March 13, 1945. R. E. RENARD 2,371,186

CAN CLOSING MACHINE

Filed Jan. 13, 1942 3 Sheets-Sheet 1

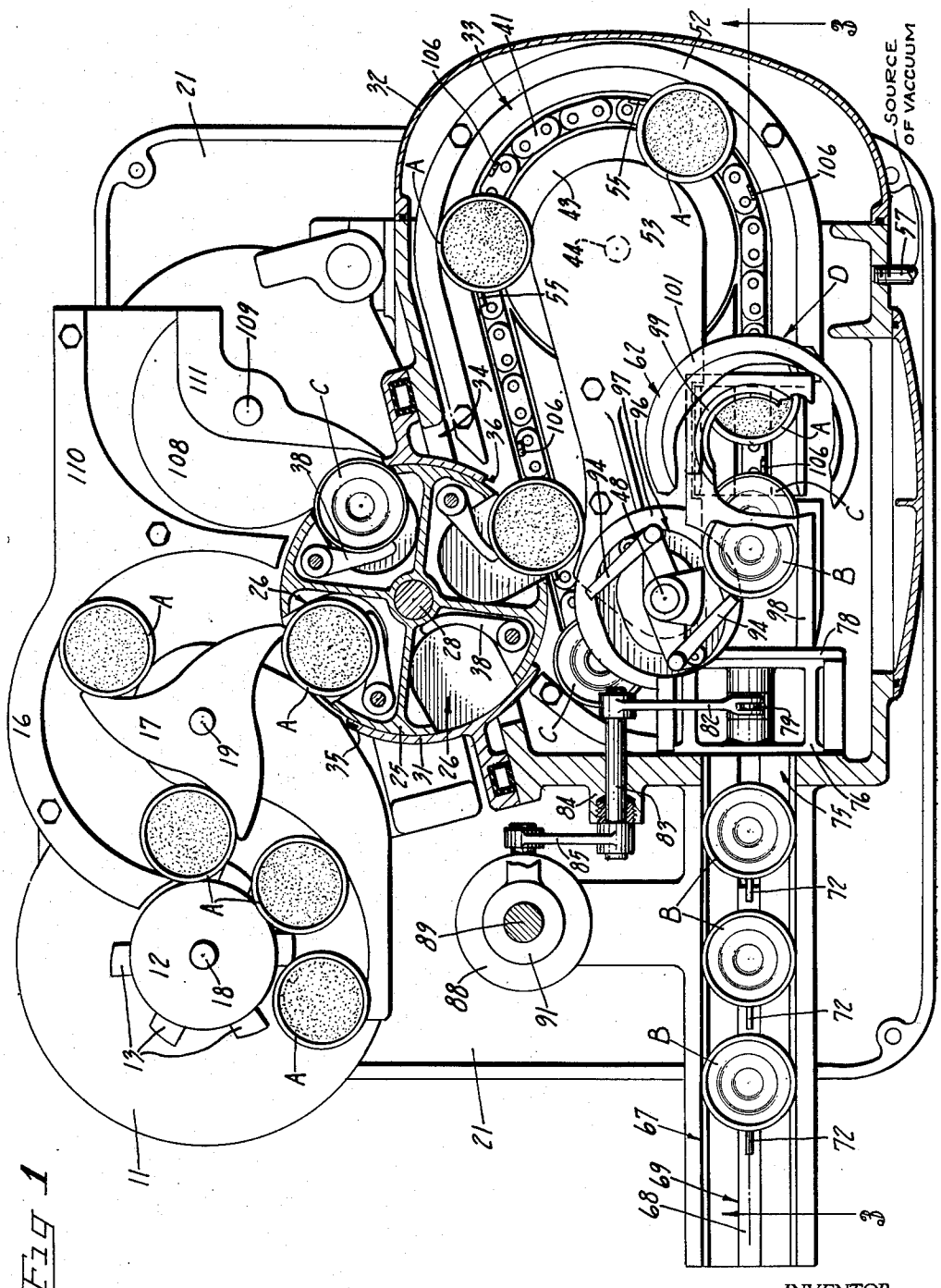


Fig 1

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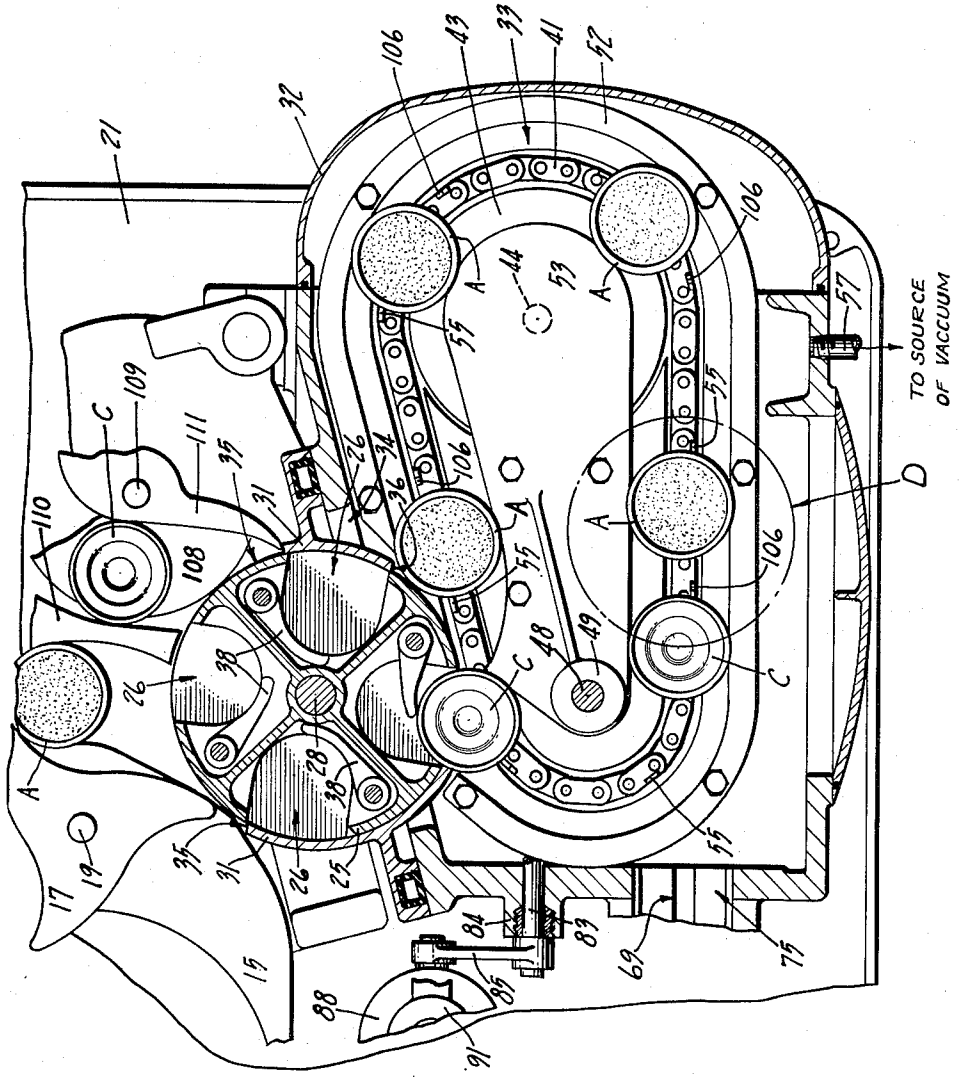


Fig 2

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CAN CLOSING MACHINE

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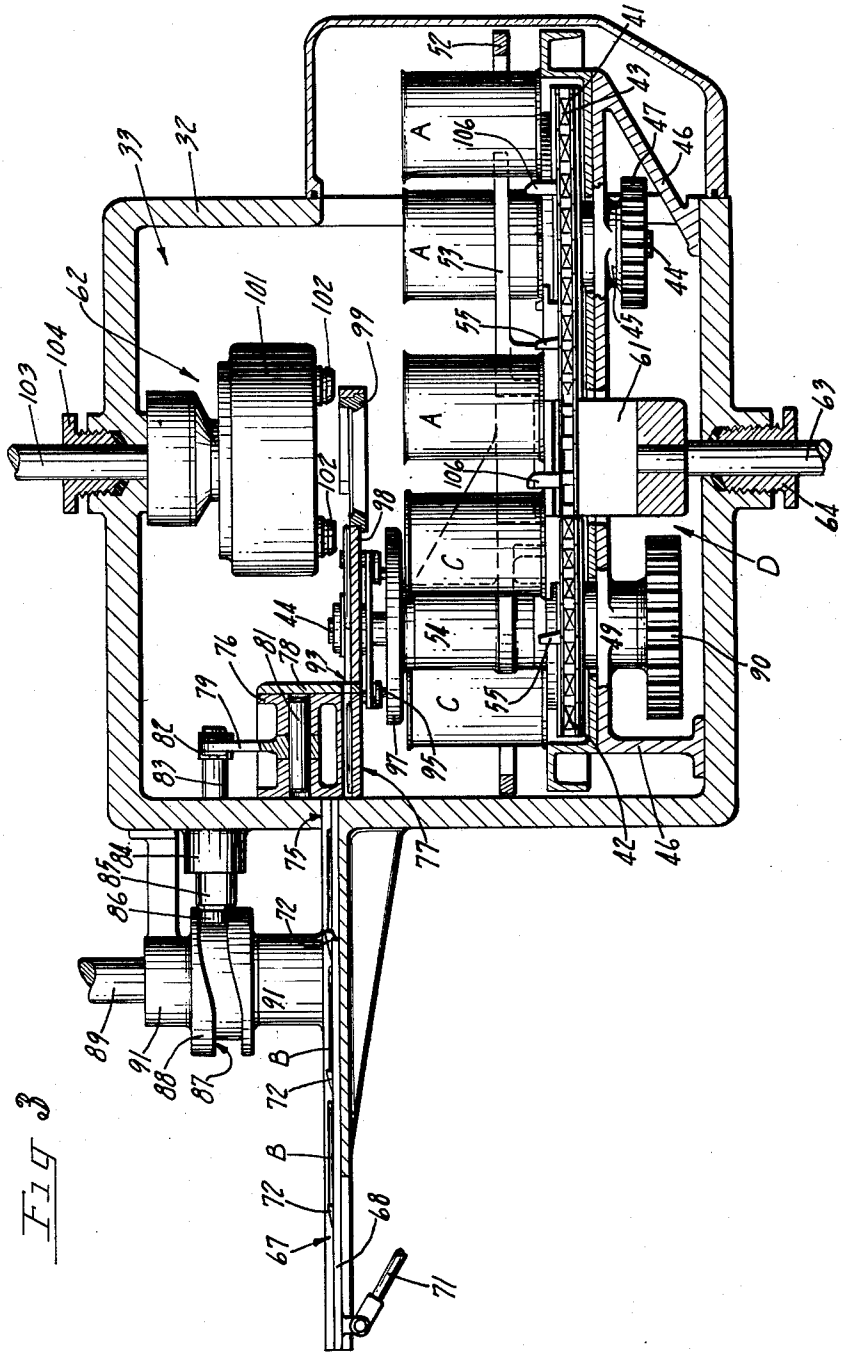


Fig 3

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2,371,186

CAN CLOSING MACHINE

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Application January 13, 1942, Serial No. 426,633

3 Claims. (Cl. 113—14)

The present invention relates to a container or can closing or treating machine and has particular reference to a unique manner of passing cans into and out of a vacuumizing and sealing chamber and within a confined area.

An object of the invention is the provision of a can closing machine having a vacuum sealing chamber of oblong shape and of greater proportions than usually found in closing machines so that a can to be closed may remain in the chamber a sufficiently long time to become vacuumized to a predetermined degree prior to its being sealed.

Another object is the provision in such a machine of a rotating valve device for introducing cans to be sealed into the sealing chamber and for discharging the sealed cans from the chamber, the unsealed cans and the sealed cans crossing each other's path of travel at the valve and in a confined space, the cans being delivered from and into different pockets of the valve so that only a single valve is required to introduce the cans into the chamber and to discharge them from the chamber.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a plan sectional view of a can closing machine embodying the instant invention, with parts broken away, the view showing unsealed and sealed cans passing through the machine;

Fig. 2 is a view similar to Fig. 1, with parts broken away, the view showing the moving parts of the machine and the cans in a different position; and

Fig. 3 is a vertical sectional view taken substantially along the line 3—3 in Fig. 1.

As a preferred embodiment of the invention the drawings illustrate a can closing machine in which filled and unsealed cans A are vacuumized, in which covers B are sealed onto the vacuumized cans, and the sealed cans (marked C) then are discharged from the machine to a suitable place of deposit.

The unsealed cans A enter the machine by way of a rotating entrance disc 11 (Fig. 1) which includes a timing turret 12 having a plurality of outwardly projecting arms 13 for spacing and timing the cans while advancing them. The timing turret 12 advances the cans along a curved path of travel between a pair of spaced and parallel curved guide rails 15, 16. Cans passing along this path of travel are engaged by a continuously rotating star wheel 17 which advances the cans further along their path of travel.

The timing disc 11 and turret 12 are mounted on a vertical drive shaft 18 and the star wheel 17 is mounted on a vertical drive shaft 19. These shafts are journaled in suitable bearings formed in a frame 21 which constitutes the main frame of the machine. These shafts are rotated in any suitable manner in time with the other moving parts of the machine.

The star wheel 17 advances the unsealed cans A into a continuously rotating, cylindrical, transfer valve 25 having a plurality of can pockets 26 arranged around its outer periphery. The valve is mounted on a vertical shaft 28 which is journaled in suitable bearings formed in the machine frame 21. The shaft is rotated in any suitable manner in time with the other moving parts of the machine.

The valve 25 rotates in a cylindrical valve seat 31 formed in a casing which is secured to a side of an oblong housing 32. This housing is a part of the machine frame and encloses a can vacuumizing and sealing chamber 33. The valve seat member extends into the chamber through an opening 34 formed in the housing 32. It is formed with a large opening 35 which is a combined entrance and discharge opening and within the chamber 33 it is also formed with another combined entrance and discharge opening 36.

The valve 25 is formed preferably with four equally spaced pockets 26. Two of these pockets, disposed on opposite sides of the valve are used for bringing unsealed cans A into the chamber 33. The other two pockets, disposed on opposite sides of the valve and aligned at right angles to the entrance pockets, are discharge pockets and are used for carrying the sealed cans C out of the chamber. All of the pockets are equipped with cam actuated discharge fingers 38 which are usual in transfer valves of this nature. These fingers extend up through the valve and are operated by a stationary cam disposed above the valve in the usual manner.

Hence when a can A is introduced into the transfer valve 25 by the star wheel 17, the can is received in one of the entrance pockets 26 of the valve and is carried by the valve into the vacuumizing and sealing chamber 33. Within the chamber, the can A is discharged from the valve pocket by actuation of the finger 38 within its pocket. The finger pushes the can out through the opening 36 in the valve seat 31. Thus while this can is being introduced into the chamber, the

opposite pocket is receiving another can A to be brought into the chamber, as shown in Fig. 1. The intervening pocket is empty at that time. Thus only alternate pockets are used for entering cans.

An unsealed can A introduced into the chamber 33 is received on an endless chain conveyor 41 (see also Fig. 3) which is disposed in a horizontal position. The conveyor operates over an idler sprocket 42 and over a larger driving sprocket 43 located in the chamber. The driving sprocket 43 is mounted on a vertical shaft 44 journaled in a bearing 45 formed in a sub-frame 46 located within the chamber. This shaft 44 is driven by a gear 47 in any suitable manner in time with the other moving parts of the machine. The idler sprocket 42 is mounted loosely on a shaft 48 journaled in a bearing 49 in the sub-frame 46.

The conveyor 41 extends the full length of the chamber 33 and carries the can along an oblong path of travel between guide rails 52, 53 which are bolted to the sub-frame 46. A bearing 54 on the guide rail 53 supports the upper end of the idler sprocket shaft 48. Incoming cans on the conveyor 41 are propelled by short upstanding dogs 55 which are secured to the conveyor at spaced intervals. The timing of the conveyor is such as to bring one of these short dogs 55 adjacent each alternate pocket in the valve in time with the rotation of the valve. As the pocket comes into can entrance position within the turret and without any time lag and in a smooth manner, the can is picked up by the conveyor without any interruption in the advancement of the can.

While a can A is passing through the chamber 33 it is vacuumized in preparation for sealing. For this purpose the chamber 33 is maintained in a vacuumized condition. The vacuum is drawn on the chamber by way of a pipe 57 (Fig. 1) which is threaded into a wall of the housing 32. The pipe leads to any suitable source of vacuum.

Near the end of its travel through the vacuumized chamber 33, the vacuumized can moves into a closing station D. At this station the conveyor travels through a lifter pad 61 which is disposed directly under a can seaming mechanism 62. The lifter pad is mounted on the upper end of an actuating stem 63 carried in a stuffing box 64 threaded in the bottom wall of the housing 32. The actuating rod is raised and lowered in any suitable manner in time with the other moving parts of the machine.

As a vacuumized can A moves into the closing station D, it passes onto the lifter pad 61 and the pad immediately begins to rise. The pad lifts the can while it is being propelled by its conveyor dog 55 and when the can is elevated sufficiently to permit the dog to pass under it the dog slips off the can and leaves it in a centralized position on the pad. This is a usual can closing station construction as disclosed in United States Patent 1,429,231, issued September 19, 1922, to P. W. Fleischer, on Can closing machine.

The rising can picks up a cover B on its ascent into the closing mechanism 62. The covers are introduced into the chamber 33 from any suitable outside source of supply by way of a runway 67. The covers are fed along the runway in timed order by a reciprocating feed bar 68 located in a groove 69 in the runway. The bar is reciprocated by a link 71 which may be actuated in any suitable manner in time with the other moving parts of the machine. The feed bar carries a plurality of yieldable feed dogs 72 spaced along its length for propelling the covers B along the runway.

The runway 67 leads to an entrance opening 75 in the chamber housing 32 and this opening is sealed by a vertically movable slide valve 76 having a cover pocket 77. The valve is located in a slideway formed in a bracket 78 disposed inside the chamber and adjacent the entrance opening. The slide valve 76 is supported on a link 79 which is mounted on a pivot pin 81 carried in the slide valve. The upper end of the link is connected to an arm 82 mounted on a shaft 83 carried in a bearing 84 in the chamber housing 32.

The shaft 83 extends outside the housing and carries a cam lever 85 having a cam roller 86 which operates in a cam groove 87 of a cam 88. Cam 88 is mounted on a vertical cam shaft 89 journaled in bearings 91, one being formed in a bracket extension that projects out from the housing 32 and the other being a projection on the runway 67. The cam shaft is rotated in any suitable manner in time with the other moving parts of the machine.

Thus as the cam 88 rotates it raises and lowers the slide valve 76 in time with the other moving parts of the machine. When the valve is in a raised position its pocket 77 is in horizontal alignment with the cover runway 67 while the slide bracket 78 cuts off communicatoin between the slide pocket and the vacuumized interior of the chamber.

While the slide 76 is in this position a cover B is introduced into the slide pocket by the feed bar 68. The slide then moves down to its lowermost position as shown in Fig. 3. In this lowered position the slide pocket is in horizontal alignment with a slot 93 which forms an entrance into the chamber 33.

While the slide valve 76 is in its lowered position, the cover B carried in the valve pocket is pushed out by a finger 94 mounted on an arm secured to the upper end of the shaft 48. The shaft is driven by way of a gear 90 which is mounted on the lower end of the shaft and which is driven in any suitable manner in time with the other moving parts of the machine. There are two of these finger arms and they operate alternately. The fingers while rotating with the shaft are moved laterally by cam rollers 95 (Fig. 3) which are carried on the fingers and which operate in a cam groove 96 of a stationary cam 97 that surrounds the drive shaft.

The fingers 94 after removing a cover B from from its valve pocket 77, push the cover along a runway 98 (Fig. 1) which is secured to the slide bracket 78. At the inner end of this runway the fingers push the cover into a cover support ring 99 secured in the runway and located immediately under the can closing mechanism 62. The cover is disposed in this ring when the rising can A on the lifter pad 61, moves up through the ring and picks up the cover. After thus picking up the cover, the can and cover continue on up into the closing mechanism where the cover is seamed onto the can to seal it.

Sealing of the can is effected preferably by a rotating seaming head 101 (Fig. 3) having seaming rollers 102 for performing the sealing operation. The head is mounted on a shaft 103 which extends up through a stuffing box 104 in the chamber housing 32. This is a usual seaming head construction. The shaft may be rotated in any suitable manner in time with the other moving parts of the machine.

After this sealing operation which results in the sealed can C, the lifter pad moves down to its original position and brings the sealed can down in front of a long upright feed dog 106 on the conveyor 41. There is one of these long dogs interposed between the short dogs 55 on the conveyor so that every other dog is a long dog. Each long dog 106 contacts a sealed can C while it is moving down with the lifter pad and continues the progress of the can through the chamber.

The dog 106 propels the can toward the transfer valve 25, as best shown in Fig. 2. As the can approaches the valve, by which it was introduced into the chamber, it crosses the path of travel of an incoming can A and is introduced by the long conveyer feed dog in conjunction with inner guide rail 53, into the empty pocket of the valve immediately succeeding the valve pocket that just brought an unsealed can into the chamber, as shown in Fig. 2. This empty pocket is one of the can discharge pockets hereinbefore mentioned.

A sealed can C introduced into the discharge pocket of the valve 25 is carried around by the valve to the opening 35 in the valve seat 31. At this opening the discharge finger 38 within the valve pocket 26 pushes the can out through the seat opening and discharges it onto a rotating discharge disc 108. This disc is mounted on a vertical shaft 109 which is journaled in the machine frame and is rotated in suitable manner.

The can is conveyed by the disc to any suitable place of deposit. During its discharge it is guided by curved guide rails 110, 111, disposed adjacent the discharge opening 35 in the valve seat.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a can closing machine, the combination of a housing enclosing a can treating chamber and having an opening therein, means in said chamber for treating and closing said can, a continuously rotatable valve disposed in said opening, said valve being provided with alternate can inlet and outlet pockets, a continuously movable endless conveyor operative within said chamber and disposed adjacent said opening, means for continuously rotating said valve and for continuously moving said conveyor in timed relation, means for transferring an open filled can from a said inlet pocket to said conveyor while said pocket moves across said opening, and means associated with said conveyor for transferring a closed filled can from said conveyor to an immediately succeeding valve outlet pocket while the latter moves across the opening thereby crossing the paths of said incoming and outgoing cans between said valve and said conveyor in arcuate directions of maximum radii to obviate spilling of the can contents and conflict of incoming and outgoing cans adjacent said opening.

2. In a can closing machine, the combination of a housing enclosing a can treating chamber having an opening therein, means in said chamber for treating and closing said cans, a rotary valve formed with alternate inlet and outlet pockets for moving cans into and out of said chamber, said valve rotatably engaging a valve seat disposed in said chamber opening, a conveyor having alternate short and long dogs located in said treating chamber and having movement adjacent said opening for advancing the cans through said chamber, means for rotating said valve and moving said conveyor in synchronized timed relation, means for transferring the open filled cans from said inlet pockets to said conveyor respectively ahead of the short dogs thereon while said pockets move across said chamber opening, means in said chamber for transferring a said can from a position in front of a short dog to a position in front of a long dog on the conveyor, and means associated with said conveyor for transferring a said closed filled can from in front of a long dog to an immediately succeeding valve outlet pocket while the latter moves across said opening, whereby the paths of said incoming open and outgoing closed cans are crossed between said valve and said conveyor to effect a minimum change in direction of travel during the transfer of the cans from the valve to the conveyor and vice versa to avoid spilling of the can contents and conflict of the cans adjacent said chamber opening.

3. In a can closing machine, the combination of a housing enclosing a can treating chamber having an enlarged opening therein, means in said chamber for treating and closing said cans, a rotary valve formed with alternate inlet and outlet pockets for moving cans into and out of said chamber respectively at opposite sides of said opening, said valve rotatably engaging a valve seat disposed in said chamber opening, a conveyor having alternate short and long dogs located in said treating chamber and having movement adjacent said opening for advancing the cans through said chamber, means for continuously rotating said valve and continuously moving said conveyor in synchronized timed relation, means for transferring the open filled cans from said inlet pockets to said conveyor respectively ahead of the short dogs thereon while said pockets move across said chamber opening so that the short dogs of the conveyor engage and advance open filled cans transferred to said conveyor from the inlet pockets only of the valve at one side of said chamber opening as an incident to the treatment of the cans in said chamber, means in said chamber for transferring the cans respectively from a position in front of a short dog to a position in front of a long dog on the conveyor, said long dogs engaging and advancing treated and closed cans only to adjacent said valve at the opposite side of said enlarged chamber opening, and means associated with said conveyor for transferring a said closed filled can from in front of a long dog to an immediately succeeding valve outlet pocket while the latter moves across said opening, whereby the paths of said incoming open and outgoing closed cans are crossed between said valve and said conveyor to effect a minimum change in direction of travel during the transfer of the cans from the valve to the conveyor and vice versa to avoid spilling of the can contents and conflict of the cans adjacent said enlarged chamber opening.

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