April 16, 1935. F. F. WOLF 1,997,710

CAN ADVANCING MECHANISM

Original Filed Nov. 4, 1930 4 Sheets-Sheet 1

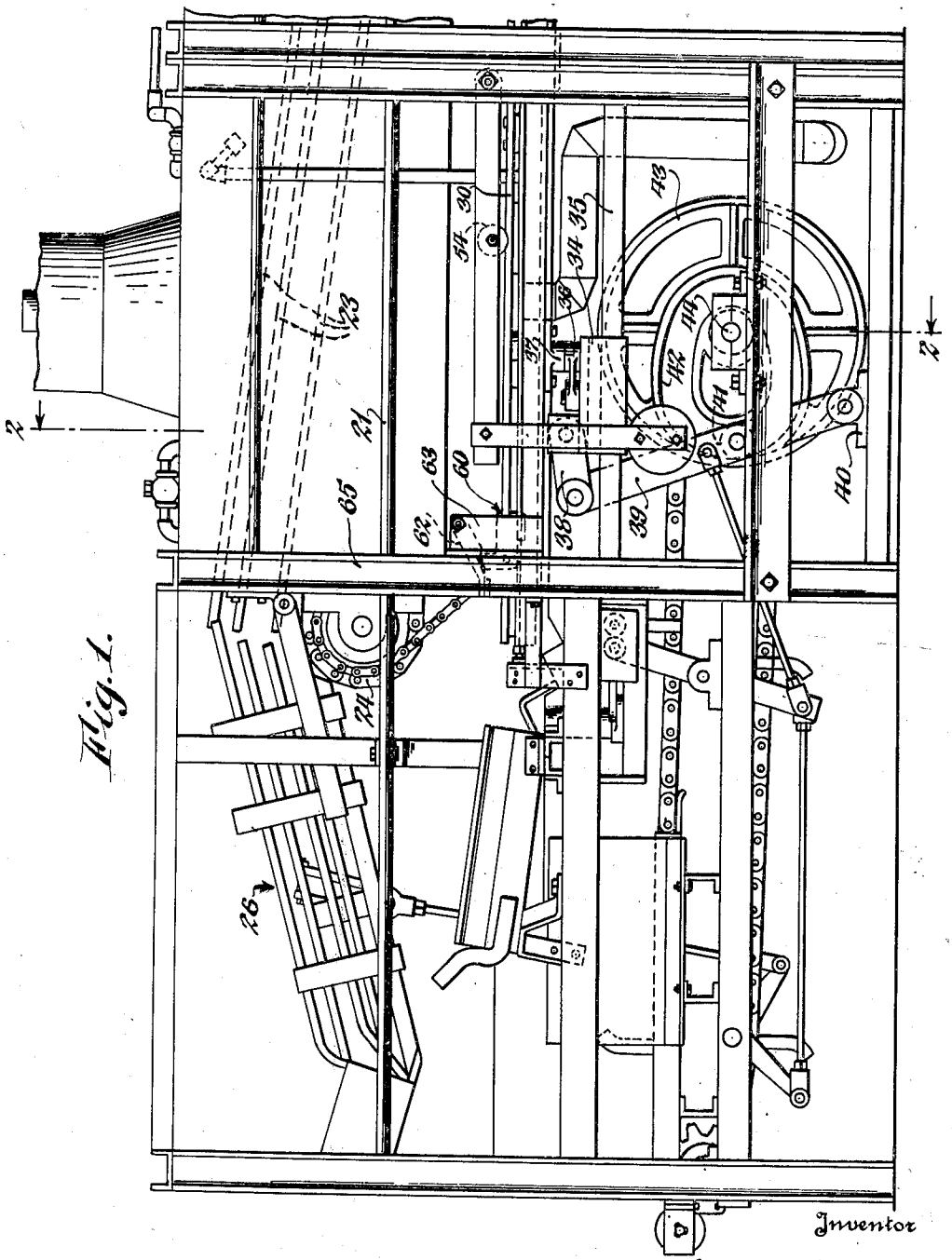

Fig. 1.

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Original Filed Nov. 4, 1930 4 Sheets-Sheet 2

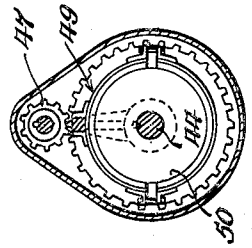

Fig. 3.

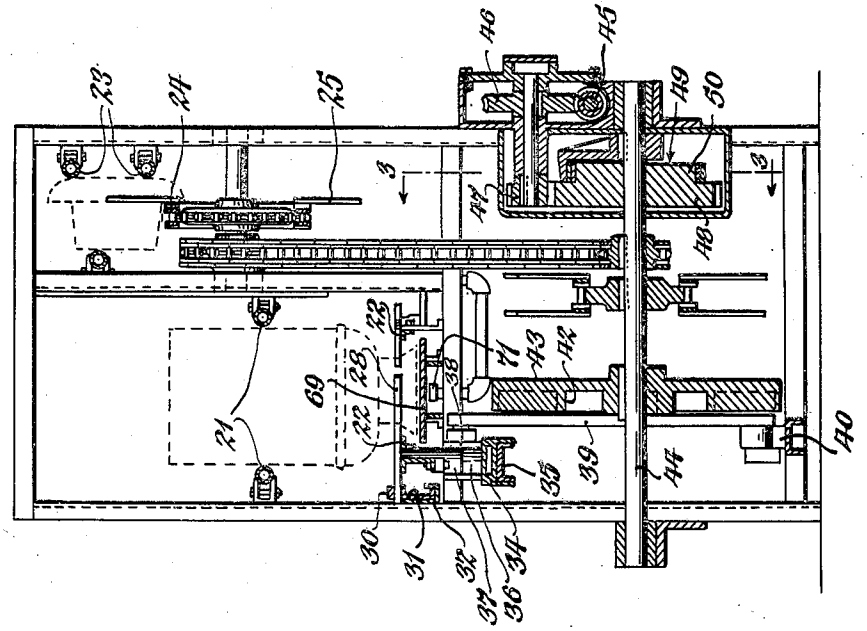

Fig. 2.

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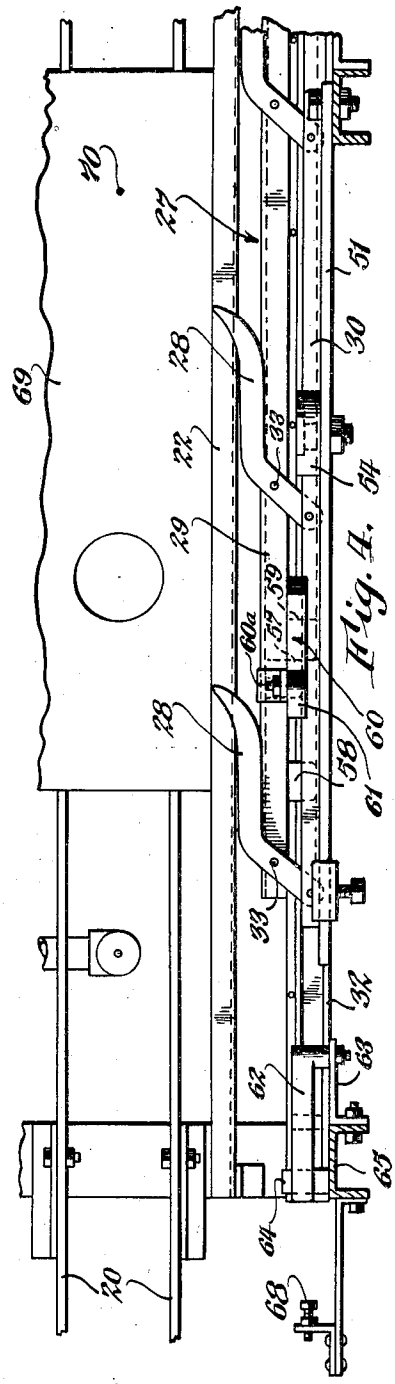

Fig. 4.

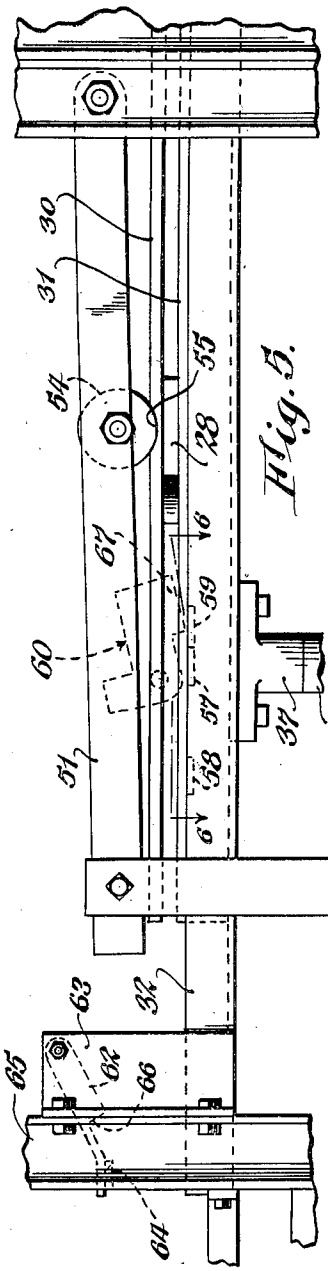

Fig. 5.

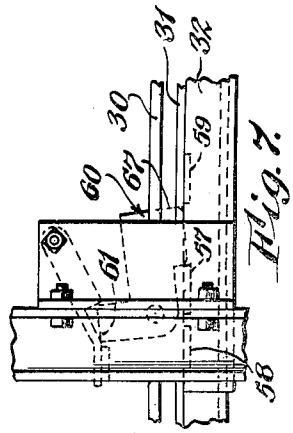

Fig. 7.

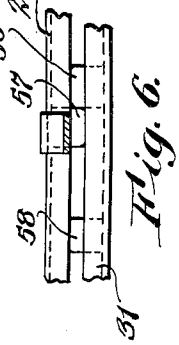

Fig. 6.

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CAN ADVANCING MECHANISM

Original Filed Nov. 4, 1930 4 Sheets-Sheet 4

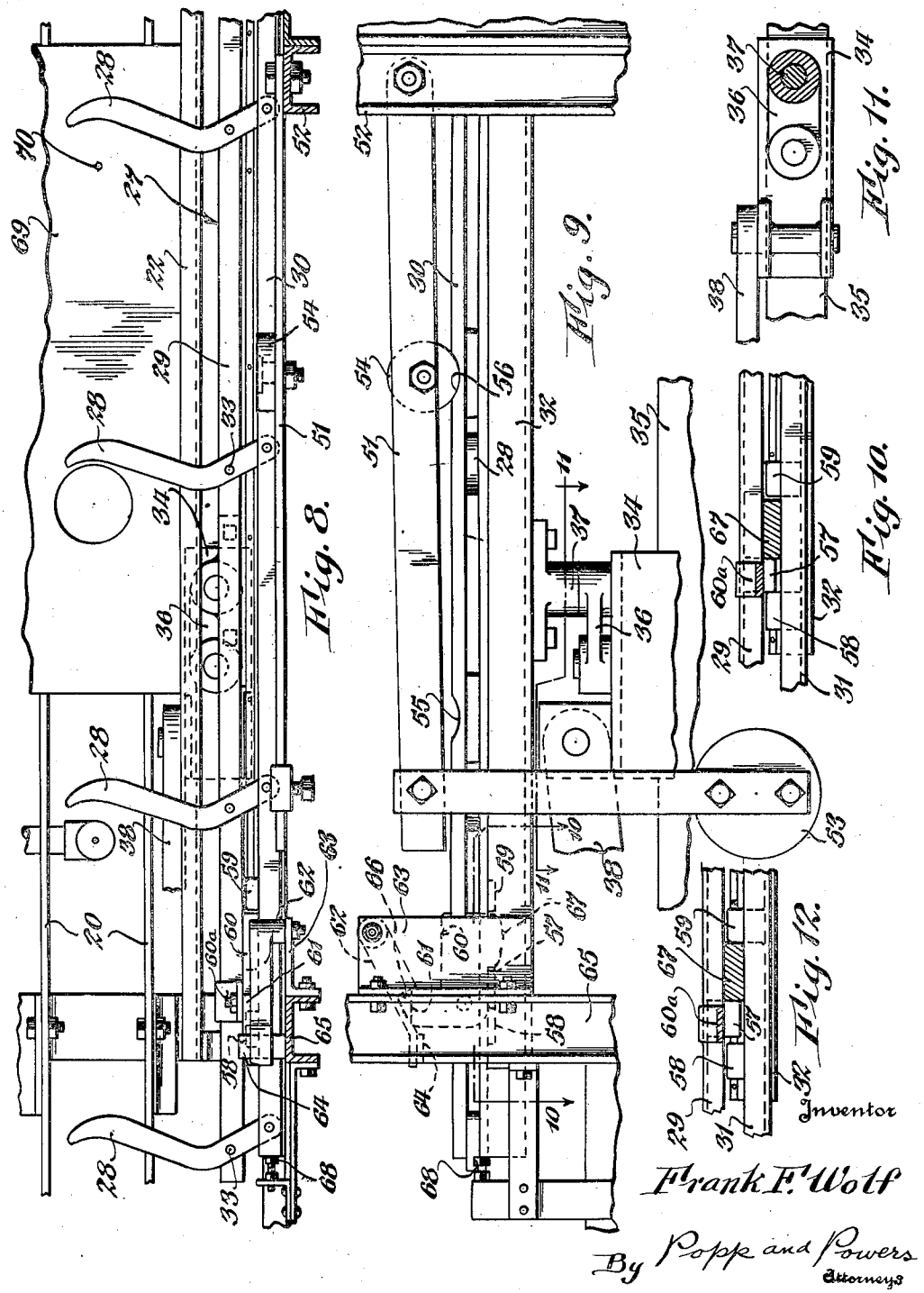

Fig. 8.

Fig. 9.

Fig. 11.

Fig. 10.

Fig. 12.

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UNITED STATES PATENT OFFICE

1,997,710

CAN ADVANCING MECHANISM

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Original application November 4, 1930, Serial No. 493,299. Divided and this application July 30, 1932, Serial No. 626,326

11 Claims. (Cl. 198—218)

This invention relates to improvements in can washing machines of the kind in which the cans and their covers are washed, sterilized and dried in successive operations, this application being a division of my co-pending application, Serial No. 493,299, filed November 4, 1930, now Patent No. 1,917,350, issued July 11, 1933, and covering the mechanism which is shown therein for advancing the cans through the various treating zones.

One object of the invention is to provide mechanism which is operative to push the cans by their necks, whereby the mouths of the cans may be completely closed in various of the zones in order to prevent the treating fluids from carrying impurities into the cans.

A further object is to provide mechanism in which the can engaging elements are positively actuated to their operative and inoperative positions, this object contemplating a construction wherein the mechanism is rendered inoperative when a can is improperly placed in the machine, thereby avoiding injury to the mechanism in such an event.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of the delivery end of a machine in which features of the invention are incorporated.

Figure 2 is a vertical section taken along line 2—2 of Figure 1.

Figure 3 is a detail section taken along line 3—3 of Figure 2.

Figure 4 is an enlarged fragmentary view in plan of the can advancing mechanism, the can engaging elements being shown in their retracted or inoperative position.

Figure 5 is a similar view in elevation of said mechanism with the parts in the same position.

Figure 6 is a fragmentary section taken along line 6—6 of Figure 5.

Figure 7 is a fragmentary view illustrating the manner in which the locking means for the advancing mechanism is released preparatory to the return of the can engaging elements to their inoperative position.

Figure 8 is a fragmentary view, similar to Figure 4, of the can advancing mechanism and in which the can engaging elements are shown in their operative position, the can engaging elements being shown at the limit of their forward movement.

Figure 9 is a view in elevation of the said mechanism with the parts thereof in the same position.

Figure 10 is a fragmentary section taken along line 10—10 of Figure 9.

Figure 11 is a fragmentary section taken along line 11 of Figure 9.

Figure 12 is a view similar to Figure 10 showing the relative positions of the parts just prior to the time that the can advancing elements reach the limit of their forward movement.

The mechanism is illustrated as applied to a machine of the type disclosed in my said co-pending application. It is to be understood, however, that such illustration is by way of example only as the mechanism is equally applicable to other types of machines.

The machine, as illustrated, includes a suitable framework by which the various mechanisms are supported in co-operating relation. In accordance with present practice the cans are advanced step-by-step through the machine while in an inverted position and during such movement are subjected to successive treatments, whereby the cans are progressively washed, sterilized and dried. The cans are moved through the machine in a horizontal runway which is provided by parallel rails 20 upon which the cans are supported in an inverted position. The cans are guided along the rails 20 by pairs of upper and lower guide rails 21 and 22 respectively, the latter being adapted to engage the necks of the cans while the former are adapted to engage the bodies of the cans. The can covers, as illustrated, are moved through the machine in a vertical sidewise position along an elevated guideway which is provided by parallel rods 23 (Fig. 2). The covers are supported in and moved along said guideway by the upper run of a chain 24, the latter being provided with fingers 25 which engage the necks of the covers and push them toward the discharge end of the machine. The covers, similarly to the cans, are subjected to the action of cleansing and drying fluids during their passage through the machine and at the completion of these operations enter a cover applying member 26 (Fig. 1) by which they are lowered into the mouths of their respective cans as the latter pass therebeneath in upright position.

The present invention is concerned with the mechanism by which the cans are advanced step-by-step through the machine. The said mechanism includes a carriage 27 by which the can engaging elements 28 are carried. The carriage is arranged lengthwise of the machine adjacent the can runway and comprises longitudinally extending members 29, 30 and 31. The member 31 (Fig. 2) is channel-shaped in cross-section and is

mounted for movement in the direction of its length in a guide 32 which is suitably secured to the frame-work of the machine. At their inner ends the elements 28 are pivotally connected between the member 31 and the member or bar 30, the free ends of the elements resting upon the adjacent guide rail 22. Intermediate their ends the said elements are pivotally connected as at 33 to the carriage member 29.

Means is provided for operating the carriage members to move the elements 28 in such a manner that they push the cans step-by-step through the machine. To this end the carriage member 29 is connected to a block 34 which is slidably mounted upon a channel guide 35, the connecting means between the member and the block including a link 36 which is pivotally secured at one end to the block and at the other end to a boss 37 which is carried by the member 29.

The block 34 is connected by a link 38 to the upper end of a lever 39, the lower end of the lever being mounted for pivotal movement in a bearing block 40 which is suitably secured to the framework of the machine. Intermediate its ends the lever 39 carries a roller 41 which fits in a cam groove 42 formed in a wheel 43. The latter is mounted upon a shaft 44 which is journaled at its opposite ends in suitable bearings carried by the framework of the machine. The shaft 44 is connected to a drive shaft 45 through reducing gears 46, 47 and 48 and is driven by a suitable motor (not shown). The gear 48 is loosely mounted on the shaft 44. A driving connection, however, is normally maintained between the drive shaft 45 and the shaft 44 by a slip clutch 49. The latter is fixed to the shaft 44 and frictionally engages an annular extension 50 formed on the gear 48. The clutch 49 is adjusted so that the frictional engagement between it and the gear extension 50 is insufficient to maintain the driving connection between these parts in the event that any of the parts of the machine become jammed. Injury to such parts is, therefore, avoided.

It will thus be apparent that by virtue of the connection between the lever 39 and the carriage member 29 a reciprocatory movement is imparted to the latter by the cam wheel 43. Rearward movement of the carriage member 29 is utilized, assuming that the elements 28 are in a position where they have just reached the limit of their can advancing movement (Fig. 8), to first pivot the said elements out of the can runway and then carry them rearwardly so that they may be operated to engage and push forward a step the next succeeding cans. Pivotal movement of the elements is effected by holding the bar 30, and hence the carriage member 31, against movement during the initial movement of the carriage member 29. For this purpose an arm 51 (Fig. 9) is pivotally connected at one end to a vertical frame member 52, the said arm carrying a weight 53 which depends from its free end. Intermediate its ends the arm carries a roller 54 which rests upon, and hence rides upon, the bar 30. The latter is formed with two arcuate depressions 55 and 56 into and out of which the roller 52 is adapted to ride during reciprocatory movements of the bar 30, it being noted that the roller 54 rests in the depression 56 when the parts are in the position shown in Figure 8. As the carriage member 29, therefore, is moved rearwardly, the roller 54 prevents a corresponding movement of the carriage members 30 and 31. Hence the elements 28 pivot between said members out of the can runway to the position shown in Figure 4. When they reach this position a lug 57 which is carried by the carriage member 29 engages a stop 59 (Fig. 6) which is carried by the carriage member 31. As the member 29, therefore, continues to move rearwardly the members 30 and 31 are moved along with it, the roller 54 being forced out of the recess 56 and riding along the bar 30 toward the recess 55. During this movement of the carriage members the elements which have been withdrawn out of the can runway are moved while in this position from behind the cans they have been pushing past the next succeeding cans in the runway. As the carriage members reach the limit of their rearward movement, the roller 54 rides into the recess 55.

As the carriage member 29 is moved forward from this position, the roller 52 remains in the depression 55 and prevents a like movement of the carriage members 30 and 31. The elements 28, therefore, are pivoted between the carriage members 30 and 31 into the can runway to the position shown in Figure 8, in which position they engage the cans past which they have just been moved while in the retracted position. During this movement of the element 28 the carriage member 29 moves laterally relative to the carriage members 30 and 31 and the lug 57 approaches a second stop 58 which is carried by the carriage member 31.

Means is provided whereby the carriage members 30 and 31 are locked against relative longitudinal movement in either direction when the elements 28 reach their fully extended position so that the latter are maintained in such position during the continued movement of the said members to advance the cans a step through the machine. To this end the carriage member 29 carries a dog 60 which is mounted thereon for pivotal movement by a bracket 60a. When the carriage member 29 is at the limit of its rearward movement and the elements 28 are fully retracted, the dog 60 rests upon the stop 59 (Fig. 5). As the carriage member 29 is actuated to move the elements toward their can engaging position, the dog rides along the top of the lug 59 until the elements reach such position. At this point the lug 59 engages the lug 58 and the head 67 of the dog drops into the space between the two lugs (Fig. 10). The carriage members and elements are, therefore, locked against relative movement and as they continue to move forward they push the cans along the runway. It will be appreciated that during the forward movement of the carriage 27 the cans act against the free ends of the elements 28 and would, unless provision were made to guard against this, pivot the elements about their connections with the carriage member 29 to move the members 30 and 31 forward, the cans remaining stationary in the runway. The dog 60, therefore, by locking the carriage members prevents this.

In order to enable the return of the elements 28 to their fully retracted position whereby they may be moved rearwardly in the machine past the cans that they are to engage during their next forwarding movement, means is provided for unlocking the carriage members. For this purpose the dog 60 is provided with an upstanding portion 61 which is adapted to cooperate with a trip member 62 (Fig. 9), the latter being suitably supported for pivotal movement from the frame of the machine by an angle member 63. The free end of the trip member normally rests upon a laterally extending member 64 which is carried

by a vertical leg 65 of the frame of the machine. As the carriage 27 approaches the limit of its forward movement the upstanding portion 61 of the dog 60 lifts the free end of the trip member 62 and moves behind a shoulder 66 of the said member. Hence during the initial return movement of the carriage 27 the dog 60 is pivoted upon its support by the trip member 62 (Fig. 7) and the head 67 thereof is withdrawn from between the lug 57 and stop 59. The roller 54 holds the carriage members 30 and 31 against movement so that during the initial movement of the member 29 the elements 28 are pivoted out of the can runway, the head 57 of the dog riding upon the stop 59 during such relative movement between the carriage members.

In order to facilitate withdrawal of the dog from between the lug 57 and the stop 59 the stops 58 and 59 are preferably spaced so that there is a clearance provided when the dog 60 is in operative position. During a can advancing movement the clearance, as shown in Figure 12, will be between the lug 57 and the stop 58. In other words, the head 57 of the dog is forced tightly against the stop 59. This is caused by the action of the cans against the free ends of the elements 28, the cans tending to pivot the elements upon the member 29 and hence tending to move the members 30 and 31 forwardly relative thereto. As the carriage approaches the limit of its forward movement the member 31 engages a stop 68 (Fig. 8) which is suitably supported from the framework of the machine and is arrested thereby. The parts are so designed that the member 29 is moved forward a short distance after the member 31 has engaged the stop 68 in the manner described. The lug 57 and dog 60, therefore, move forward with the member 29 relative to the members 30 and 31. Thus they take up the clearance between the lug 57 and the stop 58, thereby providing a clearance between the head 67 of the dog and the stop 59 (see Fig. 10). With the parts in the position described the dog can be readily released by the trip member 62 upon the initial return movement of the carriage. The carriage members 30 and 31 are held against movement in the return direction by the roller 54 until the elements 28 are pivoted out of the can runway, the released dog 60 riding during this relative movement between the carriage member upon the step 59 in the manner described. As the elements reach their fully retracted position the lug 57 engages the stop 59 and during further movement of the member 29 the members 30 and 31 are carried with it, the roller 54 being forced out of the depression 56 and moved along the member 30 toward the depression 55. As the carriage reaches the limit of its rearward movement the roller enters the depressions 55 whereby the parts are conditioned for the next forwarding movement of the elements.

From the foregoing it will be apparent that the mechanism has the advantage that the can engaging elements are positively actuated, thereby insuring their movement at all times in the manner desired. The locking means is operative only after the elements have reached their fully extended position. Hence if an attendant fails to place a can at the proper position in the can runway, for example, not far enough in the runway and an element engages the can at the side instead of at the rear the element is pivoted out of the runway by the can, the latter remaining stationary. Injury to the parts of the mechanism is, therefore, avoided.

It will be noted that the elements 28 in pushing the cans in the manner described engage the necks of the latter above the plane of their mouths. This is desirable as it enables the mouths of the cans to be closed at certain of the stations to prevent the cleaning fluids from carrying foreign substances into the cans. Thus, as illustrated, the cans in their travel along the runway pass from the rails 20 upon a plate 69 which is supported by the rails, the upper surface of the plate being flush with the upper surfaces of the rails. The plate 69 is formed with an opening 70 through which steam, for example, may be introduced into the cans from a nozzle 71 (Fig. 2). The plate seals the mouths of the cans during the introduction of the steam spray, whereby a highly effective sterilizing action is obtained with a minimum quantity of steam and without the introduction of foreign matter. As the can engaging element operates in a plane over the mouths of the cans, the mechanism has the advantage that it enables sealing of the cans in the manner described during the treating operations.

Having fully described my invention, I claim:

1. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, actuating mechanism connected to said second carriage member for moving it forward a determined distance, means for holding said first mentioned carriage member against movement during the initial movement of said second carriage member, whereby said element is moved to a can engaging position and means for locking the said carriage members against relative movement after said element has reached such position, said holding means being operative to release said first mentioned member when said element has been moved to its can engaging position, whereby during the remainder of the forward movement of said second carriage member said actuating mechanism also moves said first mentioned carriage member, said element remaining in its can engaging position.

2. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, actuating mechanism connected to said second carriage member for moving it forward a determined distance, means for holding said first mentioned carriage member against movement during the initial movement of said second carriage member whereby to move said element to a can engaging position, means for locking said carriage members against relative movement when said element has reached such position thereby to hold said element against angular movement during the remainder of the forward movement of said second carriage member, whereby said actuating mechanism also moves said first mentioned carriage member and effects the release of said holding means, means for returning said second carriage member to its original position, means for unlocking said carriage members during the initial return movement of said second carriage member and means for holding said first mentioned carriage member against movement during the initial return movement of said second carriage member whereby

said element is moved out of its can engaging position.

3. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, actuating mechanism connected to said second carriage member for moving it forward a determined distance, means for holding said first mentioned carriage member against movement during the initial movement of said second carriage member thereby to move said element to a can engaging position, a locking member carried by one of said members and co-operating with locking means carried by the other said member to lock said members against relative movement when the said element reaches such position, said holding means being releasable, whereby said actuating mechanism also moves the said first mentioned carriage member during the remainder of the forward movement of the said second carriage member and means for releasing said locking member so that the said element may be moved out of its can engaging position during the initial part of the return movement of said second carriage member.

4. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, actuating mechanism connected to said second carriage member for moving it forward a determined distance, means for holding said first mentioned carriage member against movement during the initial movement of said second carriage member thereby to move said element to a can engaging position, a dog carried by one of said members and co-operating with the other of said members to lock said members against relative movement when the said element reaches such position, whereby said actuating mechanism also moves the said first mentioned carriage member during the remainder of the forward movement of the said second carriage member, said element remaining in its can engaging position, means for moving said second carriage member rearwardly to return said element to its original position and means operative during the initial return movement of said second carriage member to trip said dog to permit relative movement between the said carriage members whereby to move said element out of its can engaging position.

5. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for moving said second carriage member a determined distance, means for holding said first mentioned carriage member against movement during the initial movement of said second carriage member thereby to move said element to a can engaging position, a pair of spaced stops carried by said first mentioned carriage member, a co-operating lug carried by said second carriage member and movable into engagement with one of said stops as the said element reaches its can engaging position and means carried by said second carriage member for co-operating with the other of said stops to lock said members against relative movement, whereby said element is locked in its can engaging position during the remainder of the forward movement of said members.

6. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for moving said second carriage member forward a determined distance, means for holding said first mentioned carriage member against movement during the initial movement of said second carriage member thereby to move said element to a can engaging position, a pair of spaced stops carried by said first mentioned carriage member, a lug carried by said second carriage member and adapted to engage one of said stops as the said element reaches the can engaging position, a dog carried by said second carriage member and adapted as the said element reaches its can engaging position to drop between said lug and the other of said stops whereby the said carriage members are locked against relative movement during the continued movement of said second carriage member, means for returning said second carriage member to its original position and means for rendering said locking dog inoperative during the initial part of the return movement of said second carriage member so that said element may be moved out of its can engaging position.

7. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for reciprocating said second carriage member, means for holding said first mentioned carriage member against movement during the initial part of the movement of said second carriage member in either direction, thereby to pivot said element into and out of its can engaging position, a pair of stops carried by one of said carriage members and a lug carried by the other of said carriage members and co-operating with said stops to limit the relative movement of said carriage members to an extent adequate to move said element in the manner described.

8. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for reciprocating said second carriage member, means for holding said first mentioned carriage member against movement during the initial part of the movement of said second carriage member in either direction, thereby to pivot said element into and out of its can engaging position, a pair of stops carried by one of said carriage members, a lug carried by the other of said carriage members and co-operating with said stops to limit the relative movement of said carriage members to an extent adequate to move said element in the manner described and a dog carried by one of said carriage members and co-operating with one of said stops to lock said carriage members against relative

movement when said element reaches its can engaging position.

9. In a can washing machine, the combination of a support and means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for moving said second carriage member forward a determined distance and means for holding said first mentioned carriage member against movement during the initial movement only of said second carriage member, whereby to move said element into can engaging position during said initial movement of said second carriage member, said last named means including a bar which is carried by one of said carriage members, said bar being formed with a recess and a roller which is carried from the framework of the machine and which is adapted to enter and leave said recess during the reciprocating movement of said carriage members.

10. In a can washing machine, the combination of a support, means for moving a can along said support, said means including a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for moving said second carriage member forward a determined distance, a bar which is carried by said first mentioned carriage member, said bar being formed with a recess, a roller, an arm which carries said roller, said arm being pivotally connected to the framework of the machine and supporting said roller so that it rests in said recess during the initial part of the forward movement of said second carriage member to hold said first mentioned carriage member against movement, whereby to move said element to can engaging position, said arm moving to permit said roller to leave said recess during the remainder of the forward movement of said second carriage member so as to permit said carriage members to move together as a unit while said element is in its can engaging position.

11. In a can washing machine, the combination of a support, means for moving a can along said support, said means comprising a can engaging element, a carriage member to which said element is pivotally connected, a second carriage member to which said element is also pivotally connected, means for moving said second carriage member forward a determined distance, a bar carried by said first mentioned carriage member, said bar being formed with a recess, a roller which is carried by the framework of the machine, said roller resting in said recess and being adapted to hold said first mentioned carriage member against movement during the initial part of the movement of said second carriage member, whereby to move said element into can engaging position, said roller moving out of said recess and said first carriage member moving with said second carriage member during the remainder of the forward movement of the latter, means for moving said second carriage member rearwardly to return said element to its original position and means for holding said first carriage member stationary during the initial part of the return movement of said second carriage member so as to move said element out of the path of said can, said means including said roller and a second recess which is formed in said bar.

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