July 14, 1931. E. H. LORENZ ET AL 1,815,009

SETTING-UP MECHANISM

Filed Nov. 18, 1927 4 Sheets-Sheet 1

Fig. 13.

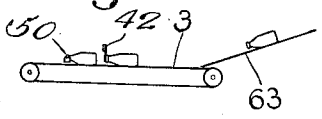


Fig. 1.

Inventors
E.H.Lorenz.
J.E.Schroder.
by Robinson & Brown
Attorney.

July 14, 1931. E. H. LORENZ ET AL 1,815,009

SETTING-UP MECHANISM

Filed Nov. 18, 1927 4 Sheets-Sheet 2

Fig. 2.

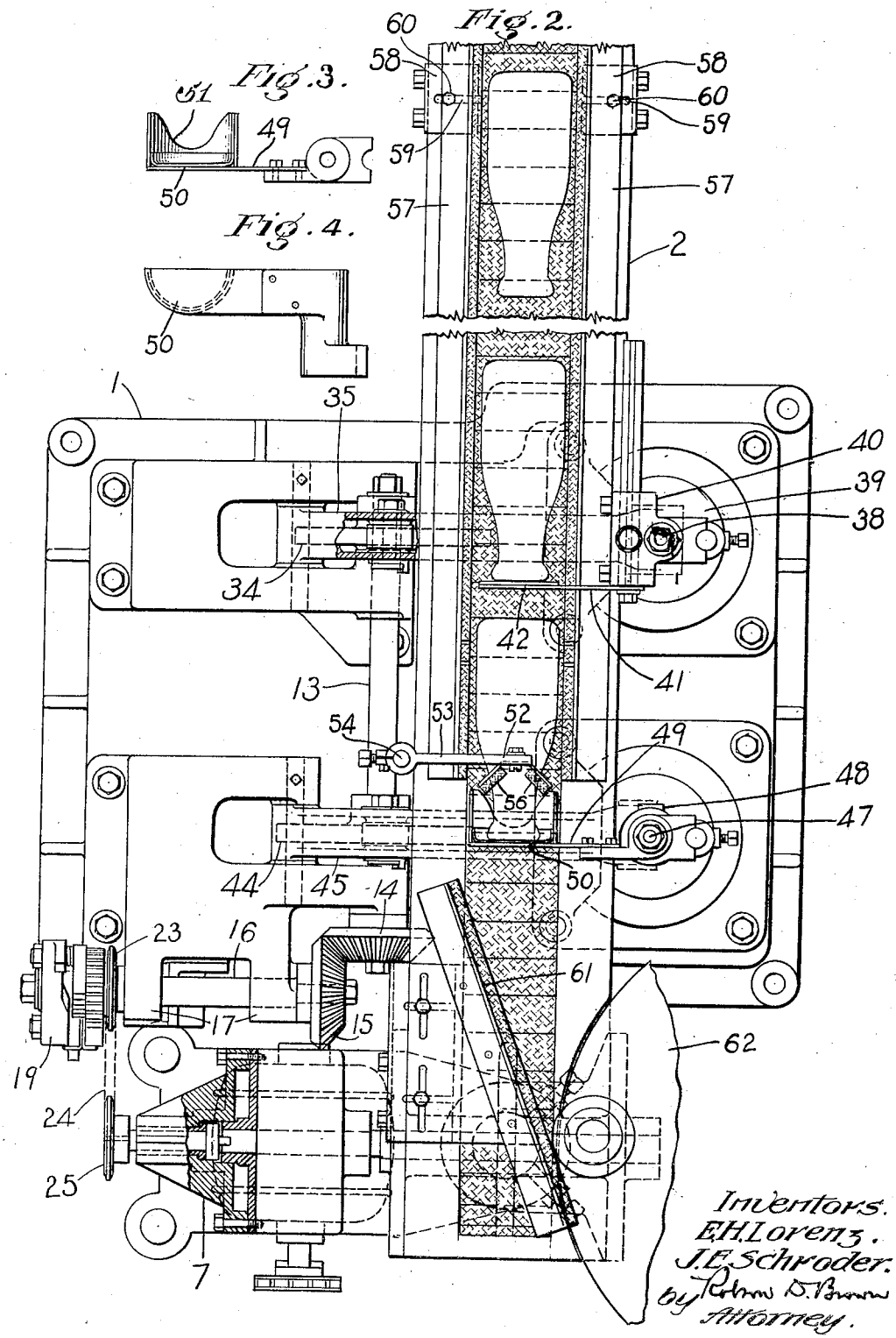


Fig. 3.

Fig. 4.

Inventors.
E.H. Lorenz.
J.E. Schroder.
by Robert D. Brown
Attorney.

July 14, 1931. E. H. LORENZ ET AL 1,815,009

SETTING-UP MECHANISM

Filed Nov. 18, 1927 4 Sheets-Sheet 3

Fig. 5.

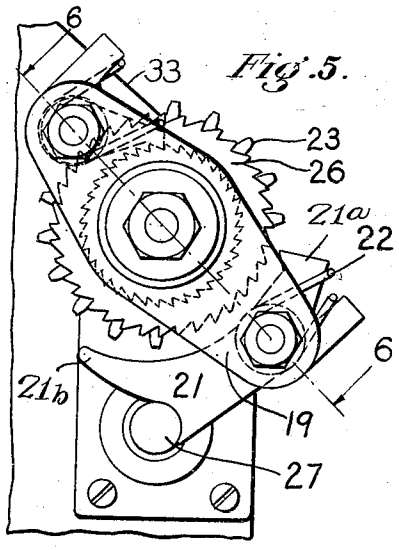


Fig. 6.

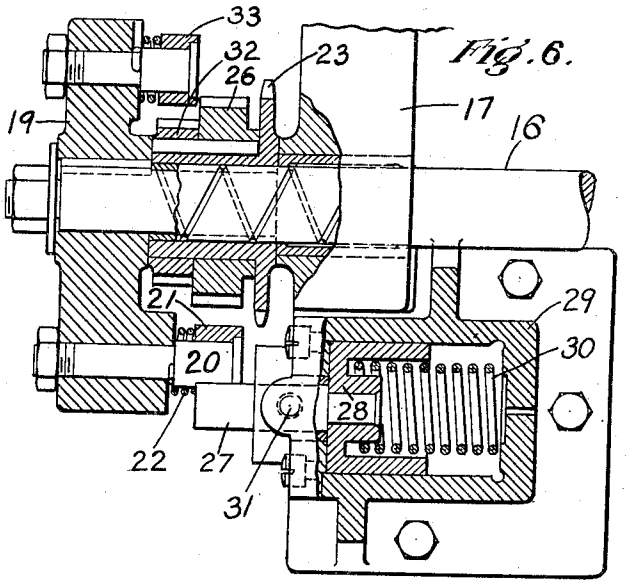


Fig. 7.

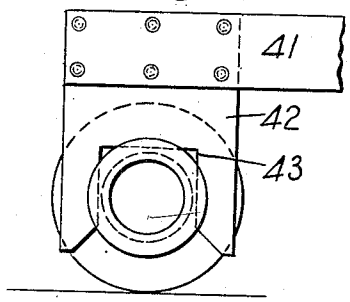


Fig. 8.

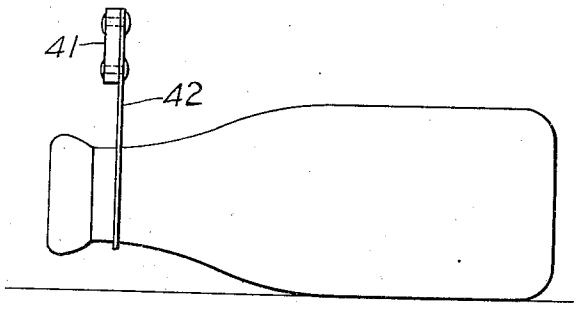


Fig. 12

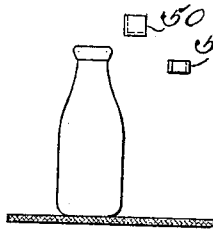


Fig. 11.

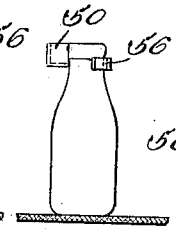


Fig. 10.

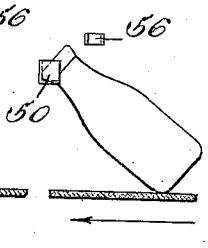
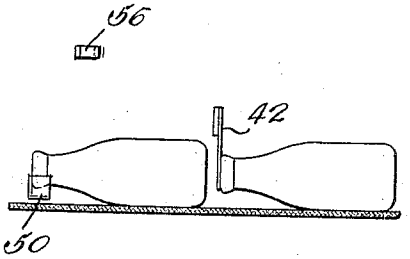


Fig. 9.



Inventors.
E.H. Lorenz.
J.E. Schroder.
by Roland A. Brown
Attorney

July 14, 1931. E. H. LORENZ ET AL 1,815,009

SETTING-UP MECHANISM

Filed Nov. 18, 1927 4 Sheets-Sheet 4

Fig. 14.

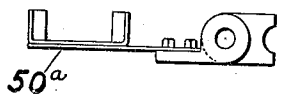


Fig. 15

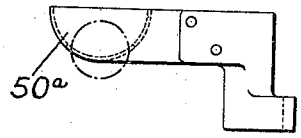


Fig. 16.

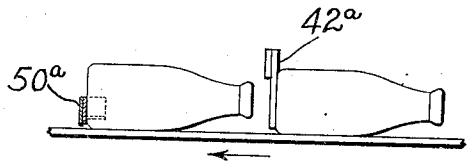


Fig. 19.

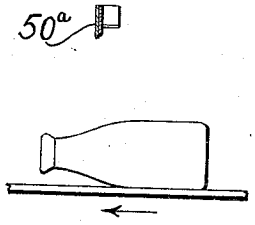


Fig. 18.

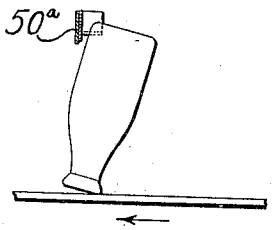


Fig. 17.

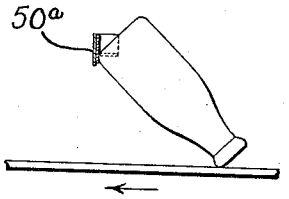
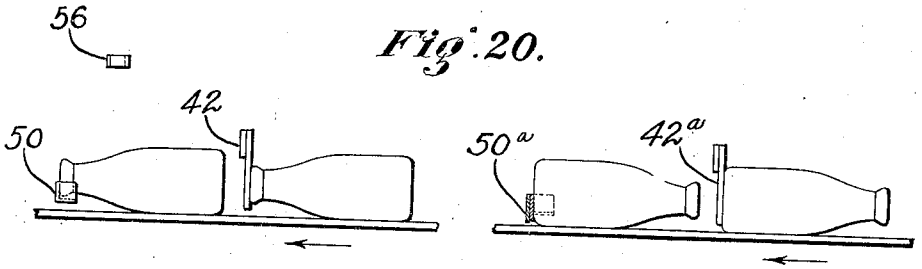


Fig. 20.



Inventors
E. H. Lorenz,
J. E. Schroder.
by Robson & Brown.
Attorney

Patented July 14, 1931 1,815,009

UNITED STATES PATENT OFFICE

EDWARD H. LORENZ, OF WEST HARTFORD, AND JOHN E. SCHRODER, OF HARTFORD, CONNECTICUT, ASSIGNORS TO HARTFORD-EMPIRE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF DELAWARE

SETTING-UP MECHANISM

Application filed November 18, 1927. Serial No. 234,197.

Our present invention relates to means for setting up objects which are received in a recumbent or non-vertical posture and which are to be postured on their bottoms or in a vertical position.

In glass manufacture there are operations such, for instance, as the delivery of molded bottles or similar objects from the fabricating machine, in which the articles are delivered in recumbent position by a chute or trough onto a conveyor which conveys them to a point at which they are to be further handled, as, for instance, to a point at which they are to be moved by a stacking device onto the conveyor of a lehr. It is desirable that the bottle be set up for numerous reasons, among them the following:—(*a*) The economical use of the space on the lehr conveyor requires stacking the bottles in upright position, and the mechanisms for stacking bottles in a lehr are usually adapted to operate either by grasping the tops of the bottles or by pushing them laterally while in upright position. (*b*) If hollow glassware is permitted to remain in recumbent position before cooling, it may become distorted.

In general our invention comprises means for receiving and causing the ware to travel, and cooperating means for engaging the traveling ware and causing it to assume the desired posture.

We further provide means for interrupting the travel of the pieces of ware so that they will be presented to the setting up means at proper intervals. We so arrange the traveling means, the means that deliver the ware to the traveling means and the interrupter, that the traveling means may receive and reduce the momentum of the ware to a suitable extent before the ware reaches the interrupter in order that the ware may not rebound from the interrupter or so destroy the timing of the presentation of the ware to the setting up means. The traveling means thus acts as a combined brake and transport for the ware.

We further provide means for properly guiding the pieces during their travel.

We further provide means for delivering the set up ware from the setting up mechanism to the mechanism which is to receive the same.

Other novel features of construction and also of arrangement of parts will appear from the following description.

In the accompanying drawings, wherein we have illustrated an embodiment of the principles of our invention, Fig. 1 is an end view of the machine; Fig. 2 is a plan view of the same; Fig. 3 is a detail in plan of the setting up cup; Fig. 4 is a front view of the same; Fig. 5 is an enlarged end view showing in detail the connections for intermittently applying operative power to the set up cup and the gate; Fig. 6 is a section taken along the line 6—6 in Fig. 5; Fig. 7 is a front view showing the gate halting a bottle by engaging the front end thereof; Fig. 8 is a side elevation showing the gate halting a bottle by engaging its neck; Fig. 9 is a diagrammatic view showing a bottle about to be set up and the next bottle to the rear halted by the gate; Fig. 10 is a like view showing the bottle in the process of being set up; Fig. 11 is a like view showing the bottle set up and engaged by the cup and the rest; Fig 12 is a like view showing the cup raised and the set up bottle continuing its travel; Fig. 13 is a diagrammatic view showing the relation between the conveyor and the delivery chute; Fig. 14 is a detail in plan of the turnover cup; Fig. 15 is a front view of the same; Fig. 16 is a diagrammatic view showing a wrongly directed bottle about to be turned over and the next bottle to the rear halted by the gate associated with the turnover mechanism; Fig. 17 is a like view showing the bottle in the process of being turned over; Fig. 18 is a like view showing a further step in the turning over of the bottle; Fig. 19 is a like view showing the bottle completely turned over; and Fig. 20 is a like view showing in order the first gate, the turnover mechanism, the second gate, and the setting-up mechanism, and showing bottles positioned to be acted upon by each of these mechanisms.

Referring to the drawings, 1 is the frame of the machine upon which is carried a hori-

zontally disposed conveyor frame 2. 3 is an endless conveyor mounted on the usual rollers which are carried by the frame. The conveyor may be made of any suitable material, as for instance asbestos or like material which furnishes high frictional resistance to glassware, or (as shown) it may be of woven wire fabric which, while having less frictional resistance than asbestos, has other qualities highly desirable in a conveyor. One of said rollers shown at 4 is keyed on a shaft 5 journaled in the sleeve bearings 6 of the frame. At one of its ends the roller shaft 5 is coupled to the delivery shaft of the speed-reducing mechanism 7 mounted on the machine frame. The speed reducer is driven, as by the sprockets 8 and 9 and the chain 10 from the motor 11 which is mounted on the machine frame. The direction of travel of the conveyor is from top to bottom of Fig. 2. 13 is a cam shaft journaled in the frame longitudinally thereof and having its front end provided with a bevel gear 14 meshing with a similar gear 15 on the inner end of a transversely disposed shaft 16 journaled in bearings 17 in the machine frame.

The outer end of the shaft 16 has fixed thereon a head 19, one end of which is provided with an inwardly extending post 20 upon which is rotatably mounted the tailed pawl 21, the pawl being resiliently pressed inwardly towards the shaft 16 by the spring 22.

23 is a sprocket idle on the shaft 16 and operatively connected by the chain 24 to the sprocket 25 of the speed reducer 7. Thus the sprocket 23 is continuously rotated. Keyed on the hub of the sprocket 23 is a ratchet wheel 26 which is engaged by the tooth 21*a* of the pawl 21 when said pawl is not retracted, thus causing the shafts 16 and 13 to be rotated. The tail 21*b* of the pawl 21 is recessed so as to be engaged by a pin 27 which is also the piston rod of the piston 28 in the fluid pressure cylinder 29 which is mounted on the frame. 30 is a helical spring in said cylinder behind the piston, which tends to extend the pin 27 into the path of the tail of the pawl 21. The pin is retracted by means of fluid pressure admitted to the cylinder in front of the piston through a pipe 31. When fluid pressure is admitted to the front end of the cylinder, the pin 27 is retracted and the pawl 21 engages the ratchet wheel 26, thus imparting rotary movement to the shaft 16 and through it to the cam shaft 13. When the fluid pressure is relieved from the front of the piston, the spring 30 causes the pin to be extended into the path of the tail 21*b* of the pawl 21. The curved surface of the tail 21*b* moving in a clockwise direction about the shaft 16 when the pawl is engaged (Fig. 5), encounters the stationary pin 27, which causes a clockwise turning movement of the pawl 21 about the post 20 and withdraws the tooth 21*a* from the ratchet wheel 26. This causes the shafts 16 and 13 to cease rotation.

A second and smaller ratchet wheel 32 having its teeth in a reverse direction to that of the teeth of ratchet wheel 26 is also keyed on the hub of the sprocket 23. 33 is a second spring pressed pawl carried by the head 19 and engaging the teeth of the ratchet wheel 32. The function of the ratchet wheel 32 and its pawl 33 is to prevent the shafts 13 and 16 turning faster than their normal speed due to the drive through ratchet 26 as above described. The admission of fluid pressure to the cylinder 29 and the relief of pressure therefrom through the pipe 31 is in practice controlled by a moving part of some of the mechanism operatively associated with the set up mechanism and with the movements of which those of the set up mechanism are to be synchronized.

On the shaft 13 is mounted a cam 34 which actuates a rocker arm 35 pivoted at one end to the shaft 36. The free end of the arm 35 is connected by a link 37 to the lower end of the post 38 slidably mounted in the vertical stand 39. The upper end of the post 38 has clamped thereto and vertically adjustable thereon the head 40 on which is mounted the horizontal arm 41 preferably made of flat spring steel. The free end of the arm 41 has mounted thereon the depending gate 42.

The gate 42 is a flat steel plate of proper dimensions to be disposed in front of a bottle, as indicated in Figs. 1, 2, 7 and 9, when the gate is lowered to halt the bottle. The gate is recessed upwardly as at 43 so that if the end of the bottle has passed beyond the path of the gate as the latter is lowered, the gate will straddle the neck of the bottle as illustrated in Fig. 8 and thus halt the bottle. The bottles when delivered to the conveyor by a chute may arrive at varying speeds dependent upon the manner in which they are delivered to the chute. It is desirable, in order to assure proper spacing of the articles by the gate, that the bottles be traveling at the speed of the conveyor when they reach the gate. Hence the gate should be positioned away from the receiving end of the conveyor a distance such that the frictional resistance of the conveyor will overcome the maximum momentum of the bottles and present them to the gate at the speed of the conveyor.

The shaft 13 has also fixed thereon a second cam 44 which engages a second rocker arm 45 also pivotally connected at one end to the shaft 36 and having its other end connected by a link 46 to the lower end of a post 47 slidable in the stand 48. The upper end of the post 47 has mounted

thereon, a flat steel spring arm 49 on the free end of which is mounted the lifting cup 50 which is shown in detail in Figs. 3 and 4. The lifting cup has a closed front end and its bottom and sides are closed by an arcuate wall so as to receive the bottle as the latter advances with the conveyor, as illustrated in Fig. 10. The under side of said arcuate wall is notched as at 51, so that as the bottle is raised to its vertical position, the cup will be disengaged from the bottle as the cup continues to rise.

52 is a stop against which the bottle is raised by the lifting cup, the stop being carried by the arm 53 adjustably mounted on a standard 54, the lower end of which is secured in a socket 55 in the conveyor frame. The stop may be provided with a pair of asbestos pads 56 disposed in angular relation to each other and against which the bottle is raised by the lifting cup. As the bottle approaches the vertical, its center of gravity passes its forward edge and the bottle tips back to upright position, its upper end drawing back from the cup, the cup thereby having a chance to clear without tipping the bottle backwards. This straightening up, combined with the forward movement of the conveyor, would continue the turning motion and upset the bottle backward, if it were not for the stop 52 against which the bottle contacts just as it reaches a vertical position.

On either side of the path of the working strand of the conveyor is a guide plate 57, the front or working face of which may be provided with an asbestos pad, and said guide plates are adjustable towards and away from each other to accommodate them to different widths of ware. Thus in Fig. 2 the lower edges of said plates are provided with outwardly extending brackets 58 which are provided with slotted holes 59 engaged by bolts 60 which are screwed down into the conveyor frame.

At the front end of the conveyor, in front of the path of movement of the lifting cup, is provided a third guide plate 61 which is disposed angularly across the path of movement of the conveyor, as shown in Fig. 2, for the purpose of directing the ware on to the rotating transfer disk 62 by means of which the set up ware is delivered to the receiving mechanism.

In Fig. 13 I show diagrammatically the bottles being delivered top foremost down an inclined chute 63 to the conveyor 3, the chute being assumed to be connected with the take-out or discharge mechanism of the fabricating machine. Under these circumstances, bottles or other ware as delivered to the conveyor will have a certain momentum, which might cause them to move forwardly at a faster rate than that of conveyor travel into contact with the gate. This is avoided by placing the gate sufficiently far from the point at which the ware reaches the conveyor that the frictional resistance of the conveyor overcomes the maximum momentum before the ware arrives at the gate.

In the operation of our setting-up mechanism, the objects, such as bottles or other articles of ware, are delivered to the conveyor which travels continuously and at uniform speed, and said objects are halted in turn by the gate which is lowered at the proper intervals. At the proper instant the gate is raised and the intercepted object then moves on into engagement with the lifting device which raises the object and stands it upright on the conveyor. In case, through any cause, such as the irregular spacing of the objects on the conveyor, the gate descends too late to be positioned in front of the object it will straddle the neck thereof and thus halt the object.

The ascent of the lifting device coacting with the forward travel of the conveyor causes the object to be moved into an erect position and the stop prevents a rearward toppling and gives the lifting device an opportunity to be further elevated and clear the top of the bottle which is now traveling forward with the conveyor. The travel of the conveyor causes the object to move forward and be deflected or transferred to the mechanism which is to receive the objects.

When, as illustrated in Fig. 13, the objects are delivered to the conveyor by gravity, their momentum may result in their irregular spacing and disposal on the conveyor which might interfere with their proper engagement by the lifting cup. The employment of the gate however insures the presentation of the objects at the proper intervals and in the proper sequence to the lifting cup and, the lateral guides insure the proper alignment of the objects so that they may be readily set up on their bottom and stood in proper alignment.

The synchronization of the operation of the setting-up cup and the gate with the operation of the mechanism associated with the setting-up mechanism, insures the proper delivery of the set-up objects. Thus our invention particularly lends itself to automatic installations, such for instance as the fabrication and annealing of glassware.

The proper operation of our setting-up device depends upon the delivery thereto of bottles which travel top first. If the bottles are delivered bottom first to the conveyor, it is necessary that they be turned over to present their neck portions to the setting-up device. Hence, if the delivery means is such that they may deliver some or all of the bottles bottom first to the conveyor, we provide additional mechanism cooperating with the conveyor and located ahead of the setting-up mechanism which

will effect the turnover of improperly headed bottles. This mechanism may comprise (1) a duplicate of the gate mechanism above described to time the presentation of the bottles to the turnover; and (2) a turnover mechanism in all respects identical to the setting-up mechanism above described, save that the stop 52 is omitted, the cup 50 so formed as to coact with the bottoms, but not the tops of the bottles, and if desired a reduction in the amount of lift of the cup to assure that the bottles be positively overturned through contact with the cup, if necessary, by the forward travel of the conveyor. Such mechanism is shown in Figs. 14 to 20 wherein Figs. 14 and 15 show the cup 50*a* and Figs. 16 to 19, show diagrammatically the gate 42*a*, the cup 50*a*, the gate 42, and the cup 50 and their method of operation.

It is obvious that the turnover mechanism has utility per se and need not necessarily be used in association with the setting-up device.

What we desire to claim is:—

1. In setting-up mechanism, the combination of a conveyor to move objects in a predetermined path, a lifting device arranged to engage the forward ends of the objects and raise them into a vertical posture, and means for preventing the raised objects from backward toppling.

2. In setting-up mechanism, the combination of a moving conveyor to move objects in a predetermined path, a lifting device arranged to engage the forward ends of the objects and raise them into a stable vertical posture on the conveyor, and a stop against which said objects are raised by the lifting device.

3. In setting-up mechanism, the combination of a conveyor to move objects in a predetermined path, a lifting device arranged to move in a path at variance with the path of the conveyor and to engage the forward ends of the objects and move them into a stable vertical posture on said conveyor, and a gate arranged to intermittently move into the path of the objects on the conveyor to intercept their movement and regulate their presentation to the lifting device.

4. In setting-up mechanism, the combination of a conveyor to move objects in a predetermined path, a lifting device arranged to move in a path at variance with the path of the conveyor and to engage the forward ends of the objects and move them into a stable vertical posture on said conveyor, a gate arranged to intermittently move into the path of the objects on the conveyor to intercept their movement and regulate their presentation to the lifting device, and a stop against which the objects are moved by the lifting device.

5. In setting-up mechanism, the combination of a conveyor to move objects in a predetermined path, a lifting device arranged to be intermittently raised and lowered in relation to the conveyor to engage the objects and raise them into a vertical posture, and a gate arranged to be raised and lowered in relation to the conveyor and to thus intercept the traveling objects and thus regulate their presentation to the lifting device.

6. In setting-up mechanism, the combination of a conveyor to move objects in a predetermined path, a lifting device arranged to be intermittently raised and lowered in relation to the conveyor to engage the objects and raise them into a vertical posture, a gate arranged to be raised and lowered in relation to the conveyor and to thus intercept the traveling objects and thus regulate their presentation to the lifting device, and a stop against which the lifting device raises the objects.

7. The combination with an object-delivery mechanism of a setting-up mechanism comprising an endless moving conveyor which receives the objects from the delivery mechanism and causes them to travel in a horizontal posture in a predetermined path on said conveyor, a lifting device arranged to engage the traveling objects and move them with respect to said conveyor into a vertical posture thereon, and means arranged to intercept the traveling objects and regulate their presentation to the lifting device.

8. A setting-up device for glassware comprising lifting means for lifting one end of a piece of glassware, and coacting horizontally moving means for advancing the other end of the ware whereby the ware is set up by a turning movement and means for preventing a continued turning movement beyond the vertical posture.

9. A setting-up device for glassware comprising a conveyor, means coacting therewith for lifting one end of the glassware from said conveyor while the other end is moved forward by the conveyor and means for preventing the ware from overturning upon continued movement of the conveyor.

10. A setting-up device for glassware, comprising a conveyor, means for moving said conveyor, means for lifting one end of the glassware from the said conveyor while the other end is being moved forward by the conveyor, and means synchronized with the conveyor moving means for periodically operating the lifting means.

11. A setting-up device for glassware, comprising a conveyor, means for lifting one end of the glassware from the said conveyor while the other end is being moved forward by the conveyor, and means active at regular intervals for raising and lowering the lifting means.

12. In setting-up mechanism, the combination of a conveyor to move the objects, which are to be set up, in a predetermined path, and means moving substantially perpendicularly to the path of the conveyor's movement for engaging one end of each of the objects as they are presented by the conveyor and causing them to assume a stable vertical posture on said conveyor.

13. A setting-up device for glassware, comprising a conveyor for moving the ware in a predetermined path, means for engaging the ware as it is presented by the conveyor, means independent of the movement of the ware for intermittently raising and lowering said engaging means to cause the ware to assume a vertical posture, and a gate arranged to be intermittently interposed in the path of the ware to regulate the presentation thereof to the said engaging means.

14. A setting-up device for glassware, comprising a conveyor for moving the ware in a predetermined path, means moving in a path at variance with the path of the conveyor but in the vertical plane thereof for engaging a part of the objects while the objects are upon the conveyor and moving them into a vertical posture while maintaining them continuously upon the said conveyor, and means for preventing the objects from turning beyond the vertical posture.

Signed at Hartford, Connecticut, this 17th day of November, 1927.

EDWARD H. LORENZ.
JOHN E. SCHRODER.