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CAN CLOSING MACHINE

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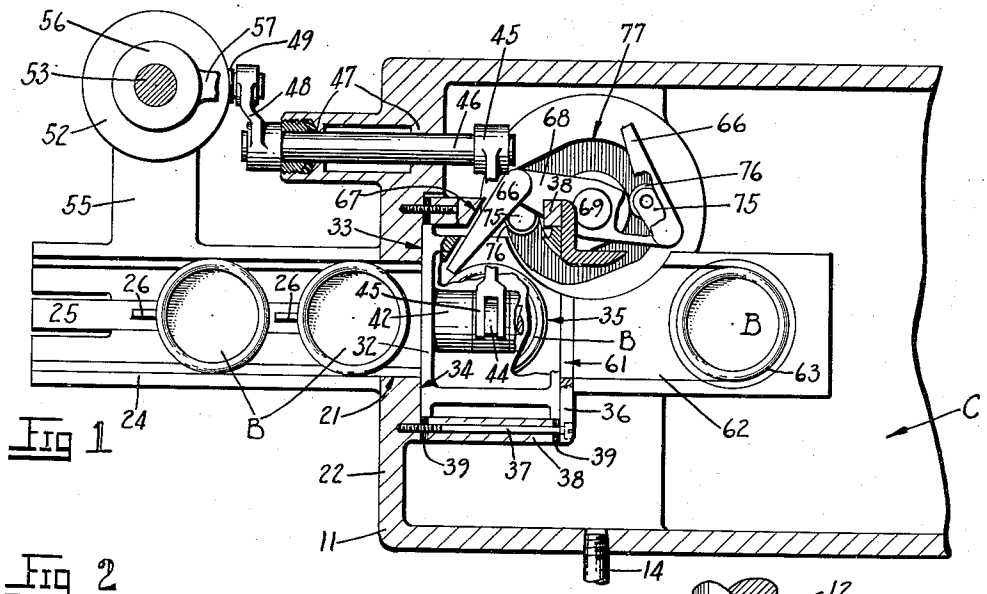
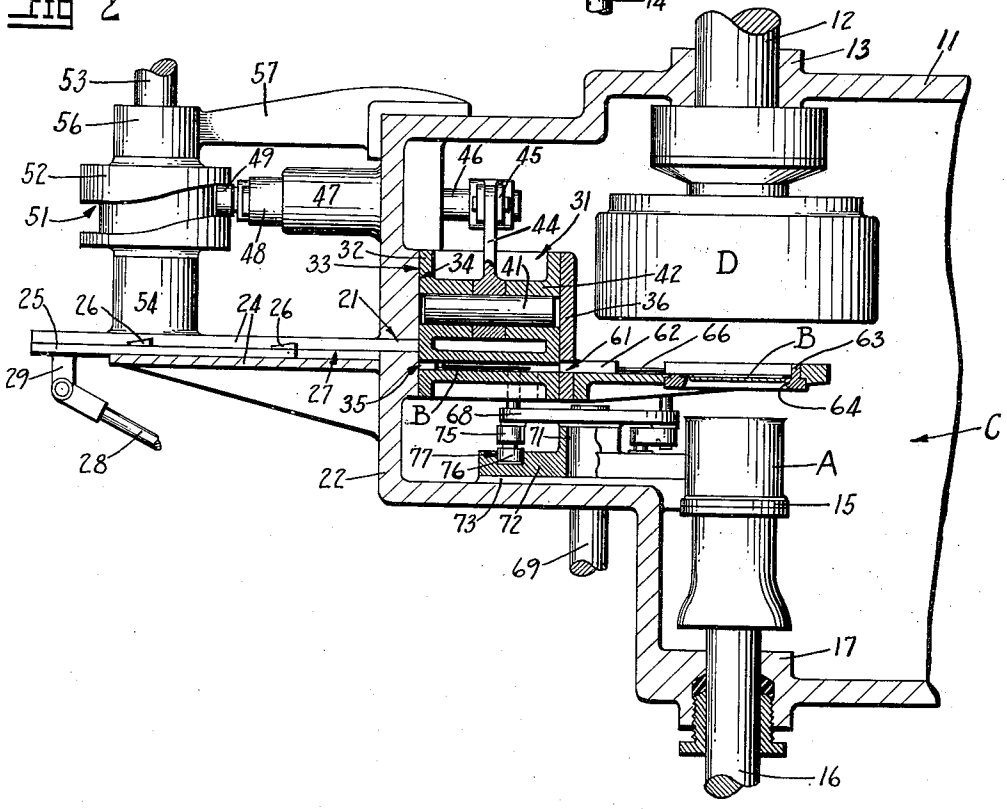


Fig 1

Fig 2



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CAN CLOSING MACHINE

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7 Claims. (Cl. 113—114)

The present invention relates to a can closing or can sealing machine and has particular reference to feeding can covers into a vacuumized chamber in a manner which minimizes loss of vacuum maintained within the chamber.

An object of the invention is the provision, in a machine for sealing cans under a vacuum, of transfer devices for passing individual can covers from an outside source of supply into a vacuumized chamber with a minimum loss of vacuum.

Another object is the provision of such transfer devices which are simple in construction, economical of space and more efficient in operation while at the same time are possessed of maximum strength so that high vacuum conditions within the chamber may be maintained.

Another object is the provision of a transfer device of this character wherein a piston type valve receives the can covers and carries them into the vacuum chamber without at any time opening direct communication between the vacuum chamber and the outside atmosphere.

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 drawing, discloses a preferred embodiment thereof.

Referring to the drawing:

Figure 1 is a composite top plan and horizontal section of a can closing machine embodying the instant invention, parts being broken away; and

Fig. 2 is a vertical longitudinal section of the machine shown in Fig. 1, with parts broken away.

As a preferred embodiment of the invention the drawing illustrates the principal parts of a vacuum can closing machine of the character disclosed in United States Patent 1,429,231 issued September 19, 1922, to P. W. Fleischer on Can closing machine. In such a machine filled cans A and covers B for the cans are brought together in a vacuumized chamber C and are united preferably by an interfolding of flange parts on the can and its cover. This uniting or sealing operation is preferably accomplished by a seaming head D which is disposed in the vacuum chamber.

A housing 11 encloses the vacuum chamber C and provides a support for various parts of the machine associated therewith, including the seaming head D which is carried on a vertical spindle 12 journaled in a bearing 13 formed in the top of the housing. The seaming head is rotated in any suitable manner in time with the other moving parts of the machine. The chamber is preferably vacuumized by way of a pipe line 14 which is threaded in a wall of the housing and which leads to any suitable source of vacuum such as a supply tank or vacuum pump.

Within the housing 11 and directly below the seaming head and in vertical alignment therewith, is provided a lifter pad 15 which is formed on the upper end of a vertically disposed rod 16 carried in a bearing 17 formed in the bottom of the housing. The rod is vertically reciprocated in any suitable manner in time with the other moving parts of the machine.

A filled can A to be supplied with a cover B and to be sealed by the seaming head D, is introduced into the vacuum chamber C through an opening in the side of the housing 11 in any suitable manner such as that disclosed in the hereinbefore mentioned patent. A can entering the chamber is placed on the lifter pad ready to be raised vertically into the seaming head. While in such a position on the lifter pad, a can cover B is fed into position over the placed can in vertical alignment therewith.

The covers B are individually introduced into the vacuum chamber C through a narrow slot opening or port 21 provided in a side wall 22 of the housing 11. These covers are fed from any suitable source of supply located outside the housing, such as a magazine or the like, in a continuous procession along a preferably horizontal runway 24 which is aligned with the cover entrance opening. A feed bar 25, having spaced feed dogs 26, advances the covers in a step-by-step movement along the runway. This feed bar is disposed in a slot 27 formed in the bottom of the runway and is reciprocated by a link 28 secured to a lug 29 formed on the outer end of the bar. The link in turn is actuated in any suitable manner in time with the other moving parts of the machine.

Loss of vacuum from the chamber C by way of the cover entrance opening 21, when covers are introduced into the chamber, is minimized by a cover transfer device 31 which is located adjacent the cover opening. This transfer device includes a vertically movable piston element 32 of preferably rectangular cross-section and having a flat face 33 which slides on a flat seat 34 surrounding the cover entrance opening 21. The seat is preferably formed on the inner surface of the side wall 22 of the housing 11. A narrow horizontal slot or pocket 35 is provided in the piston for the reception of the cover B.

The piston element 32 is held in place against its seat 34 by a flat retaining or end plate 36 which engages against the opposite or inner face of the piston. The plate is secured to the housing wall 22 by long bolts 37 which extend through spacer side plates 38 which also serve as guides for the piston. Laminated washers 39 on the bolts 37 are interposed between the seat 34 and the edge of the side plate 38 and between the side plate and the end plate 36 so that wearing of the piston slide surfaces may be compensated for and proper sliding fit of the piston may be had at all times. Such a construction prevents vacuum leaks around the piston.

The piston element 32 is reciprocated on its seat 34 in time with the other moving parts of the machine. For this purpose the piston carries a wrist pin 41 mounted in bearings 42 formed in the piston. A vertical connecting rod 44 is mounted on the wrist pin.

The upper end of the connecting rod 44 is attached to an arm 45 which is mounted on the inner end of a horizontal rock shaft 46 carried in bearings 47 formed in the housing side wall 22. The shaft extends outside the housing 11 and carries on its outer end a cam arm 48 having a cam roller 49 which operates in a cam groove 51 of a barrel cam 52.

The cam 52 is keyed to a vertically disposed cam shaft 53 journaled in a lower bearing 54 formed in a bracket extension 55 of the cover feed slide horizontal runway 24 and in an upper bearing 56 of a bracket 57 bolted to the housing 11. The cam shaft is rotated in any suitable manner in time with the other moving parts of the machine.

Hence the piston element 32 is moved into an elevated position and then into a depressed or lowered position as the rotating cam 52 rocks the shaft 46 and the arm 45 carried thereon. When the piston element is in its uppermost or elevated position its cover pocket 35 is in register or alignment with the cover entrance opening 21 in the housing 11. The inner end of the pocket is blocked off by the piston retaining end plate 36 so that the pocket is in no way in communication with the interior of the vacuum chamber. Therefore the vacuum within the chamber is maintained.

While the piston element is momentarily in this position the feed bar 25 pushes a can cover B through the cover entrance port 21 and deposits the cover in the pocket 35 of the piston element. The pocket is preferably just big enough to receive the cover so that only a minimum of air space will remain around the pocketed cover.

When the piston pocket has received its cover the cam 52 operates to lower the piston element into its depressed position. This action lowers the pocket to a level below the cover entrance port 21 and moves the flat face 33 of the piston across the cover entrance port so that is blocked off against the entrance of air therethrough (Fig. 2)

In this lowermost position (Fig. 1) the cover pocket 35 is in register with an exit port 61 provided in the piston retaining end plate 36. This port leads into the vacuum chamber C. Thus what little air is in the pocket with the cover is admitted into the chamber but this quantity is so small that it is readily dissipated in the chamber without impairing the vacuum maintained therein.

While the piston 32 is in the lowermost position the cover B is swept out of its pocket, through the exit port 61 and along a runway 62 which is secured to the end plate 36. At the end of the runway the moving cover passes into a centering ring 63 which is located over the can A on the lifter pad 15. The centering ring is provided with an annular ledge 64 which holds the cover concentric with the can.

Sweeping of the cover B out of the piston pocket 35 is preferably effected by cam operated fingers 66 moved into and through an opening 67 formed in the adjacent piston pocket 35 when the piston is in its lowermost position. There are two of these fingers 66 spaced 180 degrees apart and mounted on the outer ends of a cross arm 68 (Fig. 1) carried on the upper end of a vertical drive shaft 69.

The drive shaft 69 is journaled in a bearing 71 (Fig. 2) of a stationary face cam 72 bolted to a boss 73 formed on the inside surface of the bottom wall of the vacuum chamber housing 11. This drive shaft is rotated in any suitable manner in time with the other moving parts of the machine.

The fingers 66 are movable in the ends of the cross arm 68 and are secured to cam arms 75 which carry cam rollers 76 traversing and operating in a cam groove 77 of the face cam 72. Hence as the drive shaft 69 rotates and carries the cross arm 68 and its cam arms 75 around the cam groove 77, one of the cam arms swings one of the fingers 66 into position to sweep the cover B out of its piston pocket 35 and into the centering ring 63. The cross arm makes one half revolution for each stroke of the piston so that every time the piston reaches its lowermost position one of the fingers 66 is in position to sweep a cover out of the piston pocket. This construction provides alternate action of the fingers insuring rapid and efficient operation of the machine.

Such placing of a cover B into the centering ring 63 completes its introduction into the vacuum chamber C incidental to the seaming operation. The cover being in place over the can A, the latter now moves up with the lifter pad 15 through the centering ring, lifting the cover into the seaming head D where cover and can are united in a suitable end seam. After the seaming operation the united cover is smaller in outside diameter than before and accordingly when the closed can moves down with the lifter pad it readily passes through the centering ring to the original lowermost position of the lifter pad. This completes the sealing of the can and the latter is thereupon discharged from the vacuum chamber in any suitable manner.

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 machine for sealing cans with can covers, the combination of a housing enclosing a vacuum chamber and having a wall provided with a can cover entrance port, a wall inside said chamber and spaced relative to said housing port wall and having a cover discharge port therein disposed in longitudinal alignment with and spaced vertically out of register with said en-

trance port, a reciprocable slide valve interposed between said housing port wall and said inside wall and having a pocket open at its opposite ends adapted to retain a can cover, and means for bodily moving said slide valve vertically first in one direction into a position which registers said pocket with said entrance port for receiving a cover therethrough from an outside source of supply while blocking off said inner discharge port against the entrance of atmospheric air into said chamber, and then in the opposite direction to register said pocket with said inner discharge port for delivery of said pocketed cover therethrough and into said chamber while blocking off said entrance port against the entrance of atmospheric air into said chamber, and means for sweeping said cover from said valve pocket out through said inner discharge port and into said vacuum chamber.

2. In a machine for sealing cans with can covers, the combination of a vacuum chamber, a slide valve unit located adjacent said chamber and having a can cover pocket, feeding devices for introducing a can cover into said slide pocket through an entrance port when said valve is in one position, means for moving said slide valve into another position to align the can cover in its pocket with a discharge port, neither position of said slide valve breaking the vacuum in said chamber, means for sweeping said cover from said slide pocket out through said discharge port and into said vacuum chamber, devices for receiving the cover introduced into said vacuum chamber and for centralizing it in superimposed position relative to a can introduced into said chamber for sealing, a can sealing head disposed within said chamber in vertical alignment with said cover centralizing devices, and a lifter pad also within said chamber for supporting said can and for raising the can vertically to receive said cover and to position the can and its cover into said sealing head for sealing.

3. In a machine for sealing cans with can covers, the combination of a housing enclosing a vacuum chamber and having a wall provided with a can cover entrance port, a wall inside said chamber and spaced relative to said housing port wall and having a cover discharge port therein located out of register with said entrance port, a vertically movable piston slidably interposed between said housing port wall and said inside wall and having a pocket adapted to retain a can cover, means for reciprocating said piston first into a position which registers its pocket with said entrance port for receiving a cover therethrough from an outside source of supply while blocking off said inner discharge port against the entrance of atmospheric air into said chamber, said piston reciprocating means moving said piston secondly into a position which registers its pocket with said inner discharge port for delivery of said cover therethrough and into said chamber while blocking off said entrance port against the entrance of atmospheric air into said chamber, and a pair of cam actuated fingers operating in time with the reciprocation of said piston and adapted to alternately sweep through said piston pocket and said discharge port when they are in register for moving said cover into said chamber.

4. In a machine for sealing cans with can covers, the combination of a housing enclosing a vacuum chamber and having a wall provided with a cover entrance port, a retaining wall spaced inwardly of said chamber relative to said housing wall and having a cover exit port spaced vertically out of register with said housing port, a reciprocable slide valve interposed between said walls and having a pocket open at its opposite ends adapted to hold a can cover, and means for bodily reciprocating said valve vertically in opposite directions to respectively register said valve pocket at each limit of movement with said cover entrance and exit ports, said pocket in one position being adapted to receive therein a can cover by way of said entrance port and in the other position in the opposite direction permitting delivery of said can cover therefrom through said cover exit port into said vacuum chamber, a said port not in register with said valve pocket being blocked off by said valve against admittance of air into said chamber.

5. In a machine for sealing cans with can covers, the combination of a housing enclosing a vacuum chamber and having a wall provided with a can cover entrance port, a wall inside said chamber and spaced relative to said housing port wall and having a cover discharge port therein spaced vertically out of register with said entrance port, a reciprocable slide valve interposed between said ports and having a pocket open at its opposite ends adapted to receive a can cover delivered through said entrance port, and means for reciprocating said slide valve vertically first into a position which registers said pocket with said entrance port for receiving a cover therethrough from an outside source of supply while blocking off said inner discharge port, and then into another position in the opposite direction to register said pocket with said cover discharge port for delivery of said cover therethrough into said vacuum chamber while blocking off said entrance port, whereby to minimize the loss of vacuum from said chamber during the introduction of a can cover thereinto.

6. In a machine for sealing cans with can covers, the combination of a housing enclosing a vacuum chamber including spaced inner and outer valve receiving walls, a reciprocable valve unit disposed within said chamber between said walls and having a can cover receiving pocket open at its opposite ends, said pocket being adapted alternately to register with vertically spaced cover entrance and discharge ports disposed respectively in said outer and inner chamber walls, feeding devices for introducing a can cover into said valve pocket through said cover entrance port, means for bodily moving said slide valve in a vertical direction to align its pocket and contained cover with said cover discharge port while preserving the vacuum in said chamber by blocking off said cover entrance port, means for sweeping said cover from said valve unit pocket through said cover discharge port and into said vacuum chamber, and devices disposed within said vacuum chamber for receiving the cover introduced thereinto for centralizing the cover in superimposed position relative to a can introduced into said chamber for sealing.

7. In a machine for sealing cans with can covers, the combination of a housing enclosing a vacuum chamber including spaced inner and outer valve receiving walls, a reciprocable slide valve unit disposed in a seat within said chamber between said walls and including a can cover pocket open at its opposite ends, means for retaining said slide valve against its seat, means for adjusting the sliding fit between said valve and its seat to compensate for wear in said valve and in said seat to prevent leakage of air there-

between, vertically spaced can cover entrance and discharge ports communicating with said vacuum chamber and disposed respectively in said outer and inner chamber walls, said ports being respectively adapted to be registered with said valve unit pocket in different positions of the latter, feeding devices for introducing a can cover into said valve pocket through said entrance port when said valve is in one position, means for delivering said can cover from said valve pocket into said vacuum chamber through said discharge port when said valve is in another position, and means for reciprocating said valve unit in opposite directions into said positions to successively and alternately register said can cover pocket with said cover entrance and discharge ports for the purpose specified.

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