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(73) Proprietor: **Shikoku Kakooki Co., Ltd.**
10-1, Aza-Nishinokawa Tarohachizu Kitajima-
cho
Itano-gun Tokushima (JP)

(72) Inventor: **Ueda, Kazuo**
1-18-9, Eifuku-cho
Suginami-ku Tokyo (JP)

(74) Representative: **Noz, Franciscus Xaverius, Ir.**
et al
Boschdijk 155 P.O. Box 645
NL-5600 AP Eindhoven (NL)

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Description

The invention relates to a packaging machine according to the precharacterizing part of claim 1.

Such a packaging machine has been disclosed in FR—A—2.120.765. In said known machine preformed containers, which are closed at their bottom ends, are supplied to the subchamber via a chute. In the subchamber a rotatable wheel is arranged with support means for supporting the containers and for displacing said containers along nozzle means toward a discharge opening. By said nozzle means are supplied sterilizing fluid and hot air for drying the sterilized containers.

Contrary thereto the packaging machine according to the invention is characterized as mentioned in the characterizing part of claim 1.

In using the structure according to the invention tubular blanks, before being supplied to the main chamber for a series of packaging operations, are fed to the subchamber, which is separate from the main chamber, are then sterilized in the subchamber and are thereafter fed to the main chamber. The blank existing in the subchamber, while being sterilized, is in the form of a tube with its both ends not yet closed, so that the blank is more evenly sterilized in its entirety than, for example, the blank that is closed at its one end. Further, the portions to be closed at the after-treatment can also be sterilized. This assures complete sterilization of the blanks.

Further, the blank is supplied to the conveyor disposed in the sterilizing compartment in order to sterilize the blank, sprayed with sterilizing solution while being transported on the conveyor, and then fed to another conveyor arranged in the drying compartment separate from the sterilizing compartment. Thereafter, hot air is blown to the blank while the latter is being transported by the conveyor. This ensures thorough working of sterilizing solution and hot air on the blanks.

By using the measures as mentioned in claim 3 it is further obtained that the packaging machine is closed when stopping its operation, so that both chambers are kept at the specified positive pressure, even if the air generation apparatus stops working, since the air supply pipe is automatically closed by the check valve. Further, should the pressures within both chambers lower for some reasons, the detector detects this pressure drop to operate the apparatus for producing clean air, whereby both chambers are kept at a predetermined positive pressure. Thus both chambers can be prevented from being polluted due to inflow of air.

With reference to the accompanying drawings, an embodiment of the invention will be described below merely for illustrative purposes.

Fig. 1 and Fig. 2 are a side elevation and a front view, respectively, of a packaging machine;

Fig. 3 and Fig. 4 are side elevations showing

the arrangement of a chamber cleaning-sterilizing system;

Fig. 5 is a side elevation showing the arrangement of a clean air supply supplying system;

Fig. 6 is a perspective view of the interior of a sub-chamber to show a blank sterilizer and a blank transfer assembly;

Fig. 7 is an enlarged view in vertical section of the subchamber to show the blank sterilizer;

Fig. 8 is a view in section taken along the line VII—VII in Fig. 7;

Fig. 9 is an enlarged view in vertical section of the subchamber to show the blank transfer assembly;

Fig. 10 is a view in section taken along the line IX—IX in Fig. 9;

Fig. 11 is an enlarged view in vertical cross section of the main chamber showing a filling device;

Fig. 12 is a view in section taken along the line XII—XII in Fig. 11;

Fig. 13 is a view in section taken along the line XIII—XIII in Fig. 12; and

Fig. 14 is a view showing part of the device as it is seen along the arrows XIV—XIV in Fig. 13.

The packaging machine to be described below comprises two rows of components, and the components of one row are identical with those of the other row. Throughout the drawings, like parts are referred to by like reference numerals.

The packaging machine is adapted for use with tubular paper blanks for packaging. A thermoplastic synthetic resin layer is formed on the inner and outer sides of each blank.

With reference to Figs. 1 and 2, the packaging machine comprises an endless conveyor 1 and a mandrel wheel 4 disposed above the starting end of the path of transport of the conveyor 1 and having a horizontal rotary shaft 2 and eight mandrels 3 extending radially from the shaft 2. The conveyor 1 and the mandrel wheel 4 are intermittently driven in synchronism. Although not shown in detail, the conveyor 1 comprises a pair of chains 5 movable in circulation in a horizontal plane, a multiplicity of holders 6 attached to the chains 5 at a predetermined spacing and a rail 7 for supporting the bottoms of bottomed tubular blanks C. The blanks C are transported by the conveyor 1 from the rear forward as indicated by an arrow A. The mandrel wheel 4 is driven counterclockwise in Fig. 1. The conveyor 1 and the mandrel wheel 4 are entirely enclosed in a closed main chamber 8. The main chamber 8 is filled with clean air which has been sterilized. A series of devices 9 are arranged on the top wall of the main chamber 8 from the rear forward in succession. These devices include primary and secondary bottom heaters 10, 11 for heating the end of the tubular blank C to be made into the bottom of a container, a bottom breaker 12 for folding the end to a flat form, a bottom sealer 13 for pressing the flatly folded end, a primary top breaker 14 for forming folds in the other end of the tubular blank C so as to render the end easily foldable into a roof form to

provide the top of the container, a filling device 15 for filling a predetermined amount of contents into the bottomed tubular blank C, a secondary top breaker 16 for eventually folding the end in the form of a roof along the folds formed by the primary top breaker 14, a top heater 17 for heating the end thus folded and a top sealer 18 for pressing the end. Of these devices, the primary and secondary bottom heaters 10, 11, the bottom breaker 12 and the bottom sealer 13 are arranged at the positions where the mandrels stop. The portions of the group of devices 9 which operate on the blank C extend into the main chamber 8. The wall portions of the main chamber 8 through which these operating portions of the devices extend into the main chamber are completely prevented from passing air therethrough with use of bellows for the operating portion which performs a reciprocating rectilinear motion or with use of an oil seal or mechanical seal for the operating portion which performs a rotary motion. The series of devices 9 are all those already known. The main chamber 8 is internally provided with a cleaning-sterilizing system 19 and a clean air supply system 20.

A closed subchamber 22 is disposed to the rear of the main chamber 8 and made to communicate therewith by a booth 21. A blank sterilizer 23 and a blank transfer assembly 24 are arranged within the subchamber 22. A blank shaping-feeding unit 25 is provided outside the subchamber 22. The blank shaping-feeding unit 25 is enclosed in its entirety in a rear chamber 26 which, however, is not of closed construction unlike the chambers 8 and 22. The unit 25, which is of the known type, is adapted to shape folded flat blanks C into a tubular form. The unit 25 includes a magazine 27 having stacked therein a multiplicity of folded flat blanks C although now shown. As will be described later in detail, the blank transfer assembly 24 is adapted to transfer blanks C shaped to a tubular form from the blank shaping-feeding unit 25 to the blank sterilizer 23 and to transfer sterilized tubular blanks C from the sterilizer 23 to the mandrel wheel 4.

As seen in Figs. 3 and 4, the cleaning-sterilizing system 19 comprises spray nozzles 28, spray balls 29 and sterilizing solution spray nozzles 30 which are arranged within the main chamber 8 as required. The conveyor 1 is operated with a cleaning solution forced out from the spray nozzles 28 and balls 29, whereby the conveyor 1 and the interior of the main chamber 8 can be cleaned automatically. A sterilizing solution, when applied by the spray nozzles 30, sterilizes the conveyor 1 and the interior of the main chamber 8. An aqueous solution of hydrogen peroxide with a concentration of 35% is used as the sterilizing solution.

Fig. 5 shows the clean air supplying system 20. The main chamber 8 has a completed container discharge opening 31 at the front end thereof. The subchamber 22 has a blank supply opening 32 at a rear portion thereof. These openings 31 and 32 are provided with openable closures 33 and 34

respectively. Branched air supply ducts 36 extending from an air supply unit 35 are connected to the main chamber 8 and the subchamber 22 and are each provided with a check valve 37. The air supply unit 35 comprises an air intake filter 38, an electric blower 39, a sterilizing filter 40 and a heater 41. An air discharge duct 42 is connected to suitable portions of the main chamber 8 and the subchamber 22 and is open to the atmosphere through a shutoff valve 43. The system 20 is further provided with a pressure sensor 44 for detecting the internal pressure of the main chamber 8, such that when the pressure detected drops below a set level, the air supply unit 35 operates in response to an output signal from the sensor 44. Although not shown in Fig. 5, the air supply duct 36 is also connected to the blank sterilizer 23 (see Figs. 6 to 8).

During steady-state operation, clean air is fed to the chambers 8 and 22 at all times from the air supply unit 35 to maintain the interior of the chambers at a positive pressure, whereby outside air is prevented from flowing into the chambers 8 and 22 to avoid contamination that would otherwise occur. While the machine is out of operation, for example, during nighttime, the closures 33, 34 and the shutoff valve 43 on the discharge duct 42 are closed, whereby the interior of the chambers 8, 22 can be maintained at a positive pressure even if the air supply unit 35 is held out of operation, since the supply ducts 36 are automatically closed by the check valves 37. The supply ducts 36 are shut off from the chambers 8, 22 by the check valves 37 and separated from the atmosphere by the sterilizing filter 40, so that the ducts 36 are made free from contaminants. This eliminates the need for routine sterilization of the supply ducts 36. If the internal pressure of the chambers 8, 22 decreases for one cause or another, the sensor 44 detects the pressure drop to operate the electric blower 39 and to thereby maintain the interior of the chambers 8, 22 at the specified positive pressure level at all times.

Figs. 6 to 8 show the subchamber 22 and the blank sterilizer 23 in detail.

The subchamber 22 comprises a drying compartment 46 having at its front portion a blank outlet 45 communicating with the main chamber 8, a sterilizing compartment 49 communicating at its front portion with the drying compartment 46 through an opening 47 and having a blank inlet 48 at its rear portion, and a pressurized compartment 50 enclosing an opening, including the blank inlet 48, of the sterilizing compartment 49. The drying compartment 46 is in the form of a flat case having a thickness in the front-to-rear direction and is formed with the blank outlet 45 in its front wall. The air supply duct 36 and the air discharge duct 42 are connected to the top wall of the drying compartment 46. The sterilizing compartment 49 is in the form of a bottomed horizontal hollow cylinder having an open front end which is attached to the rear wall of the drying compartment and thereby closed. The blank inlet 48 is positioned to the rear of the communication

opening 47 in alignment therewith. The pressurized compartment 50 is in the form of a case open at its front end and having such a size as to cover the sterilizing compartment 49 with a required space formed therein around the compartment 49. Like the sterilizing compartment 49, the open end of the pressurized compartment 50 is intimately attached to and closed by the rear wall of the drying compartment 46. The aforementioned blank supply opening 32 is formed in the rear wall of the compartment 50. The air supply duct 36 is also connected to the top wall of the pressurized compartment 50.

The blank sterilizer 23 comprises a drying conveyor 51 disposed within the drying compartment 46, a sterilizing conveyor 52 disposed within the sterilizing compartment 49, hot air blowing nozzles 53 arranged along the path of transport of the drying conveyor 51, and a blank sterilizing spray nozzle 54 directed toward the path of transport of the sterilizing conveyor 52.

The drying conveyor 51 comprises drive and driven sprockets 55, 56 having axes of rotation spaced apart by a predetermined distance one above the other and extending in the front-to-rear direction, endless chains 57 reeved around the sprockets 55, 56 and a multiplicity of drying blank holders 58 attached to the endless chains 57 at a predetermined spacing. The drying conveyor 51 is so disposed within the drying compartment 46 that each of the holders 58 travels passing positions opposed to the blank outlet 45 and the communication opening 47. The sterilizing conveyor 52 comprises a horizontal rotary shaft 59 extending in the front-to-rear direction and four sterilizing blank holders 60 attached to the rotary shaft 59 and arranged around the rotary shaft at a predetermined spacing. The sterilizing conveyor 52 is so disposed within the sterilizing compartment 49 that each of the holders 60 travels passing a position opposed to the communication opening 47 and the blank inlet 48. Both the drying and sterilizing blank holders 58 and 60 are of the same shape and comprise a plurality of horizontal pieces to be positioned around the tubular blank C to retain the blank C in a horizontal position, restraining the blank from upward or downward movement but allowing the blank to move forward or rearward.

The hot air blowing nozzles 53 are attached to a hot air supply duct 61 extending vertically within the drying compartment 46 and are arranged at the same spacing as the drying blank holders 58. The orifices of the nozzles 53 are directed in the axial direction of the holders 58. The upper end of the duct 61 extends through the top wall of the drying chamber 46 upward, with a heat insulating tube 62 provided around the duct 61. The top end of the duct 61 has the air supply duct 36 connected thereto and a burner 63 attached thereto.

The nozzle 54 for spraying a solution for sterilizing the blank is mounted on the bottom of a bottomed tube 64. The tube 64 extends in the front-to-rear direction across the drying compartment 46 so as to be positioned in front of and in

alignment with each of the sterilizing blank holders 60 when the holder 60 depends from the rotary shaft 59. The tube 64 is provided in the drying compartment 46 with its open end communicating with the sterilizing compartment 49. Thus the orifice of the spray nozzle 54 is oriented in the axial direction of the blank holder 60.

The drive sprockets 55 of the drying conveyor 51 are fixed to a rotary shaft 65 extending from the rear wall of the drying compartment 46 forward through the front wall thereof. A pulley 66 is fixedly mounted on the end of the shaft 65 projecting outward from the compartment 46. A belt 67 is reeved around the pulley 66 and another pulley fixed to the output shaft of an unillustrated prime mover. The drying conveyor 51 is intermittently driven by the belt 67 so that the holders 58 thereon can be stopped at the positions opposed to the blank outlet 45 and the communication opening 47. On the other hand, the horizontal rotary shaft 59 of the sterilizing conveyor 52 is supported by a tube 68 attached to the rear end of the drying compartment 46. The front end of the rotary shaft 59 extends into the drying compartment 46, and drive sprockets 69 are fixed to the front end. The sprockets 69 are in mesh with the endless chains 57 so that the holders 60 of the sterilizing conveyor 52 can be stopped at the position opposed to the communication opening 47 and the blank outlet 48. Thus the sterilizing conveyor 52 is intermittently driven in synchronism with the drying conveyor 51. The drive interval is 90 degrees in terms of the revolution of the holders 60, i.e. one pitch of the holders 60. A blank guide 70 provided within the booth 21 in front of the drying compartment 46 is opposed to the blank outlet 45 of the compartment 46, while a blank guide 71 is provided within the pressurized compartment 50 and positioned in the rear of and opposed to the blank inlet 48 of the sterilizing chamber 49. The blank guides 70, 71 are generally identical with the blank holders 58, 60 in shape.

The air discharge duct 42 extending through the drying compartment 46 and the pressurized compartment 50 is connected to a lower portion of the sterilizing compartment 49. The interior of the pressurized compartment 50 is maintained at a higher pressure than the interior of the sterilizing compartment 49 because clean air is rapidly fed to the pressurized compartment 50 through the air supply duct 36 and further because air is rapidly discharged from the sterilizing compartment 49 via the air discharge duct 42. Accordingly the air within the sterilizing compartment 49 will not flow out into the pressurized compartment 50, and the sterilizing solution sprayed into the compartment 49 is discharged with the air discharged via the duct 42. This prevents air pollution with the sterilizing solution.

Figs. 6, 9 and 10 show the blank transfer assembly 24 in detail.

The blank transfer assembly 24 comprises a pair of upper and lower horizontal guide rods 72 extending in the front-to-rear direction at one side of the sterilizing compartment 49 within the

pressurized compartment 50, a carriage 74 movably supported by rollers 73 on the guide rods 72, a pair of upper and lower pawl rods 77, 78 extending in the front-to-rear direction, rotatably supported by brackets 75, 76 on the carriage 74 and spaced apart by a predetermined distance from each other in parallel, an upper pawl 79 fixed to the upper pawl rod 77, and first and second lower pawls 80, 81 fixed to the lower pawl rod 78 and spaced apart from each other by a predetermined distance in the front-to-rear direction.

The horizontal guide rods 72 are supported, in the vicinity of their front ends, by the rear wall of the drying compartment 46 in a cantilever fashion. The forward end of a drive arm 83 is connected to the carriage 74 by a link 82. The drive arm 83 is supported by a transverse horizontal shaft 84. The drive arm 83, when pivotally moved by unillustrated means, moves the carriage 74 forward and rearward in reciprocation along the guide rods 72. A major portion of the upper pawl rod 77 extends into the drying compartment 46 through a hole 85 formed in the rear wall of the compartment 46. The upper and lower pawl rods 77, 78 are interconnected by a pair of arms 86, 87 and a link 88 so as to transmit rotation to each other. An operating arm 89 extending obliquely upward is secured to the front end of the arm 86 attached to the upper pawl rod 77. Lift means 91 is connected to the arm 89 by a connecting member 90. The lift means 91 comprises a lift rod 92, a pair of opposed horizontal guide rails 93 fixed to the lower end of the lift rod 92 and extending in the front-to-rear direction, and a trolley 94 supported by the rails 93. The lift rod 92 is movable upward and downward by an unillustrated cylinder. When the lift rod 92 is moved upward or downward along with the rails 93 and the trolley 94, the operating arm 89 is pivotally moved through the connecting member 90, whereby the upper pawl rod 77 is rotated. The rotation of the upper pawl rod 77 is transmitted to the lower pawl rod 78 via the pair of arms 86, 87 and the link 88. When the upper and lower pawl rods 77, 78 are both rotated, the upper pawl 79, the first lower pawl 80 and the second lower pawl 81 secured to these rods pivotally move between the horizontal position and the downward position indicated in solid lines or broken lines in Fig. 10. The peripheral wall of the sterilizing compartment 49 is formed with an aperture 95, through which the first and second lower pawls 80 and 81 are movable into the sterilizing compartment 49. When the pawls 79, 80 and 81 are pivotally moved, these pawls are engageable with blanks C. Stated more specifically, the upper pawl 79 is engageable with or disengageable from the blank C held by the drying blank holder 58 which is at rest in the position opposed to the blank outlet 45 of the drying compartment 46. The first lower pawl 80 is engageable with or disengageable from the blank C held by the sterilizing blank holder 60 which is at rest as opposed to the communication opening 47 and to the blank inlet 48. The second lower pawl 81 is engageable with or disengageable

from the blank C which is to be held by the sterilizing blank holder 60. The last-mentioned blank C is retained by the blank guide 71 within the pressurized compartment 50. Although not shown, another pawl is secured to the upper pawl rod 77 to the front of the upper pawl 79. This pawl serves to forward the blank C which has been removed from the drying blank holder 58 by the upper pawl 79. This blank C is sent forward by being guided by the blank holder 70 within the booth 21. The carriage 74 further has a horizontal rod 96 extending rearward therefrom under the lower pawl rod 78 and fixedly provided with an engaging piece 97 at its rear end. The blank C which had been forwarded from the blank shaping-feeding unit 25 is brought by the engaging piece 97 into the range of stroke of the second lower pawl 81, i.e. to the position where it is to be held by the blank guide 71. The blank C shaped into a tubular form by the unit 25 is sent forward by the engaging piece 97 and the second lower pawl 81 and held by one of the sterilizing blank holders 60. At this time, the holder 60 is at rest on a horizontal line through the horizontal rotary shaft 59. When the sterilizing conveyor 52 is driven by one pitch, the same blank C is brought to a position opposed to the spray nozzle 54 in alignment therewith and is exposed to a spray of sterilizing agent from the nozzle 54, whereby the blank is uniformly sterilized over the inner and outer surfaces thereof. Subsequently the conveyor 52 is driven by three pitches, whereby the sterilized blank C is moved round the shaft 59 and returned to the original position within the compartment 49. When at rest in this position, the blank is forwarded by the first lower pawl 80 and is thereby removed from the holder 60 and held by one of the drying blank holders 58. Another blank C is placed by the second lower pawl 81 onto the sterilizing blank holder 60 from which the above blank C has been withdrawn. The blank C held by the drying blank holder 58 is sterilized and dried by the hot air blowing nozzles 53 during travel through the drying compartment 46. When the same blank C is brought to a halt at a position two pitches preceding the initial position after travelling through the drying compartment 46 the blank is removed from the sterilizing blank holder 58 and sent forward by the upper pawl 79. The blank C thus withdrawn from the holder 58 is further forwarded as retained on the blank guide 70 and fed to the main chamber 8.

Figs. 11 to 14 show the filling device 15.

The filling device 15 comprises a filling liquid tank 98, a filling cylinder 100 connected at its upper end to the bottom of the liquid tank 98 by a branch pipe 99 so as to communicate with the tank 98, a metering cylinder 102 connected to an intermediate portion of the filling cylinder 100 between its upper and lower ends by a connecting pipe 101, and a filling nozzle 103 connected to the lower end of the filling cylinder 100.

A liquid supply pipe 104 is connected to the liquid tank 98. A cleaning solution supply pipe 105 extending from the cleaning-sterilizing system 19

is connected to the liquid tank 98 and to the metering cylinder 102. The filling nozzle 103 extends into the main chamber 8 through the top wall thereof and has an open lower end which is positioned immediately above the path of transport of blanks. Filling operation is conducted twice for each bottomed tubular blank C, so that two adjacent, front and rear filling nozzles 103 are arranged along the transport path.

A liquid conduit 106 is disposed under the filling nozzles 103 within the main chamber 8. The liquid conduit 106 comprises a vertical portion 107 rotatably and vertically movably supported by the main chamber 8 at a location a predetermined distance sidewise away from immediately below the filling nozzles 103, and a horizontal portion 108 integral with the vertical portion 107 and having a length corresponding to the above-mentioned distance. The lower end of the vertical portion 107 extends outward from the main chamber 8 through its bottom wall, with a tubular seal member 109 fitted in the wall around the lower end. A liquid discharge pipe 110 is connected to the seal member 109. A liquid receptacle 111 is attached to the forward end of the horizontal portion 108. The liquid receptacle 111 is formed with two upwardly open nozzle sockets 112 corresponding to the two adjacent filling nozzles 103 and communicating with the liquid conduit 106. An annular seal member 113 of elastic material is attached to the inner periphery of each socket 112. A pair of opposed engaging pieces 114 projecting upward are attached to opposite sides of the liquid receptacle 111. A laterally U-shaped cutout 115 is formed in each engaging piece 114 as seen in Fig. 14. A rotating rod 116 is connected to the upper end of the vertical portion 107 of the conduit 106 in alignment with the portion 107. The rotating rod 116 slidably extends through and projects upward from a guide tube 117 attached to the top wall of the main chamber 8. A handle 118 is attached to the projecting end of the rod 116. The handle 118 is supported by the top wall of the main chamber 118 by means of a vertical solid cylindrical spacer 119 upstanding from the chamber 8 and a horizontal contact disk 120 fixed to the upper end of the spacer. The handle 118, when rotated, causes the rotating rod 116 and the liquid conduit 106 to revolve the liquid receptacle 111 in a horizontal plane.

The filling nozzles 103 are provided with a vertically movable rod 121 extending upward from their lower ends. The lower end of the rod 121 is integral with an engaging member 122 extending horizontally laterally. The vertically movable rod 121 is slidably inserted through a guide tube 123 attached to the top wall of the main chamber 8, further slidably extends through a slide guide plate 124 mounted on the upper side of the top wall of the main chamber 8 immediately above the tube 123 and has its upper end projected upward beyond the plate 124. A rectangular tube 125 is held to the projecting end. The lateral opposite sides of the rectangular tube 125

are in bearing contact with a pair of blocks 126 having the same front-to-rear thickness as the tube 125 and adapted for guiding vertical movement. A projection 127 is integral with each of the front and rear sides of the rectangular tube 125. The tube 125 and the guide blocks 126 on opposite sides thereof are held between a pair of front and rear movable plates 128 which are rectangular and laterally elongated and which are laterally movably placed on the slide guide plate 124, the movable plates 128 being slidable on the front and rear surfaces of the tube 125 and the blocks 126. Each movable plate 128 is formed with a slot 129 having the projection 127 fitted therein. The slot 129 is slanted upwardly rightward as seen in Fig. 13. A threaded member 130 is held between the two movable plates 128 at one side of the chamber 8. A screw rod 132 supported by a bearing 131 on the top wall of the main chamber 8 has its one end screwed in the threaded member 130. A rotary handle 133 is attached to the other end of the screw rod 132.

During the steady-state filling operation, the horizontal portion 108 of the liquid conduit 106 is oriented in the front-to-rear direction so as not to interfere with the blanks C transported on the endless conveyor 1.

When the filling liquid is to be replaced by a different liquid after completion of the filling operation, the liquid receptacle 111 is revolved in the manner already described and positioned immediately below the open lower ends of the filling nozzles 103, whereby the engaging pieces 114 are fitted at the cutouts 115 to the engaging member 112 of the vertically movable rod 121. Thus, the liquid receptacle 111 is positioned in place immediately below the filling nozzles 103 and engaged with the vertically movable rod 121. When the rotary handle 133 is subsequently rotated, the screw rod 132 rotates, moving the movable plates 128 leftward in Fig. 13 along with the threaded member 130 which is screwed on the rod 132. This movement causes the slot portions 129 of the movable plates 128 to push up the projections 127 to thereby lift the movable rod 121 along with the liquid receptacle 111. Consequently the sockets 112 of the receptacle 111 are hermetically joined to the open lower ends of the filling nozzle 103 with the seal members 113 interposed therebetween. The liquid remaining in various portions of the filling device 15 is then discharged. Further when required, the components of the filling device 15 can be cleaned and sterilized by forcing out a cleaning solution or hot steam from the cleaning solution supply pipe 105. The solution or steam used can be discharged in the same manner as the filling liquid. Because the removal of the filling liquid and the cleaning-sterilizing operation can be carried out by moving the handles 118 and 133 with the main chamber 8 sealed off from the outside air, it is unlikely that the main chamber 8 will be contaminated with the outside air by conducting such operation.

The figures used in the claims are only meant to

explain more clearly the intention of the invention and are not supposed to be any restriction concerning the interpretation of the invention.

Claims

1. A packaging machine comprising an endless conveyor (1), a mandrel wheel (4) disposed above the starting end of the path of transport of the conveyor and having a plurality of mandrels (3), a closed main chamber (8) entirely enclosing the conveyor (1) and the mandrel wheel (4), a series of devices (9) arranged on the top wall of the main chamber (8) for filling contents into containers (C) and thereafter closing the containers, the series of devices having portions operative on the containers and extending into the main chamber (8), and a closed subchamber (22) disposed to the rear of the main chamber (8) and communicating therewith, the subchamber (22) having therein a sterilizer (23) and a transfer assembly (24) for transferring containers from a feeding unit (25) to the sterilizer (23) and for transferring sterilized containers from the sterilizer (23) to the mandrel wheel (4), characterized in, that the subchamber (22) comprises at a rear portion thereof an inlet for feeding tubular container blank (C) into the subchamber (22) from the blank-shaping feeding unit (25) by means of the blank transfer assembly, the subchamber (22) further comprising a drying compartment (46) having at a front portion thereof an outlet (45) communicating with the main chamber (8) and a sterilizing compartment (49) communicating at a front portion thereof with the drying compartment (46) through a communication opening (47), and the blank sterilizer (23) comprises a drying conveyor (51) disposed within the drying compartment (46), a sterilizing conveyor (52) disposed within the sterilizing compartment (49), hot air blowing nozzles (53) arranged along the path of transport of the drying conveyor (51) and a blank sterilizing nozzle (54) directed toward the path of transport of the sterilizing conveyor (52), the drying conveyor (51) comprising drive and driven sprockets (55, 56) having axes of rotation spaced apart by a predetermined distance one above the other and extending in the front-to-rear direction, endless chains (57) reeved around the sprockets (55, 56) and a multiplicity of drying blank holders (58) attached to the endless chains (57) at a predetermined spacing, the drying blank holders (58) being adapted to travel through and stop at positions opposed to the blank outlet (45) and to the communication opening (47), the sterilizing conveyor (52) comprising a horizontal rotary shaft (59) extending in the front-to-rear direction and sterilizing blank holders (60) attached to the rotary shaft (59) and arranged around the rotary shaft (59) at a predetermined spacing, the sterilizing blank holders (60) being adapted to travel through and stop at a position opposed to the communication opening (47) and to the blank inlet (48), the drying and sterilizing blank holders (58, 60) being adapted to restrain the tubular blank (C) from upward or downward

movement, but allow the blank to move forward or rearward, the blank transfer assembly (24) comprising a plurality of pawls (79, 80, 81) movable forward and rearward at a predetermined stroke length and respectively engageable with and disengageable from blanks C held by the drying and sterilizing blank holders (58, 60) stopped at the said positions and means on the top wall of the main chamber for making the tubular blanks into containers by closing one end of the blank to form the bottom of the container.

2. A packaging machine as defined in claim 1, wherein nozzles (30) for spraying and sterilizing solution are provided in a required arrangement within the main chamber (8).

3. A packaging machine as defined in claim 1 or 2, wherein the main chamber (8) is provided with a container discharge opening (31) at a front portion thereof, and the subchamber (22) is provided with a blank supply opening (32) at a rear portion thereof, the openings (33 and 34) being provided with openable closures (33 and 34), an air supply duct (36) extending from a clean air supply unit (35) and being connected to the main chamber (8), the air supply duct (36) being provided with a check valve (37) and the main chamber (8) having a sensor (44) for detecting the internal pressure thereof, whereby the clean air supply unit (35) operates in response to an output signal from the sensor (44) when the detected pressure drops below a set level.

4. A packaging machine as defined in any preceding claim, wherein the subchamber (22) further comprises a pressurized compartment (50) enclosing an opening of the sterilizing compartment (49) including the blank inlet (48), an air supply duct (36) being connected to the pressurized compartment (50), an air discharge duct (42) extending into the pressurized compartment (50) and being connected to the sterilizing compartment (49), whereby the pressurized compartment (50) is made to have a higher internal pressure than the sterilizing compartment (49).

5. A packaging machine as defined in any preceding claim, wherein the series of devices on the top wall of the main chamber (8) include a filling machine (15) comprising a filling liquid tank (98) disposed above the main chamber (8), and a filling nozzle (103) communicating with the filling liquid tank (98) at its upper end and extending into the main chamber (8) at its lower end, the filling nozzle (103) being opened at the position immediately above the container transport conveyor (1), a pipe (105) for supplying sterilizing steam and cleaning solution is connected to the filling liquid tank (98), a liquid conduit (106) is disposed below the filling nozzle (103), the liquid conduit (106) comprising a vertical portion (107) rotatably and vertically movably supported by the main chamber (8) at a location a predetermined distance horizontally away from immediately below the filling nozzle (103) in the direction perpendicular to the direction of the container transport conveyor (1) and a horizontal portion (108) integral with the vertical portion (107) and having a

length corresponding to the predetermined distance, the vertical portion (107) having a lower end extending through the bottom wall of the main chamber (8) outward, the horizontal portion (108) being provided at its forward end with a liquid receptacle (111) having an upwardly open nozzle socket (112).

6. A packaging machine as defined in claim 5, wherein the vertical portion (107) of the liquid conduit (106) is provided at its upper end with a rotating rod (116) in alignment with the vertical portion (107), the rotating rod (116) having an upper end extending through and projecting upward beyond the top wall of the main chamber (8), the filling nozzle (103) being provided with a vertically movable rod (121) extending upward from its lower end and inserted through the top wall of the main chamber (8), the vertically movable rod (121) having a horizontally projecting engaging member (122) at its lower end, the liquid receptacle (111) having an U-shaped fitting portion (115) engageable with the engaging member (122) when the liquid receptacle (111) is brought to a position immediately below the filling nozzle (103).

7. A packaging machine as defined in any preceding claim, wherein the horizontal rotary shaft (59) of the sterilizing conveyor (52) is rotatably supported on the partition wall between the drying compartment (46) and the sterilizing compartment (49), the rotary shaft (59) having its front end projecting into the drying compartment (46) to which end drive sprockets are fixed, the drive sprockets (69) being in mesh with the endless chains.

8. A packaging machine as defined in any preceding claim, wherein pawls (79, 80, 81) are respectively fixed to at least two rods, each extending in the front-to-rear direction, the rods (77, 78) being rotatably supported on the carriage (74) which is movable forwardly and rearwardly, a means being provided for rotating the rods (77, 78) normally or reversely, so that the pawls (79, 80, 81) engage with the rear ends of the blanks (C) held by the drying blank holder (58) and the sterilizing blank holder (60) only when the carriage (74) moves forward.

9. A packaging machine as defined in claim 5 or any of the claims 6—8 as far as depending on claim 5, wherein an annular seal member (113) of elastic material is attached to the inner periphery of each socket (112).

10. A packaging machine as defined in claim 6 or any of the claims 7—9 as far as depending on claim 6, wherein an operation handle (118) is attached to the upper projecting end of the rotary rod (116) and a means for lifting the rod (121) is provided, the lifting means comprising a rectangular tube (125) fixedly fitted on the upper projecting end of the rod (121) and provided with two projections (127) extending forwardly and rearwardly, two movable plates (128) having a slanted slot (129) with the projection (127) fitted therein and movably supported on the top wall of the main chamber (8) in the right-to-left direction,

a threaded member (130) being held at one end of the movable plate (128), a screw rod (132) having its one end screwed in the threaded member (130) and supported by a bearing (131) on the top wall of the main chamber (8), and a rotary handle (133) attached to the other end of the screw rod (132).

Patentansprüche

1. Verpackungsmaschine mit einem Endlosförderer (1), einem über dem Beginn der Transportstrecke des Förderers angeordneten und mehrere Dorne (3) aufweisenden Dornrad (4), einer geschlossenen Hauptkammer (8), die den Förderer (1) und das Dornrad (4) vollständig umschließt, einer Reihe von auf der Decke der Hauptkammer (8) angeordneten Vorrichtungen (9) zum Einfüllen von Inhalten in Behälter (C) und anschließenden Schließen der Behälter, wobei die Reihe von Vorrichtungen Teile aufweist, die auf die Behälter einwirken und sich in die Hauptkammer (8) erstrecken, und mit einer geschlossenen Unterkammer (22), die an der Rückseite der Hauptkammer (8) angeordnet ist und mit dieser in Verbindung steht, wobei in der Unterkammer (22) ein Sterilisator (23) und eine Transferanordnung (24) zum Transportieren von Behältern von einer Zuführeinheit (25) zu dem Sterilisator (23) und zum Transportieren von sterilisierten Behältern von dem Sterilisator (23) zu dem Dornrad (4) vorgesehen sind, dadurch gekennzeichnet, daß die Unterkammer (22) an einem hinteren Abschnitt einen Einlaß zum Zuführen rohrförmiger Behälterrohlinge (C) von der Rohlingsform- und -zuführeinheit mittels der Rohlingstransferanordnung in die Unterkammer aufweist, wobei die Unterkammer (22) ferner ein Trockenabteil (46) aufweist, das an einem vorderen Abschnitt einen mit der Hauptkammer (8) in Verbindung stehenden Auslaß aufweist, und ein Sterilisierabteil (49), das an einem vorderen Abschnitt über eine Verbindungsöffnung (17) mit dem Trockenabteil (46) in Verbindung steht, und daß der Rohlingssterilisator (23) einen innerhalb des Trockenabteils (46) angeordneten Trockenförderer (51), einen innerhalb des Sterilisierabteils (49) angeordneten Sterilisierförderer (52), entlang der Transportstrecke des Trockenförderers (51) angeordnete Heißluftblasdüsen (53) und eine auf die Transportstrecke des Sterilisierförderers (52) gerichtete Rohlingssterilisierdüse (54) aufweist, wobei der Trockenförderer (51) Antriebs- und angetriebene Zahntrummeln (55, 56) aufweist, deren Rotationsachsen um einen bestimmten Abstand übereinander voneinander beabstandet sind und sich von vorn nach hinten erstrecken, wobei Endlosketten (57) über die Zahntrummeln (55, 56) geführt sind und mehrere Trockenrohlingshalter (58) mit einem bestimmten Abstand an den Endlosketten (57) befestigt sind, wobei die Trockenrohlingshalter (58) sich fortbewegen und an dem Rohlingsauslaß (45) und der Verbindungsöffnung (57) gegenüberliegenden Positionen anhalten, wobei der Sterilisierförderer (52) eine sich von vorn nach hinten erstreckende

horizontale Drehwelle und Sterilisier-Rohlingshalter (60) aufweist, die an der Drehwelle (59) befestigt sind und in einem bestimmten Abstand um die Drehwelle (59) angeordnet sind, wobei die Sterilisier-Rohlingshalter (60) sich fortbewegen und an einer Verbindungsöffnung (47) und dem Rohlingseinlaß (48) gegenüberliegenden Position anhalten, wobei die Trocken- und Sterilisier-Rohlingshalter (58, 60) die Aufwärts- und Abwärtsbewegung des rohrförmigen Rohlings (C) beschränken, aber eine Vorwärts- und Rückwärtsbewegung des Rohlings zulassen, wobei die Rohlingstransferanordnung (24) mehrere Klinken (79, 80, 81) aufweist, die um eine bestimmte Hublänge nach vorwärts und rückwärts beweglich sind und mit Rohlingen (C) in Eingriff bringbar bzw. außer Eingriff bringbar sind, die von den an den genannten Positionen angehaltenen Trocken und Sterilisier-Rohlingshaltern (58, 60) gehalten werden, und Einrichtungen auf der Decke der Hauptkammer, die aus den rohrförmigen Rohlingen durch Schließen eines Endes des Rohlings zur Ausbildung des Behälterbodens Behälter herstellen.

2. Verpackungsmaschine nach Anspruch 1, wobei Düsen (30) für Sprüh- und Sterilisierlösung in einer bestimmten Anordnung innerhalb der Hauptkammer (8) vorgesehen sind.

3. Verpackungsmaschine nach Anspruch 1 oder 2, wobei die Hauptkammer (8) an einem Vorderwandabschnitt einer Behälterabgabeöffnung (31) und die Unterkammer (22) an einem hinteren Abschnitt eine Rohlingszuführöffnung (32) aufweisen, wobei die Öffnungen (31 und 32) bewegliche Verschlüsse (33 und 34) aufweisen und wobei eine Luftzuführleitung (36) sich von einer Reinluftzuführeinheit (35) erstreckt und mit der Hauptkammer (8) verbunden ist, wobei die Luftzuführleitung (36) mit einem Absperrventil (37) versehen ist und die Hauptkammer (8) einen Sensor (44) zum Ermitteln des Innendrucks aufweist, wobei die Reinluftzuführeinheit (35) in Abhängigkeit von einem Ausgangssignal von dem Sensor (44) betätigt wird, wenn der ermittelte Druck unter ein eingestelltes Niveau abfällt.

4. Verpackungsmaschine nach einem der Ansprüche 1 bis 3, wobei die Unterkammer (22) ferner ein Druckabteil (50) aufweist, das eine Öffnung des Sterilisierabteils (49) einschließt, wobei eine Luftzuführleitung (36) mit dem Druckabteil (50) verbunden ist und eine Luftablaßleitung (42) sich in das Druckabteil (50) erstreckt und mit dem Sterilisierabteil (49) verbunden ist, wodurch das Druckabteil (50) einen höheren Innendruck als das Sterilisierabteil (49) aufweist.

5. Verpackungsmaschine nach einem der Ansprüche 1 bis 4, wobei die Reihe von Vorrichtungen auf der Decke der Hauptkammer (8) eine Füllmaschine (15) mit einem oberhalb der Hauptkammer (8) angeordneten Füllflüssigkeitstank (98) und mit einer an ihrem oberen Ende mit dem Füllflüssigkeitstank (98) in Verbindung stehenden und an ihrem unteren Ende sich in die Hauptkammer (8) erstreckenden Fülldüse (103) umfaßt, wobei die Fülldüse (103) an der Position unmittel-

bar oberhalb des Behältertransportförderers (1) geöffnet ist, wobei ein Rohr (105) zum Zuführen von Sterilisierdampf und Reinigungslösung mit dem Füllflüssigkeitstank (98) verbunden ist, wobei eine Flüssigkeitsleitung (106) unterhalb der Fülldüse (103) angeordnet ist, wobei die Flüssigkeitsleitung (106) einen vertikalen Abschnitt (107) aufweist, der von der Hauptkammer (8) drehbar und vertikal beweglich an einer Stelle gehalten wird, die um einen bestimmten Abstand horizontal von einer Stelle unmittelbar unterhalb der Fülldüse (103) in der zur Richtung des Behältertransportförderers (1) senkrechten Richtung entfernt ist, und einen horizontalen Abschnitt (108), der mit dem vertikalen Abschnitt (107) einstückig ist und dessen Länge dem bestimmten Abstand entspricht, wobei der vertikale Abschnitt (107) ein unteres Ende aufweist, das sich durch den Boden der Hauptkammer (8) nach außen erstreckt, und am vorderen Ende des horizontalen Abschnitts (108) ein Flüssigkeitsgefäß (111) mit einer nach oben offenen Düsenhülse (112) vorgesehen ist.

6. Verpackungsmaschine nach Anspruch 5, wobei der vertikale Abschnitt (107) der Flüssigkeitsleitung (106) an seinem oberen Ende einem mit dem vertikalen Abschnitt (107) ausgerichteten Drehstab (116) aufweist, wobei sich das obere Ende des Drehstabs (116) durch und nach oben über die Decke der Hauptkammer hinaus erstreckt, wobei die Fülldüse (103) einen vertikal beweglichen Stab (21) aufweist, der sich von seinem unteren Ende nach oben erstreckt, und in die Decke der Hauptkammer (8) eingeführt ist, wobei der vertikal bewegliche Stab (121) an seinem unteren Ende ein horizontal vorspringendes Eingriffsteil (122) aufweist und wobei das Flüssigkeitsgefäß (111) ein U-förmiges Paßteil (115) aufweist, das mit dem Eingriffsteil (122) in Eingriff bringbar ist, wenn das Flüssigkeitsgefäß (111) in eine Position unmittelbar unterhalb der Fülldüse (103) gebracht wird.

7. Verpackungsmaschine nach einem der Ansprüche 1 bis 6, wobei die horizontale Drehwelle (59) des Sterilisierförderers (52) drehbar auf der Trennwand zwischen dem Trockenabteil (46) und dem Sterilisierabteil (49) gelagert ist, wobei das vordere Ende der Drehwelle in das Trockenabteil (46) hineinragt und an diesem Ende Antriebszähne befestigt sind, wobei die Antriebszähne (69) und die Endlosketten ineinandergreifen.

8. Verpackungsmaschine nach einem der Ansprüche 1 bis 7, wobei Klinken (79, 80, 81) jeweils an mindestens zwei Stäben befestigt sind, die sich jeweils von vorn nach hinten erstrecken, wobei die Stäbe (77, 78) drehbar auf dem vorwärts und rückwärts beweglichen Schlitten (74) gelagert sind und eine Einrichtung zum Drehen der Stäbe (77, 78) in Normal- oder Rückwärtsrichtung vorgesehen ist, so daß die Klinken (79, 80, 81) nur dann mit den hinteren Enden der von dem Trockenrohlingshalter (58) und dem Sterilisier-Rohlingshalter (60) gehaltenen Rohlinge (C) in Eingriff kommen, wenn sich der Schlitten nach vorn bewegt.

9. Verpackungsmaschine nach Anspruch 5 oder

nach einem der Ansprüche 6 bis 8, soweit sie von Anspruch 5 abhängen, wobei eine ringförmige Dichtung (113) aus elastischem Material am inneren Umfang jeder Hülse (112) befestigt ist.

10. Verpackungsmaschine nach Anspruch 6 oder nach einem der Ansprüche 7 bis 9, soweit sie von Anspruch 6 abhängen, wobei ein Betätigungsgriff (118) am oberen vorspringenden Ende des Drehstabs (116) befestigt ist und eine Einrichtung zum Anheben des Stabs (121) vorgesehen ist, wobei die Hubeinrichtung ein rechteckiges Rohr (125) aufweist, das fest auf das obere vorspringende Ende des Stabs (121) gepaßt ist und zwei sich nach vorn und hinten erstreckende Vorsprünge (127) aufweist, wobei zwei bewegliche Platten (128) mit einem schrägen Schlitz (129), in den der Vorsprung (127) eingepaßt ist, in Rechts-Links-Richtung beweglich auf der Decke der Hauptkammer (8) gelagert sind, wobei ein Gewindeteil (130) an einem Ende der beweglichen Platte (128) gehalten wird, wobei eine Schraubenspindel (132) mit einem Ende in das Gewindeteil (130) eingeschraubt ist und von einem Lager (131) auf der Decke der Hauptkammer (8) gehalten wird, und wobei ein Drehgriff (133) am anderen Ende der Schraubenspindel (132) befestigt ist.

Revendications

1. Machine d'emballage comprenant un convoyeur sans fin (1); une roue (4) à mandrins, disposée au-dessus de l'extrémité de départ du trajet de transport du convoyeur et munie de multiples mandrins (3); un compartiment principal fermé (8), renfermant entièrement le convoyeur (1) et la roue (4) à mandrins; une série de dispositifs (9) installés sur la paroi supérieure du compartiment principal (8) pour déverser des contenus dans des conteneurs (C), et pour fermer ensuite ces conteneurs, la série de dispositifs présentant des parties agissant sur les conteneurs et s'engageant dans le compartiment principal (8); et un compartiment secondaire fermé (22) situé à l'arrière du compartiment principal (8) et communiquant avec ce dernier, le compartiment secondaire (22) renfermant un stérilisateur (23) et un dispositif de transfert (24) pour transférer, au stérilisateur (23), des conteneurs provenant d'un mécanisme de délivrance (25) et pour transférer, à la roue (4) à mandrins, des conteneurs stérilisés provenant du stérilisateur (23), caractérisée par le fait que le compartiment secondaire (22) comporte, dans une région postérieure, une entrée pour introduire dans ce compartiment secondaire (22) des ébauches tubulaires de conteneurs (C) provenant du mécanisme (25) de mise en forme et de délivrance d'ébauches, au moyen du dispositif de transfert des ébauches; le compartiment secondaire (22) comprenant par ailleurs une chambre de séchage (46) qui présente, dans une région frontale, une sortie (45) communiquant avec le compartiment principal (8), et une chambre de stérilisation (49) communiquant par une région frontale avec la chambre de séchage (46),

par l'intermédiaire d'une ouverture de communication (47); et le stérilisateur (23) d'ébauches comprend un convoyeur de séchage (51) logé à l'intérieur de la chambre de séchage (46), un convoyeur de stérilisation (52) logé à l'intérieur de la chambre de stérilisation (49), des buses (53) d'insufflation d'air chaud, agencées le long du trajet de transport du convoyeur de séchage (51), et une buse (54) de stérilisation des ébauches, dirigée vers le trajet de transport du convoyeur de stérilisation (52); le convoyeur de séchage (51) comprenant des pignons menants et menés (55, 56) qui présentent des axes de rotation espacés d'une distance prédéterminée les uns au-dessus des autres, et qui s'étendent de l'avant vers l'arrière, des chaînes sans fin (57) passant autour des pignons (55, 56), et de multiples supports (58) de séchage des ébauches fixés aux chaînes sans fin (57) avec un espacement prédéterminé, les supports (58) de séchage des ébauches étant destinés à défiler et à s'immobiliser en des emplacements opposés à la sortie (45) des ébauches et à l'ouverture de communication (47); le convoyeur de stérilisation (52) comprenant un arbre horizontal rotatif (59) qui s'étend de l'avant vers l'arrière, et des supports (60) de stérilisation d'ébauches fixés à l'arbre rotatif (59) et agencés autour de cet arbre rotatif (59) avec un espacement prédéterminé, les supports (60) de stérilisation des ébauches étant conçus pour défiler et s'immobiliser en un emplacement opposé à l'ouverture de communication (47) et à l'entrée (48) des ébauches, les supports (58, 60) de séchage et de stérilisation des ébauches étant destinés à interdire un mouvement ascendant ou descendant de l'ébauche tubulaire (C), mais à autoriser un mouvement de cette ébauche vers l'avant ou vers l'arrière; le dispositif (24) de transfert des ébauches comprenant de multiples cliquets (79, 80, 81) qui sont mobiles vers l'avant et vers l'arrière d'une longueur de course prédéterminée et qui peuvent être respectivement mis en prise et hors prise avec des ébauches C retenues par les supports (58, 60) de séchage et de stérilisation d'ébauches immobilisés aux emplacements précités, et des moyens installés sur la paroi supérieure du compartiment principal pour transformer les ébauches tubulaires en des conteneurs, en fermant l'une des extrémités de l'ébauche pour former le fond du conteneur.

2. Machine d'emballage selon la revendication 1, dans laquelle des buses (30) pour pulvériser et stériliser une solution sont prévues, en un agencement nécessaire, à l'intérieur du compartiment principal (8).

3. Machine d'emballage selon la revendication 1 ou 2, dans laquelle le compartiment principal (8) est doté d'un orifice (31) d'évacuation des conteneurs dans une région frontale et le compartiment secondaire (22) est pourvu d'un orifice (32) d'amenée des ébauches dans une région postérieure, les orifices (33 et 34) étant munis d'obturations (33 et 34) pouvant être ouvertes; un conduit (36) d'alimentation en air, s'étendant à partir d'un groupe (35) d'alimentation en air épuré et rac-

cordé au compartiment principal (8), le conduit (36) d'alimentation en air étant muni d'un clapet antiretour (37) et le compartiment principal (8) présentant un détecteur (44) pour détecter la pression interne qui y règne, de sorte que le groupe (35) d'alimentation en air épuré fonctionne en réaction à un signal de sortie provenant du détecteur (44), lorsque la pression détectée chute en deçà d'un niveau de consigne.

4. Machine d'emballage selon l'une quelconque des revendications précédentes, dans laquelle le compartiment secondaire (22) présente par ailleurs une chambre pressurisée (50) qui entoure une ouverture de la chambre de stérilisation (49) matérialisée par l'entrée (48) des ébauches, un conduit (36) d'alimentation en air étant raccordé à la chambre pressurisée (50), un conduit (42) de sortie d'air pénétrant dans la chambre pressurisée (50) et étant raccordé à la chambre de stérilisation (49), la chambre pressurisée (50) étant conçue pour qu'il y règne une plus forte pression interne que dans la chambre de stérilisation (49).

5. Machine d'emballage selon l'une quelconque des revendications précédentes, dans laquelle la série de dispositifs installés sur la paroi supérieure du compartiment principal (8) englobe une machine d'emplissage (15) comprenant un réservoir (98) à liquide d'emplissage qui est disposé audessus du compartiment principal (8), et une buse d'emplissage (103) qui communique par son extrémité supérieure avec le réservoir (98) à liquide d'emplissage et qui pénètre par son extrémité inférieure dans le compartiment principal (8), la buse d'emplissage (103) étant ouverte dans la zone directement sus-jacente au convoyeur (1) de transport des conteneurs; un conduit (105) pour délivrer de la vapeur stérilisante et une solution nettoyante est raccordé au réservoir (98) à liquide d'emplissage; un conduit (106) à liquide se trouve au-dessous de la buse d'emplissage (103), ce conduit (106) à liquide comprenant un tronçon vertical (107) qui est supporté avec faculté de rotation et de mouvement vertical par le compartiment principal (8), dans une zone située horizontalement à une distance prédéterminée à l'écart de la zone immédiatement sous-jacente à la buse d'emplissage (103), dans la direction perpendiculaire à la direction du convoyeur (1) de transport des conteneurs, ainsi qu'un tronçon horizontal (108) qui fait corps avec le tronçon vertical (107) et possède une longueur correspondant à la distance prédéterminée, une extrémité inférieure du tronçon vertical (107) s'étendant vers l'extérieur, à travers la paroi de fond du compartiment principal (8), le tronçon horizontal (108) étant muni, à son extrémité avant, d'un réceptacle (111) à liquide équipé d'une douille (112) à buse ouverte vers le haut.

6. Machine d'emballage selon la revendication 5, dans laquelle le tronçon vertical (107) du conduit (106) à liquide est doté, à son extrémité supérieure, d'une tige rotative (116) alignée avec le tronçon vertical (107), une extrémité supérieure de cette tige rotative (116) traversant la paroi supérieure du compartiment principal (8), au-delà

de laquelle elle fait saillie vers le haut; la buse d'emplissage (103) étant dotée d'une tige (121) mobile verticalement, qui s'étend vers le haut à partir de son extrémité inférieure et est engagée à travers la paroi supérieure du compartiment principal (8), la tige (121) mobile verticalement présentant, à son extrémité inférieure, un organe (122) de venue en prise qui fait saillie horizontalement; le réceptacle (111) à liquide présentant une zone d'ajustement (115) configurée en U, qui peut coopérer avec l'organe (122) de venue en prise lorsque le réceptacle (111) à liquide est amené à un emplacement directement sous-jacent à la buse d'emplissage (103).

7. Machine d'emballage selon l'une quelconque des revendications précédentes, dans laquelle l'arbre horizontal rotatif (59) du convoyeur de stérilisation (52) est supporté à rotation par la cloison séparant la chambre de séchage (46) et la chambre de stérilisation (49), l'extrémité antérieure de l'arbre rotatif (59) s'engageant dans la chambre de séchage (46), extrémité sur laquelle sont calés rigidement des pignons d'entraînement, ces pignons d'entraînement (69) étant en prise avec les chaînes sans fin.

8. Machine d'emballage selon l'une quelconque des revendications précédentes, dans laquelle des cliquets (79, 80, 81) sont respectivement fixés à au moins deux tiges dont chacune s'étend de l'avant vers l'arrière, ces tiges (77, 78) étant supportées à rotation sur le chariot (74) mobile vers l'avant et vers l'arrière; un moyen étant prévu pour faire tourner les tiges (77, 78), normalement ou dans le sens inverse, de telle sorte que les cliquets (79, 80, 81) viennent en prise, avec les extrémités postérieures des ébauches (C) retenues par le support (58) de séchage des ébauches et le support (60) de stérilisation des ébauches, seulement lorsque le chariot (74) se déplace vers l'avant.

9. Machine d'emballage selon la revendication 5 ou l'une quelconque des revendications 6—8 dans la mesure où elles dépendent de la revendication 5, dans laquelle une garniture annulaire d'étanchement (113) en un matériau élastique est fixée à la périphérie interne de chaque douille (112).

10. Machine d'emballage selon la revendication 6 ou l'une quelconque des revendications 7—9 dans la mesure où elles dépendent de la revendication 6, dans laquelle une poignée de manoeuvre (118) est fixée à l'extrémité supérieure saillante de la tige rotative (116) et un moyen est prévu pour soulever la tige (121), ce moyen de levage comprenant un tube rectangulaire (125) qui est calé rigidement sur l'extrémité supérieure saillante de la tige (121) et est muni de deux protubérances (127) s'étendant vers l'avant et vers l'arrière; deux flasques mobiles (128) qui présentent une boutonnière inclinée (129) dans laquelle la protubérance (127) s'ajuste, et qui sont supportés, avec faculté de mouvement de la droite vers la gauche, par la paroi supérieure du compartiment principal (8); un élément taraudé (130), retenu à l'une des extrémités du flasque

mobile (128); une broche filetée (132); dont l'une des extrémités est vissée dans l'élément taraudé (130) et qui est supportée par un palier (131) sur la

paroi supérieure du compartiment principal (8); et un volant (133), calé rigidement sur l'autre extrémité de la broche filetée (132).

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FIG.1

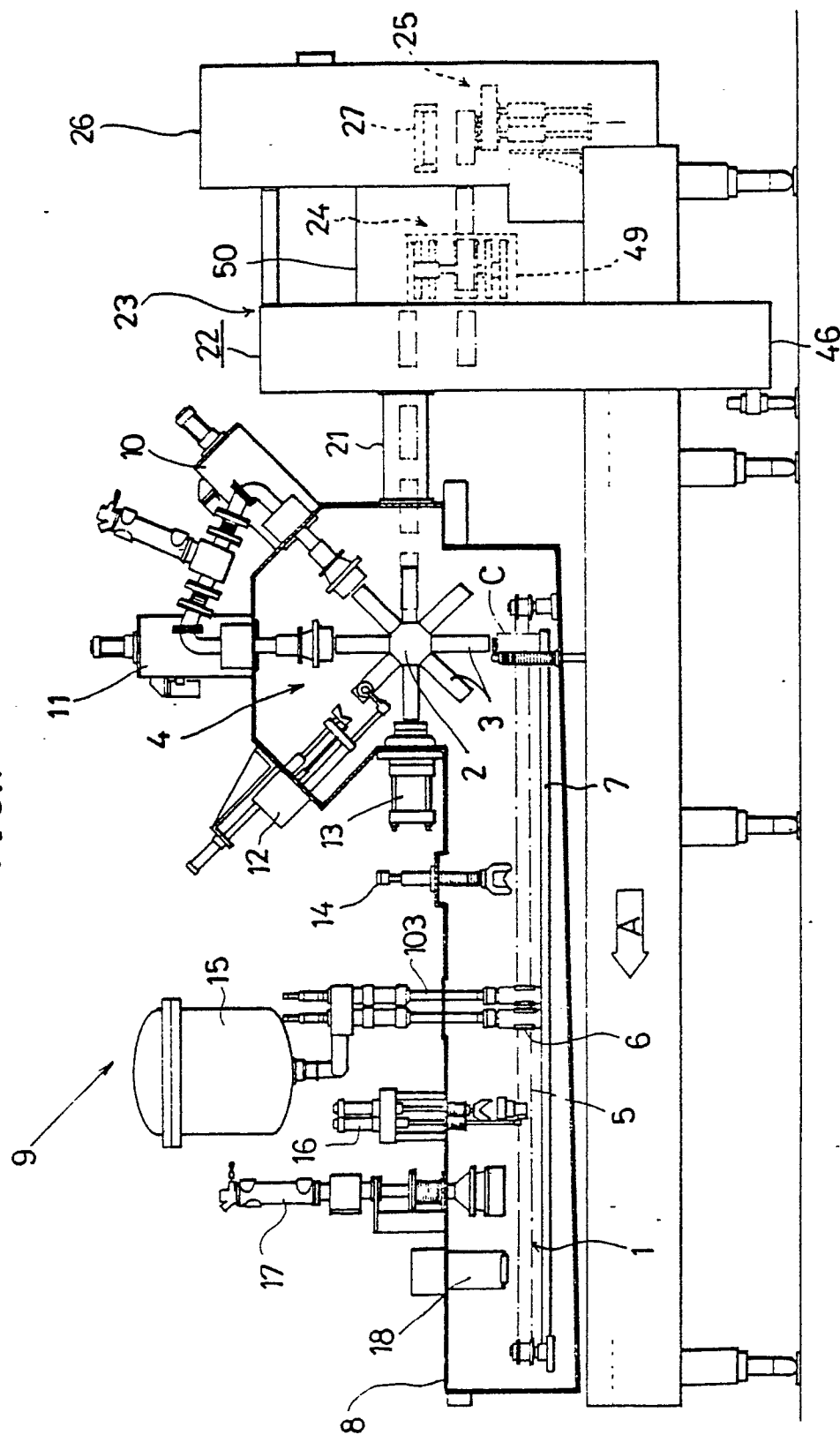


FIG.2

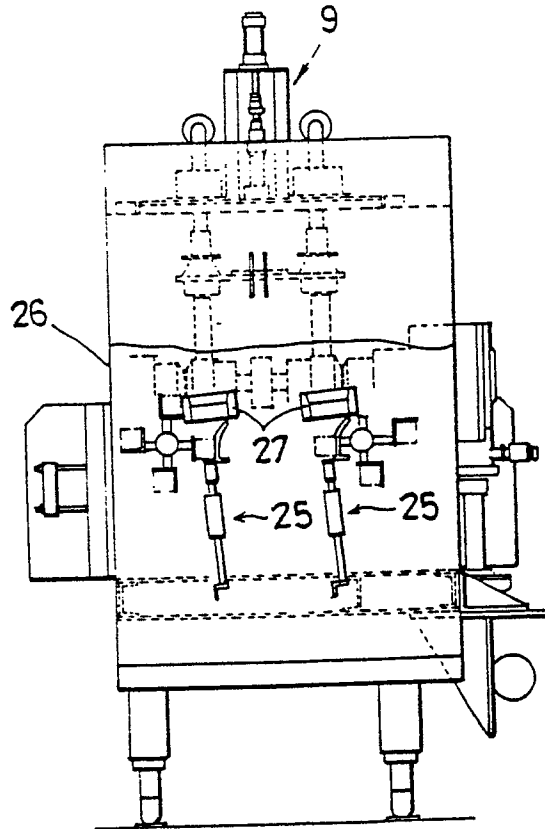


FIG.3

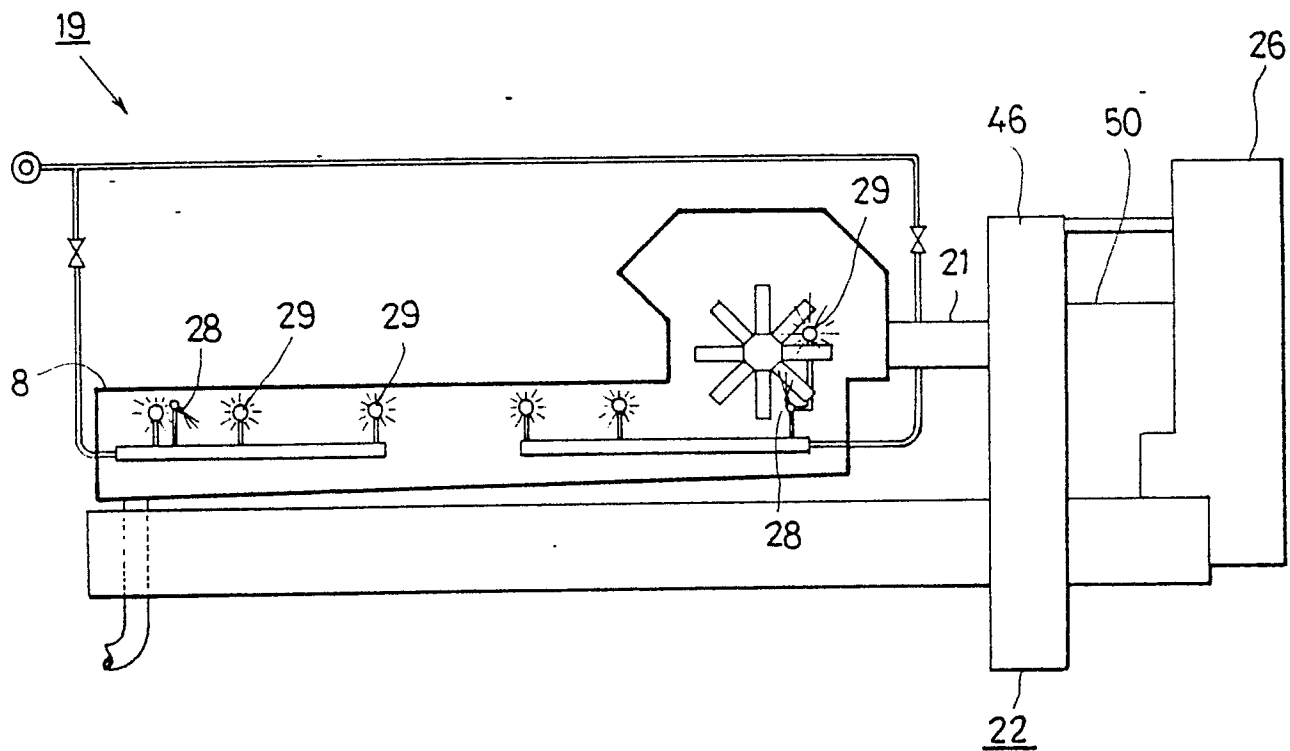


FIG.4

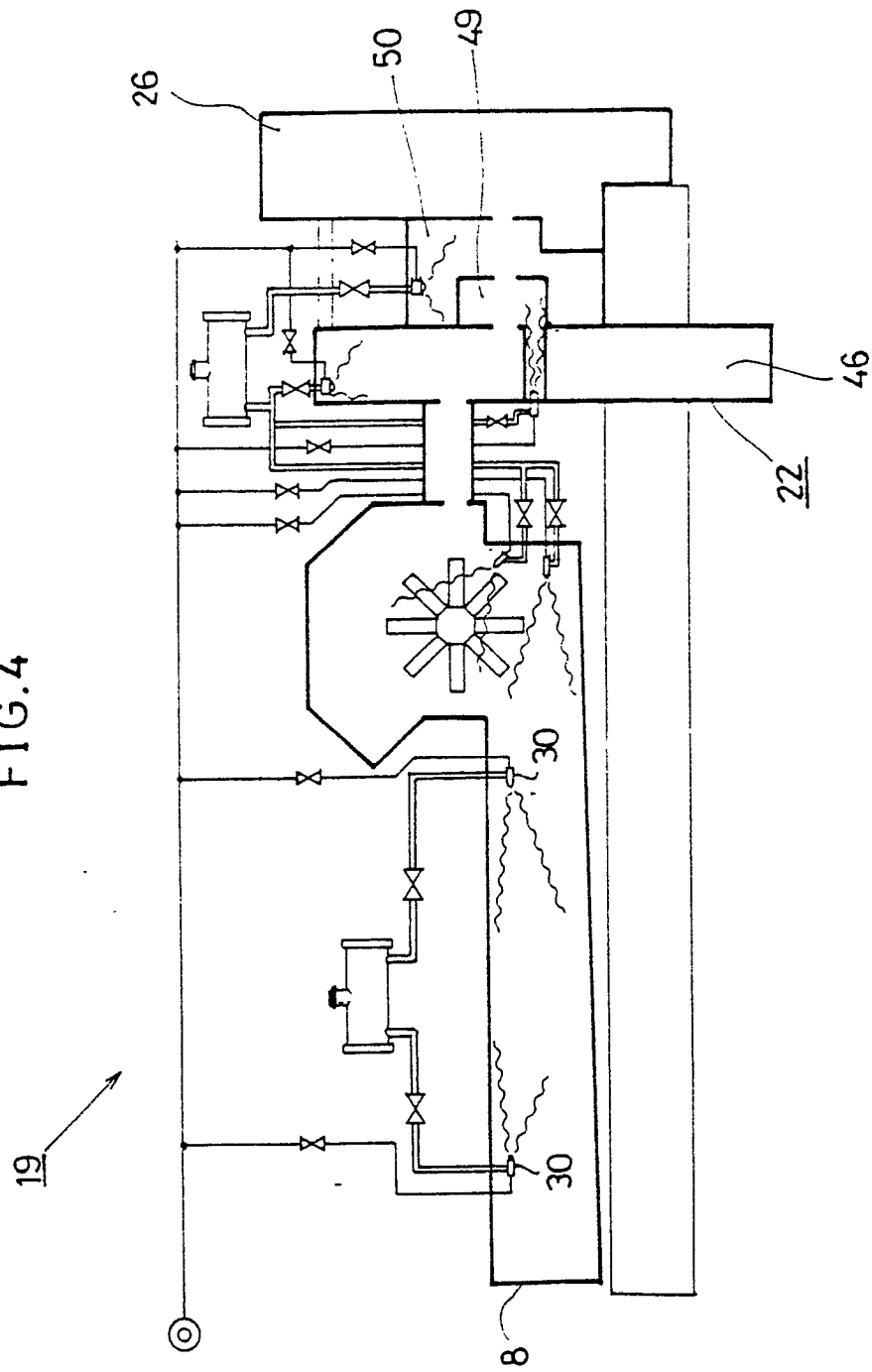


FIG.5

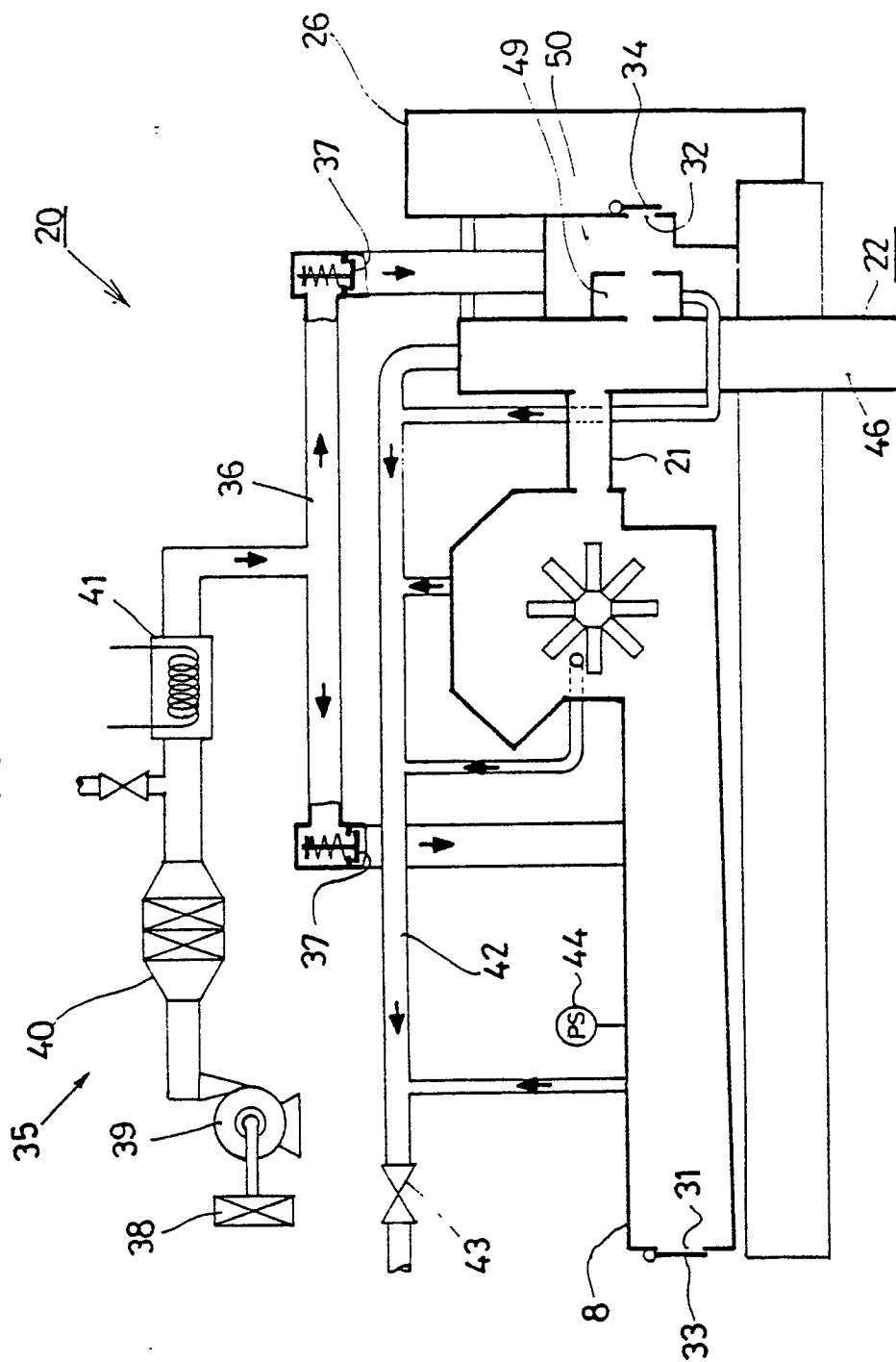


FIG.6

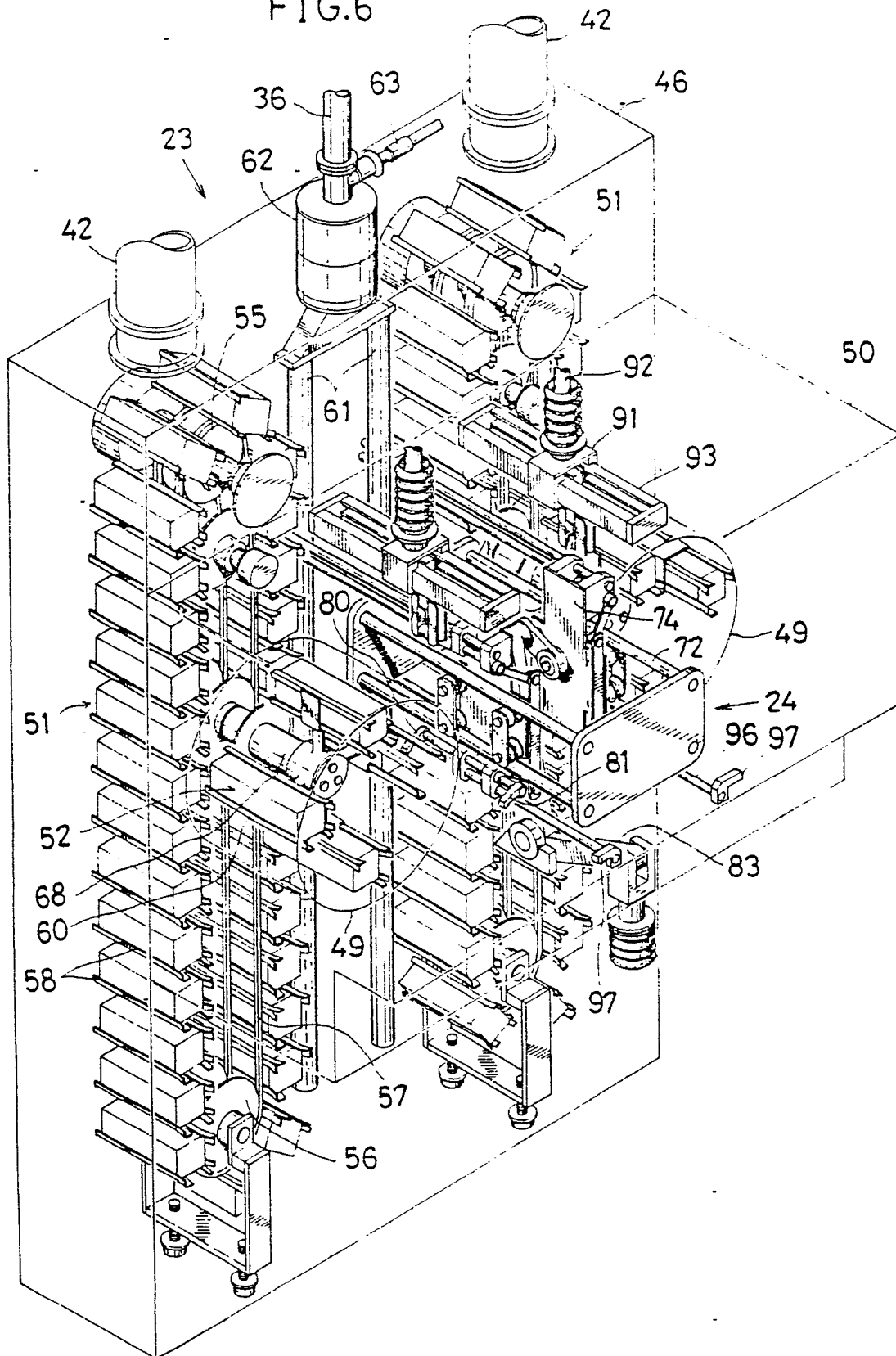


FIG.7

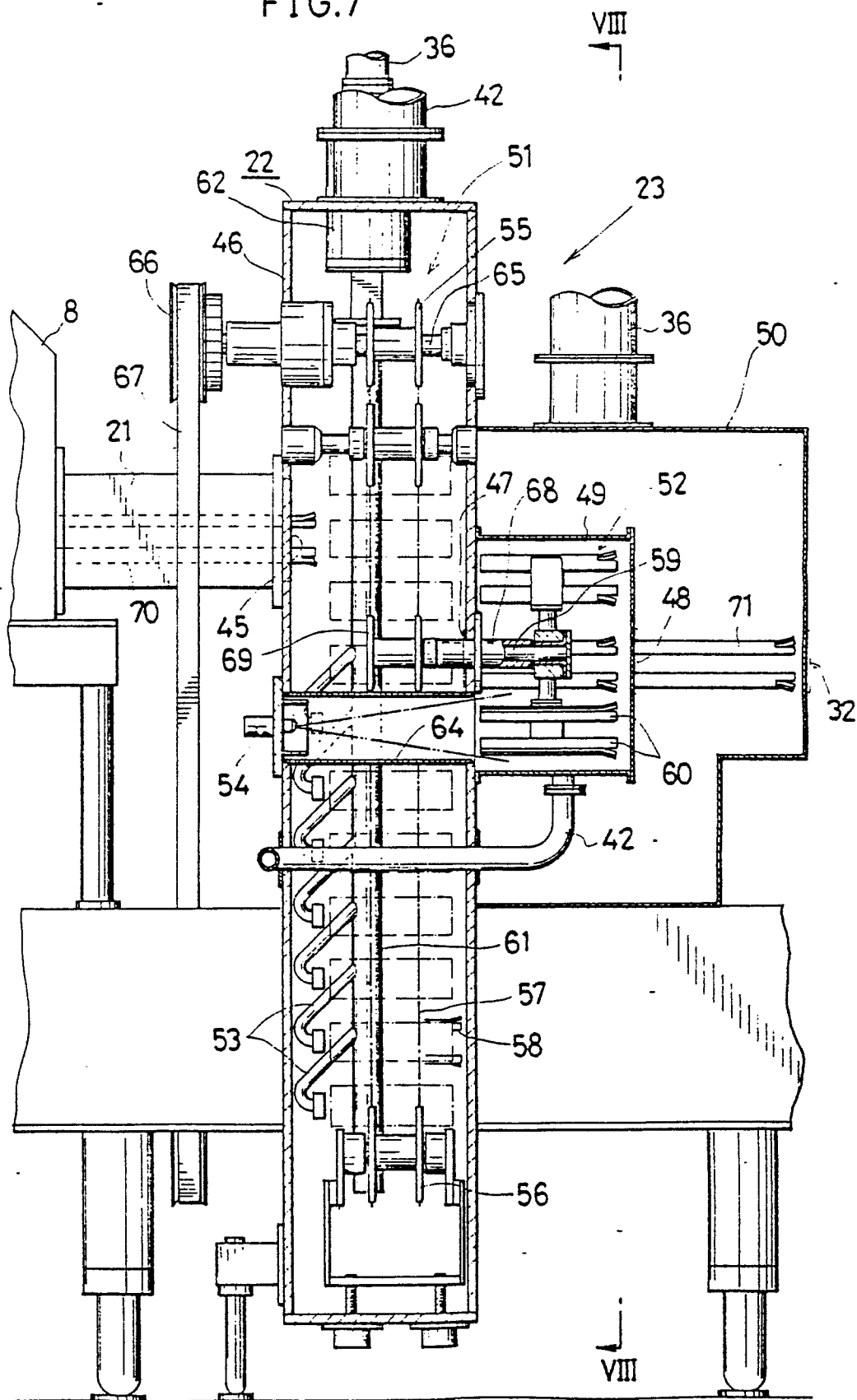
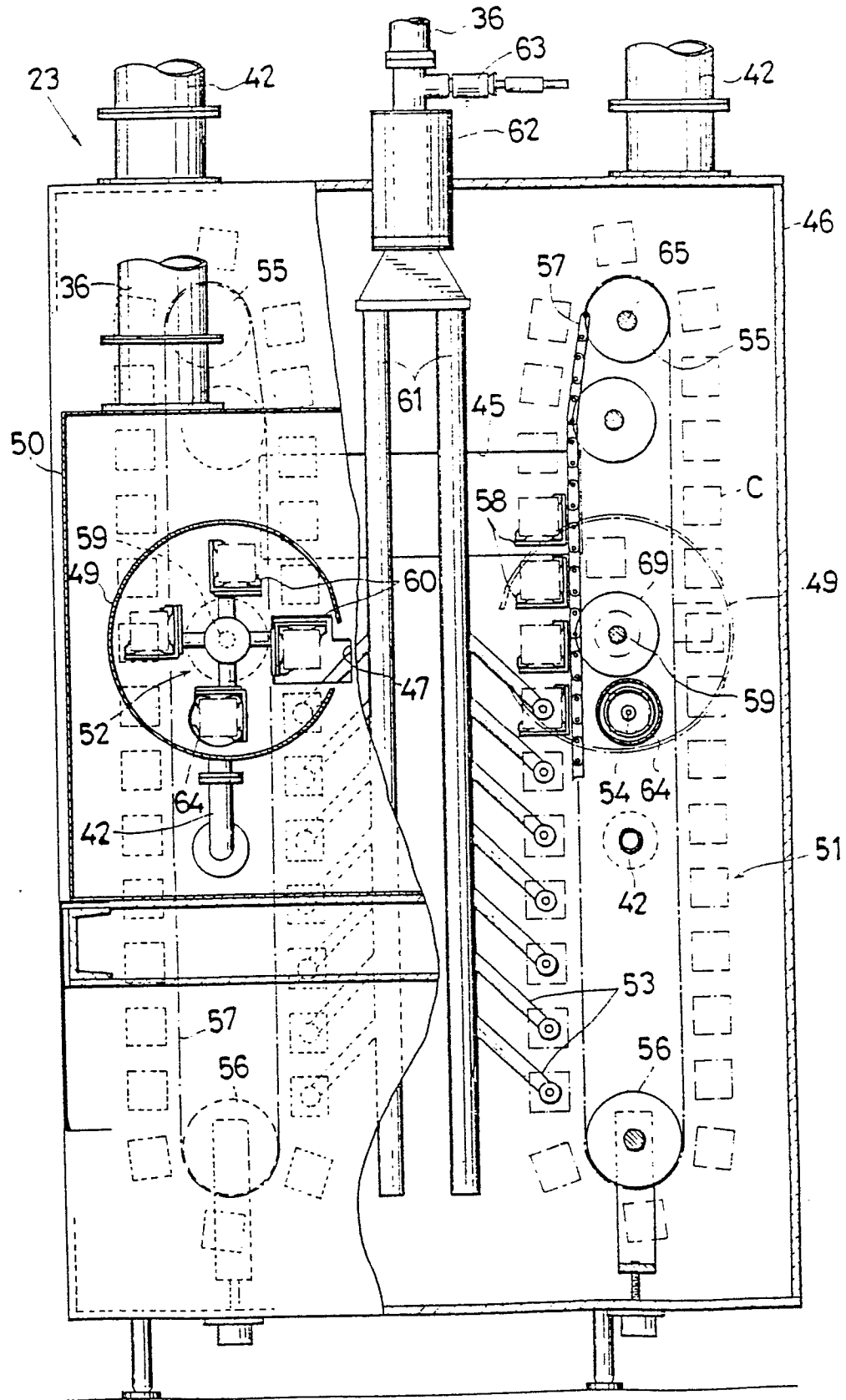


FIG.8



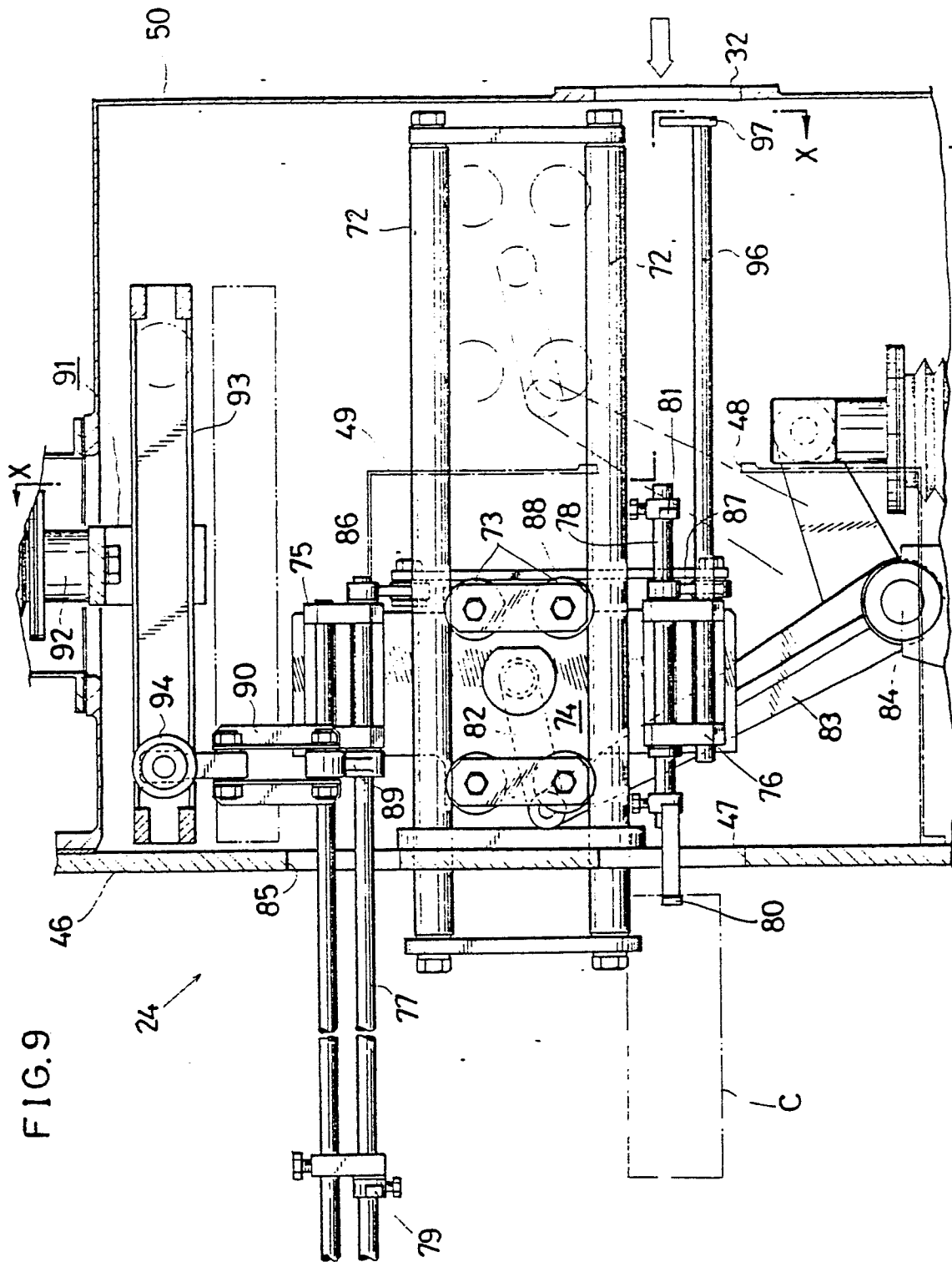


FIG.10

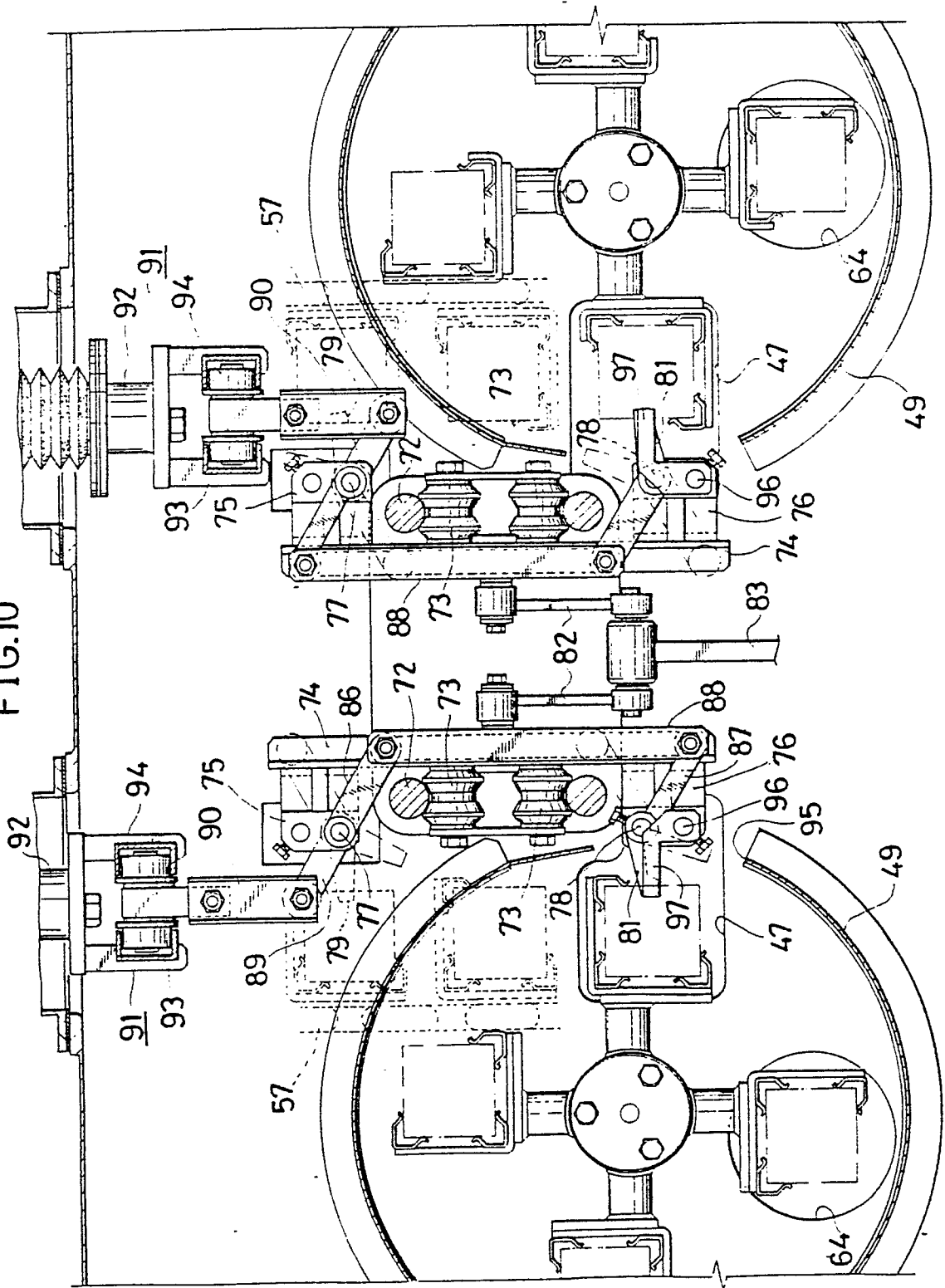


FIG.11

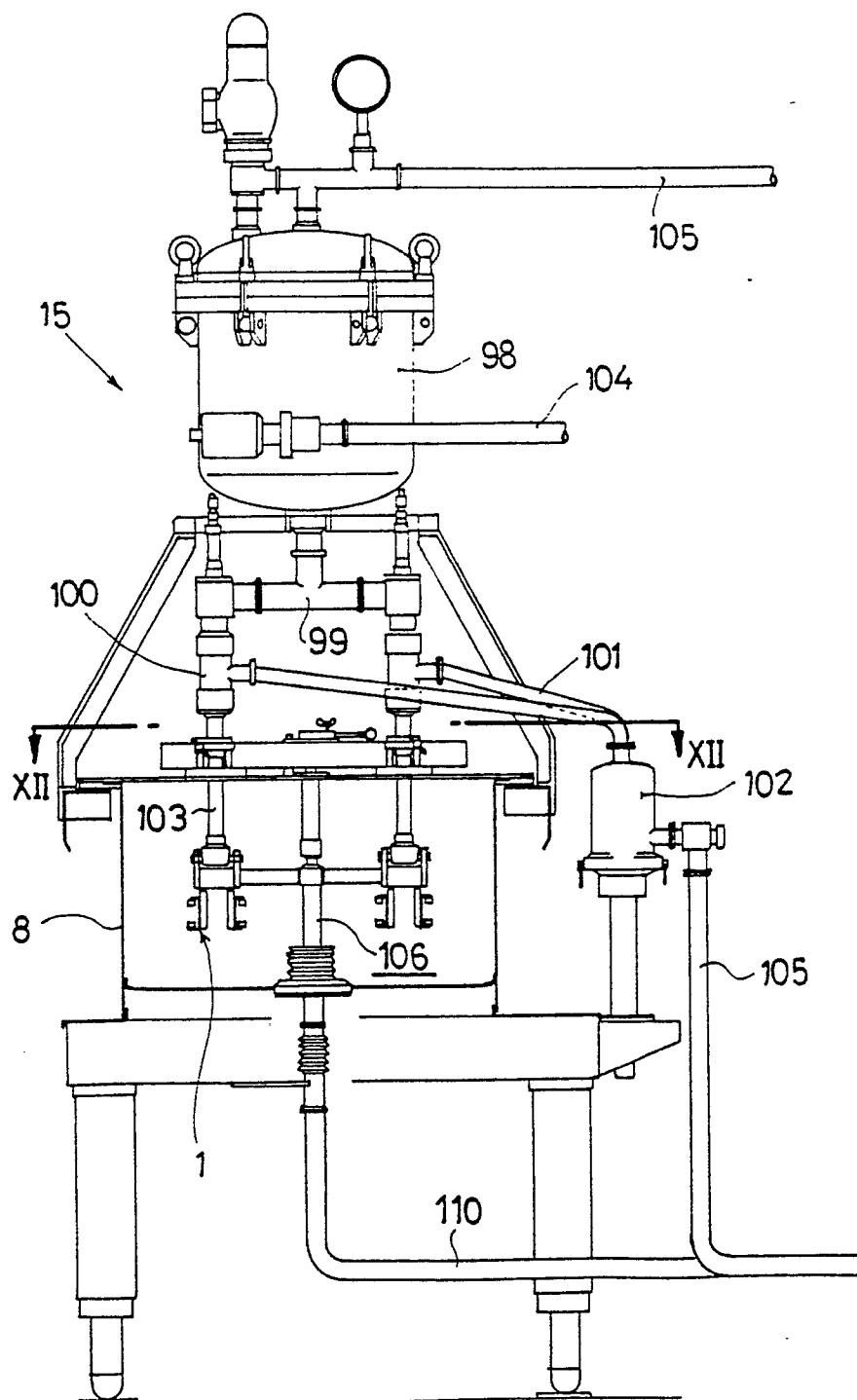


FIG.12

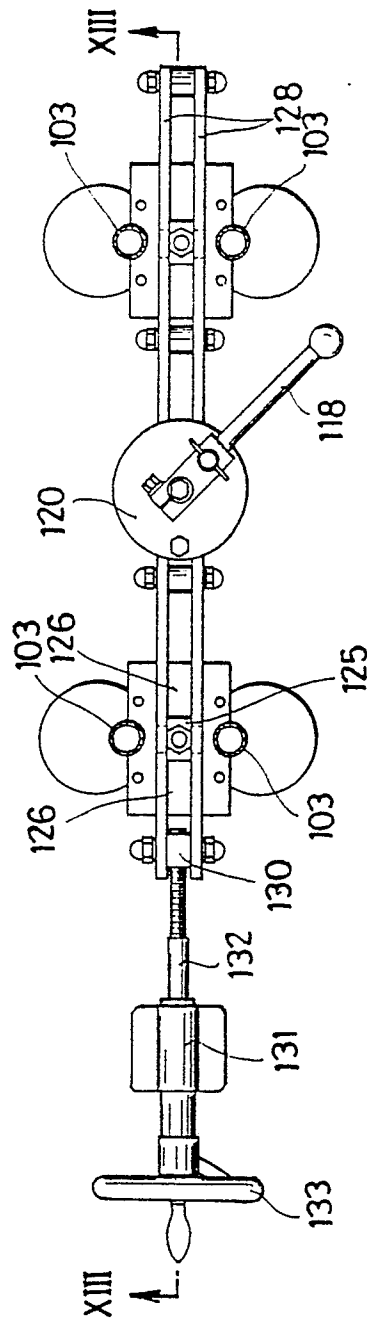


FIG.14

