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[54] **CONTAINER UNSCRAMBLER**
3 Claims, 4 Drawing Figs.

[52] **U.S. Cl.**..... **198/32**

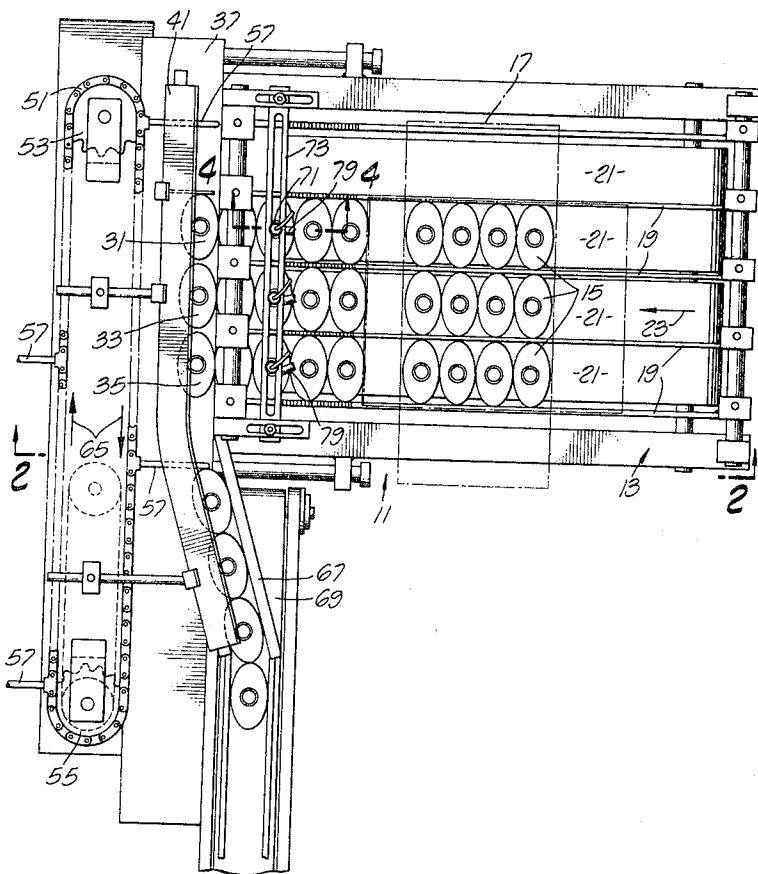
[51] **Int. Cl.**..... **B65g 47/26**

[50] **Field of Search**..... **198/32**

[56] **References Cited**
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ABSTRACT: A container-unscrambling machine is disclosed for arranging a carton full of empty plastic bottles into a single file so that they are ready to be conveyed to a bottle filling machine. The unscrambler is of a type known in the trade as an inliner unscrambler because of its ability to line up the bottles in a single file.



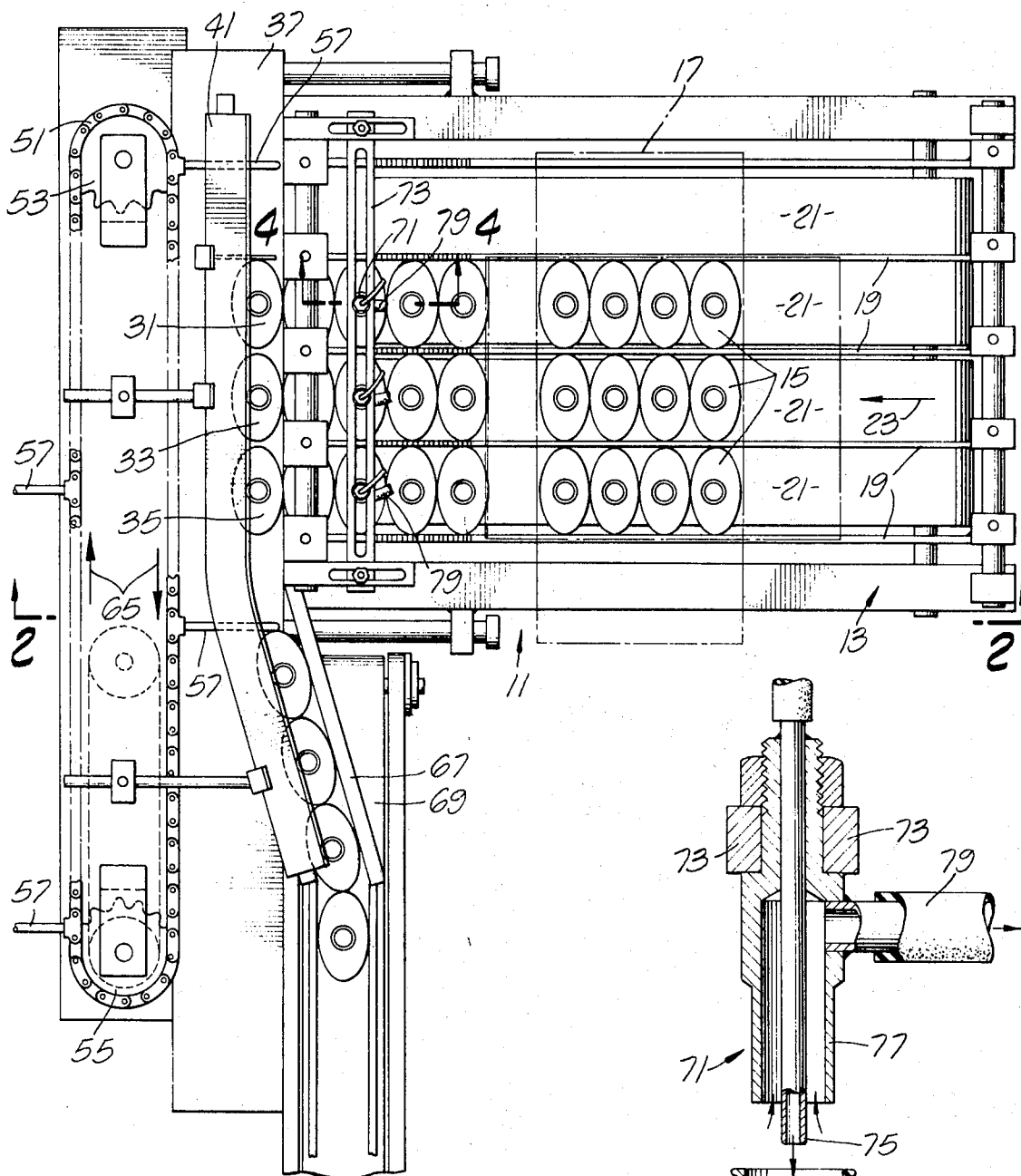


FIG. 1.

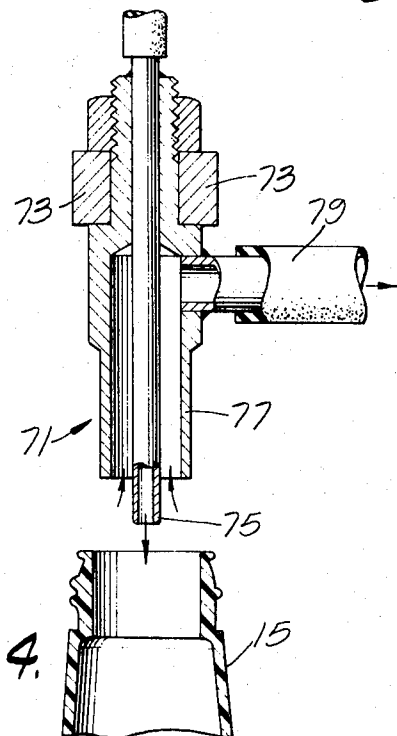


FIG. 4.

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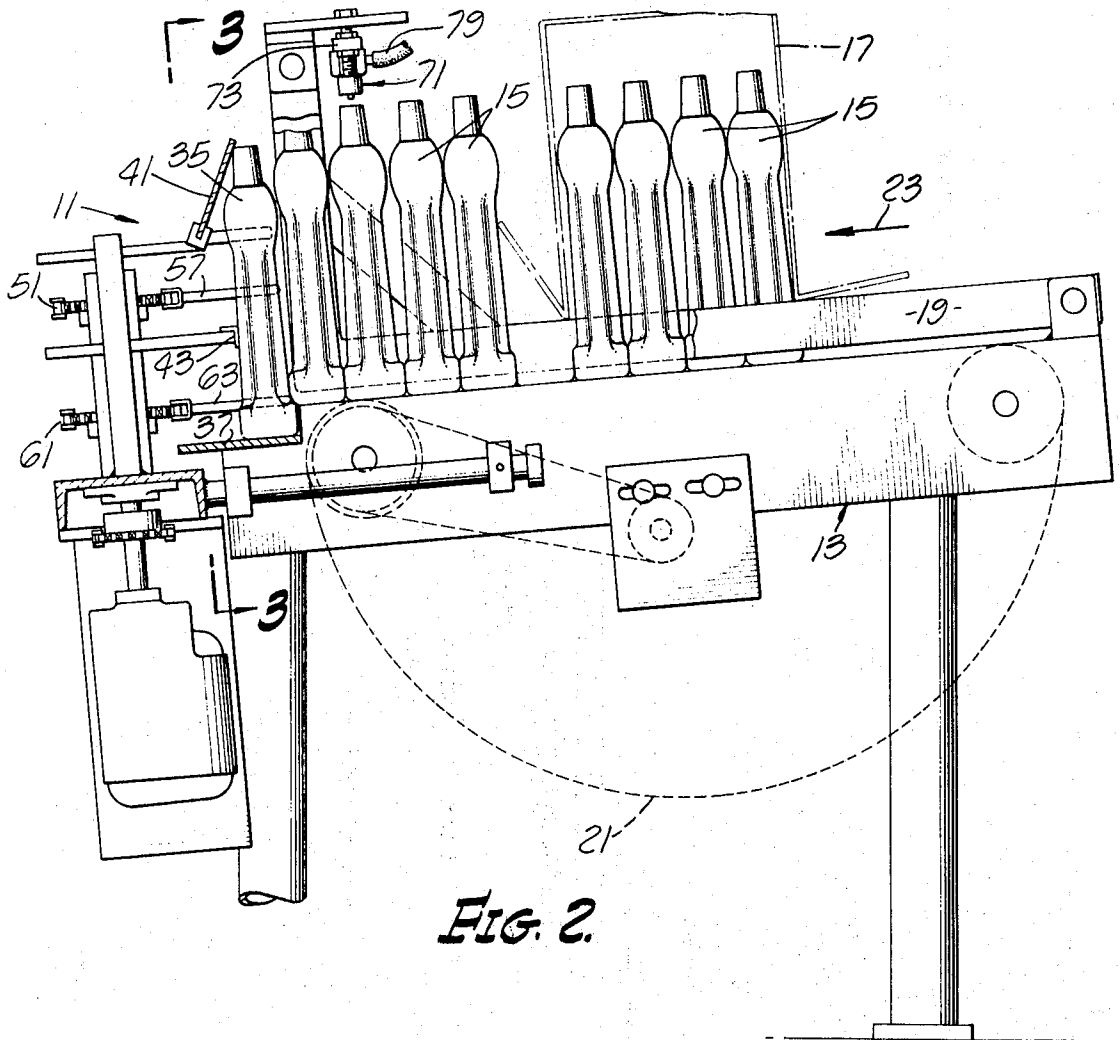


Fig. 2.

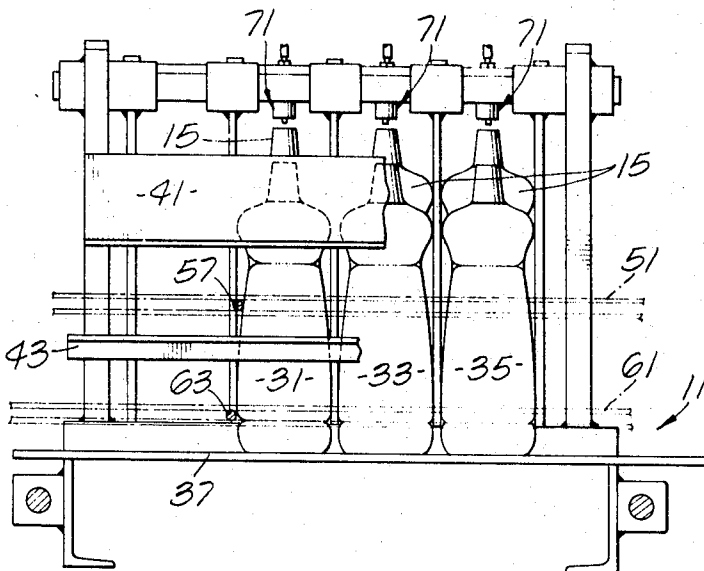


Fig. 3.

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CONTAINER UNSCRAMBLER

BACKGROUND OF THE INVENTION

Inliner unscramblers presently in use are either an accelerating belt unscrambler type or a rotary or turntable unscrambler. Both types can be used only for round bottles. There is a need for a fast container unscrambler that can handle containers that are not round, and which has a simple mechanism, does not require cam-activated push bars and does not involve repeated stopping and starting of the mechanism.

SUMMARY OF THE INVENTION

According to the preferred embodiment of the present invention, a container unscrambler includes a slanting surface upon which the bottles are placed when they are emptied out of their carton. The bottles are separated by guide rails and are moved towards a lower shelf. When the leading bottles drop down onto the lower shelf, they are moved laterally, until they reach a conveyor which transports them away in a single file.

BRIEF DESCRIPTION OF THE DRAWINGS

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. The present invention, both as to its organization and manner of operation, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, in which:

FIG. 1 is a plan view of a container unscrambler according to the present invention.

FIG. 2 is a view taken along the line 2-2 of FIG. 1.

FIG. 3 is a view taken along the line 3-3 of FIG. 2.

FIG. 4 is a sectional view taken along the line 4-4 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now to the drawings, FIGS. 1 and 2 show container unscrambler 11 having slanted table 13 supporting empty plastic bottles 15 thereon. Bottles 15 are packaged upside down in cardboard carton 17, which is shown inverted, so that bottles 15 land upon table 13 in an upright position when they are emptied out of carton 17. The guide rails 19 are spaced so as to accommodate the width of the particular bottles being used, and facilitate knocking the bottles out of the carton, in addition to aligning the bottles. The slanting of the table is important because it prevents the bottles from falling backwards when they are dumped out of the carton.

The conveyor belts 21 move the bottles along in the direction of the arrow 23, until the forward motion of each bottle is stopped by the bottle in front of it. If preferred, a single conveyor belt could be used, provided it were wide enough. For the purposes of example only, three rows of bottles with two conveyor belts therefor are shown.

FIG. 3 shows how the three leading bottles 31, 33 and 35 rest upon lower platform or shelf 37. Shelf 37 and conveyor belts 21 are slanted or tilted in the same direction. Conveyor belts 21 move the bottles forward until the three leading bottles encounter knock-down plate 41, which forces the three leading bottles down to the lower shelf 37. The further forward motion of bottles 31, 33 and 35 is arrested by knockdown plate 41 and railing 43.

Upper roller chain 51 is supported between sprockets 53 and 55, and carries extended fingers 57 spaced therealong. Lower roller chain 61 similarly carries an extended finger 63 corresponding to each finger 57 and positioned therebelow. As roller chains 51 and 61 are moved in the direction shown by arrows 65, fingers 57 and 63 are carried therealong until a pair of fingers encounter the three leading bottles 31, 33 and 35, which are resting upon lower shelf 37. The pair of fingers 57 and 63 push the three leading bottles 31, 33 and 35 along chute 67 towards conveyor belt 69.

Chute 67 bends away from roller chains 51 and 61 at an angle so that as the bottles reach conveyor belt 69 and are deposited thereon, they are clear of fingers 57 and 63. The bottles are then carried away by conveyor belt 69 in single file. In the meantime, conveyor belts 21 will have dropped down onto lower shelf 37, ready to be pushed away laterally along chute 67 by the next pair of extended fingers 57 and 63.

FIG. 4 shows a bottle cleaning attachment that has been found useful when used with the described unscrambler. As the bottles are moved forward along table 13, they pass under nozzles 71, which are supported by rack 73. Ionized air is blown into the bottle 15 through spout 75, and suction is applied through sleeve 77, which is connected to a vacuum source through tube 79.

The ionized air removes the charges present on the inside of the bottle 15, on plastic chips which result from reaming operations during manufacture of the bottles, and on other dirt. The suction removes these as they are blown out.

While particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects.

I claim:

1. A container unscrambler for aligning a plurality of non-cylindrical plastic containers in a single file, comprising:
 - a. conveyor means adapted for receiving a plurality of non-cylindrical plastic containers thereon;
 - b. supporting platform means located lower than the position of said containers when said containers are supported by said conveyor means, said conveyor means including a continuously moving endless belt tilted in a downward direction towards said platform means sufficiently to cause containers placed upon said endless belt to lean towards said platform means without sliding, said endless belt transporting said containers in a forward direction towards said platform means;
 - c. guide rails for separating said containers which are placed upon said endless belt into a plurality of rows, said guide rails being positioned parallel to the direction of travel of said containers upon said endless belt;
 - d. means for forcing the leading container in each row to move down to said platform means;
 - e. continuously moving endless support means including a plurality of extended engaging means connected thereto in a spaced relationship such that when any given extended engaging means encounters the most proximate container thereto which is supported on said platform means, it simultaneously pushes all of said containers on said platform means in single file in a direction perpendicular to the direction of travel of said containers upon said endless belt, and the next leading container in each row being forced down into position upon said platform means before the next extended engaging means arrives, the arrival of said next engaging means being timed so that it encounters the most proximate container thereto which is supported on said platform means and simultaneously pushes all of the containers then on said platform means in single file behind the containers which were pushed in single file by the preceding engaging means;
 - f. chute means along which said containers in a single file are pushed without interruption by successive ones of said extended means, said chute means being bent at an angle such that said containers in single file are moved away from the path taken by said extended means and each said extended means sequentially loses contact with the containers it is pushing; and
 - g. second conveyor means, said containers being deposited in single file upon said second conveyor means as they exit from said chute means.
2. Apparatus as defined in claim 1 in which said supporting platform means is tilted in the same direction as said endless belt is tilted.

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3. Apparatus as defined in claim 2 in which said continuously moving endless support means includes a pair of vertically disposed endless roller chains and in which each of said

extended means includes a pair of fingers, one finger of each pair being attached to a respective one of said pair of chains.

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