

H. STAKE & A. P. EKVALL.
 ESCAPEMENT AND FEED MECHANISM FOR BOTTLES OR THE LIKE.
 APPLICATION FILED JAN. 10, 1917.

1,258,623.

Patented Mar. 5, 1918.
 2 SHEETS—SHEET 1.

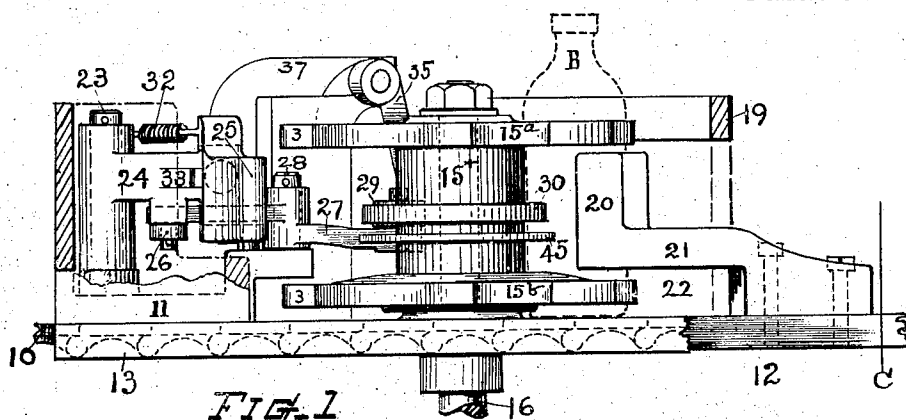


FIG. 1

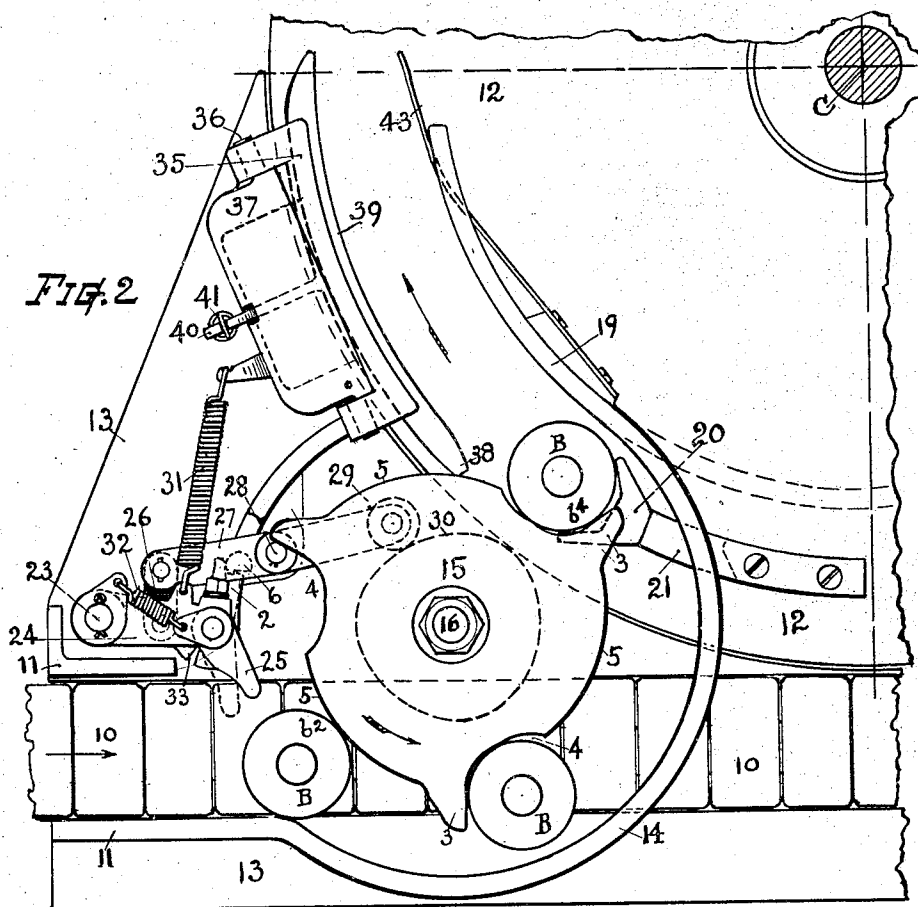


FIG. 2

Inventors—

Herman Stake
 Arvid P. Ekvall
 By Chas. H. Burleigh
 Attorney

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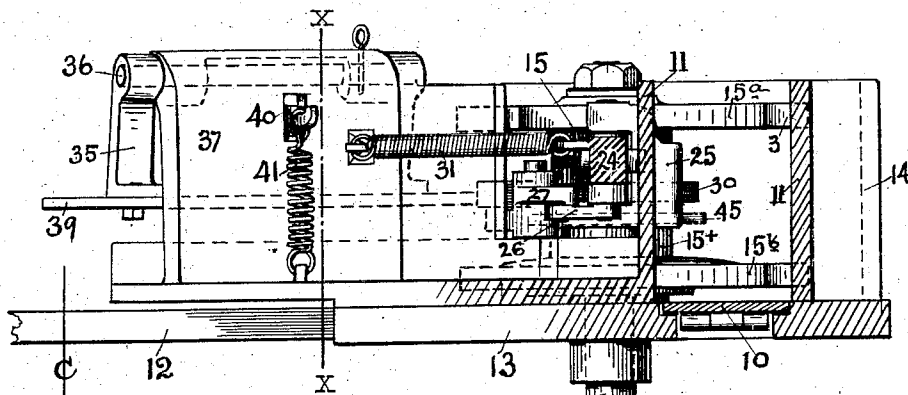


FIG. 3

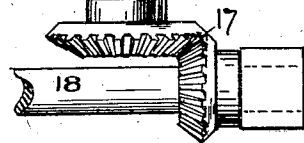


FIG. 4

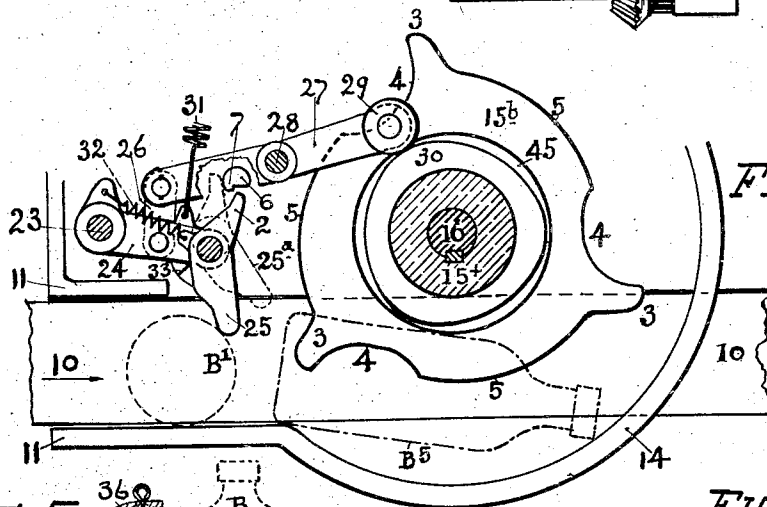


FIG. 5

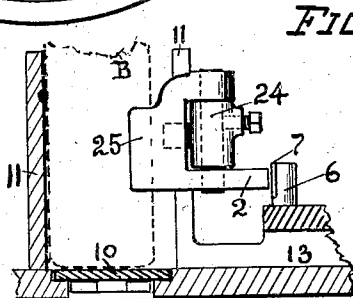


FIG. 6

Inventors—Herman Stake
 Arvid P. Ekvall,
 By Chas. H. Dulleigh
 Attorney,

UNITED STATES PATENT OFFICE.

HERMAN STAKE AND ARVID P. EKVALL, OF WORCESTER, MASSACHUSETTS, ASSIGNORS
TO ECONOMIC MACHINERY COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

ESCAPEMENT AND FEED MECHANISM FOR BOTTLES OR THE LIKE.

1,258,623.

Specification of Letters Patent.

Patented Mar. 5, 1918.

Application filed January 10, 1917. Serial No. 141,699.

To all whom it may concern:

Be it known that we, HERMAN STAKE and ARVID P. EKVALL, both citizens of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Escapements and Feed Mechanism for Bottles or the like, of which the following is a specification.

This invention relates to a novel construction and organization of mechanism for controlling, handling and feeding bottles, cans or other containers, or similar articles, to rotary automatic labeling machines and similar continuously operating machinery for which the same is adapted; it being more especially designed for use in connection with rotary labeling machines of the general character shown and described in prior Letters Patent, an example of which may be found in Patent No. 1,113,854, granted on the application of Frank O. Woodland and dated October 13, 1914, reference to which may be had for a fuller understanding of the general operation of the class of machines to which, as a feeding appliance, the within described invention is successfully applicable.

The prime object of our present invention is to provide an efficient and reliable mechanism whereby bottles, cans or similar articles can be automatically transferred from a delivery conveyer to the continuously moving carrier or rotary table of a labeling or other similar operating machine; in an accurate, rapid and positive manner regardless of the regularity with which they are brought forward by the delivery conveyer.

Another object is to provide a feeding mechanism of the character described, comprising a continuously rotating feeding-head of peculiar peripheral contour and carrying an intermedial revolver cam, combined with an intercepting and escapement means, controlled by the rotary action of the feeder, said escapement means being automatically lockable, as more fully hereinafter explained.

Another object is to provide, in combination with the revolving feeder-head as described, an oscillating spring-pressed guard adapted for steadying or supporting bottles or the like as they pass from the feeder-head

to the rests or push-devices upon the rotary carrier.

Another object is to provide in a mechanism of the character described, means for protecting bottles or the like against damage, if in accidentally overturned position, within the feeder.

Minor objects and features of our invention are specifically hereinafter set forth.

These objects we attain by mechanism the nature and organization of which is explained in the following detailed description, and illustrated in the accompanying drawings; wherein Figure 1 represents an elevation view of mechanism embodying our invention, the front guard plate being omitted for clearer illustration. Fig. 2 is a plan view of our escapement and feeding mechanism, together with a portion of the main rotary carrier of a labeling machine, showing the relative combination of the respective devices. Fig. 3 is an elevation view, partly in section, looking in the direction of the delivery. Fig. 4 is a horizontal sectional diagram of the feeder-head and escapement devices. Fig. 5 is a transverse vertical section of the steadying guide at line X X on Fig. 3, and Fig. 6 is a separate detail back elevation of the escapement member and its locking means.

Our invention is herein illustrated as adapted for feeding bottles to the rotary carrier of an automatic labeling machine; but it will be understood that it may be employed, without material change in its essential features, for in like manner feeding cans or other similar containers or articles, into machines for performing other operations than labeling thereon; and we desire to include such use of the invention in practice, as within the scope of the subjoined claims.

As shown in the drawings, the part indicated by numeral 12 represents the movable table or rotary carrier (only a portion thereof is shown) which may be of any suitable or well known construction and operated in the usual manner; preferably revolving with continuous movement about the central axis C in the direction indicated by the pointer, and as will be understood, employed in practice for advancing bottles or the like through the several stages of labeling, or other opera-

tions; the means for which being of well known character and not of our present invention, is not included in the drawings.

10 indicates the conveyer by which the series of bottles B are brought forward and delivered to the feed mechanism from any desired location. Said conveyer preferably comprises a traveling belt or chain of flat plate links, upon which the bottles or the like stand in upright relation; suitable guiding walls 11 being provided at either side thereof, between which they are advanced with the continuous movement of the chain or belt, in the manner heretofore practised.

13 indicates a stationary horizontal bed or frame, and 14 an upright semicircular guard or fender, defining the path for the bottles or the like from the conveyer 10 to the carrier 12.

15 indicates the propelling revolver or rotary feeder-head, the peculiar structure, arrangement and operation of which constitutes an important feature of our invention. Said feeder-head comprises upper and lower disks 15^a and 15^b fixed upon a central hub 15^c, and having similar peripheral contour; each being provided with preferably three radially projecting fingers or prongs arranged at uniform intervals and adapted for propelling bottles or the like; the edges of the two disks between their several prongs being uniformly shaped substantially as illustrated. Said edges are formed with approximately semi-circular, inwardly rounded recesses or spaces 4 for accommodating the bottle or article positioned immediately in front of the projecting prong 3, the radial face of which merges with the curved surface at the rear side of the recess space. The backs of the prongs are respectively formed with an abrupt incline or offset extending for some distance (approximately one half the diameter of a bottle) inward from the outer end of the prong, and the peripheral-edge-faces 5, between the prongs and recess spaces 4, are respectively formed on an approximately circular arc commencing at the base of the inclined offset back of the prong and extending to and terminating at a point upon the outwardly curved front of the semi-circular recess. Said circular peripheral edge face is best disposed slightly eccentric in relation to the circle of movement, the leading end of each of said peripheral edge faces 5 adjacent to the base of the prong being a little farther from the central axis than is the rear end of said face where it meets the front outward curve of the recess space 4; thus giving a gradual receding effect to the edge face 5 as the feeder-head revolves; but the latter portion of the peripheral edge face is farther from the central axis than is the bottom of the recess.

The feeder-head is mounted upon an upright axial shaft 16 supported to turn in suitable bearings on the frame 13, and rotated by bevel-gears 17, or other means, from a cross-shaft 18 driven in connection with the operating shaft of the main machine, so that the recesses or station points of the feeder-head work in synchronal coincidence with the several stations or pushers on the rotating carrier 12, when in operation.

The semicircular wall or guard 14 extends concentric to the feeder-head 15 from the front wall of the conveyer to the inner circular wall 19 above the carrier, inclosing the semicircular pass-way connecting the path of the conveyer with the path of the rotating carrier. An open space is formed in said wall to permit the pusher-rests 20 fixed upon the carrier, to pass through with the rotary movement of said carrier. The axis of the feeder-head is positioned so that the edge of its disks extend over the conveyer and also over the outer part of the rotating carrier, as shown; but without contacting therewith.

Operating in connection with the rotary feeder-head, we provide a peculiar intercepting or escapement means for controlling and synchronizing the delivery of bottles or the like to conform with the action and positions of the revolving feeder-head. Said means comprises a detent or member 25 pivotally supported upon a laterally swinging arm 24 fulcrumed upon an upright axis stud 23 fixed on the bed 13, and located in relation to the conveyer approximately as indicated. Said escapement detent is formed with a suitable plate or body portion that projects, when at forward position, (see full lines Fig. 4) into the conveyer passage sufficiently for intercepting or arresting bottles or the like, as they are brought forward by the conveyer; temporarily stopping the same at the position indicated by dotted line B¹, if the bottle or article is not in regular close sequence position but not interfering with the forward movement of the bottles when they come along in regular close order, or standing close together upon the conveyer. The end of the detent is best formed smooth and transversely rounded as shown. Stop lugs 33 limit the forward swing of the detent.

The arm 24, which carries the escapement detent 25, is connected by a pivotally attached link 26, with one arm of a horizontally swinging lever 27 which is pivotally fulcrumed upon a stud 28 fixed in the frame; while the other arm of said lever is provided with a stud-roll 29 that engages or runs against the peripheral face of a cam 30 combined with the hub of the feeder-head 15 and rotating with the disks 15^a and 15^b; said cam having a series of swells and reduced portions corresponding with the number 130

and arrangement of the propelling projections 3 on said disks.

A suitable spring 31 connects the arm 24 and an anchorage stud, and serves for pulling back the arm and escapement member and for normally pressing the roller 29 against the face of the cam 30.

A spring 32 is also provided for normally swinging the detent 25 to its forward position, as in full lines Fig. 4; said spring is shown strained between a projecting lug on the hub of the arm 24 and a lug on the body of the detent.

The escapement detent 25 is provided with a projection or finger 2 at its rear end that coöperates with a stationary stud 6 located near the end thereof, and having an offset or lug 7 thereon. The spring 32 tends to normally swing the detent to its primary position, as shown by full lines on Figs. 4 and 6, bringing the end of the finger into alinement with the stud 6 just back of the lug 7, so that rearward movement of the arm 24 and detent will cause the end of the finger to lock behind the lug and against the stud 6, thereby holding the detent at its outward position for resisting advance of the bottle or the like beyond the position indicated by dotted line B¹, Fig. 4, until the interlock is released by the action of the feeder-head cam 30, levers 27 and 24, and spring 31.

If a bottle or the like, moving with the conveyer, presses against the detent 25 while the finger 2 is free from engagement with the lug 7, the detent is thereby actuated sufficiently to permit the finger 2 to pass by the side of stud 6, the detent being then free to swing back to the position indicated by full lines on Fig. 2, and dotted lines on Fig. 4; thus allowing the bottle or article to be carried forward against the edge 5 of the revolving feeder-head 15. This occurs when the bottle or the like is positioned upon the conveyer in proper pre-determined relation in respect to one of the three engaging points on the feeder-head; otherwise the bottle is detained by the escapement detent until such relation is established, then it is released.

The pushing-rest 20 is formed with a forwardly extended overhanging neck 21 connecting its attaching seat portion with the upright push-pad, and affording an open space 22 beneath it for allowing the edge of the feeder-disk 15^b or its prongs 3 to pass between the lower end of the push-pad and the top surface of the carrier table 12. The rests 20 are disposed at intervals upon the carrier, in successive order, and are rigidly secured thereto to travel in a circular path.

The movements of the feeder-head 15 and rotating carrier 12 are so adjusted or timed that the respective projections 3 bring the bottles or the like onto the carrier 12 just

in advance of the respective pushing rests 20, as shown in Fig. 2; so that the pusher takes the same from the prongs 3 while the latter swing away from the carrier path. Adjacent to this point of transfer we provide, at the outer side of the carrier path, a steadying guard consisting of a laterally swinging frame 35 pivotally supported at its upper edge upon a shaft 36 fixed in a stationary housing 37, and having at its lower edge a horizontally disposed curved bar or flange 39, the edge of which acts against the side of the bottle B as it moves forward. The first end 38 of the guard bar 39 is located contiguous to the position where the feeder member moves away from the pushing-rest. Said guard serves to prevent the bottles being impelled laterally, or tottering by the change in movement when in rapid action. The swinging frame is provided with an arm 40 that projects through the housing, and a pull spring 41 connects said arm with a lug 42 on the frame; said spring being tensioned to afford the required degree of yielding pressure on the guide 39.

Combined with the hub of the feeder-head there is preferably provided a flange or plate 45, having a true circular periphery, and of a diameter equal to or somewhat greater than the outmost swell of the cam 30. In the event of a bottle accidentally getting into the revolving feeder 15 in end-wise position, it becomes stopped or lodged between the outside guard 14 and the smooth circular edge of the plate 45, as indicated by dotted line B², Fig. 4, and is there held and protected from being crushed by the revolving cams, until the machine can be stopped and such misplaced bottle removed without injury thereto.

In the operation of this mechanism; assuming that the rotating carrier table 12 and feeder-head 15 are revolving at such relative speeds as will bring the respective feeder-prongs 3 into proper correlation with the respective pushing-rests 20 of the carrier, in their successive order, and that the conveyer 10 is moving at a velocity that advances it approximately the space of one bottle, or slightly more, during the time required by the respective prongs 3 of the feeder-head to successively pass to a predetermined position in relation to said conveyer chain or belt. The bottles B or the like, standing upright, are brought forward by the conveyer and into contact with the detent or member 25. If the bottle is in proper position to reach the feeder-head at the right place thereon the detent 25, which is then released from the lug 7 by action of the cam 30, is free to swing back by contact of the bottle therewith, so that its finger 2 is out of line with the stud 6; and as the reduced portion of the cam comes under

the lever roll 29 of the spring 31, causes the escapement devices to swing back out of the path (see dotted lines 25^a Fig. 4) and allow the bottle to move forward against the eccentrically disposed peripheral edge 5 of the feeder-head and in rear of the advancing prong 3, as at 7², Fig. 2. It is there supported by the edge 5 and wall 11, gradually moving forward as the eccentric surface recedes, until the space 4 comes into line therewith; then the bottle moves into said space in front of the pusher-prong 3 and is whirled forward by the feeder-head until brought adjacently in front of the pushing rest 20 upon the carrier 12. The movement of the carrier and rest being greater than the velocity of the feeder-head, the bottle is taken away from the feeder space 4 and prong 3 by the pusher 20, the steadying guard acting against the side of the bottle immediately as the shift from one to the other is effected to prevent liability of the bottle being overturned or displaced by the quick change in direction of movement.

When the bottles or the like are at irregular positions upon the conveyer, or when there is an undue amount of space between one and the next following, then the escapement detent 25 becomes locked in its outward position, by the finger 2 engaging with the lug 7, as hereinbefore explained, and the bottle is detained at the position indicated by dotted lines B¹ on Fig. 4, while the feeder-head prong 3 moves beyond a position where it could jam the bottle between the end of the prong and the angle of the guard or wall 11, or force the bottle backward on the conveyer; then as the correct relation of the delivery with the following section of the feeder-head is established, the escapement device is unlocked by the action of the cam 30 and its connections, and the bottle is released to move into the feeder in its regular order as above described.

So long as the bottles or the like come along the conveyer in close regular order the escapement device allows them to pass into the feeder each in its approximate place; but any irregularity in the delivery is checked and the relative positioning of the bottles in respect to the feeder means corrected by the escapement means before they pass to the feeder-head; thus rendering the mechanism highly efficient; avoiding the breaking of bottles or containers; and affording a means capable of high speed action.

We are aware that rotatable feeding means of different character has heretofore been employed in machines for handling bottles or the like; it will therefore be understood that we do not broadly claim the idea of rotatability as a new feature in mechanism of this class.

What we claim and desire to secure by Letters Patent, is—

1. In a feed mechanism for bottles or the like, a rotating bottle-propelling head, comprising a central hub having upper and lower disks thereon, each provided at its periphery as described, with a plurality of approximately semicircular bottle-engaging recesses and radially-projecting prongs, the face of said prongs merging into the recesses, the backs of the prongs being abruptly offset inward, and with circular intermediate peripheral-edge faces extending, respectively, from the base of the offset at the back of the prong rearward, to the outwardly curved front line of the semicircular recess; said peripheral-edge faces being disposed slightly eccentric to the circle of motion, the latter portion of said peripheral-edge faces being farther from the central axis than is the bottom of the bottle-engaging recess.

2. In a mechanism for the purpose specified, the combination of a delivery conveyer, a revolving feeder-head comprising upper and lower disks having the propelling projections, adjacent bottle-engaging recesses and intermediate peripheral-edge faces thereon formed and arranged relatively as shown, and a cam mounted between and revolving with said disks, an axis shaft supporting and rotating said feeder-head, guard fenders defining the path of the conveyer and the circular path about said feeder-head, a normally non-resistant swinging escapement member disposed approximately transverse to the path of the delivery conveyer, a laterally moving supporter having said escapement member pivoted thereon, means for moving said supporter actuated by the cam in the feeder-head, a stationary member against which said escapement member engages and becomes temporarily locked for resisting the advance of a bottle and reestablishing a close-order relation of action when the delivery is irregular.

3. In a feed mechanism for the purpose specified, a rotary feeder-head the periphery of which is shaped to present essentially a series of three projecting pushing members with inwardly rounded article-receiving spaces adjacently in front of said members, and having convexly curved circular peripheral edge faces between the inwardly offset backs of the projecting members and the outwardly curved front line of the succeeding receiving spaces, in combination with means for delivering a train of bottles, an escapement device comprising the laterally swinging supporting-arm carrying an escapement detent pivotally mounted transversely thereon and having a stop-engaging rear member and forward projecting member adapted for intercepting the delivery train and for releasing individual bottles

to impinge against said feeder-head in predetermined relation to the respective convex peripheral edge faces, and means for automatically effecting temporary resistant retention of the release action of said escapement, to readjust the relation of the delivery train, when the leading bottle of the train fails to normally come into pressing contact with said escapement detent.

4. In a machine for the purpose specified, a rotary feeder-head the periphery of which is shaped substantially as set forth; presenting a plurality of projecting pusher-prongs, inwardly rounded spaces and circular peripheral edge surfaces between the backs of said prongs and the succeeding spaces, said edge faces being disposed slightly receding in relation to the circle of rotation; in combination with a path-defining guard, means for conveying bottles or the like in close order into conjunction with the periphery of said feeder-head, an escapement device comprising a laterally swinging arm having a readily yieldable spring-pressed member pivoted thereon for intercepting the conveyer passage, and means for controlling the same, including a cam in the feeder-head, having a plurality of lobes corresponding with the number of pusher-prongs, a lever actuated by said cam and connected with said escapement-arm, and means for engaging said escapement member for readjusting or synchronizing the contiguous delivery of the bottles or the like to successively contact with said peripheral edge faces at predetermined positions of the feeder-head.

5. In a feed mechanism for bottles or the like, in combination, a traveling conveyer, a revoluble feeder-head having a plurality of prongs and recesses, guard walls defining the path of the conveyer and feedway, a horizontally swinging escapement barrier, a movable support for said barrier, an engaging stop for locking said escapement barrier in its forward position to resist retraction thereof, means in connection with the feeder-head for releasing said lock as the prongs and receivers approach a predetermined position to permit control and escape of the bottle or the like if in its proper relation upon the conveyer.

6. In a mechanism of the class described, in combination with a rotating carrier having means for advancing bottles or the like, a delivery conveyer and a circular guard segment inclosing a pass-way from the conveyer to the carrier; a revoluble feeder-head comprising upper and lower disks having, at regular intervals on their peripheries, means for receiving and propelling bottles, a movable escapement member having a feed-resisting portion and a backwardly projecting finger, a moving support for said member, an actuating lever connected there-

with, a cam on the feeder-head controlling said lever, springs for returning the parts to normal position, a stationary stud for arresting said finger for locking the escapement, and means for rotating said feeder-head.

7. In a mechanism of the class specified, a rotating feeder-head comprising upper and lower disks, their peripheral edges uniformly provided with three radially projecting members and adjacent recesses at the front of the respective projections, and having circular peripheral edges from the backs of said projections to the front of the recesses, an upright axis-shaft whereon said feeder-head is mounted, and means for operating said shaft; in combination with a surrounding guide, a delivery-conveyer leading to said feeder-head, said peripheral edge adapted for temporarily restraining the advance of the bottle until the feeder prong has passed beyond a position where it might otherwise contact with a succeeding bottle closely adjacent to the first.

8. In a mechanism for the purpose specified, in combination, a traveling delivery conveyer, a rotary feeder-head provided with bottle-propelling prongs and intermediate peripheral-edge faces adapted for individual contact with and retarding the advancing bottles, an escapement device adapted for permitting free passage of bottles conveyed to said feeder-head in closely adjacent order, means for rendering said escapement devices resistant for reestablishing the regular contact relation when the close-order of delivery is interrupted by intervening space between the bottles on the conveyer, and means for controlling said escapement devices for resistant or non-resistant action, including a plural-lobed cam within the rotary feeder-head.

9. In a mechanism of the class described, the combination, with the circular feed-way inclosing wall, a concentric revoluble feeder-head comprising upper and lower disks having bottle-propelling members thereon, and an intermediately disposed cam having peripheral swells and receding surfaces revolving with said feeder-head; of a guard or fender having a fending surface adapted for preventing contact with said cam of any bottle or the like when loose within the feed-way.

10. In mechanism for the purpose specified, the combination with an outer concentric guard, a revoluble feeder-head including means for propelling bottles or the like, and an escapement-actuating cam having peripheral swells; of a guard device supported on said feeder-head and having a circular periphery slightly greater than the extreme diameter of said cam and adapted to prevent contact of the cam with a bottle or the like lying within said outer guard.

11. In a feed mechanism for the purpose specified, the combination, with the revoluble feeder-head, comprising a central hub, upper and lower disks fixed thereon and having at 5 their peripheries means for propelling bottles or the like, and an intermediately disposed cam arranged upon and moving with said hub; of a plate or flange having a true circular peripheral edge concentrically surrounding said hub, and of a diameter equal 10 to or somewhat greater than the extreme outside dimension of said cam, a semi-circular path-defining outer guard inclosing the feed-way, and means for rotating said 15 feeder-head.

12. In a mechanism of the class specified, in combination, a revolving feeder-head comprising upper and lower plates peripherally shaped, as described, a central hub 20 supporting said plates, an axis shaft therefor and means for rotating the same, means for delivering bottles to said feeder-head, a rotating carrier provided with pusher-rests adapted for taking the bottles, by greater 25 velocity, away from the feeder-head prongs, and a steadying guard comprising a spring-actuated laterally oscillatable horizontally hinged frame having a curved flange-bar

thereon at approximately mid-height alignment with the feeder-head, said flange-bar 30 being disposed adjacent to the outer circle of the carrier path at the position where the bottle is taken from the feeder-head prongs by the more rapidly moving pusher-rest. 35

13. In a mechanism of the class specified, the combination substantially as described, of a rotatable feeder-head with peripheral recesses and projecting prongs for advancing bottles or the like, a rotating carrier 40 having pusher-rests, an oscillating guard consisting of a guard-frame having a backwardly projecting arm, an extended flange or bar attached to said guard-frame, a stationary housing, a guard-pivoting shaft in 45 the upper part thereof, and a tensioned spring connected with the arm of the guard-frame, the fore end of said flange bar being positioned adjacent to the point where the bottle or the like is transferred from the 50 feeder-prong to the pusher-rest.

In testimony whereof we have hereunto set our hands this 8th day of January, 1917.

HERMAN STAKE.
ARVID P. EKVALL.