J. C. BOWERS.

CAN SEALING MACHINE.

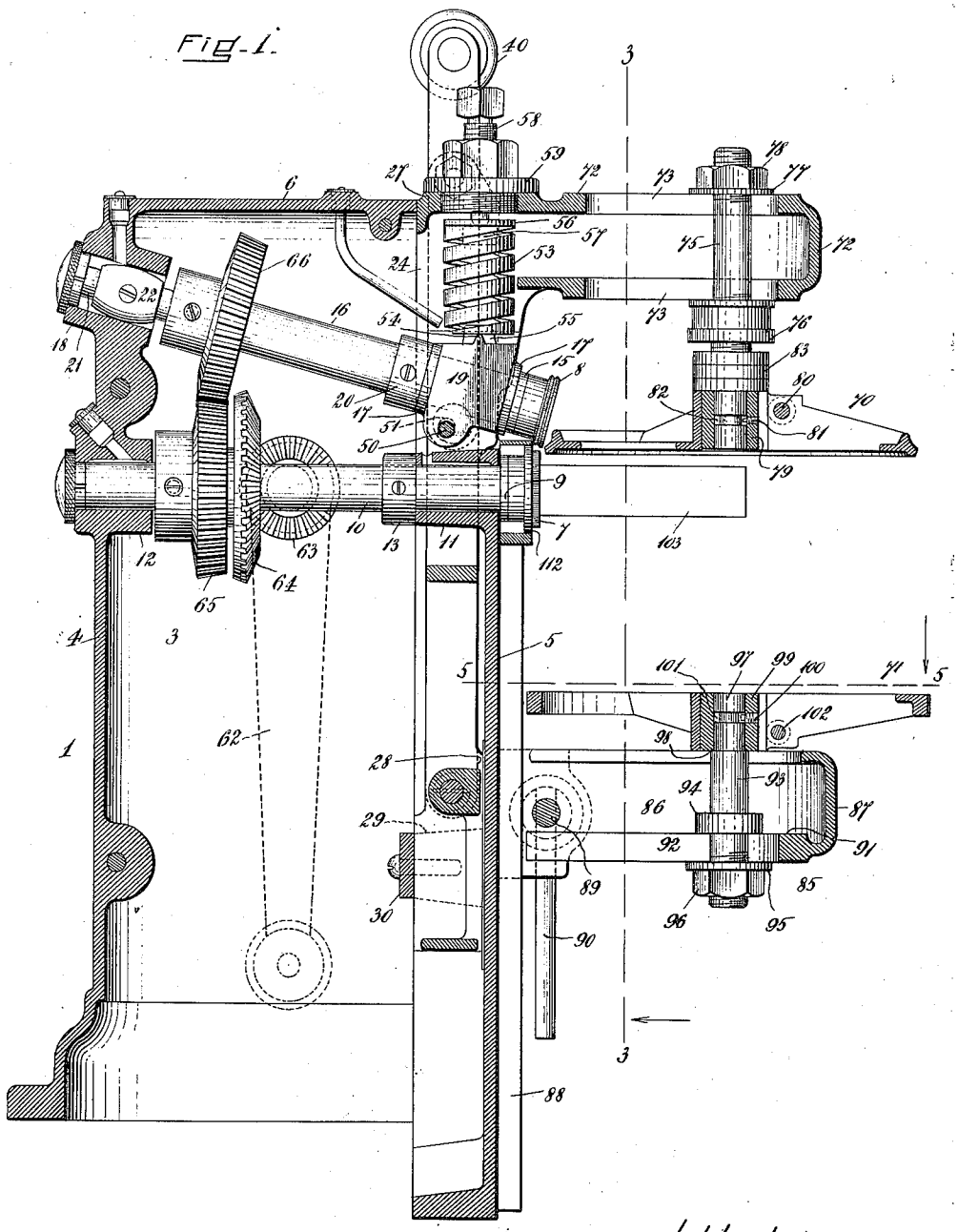
APPLICATION FILED APR. 28, 1917.

1,306,168.

Patented June 10, 1919.

5 SHEETS—SHEET 1.

Fig. 1.



INVENTOR:

John C. Bowers.

By his attorneys.

Cook & Hayes

J. C. BOWERS.

CAN SEALING MACHINE.

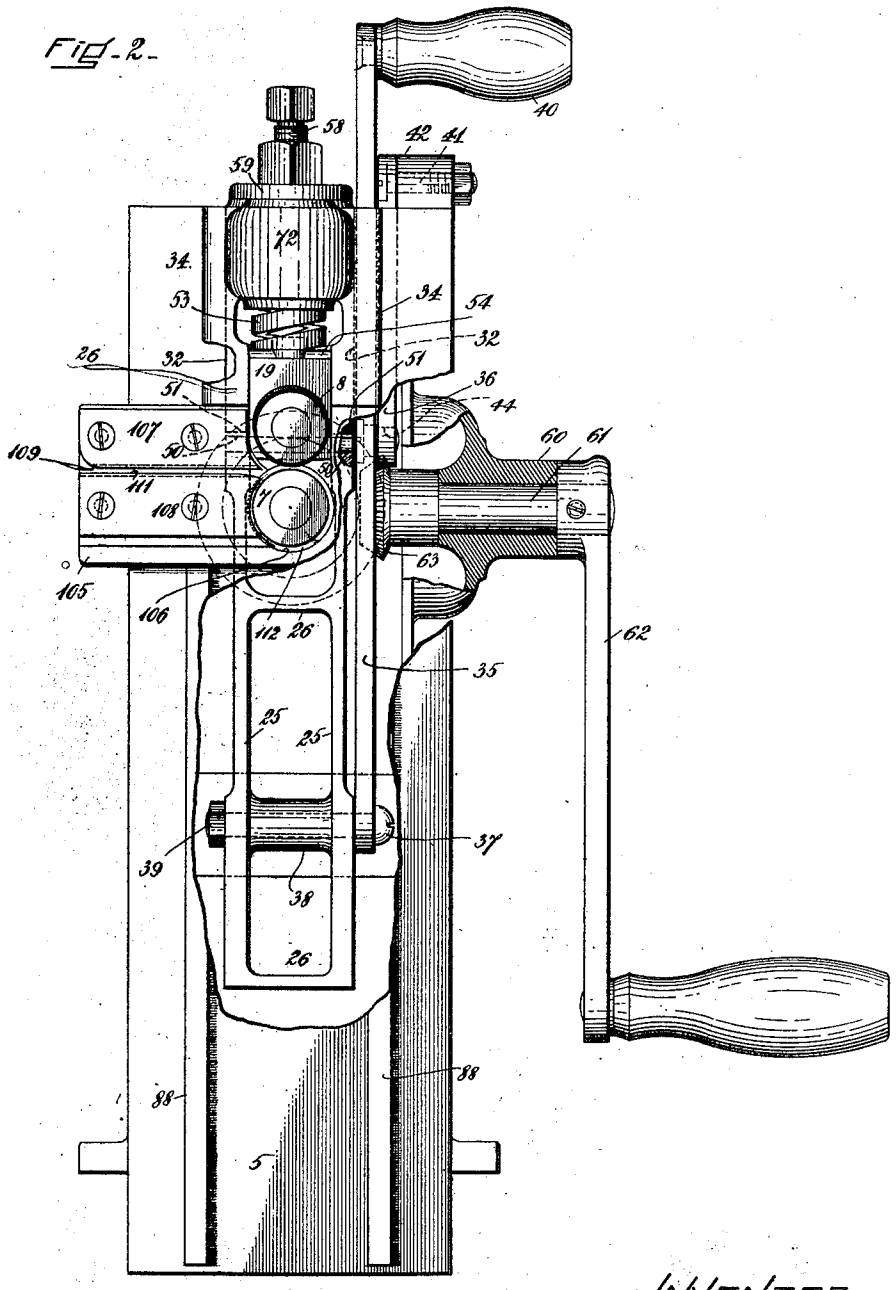
APPLICATION FILED APR. 28, 1917.

1,306,168.

Patented June 10, 1919.

5 SHEETS—SHEET 2.

Fig. 2.



INVENTOR:
John C. Bowers
By his attorneys,
Coates & Langner

J. C. BOWERS.

CAN SEALING MACHINE.

APPLICATION FILED APR. 28, 1917.

1,306,168.

Patented June 10, 1919.

5 SHEETS—SHEET 3.

Fig. 3.

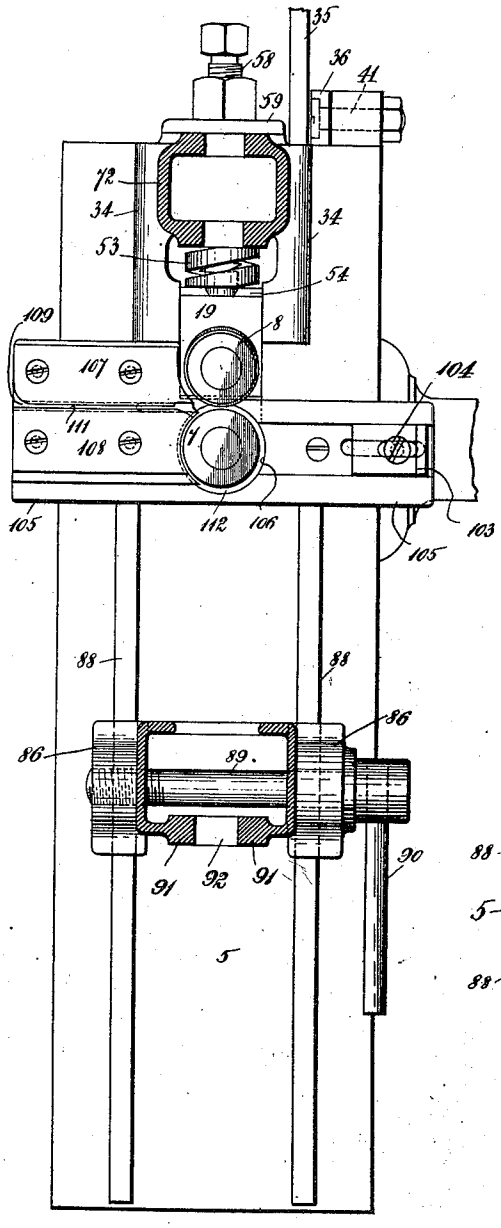


Fig. 4.

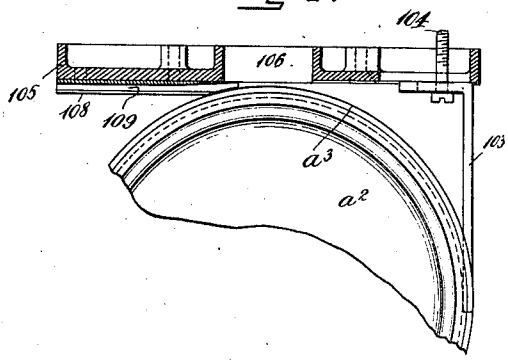
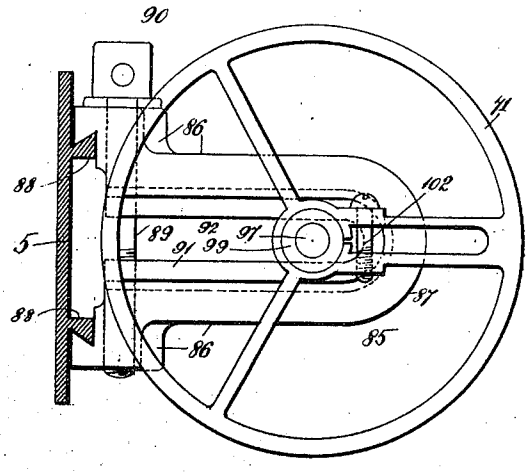


Fig. 5.



INVENTOR:

John C. Bowers.

By his attorneys,

Crabb & Hayes

J. C. BOWERS.

CAN SEALING MACHINE.

APPLICATION FILED APR. 28, 1917.

1,306,168.

Patented June 10, 1919.

5 SHEETS—SHEET 4.

Fig. 6.

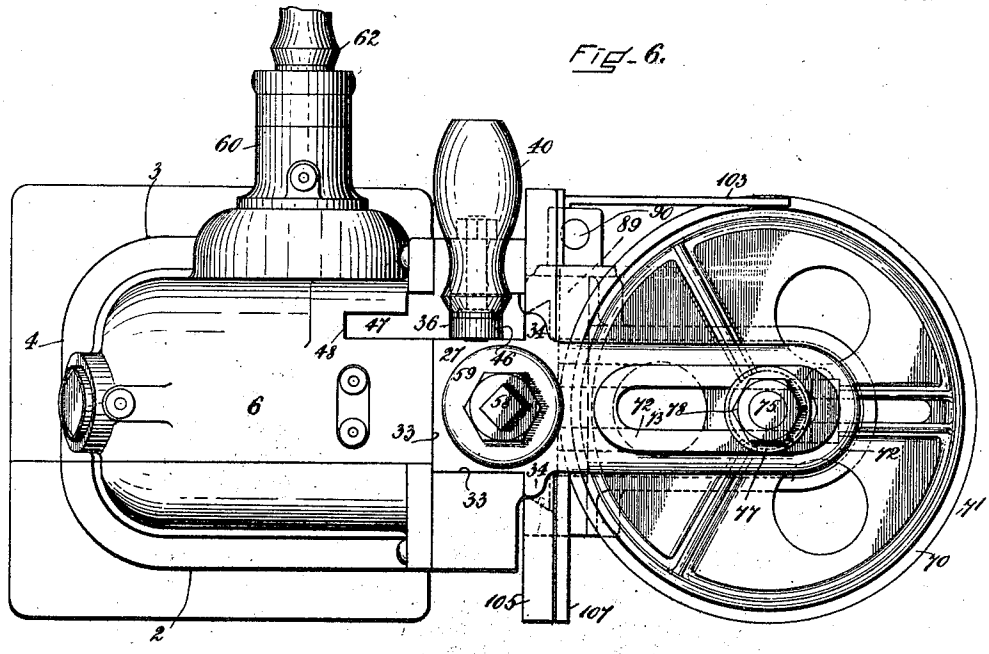


Fig. 7.

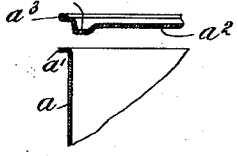


Fig. 8.

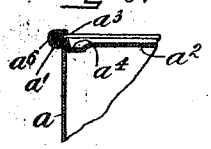


Fig. 9.

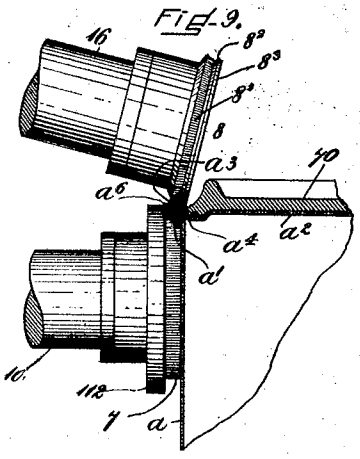


Fig. 10.

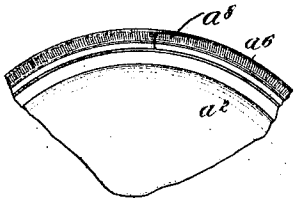


Fig. 11

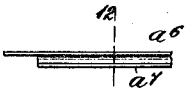
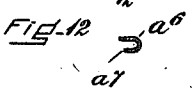


Fig. 12



INVENTOR:

John C. Bowers.

By his attorneys.

Grant Hayes

J. C. BOWERS.

CAN SEALING MACHINE.

APPLICATION FILED APR. 28, 1917.

1,306,168.

Patented June 10, 1919.

5 SHEETS—SHEET 5.

Fig. 13.

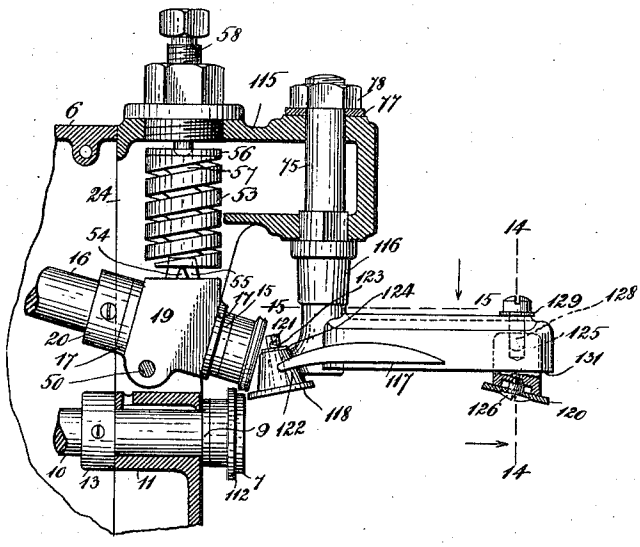


Fig. 14.

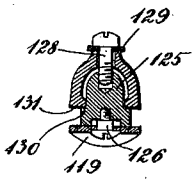


Fig. 15.

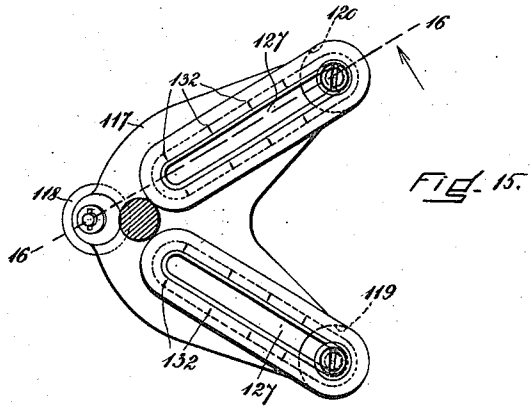
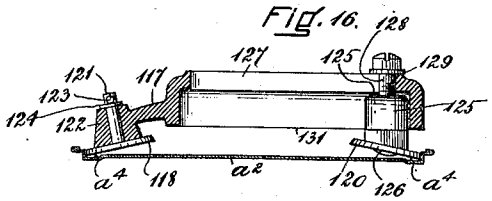


Fig. 16.



INVENTOR=

John C. Bowers,

By his attorneys,

Coale & Hayes

UNITED STATES PATENT OFFICE.

JOHN C. BOWERS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE BOWERS CAN SEAL COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

CAN-SEALING MACHINE.

1,306,168. Specification of Letters Patent. Patented June 10, 1919.

Application filed April 28, 1917. Serial No. 165,162.

To all whom it may concern:

Be it known that I, JOHN C. BOWERS, of Boston, in the county of Suffolk and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Can-Sealing Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

My invention relates to a machine for the hermetic sealing of cans, boxes and other receptacles without the use of solder, and especially one adapted to obtain the hermetic sealing of cans or receptacles substantially as described in my Letters Patent of the United States No. 867,239, of October 1, 1907, where not only is the head or cover hermetically secured to the body of the receptacle but in a manner also permitting of the breaking of the seal without the use of a key or other tool.

My invention relates also to a machine especially adapted to be operated by hand, although many of its operating parts might advantageously be used in a power-operated automatic machine.

It is the essential object of my invention to provide a machine that can be easily operated by hand to obtain an airtight seal or joint without any special skill being required on the part of the operator. In accordance with the general structure and operation of the present machine a substantially U-shaped sealing strip is applied or pressed onto the outwardly-projecting and overlapping flanges of a can body and cover by sealing rolls.

The general structure of the machine and its various parts together with the incidents of its operation can best be seen and understood by reference to the drawings, in which—

Figure 1 is a longitudinal vertical section of the machine, some of the parts being shown in section, others in side elevation.

Fig. 2 is a front elevation of the machine with a portion cut away.

Fig. 3 is a view partly in front elevation and partly in section taken on the line 3—3 of Fig. 1.

Fig. 4 is a view partly in plan and partly in section of a detail of construction to which special reference will later be made.

Fig. 5 is a plan taken on the line 5—5 of Fig. 1.

Fig. 6 is a plan of the entire machine.

Fig. 7 shows in cross section portions of a can body and cover, the parts being shown detached.

Fig. 8 is the same as Fig. 7 with the parts combined and the sealing strip applied to the overlapping flanges of the combined parts but not pressed thereon.

Fig. 9 is a view partly in side elevation and partly in section of the sealing rolls and another intimately-associated part, said rolls and part being shown in an operative or engaging position with relation to the work.

Fig. 10 is a plan of a portion of a can body and cover with the sealing strip applied thereto.

Fig. 11 is a front elevation of the sealing strip, and

Fig. 12 is a section of the sealing strip on the line 12—12 of Fig. 11.

Fig. 13 is a view partly in vertical section and partly in side elevation of a slightly modified structural part of the machine and to which special reference will hereinafter be made.

Fig. 14 is a cross section on the line 14—14 of Fig. 13.

Fig. 15 is a plan of a portion of the modified structure shown applied to a can cover, and

Fig. 16 is a section on the line 16—16 of Fig. 15.

Referring to the drawings:—

The frame or body of the machine consists of a casing 1 substantially rectangular in shape and having a detachable side 2 through which access is had to the interior of the casing. 3 represents the other side of the casing, 4 the back, 5 the front and 6 the top of the casing.

7 and 8 represent, respectively, the sealing rolls. Of these rolls the bottom roll 7 is mounted upon the enlarged forward end 9 of a shaft 10 horizontally arranged and turning within bearings 11 and 12 formed, respectively, in the front and back of the casing. Endwise movement of the shaft is prevented by the engagement of the head 9 with the forward end of the bearing 11 and by the engagement also of a collar 13 upon the shaft with the rear side of this same

bearing. With the parts thus arranged, the roll 7 will turn within a vertical plane substantially parallel with, and a short distance in front of the front face of the casing.

The top roll 8 is mounted upon the enlarged end 15 of a shaft 16. This shaft is an inclined shaft for purposes later to be explained. The shaft turns in bearings 17 and 18, respectively. The bearing 17, in the nature of a bushing, is arranged within a block 19. The bearing 18 is formed in the back of the casing. Endwise movement of the shaft is prevented by the engagement of the head 15 with the front end of the bearing 17 and by the engagement also of a collar 20 with the rear end of this same bearing.

According to the operation and adaptation of the parts there is permitted to the block 19, the forward end of the shaft 16 and the roll 8 carried by it a slight degree of vertical movement, the roll 8 being movable vertically toward or away from the roll 7 which defines the operative and releasable positions of the roll 8 with relation to the roll 7. The vertical movement of the block 19, forward end of the shaft 16 and roll 8 carried by it is permitted and otherwise compensated for by mounting the rear end of the shaft 16 within the bearing 18 in a manner to permit the free turning of the shaft and also both a slight endwise movement of the shaft within the bearing and rocking motion therein, which permits of the shaft turning pivotally. Such mounting is secured by cutting down the rear end portion 21 of the shaft and fixing thereto a barrel-shaped sleeve 22 capable of rotating, sliding and rocking within the bearing 18.

The block 19 is borne by a movable part of the roll-supporting structure or carrier 24 to which the block is pivoted as will later be explained. The carrier comprises a frame consisting of spaced parallelly-arranged bars 25 connected and reinforced at intervals by cross-bars 26, and at its upper end it is provided with a squared head 27 (see Figs. 2 and 6).

The carrier 24 is vertically arranged in the fore part of the casing to extend above and below the shafts 10 and 16 and has a slight degree of up and down movement. That portion of the carrier lying below the shaft 10 bears along the fore edges 28 of the side bars against the front of the frame or casing. On either side the side bars bear laterally against butts 29 projecting inwardly from the front 5 of the casing. Secured to these butts is a strap 30 which extends across the rear sides of the side bars. Thus the fore part of the casing, butts 29 and strap 30 restrain and guide the lower portion of the carrier to have only a vertical movement, the bearing of the carrier against these parts being sufficiently loose to permit of such movement. That portion of the carrier lying above the shaft 10 and bearing 11 of this shaft are contained within an incised portion of the casing. In other words, that portion of the front of the casing above the bearing 11, including, also, a portion of the head or top 6 of the casing, is cut away, leaving in the front of the casing vertically-spaced edges 32 and in the top of the casing squared edges 33. The side bars 25 of the carrier are widened to bear laterally against the edges 32 and slide thereon, both widened edges of the side bars being also provided with outwardly-extending flanges 34 (see Figs. 2 and 6) which bear against the outer face of the front of the casing adjacent the edges 32 and slide thereon. The head 27 of the carrier fits within the squared edges 33 of the top of the casing (see Fig. 6) and is slidable vertically upon these edges.

The carrier is supported by an arm 35 and connecting link 36. The arm 35 extends from a point above the top of the casing downwardly alongside one of the side bars 25 of the carrier and is pivoted to the lower end of the carrier by a pin 37 which extends through a hub 38 interposed between its side bars 25, the pin being secured at its outer end by a nut 39. At its upper end the arm 35 is provided with a handle 40. The link 36 is pivotally secured by a pin 41 to a boss 42 on the top of the casing. From the point of its pivotal attachment the link extends downwardly alongside the arm 35 and is pivotally secured to this arm about midway its length by a pin 44 (see Fig. 2). According to their normal arrangement, the side bar 25 of the carrier to which the arm 35 is secured, this same arm and also the link 36 will normally occupy vertical positions substantially parallel with one another, their normal positions being defined by the engagement of the arm 35 with an edge 46 in the top of the casing and against which edge the arm 35 has bearing. The pivotal connection of the arm 35 with the carrier and also a slot 47 formed within the top of the casing permits of the arm being thrown backward toward the rear of the casing by one grasping the handle 40. By this motion of the arm a toggle effect is obtained with the link 36 to impart a slight upward movement upon the carrier, this movement being but a limited one and defined by the engagement of the arm 35 with the edge 48 at the rear of the slot 47 in the top of the casing. Upon returning the arm 35 to its initial position the link or toggle action will lower the carrier to its original position. This operation is described at this time in order that its bearing upon the control of the rolls may be better understood at a later point in the description.

The block 19 fits between the side bars 25

of the carrier and is pivoted thereto by trunnions 50 which enter openings or sockets 51 formed within the side bars. It will accordingly be seen that the fore end of the shaft 16 and roll 8 carried by it are borne by the carrier. Borne also by the carrier is a spring 53 interposed between the block 19 and the head of the carrier. For supporting the lower end of the spring the block 19 is provided on its top side with a knife edge 54 and also a short central post 55. The bottom end of the spring rests upon the knife edge 54 with the post 55 entering the coil of the spring and acting to center it. At its top end the spring is provided with a follower 56 having a short post 57 which enters the coil of the spring and by which the follower is centered and held in place. Having bearing against the follower 56 is a screw 58 which turns within a headed plug 59 threaded to fit within the top 27 of the carrier. The plug 59 is threaded and accordingly removable, which allows an easy insertion or removal of the spring from the carrier as occasion may require. Adjustment in the tension of the spring is obtained by turning the screw.

It is the spring 53, which is of considerable tensile strength, that holds the roll 8, when occupying its normal operative position, onto the work in order that both rolls 7 and 8, when turned, may perform the sealing operation. The normal operative position of the roll 8 is defined initially by the retention of the carrier in that position normally occupied by it when supported by the arm and link connections 35 and 36, when occupying their normal positions as aforesaid. With the carrier occupying this, its normal position, the spring 53 exerting tension against the block 19, will force the trunnions 50 of the block against the lower surfaces of the openings or sockets 51 formed within the side bars of the carrier. Inasmuch as the block 19 must move simultaneously with the end of the shaft 16 and roll 8 carried by it, the normal operative position of this roll is accordingly secondarily defined by the bearing of the trunnions of the block against the lower surfaces of the sockets or openings formed within the carrier within which the trunnions are resting. For a purpose, to which attention will later be directed, it is necessary that the roll 8 when occupying a normal operative position in relation to the roll 7, may move slightly away from the roll 7 independently of the carrier and consequently against the tension of the spring 53, the yielding of the roll resulting in a compression of the spring. Such yielding of the roll is compensated for by permitting the block 19 to yield slightly within the carrier with an up and down motion, this being provided for by permitting the trunnions of the block to move within the sockets 51 within which they are contained, on the carrier, these sockets being made slightly elongated or elliptical in form to permit of such yielding.

The relative yielding permitted the roll 8 is one that obtains during the sealing operation and is one independent of that movement which ensues when the roll 8 is thrown into a released position with relation to the roll 7 to permit of the insertion or removal of the work. This movement of the roll 8, or the throwing of this roll into and out of an operative position is by the up and down motion imparted to the carrier when the arm 35 is operated by the handle 40 as above described. During such up and down motion of the carrier and consequent motion of the roll 8 the normal positions of the block 19, spring 53 and other parts borne by the carrier will be maintained, it being especially to be noted that the spring moves with the carrier with no change in the tension of the spring. Accordingly the motion which moves the carrier to throw the roll into an operative or inoperative position is independent of the tension of the spring.

As the carrier is moved, throwing the roll 8 into operative and released positions, and, also, when the roll is moved relatively to the carrier, the operation of the parts is such that a slight relative change in position will ensue between the block 19 and the carrier. This is compensated for by the pivoting of the block. Such relative change in the position of the block during this motion might also tend to disturb the spring or cause its cramping, exerting as it does a heavy tension, but this is compensated for by the suspension of the spring between bearing points as above described.

Motion is imparted to the sealing rolls as follows: Arranged upon the right side of the casing is a boss 60 providing a bearing for the shaft 61 of a crank 62. The shaft 61 carries upon its inner end inside the casing a bevel gear 63 meshing with a bevel gear 64 on the shaft 10, motion being thus imparted to the shaft 10 and roll 7 as the crank is turned. Motion is imparted to the roll 8 from off the shaft 10 to the shaft 16 by connecting gears 65, 66 arranged on the respective shafts.

Reference will now be made to the manner in which the work (meaning the can and cover) is held in position to receive the sealing strip and accompanying pressure of the sealing rolls. At such time the work is held between rotary clamps 70, 71, which engage, respectively, the cover and bottom of the can body. Of these clamps the clamp 70 is mounted upon the carrier, while the clamp 71 is mounted upon the casing or fixed portion of the machine. The clamp 70 is mounted as follows: Fixed to the top end of the carrier by preferably an integral con-

nection is a bracket 72. This bracket has a forward horizontal projection and is provided with a vertical slot 73 of considerable length and depth running longitudinally the bracket. Extending through the slot 73 of the bracket and adjustable therein is a shaft or stud 75. Arranged upon the stud and bearing against the under side of the bracket is an adjustable nut 76. Arranged upon the stud and bearing against the upper side of the bracket is a washer 77 which is retained by a nut 78 likewise arranged upon the stud. By this means the stud is securely fixed to the bracket in any adjustable position to which it may be moved. Loosely arranged upon the bottom end of the stud projecting below the bracket is a sleeve 79 to which the clamp member 70 is secured by a binding screw 80, the clamp member being made to normally loosely embrace the sleeve and the member thus embracing the sleeve being made sufficiently flexible as to be capable of bending and tightly embracing the sleeve upon tightening the binding screw. The sleeve 79 is loosely mounted to turn upon the end of the stud, but is held against excess endwise movement by means of a pin 81 projecting from the interior of the sleeve into an annular slot 82 formed in the stud. This arrangement permits the sleeve and clamp member 70 to have a slight vertical yielding with relation to the stud in order that the sleeve and clamp member may engage a roller bearing 83 arranged upon the stud above the sleeve. The adaptability of this roller bearing is such that the sleeve and clamp member carried by it will turn upon the bearing after the clamp member has been brought into engagement with the work and during the rotation thereof, the clamp member then being under pressure as will later be explained.

The clamp member 71 is supported to turn upon a bracket 85. This bracket is mounted upon the front face of the casing in a manner permitting of the vertical adjustment of the bracket and clamp member carried by it and the fixing thereof in any desired adjusted position. To secure these ends the bracket is made substantially U-shaped with spaced sides 86 and connecting fore end 87. The rear ends of the sides of the bracket are vertically grooved to slide upon parallelly-spaced guides 88 upon the front of the casing, in which connection, also, it will be observed that the grooving of the sides of the bracket and the formation of the guides are such that the sides of the bracket will normally have a loose interlocking engagement with the guides permitting of the vertical adjustment of the bracket. The bracket is fixed to the guides in any adjusted position by means of a binding screw 89 the head of which bears against one side of the bracket with the shank extending through this side and with an end threaded into the other side of the bracket and screwing into the same, the arrangement being such that as the binding screw is turned the two sides of the bracket will be drawn together and the ends thereof hard against the sides of the guides, fixedly holding the bracket in place secured to the casing. The drawing together of the two sides of the bracket is permitted by reason of the elasticity of the metal and is accomplished by means of an arm 90 secured to the head of the binding screw. The sides 86 of the bracket are provided along their bottom edges with an inwardly-extending web or flange 91 spaced to leave a slot 92 in the bottom of the bracket. This slot is a horizontal slot extending at right angles to the face of the casing, and occupies a position in substantially the same vertical plane and in parallel alinement with the slot 73 in the bracket 72 which supports the upper clamp member. Arranged to slide within the slot 92 and become affixed to the bracket in any adjusted position is a vertical stud 93. The body of this stud is enlarged or provided with a collar 94 which bears against the top surface of the webs or flanges 91 between which the slot 92 is formed. Arranged upon the stud and bearing against the bottom sides of these same webs or flanges is a washer 95 secured by a nut 96 threaded upon the lower end of the stud, the coöperation of the parts affixing the stud securely to the bracket in any adjusted position within the range afforded by the slot 92. Above the collar 94 the shank of the stud extends upwardly between the two sides of the bracket with the top end 97 thereof lessened in diameter to provide a shoulder 98. Arranged to turn upon the narrowed top end 97 of the stud and bearing against the shoulder 98 is a sleeve 99. This sleeve is secured against endwise displacement by means of a pin 100 in the sleeve entering an annular slot 101 in the stud. The clamp member 71 is secured to the sleeve by means of a binding screw 102, the clamp member being made to normally loosely embrace the sleeve yet capable of yielding and tightly embracing the sleeve when the binding screw is tightened.

In connection with the operation of the clamping members 70, 71, it should be explained at this point that the member 71 acts as a table upon which the can body a is initially placed, the table being so adjustably fixed that when the can body is resting upon it the top flange a^1 of the body will overlap the top peripheral surface of the roll (see Fig. 9). It will be assumed that the cover a^2 has been placed upon the can with the flange a^3 of the cover overlapping the flange on the body of the can. It will be assumed, also, that the clamping member 71, by the throwing backward of the lever arm 35, is occupy-

ing a raised position coincident with the raised disengaged position of the carrier to which it is secured. When the carrier is lowered by the bringing forward of the arm 35 the clamp member 70 will become lowered to fit into a depression a^4 formed in the cover of the can, and the can body will then become tightly clamped between the two members, the members then operating to hold the can body and cover in position to rotate around such center as will maintain the flanges thereof between the rolls during the entire period of rotation and will also operate to hold the can body and cover against lateral displacement, this effect being especially obtained by the operation of the clamp member 70. The proper centering of the can with relation to the sealing rolls is obtained when the upper clamp member fits within the depression formed in the cover of the can, the clamp member 70 being adjustably moved whereby it may fit in the depression depending upon the particular size of the can. In order to prevent slipping of the can or work between the clamp members it is necessary that both clamp members rotate about a common center and this effect can be obtained by adjusting the clamp member 71 to have a common center of rotation with the clamp member 70 and accordingly with the can held between the respective members. Having properly centered any particular sized can with relation to the sealing rolls through adjustment of the clamp members, the position thus attained is established for all cans of the same size by a gage 103 consisting of an angular bent bar fastened to the body of the casing by a screw 104 which extends through a slot in the bar, thus providing for the adjustment thereof.

When the carrier is occupying its raised position by the throwing forward of the arm 35, the roll 8 of the sealing rolls will then be occupying a raised or disengaging position with relation to the roll 7, which permits of the placing of the can body and cover in proper position between the clamp members and the proper interposition of the flanges thereof between the sealing rolls. When the carrier is lowered, lowering the clamp member 70 into engagement with the cover, the roll 8 will at the same time be lowered into its operative or engaging position to press the sealing strip onto the flanges of the can body and cover. With the parts occupying such position, the U-shaped sealing strip a^6 is fed in such manner as to first embrace the flanges of the can body and cover and afterward become compressed upon the flanges by the operation of the sealing rolls as these rolls are turned by the operation of the crank 62.

Reference will now be made in further detail to the means employed for feeding the sealing strip. Extending across the front of the casing and fastened thereto in suitable manner is a plate 105. The sealing rolls turn within a large opening 106 in this plate. Secured to the plate 105 at the left of the sealing rolls are spaced plates 107, 108, respectively, which are so arranged that these plates together with the back plate 105 form a guide for the sealing strip which is inserted endwise into the guide 109. The guide is substantially U-shaped in cross section to correspond with the form of the strip, the strip being inserted with the back of the strip bearing against the back plate 105. To prevent the strip turning within the guide and for a further special purpose, as will later be explained, the plate 108 is provided with a flange 111 against which the lower edge a^7 of the strip bears. The guide is a straight guide, or, in other words, is adapted to receive a straight strip, and occupies a horizontal plane coincident with substantially the same horizontal plane as that occupied by the flanges of the can body and cover when in place between the sealing rolls. That is, the arrangement of the guide is such that as the strip is inserted it may be fed onto or embrace the flanges of the can body and cover and later receive the pressure or bearing of the sealing rolls.

The guide is also located slightly forward of the compression point of the sealing rolls, occupying a position where the sealing strip fed through the guide will engage the flanges of the can body and cover on the arc described by them laterally removed from, and slightly forward of the compression point of the sealing rolls (see Fig. 4). In other words, the line of the guide is such that if the back edge of the sealing strip were extended in a straight line it would not engage the flanges of the can body and cover tangentially at the compression point of the sealing rolls, but would cut the flanges as a chord. In consequence the sealing strip coming into engagement with the flanges of the can body and cover, in order to reach the compression point of the sealing rolls, is bent backward slightly, the elasticity of the metal permitting such bending and with the effect that the sealing strip, owing to the elasticity of the metal, will press forward hard against the edges of the flanges during the operation of the rolls. As the strip is bent backward the tendency would be to throw the outer end of the strip, or that portion within the guide, in a forward direction, but this is prevented and the strip held in proper alinement within the guide at all times by the flange 111 which engages the edge a^7 of the sealing strip as above described. The bending of the sealing strip and feeding thereof to the sealing rolls is initially accomplished by a slight pressure exerted by the hand of the operator upon the end of the strip, which enables the strip to catch onto the work, the

further feeding and consequent bending of the strip being accomplished by the rotation of the work by the sealing rolls, frictional contact then operating to hold the strip onto the work.

Not only does the elasticity or spring inherent in the sealing strip act to hold it upon the flanges during the operation of the sealing rolls and prevent any tendency of the rolls to crowd the strip off the flanges owing to the severity of their compression, but this is also prevented by the engagement of the back of the strip during the sealing operation with the flanged edge 112 of the roll 7 acting as a backing for the strip, the work at the same time being held from displacement by the clamps 70, 71.

It is very desirable that any tendency of the sealing rolls to crowd the sealing strip off the flanges during their compression be fully safeguarded, and there is therefore provided not only the means just above described, but the bearing of the sealing roll 8 is such as to prevent such displacement, this being the roll that might cause displacement if not compensated for.

It is apparent that those portions of the flanges of the can body and cover with the sealing strip thereon against which the sealing rolls have bearing, have different speeds of rotation, that is, the outer or peripheral edge thereof is rotated at a faster speed than the portion inwardly removed therefrom. If the sealing roll 8 had a uniform speed of rotation throughout its entire bearing surface there must consequently be slippage between it and those portions of the sealing strip against which the roll has bearing and this slippage during the operation of the parts might cause a displacement of the strip. It is in compensating for this slippage that arrangement is made whereby the bearing surface 8^1 of the sealing roll 8 (see Fig. 9) shall have a speed of rotation substantially the same as that portion of the sealing strip against which said surface 8^1 of the roll has bearing. This effect is obtained by making the roll 8 to have a gradually lessening diameter whereby it will present a working face having a variable rotative speed as the roll is rotated, and then arranging this roll through inclination of the shaft 16 bearing it so that the face to that portion of the roll having the larger diameter will engage the outer edge portion of the strip, and the face to that portion of the roll having the lesser diameter will extend inwardly over the strip from the outer edge thereof. With the roll thus constructed and arranged the rotative speed of its bearing face becomes practically coincident with the rotary speed of those portions of the sealing strip with which it is in engagement in so far as this end can be attained. While the difference in speed of different portions of the sealing strip will depend relatively upon the size of the can and would consequently call for a slight difference in the angularity given the surface of the roll 8, this depending upon the inclination of the shaft 16 bearing the roll, yet if the shaft 16 be given an inclination of about 15° it will permit of such variation in the surface speed of the roll 8 as will effect proper compensation in the case of any can which might be used in the machine. According to the embodiment of the machine shown, while a substantially U-shaped sealing strip is applied to the flanges of the can body and cover, yet during the application the strip is indented to form a locking edge or shoulder substantially as shown and described in the Letters Patent of the United States previously noted. For this purpose the roll 8 is provided with a projecting edge or bead 8^2, and that portion of the roll forward of this bead which bears against the sealing strip inwardly removed or forward from the indentation or edge is made of varying diameter and presents a working face 8^3 which is beveled or inclined substantially the same as the surface 8^1 of the roll and for the same reason.

The further general operation of the machine is as follows: The two clamp members 70, 71, and gage 103 are first set in such positions as will properly center the can in relation to the sealing rolls, this depending upon the size of the can. When properly centered the can body with the cover upon it will rest upon the clamp member 71 with the flanges of the can body and cover lying between the sealing rolls and with the flange of the can body removed from the top surface of the roll 7 by an amount equal to the thickness of the metal of the sealing strip. The further adjustment of the clamp members should be such that the clamp member 71 when lowered will fit within the depression formed in the cover and both clamp members will turn about a common center. The placement of the can body and cover thus attained is further defined by the adjustment of the gage 103, which is set to contact with the side of the can body.

Having now positioned the two clamp members and gage for the particular size of can to which they have been adjusted, the sealing operation for all cans of this size is as follows: The lever arm 35 is first thrown back raising the carrier and with it the sealing roll 8 and clamp member 70 into their respective disengaging positions. The can body with the cover upon it is then placed upon the lower clamp member 71 and against the gage. The flanges of the can body and cover will then lie properly positioned between the sealing rolls. The carrier is now lowered by the drawing forward

of the lever arm 35 which brings the sealing roll 8 into engagement with the flange of the cover and the clamp member 70 to fit within the depression in the cover and the can will become clamped between the two clamp members and properly centered with relation to the sealing rolls. The sealing strip is now inserted and brought into contact with the flanges of the can body and cover. A slight pressure is applied to the sealing strip and at the same time the sealing rolls are operated by the crank, thereby rotating the work. As the work is rotated the sealing strip will be drawn forward, as explained above, to pass between the sealing rolls and become applied to the flanges of the can body and cover, the operation of the rolls being continued until the strip has been fully applied. The bending of the strip around the flanges of the can body and cover is effected by the rotation of the work, the strip being initially bound to the flanges and then bent and progressively applied thereto as the rotation of the work continues. After the strip has been fully applied no further rotation is required, a single application of the rolls being sufficient. After the application of the strip the carrier is disengaged, throwing the roll 7 and clamp member 70 into their disengaging positions when the can can be removed and another can inserted with the same operation as before.

It will further be explained that when the carrier is lowered bringing the roll 8 into contact with the flange of the cover, the contact is merely a frictional contact or one just sufficient to rotate the work. The pressure exerted by the spring 53 upon the roll 8 is not applied until the sealing strip passes between the rolls when the roll 8 becomes lifted by an amount equal to the thickness of the metal of the strip. This lifting of the roll 8 operates through the shaft 16 and block 19 to slightly compress the spring when the tension thereof exerting a pressure of preferably about 300 lbs., is thrown upon the roll. The yielding of the shaft 16 and block with it is permitted, as before explained, by the freedom of the trunnions 50 of the block within the sockets or openings 51 in the carrier within which they are contained. Just before the strip has become fully applied to the can the end a^8 of the strip will overlap that portion of the strip initially applied, which causes a further raising of the roll 8 and consequent further compression of the spring, which is permitted by movement of the block with relation to the sockets or openings within which it is pivoted, the same as before.

While it has been explained that the lowering of the carrier when the work is in place brings the roll 8 into frictional contact with the flange of the cover so as to rotate the work as the rolls are turned for bending the sealing strip, yet this is not necessary, though convenient, for the roll may be lowered to a position just short of engagement with the flange, but so as to become raised for compressing the spring when the sealing strip on the flanges passes between the rolls. In such case the rotation of the rolls cannot initially rotate the work for assisting in the feeding and bending of the sealing strip, but the strip can be fed and the work initially rotated bending the strip and applying it to the sealing rolls by pressure applied by the hand of the operator against the end of the strip.

In Fig. 13 and the figures following there is shown a slightly modified structure in the parts pertaining to the clamping of the can body and cover and for otherwise properly locating the same in relation to the sealing rolls. As heretofore described, before the sealing operation can be properly effected the can body with the cover upon it must be centered between the clamp members 70, 71 with the flanges thereof lying between the sealing rolls. Experience has demonstrated that in some instances due to carelessness the can body and cover have been clamped between the two clamp members without the flanges thereof being properly located between the sealing rolls. In such case the sealing strip could not be properly applied to the flanges. It is to eliminate all difficulty of this kind that the following described structure has been provided:—

Fixed to the top end of the carrier to extend forward therefrom in substantially the same manner as the bracket 72 is a short bracket 115. Fixed to this bracket is a post 116 vertically arranged to project below the bracket and carrying a clamp member 117 having three rotary bearings 118, 119, 120 which are adapted to fit within the depression a^4 formed within the can cover, and make collectively a three-point contact therewith. Of these bearings the bearing 118 is a fixed bearing, the same being mounted upon a short shaft or stud 121 journaled within a boss 122 on the member 117. The shaft 121 is held in place in any suitable manner as by a pin 123 which extends through the end of it and bears against a washer 124 interposed between the pin and the top end of the boss. As regards location the relative disposition of the bearing 118 is such that it will only enter the depression a^4 in the cover when the flanges on the cover and also the flange on the body of the can are properly located between the sealing rolls.

The rotary bearings 119, 120 are set adjustably on the member 117, the bearings being movable in or out on diverging lines. Each of the bearings 119, 120 is fixed to a block 125 by a screw stud 126 on which the

bearing turns. The member 117 is provided upon the under side thereof with ways in which the blocks slide, the member being also provided with slots 127 extending along the lines of the ways. The blocks are held within the confines of the ways by means of screws 128 which pass through the slots from the top side of the member and fasten into the blocks, washers 129 being interposed between the heads of the screws and the member along the side edges of the slots. The loosening of the screws permits of the adjustment of the blocks and bearings carried by them within the limits of the slots. Tightening of the screws draws the blocks against the under side of the member, so fixing the bearings in adjusted position. At such time shoulders 130 upon the blocks will be drawn to have engagement with the edges 131 on the under side of the member along the sides of the ways.

The adjustment of the rotary bearings 119, 120 permits of their being placed in proper position to engage covers of different sized cans, the bearings being simply adjustably set in position to enter the depression a^4 in the cover. It is desirable at least that both bearings 119, 120 be set in such position as to engage the cover when it and the can body are occupying a centered position in relation to the sealing rolls, and to enable one to fix the bearings in proper position, dependent upon the particular size of the can and cover, the support along the sides of the ways is preferably provided with indices or marks 132 which indicate the proper adjusted positions of the bearings.

The advantage of the present construction is that the flanges of the can body and cover are always properly set between the sealing rolls, for, as above described, the rotary bearing 118 having fixed relation to the sealing rolls cannot enter the depression in the cover until the flanges are properly set. After the adjustment of the bearings 119, 120 to any cover or can the centering of the lower clamp member is obtained in the same way as before described, all the parts then operating substantially the same as before excepting that as the work turns all the bearings 118, 119, 120 of the clamp member 117 will rotate.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—

1. In a can-sealing machine, the combination of a pair of rotary sealing rolls one of which is releasable relatively to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable one of said rolls whereby it moves with the movable portion of the structure or is movable independently of it with relation to the roll mounted upon the fixed portion of the structure, a spring carried by said movable portion of the structure, means for mounting said spring and maintaining the same under tension whereby the spring may be moved with the movable portion of the structure without disturbing the tension of the spring and said spring resist by its tension any permitted independent movement of the releasable one of said rolls in relation to its companion roll as aforesaid, means for controlling the position of the movable portion of the structure and releasable roll carried by it, and a roll-actuating mechanism.

2. In a can-sealing machine, the combination of a pair of rotary sealing rolls one of which is releasable relatively to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable one of said rolls whereby it moves with the movable portion of the structure or is movable independently of it with relation to the roll mounted upon the fixed portion of the structure, a spring carried by said movable portion of the structure, means for mounting said spring and maintaining the same under tension whereby the spring may be moved with the movable portion of the structure without disturbing the tension of the spring and said spring resist by its tension any permitted independent movement of the releasable one of said rolls in relation to its companion roll as aforesaid, manually-operated means for controlling the position of the movable portion of said structure whereby the releasable roll carried thereby may be moved to and maintained in either a released position to its companion roll or an operative position with relation thereto, and a roll-actuating mechanism.

3. In a can-sealing machine, the combination of a pair of rotary sealing rolls one of which is releasable relatively to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable one of said rolls whereby it moves with the movable portion of the structure and is positioned thereby in either a disengaging or an operative position with relation to its companion roll and whereby also said releasable roll is movable independently of said movable portion of the structure with relation to its companion roll, said mounting for the releasable roll comprising a shaft and a support for said shaft having within it a bearing in which the shaft turns and

pivotally arranged to turn upon the movable portion of the structure, a spring carried by said movable portion of the structure and interposed between the head thereof and said support for the shaft bearing the releasable roll whereby it may resist by its tension any permitted independent movement of the releasable roll in relation to its companion roll as aforesaid, means for controlling the position of the movable portion of the structure and releasable roll carried by it, and a roll-actuating mechanism.

4. In a can-sealing machine, the combination of a pair of sealing rolls one of which is releasable relatively to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable roll whereby it moves with the movable portion of the structure or is movable independently thereof, a spring carried by said movable portion of the structure and movable with it, the same being arranged whereby it may resist by its tension any independent movement of said releasable roll with relation to said movable portion of the structure, means for maintaining said spring under tension and for varying the tension thereof, means for controlling the movable portion of the structure and releasable roll carried by it, and a roll-actuating mechanism.

5. In a can-sealing machine, the combination of a pair of rotary sealing rolls one of which is releasable relatively to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable one of said rolls whereby it moves with the movable portion of the structure or is movable independently thereof, said last-named means comprising a shaft carrying said releasable roll and a support for said shaft pivotally and otherwise loosely connected to said movable portion of the structure to be movable therewith or independently thereof, a spring carried by said movable portion of the structure and retained to bear against said support carrying the releasable roll whereby it may resist by its tension any permitted independent movement of said support, means for controlling the movable portion of the structure and the releasable roll carried by it, and a roll-actuating mechanism.

6. In a can-sealing machine, the combination of a pair of rotary sealing rolls one of which is releasable relatively to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable one of said rolls whereby it moves with the movable portion of the structure or is movable independently thereof, said last-named means comprising a shaft carrying said releasable roll pivotally supported to turn on both the fixed and movable portions of said structure and loosely connected to the movable portion of said structure whereby it moves therewith or is movable independently thereof, a spring carried by said movable portion of the structure whereby it may resist by its tension any permitted independent movement of the shaft carrying the releasable roll on said movable portion of the structure, means for controlling the position of the movable portion of the structure and releasable roll carried by it, and a roll-actuating mechanism.

7. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls one of which is releasable with relation to the other of said rolls and to the work, shafts carrying the respective rolls, a roller-supporting structure having a fixed and a movable portion, a spring member carried by the movable portion of said structure, means for mounting the shaft carrying one of said rolls upon the fixed portion of the structure, a block providing a bearing for the shaft carrying the other releasable one of said rolls, said block being mounted upon the movable portion of said roll-supporting structure and movable therewith, means for pivotally supporting said block whereby it may yield upon the movable portion of said structure against said spring member and said spring member be compressed and the force exerted thereby transmitted through said block and shaft journaled therein to the releasable one of said rolls, means for otherwise supporting the shaft carrying the releasable roll, and means for controlling said movable portion of the roll-supporting structure as to position.

8. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls one of which is releasable with relation to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of said structure, means for mounting the other releasable one of said rolls to be movable with the movable part of said structure and be positioned thereby in an operative or a released position with relation to its companion roll, work-holding clamp members, means for mounting one of said members on the fixed portion of said structure, means for mounting the other clamp member on the movable portion of said structure whereby it is movable therewith to occupy an operative or a released position simultaneously with the releasable one of said rolls, and means for con-

trolling the position of said movable part of the roll-supporting structure.

9. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls one of which is releasable with relation to the other of said rolls and to the work, a roll-supporting structure having a fixed and a movable portion, means for mounting one of said rolls on the fixed portion of the structure, means for mounting the other releasable one of said rolls to be movable with the movable portion of said structure and be positioned thereby in an engaging or a released position with relation to the work, a work-holding member, means for mounting said member on the movable portion of said structure whereby it is movable therewith to occupy an engaging or released position simultaneously with the releasable one of said rolls, and means for controlling the position of said movable portion of the structure whereby said releasable roll and said work-holding member may be moved to and maintained in an engaging position or released into a disengaging position.

10. In a can sealing machine, a pair of rotary sealing rolls coöperating with one another as the rolls are actuated to press a substantially U-shaped strip upon overlapping circular flanges lying closely together, one of which rolls has a gradually lessening diameter and presents a working face having a variable rotative speed as the roll is rotated, said one of the rolls being also so arranged that the face to that portion of the roll having the larger diameter may engage the outer edge portion of said strip and the face to that portion of the roll having the lesser diameter may extend inwardly over the strip from the outer edge thereof, means for mounting the rolls whereby both may have working engagement with the strip, and a roll actuating mechanism.

11. In a can-sealing machine, the combination with mechanism for pressing a substantially U-shaped sealing strip upon overlapping flanges lying closely together and at the same time feeding the strip, of means for holding the strip and directing it onto said flanges whereby the strip may be sprung by the flanges to bear laterally by its own tension against them during the operation of the strip-pressing and feeding mechanism.

12. In a can-sealing machine, the combination with mechanism for pressing a substantially U-shaped sealing strip upon overlapping flanges lying closely together, of means for holding the strip and directing it onto said flanges whereby it may be sprung by the flanges to bear laterally by its own tension against them during the operation of the strip-pressing mechanism.

13. In a can-sealing machine, the combination with mechanism for pressing a substantially U-shaped sealing strip upon overlapping flanges lying closely together, of a guide for the sealing strip through which it is directed onto said flanges and to said strip-pressing mechanism, said guide being constructed and arranged whereby the strip directed therethrough may engage said flanges in advance of the strip-pressing mechanism and become sprung by the flanges to bear laterally by its own tension against said flanges thereof during the operation of the strip-pressing mechanism.

14. In a can-sealing machine, the combination with a roll-supporting structure, a pair of rotary sealing rolls carried thereby and coöperating with one another to press a substantially U-shaped sealing strip upon overlapping flanges lying closely together and mechanism for actuating said rolls, of a guide through which the strip is directed to said flanges and to said rolls, said guide being arranged to lie in front of the plane occupied by said rolls whereby the strip fed through the guide will engage said flanges in front of the compression point of said rolls and become sprung by said flanges to bear with tension laterally against the same during the operation of the rolls, substantially as described.

15. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls, clamp members for holding the work and permitting of the rotation thereof as the sealing rolls are rotated, one of said members having a bearing occupying a relatively defined position in relation to said rolls, and another bearing adjustable in relation thereto.

16. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls, clamp members for holding the work and permitting of the rotation thereof as the rolls are rotated, one of said members having a rotary bearing for engaging the work and occupying a defined position in relation to said rolls, said one of the members having also other adjustable rotary bearings for engaging the work.

17. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls, clamp members for holding the work and permitting of the rotation thereof as the rolls are rotated, one of which members is vertically and laterally adjustable and the other of which members is provided with a bearing occupying a relatively defined position in relation to said rolls, and other bearings adjustable in relation thereto.

18. In a can-sealing machine, the combination comprising a pair of rotary sealing rolls, one of which is releasable with relation to the other of said rolls and to the work, a roll-supporting structure having a movable portion, means for mounting one of

said rolls on the fixed portion of said structure, means for mounting the other releasable one of said rolls on the movable portion of said structure, work-holding clamp members, means for adjustably mounting one of said members on the fixed portion of said structure, and means for mounting the other clamp member on the movable portion of said structure, said other member having a bearing occupying a relatively defined position with relation to said rolls and having also other bearings relatively adjustable in relation to said rolls.

JOHN C. BOWERS.