Jan. 20, 1970 T. A. SULLIVAN 3,490,630

BOTTLE DUMPING DEVICE

Filed Nov. 20, 1967 2 Sheets-Sheet 1

FIG. 1.

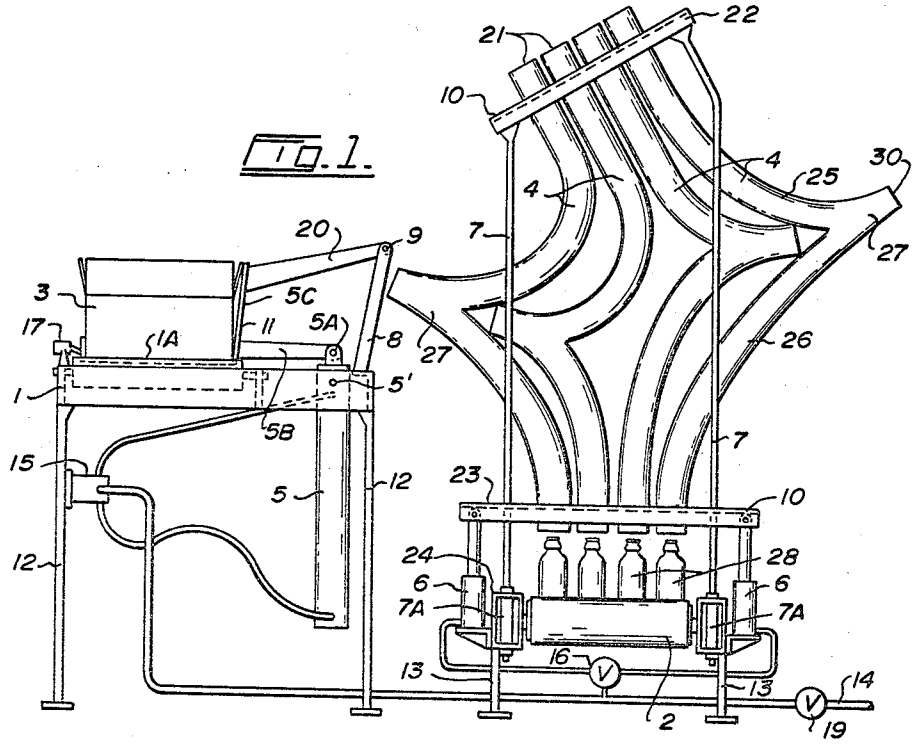
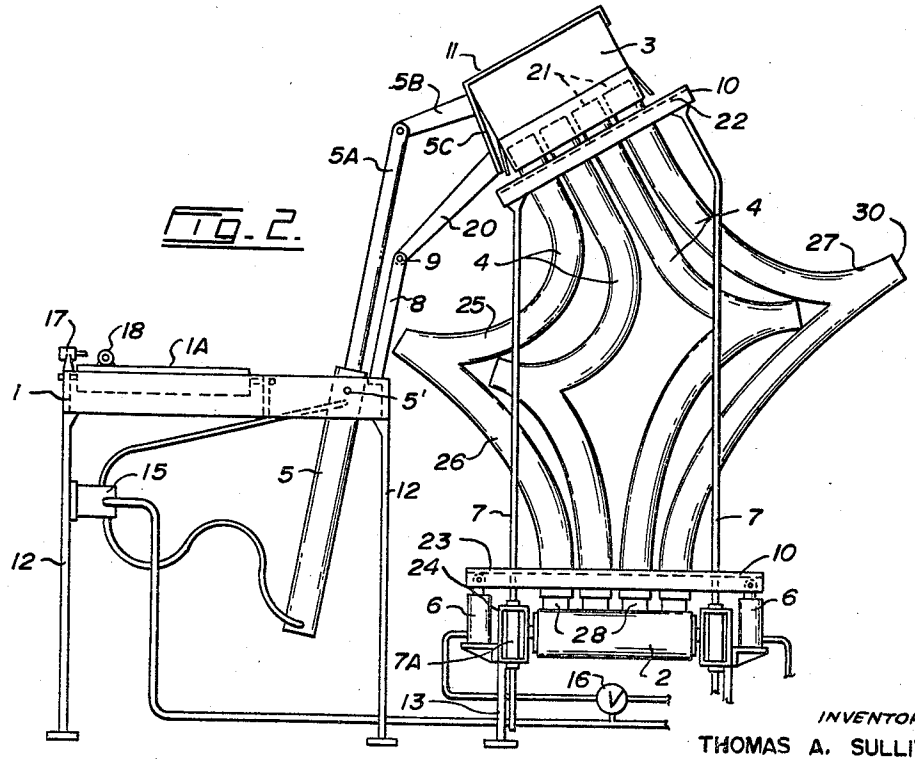


FIG. 2.



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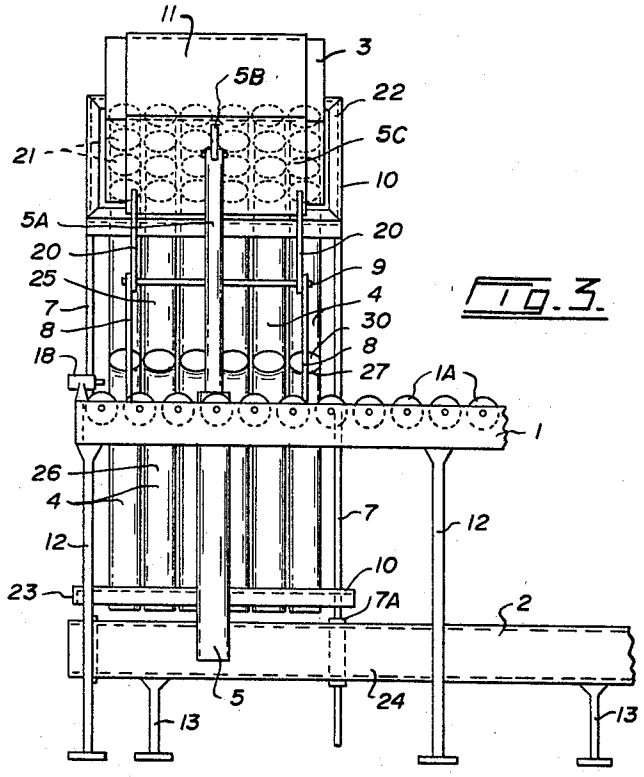


FIG. 3.

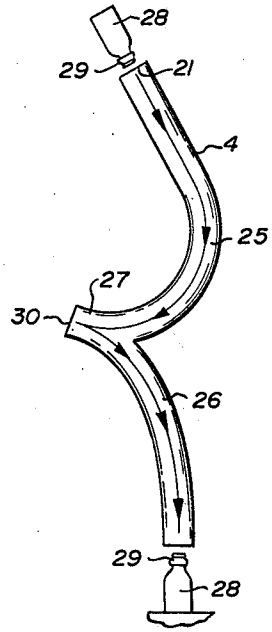


FIG. 4.

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BOTTLE DUMPING DEVICE

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Int. Cl. B65g 65/24, 11/08
U.S. Cl. 214—300 9 Claims

ABSTRACT OF THE DISCLOSURE

This device is for receiving a carton of empty bottles and dumping said bottles neck down into bottle chutes which are substantially Y shaped. This configuration allows the bottles to move neck downwardly and then to be rotated through substantially 180° so that they are now base down, the reversing action taking place in the stem of the Y shaped chute, which stem is substantially in a horizontal position.

This invention relates to new and useful improvements in devices for facilitating the dumping of empty bottles from the cartons onto a conveyor belt or the like prior to cleaning and sterilizing said bottles.

Although it is designed primarily for use in breweries, nevertheless it will be appreciated that it can be utilized in soft drink manufacturing plants, milk bottling plants, or under circumstances which require a plurality of bottles to be dumped from a carton onto a conveyor belt or the like.

It will, of course, be appreciated that if bottles are dumped from a carton or case, open end first, they have to be turned through 180° so that they engage the conveyor belt or supporting surface, the right way up.

At the moment, it is conventional for cartons containing empty bottles, to be passed through various saws or cutting devices which cut the flaps from the carton so that the upper ends of the bottles are clear and unimpeded. This necessitates the provision of a flap conveyor to remove the cut flaps from the cartons.

It is then conventional practice to engage the upper ends of the bottles within the carton with a plurality of suction cups thus causing the bottles to adhere to the suction cups so that they can be lifted from the carton en masse and transferred to the bottle conveyor whereupon the suction is released.

As an example, a case or carton containing 24 empty bottles, is engaged by a suction device containing 24 individual suction cups which engage over the neck of each bottle.

It will therefore be appreciated that several stages are required in order to empty the contents of a carton onto a conveyor all of which require maintenance, operating supervision and space. Furthermore, each individual carton takes several seconds from the commencement of the operation to the end thereof.

It will be apparent that it is relatively easy to dump a carton of bottles if some method could be found to reverse the positions of the bottles so that they engage the bottle conveyor by the bases of the bottles.

The present device accomplishes this end and eliminates the necessity for cutting flaps from the carton and moving bottles from the carton a certain distance in order to place them on the conveyor.

I accomplish this by dumping the carton upsidedown upon the upper ends of a plurality of bottle chutes, each chute permitting the bottle to slide neck downwardly and to turn through approximately 90° whereupon the bottle reverses direction of movement so that it is now travelling

base downwardly so that it can be dropped directly upon a bottle conveyor.

The principal object and essence of the invention is therefore to provide a device of the character herewithin described which reverses a carton upon a set of bottle guides or chutes which then transfers and deposits the bottle base downward upon a bottle conveyor therebelow.

Another object of the invention is to provide a device of the character herewithin described which is designed for use with a 24 bottle carton, a pair of 12 bottle cartons, or 4 six bottle cartons.

A yet further object of the invention is to provide a device of the character herewithin described which is simple in construction, economical in manufacture, and otherwise well suited to the purpose for which it is designed.

With the foregoing considerations in view, and such other objects, purposes or advantages as may become apparent from consideration of this disclosure and specification, the present invention consists of the inventive concept exhibited in the method, process, construction, arrangement of parts, or new use of any of the foregoing herein particularly exemplified in one or more specific embodiments of such concept, reference being had to the accompanying figures in which:

FIGURE 1 is an end view of the device showing the carton on the carton conveyor ready to be dumped upon the bottle chute device.

FIGURE 2 is a view similar to FIGURE 1 but showing the case or carton turned upside down upon the upper ends of the bottle chutes.

FIGURE 3 is a side view of FIGURE 2 taken from the left-hand side thereof.

FIGURE 4 is a schematic view of one of the bottle chutes showing the action thereof.

In the drawings like characters of reference indicate corresponding parts in the different figures.

Proceeding therefore to describe the invention in detail, reference character **1** illustrates a carton conveyor which is conventional in design and which consists of a plurality of rollers **1A** upon which cartons containing bottles or the like may be moved into position, either manually or automatically.

Situated adjacent to this conveyor is a bottle conveyor **2** which is also conventional in design and does not form part of present invention.

In general, cartons **3** holding bottles to be dumped, are slid along the conveyor **2** and are then elevated and turned over to be dumped upon the upper ends of the bottle chutes **4**, air operated piston and cylinder assembly **5** accomplishing this action. As the bottles pass downwardly through the chutes **4**, and engage the bottle conveyor belt **2**, piston and cylinder assemblies **6** elevate the chutes upwardly about the guide standards **7** running in sleeves **7A** so that the bottles clear the guide chutes and may be moved by the conveyor **2**.

8 indicates a bracket carrying shaft **9** forming part of the carton elevating portion and **10** indicates the angle-iron frame holding the chutes **4**.

The case **3** is held in position by a substantially rectangular frame **11** connected to the elevating mechanism, said frame resting upon the carton conveyor **1** which in turn is supported by legs **12**.

Legs **13** support the bottle conveyor **2** and a compressed air line **14** supplies compressed air to the piston and cylinder assemblies **5** and **6**.

A three-way solenoid valve **15** controls air in and out of the lift cylinder **5** and **16** indicates a three-way solenoid valve controlling the air in and out of the lift cylinder **6**.

The solenoid valve **15** is controlled bp micro-switch

18 and solenoid valve 16 is controlled by micro-switch 17. The air supply pressure is controlled by a pressure regulating valve 19 within the air-line 14.

In detail, the aforementioned frame 11 is substantially rectangular in configuration and includes cross members (not illustrated) to support the carton 3 thereon. It is desirable that this frame grip the carton frictionally to assist in removing the carton from the upper ends of the bottle chutes 4 after dumping the bottles therein.

The piston and cylinder assembly 5 elevates the frame 11 together with the carton and link 20 extending from shaft 9 to the side of the carton frame, causes the carton frame 11 together with the carton 3 to turn over to the position shown in FIGURE 2, the inertia of the bottles preventing them from spilling until the carton takes up the position shown in FIGURE 2.

The cylinder 5 is pivotally mounted adjacent the upper end thereof upon pivot pin 5' within the framework associated with carton conveyor 1. The piston rod 5A of this piston and cylinder assembly is connected to one lower side 5B of the rectangular framework 11. The link 20 is connected to an upwardly extending frame side member 5C thus giving the flip over or turn over action to the frame 11 and the carton carried thereby when the piston and cylinder assembly 5 is extended.

I provide 24 bottle chutes 4 having the open upper ends 21 positioned to receive the necks of the bottles from the carton as it is turned over into the dumping position and it will be observed that the plane of the upper open ends 21 is inclined from the horizontal to facilitate the engagement of the carton thereover. These chutes can be made of plastic or metal or can consist of metal rods forming a cage.

These chutes are carried and secured within an upper frame 22 and a lower frame 23 forming parts of the general framework 10. Four guide posts 7 extend between the frame 22 and 23 and pass through guide sleeves 7A held upon the transverse supports 24.

The piston and cylinder assemblies 6 extend between the transverse supports 24 and the lower frame 23 so that if these piston and cylinder assemblies are extended, the chutes together with the framework supporting same move upwardly to the bottle dumping position shown in FIGURE 1, and if the piston and cylinder assemblies are retracted, the chutes are in the lowermost bottle releasing position shown in FIGURE 2.

The chutes 4 are preferably cylindrical and include the aforementioned open upper end 21 and a downwardly curving upper portion 25 together with a downwardly curved lower portion 26. The junctions between the portions 25 and 26 form the common reversing portion 27 thus giving a substantially curved Y-shaped configuration to the chute. The bottles 28, enter the chutes neck down, it being understoood that there is one bottle to each chute. It follows the arrows in FIGURE 4 so that the nect 29 of the bottle enters the reversing position 27 and hits against the closed end 30 of the reversing portion 27. The bottle stops momentarily at this point and the base of the bottle falls into the lower portion 26. It then moves downwardly by gravity into the lower portion 26 said bottle now being base downwards so that it can be deposited upon the bottle conveyor 2, the right way up.

Micro-switch 18 is operated by the carton being in position to be elevated and controls the solenoid valve 15 which in turn controls the lift or dumping piston and cylinder assembly 5. Micro-switch 17 controls solenoid valve 16 which in turn controls the operation of the lift piston and cylinder assembly 6.

As soon as the bottles have been dumped within the upper ends of the chutes 4, the case is removed therefrom by the lowering of the piston and cylinder assembly 5 and returning the frame 11 to the case conveyor (in the position shown in FIGURE 1).

The bottles slide down the chutes and reverse themselves as hereinbefore described and as soon as they engage the bottle conveyor, lift cylinders 6 are actuated by micro-switch 17 via solenoid valve 16 thus lifting the bottle chutes upwardly to the position shown in FIGURE 1 and enabling the bottles to be cleared from under the chutes by the conveyor 2.

Prior to the next case load being dumped upon the chutes 4, the chute assembly is lowered by the cylinders 6, so that when the bottles engage the surface of conveyor 2 they are supported and steadied prior to moving with the conveyor.

Various modifications can be made within the scope of the inventive concept disclosed. Accordingly, it is intended that what is described herein should be regarded as illustrative of such concept and not for the purpose of limiting protection to any particular embodiment thereof, but that only such limitations should be placed upon the scope of protection to which the inventor hereof is entitled, as justice dictates.

What is claimed as my invention is:

1. A device for dumping bottles from cartons comprising in combination with supporting framework, carton holding means, a plurality of bottle chutes in said framework, and means to elevate said carton and to turn same over to a bottle dumping position adjacent the upper ends of said chutes whereby said bottles fall into said chutes neck first, said chutes including means to reverse the position of said bottles as they pass down said chutes from a neck first position to a base first position, said carton holding means including a carton base surrounding frame, said means to elevate said carton and to turn said carton over including a fluid operated piston and cylinder assembly mounted in said framework, the piston rod of said assembly being pivotally secured to said frame on one side thereof, a frame extension member above said surrounding frame, and a restraining link pivotally secured by the ends thereof and extending between said frame extension member and a fixed point on said framework.

2. The device according to claim 1 in which said bottle chutes include an upper holding frame and a lower holding frame, vertical guides extending between said frames and maintaining same in spaced relationship with one another, guide sleeves on said supporting framework within which said guides are supported for limited vertical movement, and means to raise and lower said frames and hence said chutes from an upper bottle dumping position to a lower bottle releasing position.

3. The device according to claim 1 in which said bottle chutes comprise a substantially Y shaped component and include an open upper ended downwardly curving upper portion, and an open lower ended downwardly curving portion, and a common reversing portion at the junction of the lower end of said upper portion and the upper end of said lower portion, said upper and lower portions communicating with said common reversing portion, said common reversing portion inclining upwardly from the horzontal, said common reversing portion being of sufficient length to receive the associated bottle neck first whereby the base of said bottle falls by gravity into said lower portion, base first.

4. The device according to claim 3 in which the plane of the upper open ends of said chutes inclines downwardly from the horizontal towards the side upon which said carton holding means is situated.

5. The device according to claim 4 in which the plane of the upper open ends of said chutes inclines downwardly from the horizontal towards the side upon which said carton holding means is situated.

6. The device according to claim 5 in which the plane of the upper open ends of said chutes inclines downwardly from the horizontal towards the side upon which said carton holding means is situated.

7. The device according to claim 2 in which said bottle chutes comprise a substantially Y shaped component and include an open upper ended downwardly curving upper

portion, and an open lower ended downwardly curving lower portion, and a common reversing portion at the junction of the lower end of said upper portion and the upper end of said lower portion, said upper and lower portions communicating with said common reversing portion, said common reversing portion inclining upwardly from the horizontal, said common reversing portion being of sufficient length to receive the associated bottle neck first whereby the base of said bottle falls by gravity into said lower portion, base first.

8. A device for dumping bottles from cartons comprising in combination with supporting framework, carton holding means, a plurality of bottle chutes in said framework, and means to elevate said carton and to turn same over to a bottle dumping position adjacent the upper ends of said chutes whereby said bottles fall into said chutes neck first, said chutes including means to reverse the position of said bottles as they pass down said chutes from a neck first position to a base first position, said bottle chutes including an upper holding frame and a lower holding frame, vertical guides extending between said frames and maintaining same in spaced relationship with one another, guide sleeves on said supporting framework within which said guides are supported for limited vertical movement, and means to raise and lower said frames and hence said chutes from an upper bottle dumping position to a lower bottle releasing position.

9. The device according to claim 7 in which said bottle chutes comprise a substantially Y shaped component and include an open upper ended downwardly curving upper portion, and an open lower ended downwardly curving lower portion, and a common reversing portion at the junction of the lower end of said upper portion and the upper end of said lower portion, said upper and lower portions communicating with said common reversing portion, said common reversing portion inclining upwardly from the horizontal, said common reversing portion being of sufficient length to receive the associated bottle neck first whereby the base of said bottle falls by gravity into said lower portion, base first.

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U.S. Cl. X.R.

193—43; 214—315