Sept. 2, 1924. 1,507,166

R. M. GARRETT

PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

Filed March 15, 1922 8 Sheets-Sheet 1

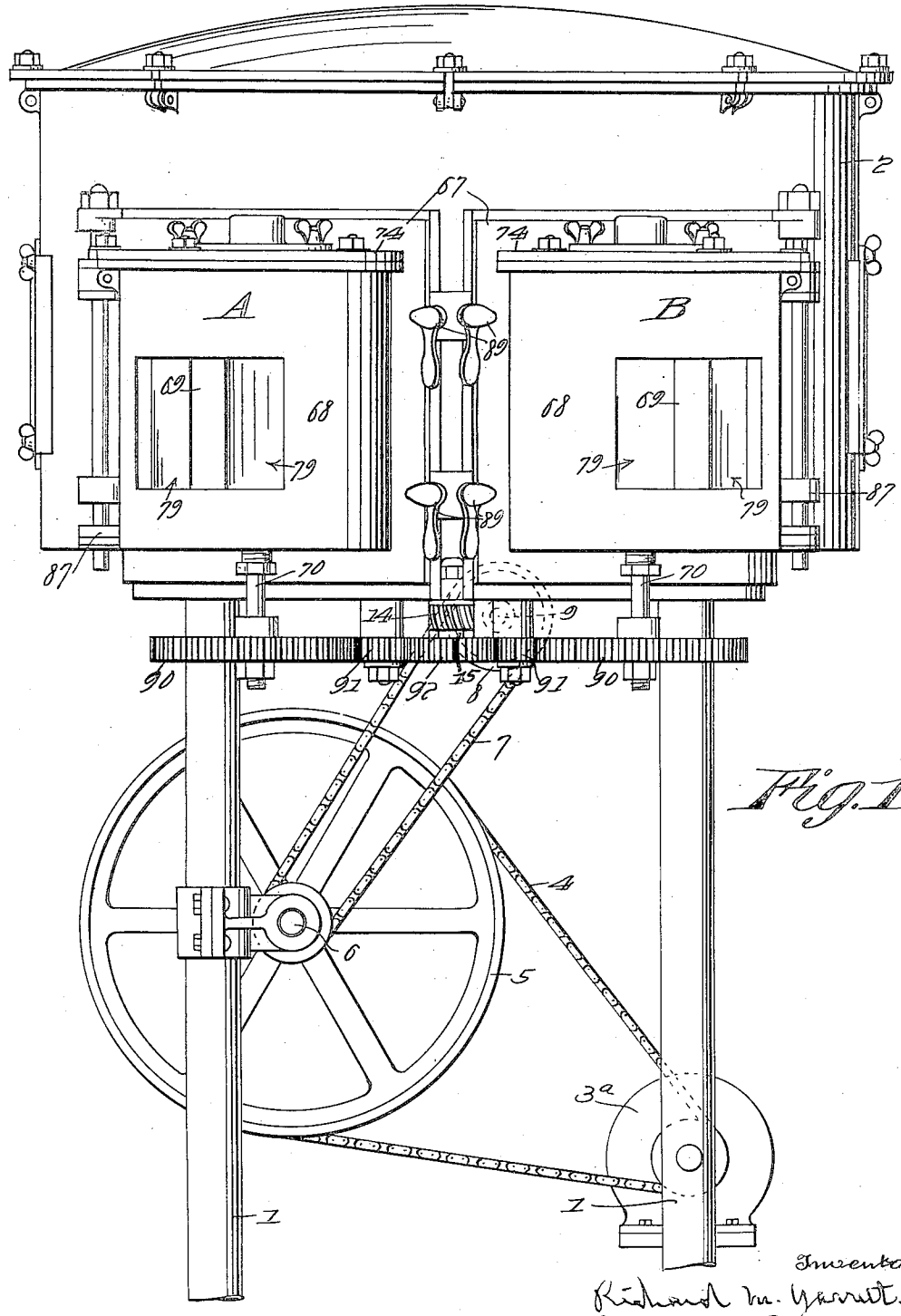


Fig. 1

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Sept. 2, 1924. 1,507,166

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PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

Filed March 15, 1923 8 Sheets-Sheet 2

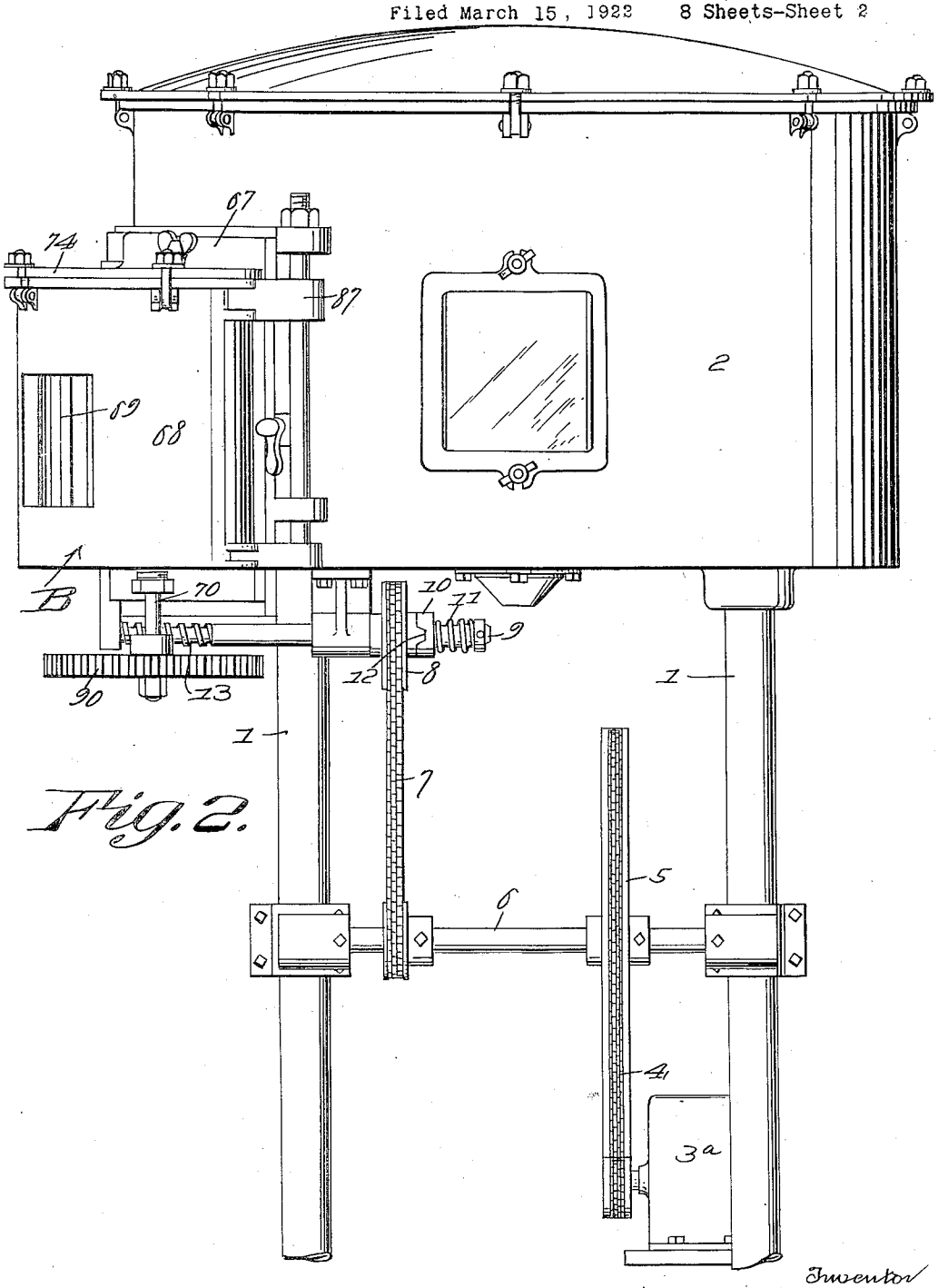


Fig. 2.

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PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

Filed March 15, 1922 8 Sheets-Sheet 3

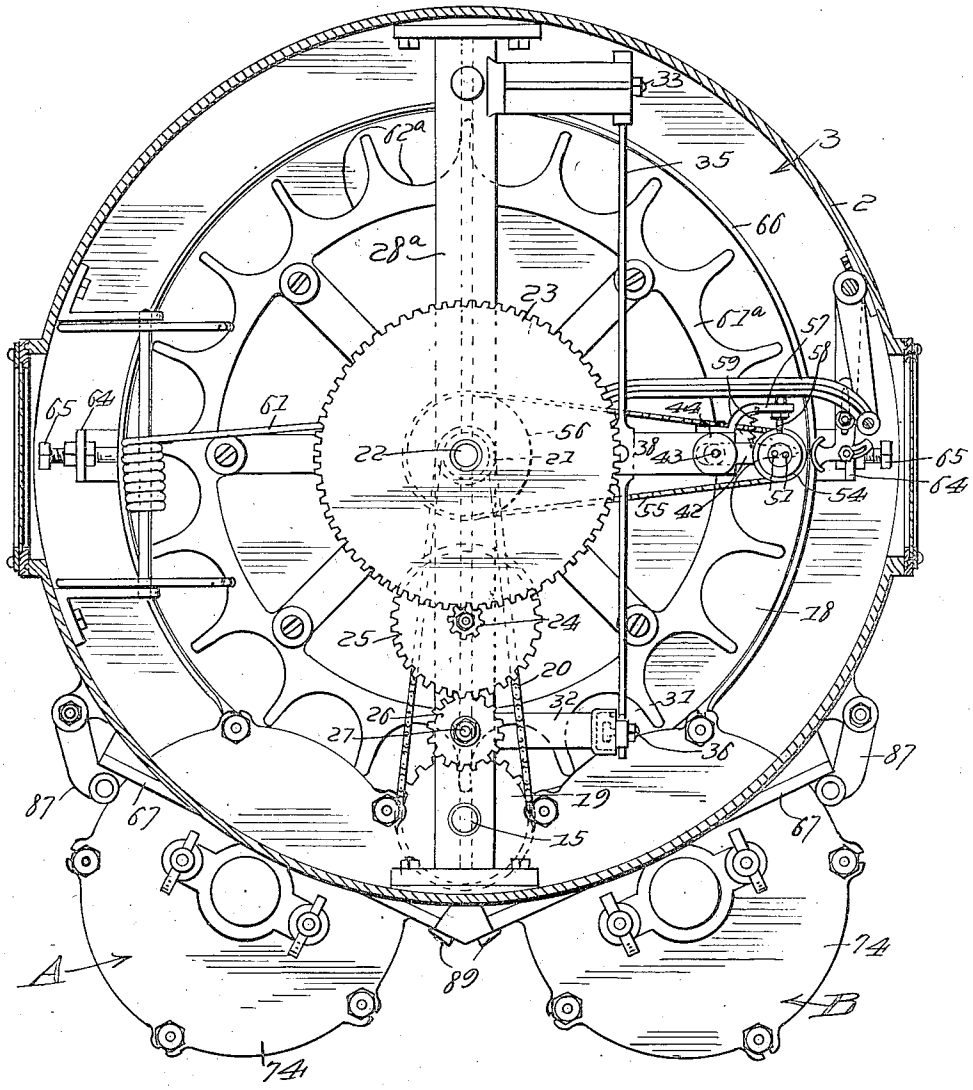


Fig. 3.

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PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

Filed March 15, 1922 8 Sheets-Sheet 4

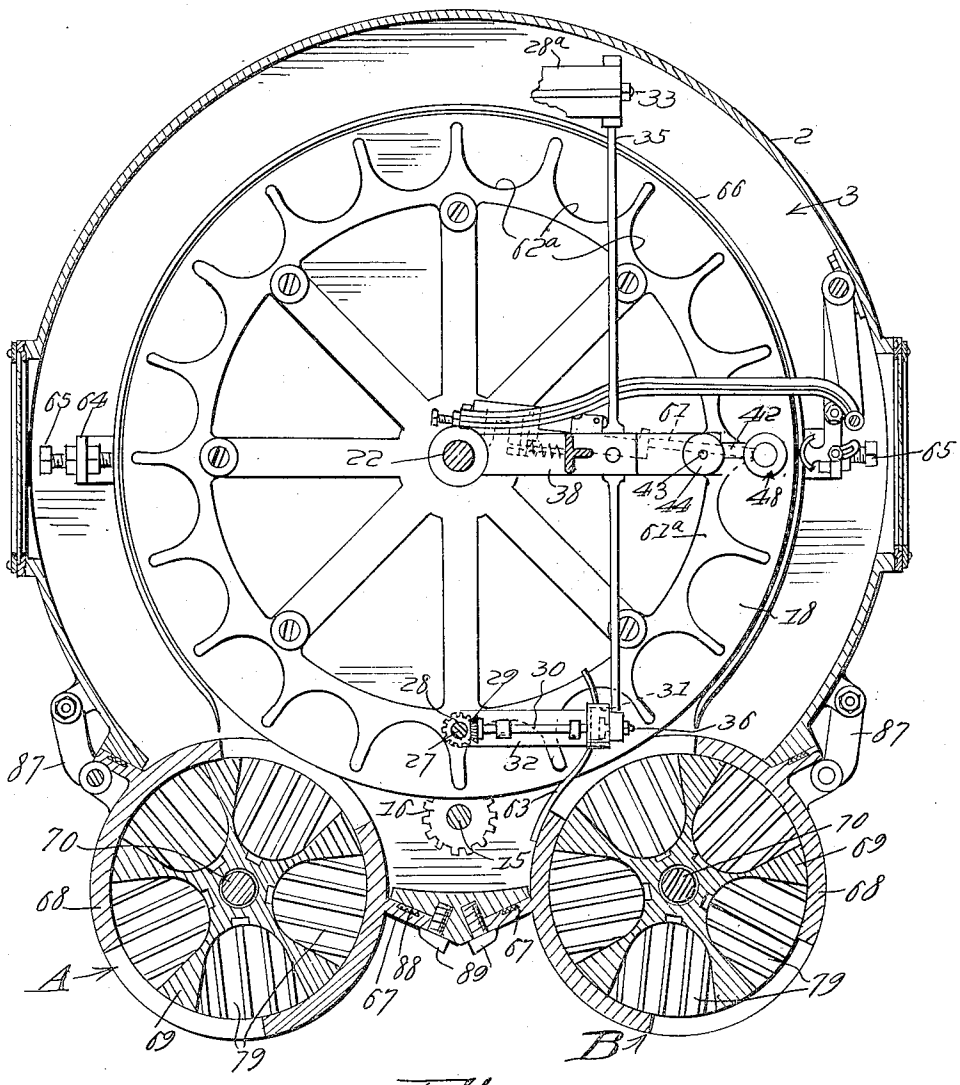


Fig. 4.

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PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

Filed March 15, 1922 8 Sheets-Sheet 5

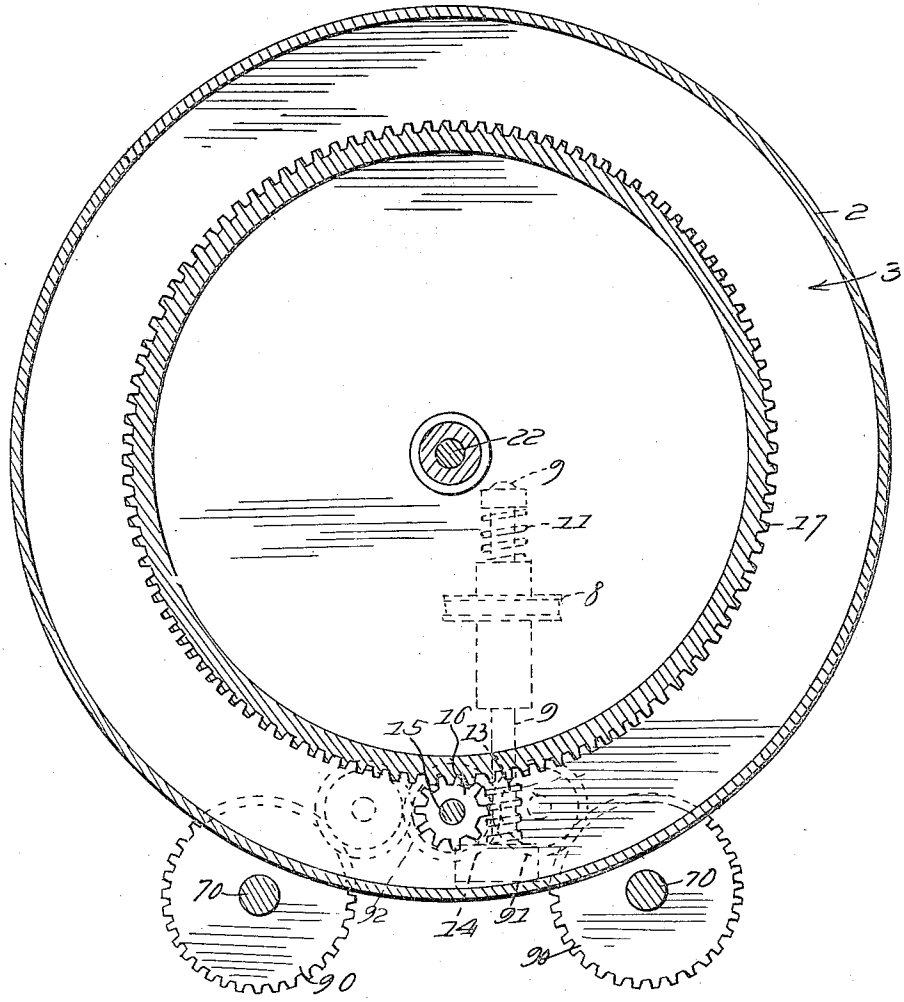


Fig. 5.

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PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

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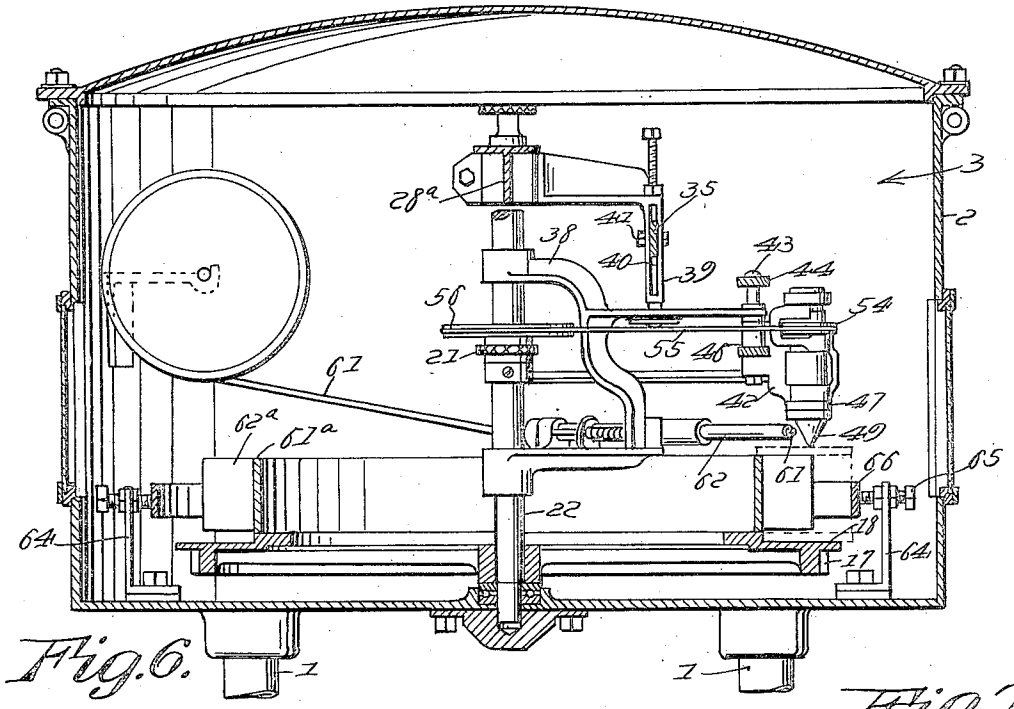


Fig. 6.

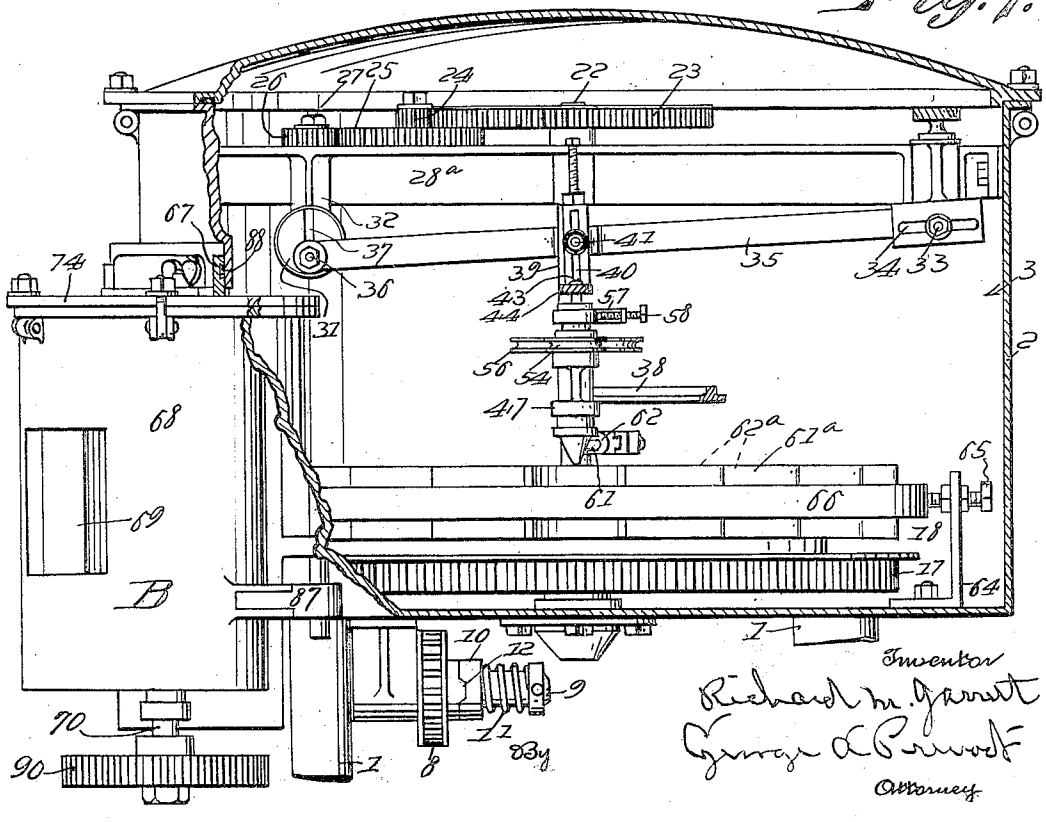


Fig. 7.

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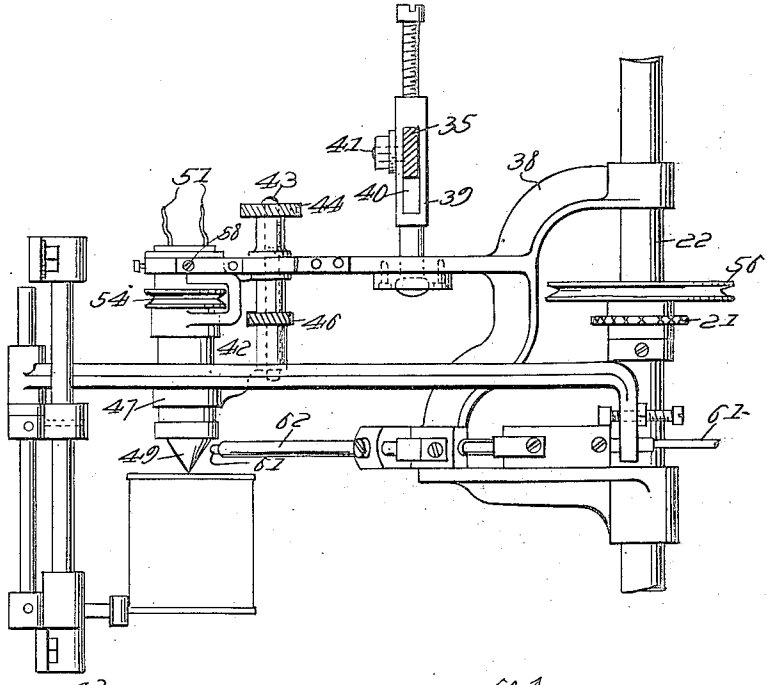
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R. M. GARRETT

PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

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Fig. 8.



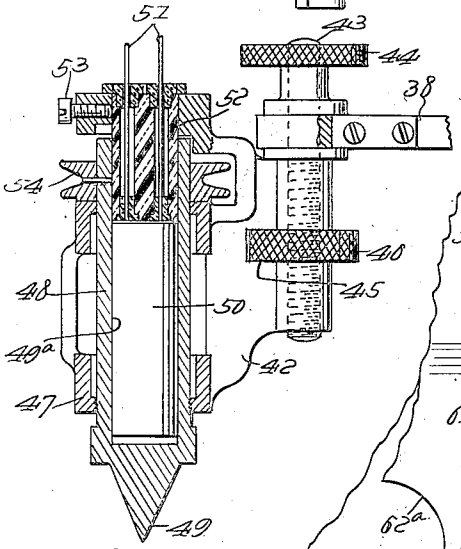


Fig. 10.

Fig. 9.

Fig. 11.

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PROCESS AND APPARATUS FOR SEALING UNDER VACUUM

Filed March 15, 1922 8 Sheets-Sheet 8

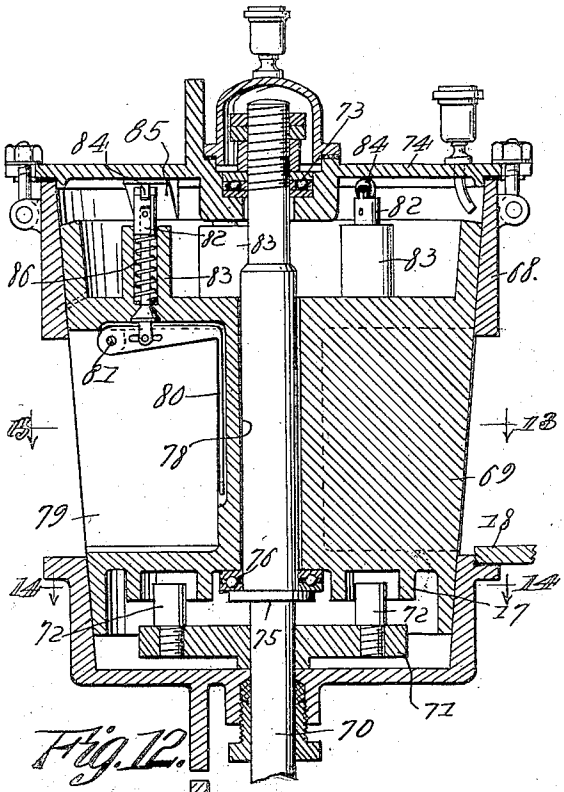


Fig. 12.

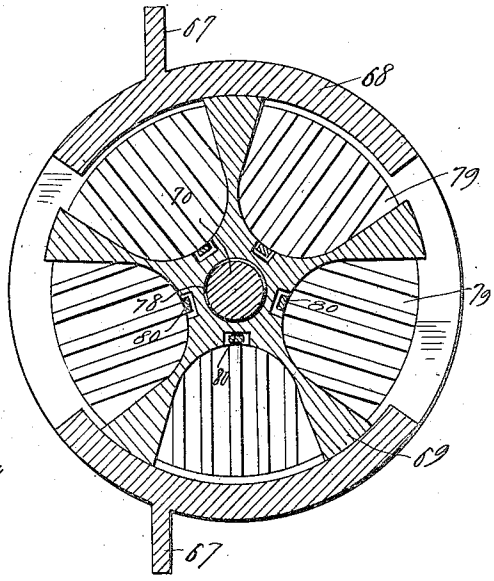


Fig. 13.

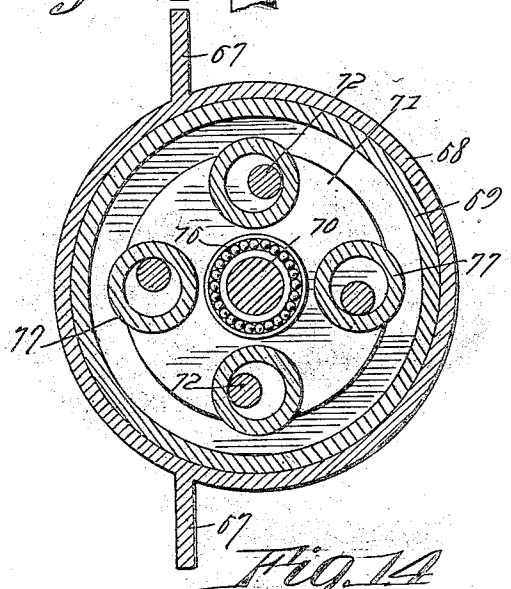


Fig. 14.

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UNITED STATES PATENT OFFICE.

RICHARD M. GARRETT, OF NEW YORK, N. Y., ASSIGNOR TO NESTLE'S FOOD COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

PROCESS AND APPARATUS FOR SEALING UNDER VACUUM.

Application filed March 15, 1922. Serial No. 543,967.

To all whom it may concern:

Be it known that I, RICHARD M. GARRETT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Process and Apparatus for Sealing under Vacuum; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a process and apparatus for tipping or applying solder to receptacles such as cans, and the primary object of the invention is to provide a process and apparatus for tipping cans with solder automatically while under vacuum, and the apparatus includes means for continuously feeding cans through a vacuum chamber, and means for automatically applying the solder to the cans while the cans are passing through the chamber.

Another object of the invention is to furnish a vacuum chamber having inlet and outlet valves adapted to admit receptacles to and discharge receptacles from the chamber substantially without permitting air to enter said chamber.

Another object of the invention is to provide an improved valve which may be readily adjusted to take up wear and the like.

A still further object is to furnish a valve of the above character with means for discharging receptacles therefrom, so that the inlet valve will deposit the receptacles within the vacuum chamber, while the outlet valve will discharge receptacles onto a suitable conveyer.

Another and an important object of the invention is to provide a soldering tool with means for moving its point in a vertical elliptical path while the tool is oscillating in an arc concentric with the path of movement of the cans through the vacuum chamber.

Various other mechanism is shown in the accompanying drawings for the purpose of disclosing the present invention, but it is obvious that details may be varied without departing from the spirit of the invention.

With the foregoing objects outlined and with other objects in view which will appear as the description proceeds, the invention consists in the novel process and features hereinafter described in connection with the drawings and more particularly pointed out in the appended claims.

Referring to the drawings:—

Figure 1 is a front view of the apparatus employed in the new process.

Fig. 2 is a side view of the same.

Fig. 3 is a horizontal sectional view.

Fig. 4 is a similar sectional view taken through a lower plane.

Fig. 5 is a horizontal sectional view taken through the lower portion of the apparatus.

Fig. 6 is a transverse vertical sectional view of the main portion of the apparatus.

Fig. 7 is a longitudinal vertical sectional view of the same.

Fig. 8 is an enlarged view of the mechanism for applying solder to the cans.

Fig. 9 is a top plan view of a portion of the same.

Fig. 10 is an enlarged vertical sectional view of the soldering tool and a side view of the means for vertically adjusting the same.

Fig. 11 is a top plan view of the structure shown in Fig. 10.

Fig. 12 is a vertical sectional view of the discharge or outlet valve of the apparatus. The inlet valve is similar with the exception that the parts are arranged to force the cans into the apparatus instead of out of the same.

Fig. 13 is a horizontal sectional view taken on line 13—13 of Fig. 12.

Fig. 14 is a similar view taken on line 14—14 of Fig. 12.

In the drawings, 1 designates suitable supporting legs which carry the casing 2 of the vacuum chamber 3. The vacuum chamber may be of any suitable construction as it forms no part of the present invention.

As shown in Figures 1 and 2, the mechanism is driven by a prime mover 3^a which through the chain 4 and wheel 5 drives a shaft 6. A chain 7 actuated by the shaft 6 drives a sprocket wheel 8 loosely mounted on a shaft 9. The shaft 9 has a clutch collar 10 yieldingly held in position by means of a spring 11 and provided with recesses to receive teeth 12 on the hub of the sprocket wheel 8. By this construction the wheel 8 will normally drive the shaft 9 but if there is any binding of the mechanism between the

shaft 9 and the parts driven by the same, the teeth 12 will slip out of their recesses in the collar 10 and permit the wheel 8 to revolve independently of the shaft 9.

A worm 13 arranged at one end of the shaft 9, as shown in Figure 5, drives a worm wheel 14 fixed at the lower end of a shaft 15 which projects into the casing 2, and is provided with a fixed gear 16 that operates a large gear 17 mounted on the underside of a turn table 18 designed to carry the receptacles through the casing 2.

As best shown in Figure 3, the shaft 15 has a fixed sprocket wheel 19 driving a chain 20, that imparts movement to a sprocket wheel 21 mounted on the center shaft 22 within the casing 2. By this mechanism the internal mechanism of the apparatus may be driven, and for this purpose the upper end of the shaft 22, as shown in Figure 7, is provided with a fixed gear 23, that through gears 24, 25 and 26 drives a short vertical shaft 27 carried by a cross-bar 28^a arranged within the casing. The shaft 27 as shown in Figure 4 carries a fixed gear 28 driving a pinion 29 mounted on the short shaft 30, which terminates in a slotted driving disk 31. The shaft 30 is mounted in suitable bearings carried by the foot extension 32 of the supporting bar 28^a.

As shown in Figure 7, the supporting bar 28^a carries at one end a vertically adjustable member having a longitudinally extending slot 34 which is engaged by a pin 33 provided at one end of a lever 35, the other end of said lever pivotally engaging a pin 36 that is slidably mounted in the slot 37 of the disk 31.

The lever 35 supports a bracket 38 that is vertically slidable on the shaft 22, and this bracket carries the soldering tool and the solder feeding mechanism. The soldering tool and so much of the solder feeding mechanism as is necessary to an understanding of the invention, will be hereinafter described.

As shown in Figures 6 and 7, the bracket 38 carries a vertical post 39 having a cross-shaped slot 40 through which the lever 35 extends. The lever turns on a horizontal pin 41 which extends through the lever and through the slot 40. By this construction, the rotation of the disk 31 will cause a circular motion of the pin 36 and the pin 36 will impart a rocking motion to the lever 35. As the disk 31 turns, the pin 33 will slide in the slot 34 and consequently an elliptical motion in a vertical direction will be imparted to the pin 41, and as this pin supports the soldering tool, the soldering tool will partake of a similar motion.

The bracket 38, as best shown in Figures 8, 10 and 11, carries an arm 42 that is pivotally mounted on an adjusting screw 43. The screw is provided at its upper end with a milled nut 44 which rests on the bracket 38 and supports the arm 42. The arm 42 is bifurcated as shown at 45 and a nut 46 is arranged between the furcations for the purpose of adjusting the arm 42 vertically. The nut 44 functions as a steadying means for holding the pivoted arm 42 in its adjusted positions.

The arm 42 carries a bearing 47 in which is rotatably mounted the soldering tool 48 having a coppered tip 49. The tool is electrically heated and for this purpose it is provided with an interior chamber 49^a containing a stationary heating device 50, the lead wires 51 of which extend through an insulated sleeve 52 that is fixed at the upper end of the arm 42 by a suitable fastening means such as a screw 53. The lead wires 51 function to conduct electric current from the exterior of the apparatus to the heating device 50, and as the tool 48 revolves it will be heated by said device. For the purpose of rotating the tool, a pulley 54 is fixed to said tool and is driven, as best shown in Figure 6, by means of a belt 55 receiving motion from a pulley 56 fixed to the shaft 22. Through this mechanism, the tool is heated and revolved, and as the lever 35 moves the bracket 38 vertically, the tool will be raised and lowered at the proper time to engage cans passing through the apparatus.

As best shown in Figure 11, the bracket 38 has an extension arm 57 supporting an adjusting device such as a screw 58 against which the pivoted arm 42 is drawn by means of a spring 59. As shown in said figure, the cans moving through the machine, have a tendency to move the soldering tool in the direction of the arrow 60 when the tool is in engagement with a can, and by reason of the spring 59, the soldering tool is brought back to its original position after it disengages the can. This is an important feature of the invention as it permits the soldering tool to cooperate with the can without any rubbing action between the tool and can.

The means for feeding the solder to the tool may be of any suitable construction, and in the drawings, I have illustrated a conventional type of this mechanism. For the purpose of this description, it may be stated that the solder rod is shown at 61 and is fed through a tube 62.

The cans enter the casing through an inlet valve A and are discharged through an outlet valve B. The entrance valve, which will be hereinafter described in detail, discharges the cans onto the turn table 18 which carries a ring 61^a provided with a series of vertically arranged peripheral pockets 62^a, each of a shape suitable to receive a single can. As the turn table revolves, it will move the cans from the entrance valve to the

soldering tool and then from the soldering tool to the discharge valve B. Any suitable means, such as a finger 63 may be provided for the purpose of guiding the cans from the turn table 18 into the pockets of the valve B.

Any suitable means may also be used for retaining the cans in the pockets while the turn table is revolving, and for this purpose I have shown vertical posts 64 extending upwardly from the floor of the casing and provided with adjusting screws 65 which support the U-shaped confining or boundary member 66.

The turn table rotates in a clockwise direction and the soldering tool 48, as shown in Figure 4, is so arranged that the table completes substantially three-quarters of a revolution before the solder is applied, and as a vacuum is maintained within the casing 2 by any suitable means, it will be understood that the interior of each can will be subjected to this vacuum by reason of the hole left in the top of the can.

The construction of the valves is best shown in Figures 12 to 14 inclusive, and it will be seen that each valve is formed as a portion of a door 67. The valve casing 68 is open at opposite sides and its interior surface is of truncated cone-shape for the purpose of receiving a valve body 69 having an outer surface of similar shape in order to provide a tight fit between the parts and prevent air from entering the casing 2 between the casing 38 and the valve body. Extending through the bottom of the valve casing is a shaft 70 to which is fixed a disk 71 carrying a series of driving pins 72. The shaft 70 is suspended from a bearing 73 at the top of the casing 68 and this bearing is carried by the cover 74 of the casing. The body or rotor 69 is supported on the shaft by a collar 75 which carries a ball bearing 76. The lower portion of the rotor has a series of sockets 77 with which the pins 72 cooperate and provide a flexible driving connection between the shaft and the rotor. It will be noted that the bore 78 of the rotor is of greater diameter than the sleeve of the shaft 70 which surrounds the same. By this construction, the rotor can be adjusted so that it will exactly fit and have a snug engagement with the inner surface of the casing 68. Owing to the space between the bore of the rotor and the shaft 70, the rotor will be permitted to center itself in the casing regardless of whether the shaft is in the exact center or not. It will be observed that the heads of the pins 72 are normally spaced from the upper ends of the sockets 77, so that the rotor may be moved downwardly during adjustment without affecting the flexible driving connection formed by the pins and sockets.

Each pocket 79 of the rotor is provided with a bell-crank-lever 80 pivoted at 81 and connected to a vertical post 82, which extends through a sleeve 83 at the top of the rotor. The upper end of the post 82 terminates in a roller 84, which during the rotation of the rotor, engages a cam 85 fixed on the under surface of the cover 74. A spring 86 is mounted in the sleeve 83 and normally forces the post 82 upwardly so that the bell-crank-lever 80 will normally occupy the position shown in Figure 12 and will not disturb a can deposited in the pocket 79. However, when the roller 84 contacts with the cam 85, the bell-crank-lever will be swung on its pivot 81 and will force a can from its pocket outwardly. It will be understood that the inlet valve will have the cam so arranged that the operation of the bell-crank levers will force the cans from the pockets into the casing 2 and onto the turn table, while the cam of the outlet valve will force the cans outwardly onto a suitable conveyer (not shown).

The door portions 67 of the valves preferably cooperates with door openings in the side of the casing 2 and are hingedly mounted as shown at 87. Packing gaskets 88 are placed between the valves and the casing to prevent air entering through the door openings in said casing, and latches 89 are employed for holding the valve doors in closed position.

The shafts 70 of the valves are provided at their lower ends with fixed gears 90 driven by gears 91, which are actuated by a gear 92 fixed on the shaft 15.

In operation and as best shown in Fig. 4, the cans are placed in the vacuum chamber 3 by being first deposited in the pockets of the inlet valve 80. As the rotor of this valve revolves, the cam 85 will cause the bell cranks 80 to kick the cans from the valve into the pockets 62 of the turn table 18. As each can is provided with a small hole in its top, the vacuum within the casing 2 will create a vacuum within the unfilled portion of the can, and when the can reaches the soldering tool, the lever 35 will force the bracket 38 and the soldering tool downwardly, against the can. As the solder rod 61 is engaged by the soldering tool, it will be understood that a small amount of solder will be deposited on the top of the can at the point where the hole is located. At the same time that the soldering tool is moved downwardly, its point will owing to the elliptical motion of the pivot pin 41, be moved in the direction in which the can travels through the apparatus, so that it will in effect be traveling with the can when it strikes the same. Owing to this elliptical motion, the soldering tool will be gradually brought into contact with the can and will be gradually raised from the same. After the solder has been applied to the

can, the can continues to move in a clockwise direction until it strikes the finger 63 which guides the same into a pocket of the discharge valve, and the rotor of the discharge valve carries the can out of the apparatus.

While I have illustrated an apparatus and described a process for tipping cans with solder, it is obvious that the same process and apparatus with slight modifications, may be employed for sealing containers of various types.

I am aware that it is not new to apply solder to cans while the cans are arranged in the vacuum chamber, but I believe that I am the first one to automatically apply solder to the cans while the cans are continuously passing through a vacuum chamber.

From the foregoing, I believe that the process and construction may be readily understood by those skilled in the art, and I am aware that various changes may be made in the steps of the process and in the details of the apparatus without departing materially from this disclosure.

What I claim and desire to secure by Letters Patent is:

1. The herein described process of sealing vent hole openings in the lids of containers while the latter are under reduced pressure, which consists in continuously moving a container having a vent hole in its lid into, through and out of an evacuated chamber while maintaining the container in upright position and without breaking the vacuum in the chamber, and automatically softening and appplying sealing material to the lid at the point where said vent occurs while the container is in motion and without breaking the reduced pressure in the chamber.

2. A process for sealing vent hole openings in the lids of containers, consisting in successively moving a series of containers having said vent holes, into, through and out of a vacuum chamber while maintaining the containers in upright position, and softening and applying sealing material to the lid of each of said containers at the point where said vent is located, while the container is in motion and passing through the chamber.

3. An apparatus for sealing the vent hole in the lid of a receptacle comprising a vacuum chamber, means for introducing a container in upright position into said chamber without breaking the vacuum in the chamber, continuously moving means for supporting the container and moving the same in upright position through said chamber; means arranged within the chamber for automatically softening and applying sealing material to the receptacle at the point where the vent hole occurs while the receptacle is in motion, and means for discharging the sealed receptacle in upright position from the chamber without breaking the vacuum in the chamber.

4. In a receptacle sealing apparatus, a vacuum chamber, and a valve for admitting or discharging a receptacle to or from said chamber without breaking the vacuum therein, said valve including a casing provided with an inlet and an outlet, a rotor arranged in said casing and provided with a series of radial pockets adapted to receive and transport receptacles, and positively actuated means normally occupying a position outside of the pockets for discharging the receptacles from said pockets.

5. In an apparatus as claimed in claim 4, the inner surface of said casing being tapered and the outer surface of the rotor being correspondingly tapered.

6. An apparatus as claimed in claim 4 in which the inner surface of said casing is of truncated cone shape, and in which the outer surface of the rotor is of similar shape and snugly engages said inner surface, a shaft for driving said rotor, and a flexible driving connection between said shaft and said rotor.

7. An apparatus as claimed in claim 6 in which the flexible driving connection includes pins fixed to said shaft, and sockets carried by the rotor and engaging said pins.

8. An apparatus as claimed in claim 4 in which the inner surface of the casing and the outer surface of the rotor are of cone shape, said surfaces engaging one another, a bore extending through said rotor, and a driving shaft for the rotor extending through the bore and of less diameter than the same to permit said rotor to adjust itself within the casing.

9. An apparatus as claimed in claim 4 in which the means for discharging receptacles from the pockets includes bell-crank-levers mounted in the pockets, operating posts connected to said bell-crank-levers, means for normally holding the levers out of said pockets and a cam for engagement with said posts.

10. An apparatus of the class described including a valve casing provided with a tapered interior surface, a rotor arranged within the casing and having a tapered outer surface, a bore extending through said rotor, radial pockets formed in the rotor, a shaft extending through said bore and of less diameter than the same, a flexible driving connection between said shaft and said rotor, receptacle ejecting means for the pockets, and means actuated during rotation of the rotor for causing movement of said ejecting means.

11. In a can sealing apparatus, a vacuum chamber, means for moving cans through the vacuum chamber, a solder tool arranged within the vacuum chamber, and means for moving said soldering tool for causing its

point to describe an elliptical figure in a vertical plane, said last named means operating independently of the cans.

12. In an apparatus of the class described, a vacuum chamber, means for moving cans through the vacuum chamber, a soldering tool arranged within said vacuum chamber and having an inverted cone-shaped lower end, means for rotating said soldering tool, and means for moving said soldering tool to cause its point to travel in an elliptical path in a vertical plane, said last named means operating independently of the cans.

13. In an apparatus of the class described, a vacuum chamber, means for moving cans through the vacuum chamber, a soldering tool pivotally mounted in said chamber, means for heating said tool, means for rotating said tool, and means for moving said tool to cause its point to travel in an elliptical path in a vertical plane, said last mentioned means operating independently of the cans.

14. In an apparatus of the class described, a vacuum chamber, a vertically movable bracket mounted in said chamber, a lever having a medial portion pivotally connected to said bracket, a support, a slot and pin connection connecting one end of said lever to said support, and means for moving the other end of said lever in a circular path.

15. The herein described process of closing vent hole openings in metallic containers while under reduced pressure, which consists in providing an evacuated chamber, moving a series of containers continuously into, through and out of said chamber while maintaining the containers in an upright position, providing a continuously moving soldering device within said chamber, and then so co-ordinating the movements of said soldering device and said containers that said soldering device will operate to solder the openings in said containers.

16. The herein described process of closing vent hole openings in metallic containers while under reduced pressure, which consists in providing an evacuated chamber, moving a series of containers continuously into, through and out of said chamber while maintaining the containers in an upright position, providing a continuously moving soldering device within said chamber, and then so co-ordinating the movements of said container and said soldering device that the latter will momentarily engage the opening in each container of said series to seal said opening.

17. The herein described process of closing vent hole openings in metallic containers while under reduced pressure, which consists in providing an evacuated chamber, moving a series of containers continuously into, through and out of said chamber while maintaining the containers in an upright position, providing a continuously moving soldering device within said chamber and then co-ordinating the movements of said container and said soldering device to cause said soldering device momentarily to engage the openings in successive containers in said series to seal said openings.

18. The herein described process of closing vent hole openings in metallic containers while under reduced pressure which consists in providing an evacuated chamber, moving a series of containers continuously into, through and out of said chamber while maintaining the containers in an upright position, providing a soldering device continuously moving within said container, and then co-ordinating the movement of said soldering device with the movement of said series of containers to cause said device momentarily to engage the openings in successive containers to seal said openings.

19. The herein described process of closing vent hole openings in metallic containers while under reduced pressure, which consists in providing an evacuated chamber, synchronously moving single units of a series of continuously moving containers into, through and out of said chamber while maintaining the containers in an upright position, providing a continuously moving soldering device within said chamber and then co-ordinating the movement of said soldering device with the movement of the units of said series whereby to cause said soldering device momentarily to engage the openings in said units to seal said openings.

20. The herein described process of closing vent hole openings in metallic containers while under reduced pressure, which consists in providing an evacuated chamber, synchronously moving single units of a series of metallic containers into and out of said chamber while maintaining the containers in an upright position, providing a continuously moving soldering device within said chamber, and then co-ordinating the movement of said soldering device with the movement of said series of containers thereby to cause said soldering device momentarily to move in synchronism with successive units of said series and in engagement with the openings therein to seal said openings.

21. An apparatus for sealing the vent holes in the lids of metallic receptacles, comprising a vacuum chamber, means for introducing containers having vent holes in their lids into the chamber while maintaining the containers in upright position and without breaking the vacuum in the chamber, a turntable in the chamber rotatable about a vertical axis and adapted to receive the containers from said means and to move the same in a rotary path while maintaining the containers in upright position, means including

a soldering tool for applying solder to the vent holes in the cans while the latter are moving with the turntable, said soldering tool being mounted for movement about a vertical axis, means for moving said soldering tool in an elliptical path in a substantially vertical plane, and means for discharging the sealed containers in upright position from the chamber without breaking the vacuum in the chamber.

22. An apparatus as claimed in claim 21 including means for continuously rotating said soldering tool.

In testimony whereof I affix my signature.

RICHARD M. GARRETT.