March 3, 1953 A. J. LIPPOLD 2,630,203

ARTICLE HANDLING AND TIMING DEVICE

Filed May 4, 1946 2 SHEETS—SHEET 1

Fig. 1.

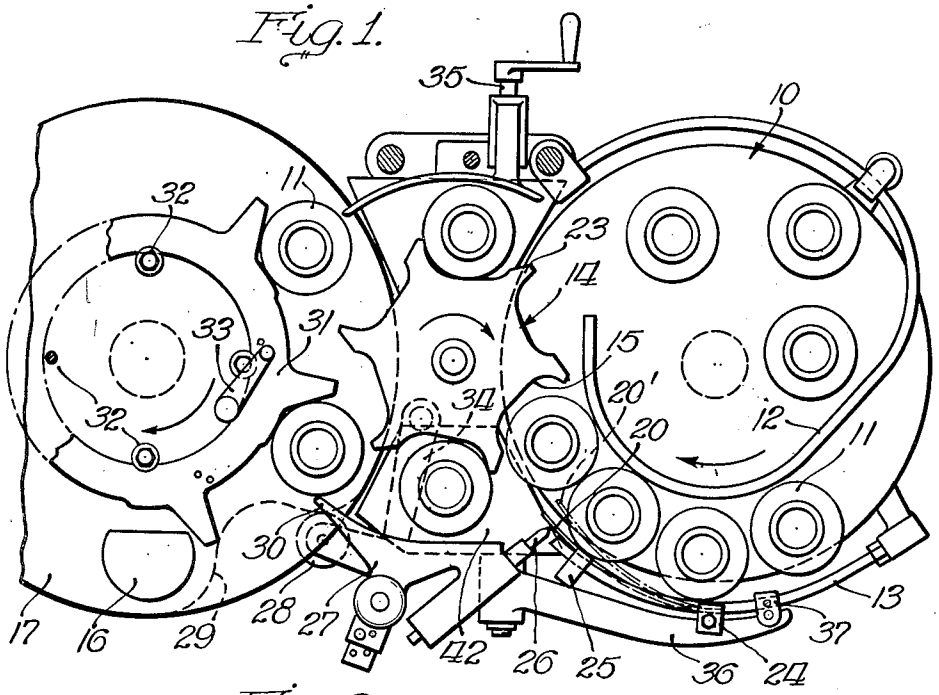


Fig. 2.

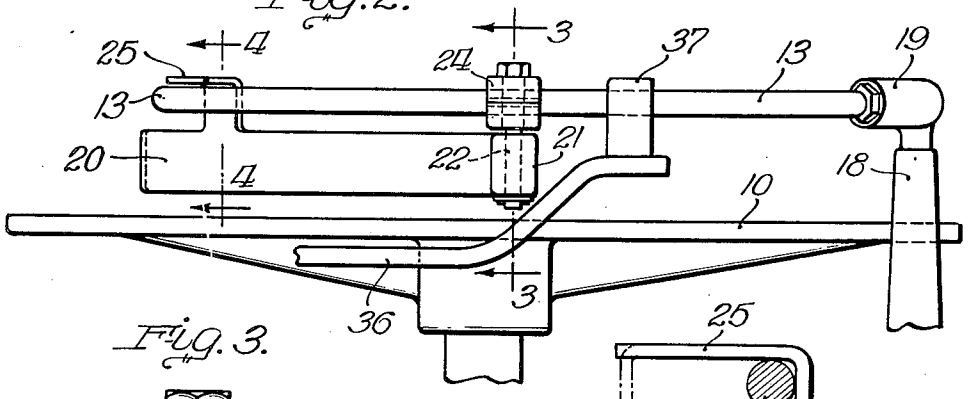


Fig. 3.

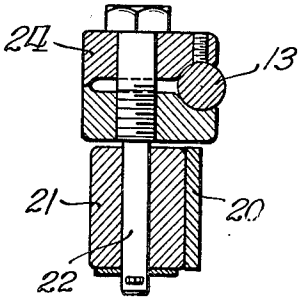
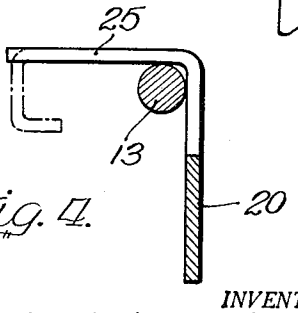


Fig. 4.



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ARTICLE HANDLING AND TIMING DEVICE

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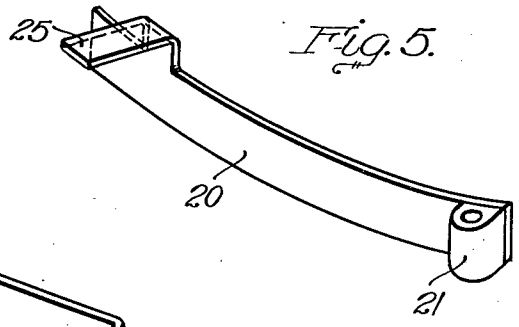


Fig. 5.

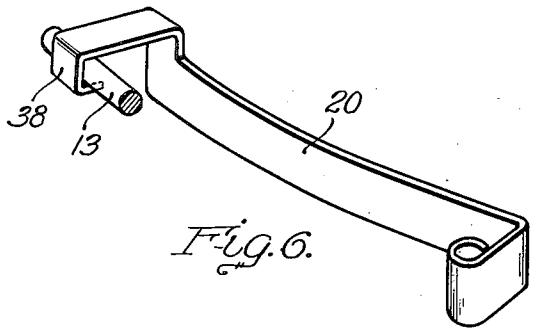


Fig. 6.

Fig. 7.

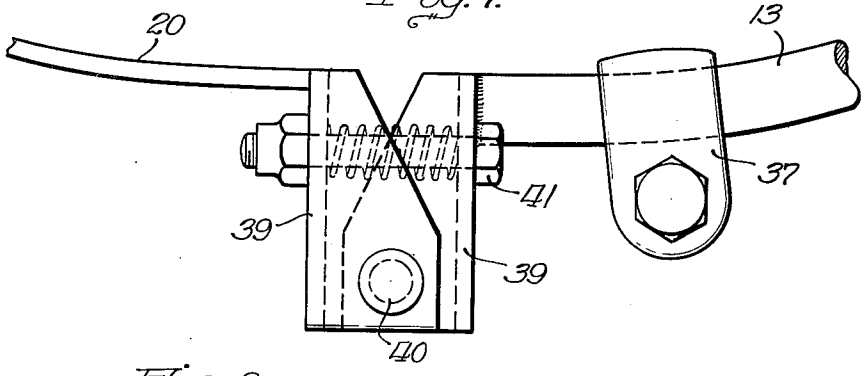
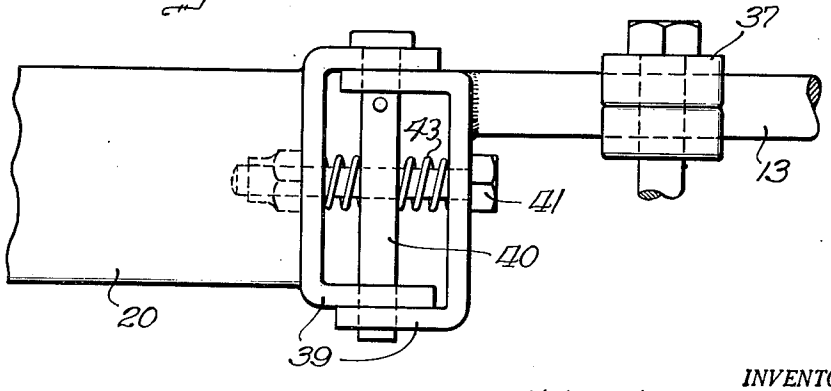


Fig. 8.



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ARTICLE HANDLING AND TIMING DEVICE

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4 Claims. (Cl. 198—22)

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This invention relates to improvements in article handling devices. More particularly, this invention pertains to improvements in apparatus for the timed movement and positioning of receptacles, such as milk bottles, onto the pedestals or receptacle supports of a rotary type of bottle filler or capper.

In the conventional rotary type of automatic bottle filler or capper, precautions must be taken to assure the accurate positioning of the receptacles in filling or capping positions. In commercial operations, the receptacles to be filled or capped are usually supplied to the filling or capping apparatus by a continuously moving type of conveyor or supply table and are transferred from such conveyor or table into filling or capping position by the use of guides and transfer wheels acting jointly and in synchronism with infeed gates or control mechanisms. In many instances such infeed gates or control mechanisms operate on the principle of intermittently stopping the otherwise continuous movement of bottles or receptacles being supplied to the transfer mechanism. In many instances, the mechanical arrangement for stopping or controlling the motion of the receptacles being supplied to a transfer mechanism depends upon a relatively small or point-like contact by the control mechanism on a receptacle at or substantially at the largest diameter thereof. In the event of imperfect operation of such control mechanism, particularly in the instances of the handling of round receptacles, a receptacle may be violently propelled forwardly or rearwardly, thereby in many instances causing breakage, and in any event destroying the timed operation of the apparatus.

The primary object of this invention is, therefore, to provide improved receptacle detention or gate means for use in controlling the movement of receptacles from a supply conveyor or table into the pockets or openings of a transfer wheel used in such devices as bottle fillers or cappers. A further object of this invention is to provide such improved gates or guides operable in synchronism with the remaining elements of devices such as continuous and automatic bottle fillers and cappers.

The invention has a number of other objects and many advantages, some of which will appear in more detail in the following description when read in connection with the accompanying drawings, in which:

Figure 1 is a fragmentary detail view in plan of a receptacle actuating and transferring portion of a rotary type combined automatic bottle filler and capper;

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Figure 2 is an elevational view, taken along the lower right-hand portion of the embodiment of the invention illustrated in Figure 1, and showing one improved form of receptacle gate or guide;

Figure 3 is a vertical section taken along line 3—3 of Figure 2;

Figure 4 is a vertical section taken along line 4—4 of Figure 2;

Figure 5 is a view in perspective of the gate element shown in elevation in Figure 2;

Figure 6 is a view in perspective of a modified form of gate element;

Figure 7 is a plan view of a further modified form of gate element embodying a spring-pressed hinge for supporting the gate element; and

Figure 8 is a view in elevation of the hinge for the gate element shown in Figure 7 of the drawings.

The preferred embodiment of this invention will be described in connection with the illustrations in the drawings of an improved rotary type of automatic bottle filler and capper, in which drawings like numerals are used to identify like elements.

The numeral 10 represents a continuously rotatable supply table or turntable means which is adapted to impositively or frictionally engage articles, such as milk bottles or receptacles 11, which are moved by the rotary feed table or turntable 10 between guides 12 and 13 to an intermittently rotatable transfer wheel or star wheel 14. The transfer wheel 14 receives the bottles 11 in pockets or receptacles receiving portions 15, and moves the bottles from the continuously rotating supply table 10 to the bottle pedestals or supports 16 of the continuously rotatable filling or work table 17.

The bottle guide 13 is supported upon post 18 by pivot element 19, and extends therefrom toward the transfer wheel 14. To aid in guiding the bottles toward the rotatable member or transfer wheel 14 and to provide for the stopping of the succeeding bottles of a series of bottles while a first bottle in a series of bottles is being urged into a pocket 15 of the rotor 14, there is provided a bottle detention or feed gate element 20. The deflector element 20 extends slightly beyond the guide rail 13 toward the transfer wheel 14 and is supported primarily by bearing 21 and pivot pin 22 upon the guide element 13 at approximately the mid-section of element 13 and at a point remote from the line of motion of the fingers 23 of the transfer wheel 14.

The pivot pin 22 for the gate or deflector element 20 is supported upon the guide 13 by clamp 24. To aid in the support and guiding of the de-

tention element or gate 20, there is provided at the free end of the element 20 a supplemental support or slide bearing 25, engaging the upper surface of the adjacent portion of the guide 13.

In the operation of the improved receptacle handling device, constructed according to the present invention, receptacles to be filled are moved in clockwise direction by the yieldable or failable means in the form of a continuously rotating supply turntable 10, between the guides 12 and 13, past the receptacle detention or gate element 20, toward the pockets 15 of the intermittently rotating transfer wheel 14. At the time that the first receptacle in a series of receptacles thus being moved toward the transfer wheel 14 is in position to be received in a pocket 15, pressure is applied to the free end of the gate element or deflector 20 to pivot it upon its support 22 from its normal position below the outer guide rail 13 toward the inner guide rail 12. In this deflected position gate 20 obstructs the further movement of the remaining receptacles toward the transfer wheel 14. By thus restricting the width of the passage between the guide rail 12 and gate 20 to a distance less than the diameter of the receptacles being handled, all successive receptacles in the series are restrained from movement beyond the gate element 20. Upon the reception of the first receptacle in a series into a pocket 15 of the transfer wheel 14 and the transfer of that receptacle over the transfer table 42 toward the work table or turntable 17, the closing pressure on the gate 20 is released and the next receptacle of a series is permitted to advance toward the next pocket 15 of the transfer wheel 14. The motion of the gate element 20 is so adjusted and timed in its closing and opening actions that the first receptacle in the obstructed portion of a series of receptacles upon the release of the gate element 20 and the return of the gate to its normal position will be moved forward in timed synchronism with the motion of the transfer wheel 14 whereby, in each instance, such receptacle will be freely moved into a pocket 15, all by virtue of the use of synchronized driving mechanism (not shown) as clearly illustrated in my United States Patent No. 2,176,557.

It has been pointed out that the receptacle detention or gate element 20 is urged toward receptacle obstructing position in synchronism with the motion of the transfer wheel 14. Such motion of the element 20 into the receptacle obstructing position is caused by the engagement with the gate element 20 of the spring pressed contact element or plunger 26 housed in one end of the oscillatory driving element or actuator means 27. The driving element 27 is provided at its opposite end with a roller type of cam follower 28 adapted to engage the cam track 29 carried by the work table 17. Thus, by virtue of the configuration of the cam track 29, the oscillatory motion of the driving element 27, and in turn the pivoting motion of the gate element 20 are each synchronized with the motion of the rotating work table 17, the transfer wheel 14 and the supply table 10. This synchronized motion is obtained by virtue of the interconnected and synchronized driving mechanism (not shown) used for supplying the necessary power to drive the supply table 10, transfer wheel 14 and the turntable 17. Such driving mechanism may be of the well-known design fully illustrated in my United States Patent No. 2,176,557.

The use of the spring pressed element or plunger 26 and the selection of the appropriate size and type of spring (not shown, but which may be housed within the oscillatory actuating means 27), enables the attainment of the application of the desired degree of restraining pressure upon the first of a series of bottles being moved by the supply turntable 10 toward the transfer wheel 14. Thus is secured the proper synchronization of the movement of the receptacles and the elements of the apparatus by the control of the motion of the bottles into the transfer wheel 14 without incurring the danger of the breakage of the bottles or the possible violent forward propelling of the bottles.

As is clearly illustrated in Figure 1 of the drawings, the possible maximum forward motion of the gate element 20 is illustrated by the dotted lines 20'. Such possible motion obviously occurs only in those instances when no bottle or receptacle 11 is stationed between the gate element 20 and the inner guide rail 12. In such instances in which a bottle 11 is pressed between the inwardly moving gate element 20 and the guide element 12, the inward or obstructing motion of the gate element 20 is limited by the contact of the gate 20 with the bottle 11. Additional motion of the driving element 27, tending to urge the gate element further toward the guide 12, will be absorbed by the escape motion of the spring-loaded plunger 26. In such instances as last mentioned, the plunger or yieldable arm 26 will be received or forced rearwardly into the plunger housing in the driving element 27.

The driving element 27 is also provided with a retractable receptacle positioning finger or means 30, adapted to overlap a portion of the work table 17 adjacent a bottle pedestal 16 when the pedestal is in receptacle receiving position, and to engage the adjacent surface of the bottle 11 just received on the pedestal to urge it into proper position against the contact faces of the bottle spacing ring 31 carried by the work table 17.

To facilitate the adaptation of the improved type of milk bottle filler and capper to the handling of various sizes of receptacles, the spacing ring 31 may be adjusted for the proper spacing of any one of a series of sizes of receptacles, such, for example, as the conventional sizes of quart, pint, half-pint and quarter-pint milk bottles. Such adjusting is made by the proper rotation of the spacing ring 31 upon its supports 32 and the engaging of the indexing device 33 into the proper index opening in the spacing ring 31. To enable the proper handling of different sizes of receptacles, it is also necessary to interchange the transfer wheel 14 with a transfer wheel so proportioned as to adapt it for the handling of the desired size of receptacles.

The oscillatory driving element 27 may be adjusted on its pivoted support 34 to adapt it for operation in connection with any desired size of receptacle. Suitable indexing mechanism is provided. When properly indexed the element 27 may be locked into operative position by tightening of a clamp nut of conventional design. In like manner, the outer guide rail 13 may be suitably adjusted for the handling of different size receptacles by moving the guide rail inwardly or outwardly with respect to the inner guide rail 12. Such inward or outward movement of rail 13 is secured by the proper turning of the adjusting screw 35, whereby the guide rail adjusting arm 36 is moved inwardly or outwardly. The swivel connection 37, which links the arm 36 to

the rail 13, causes the rail 13 to pivot on its support 18 during the adjustment of the arm 36, and to remain in the adjusted position.

In Figure 6 of the drawings, there is illustrated a modified form of infeed gate or deflector or receptacle detention element 20. In this modified form, bearing 21 is formed integrally with the arm 20, and the sliding support 25 for the gate 20 is provided with a motion control guard 38 which overlaps the guide means or rail 13, thereby limiting the maximum inward pivoting motion of the gate 20 toward the inner guide means or rail 12.

In Figures 7 and 8 of the drawings, there is illustrated a further modified form of gate 20. In this further modified form the gate element 20 is pivotally supported by the hinge elements 39 and hinge pin 40 upon the end of a shortened guide rail 13. In both forms of the gate element 20, illustrated in Figures 1 to 6, inclusive, of the drawings, the gate element 20 is forced inwardly toward receptacle obstructing position by the plunger 26 of the driving element 27. In these two forms of the embodiment of the invention as illustrated in Figures 1 to 6, inclusive, the gate element is returned to its normal position under the guide rail 13 by the pressure exerted against it by the receptacles being fed by the supply table 10 toward the transfer wheel 14. In the modified form of deflector or gate 20, illustrated in Figures 7 and 8 of the drawings, the gate 20 upon the retraction of the plunger 26 of the driver 27 is opened by the pressure of the confined spring 43, supported upon the motion limiting screw 41 between the hinge elements 39. The compressed spring 43 is so positioned and arranged between the hinge elements 39 as to tend to open the gate 20 upon the release of the pressure of the driving plunger 26 against the gate 20.

The foregoing description of the improvements in an article handling device such as an automatic rotary type of bottle filler and capper, when read in connection with the accompanying drawings, clearly sets forth and illustrates the various advantages in the improved article handling device. One of the great difficulties in supplying receptacles from a continuously moving conveyor to a machine, such as a bottle filler and capper, is to achieve a construction in which complete and accurate control may be exercised over the movement of the receptacles when passing into position in between mechanically and positively moved elements, in which position the receptacles, if improperly placed, may be damaged. This problem is made even more difficult in those instances in which it is desired to provide an apparatus, such as a bottle filler and capper, adapted, upon the making of slight adjustments, to handle different sizes and shapes of receptacles. It is a relatively easy matter to devise apparatus capable of controlling the motion of receptacles from a supply conveyor into a transfer mechanism when each such receptacle has the same size and shape. However, to provide an apparatus capable of accurately controlling the motion of receptacles of different sizes and different shapes, when moving from a supply conveyor onto a transfer mechanism, is a relatively difficult problem. The present invention clearly provides means for satisfactorily controlling the motion of different sizes and shapes of receptacles when being moved from a supply conveyor onto a transfer mechanism and thence into proper position in a bottle filler, in addition to other advantages hereinbefore set forth.

Having thus described and illustrated the preferred, and some modified embodiments of the invention in an improved article handling device, the invention is not to be restricted to the specifically illustrated preferred or modified embodiments thereof, as disclosed, excepting in so far as is necessitated by the prior art and the appended claims.

The invention is hereby claimed as follows:

1. In combination, a turntable having spaced receptacle supports, an adjacent rotary feed table, a transfer table between said feed table and said turntable, and a star wheel having receptacle propelling fingers adapted to engage receptacles on said feed table and transfer such receptacles over said transfer table to an appropriate receptacle support on said turntable, means for assisting in the positioning of receptacles on the supports of said turntable, comprising a retractable finger having a portion disposed in the path of the advancing receptacles immediately following the positioning of a receptacle on a receptacle support of said turntable, means for retracting said finger out of the path of advancing receptacles carried by the turntable support, and receptacle detaining means movable to and from a position in which it obstructs the movement of receptacles being fed to said star wheel from said feed table, said receptacle detaining means being movable into receptacle obstructing position by an element carried by said means for retracting said finger, said receptacle detaining means also being movable into receptacle obstructing position in synchronism with the movement of said star wheel, whereby said detaining means is adapted to engage receptacles on said feed table for the detention thereof pending the removal by the star wheel of a receptacle engaged by one of the propelling fingers of said star wheel and carried by said feed table.

2. In a device of the class described, the combination of a rotatable member having receptacle receiving portions, turntable means adapted to frictionally engage receptacles for feeding them to said rotatable member, receptacle guide means associated with said turntable means for guiding receptacles toward said rotatable member, receptacle detention means forming a part of said guide means, said receptacle detention means being driven to and from a position in which it obstructs the movement of receptacles being fed to said rotatable member, and means for driving said receptacle detention means into receptacle obstructing position.

3. In combination, an intermittently rotating member having receptacle receiving portions, continuously moving means for supplying receptacles to said rotating member, pivoted receptacle detaining means movable to and from a position in which it obstructs the movement of receptacles being supplied to said intermittently rotating member, motion limiting means for regulating the extent of the motion of said detaining means, actuating means for driving said detaining means into receptacle obstructing position in synchronization with the movement of said rotating member, and a receptacle guide means associated with said continuously moving means for guiding receptacles to said rotating member, said receptacle detaining means forming a part of said receptacle guide means.

4. In a device of the character described the

combination with a rotatable work table of a rotatable transfer wheel having receptacle receiving portions for the delivery of receptacles to said rotatable work table, a rotatable supply table upon which receptacles are delivered to said rotatable transfer wheel and provided with means for the impositive advance of receptacles toward said transfer wheel, guide means associated with said supply table for guiding receptacles toward said transfer wheel, and a reciprocatory member of such length as to project alternately over said work table and said supply table, and means for reciprocating said member in synchronism with the movement of said work table said transfer table and said supply table, said member having at one of its ends receptacle positioning means adapted to assist in placing receptacles on said work table and said member having at the other of its ends means for engaging a pivoted receptacle detention member positioned to periodically engage and temporarily restrain the forward motion of receptacles advancing on said supply

table, said receptacle detention member being so constructed and arranged as to form a part of said guide means.

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