

[54] **METHOD AND APPARATUS FOR INTERLEAVING A STRIP OF MATERIAL BETWEEN SUPERPOSED PACKETS**

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[52] **U.S. Cl.**..... **53/14, 53/128 X, 53/157 X**

[51] **Int. Cl.**..... **B65b 5/10, B65b 61/20**

[58] **Field of Search**..... **53/14, 26, 55, 66, 116, 53/117, 137, 128, 156, 157, 175; 93/36.01, 54.2, 54.3**

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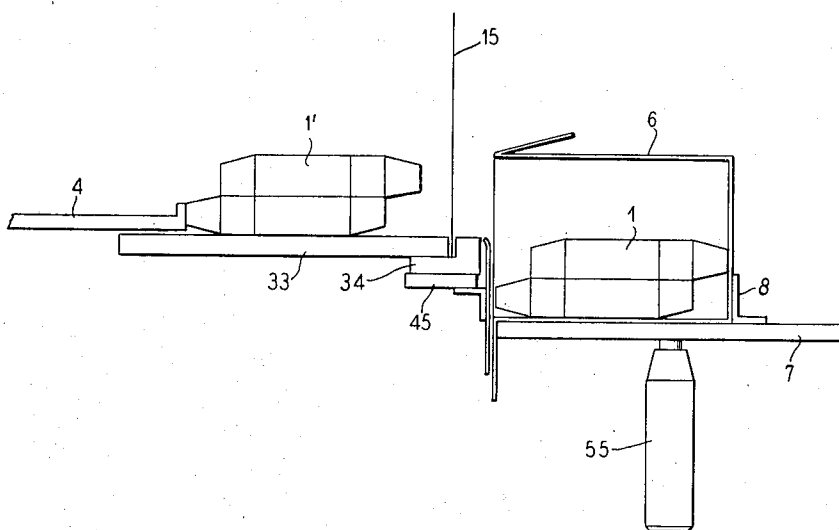
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[57] **ABSTRACT**

A method and apparatus for inserting packets of articles into a container characterized by positioning a strip of thin material in front of at least one of the packets, gripping a marginal edge of the material so that the insertion of the packet causes bending of the material adjacent the marginal edge and draws the remaining portion of the material into the box to be disposed along the side of the packet. Preferably, the method and apparatus is utilized for interleaving a strip of thin material between a pair of packets disposed in a container. The device utilizes a table having a strip guideway adjacent one edge formed by the gripping device and a tong device which is carried by a moveable stop along the strip guideway. The strip of thin material is preferably provided from a roll and the apparatus includes the cutting device which severs the portion of the strip, which was drawn into the guideway by the tongs, from the remaining portion.

**11 Claims, 12 Drawing Figures**



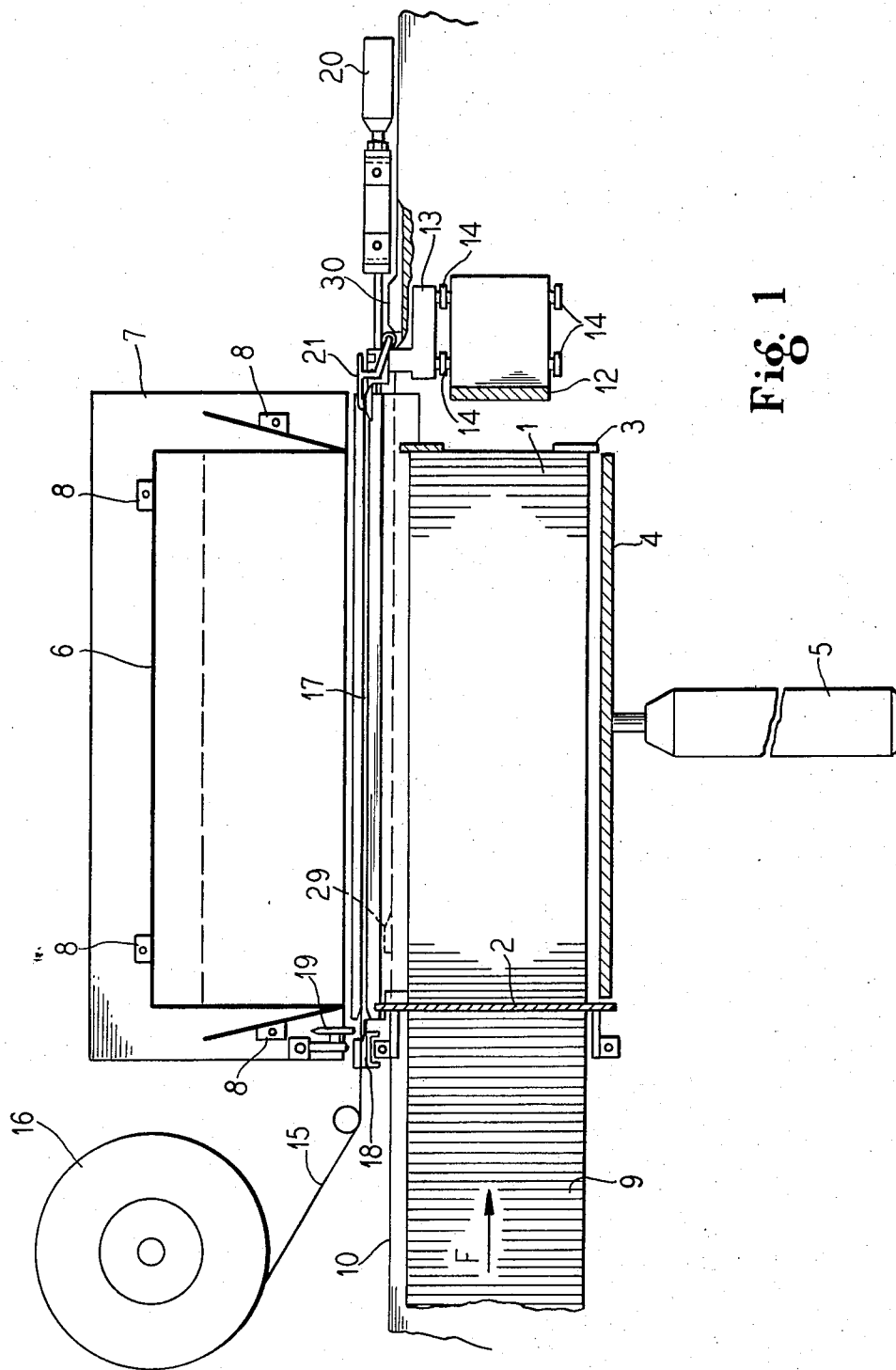
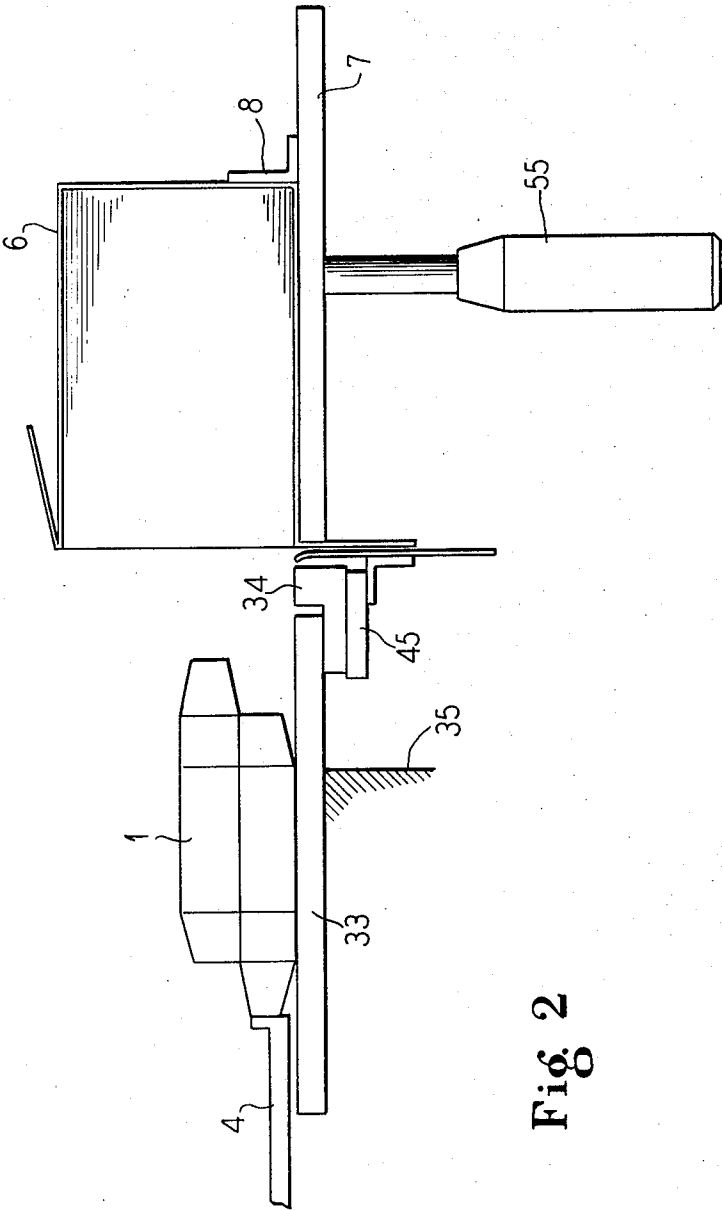


Fig. 1



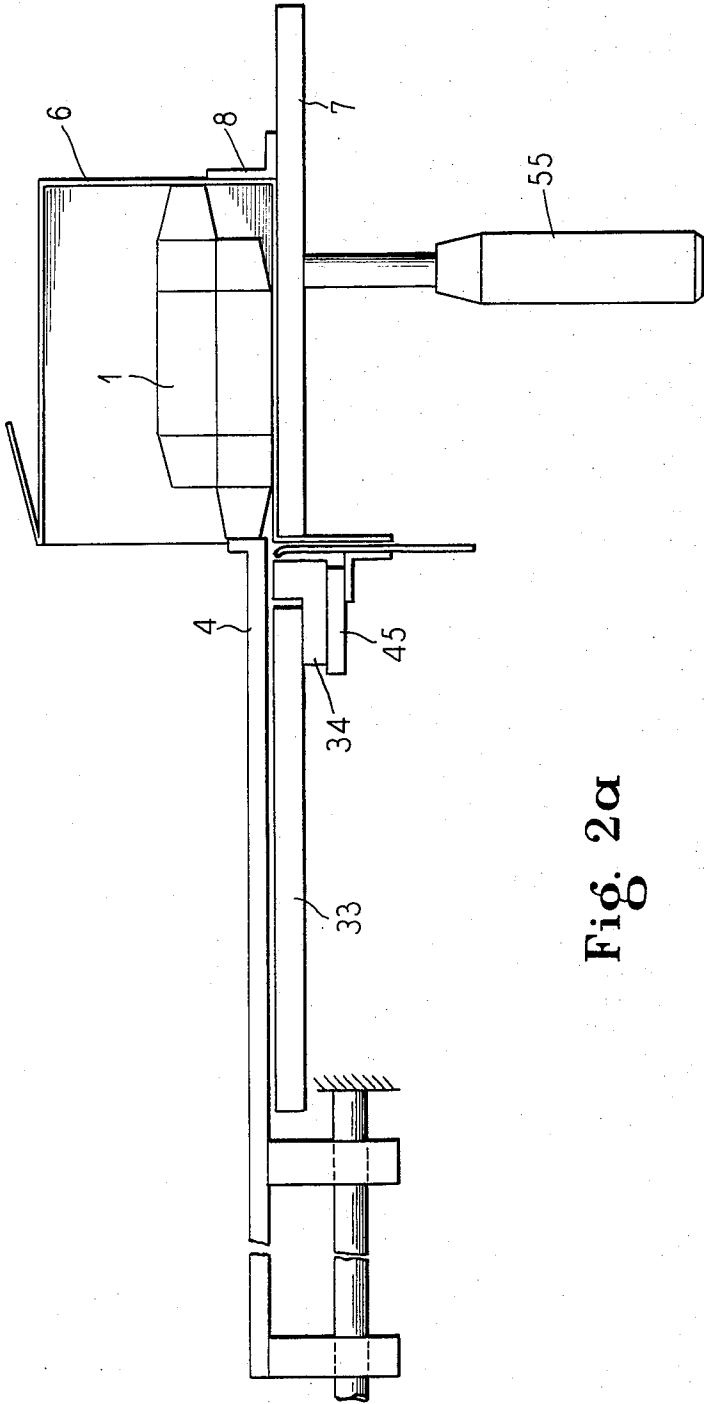


Fig. 2a

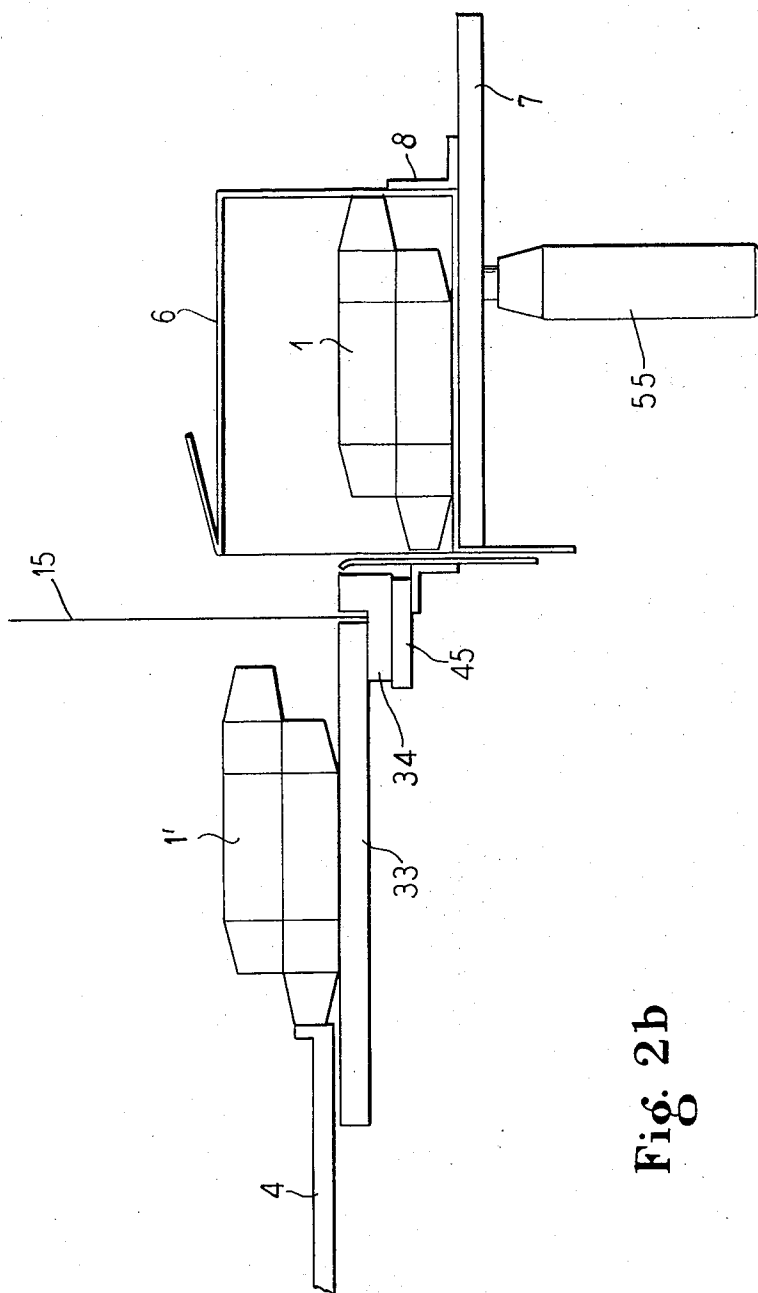


Fig. 2b

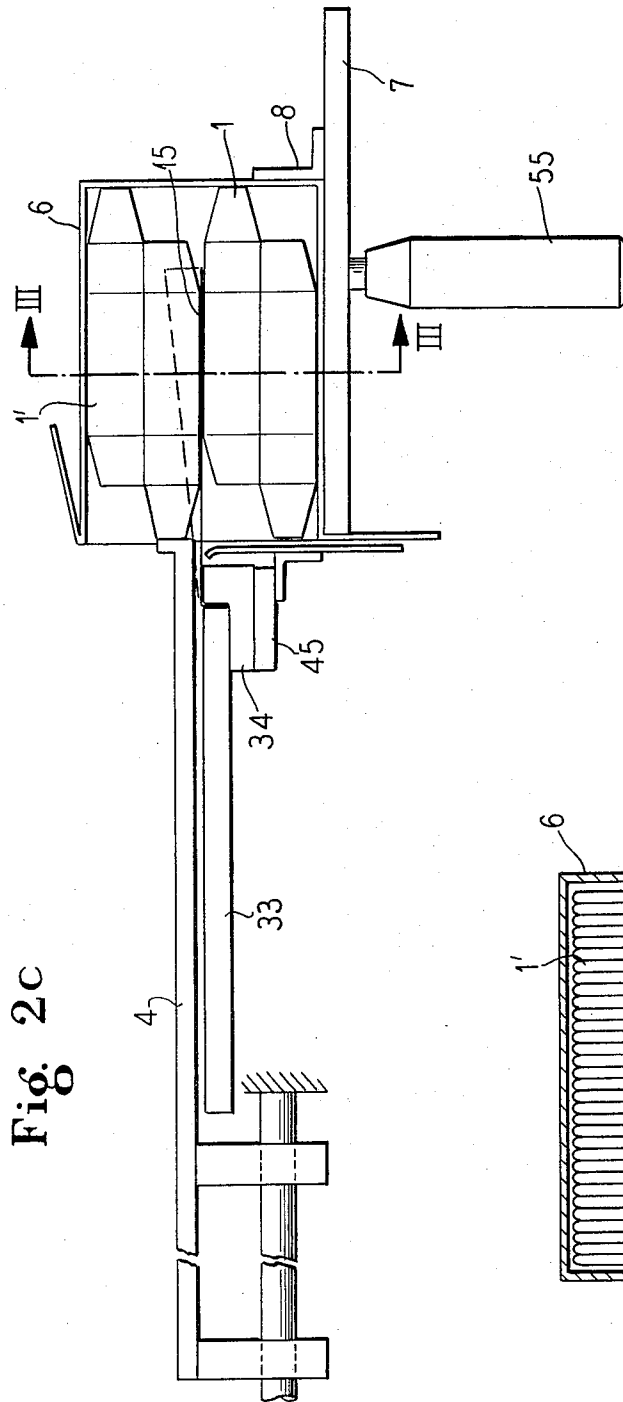


Fig. 2c

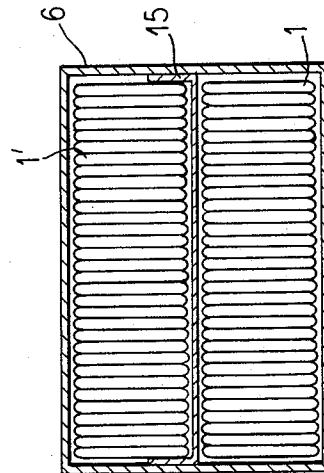


Fig. 3

Fig. 4

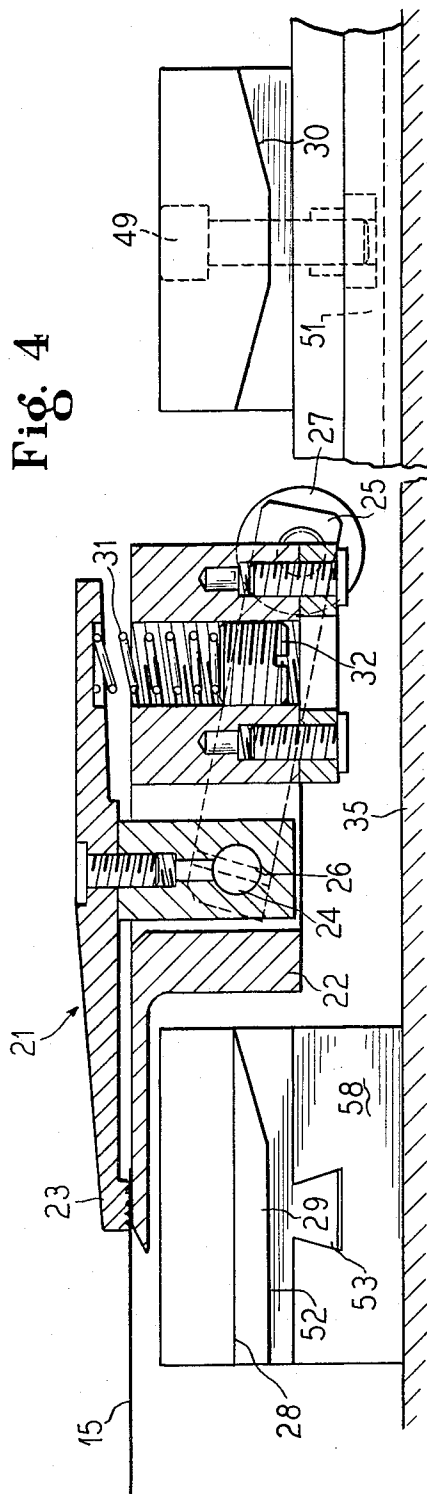
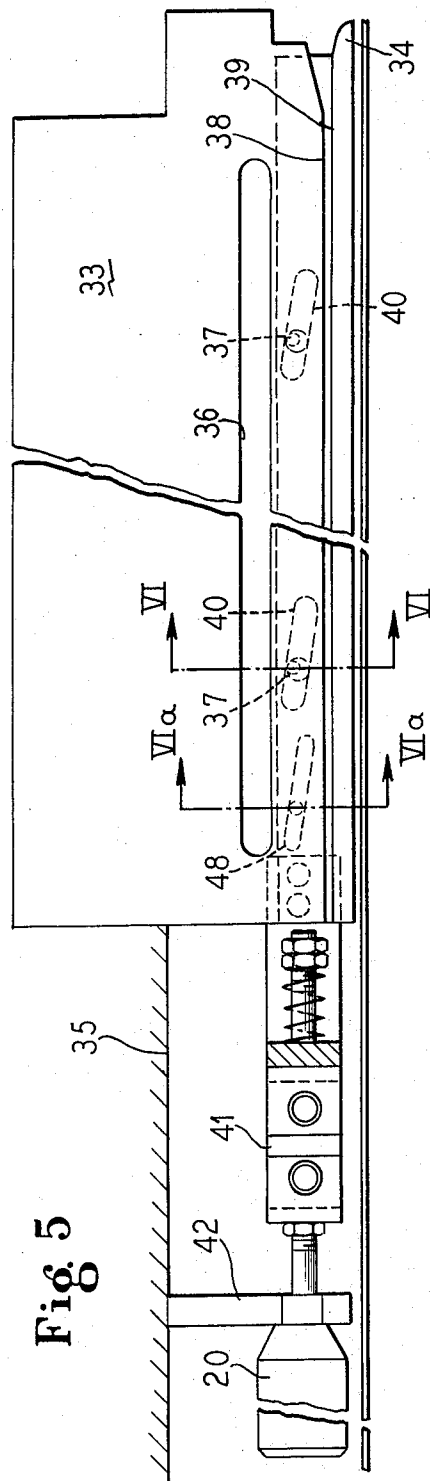
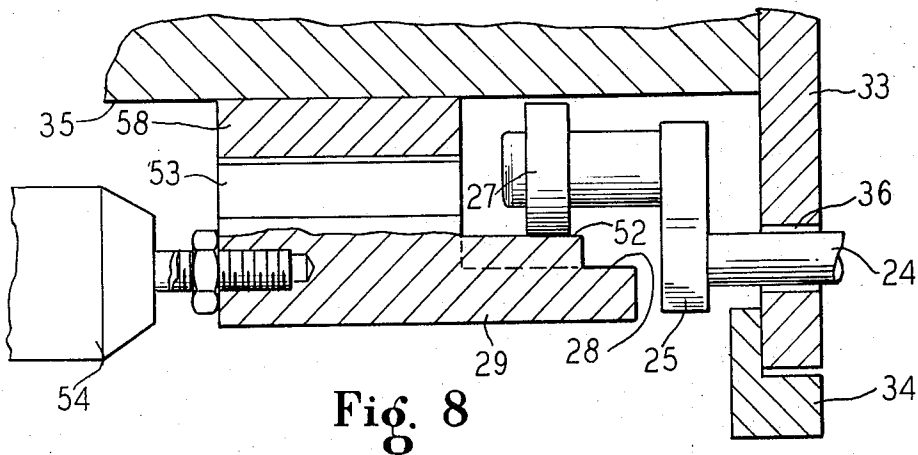
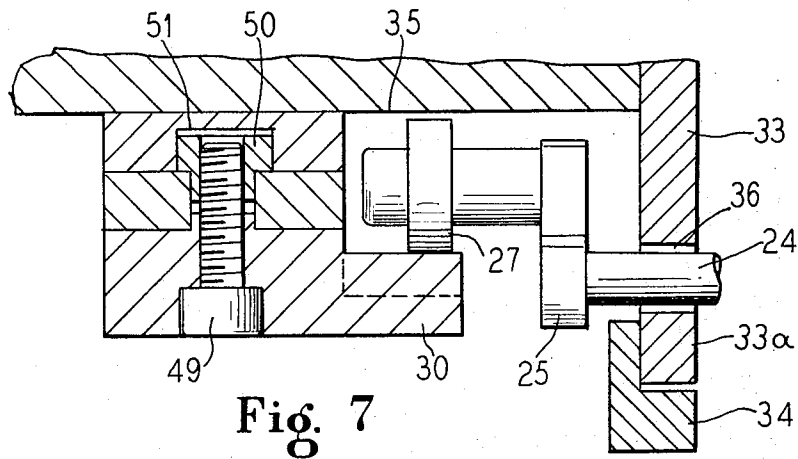
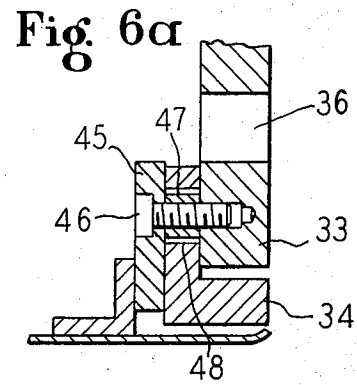
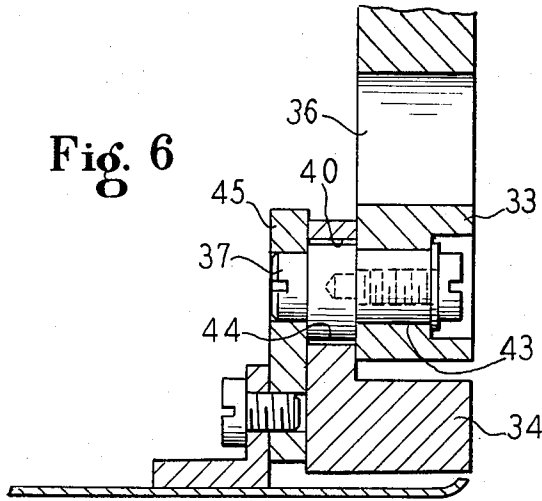


Fig. 5







# METHOD AND APPARATUS FOR INTERLEAVING A STRIP OF MATERIAL BETWEEN SUPERPOSED PACKETS

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention is directed to a method and apparatus to enable inserting a thin sheet of strip material along side a packet of articles such as stampings for boxes or folded boxes as they are inserted in a container.

### 2. Prior Art

Articles such as stampings for boxes or folded boxes are received from a folder-sticker machine as a bed of articles which are standing on their edges such as the crease or fold of the box. This flow of articles is then subdivided into packets of a desired number and inserted into cartons for shipment. Preferably, more than one packet is placed in the carton and it is desirable to have a thin sheet of material disposed between adjacent packets.

## SUMMARY OF THE INVENTION

The present invention is directed to a method and apparatus to enable the placement of a thin sheet of material along one side of a packet of articles which is inserted in a container and preferably to enable interleaving the thin sheet between adjacent packets disposed in the container. The method comprises the steps of positioning a strip of thin material adjacent to an opening of the container, gripping a marginal edge of the strip, inserting a packet in the container with the packet bending the strip adjacent to the marginal edge being gripped and drawing the remainder portion of the strip of material into the container to be disposed along one side of the packet. Preferably, if the material is to be disposed between a pair of packets, a first packet is inserted in the container prior to positioning the strip. The apparatus for performing the method includes a surface for supporting a packet of articles, means supporting a container adjacent an edge of the surface, means for inserting a packet disposed on said surface into the container, means disposed at an edge of the surface adjacent the support means on the container for gripping a marginal edge of the strip of thin material to position the thin material in the path of the packet being inserted into the container so that as the packet is inserted by the inserting means, the packet will fold the thin material adjacent the marginal edge and draw the remaining portion of the thin material into the container to be disposed along a side of the packet. Preferably, the gripping means includes a member moveable relative to the edge of the surface which member is moveable between one position providing a guideway for the strip as it is being positioned and a second position gripping the marginal edge between the member and edge of the surface. To position the strip, the device includes a tong means preferably connected to a moveable stop of the device which tong means grips the strip which is preferably supplied from a roll and draw the strip along the guideway with the length of the strip being determined by the length or size of the packet. The apparatus is preferably provided with cutting means for severing the positioned portion of the strip from the remaining portion.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a general plan view of the apparatus of the present invention;

FIG. 2 is an end view of the apparatus of FIG. 1 with portions removed for purposes of illustration;

FIGS. 2a, 2b and 2c are similar to FIG. 2 illustrating insertion of a first packet, positioning of a second packet, and insertion of the second packet, respectively;

FIG. 3 is a cross-sectional view taken along line III—III OF FIG. 2c;

FIG. 4 is a detailed view of a tong device utilized for gripping of the paper strip with portions removed for purposes of illustration;

FIG. 5 is a detailed plan view of the device for gripping the marginal edge of a strip of material according to the present invention;

FIGS. 6 and 6a are cross-sectional views taken along the respective line VI—VI and VIa—VIa of FIG. 5;

FIG. 7 is a cross-sectional view of the cam follower of the tong device of the present invention and an adjustable cam; and

FIG. 8 is a cross-sectional view similar to FIG. 7 illustrating the cam follower engaging a retractable cam.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

The principles of the present invention are particularly useful in an apparatus schematically illustrated in FIG. 1. The apparatus includes a table 10 having an upper surface on which a bed or flow 9 of articles, which may be folded or collapsed boxes which are standing upright on an edge or fold, are moved in a direction F against a separator 2, which extends in a plane perpendicular to the upper surface of the table 10. The separator 2 is moveable vertically from a position blocking the flow 9 to a withdrawn position to allow the flow 9 to move under the separator 2 and across the table 10. A pair of fixed stops 3 are mounted on the table 10 in spaced relationship to the separator 2 and the position of the fixed stops may be adjusted relative to the separator 2 to determine the length of a packet 1 of boxes or articles which is disposed therebetween. To move the packet 1 off the table 10, means for inserting comprising a pusher or bar 4 connected to a pneumatic cylinder 5 is provided on the table. As the packet 1 is shifted or moved off the table 10 by the pusher 4, it is received in a carton or container 6, which is carried on a table 7 and held in the desired position by a plurality of catches 8. The table 7 is moved vertically to the table 10 by a pneumatic cylinder 55 (FIG. 2).

To form a packet 1 of articles, the separator 2 is in a lower position as illustrated relative to the table 10, and a moveable stop 12 having wheels 14 supported on axles is biased against the separator 2 (means not illustrated). When the separator is raised from the position blocking the flow 9 of boxes, the flow bears against the moveable stop 12 and pushes the stop across the table 10 until it passes through the two fixed stops 3 which prevent further movement of the flow. The separator 2 is then lowered to separate the packet 1 from the remaining flow 9.

To insert a strip of thin material 15, such as paper, between adjacent packets 1 and 1' disposed in a container 6 as illustrated in FIG. 3, the apparatus of FIG.

1 is provided with means for positioning a strip 15 between packet 1 and the container 6. As illustrated, the device for positioning includes a strip or paper guideway 17 which is collapsible or closed by a pneumatic cylinder 20 to grip a marginal edge of the strip 15, and a moveable means illustrated as tongs 21 which are carried on an attachment 13 which is attached to the axles of the moveable stop 12. As illustrated, the strip of thin material 15 is provided on a roll 16 and passes through a cutting means 18, such as a paper knife, which cutting means includes a cutting wheel 19 received in a groove.

The tongs 21 are best illustrated in FIG. 4 and comprise a housing 22 having a fixed jaw which coacts with a moveable jaw 23. The moveable jaw 23 is mounted on a shaft 24 which is rotatably mounted in the housing 22 with a portion of the shaft extending out of the housing. On an end of the shaft 24, a lever arm 25 is fixedly mounted by a pin 26 and the opposite end of the lever arm supports a roller or follower 27 which is adapted to cooperate with a pair of cams 29 and 30. When the follower 27 engages one of the cams 29 or 30, the lever 25 is pivoted to move the moveable jaw 23 from engagement with the fixed jaw. To maintain or bias the moveable jaw 23 in gripping engagement with the fixed jaw of the housing 22, a spring 31 is disposed in a bore provided in the housing 22 and the compression of the spring 31 is adjusted by a screw 32.

The strip guideway 17 is best illustrated in FIGS. 5, 6 and 6a and is formed by an edge face 38 of a fixed plate or part 33 and an edge face 39 of a moveable plate or part 34. The fixed part 33 can be a portion of the table 10 or the entire table 10 and is supported on a frame 35. The part 33 has an elongated slot 36 which extends parallel to the edge face or surface 38. The slot 36, as illustrated in FIGS. 7 and 8, receives a shaft 24 connecting the tongs 21, which are disposed on the upper surface of part 33, to the follower comprising the lever and roll or wheel 27 which are disposed beneath the part 33.

The moveable part 34 (FIG. 6) is L-shaped in cross-section and is provided with a pair of slots 40 in the portion of the part which is parallel to the fixed part 33. The slots 40 (FIG. 5) are inclined at an angle to the surfaces 38 and 39 and each slot 40 receives a pin 37. Relative longitudinal movement of the part 34 to the part 33 causes the slots to move relative to the pins 37 and cause shifting of part 34 between a position with the edge surface 39 in tight engagement with the edge surface 38 for gripping a marginal edge of the strip and a position with the surfaces 38 and 39 spaced apart to form the guideway 17 for the marginal edge. To accomplish the movement of moveable part 34, it is connected by a flexible link 41 to the piston 20 which is supported on the frame 35 by a bracket 42.

The pins 37 (FIG. 6) have a portion 43 which is received in the bore provided in the fixed part 33 and an eccentric portion 44 which is received in the slot 40 of the moveable part 34. The eccentric portion 44 permits an alignment of the moveable part 34 at erection and also enables adjustment of travel of the moveable part 34 relative to the fixed part 33. To hold the part 34 on the part 33, a part or plate 45 is removably attached to the fixed part 33 (see FIG. 6a) by means of a number of screws or bolts 46 which are provided with spacer 47 that are received in enlarged aperture 48 of the moveable part 34. The spacers 47 and aperture 48 are pro-

vided with dimensions to enable the part 34 to move relative to the part 33.

As mentioned hereinabove, the roller or follower 27 engages cams such as 29 and 30 to cause opening of the tongs 21. It is best illustrated in FIG. 7, the shaft 24 of the tongs 21 which is carried on the upper surface of 33a passes through the elongated slot 36 so that the lever arm 25 and follower 27 are disposed beneath the fixed part 33. As illustrated, the cam 30 is attached by a machine screw 49 to a tee nut 50 which is received in an elongated T-slot 51 of a plate attached to the frame 35. Thus, the position of the cam 30 can be adjusted along the direction of advance of the strip 15. If the length of the packets is to be changed, then the position of the cam 30 and the fixed stops 3 are adjusted in the direction of flow F.

The forward cam 29 (FIG. 8) which has a raised cam portion 52 and a lower level portion 28, causes the closing and opening of the tongs 21 when the tongs are in the forward position which is adjacent to the cutting means 18. The forward cam 29 has a slide connection 53, which may be dove-tailed connection, with a block 58 supported on the frame 35. A pneumatic cylinder 54 reciprocates or moves the cam 29 along its slide connection 53 to selectively position either portion 28 or the raised cam portion 52 in the path of roller 27. When the slide is in the position illustrated in FIG. 8, the roller 27 will engage the raised cam portion 52 to cause opening of the moveable jaw or finger of the tongs 21. However, when the cam has been withdrawn so that the follower 27 engages level 28, the jaws or fingers or the tongs will remain closed. It should be pointed out that due to the force of spring 31 the finger of the tongs 21 will remain in the closed or gripping position unless biased to the opened or ungripping position by the cams 29 or 30.

With reference to FIGS. 1, 2, 2a, 2b and 2c, the apparatus operates in the following manner. At a beginning of a cycle, the boxes manufactured by a folder-sticker device or machine are delivered as a flow 9 moving in the direction F. With the separator 2 in the down or blocking position, the flow 9 is brought in tight engagement therewith and the moveable stop 12 is also biased against the separator 2. The tongs 21, which are carried by the stop 12, are at the forward position adjacent the cutting means 18. During the first passage of the tongs 21, the cam 29 remains fixed and the tongs 21 remain open but do not grip the strip 15. When the separator 2 is raised by appropriate means such as a pneumatic cylinder (not illustrated), the first or forward article in the flow 9 will engage the moveable stop 12 and the flow will force the stop 12 and tongs 21 to be moved across the table 10 until the stop 12 passes between the two fixed stops 3 which prevent further movement of the flow 9 of the boxes. As the moveable stop 12 passes through the fixed stops 3, the separator 2 is moved to the down position to separate the boxes disposed between the separator 2 and the fixed stops 3 from the flow 9 to form the packet 1 (see FIG. 2). The control of the separator may be actuated manually or be electrical switches which are actuated or tripped by the movement of the moveable stop 12 past the fixed stops 3. However, although the fingers or jaws of the tongs 21 were open, the tongs did not grip the strip 15 and draw it along the guideway 17.

With the packet 1 formed, the inserting means is actuated with the pusher 4 placing the packet into the container 6 (see FIG. 2a).

Having completed the insertion of the packet 1 into the container 6, the pusher 4 is withdrawn from the position illustrated in FIG. 2b, the moveable stop 12 along with the tongs are moved across the table 10 to be in engagement with the separator 2. The roller 27 engages the cam portion 52 and the follower pivots the shaft 24 to lift the finger or jaw 23 from gripping engagement with the fixed jaw or finger and thereby open the tongs 21 to receive the end of strip 15. The separator 2 is again withdrawn and the flow 9 again forces the moveable stop 12 back across the table 10 and at the same time the pneumatic cylinder 54 is actuated and the roller 27 engages the portion 28 whereby the jaws or fingers of the tongs 21 are closed and grip the strip 15. The strip is thus pulled along the opened guideway 17 which is formed by the fixed and moveable parts 33 and 34. As the moveable stop 12 passes between the fixed stops 3, the separator 2 is lowered to form packet 1' and the roller 27 engages the rear cam 30 which causes the moveable jaw 23 to release the end of the strip 15.

When the strip is released by the tongs 21, the cutting means 18 comprising the cutting wheel 19 moving in the groove is actuated to separate the portion of the strip in the guideway 17 from the remaining strip 15. At the same time, the pneumatic cylinder 27 is operated to shift the moveable part 34 relative to the fixed part 33 so that the surfaces 38 and 39 grip the marginal edge of the strip disposed therein. During this sequence, the pneumatic cylinder 55 is actuated to lower the table 7, which supports the container 6, a sufficient amount so that the second packet 1' can be inserted into the container 6 (see FIG. 2b).

With the marginal edge of the strip 15 gripped between the moveable parts 34 and 33 (see FIG. 2c), and with the actuation of the pusher 4 to move the second packet 1' into the container 6, the strip 15 is bent or folded adjacent to the marginal edge gripped by the parts 34 and 33 and the remaining portion of the strip is carried into the container 6 and disposed along one side of the packet 1' and, as illustrated, between the packets 1 and 1'. As illustrated in FIG. 2c and FIG. 3, end portions of the strip 15 are also upwardly folded.

Due to the fact that the tongs 21 are carried by the moveable stop 12, the length of the sheet 15 drawn from the roll 16 and then severed by the cutting device 18 is directly dependent upon the length of the packet 1. By adjusting the position of the fixed stops 3 along with the position of the cam 30, the device can be utilized for providing packets 1 of different lengths for different size containers 6.

Although various minor modifications might be suggested by those versed in the art, it should be understood that I wish to embody within the scope of the patent granted hereon all such modifications that reasonably and properly come within the scope of my contribution to the art.

I claim:

1. A method of inserting a strip of thin material along a side of a packet of articles which packet is inserted into a container having an opening, said method comprising the steps of positioning a strip of the thin material adjacent to the opening of the container, gripping

a marginal edge of the strip, inserting a packet into the container, said packet bending the strip adjacent to the marginal edge being gripped and carrying the remaining portion of the strip into the container to be disposed along the side of the packet.

2. A method according to claim 1, wherein the step of positioning includes unreeling the strip from the roll of thin material by drawing the strip across the opening of the container by gripping the sheet adjacent said one marginal edge and moving the strip in a direction parallel to said edge, said method including the step of cutting the portion of the strip to the desired length after positioning the strip at the opening of the container.

3. A method according to claim 2, wherein the steps of unwinding the strip is accomplished simultaneously with a step of feeding the articles to form the packet so that the length of the strip is dependent on the size of the packet.

4. A method according to claim 1, which includes inserting a first packet into the container prior to positioning the strip so that the strip carried into the container by the insertion of a following packet after positioning is disposed between a pair of packets in the container.

5. An apparatus for inserting a packet of articles into a container having an opening with a strip of thin material disposed along one side of the packet, said apparatus comprising a surface for supporting a packet of articles, means supporting a container adjacent an edge of said surface, means for inserting a packet disposed on said surface into the container, means disposed at an edge of the surface adjacent the support means of the container for gripping a marginal edge of a strip of thin material to position the material in the path of the packet being inserted into the container so that as the packet is inserted into the container by the inserting means, the packet will fold the thin material adjacent said marginal edge and draw the remaining portion of the thin material into the container to be disposed along a side of the packet.

6. An apparatus according to claim 5, wherein the means for gripping the marginal edge comprises an elongated part coacting with said edge of said surface, said elongated part being moveable relative to said edge from a first position for gripping material to a second position withdrawn from said edge to form a guideway for the movement of the marginal edge of the material therebetween.

7. An apparatus according to claim 5, which includes tong means for grasping the strip adjacent the marginal edge, said tong means being moveable across said surface from a first to a second position for drawing a strip of said thin material along said edge of said surface into position prior to being gripped by said gripping means.

8. An apparatus according to claim 7, which further includes means for storing a roll of the strip material adjacent one end of the gripping means and cutting means disposed adjacent said one position of the tong means for severing the portion of the strip of material drawn by the tong means from the roll into the gripping means to the desired length.

9. An apparatus according to claim 8, which further includes a moveable stop disposed on said surface, said stop being moved by the forming of a packet on the surface, said tong means being connected to said moveable stop to move therewith so that the tong means

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draw the strip of material into position as the packet is formed on said surface.

10. An apparatus according to claim 9, wherein said tong means includes a follower disposed beneath said surface, a cam slideably mounted beneath said surface adjacent the cutting means and attached to means for moving the cam into and out of the path of the follower to selectively cause the follower to open said tong means and a second cam disposed beneath said surface

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in the path of the follower at the second position of travel of the tong means, said follower engaging the cam to cause the tong means to open when reaching the second position.

11. An apparatus according to claim 10, wherein the cutting means comprises a cutting wheel moveable vertically in a groove.

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