L. C. KRUMMEL.

HEAD SEAMING MECHANISM FOR CAN BODIES.

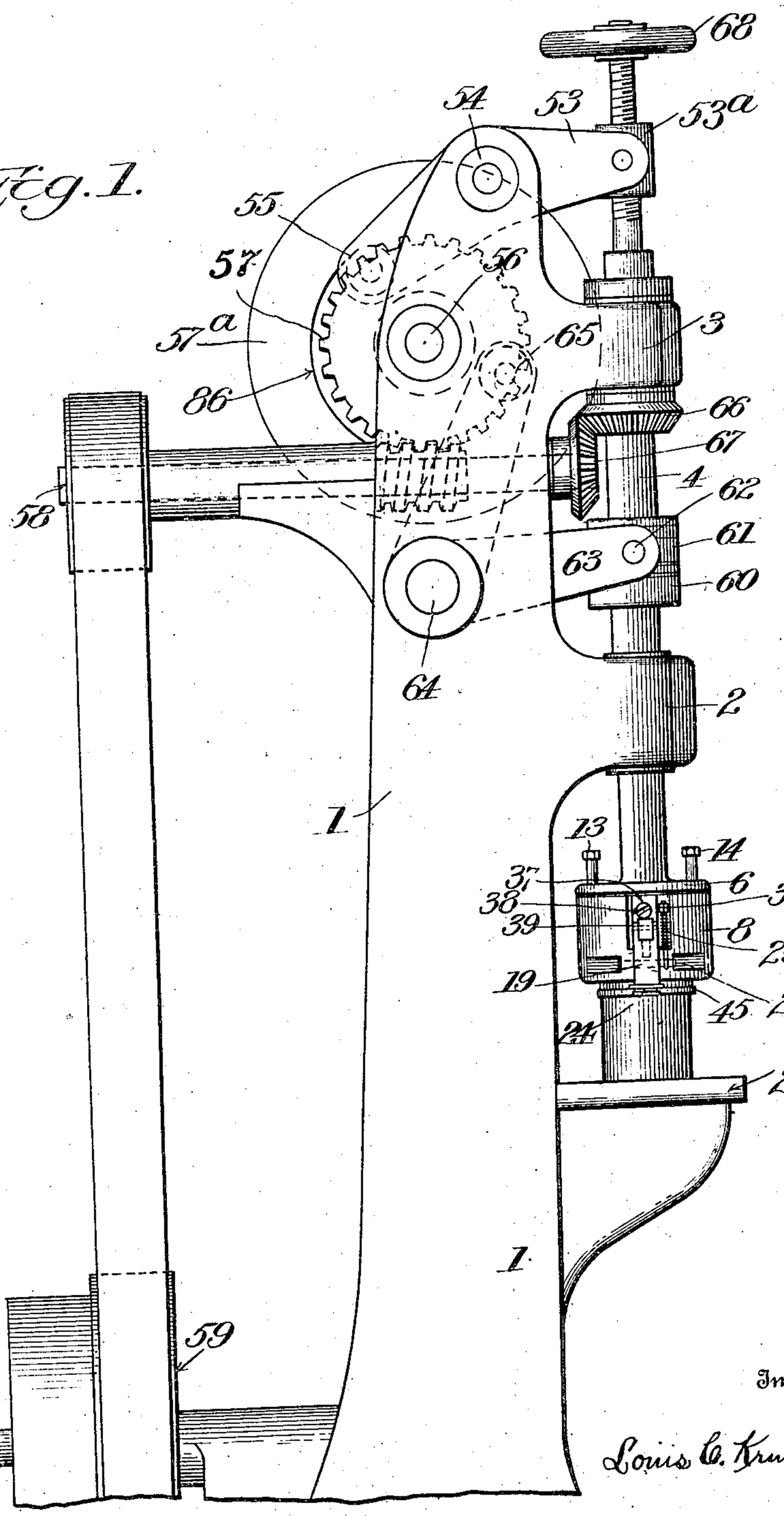
APPLICATION FILED NOV. 12, 1908.

934,921.

Patented Sept. 21, 1909.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 2.

Fig. 2.

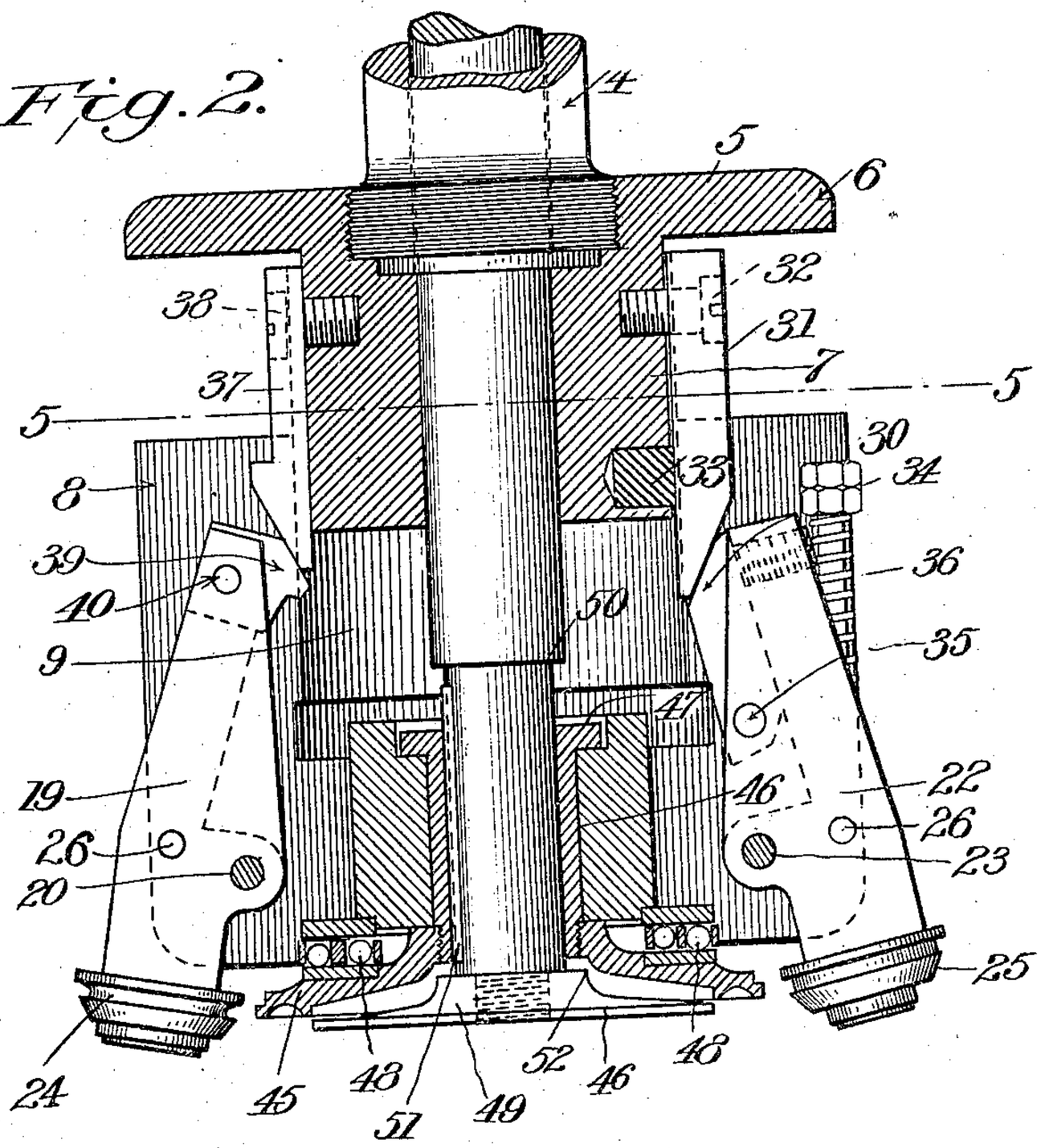
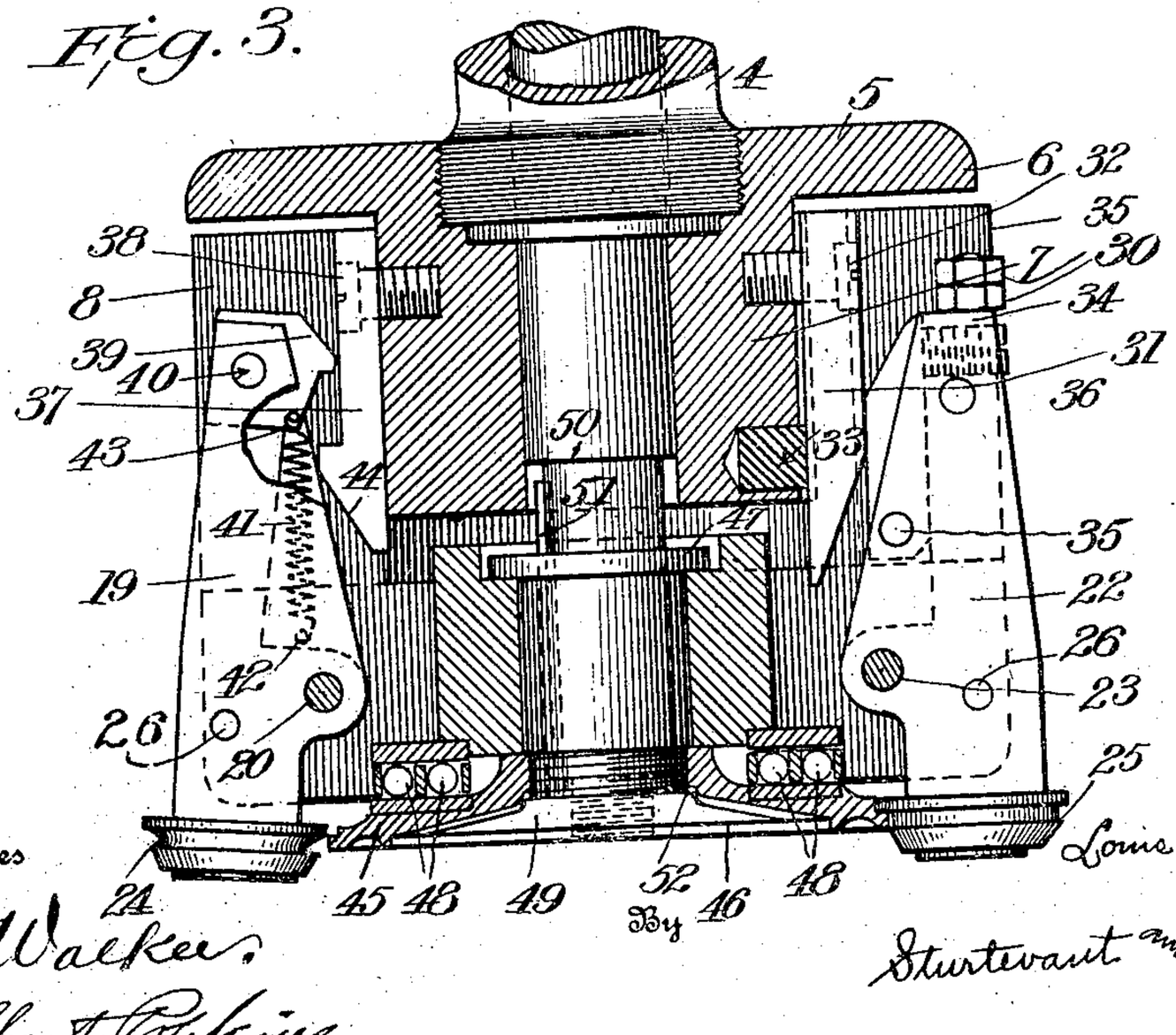


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 5.

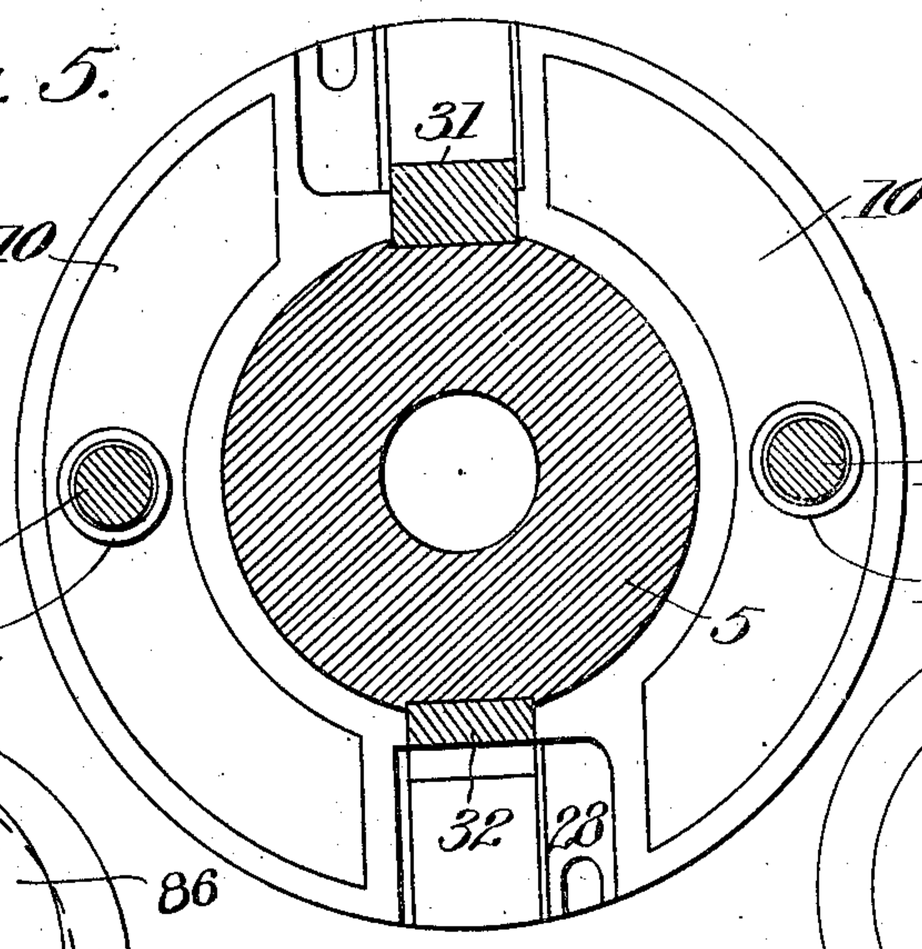


Fig. 6

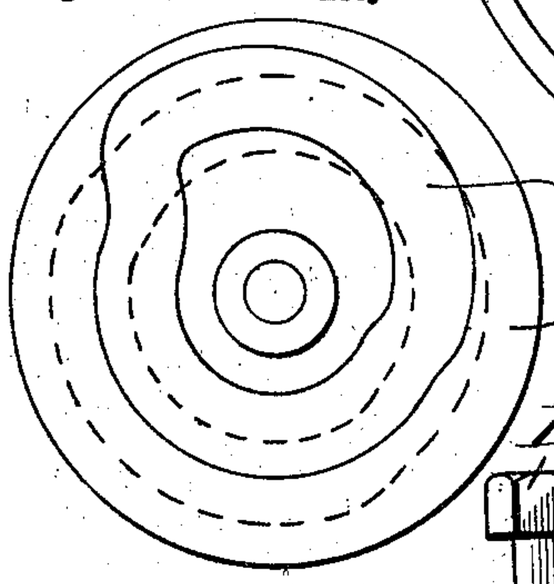


Fig. 7.

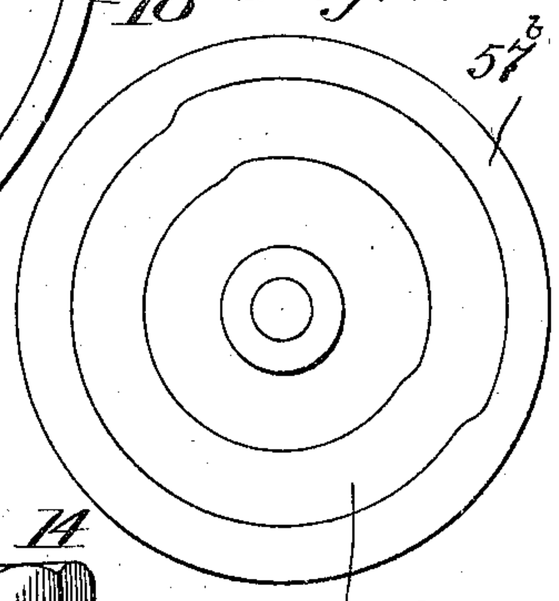
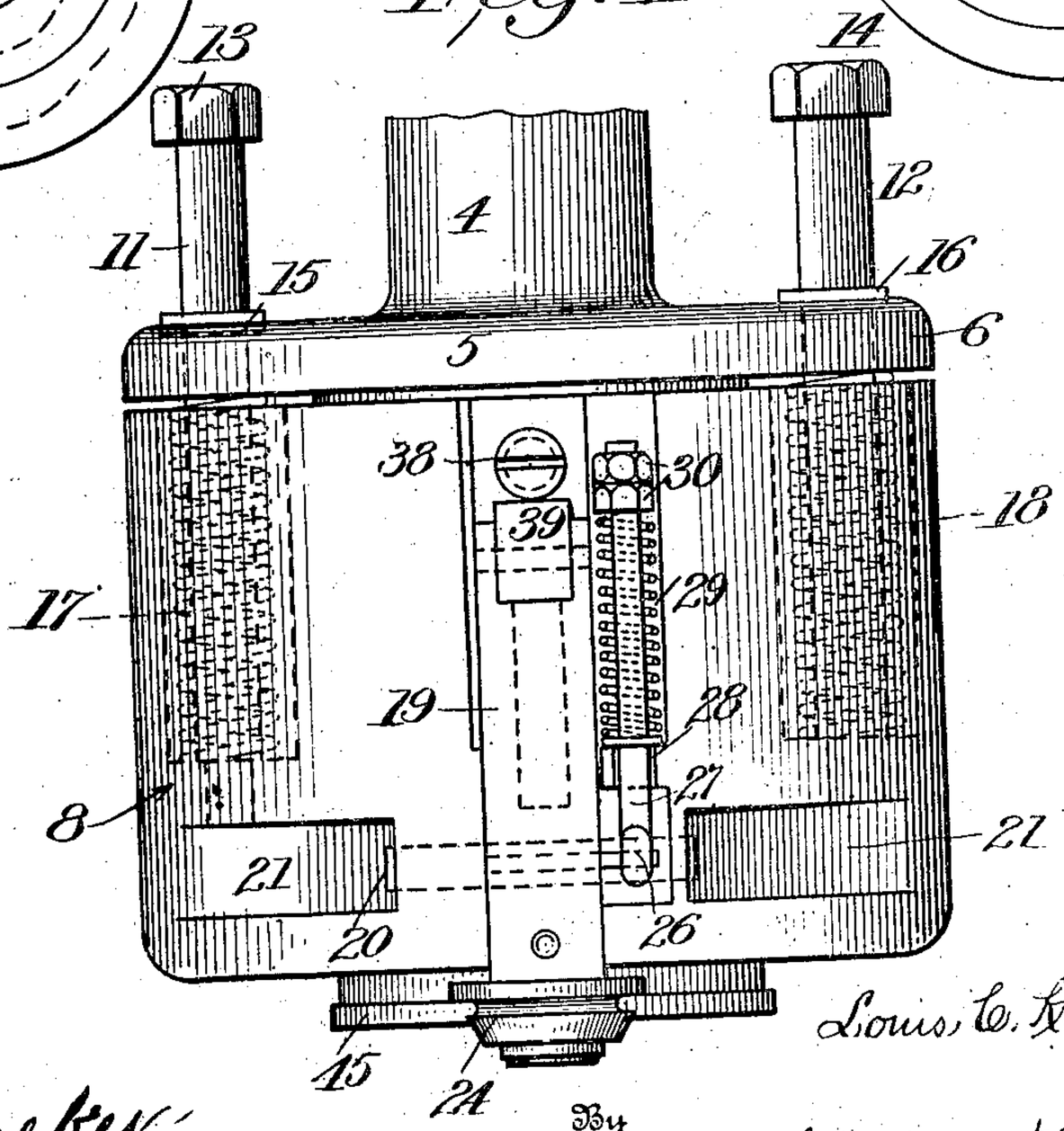


Fig. 4.



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UNITED STATES PATENT OFFICE.

LOUIS C. KRUMMEL, OF CLINTON, CONNECTICUT.

HEAD-SEAMING MECHANISM FOR CAN-BODIES.

934,921. Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed November 12, 1908. Serial No. 462,229.

To all whom it may concern:

Be it known that I, LOUIS C. KRUMMEL, a citizen of the United States, residing at Clinton, in the county of Middlesex, State of Connecticut, have invented certain new and useful Improvements in Head-Seaming Mechanisms for Can-Bodies, of which the following is a description, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon.

The invention relates to new and useful improvements in head seaming mechanisms for cans and other receptacles, of the type wherein a "sanitary" can may be produced; *i. e.*, a can having its top secured to the can body solely by crimping and seaming, commonly known as a double seamed can. In the present machines of this type, the can during the closing operation, is either revolved, lifted or otherwise moved. The movement of the filled can often causes a spilling of the contents, which soon causes an unclean and unsanitary condition of the apparatus and is objectionable in many ways.

The primary object of the invention is to provide a seaming head that will permit of seaming the cover on to the body of a filled can without either revolving or lifting the can, or moving the same in any way. It is obvious, however, that the invention in its broader aspects is capable of other uses. It is also obvious that certain features of the invention, as will hereinafter be pointed out, are well capable of use in machines wherein the can is rotated relative to the seaming rolls carrier during the closing operation.

The invention consists in the parts, improvements and arrangements hereinafter shown, described and pointed out in the appended claims.

In the drawings which show by way of illustration one embodiment of the invention,—Figure 1 is a side view of a can seaming machine having my improved seaming head thereon; Fig. 2 is a sectional view of the seaming head when expanded; Fig. 3 is a similar view with the head in position to finish flattening the seam; Fig. 4 is a side view of the seaming head, showing the means for limiting the movement of one sleeve relative to the other; and Fig. 5 is a sectional view on the line 5—5, of Fig. 2. Fig. 6 is a side view of the cam for operating the center rod. Fig. 7 is a side view of the cam for operating the shaft which supports the seaming head.

In carrying out my invention, I have herein shown a standard 1, on which is mounted and operated my improved closing head. Said standard is provided with a laterally projecting table 2, which is stationary, and which has a smooth unbroken surface on which the cans rest during the closing operation.

By providing a table of the above character, there are no pockets in which the contents spilled from the filled cans may lodge, and, therefore, the table may be quickly and readily cleaned by wiping off the smooth unbroken surface of the same.

The standard 1 is provided with laterally projecting bearing lugs 2, 3, in which is mounted a hollow shaft 4, carrying at its lower end my improved seaming head. Said seaming head comprises an inner sleeve 5, which is threaded on to the end of the hollow shaft 4, as clearly shown in Figs. 2 and 3. Said inner sleeve 5 is provided with an outwardly extending flange 6, and with a downwardly extending cylindrical portion 7. The head also comprises an outer sleeve 8, which is provided with a central recess 9, so that said outer sleeve fits over the depending cylindrical portion 7 of the inner sleeve. The outer sleeve, as shown in Fig. 5, is also provided with segmental pockets or recesses 10, 10. Located within the pockets 10, are, as herein shown, two bolts 11 and 12. Said bolts 11 and 12 extend up through openings in the flange 6 of the inner sleeve 5. The bolts 11 and 12 are threaded into sockets at the lower end of the pockets, and are provided at their upper ends with heads 13, 14. The purpose of the bolts 11 and 12 is to limit the movement of the outer sleeve away from the inner sleeve. Buffers 15 and 16 surround the bolts 13 and 14, and are located in suitable recesses in the upper face of the inner sleeve.

If my improved seaming head be located as shown in Fig. 1, so as to operate vertically, the outer sleeve may be moved away from the inner sleeve by the force of gravity alone. In order, however, to insure the expanding of my seaming head with certainty, I preferably provide springs 17 and 18 (see Fig. 4) which are coiled about the bolts 11 and 12, and rest at one end on the bottom walls of the pockets 10, and at their other ends said springs bear against the

flange 6 of the inner sleeve. Normally the springs will separate the inner and outer sleeves so that the heads of the bolts 11 and 12 will rest against the flange on the inner sleeve.

While I have shown herein two bolts serving to limit the movement of the outer sleeve relative to the inner sleeve, it is obvious that any number of bolts may be used, or other limiting means may likewise be used, if desired. The outer sleeve 8 carries the levers which support the seaming rolls. The lever 19 is mounted in a vertical recess in the outer sleeve on a pivot bolt 20. The sleeve is cut away horizontally at 21 (see Fig. 4), in order to allow the insertion of the pivot bolt. The lever 22 is mounted in a similar recess in the outer ring on a pivot bolt 23. The lever 19 carries a curling roll 24, and the lever 22 (as herein shown), carries a flattening roll 25. It will be obvious that instead of providing two levers, one carrying a curling roll and the other a flattening roll, that any desired number of seaming rolls may be provided.

The lever 22 is provided with an outwardly projecting stud 26, which engages an eye in a rod 27, passing through a lug 28 extending from the side wall of the outer sleeve. A spring 29 surrounds the rod 27, and engages a nut 30 at the upper end of the rod 27. The stud 26 is so located relative to the pivot bolt 23, that the spring 29 serves to turn the lever 22 and throw the lower end thereof outward, while the upper end of the lever is thrown inward. A similar spring is provided for the lever 19, which also holds the seaming roll 24 outward away from the can body. The inner sleeve 5 is provided with a cam 31, which is secured loosely to the inner sleeve by means of a bolt 32. A rubber pad 33, or other suitable cushion device is located under cam 31 on the inner sleeve, and engages the rear side of the cam 31.

The lever 22 is provided with a cam plate 34, which is pivoted by a pivot bolt 35 in a cut away portion in the inner face of the lever 22. A screw 36 serves as a means for determining the position of the cam plate 34, relative to the lever 22. The cam surface of the cam plate 34, coöperates with the inclined face of the cam 31. As the inner sleeve is moved downward relative to the outer sleeve, the inclined face of the cam 31 will force the upper end of the lever 22 outward against the action of the spring 29, and bring the seaming roll 25 into contact with the can. A cam 37 is also secured to the inner sleeve by a bolt 38, which holds the cam 37 in a recess formed in the outer face of the depending portion of the inner sleeve.

The lever 19 is provided with a latch cam 39, which is pivoted to the lever 19 by a pivot bolt 40. A spring 41 secured at one end to the latch cam 39 and at its other end to a stud 42 carried by the lever 19, serves to hold the latch cam against the supporting shoulder 43 on the lever 19.

The cam 37 is provided with an inclined face 44, and at a slight distance above the inclined face 44, said cam is cut away. When the inner sleeve is moved downward relative to the outer sleeve, the inclined face 44 will engage the cam latch 39, and crowd the upper end of the lever 19 outward and against the action of its spring, and thus force the seaming roll carried thereby into contact with the can. As soon, however, as the nose of the latch cam 39 reaches the cut away portion of the cam 37, the spring 29 will move the lever 19 so as to move the seaming roll out of contact with the can top. When the seaming head is expanded, and the outer sleeve moved away from the inner sleeve, the cam latch 39 will turn about its pivot, so that said latch may pass the shoulder on the cam 37.

Coöperating with the seaming rolls is a chuck 45, which, as herein shown, is threaded on to a chuck shank 46, extending up through a central opening in the outer sleeve 8. The chuck shank 46 is provided with a bearing head or flange 47 at its upper end. Ball bearings 48 are interposed between the chuck and the outer sleeve, so that the outer sleeve may rotate freely upon the chuck shank and chuck. The chuck, however, will be moved toward and from the inner sleeve with the outer sleeve. Centrally of the chuck is a center pad 49, which is so shaped as to fit within a recess in the lower face of the chuck 45. The center pad 49 is rigidly secured to a center rod 50, which extends up through the hollow chuck shank and up through a central opening in the inner sleeve 5, and through the hollow shaft 4, which supports the seaming head. The chuck shank is connected to the center rod 50, by means of a groove and spline connection 51. This spline connection between the center rod and the chuck shank allows the chuck shank to move longitudinally upon the center rod, but holds the chuck so that it cannot rotate relative to the center rod. The center pad is provided with a shoulder 52 on its upper face, which engages the chuck and limits the downward movement thereof, as will be hereinafter more fully described.

It will be noted that the center rod is not only supported by the inner sleeve, but through the chuck shank it is also supported by the outer sleeve, and I have by this construction provided a head which is very steady in operation.

The center rod 50, near its upper end is threaded into a sleeve 53ª, which is pivoted between the outer forked ends of a lever 53, carried by a bearing 54 in the standard of

the machine. The other end of the lever 53 carries a roll 55 running in a cam groove 86 in the face of a rotating cam 57ª. Said rotating cam is carried by a short shaft 56 operated by the worm gear 57, which gears with a worm on a shaft 58, which in turn is driven by the main shaft 59.

The hollow shaft 4 which supports the seaming head is threaded into a sleeve 60, which has an annular groove engaged by a collar 61 carrying studs 62 entering sockets in the outer ends of the forked lever 63. Said lever 63 is pivoted at 64, and at its other end carries a roll 65, running in a groove 102 in the face of a cam 57ᵇ carried on the shaft 56. As the shaft 56 is rotated, the cam 57ª carried thereby will operate to reciprocate the center rod 50, while the cam 57ᵇ will operate to reciprocate the hollow shaft 4 carrying the seaming head. The seaming head is rotated by means of a gear 66, which is splined on to the hollow shaft 4 and coöperates with a gear 67 carried by the end of the shaft 58.

The cams carried by the shaft 56 are so constructed, that in the operation of my device, the center pad 46 is first moved down on to the cover of the can which is to be closed. This downward movement of the center pad may be adjusted by turning the hand wheel 68 at the upper end of the center rod. Said center rod is threaded into the sleeve 53ª and by rotating the hand wheel 68, the center rod may be moved up and down in said sleeve. When the parts are properly adjusted, the center pad will come down on to the can, so as to hold the same lightly but firmly, on the supporting table 2. After the center pad engages the top of the can, the lever 63 is then operated so as to lower the seaming head. This movement of the center pad down on to the cover in advance of the seaming head serves to properly place or seat the cover on the can body, whereby a perfect joint may be made. The inner and outer sleeves first move down together until the chuck engages the shoulder 52 on the center pad, at which time the lower face of the chuck is substantially flush with the lower face of the center pad, and the chuck properly positioned on the cover or top of the can. Further downward movement of the outer sleeve is thus prevented by the center pad, and the inner sleeve continues its downward movement, compressing the springs 17 and 18, located between the inner and outer sleeves. The cam 37 first contacts with the cam latch 39 so as to swing the lever 19 and move the curling roll 24 into engagement with the heads of the can top and the edge of the can body.

It should be borne in mind that the seaming head is rotated continuously by the beveled gears 67, 66. The center rod, however, is stationary, and inasmuch as the chuck is splined thereto, it also is stationary. As soon as the inner sleeve has descended sufficiently to complete the curling of the edges of the can top and can body, the cam latch 39 passes into the cut away portion in the cam 37, and the spring at once swings the lever 19 so as to bring the curling roll out of engagement with the edge of the can. The cam 31 meanwhile has been swinging the lever 22 so that the flattening roll carried thereby is brought into contact with the curled edges of the can, and the seam flattened and finished. The downward movement of the inner sleeve is just sufficient, so as to properly finish the closing seam when the lever 63 is swung in the opposite direction and the seaming head raised.

During the first part of the upward movement of the seaming head, the inner sleeve moves out of the outer sleeve, and the chuck remains in contact with the top of the can. The seaming rolls are moved out of contact with the edge of the can by the springs which control the same. When, however, the outward extending flange 6 of the inner sleeve 5 engages the heads of the bolts 15 and 14, the movement of the inner sleeve relative to the outer sleeve ceases, and the outer sleeve is then moved with the inner sleeve. This movement of the outer sleeve lifts the chuck off from the top of the can. The lever for operating the center pad is so controlled by its cam that the center pad still remains in contact with the cover or top of the can until after the chuck is raised to a position shown in Fig. 2. The center pad will, therefore, operate to strip the can from the chuck, should the closing of the seam bind the can top on the chuck.

During the entire operation of closing the seam, the can is stationary, for the reason that the center pad which has no rotating movement, is first moved down on to the can cover, properly centering, seating and holding the cover, and then the chuck which also has no rotating movement, is moved down on to the can top. The friction between the edge of the can top and the chuck, due to the closing of the seam, is a sliding friction. That is to say, if there is any movement between the can and the chuck, the can must slide on the chuck. The friction due to the rotating parts, (*i. e.*, his closing rolls), is a rolling friction, and it is well known that a sliding friction is very much greater than a rolling friction, and, therefore, the can will be held stationary by the stationary center pad and chuck, while the seaming head rotates about the can.

I have found in practice, that it is not necessary to make the chuck fit with great accuracy into the top of the cover, but that there may be considerable clearance between the chuck and the inner face of the can top, and still the sliding friction between the

can and the chuck will prevent the rotation of the can relative to the chuck. This is of considerable importance, for the reason that if it were necessary to have the chuck of exactly the same size as the inner face of the cover, the chuck would soon wear so as to be too small to properly operate to hold the can.

While I have described my invention as particularly adapted for closing a can which is absolutely stationary during the closing operation, it will readily be seen that the connection herein shown between the center rod and the shank of the chuck, so that the chuck and the center rod have no rotating movement relative to each other, would be of great value in that type of machine where the can rotates, and the seaming rolls are stationary, as the rotating chuck and center pad would rotate the can with little or no slipping, and after the can is closed the center pad would readily operate to strip the can from the chuck. So far as these features of the invention are concerned, I do not, therefore, desire to be limited to the use of my invention, for the purpose of closing a can without giving to the can any movement.

By my improved device, wherein the chuck and center pad are stationary and move down one after the other onto the can, I have found that it is not necessary to clamp the can in any way on the table. Suitable guides may, if desired, be placed on the table, in order to locate the can centrally under the seaming head. Instead of placing the can by hand under the seaming head, automatic means may be devised for feeding the cans one after another under the seaming head. The particular way of placing the can under the seaming head is no part of the present invention, and it should be distinctly understood that my improved seaming head may be used in connection with any desired feeding mechanism, or the cans may be fed thereto by hand, if desired. By adjusting the screw 36, it will be obvious that the pressure of the flattening roll on the seam may be varied. The cushion 33 serves to relieve the strain on the flattening roll when passing over side seams or the like.

It will be obvious that minor changes in the details of construction may be made without in any way departing from the spirit of my invention, or sacrificing its principles.

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

1. A seaming head including in combination, a rotary spindle, an inner sleeve carried thereby, an outer sleeve located beneath said inner sleeve, and having a recess adapted to receive said inner sleeve, seaming rolls carried by said outer sleeve, a chuck carried by said outer sleeve, and means for holding said chuck from rotating with said outer sleeve.

2. A seaming head including in combination, a rotary spindle, an inner sleeve carried thereby, an outer sleeve arranged below said inner sleeve and having a recess adapted to receive said inner sleeve, seaming rolls carried by said outer sleeve, a chuck, a chuck stem carrying said chuck, said chuck stem being journaled in said outer sleeve and means for preventing said chuck from rotating with said outer sleeve.

3. A seaming head including in combination, a rotary spindle, an inner sleeve carried thereby, an outer sleeve arranged below said inner sleeve and having a recess adapted to receive said inner sleeve, a chuck, a chuck stem carrying said chuck, said chuck stem being journaled in said outer sleeve, ball bearings between said chuck and said outer sleeve, means for holding said chuck from moving longitudinally relative to said outer sleeve, and means for holding said chuck from rotating with said outer sleeve.

4. A seaming head including in combination, a rotary spindle, an inner sleeve carried by said rotary spindle, an outer sleeve mounted below said inner sleeve and having a recess adapted to receive said inner sleeve, said outer sleeve having radial recesses formed therein, levers pivoted in said radial recesses in the outer sleeve, seaming rolls carried by said levers and means for swinging said levers about their pivots, whereby the seaming rolls are operated.

5. A seaming head including in combination, a rotary spindle, an inner sleeve carried thereby, an outer sleeve mounted below said inner sleeve and having a recess adapted to receive said inner sleeve, said outer sleeve having radial recesses formed therein, levers pivoted in said radial recesses, seaming rolls carried by said levers, and cams carried by said inner sleeve and cooperating with said levers.

6. A seaming head including in combination, a rotary spindle, an inner sleeve carried by said rotary spindle, an outer sleeve mounted beneath said inner sleeve, and having a recess adapted to receive said inner sleeve, said outer sleeve having radial recesses, levers pivoted in said radial recesses, seaming rolls carried by said levers, cams carried by said inner sleeve and coöperating with said levers, a chuck carried by said outer sleeve, and means for preventing said chuck from rotating with said outer sleeve.

7. A seaming head including in combination a rotary spindle, an inner sleeve carried by said rotary spindle, an outer sleeve mounted beneath said inner sleeve and having a recess adapted to receive said inner sleeve, seaming rolls carried by said outer sleeve, a center rod extending through said

inner and said outer sleeves, means for holding said center rod from rotating, chuck mounted on said center rod, means for connecting said chuck to said center rod whereby the same is held from rotating with the seaming head, and means whereby said chuck is journaled in said outer sleeve.

8. A seaming head including in combination, a rotary spindle, an inner sleeve carried thereby, an outer sleeve mounted beneath said inner sleeve and having a recess adapted to receive the same, springs for forcing said outer sleeve away from said inner sleeve, bolts for limiting the movement of said outer sleeve, seaming rolls carried by said outer sleeve, a chuck, means whereby said chuck is journaled in said outer sleeve, and means for holding said chuck from rotating with said outer sleeve.

9. A seaming head including in combination, a rotary spindle, an inner sleeve threaded to said rotary spindle, an outer sleeve mounted beneath said inner sleeve and having a recess adapted to receive said inner sleeve, said outer sleeve having radial recesses, levers pivotally supported in said recesses in the outer sleeve, seaming rolls carried by said levers, cams carried by said inner sleeve and coöperating with said levers, a center rod, means for holding said center rod from rotating with the seaming head, a chuck, a spline for connecting said chuck to said center rod whereby the same may move longitudinally on said center rod, and means whereby said chuck is journaled in said outer sleeve.

10. A can seaming head including in combination, a plurality of seaming rolls, operating levers therefor pivoted to said head, a cam slide for actuating said operating levers, cams carried by said slide and engaging said levers, a cushion for yieldingly supporting the operative end of the cam which operates the flattening roll.

11. A can seaming head including in combination, a seaming roll, a pivoted lever carrying said seaming roll, a cam slide for actuating said lever, a cam carried by said slide, a cam plate carried by said cam slide, and means for adjusting the position of said cam plate.

12. A can seaming head including in combination, a seaming roll, a pivoted lever carrying said seaming roll, a cam for operating said pivoted lever, means for supporting and moving said cam relative to said lever, a rod connected to said lever, a perforated lug carried by said head through which said rod extends, a spring surrounding said rod and operating to hold the pivoted lever in contact with its operating cam.

13. A can seaming head including in combination, a seaming roll, a pivoted lever carrying said seaming roll, a pivoted latch cam carried by said lever, a spring normally holding said latch cam on its seat in the lever, a cam slide, a cam carried thereby and coöperating with said latch cam, and a spring for holding said pivoted lever in contact with its operating cam.

14. A can seaming head including in combination, an outer sleeve having a central recess, an inner sleeve fitting said central recess, and having an outwardly extending flange, pivoted levers carried by said outer sleeve, seaming rolls mounted on said levers, cams carried by said inner sleeve and operating said levers, springs interposed between said outer sleeve and said inner sleeve, and means engaging said flange for limiting the movement of the outer sleeve relative to the inner sleeve.

15. A can seaming head including in combination, an outer sleeve having a central recess, an inner sleeve fitting said central recess, and having an outwardly extending flange, pivoted levers carried by said outer sleeve, seaming rolls mounted on said levers, cams carried by said inner sleeve and operating said levers, springs interposed between said outer sleeve and said inner sleeve, and bolts carried by said outer sleeve and extending through openings in the flange of the inner sleeve, the heads of said bolts operating to limit the movement of the outer sleeve relative to the inner sleeve.

16. A can seaming head including in combination, an outer sleeve, seaming rolls carried thereby, a chuck, means for connecting said chuck to said outer sleeve, whereby said outer sleeve may rotate freely relative to said chuck, a center pad located centrally of said chuck, a center rod connected to said center pad and extending upwardly through said chuck and outer sleeve, means for holding said center rod from rotating with said outer sleeve, and means for connecting said center rod to said chuck, whereby said chuck is held from rotating relative to said center rod and said chuck is free to move longitudinally on said center rod.

17. The combination with a stationary table on which the can is adapted to rest during the entire seaming operation, of a seaming head, means for reciprocating said seaming head, said seaming head including seaming rolls, pivoted levers carrying said seaming rolls, a cam slide, cams carried thereby and operating said pivoted levers, a chuck, means for connecting said chuck to said seaming head, whereby it is reciprocated therewith, and whereby said seaming head may rotate freely relative to said chuck, and means for positively holding said chuck from rotation.

18. The combination with a stationary table on which the can is adapted to rest during the entire seaming operation, of a seaming head, means for reciprocating said seaming head, said seaming head including

seaming rolls, pivoted levers carrying said seaming rolls, a cam slide, cams carried thereby and operating said pivoted levers, a chuck, means for connecting said chuck to said seaming head, whereby it is reciprocated therewith, and whereby said seaming head may rotate freely relative to said chuck, a center pad, a center rod connected to said center pad, and a spline for connecting said chuck to said center rod, whereby said chuck is held from rotating relative to the center rod.

In testimony whereof I affix my signature, in presence of two witnesses.

LOUIS C. KRUMMEL.

Witnesses:

WM. G. BISSELL,

EZRA E. POST.