for the purpose of varying the tension. The several shafts 3, 5, 7 and 9 are journaled in bearings supported by the two parallel rails 10, 10. The bearing 11 for the shaft 7 is adjustable longitudinally on the rail 10 by any suitable means. As shown in the drawings the bearing 11 is formed with a lug 12 which has a screw-threaded hole to receive a bolt. A bolt 13 passes through an angle plate 14 secured to the rail 10 and engages with the threaded hole in the lug 12 so that by turning the bolt 13 the bearing 11 may be moved toward or from the angle plate 14 thereby varying the position of the shaft 7 and pulley 6 and thereby varying the tension of the belt 1.

The rails 10 are adjustably supported between the two pairs of columns 15, 15, 16, 16, in such manner that the rails may be raised or lowered. The means for supporting and adjusting the rails are as follows:—Inasmuch as the supporting and adjusting mechanism is the same for each set of columns 15, 16, the same numerals will be used to designate the corresponding parts of each set of columns, as far as convenient. Each pair of columns is tied together by a cross bar 17 which has a vertical screw threaded aperture for the passage of a screw-threaded rod 18 midway between the two columns. The lower end of the rod is provided with a wheel or handle 19 for the purpose of rotating the rod. A table 20 rests on top of the rod 18, preferably being formed with a recess in the under side to receive the end of the rod. In order to prevent the table 20 from turning with the rod 18 and to maintain it in straight position two studs 21 extend down from the under side of the table 20 on opposite sides of the rod 18 and pass loosely through holes in the cross bar 17. A U-shaped fork 22 rests on the upper side of the table 20 and is formed with inside web portions 23 which are thickened at their upper end to which the two parallel rails 10, 10, are secured. The upper ends of the fork 22 are formed with bosses 24 which have threaded holes extending into the thickened upper portions of the web 23 to receive the screw bolts 25 which pass through slots 26 in the columns 15 and engage with said screw-threaded holes in the bosses 24 and webs 23. These bolts 25 are provided with heads which bear against the outside of the slots 26 so that by setting up the bolts the fork will be clamped firmly against the side of the columns 15. The slots 26 are elongated vertically. By loosening the bolt 25 the rod 18 may then be turned so as to elevate the rod and the table 20 and therefore the fork 22 may be raised and also by turning the rod 18 in the reverse direction the rod will be lowered and the table and fork will be lowered. The bolts 25 lock the rails and fork in position after they have been adjusted by the rod 18.

At some distance above the rails 10 is another pair of rails 27 parallel with each other supported by bolts 28 passing through slots 29 in the columns 15, 16 engaging with threaded holes in the rails. The slots 29 are vertically elongated so that the rails 27 may be raised and lowered, and when adjusted they are clamped in position by setting up the bolts 28. Secured to each rail 27 is an upright member 30. A fork 31 which is of inverted U-shape has one leg extending down on the outside of one of the uprights 30 and the other leg extends down on the outside of the other upright 30, that is the two uprights 30 are embraced between the two legs of the fork. A shaft 32 is journaled in the lower ends of the legs of said fork 31 and passes through a vertically elongated slot 33 in each of said uprights 30 so that the shaft 32 and the fork 31 may be adjusted vertically with relation to the uprights 30.

A block or cross bar 35 extends crosswise between the two uprights 30 and is secured to said uprights. An adjusting screw 34 passes down through a threaded hole in the head of the fork 31 and its lower end bears upon the block 35, said cross block 35 and the uprights 30 being immovable after the rails 27 are clamped in their adjusted position. Inasmuch as the screw 34 does not move longitudinally if it is rotated in one direction it will have the effect of raising the fork 31 and if rotated in the other direction it will have the effect of depressing the fork 31 to the extent allowed by the elongated slot 33. By raising or lowering the fork 31 the shaft 32 is raised or lowered.

A belt 36 passes around over the two end pulleys 37, 38, mounted respectively on shafts 39 and 40 journaled in bearings mounted upon the rails 27. Said belt also passes over the pulley 40 mounted on shaft 32. By raising said shaft 32 in the manner previously described said pulley 40 may be raised to increase the tension of belt 36.

A series of rollers 41 are journaled loosely in rails 42 which are hung from the rails 27 in any suitable manner, as for instance, by hangers 43. These rollers are journaled in the rails 42 so that the rollers may yield up and down in their bearings to the upward pressure of the belt which runs beneath them and in contact therewith. As shown in the drawings the shafts 44 of the rollers 41 rest in half round notches 45 in the upper edge of the rails 42 so that the shaft and rollers may be raised and dropped back again into their bearings without moving the rails.

The space between the lower run of the belt 1 on which the cartons are carried should be very slightly less than the height of the carton so that the downward pressure of the rollers 41 upon the lower run of the belt 36 will cause the belt to bear with a yielding pressure upon the folded flaps on the upper end of the carton.

The upper run of the belt 1 slides on a rigid horizontal support or table 46 so that the upper run of the belt 1 which carries the cartons cannot sag but will be maintained in a perfectly straight plane, and at a constant elevation. The said support 46 is mounted on the rails 10 so that when the rails 10 are raised or lowered to adjust them, the support 46 will also be raised or lowered at the same time but when the rails are clamped in their adjusted position the support 46 will also be fixed.

The belts 1 and 36 should travel at an equal speed with each other and may be driven in any suitable way. When the apparatus of the present invention is used directly with a sealing machine it is preferable to have the said belts driven uniformly with the carrier of the sealing machine. As shown in the drawings a sprocket wheel 47 is mounted on the shaft 3, a sprocket wheel 48 is mounted on shaft 39, a sprocket chain 49 passes over said sprockets 47 and 48 and over an idler 50 thence the chain is shown broken off but it may pass around any suitably driven sprocket wheel which if desired may be driven by the same mechanism which drives the carrier of the sealing mechanism.

The belts 1 and 36 are driven slowly so that as the carton passes the length of travel allowed by said belts, the glue of the top closing flaps of the carton will have time to become partially set before it is tumbled over into the inverted position on the next belt, otherwise the flaps will spring back during the tumbling. After the carton is carried by the belt 1 to the turning point where the belt runs around the forward pulley 4 the carton will tip and is turned end over end by means which will be hereinafter described onto another belt 51 so that the carton will stand on the belt 51 bottomside up. Said belt 51 is run over pulleys in such manner that the upper run of the belt 51 will be on a lower level than the upper run of the belt 1. As shown said belt 51 runs over a pulley 52 at one end and over a similar pulley at the other end (not shown because the belt is broken away) said pulley 52 being mounted on a shaft 53 journaled in bearings mounted on two parallel rails 54 in a similar manner to that in which the pulleys 2 and 4 are carried by the rails 10. The forward pulley, not shown, over which the pulley 51 runs is similarly supported. The rails 54 are adjustably supported between columns 55 and between another pair of forward columns similarly constructed but not shown in the same manner as the rails 10 are supported. The same numerals are used to indicate the corresponding parts in the columns 55 and the said supporting parts as already described with relation to the columns 15 and 16 as far as convenient. The elongated slot 261 in the column 55 corresponds with the elongated slot 26 in the column 15 and the elongated slot 291 corresponds with the slot 29 in the column 15 except that preferably the slots 261 and 291 are longer than the slots 26 and 29 in order to give a greater range of adjustment although it is obvious that in both cases the slots may be of equal length if made sufficiently long to afford the requisite range of adjustment. The upper run of the belt 51 slides on a rigid support 56 which is raised or lowered when the rails 54 are raised or lowered the same as described with relation to the support 46.

The belt 57 passes over pulley 58 and over a forward pulley, not shown, said pulley 57 and said forward pulley being mounted on shafts 59 journaled in bearings mounted upon rails 60. Said rails 60 are mounted and adjustably connected with the columns in the same manner as the rails 27 were mounted with relation to the columns 15 and 16. Hung from the rails 60 are another pair of rails 61 in the same manner as the rails 42 are hung from the rails 29. Journaled on said rails 61 are a series of rollers 62 in the same manner also as described with relation to the rollers 41 and the rails 42. The space between the upper run of the belt 51 and the under run of the belt 57 should be slightly less than the height of the carton, the same as described with relation to the space between the belts 1 and 36.

The mechanism for inverting the carton as it passes from the belt 1 onto the belt 51 is as follows:—There is a short space between the forward end of the run of the belt 1 and the beginning of the run of the belt 51 and as already stated the belt 51 is somewhat lower than the belt 1. An inclined plate 63 is secured just forward of the pulley 4 to suitable supports, the supports shown in the drawings being the forward ends of the rails 10. The rear end of the said inclined plate 63 comes close to the belt 1, the rear end of said inclined plate being higher than the forward end but being preferably slightly lower than the upper level of the belt 1. The lower and forward end of the plate 63 extends toward the pulley 52 and preferably slightly below the level of the upper run of the belt 51. Mounted on the upper face of said inclined plate 63 is a block 64, the rear face 65 of which is in a plane at an incline to the horizontal and terminating in an abrupt turn 66 at its

highest point. Its forward face 67 extends down to the base plate 63 by a sharp descent, preferably slightly inclined rather than vertical. The forward face 67 will be somewhat longer than the rear face 65. Preferably the faces 65 and 67 are straight with the exception of the slightly curved portion at the crown 66. When the carton carried by the belt 1 reaches the downward turn of the belt around the forward pulley 4 it will fall over and as soon as it loses its balance the carton will first tip over with its forward side lying upon the face 65 of the block 64. The length of said face 65 of the block 64 is preferably somewhat less than half of the length of the carton. When the carton falls flat on the face 65 of the block somewhat more than half of the carton will project beyond the end or crown 66 of the block 64 and the carton will again lose its balance on account of the greater weight of the projecting portion of the carton so that it will tumble over the hump or crown 66 of the block and fall top end down upon the belt 51. The momentum of the carton will cause it to keep on from the position shown in Fig. 6 until it stands square on end. The carton will then be carried by the belt 51 with the top end down so that when it reaches the pressure belt 57 the pressure belt 57 will bear on what really is the bottom of the carton now on top pressing the carton down against the unyielding upper run of the belt 51 and the full weight of the contents will press down upon the inner face of the top closing flaps which are now on the bottom so that now the newly sealed top closing flaps are squeezed together between the weight of the material in the carton and the pressure belt beneath, and continue thus until the carton is carried beyond the pressure mechanism during which time the glue will become firmly set.

In order to properly guide the carton so that it will not fall sidewise when it passes from the belt 1 to the belt 51, said guide rails 68 are located somewhat higher than the top of the belt 1. As shown in the drawings these side guides 68 are secured to upright bars 69 rising from the rails 10. These guide rails 68 extend forward over the belt 51 to properly guide the carton until it is fully seated on the belt 51. The pulleys 52 and 58 are driven by any suitable mechanism, that shown being by a sprocket chain 70 running over a sprocket wheel 71 on shaft 53 and sprocket wheel 72 on shaft 59 and around an idler 73 on shaft 74 thence around any suitable driving sprocket which is not shown, and preferably connected with the same driving mechanism.

In order to insure that the carton will not tip too far over so as to lose its balance after it strikes the belt 51 mechanism is provided to engage what is then the upper end of the carton, that is the bottom end when the carton is on the belt 51. The mechanism shown consists of a plate 75 hung from the rear ends of the rails 60 as for instance by a hanger 76. Said plate 75 is slightly higher than the under run of the belt 57 but is lower than the under run of the belt 36 so that as the carton tips over the block 64 if it should tend to still further turn after it has turned bottom end up, said bottom will strike the plate 75 and be prevented from turning further and will be retained on its end.

What I claim is:—

1. In combination with a carrier for filled cartons, pressure mechanism for engaging the top closing flaps of the carton while the carton is being moved by said carrier, a second carrier in juxtaposition with said first carrier, an obstruction member mounted between said two carriers having inclined rear and front faces, the rear face of which is inclined upwardly and forwardly and the front face of which is inclined downwardly and forwardly toward the second carrier, said first carrier being adapted to move the carton into engagement with the rear face of said obstruction member.

2. In combination with a carrier for filled cartons, a second carrier in juxtaposition with said first carrier, an obstruction member mounted between said two carriers having inclined rear and front faces, the rear face of which is inclined upwardly and forwardly and the front face of which is inclined downwardly and forwardly toward the second carrier, said first carrier being adapted to move the carton into engagement with the rear face of said obstruction member.

3. In combination with a carrier for filled cartons having a bottom support for the cartons, a second carrier in juxtaposition with said first carrier having a support for the lower end of the carton at a lower level than said bottom support of the first carrier, an obstruction member mounted between said two carriers, the rear face of which is inclined upwardly and forwardly and the front face of which is inclined downwardly and forwardly toward said second carrier, said first carrier being adapted to move the carton into engagement with the rear face of said obstruction member causing the carton to tumble over said obstruction member in inverted position on said second carrier.

4. In combination with a carrier for filled cartons having a bottom support for the cartons, a second carrier in juxtaposition with said first carrier having a support for the lower end of the carton at a lower level than said bottom support of the first carrier, an obstruction member mounted between said two carriers, the rear face of which is inclined upwardly and forwardly and the

front face of which is inclined downwardly and forwardly toward said second carrier, said first carrier being adapted to move the carton into engagement with the rear face of said obstruction member causing the carton to tumble over said obstruction member in inverted position on said second carrier, and pressure mechanism which engages one end of the carton while being moved by both of said carriers.

5. In combination with a carrier for filled cartons having a bottom support for the cartons, a second carrier in juxtaposition with said first carrier having a support for the lower end of the carton at a lower level than said bottom support of the first carrier, an obstruction member mounted between said two carriers, the rear face of which is inclined upwardly and forwardly and the front face of which is inclined downwardly and forwardly toward said second carrier, said first carrier being adapted to move the carton into engagement with the rear face of said obstruction member, the length of said rear face being less than one half of the height of the carton.

6. In combination with a traveling carrier for cartons on which one end of the carton rests during the travel, a second traveling carrier in juxtaposition with said first carrier at a lower level than said first carrier and adapted to form a bottom support for cartons carried thereby, means for automatically tumbling the cartons from said first carrier into an inverted position on said second carrier, traveling pressure mechanism which engages the upper end of said cartons for a continued period of time while the carton is being moved by said first carrier pressing down upon the top of the carton in opposition to the bearing surface of the carrier on the lower end of the carton and traveling pressure mechanism which engages for a continued period of time the upturned end of the inverted carton on the second carrier in opposition to the bearing surface of the carrier on the lower end of the carton.

In testimony whereof I affix my signature, in presence of two witnesses.

JOHN H. WITT.

Witnesses:
WILLIAM A. COPELAND,
ALICE H. MORRISON.