J. A. GRAY.

MECHANISM FOR SEAMING ENDS TO CAN BODIES.

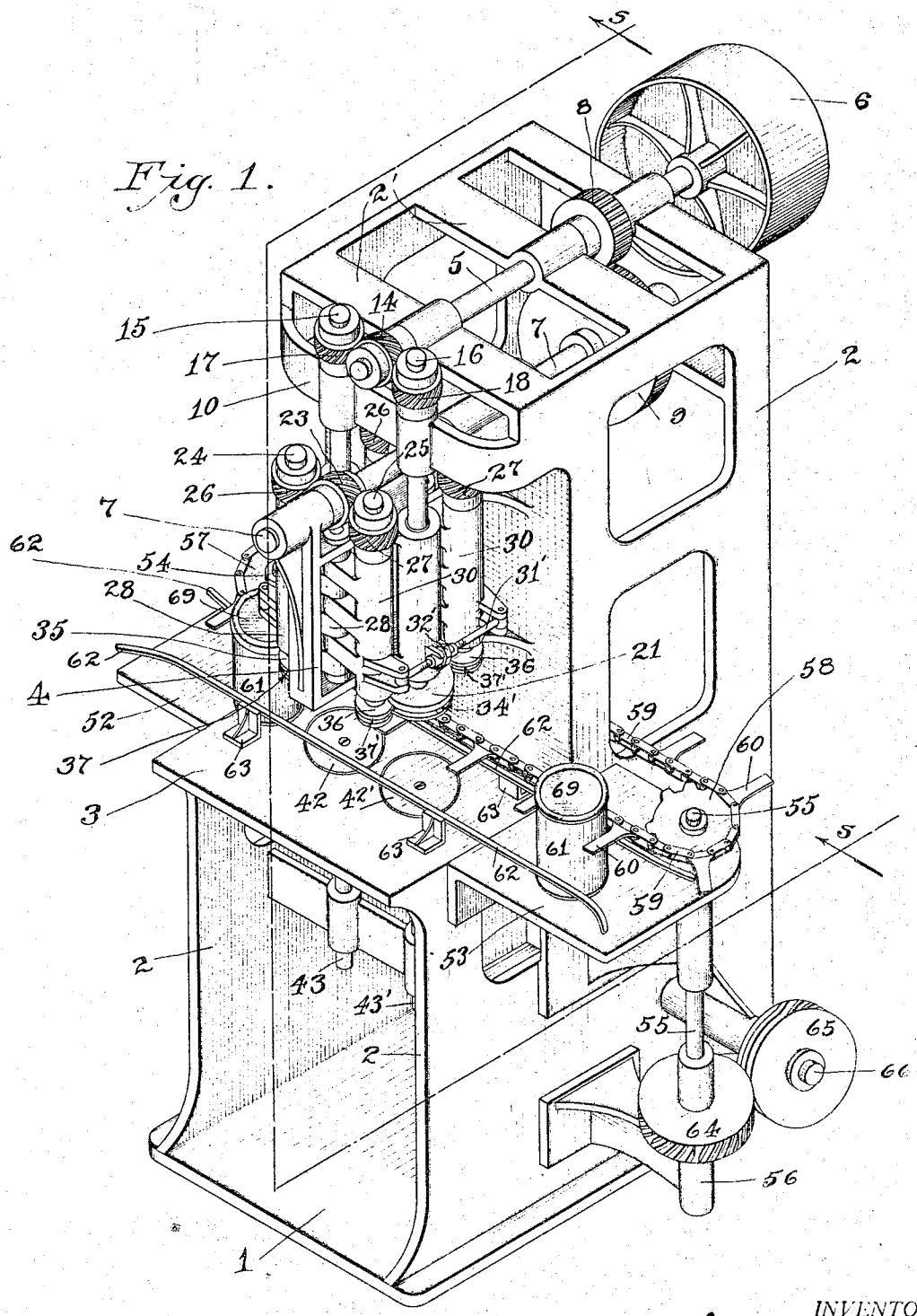
APPLICATION FILED OCT. 18, 1915.

1,327,994.

Patented Jan. 13, 1920.

4 SHEETS—SHEET 1.

Fig. 1.



WITNESS.

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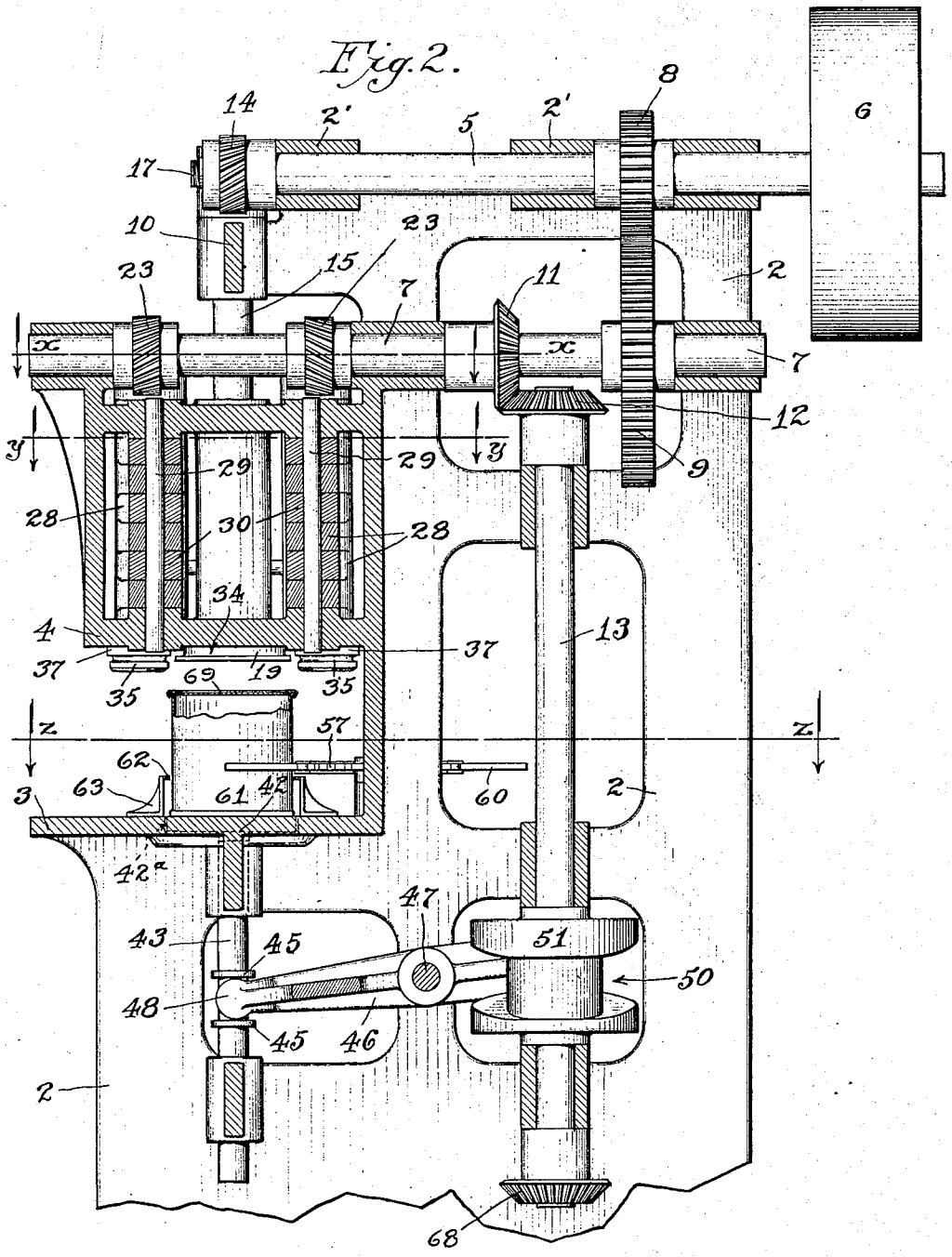
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

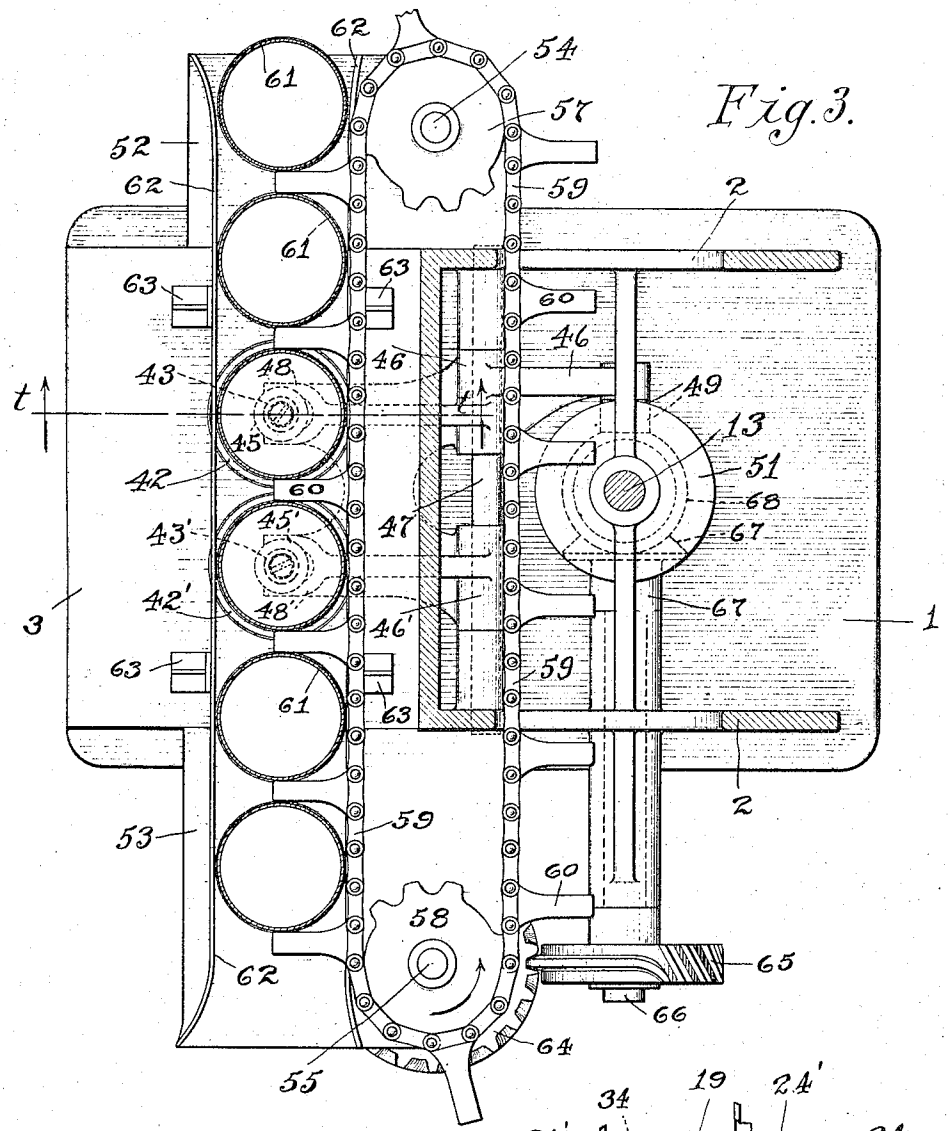
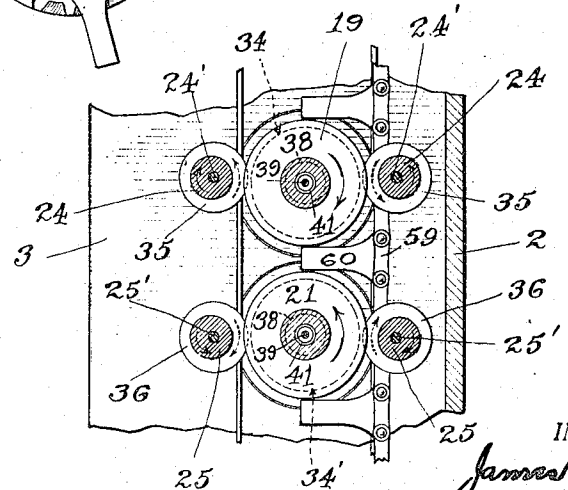


Fig. 7.



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4 SHEETS--SHEET 4.

Fig. 4.

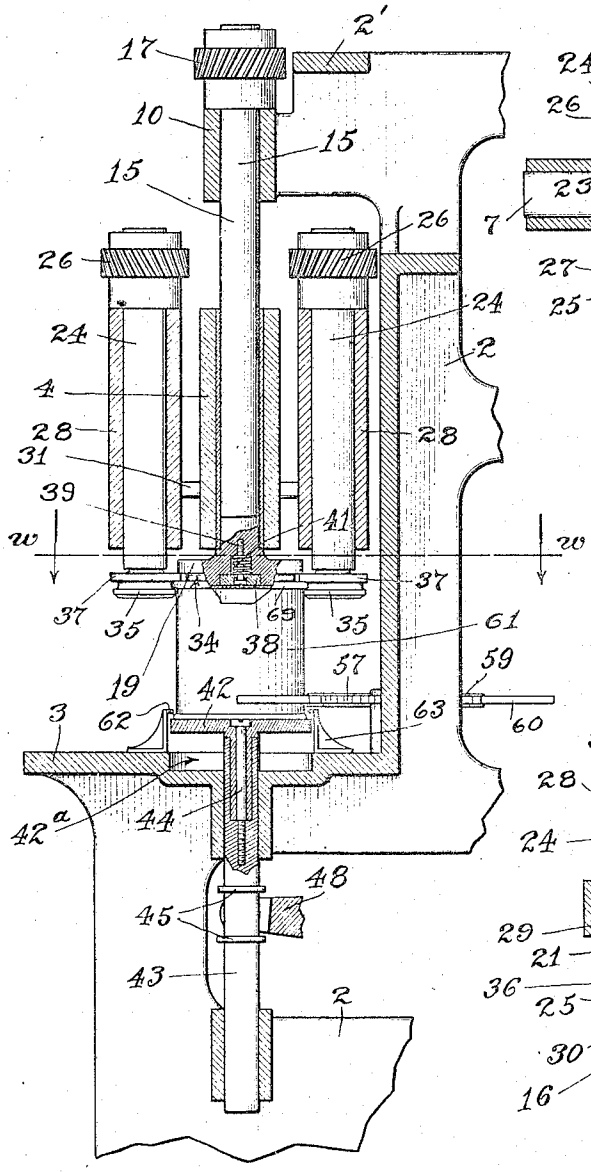


Fig. 5.

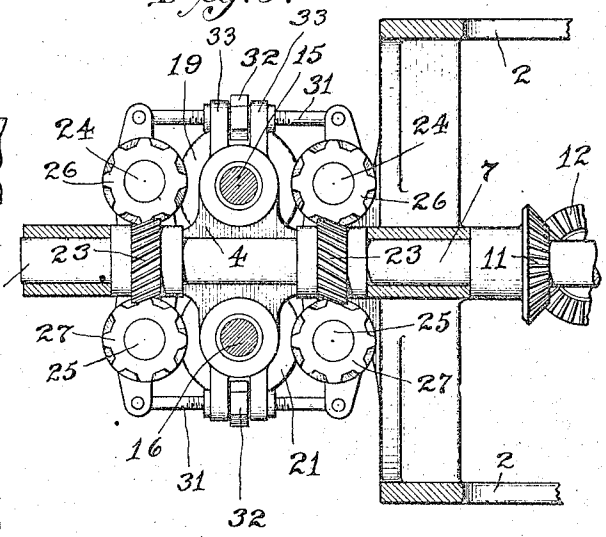
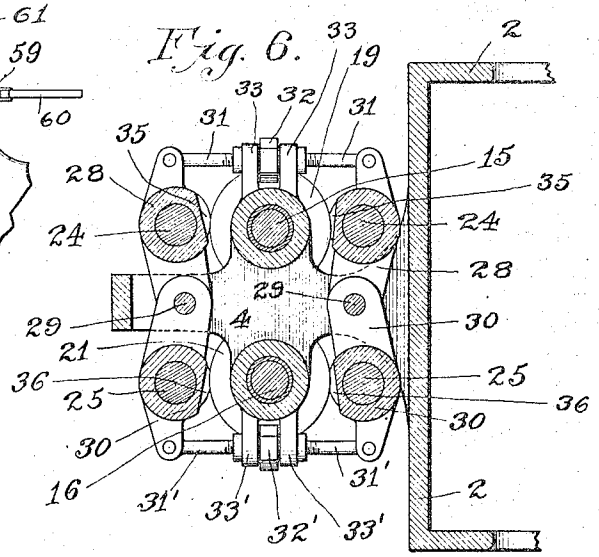


Fig. 6.



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UNITED STATES PATENT OFFICE.

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MECHANISM FOR SEAMING ENDS TO CAN-BODIES.

1,327,994. Specification of Letters Patent. **Patented Jan. 13, 1920.**

Application filed October 18, 1915. Serial No. 56,456.

To all whom it may concern:

Be it known that I, JAMES A. GRAY, a citizen of the United States, residing at the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Mechanism for Seaming Ends to Can-Bodies, of which the following is a specification.

The present invention relates to a machine for seaming an end or cover onto a can. It is customary in the canning art to seal the cans used for the preservation of food products or other material, by turning over the adjacent edges of the metal of the can and end to form a locked joint, the stiffness of the metal in the seam so formed being relied upon to hold the parts in close contact. The usual method of forming such a seam is by a spinning process, the flanges of the can and the end being pressed against a suitable formed roller, which clenches or spins over said flanges into a locked seam. Obviously, means must be provided for either rotating the can or revolving the seaming roll thereabout, and for bringing said seaming roll into contact with the flange of the can.

The object of the present invention is to provide a machine in which the seaming rolls are moved into and out of engagement with the can flange with the least possible loss of power and time, and in which the number of moving parts is reduced to a minimum.

In order to comprehend the invention, reference should be had to the accompanying sheets of drawings, in which—

Figure 1 is a perspective view of the double seaming machine.

Fig. 2 is a part-sectional elevation on a plane represented by the line *s—s* in Fig. 1 of the drawings, viewed in the direction of the arrows, showing the seaming rolls in their inoperative positions.

Fig. 3 is a sectional plan taken in the direction of the arrows on the line *z—z* of Fig. 2 of the drawings.

Fig. 4 is a part sectional elevation taken in the direction of the arrows on the line *t—t* of Fig. 3 of the drawings, showing a can in position for the seaming of a can end or cover thereto, and the seaming rolls in their operative positions.

Fig. 5 is a part sectional plan taken in the direction of the arrows on the line *x—x* of Fig. 2 of the drawings.

Fig. 6 is a sectional plan taken in the direction of the arrows on the line *y—y* of Fig. 2 of the drawings.

Fig. 7 is a sectional plan taken in the direction of the arrows on the line *w—w* of Fig. 4 of the drawings, showing the seaming rolls in their operative positions.

In the drawings, the numeral 1 represents a base, upon which is mounted a suitably constructed frame 2, formed with a horizontal table 3 and a forwardly extending bracket 4 above said table, Figs. 1, 2 and 4 of the drawings. A horizontal drive shaft 5, journaled in cross members 2′ of the frame 2, is provided with means, as, for example, a pulley 6, for receiving power from an outside source, not shown in the drawings.

Journaled in the frame 2, beneath and parallel to the drive shaft 5, is a second shaft 7, adapted to be continuously rotated at a speed considerably slower than that of said drive shaft 5, as, for example, by means of co-acting spur gears 8 and 9, Figs. 1 and 2 of the drawings. A vertical shaft 13, journaled in the frame 2 at the rear of the machine, is driven by the horizontal shaft 7 by any suitable means, shown in Fig. 2 of the drawings, as bevel gears 11 and 12.

The forward end of the drive shaft 5 carries a spiral gear 14, which meshes with spiral gears 17 and 18 on the spaced parallel vertical chuck shafts 15 and 16 respectively, Fig. 1 of the drawings, said chuck shafts 15 and 16 being journaled in brackets 10 and 4, and continuously rotated at relatively high speed by said spiral gears. Removably attached to the lower ends of the vertical chuck shafts 15 and 16 respectively are the chucks 19 and 21, Figs. 1, 4 and 7 of the drawings.

Parallel to the chuck shaft 15 and on either side thereof are vertical seaming roll spindles 24, Figs. 1, 2, 4, and 5 of the drawings, rotated from the slow speed shaft 7 by means of spiral gears 26 on said spindles 24 which mesh with spiral gears 23 on said shaft 7. The spindles 24 are journaled in brackets 28 which are pivoted for horizontal

adjustment upon vertical pins 29, said pins being supported by the forwardly extending frame bracket 4, in line with the centers of the spiral gears 23 on the shaft 7. These pivoted brackets 28 are held in position by an adjustable connecting rod 31, Figs. 4, 5 and 6 of the drawings, provided with a turn-buckle 32 for adjusting its length, and secured against longitudinal movement by spaced lugs 33, extending from the bracket 4, and between which said turn-buckle 32 is held.

By means of this adjustable rod 31, the pivoted brackets 28 carrying the seaming roll spindles 24 may be mutually separated or brought together, for the purpose hereinafter set forth.

Seaming rolls 35, Figs. 4 and 7 of the drawings, adapted to perform the first seaming operation, are journaled for free rotation upon pins 24′ extending from the lower ends of said spindles and disposed eccentrically with respect to the axes thereof, so that by the relatively slow rotation of said spindles 24, said seaming rolls 35 are moved toward and away from the chuck 19.

In similar positions with respect to the chuck shaft 16 are two corresponding seaming roll spindles 25, driven by spiral gears 27 from the spiral gears 23 on the slow-speed shaft 7, and journaled in brackets 30 pivoted upon the pins 29, Figs. 5 and 6 of the drawings. Said brackets 30 are held in the proper relation to the chuck 21 by an adjustable rod 31′ having a turn-buckle 32′ held between lugs 33′, in a manner similar to that described above in connection with the brackets 28. The spindles 25 carry at their lower ends freely rotatable seaming rolls 36, journaled upon pins 25′ eccentric to the axes of the spindles, Figs. 1, 6 and 7 of the drawings, and adapted to perform the second and final seaming operation.

The chucks 19 and 21 are formed, as shown in Figs. 1, 2, 4 and 7 of the drawings, with peripheral grooves 34 and 34′ respectively, and the seaming rolls 35 and 36 are formed with peripheral flanges 37 and 37′ respectively, said flanges 37 and 37′ being adapted to engage the grooves 34 and 34′ respectively of the chucks 19 and 21, as shown in Figs. 2 and 7 of the drawings, to provide supports for the seaming rolls during the seaming operation, and to relieve the end thrust on the bearings of said rolls.

Centrally located in each of the chucks 19 and 21 is a knock-out head 38, Figs. 4 and 7 of the drawings, slidably mounted upon a fixed pin 39, and normally pressed outwardly slightly beyond the face of the chuck by a spring 41, the function of said knock-out or ejector head being to remove the can from the chuck after the seaming operation has been performed.

A can lift plunger 42, Fig. 4 of the drawings, is rotatably mounted upon a vertically slidable shaft 43 below and in vertical alinement with the chuck 19. A central pin 44 retains said plunger 42 on its shaft 43. Two spaced collars 45 on said plunger shaft 43 are adapted to be engaged by the forked end 48 of a lever 46, fulcrumed upon the frame 2 at 47, Figs. 2 and 3 of the drawings, the other end of which carries a cam following roller 49, Fig. 3 of the drawings, adapted to be engaged by the groove 50 of a double face cam 51 mounted upon the vertical shaft 13, Figs. 2 and 3 of the drawings.

The plunger 42 normally rests within a recess 42^a in the table 3, so that its upper surface is flush with the surface of said table 3, but by means of the cam 51 and the lever 46, said plunger is raised at a certain period in the cycle of operation of the machine, as shown in Fig. 4 of the drawings. A similar can lift plunger 42′, Figs. 1 and 3 of the drawings, is rotatably carried by a slidable shaft 43′ beneath and in vertical alinement with the chuck 21, and is lifted simultaneously with the plunger 42 by the engagement with a pair of spaced flanges 45′ on the sliding shaft 43′ of the forked end 48′ of an extension 46′ of the lever 46, Fig. 3 of the drawings.

Horizontal extensions 52 and 53, Figs. 1 and 3 of the drawings, are attached to the frame 2 on either side of the table 3, and journaled in said extensions and in brackets 56 extending from the frame 2 are vertical shafts 54 and 55, Figs. 1 and 3 of the drawings, mounted respectively upon the upper ends of which, above the surface of said extensions 52 and 53, are an idler sprocket 57 and a driving sprocket 58. A horizontally disposed conveyer chain 59, carrying spaced can-engaging fingers 60, is carried by said sprockets 57 and 58. Step rotation is imparted to the shaft 55 carrying the sprocket 58 by co-acting mutilated worm gears 64 and 65, Figs. 1 and 3 of the drawings, the worm gear 65 being mounted upon a transverse shaft 66 journaled in the frame 2, and continuously rotated by means of a bevel gear 67 which meshes with a co-acting bevel gear 68 on the vertical cam shaft 13, Figs. 2 and 3 of the drawings.

Suitably disposed guide rails 62, Figs. 1, 2, 3, and 4 of the drawings, are supported by brackets 63 above the table 3, to guide the cans 61 in their proper path through the machine.

The operation of the machine may be described as follows:—A can 61, Figs. 1 and 3 of the drawings, to which has previously been loosely applied an end or cover 69, is fed into the machine, by any suitable means not indicated in the drawings, on the extension 52 of the table 3. Said can 61 is engaged by one of the fingers 60 extending from the conveyer chain 59, and is intermit-

tently moved thereby along said table 3 between the guide rails 62, until it rests upon the can lift plunger 42.

The rotation of the cam 51 then lifts said plunger 42, with the superposed can 61, by means of the lever 46, until the end 69 of said can comes into contact with and is engaged by the rapidly rotating chuck 19 (Fig. 4), whereby said can and the plunger 42, upon which it rests, are rotated. At this moment the initial seaming rolls 35, mounted eccentrically upon their spindles 24, are brought into frictional contact with the flange of the can end 69 and by the continuous slow rotation of said spindles 24 and the rapid rotation of the chuck 19 and the held can 61 with the flange of its end 69 in contact with said seaming rolls 35, the first seaming operation is performed. During this operation the flanges 37 on said rolls 35 engage with the peripheral groove 34 in the chuck 19, thereby furnishing a support for said rolls to partly relieve the end thrust thereon caused by the contact with the flange of the can end 69, as is shown in Figs. 4 and 7 of the drawings.

The continued rotation of the spindles 24 carries the seaming rolls 35 out of contact with the flange of the can end 69, and at the same time the plunger 42 is lowered by its actuating cam. The spring-pressed knock-out head or ejector 38 removes the can from the chuck 19, and forces it to follow the plunger 42 downward toward the level of the table 3. The conveyer chain 59 is now moved through another step, by the means described, to carry the can 61 with its partly seamed end 69 onto the second lift plunger 42′, Fig. 1 of the drawings. Said plunger 42′, actuated by the cam 51, thereupon lifts said can 61 until the partly seamed peripheral flange of its end 69 is engaged by the rotating chuck 21, when the second seaming rolls 36 are moved inward into frictional contact with the flange of said end 69 by the continuous slow rotation of their spindles 25, and the final seaming operation is performed in a manner identical with that of the initial seaming operation above described, after which the can 61 is lowered by its plunger 42′ and carried off said plunger and out of the sphere of the machine by the step movement of the conveyer chain 59.

Inasmuch as the two can lift plungers 42 and 42′ are raised and lowered simultaneously by the two forked arms 48 and 48′ of the cam-actuated lever 46, and the two pairs of seaming rolls 35 and 36 are simultaneously moved inwardly toward their respective chucks 19 and 21 by the timed rotation of their respective spindles 24 and 25, it is obvious that two cans are acted on at the same time, the one held by the chuck 19 receiving the initial seaming operation and the other held by the chuck 21 receiving the final seaming operation, and at every step-movement of the conveyer chain 59, a fresh unseamed can is carried onto the first lift plunger 42, a partially seamed can is transferred from said plunger 42 to the second lift plunger 42′, and a finished can is removed from said plunger 42′.

The degree of pressure exerted upon the flange of the can end 69 by the seaming rolls may be adjusted as desired by means of the turn-buckle connecting rods 31 and 31′, which maintain the desired distance between the seaming spindle brackets 28 and 30 as hereinbefore described.

By reason of the adjustment provided for the spindles 24 and 25 respectively, through the medium of the turn-buckles 32 and 32′, the seaming rolls 35 and 36 carried by the spindles 24 and 25 respectively may be adjusted toward and from each other in order to position the same to form a tight seam and for varying size can bodies.

I am aware that the principles of my invention may be embodied in machines differing in form and construction from that herein described, and I therefore do not wish to limit myself in this regard, but on the contrary wish to be understood as claiming the invention as broadly as the state of the art at this time will permit.

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

1. An apparatus for the described purpose, the same comprising alined vertically disposed members for receiving and clamping therebetween a can body with an end cover loosely applied thereto, means for imparting rotation to one of said members, devices for intermittently moving the opposing member toward and from the rotary member, a plurality of continuously rotatable seaming roll power spindles, rotatable seaming rolls eccentrically mounted thereon with respect to the axis of the same and associated with the rotary members, said spindles being adapted for moving said rolls into and out of engagement with the flange of a can end cover of a can while held clamped between the mentioned vertically alined members, and devices for adjusting the position of said rolls relative to each other to adapt the same for the seaming of end covers to can bodies of varying diameter.

2. In an apparatus for the described purpose, the combination with a rotary can chuck, of a vertically movable plunger for moving a can body with an end cover thereon into and out of clamped engagement with said chuck, means for conveying can bodies onto said plunger and removing the same therefrom, a plurality of continuously rotatable seaming roll power spindles, rotatable seaming rolls eccentrically mounted

on said spindles with respect to the axes of the same associated with said can chuck, said spindles being adapted for moving the said rolls into and out of engagement with the flange of the can end cover of a can body while held clamped to the can chuck, adjustable devices for varying the position of the said rolls relative to each other, and a device associated with the can chuck for positively releasing a seamed can body on the downward movement of the vertically movable plunger.

3. In an apparatus for the described purpose, the combination with a plurality of spaced rotary can chucks, of a vertically movable plunger associated with each chuck for moving can bodies with an end cover loosely applied thereto into and out of clamped engagement with the can chucks, an intermittently traveling conveyer for moving can bodies onto and off of the said plungers, a pair of spaced rotary and movable power spindles adjacent said plungers, a pair of rotatable seaming rolls eccentrically mounted on said spindles with respect to the axes of the same and associated with each of the can chucks, said spindles being adapted for moving the said rolls into and out of engagement with the flange of a can end cover of a can body while held clamped to the can chuck, and adjustable devices for varying the position of the rolls relative to each other for adapting the same for operation on can bodies of varying diameter.

4. In an apparatus for the described purpose, the combination with a circumferentially grooved rotatable can chuck, of a member co-acting therewith for the clamping thereto of a can body with an unseamed end cover thereon, a pair of continuously rotatable seaming roll power spindles adjacent said can chuck, circumferentially flanged seaming rolls eccentrically mounted on said spindles with respect to the axes of the same and associated with said can chuck, said spindles being adapted for axially moving the seaming rolls toward and from the can chuck, and adjustable devices for varying the position of the seaming rolls relative to each other to adapt the same for a seaming operation on can bodies of varying diameter.

5. In a can seaming machine, the combination of four seaming rolls mounted on vertical axes and spaced apart in pairs, a can-rotating device arranged between the rolls of each pair, means for moving the axes of said rolls horizontally and continuously with a relatively slow motion, means for rotating said can-rotating devices with a relatively fast motion, means for preliminarily adjusting said rolls horizontally, and a can carrier having an intermittent motion to deliver can bodies and ends successively between the rolls of one pair and then between the rolls of the other pair, to be seamed by said rolls.

6. In a can seaming machine, the combination of four seaming rolls mounted on vertical axes and spaced apart in pairs, a can-rotating device arranged between the rolls of each pair, means for moving the axes of said rolls horizontally with a relatively slow motion, means for rotating said can-rotating devices with a relatively fast motion, and a can carrier having an intermittent motion to deliver can bodies and ends successively between the rolls of one pair and then between the rolls of the other pair to be seamed by said rolls.

7. In a can seaming machine, the combination of four seaming rolls mounted on vertical axes and spaced apart in pairs, four vertical and continuously rotatable spindles having mounted thereon respectively and eccentrically the said axes of the rolls, a can-rotating device arranged between the rolls of each pair, means for rotating said spindles continuously with a relatively slow motion, means for rotating said can-rotating devices with a relatively fast motion, and a can carrier having an intermittent motion to deliver can bodies and ends successively between the rolls of one pair and then between the rolls of the other pair to be seamed by said rolls.

8. In a can seaming machine, the combination of four seaming rolls mounted on vertical axes and spaced apart in pairs, four vertical and continuously rotatable spindles having mounted thereon respectively and eccentrically the said axes of the rolls, a can-rotating device arranged between the rolls of each pair, means for rotating said spindles continuously with a relatively slow motion, means for rotating said can-rotating devices with a relatively fast motion, a can-supporting table extending between said pairs of spindles, and a horizontal intermittent carrier for propelling can bodies and ends along said table to said can-rotating means and between said pairs of rolls successively and for removing them therefrom.

9. In a can seaming machine, in combination, upper and lower horizontal rotary shafts, gearing connecting said shafts for maintaining one shaft at a faster rotation and the other shaft at a slower rotation, can-rotating means at each side of said shafts and operatively connected with the faster shaft, seaming rolls arranged in pairs the rolls of each pair at the sides of said can-rotating means and operatively connected with the slower shaft to be moved toward and from each other, means for initially adjusting said rolls relative to each other, and means for intermittently convey-

ing cans to said can-rotating means successively.

10. In a can seaming machine, the combination of four seaming rolls mounted on vertical axes and spaced apart in pairs, four vertical and continuously rotatable spindles having mounted thereon respectively and eccentrically the said axes of the rolls, a can-rotating device arranged between the rolls of each pair, means for rotating said spindles, continuously with a relatively slow motion, means for rotating said can-rotating devices with a relatively fast motion, movable bearings for the spindles adjustably connected in pairs for the adjustment of the spindles and rolls, and a can carrier having an intermittent motion to deliver can bodies and ends successively between the rolls of one pair and then between the rolls of the other pair to be seamed by said rolls.

11. In a can seaming machine, in combination, upper and lower horizontal rotary shafts, gearing connecting said shafts for maintaining one shaft at a faster rotation and the other shaft at a slower rotation, can-rotating means at each side of said shafts and operatively connected with the faster shaft, continuously rotatable spindles arranged in pairs the spindles of each pair at the sides of said can-rotating means and rotatively connected with the slower shaft, and seaming rolls mounted on said spindles respectively on axes which are eccentric to the spindles.

12. In an apparatus for double seaming ends to can bodies, in combination, a pair of vertical and continuously rotatable seaming spindles, double seaming rolls carried on said spindles and having axes which are eccentric to the axes of said spindles, can-rotating chucks arranged above and below a can receiving space which is between said spindles, mechanism for rotating said spindles and chucks whereby each roll may be moved in a small circular path into and out of contact with a rotating can and end, and a horizontal intermittent carrier for placing the cans and ends between said chucks and removing them therefrom.

13. In an apparatus for double seaming ends to can bodies, in combination, a pair of vertical rotatable double seaming rolls, can-rotating chucks arranged above and below a can-receiving space which is between said rolls, mechanism for rotating said chucks, means for carrying the axes of said rolls continuously, in a small circular path, into and out of contact with a rotating can and end, and a horizontal intermittent carrier for placing the cans and ends between said chucks and removing them therefrom.

14. In an apparatus for double seaming ends to can bodies, in combination, a pair of rotatable double seaming rolls, can-rotating chucks arranged intermediately of said rolls, mechanism for rotating said chucks, means for carrying the axes of said rolls continuously in a small circular path into and out of contact with a rotating can and end, and an intermittent carrier for placing the cans and ends between said chucks and removing them therefrom.

15. An apparatus for double seaming ends to can bodies, having in combination rotary devices for receiving and clamping therebetween a can body with an end loosely applied thereto, a continuously rotatable spindle substantially parallel with the axis of said rotary clamping devices, mechanism for imparting a relatively rapid rotation to said clamping devices and to the can body and a relatively slow and continuous rotation to said spindle, and a double seaming roll the periphery of which continuously surrounds the axis of said spindle and which is rotatably mounted thereon on an axis parallel with the axis of the spindle and eccentric thereto.

16. An apparatus for double seaming ends to can bodies, having in combination rotary devices for receiving and clamping therebetween a can body with an end loosely applied thereto, a continuously rotatable spindle substantially parallel with the axis of said rotary clamping devices, mechanism for imparting a relatively rapid rotation to said clamping devices and to the can body and a relatively slow and continuous rotation to said spindle, and a rotatable double seaming element mounted on said spindle on an axis eccentric to the axis of said spindle and having a continuous seaming surface a part of which seaming surface is constantly maintained between the axis of the rotary clamping devices and the axis of said spindle.

17. In an apparatus for double seaming ends to can bodies, in combination, a plurality of pairs of vertical and continuously rotatable seaming spindles, double seaming rolls carried on said spindles respectively and having axes which are eccentric to the axes of said spindles, a can-rotating means arranged between each pair of said spindles, mechanism for rotating said spindles whereby said rolls may be moved intermittently into and out of contact with a rotating can end, a can-supporting table extending between said pairs of spindles, and a horizontal intermittent carrier for propelling can bodies and ends along said table to said can-rotating means and between said pairs of rolls successively and for removing them therefrom.

18. In an apparatus for double seaming ends to can bodies, in combination, a plurality of pairs of vertical and continuously rotatable seaming spindles, double seaming rolls

carried on said spindles respectively and having axes which are eccentric to the axes of said spindles, a can-rotating means arranged between each pair of said spindles, mechanism for rotating said spindles whereby said rolls may be moved intermittently into and out of contact with a rotating can end, and a horizontal intermittent carrier for delivering can bodies and ends to said can-rotating means and between said pairs of rolls successively and for removing them therefrom.

19. In an apparatus for seaming ends to can bodies, in combination, a plurality of pairs of seaming rolls, a can-rotating means for each pair of rolls and arranged between the same, means for intermittently moving said seaming rolls toward each other to operate on the can when the same is being rotated, means for preliminarily adjusting the rolls of each pair toward or from each other, and an intermittently movable can conveyer adapted to carry the cans successively between the rolls of each pair and from one pair of rolls to the other pair of rolls, the intermission in the movement of the carrier occurring when the cans are being operated on by said rolls.

20. In an apparatus for seaming ends to can bodies, in combination, a plurality of pairs of seaming rolls, a can-rotating means for each pair of rolls and arranged between the same, means for intermittently moving said seaming rolls toward each other to operate on the can when the same is being rotated, comprising a continuously rotating spindle for each roll on which the roll is rotatably and eccentrically mounted, and an intermittently movable can conveyer adapted to carry the cans successively between the rolls of each pair and from one pair of rolls to the other pair of rolls.

21. In an apparatus for seaming ends to can bodies, in combination, a plurality of pairs of seaming rolls, a can-rotating means for each pair of rolls and arranged between the same, means for intermittently moving said seaming rolls in a small circular path to operate on the can when the same is being rotated, and an intermittently movable can conveyer adapted to carry the cans successively between the rolls of each pair and from one pair of rolls to the other pair of rolls, the intermission in the movement of the carrier occurring when the cans are being operated on by said rolls.

22. In an apparatus for double seaming ends to can bodies, in combination, a plurality of pairs of seaming rolls the first operating pair being shaped to curl the can end flange and a later operating pair being differently shaped to finish the double seam, a can-rotating means for each pair of rolls and arranged between the same, means for intermittently moving said seaming rolls toward each other to operate on the can when the same is being rotated, and an intermittently movable can conveyer adapted to carry the can successively between the rolls of each pair and from one pair of rolls to the other pair of rolls.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES A. GRAY.

Witnesses:
D. F. MENNIS,
ADOLPH E. J. HOERL.