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(54) Carton activating mechanism

(57) There is provided a mechanism for opening the gatefold seats of a paperboard blank 13. A rotatable disc 30 carries a number of activators 34, each comprising a plate 35 having a pair of pivotally connected fingers 37. The plate is slidably received in the disc and have a

pin 36 which is received in a stationery groove 32. The fingers 37 have projections 40 and cooperating abutments 41 such that the fingers can move outwardly into an extended position and then open out to activate the seat before closing and then retracting.

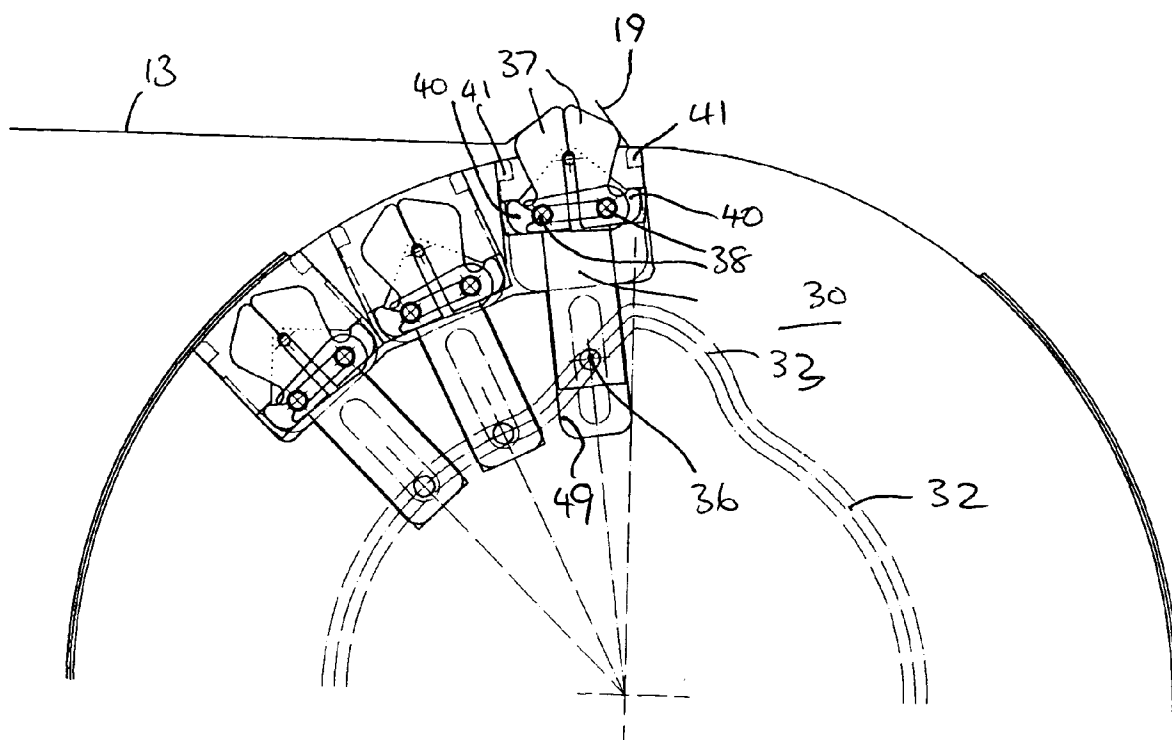


FIGURE 5B

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Description

This invention relates to carton activating mechanisms and more particularly to cartons having a gatefold article retaining seat spanning a folded junction between two main panels of the carton.

In the blank for such a carton each seat has two tab panels which are either spaced apart or are disposed on either side of a cut which is generally perpendicular to and which preferably spans the folded junction. Each tab panel is divided by a fold line extending towards the cut or space from the fold line between the two main panels at an angle relative to the fold, with each tab panel being hinged to the main panels by angled fold lines. In other types of this carton, there is a sub-panel between the two main panels. Where a sub-panel is provided the angled fold line of each tab panel extends from one of the fold lines between the main panels and the sub-panel. When the main panels are hingedly moved towards each other the tab panels form retaining seats for articles such as bottles in the angle between the main panels. Figures 1A and 1B show a pair of suitable blanks for such a seat and figures 2A and 2B show a plan view of one seat and an end view of another seat.

According to the present invention there is provided a mechanism for activating a gatefold article seat of a carton comprising a pair of fingers which are movable between a withdrawn position and a projecting position in which they engage and push back the two tab panels of the seat at one side of the angled fold lines dividing the tab panels, the mechanism also spreading apart said fingers for a predetermined time whilst in said projecting position so as to bend back the two tab panels and at the same time folding means engage the main panel at the other side of the angled fold lines so as to bend the two panels relative to each other such that the gatefold seat adopts its configuration.

In preferred embodiments a number of pairs of fingers are provided at spaced locations on a rotating disc so as to engage successive pairs of tab panels in a sequential manner. The locations may be equally spaced for a non-pitched machine or in spaced groups according to pack size and pitch in a pitched machine. Conveniently the disc and the operation of the fingers are driven in synchronisation with the main packing machine drive.

Preferably, each pair of fingers is moved between its withdrawn and projecting positions by means of a follower engaged in a stationary guide groove. In one embodiment, each follower is secured on a carrier plate which carries its associated pair of fingers. It is a further preferred feature that each pair of fingers is provided with outwardly projecting portions at their inner ends, which portions engage stops when in the projecting position so as to spread apart the outer ends of the hinges by deflecting the inner ends inwards about individual pivot points. Ideally said stops are provided on said disc.

In preferred embodiments the folding means com-

prise guide surfaces which progressively fold the panels relative to each other. In another embodiment the folding means comprises kicking elements which are also mounted on the disc and comprise a tangentially extending bar for each pair of fingers which bar swings into and out of its active position by means of a second follower which follows a stationary cam surface.

With preferred embodiments the leading edge of each pair of fingers is generally pointed to facilitate the pushing back of the tab panels of the gatefold seat.

According to another aspect of the present invention there are provided two such mechanisms on opposite sides of an articulated packaging device which mechanisms operate on gatefold seats at opposite side of a carton.

An embodiment of the present invention will now be described in more detail. The description makes reference to the accompanying drawings in which:

Figures 1A and 1B show two blanks for a carton incorporating a gatefold article seat,
Figure 2 is a perspective end view of a gatefold article seat made from the blank of figure 1A,
Figure 3 is a part cut away plan view of a mechanism according to the present invention installed in a packaging machine,
Figure 4 is a sectional view taken on line IV-IV of figure 3,
Figure 5 is a part sectional end view on line V-V of figure 3, and
Figures 6A to 6E is a range of enlarged schematic plan views showing the operation of fingers used in the mechanism.

In the figures there is shown part of a machine for wrapping a sleeve 11 around a plurality of articles such as bottles or cans 12. Each sleeve 11 is made from a blank 13 having a top panel 14, two side walls 15 and two interconnecting base panels 16. The junction of each base panel 16 and its associated side wall is by way of a fold 17 or a fold 17 and a sub panel 9 as in figure 1B. Where the base 16 and side wall 15 are to engage a bottle for example a gatefold seat is provided. Each gatefold seat is formed from two tab panels 19 separated by a vertical cut 18 (or space in figure 1B). Each tab panel 19 is divided in two by angled fold lines 20 extending from the fold 17 to the vertical cut. The two parts of each tab panel 19 remain attached to the blank 13 by angled side folds 21, 22. When the tab panels 19 are pushed in and the base 16 bent about the fold 17, the tab panels 19 form a seat for the bottle with the lower portions of the tab panels 19 lying either against the base 16 or at suitable angles to engage portions of the article being held. In use the bottle sits against these lower portions thereby ensuring that the seat remains in position. Figures 1 and 2 illustrate this.

The machine 10 has a central can conveyor along which bottles are transferred in groups of 2x2,

2x3, 2x4 or whatever size multipack is to be wrapped. In the embodiment shown the machine is set up for 2x3 multipacks. The blanks 13 are positioned over the groups of bottles and the walls of the blanks manipulated around the bottles. The gatefold seats are activated by an activating mechanism 26 located on each side of the conveyor 25. In the arrangement shown the machine 10 is pitched, such that the bottles for one multipack are fed through one after the other but with a predetermined space between groups. In other arrangements the passages of bottles could be unbroken whilst still being packaged in multipacks.

The gatefold seats require precise technique in order to activate them and of course this technique must be perfectly timed in relation to the passage of bottles through the machine 10. The mechanism 26 is designed to activate the gatefold seats.

The mechanism 26 comprises a disc 30 which is adapted to be rotated about a vertical axis adjacent the conveyor 25. Located below the disc 30 is a plate 31 which is stationary and in which is machined a guide groove 32. The groove 32 is generally circular and centred on the axis of the disc but has an outwardly deformed section 33 in its region adjacent the conveyor 25.

The disc 30 carries a number of activators 34 arranged in four groups of three. The machine 10 is phased and is set up to pack 2x3 multipacks and so the activators are associated respectively with the three gatefold seats of each blank 13. If the machine 10 was not phased, the activators 34 would be provided all around the periphery of the disc.

Each activator comprises a carrier plate 35 mounted for radial sliding movement. Slots are provided to define the path of the sliding movement. A downwardly projecting pin 36 is provided on each plate 35 and the pins engage in the groove 32 in the plate 31. It will be appreciated that most of the time the carrier plates 35 will be in retracted positions but once in each revolution of the disc 30 each carrier plate will be thrust outwardly by virtue of the outwardly deformed section 33 of the guide groove 32.

Each carrier plate 35 carries a pair of fingers 37 which are pivotally connected to the plate 35 by pins 38. When closed together the fingers 37 provide a generally pointed leading area 39. Adjacent the pins 38, each finger 37 has an outward projection 40 for cooperation with abutments 41 formed on the disc on each side of the carrier. For each activator 34 the distance between its pair of abutments 41 is just sufficient for the fingers 37 to pass through. After a certain amount of radial movement of the activator 34, the projections 40 engage the respective abutments 41 and this causes rotation of the fingers 37 about the pins 38. The leading ends of the fingers 37 are thus caused to spread outwards.

As the carrier plate 35 begins to move radially inwards the side walls 15 of the carton engage the outer surfaces 42 of the fingers 37 such that the fingers rotate back about the pins 38 until the fingers 37 return to their

original closed position.

Also included in the mechanism are guide surfaces 50 which support the side walls 15 of the blank when the fingers are inserted. After the tab panels 19 have been bent back the blank 13 passes between guides 51 which hold the side panels 19 in their bent back position whilst a bottom guide 52 engages the base panel 16 and progressively folds the blank into contact with the bottles. To avoid complication, the guides 51 are shown only in figures 3, 4 and 5E, but will be present in figures 6A and 6D.

In use of the mechanisms 26, the rotation of the disc 30 is timed so as to coincide with the passage of bottles. As a group of six bottles begins to pass the mechanism 26 with a blank 13 partially folded over the bottles, the first activator 34 of a group of three is activated. At this point the pin 36 of the first carrier engages the outward section 33 of the groove 32 and the carrier plate 35 with its fingers 37 is pushed forward. The tab panels 19 of the first gatefold seats are engaged and pushed back. Further outward movement of the carrier plate causes the fingers 37 to spread out behind the side wall 15 of the blank by virtue of projections 40 engaging the abutments 41. At the same time as the spreading of the fingers 37, the blank engages the guides 51, 52 which fold the base panel 16 about side wall 15 and retains the seat as it is inserted underneath its bottle. The pin 36 then starts to move inwards thereby closing the fingers 37 before withdrawing the fingers 37 and carrier plate 35. Before this stage has been completed however the second activator has begun its working cycle on the second gatefold seat of the blank 13. This is repeated for the third activator of the set of three with the final gatefold seat of the blank 13. As the disc 30 continues to rotate, the next blank 13 is manipulated by the next group of three activators 34/guides 51, 52.

It will also be appreciated that other methods of guiding the activators 34 would be possible. Also, the geometry and form of the fingers and carrier plates could be manipulated. Also it will be readily apparent that the numbers of activators per disc and the groupings (or lack of them) are a matter of design choice.

The guides 51, 52 could also be replaced by kicking bars which could engage the base panel from below. In one envisaged arrangement, each bar extends tangentially relative to the disc 30 and is pivotally connected to the disc by means of a link element. The link elements rest against a cam surface which is shaped such that for most of the revolution of the disc the bars are lowered. However, adjacent the conveyor the cam surface has an outward deformation which causes the bar to kick upwards and engage the base panel 16 of the blank. Other methods of ensuring the fold are envisaged.

Claims

1. A mechanism for activating a gatefold article seat of a carton comprising a pair of fingers which are movable between a withdrawn position and a projecting position in which they engage and push back the two tab panels of the seat at one side of the angled fold lines dividing the tab panels, the mechanism also spreading apart said fingers for a predetermined time whilst in said projecting position so as to bend back the two tab panels and at the same time folding means engage the main panel at the other side of the angled fold lines so as to bend the two panels relative to each other such that the gatefold seat adopts its configuration. 5 10 15
2. A mechanism as claimed in claim 1 wherein a number of pairs of fingers are provided at spaced locations on a rotating disc so as to engage successive pairs of tab panels in a sequential manner. 20
3. A mechanism as claimed in claim 2 wherein the locations are equally spaced for a non-pitched machine. 25
4. A mechanism as claimed in claim 2 wherein the locations are in spaced groups according to pack size and pitch in a pitched machine.
5. A mechanism as claimed in any one of claims 1 to 4 wherein the disc and the operation of the fingers are driven in synchronisation with the main packing machine drive. 30
6. A mechanism as claimed in any one of claims 1 to 5 wherein each pair of fingers is moved between its withdrawn and projecting positions by means of a follower engaged in a stationary guide groove. 35
7. A mechanism as claimed in claim 6 wherein each follower is secured on a carrier plate which carries its associated pair of fingers. 40
8. A mechanism as claimed in claim 7 wherein each pair of fingers is provided with outwardly projecting portions at their inner ends, which portions engage stops when in the projecting position so as to spread apart the outer ends of the hinges by deflecting the inner ends inwards about individual pivot points. 45 50
9. A mechanism as claimed in claim 8 wherein said stops are provided on said disc.
10. A mechanism as claimed in any one of claims 1 to 9 wherein the folding means comprise guide surfaces which progressively fold the panels relative to each other. 55
11. A mechanism as claimed in any one of claims 1 to 9 wherein the folding means comprises kicking elements which are also mounted on the disc and comprise a tangentially extending bar for each pair of fingers which bar swings into and out of its active position by means of a second follower which follows a stationary cam surface.
12. A mechanism as claimed in any one of claims 1 to 11 wherein the leading edge of each pair of fingers is generally pointed to facilitate the pushing back of the tab panels of the gatefold seat.
13. In combination, a pair of mechanisms as claimed in any one of claims 1 to 13 disposed on both sides of an article packaging device.

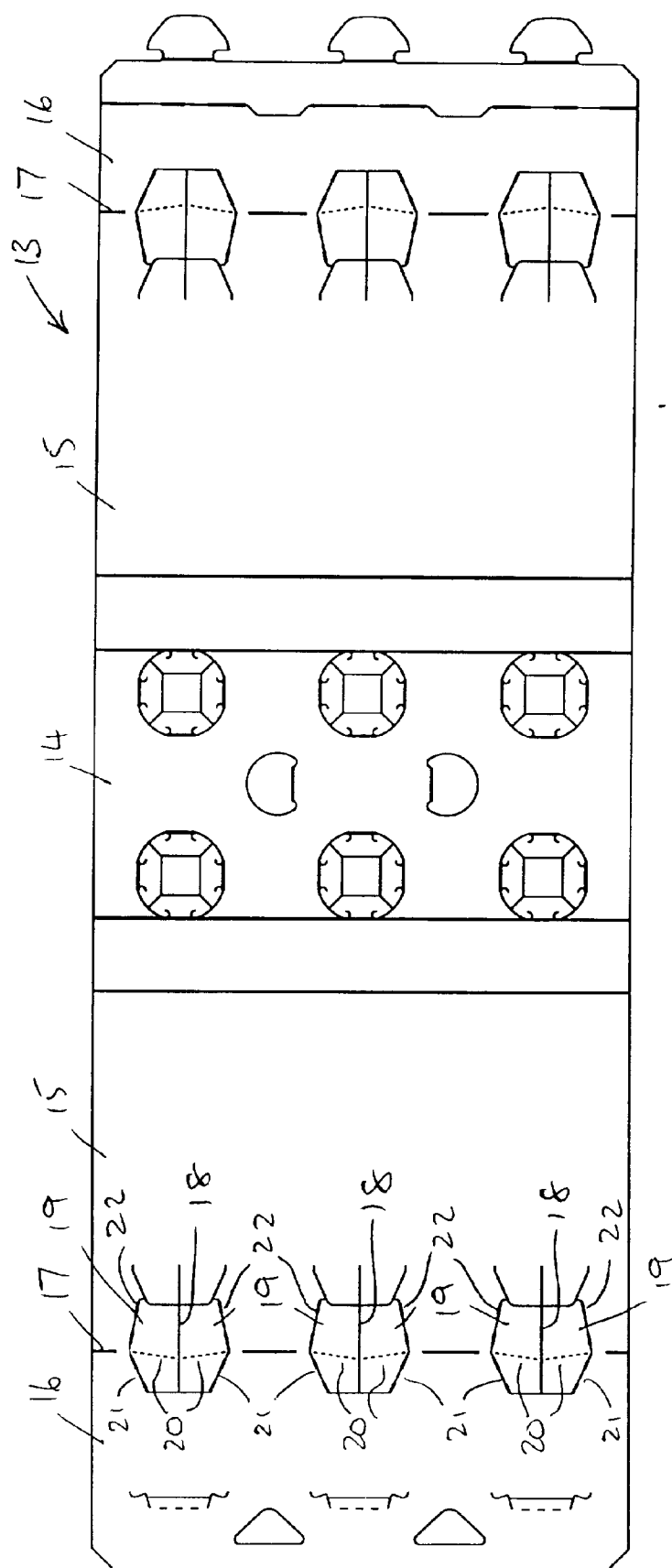
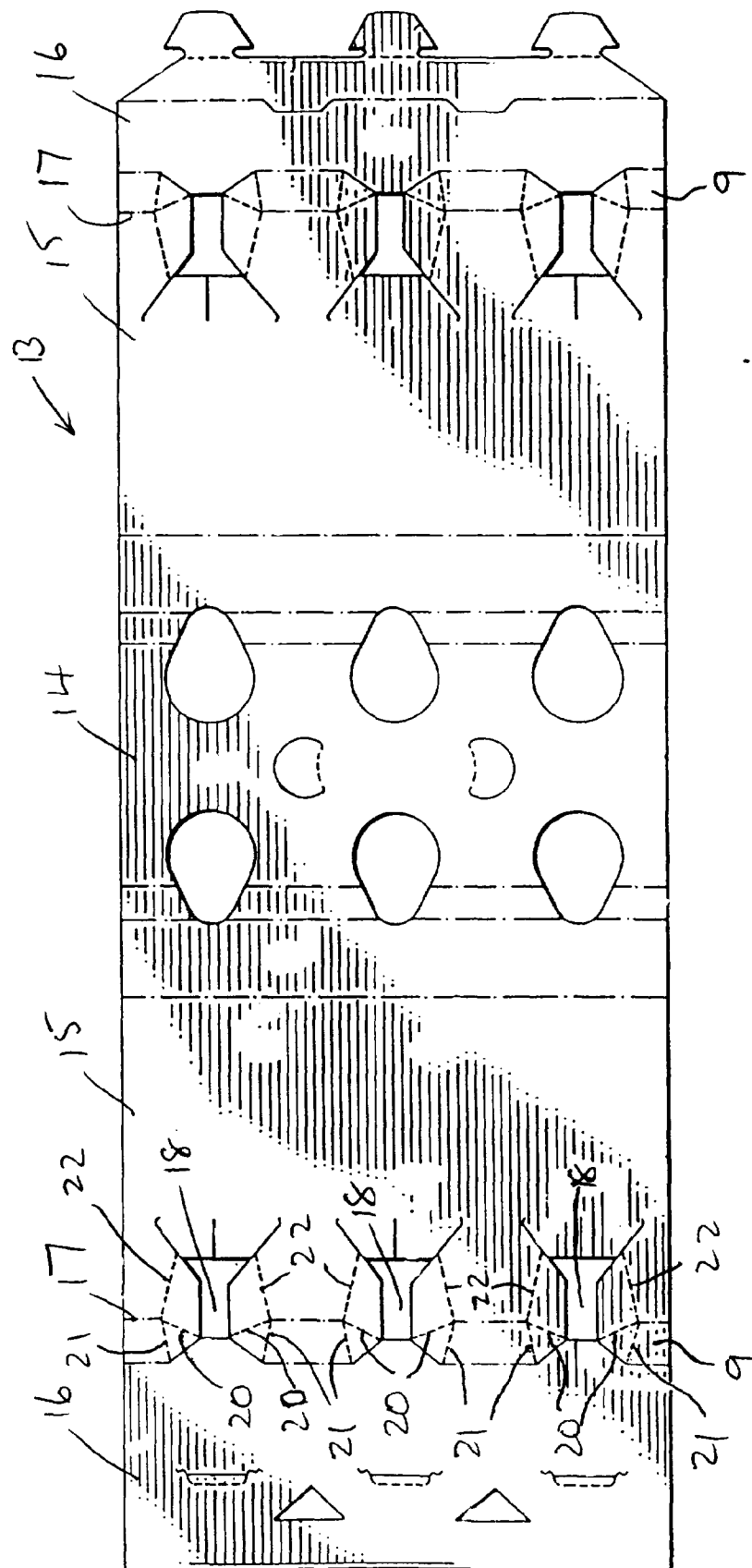


FIGURE 1A

FIGURE 1 B

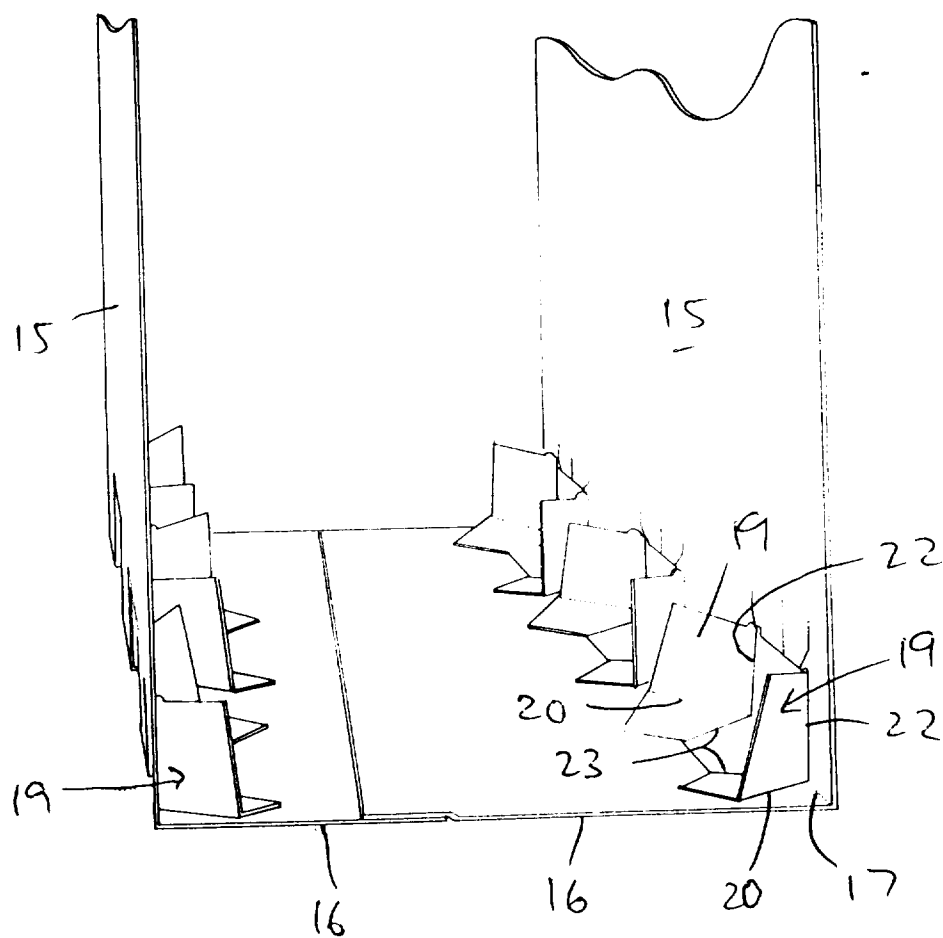


FIGURE 2

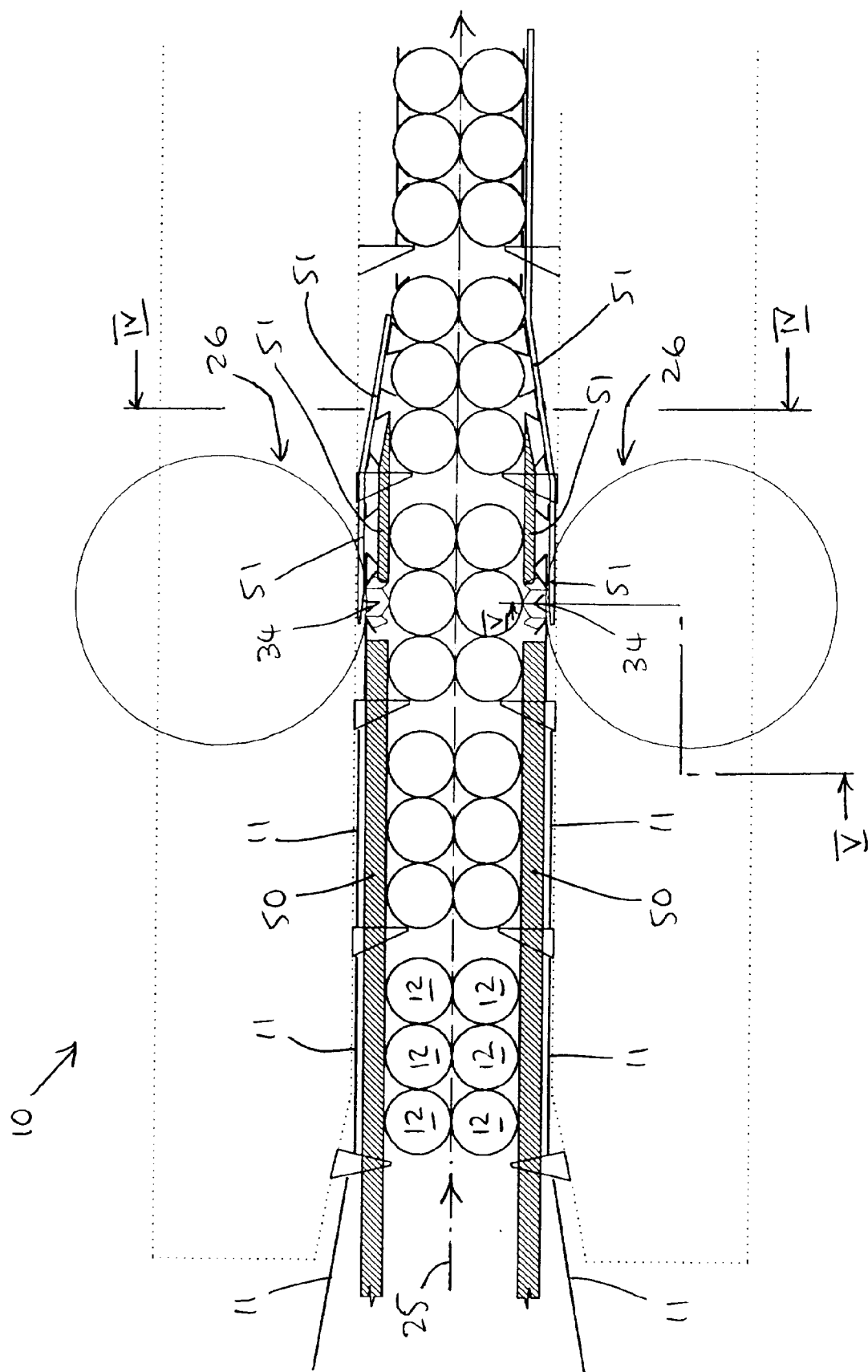


FIGURE 3

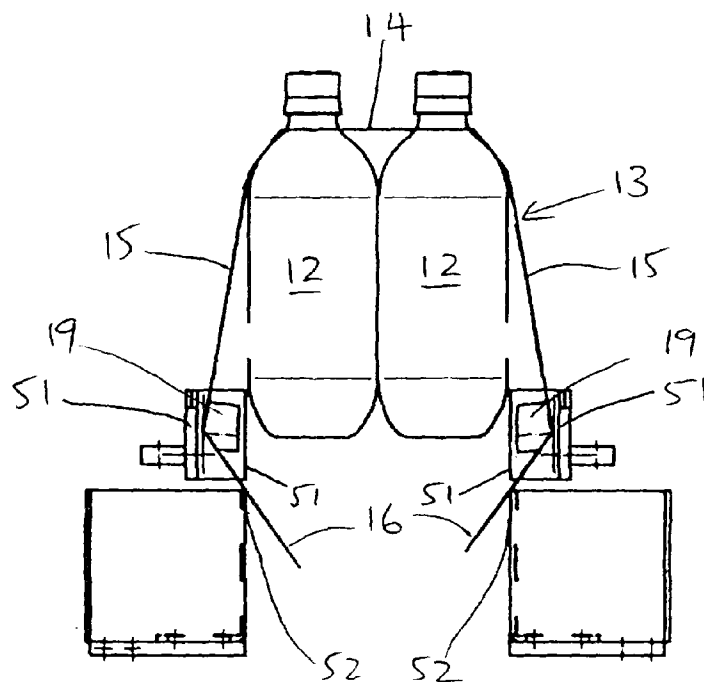


FIGURE 4.

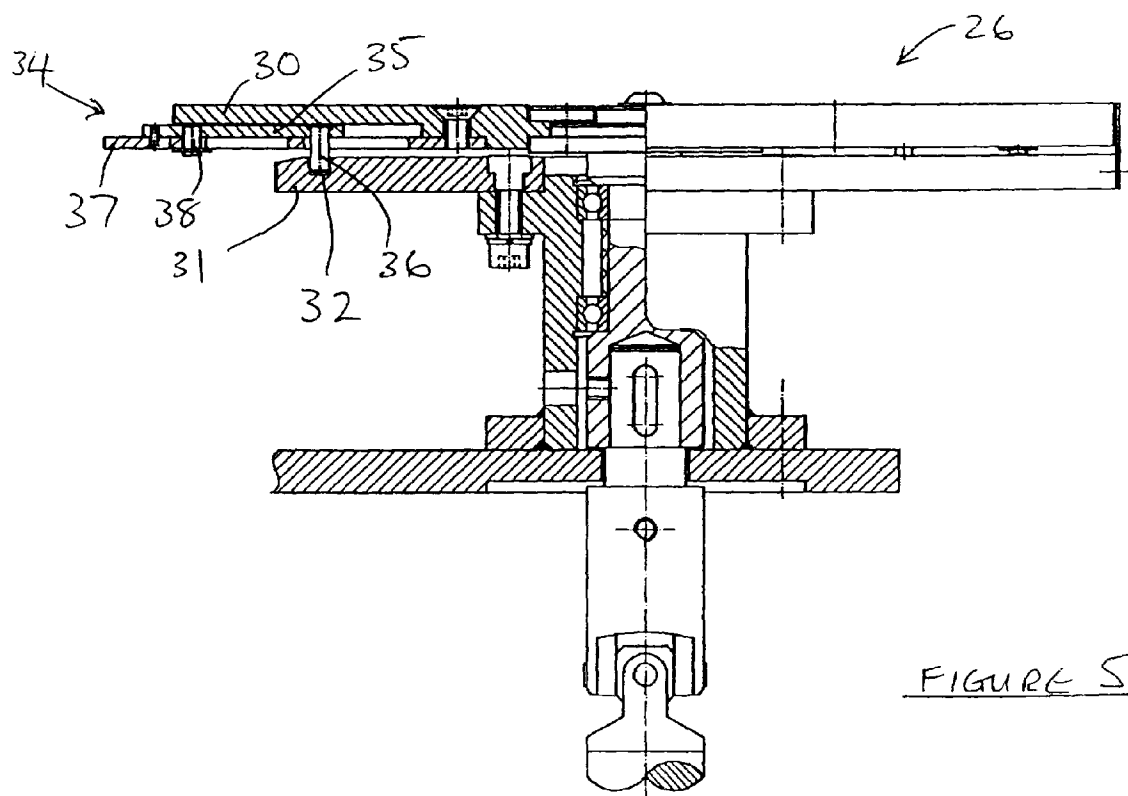


FIGURE 5

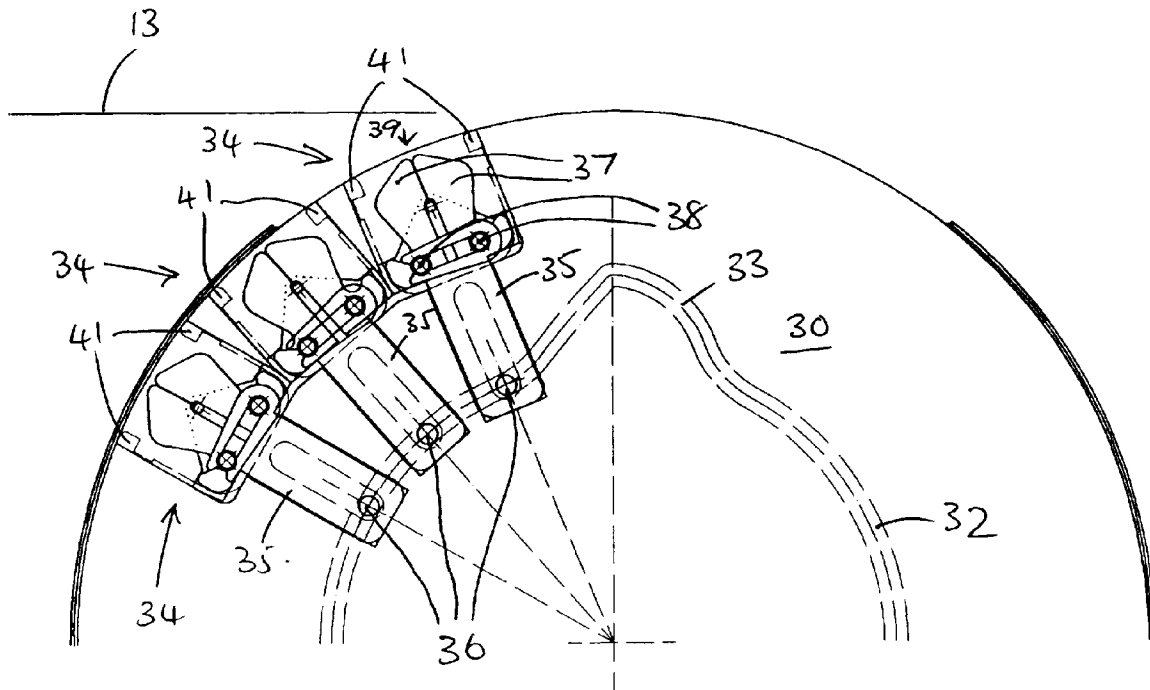


FIGURE 6A

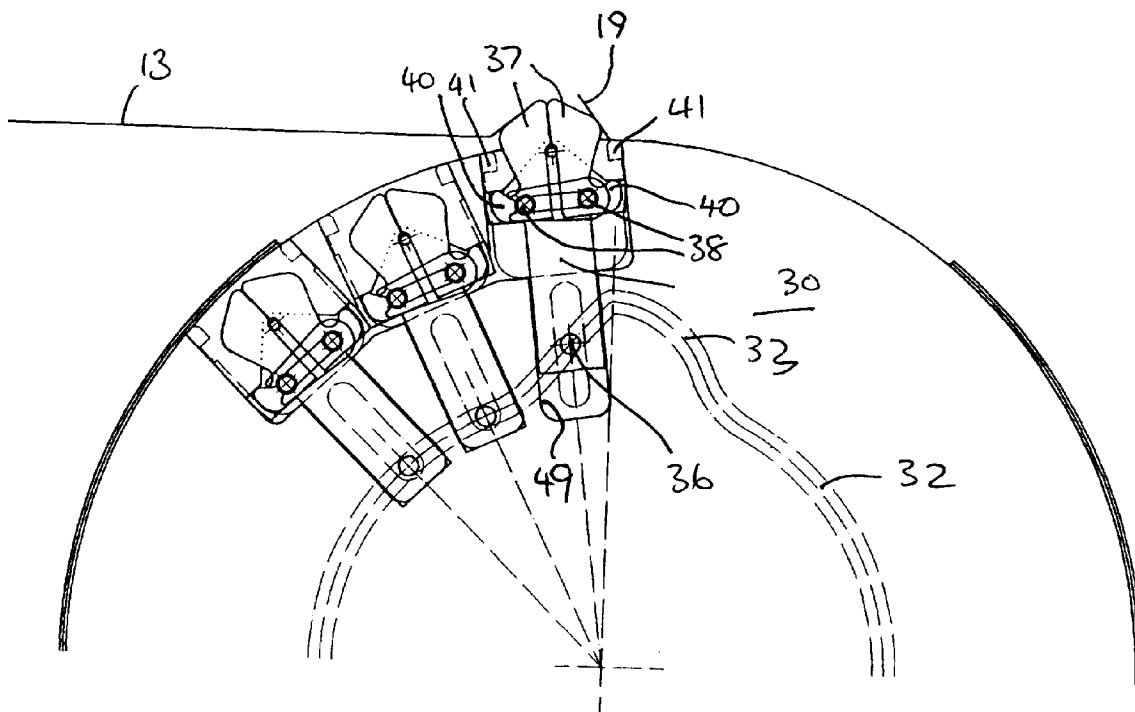


FIGURE 6B

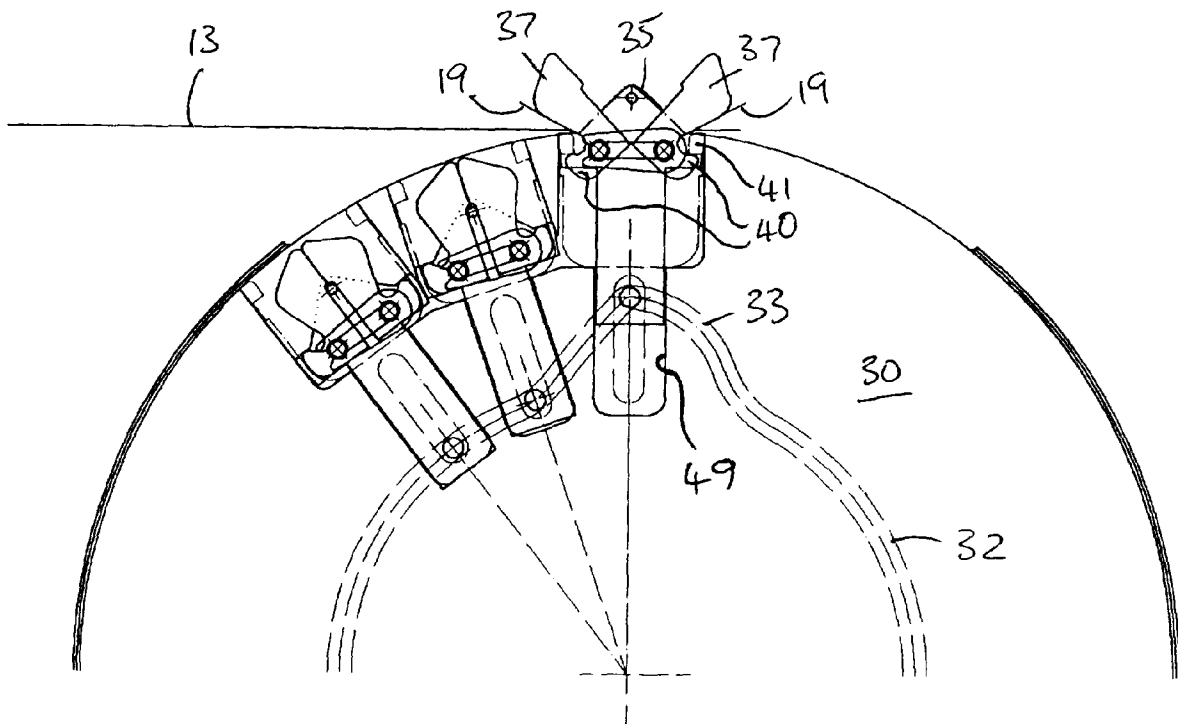


FIGURE 6C

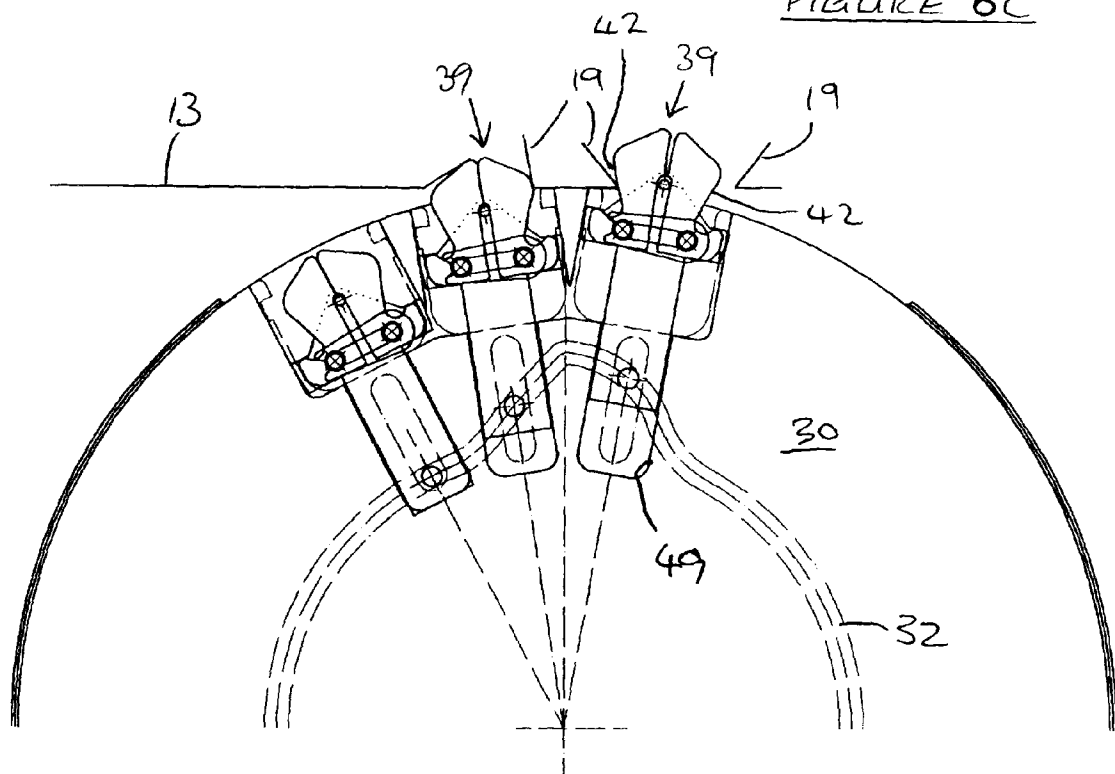


FIGURE 6D

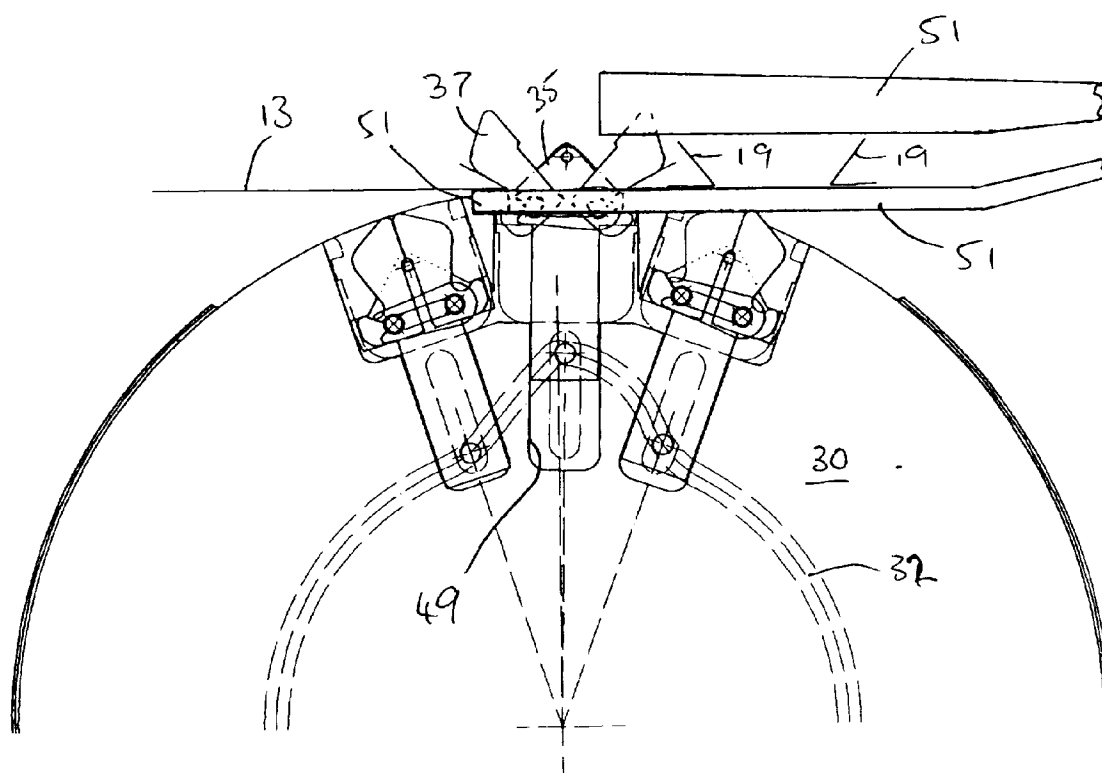


FIGURE 6E



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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 7258

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	EP-A-0 200 445 (MEAD CORPORATION) 5 November 1986 * the whole document *	1,6-8, 10,12,13	B65B11/10
Y	---	2-5,9	
Y	US-A-4 612 753 (B.C. TAYLOR ET AL.) 23 September 1986 * column 3, line 1-9; figure 1 * -----	2-5,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 6 February 1996	Examiner Grentzius, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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