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2,834,453

BOTTLE CONVEYING DEVICE

Filed Jan. 20, 1956

2 Sheets-Sheet 1

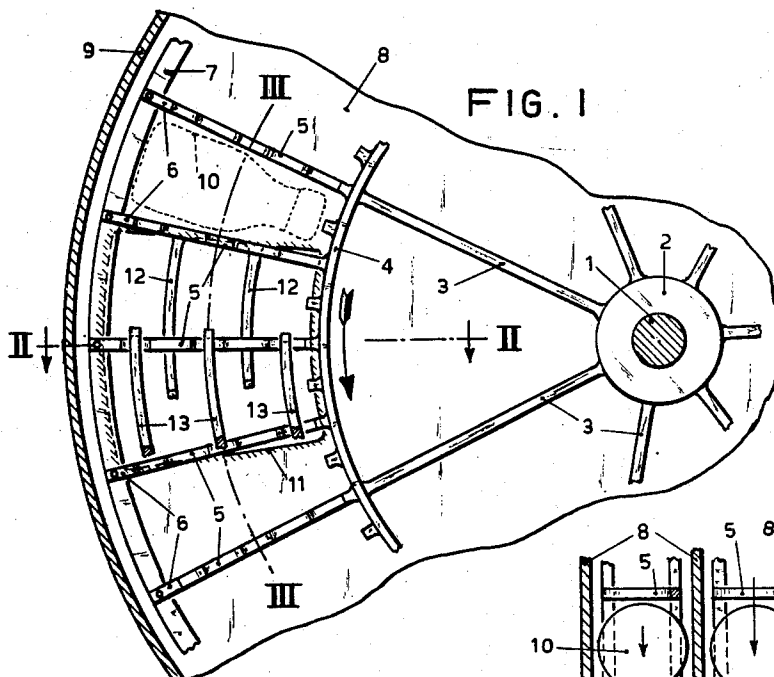
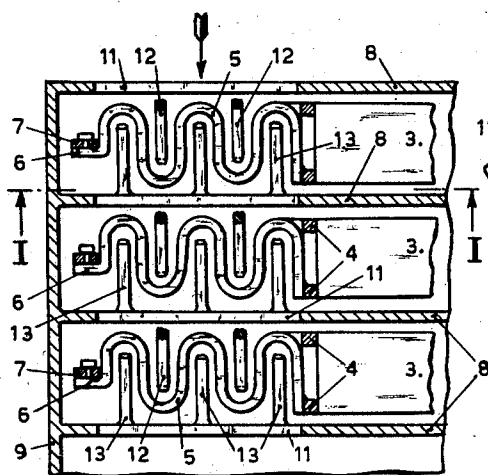


FIG. 2

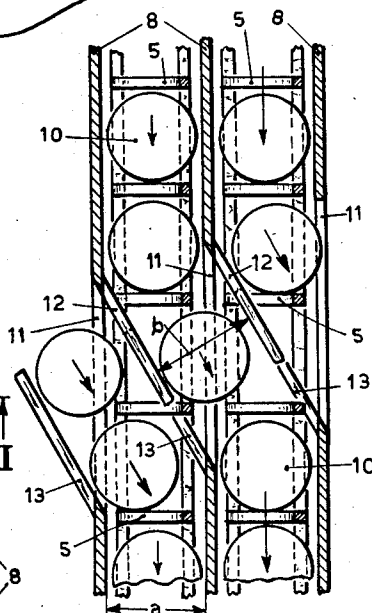


FIG. 3

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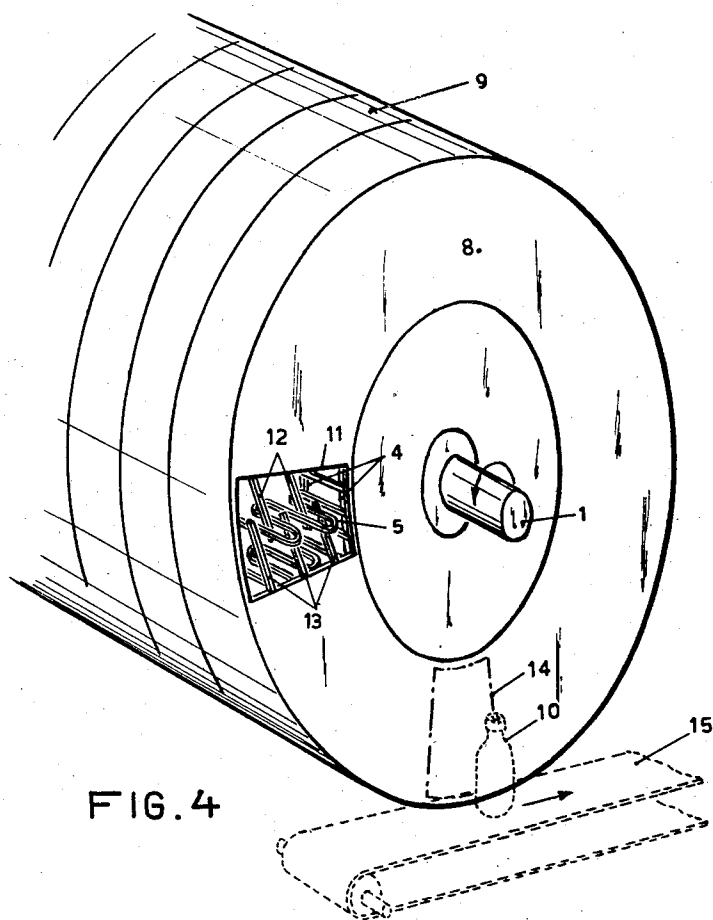


FIG. 4

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BOTTLE CONVEYING DEVICE

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Claims priority, application Netherlands January 27, 1955

10 Claims. (Cl. 198—211)

The invention relates to a bottle conveying device such as may be used for various purposes, e. g. on behalf of a bottle rinsing machine, a device for pasteurising or sterilising bottles or a machine for executing various operations in connection with bottles, such as labeling, capsuling, filling and the like. The invention relates in particular to a bottle conveying device comprising a number of wheels mounted for rotation about a common, e. g. a horizontal axis, each of said wheels being provided with a number of compartments for accommodating radially positioned bottles, whilst intermediate said wheels stationary dividing walls provided with passages for the bottles are arranged, and near said passages switches are provided in an oblique direction with respect to the direction of transportation of the bottles, said switches being adapted for transmitting the bottles to a next wheel or for discharging the bottles and for cooperating with carriers defining laterally the bottle compartments (see Dutch patent specification 22,907). The switches of this known conveyor consist of comb-shaped members, each running from a single dividing wall in the direction of an opposite dividing wall. The carriers consist of pins mounted on arms secured to the wheels. It is true that this known conveyor operates satisfactorily when the bottles remain undamaged, but if, due to breakage of a bottle, splinters are taken along by the wheels, the chances are that the wheels are jammed by larger pieces of glass that get stuck in the corners between the switches. The object of the invention is to provide a bottle conveyor device the wheels of which will not get stuck in case a bottle breaks.

According to the invention each switch consists of two overlapping combs directed towards each other from opposite dividing walls, whilst each carrier consists of a bar or a plate bent in a zigzag line in such a way that it can pass the comb-shaped switches. Due to this shape of the switches and the carriers cooperating therewith even big splinters originating from broken bottles are carried to a next wheel, so that they cannot get stuck between parts of the switches. With wheels having a horizontal axis the pieces of broken bottles can, when they reach the lower side of a wheel, fall from the wheel and be removed without causing damage.

In order to improve the strength of the zigzag carriers the free ends thereof can be suitably united by means of a closed ring. Small splinters, which might get between the combs of the switches in spite of the measures taken according to the invention, will thus be easily pounded without the carriers being bent. The connecting ring consists preferably of a rectangular hoop-shaped bar. Such a bar forms a sufficient support for the bottles but will easily allow splinters to pass.

With a view to preventing the bottles as much as possible from making undesired movements it is desirable to arrange the dividing walls as closely to each other as possible, e. g. at a distance which is a little greater than the maximum diameter of the bottles to be treated. In order to ensure that the bottles can freely pass the places

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where the switches are provided, the passages and the corresponding switches of adjacent wheels are preferably arranged somewhat in staggered relation with respect to each other, viz. as regards wheels following each other in the direction of transportation, contrary to the direction of transportation. In this way the distance in perpendicular direction between two adjacent switches can be approximately equal to the distance in perpendicular direction between adjacent dividing walls.

With the conveyor according to the invention it is possible to provide each wheel with a number of concentric rings, each ring comprising bottle compartments, the arrangement being such that the bottles can, with the aid of suitable members, in particular guide rings provided with passages, be moved in radial direction towards rings of greater or smaller diameter. Such a construction enables the bottles to cover a long distance within a small space, which is efficient in connection with manipulations taking much time, such as the pasteurisation or the sterilisation of bottles.

The invention will be elucidated with reference to the drawing, in which an embodiment of a bottle conveying device according to the invention is shown.

Fig. 1 shows a cross-section of a part of a bottle conveyor according to the invention.

Fig. 2 shows a section on the line II—II of Fig. 1.

Fig. 3 shows a section on the line III—III of Fig. 1.

Fig. 4 gives a perspective representation of the embodiment.

In Fig. 1 the numeral 1 designates the axis of a rotatable wheel, driven by a prime mover at a suitable rate of revolutions, e. g. 50 rev./min., which wheel is provided with a hub 2 secured to the axis and having radial spokes 3 and an annular member 4. This annular member carries a number of zigzag carriers 5 interconnected at their free ends 6 by a ring 7, consisting of a rectangular hoop-shaped bar, the cross section of said bar having the largest dimension in a radial direction with respect to the axis 1. Each wheel is enclosed in a drum having transverse walls 8, forming dividing walls between adjacent wheels, and a cylindrical wall 9. By means of the walls 8 and 9 each wheel is enclosed in a drum-shaped space.

Between each pair of two carriers 5 of a wheel a compartment for receiving a bottle 10 is formed. On rotating the wheels the bottles 10 move along circular paths. The dividing walls 8 are each provided with passages 11, where switches are arranged for transmitting the bottles to a next wheel or for evacuating the bottles. Each switch consists of two sets of overlapping parallel combs 12 and 13, in each set the combs being directed obliquely from opposite dividing walls 8 and arranged in the same plane. The carriers 5 are bent in a zigzag line in such a manner that they can pass the comb-shaped switches 12, 13, see Fig. 2. Each time a switch is passed, a bottle 10 received in the relative compartment is transmitted to a compartment of the next wheel by the combs 12, 13. On considering Figs. 2 and 3 it will be apparent that the possibility that relative big pieces of glass originating from broken bottles, in particular bottoms or necks, will get stuck is excluded as the conveyor according to the invention does not contain dead corners.

As Fig. 3 shows, the passages 11 and the corresponding switches 12, 13 of adjacent wheels are positioned somewhat in staggered relation with respect to each other, i. e. as regards the wheels that follow each other in the direction of transportation, contrary to this direction of transportation, in such a manner that the distance a between the adjacent dividing walls is equal to the distance b between adjacent switches 12, 13. This means that, when the conveyor contains a great number of wheels adjoining each other, the passages will each time come

to lie a little higher. If a passage should come to lie in an undesired place, e. g. in the case of a rinsing machine in a point, where the bottles are not quite empty, it is possible to arrange a following passage at some angular distance, e. g. 40-50°, from the preceding one and to execute the drum of the corresponding wheel as a dry section of the rinsing machine.

The feeding of the bottles to the wheels and their discharging therefrom can be done in different ways. In Fig. 4 a passage opening 14 of an ultimate drum of the conveyor is indicated in dotted lines. The bottles come out of this opening by means of a switch, in vertical position and they can, after leaving the switch, be received immediately by an endless conveyor belt 15.

The feeding of the bottles can be effected in a similar way, but attention must be paid that the speed of the conveyor belt be adapted to the velocity of transport of the wheels. With these embodiments the feeding and discharge of the bottles takes place by means of switches of the same kind as those used for transmitting the bottles to a following wheel. It is, however, also possible to feed the bottles in radial direction to the compartments or to evacuate them therefrom. In this case the ring 7 must be omitted or present such a form that the bottles can be allowed to pass. In this case a zigzag ring may be used.

In order to prevent, with bottle conveyors having a horizontal axis, that bottles might drop out of the compartments, a stationary guide ring must be applied in this case, along the lower circumference of each drum. In such a construction it is also possible to convey the bottles along a number of concentric paths in each wheel, in which case, therefore, a number of concentric compartments are arranged one behind the other in radial direction. Said stationary guide ring can then, in a suitable point, provided with an opening for allowing the bottles to pass. The parts against which the bottles are abutting when passing from one compartment to the next one, may then suitably be coated with rubber. The path of a bottle is then such that the bottle enters the inner ring of a wheel e. g. by means of a switch whereupon it is transmitted each time, through a port of a guide ring, into a subsequent concentric ring having a greater diameter. Between the outer ring of the wheel and the outer ring of the next wheel a switch is provided according to the invention. When the outer ring of the next wheel is reached, the bottles are gradually conveyed to the subsequent concentric rings having a smaller diameter. Between the inner ring of this wheel and the inner ring of the following wheel a switch according to the invention is again provided, and so on.

The application of this arrangement makes it possible to convey bottles through a long path in a very compact space, which may be useful in view of operations taking much time, such as the pasteurisation and the sterilisation of bottles.

What I claim is:

1. Bottle conveying device comprising a plurality of conveying wheels mounted for rotation about a common axis, each of said wheels being provided with a number of compartments for radially positioned bottles, while intermediate said wheels dividing walls are arranged which are provided with passages for the bottles, near said passages switches being provided which are directed obliquely with respect to the direction of transportation of the

bottles and serve for transmitting the bottles to a next wheel or for discharging the bottles, said switches cooperating with carriers defining laterally the bottle compartments, each of said switches being composed of two sets of overlapping combs, directed towards each other from opposite dividing walls and each said carrier being composed of a member bent in a zigzag line in such a manner that it can pass said switches.

2. Bottle conveying device according to claim 1, and wherein in that all the free ends of the zigzag carriers are connected with a closed ring.

3. Bottle conveying device according to claim 1, and wherein each wheel comprises a number of concentric rings, each of which is provided with compartments for bottles, the arrangement being such, that, by means of guide rings provided with ports, the bottles are displaced towards rings having a greater or a smaller diameter.

4. Bottle conveying device according to claim 1, and wherein all of the free ends of said zigzag carriers are connected with a closed ring comprising a substantially rectangular hoop shaped bar.

5. Bottle conveying device according to claim 1, and wherein said passages and the corresponding switches of adjacent wheels are disposed in substantially staggered relation with respect to each other.

6. Bottle conveying device according to claim 1, and wherein said passages and the corresponding switches of adjacent wheels are disposed in substantially staggered relation with respect to each other and in a direction contrary to the direction of transportation of said wheels.

7. Bottle conveying device according to claim 5, and wherein each wheel comprises a number of concentric rings, each of which is provided with compartments for bottles, the arrangement being such, that, by means of guide means provided with ports, the bottles are displaced towards the rings having a greater or smaller diameter.

8. Bottle conveying device according to claim 6, and wherein each wheel comprises a number of concentric rings, each of which is provided with compartments for bottles, the arrangement being such, that, by means of guide rings provided with ports, the bottles are displaced towards rings having a greater or a smaller diameter.

9. Bottle conveying device according to claim 1, and wherein said passages and the corresponding switches of adjacent wheels are disposed in substantially staggered relation with respect to each other, and wherein all of the free ends of said zigzag carriers are connected with a closed ring.

10. Bottle conveying device comprising a plurality of conveying wheels mounted for rotation about a common axis, each of said wheels being provided with a plurality of compartments for radially positioned bottles, dividing walls arranged intermediate said wheels and provided with passages for the bottles, switches provided adjacent said passages and directed obliquely with respect to the direction of transportation of the bottles and serving for transmitting the bottles to a next wheel or for discharging the bottles, carriers defining laterally the bottle compartments and said switches cooperating therewith, each of said switches comprising two sets of overlapping members, directed towards each other from opposite dividing walls, and each of said carriers comprising a member bent in a zigzag line in such a manner that it can pass said switches.

No references cited.