United States Patent

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[54] **ARTICLE FEED CONTROL**
14 Claims, 10 Drawing Figs.

[52] U.S. Cl. **198/19**, 198/34
[51] Int. Cl. **B23q 5/22**, B23q 7/00
[50] Field of Search ..... 198/19, 34, 25, 26, 22, 22 B

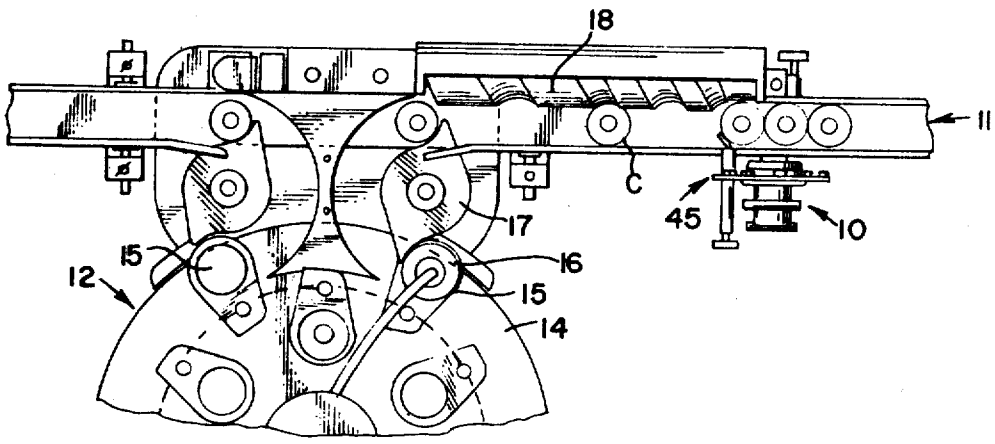
[56] **References Cited**

UNITED STATES PATENTS

2,013,144	9/1935	Gladfelter	198/22 (B)
2,782,897	1/1957	Filander	198/22
3,092,237	6/1963	Miller	198/19
3,150,758	9/1964	Johnson	198/25

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ABSTRACT: An apparatus for incorporating in a container feedline for a container-filling machine which comprises a movably mounted can stop member adapted to be projected into the path of the cans advancing to the filling machine to momentarily hold back the cans, and a series of cams carried on a rotating disc or wheel which are manually settable on the wheel in either operative or inoperative position and which, in operative position, move the can stop member to can stopping position on each rotation of the wheel. There is a cam on the wheel for each filling head or station on the filling machine and the rotation of the wheel is synchronized with the movement of the filling machine so that when there is a malfunctioning of a filling head on the filling machine the cam corresponding to the same may be set to interrupt the feed of the cans to that station, thereby enabling repair or adjustment to be delayed until a more convenient time when the machine may be shut down.



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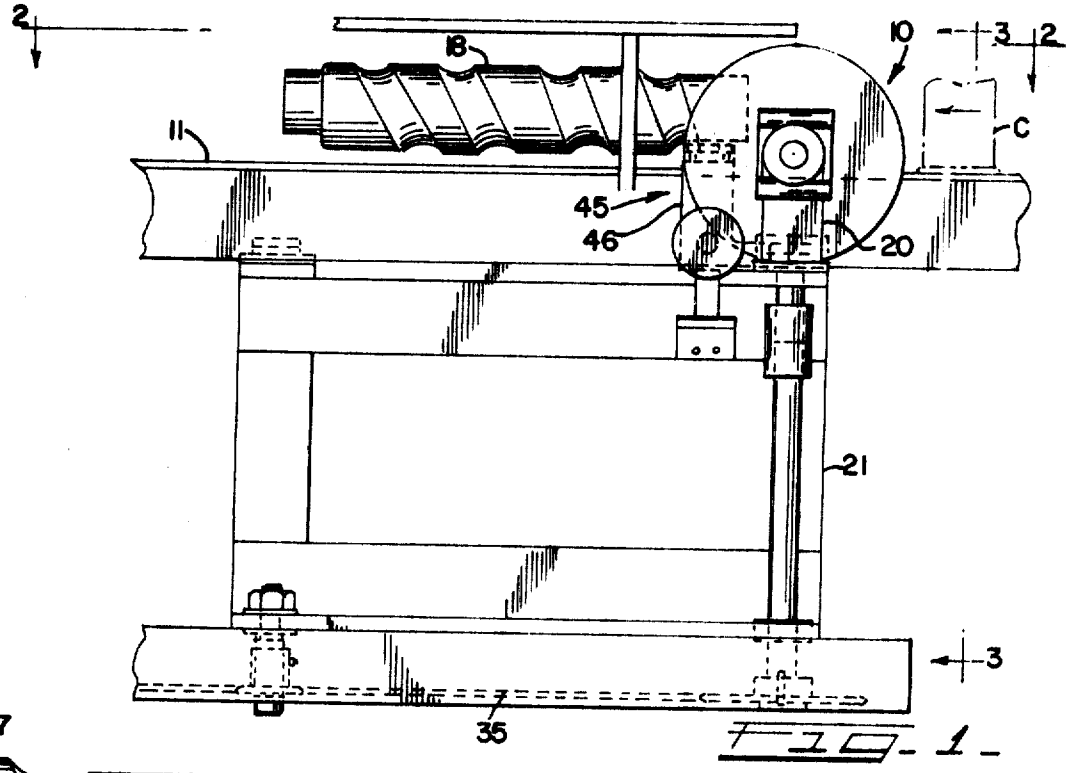


FIG. 1

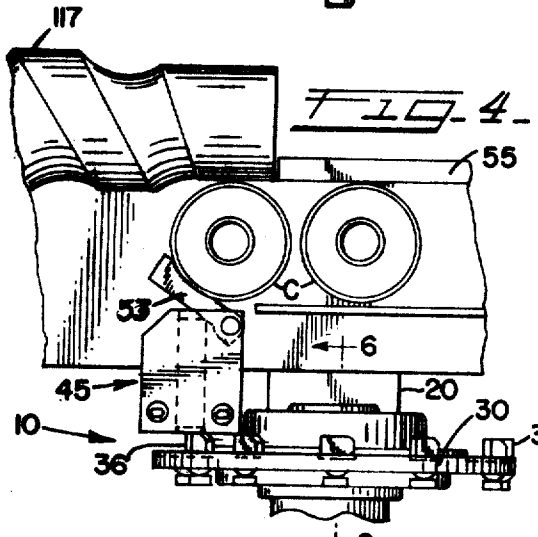


FIG. 4

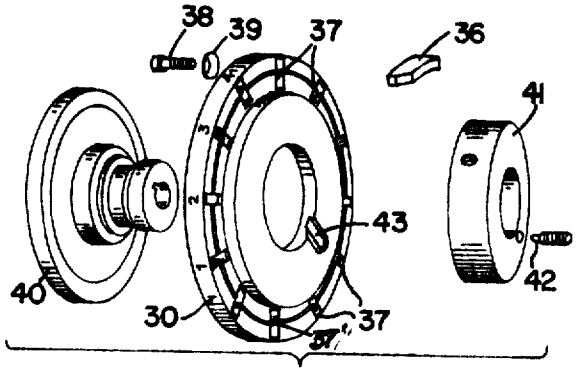


FIG. 5

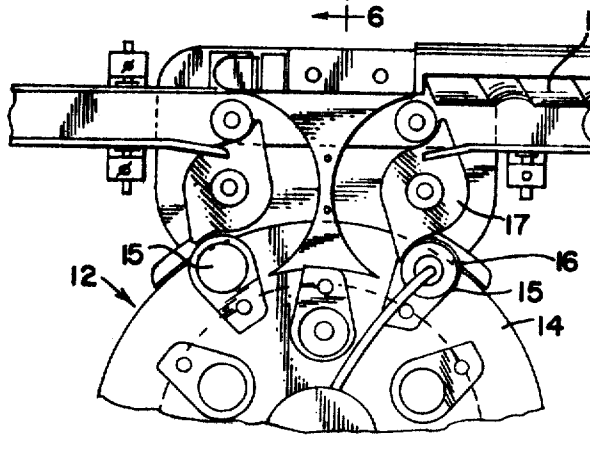


FIG. 2

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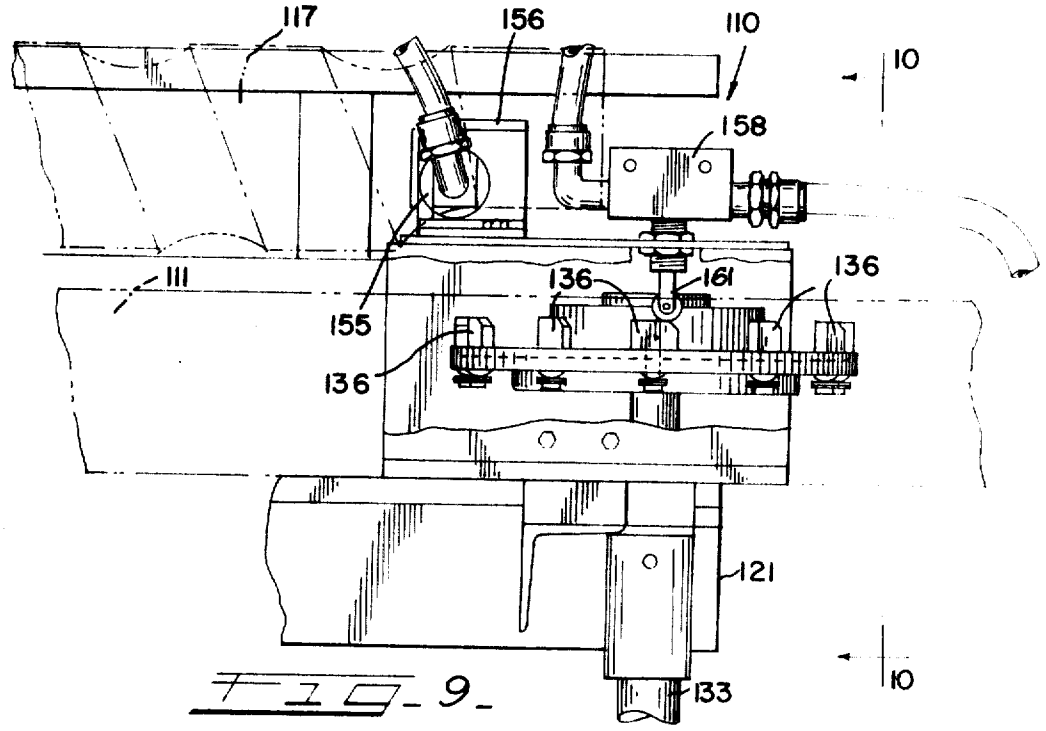


FIG. 9.

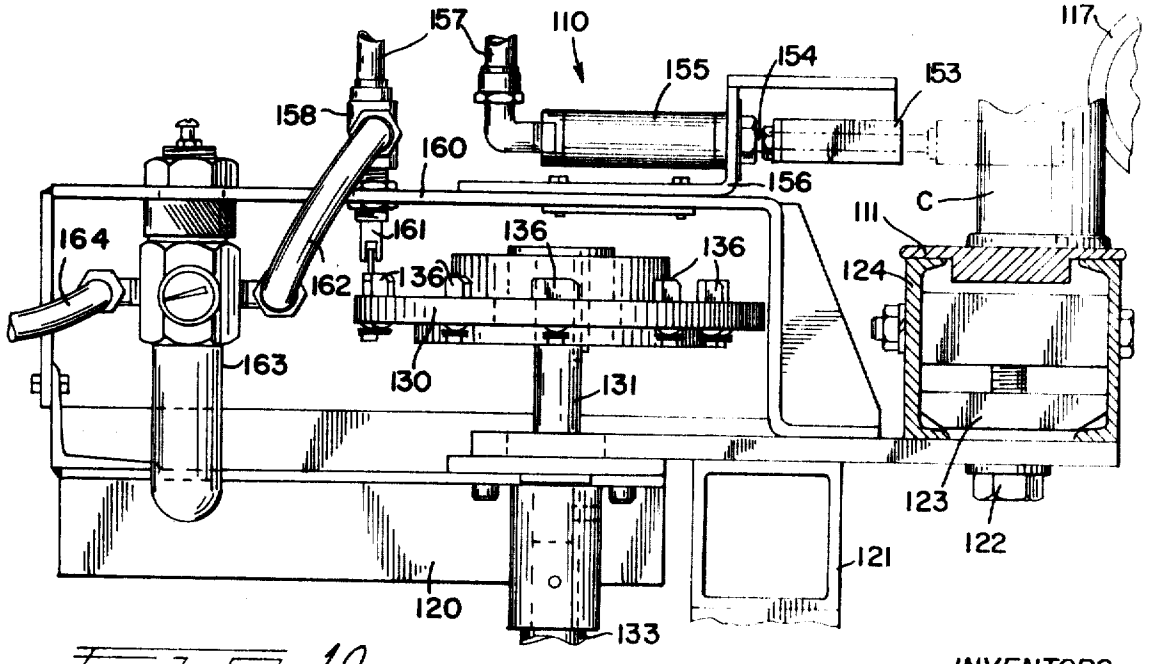


FIG. 10.

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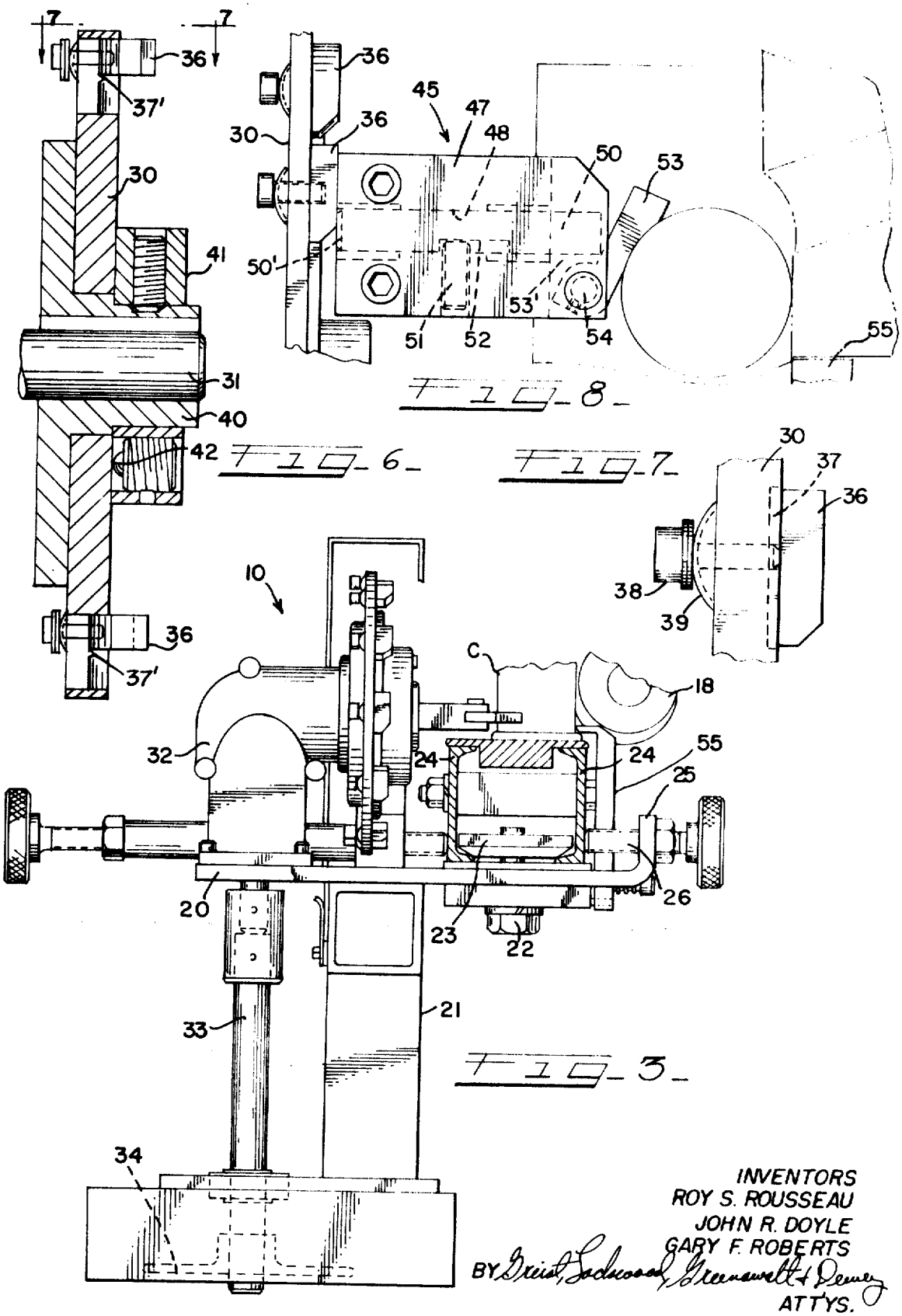


FIG. 6

FIG. 7

FIG. 8

FIG. 3

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ARTICLE FEED CONTROL

This invention relates to article-handling apparatus and is more particularly concerned with improvements in an apparatus for use in feeding containers to a filling machine or like processing equipment.

In one form of equipment used for feeding empty containers to machines employed in filling aerosol containers or the like a straight line conveyor advances the empty containers to a worm-type spacer which spaces the containers for delivery to a star wheel, or the like, which transfers the containers, one by one, to filling stations spaced about the circumference of a turret on which filling heads are carried so that a container is positioned at each of the filling stations. In the operation of the filling heads it sometimes occurs that there is some malfunctioning of the equipment at a station which makes it desirable to either stop the machine and make whatever repairs or adjustments are necessary to put the station back into proper operation or to discontinue the use of the malfunctioning station until the necessary repairs or adjustment can be made. There is, of course, a loss of time and production when the machine is shut down for any reason. Consequently, it is desirable to avoid shutdown of the machine, if possible, or at least to delay the same until there is a normal period of interruption in the operation of the machine, such as, the end of the run or a normal operator rest period or the like. When the machine is of the type having a substantial number of filling stations, loss of time can be minimized if a station can be rendered inoperative without shutdown for repairs or adjustment until there is a normal shutdown period during which adjustment or repairs can be taken care of. If there is a malfunction of the machine and a station becomes inoperative, it is, of course, desirable to eliminate the feeding of an empty container to the inoperative station. A general object of the present invention is to provide an apparatus for accomplishing this purpose.

A more specific object of the invention is to provide apparatus for incorporation in a line feeding containers to a filling machine of the type which has a plurality of successive filling heads disposed at spaced filling stations which apparatus is operative to interrupt the feed of the containers so that an empty container is not fed to a station when the filling at such station is disabled or inoperative.

It is a further object of the invention to provide a filling line for a rotary filling machine which has a plurality of circumferentially spaced filling stations, each adapted to receive an empty container from the filling line, wherein an apparatus is provided in the filling line to enable production to continue when one or more heads of the filling machine are inoperative without empty containers being fed to the inoperative heads, which apparatus comprises a rotating disc having a series of cams mounted thereon each corresponding to a station on the filling machine which cams are adjustable or settable to a position for actuating a stop device which momentarily holds back a container a sufficient length of time to prevent its delivery to the corresponding filling station, the rotation of the disc being synchronized with the rotation of the filling machine and the cams being located on the disc so that when the operator observes that a station on the rotary machine is not functioning properly, he may adjust or set the proper cam on the apparatus to hold back the container which would otherwise be fed to the malfunctioning or inoperative station.

These and other objects and advantages of the invention will be apparent from a consideration of the several forms of the apparatus which are shown by way of illustration in the accompanying drawings wherein:

FIG. 1 is a side elevation, with portions omitted, of one form of an apparatus which is adapted for association with the infeed mechanism of a rotary container filling machine so as to enable the operator to hold back the feed of a container or containers to a filling station or stations which may be malfunctioning and which apparatus has incorporated therein the principal features of the invention;

FIG. 2 is a plan view, to a smaller scale, of the apparatus of FIG. 1 and a portion of a rotary filling machine, showing the manner in which the apparatus is associated with the infeed mechanism of the filling machine, the view being taken on the line 2–2 of FIG. 1;

FIG. 3 is an end elevation of the apparatus shown in FIG. 1, to a larger scale, the view being taken on the line 3–3 of FIG. 1;

FIG. 4 is a fragmentary plan view, to a still larger scale, showing a portion of the apparatus shown in FIG. 2;

FIG. 5 is an exploded perspective view of the selector cam assembly;

FIG. 6 is a section taken on the line 6–6 of FIG. 4, to a larger scale;

FIG. 7 is a fragmentary view taken on the line 7–7 of FIG. 6, to a larger scale;

FIG. 8 is a fragmentary plan view of the apparatus of FIG. 1, to a larger scale;

FIG. 9 is a partial side elevation of a modified form of the apparatus; and

FIG. 10 is an end elevation of the apparatus shown in FIG. 8, the view being taken on the line 10–10 of FIG. 9.

Referring first to FIGS. 1 to 8, there is illustrated an apparatus 10 for incorporation in the feedline 11 for supplying empty containers C to a rotary-type filling machine 12 (FIG. 2), the latter being characterized by a rotary turret, indicated at 14, which is disposed for operation in a horizontal plane, and which has a plurality of container filling stations 15, circumferentially spaced about the margin thereof, each of which is provided with a support for an empty container C positioned beneath a filling head 16 for receiving a product from the latter. The container C, which may be aerosol-type cans, for example, are fed to the individual stations 15 by a feed wheel 17 located adjacent the discharge end of a spacing screw or worm 18 which is arranged alongside of the path of the straight line conveyor 11.

The infeed line 11 includes the worm 18 for spacing the empty cans C the proper distance apart to be picked up by the feed wheel 17 for delivery to the pockets or stations 15 of the filling turret 14. The apparatus 10, which is provided for selecting and holding back the proper can C when it is desired to skip delivery to a particular station on the filling turret, is mounted on a platelike bracket 20 which is adjustably supported on the main frame structure 21 of the machine. The bracket 20 is releasably clamped by bolts 22 and clamp member 23 to the longitudinally extending channels 24 which support the upper run of the conveyor 11 on which the empty containers C are advanced. A marginal portion 25 is turned up at the end of the plate bracket 20 to form a flange which carries an adjusting screw 26, the free end of which bears against the vertical face of the one channel 24 so that the position of the bracket 20 and the mechanism supported thereon may be adjusted relative to the path of the container C by loosening the clamp plate 23 and turning the adjusting screw 6. This permits adjustment when required due to changes in the diameter or size of the cans C which are being handled on the equipment.

The selector mechanism or apparatus 10 (FIGS. 4 to 8) comprises a rotatable cam supporting plate 30 mounted for rotation in a vertical plane on a driven shaft 31 which extends from a right-angle gear box 32 at the top of a vertical drive shaft 33, the latter being suitably journaled in the main frame 21. The vertical shaft 33 carries at its bottom end a sprocket 34 driven by chain 35 running from a main drive for the apparatus (not shown). The cam support plate 30 carries in circumferentially spaced relation about the marginal portion thereof a series of platelike cam members 36 each of which is mounted in a radial recess or slot 37 in the cam support plate 30 and held therein by a shoulder bolt 38 with a spring washer 39. Each cam member 36 is slidable in the associated radial slot 37 toward and from the axis of the supporting shaft 31 with the distance limited by the length of the slot 37. Each cam member 36 extends in a plane normal to the face of the

support plate 30 and tangential relative to the path traversed by the bolt 38. The cam support plate 30 is mounted on a hub member 40 secured on the drive shaft 31 and locked thereon by a clutch collar 41 having a clutch detent 42 which cooperates with a recess 43 in the face of the cam support plate 30, providing limited torque to the cam plate 30 under machine power and reduced overriding torque in the opposite direction of rotation for manual turning of the cam support plate or wheel 30 when setting the cams. The cams 36 are ineffective or nonoperative when moved to the outside position in the slots 37. When a cam 36 is moved radially inwardly to an inside position in its slot 37 it actuates a can stop device 45 (FIG. 8) which is mounted adjacent the inside face of the cam support plate 30 on an upright bracket 46. To assist in holding the cams in the two positions the support plate 30 has an annular rib 37' over which the cams are snapped as they are moved from one position to the other.

The can stop device 45 (FIG. 8) comprises a horizontally disposed platelike block member 47 having a slot or bore 48 in which a pin 50 is slidably mounted in suitable sleeve bearings. A movement limiting setscrew 51 is mounted in the block member 47 with its inner end extending into an axially extending slot or flat 52 on the side of the pin 50 so as to limit the axial movement of the latter. A trigger forming arm member 53 is pivotally mounted at 54 at the inner end of the member 47 in a recess 53' cut in the end of the block member 47, pivot 54 being adjacent the end of pin 50 so that in the innermost position of pin 50, as shown in FIG. 8, the stop or trigger arm 53 is swung so that the free end is in the path of the cans C advancing on conveyor 11. The stop arm 53 will hold back the cans, so that they will not be advanced, as long as the member 53 is held in the outwardly swung position shown by the position of the pin 50. The pin 50, when retracted, will have the end 50 thereof projecting into the path of a cam 36, when the latter is moved to the inside position in its slot 37 so that rotation of the support plate 30 will engage the cam 36 with the end of the pin 50 and move the same axially to the position shown in FIG. 8 which swings the arm 53 into the path of advance of the cans so as to stop the same. A backup or back stop member 55 is positioned along the path of the conveyor 11 to prevent lateral movement of the cans at the selector station. When the cam 36 passes the end of the pin 50 by rotation of the support plate 30 the pressure of the cans in the forward direction will move the stop arm 53 out of the way and permit the cans to advance on the conveyor 11. With each rotation of the cam support plate 30 the cam 36 will actuate the pin 50 to hold back a can C a sufficient length of time to space the same so that a can will not be delivered to the filling station 15 on the turret 14 which corresponds to the station on the cam support plate 30 at which the cam 36 is mounted, that is, the advance of the cans is interrupted and a can is not delivered to the corresponding turret pocket until the cam 36 is moved to the inoperative position, in the outer end of its associated slot 37. Thus, one or more stations may be deactivated on the filling turret and an empty can will not be moved into the filling position at the selected station or stations. The construction and support for the plate 30 permits manual adjustment of the cams 36, radially on the support plate. It also permits adjustment of the support plate 30 about its supporting axis for properly locating the cams to actuate arm 53 and hold back the cans at the proper time and for the time interval necessary to skip delivery to the turret station or pocket which it is desired to take out of operation.

A modified arrangement of the selector and can stop apparatus is shown in FIGS. 9 and 10 wherein the apparatus is arranged for pneumatic operation. In this form of the apparatus the selector mechanism 110 is arranged on the main support frame adjacent the end of the infeed worm 117 and mounted on a support frame 120 which in turn is mounted on the main support frame 121 clamped to conveyor channels 124 by clamp plate 123 and bolts 122. A cam support plate or cam wheel 130 of the same construction as cam support plate 30 is mounted on the shaft section 131 at the top of the drive shaft 133 for operation in a horizontal plane. Cams 136 which are the same construction as cams 36 are mounted for adjustment in radial slots on the support plate 130 in the same manner and the plate 130 is mounted for adjustment about the supporting shaft 131 in the same manner as in the previously described form of the apparatus. A can stop arm 153 is mounted on the piston 154 of the air cylinder 155 which is carried on an angle bracket 156 mounted above the cam wheel 130. The air cylinder 155 is connected by conduit 157 with an air switch 158 mounted on a horizontally disposed frame member 160 so that its plunger 161 extends into the path of the cams 135, when they are positioned in the innermost ends of the slots in the cam support plate 130, so that the switch 158 is actuated upon rotation of the cam support plate 130 by any cam 135 which has been moved to the inside of its supporting slot. The switch 158 operates the air cylinder 155 and projects the cam stop 153 into the path of the cams for interrupting the advance of the same. The air switch 158 is connected by conduit 162 through an air filter and regulator 163 with an air supply line 164 for operating the mechanism. The cams 135 may be set manually in operative or nonoperative position in the same manner as in the previously described form of the apparatus with each of the cams 135 being numbered to correspond to the station on the filling machine to which it applies and the cam wheel 130 being adjustable to coordinate the same with the rotation of the filling turret.

I claim:

1. Apparatus for feeding articles to a conveyor having a series of work stations each adapted to receive an article, said apparatus comprising a traveling article supply conveyor on which the articles are advanced to a station for removal and transfer one by one to successive work stations, an article-engaging member positioned for movement into and out of the path of the articles to stop the advance of the articles on the conveyor for a predetermined period and a rotating wheel having a plurality of manually settable cams mounted thereon, each of which may be set at a position to cause said article-engaging member to move into the path of the articles on the conveyor on each revolution of the wheel so as to interrupt the delivery of articles to the work stations, said cams being equal in number to the number of work stations, and the rotation of said wheel being synchronized with the travel of the work stations so that the delivery of an article to a selected work station may be prevented by manually setting the proper cam on said wheel.

2. Apparatus for feeding articles to a turret having a plurality of peripherally spaced work stations each adapted to receive an article, said apparatus comprising an article supply conveyor on which the articles are advanced to a station for removal and transfer one by one to successive work stations on the turret, an article engaging member positioned for movement into and out of the path of the articles to stop the advance thereof and a rotating wheel having a plurality of spaced movable cams mounted thereon, each of which may be set at a position to cause said article-engaging member to move into the path of the articles so as to stop the advance of the articles momentarily and interrupt the delivery of an articles to a work station, said cams being equal in number to the number of work stations on the turret, and the rotation of said wheel being synchronized with the rotation of the turret so that the delivery of an article to each work station is determined by the position of one of the cams on said wheel.

3. Apparatus as set forth in claim 2, and said article engaging member comprising a swingably mounted arm with an associated operating manner which is engageable by a preset cam on said cam carrying wheel.

4. Apparatus for feeding articles to a traveling work conveyor having a plurality of spaced work stations each adapted to receive an articles said apparatus comprising an article-feeding conveyor means on which the articles are advanced to a station for transfer one by one to successive work stations on the work conveyor, means positioned for movement into and out of the path of the articles advancing on the article-feeding

conveyor means to stop the advance thereof and a rotatably mounted disc having a plurality of cams movably mounted thereon, there being a cam for each of the work stations on the work conveyor, each of said cams being movable from an inoperative position to an operative position where it will move said stop means into the path of the articles so as to stop the advance of the articles on the article-feeding conveyor means and interrupt the delivery of an article to a selected work station, and means for rotating said cam supporting disc with the travel of said disc being synchronized with the travel of the work conveyor so that the delivery of an article to a selected work station may be interrupted by moving to an operative position the cam on said disc which corresponds to the selected work station, said stop means being moved into the path of the articles to interrupt the advance of an article to said selected work station upon each rotation of said disc.

5. Apparatus for feeding articles to a traveling work conveyor having a plurality of spaced work stations each adapted to receive an article, said apparatus comprising an article-feeding conveyor means on which the articles are advanced to a station for transfer one by one to successive work stations on the work conveyor, means positioned for movement into and out of the path of the articles to stop the advance thereof and traveling support means having a plurality of settable cams mounted thereon, each of which may be set at an operative position to cause said stop means to move into the path of the articles so as to stop the advance of the articles on the conveyor means and interrupt the delivery of an article to a work station, there being a cam for each of the work stations on the work conveyor, and the travel of said cam support means being synchronized with the travel of the work conveyor so that the delivery of an article to a selected work station may be interrupted by positioning the corresponding cam on said support means so as to operate said stop means, and said traveling cam support means comprising a rotatably mounted wheel with said cams mounted thereon for adjustment in radial paths.

6. Apparatus as set forth in claim 5, and said rotatably mounted wheel having recesses in which said cams are mounted for radial adjustment between inoperative and operative positions.

7. Apparatus for feeding articles to a traveling work conveyor having a plurality of spaced work stations each adapted to receive an article, said apparatus comprising an article-feeding conveyor means on which the articles are advanced to a station for transfer one by one to successive work stations on the work conveyor, means positioned for movement into and out of the path of the articles to stop the advance thereof and traveling support means having a plurality of settable cams mounted thereon, each of which may be set at an operative position to cause said stop means to move into the path of the articles so as to stop the advance of the articles on the conveyor means and interrupt the delivery of an article to a work station, there being a cam for each of the work stations on the work conveyor, and the travel of said cam support means being synchronized with the travel of the work conveyor so that the delivery of an article to a selected work station may be interrupted by positioning the corresponding cam on said support means so as to operate said stop means, and said traveling cam support means comprising a rotatably mounted disc having radial slots in which said cams are adjustably mounted.

8. Apparatus for feeding articles to a traveling work conveyor having a plurality of spaced work stations each adapted to receive an article, said apparatus comprising an article-feeding conveyor means on which the articles are advanced to a station for transfer one by one to successive work stations on the work conveyor, means positioned for movement into and out of the path of the articles to stop the advance thereof and traveling support means having a plurality of settable cams mounted thereon, each of which may be set at an operative position to cause said stop means to move into the path of the articles so as to stop the advance of the articles on the conveyor means and interrupt the delivery of an article to a work station, there being a cam for each of the work stations on the work conveyor, and the travel of said cam support means being synchronized with the travel of the work conveyor so that the delivery of an article to a selected work station may be interrupted by positioning the corresponding cam on said support means so as to operate said stop means, and said stop means comprising an arm which is adapted to be moved into the path of the articles when a cam is moved to an operative position on said cam support means.

9. Apparatus as set forth in claim 8, and said stop means comprising an arm which is swingably mounted and an actuator which is movable to swing the arm into article-stopping position when said actuator is engaged by a cam which is moved to a predetermined operative position on said cam support means.

10. Apparatus for feeding articles to a traveling work conveyor having a plurality of spaced work stations each adapted to receive an article, said apparatus comprising an article-feeding conveyor means on which the articles are advanced to a station for transfer one by one to successive work stations on the work conveyor, means positioned for movement into and out of the path of the articles to stop the advance thereof and traveling support means having a plurality of settable cams mounted thereon, each of which may be set at an operative position to cause said stop means to move into the path of the articles so as to stop the advance of the articles on the conveyor means and interrupt the delivery of an article to a work station, there being a cam for each of the work stations on the work conveyor, and the travel of said cam support means being synchronized with the travel of the work conveyor so that the delivery of an article to a selected work station may be interrupted by positioning the corresponding cam on said support means **50** as to operate said stop means, and said cam support means comprising a rotatably mounted disc having said cams mounted thereon for adjustment radially between an operative and an inoperative position, a fluid cylinder having a piston supporting said article stop means, a fluid supply line connected to said fluid cylinder, a control valve in said supply line and a means for actuating said control valve positioned in the path traversed by said cams when said cams are adjusted to an operative position.

11. Apparatus for feeding articles to a traveling work conveyor having a plurality of spaced work stations each adapted to receive an article, said apparatus comprising an article-feeding conveyor means on which the articles are advanced to a station for transfer one by one to successive work stations on the work conveyor, means positioned for movement into and out of the path of the articles advancing on the conveyor to stop the advance thereof and traveling support means having a plurality of settable cams mounted thereon, there being a cam for each of the work stations on the work conveyor, each of said cams being adapted to be moved from an inoperative position to an operative position where it will cause said stop means to move into the path of the articles so as to stop the advance of the articles on the conveyor means and interrupt the delivery of an article to a work station, and the travel of said cam support means being synchronized with the travel of the work conveyor so that the delivery of an article to a selected work station may be interrupted by moving to an operative position the cam on said support means which corresponds to the selected work station, and said cam support means mounted for travel in a generally horizontal path, a fluid motor connected to said article stop means for moving said stop means into and out of the path of said articles and a control member for said motor which includes an actuator positioned in the path of said cams when said cams are adjusted to an operative position.

12. Apparatus for controlling the feed of articles to a traveling conveyor having a series of spaced work stations each adapted to receive an article, an article supply conveyor and an associated indexing device for delivering articles to a transfer station in properly spaced relation for transfer to successive work stations, and a mechanism for interrupting the

feed of the articles to the indexing device so as to skip a work station, which mechanism comprises a stop means disposed adjacent the supply conveyor and adapted to be projected into the path of the articles on the supply conveyor, and means for projecting said stop means including a series of actuating cams corresponding in number to the number of work stations, and a traveling cam support means on which said cams are mounted for adjustment between operative and inoperative positions with each cam being adjustable at the will of the operator to project the article stop means into the path of the articles so as to hold back the advance of the articles temporarily thereby to skip the feed of an article to a work station.

13. An apparatus for feeding containers to a container-filling machine having a series of traveling work stations, which apparatus comprises means for advancing containers to a station where they are normally transferred one by one for delivery to successive work stations on the filling machine, a container stop member positioned adjacent said container-advancing means which is adapted to be operated to momentarily interrupt the advance of the containers by said container-advancing means so as to skip the transfer of a container to a work station when desired in order to take said work station out of operation.

14. An apparatus for feeding containers to a container-filling machine which is characterized by a series of traveling work stations, said apparatus comprising means for advancing containers to a station where they are normally transferred one by one for delivery to successive work stations on the filling machine, a container stop member positioned adjacent said container-advancing means which is adapted to be operated to interrupt the advance of the containers by said container advancing means for a sufficient length of time to prevent the transfer of a container to a work station, means manually settable when it is desirable to prevent the delivery of a container to a work station and means for operating said stop means which is actuated upon a predetermined setting of said manually settable means.