United States Patent [19]

Vergobbi

[11] **3,877,198**

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

[75] Inventor: **Robert W. Vergobbi,** Braintree, Mass.

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

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[21] Appl. No.: **413,781**

[52] **U.S. Cl.** **53/48;** 53/49; 53/74; 53/314

[51] **Int. Cl.** **B65b 21/00**

[58] **Field of Search** 53/74, 48, 49, 313, 314, 53/315

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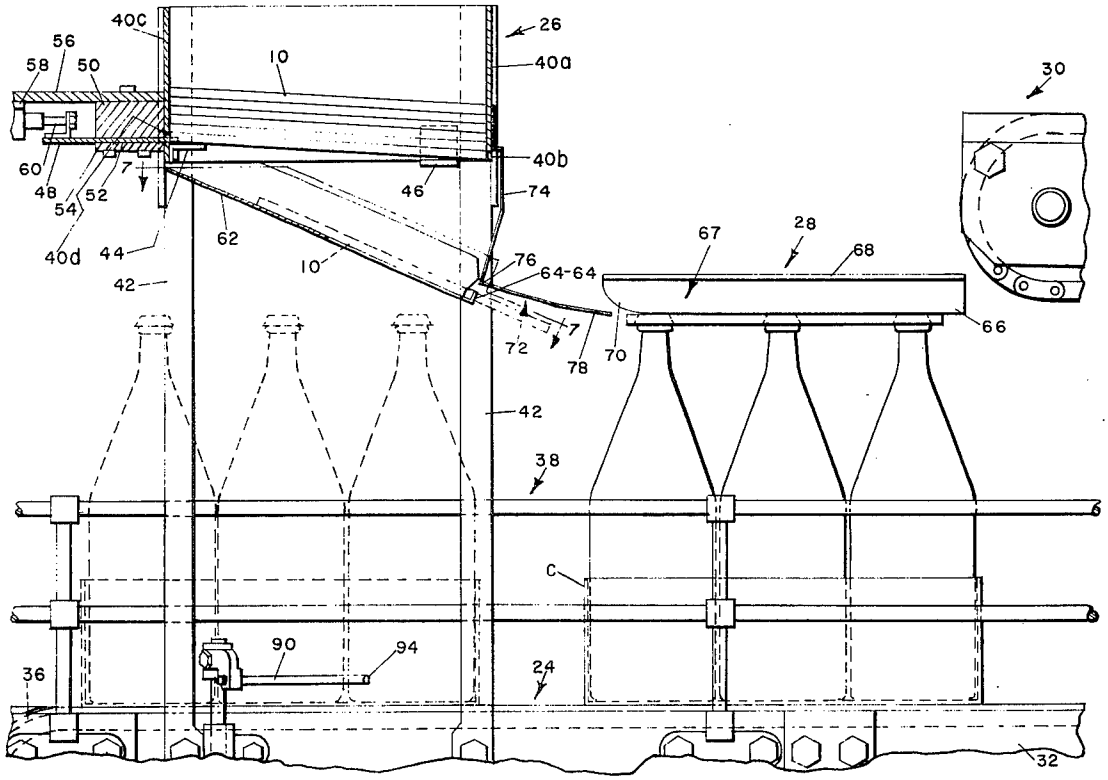
Primary Examiner—Travis S. McGehee

Attorney, Agent, or Firm—Dike, Bronstein, Roberts, Cushman & Pfund

[57] **ABSTRACT**

Apparatus for applying flat carrier grids to the tops of capped bottles of groups of three in line, said grids being of the kind having top encircling elements corresponding in number to the number of bottles in the group to which it is to be applied, which are adapted to be expanded over the caps onto the necks of the bottles, comprising a conveyor for moving the groups of bottles along a predetermined path, a pressure-applying assembly supported above the conveyor for progressively applying pressure to a grid deposited on the tops of the bottles downwardly over the caps onto the necks, a hopper for delivering grids to the successive groups of bottles, a detector operable by movement of each group of bottles by it to release a grid from the hopper to the bottles, and a stabilizer situated between the pressure-applying assembly and the hopper for initially engaging all of the top encircling elements of a grid with all of the bottle caps before the grid is presented to the pressure-applying assembly.

24 Claims, 14 Drawing Figures



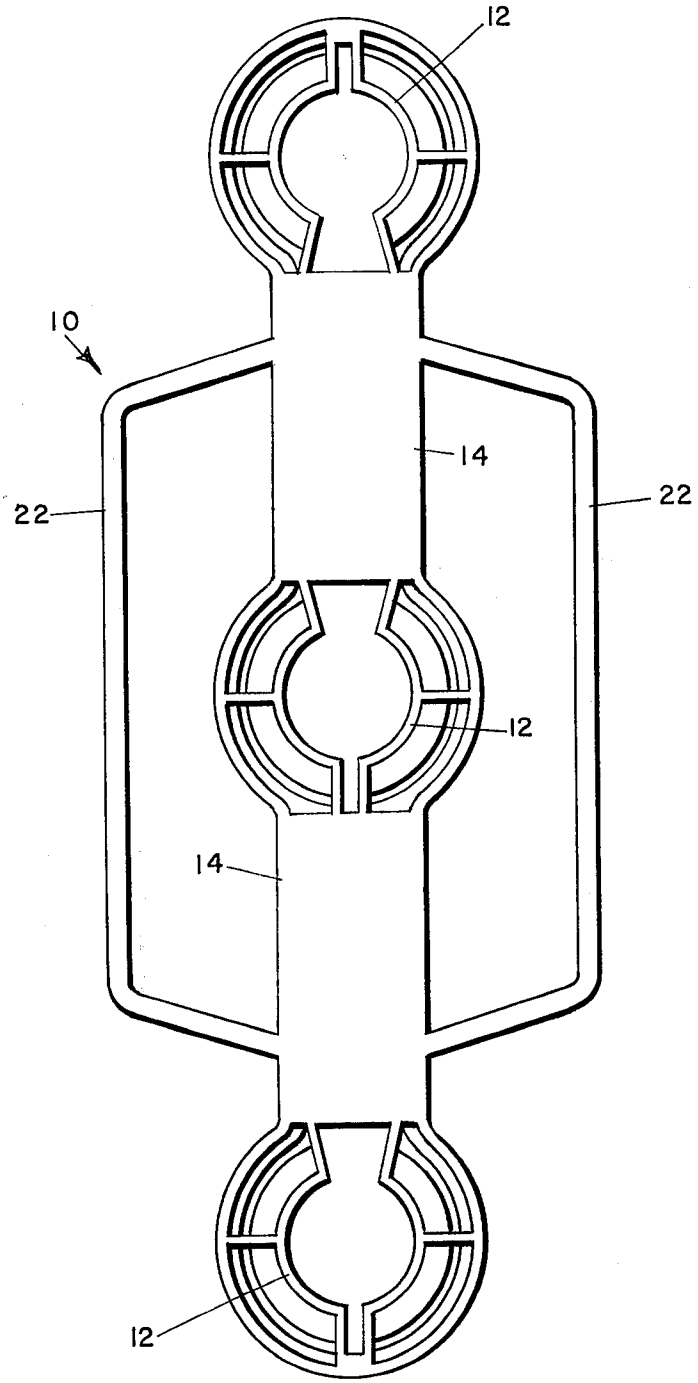


Fig. 1

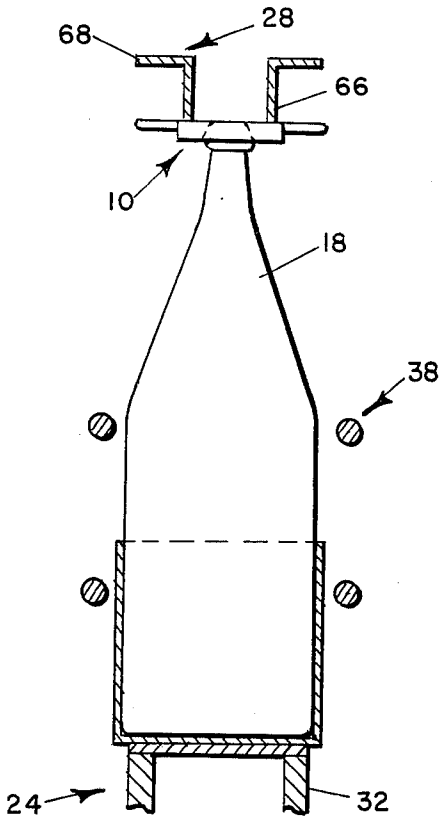


Fig.9

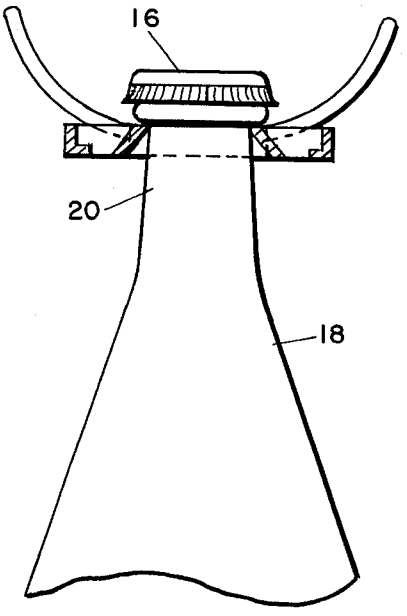


Fig.2

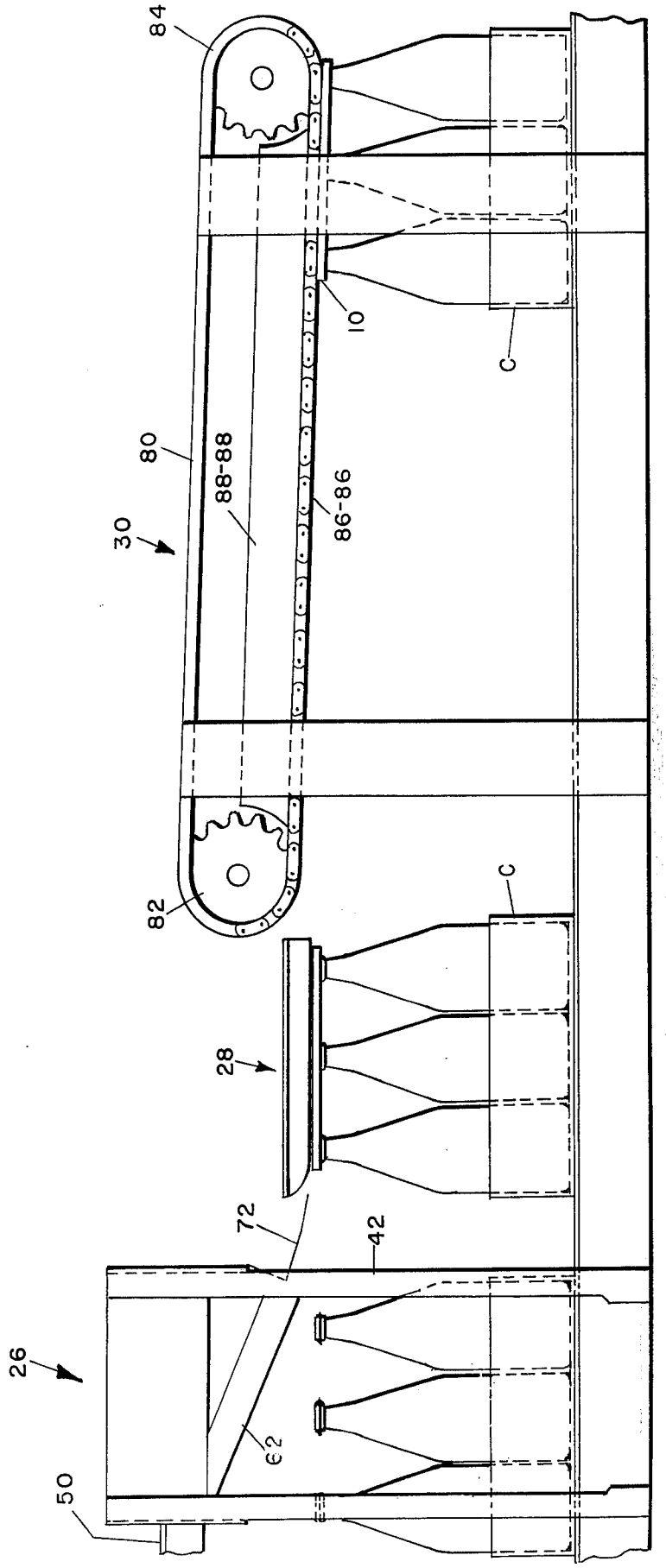


Fig. 3

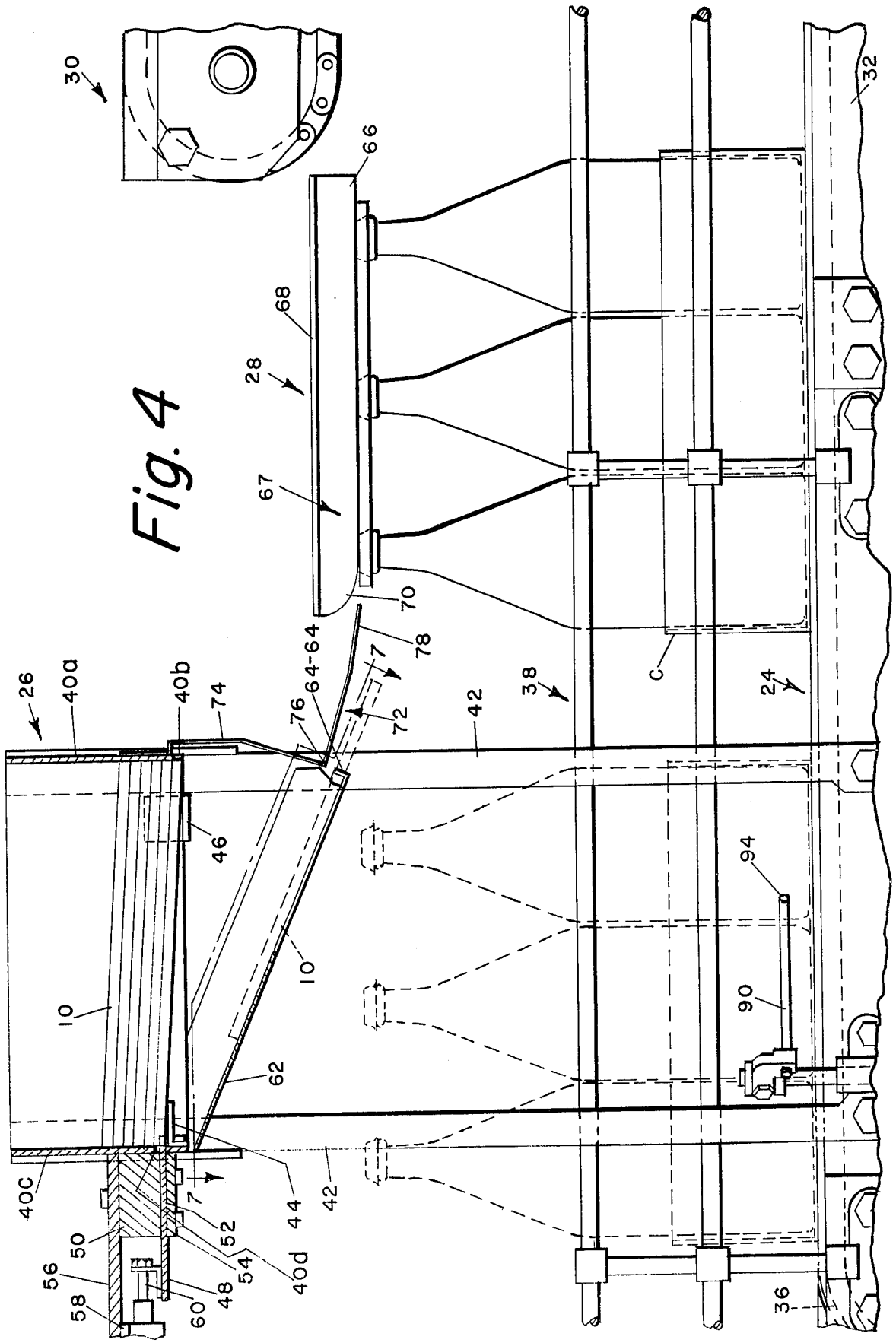

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40b
40a
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40d
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Fig. 4

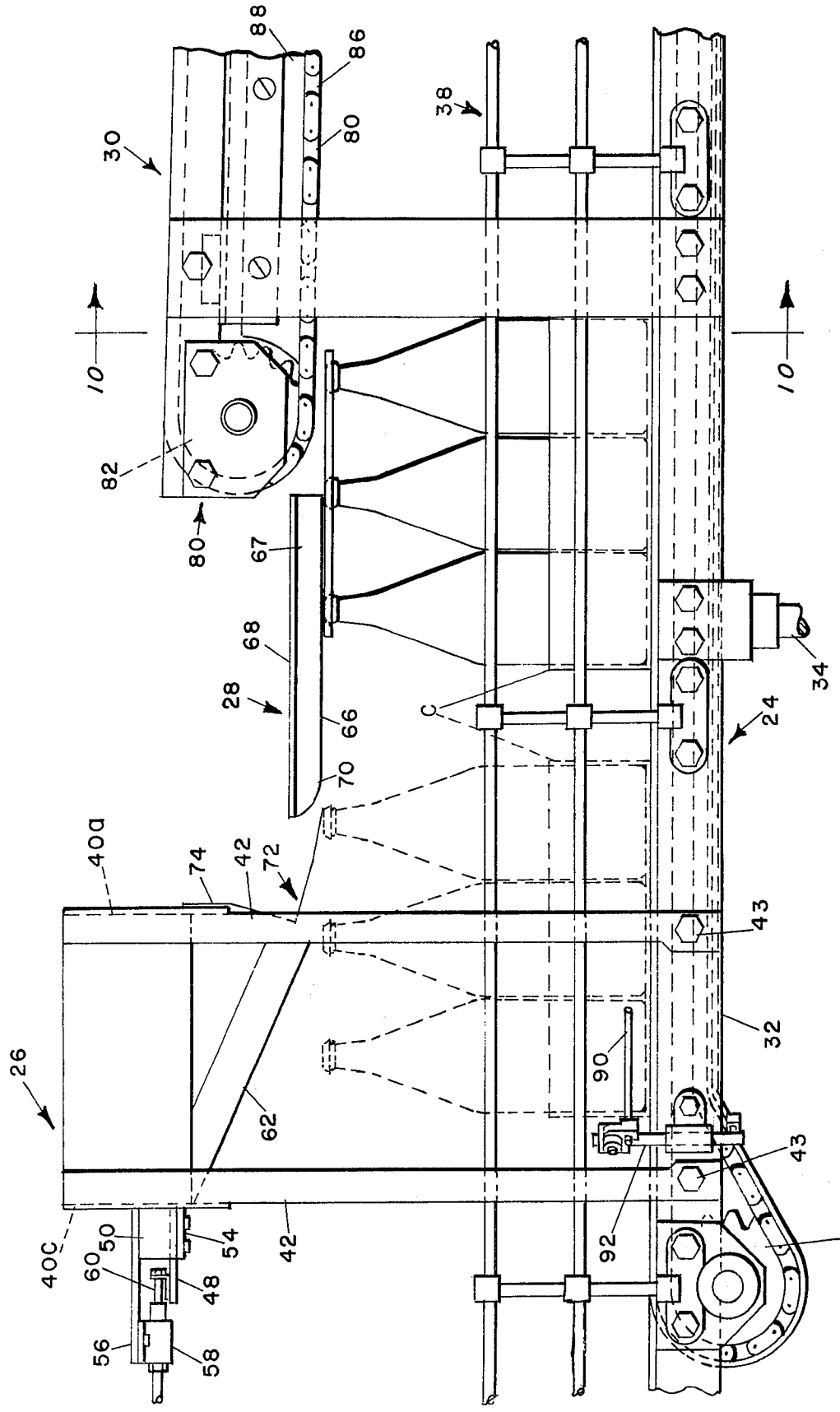

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Fig. 5

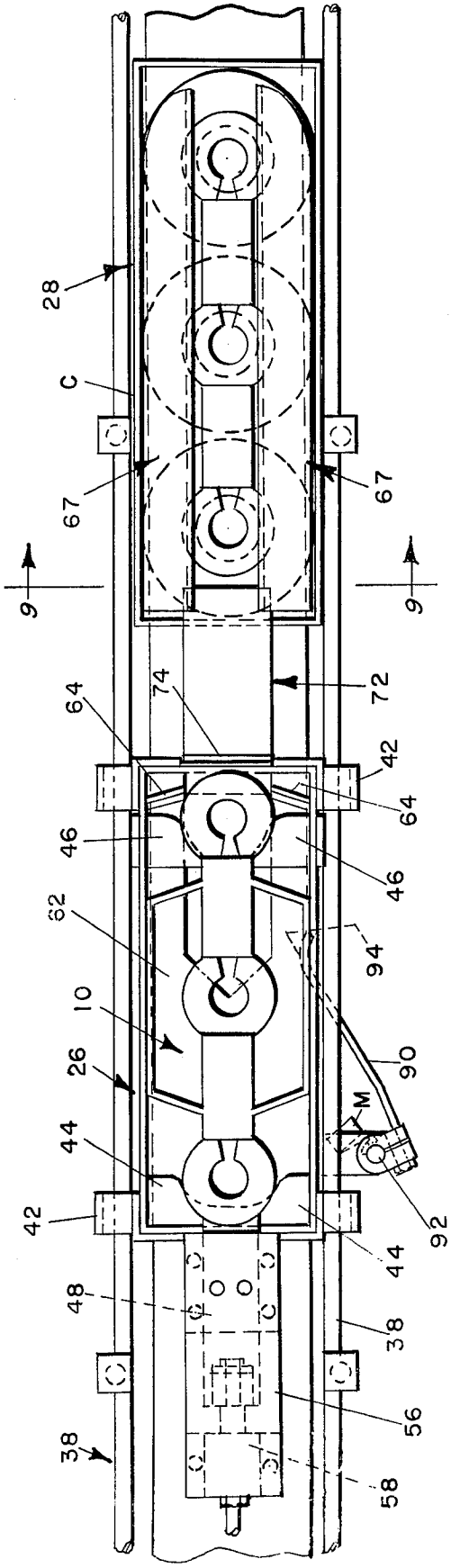

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Fig. 6

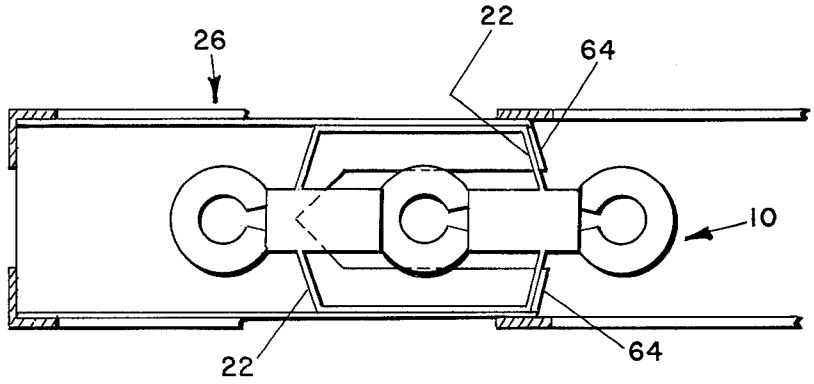


Fig.7

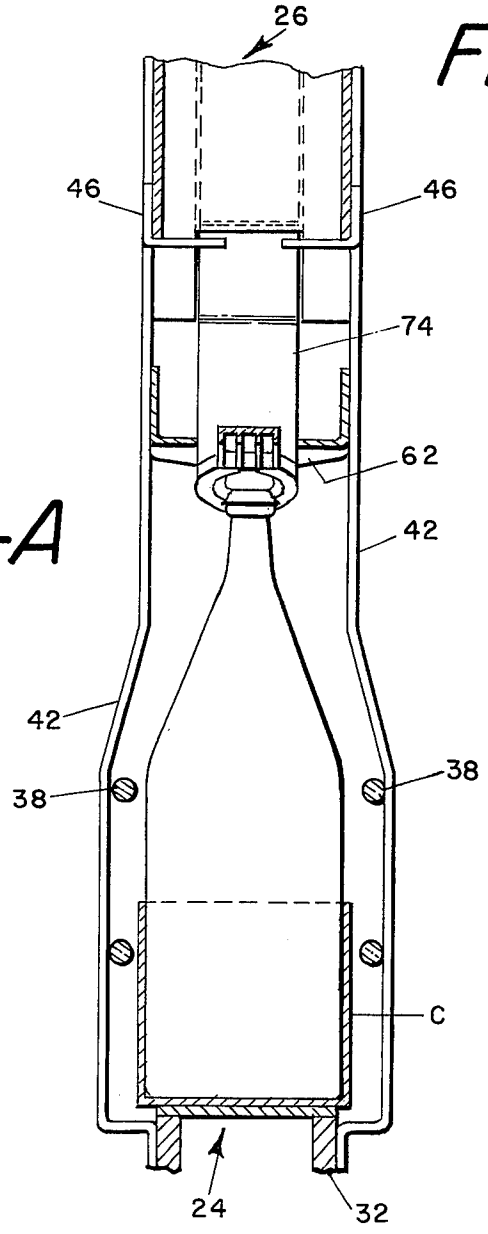
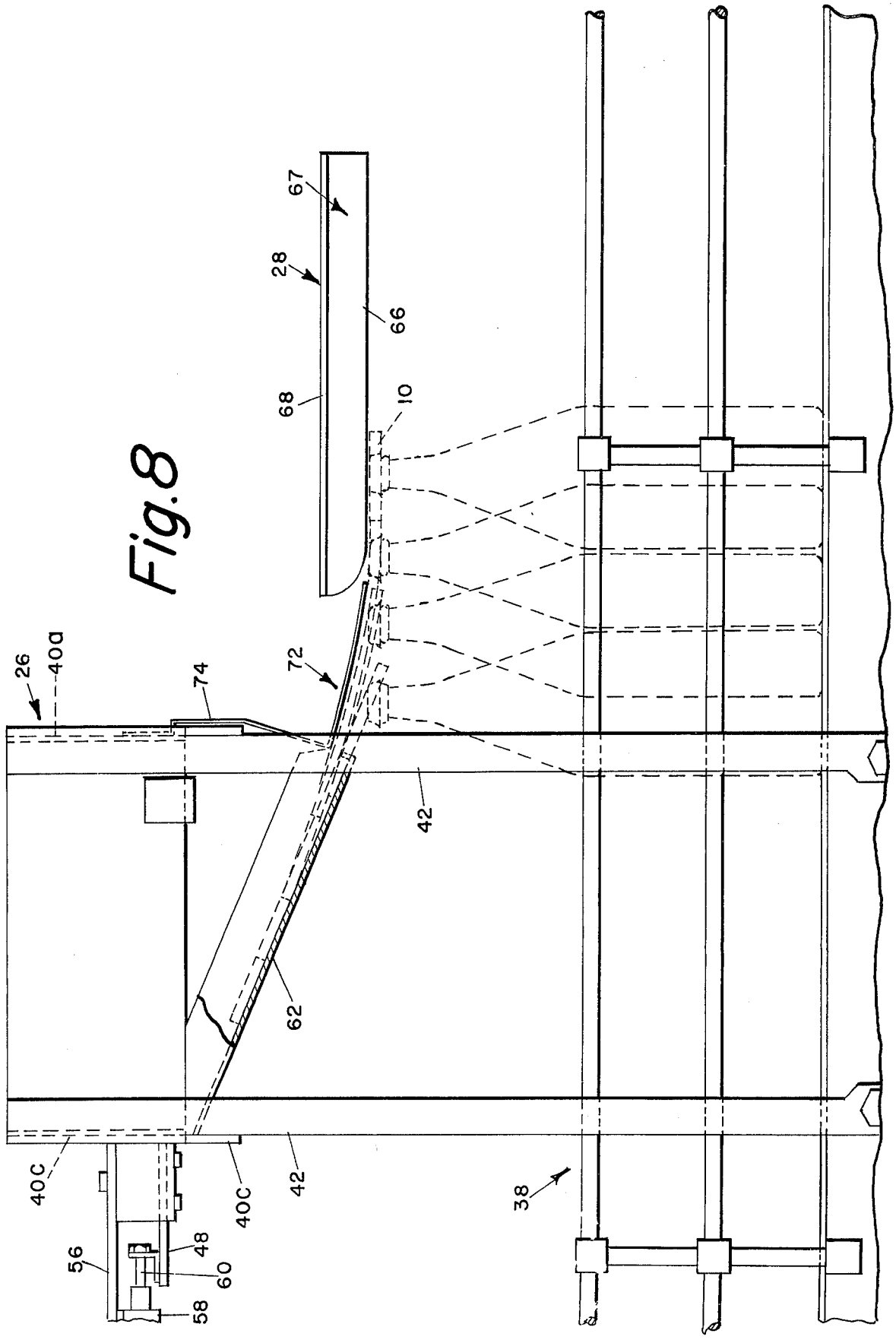


Fig.7-A

Fig.8



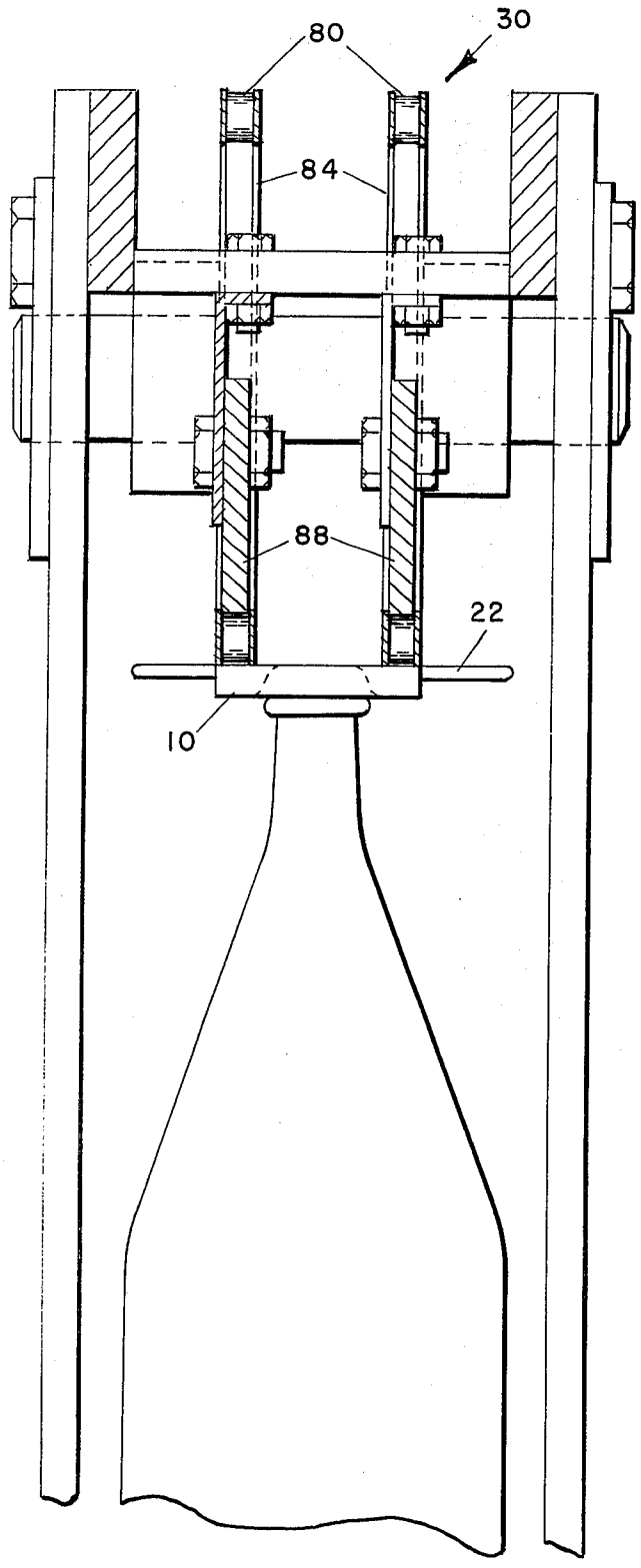


Fig. 10

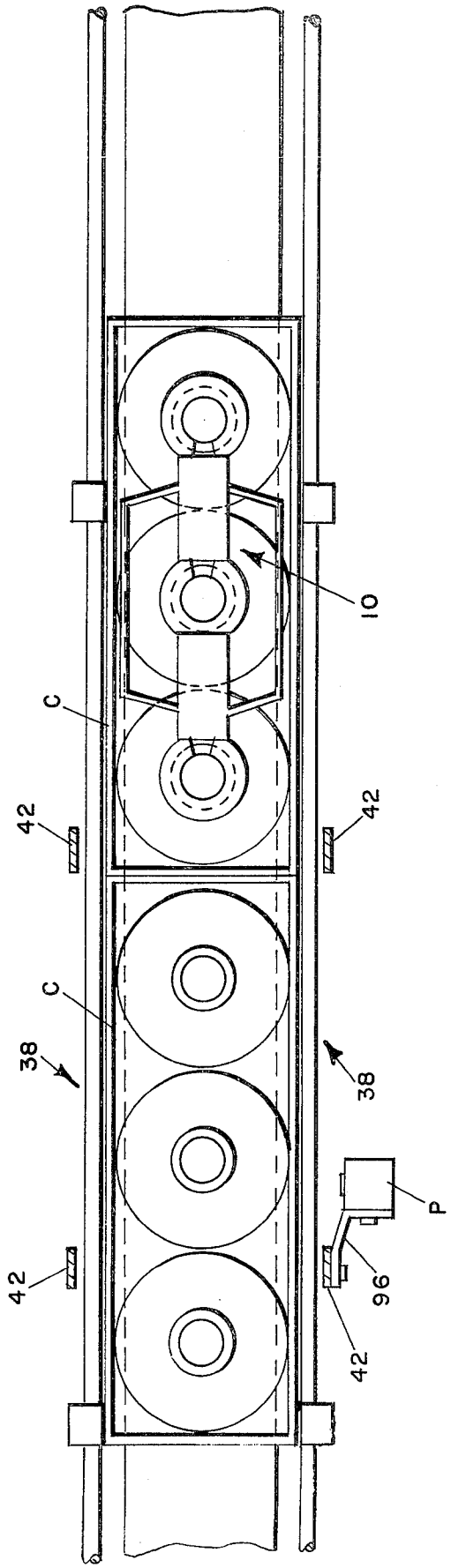
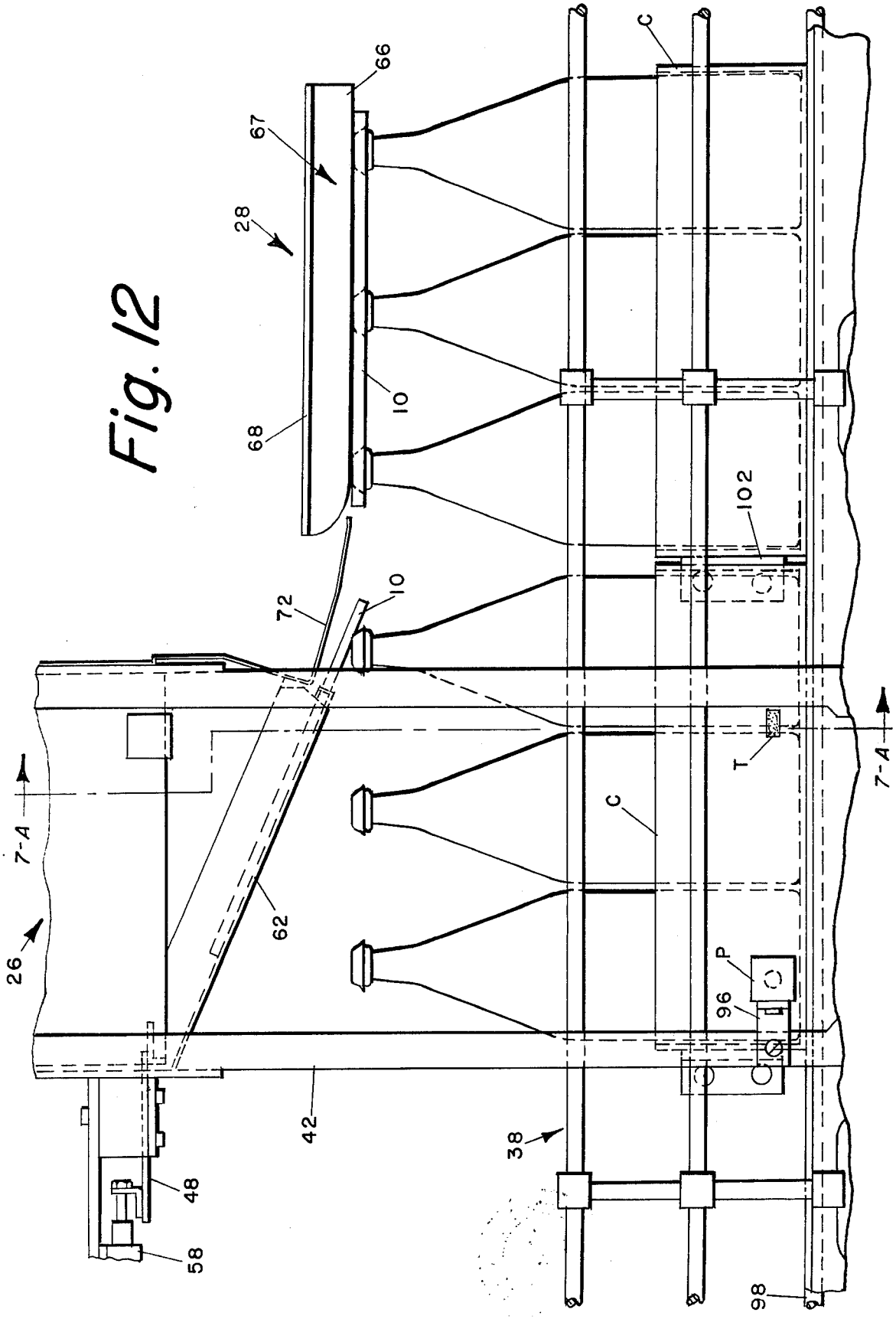


Fig. 11

Fig. 12



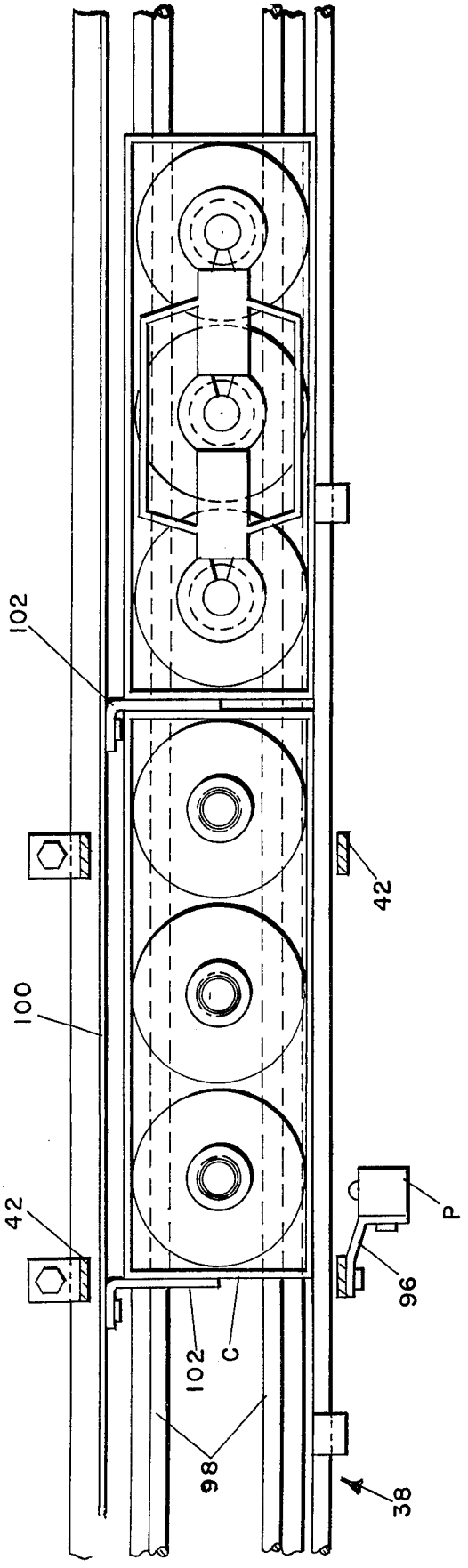


Fig. 13

APPARATUS FOR APPLYING CARRIER GRIDS TO BOTTLES

BACKGROUND OF THE INVENTION

In my copending application Ser. No. 308,964, filed Nov. 24, 1972, there is disclosed apparatus for applying grids to the tops of groups of containers and, in particular, plastic carrying grids to the tops of groups of six bottles arranged in two rows side by side with three in each row. The grids applied with the aforesaid apparatus embody six top encircling elements adapted to be expanded by pressure over the caps of the bottles down onto the necks below the caps and are provided with upstanding handles which assisted in depositing and guiding the grids into position for application to the tops of the bottles.

This invention relates to apparatus of the same general kind adapted to be used to apply plastic carrying grids to the tops of groups of three containers wherein the containers in each group are arranged in a single row and especially to a combination designed to deposit flat grids having handles which lie in the plane of the grid onto the tops of the single row of bottles for delivery to pressure-applying means for forcing the grids downwardly over the caps onto the necks and to improved means for effecting deposit of the grids in timed relation with the arrival of groups of containers in a position for application of the grids thereto.

SUMMARY

Apparatus for applying carrier grids to the tops of the containers of groups of containers, said grids having top encircling elements corresponding in number to the number of containers in the group to which it is to be applied, and said elements being adapted to be expanded over the tops of the containers by downward pressure applied to the grids, comprising a conveyor for moving successive groups of containers along a predetermined path, pressure-applying means mounted above the conveyor and extending therealong beneath which the upper ends of the containers travel for progressively applying pressure to the grids deposited on the upper ends of the containers in the group, means for depositing a grid on the upper ends of the containers in each group as it approaches said pressure-applying means and means situated above the conveyor between the means for depositing the grid and the pressure-applying means for engaging the entire number of openings in the grid with all of the upper ends of the containers in the group prior to movement of the containers into the sphere of operation of the pressure-applying means. The means situated above the conveyor between the means for depositing the grids and the pressure-applying means comprises spaced parallel, elongate, rigid guide rails supported with their lower sides at the level of the path of movement of the tops of the containers with which the grid is adapted to have sliding engagement, said means by engagement with the grid deposited on the tops holding the grid with all of the top encircling elements engaged with the tops of all of the containers as the grid travels with the containers toward the pressure-applying means. The means for depositing the grids is a hopper supported above the conveyor having a bottom opening and a tray situated below the bottom opening which is inclined downwardly therefrom in the direction of the path of movement of the tops of the containers and there is power-operable means responsive to a detector to release the grids through the bottom opening of the hopper to the tray as each group of containers pass beneath it. The lower end of the tray is situated above the path of travel of the tops of the containers and there is means at the lower end for supporting a grid released thereto with its leading end intersecting the path of travel of the tops of the containers. The aforesaid means comprises transversely spaced, upstanding shoulders of a height corresponding substantially to the thickness of the grid. A flexible hold-down provided with a flat elongate surface is supported with one end above the aforesaid shoulders and its other end at the level of the last-named means. A detector is employed to release grids to the tray and is responsive to the presence of a group of containers arriving at a position for deposit of a grid thereon and may comprise a detector arm supported with an end adjacent the path of movement of the container or an electric eye operable, when intercepted by a group of containers, to effect the release of a grid. The conveyor comprises longitudinally spaced, parallel link chains but may alternatively comprise spaced parallel bars along which the containers are moved by a belt provided with spaced lugs.

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

FIG. **1** is a plan view of a flat carrier grid for carrying a group of three bottles showing the handles in the plane of the grid;

FIG. **2** is a fragmentary end elevation of a group of three in line bottles with a carrier grid applied to the top and with the handles bent upwardly from the plane of the grid;

FIG. **3** is an elevation of the apparatus for applying grids of the kind shown in FIG. **1** to groups of three bottles, showing a group of three bottles advancing from the left toward the place of deposit of the grid, a group of three bottles at the place of deposit of the grid thereon, and a group of three bottles at the right at the place of discharge with the grid forced down onto the necks of the bottles;

FIG. **4** is an enlarged elevation, partly in section, showing the hopper for depositing the grids on the upper ends of the bottles of the group of bottles in section, stabilizing means for engaging the grids with all of the bottle tops of a group of bottles and a fragmentary portion of pressure-applying means for pressing the grids downwardly onto the necks of the bottles;

FIG. **5** is an elevation, to somewhat smaller scale, showing the progress of a group of bottles from the stabilizing means to the pressure-applying means and the relation of the stabilizing means to the hopper and pressure-applying means and in addition conveyor means for moving the groups of bottles;

FIG. **6** is a plan view of the top of the hopper and the stabilizing means;

FIG. **7** is a plan view taken on the line **7—7** of FIG. **4**, showing the tray;

FIG. **7A** is a section taken on the line **7-A, 7-A** of FIG. **12**;

FIG. **8** is an elevation, partly in section, showing the progress of a grid as it is withdrawn from the tray and guided to the underside of the stabilizing means;

FIG. **9** is a vertical transverse section taken on the line **9—9** of FIG. **8**;

FIG. **10** is a vertical transverse section taken on the line **10—10** of FIG. **5**;

FIG. 11 is a plan view of the apparatus provided with a photoelectric detector;

FIG. 12 is an elevation of FIG. 11 showing the photoelectric detector; and

FIG. 13 is a plan view of an alternative form of apparatus wherein the containers are moved along fixed, longitudinally extending rails by a conveyor belt mounting lugs along one side.

The apparatus of this invention is designed especially to apply flat plastic carrying grids of the kind shown in FIG. 1 to the tops of bottles as shown in FIG. 2. These grids comprise a flat plastic frame having three longitudinally spaced neck encircling elements 12 arranged in a single row and connected to each other by webs 14, the neck encircling element 12 being adapted to be expanded over the caps 16 of bottles 18, downwardly onto the necks 20 below the caps. Handle members 22—22 connected to the webs 14 are provided in the plane of the webs for upward bending after the grid has been applied to the tops of the bottles, as shown in FIG. 2, to positions above the tops of the bottles and spaced therefrom sufficiently to enable a customer to insert his fingers through the upwardly bent loops provided by the handles and the tops of the caps to easily carry the group of three bottles for which this particular grid is designed.

The apparatus for applying the grids as described comprises, in general (FIG. 3) a conveyor 24 for moving groups of three containers along a predetermined path; a hopper 26 for holding a quantity of grids from which grids are delivered to the tops of groups of containers as they move into position for application of a grid thereto; guiding and stabilizer means 28 for holding a grid delivered to the tops of the containers properly positioned for readiness for application of pressure to the grid to force it downwardly over the caps onto the necks of the bottles; and pressure-applying means 30 for applying pressure progressively to the grid to force it downwardly over the caps onto the necks of the bottles.

The conveyor 24 (FIGS. 4 and 5) is mounted on a rigid elongate frame 32 supported at its ends and intermediate its ends from the floor by means of pedestals 34, only one of which is shown herein. The conveyor is of the flat plate type comprising spaced parallel chains with cross-plates and is supported at its ends on longitudinally spaced sprockets 36-36, those at the left end only being shown in FIGS. 4 and 5, so that a portion of the conveyor travels in a horizontal plane below the hopper 26, stabilizer means 28 and pressure-applying means 30. The sprockets 36—36 at the right-hand end, but not shown, are fixed to a shaft which, in turn, is provided with a sprocket connected by a suitable chain to a drive motor, as shown in my copending application. Spaced parallel upstanding guide rails 38—38 (FIGS. 4 and 5) are mounted along the opposite sides of the frame 32 for confining the containers as they travel along on the conveyor.

The hopper 26 (FIGS. 3, 4 and 5) for holding a quantity of grids in contrast to that shown in the copending application is supported in a vertical rather than an inclined position, is substantially rectangular in horizontal cross-section and is supported at its four corners by posts 42, the lower ends of which are fastened to the frame 32 by bolts 43. The bottom of the hopper 26 (FIGS. 4 and 6) is open except for a pair of transversely spaced, horizontally disposed, inwardly extending ledge members 44—44 at the rear end of the hopper with respect to the direction of movement of the conveyor and a pair of transversely spaced, horizontally disposed, inwardly extending ledge members 46—46 adjacent the forward end of the hopper. The longitudinal spacing of the ledge members 44—44 and 46—46 is such that when a stack of grids is deposited in the hopper the lowermost grid rests on the ledge members by engagement of the rear portion of the top encircling element at the rear end of the lowermost grid with the ledge members 44—44 and the rear portion of the top encircling element at the forward end of the lowermost grid with the ledge members 46—46. The ledge members 44—44 are slightly higher than the ledge members 46—46 so that the lowermost grid slopes forwardly and downwardly, as shown in FIG. 4. The forward wall 40*a* of the hopper has a transversely extending slot 40*b* of a vertical height corresponding to the thickness of the grid so that the forward end or leading end of the lowermost grid resting on the ledge members 44—44, 46—46 is aligned with the slot 40*b*. The rear wall 40*c* of the hopper contains a transverse slot 40*d* above the ledge members 44—44 and a feed plate 48 is mounted to be moved through the slot 40*b* and by such movement to push the lowermost grid forwardly through the slot 40*b* far enough to clear the rear portions of the top encircling elements at the trailing and leading ends of the grid from the ledge members 44—44, 46—46 so as to permit it to drop through the bottom opening. The feed plate 48 is slidingly supported in a groove 52 at the underside of a block 50 by a retainer plate 54, the block 50, in turn, being mounted to the rear wall 40*c* of the hopper. A bracket plate 56 bolted to the upper side of the block 50 supports a piston and cylinder assembly 58 with the piston connected by a rod 60 to the feed plate 48. Pressure is supplied to the piston and cylinder assembly at appropriate intervals as determined by sensing means to be described hereinafter to cause the feed plate to release the lowermost grid from the hopper.

Below the hopper 26 there is mounted a tray 62 (FIGS. 3, 4 and 5) which inclines downwardly from the open bottom of the hopper and forwardly in the direction of travel of the conveyor, the forward end terminating just above the path of movement of the tops of the containers and being provided with upstanding, transversely disposed supporting elements 64—64 (FIGS. 4, 6 and 7). The space between the elements 64—64 is wide enough so that when a grid drops down onto the tray the leading one of the top encircling elements passes between the supports 64—64 and is supported from further forward movement by engagement of the laterally extending handles 22—22 with the elements 64—64 with the leading one of the top encircling elements extending forwardly and downwardly therefrom, as shown in FIGS. 7 and 8. The elements 64—64 correspond substantially in height to the thickness of the grid.

The stabilizer means 28 (FIGS. 4, 5 and 9) which is mounted forwardly of the hopper in the direction of travel of the conveyor comprises a pair of longitudinally extending, spaced parallel members 67—67 supported parallel to the conveyor, each having a vertical flange 66 and at the upper edge of a horizontal flange 68. The distance between the vertical flanges 66—66 is wide enough to engage a grid at opposite sides of the top encircling elements. The members are of a length

which is at least as long as the grid and preferably somewhat longer so that the entire length of the grid resting on the upper ends of the containers is firmly seated and held engaged with the caps of all of the containers while slidingly moving along beneath the members. The trailing ends of the members, with respect to the direction of movement of the conveyor, are upwardly curved, as shown at **70—70,** to facilitate entrance of the grid beneath these members.

A resilient guide and hold-down plate **72** (FIGS. **4** and **8**) is supported between the lower end of the tray **62** and the trailing ends **70—70** of the members **67—67** for guiding the grids as they leave the tray and are moved forwardly by engagement with the leading container of the group of containers into engagement with the underside of the members **67—67.** The hold-down plate **72** is secured to the lower end of a bracket member **74** fastened to the front wall **40***a* of the hopper with its rear end **76** above the elements **64—64** and its forward end **78** substantially at the level of the lower edges of the vertical flanges **66—66.** The space between the rear end **76** and the elements **64—64** corresponds substantially to the thickness of the grid so that when the latter is lifted up onto the elements **64—64** by engagement of the top of the leading container and is slid forwardly over these elements it will be firmly controlled against lateral movement and as successive portions are withdrawn from the tray they are pressed downwardly onto the caps of the succeeding containers.

The pressure-applying means **30** (FIGS. **3, 5** and **10**) comprises a pair of transversely spaced, longitudinally extending chains **80—80** mounted on longitudinally spaced sprockets **82—82, 84—84** in the same way as shown in the aforementioned copending application with the lower runs **86—86** inclined downwardly and forwardly in the direction of travel for engagement with the portions of the grid at opposite sides of the top encircling elements so that as the containers are moved forwardly beneath the chains the grids will be progressively forced downwardly over the caps of the containers onto the necks. The lower runs of the chains are supported by rigid backing rails **88—88** as is described in the copending application and the sprockets **84—84** are driven by suitable connections from a motor.

The stabilizing means **28** provides for insuring registration of all of the top encircling elements with the caps of the containers before pressure commences to be applied by the pressure-applying means **30** which is particularly important when applying grids to the tops of a single row of containers since in the absence of the stabilizing means the grid could move laterally after engagement with the leading container in contrast to the apparatus of the copending application wherein such lateral movement is not possible because the leading end of the grid is engaged by two containers which thus prevent any skewing of the trailing end of the grid. Thus the stabilizing device insures against skewing and hence failure of the grid to be applied.

As previously related, it is desirable to release a grid from the hopper to the tray as each group of three containers approach a position for application of a grid thereto and in accordance with one form of the invention this is effected by a detector in the form of an arm **90** (FIGS. **4, 5** and **6**) mounted at one end on a vertical post **92** with its other end **94** situated parallel to the path of movement of the containers and yieldably held in this position so that as containers are moved past it on the conveyor they will displace the arm **90** about the post **92** and such displacement will actuate a microswitch M which will supply pressure to the piston and cylinder assembly **58.**

Optionally, as shown in FIGS. **11** and **12,** a photocell P supported by a bracket member **96** on one of the posts **42** may be substituted for the arm **90.** Activation of the photocell by a suitable mark T (FIG. **12**) on the carton C in which the cartons are supported will supply pressure to the piston and cylinder assembly. The circuit for the photoelectric cell is provided with a conventional time delay such that a grid will be dropped down into the tray before the leading bottle arrives at a position to pick it from the tray. It is obvious that other well-known detecting devices may be substituted for either the arm or the photocell shown herein without departing from the intent and purposes of the invention as herein illustrated.

It is as heretofore related the purpose of the invention to apply a grid to every three containers and to this end the containers are, as shown in FIGS. **1** to **8** inclusive, placed in cartons C which support the three containers as a unit for movement along the conveyor. Movement of the group of containers in their cartons may be effected by merely placing the cartons with the containers in them on the conveyor and depending upon the friction between the bottoms of the cartons and the conveyor to move the cartons along relative to the hopper, stabilizer and pressure-applying means and such operation is reasonably effective since the detectors will operate as each group comes along to supply a grid to it regardless of whether the spacing is the same from one group to the next or not and so without having to synchronize the feed of the cartoned containers with the grid applying means. Optionally, the conveyor chains may have lugs (not shown) at spaced intervals therealong for positively moving the cartons of containers along at a uniform spacing and rate.

In place of chain conveyors a pair of transversely spaced, parallel, horizontally disposed tracks **98—98** (FIGS. **12** and **13**) may be employed in place of the chains. A belt type conveyor **100** arranged along one side of the tracks on appropriately spaced pulleys provides for sliding the cartons along the rails by means of spaced lugs **102** fastened to it so as to extend transversely across the tracks as shown in FIG. **13.** It is obvious from the foregoing that the type of conveyor for effecting the continuous movement of the containers is not critical to the operation of the apparatus except in that it operates to move the containers forwardly along a predetermined path.

FIG. **8** especially shows the progress of a grid as it is removed from the tray onto the tops of the containers and the preliminary application of pressure by the stabilizing means which engages the top encircling elements of the grid with the caps but without forcing the top encircling elements downwardly on the caps and this is important because if the first of the top encircling elements should be forced down onto the flaring portion of the cap before the succeeding cap encircling elements became engaged with the succeeding caps it could displace the grid forwardly with respect to the succeeding containers so as to move the succeeding top encircling element out of proper registration with the tops of the succeeding containers and therefore make it impossible to register all of the top encircling elements with all of the tops of the containers. It is for this

reason and also for the reason previously mentioned of preventing the grid skewing that the stabilizing means of this invention is employed in conjunction with the hopper and the pressure-applying means.

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

I claim:

1. 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 extending therealong beneath which the upper ends of the containers are moved by the conveyor for progressively applying pressure to a grid deposited on the upper ends of the containers in the group, means for depositing a grid on the upper ends of the containers in each group as it approaches said pressure-applying means, and stabilizing means situated above the conveyor between the means for depositing the grid and the pressure-applying means for engaging the entire number of top encircling elements of the grid with all of the upper ends of the containers in the group prior to movement of the containers into the sphere of operation of the pressure-applying means.

2. Apparatus according to claim **1**, wherein said stabilizing means is at least as long as the length of the grid.

3. Apparatus according to claim **1**, wherein said stabilizing means comprises a pair of spaced parallel, elongate, rigid top guide rails supported with their lower sides at the level of the tops of the containers and with which a grid engaged with the tops of the containers is adapted to have sliding engagement.

4. Apparatus according to claim **1**, wherein said stabilizing means holds the grid engaged with the tops of the containers as the grid travels with the containers toward the pressure-applying means.

5. Apparatus according to claim **1**, wherein the means for depositing the grids is a hopper supported above the conveyor having a bottom opening, a tray situated below the bottom opening and inclined downwardly therefrom toward the path of movement of the tops of the containers, and power-operable means responsive to a detector to release a grid through the bottom opening of the hopper to said tray as each group of containers pass beneath it.

6. Apparatus according to claim **5**, wherein the detector is responsive to the presence of a group of containers as they approach the hopper to release a grid.

7. Apparatus according to claim **5**, wherein the detector is an arm supported adjacent the conveyor in the path of movement of the containers operable by deflection to effect release of the grid.

8. Apparatus according to claim **5**, wherein the detector is an electric eye supported adjacent the path of movement of the containers operable when intercepted by a group of containers to effect release of the grid.

9. Apparatus according to claim **8**, wherein the containers are advanced in a carton in which they are set in line and the carton has on it an index mark for detection by the electric eye.

10. Apparatus according to claim **1**, wherein a springy presser plate overlies the top of the containers at the place of engagement of the leading container in a group of containers with the leading end of a grid supported by the tray.

11. Apparatus according to claim **1**, wherein the conveyor for the groups of containers comprises longitudinally extending, spaced parallel link chains connected by cross-plates which form a supporting surface and is supported with a length thereof below the pressure-applying means in a horizontal plane.

12. Apparatus according to claim **1**, wherein the conveyor for the groups of containers comprises longitudinally extending, spaced parallel, horizontally disposed rails and a belt supported along one side of the rails for movement therealong on which there are mounted lugs, the spacing between which corresponds to the length of the carton in which the containers are packaged.

13. 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 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 extending therealong beneath which the upper ends of the containers are moved by the conveyor for progressively applying pressure to a grid deposited on the upper ends of the containers in the group, means for depositing a grid on the upper ends of the containers of each group as it approached said pressure-applying means, and stabilizing means situated between the means for depositing the grid and the pressure-applying means for engaging all of the top encircling elements with all of the tops of the containers before the containers enter the pressure-applying zone, and wherein said means for depositing the grid comprises a hopper having vertically disposed side and end walls, an open top and open bottom, transversely spaced supporting shoulders at the bottom extending inwardly from the side walls, the distance between which is slightly less than the transverse width of the top encircling elements at the ends of the grid so that a grid deposited in the hopper rests with marginal portions on the shoulders, said hopper having in its forward wall with respect to the direction of movement a transverse slot corresponding in length and height to the width and thickness of the grid such that the forward end of the grid may enter the slot, a slot in the rear wall, a feed plate mounted to move through the slot in the rear wall to push the lowermost grid forwardly into the slot in the front wall far enough to clear said shoulders, and a downwardly and forwardly extending tray below the hopper for receiving the grid as it is pushed off said shoulders.

14. Apparatus according to claim **13**, wherein the tray has at its lower end transversely spaced upright supports, the distance between which is greater than the width of the top encircling elements at the ends of the grid but less than the width of the handles.

15. Apparatus for applying a carrier grid to the tops of capped bottles of a group of three aligned bottles,

said grid having three aligned top encircling elements spaced to engage the tops of the bottles, said elements being adapted to be expanded over the caps of the bottles down onto the necks below the caps by downward pressure applied to the grid, comprising a conveyor for moving successive groups of bottles along a predetermined path, pressure-applying means mounted above the conveyor and extending therealong beneath which the upper ends of the bottles travel for progressively applying pressure to a grid deposited on the upper ends of the bottles in the group, means for depositing a grid on the upper ends of the bottles in each group as it approaches said pressure-applying means, and stabilizing means situated above the conveyor between the means for depositing the grid and the pressure-applying means comprising spaced parallel, longitudinally extending rails having substantially flat, horizontal surfaces parallel to the conveyor situated at a height from the conveyor corresponding to the heights of the bottles.

16. Apparatus according to claim **15,** wherein the rails have transversely narrow lower edges, the distance between which is greater than the diameters of the caps on the bottles.

17. Apparatus according to claim **15,** wherein the means for depositing the grids is a hopper having a bottom opening below which there is a tray inclined downwardly in the direction of travel of the groups of bottles, and wherein said tray has a lower end situated above the path of travel of the tops of the bottles and there is means at the lower end of the tray supporting a grid deposited therein with its lower end intersecting the path of travel of the tops of the bottles.

18. Apparatus according to claim **17,** wherein the means supporting the grid deposited on the tray comprises transversely spaced upstanding shoulders.

19. Apparatus according to claim **18,** wherein the shoulders correspond in height to the thickness of the grid such that the top of the leading bottle in a group of bottles lifts the grid up onto the upper edges of the shoulders.

20. Apparatus according to claim **17,** wherein a flexible hold-down provided with a flat elongate surface is supported with one end above the shoulders and the other end at the level of said stabilizing means.

21. 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 the 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 extending therealong beneath which the upper ends of containers are moved by the conveyor for progressively applying pressure to a grid deposited on the upper ends of the containers in the group, means for delivering a grid in a downwardly inclined direction toward the path of movement of the tops of the containers, stabilizing means situated above the conveyor between the last means and the pressure-applying means for engaging the entire number of top encircling elements of the grid with the entire number of the upper ends of the containers in the group, and spring means for holding the leading end of the grid downwardly depressed while the leading one of the containers in the group moves into intersecting engagement with the top encircling element at the leading end of the grid and for progressively continuing to apply downward pressure to the entire length of the grid as it is drawn forwardly with the containers.

22. 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 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 extending therealong beneath which the upper ends of the containers are moved by the conveyor for progressively applying pressure to a grid deposited on the upper ends of the containers in the group, a hopper supported above the conveyor having a bottom opening for holding a stack of grids, a tray situated below the bottom opening and inclined downwardly therefrom toward the path of movement of the tops of the containers to which the lowermost grid in the stack of grids is adapted to be released, means at the lower end of the tray for holding the grid released thereto in a downwardly inclined position with its leading end intersecting the path of movement of the tops of the containers as they are moved along by the conveyor, and spring means supported above the lower end of the tray at the place of intersection of the leading end of the grid with the leading one of the containers in the group for engaging the leading top encircling element with the top of the leading container as the latter withdraws the grid from the tray and successively engaging the remaining top encircling elements with the tops of the remaining containers in the group.

23. Apparatus according to claim **22,** wherein the spring means is spaced from the lower end of the tray by an amount corresponding approximately to the thickness of a grid.

24. Apparatus according to claim **15,** wherein the pressure-applying means slopes toward the conveyor in the direction of movement of the containers along the conveyor.

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