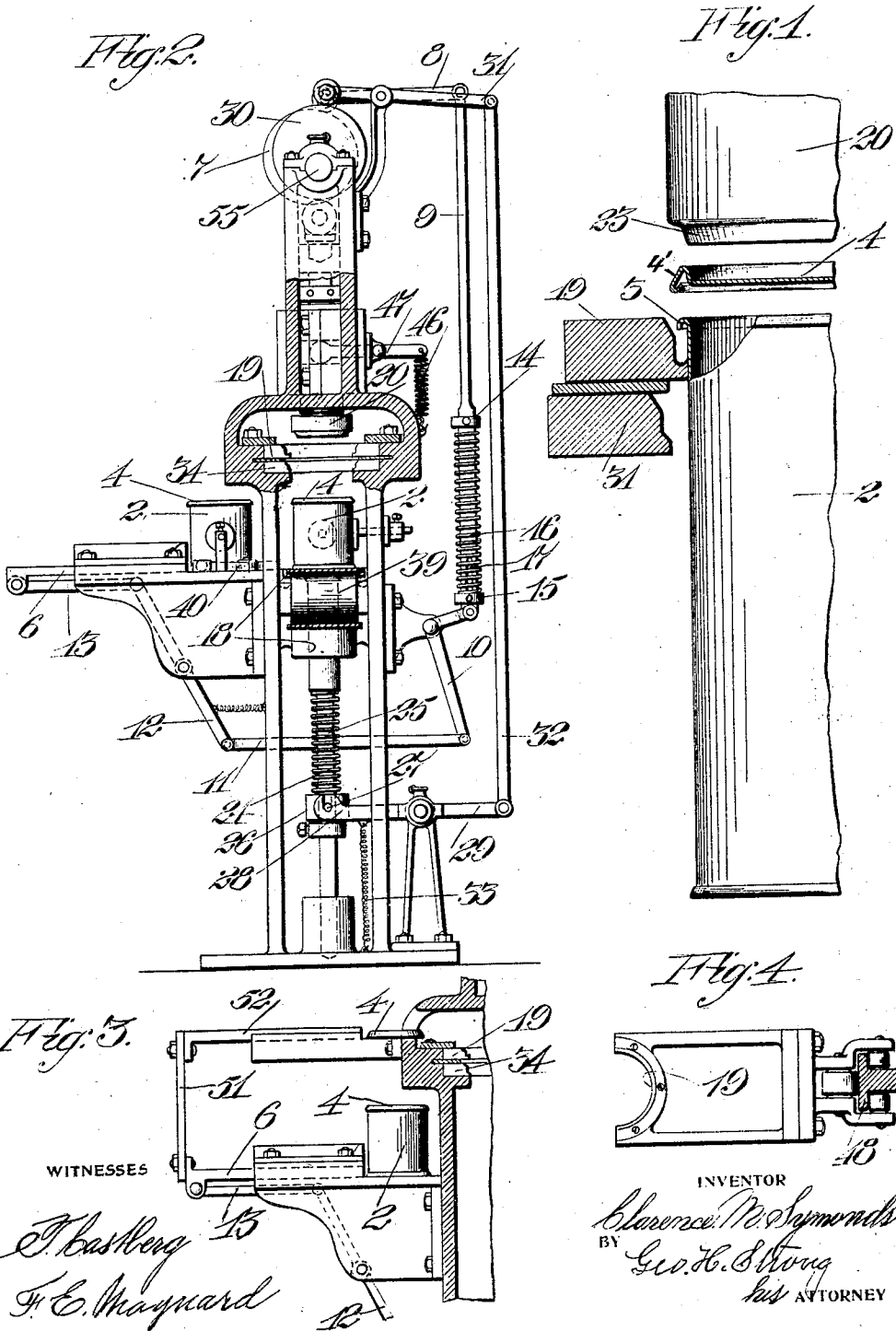


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APPLICATION FILED NOV. 7, 1908.

934,371.

Patented Sept. 14, 1909.  
2 SHEETS—SHEET 1.



WITNESSES

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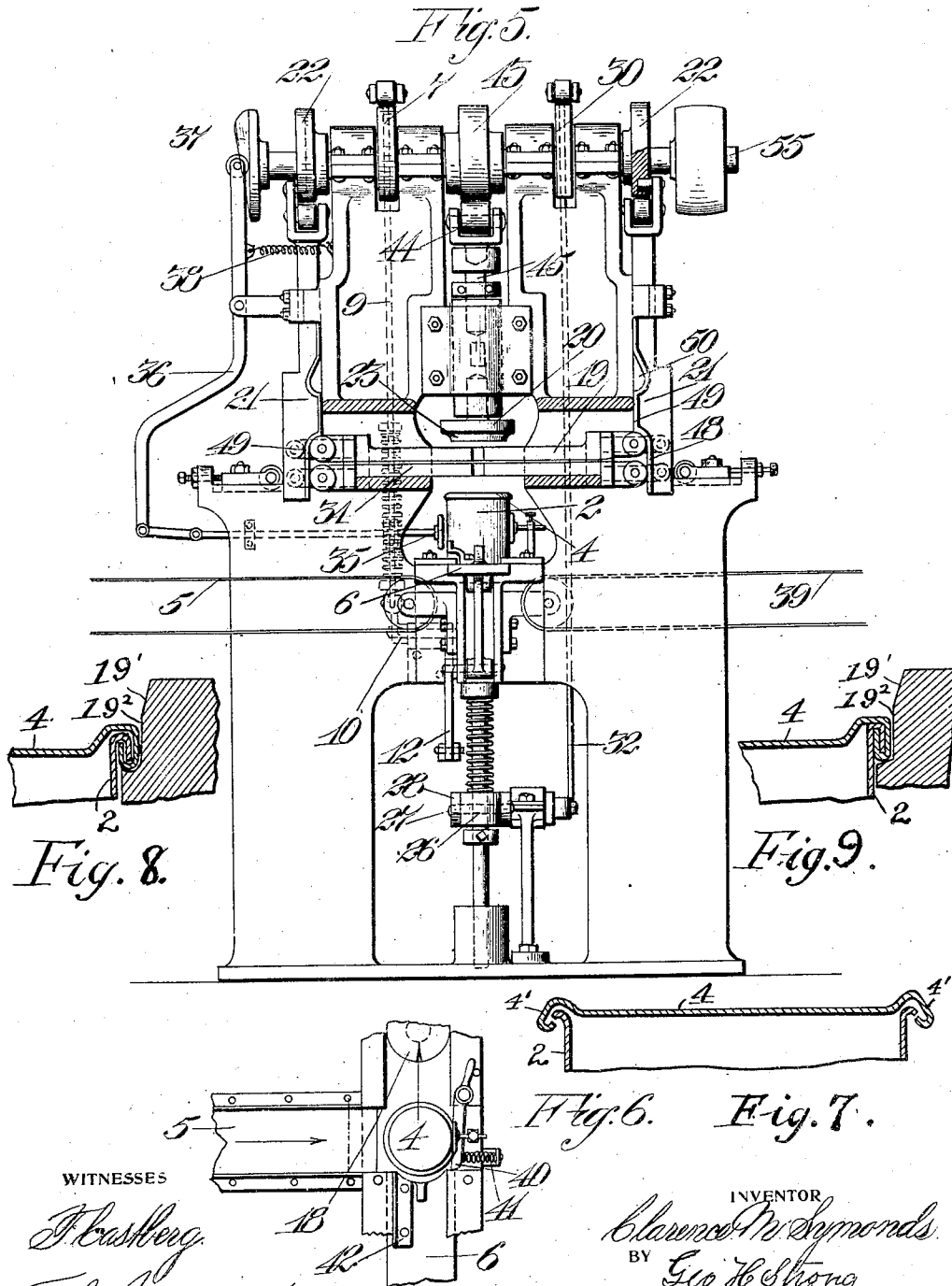


Fig. 8.

Fig. 9.

Fig. 6. Fig. 7.

WITNESSES

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# UNITED STATES PATENT OFFICE.

CLARENCE M. SYMONDS, OF SAN ANSELMO, CALIFORNIA.

## CAN-CLOSING MACHINE.

934,371.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed November 7, 1908. Serial No. 461,460.

*To all whom it may concern:*

Be it known that I, CLARENCE M. SYMONDS, a citizen of the United States, residing at San Anselmo, in the county of Marin and State of California, have invented new and useful Improvements in Can-Closing Machines, of which the following is a specification.

My invention relates to machines of a character used to close or seam ordinary cans, which have been filled with suitable material, and relates particularly to machines for hermetically sealing the tops of the cans.

It is an object of my invention to provide a simple, continuously operating automatic machine for rigidly and hermetically forming a seam or joint between the can top and the can.

A further object of the invention is to provide a machine which, during the operation of seaming or sealing the cap to the can, will reduce to a minimum the usual waste of cans, and also to minimize the spilling of the contents from the can.

Another object is to provide a machine of this character, of extreme simplicity, and one requiring as little power to operate as is possible.

My invention comprises the elements, and the construction and combination of parts as will be set forth in the specification and claims, and which is shown in the accompanying drawings.

Figure 1 shows a can, with the cap in position to be snapped on. Fig. 2 is a side elevation partly in section. Fig. 3 is a detail showing a top feeder and latch. Fig. 4 is a detail of a die and operating cam. Fig. 5 is a front elevation of the machine, partly in section. Fig. 6 is a partial plan showing the platen and feed bar. Figs. 7, 8 and 9 illustrate sectional details showing the various steps of applying the can cover and closing the seam between the cover and the can body.

I have shown in Fig. 1 a can of the nature which it is desirable to close or seal in this machine. The can 2 may be of any suitable cross section, either cylindrical or polygonal, and has at its upper edge a curved annular flange 3, over which is adapted to be snapped, the cover 4, which has a downwardly bent flange interlocking with the flange 3 of the can 2.

Heretofore in machines used for the pur-

pose of sealing the tops of can bodies, it has been the custom to either rapidly revolve the can between dies, thereby closing the seam, or to hold the can body in a fixed position, and have the dies revolve about it. In the first instance, when the can is revolved rapidly, a great deal of the contents is overthrown, resulting in soiling the machine generally, and in leaving quite an air-space in the can after it has been topped, aside from other annoying conditions. In the latter case, where the dies are revolved about the can, this requires a large cumbersome, power-consuming, complicated machine, and it is for the purpose of overcoming these various detrimental features that I design a machine of very simple construction and operation.

The cans 2, with the covers snapped on them, are brought from the carrier of the exhaust box directly on to the continuous running feed belt 5, which carries the can in front of the feed bar 6, adapted to be reciprocated by cam 7, and its associated train of lever 8, link 9, crank-lever 10, link 11 and lever 12, and link 13.

The link 9 has secured to it a collar 14, beneath which is seated upon a collar 15, a spring 16; the lower end of the link 9 being provided with a slot 17, which allows the cam 7 to depress the rod 9 without actuating the crank-lever 10, should this crank-lever be locked against oscillation during the operation of the machine.

When a can has been fed in front of the feed bar 6, it is thereby pushed forward on to a platen or bed 18 by which it is raised until the upper end is approximately contiguous to the closable jaws or dies 19, and under the plunger 20; and having assumed this position, the dies 19 are forced inwardly closed and held around the can by means of cam bars 21 which are reciprocated in slides upon the sides of the machine, by means of cams 22. The convergent or funnel shape of the upper part of the die 19 receives the periphery of the can cover which has been loosely snapped upon the edge of the can, and as the can fits the lower part of the already closed die, the cover will be centered and positioned with relation to the can, so as to insure the edge being accurately placed within the downturned edge of the can when the two are forced together.

Immediately following the inward stroke of the dies 19, the plunger 20 is forced down-

wardly, and having formed at its lower edge an annular groove 23, engages the top 4, and impinges it snugly between the dies 19, causing the annular rim 4' of the top to first strike an inclined downwardly converging wall 9' surrounding the central opening between the dies to thus press the rim inwardly, said rim fulcruming at its upper angle and the lower edge of the rim being thus positioned to interlock under the rim 3 of the can; the lower end of the wall 19' merged into the vertical wall 19<sup>2</sup> of a channel which bounds the central opening between opposed dies, the bottom of said channel terminating above the bottom of the die and being curved whereby when the lower edge of the rim 4' strikes this curved portion the latter causes the edge of the cover to curl inwardly and upwardly, tucking it under the outwardly and downwardly turned edge of the can body. The plunger 20 is then raised slightly, allowing the platen 18 to raise the can out of the hook formed in the upper die. This slight uplift of the platen is caused by a spring 24 which surrounds the spindle 25 of the platen 18; this spindle projecting downwardly in a suitable guide formed in the base of the machine.

At 26 is shown the collar supporting the spring 24, and loosely mounted on the spindle 25. The collar 26 has projecting lugs 27 seated in the arms of a yoke 28 formed upon the outer end of a lever 29. This lever is operable by means of cam 30 through connecting lever and link, 31 and 32 respectively.

A spring 33 secured to the lever 29, approximately at the yoke 28, serves to normally draw the platen to a downward position, and maintain the roller carried by lever 31 in contact with the cam 30, cams 7, 22, 30, 37 and 43 all being secured on a driven shaft 55.

Immediately following the opening of dies 19, the plunger descends sufficiently to force the can and cover into a lower set of dies 34 which are closed and rigidly held, and compresses the seam made by the previous dies, until it is practically liquid and air-tight. These dies are then opened, and the can, still resting upon the platen 18 is carried downwardly thereby, into its original position, level with the feed belt 5, and the can is then forced off the platen 18 by means of an ejector 35, operated by suitable connections, as lever 36 with a cam 37; a spring 38 normally keeping the lever in contact with the cam. The closed can is then carried from the machine by any suitable or desired form of conveyer, here shown as a belt 39.

The cans being fed in on the belt 5, one behind the other, will force the locking detent 40 outwardly, releasing the feed bar 6, thereby allowing it to be reciprocated or forced inwardly by its actuating cam 7, the lock 40 being secured or fitted to the machine frame

in such a manner as to be normally forced inwardly by a spring 41 so as to engage the front edge of the feed bar 6. Thus, when a can is fed inwardly in position to be pushed forward on to the platen 18, the can body engages the detent 40, compressing the spring 41, which releases the feed bar 6; and, in its proper sequence, the cam 7 will force the feed bar inwardly against the can which is carried thence on to the platen 18.

Secured to one side of the feed bar 6 is a lug 42 which is adapted to intercept the next succeeding can and prevent it from being pushed in further along, or toward the lock 40, while a can is still under the punch or die 20.

Upon the retraction of the feed bar 6 and the discharge of the seamed can, the next successive can will then be allowed to feed into position at front of the feed bar 6, releasing the detent 40, and again the feed bar may be reciprocated.

Any suitable well known means may be used to reciprocate the plunger 20, and I have here shown an ordinary cam 43 of suitable contour, adapted to engage with a roller 44 carried in the upper end of an adjustable stem 45 of the plunger 20. A spring 46 normally maintains the roller in position against the cam through the lever 47.

I have shown the cam bars 21 which operate the seaming dies 19 and 34, as provided with flanges 48. These flanges are so arranged or formed as to present a curvilinear surface which slides between rollers carried on the dies 19 and 34; thus when slide bars 21 are pressed downwardly by cams 22, a portion 49 of the flanges 48, first forces the dies 19 inwardly around the can. Further downward motion of the slides 21 causes a retraction of the dies 19 by means of a recess 50 in the cam bar flange 48, and following inward motion of the dies 34 in close sequence. Obviously, the retraction of the cam bars 21 will return the dies 19 and 34 to their normal open position as shown.

I have shown an attachment for the machine to be used in instances where the contents of the cans have not been previously processed, and in which case the covers have not yet been placed over the cans. This attachment comprises a bracket 51, and a carriage mounted on and operable with feed bar 6; the carriage 52 being arranged to receive the covers 4, which may be fed in, in any suitable manner; and when the feed bar 6 is carried inwardly, the cover is deposited upon the dies 19, and the cans 2 raised into position to be operated on by the dies 19 and 34. The lifting of the can 2 will cause it to engage the cover 4, when it will then be snapped over the can 2, and seamed as heretofore described.

In general the operation of this machine will be as follows: The cans which are

brought in continuously on the belt 5, and carried forward by the feed bar 6, over the platen 18, the superposed can is then raised, and the upper jaws or dies 19 are closed, and the initial bending of the cap 4 is done by means of the punch 20. The punch is then raised sufficiently to allow the can to be raised from the die 19, said dies being retracted to allow the can to be depressed between them when the punch again descends, forcing the can into intimate contact with the dies 34. These dies are then retracted, the can lowered into the level of the discharge belt 39, and the can discharged from the machine by means of the ejector 35.

Manifestly, the structure shown may be varied to adapt the machine to cans of various sizes, and sectional shapes, and other changes, as expedient, may be made, and still be within the scope of the claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a can closing apparatus, the combination of a reciprocating plunger, dies below the plunger, and between which the can body is guided, said dies having an annular channel which circumscribes their central opening, the entrance to said channel having a downwardly converging wall, for centering the can cover and the bottom of the channel being curved in cross-section, means for slightly elevating the can body relatively to the die, and means for opening the dies.

2. In a can closing apparatus, the combination of a reciprocating plunger, opposed dies between which a can body is received, means for operating the dies toward and from each other, said dies having formed in a part thereof, an annular channel of greater diameter than the can body and said channel having an outwardly diverging wall at the top for centering the loose can head and a curved wall at the bottom, a plunger operable in line with the can body and adapted to force a cover between the dies, while said dies are closed, said cover having an outwardly and downwardly extending rim adapted to be first brought into contact with the inclined wall of the channel in the dies to thereby force the rim inwardly toward the can body, and the curved bottom of the channel adapted to curl the edge of the rim into the plane of a corresponding portion on the can body whereby the cover and body interlock.

3. In a can closing apparatus, the combination of a reciprocating plunger, opposed dies axially underlying the same and between which a can body is adapted to be held, said dies having an annular channel surrounding the central opening which receives the can body and said channel having a part of its wall straight and a part inclined and adapted to receive and inwardly center the cover and force the rim thereof

toward the rim of a cover, the bottom of said channel merging into the said straight wall and being concaved inwardly and adapted to upturn the edge of the cover rim to enable it to interlock with a corresponding portion on the can body, and means for operating the dies.

4. In a can closing apparatus, the combination of a reciprocating plunger having an end to engage a can cover, superposed pairs of parallel dies, means for operating the uppermost dies to cause them to grip a can body therebetween, said upper dies having an enlarged channel circumscribing their central opening adapted to guide the bent flange of a can head and direct the same inwardly toward the can body, the bottom of said channel adapted to curl said flange so that it will interlock with a similar flange on the can body, means for retracting the members of the uppermost die to allow the plunger to force the can body and head therethrough into position between the closed lower dies, to complete the locking of the cover to the can body.

5. In an apparatus of the character described, the combination of superposed parallel dies, each comprising opposed members adapted to receive a can body therebetween, a plunger adapted to position a can head relative to the can body, means for closing the upper dies on a can body, said upper dies having an enlarged channel to permit the loosely fitted can cover to be centered and placed in an interlockable position relative to the can body flange, means for opening the upper die to allow the plunger to force the can axially through the die and between the closed members of the lower die, to complete the locking of the cover to the can body.

6. In a can closing machine, the combination of a superposed pair of closed dies, one pair of which partially closes the seam between the can and can cover, and the other pair is adapted to embrace the can body to which the cover is loosely interlockably attached, and a pressure device adapted to force the joint between the can body and cover into constricted walls of the lower die to thereby compress the joint and lock the cover to the can body.

7. In a can cover securing apparatus, a reciprocating plunger, means by which the plunger is actuated to press upon the can cover, pairs of closed dies, means by which said dies are successively closed and retained closed, while the cover is curled and double seamed upon the can top, a platen upon which the can is supported, means by which said platen is successively raised and depressed with the movements of the plunger, and means by which the platen and can may be finally depressed to a discharge position.

8. In an apparatus of the character de-

scribed, a horizontally traveling carrying belt, a platen, means by which the cans are delivered upon said platen, means for raising the platen, a reciprocating plunger adapted to meet and contact with the can head, superposed parallel closed dies coacting with the plunger to curl and double seam the can head upon the body in two stages, said plunger forcing the can body with its attached cover axially through one pair of dies to a position between the opposed members of the other die, means by which the platen and can are subsequently depressed, and a carrier upon which the cans are delivered for removal.

9. In an apparatus of the character described, a can support or platen, a plunger adapted to contact with the can head, a yielding support for the platen, means by which the plunger and can are depressed, closed dies by which the can head is partially compressed upon the can, means for releasing the plunger presser, and raising the platen and the can, a second series of dies beneath the first ones, means by which the plunger and platen are subsequently depressed to place the can head between said second set of dies, means by which said dies are retained closed to finish the compressing of the can-head seam, means for again depressing the platen and can below the dies, and delivering the can upon the discharge conveyer.

10. In an apparatus of the character described, a horizontally traveling can carrier, a platen or support upon which the cans are successively delivered, a locking detent by which the cans are prevented from advancing upon the platen, a feed bar, means for releasing said bar by the action of the detent whereby the cans are advanced upon the platen, and means carried by the feed bar to arrest the movement of the succeeding can.

11. In an apparatus of the character described, a can support, a reciprocating plunger adapted to engage the can cover, movable dies coacting with the plunger to

close the seam, reciprocating bars by which the dies are closed and held closed, while the cover and can are forced into them to curl and close seams in two stages, said bars having channels into which the dies are successively retracted after their operation.

12. In a can closing apparatus of the character described, a horizontally traveling carrier for cans, a receiving support or platen, a feed bar by which the cans are successively placed thereon, a carriage arranged to receive can covers, means by which the support and cans are elevated, a plunger with which the can covers contact when raised, whereby they are first interlocked with the top of the can, means by which the plunger and can are then depressed, dies which are held closed while coacting with the plunger to partially close the seam when the plunger and can are depressed, means by which said dies are separated, a second set of dies, means by which they are held closed to finally complete the seam, and means by which the dies are separated to allow the can to be finally depressed to discharge position.

13. In a can closing machine, the combination of two sets of independently mounted automatically closed dies, and a pressure device co-acting therewith, one set of said dies adapted to partially close the seam between the can and can cover, and the other set of dies having constricted walls adapted to embrace the can body to which the cover is loosely, interlockably attached, said pressure device operating through the dies progressively and adapted to force the joint between the can body and cover into the said constricted walls of the second set of dies to thereby compress the joint and seal the cover to the can body.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CLARENCE M. SYMONDS.

Witnesses:

CHARLES A. PENFIELD,  
CHARLES EDELMAN.