

April 27, 1954

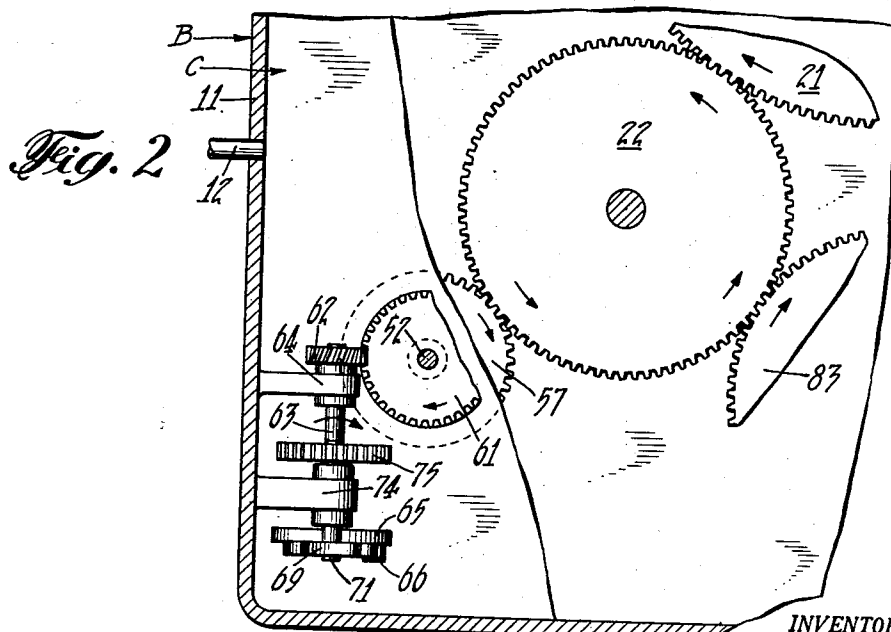
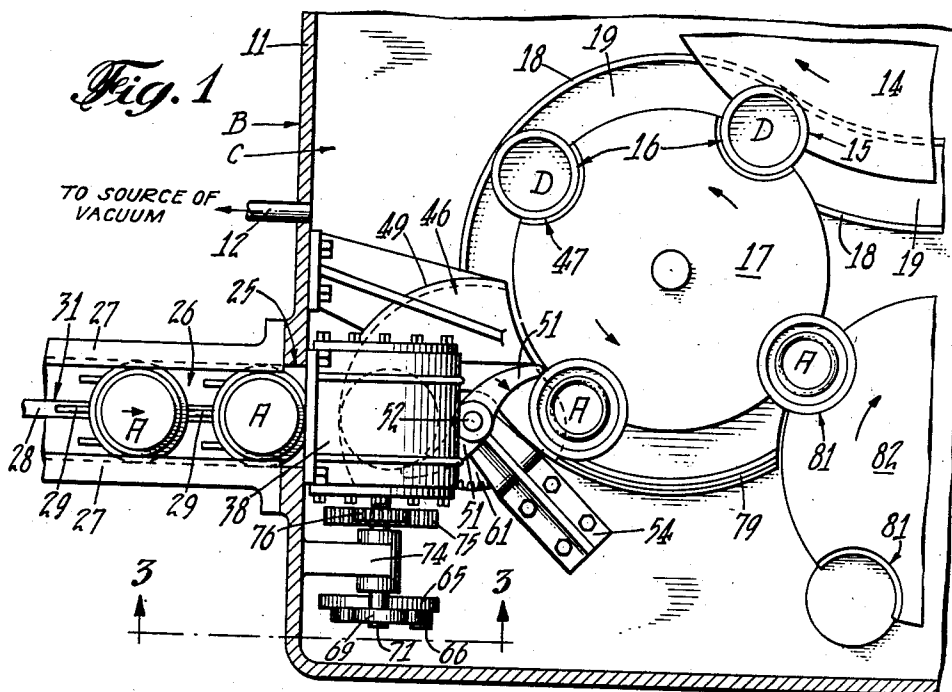
S. BIRKLAND

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TRANSFER DEVICE FOR PRESSURIZED COMPARTMENTS

Filed May 8, 1951

2 Sheets-Sheet 1



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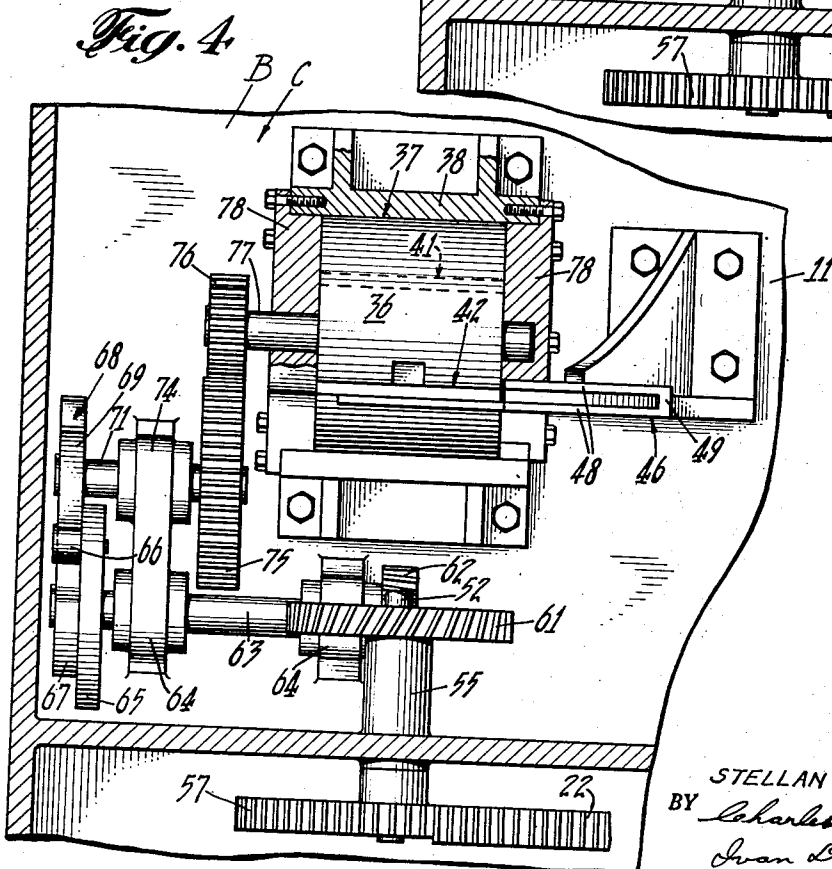
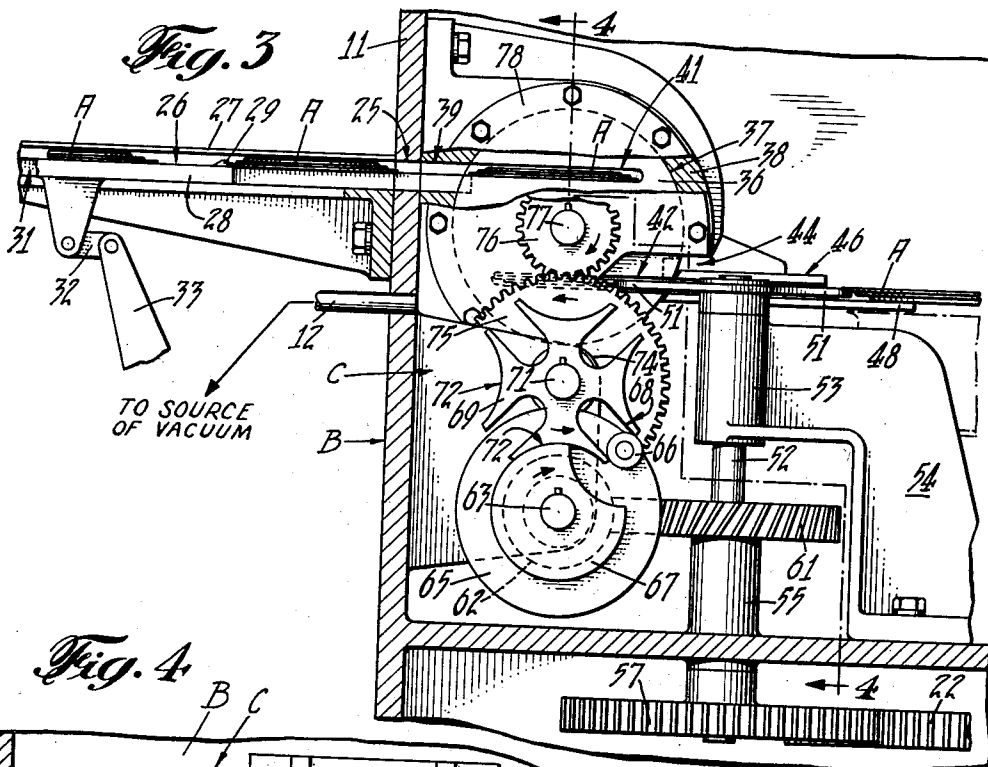
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UNITED STATES PATENT OFFICE

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TRANSFER DEVICE FOR PRESSURIZED COMPARTMENTS

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Application May 8, 1951, Serial No. 225,085

4 Claims. (Cl. 226—68)

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The present invention relates to a transfer device for conveying articles such as can covers into a pressurized or vacuumized compartment and has particular reference to a device for inverting the article simultaneously with its transfer.

This is a companion application to my co-pending United States applications Serial No. 225,086, filed May 8, 1951, by Stellan Birkland and Malcolm W. Loveland for a Machine for Weighing, Filling and Sealing Products into Containers, and Serial No. 225,084, filed May 8, 1951, by Stellan Birkland for Weighing and Filling Machine.

An object of the invention is the provision of a transfer device wherein articles may be introduced into a pressurized or vacuumized compartment without appreciable change in the pressurized condition of the compartment.

Another object is the provision of such a transfer device wherein an article such as a can cover being transferred is fed into the device while supported on its flange to protect inner coated surfaces against being scratched, said cover thereafter being inverted during the transfer to place the cover in a position ready for use when discharged.

Another object is the provision of such a transfer device wherein a rotary valve is utilized to effect the transfer of the articles so that greater efficiency in maintaining a hermetic seal and higher speeds of operation may be obtained.

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 combined top plan and horizontal sectional view of a transfer device and principal conveyor parts of a machine embodying the instant invention, with arts broken away;

Fig. 2 is a view similar to Fig. 1, showing how the various moving parts are driven, with parts broken away;

Fig. 3 is an enlarged sectional detail taken substantially along the line 3—3 in Fig. 1, with parts broken away; and

Fig. 4 is a sectional view taken substantially along the broken line 4—4 in Fig. 3, with parts broken away.

As a preferred or exemplary embodiment of the invention the drawings disclose a transfer device for conveying circular can covers A in an upside-down or inverted position, from a suitable

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source of supply located outside of a can closing or sealing machine B and for introducing them into a vacuum chamber C within the machine B and for simultaneously turning the covers into an upright position for assembly with a can or container D preparatory to permanently uniting the cover with the can.

In such a can closing machine B the vacuum chamber C is enclosed by a main housing 11 (Fig. 1) which also serves as and constitutes the main frame of the machine. The interior of this housing 11 is exhausted of air and is maintained at a predetermined vacuum by way of a pipe 12 which leads to any suitable source of vacuum. If the cans D are to be sealed under gas pressure, the pipe 12 may lead to any suitable source of such gas under pressure for maintaining the chamber C at a predetermined pressure.

The cans D to be closed may be advanced through the chamber C in any suitable manner such as for example by a rotatable turret 14 which may be a can filling turret, having peripheral pockets 15 which deposits the cans into a pocket 16 of a rotatable transfer turret 17 for the reception of a can cover A. Suitable guide rails 18 and tables 19 support and retain the cans in their pockets during this advancement. The turrets are rotated in any suitable manner such as by meshing gears 21, 22 (Fig. 2).

The can covers A for the cans D to be closed within the chamber C are introduced into the chamber without appreciable change in the pressurized condition of the chamber, by way of a shielded entrance opening 25 (Figs. 1 and 3) formed in the housing 11 adjacent the can transfer turret 17. The can covers A are fed toward this opening 25 from the outside source of supply, in an upside-down horizontal position and in spaced and timed order in a substantially continuous procession along a runway 26 comprising a pair of spaced and parallel guide rails 27 secured to the outside of the housing 11. The covers are propelled along this runway 26 and through the entrance opening 25 by a reciprocating stroke bar 28 having spring pressed feed dogs 29. The stroke bar operates in a slideway 31 formed in the base of the runway and is reciprocated preferably by a link connection 32 with an arm 33 which may be actuated by cam or other motion in time with the other moving parts of the machine. Upon each forward stroke of the stroke bar 28 one cover A is passed through the entrance opening 25.

Within the chamber C the cover entrance opening 25 is shielded by an intermittently rotat-

able, horizontally disposed valve 36 (Figs. 3 and 4) disposed in a close fitting horizontally disposed cylindrical seat 37 formed in a valve casing 38 secured to the inside of the housing 11 around the entrance opening 25. The valve casing 38 is provided with an entrance opening 39 which is disposed in alignment with the entrance opening 25 in the housing for the passage of a cover A into the valve. A cover A passed through these openings 25, 39 is received in the uppermost of a pair of spaced and parallel horizontal slots or recesses 41, 42 formed in the valve in an offset location relative to the axis of the valve, one above and one below the axis of the valve as shown in Figs. 3 and 4. These slots 41, 42 extend from the outer periphery of the valve inwardly a distance slightly greater than the diameter of the cover A, and in width extend from one side of the valve to the other so that the ends of the slots are open. The slots are only slightly thicker than the thickness of a cover A so as to eliminate any excess looseness of the cover in the slots.

When a cover A is received in the upper slot 41, the valve 36 is rotated in a clockwise direction (as viewed in Fig. 3) through an arc of 180 degrees. This rotation of the valve swings the upper slot 41 and its received cover A upwardly and thence downwardly into the position of the lower slot 42 as viewed in Fig. 3 while blocking or sealing the entrance openings 25, 39 to prevent entrance of outside air into the chamber C. This rotation of the valve also simultaneously turns the cover A in the slot 41 into an upright position for application to a can D. In this position the cover A is adjacent an exit opening 44 (Fig. 3) in the valve casing 38 and this opening is in communication with the chamber C. In this manner the cover is introduced into the chamber without admitting an appreciable amount of air into the chamber. The lower slot 42 in the valve is thus also moved into position adjacent the entrance opening 25 and the continuing entrance opening 39 for the reception of a subsequent cover A.

While the valve 36 is at rest in this position between its intermittent rotations, the cover A introduced into the chamber C is swept laterally out of its slot 41 (now in the position of the lower slot 42) and is advanced along a curved guide rail 46 (Figs. 1, 3 and 4) which extends from the valve 36 toward the path of travel of the cans D being advanced by the transfer turret 17. The guide rail terminates adjacent the outer periphery of the turret 17, overlapping the path of travel of the cans and in horizontal alignment with a cover seat or ledge 47 (Fig. 1) in the turret 17 above and concentric with the can pockets 16. The guide rail 46 is provided with a pair of broad horizontally spaced and parallel upper and lower confining and supporting walls 48 (Fig. 4) connected by an outer curved guide wall 49, the space between the horizontal walls 48 being only slightly greater than the thickness of the cover A to fully support and confine the cover.

A cover A thus swept out of its valve slot 41 and along the guide rail 46 is moved toward an advancing can D in the transfer turret 17 and is deposited in the cover seat 47 in the turret in a position slightly above and in vertical alignment with the can. This advancement of the cover A preferably is effected by a double pronged horizontal transfer finger element 51 (Figs. 1 and 3) which may consist of two diametrically opposed fingers formed as one piece. These fingers

are disposed in a plane which coincides with the lower slot position of the cover valve 36 and with the space between the horizontal walls 48 of the guide rail 46. This finger element 51 intermediate its ends is mounted on a continuously rotating shaft 52 journaled in a bearing 53 formed in a bracket 54 which is secured to the bottom of the housing 11 and in a bearing 55 which extends up from the bottom of the housing.

The rotation of the transfer fingers 51 is effected in timed relation with the intermittent rotation of the valve 36 so that the fingers will pass through the slots 41, 42 when they are in the lower slot position, and both the fingers and slots are rotated in timed relation with the rotation of the transfer turret 17 so that a cover will be properly superimposed upon a can D. For this purpose the transfer fingers 51 and the valve 36 are driven from the transfer turret driving gear 22 (Fig. 2). The gear 22 meshes with and drives a gear 57 (Figs. 2, 3 and 4) carried on the lower end of the finger shaft 52 and thus rotates the shaft continuously.

The cover valve 36 is intermittently rotated by a helical gear 61 which is carried on the transfer finger shaft 52. The helical gear 61 meshes with and drives a second helical gear 62 mounted on a short horizontally disposed Geneva actuating shaft 63 journaled in a pair of spaced bearings 64 projected from the inside of the housing 11. One end of the Geneva actuating shaft 63 carries a disc 65 having secured thereto a Geneva actuating roller 66 and a Geneva locking member 67.

As the disc 65 rotates continuously the roller 66 engages in spaced radial slots 68 of a conventional Geneva wheel 69 mounted on a horizontal Geneva shaft 71 to rotate the shaft intermittently. The usual locking recesses 72 formed in the Geneva wheel co-operate with the locking member 67 in the conventional manner to hold the Geneva wheel stationary between its intermittent partial rotations.

The Geneva shaft 71 is journaled in a bearing 74 which projects inwardly from the main housing 11. Beyond the bearing, the shaft 71 carries a gear 75 which meshes with a pinion 76 mounted on one end of a valve shaft 77 which extends through the axis of the cover valve 36 and on which the valve rotates. The valve shaft 77 is journaled in bearings formed in end plates 78 of the valve casing 38. It is through this train of gears and the Geneva mechanism explained above that the cover valve 36 and the transfer fingers 51 are operated in timed relation to introduce a cover A into the chamber C and to advance it into superimposed position on the can D.

A can D after receiving its cover A continues to advance along its support table 19 toward any suitable place of deposit. During this travel, a curved guide rail 79 (Fig. 1) holds the cover A in place in its seat 47 in the transfer turret 17. As an example of a place of deposit for the can D and its superimposed cover, Fig. 1 of the drawings shows the transfer turret 17 placing the can and its cover into a pocket 81 of a rotatable turret 82 which may be a part of a more elaborate machine for uniting the cover with the can to close and seal the can. This turret 82 may be driven by a gear 83 (Fig. 2) which meshes with the transfer turret driving gear 22.

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. Mechanism for introducing articles into a treating chamber, comprising an entrance opening in a wall of said chamber, a cylindrical valve rotatably mounted on a horizontal axis within said chamber adjacent said opening, said valve having a housing including a cylindrical valve seat provided with a peripherally spaced entrance and exit openings, said valve also having an elongated article receiving and discharge recess disposed chordally of said valve on one side of the valve axis, said recess opening at one end thereof into the valve periphery, means for rotating said valve to alternately dispose said valve recess in horizontal alignment with said exit and entrance openings, means for successively introducing articles in a horizontal direction through said entrance opening into the aligned valve recess, and movable means mounted within said chamber for movement through said valve recess when the latter is disposed in registry with said exit opening and while said valve is stationary, whereby successive articles introduced into said valve recess are inverted by said valve and positioned for engagement by said movable means to discharge said article from said valve recess through the aligned valve seat exit opening and thence into said chamber.

2. A transfer device for introducing substantially flat articles into a treating chamber, comprising an entrance opening in a wall of said chamber, a cylindrical valve rotatably mounted on a horizontal axis within said chamber adjacent said opening, said valve having a housing including a cylindrical valve seat provided with peripherally spaced entrance and exit openings, said valve also having a pair of substantially straight and narrow article receiving and discharge recesses disposed chordally of said valve on opposite sides of the valve axis, said recesses respectively opening at one end thereof into the valve periphery on opposite sides of the valve, means for intermittently rotating said valve to alternately dispose said valve recesses in horizontal alignment with said valve seat entrance and exit openings, means for successively introducing articles in a horizontal direction through said entrance opening into the horizontally aligned valve recess, a rotatable member mounted on a vertical axis within said chamber for movement through said valve recess when the latter is disposed in registry with said exit opening and while said valve is momentarily stationary, and means for rotating said member in time with the intermittent rotation of said valve, whereby successive articles introduced alternately into said valve recesses are inverted by said valve and positioned for engagement by said rotatable member to discharge said article from said valve recess through the aligned valve seat exit opening and thence into said chamber.

3. A transfer device for introducing can ends into a pressurized can treating chamber, comprising an entrance opening in a wall of said chamber, a cylindrical valve rotatably mounted on a horizontal axis within said chamber adjacent said opening, said valve having a housing including a cylindrical valve seat provided with peripherally spaced entrance and exit openings, said valve also having a pair of substantially

straight and narrow can end receiving and discharge recesses disposed chordally of said valve and in parallel relation on opposite sides of the valve axis, said recesses respectively opening at one end thereof into opposed sides of the valve, means for intermittently rotating said valve through successive partial revolutions of substantially 180° to alternately dispose said valve recesses in horizontal alignment in registry with said exit and entrance openings respectively, feeding means for successively introducing can ends in a horizontal direction through said entrance opening into the successively horizontally aligned valve recesses, a discharge finger rotatably mounted on a vertical axis within said chamber for movement through said valve recesses when the latter are alternately disposed in registry with said exit opening and while said valve is momentarily stationary, and means for rotating said finger in synchronism with said valve rotation, whereby successive can ends introduced alternately into said valve recesses are inverted by said valve and positioned for engagement by said rotatable finger moving through said valve recess to discharge said can end therefrom and thence through the valve seat exit opening into said pressurized chamber.

4. Mechanism for introducing can covers into a can treating chamber for application to cans being treated therein, comprising a cover entrance opening in a wall of said chamber, a cylindrical valve mounted for intermittent rotation on a horizontal axis within said chamber adjacent said opening, said valve having a housing including a cylindrical valve seat provided with peripherally spaced entrance and exit openings, said valve also having a pair of substantially parallel cover receiving and discharge recesses disposed chordally of said valve and on opposite sides of the valve axis, said valve recesses each opening at one end thereof into the valve periphery on opposite sides of said axis, means for intermittently rotating said valve through successive partial revolutions of 180° to alternately dispose said valve recesses in horizontal alignment with said exit and entrance openings, means for successively introducing can covers in horizontal position through said entrance opening into an aligned valve recess disposed above said horizontal axis, a cover engaging finger rotatably mounted on a vertical axis within said chamber for movement through a said valve recess disposed in registry with said exit opening below said horizontal axis when said valve is stationary, and means for rotating said finger in synchronism with the rotation of said valve, whereby successive can covers introduced alternately into said valve recesses are inverted by said partial valve rotation and positioned for engagement by said finger moving through a positioned valve recess to discharge said cover therefrom through the aligned valve seat exit opening for application of said cover to a can being treated in said chamber.

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