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(54) Packaging mechanism and carton

(57) A mechanism (10) for packaging cartons (C) with a plurality of articles (B) comprising means (12-18) for associating an article separator (1) with an article, means (24-28) for selecting a group of articles comprising said article and said article separator, and means (36-40) for packaging said groups of articles and said article separator in a carton wherein said article is separated from an adjacent article by said article separator. Also, a mechanism (10) for packaging cartons (C) of the open-ended type by end loading a plurality of articles (B), comprising means (12-18) for associating an article separator (1) with an article, means (24-28) for selecting a group of articles comprising said article and said article separator, and means (36-40) for packaging said groups of articles and said article separator in a carton through an open end thereon, such that said article is separated from an adjacent article by said article separator in the packaged carton.

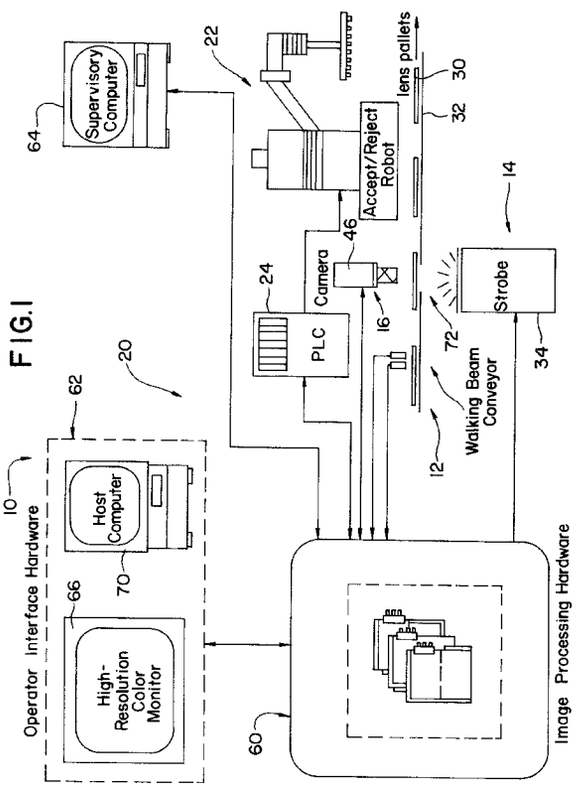

FIG.1

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The invention relates to a mechanism for packaging articles such as bottles, for example, into cartons thereby to enable a plurality of articles to be carried within the carton. The invention also relates to a particular type of carton comprising article separators and to insertable article separators themselves.

When loading articles such as bottles into cartons of the end-loading type, it is known to feed bottles into a partially erected, open-ended carton in the form of a tube or sleeve. When loaded, the ends of the carton sleeve are closed thereby securing the packaged articles. However, the articles abut one another within the carton and particularly if the articles are bottles made of glass, this can cause breakage problems during transport, for example.

The invention seeks to avoid, or at least mitigate, these and other problems of the prior art. Accordingly, one aspect of the invention provides a mechanism for packaging cartons with a plurality of articles comprising means for associating an article separator with an article, means for selecting a group of articles comprising said article and said article separator, and means for packaging said groups of articles and said article separator in a carton such that said article is separated from an adjacent article by said article separator in the packaged carton.

Preferably the associating means comprises a device which effects a change in configuration of the article separator from an inoperative configuration in which it is stored to a configuration in which it can abut more than one point on the outer surface of an article to enable separation of said article from two adjacent articles in a packaged carton.

More preferably selecting means enables a group of articles to be formed in a row of two or more articles.

The associating means can associate one or more article separators with a row of articles to enable separation of each article from an adjacent article in the row when in the carton.

The packaging means can enable two or more rows of articles to be packaged in a carton.

Preferably the associating means enables one or more article separators to be associated with each row of articles such that each row is separated from an adjacent row by the one or more article separators in a packaged carton.

The packaging means can enable a group of articles and said article separator to be loaded through an open end of a sleeve-like, or open-ended, carton.

Another aspect of the invention provides a mechanism for packaging cartons of the open-ended type by end loading a plurality of articles, comprising means for associating an article separator with an article, means for selecting a group of articles comprising said article and said article separator, and means for packaging said groups of articles and said article separator in a carton through an open end thereon, such that said article is separated from an adjacent article by said article separator in the packaged carton.

Preferably, there is provided means for conveying an open-ended carton and a group of articles whilst the articles are loaded into the carton guide means can co-operate with said conveying means to cause said articles to be loaded into a carton.

The conveying means can select one or more groups from a packaging infeed position to be loaded into an associated carton. Preferably, two or more channels for articles are provided to present two or more groups of articles at said packaging infeed position. The associating means for associating an article separator and an article can be provided for each channel.

A further aspect of the invention provides a mechanism for transferring an article separator having an operative and inoperative configuration from a stored position into association with an article, comprising means for selecting an article separator in an inoperative configuration from an array of stored article separators, means for conveying the selected article separator away from the stored position, and means for associating the article separator with an article.

Preferably, there is means for at least partially causing the article separator to adopt its operative configuration in which it can enable separation of one article from an adjacent article in a packaged carton.

A further aspect of the invention provides an article separator for separating a pair of adjacent articles in a packaged carton comprising means enabling the partition to be associated with an article prior to packaging.

Preferably the article separator comprises a main panel and an article separator portion foldably attached thereto.

Another aspect of the invention provides a carton having a plurality of packaged articles and an article separator according to another aspect of the invention.

Preferably the carton is of the end-loading type.

Preferably it comprises two or more rows of articles wherein each row is separated from an adjacent row by an article separator. Each article can be separated from a neighbouring article by part of an article separator

Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic perspective view of a first embodiment of a packaging mechanism according to the invention;

Figure 2 is a plan view of cartons according to the invention;

Figure 3 is a perspective view of an insert according to the invention;

Figure 4 is a plan view of part of the packaging

mechanism shown in Figure 1;

Figure 5 is a plan view of a slight modification of the packaging mechanism shown in Figure 1;

Figure 6 is a side view of the mechanism shown in Figure 5;

Figure 7 is a plan view of another embodiment of a packaging mechanism according to the invention;

Figure 8 is a plan view of part of the mechanism shown in Figure 7;

Figure 9 is an end view of part of the insert transfer mechanism shown in Figure 7;

Figure 10 is a plan view of the star wheel mechanism shown in Figure 7; and

Figure 11 is a plan view of a further embodiment of a packaging mechanism according to the invention.

Referring to Figures 1 and 4 there is shown a first embodiment of a packaging mechanism 10 according to the invention, as well as a carton C and an insert 1 according to other aspects of the invention. As can be seen from Figure 1 for example, mechanism 10 enables the packaging of a plurality of bottles B into cartons C of an end-loading type. In this particular case, four rows of three bottles B are loaded into each carton C. Additionally, the mechanism enables inserts 1 to be loaded into each of the cartons C in order to enable separation of at least some of the bottles from adjacent bottles.

Mechanism 10 comprises an insert hopper IH and a transfer mechanism 12 for transferring the inserts 1 onto a chain conveyor 14 which, as shown in Figure 4, comprises a series of lugs 16 which act to convey individual inserts 1 from the transfer mechanism 12 to a device 18 for setting up the inserts 1 ready for engagement with bottles B. Of course, the lugs could co-operate with other fixed guides, for example, in this operation.

Device 18 comprises a series of pairs of lugs 20 and 22 which rotate along a continuous path as shown in Figure 4. As an insert 1 is conveyed from mechanism 14 to device 18 a leading lug 20 of a given pair engages the forward-most article separator panel 2 of an insert 1 causing it to fold away from the main panel 3 about a fold line 4 (see Figure 3). Subsequently, the trailing lug 22 engages the rear most article separator panel 2 and causes it to fold outwardly. Arrows in Figure 4 indicate the direction of movement of the conveyors and the inserts 1 as they move away from the hopper IH.

An infeed channel 23 leads a line of bottles B to a star wheel 24 adjacent device 18. The star wheel 24 acts to regulate the flow of articles and enables inserts 1 to be aligned with a given number of articles. In this example the inserts 1 comprise two article separator panels which are intended to be positioned between a central bottle and outer bottles in a row of three. As can be seen in Figure 4 the inserts 1 are guided by a device such as a fixed guide (not shown) into engagement with a selected group of three articles. These three articles are then conveyed together with the insert through a conveyor and article separator mechanism 26.

Mechanism 26 comprises individual supports 28 for each of the bottles. The supports, or trolleys, 28 comprise upright lugs 29 which can act to hold a bottle when the support 28 moves sideways and also to maintain an insert 1 against the side of the associated bottle. The individual supports 28 can be moved sideways to create two lines of groups of articles which eventually are guided by channels 34 and 35 along the flow direction. For example, alternate groups can be selected for each channel.

A lug conveyer mechanism 30 comprising lugs 32 is provided for each of the lines of divided articles to effect transfer of the groups of bottles from the mechanism 26 onto a conveyor 36 which moves the groups of articles along channels 34 and 35.

In one example, four lines of articles can be created using two of the mechanisms just described. Thus, pairs of mechanisms from insert hopper IH to guide channels 34 and 35 can be provided on opposite sides of mechanism 10. The mechanism shown in Figure 1 applies the inserts to the outsides of the groups of articles relative to a central axis M of the mechanism. The substantially similar mechanism shown in Figures 5 and 6 apply the inserts to the insides of the groups, however. Thus, whilst they are substantially the same, two configurations of the inserts relative to the bottles and cartons results from these different arrangements. These configurations are shown in Figure 2A and 2B, where that resulting from the mechanism of Figure 5, as shown in Figure 2B, is preferable since central rows of articles are separated by insert article separators.

Of course, the opposite sides of the mechanism need not be mirror images of one another and one device 18 can apply inserts 1 to the outside of bottles on one side of the mechanism and a second device 18 can apply inserts 1 to the inside of the bottles relative to axis M. This leads to the configuration shown in Figure 2C which also results from the mechanisms shown in Figures 7 and 11.

Referring to Figure 5, guide channels 34 and 35 cause the rows of articles to converge at a point beyond, or downstream of, a carton hopper CH and carton transfer device R shown in Figure 6. The transfer device R could, for example, comprise a rotating mechanism having carton gripping means such as vacuum cups which attach to the forward most carton in a hopper and draw the carton downwardly to the level of the articles. The carton can be engaged by flight bars 38 and, using known mechanisms, caused partly to erect thereby enabling articles to be end-loaded into a carton which is in a sleeve like configuration.

This configuration is shown in Figure 1 where individual cartons C are carried by flight bars 38 having upright supports 39 which can act to sustain the cartons C in their upright positions. The flight bars 38 can comprise contoured ends, or wedges, which protrude into the assembled articles at the end of channels 34 and 35 and cause separation and forward movement of selected groups of the articles. For example, as shown in Figure 5, an individual flight bar can act to gather a given group of three articles each having an insert 1 from each of the four channels. Further guide plates (not shown) can cause the articles to move inwardly into an open ended carton C as the carton and articles are conveyed by a flight bar 38.

A separate article pushing mechanism 40 can be provided to push the group of articles into the centre of each of the cartons. Additionally, a guide mechanism 40 can be used to close the ends of the carton and possibly seal the ends, for example, using glue or locking tabs.

Referring to Figures 7 to 10, there is shown another embodiment of a mechanism 110 according to the invention wherein components or integers of this mechanism which are in common with those described in relation to mechanism 10 are referred to using the same reference numeral prefixed with the number 1. In this embodiment four lines of articles are directed for end-loading into a carton from one side of the carton rather than from both sides as described earlier. Accordingly, four guide channels 51, 52, 53 and 54 are provided as shown in Figure 7. An infeed line of bottles B is thus directed along each of the channels 51 to 54 as far as a star wheel 76 provided at each of four stations 60. At each station 60, the lines of bottles are divided into groups of three and an insert is applied to each of the groups in a similar manner to that previously described.

In this mechanism there is provided a rotating transfer mechanism 62 which transfers the forward most insert 1 in a hopper IH onto a conveyor system 70. The transfer mechanism 62 is a rotary device comprising a rotary wheel 65 which is driven by means not shown about an axis 64 which is tilted with respect to the orientation of the longitudinal axis of the articles B, for example. Thus, where the bottles are conveyed in an upright position and thus insert article separators 1 are applied in a substantially upright position against the sides of the upright bottles, the axis 64 is inclined to be vertical. This enables the transfer mechanism 62 to move the inserts from a relatively high hopper position to a lower position level with device 70 and articles B. Thus a hopper IH can extend above an infeed line going to a different station 60. As shown in Figure 7 the hopper IH of the first three stations 60 extend above at least one of channels 51, 52 and 53. Mechanism 62 further comprises insert grippers 67 which can, for example, be suction cupped wherein low pressure is created (using means not shown) inside a cup when the cup is brought into contact with the forwardmost insert in a hopper IH thus enabling the cup to attach to the insert. The gripper 67 can be attached to an arm 66 which in turn is attached to wheel 65 thus enabling a gripped insert 1 to be rotated about axis 64 to a position adjacent conveyor mechanisms 70.

Of course, the gripper 67 need not rotate in a purely circular fashion and, for example, arm 66 can be driven using a cam and cam follower system in an eccentric path such that, for example, the gripper 67 is caused to move to an outermost position relative to axis 64 when it is required to abut the inserts 1 in the hopper IH and when required to position the inserts 1 onto the conveyor 70.

As an insert 1 is brought adjacent conveyor 70 the low pressure in a suction cup, where such a system is used, can be released and a main lug 72 carried on conveyor 70 can be used to convey individual inserts in the manner shown in Figure 8. As the insert is conveyed by lug 72, secondary lugs 74 can be caused gradually to protrude outwardly thereby erecting the article separators 2. For example, the lugs 74 might be carried on a chain carrying the series of main lugs 72 wherein the lugs 74 can reciprocate through the chain in a transverse direction to the direction of movement of the chain. Thus the lugs 74 can be caused to move transversely using a fixed guide system, for example.

A star wheel 76 is provided for each of the stations 60 adjacent the insert carrier 70. Star wheel 76 comprises a series of teeth 79 and dividing lugs 78 which are adapted to separate the series of articles into groups of three, for example, as shown in Figures 8 and 10. Of course, star wheel 76 can be adapted to enable any workable number of articles to be divided into a group. As the articles B leave star wheel 76 in a group, this group is engaged by an insert 1. Again, since the groups are formed of three bottles, the article separators 2 are positioned on each side of the central bottle, between it and the outermost bottles of the group. As conveyor 70 and star wheel 76 continue to rotate, main lug 72 engages the rearmost article in a group and conveys the group of articles and insert further along the channel. Subsequently, the individual groups are engaged by a flight bar 138 whereupon this acts to convey them.

Referring to Figure 7, the individual article feed lines 51 to 54 are gradually brought together so that groups of articles converge shortly after the endmost station 60 to a carton infeed position. The flight bars co-operate with the guides to cause four groups of three articles each to enter one end of a partly erected carton. Mechanism 140 causes the articles to move to a central position within the carton. Mechanism 142 can then be used to close the ends of carton, thereby sealing the articles within it.

As can be seen in Figure 7 each of the groups of

three articles which are eventually brought together within a given carton, have an insert applied to them on their outside relative to the central axis M. Thus, an insert is provided between each of the groups of three articles when packaged in a carton and accordingly each article is separated from its neighbour by either part of a main panel 3 or an article separator 2 of an insert 1. This configuration is shown in Figure 2C.

Mechanism 110 can also comprise a series of four guide channels 50 to enable the mechanism to be converted for packaging bottles where no inserts 1 are required.

Referring to Figure 11 there is shown another mechanism 210 according to the invention. In this mechanism, components in common with those of earlier embodiments are referred to using the same reference numerals prefixed with the number 2. Here, four infeed channels 251, 252, 253 and 254 are provided on one side of central axis M, which can, for example, be the same side as a series of infeed channels 250 to be used when no inserts are required. The channels 251 to 254 pass over central axis M to individual stations 260 which apply inserts 1 on the inside of groups of articles relative to axis M. The groups of articles and inserts are then conveyed from the stations 260 to the cartons using dedicated flight bars 80 which can, for example, be carried through an endless path using a chain conveyor mechanism. Accordingly, using this mechanism, the bottles are packaged into a carton C in a similar configuration to that described in relation to mechanism 110 except that the actual orientation of the inserts relative to the bottles and the feed direction is reversed from left to right. However, each bottle is still separated from its neighbour by either an insert main panel 3 or insert article separator panel 2 as shown in Figure 2C.

Of course, whilst a specific article separator or insert 1 is described here as shown in Figure 3, other configurations of article separator are possible. For example, any number of article separator portions 2 could be provided, including 1, to suit the number of articles in a row. The article separators can be maintained in association with a given article during movement, for example, by external guides or using guides in combination with a gripping function carried out by article separator portions 2 gripped between adjacent articles in a row. Other means could be provided for keeping an article separator 1 and an article together such as using an adhesive or other attachment means.

Claims

1. A mechanism for loading a plurality of articles into a carton which mechanism comprises means for associating an article separator with an article, means for selecting a group of articles comprising said article and said associated separator, and means for loading said groups of articles and said associated separator into a carton such that said article is separated from an adjacent article by said article separator in the packaged carton.

2. A mechanism according to claim 1 wherein the associating means comprises a device which effects a change in configuration of the article separator from an inoperative configuration in which it is stored to a configuration in which it can abut more than one point on the outer surface of an article to enable separation of said article from two adjacent articles in a packaged carton.

3. A mechanism according to claim 1 or claim 2 wherein selecting means enables a group of articles to be formed in a row of two or more articles.

4. A mechanism according to claim 3 wherein the associating means associates one or more article separators with a row of articles to enable separation of each article from an adjacent article in the row when in the carton.

5. A mechanism according to claim 3 or 4 wherein the packaging means enables two or more rows of articles to be packaged in a carton.

6. A mechanism according to claim 5 wherein the associating means enables one or more article separators to be associated with each row of articles such that each row is separated from an adjacent row by the one or more article separators in a packaged carton.

7. A mechanism according to any preceding claim wherein the packaging means enables a group of articles and said article separator to be loaded through an open end of a sleeve-like or end loaded carton.

8. A mechanism for packaging cartons of the end-loading type by end loading a plurality of articles, comprising means for associating an article separator with an article, means for selecting a group of articles comprising said article and said article separator, and means for packaging said groups of articles and said article separator in a carton through an open end thereof, such that said article is separated from an adjacent article by said article separator in the packaged carton.

9. A mechanism according to claim 7 or 8 comprising means for conveying an open-ended carton and a group of articles whilst the articles are loaded into the carton.

10. A mechanism according to claim 9 comprising guide means which co-operate with said conveying means to cause said articles to be loaded into a carton.

11. A mechanism according to claim 9 or 10 wherein said conveying means selects one or more groups from a packaging infeed position to be loaded into an associated carton.

12. A mechanism according to claim 11 wherein two or more channels for articles are provided to present two or more groups of articles at said packaging infeed position.

13. A mechanism according to claim 12 wherein associating means for associating an article separator and an article is provided for each channel.

14. A mechanism for transferring an article separator for a multiple packaging carton which separator has an operative and inoperative configuration, from a stored position into an operative position in association with an article, said mechanism comprising means for selecting a separator in an inoperative configuration from an array of stored article separators, means for conveying the selected separator away from the stored position, and means for associating the article separator with an article.

15. A transfer mechanism according to claim 14 further comprising means for at least partially causing the article separator to adopt its operative configuration in which it can enable separation of one article from an adjacent article in a packaged carton.

16. An article separator for separating a pair of adjacent articles in a packaged carton comprising means enabling the partition to be associated with an article prior to packaging.

17. An article separator according to claim 16 comprising a main panel and an article separator portion foldably attached thereto.

18. A carton having a plurality of packaged articles and an article separator according to claims 16 or 17.

19. A carton according to claim 18 which is of the end-loading type.

20. A carton according to claim 18 or 19 comprising two or more rows of articles wherein each row is separated from an adjacent row by an article separator.

21. A carton according to any one of claims 18 to 20 wherein each article is separated from a neighbouring article by part of an article separator.

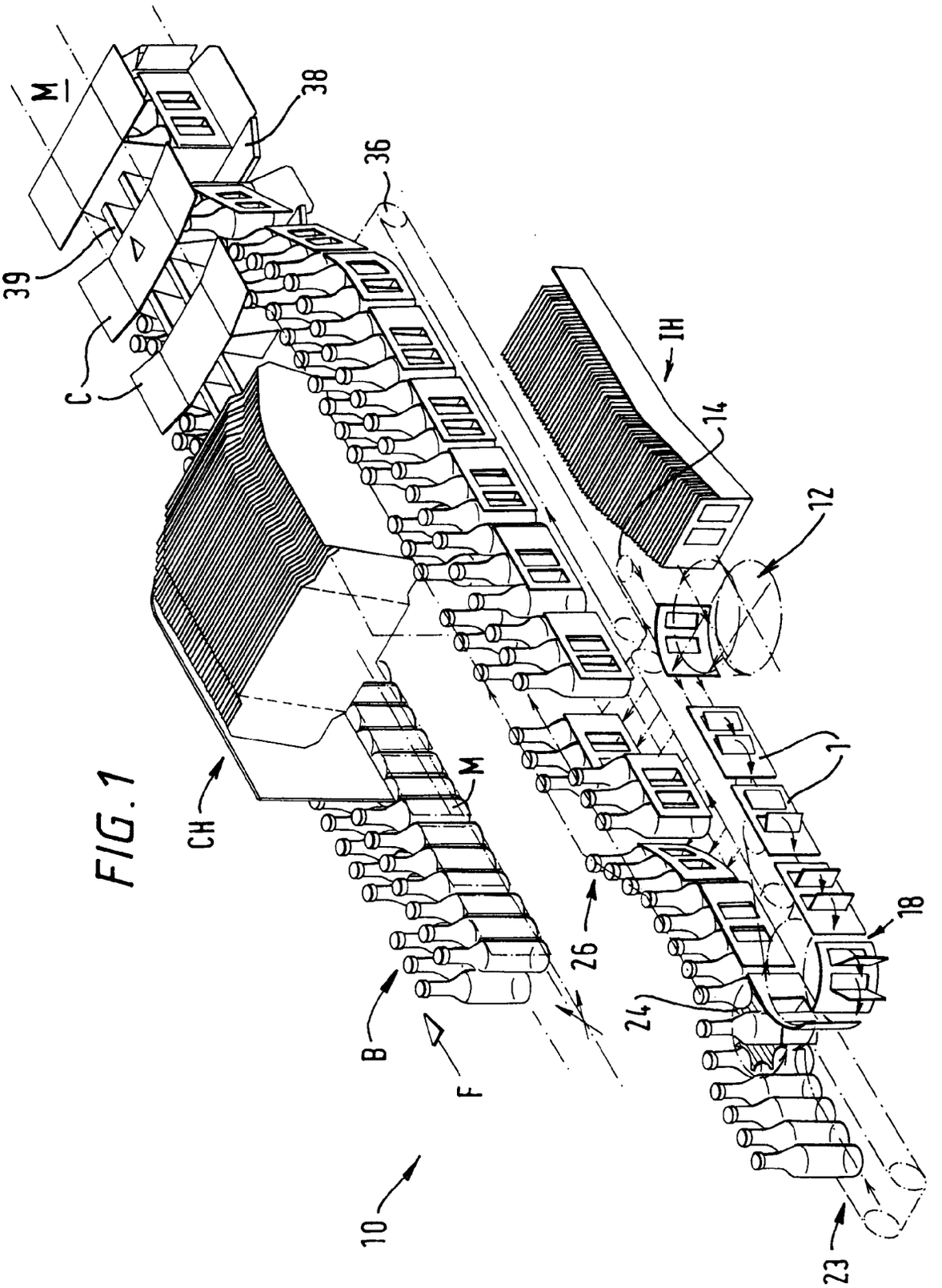


FIG. 1

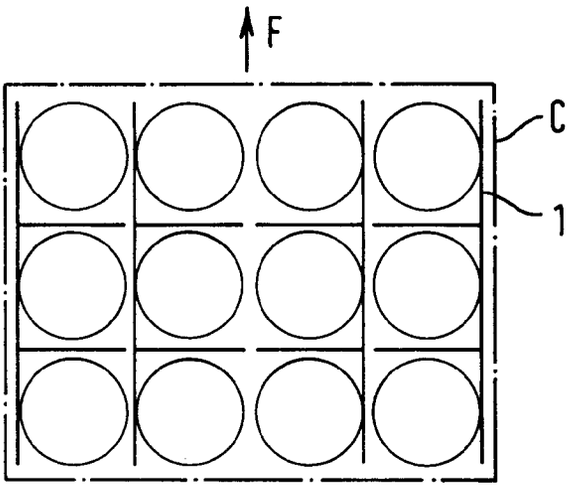


FIG. 2a

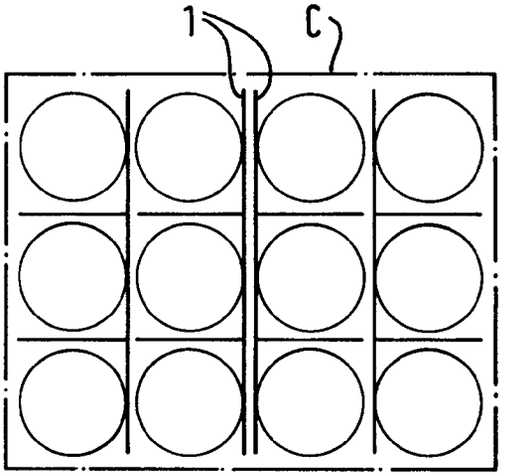


FIG. 2b

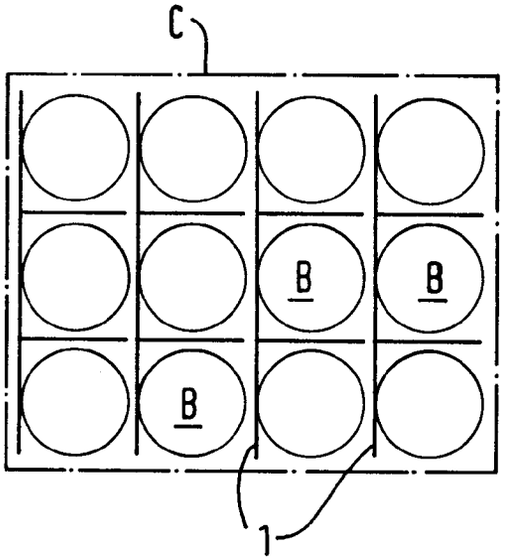


FIG. 2c

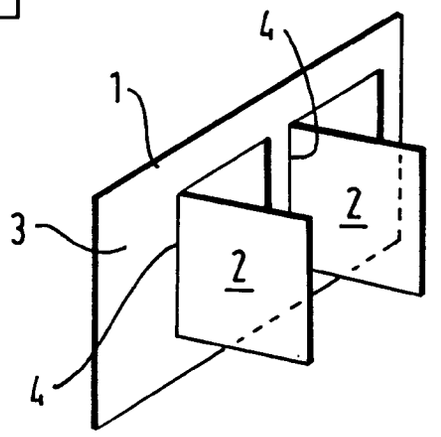


FIG. 3

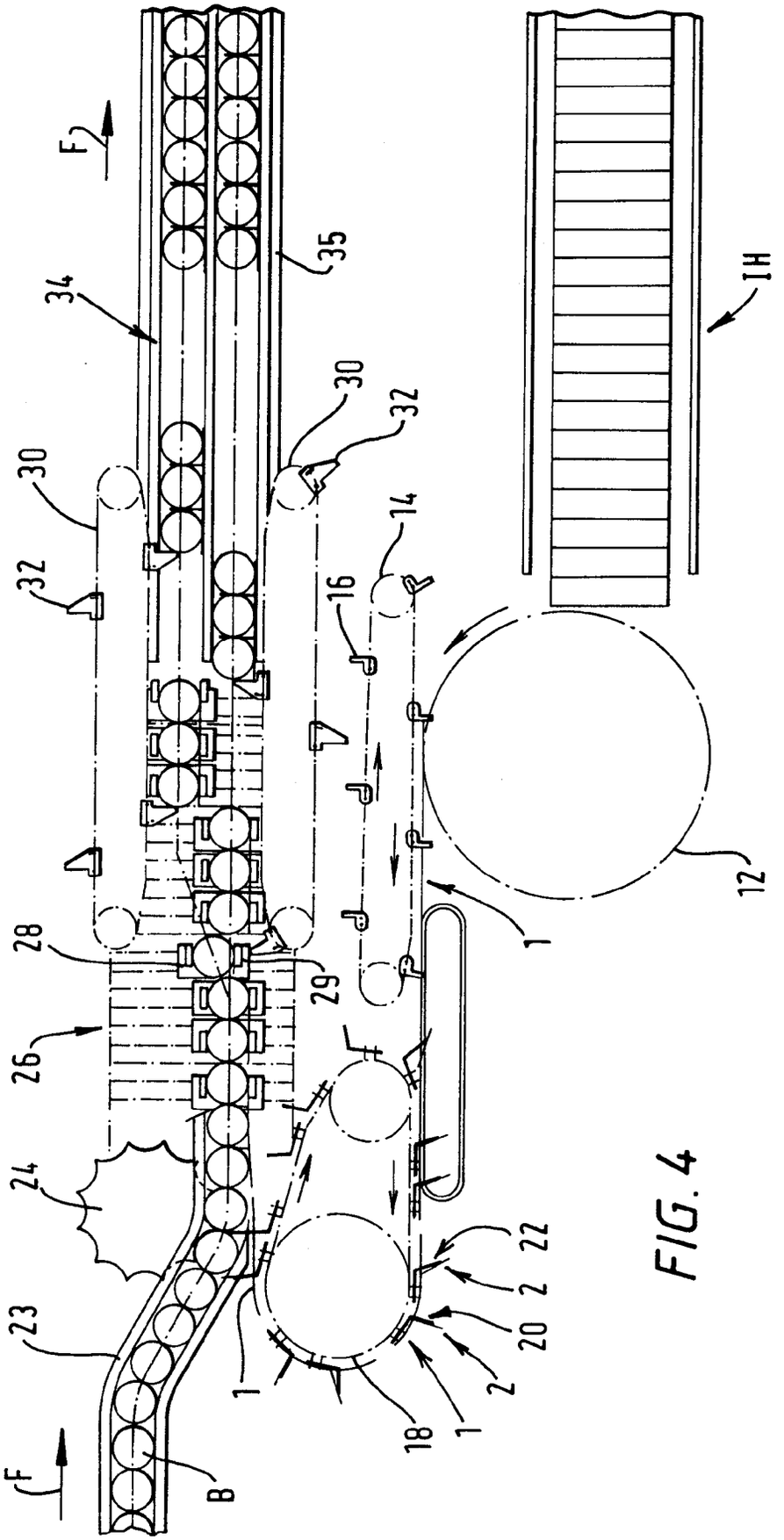


FIG. 4

FIG. 5

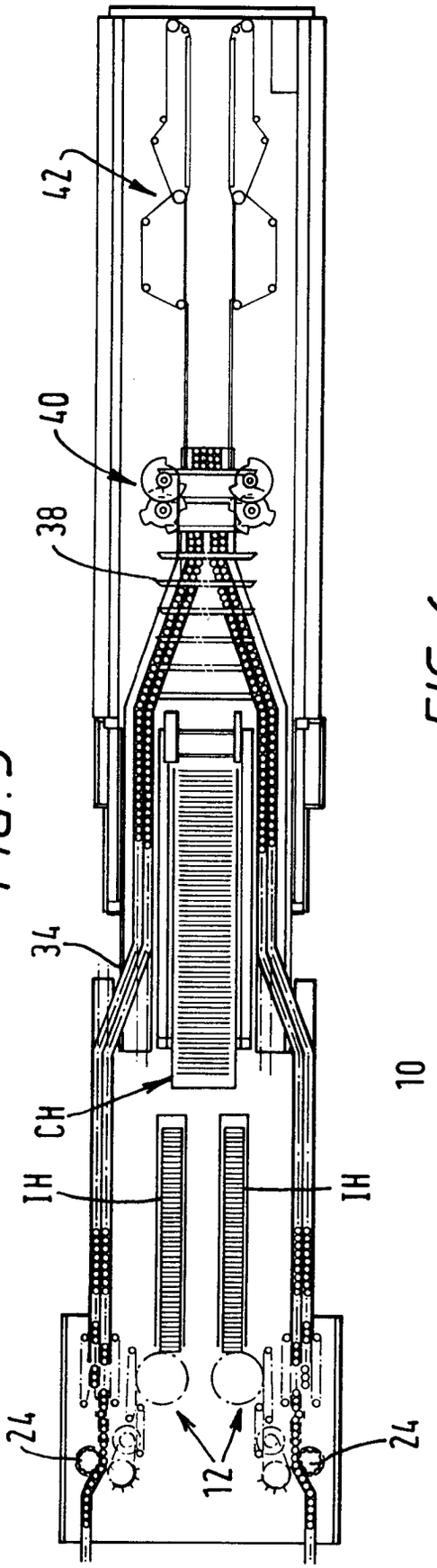


FIG. 6

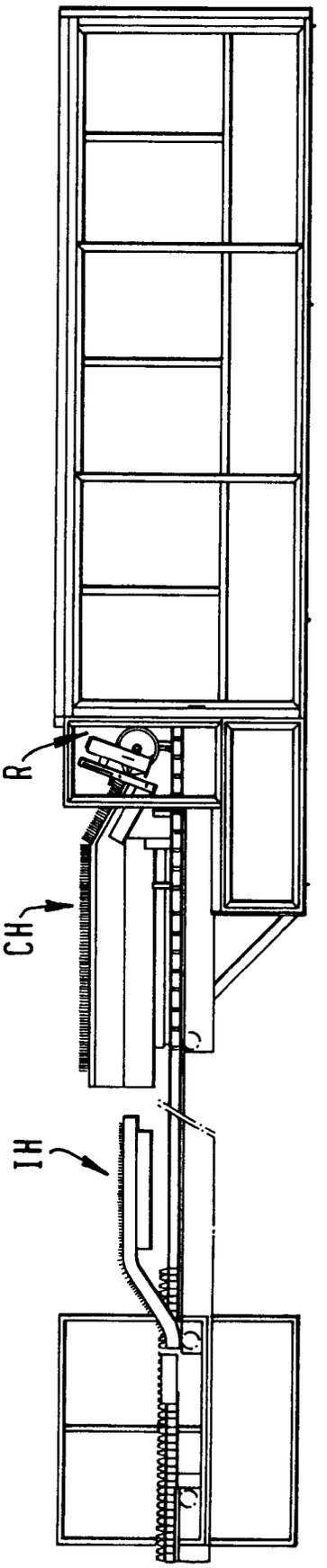


FIG. 7

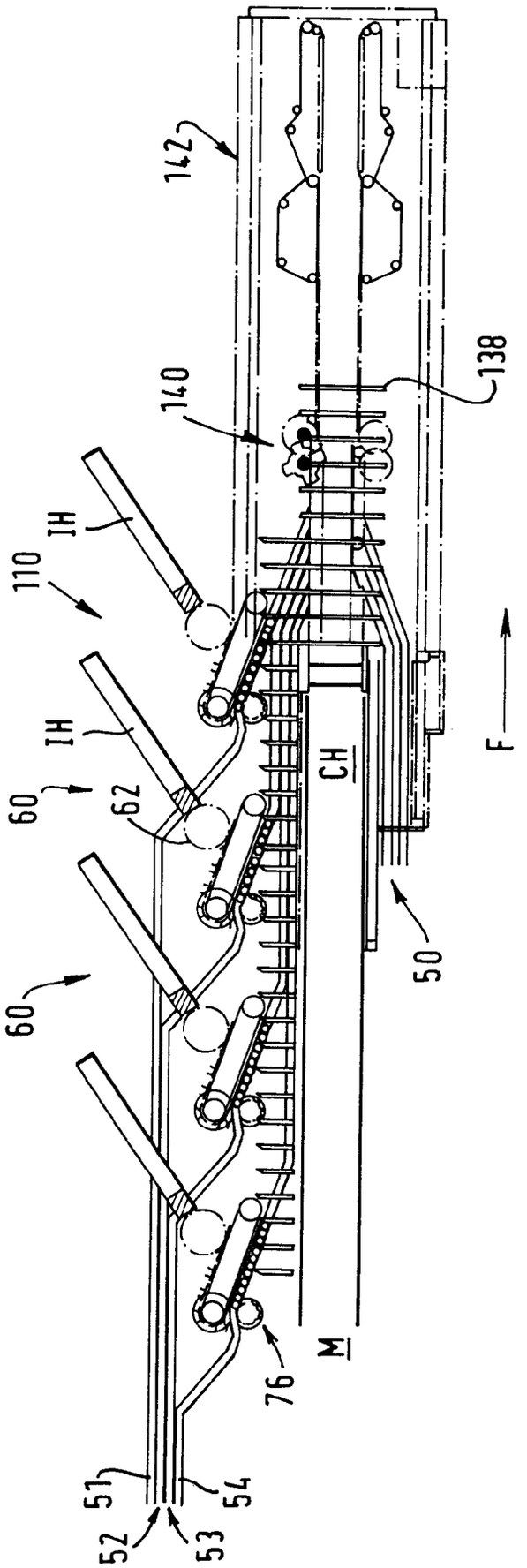


FIG. 8

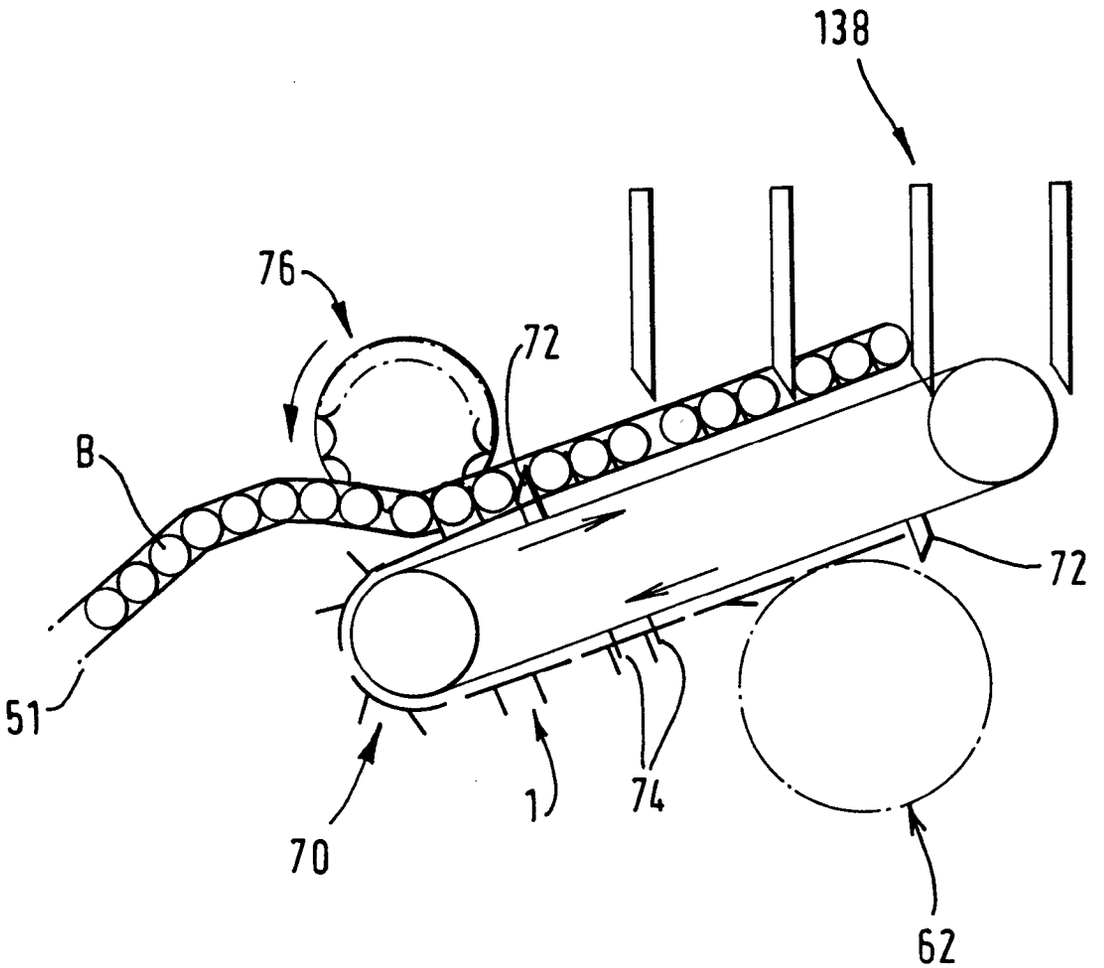
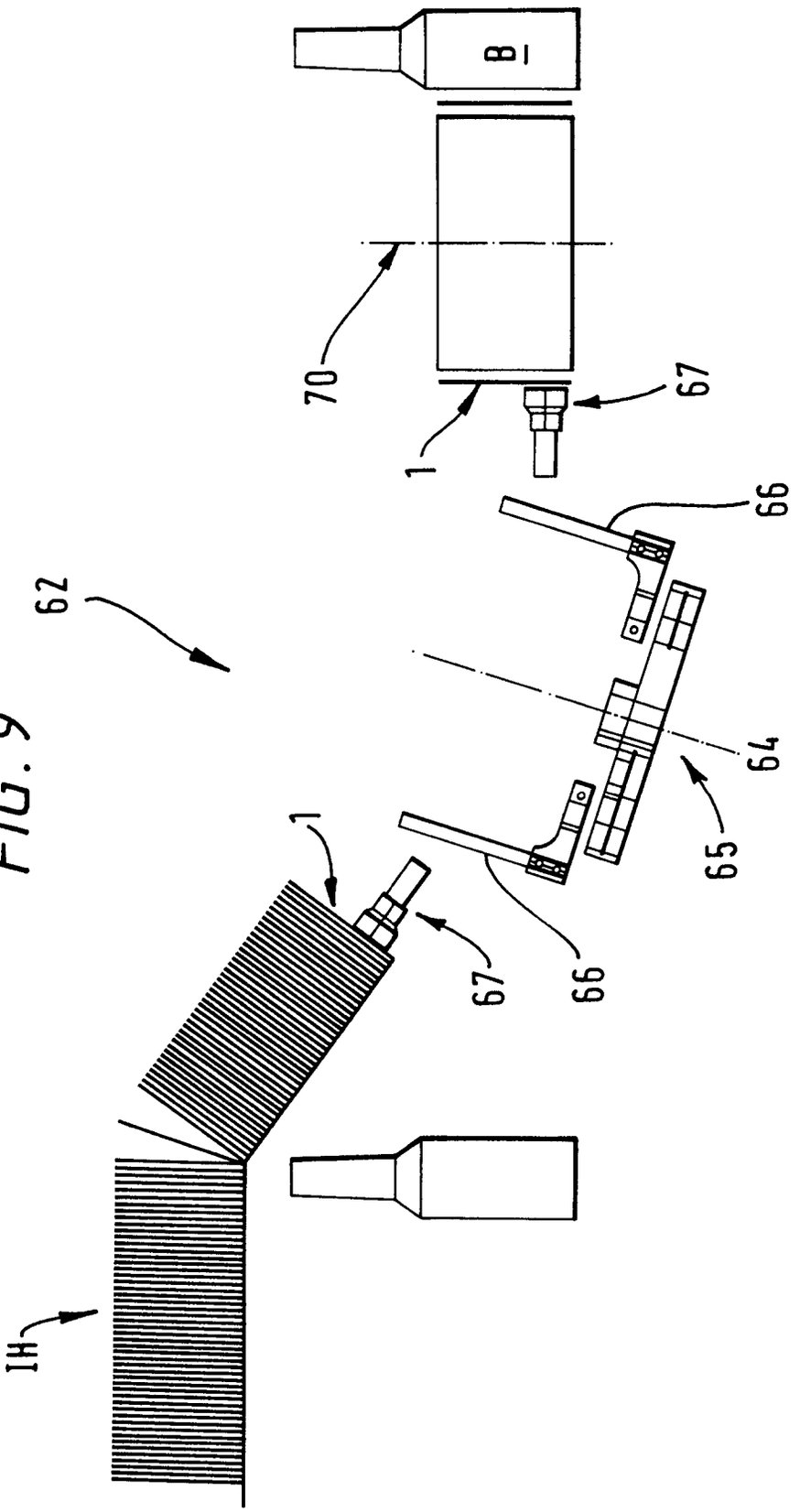


FIG. 9



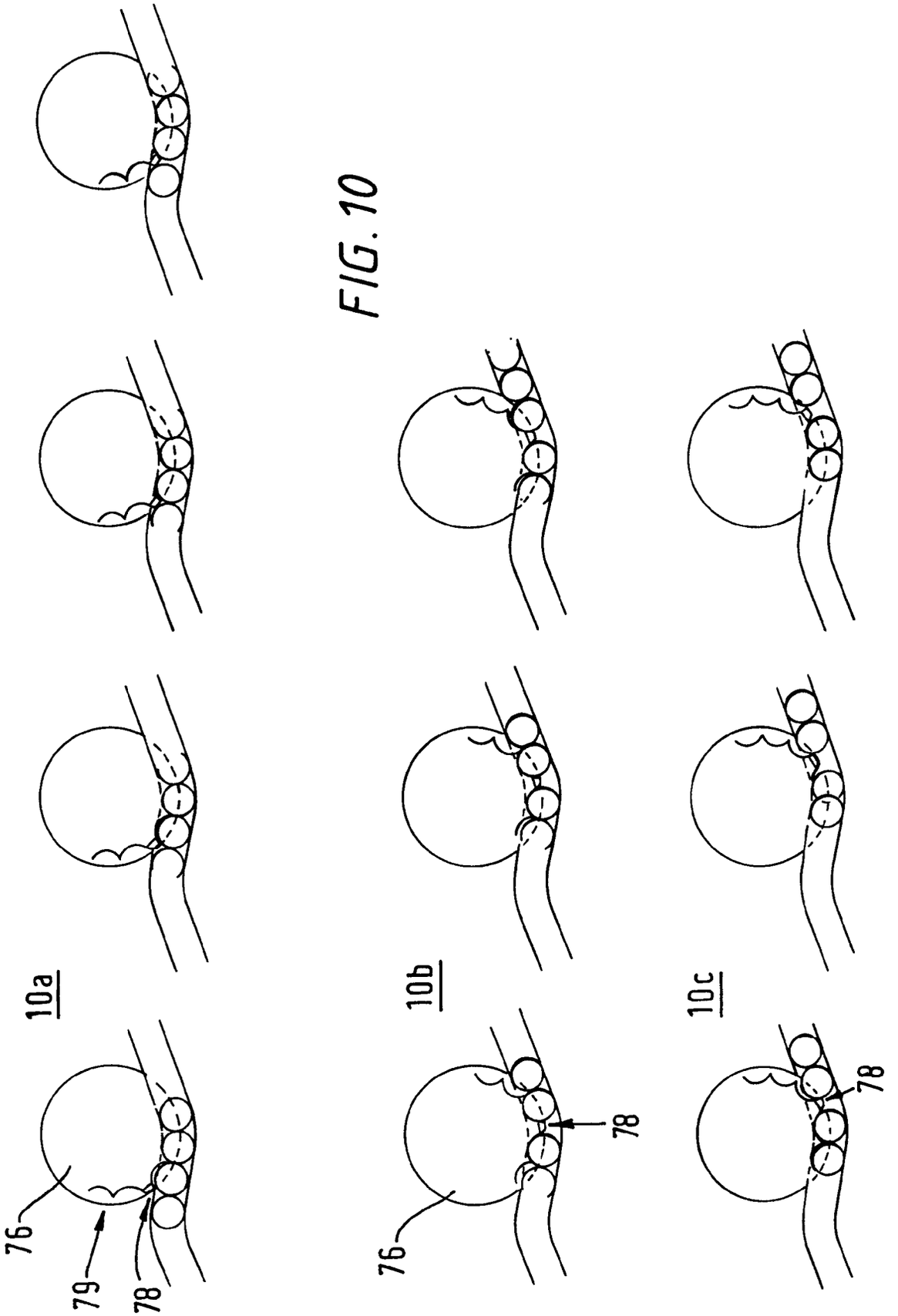
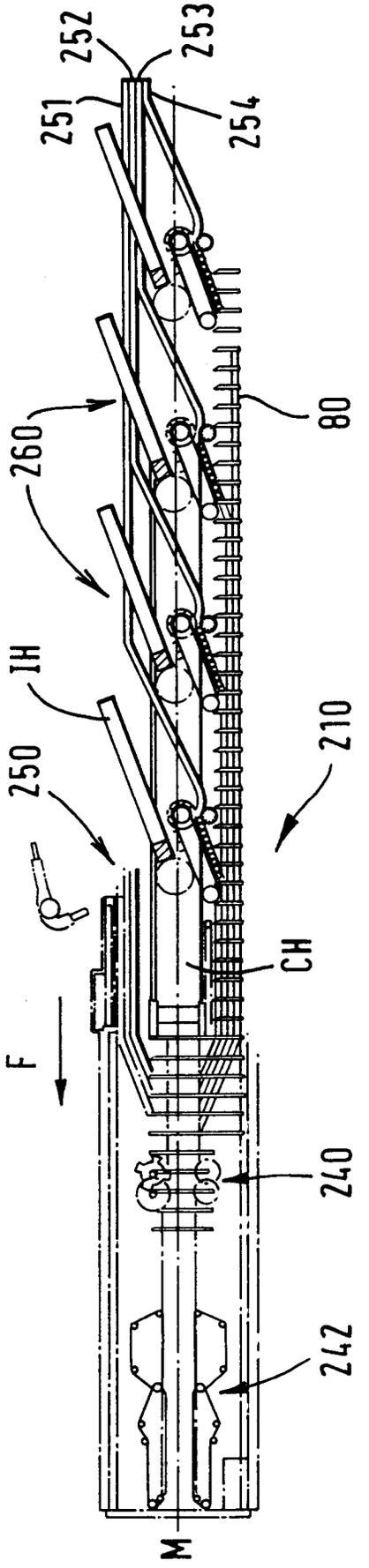


FIG. 10

FIG. 11



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EUROPEAN SEARCH REPORT

Application Number
EP 95 30 4030

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 Y	US-A-4 023 328 (R.K. CALVERT ET AL.) 17 May 1977 * the whole document * ---	1-8, 14-21 9-13	B65B61/20 B65D71/00
Y	EP-A-0 017 333 (MEAD CORPORATION) 15 October 1980 * claim 1; figures 1,2 * ---	9-13	
X	US-A-3 924 385 (R.T. WALTER) 9 December 1975 * column 2, line 1-59; figures 1-6 * ---	1-7, 14-18, 20,21	
X	US-A-3 190 048 (R.H. GANZ) * column 6, line 61 - column 7, line 55; figures 1-10 * -----	14-17	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65B
B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	28 September 1995	Grentzius, W

CATEGORY OF CITED DOCUMENTS

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