April 16, 1946. C. D. KEITH ET AL 2,398,747

BOTTLE TRANSFERRING AND CARRYING APPARATUS

Filed Oct. 17, 1944 2 Sheets-Sheet 1

Fig. 1

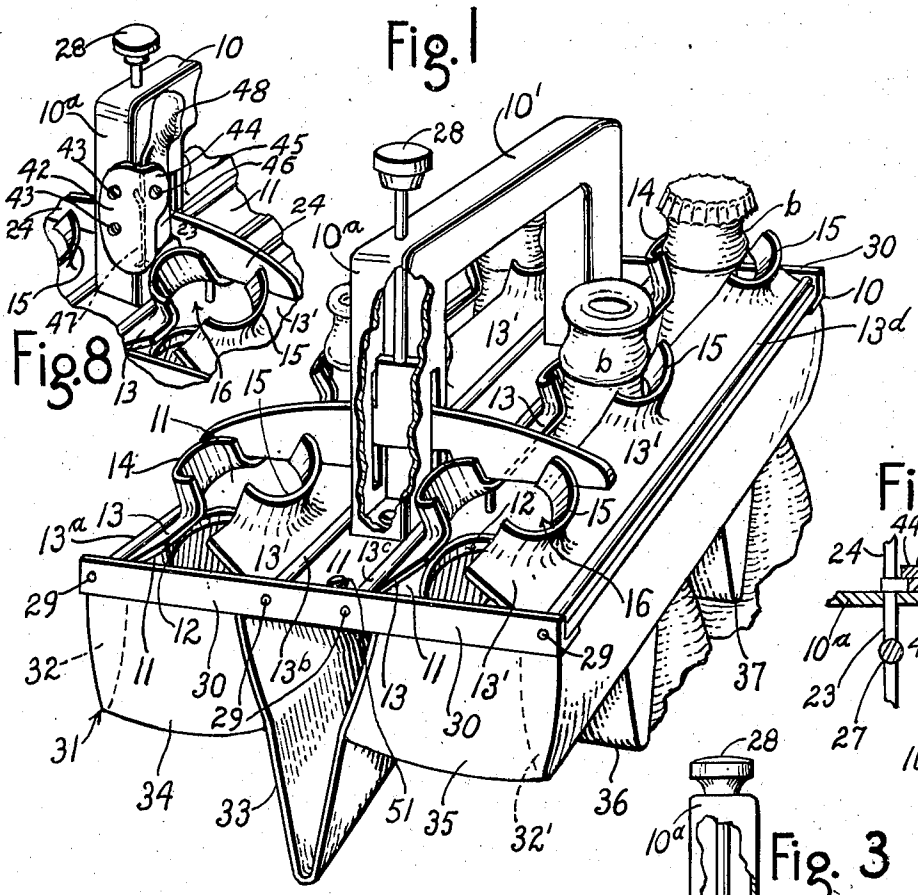


Fig. 8

Fig. 9

Fig. 2

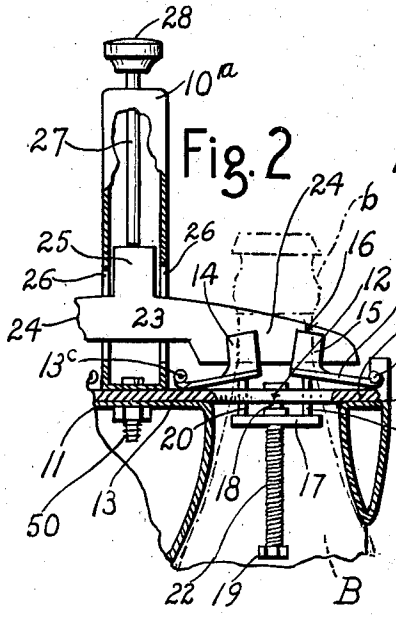
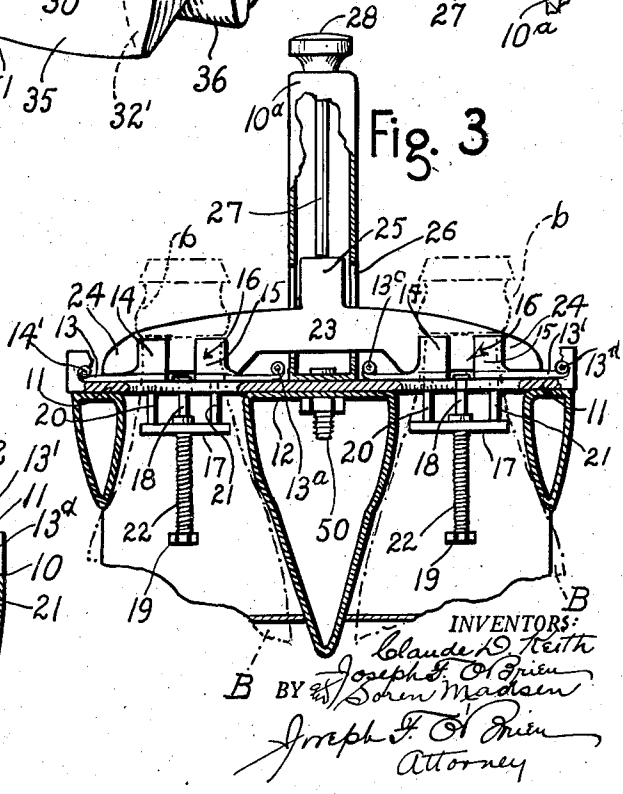


Fig. 3



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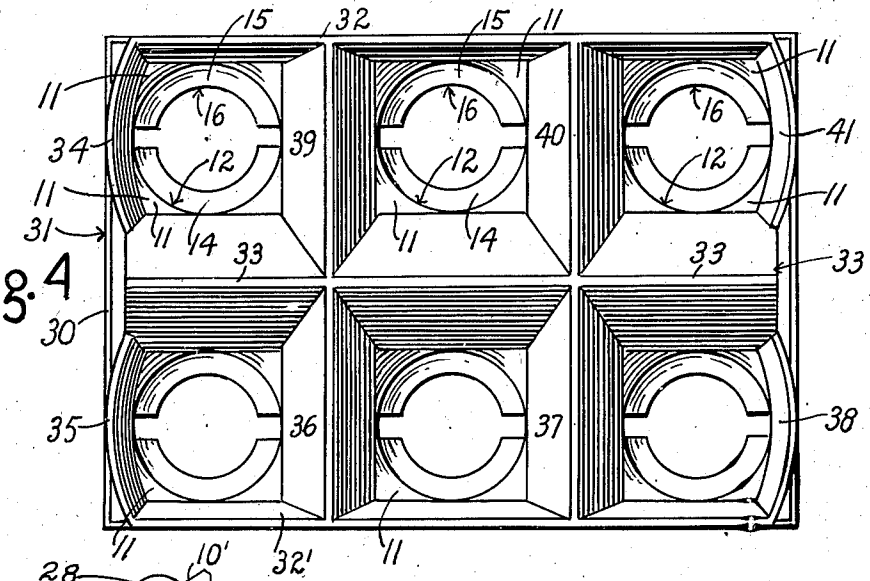


Fig. 4

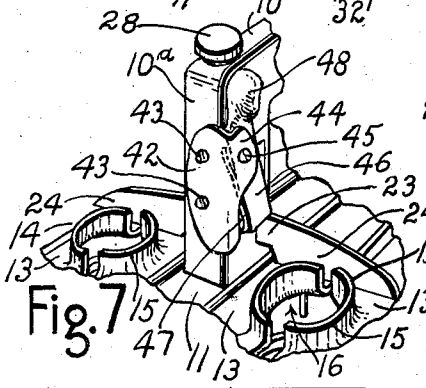


Fig. 7

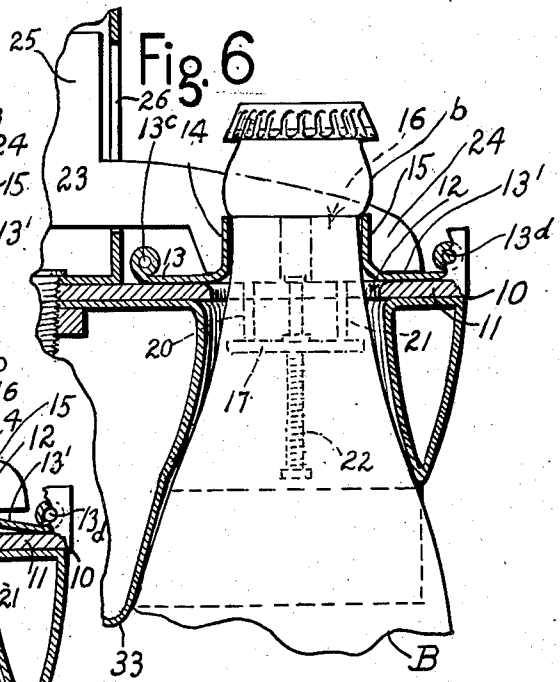


Fig. 6

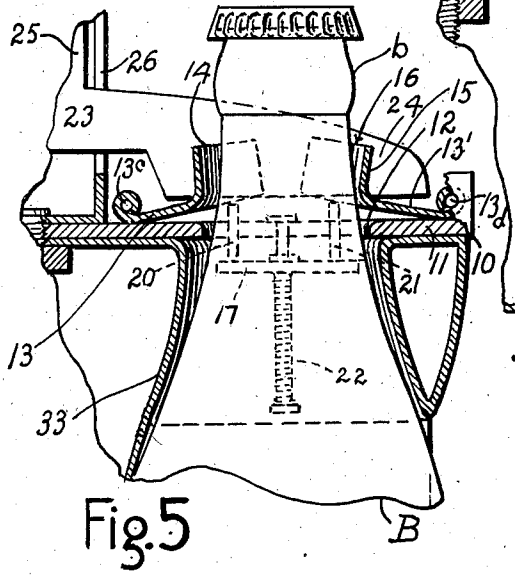


Fig. 5

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UNITED STATES PATENT OFFICE

2,398,747

BOTTLE TRANSFERRING AND CARRYING APPARATUS

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Application October 17, 1944, Serial No. 559,054

5 Claims. (Cl. 294—87)

This invention relates to improvements in bottle-transferring and carrying apparatus and particularly to apparatus or devices for the lifting and carrying or transferring of cylindrical-necked bottles having upper portions or tops provided with round surfaced, outwardly projecting ribs or bulbs arranged adjacent to the top or capped ends thereof.

One of the objects of this invention is to provide a simple, inexpensive and easily-operable apparatus capable of speedy operation for lifting and transferring or carrying such bottles, preferably in aggregated groups from one point to another, as for example, from conveyors or turntable on which, in bottling plants, bottles are aggregated to a bottle-carrying case or from a bottle-carrying case to a washing machine.

Another object of our invention is, in a device of the character specified, to provide for speedy operation by employing bottle-engaging members which are manually closable on the necks of the bottles and automatically-releasable through spring operation by contact or engagement of the bottoms of the bottles with a support or the like, the engaging members being so arranged that the bottles, upon closure of the engaging members, will hang by gravity in the bottle-engaging members and the weight of the bottles may be utilized to retain the bottle-engaging members in closed position and to suspend the bottles in the apparatus until automatically released, as aforesaid.

Another object of our invention is to provide means, in a device of the character specified, to position the bottles vertically in relation to an engaging device and means to space bottles aggregated in contact with each other and move the same into transverse alignment with the positioning device or means.

Still another object of our invention is to provide for speedy operation by utilizing spring means for normally pressing the bottle-engaging members into open position and for automatically releasing said bottle-engaging members when the weight of the bottles is removed therefrom by setting the bottles down on a suitable support.

Still another object of our invention is, in a device of the character specified, to provide in connection with normally-open bottle-engaging plates a single manually-actuated means and preferably a finger or thumb-actuated member for moving all of said jaws into closed position in cooperation with a handle on the base member adapted to lift said base member and the bottles therein from their support and leave them hanging by gravity as aforesaid in said bottle-engaging members.

Still another object of our invention is to produce apparatus embodying a base member having bottle-positioning openings arranged in axially-aligned rows both longitudinally and transversely and a bottle-spacer device cooperating therewith composed of downwardly-tapered cuneiform partitions arranged between such longitudinal and transverse rows of bottle-positioning openings, such partitions preferably defining beneath each bottle-positioning opening a cavity of square configuration having outwardly divergent walls meeting each other at a given line below such openings and having pointed portions adapted to be pressed downwardly between the members of a group of bottles to wedge them apart, and upon downward movement over a group of bottles to engage and shift the individual bottles into alignment with the bottle-positioning openings and to guide the same thereinto.

Another object of our invention is in a device provided with a bottle-top engaging or gripper member or members and spring means for automatically opening said engaging or gripper member or members to release the bottles, of an additional locking member movable and preferably automatically-movable to lock said engaging-members in closed position, and we preferably provide manually-operable means for releasing said automatically-movable locking member to cause speedy operation and opening by automatically-opening spring means of said engaging member or members to release the bottle tops simultaneously with the setting down of the bottles and the removal of the weight thereof from said gripping member or members.

With the above objects in view, together with other objects which will hereinafter appear, our invention comprises the combination of elements and arrangement of parts as hereinafter more specifically specified, illustrated in the drawings and pointed out in the appended claims.

In the drawings:

Fig. 1 is a view in perspective of a bottle-transfer and carrying apparatus showing our engaging members in wide-open position and the tops of bottles extending through some of the openings before movement of the manually-actuated plunger to close the gripper members on the bottle necks to engage the same;

Fig. 2 is an illustrative fragmentary view showing in section a single opening of bottle-transfer device with the plunger and engaging members

partly closed or depressed, the position of the bottle necks being shown in dotted lines;

Fig. 3 is a broader view along the same lines as Fig. 2 showing the position of the parts in fully-engaged position;

Fig. 4 is a bottom plan view of the apparatus shown in Figs. 1 to 3;

Fig. 5 is an enlarged fragmentary view similar to Fig. 2 showing in full lines a bottle neck and in section an engaging-member just prior to completion of the engaging movement thereof;

Fig. 6 is an enlarged view similar to Fig. 5 showing the gripper member in final engaging position;

Fig. 7 is a fragmentary perspective showing in locked position our manually-releasable spring-actuated means for automatically locking the gripper members against movement by the automatic opening means;

Fig. 8 is a view similar to Fig. 7 of the locking means in open position to disengage the bottle tops; and

Fig. 9 is a horizontal section through the automatic locking means and adjacent mounting parts illustrated in Figs. 7 and 8.

Referring now to these drawings, which illustrate a preferred embodiment of our invention, 10 indicates a unit of our bottle-transferring and carrying apparatus comprising a base-member or base-plate 11 having a series of circular bottle-receiving openings 12 preferably of fixed size, area and position. As illustrated, the bottle-receiving openings are arranged in rows of any suitable number of such openings and our preferred embodiment shows two parallel rows, each comprising three of such openings to accommodate, transfer and carry six bottles, and a handle 10' is mounted between the two rows to extend substantially along the longitudinal center line of the base-member 11.

Bottle-engaging members 13, 13' are pivotally mounted at one longitudinal edge on the base member and have pivotal axes extending longitudinally of the base plate and adjacent to edge portions of said rows of openings to cause the opposite edges to be movable and to overhang such openings. Such members 13, 13' are arranged to move pivotally from a closed position in abutment with and parallel to said plate 11 to an open position inclined at an angle of approximately forty-five degrees (45°) to the base plate and vice versa. The inclination of said members in open position will not only permit free movement of bottles projected through the bottle-receiving opening 12 to extend upwardly above said bottle-engaging members, but will in the receiving or filling operation of the device assist in guiding bottles into proper vertical position. The pivotal movement of these engaging members from open to closed positions will cause the movable edges of such members to extend over and obstruct said openings, and these movable edges are adapted when such members are moved into closed position parallel to the plate 11, to engage the tops of bottles projected therethrough, while a movement in the opposite direction to inclined open position will cause such movable edges to move upwardly and outwardly to release the tops of the bottles.

As shown, these bottle-engaging members are arranged in pairs 13, 13' the members of which are opposed to each other and are pivotally-mounted to cause the movable edges thereof to swing toward and away from each other and toward and away from a longitudinal center line diametrically bisecting the circular openings of a row of such bottle-receiving openings 11. Each of the members 13, 13' are provided in axial alignment and concentric with the bottle-receiving openings of the base-plate 11 with arcuate bottle-top hugging-portions so as to produce a hugging or encircling engagement between said movable edge portions of the bottle-engaging members and the necks of the bottles projected through such bottle-receiving openings, whereby the area of contact between the bottle-neck and the bottle-engaging member is increased and a tighter engagement between the bottle-neck and said bottle-engaging member is produced than would be the case if the arcuate hugging portions were omitted.

In the preferred embodiment of our invention illustrated, two pairs of such bottle-engaging members are employed to cooperate with two rows of bottle-receiving openings, and each pair is provided with a suitable number of pairs of arcuate bottle-top hugging portions to accommodate the number of bottles which it is desired to handle by the device, and as shown, we have provided three pairs of bottle-top hugging-portions to accommodate six bottles.

While arcuate hugging-portions in the plane of the engaging member encircle and hug the necks of the bottles, it is desirable, in order to procure a still tighter grip and a steadying of the bottle in the apparatus, to provide such hugging portions with collars, and, in the embodiment shown, we have provided deep collars 14 and 15 which not only encircle the bottle neck but form chocks which fit in between the surface of the bottle-engaging members and the lower edge of the bulb or bead *b* of the bottle B.

In the embodiment illustrated, the bottle-engaging members are provided with rolled or folded pivoted edges 13*a*, 13*b*, 13*c* and 13*d* and pivot pins 29 disposed at the opposite ends of these folded edges are mounted to move pivotally in apertures in angle-bars 30 mounted transversely at the opposite ends of the base member or plate 11 and suitably connected thereto.

In said preferred embodiment, the pairs of pivoted engaging-members 13, 13' are normally moved into open, inclined position automatically, and are retained in such open, inclined position to free the receiving opening during the loading or positioning of the bottles within the bottle-receiving openings of the base member 11. As illustrated, each pair of the said members are automatically moved and pressed into such open inclined position by a pair of spring-pressed plungers 20, 21 which as shown, pass through the base plate and in the embodiment illustrated are fixedly mounted upon a transverse yoke member 17 which is mounted to reciprocate on a fixed rod 18 disposed below the base plate 11. Each yoke 17 rests upon and is normally forced upwardly against the under surface of the base plate by a spiral spring 22 mounted on the fixed rod 18 which, as shown, is fastened at its upper end in the base plate 11, extends downwardly through said yoke-member to permit reciprocating movement of said yoke thereon and has at its opposite end a spring-abutment member 21 for the spring 22.

The handle 10', as shown, has mounted thereon at the front end thereof, a manually-actuated closing mechanism which also serves to limit the opening movement of the engaging members, and

for this purpose, we provide a reciprocating closing-member comprising a yoke 23 mounted at its middle portion in vertical slots 26 formed in a tubular or hollow-leg 10a of the handle 10' and having fixed arms 24, disposed transversely at opposite sides of said slots 26 extending over the bottle-top engaging members 13, 13' to engage and depress or move the movable or free edges of such engaging members when the yoke is moved downwardly in the vertical slot 26 and also to limit the upward opening movement of said movable edges of such engaging-members by the springs.

The yoke member 23 is movable downwardly manually and for this purpose, we mount in the hollow-leg 10a of the handle member 10' a plunger member or rod 27 which extends upwardly from the yoke 23, passes through an opening in the top of the leg 10a and is provided at its top end with an operating button 28.

Pressure by the finger of the user on the button 28 will move the yoke downwardly in said vertical slot 26 and will depress or close the movable edges of the bottle-top engaging members against the action of the opening springs 22.

In the operation of the device so far described, a series of bottles are aggregated or grouped on a suitable support and when our device is pressed down over six of such bottles, the tops pass through the bottle-top receiving-opening in the base plate and extend upwardly a proper distance therethrough. The user thereupon by a manual operation presses the button 28 upon the plunger 27 which in turn depresses the yoke 23 so that the arms 24 thereof engage and move the movable or free edges of the bottle-top engaging member about their pivots into closed position in which the arcuate, concentric, engaging-portions will pass beneath the bulb b and contact the neck of the bottle below the same. Now, upon lifting of the transfer or carrier apparatus while the engaging members are in closed position the bottles will drop or move downwardly slightly and then said bulb b will contact said arcuate engaging portions and will be hung or suspended thereon. The weight of such bottles will completely counter-act and overcome the pressure of the opening springs and the bottles may be carried or moved by the apparatus while they are thus suspended.

Speed of operation of a device of this character is highly important and engagement of a series of bottles at the top-portions by a mere downward movement of the device over the same and pressure of the finger on the button 28 will enable an instantaneous and positive engagement of the bottles and upon a lifting of the device by the handle, the bottles may then be transferred to any suitable support and instantaneously released. If desired, of course, the finger may be held on the button 28 and the engaging member kept in depressed position until the user places the bottles on a suitable support or in a suitable container, whereupon a mere removal of the finger and the relief from the weight of the bottles by setting the same down on said support, will immediately cause the engaging members to be automatically swung into open position so that the device may be instantly removed from the tops of the bottles.

If, however, the pressure of the finger of the user be removed from the button 28 immediately after engagement of the bottles and the apparatus is simultaneously lifted to suspend such bottles as above indicated, a release of the bottles may be instantaneously and automatically effected by a mere setting down of the bottles on a support to remove the weight thereof from the movable edges of the engaging members, whereupon these edges will be automatically opened by the springs 22 to release the bottles.

In some cases it is desirable upon manual depression of the plunger to positively lock the bottles in engaged position, and for this purpose we provide a spring-pressed locking member or lever 46 which is pivotally mounted upon the wall of the handle and preferably is mounted in a bearing-bracket 42, connected to said wall by screws 43. Said bracket 42 is provided with a mounting member or arm 44 spaced from the wall of the tubular handle portion 10a and having a screw 45 which serves as a pivot on which the spring-pressed locking member 46 is mounted to swing into and out of engagement with the yoke member 24.

As illustrated, the pivoted locking lever 46 is provided at its upper end with a finger-engaging releasing portion 48 and the lower end or heel thereof is adapted to be moved pivotally about the screw pivot 45, in the mounting arm 44. In said preferred embodiment shown, we provide a flat spring 47 connected at its upper end to the inner wall of the bracket and having a free lower end adapted to press the lever 46 outwardly or rearwardly of the device and into resilient contact with the side face of one of the arms 24 of the yoke 23 so that upon the lowering or depression of said yoke, the heel of the lever will automatically move into locking position over said yoke. When, therefore, the yoke is depressed manually by pressure on the button 28, the heel of the lever 46 will automatically move over said yoke arm to retain it and the movable edges of the engaging-members in such depressed position and thus to keep the bottles locked in position by said engaging members. In this locking arrangement, neither the weight of the bottles nor manual pressure on the button or knob 28 is relied upon to overcome the power of the continuously-operating opening springs acting on the engaging members. In this form, the bottles are automatically and positively locked in position within the bottle-receiving openings by a mere manual depressing of the button or knob 28, and such bottles will be retained in locked position until manually released by a releasing movement of the locking lever 46 from the yoke 23. In a device of this character, it is desirable to have two operating members, one for depressing the yoke against the action of the opening springs, and another for the releasing of the locking member 46 from the yoke 23, and we have therefore provided the locking member 46 with a finger-engaging portion 48 for the releasing of the bottles and this releasing member is positioned in adjacency to the operating button or knob 28 for engaging the bottles.

As above indicated, the inclined bottle-engaging members guide the tops of bottles when projected through the bottle-receiving openings, and we also preferably provide means to separate bottles, when aggregated or grouped on a suitable support or arranged in adjacent lines by a mere downward movement of the device over the same and simultaneously to guide the tops of such bottles into the bottle-receiving openings in the base member, and in the preferred embodiment of our invention illustrated, we provide beneath the base member a bottle-guiding grill 31 preferably comprising a single piece formed in any suitable manner, as for example by a casting operating, by welding the parts or otherwise and is composed as a series of cuneiform portions 33, 34, 35,

36, 37, 38, 39, 40 and 41 (see Figs. 1 and 4) arranged longitudinally and transversely to define a series of openings of truncated pyramidal configuration, the top portions of which openings are aligned and concentric with the bottle-receiving openings in the base member so that in effect, each of the circular openings in the base-member is inscribed within the outline of the top end of the pyramidal openings in the grill. The said cuneiform members of the grill are extended downwardly a sufficient distance to engage the cone-shaped necks of the bottles, and in view of the cuneiform conformation and the pyramidal openings, we are enabled by a mere downward movement of the device over the tops of the bottles to separate bottles that are arranged closely-adjacent to each other in groups or aggregations and to space the same in our apparatus for subsequent delivery and deposit to honeycomb cases or to washing-machine channels or the like. In the form of our invention illustrated, the grill is connected at its middle portion to the base-member or plate by the bolts 50 (which also connects the handle 10' thereto) and at its ends is connected to the base plate by screws 51.

The operation of the device will be apparent from the above description.

It is noted, however, that the device is useful with or without a grill and when a grill is employed in a device of the character specified, it becomes unitary with or a part of the base-member and its openings and the fixed walls thereof are preferably employed to position the bottles for subsequent engagement by the engaging members, whereas if the grill be omitted the circular openings 12 would then function as bottle-positioning openings.

Having described our invention, we claim:

1. In bottle-transferring and carrying apparatus, the combination of a rigid movable base member having a plurality of bottle-positioning openings provided with fixed walls for initially positioning in said base member the tops of bottles projected through said openings, a bottle-top-engaging member movably mounted on said base member and having opening and closing movements over said bottle-positioning openings to engage and release bottles positioned in said openings, said bottle-engaging member being adapted in closed position to engage and retain in said base member the necks of bottles passing through said bottle-positioning openings and in open position to release and disengage said bottles from said base member, spring mechanism for normally pressing said bottle-engaging member to open position to permit free ingress of the bottle necks, and a manually-actuated device engagable with said bottle-engaging member to move the same to bottle-engaging position against the action of said spring mechanism, whereby, upon a lifting of the base member while said members are engaged, a gravity hanging-engagement of said bottles is produced that is automatically releasable upon engagement of the bottoms of the bottles with a support.

2. In bottle-transferring and carrying apparatus, the combination of a rigid movable base member comprising a substantially flat plate having a plurality of circular bottle-positioning openings arranged in two parallel rows and provided with fixed walls for initially positioning in said base member the tops of bottles projected through said openings, a pair of bottle-engaging members hingedly mounted between said parallel rows of bottle-positioning openings to swing in opposite direction above said openings and having opening and closing movements upwardly and downwardly in a vertical arcuate path above said openings, said bottle-engaging members having arcuate jaw portions positioned coaxially over said circular bottle-positioning openings and being adapted in the closed position of said engaging members to engage and retain in said base member the necks of bottles passing through said openings and in open position to release and disengage said bottles from said base member, spring mechanism for normally pressing said bottle-engaging member to open position to permit free ingress of the bottle necks and a manually-actuated closing device conjointly engageable with said bottle-engaging members to move the same to bottle-engaging position against the action of said spring mechanism, whereby upon a lifting of the base member, while said bottle-engaging members are engaged, a gravity hanging engagement of the two rows of bottles is produced that is retained by the weight of the bottles during the carrying thereof and is automatically released when the bottles are placed upon a support.

3. In bottle-transferring and carrying apparatus, the combination of a rigid movable base member comprising a substantially flat plate having a plurality of circular bottle-positioning openings arranged in two parallel rows and provided with fixed walls for initially positioning in said base member the tops of bottles projected through said openings, a pair of bottle-engaging members hingedly mounted between said parallel rows of bottle-positioning openings to swing in opposite direction above said openings and having opening and closing movements upwardly and downwardly in a vertical arcuate path above said openings, said bottle-engaging members having arcuate jaw portions positioned coaxially over said circular position of said engaging members to engage and retain in said base member the necks of bottles passing through said openings and in open position to release and disengage said bottles from said base member, spring mechanism for normally pressing said bottle-engaging member to open position to permit free ingress of the bottle necks, a manually-actuated closing device conjointly engageable with said bottle-engaging members to move the same to bottle-engaging position against the action of said spring mechanism, whereby upon a lifting of the base member, while said bottle-engaging members are engaged, a gravity hanging engagement of the two rows of bottles is produced that is retained by the weight of the bottles during the carrying thereof and is automatically released when the bottles are placed upon a support and a handle mounted on said base member adjacent to said manually-actuated device to enable immediate lifting of the base member upon manual actuation of said closing device.

4. In bottle-transferring and carrying apparatus, the combination of a rigid movable base member comprising a substantially flat plate having a plurality of bottle-positioning openings provided with fixed walls for initially positioning in said base member the tops of bottles projected through said openings, a bottle-engaging member movably mounted on said base member and having opening and closing movements over said bottle-positioning openings to engage and release bottles positioned in said openings, said bottle-engaging member being adapted in closed posi-

tion to engage and retain in said base member the necks of bottles passing through said bottle-positioning openings and in open position to release and disengage said bottles from said base member, spring mechanism for normally pressing said bottle-engaging member to open position to permit free ingress of the bottle necks, and a manually-actuated device engageable with said bottle-engaging member to move the same to bottle-engaging position against the action of said spring mecehanism, and a manually-releasable locking member automatically movable to lock and retain said bottle-engaging members in bottle-engaging position against the action of said opening spring mechanism.

5. In bottle-transferring and carrying apparatus, the combination of a rigid movable base member comprising a substantially flat plate having a plurality of circular bottle-positioning openings provided with fixed walls for initially positioning in said base member the tops of bottles projected through said openings, a bottle-engaging member hingedly mounted on said base member above said bottle-positioning openings and having opening and closing movements upwardly and downwardly in a vertical arcuate path above said openings, said bottle-engaging member having arcuate jaw portions positioned coaxially over said circular-bottle-positioning openings and being adapted in the closed position of said bottle-engaging member to engage and retain in said base member the necks of bottles passing through said bottle-positioning openings and in open position to release and disengage said bottles from said base member, and a bottle-separating and guiding grill connected to said base member and extending below the bottle positioning-openings therein and composed of downwardly-extending longitudinal and transverse partitions arranged to provide bottle-guiding openings disposed below the bottle-positioning openings of the base plate, said partitions being of cuneiform shape and disposed to produce bottle-guiding openings of pyramidal configuration, said bottle guiding openings being axially aligned with and circumscribed about the circular bottle-positioning openings in the base member.

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