



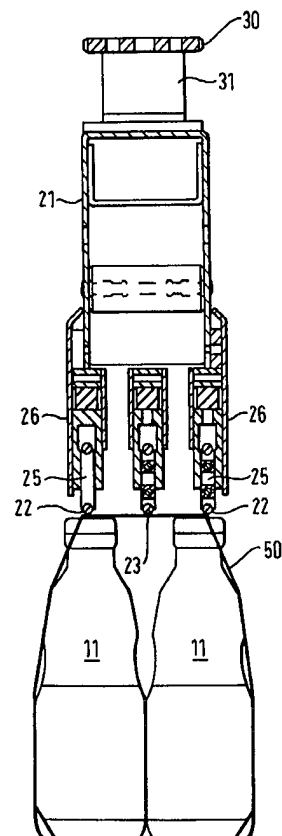
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(54) Title: OVERHEAD BOOM ARRANGEMENT FOR A PACKAGING MACHINE

(57) Abstract

There is provided for a packaging machine an overhead boom arrangement (20) having a number of endless belts (22, 23) driven around sets of rollers (25). The belts (22, 23) contact the tops of articles/bottles (11) or carton blanks (50) and are driven at the same speed as the speed of the articles through the packaging machine. At least one of the belts (23) is height adjustable relative to the other belt or belts (22). The boom arrangement holds the articles (11) whilst the blanks (50) are being folded around.



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OVERHEAD BOOM ARRANGEMENT FOR A PACKAGING MACHINE

5 The present invention relates to an overhead boom arrangement for use in a packaging machine, particularly but not exclusively packaging machines for forming cartons around a plurality of products such as bottles or cans.

10 According to the present arrangement there is provided an overhead boom arrangement for use in a packaging machine comprising a support structure, a plurality of endless belts carried thereon, each endless belt being driven around a set of rollers mounted on the support structure and having an active portion of its path during which in use the belt engages blanks or products as they move through the packaging machine, at least one
15 of the belts being height adjustable such that said active portion of said one belt path is movable upwards and downwards relative to the support structure and the active portions are parallel to each other and in use run at the same speed equal to that of the product speed of the packaging machine.

20 In some preferred arrangements three belts are provided, the central belt being height adjustable relative to the support structure of the boom arrangement and the outer two belts being fixed relative to the support structure.

25 In other preferred arrangements five belts are provided, the central and extreme side belts being fixed relative to the support structure and the two belts between the central belt and the respective extreme side belts being height adjustable relative to the support structure.

30 Preferably, in use, the complete overhead boom arrangement is movable vertically relative to the horizontal plain of the packaging machine. Conveniently the belts are elastic in nature and also the belts are circular in cross-section.

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A preferred feature of the present invention is that each belt is supported by rollers along said active portion of the path of the belt. The rollers for the or each movable belt are carried by a bracket which is vertically movable relative to the support structure of the boom arrangement.

In certain embodiments said movement of the or each bracket is effected by a hand operated wheel attached to a sleeve carrying a threaded collar and mounted for rotation only relative to the support structure and a threaded shaft which cooperates with the threaded collar and which carries the bracket. With certain arrangements the threaded shaft is capable only of movement along its lengthwise axis.

One further preferred feature is that the rollers supporting each endless belt along said active portions are provided with resilient suspension means in a direction perpendicular to the active portions. Conveniently the rollers are mounted on rubber mountings.

Another preferred feature is that the positions of the fixed and/or height adjustable endless belts are laterally adjustable.

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

Figure 1 is a side view of part of an overhead boom arrangement according to the present invention,

Figure 2 is a side view of part of the overhead boom shown in figure 1 in a different configuration,

Figure 3 is a sectional view taken on line 3-3 of the figure 1 arrangement operating on one type of product in single lane configuration,

Figure 4 is a sectional view taken on line 4-4 of the figure 1 arrangement operating on another type of product in twin lane configuration,

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Figure 5 is a sectional view taken on line 5-5 of the figure 2 arrangement,

Figure 6 is a detailed view of a fixed belt section of the overhead boom of figures 1 and 2,

Figure 7 is a detailed view of a movable belt section of the overhead boom of figure 1 showing the belt in an upper position,

Figure 8 is a detailed view of a movable belt section of the overhead boom of figure 2 showing the belt in a lower position,

Figure 9 is a detailed sectional view taken on line 9-9 of figure 6,

Figure 10 is a sectional view through a further embodiment of overhead boom, and

Figure 11 is a schematic side view of the overhead boom arrangement and its mounting.

In figures 1 and 2 there is shown part of a carton folding section 10 of a packaging machine for forming multipacks of bottles 11 in this embodiment. Other articles could of course be packed instead of the bottles 11. The bottles 11 are transported through the packaging machine at a steady machine speed whilst carton blanks 50 are transported from a blank magazine and on to the bottles. Further actions will fold the blanks and tighten and connect base panels of the carton beneath the bottles 11, but these areas are not shown.

In the embodiments illustrated, the bottles and/or the carton are engaged by an overhead boom arrangement 20 comprising a lengthwise extending support structure 21. The structure 21 carries two fixed endless belts 22 which are spaced apart in the transverse direction of the packaging

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5 machine and which extend in a lengthwise direction. Between the two fixed belts 22 the structure 21 carries an endless belt 23 which is movable in the upwards and downwards direction. This belt 23 is movable by virtue of being partially carried by a bracket 24 which is movable relative to the support structure 21.

10 The fixed belts 22 and the movable belts 23 have a round cross-section and are made from an elastic material such as rubber or synthetic rubber to allow for adjustment of the movable belts. The fixed belts 22 are stretched around a series of support rollers 25 which are secured for free rotation to panels 26 of the support structure 21 and also around end driven rollers 27 which are driven at machine speed. Each belt 22 is therefore driven at machine speed in the same direction as the bottles 11 during the active portion of its travel, namely when it is below the rollers 25, 27.

15 The movable belt 23 is stretched around a fixed roller 25 and a driven roller 27, similar to those described above in relation to the fixed belts, which rollers 25, 27 are fixed relative to the support structure 21. The belt also passes around a number of movable rollers 29 which are secured for free rotation on the bracket 24 disposed between the rollers 25, 27 for the movable belt. The bracket 24 is movable upwards and downwards relative to the support structure 21 and therefore relative to the fixed belts 22. This is clearly seen in figure 5, 7 and 8.

20 The support structure 21 as a whole is movable relative to the conveyor 28, as can be seen from figure 11. The structure 21 is secured to the machine frame 12 by two adjustable supports 13 which can be lowered or raised by electric/servo motor 14 or hand wheels or other suitable means. This figure also shows rotating arms 15 for folding the sides of the blanks 50.

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In order to enable the bracket 24 to move relative to the support structure 21 there is provided a hand operated wheel 30 attached to a sleeve 31 which extends into the support structure 21 and which is rotatable relative thereto about its lengthwise axis. At the base of the sleeve 31 is an internally threaded collar 32 which cooperates with a threaded shaft 33 attached to the bracket 24. It will be clear, therefore, that rotation of the hand operated wheel 30 results in upward or downward movement of the bracket 24 and, therefore, the movable belt 23. It will be readily appreciated that other ways of moving the bracket 24 are possible, the above arrangement being a preferred example.

Figure 9 shows in more detail the mounting of the rollers 25 on the panels 26 of the support structure 21. The other rollers 27, 29 may be similarly mounted. Each roller 25 has an axle 34 supported in a pair of bearings 36 in a housing 35 which is itself secured relative to the panel 26. The attachment of the housing 36 relative to the panel 26 incorporates mounting means in the form of a rubber block 37, although other forms of mounting would be possible. The flexible mounting is desirable so as to accommodate tolerances in the height of the products, as will be apparent later in the description.

In operation, the bottles 11 are engaged by the carton blanks 50 prior to reaching the overhead boom arrangement 20. If the carton is to extend over the crown closure 51 of the bottles (OTC) in a one lane pack then the figure 3 configuration is used. Here the central belt 23 is moved so as to engage the top panel of the carton on top of the closures 51. As the belt 23 is being driven at machine speed, that is the speed the bottles are being driven at, the top portion of the bottles are securely held as the carton blank 50 is folded and secured about them. The flexible mounting means associated with

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the rollers ensures that the overhead boom can accommodate small variations in bottle height by upward deflection of the belts.

5 In a two lane OTC arrangement as shown in figure 4, the two fixed belts 22 engage the top panel of the blank 50 above the closures 51 and the central belt 23 is moved so as to be at the same height so as to engage the top panel of the blank 50 between the closures 51.

10 In figure 5, however, there is shown a two lane arrangement for cartons in which the bottle necks 52 extend through apertures in the blank which then rests on the shoulders 53 of the bottles. This type of package is known as a neck through (N/T) package. With the N/T package the fixed
15 belts 22 engage the closures 51 of the two bottles whilst the central belt 23 is moved downwards relative to the two fixed belts 22. The central belt can then engage that part of the top panel of the blank 50 between the necks 52 of the bottles.

20 In figure 10, there is shown a further, more complex arrangement in which there are three fixed belts 22 and two movable belts 23. This arrangement is ideally suited to three lanes of bottles, the operation of which is readily apparent from the drawings.

25 It will be appreciated that other arrangements are possible in which more or even all belts are height adjustable relative to the support structure. It is also possible that the lateral position of the belts could also be made adjustable with reasonably simple modification.

30 Other adaptations will be apparent and may be necessary for different types of product and carton.

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CLAIMS

1. An overhead boom arrangement for use in a packaging machine comprising a support structure, a plurality of endless belts carried thereon, each endless belt being driven around a set of rollers mounted on the support structure and having an active portion of its path during which in use the belt engages blanks or products as they move through the packaging machine, at least one of the belts being height adjustable such that said active portion of said one belt path is movable upwards and downwards relative to the support structure and the active portions are parallel to each other and in use run at the same speed equal to that of the product speed of the packaging machine.
2. An overhead boom arrangement as claimed in claim 1 wherein three belts are provided, the central belt being height adjustable relative to the support structure of the boom arrangement and the outer two belts being fixed relative to the support structure.
3. An overhead boom arrangement as claimed in claim 1 wherein five belts are provided, the central and extreme side belts being fixed relative to the support structure and the two belts between the central belt and the respective extreme side belts being height adjustable relative to the support structure.
4. An overhead boom arrangement as claimed in any one of claims 1 to 3 wherein in use, the complete overhead boom arrangement is movable vertically relative to the horizontal plain of the packaging machine.

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5. An overhead boom arrangement as claimed in any one of claims 1 to 4 wherein the belts are elastic in nature.
6. An overhead boom arrangement as claimed in any one of claims 1 to 5 wherein the belts are circular in cross-section.
7. An overhead boom arrangement as claimed in any one of claims 1 to 6 wherein each belt is supported by rollers along said active portion of the path of the belt.
8. An overhead boom arrangement as claimed in claim 7 wherein the rollers for the or each movable belt are carried by a bracket which is vertically movable relative to the support structure of the boom arrangement.
9. An overhead boom arrangement as claimed in claim 8 wherein said movement of the or each bracket is effected by a hand operated wheel attached to a sleeve carrying a threaded collar and mounted for rotation only relative to the support structure and a threaded shaft which cooperates with the threaded collar and which carries the bracket.
10. An overhead boom arrangement as claimed in claim 9 wherein the threaded shaft is capable only of movement along its lengthwise axis.

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11. An overhead boom arrangement as claimed in any one of claims 7 to 10 wherein the rollers supporting each endless belt along said active portions are provided with resilient suspension means in a direction perpendicular to the active portions.
12. An overhead boom arrangement as claimed in claim 11 wherein the rollers are mounted on rubber mountings.
13. An overhead boom arrangement as claimed in any one of claims 1 to 12 wherein the positions of the fixed and/or height adjustable endless belts are laterally adjustable.

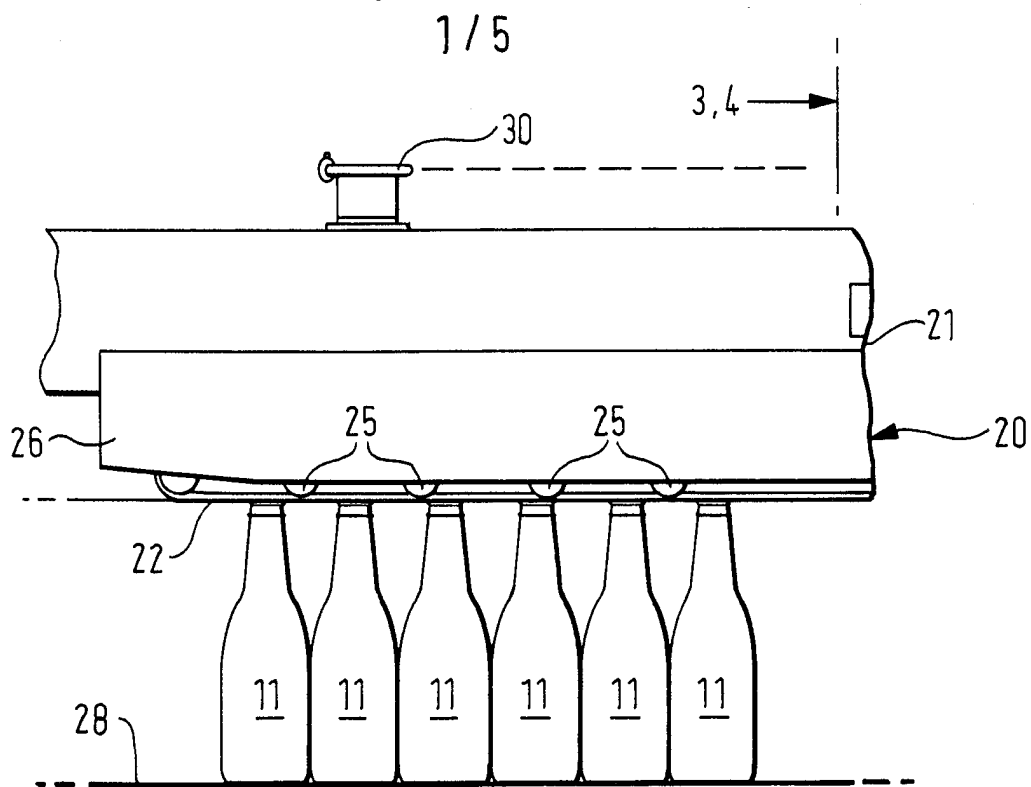


FIG. 1

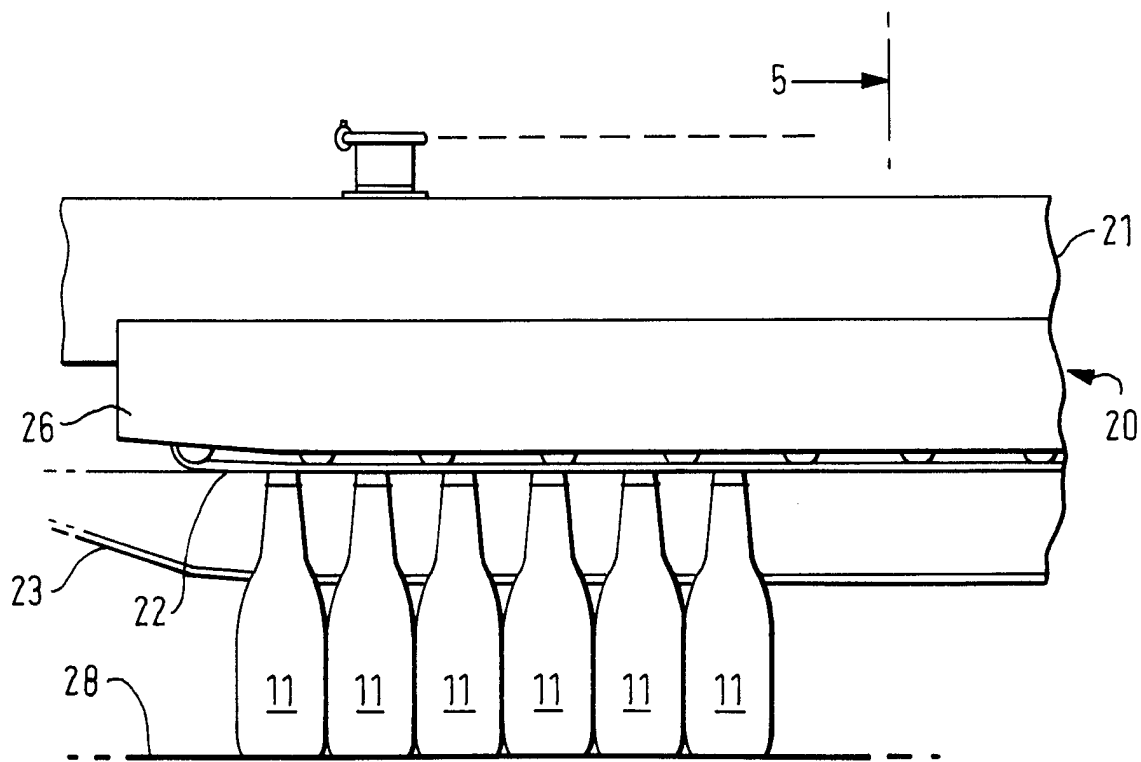


FIG. 2

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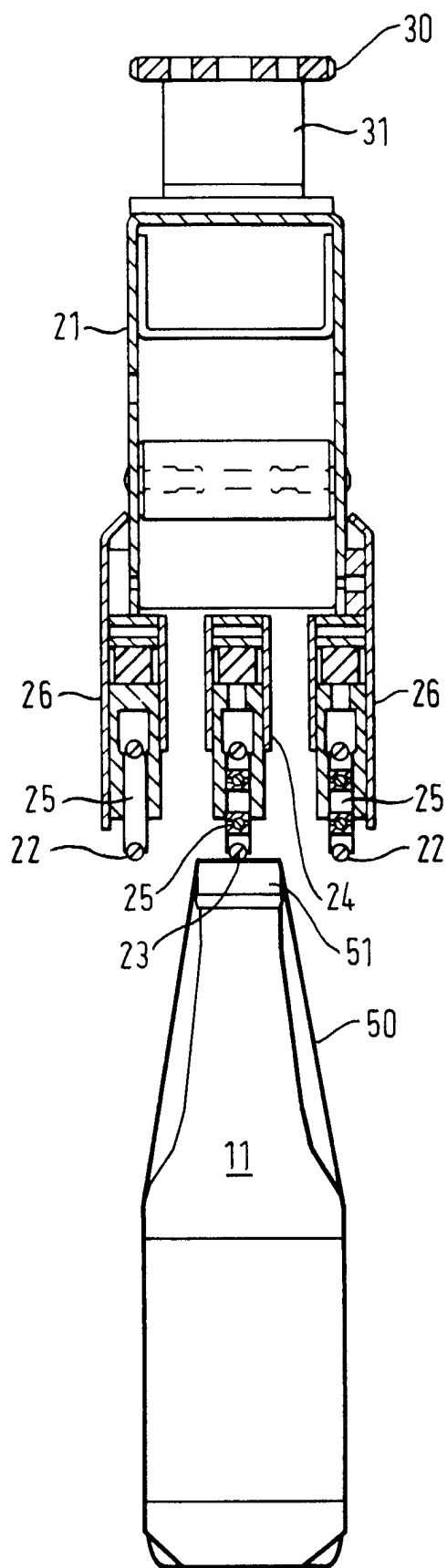


FIG. 3

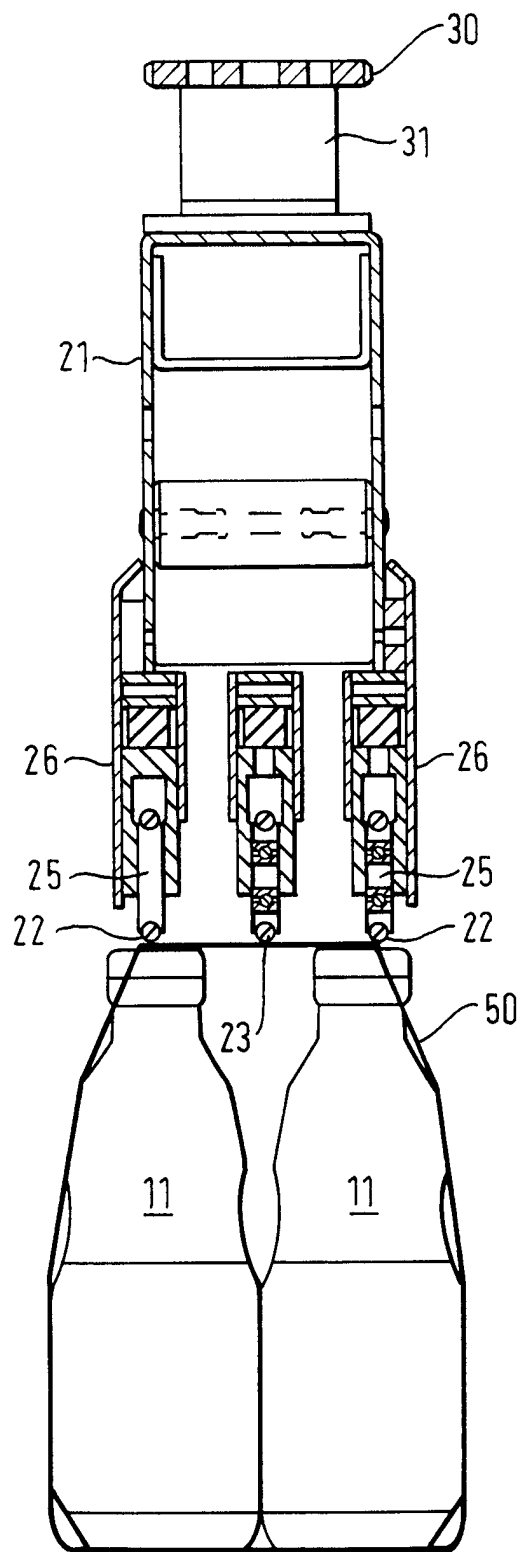


FIG. 4

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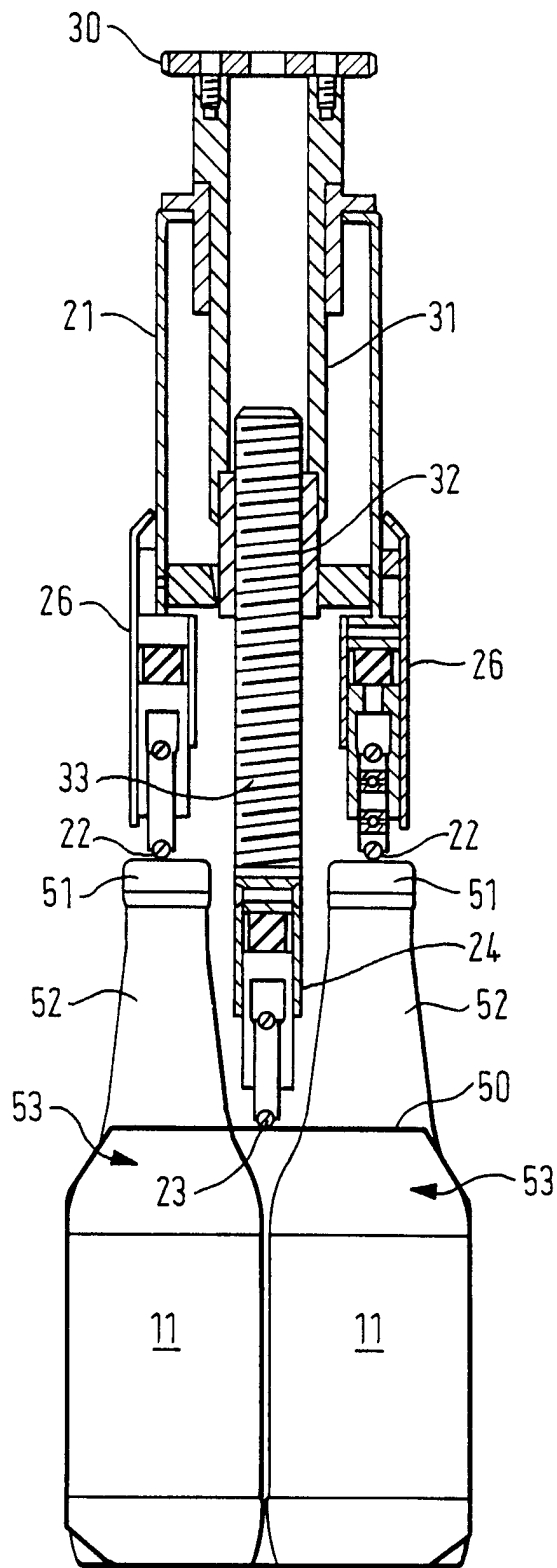


FIG. 5

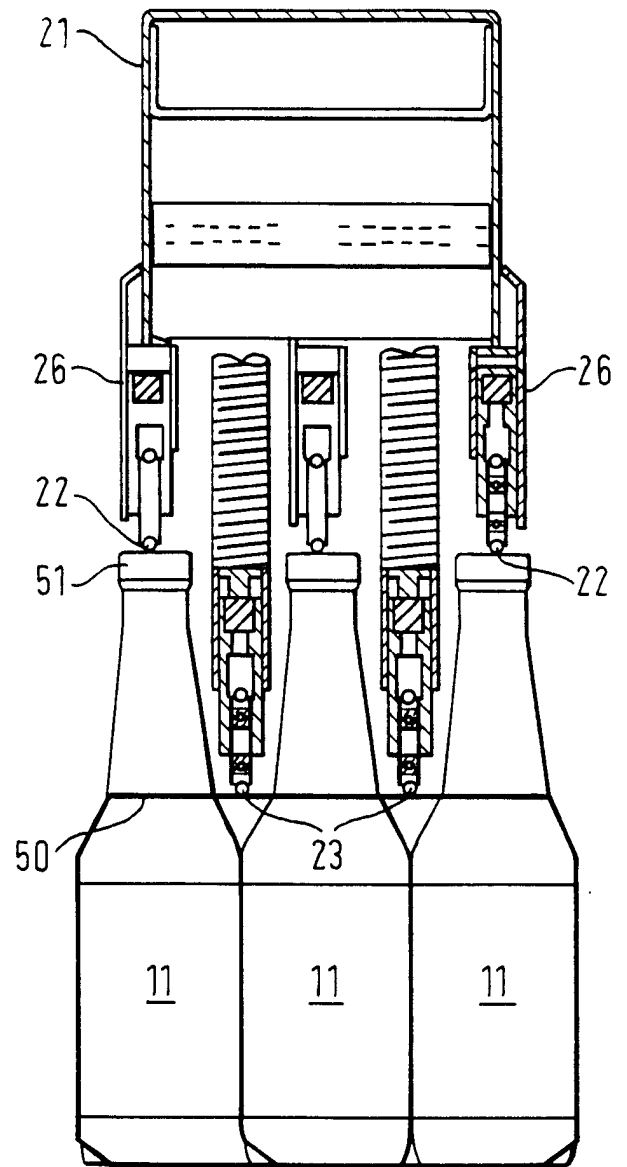
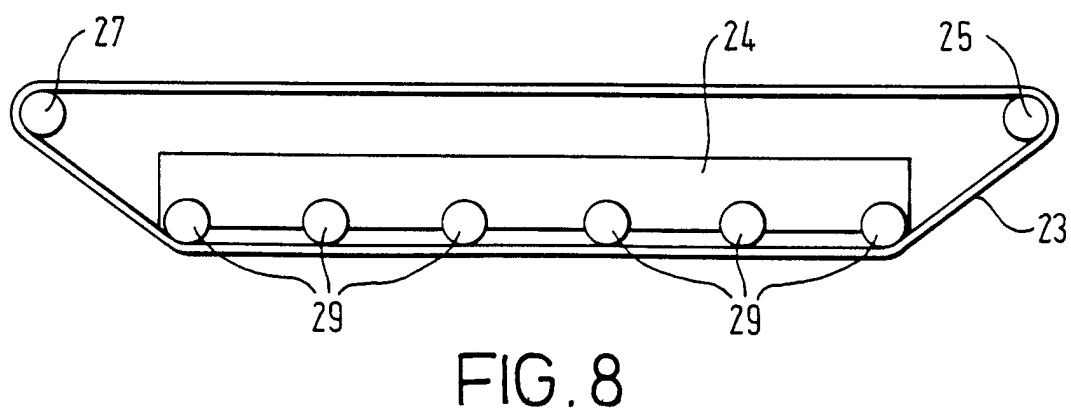
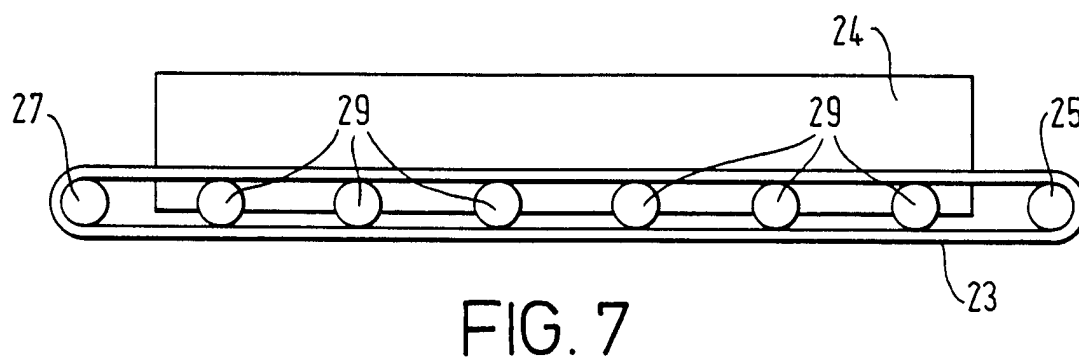
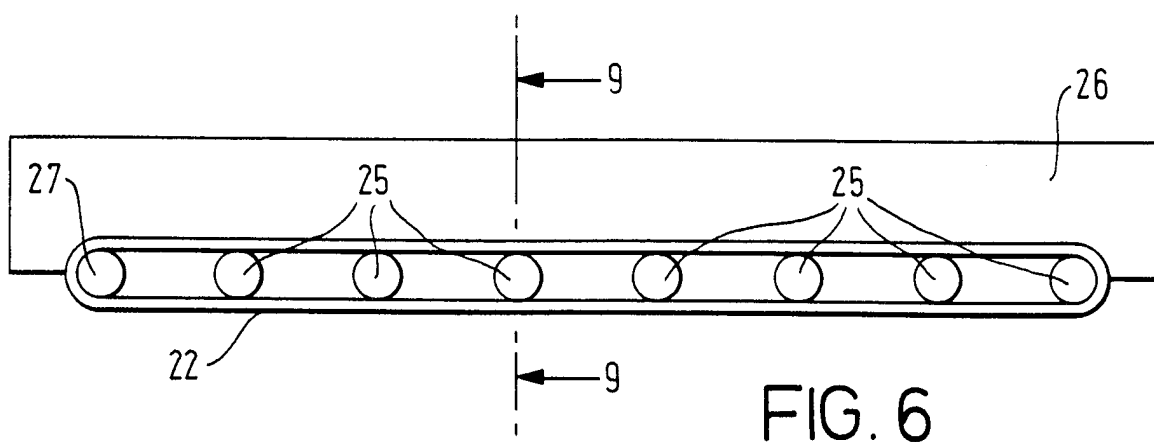
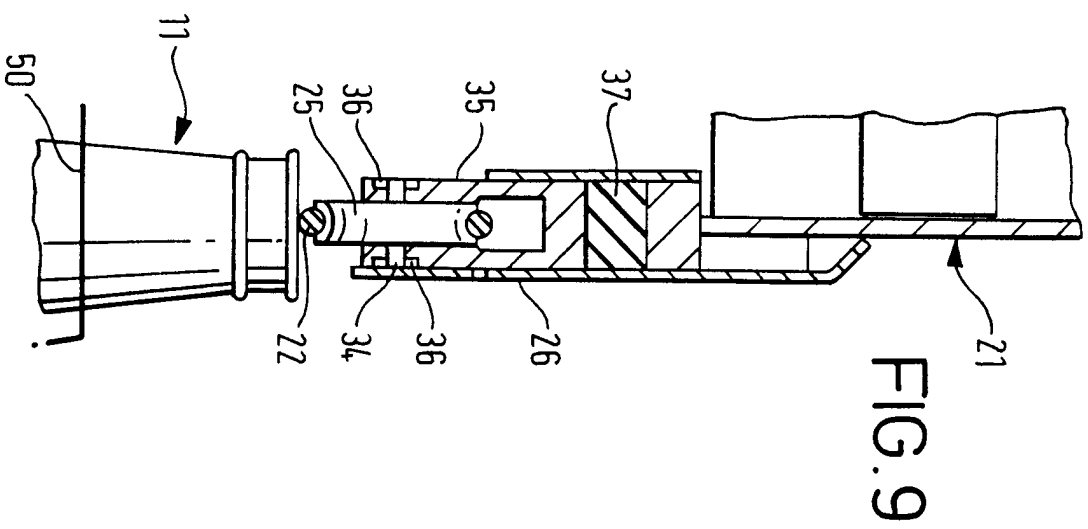
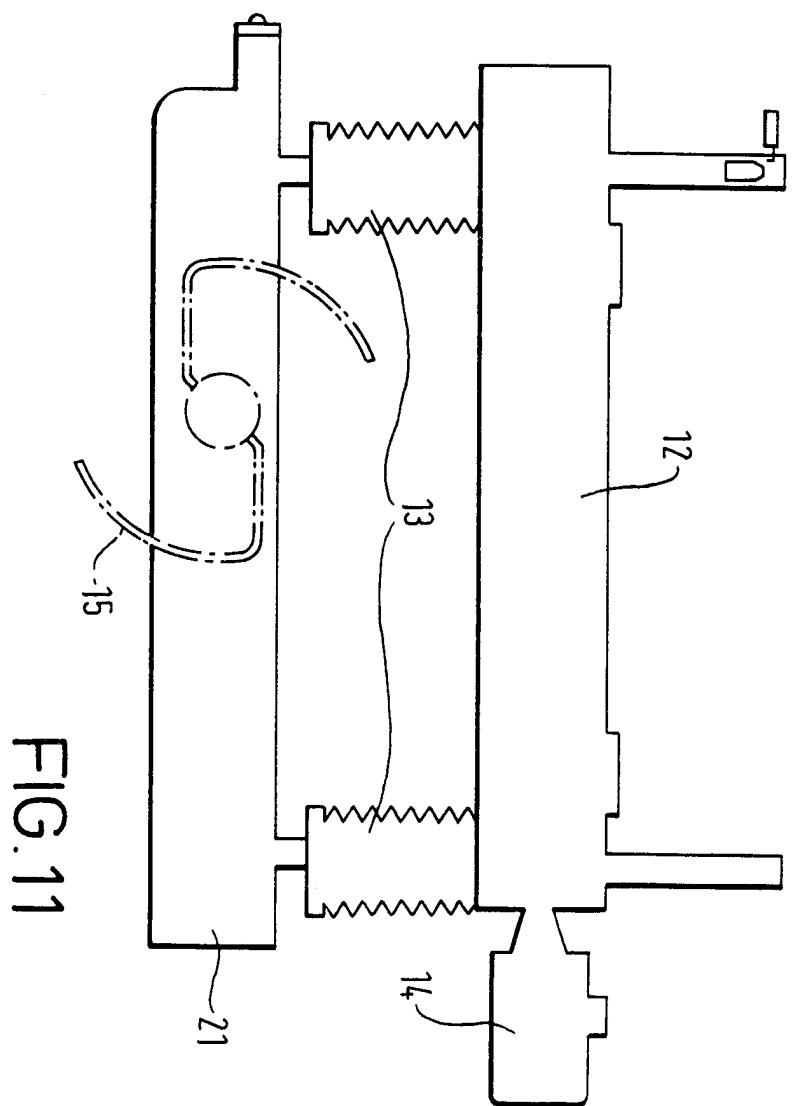


FIG. 10

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 97/03308

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B65B21/24 B65B59/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 96 32324 A (MEAD) 17 October 1996 see page 36, line 36 - page 37, line 6; figures 37,38	1,4,7
Y	US 3 766 704 A (GANZ) 23 October 1973 see column 8, paragraph 2; figures 1,2B,11	1,4,7
Y	US 2 996 169 A (GENTRY) 15 August 1961 see the whole document	4
Y	GB 797 148 A (ATLANTA PAPER) 25 June 1958 see page 4, column 1, paragraph 3	7

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Information on patent family members

International Application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9632324 A	17-10-96	US 5671587 A	30-09-97
		AU 5485796 A	30-10-96
		AU 5545096 A	30-10-96
		AU 5546196 A	30-10-96
		AU 5546296 A	30-10-96
		AU 5548196 A	30-10-96
		AU 5664496 A	30-10-96
		EP 0817748 A	14-01-98
		EP 0817746 A	14-01-98
		EP 0817745 A	14-01-98
		EP 0820403 A	28-01-98
		EP 0817747 A	14-01-98
		EP 0820404 A	28-01-98
		WO 9632320 A	17-10-96
		WO 9632321 A	17-10-96
		WO 9632325 A	17-10-96
		WO 9632327 A	17-10-96
		WO 9632322 A	17-10-96
US 3766704 A	23-10-73	US 3627309 A	14-12-71
US 2996169 A	15-08-61	NONE	
GB 797148 A		NONE	