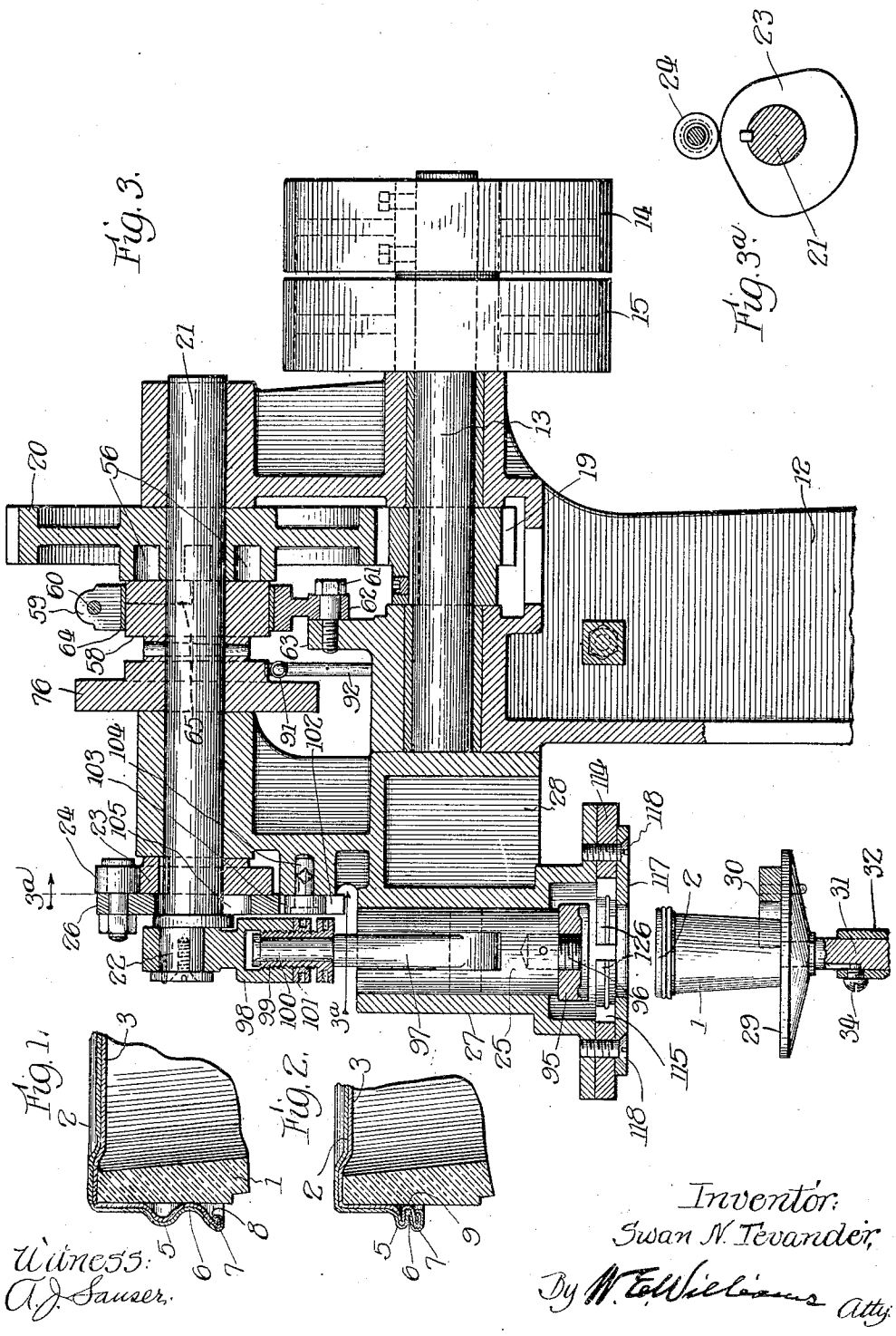
Sept. 22, 1931. S. N. TEVANDER 1,824,384

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Filed June 4, 1923 6 Sheets-Sheet 1



Sept. 22, 1931. S. N. TEVANDER 1,824,384

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Filed June 4, 1923 6 Sheets-Sheet 2

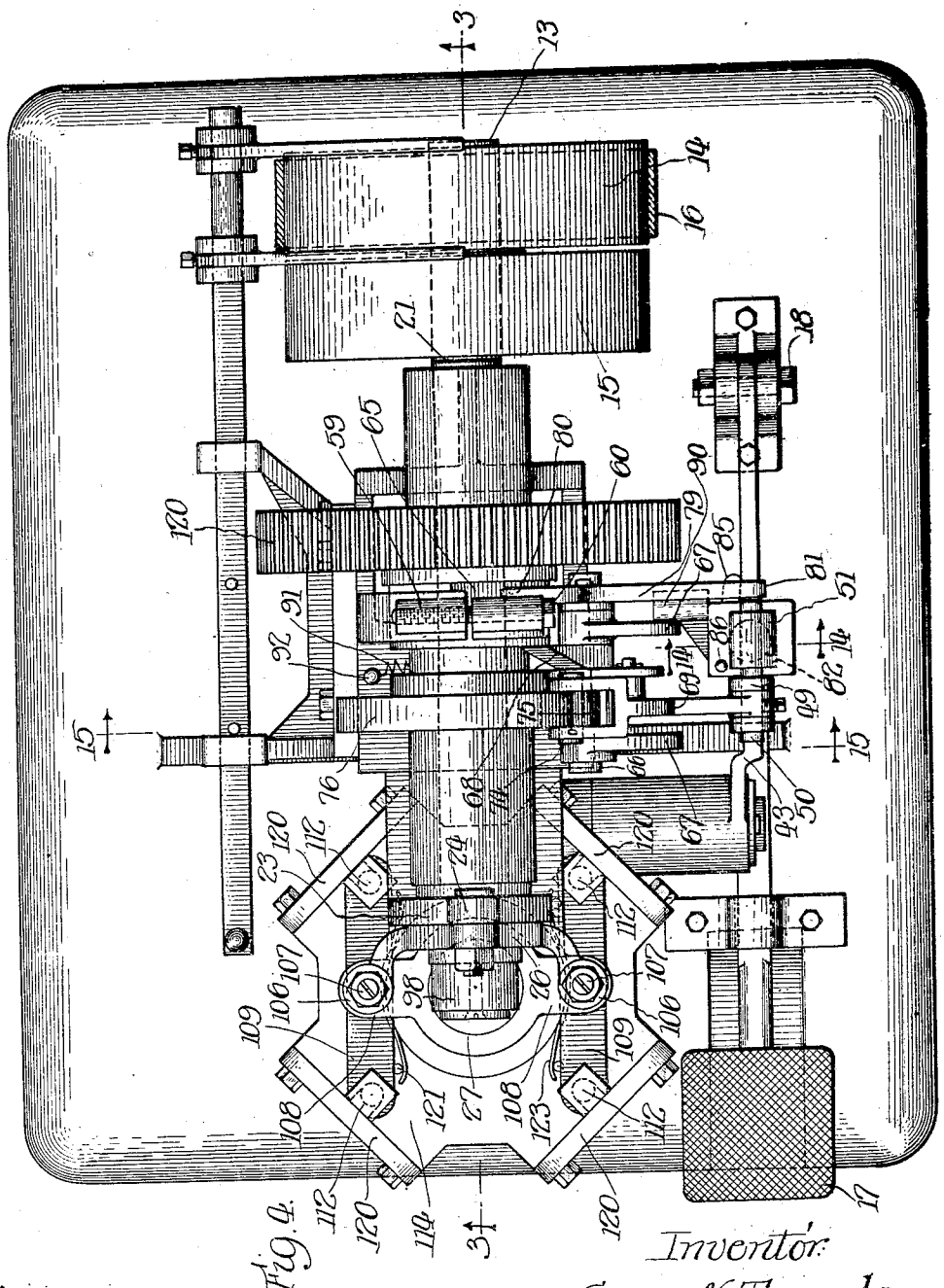


Fig. 4.

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Sept. 22, 1931. S. N. TEVANDER 1,824,384

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Filed June 4, 1923 6 Sheets-Sheet 3

Fig. 5.

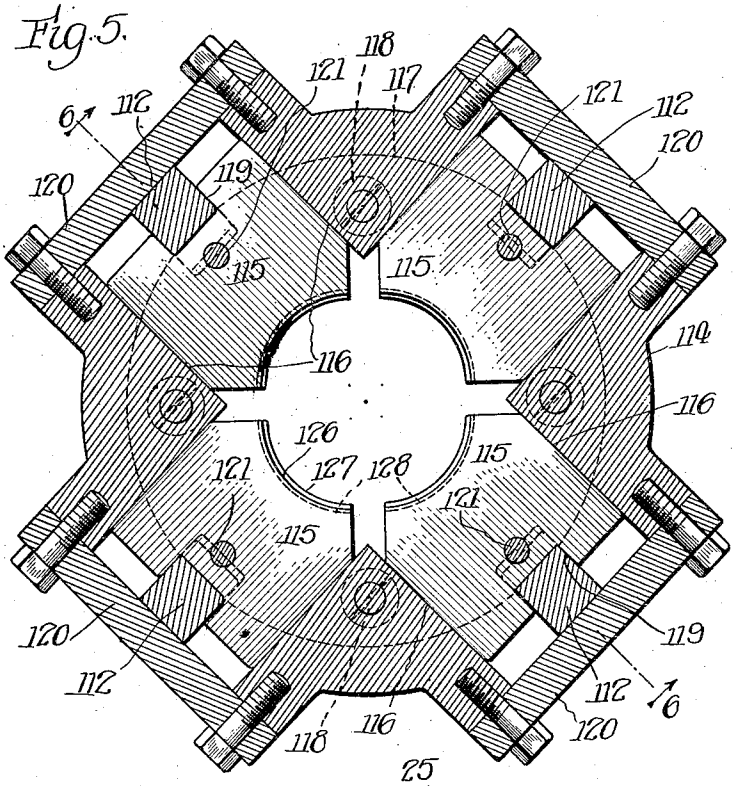


Fig. 7a

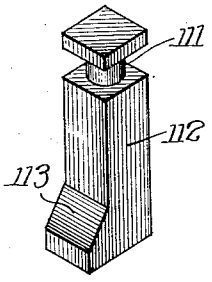


Fig. 6.

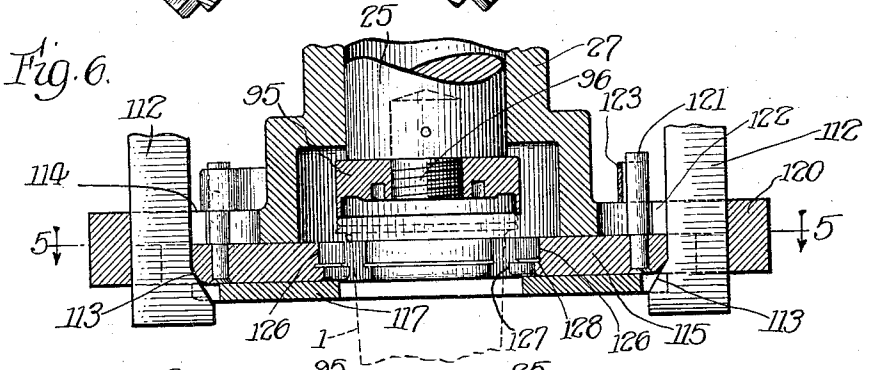
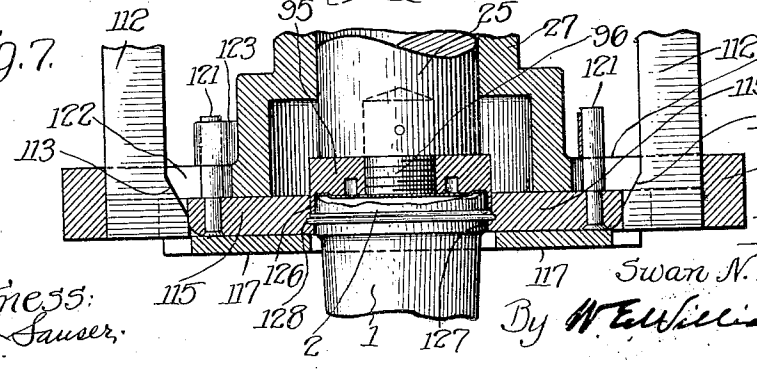


Fig. 7.



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Sept. 22, 1931. S. N. TEVANDER 1,824,384

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Filed June 4, 1923 6 Sheets-Sheet 4

Fig. 8.

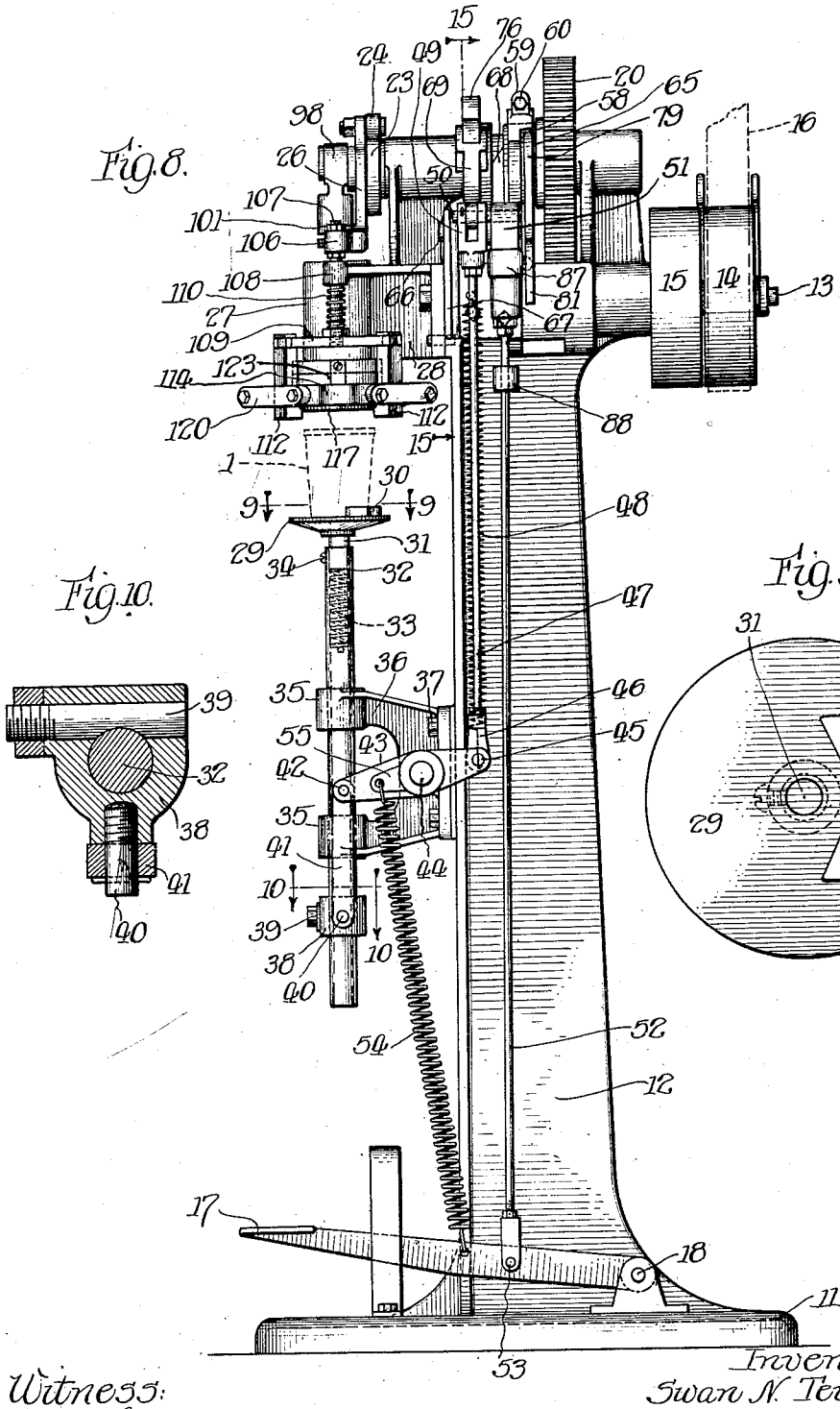


Fig. 10.

Fig. 9.

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Sept. 22, 1931. S. N. TEVANDER 1,824,384

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Filed June 4, 1923 6 Sheets-Sheet 5

Fig. 11.

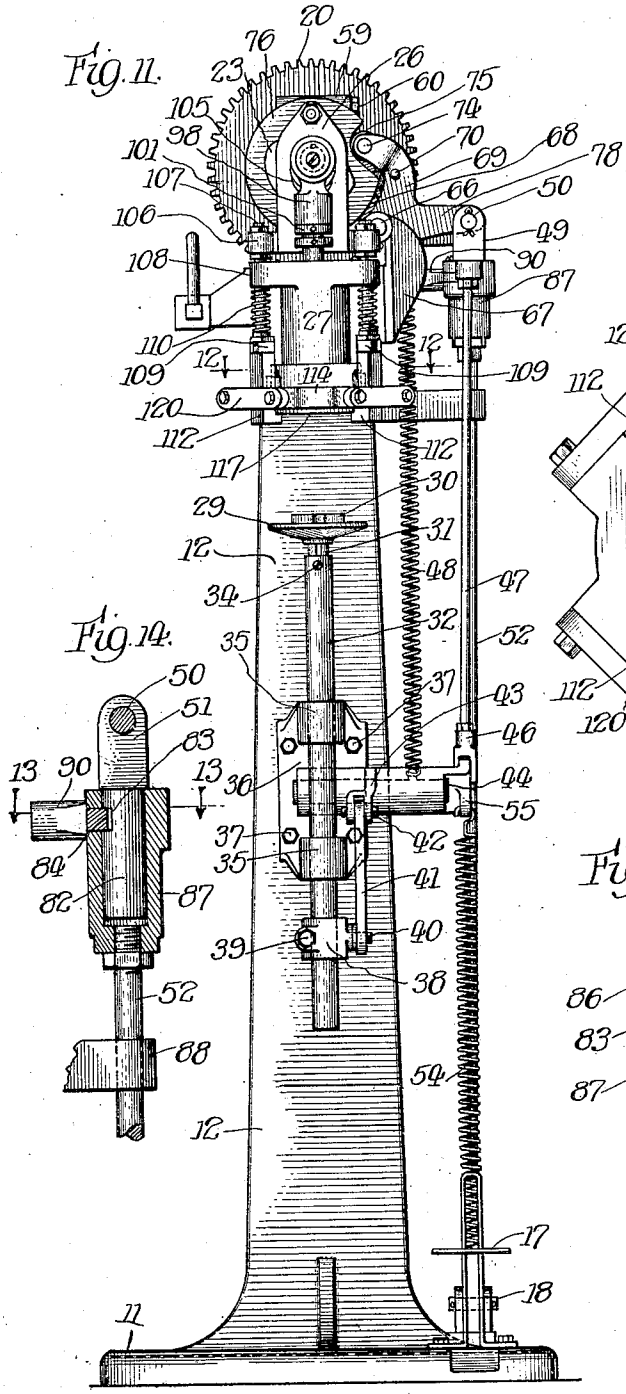


Fig. 12.

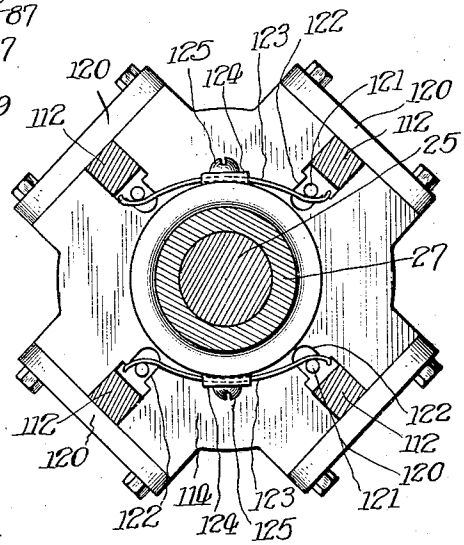
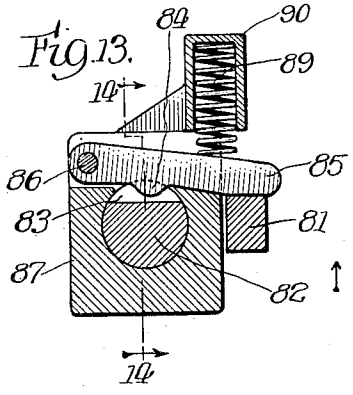


Fig. 14.

Fig. 13.



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Sept. 22, 1931. S. N. TEVANDER 1,824,384

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Filed June 4, 1923 6 Sheets-Sheet 6

Fig. 16.

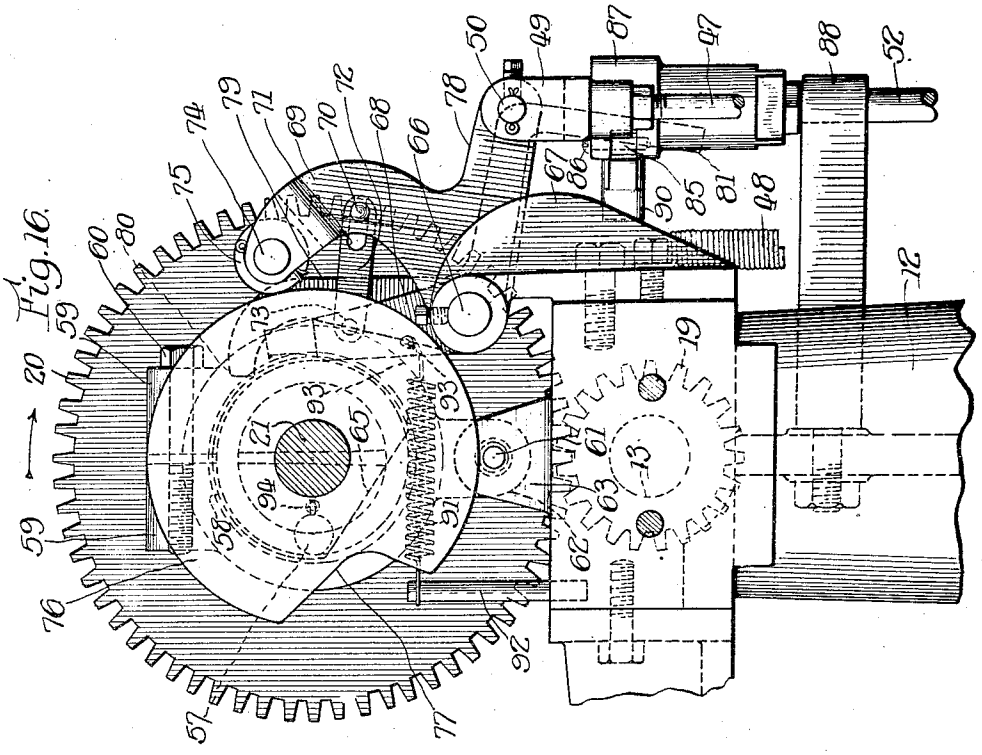
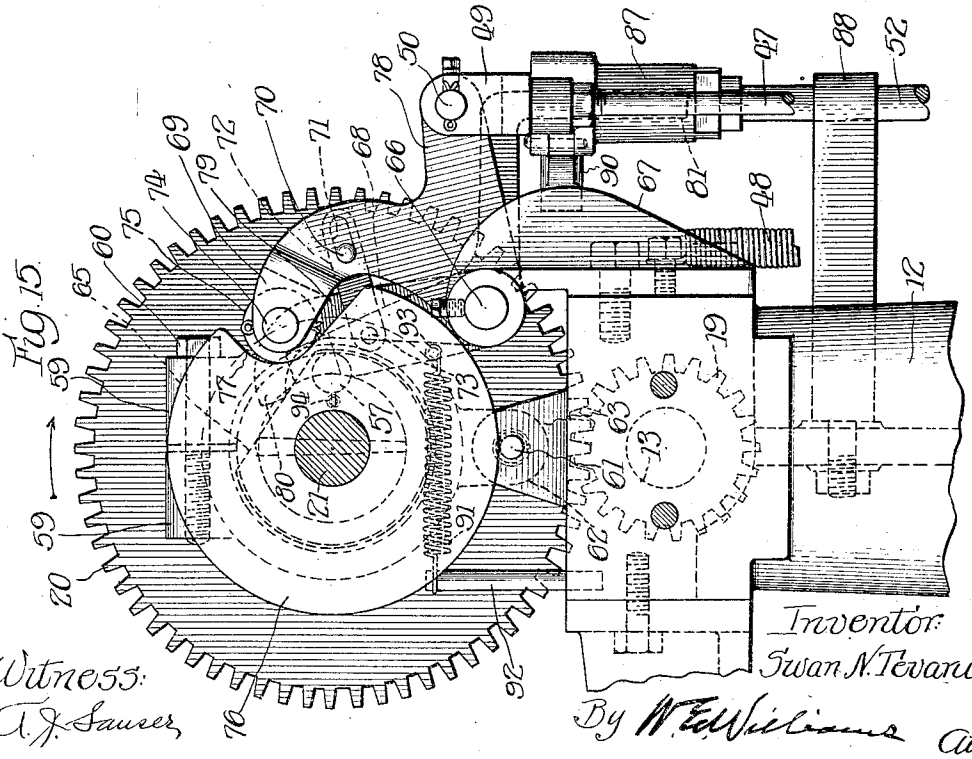


Fig. 15.



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Patented Sept. 22, 1931 1,824,384

UNITED STATES PATENT OFFICE

SWAN NILS TEVANDER, OF MAYWOOD, ILLINOIS, ASSIGNOR TO SWAN METALLIC SEAL & CAP COMPANY, A CORPORATION OF ILLINOIS

POWER MACHINE FOR SEALING CAPS TO JARS AND CANS

Application filed June 4, 1923. Serial No. 643,208.

My invention relates to a type of machine adapted to seal a cap on the top of a glass jar or a tin can or other suitable receptacle by operating upon a flange of a cap seated over the top and outside of the mouth of the vessel and the object of my invention is to provide a power machine that will operate very rapidly and successfully in sealing the peculiar type of cap I use requiring the operator simply to move a foot treadle which puts in motion the mechanism which automatically does the sealing.

Reference will be had to the accompanying drawings in which Fig. 1 is a section of the mouth of the jar with my cap applied thereon ready for sealing. Fig. 2 is a view similar to that of Fig. 1, but shows the cap sealed. Fig. 3 is a sectional elevation of a part of the machine on an enlarged scale on line 3—3 of Fig. 4, looking in the direction of the arrows. Fig. 3*a* is a section on line 3*a*—3*a* of Fig. 3. Fig. 4 is a top plan view of the machine on substantially the same scale as that of Fig. 3. Fig. 5 is a plan sectional view through the head block mechanism on line 5—5 of Fig. 6 which operates on the cap. Fig. 6 is a vertical sectional view taken on line 6—6 of Fig. 5. Fig. 7 is a view similar to that of Fig. 6 showing a different position of the gripper jaws and head block. Fig. 7*a* is a detail of a cam block. Fig. 8 is an elevation from the right side of the machine. Fig. 9 is a plan view on line 9—9 of Fig. 8 of the table which supports the glass jar or can to be operated on. Fig. 10 is a detail on line 10—10 of Fig. 8. Fig. 11 is a front elevation of the machine. Fig. 12 is a plan sectional view of the head block on line 12—12 of Fig. 11. Fig. 13 is a detail of the clutch mechanism on line 13—13 of Fig. 14. Fig. 14 is a detail feature of the clutch mechanism on line 14—14 of Fig. 4. Fig. 15 is a transverse view through the machine on line 15—15 of Figs. 4 and 8. Fig. 16 is a view similar to that of Fig. 15 showing the parts in a different position.

In the drawings 1 indicates a glass jar, but in place of a glass jar any suitable receptacle may be used, 2 indicates the metal portion of the cap and 3 indicates the paper lining on the inside. The cap here shown may be of tin or any other suitable material either metal or other material and the paper lining 3 may be of suitable material adapted for the purpose. The lining material 3 is secured by a suitable adhesive to the inside portion 2 of the cap so that both of them function as a single unit as near as may be.

The caps are previously formed with an outer flange embracing the outside wall of the jar 2 as is shown in Fig. 1 and this outside flange has a normally straight portion 4 merging into an outwardly curved bead 5 and this merges into an inwardly curved bead 6 and this into a margin 7 and this margin 7 is curled over as indicated by 8. This curled over feature of the metal 2 of the cap locks the edge of the lining with the metal for a better connection on the edge between the metal and the lining, and also furnishes a smooth edge to the cap as against a raw or sharp edge in the absence of this curling. The curled edge is a more desirable edge to handle in arranging the caps on the jars and in packing and shipping the caps.

The sealing operation of the cap to the jar is brought about by the machine and this sealing operation results in changing the form of the flange of the cap from that shown in Fig. 1 to that shown in Fig. 2. In Fig. 2 the beads 5 and 6 and the margin 7 are shortened vertically, and as this is done without permitting any enlargement of the diameter of the parts, the surplus metal in the beads is forced to flow inward and thus produce a tight seal of the cap to the jar top causing the portion 9 to conform tightly to the outside of the jar surface even though there is a considerable irregularity in the diameters and shapes of different jars, vessels or containers upon which the caps are used.

In a factory where a lot of packing is engaged in, it is desirable to have a machine that will do this work rapidly and safely and with the least handling possible and at the same time do it in a manner to assure against accidental damaging of the jars and caps and to this end I provide a machine having a rather broad base frame 11 which supports an

upright base part member 12 into which is mounted an operating shaft 13 arranged to be driven by a pulley 14 and having a companion loose pulley 15 over which pulleys a driving belt 16 shown in Figs. 4 and 8 operates the machine by power at intermittent intervals as desired by the operator who sets in motion the sealing operation through the medium of a foot treadle 17 hinged at 18 to a block on base 11 of the machine. This foot treadle sets in motion as desired the sealing mechanism through the medium of a pinion 19 on the shaft 13 which engages and constantly drives a gear 20 on a shaft 21 thus the gear 20 revolves in continuous motion so long as the belt 16 is driving the shaft 13, and this gear 20 is engaged by a clutch under the influence of the said foot treadle which sets in intermittent motion the shaft 21 a single revolution of which brings about the sealing of a cap on a jar. Thus the shaft 21 amounts to what may be termed a shaft of a punch press and revolves a crank 22 which is connected to the reciprocating cross head 25 forming a part of the sealing mechanism. On the shaft 21 there is also mounted a cam 23 which engages a roller 24 which operates a reciprocating block 26 which works in conjunction with the cross head 25 in the operation of sealing the cap. The cross head 25 is supported in a cylindrical guide way 27 being a fixed part of a head block casting 28 on the post 12 of the machine.

The jar 1 to be sealed at any given revolution of the machine is placed upon a floating table 29 provided with a registering block 30 adapted to seat the jar 1 in proper position on the table 29. This table 29 is supported on a plunger 31, sliding in a hollow tubular post 32 in which there is a spring 33 providing for an elastic connection in vertical arrangement between the table 29 and the hollow tubular post 32. The screw 34 prevents the escape of the plunger 31 from the tubular post 32.

The purpose of this spring connection of the table with the post is to accommodate the movement of the jar in the sealing operation. The post 32 is mounted to slide vertically in ways 35 of a block 36 screwed to the frame post 12 by screws 37 and the tube or block 32 with its table 29 is raised and lowered as desired in the ways 35 by the block 38 secured by a locking pin 39 to the said post 32 and in the side of this block 38 there is a hinge pin 40 to which a link 41 is connected and this link 41 is hinged to a pin 42 of the lever 43 hinged on a pin 44 of the aforementioned block 36.

The lever 43 is hinged by a pin 45 to a block 46 on the end of a rod 47 which is connected to a block 49 which is provided with a hinge pin 50 which extends through and carries a block 51, so that the block 51 and block 49 move together in all of their movements through this connection of the pin 50. A tension spring 48 tends to return the mechanism to its normal position.

The block 51 is connected by a peculiar clutch mechanism to the operating rod 52 which is connected at 53 to the foot treadle 17.

Thus the movement of the foot treadle 17 downward results in moving the table 29 with its jar 1 thereon up into the embrace of the sealing mechanism. The return movement is brought about by the spring 48 and a secondary spring 54 connected to the treadle lever 17 and to a block 55 on the aforementioned pin 44. This connection of the spring 54 to the block 55 is simply a means of convenience as the said connection might be to any fixed portion of the frame and function substantially the same.

Upon the foot treadle 17 being pushed downward, it actuates a clutch mechanism substantially the same as is involved in punch press operation to revolve the shaft 21 a single revolution the difference being that in the ordinary punch press clutch mechanism whenever the foot treadle 17 is held down the press will continue to repeat its strokes but this is desired to be prevented in the operation of this machine and a peculiarly constructed clutch is provided to make it necessary that the operator release the foot treadle 17 and again press it down for each sealing operation of the machine thus serving to insure the removal and replacement of the jar sealed by the machine and this peculiar clutch construction may be made in any suitable manner, but I prefer to make it as here shown namely—

The revolving gear 20 amounts to the fly wheel of an ordinary simple punch press and in the hub of this gear I provide the pockets 56 which are the engaging seats for an ordinary clutch pin 57, shown in dotted lines in Figs. 15 and 16. This clutch pin 57 is mounted and carried by a block 58, see Fig. 3, which serves a triple purpose and is securely fixed by any suitable fastening means to the shaft 21 and revolves therewith. The outside diameter of this block 58 acts as a brake member in conjunction with a brake strap block 59 set for braking purpose by a bolt 60. This brake strap block 59 is connected to the frame of the machine by a screw 61, passing through the lug 62 of the brake strap block and secured into a lug 63 of the frame which prevents the rotation of the brake strap block 59. A suitable lining material 64 is provided for this brake.

The right edge of this block 58 is chamfered off at one spot as shown by the dotted lines, Figures 3, 15 and 16 furnishing a flat cam surface 65 of a narrow width at the right side of the block looking in the direction of Fig. 3, the purpose of which will be described later.

A short shaft 66 is supported in bracket pieces 67 on the frame members carries an

arm 68 which withdraws the bolt or clutch pin 57 at each revolution of the shaft 21 as controlled by the mechanism which connects the arm 68 with the foot treadle 17. Mounted also on the shaft 66 there is a bell crank lever 69 which is connected by pin 70 into the slot 71 of the link 72 connected by a pin 73 to the aforementioned arm 68, thus on the movement of the bell crank lever 69 beyond the limits of the slot 71 the arm 68 moves with the bell crank lever 69.

The bell crank lever 69 carries a pin 74 upon which there is mounted a roller 75 which is engaged by a cam wheel 76 provided with a cam notch 77 into which the roller 75 normally rests at the interval of rest of the sealing mechanism. The bell crank 69 is provided with an arm 78 carrying the hinge pin 50 which is connected to the blocks 49 and 51 previously mentioned.

Mounted on the short shaft 66 there is a bell crank lever 79 having one end 80 operating on the cam surface 65 of the block 58 previously mentioned, and the other end 81 of this bell crank lever 79, shown in dotted lines in Figs. 15 and 16 and in full lines in Figs. 4 and 13, extends down and acts as a detaching means for a clutch device in the said block 51 or rather a cylindrical extension thereof 82, see Figs. 13 and 14. The block 51 with its cylindrical extension 82 is provided with a notch 83 which is engaged by the projection 84 of a lever 85, hinged at 86 to a block 87 to which the treadle rod 52 is connected.

A keeper 88 on the frame of the machine serves to assist in holding in position the upper end of the rod 52. A spring 89 (see Fig. 13) mounted in a pocket 90 on the block 87 serves in holding the end 81 of the bell crank lever 79 in position to cause its other end 80 to at all times be in contact with the cam surface 65 of the block 58 as before described.

The arm 68 is held normally in position to engage the bolt or clutch pin 57 by means of a spring 91 connected at one end to a fixed post 92 and at the other end to a pin 93, in the said arm 68, see Figs. 15 and 16. Thus on the operation downward of the foot treadle 17 by the operator, the rod 52 being engaged in the locked position of the clutch mechanism as illustrated in Figs. 13 and 14, pulls downward the pin 50 and carries with its block 49 and its connected parts and the bell crank lever 69 pulling the roller 75 out from position of Fig. 15 to that of Fig. 16, and simultaneously this movement through the link 72 disengages the arm 68 from the clutch pin 57 and allows the clutch pin to be engaged into a hole or pocket 56 in the gear 20. The movement of this pin 57 being brought about by a small spring 94 shown only in dotted lines in Figs. 15 and 16. Immediately upon the release of the clutch pin 57 the shaft 21 with its connected mechanism, a part of which is cam block 76, revolves bringing the roller 75, then being out from the cam pocket, 77, on to the concentric surface of the cam block 76 and thereafter the bell crank 69 is held in this position until a complete revolution of the shaft 21 again allows the roller 75 to enter the cam pocket 77 to the normal position shown in Fig. 15 and during this revolution a cap has been sealed on the jar on the table 29 as will be described later. During the revolution of this shaft 21 it carries with it the block 58 causing the movement of the cam surface 65 in contact with the end 80 of the bell crank lever 79, to move from position of Fig. 15 to that of Fig. 16, and in this movement of the bell crank lever 79 the end 81 has moved in the direction of the arrow in Fig. 13 from the position shown in Figs. 13 and 15 to that of Fig. 16 which results in releasing the locking lever 85 and thus amounts to disconnecting the foot treadle 17 from the control of the pin 50 so that when one revolution of the shaft 21 has been completed the disengaging arm 68 will automatically release the clutch pin 57 regardless of the lever 17, making it necessary for the operator in order to bring about another revolution of the shaft 21 to allow the foot treadle lever 17 to rise up to a new engagement of the locking lever 85 with the notch 83 of the cylindrical portion 82 of the block 51 giving a new connection which will thus permit the foot treadle 17 to again set in motion the clutch mechanism which revolves the shaft 21 and this arrangement of the clutching device insures that the operator will not under ordinary circumstances operate twice on the same jar.

The mechanism which actually comes in contact and operates upon the cap 2 is composed of a head block 95 see Fig. 3 which is connected by a screw 96 to the cross head 25 before mentioned and this head block 95 is shaped to fit over the top and the flange part 4 of the flange of the cap. The cross head 25 is connected to a pitman 97 which is secured into a pitman bearing block 98 by means of an adjustable screw threaded sleeve 99 screwed into the block 98 and secured over the end 100 of the pitman 97. A locking nut 101 is provided to keep the adjustment from becoming loosened. Thus there is provided means to properly adjust the stroke of the cross head 25 with its head block 95 in relation to the maximum throw of the crank 22 carrying the block 98.

The block 26 under the influence of the roller 24 on the cam 23 is guided in vertical movement by a slot 102 in the lower end of the block working over a roller 103 on a pin 104 in a part of the frame, and by a larger slot 105 that embraces the body of the shaft 21.

This block 26 is provided with the lugs 106 (see Figs. 4, 8, and 11) into which there are fastened the rods 107 by engaging nuts on

each side of the lugs 106 and these rods 107 extend through guide way lugs 108 in the cross head guide block 27 before mentioned and they extend downward and are secured into the ends of the cross members 109 see Figs. 4 and 8 and the springs 110 slide over these rods 107 and serve constantly to push the rods down below the lugs 108 so that the cam 23 and roller 24 serve only to lift the rods 107 with their cross members 109 and the springs 110 produce the reverse or downward movement. The ends of the cross members 109 are slotted and into these slots there are engaged the circular portions 111 of four cam blocks 112 provided with the cam surfaces 113 see Fig. 7*a* where this cam block is shown in perspective.

The lower end of the guide way 27 is provided with a horizontal flange section 114 through which these blocks 112 extend and are sustained in a position to perform their work. Underneath the flange 114 are provided four die or gripper blocks 115, held laterally by the side guides 116 of the flange 114 and supported vertically by a plate 117 underneath these die blocks 115 and the plate 117 is held in place by screws 118 see Figs. 3 and 5. In the back end of these die blocks 115 there are notches 119 into which the cam blocks 112 are held laterally and the back side of the blocks 112 are sustained in alignment by the cross blocks 120 which check the backward thrust of the cam blocks 112 when their cam surfaces 113 engage the die blocks 115 and push the said die blocks toward the center (see Fig. 5) as the block 26 is raised by the cam 23 before described. The pins 121 secured into the die blocks 115 extend upward through some slots 122 in the flange 114 and are engaged by plate springs 123 see Fig. 12 which are held in place by the keepers 124 and screws 125. The result of these springs is to keep the die blocks 115 always outward in contact with the cam surfaces 113 of the cam blocks 112 so that on the downward movement of the block 26 the springs 123 act to reverse or throw outward the gripper or die blocks 115.

The gripper or die blocks 115 are provided with a cylindrical wall 126 and a shoulder or lip 127 and this shoulder where it joins the wall 126 is undercut as indicated by 128.

In the operation of sealing the cap after the jar and cap to be sealed have been placed upon the table 29 as is indicated by Fig. 3 the first movement brought about is that of the foot treadle bringing the head of the jar with the cap upon it up into contact with the head block 95 as is shown in dotted lines in Fig. 6, simultaneously the action of the foot treadle has set in motion the shaft 21 through the clutch mechanisms before described, thus revolving the cam 23 which results in actuating the cam blocks 112 to move the die blocks 115 from the position of Figs. 5 and 6 inward toward the jar bringing the walls 126 concentric with the outside of the cap and jar and the shoulders 127 underneath the margin 7 of the cap flange, meantime the crank 22 is moving the cross head 25 with its block 95 downward from the position shown in Fig. 6 to the position shown in Fig. 7. Thus transforming the flange of the cap from Fig. 1 to that of Fig. 2, and thus completing the seal of the cap upon the jar head. The work upon the flange of the cap 2 being such as to crimp the flange in a manner to force a portion tightly against the wall of the jar at the point 9 as indicated in Fig. 2 making a tight seal of the parts.

On the completion of the stroke of the cross head 25 the machine again goes to rest in the normal position of Figs. 3 and 8 ready for admission of the next jar.

The wall 126 of the die blocks 115 keeps the parts 4, 5, 6, and 7 of the flange of the cap from enlarging in diameter at all points save at the point of the undercut 128 in the die blocks 115 the purpose of this being to allow the edge of the margin 7 of the cap to flow into this undercut 128 and prevent the curled over portion 8 from coming in contact with the wall of the jar, thus keeping the outside metal or material of the cap from contact with the wall of the jar and allowing a greater freedom of flow of the material of the cap to assemble at the point 9 where the maximum seal contact is desired.

The movement of the cap and jar from the position shown in Fig. 6 to that of Fig. 7 is permitted by the spring 33 in the hollow post 32 as before mentioned.

Thus it will be seen that jars having their caps previously applied, or applied to the jars by the operator as the machine is fed may be sealed substantially and rapidly as an operation may be accomplished in simple ordinary punch press work and this with little or no danger of damage of glass jars or other receptacles which are desired to be sealed.

What I claim is:—

1. In a machine for sealing a rigid walled receptacle with a pliable cap having a marginal down-turned flange formed with a plurality of initially open, vertically spaced annular beads, the combination with a supporting frame, of a plurality of horizontally movable die blocks adapted to rigidly support the lower edge of the cap flange which is curled to secure in the cap a lining of compressible material such as paper, said block being formed to simultaneously provide unyielding lateral support for the beaded portion of the cap flange and having also an internal annular groove adjacent the curled lower edge of the flange, means for moving the die blocks to engage the cap flange on the receptacle to be sealed, and means for vertically compressing the beads on the cap

flange to form a sealing ring encircling and closely adhering to the receptacle, thereby causing the curled lower edge of the cap flange to flare outwardly and flow into the groove in the die blocks, thus insuring that the curled edge will be spaced out of contact with the receptacle.

2. In a machine for sealing a receptacle with a pliable cap having a marginal down-turned flange formed with a plurality of initially open, vertically spaced annular beads, in combination with a supporting frame, a plurality of radially movable die blocks each having a vertical curved wall and an inwardly projecting shoulder below said wall for rigidly supporting the lower edge of the cap flange which is rolled to secure inside the cap an insert or liner of compressible material such as paper, and arranged to provide rigid lateral support for the beaded flange, said die block being formed with a continuous internal annular groove joining the vertical wall and said shoulder, and a vertically movable die block having a depending skirt flange for encircling the upper end of the cap and adapted to be moved toward the shoulder of said radially movable die blocks for compressing the beads of said flange, and forcing an inwardly convex annular bead thereof tightly against the outer surface of the receptacle, the rolled edge of the cap flange being caused to flow outwardly away from the receptacle into the annular groove.

3. In a device of the class described, a floor stand adapted to support jar sealing devices, a reciprocatory jar supporting table, a plurality of horizontally movable die blocks, sealing means for compressing a plurality of vertically spaced annular beads of a sealing cap while gripped by said die blocks for causing the cap to tightly adhere to the receptacle, means for operating in succession said die blocks and said sealing means, a control member operable at will for initiating the working movements of said die blocks and sealing means, and means for limiting the operation of said device to a single sealing cycle for each initiating actuation of the control member.

4. Means for sealing a receptacle comprising a pliable cap having a marginal down-turned flange provided with a plurality of initially open, vertically spaced annular beads, in combination with a supporting frame, a receptacle supporting table, a plurality of horizontally movable die blocks formed for embracing the down-turned flange of the cap, and providing a rigid stop supporting the lower margin of said flange, means for moving the die blocks into engagement with the cap flange, and means for moving the cap flange into engagement with the stop portion of said die blocks and thereafter compressing the beads of the cap flange in vertical direction to form them into a sealing ring encircling and closely adhering to the side wall of the receptacle.

Signed at Chicago, in the county of Cook, and State of Illinois, this 31st day of March, 1923.

SWAN NILS TEVANDER.