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Vergobbi

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[54] **APPARATUS FOR APPLYING CARRYING GRIDS TO BOTTLES**

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[73] Assignee: **Pneumatic Scale Corporation,** Quincy, Mass.

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[52] **U.S. Cl.** **53/48,** 53/314

[51] **Int. Cl.** **B65b 21/14,** B65b 27/04

[58] **Field of Search** ..... 53/26, 48, 49, 313, 314, 53/315, 316; 271/57, 135, 137, 138; 214/8.5 F, 8.5 K

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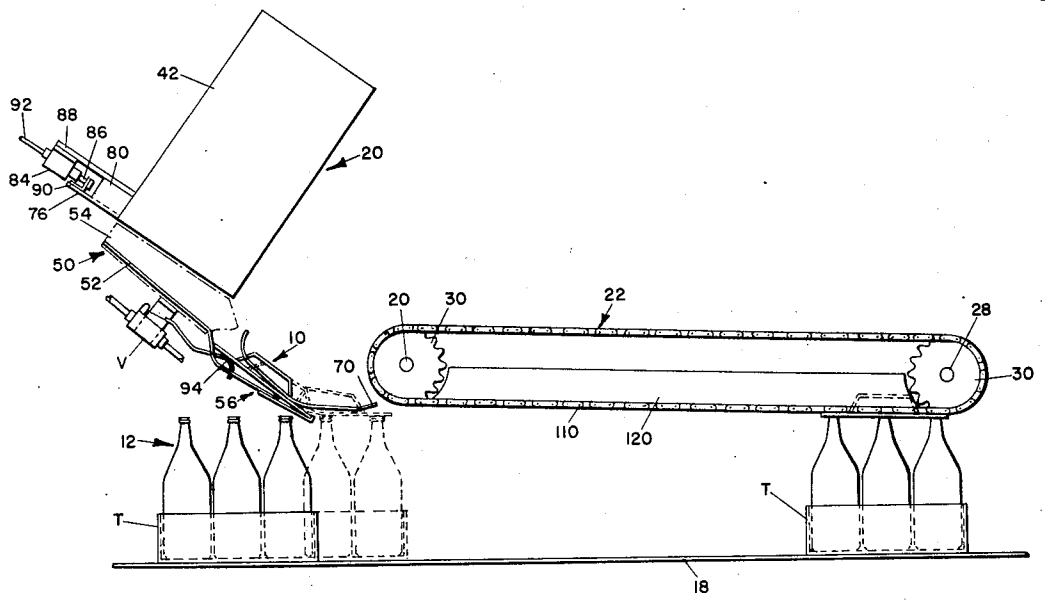
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Primary Examiner—Travis S. McGehee
Assistant Examiner—John Sipos
Attorney, Agent, or Firm—Dike, Bronstein, Roberts & Cushman and Robert T. Gammons

[57] **ABSTRACT**

Apparatus for applying carrying grids to the tops of groups of bottles, the grids being of the kind having neck encircling elements adapted to be expanded over the caps onto the necks, comprising a conveyor arranged to move groups of bottles of the desired number of bottles along a predetermined path, a hopper supported above the conveyor near one end for supporting a stack of carrying grids for automatically delivering a grid to each successive group of bottles on the conveyor, and pressure-applying means for progressively pushing the grids downwardly over the caps of the bottles onto the necks.

9 Claims, 10 Drawing Figures



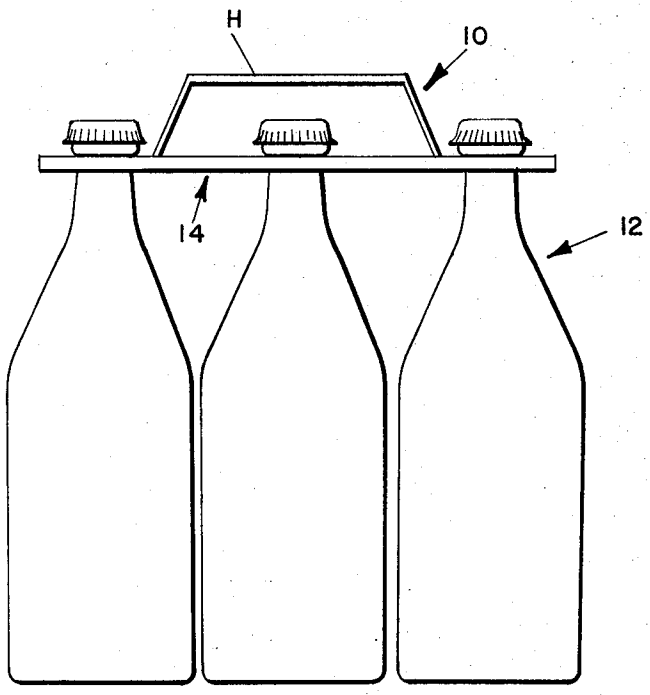


Fig. 1

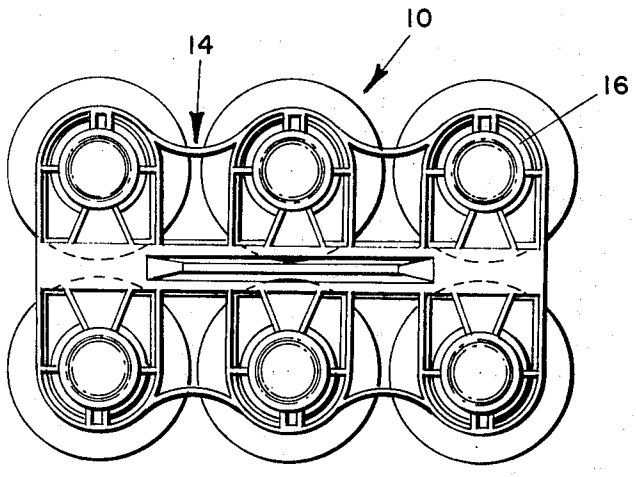


Fig. 2

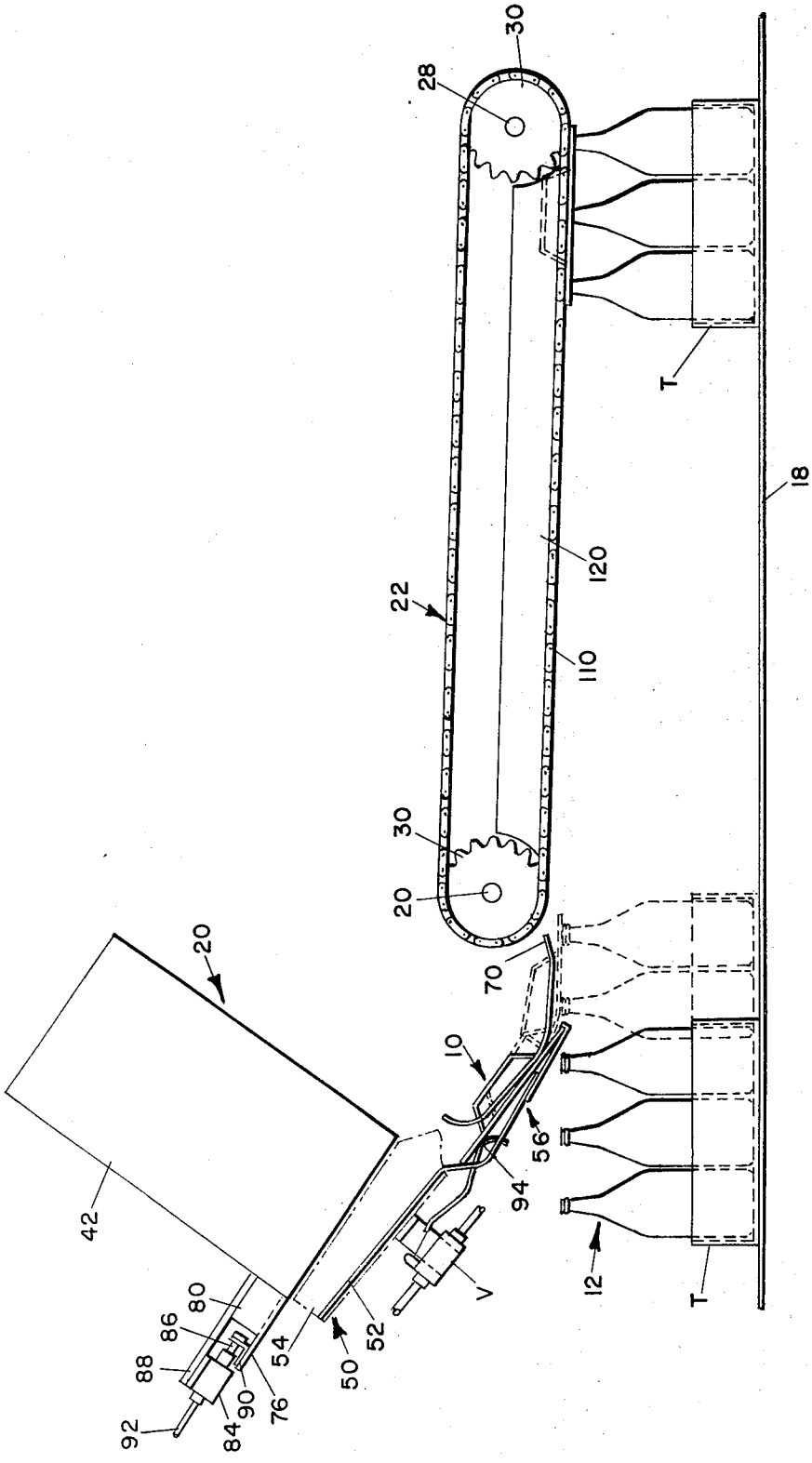

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Fig. 3

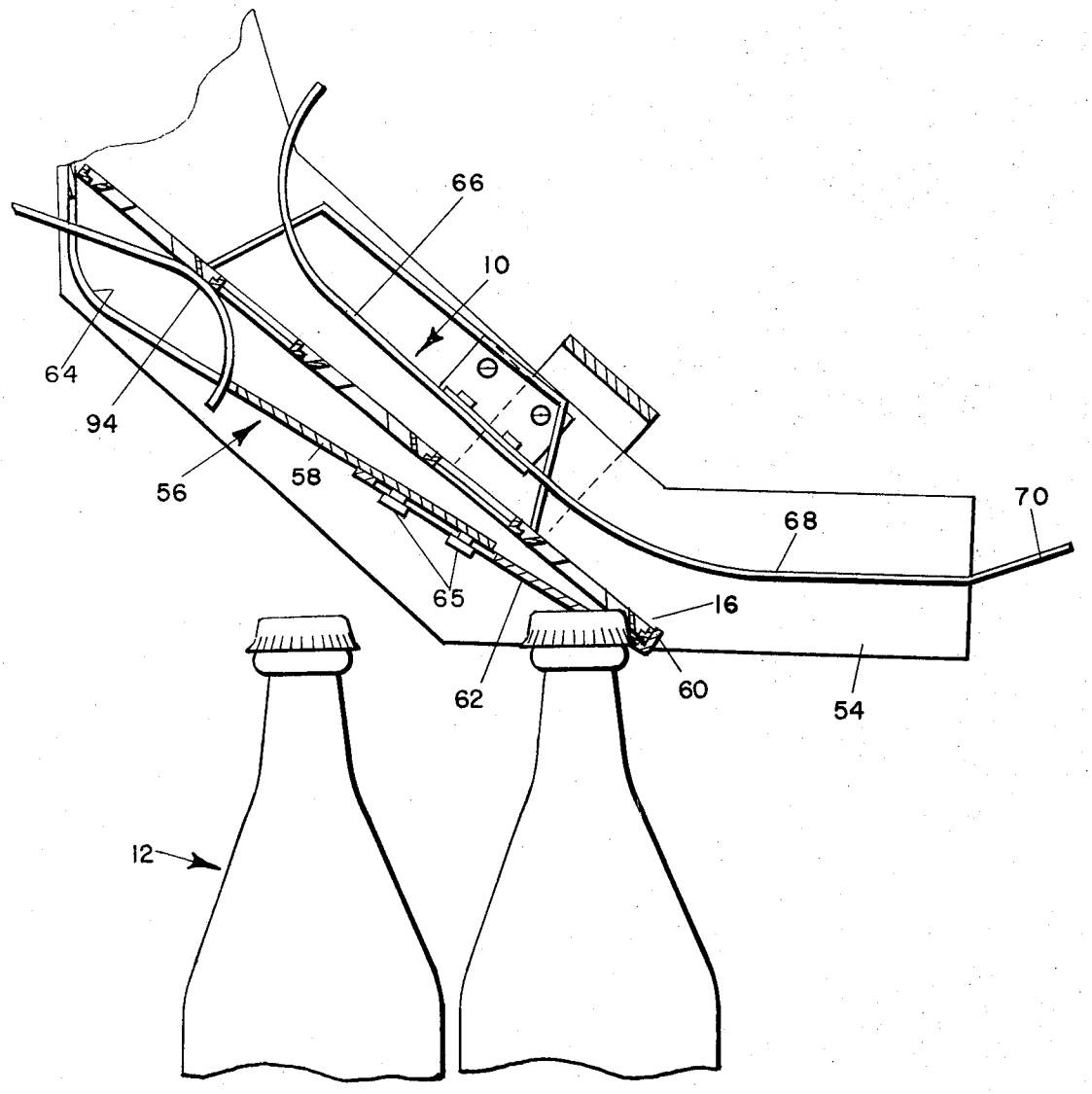


Fig. 4

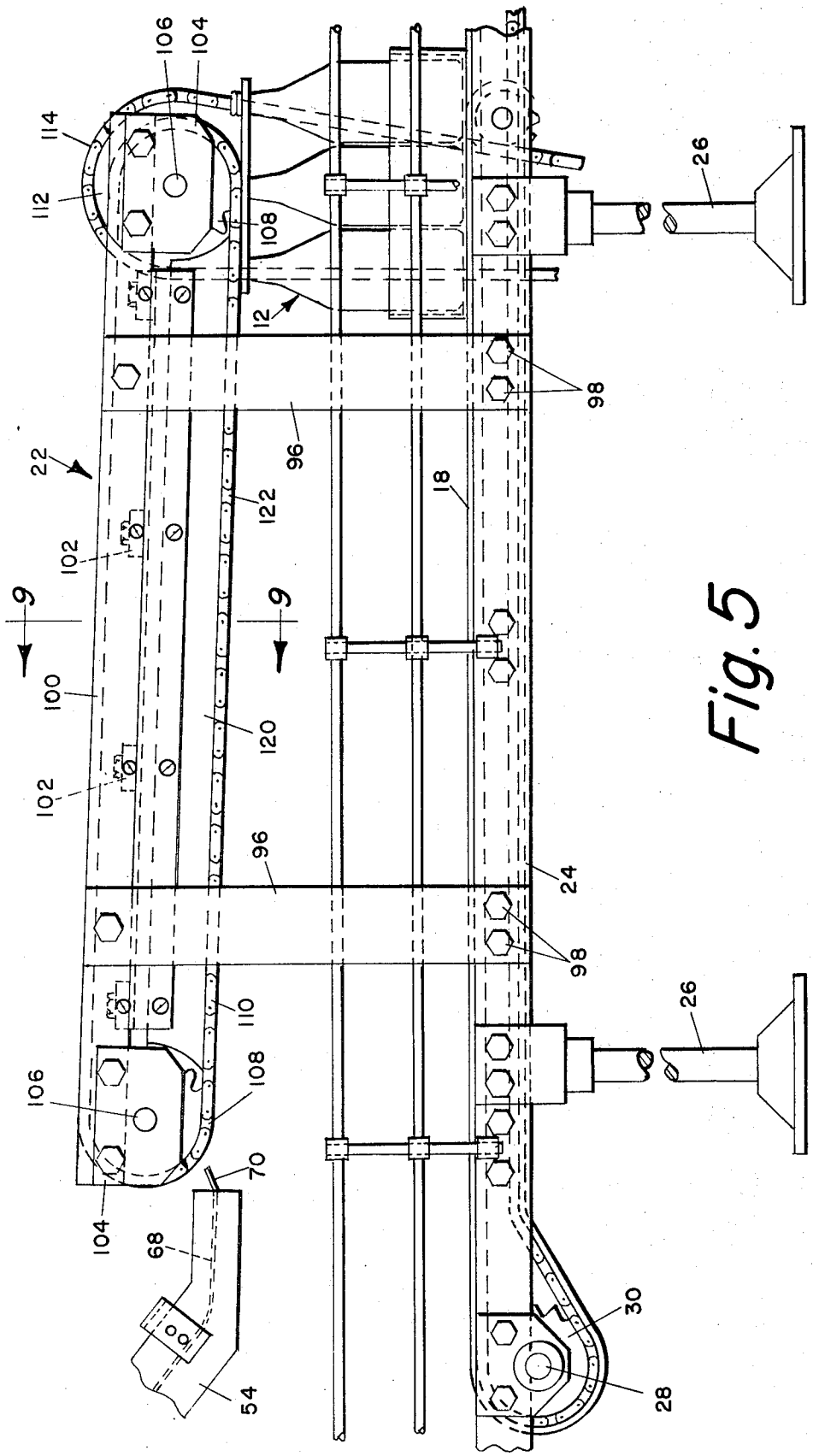

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Fig. 5

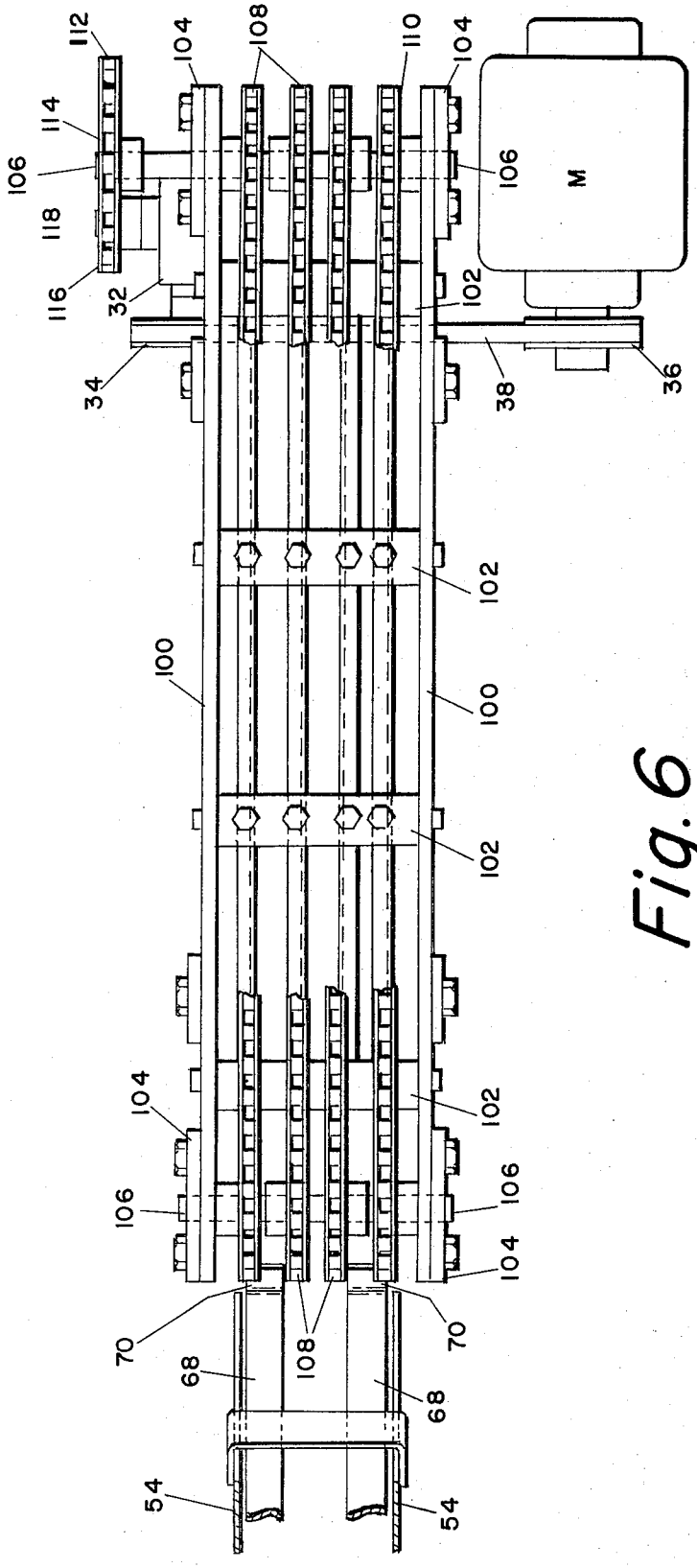

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Fig. 6

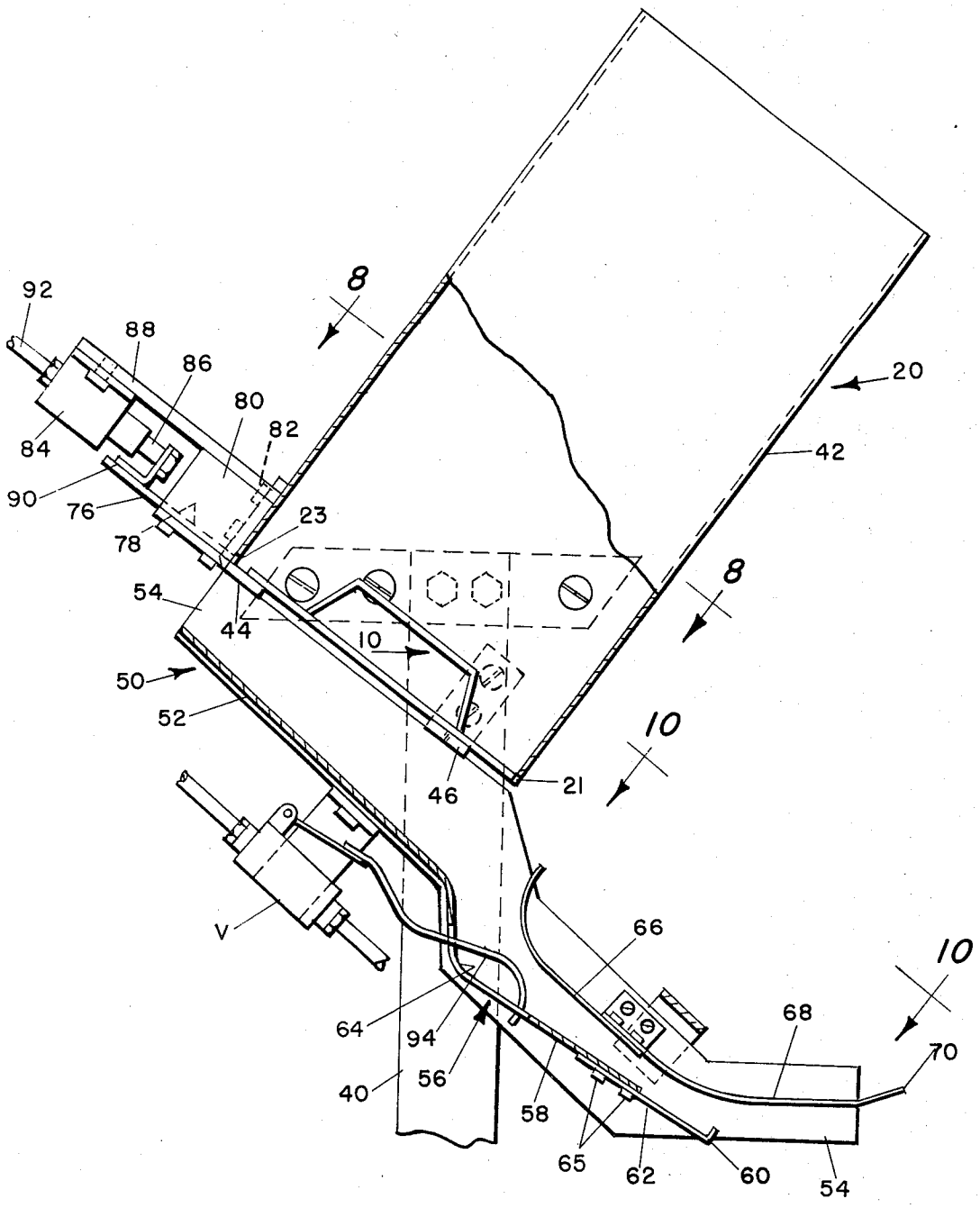

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Fig. 7

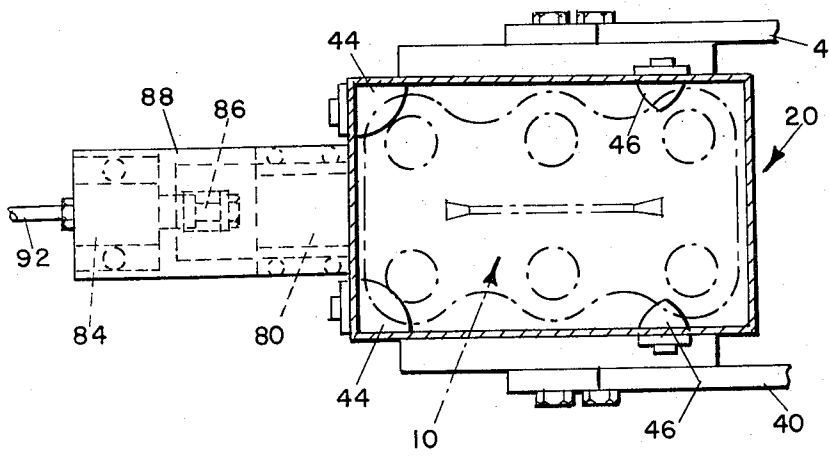
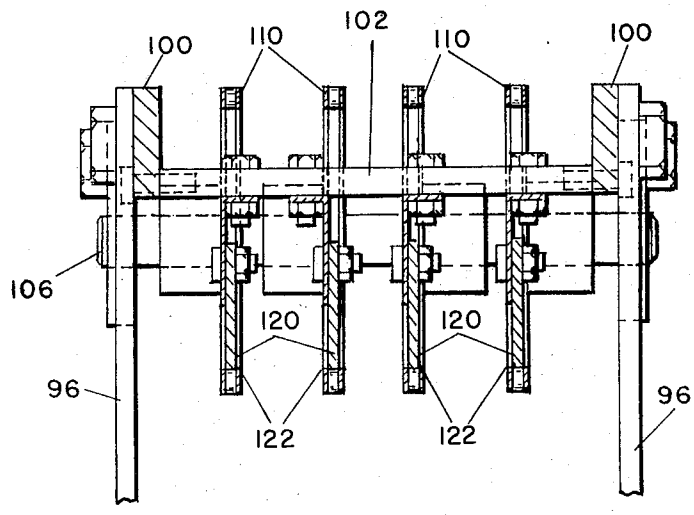


Fig. 8

Fig. 9



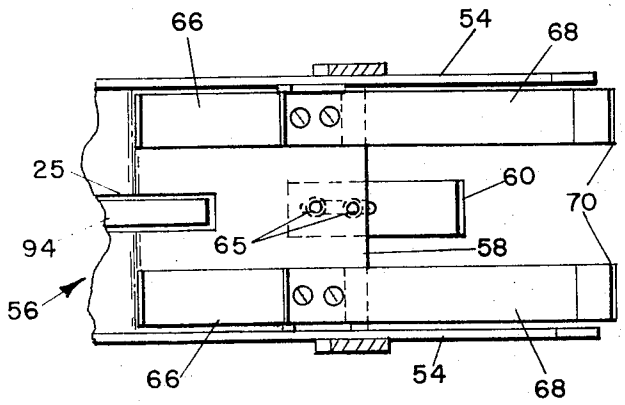


Fig. 10

APPARATUS FOR APPLYING CARRYING GRIDS TO BOTTLES

BACKGROUND OF THE INVENTION

In U.S. Pat. Nos. 3,261,498 and 3,633,962, there are shown carrying grids which are designed to be applied to the tops of groups of bottles for carrying the groups as units. The grids contain within a resilient frame neck encircling elements corresponding in number to the number of bottles of the group, which are adapted to be expanded by application of pressure downwardly over the bottle caps onto the necks therebelow and to be retained by contraction beneath the caps. The grids until now have been applied manually by placing them on the tops of bottles and forcing them downwardly over the caps onto the necks. This invention relates to an apparatus designed to apply grids to successive groups of bottles; which requires little attention on the part of the operator except to keep an adequate supply of grids in the hopper of the apparatus; and which is relatively simple in construction and dependable in operation.

SUMMARY

As herein illustrated, the apparatus is designed to apply carrying grids to tops of containers, the grids being of the kind containing top encircling elements adapted to be applied to the tops by pressure applied to the grids to expand the elements over the tops and comprises a conveyor arranged to move groups of containers along a predetermined path, pressure-applying means supported above the conveyor for forcing grids resting on the tops of the containers downwardly over the tops, the pressure-applying means sloping downwardly relative to the conveyor in the direction of travel so as to progressively apply downward pressure to the grids, said conveyor and pressure-applying means forming a passage through which groups of containers are moved from one end to the other, and means situated adjacent one end of the passage for supplying grids to the tops of successive groups of containers as the latter are moved toward the entrance end of the passage. The pressure-applying means comprises spaced parallel rails extending longitudinally of the conveyor and inclined downwardly, from a level at one end above the tops of the containers to a level at the other end below the tops, the transverse spacing of the rails being such as to straddle the tops of the containers and chains mounted for movement along the lower edges of the rails in consonance with the movement of the conveyor for simultaneously applying downward pressure to the grids at opposite sides of the tops of the containers and in cooperation with the conveyor moving the groups forwardly therewith. There are as many pairs of such rails and chains as there are rows of containers in the groups to which the grids are being applied. The means for supplying grids to the tops of the containers comprises a hopper supported above the conveyor adapted to hold a stack of grids and an inclined chute at the lower end of the hopper to which the lowermost grids in the hopper are successively delivered. The chute is disposed at an angle such as to support the lower end of the grid in a position which intersects the path of movement of the tops of the containers so that forward movement of the containers beneath the chute engages the leading containers with the grid, lifting it from the chute and moving it forwardly into the passage between the conveyor and the pressure-applying means. Springs are arranged to press the grid downwardly onto the tops of the containers as it is withdrawn from the chute. There is a reciprocal ram plate at the level of the lowermost grid adapted to force it from the hopper into the chute and a switch on the chute operable by movement of the grid therefrom to initiate operation of the ram plate to supply a grid for the next group of containers. The containers in each group of containers are maintained in a group by a tray or carton mounted on the conveyor and guide members along opposite sides of the conveyor.

The invention will now be described in greater detail with reference to the accompanying drawings wherein:

FIG. **1** is an elevation of a group of containers in the form of bottles, to the upper ends of which a carrier grid is applied so that the bottles may be carried as a unit;

FIG. **2** is a plan view of FIG. **1** showing the configuration of the grid;

FIG. **3** is a side elevation diagrammatically illustrating an apparatus designed to automatically apply the grids shown in FIG. **2** to the tops of groups of bottles;

FIG. **4** is a fragmentary elevation, partly in section, showing initial engagement of a grid with the leading containers in a group of containers to which the grid is to be applied;

FIG. **5** is a side elevation of the apparatus showing the lower conveyor support for the containers;

FIG. **6** is a plan view of the apparatus shown in FIG. **5**;

FIG. **7** is an elevation, partly in section, and to much larger scale of the hopper;

FIG. **8** is a section taken on the line **8—8** of FIG. **7**;

FIG. **9** is a vertical section taken on the line **9—9** of FIG. **5**; and

FIG. **10** is a plan view taken on the line **10—10** of FIG. **7**.

Referring to FIGS. **1** and **2** this invention is concerned with applying carrying grids **10** of the kind shown, for example, in the Erickson U.S. Pat. Nos. 3,261,498 and 3,633,962 to the tops of the containers of a group of containers **12** to enable carrying the group of containers as a unit. As herein shown, there are six containers in the form of bottles and the carrier comprises a frame **14** embodying neck encircling elements **16** arranged in spaced parallel rows of three, each of which are adapted to be expanded over the tops of the bottles by downward pressure applied to the grid to a position on the necks of the bottles below the caps where the encircling elements contract of their own elasticity so as to firmly grip the necks of the bottles below the caps and thus enable carrying the bottles in the group as a unit. The purpose of the machine illustrated herein is to automatically apply the carrying grids to the upper ends of the bottles.

Referring to FIG. **3** which diagrammatically illustrates the apparatus, there is a container-conveyor **18** by means of which containers are moved in groups of a predetermined number to a position for application of a grid to their upper ends, a hopper **20** for supplying grids in succession to the groups of containers as they are moved into position and pressure-applying means

22 for pressing the grids into engagement with the tops of the containers as they are delivered thereto from the hopper 20.

The conveyor 18, hopper 20 and pressure-applying means 22 are mounted on a rigid elongate beam 24 (FIG. 5) supported near its opposite ends in spaced relation to the floor by means of pedestals 26—26. Near the opposite ends of the beam there are mounted on horizontally supported shafts 28—28 sprockets 30—30 about which is entrained a flat link-type of conveyor 18, the upper run of which travels in a horizontal plane and supports the lower ends of the containers for movement into a position beneath the hopper 20 for receiving a carrying grid and then beneath the pressure-applying means 22 where the carrying grid is pressed into engagement with the upper ends of the containers. As shown in FIGS. 5 and 6 the shaft 28 on which the sprocket 30 at the right-hand end of the apparatus is mounted is drivably connected to a gear reduction unit 32 which in turn is drivably connected to a motor M by way of pulleys 34 and 36 fixed, respectively, to the input shaft of the reduction unit and to the motor shaft and a chain entrained about the pulleys 34, 36.

The hopper 20 (FIG. 7) for supplying the carrying grids to the groups of bottles as they are moved along by the conveyor 18 is mounted on the beam 24 by a pair of spaced parallel bracket plates 40—40 bolted at their lower ends to the beam 24 and comprises, as shown in FIGS. 3 and 7, a receptacle 42 of rectangular cross-section mounted at the upper ends of the posts 40—40 in a forwardly inclined position so that its bottom inclines downwardly toward the tops of the containers travelling along on the conveyor 18. The interior cross-section of the hopper corresponds substantially to the dimensions of the carrying grids and these are stacked in superposed relation within the receptacle. At the bottom of the receptacle which is for the most part open there are, as shown in FIG. 8 at one end (the upper end), bottom supports 44—44 and at the lower end spaced from the end bottom supports 46—46. The supports 44—44 and 46—46 are so located that a grid 10 deposited in the receptacle rests at the bottom with one end seated on the supports 44—44 and the other end seated on the supports 46—46. The front wall of the hopper contains a transverse slot 21 corresponding in height to the thickness of the grid so that the bottomost grid can be pushed forwardly far enough through the slot to disengage the grid from the supports 44—44 and 46—46 whereupon it will be released for downward movement and the next grid will drop down onto the shoulders.

Each grid, as shown in FIGS. 1 and 2, has longitudinally thereof a narrow slot and above the slot a truncated handle H. When the grids are stacked the handles of the grids project upwardly through the slots in the superposed grids in nesting relation. The truncated handles have the effect when the lowermost grid is pushed forwardly relative to the grids above it to cam the lowermost grid abruptly downward thus precipitating the grid quickly into a tray 50 below which will now be described.

The tray 50 is mounted below the hopper and has a flat bottom wall 52 inclined downwardly toward the tops of the containers at a somewhat greater angle than the bottom of the hopper and spaced parallel side walls 54—54 into which the lowermost grid is dropped when released from the holders as related above. The walls 54—54 extend forwardly from the lower end of the tray and there is supported between these forwardly extending portions of the walls an apron 56 onto which the grids gravitationally slide from the bottom wall 52 to a position of engagement of the forward end of the grid with an upstanding shoulder 60 at one end of a narrow flat plate 62 adjustably fastened by bolts 64 to the underside of the apron. The apron is disposed at an angle with reference to the tops of the containers, as shown in FIG. 4, so that when a grid has dropped down into the apron with its forward end engaged with the shoulder 60, in which position the rear end of the grid is supported above the bottom of the apron by engagement with a shoulder 64 at the junction of the rear end of the apron with the bottom wall 50, the openings defined by the neck encircling elements 16—16 at the forward end of the grid are situated just below the path of movement of the upper ends of the containers as they are moved along by the conveyor 18 so that as the containers move forwardly they intercept the forward sides of the openings and thereby move the grid forwardly. As shown in FIG. 4 the openings in the grid are downwardly divergent and the grid is supported at such an angle that the edge of the opening at the lower side is substantially perpendicular to the direction of movement of the containers so that the caps of the bottles, when engaged with the edges, push the grid forwardly in the direction of movement without any tendency for the grid to lift off. Spaced parallel spring fingers 66—66 are mounted between the side walls 54—54 above the apron to direct and press the grids downwardly as they are drawn forwardly. The fingers incline downwardly and converge toward the apron. Beyond the apron there are substantially horizontal portions 68—68 parallel to the tops of the containers which terminate in upwardly inclined portions 70—70.

The lowermost grid is disengaged from the supporting shoulders at the bottom of the hopper by a reciprocably mounted ejector or ram in the form of a flat plate 76 (FIG. 7) supported in a slot 78 at the lower side of a block 80 fastened by bolts 82 to the rear side of the hopper. A pneumatic cylinder 84 provided with a plunger 86 is mounted by means of a bracket 88 to the rear wall of the hopper above the ram plate and the latter is connected to the plunger by means of a bracket 90. A conductor 92 supplies air to the motor for effecting reciprocation of the ram plate which, as pointed out above, when moved forwardly will disengage the lowermost grid from the hopper, causing it to be precipitated downwardly into the receptacle 50 and to gravitate therefrom downwardly onto the apron 56. A transverse slot 23 at the lower edge of the rear wall of the hopper provides for movement of the ram plate into engagement with the rear edge of the lowermost grid.

As each grid is engaged by the leading containers its forward end is lifted free of the shoulder 60 so that it moves forwardly with the group of containers. Forward movement allows the rear end of the grid to slide down on the shoulder 64 into engagement with a trigger member 94 which extends forwardly through a slot 25 in the shoulder 64 to depress the trigger. Downward displacement of the trigger is insured by the pressure of the spring fingers 66—66 against the top of the grid as the latter is pulled forwardly. At the underside of the tray 50 there is mounted an air valve V to which the trigger 94 is connected so that each time that a grid is drawn forwardly from the apron the air valve is actu-

ated to in turn supply air pressure to the motor **84** so that the latter releases another grid from the bottom of the hopper into the tray and from thence onto the apron in readiness for the next group of containers advanced along by the conveyor **18.**

The pressure-applying means **22,** as shown in FIG. **5,** is mounted above the conveyor **18** by means of longitudinally spaced pairs of transversely spaced posts **96—96,** the lower ends of which are fastened by bolts **98** to the beam **24** and comprises spaced parallel, longitudinally extending frame members **100—100** rigidly connected to each other at longitudinally spaced intervals by transverse plates **102,** four such plates being shown. At opposite ends of the frame members **100—100** there are fastened to the outer sides bearing plates **104** for rotatably receiving horizontally disposed shafts **106—106.** Four sprockets **108** are mounted on each shaft **106** between the frame members **100—100,** and on each pair of sprockets, comprising a sprocket at one end and a sprocket at the other end, there is mounted a link chain **110.** The shaft **106** at the right-hand end of the frame, as shown in FIG. **6** at one end, extends beyond its bearing plate **104** and has mounted on it a large sprocket **112** about which is entrained one end of a chain **114.** The other end of the chain **114** is entrained about a sprocket **116** fastened to a shaft **118** extending from the reduction gear unit **32.** The sprocket ratios are such that the chains on the pressure-applying unit are driven at the same rate as the conveyor **18.** Guide and back-up plates **120** are mounted to the undersides of the bars **102** above the lower runs of the chains **110** so that the lower runs of the chains travel along the lower edges **122** of these plates and are thus supported from upward displacement. As illustrated (FIG. **9**) the lower edges **122** are slightly narrower than the widths of the chains so that the chains are guided against lateral displacement by engagement of the links with opposite sides.

It will be observed (FIGS. **3** and **5**), that the pressure-applying means is supported in an inclined position with respect to the conveyor **18** with the end adjacent the hopper at a higher level than the other end so that the lower runs of the conveyor chains **110** at the one end are above the upper ends of the containers shown in FIG. **3** and at their other ends just below the upper ends of the containers. As thus arranged when a group of bottles onto which a grid has been deposited from the tray moves forwardly beneath the pressure-applying means, the upper ends of the two rows of containers travel between the chains of each pair of chains so that as the containers of the group move along through the converging passage, which is formed between the conveyor **18** and the inclined conveyor chains **110,** the grids at opposite sides of the tops of the containers are progressively pressed downwardly over the caps onto the necks below the caps as shown in the extreme right-hand position in FIGS. **3** and **5.** It will be observed that the upwardly inclined portions **70—70** of the fingers **68—68** insure entry of the leading end of the grid beneath the conveyor chains in the event that it should accidentally disengage just as it is moving into the sphere of action of the pressure-applying means.

In order to keep the containers of a group in close order as they travel along the conveyor **18,** the latter may be provided with a tray or carton adapted to receive the lower ends of the containers. The tray or carton, as the case may be, is guided while travelling along with the conveyor by vertically spaced, longitudinally extending bars **112—112** mounted on the beam **24** at opposite sides of the conveyor **18.**

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. Apparatus for applying a carrier grid to the tops of containers of a group of containers in which there are two rows of containers arranged side by side, each grid having top encircling elements corresponding in number and arrangement to the tops of the containers in the group which are adapted to be expanded over the tops of the containers by downward pressure applied to the grid, comprising a conveyor along which the group of containers are adapted to be moved, pressure applying means mounted above and extending along the conveyor, the pressure applying means comprising two pairs of endless members supported with portions thereof traveling in the same direction as the conveyor there below and forming with the conveyor a passage through which the containers are moved by the conveyor, said portions being arranged to engage the grid at opposite sides of each line of encircling elements and to slope downwardly in the direction of movement from a level above the tops of the containers to a level below the tops of the containers, and means for depositing grids on the tops of the groups of containers before they enter the passage.

2. Apparatus according to claim **1,** wherein the endless members are link chains.

3. Apparatus for applying a carrier grid to the tops of the containers of a group of containers, said grid having top encircling elements corresponding in number to the number of containers to which it is to be applied, said elements being adapted to be expanded over the tops of the containers by downward pressure applied to the grid, comprising a conveyor along which groups of containers are adapted to be moved, guide members mounted above the conveyor in spaced parallel relation, said guide members extending along the conveyor and having downwardly facing bearing surfaces inclining downwardly from one end to the other in the direction of movement of the conveyor, said guide members with the conveyors forming a passage which diminishes in vertical height from one end to the other, link chains mounted on the guide members with portions thereof extending lengthwise and in engagement with the downwardly facing bearing surfaces, said link chains being operable in conjunction with the conveyor to effect movement of the containers along the passage, and said link chains being operable progressively to press the top encircling elements of the grid downwardly over the tops of the containers, and means for effecting movement of the conveyor and link chains in consonance and in the same direction.

4. Apparatus according to claim **3,** comprising spaced parallel guides at the opposite sides of the conveyor for guiding the groups of containers rectangularly through the passage between the conveyor and the link chains.

5. Apparatus for applying a carrier grid to the tops of the containers of groups of containers, said grid having top encircling elements corresponding in number to the number of containers in the group to which it is to be applied, said elements being adapted to be expanded

over the tops of the containers by downward pressure applied to the grid, comprising a conveyor for moving successive groups of containers along a predetermined path, pressure-applying means mounted above the conveyor and means for depositing a grid on the tops of the containers of each group as it is moved into the sphere of operation of the pressure applying means, said pressure-applying means being adapted to apply increasing downward pressure to the grid as the groups of containers and grid are moved along by the conveyor to progressively press the encircling elements of the grid down over the tops and said means for depositing the grid on the top of the containers comprising an inclined chute supported adjacent the entrance to the passage between the conveyor and the pressure-applying means to which grids are delivered one at a time, the lower end of the chute being so disposed that the tops of the containers at the forward end of the group of containers as the group is moved forwardly beneath the chute engages the top encircling elements at the forward end of the grid and lifts the forward end off the chute, spring means mounted on the chute holding the grid down against the chute in opposition to the lift imparted thereto by the movement of the containers therebelow as the grid is moved forwardly by forward movement of the containers into the passage, and means operable by the trailing end of the grid as it leaves the chute to effect delivery of another grid to the chute.

6. Apparatus for applying a carrier grid to the tops of the containers of groups of containers, said grid having top encircling elements corresponding in number to the number of containers in the group to which it is to be applied, said elements being adapted to be expanded over the tops of the containers by downward pressure applied to the grid, comprising a conveyor for moving successive groups of containers along a predetermined path, pressure-applying means mounted above the conveyor, and means for depositing a grid on the tops of the containers of each group as it is moved into the sphere of operation of the pressure applying means, said pressure-applying means being adapted to apply increasing downward pressure to the grid as the groups of containers and grid are moved along by the conveyor to progressively press the top encircling elements of the grid down over the tops and said means for depositing the grids on the top of the containers comprising an inclined chute supported adjacent the entrance to the passage between the conveyor and the pressure-applying means to which grids are delivered one at a time with its lower end situated below the tops of the containers resting on the conveyor, an abutment at said lower end which supports a grid resting on the inclined surface of the chute with the top encircling elements at the lower end of the grid in a position to be intercepted by the tops of the containers at the forward end of the group, spring means mounted on the chute for holding the grid down against upward displacement by the tops of containers as they are advanced beneath it so as to press the top encircling elements firmly against the tops of the containers and hold the grid in place until it enters the passage, said tops of the containers being operative as they move beneath the leading end of the grid to lift it off the abutment, and means operable as the trailing end of the grid leaves the chute to effect delivery of another grid to the chute.

7. Apparatus according to claim **6,** wherein there is a hopper situated above the chute for holding a stack of grids with the lowermost grid in a position to be discharged into the chute, an ejector mounted to be moved in the plane of the lowermost grid in the hopper to push the lowermost grid from the hopper into the chute, and switch means on the chute operable by the trailing end of the grid to effect movement of the ejector to push the lowermost grid into the chute.

8. Apparatus according to claim **6,** wherein there is a hopper supported above the chute for receiving a stack of grids, means at the lower end of the hopper on which the stack of grids is adapted to rest, said grids being adapted to be released from said support means by longitudinal movement of the lowermost grid, and a ram supported to be moved in the plane of the lowermost grid operable by such movement to effect release of the grid from said supporting means to the chute therebelow.

9. Apparatus according to claim **6,** wherein there is a hopper supported above the chute for receiving a stack of grids, means at the lower end of the hopper on which the stack of grids is adapted to rest so long as the lowermost grid is confined within the hopper, said hopper having at its forward lower end an opening at the level of the lowermost grid through which the lowermost grid is adapted to be moved, and said grid being of a configuration such that longitudinal movement disengages it from said last-named means to drop from the hopper into the chute, and a ram supported to be moved in the plane of the lowermost grid operable by longitudinal movement to effect longitudinal movement of the grid and hence release from said last-named means to the chute therebelow.

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