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(54) **CARTON FEEDING MECHANISM**

ZUFÜHRMECHANISMUS FÜR KARTONS

MECANISME DE CHARGEMENT DE CARTONS

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Description

[0001] This invention relates to packaging of primary articles such as cans and bottles in multiple packaged cartons and is more particularly concerned with feeding such cartons from a hopper and then initiating and completing a loading operation of cartons in sequence and continuously.

[0002] One common method used by known packaging machines typically comprises removing a collapsed carton from a supply of such cartons or blanks. The collapsed carton is then erected, and the cans, bottles or other articles to be packaged are placed into the erected carton. Alternatively, a supply of cartons in the form of flat blanks may be provided. After withdrawal of the carton from the supply, the carton may first be partially formed, and is then placed onto the articles. The carton is further formed into the completed package.

[0003] A number of different forms of machinery are known for practising these basic methods. In one form of machinery, separated groups of articles comprising one or more article are formed and moved along a conveyor through the machine. Cartons are also moved along the machine, and each carton is positioned over one of the article groups. As the group and carton continue to move, the carton is lowered onto the group to load the articles into the carton. A known example of such a machine is shown in WO 96/32324.

[0004] Machines of this type have several disadvantages. Many bottling plants package cans and bottles into a variety of carton sizes, for example, cartons which hold six, eight or twelve articles. Various packaging machines have been developed that may be adjusted to accommodate cartons of different sizes, but the machine must be shut down for a period of time (known as "downtime") while the adjustment is made. Minimising downtime is therefore desirable.

[0005] The present invention seeks to overcome the commercial disadvantages of known packaging machines by providing a carton loading mechanism which is able to load more than one type or size of carton, and in which changeover between carton sizes or styles may be made rapidly. Further, the invention provides a loading mechanism that requires relatively little machine length to perform its loading function.

[0006] The present invention can be used with a packaging machine described in a corresponding application EP 98922489.4. It is envisaged that the present invention can be used in various types of packaging machines. Alternatively, the carton loading mechanism of the present invention can be sold as an individual module to be fitted to new equipment or to existing equipment on a retro fit basis.

[0007] One aspect of the invention provides an apparatus for continuously feeding and conveying cartons to an article loading station in a packaging machine. The apparatus comprises selectively operable feed means in which first feed means is adapted sequentially to de-

liver cartons from a first supply and second feed means is adapted sequentially to deliver cartons from a second supply and locating means co-operating with the first and second feed means to maintain the cartons in a set location relative to conveyor means by which conveyor means the cartons are moved downstream to the loading station to be loaded by lowering each of the cartons onto at least one article to be packaged.

[0008] According to an optional feature of this aspect of the invention, the locating means may comprise a pair of blocks mounted to respective first and second endless chains, each block including a catch projecting from a bottom surface of the block and wherein the catches being adapted to engage opposed outer panels of the carton at the spaced locations intermediate ends and at spaced locations intermediate its transverse edges. Alternatively, the locating means may comprise a plurality of oppositely disposed pins projecting from respective ones of a pair of endless chains, the pins being adapted to engage opposed panels of the carton at spaced locations intermediate ends and at spaced locations intermediate the transverse edges.

[0009] According to an optional feature of this aspect of the invention the conveyor means may comprise a pair of endless chain tracks for receiving first and second endless chains which tracks are adapted to guide corresponding pins in a downwardly inclined direction.

[0010] According to another optional feature of this aspect of the invention the catches and/or the pins may be shaped to engage and/or maintain the carton in a substantially horizontal plane.

[0011] According to a further optional feature, the regulating means may be provided to control the flow of articles at the infeed end, the regulating means further comprising means to control the pressure of the articles into the machine and means to determine the correct number of articles for each carton. Preferably, the means to control the pressure of the articles may comprise an infeed star wheel.

[0012] A second aspect of the invention provides a method for continuously feeding and conveying cartons to an article loading station in a packaging machine. The method comprises the steps: (i) causing cartons to be sequentially delivered from a first supply and/or a second supply onto a common conveyor means; (ii) conveying the cartons down stream on to a loading station; and (iii) loading the cartons by lowering each of the cartons onto at least one article to be packaged.

[0013] A third aspect of the invention provides a packaging machine for packaging articles into cartons selected from at least a first carton or a second carton, the first and second cartons being of a different type or size, the cartons being stored in at least one hopper, and picked for packing by a carton engaging means arranged to remove cartons successively one at a time from the at least one hopper and to transport them sequentially to a first determined position from where the cartons are transferred to a paper feed chain which sup-

ports the cartons to a second predetermined position from where the cartons are introduced to the articles.

[0014] Embodiments of the invention will now be described by way of example, with reference to accompanying drawings in which:

FIGURE 1a is a side view of a basket type carton supplied in a flat collapsed condition suitable for use with a machine according to the invention;

FIGURE 1b is a perspective view of a basket type carton suitable for use with a machine according to the invention;

FIGURE 2a is a perspective view of a wraparound carton blank suitable for use with a machine according to the invention;

FIGURE 2b is a perspective view of an erected and loaded carton of the type illustrated in Figure 2a;

FIGURE 3 is a perspective view of machine according to the invention illustrating those parts of the machine required for construction of basket type carriers;

FIGURES 4, 5 and 6 are perspective views of the carton supply infeed and setup stations of the machine according to the invention adapted to load basket type cartons;

FIGURE 7 is a simplified view of the carton conveyor used to transfer the carton from the set up station to the loading station;

FIGURES 8, 9 and 10 illustrate an alternative embodiment of the carton conveyor and loading station of the machine adapted to load basket type cartons;

FIGURE 11 is a perspective view of the carton conveyor and loading station of the machine adapted to load basket type carriers;

FIGURE 12 is a perspective view of the outfeed end of the machine containing basket type carriers;

FIGURE 13 is a perspective view of the machine shown in Figure 3 illustrating those parts required to set up and load wraparound cartons; and

FIGURE 14 is a perspective view of the outfeed end of the machine containing wraparound cartons.

[0015] The machine according to the present invention is capable of loading both wraparound and basket type cartons.

[0016] Referring to the drawings, and in particular Figures 1a and 1b thereof, carton 10 is a basket type carrier,

shown in Figure 1b in a set up condition ready for lowering onto articles. The carton 10 includes opposed side wall panels 12, 14 and opposed end wall panels 16, 18 hingably connected one to the next. The carton 10 further includes a handle structure 20 which interconnects end wall panels 16, 18 and comprises transverse partition panels 22 interconnecting each side wall panel 12, 14. Base panels 24, 26 are hingably connected to each side wall panel 12, 14 respectively.

[0017] As illustrated in Figures 2a and 2b, carton 30 is a wraparound type carton, shown in Figure 2a in its blank form. The carton blank 30 includes first base panel 32, side wall 34, top panel 36, second side panel 38 and base panel 40 hingably connected one to the next. Top panel 36 comprises three pairs of apertures 42, 44 spaced between the side edges of top panel 36 and adapted to receive an upper portion of articles A, illustrated in Figure 2b.

[0018] It is envisaged that the cartons can vary depending upon the shape and/or quantity of articles to be packaged and accordingly, a machine in accordance with the present invention is adjustable in numerous respects so that it can process a wide variety of such cartons. The principal arrangements which are likely to be varied are shown in Figure 1a and 2b in which "H" is the overall height of the set up carton equivalent to the distance between the upper edge of the side wall and base panel, "L" is the overall length of the carton when the base panels are closed.

[0019] Referring now to Figures 3 and 13 of the drawings simultaneously, there is shown a machine 50 for processing cartons 10 of the basket type outlined above. There is shown an apparatus for continuously feeding and conveying cartons to an article loading station in a packaging machine, which apparatus comprises selectively operable feed means 46, 47 in which first feed means 46 (shown in Figure 3) is adapted sequentially to deliver cartons from a first supply 54 and second feed means 47 (shown in Figure 13) is adapted sequentially to deliver cartons from a second supply 140 and locating means 48 co-operating with said first and second feed means 46, 47 to maintain the cartons in a set location relative to conveyor means 102, 104 by which conveyor means said cartons are moved downstream to said loading station to be loaded by lowering each of said cartons onto at least one article to be packaged.

[0020] The upstream end of the machine includes a hopper 54 in which a multiplicity of cartons 10 in flat collapsed condition are held ready for processing. As shown in Figures 4 and 5, the cartons are removed from the hopper 54 sequentially by a rotary vacuum feeder 56. The vacuum feeder 56 comprises four pairs of suction cups (not shown) each being interconnected to a drive shaft 58 by an elongate support rod 60. In one class of embodiments, the rods 60 are slidably mounted respectively on a collar structure 63 which collar structure is rigidly secured to main rotatable shaft 65. The drive shafts 58 are preferably connected to a cam track

by a cam follower housed in a housing 62 which provides a uniform path for the suction cups as each drive shaft 58 is rotated.

[0021] The main drive shaft 65 is rotatable about a fixed axis X-X. The shaft 65 is generally supported at its end by a suitable bearing structure which is conventional and which is mounted to a side frame. Suitable driving mechanism, for example a servo motor 57, is provided to rotate the shaft 65.

[0022] In the present embodiment, it is envisaged that a vacuum break is provided in the feeder mechanism 56 which is used in conjunction with a vacuum supply to set the vacuum connection and cut off points thereby determining when the carton is held by the feeder mechanism 56.

[0023] Whilst the use of a rotary vacuum feeder to supply cartons to the conveyor is preferred, it is envisaged that the present invention can be used with other types of feeder mechanisms without departing from the scope of the invention.

[0024] The hopper 54 is a "gravity feed" type whereby the carton blanks 10 are held in the hopper at an incline to provide a positive feed. In order for the blank to be transferred from this inclined position to a vertical plane, it is necessary to off-set the axis of rotation X-X of the rotary feeder from the vertical plane, as illustrated in Figure 4. Additional aspects of the feed system are described in greater detail in parent application GB 9710639.7 and various other patent applications which depend therefrom for a priority date, and more particularly in the contemporaneous application denoted by Applicant's reference number D-7718-3.

[0025] In use, the feeder mechanism 56 continuously and sequentially feeds cartons from the hopper to the infeed by the main shaft 65 rotating the pick up means in the direction indicated by the arrow A, shown in Figure 4. As the feeder 56 rotates, the suction cups are moved in contact with side wall of carton 10. A vacuum is then applied to the set of suction cups by the vacuum supply. Thus, the carton 10 is withdrawn and then transferred to a belt 64. The vacuum is then maintained during this transfer stage so that the suction cups hold the side wall of the carton 10. When the carton is deposited at the belt 64, the vacuum break disconnects the vacuum supply from the suction cups to release the carton.

[0026] The blank is then placed between the nip end 66 of an infeed belt set shown generally at 64. The infeed belt set includes pairs of upper and lower receiving belts 70, 72 spaced apart so as to receive the handle portion 20 and base panels 24, 26 of a flat carton delivered by the rotary feeder 56. The belt sets 70, 72 maintain the position of the carton and move the carton downstream to a set up station shown generally at 74. It will be seen from Figures 4, 5 and 6 that as the rotary vacuum feeder rotates the cartons, they also undergo a translation about the path of the rotary movement from an inclined angle to a vertical plane.

[0027] The set up station 74 includes a pair of opening

wheel units (or panel separating means) 76, 78 which are used to separate opposing panels and to assist in part erecting the carton. The units 76, 78 are positioned either side of the carton of which the nearside unit 76 is adjustable relative to the far side unit 78 transversely to the machine to reflect the adjustments made to the type of carton. The wheel units are similar and hence only unit 76 is described with reference to Figures 4 and 6. The apparatus used to separate opposing panels is described in more detail in parent application GB 9710639.7 and various other patent applications which depend therefrom for a priority date, and more particularly in the contemporaneous application denoted by Applicant's reference number D-7718-1.

[0028] The nearside unit 76 comprises a vacuum suction cup connected via a drive rod to the opening wheel 80. The opening wheel 80 is mounted onto a drive shaft 82 which is powered by a servo motor 84. The servo motor 84 is controlled by suitable control means, which can cause the rotational velocity of the opening wheel 80 to be varied and therefore, the suction cup.

[0029] The drive rod is preferably connected to a cam track by a cam follower (not shown) contained in a housing 83 or to other suitable means to provide a uniform path for the suction cups when the drive shaft 82 is rotated. Thus, the suction cups and drive rod are moved under a guided linear motion towards and away from the carton during one complete rotation of the drive shaft.

[0030] In the present embodiment, it is envisaged that a vacuum break is provided in the housing 83 which is used in conjunction with a vacuum supply to set the vacuum connection and cut off points thereby determining when the carton is held by the panel separating means 76.

[0031] Likewise, the far side unit 78 shown in Figure 6 corresponds to the near side unit 76 and comprises a vacuum suction cup connected via a drive rod to the opening wheel 86. The opening wheel 86 is mounted onto a drive shaft 88 powered by a servo motor 90. The servo motor 90 is adapted to vary the rotational velocity of the opening wheel 86 and therefore, the suction cup.

[0032] In order to bring the carton 10 into a set up condition the lower belt set terminates short of opening units 76, 78 and the carton is moved downstream by the upper belt unit only as shown in Figures 4 and 5. The suction cup of the far side opening wheel 86 is rotated and caused to engage the corresponding side panel 14 of the carton. The far side opening wheel 86 is accelerated by the control means relative to the moving blank so that the suction cup is accelerated relative to the moving blank. The suction cup is also caused to move away from the carton by the cam effect of the opening wheel 86 so that side panel 14 and leading end panel 18 are separated and moved apart from the handle structure 20.

[0033] Likewise, the suction cup of the nearside opening wheel 80 is rotated and caused to engage the opposing side panel 12 of the carton blank. Vacuum is ap-

plied to the suction cup mounted on the nearside opening wheel 80 and the electronic cam effect causes the suction cup to move away from the handle structure 20 thereby separating leading side panel 12 and trailing end panel 16 from the handle structure 20. Thus, the side panels 12, 14 are moved apart so that carton 10 is progressively brought into a set up condition (shown in Figure 1b). Preferably, the nearside opening wheel 80 is caused to decelerate so that the suction cup slows relative to the velocity of the carton as it moves through the set up station.

[0034] Turning again to figures 4 and 6, the end panels 16, 18 are maintained in a perpendicular relationship to the side panels 12, 14 by blocking lugs 92 mounted on a pair of side lug chain sets 94, 96. The base panels 24, 26 are then outwardly folded into a substantially perpendicular relationship with their respective side panels 12, 14 by guides positioned on either side of the carton 10.

[0035] After the cartons have been set up, they are transferred to the loading station 100 shown in Figure 3. Thus, the cartons leave engagement with the upper belt set and blocking lugs 92 and engagement is gradually transferred as the cartons move downstream to a pair of side lug chain sets 102, 104 shown in Figure 7. Each side lug chain 102, 104 set is of similar construction and includes endless chains 106 having a plurality of guide pin sets 108 which engage the opposed base panels 24, 26 of the carton in order to continue the downstream movement of the carton and to retain the base panels 24, 26, side panels 12, 14 and end panels 16, 18 in the set up condition illustrated in Figure 1b

[0036] As illustrated in Figure 7, the set of three guide pins 110 are inserted into respective ones of apertures formed from each base panel 24, 26.

[0037] The endless chain sets 102, 104 are mounted on tables 112, 114 to provide additional support to the base panels 24, 26 and are downwardly inclined towards the loading station 100.

[0038] An alternative embodiment of the carton conveyor is illustrated in Figures 8, 9 and 10. In the second embodiment the carton blanks 200 are transferred to the upper and lower belt sets 210, 212 in a flat collapsed condition, shown in Figure 8. The base panels 24, 26 are outwardly folded into a substantially perpendicular relationship with their respective side panels 12, 14 by guides 214 positioned on either side of the carton 200. As the cartons move downstream they leave engagement with the upper and lower belt sets and engagement is gradually transferred as the cartons move downstream to a pair of side lug chain sets 216, 218 shown in Figure 8. Each side lug chain 216, 218 set is of similar construction and includes endless chains 220 having a plurality of guide pin sets 222 which engage the opposed base panels 24, 26 of the carton in order to continue the downstream movement of the carton. The endless chain sets 216, 218 are downwardly inclined towards the loading station 100.

[0039] As illustrated in Figure 10, each set of guide pins 222 comprises three pins 224 mounted to a wedge shaped block or blocks 226. The blocks are adapted to maintain the carton in a horizontal plane. The pins are inserted into respective ones of apertures formed from each base panel 24, 26. Each guide pin set 222 is moved forward by the chain 220 mounted in a track 230. Preferably, the track 230 is set up so that the guide pin set moves outwardly from the feed path of the carton blank 200, as shown in Figure 10, during forward movement. The base panels are moved apart to set up the carton so that it is ready to receive articles to be packaged. Optionally, side panels 16, 18 are also separated by suction cups 232 mounted on a cam 234 and cam track 236, shown in Figure 11, but it is envisaged that the carton can be set up without this module, if preferred. The set up cartons are then lowered to the loading station hereinafter described.

[0040] The embodiment described in the preceding two paragraphs can be incorporated into a dedicated machine packaging basket style cartons or can be incorporated into a machine of the present invention. Of course, the packaging of wraparound cartons would require the endless chain set to be adjusted and would require the feeding of cartons to be sited in a different position to that described below.

[0041] Articles such as bottles are fed into the machine by an infeed conveyor (not shown) and the line pressure of the bottles is controlled by an infeed star wheel (not shown), as is well known. The articles are separated into groups of the correct number per blank by means of a series of spaced metering bars (not shown) which also control the flow of the articles so that they can be introduced to the carton at the same rate as the carton blank flow.

[0042] At loading station 100 illustrated in Figures 9 and 11, the cartons are introduced to the group of articles A from above as the carton and article group are moved forward in unison. The carton is lowered onto the articles due to the downward incline of the endless chains sets 102, 104. As illustrated in Figure 11, lateral movement of the carton 10 in the loading station 100 is controlled by a pair of guides 116, 118 positioned above each chain set 102, 104 and adapted to receive the free edges of each base panel 24, 26. Vertical movement of the carton is minimised by a pressure belt 119 shown in Figures 9 and 11 positioned above the endless chain sets and adapted to apply downward pressure to the handle structure. It is envisaged that in some embodiments, the pressure belt could be replaced by fixed guides or, where appropriate, vertically mounted endless chain and lug sets.

[0043] Once the cartons have been loaded with articles, they are transferred by means of the article conveyor and/or pressure belt 119 to a further set of endless chains with side lugs 120, 122 which are used to transfer the carton to the outfeed end of the machine shown in Figure 10.

[0044] During this stage, the base panels 24, 26 are folded around to the underside of the carton and are interconnected by a locking mechanism 124 known in the art. Optionally, where the basket carrier is provided with apertures to receive and retain the articles, folding mechanism 126 is provided prior to constructing the base, as is known in the art. A second pressure belt 128 is provided above the handle structure to prevent unwanted upward movement of the carrier. The completed carton is transferred to the outfeed end of the machine.

[0045] Turning to the construction of wraparound type cartons, as illustrated in Figures 2a and 2b, the machine 10 must first be adjusted to receive cartons of this type. Thus, the pair of downwardly inclined chain sets 102, 104 and tables 112, 114 are mounted on platforms which can be adjusted in both vertical and horizontal planes by computer controlled servo motors 130. Likewise, the first and second pressure belts 119, 128 are also mounted on units 132, 134 which are adjustable in a vertical plane by computer controlled servo motors 136, 138.

[0046] In order to modify the machine to receive wrap-around cartons shown in Figures 13 and 14, the downwardly inclined chain sets are moved apart to increase the width between the chain sets 102, 104 and a second hopper 140 and rotary vacuum feeder 142 brought into position of use, by suitable control means. The hopper 142 holds a multiplicity of carton blanks 30 illustrated in Figure 2 which are held ready for processing. The blanks 30 are then removed sequentially by the rotary vacuum feeder 142. The vacuum feeder 142 is mounted horizontally and is similar in construction to the feeder outlined above. A blank is removed from the hopper 140 and is fed one at a time to the paper feed chain sets 102, 104 so that the base panels 32 and 40 and side panels 34, 38 are supported. The carton is transferred to the set up station by the endless chains 102, 104 and guide pins 110. The chain is downwardly inclined so that the carton can be introduced to a group of articles from above during forward movement as illustrated in Figure 13. It is often the case that the angle of incline will differ for different carton types and therefore the chain sets 102, 104 and tables 112, 114 can be adjusted vertically to alter the angle of incline by suitable control means.

[0047] The articles are introduced to the loading station 100 by the article conveyor in the same way as described above.

[0048] At the loading station 100, upper portions of the articles are inserted through apertures 42, 44 by lowering the cartons. This is achieved by the first pressure belt 119 which is positioned in a central region to lower the top panel and enable the neck portions of the articles to pass through the apertures.

[0049] As illustrated in Figures 13 and 14, the side panels are folded into a perpendicular relationship with top panel by fixed guides (not shown) and the partly erected carton is transferred to the second set of endless chains 120, 122 (Figure 14) which transfers the carton to the outfeed end of the machine. In this embodi-

ment, the second pressure belt 128 is raised to a position of non-use and where appropriate, the second set of endless chains are moved apart or brought closer together by means of horizontal adjustment which are controlled and powered by servo motors (not shown). The bottom is constructed and, where appropriate, an article retaining means is formed by the same method as described above. Thus, the carton is secured to complete the packaging operation.

[0050] The control means may be a dedicated processor or may be a control means for a packaging machine with which the apparatus of the invention is used. Alternatively, the control means may preferably be a known programmable servo control system.

[0051] By pre-programming the control system, the adjustments to the machine required to change from packaging one carton type to another carton type can be preset, thus reducing the amount of down time when interchanging carton types or styles. According to this invention, the speed of operation of the apparatus is improved as well as its efficiency and durability. An advantage of the present invention is the flexibility offered by the system.

[0052] While the preferred embodiment described herein is for loading bottles into cartons, it will be recognised that the invention is not limited to cartons for bottles. The invention may be used with machines for packaging cans, paperboard "bricks" and other containers into cartons.

[0053] Moreover, while the preferred embodiment described herein is shown as part of a machine for loading containers into vertically-loaded basket type cartons, the invention is not limited to cartons of this type. As will be recognised by those skilled in the art, the invention may be used with wrap-around or end-loaded cartons.

[0054] It will be understood that the carton erecting mechanism of the invention has been illustrated with reference to a specific embodiment and that numerous modifications are possible within the scope of the invention. The carton erecting mechanism is able to process cartons comprising numerous configurations of groups of articles covering a range of carton size and shape, for example, four, six, eight and twelve bottles without undue time being spent in adjusting the mechanism.

Claims

1. An apparatus for continuously feeding and conveying cartons to an article loading station in a packaging machine (50), **characterised in that** the apparatus comprises selectively operable feed means (46, 47) in which first feed means (46) is adapted sequentially to deliver cartons from a first supply (54) and second feed means (47) is adapted sequentially to deliver cartons of different size or type from a second supply (140) and locating means (48) co-operating with said first and second feed means

to maintain the cartons in a set location relative to conveyor means by which conveyor means said cartons are moved downstream to said loading station to be loaded by lowering each of said cartons onto at least one article to be packaged.

2. The apparatus according to claim 1 wherein said locating means comprises a pair of blocks (226) mounted to respective first and second endless chains (216, 218), each block including a catch (224) projecting from a bottom surface of said block and wherein said catches being adapted to engage opposed outer panels of the carton at spaced locations intermediate ends and at spaced locations intermediate its transverse edges.

3. The apparatus according to claim 1 wherein said locating means comprises a plurality of oppositely disposed pins (110) projecting from respective ones of a pair of endless chains (102, 104), said pins being adapted to engage opposed panels of the carton at spaced locations intermediate ends and at spaced locations intermediate the transverse edges.

4. The apparatus as claimed in claim 2 or claim 3 wherein the conveyor means comprises a pair of endless chain tracks (102, 104) for receiving first and second endless chains (102, 104, 216, 218) which tracks are adapted to guide corresponding pins in a downwardly inclined direction.

5. The apparatus according to any one of claims 2 to 4 wherein said catches (224) and/or said pins (110) are shaped to engage and/or maintain said carton in a substantially horizontal plane.

6. The apparatus according to any preceding claim wherein regulating means is provided to control the flow of articles at said infeed end, said regulating means further comprising means to control the pressure of said articles into the machine and means to determine the correct number of articles for each carton.

7. The apparatus according to claim 6 wherein said means to control the pressure of said articles comprises an infeed star wheel (86).

8. A method for continuously feeding and conveying cartons of different size or type to an article loading station in a packaging machine which method comprises the steps:

(i) causing cartons to be sequentially delivered from a first supply (54) and a second supply (140) onto a common conveyor means (102, 104).

(ii) conveying said cartons down stream on to a loading station.

(iii) loading the cartons by lowering each of said cartons onto at least one article to be packaged.

9. A packaging machine for packaging articles into cartons selected from at least a first carton or a second carton, said first and second cartons being of a different type or size, said cartons being stored in at least one hopper (54), and picked for packing by a carton engaging means (56) arranged to remove cartons successively one at a time from said at least one hopper and to transport them sequentially to a first predetermined position from where the cartons are transferred to a paper feed chain which supports the cartons to a second predetermined position from where the cartons are introduced to said articles.

10. A packaging machine incorporating apparatus as claimed in any of claims 1 to 7.

Patentansprüche

1. Vorrichtung zum kontinuierlichen Zuführen und Fördern von Schachteln zu einer Gegenstandsladestation in einer Verpackungsmaschine (50), **dadurch gekennzeichnet, dass** die Vorrichtung selektiv bedienbare Zuführmittel (46, 47) umfasst, wobei erste Zuführmittel (46) angepasst sind, um Schachteln aus einem ersten Spender (54) sequentiell zu liefern, und zweite Zuführmittel (47) angepasst sind, um Schachteln unterschiedlicher Größe oder Art aus einem zweiten Spender (140) sequentiell zu liefern, sowie Ortungsmittel, die mit den ersten und zweiten Zuführmitteln zusammenwirken, um die Schachteln an einer festgelegten Stelle relativ zu Fördermitteln zu halten, wobei die Schachteln von den Fördermitteln stromabwärts zu der Ladestation bewegt werden, um beladen zu werden, indem jede der Schachteln auf wenigstens einen zu verpackenden Gegenstand herabgesenkt wird.

2. Vorrichtung nach Anspruch 1, wobei die Ortungsmittel ein Paar von Blöcken (226) umfassen, die an einer ersten bzw. zweiten Endloskette (216, 218) befestigt sind, wobei jeder Block einen Mitnehmer (224) einschließt, der aus einer Bodenfläche des Blocks vorsteht, und wobei die Mitnehmer angepasst sind, um gegenüberliegende äußere Wandflächen der Schachtel an beabstandeten Stellen zwischen Enden und an beabstandeten Stellen zwischen ihren quer verlaufenden Kanten in Eingriff zu nehmen.

3. Vorrichtung nach Anspruch 1, wobei die Ortungsmittel eine Vielzahl gegenüber angeordneter Stifte

(110) umfassen, die von den jeweiligen Ketten eines Paares von Endlosketten (102, 104) vorstehen, wobei die Stifte angepasst sind, um gegenüberliegende Wandflächen der Schachtel an beabstandeten Stellen zwischen Enden und an beabstandeten Stellen zwischen den quer verlaufenden Kanten in Eingriff zu nehmen.

4. Vorrichtung nach Anspruch 2 oder 3, wobei die Fördermittel ein Paar von Endloskettenführungsbahnen (102, 104) zum Aufnehmen erster und zweiter Endlosketten (102, 104, 216, 218) umfassen, wobei die Führungsbahnen angepasst sind, um korrespondierende Stifte in einer abwärts geneigten Richtung zu führen. 5 10
5. Vorrichtung nach einem der Ansprüche 2 bis 4, wobei die Mitnehmer (224) und/oder die Stifte (110) geformt sind, um die Schachtel in einer im Wesentlichen horizontalen Ebene in Eingriff zu nehmen und/oder zu halten. 20
6. Vorrichtung nach einem der vorstehenden Ansprüche, wobei Stellmittel bereitgestellt sind, um den Fluss der Gegenstände an dem Zuführende zu steuern, wobei die Stellmittel ferner Mittel umfassen, um den Druck der Gegenstände in die Maschine zu steuern, sowie Mittel, um die korrekte Anzahl von Gegenständen für jede Schachtel zu bestimmen. 25 30
7. Vorrichtung nach Anspruch 6, wobei die Mittel zum Steuern des Drucks der Gegenstände ein Zufuhrsternrad (86) umfassen. 35
8. Verfahren zum kontinuierlichen Zuführen und Fördern von Schachteln unterschiedlicher Größe oder Art zu einer Gegenstandsladestation in einer Verpackungsmaschine, wobei das Verfahren die folgenden Schritte umfasst: 40
 - (i) das Bewirken, dass Schachteln sequentiell aus einem ersten Spender (54) und einem zweiten Spender (140) auf gemeinsame Fördermittel (102, 104) geliefert werden; 45
 - (ii) das Fördern der Schachteln stromabwärts zu einer Ladestation;
 - (iii) das Beladen der Schachteln durch Absenken jeder der Schachteln auf wenigstens einen zu verpackenden Gegenstand. 50
9. Verpackungsmaschine zum Verpacken von Gegenständen in Schachteln, die aus wenigstens einer ersten oder einer zweiten Schachtel ausgewählt sind, wobei die erste und zweite Schachtel von unterschiedlicher Art oder Größe sind, wobei die 55

Schachteln in wenigstens einem Magazin (54) aufbewahrt werden und zum Verpacken von einer Schachtel in Eingriff nehmenden Einrichtung (56) aufgenommen werden, die angeordnet ist, um die Schachteln sukzessiv einzeln aus dem wenigstens einen Magazin zu entnehmen und diese sequentiell zu einer ersten vorbestimmten Position zu befördern, von wo aus die Schachteln zu einer Papier-vorschubkette übertragen werden, die die Schachteln bis zu einer zweiten vorbestimmten Position trägt, von wo aus die Schachteln den Gegenständen zugeführt werden.

10. Verpackungsmaschine, die die Vorrichtung nach einem der Ansprüche 1 bis 7 enthält. 15

Revendications

1. Dispositif pour alimenter en continu et transporter des cartons vers un poste de chargement d'articles dans une machine d'emballage (50), **caractérisé en ce que** le dispositif comprend des moyens (46, 47) d'alimentation actionnables de façon sélective parmi lesquels le premier moyen (46) d'alimentation est adapté pour délivrer des cartons provenant d'un premier moyen d'approvisionnement (54), de façon séquentielle, et un deuxième moyen (47) d'alimentation est adapté pour délivrer des cartons de types ou de dimensions différentes provenant d'un deuxième moyen d'approvisionnement (140), de façon séquentielle, ainsi qu'un moyen (48) de mise en position qui coopère avec lesdits premier et deuxième moyens d'alimentation pour maintenir les cartons dans une position déterminée par rapport au moyen formant convoyeur qui transporte lesdits cartons vers l'aval vers ledit poste de chargement pour qu'ils soient chargés en abaissant chacun desdits cartons sur au moins un article à emballer.
2. Dispositif selon la revendication 1 dans lequel ledit moyen de mise en position comprend une paire de blocs (226) montés respectivement sur les première et deuxième chaînes sans fin (216, 218), chaque bloc comportant un crochet preneur (224) faisant saillie depuis une surface inférieure dudit bloc et dans lequel lesdits crochets preneurs sont adaptés pour accrocher les panneaux extérieurs opposés du carton en des points situés dans des positions espacées entre les extrémités et entre les bords transversaux du carton.
3. Dispositif selon la revendication 1 dans lequel ledit moyen de mise en position comprend une pluralité de broches (110) disposées les unes en face des autres en faisant saillie depuis chacune de deux chaînes sans fin (102, 104), lesdites broches étant adaptées pour accrocher les panneaux opposés du

carton en des points situés dans des positions espacées entre les extrémités et entre les bords transversaux.

4. Dispositif selon la revendication 2 ou la revendication 3 dans lequel le moyen formant convoyeur comprend une paire de chemins (102, 104) de chaînes sans fin pour recevoir les première et deuxième chaînes sans fin (102, 104, 216, 218), ces chemins étant adaptés pour guider les broches correspondantes dans une direction inclinée vers le bas. 5
10
5. Dispositif selon une quelconque des revendications 2 à 4 dans lequel lesdits crochets preneurs (224) et/ou lesdites broches (110) sont configurés pour accrocher et/ou maintenir ledit carton dans un plan sensiblement horizontal. 15
6. Dispositif selon une quelconque des revendications précédentes dans lequel il est fourni un moyen de régulation pour commander le flux d'articles au niveau de ladite extrémité d'alimentation, ledit moyen de régulation comprenant en outre un moyen pour contrôler la pression desdits articles entrant dans la machine, ainsi qu'un moyen de détermination du nombre correct d'articles pour chaque carton. 20
25
7. Dispositif selon la revendication 6 dans lequel ledit moyen pour contrôler la pression desdits articles comprend une roue en étoile (86) d'alimentation. 30
8. Procédé pour alimenter en continu et transporter des cartons de différentes dimensions ou différents types vers un poste de chargement d'articles dans une machine d'emballage, ledit procédé comprenant les étapes consistant à : 35
 - (i) faire en sorte que les cartons soient délivrés de façon séquentielle depuis un premier moyen d'approvisionnement (54) et un deuxième moyen d'approvisionnement (140) vers un moyen (102, 104) formant convoyeur commun ; 40
 - (ii) transporter lesdits cartons vers l'aval jusqu'à un poste de chargement ; 45
 - (iii) charger les cartons en abaissant chacun desdits cartons sur au moins un article à emballer.
9. Machine d'emballage pour emballer des articles dans des cartons sélectionnés entre au moins un premier carton et un deuxième carton, lesdits premier et deuxième cartons étant de type différent ou de dimensions différentes, lesdits cartons étant stockés dans au moins un magasin (54) et pris pour l'opération d'emballage par un moyen (56) de saisie de cartons conçu pour extraire les cartons successivement, un par un, depuis ledit magasin au nom- 50
55

bre d'au moins un et pour les transporter de manière séquentielle vers une première position prédéterminée d'où les cartons sont transférés sur une chaîne d'alimentation de papier qui amène les cartons dans une deuxième position prédéterminée d'où les cartons sont placés sur les articles.

10. Machine d'emballage incorporant un dispositif selon une quelconque des revendications 1 à 7.

FIG. 1a

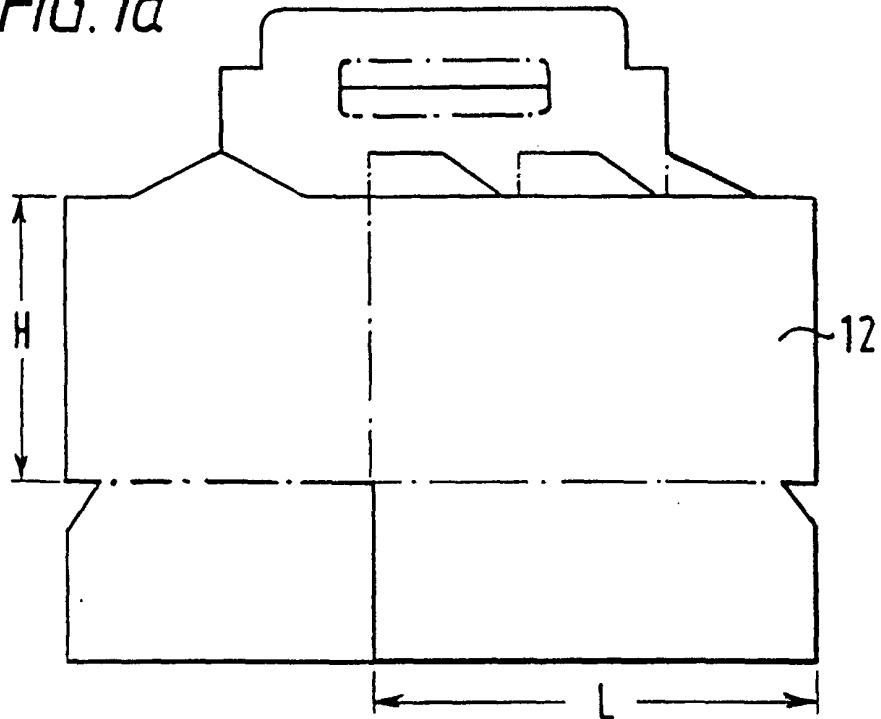


FIG. 1b

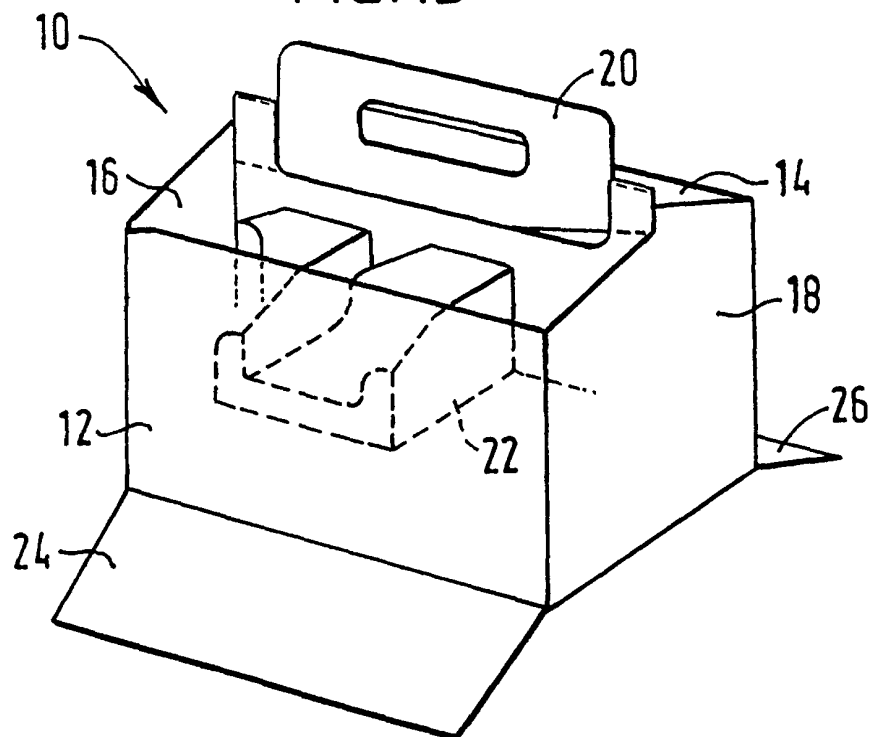


FIG. 2a

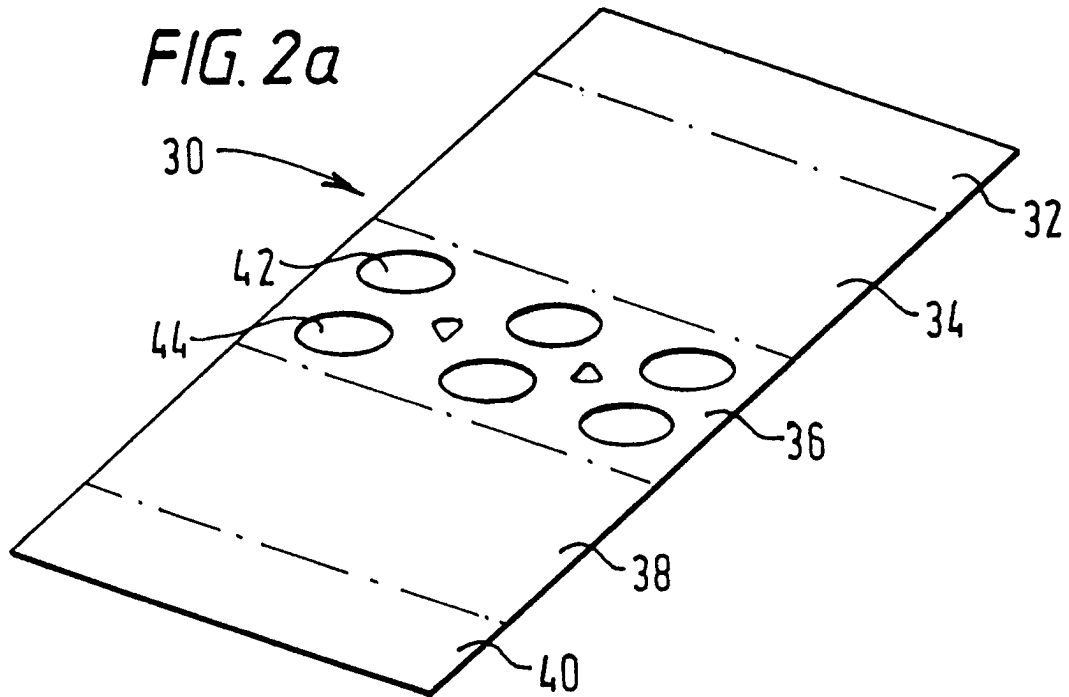
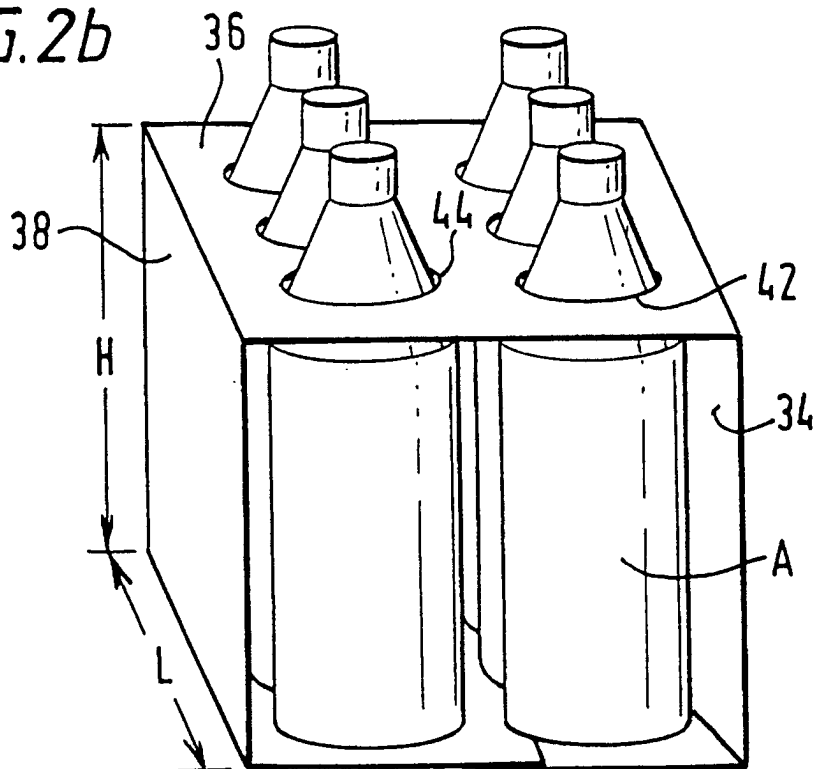
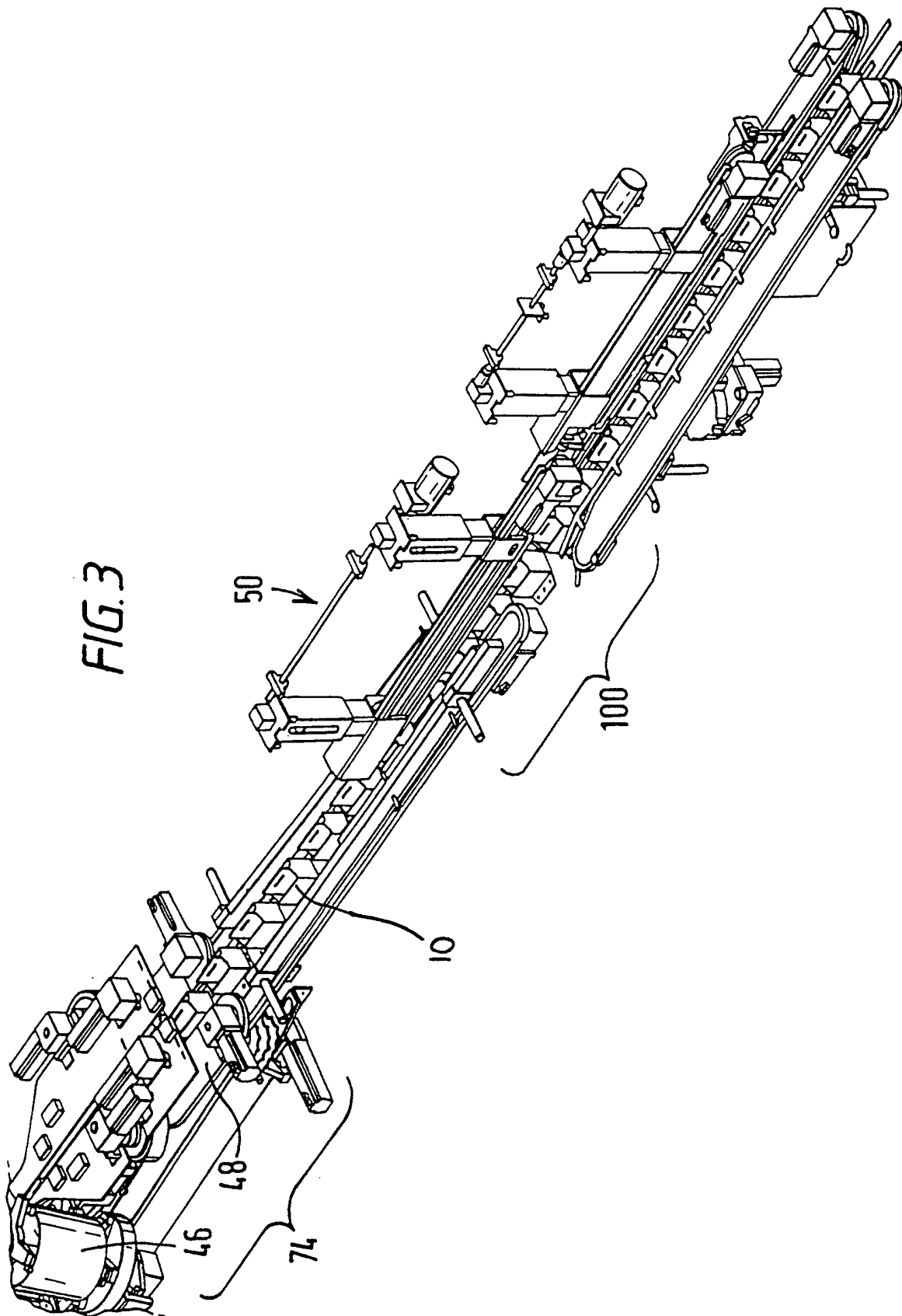


FIG. 2b





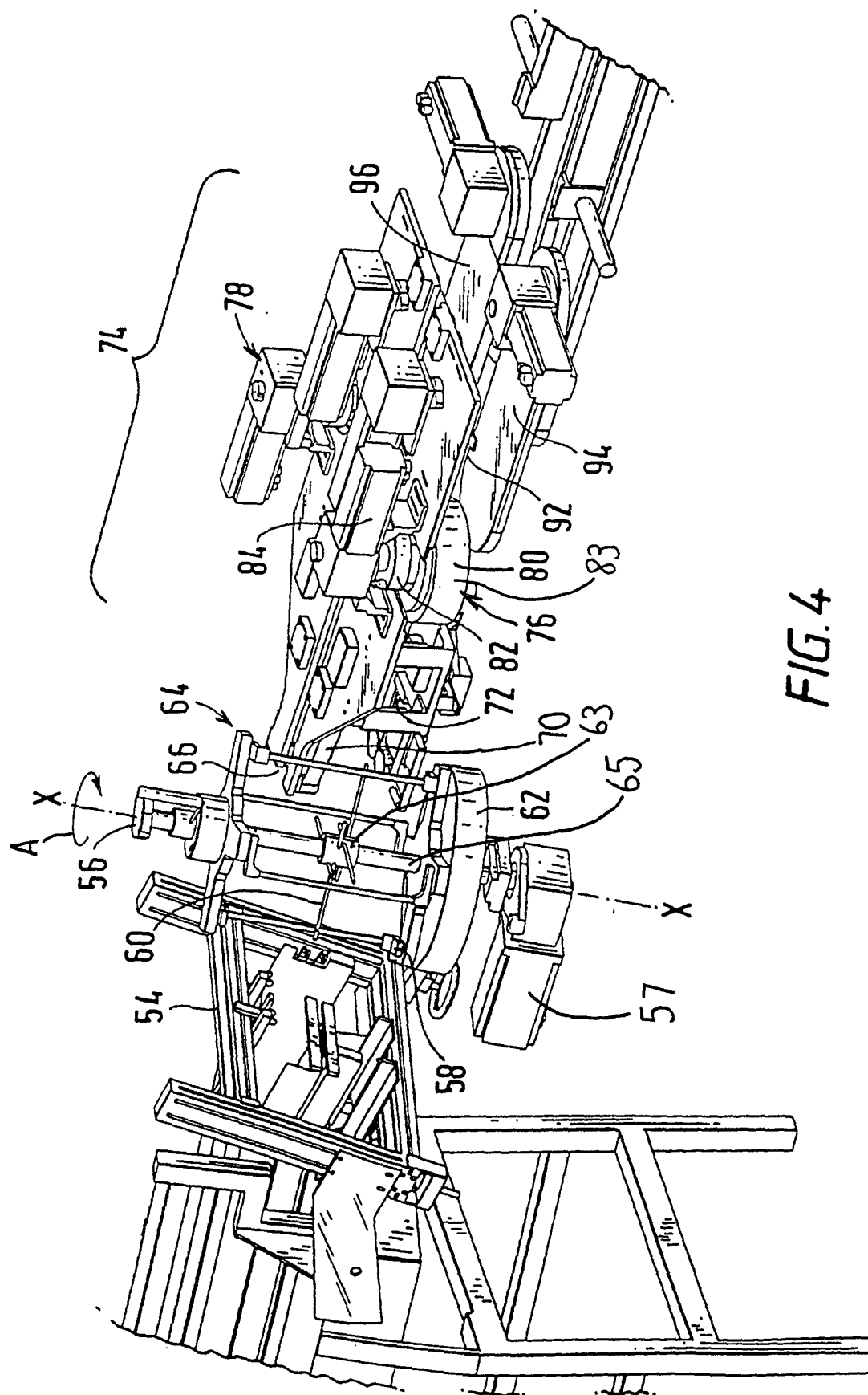
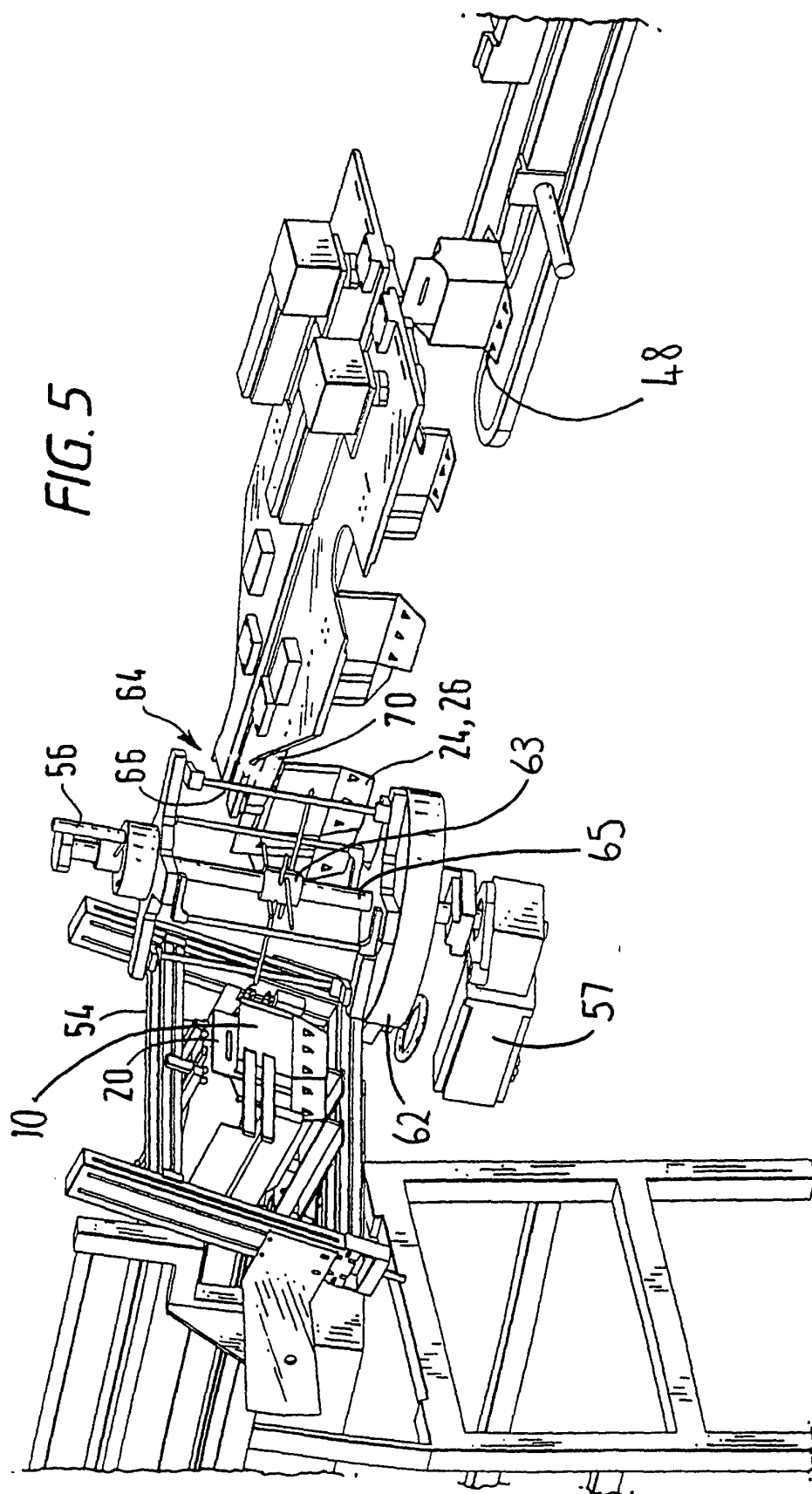
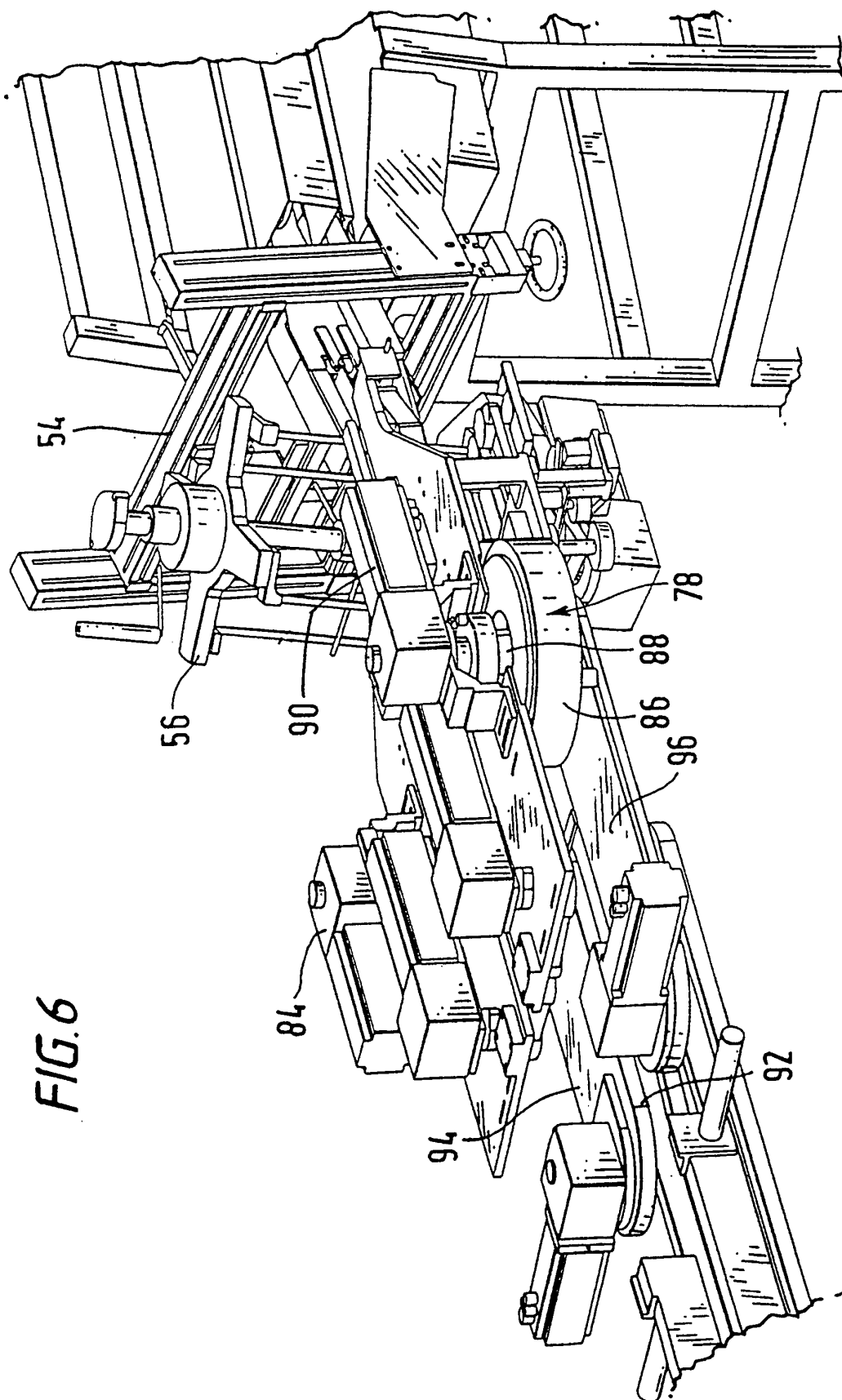


FIG. 4





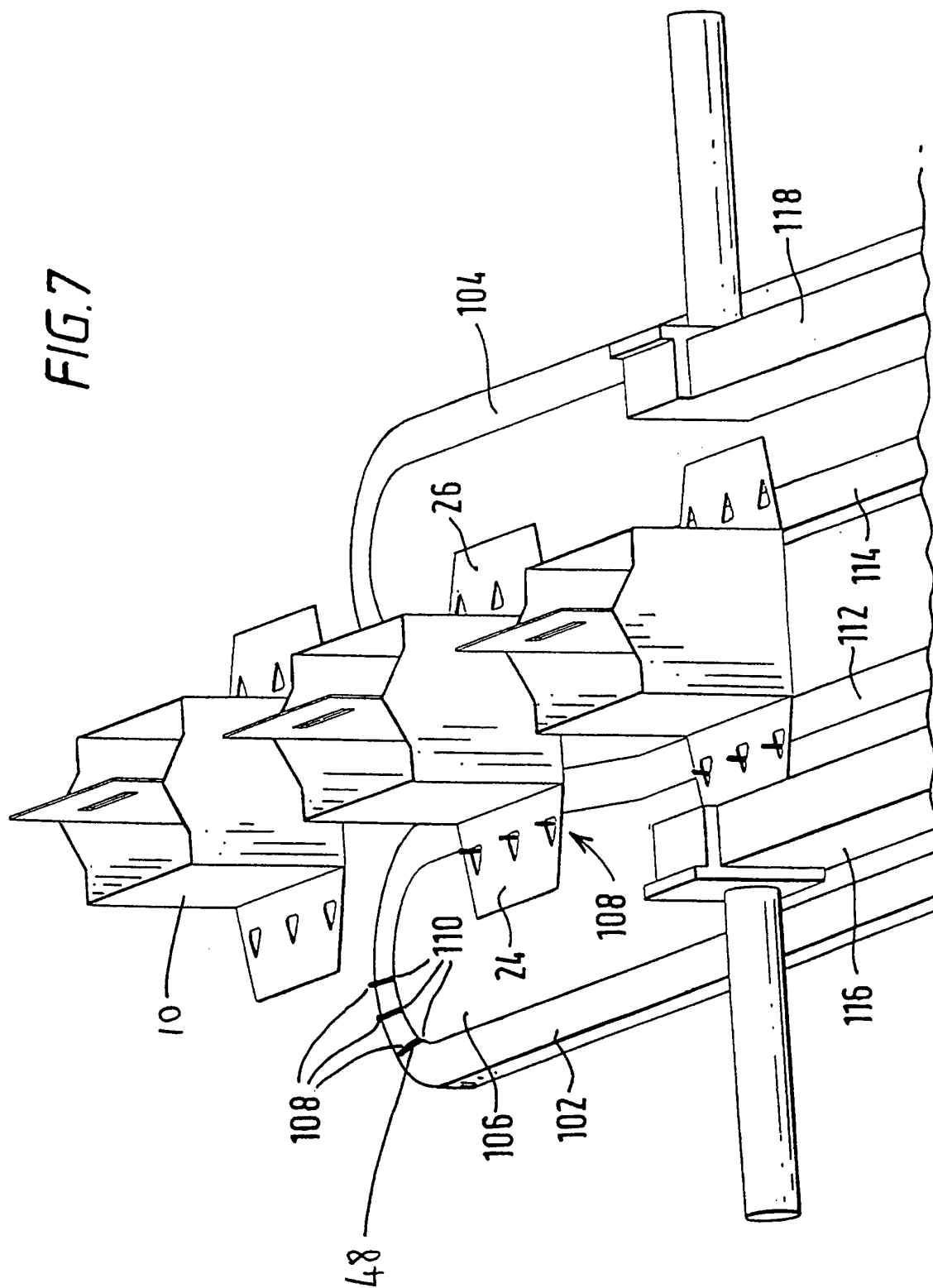
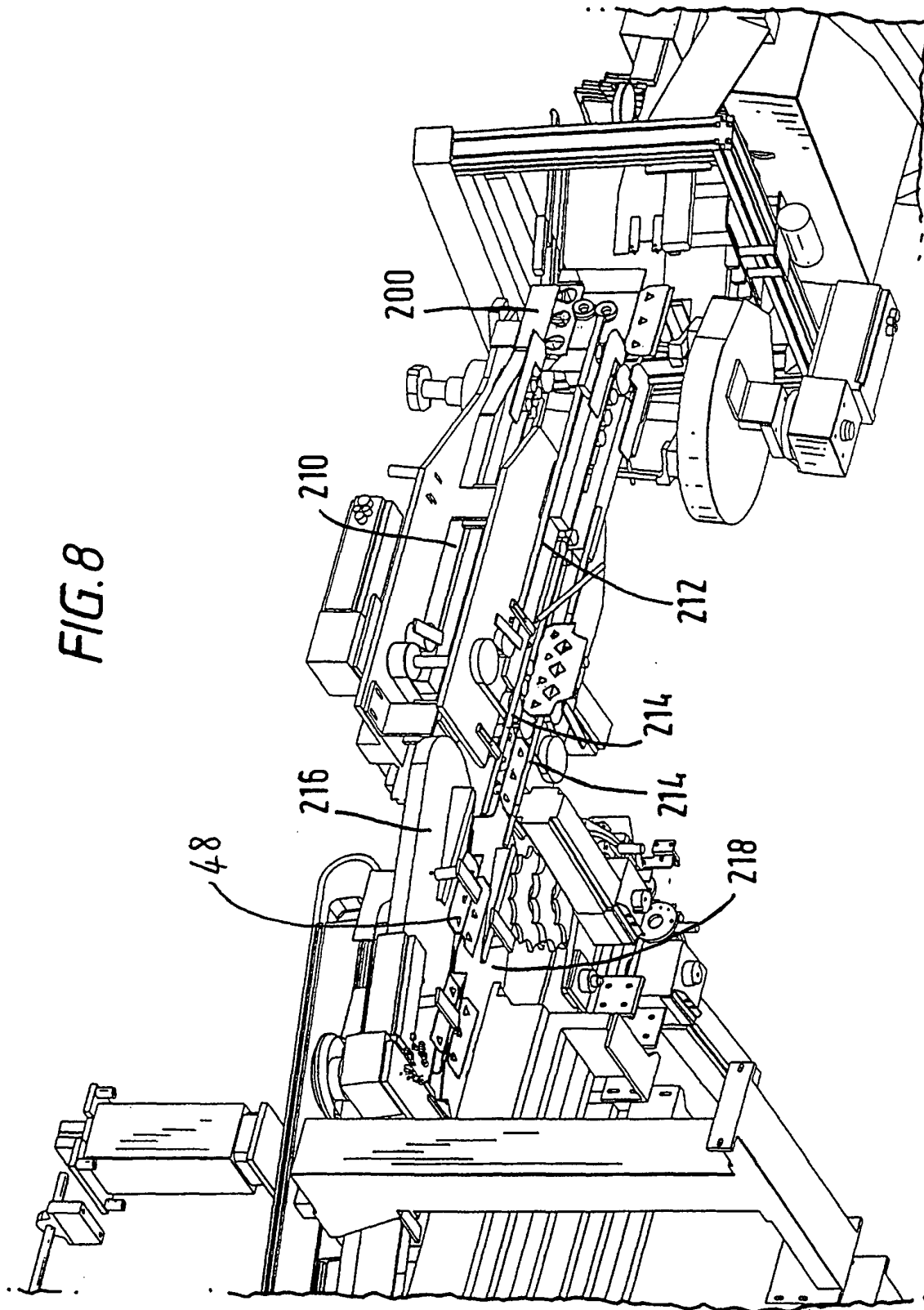
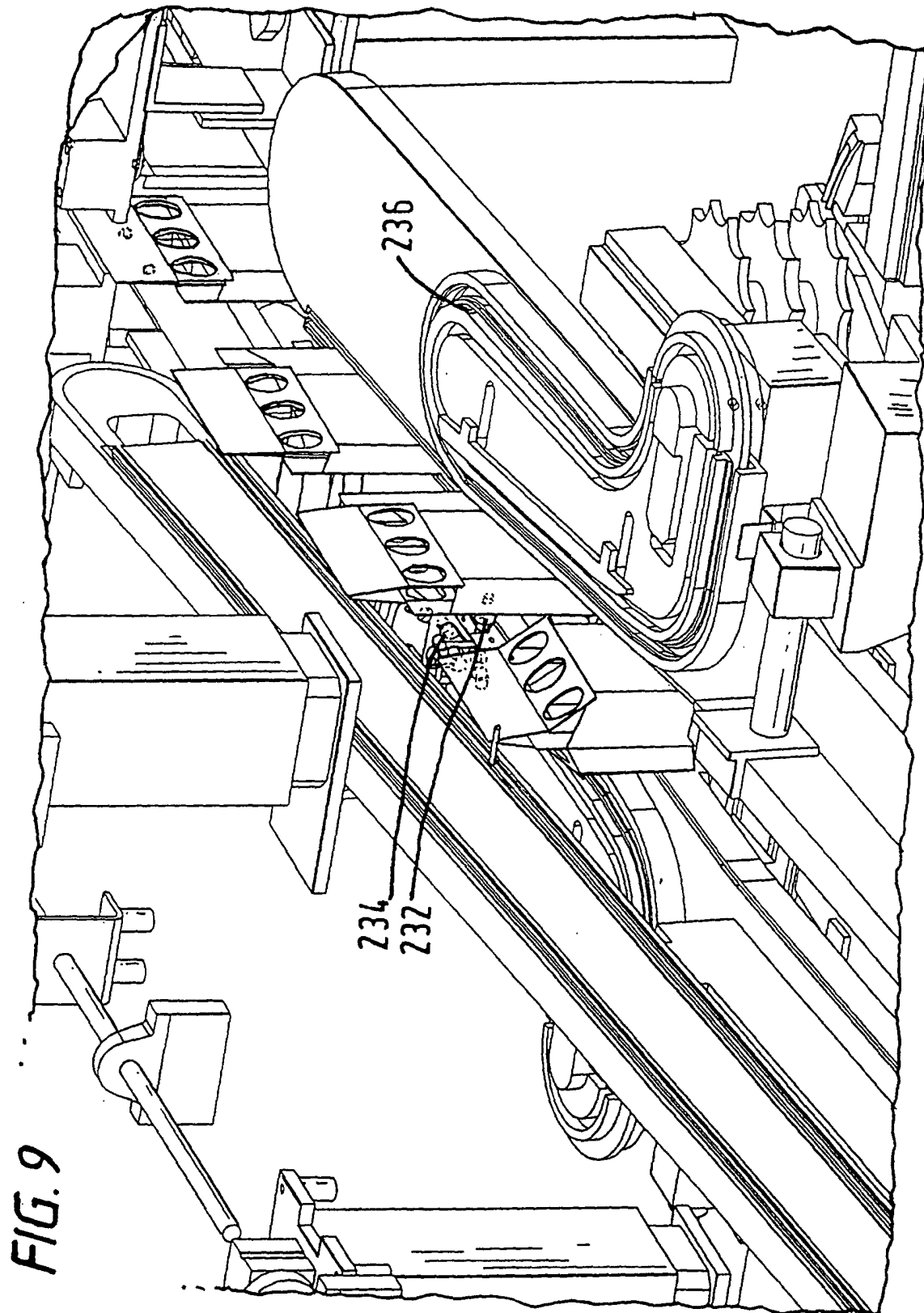
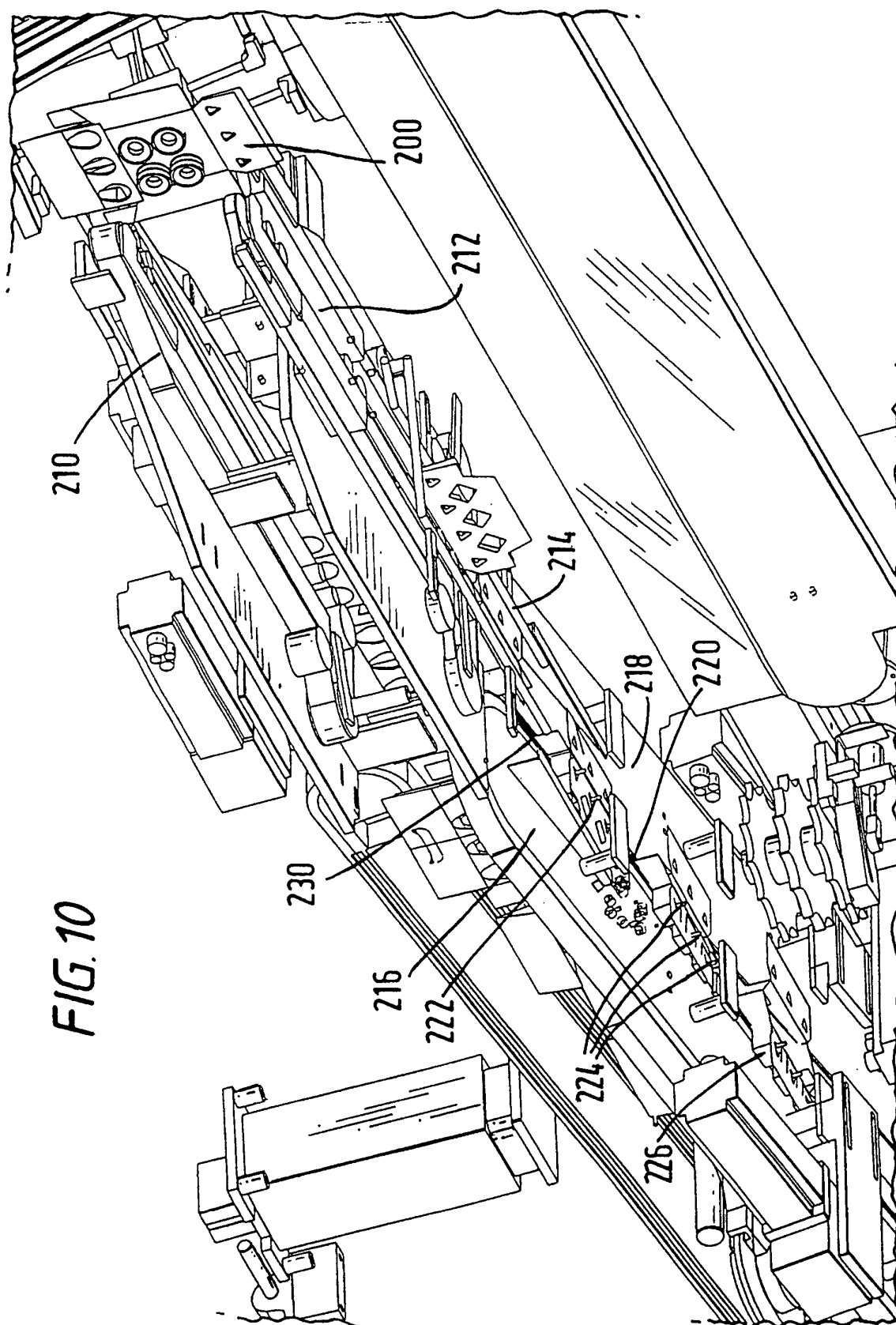


FIG. 8







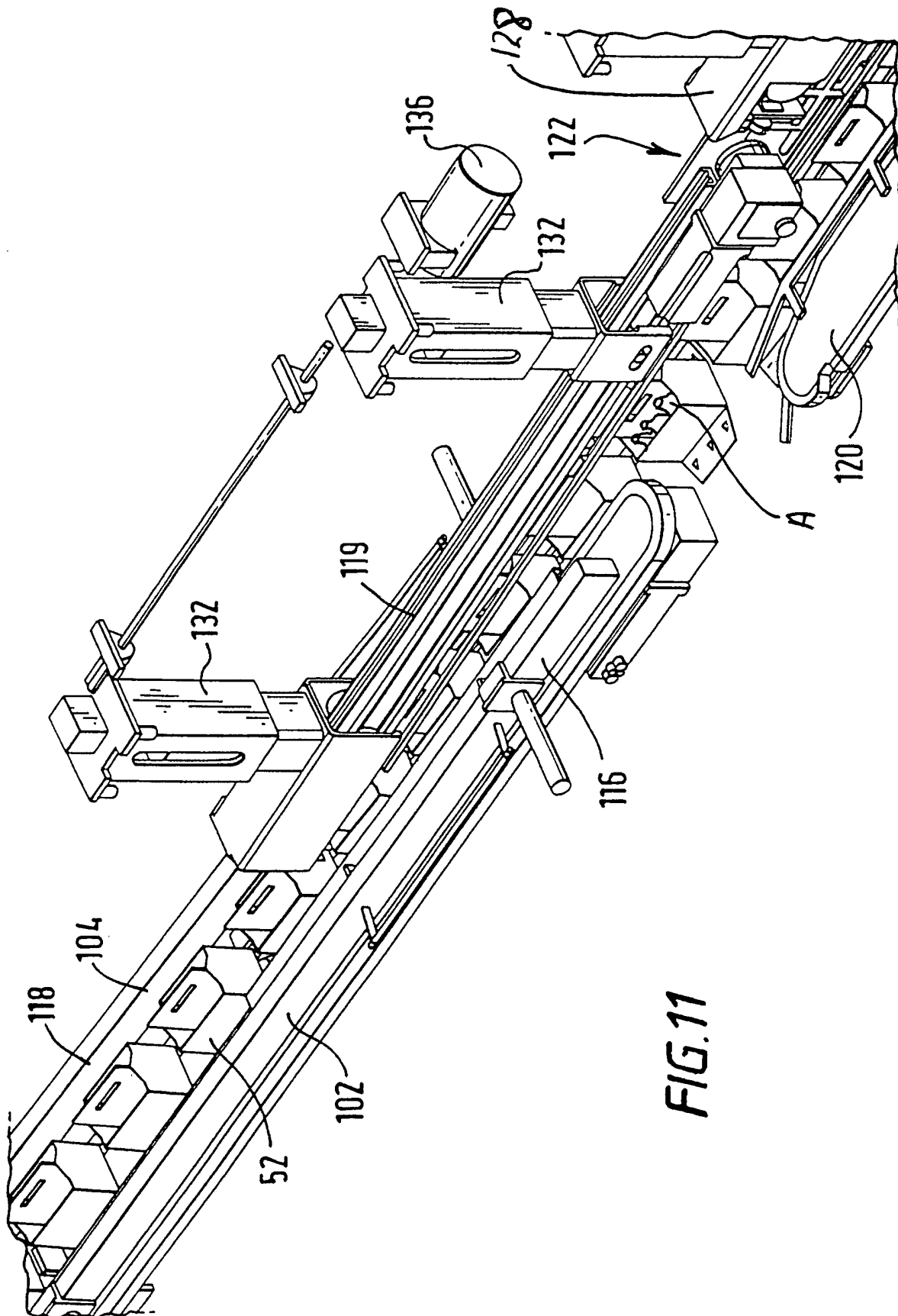


FIG. 11

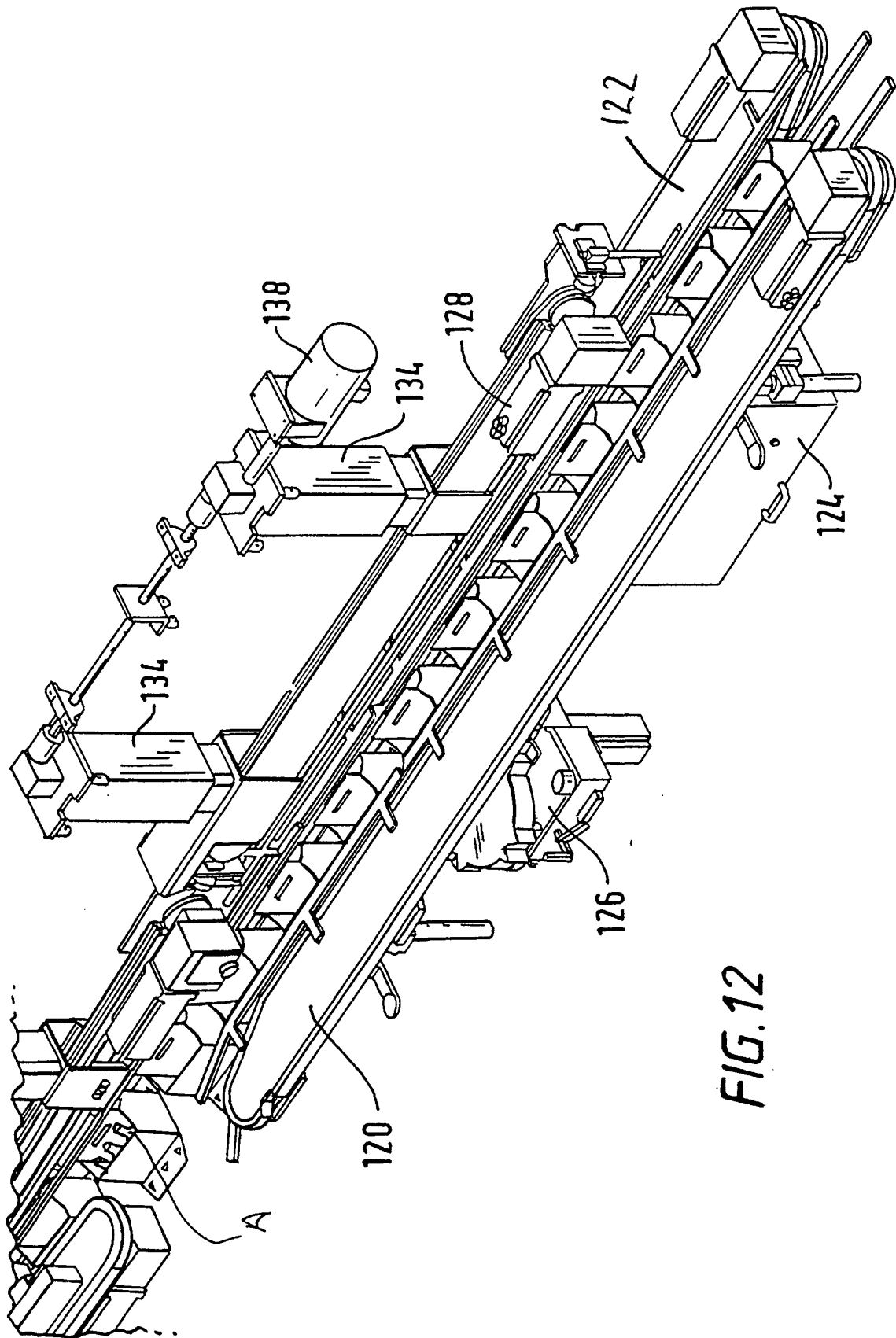


FIG. 12

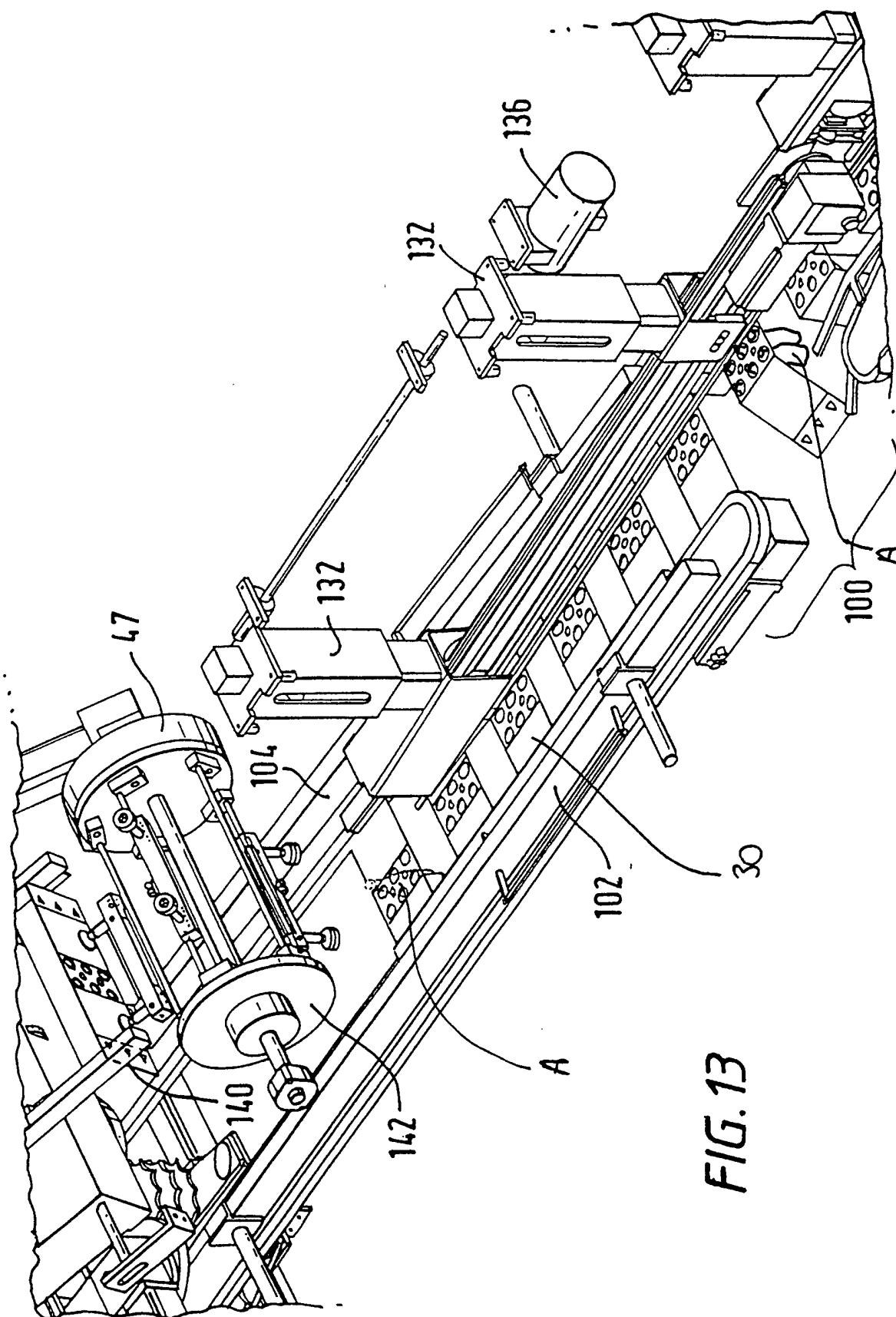


FIG. 13

