

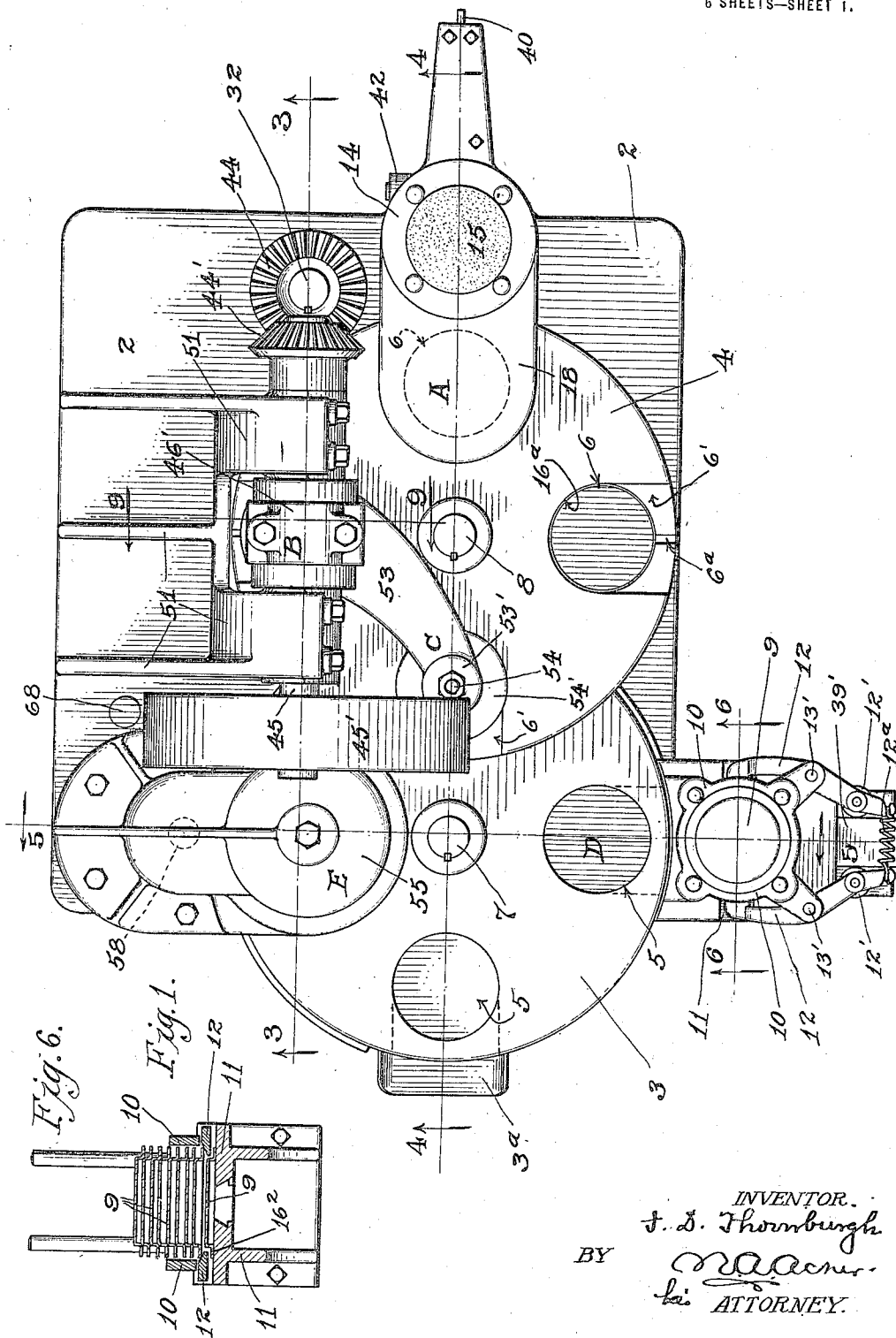
W. D. THORNBURGH,
APPARATUS FOR ASSEMBLING AND SECURING RING LINERS TO CAN ENDS.
APPLICATION FILED OCT. 25, 1911.

APPLICATION FILED OCT. 19, 1918.

Patented Dec. 28, 1920.

6 SHEETS—SHEET 1.

1,363,542.

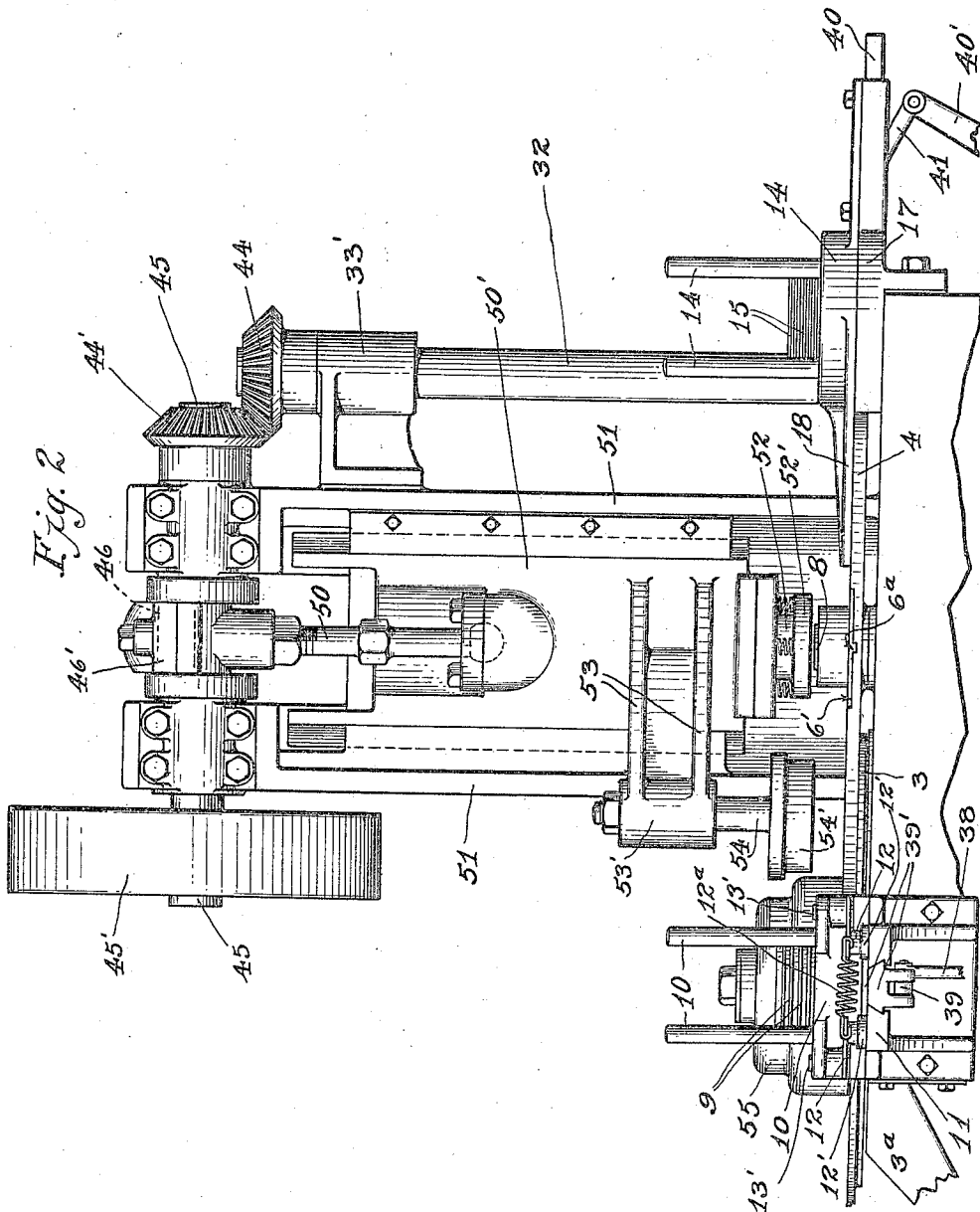


INVENTOR.

J. S. Thornburgh

BY

W. A. Macner.
his ATTORNEY.



INVENTOR.
 J. D. Thornburgh
 BY *[Signature]*
 ATTORNEY.

I. D. THORNBURGH.

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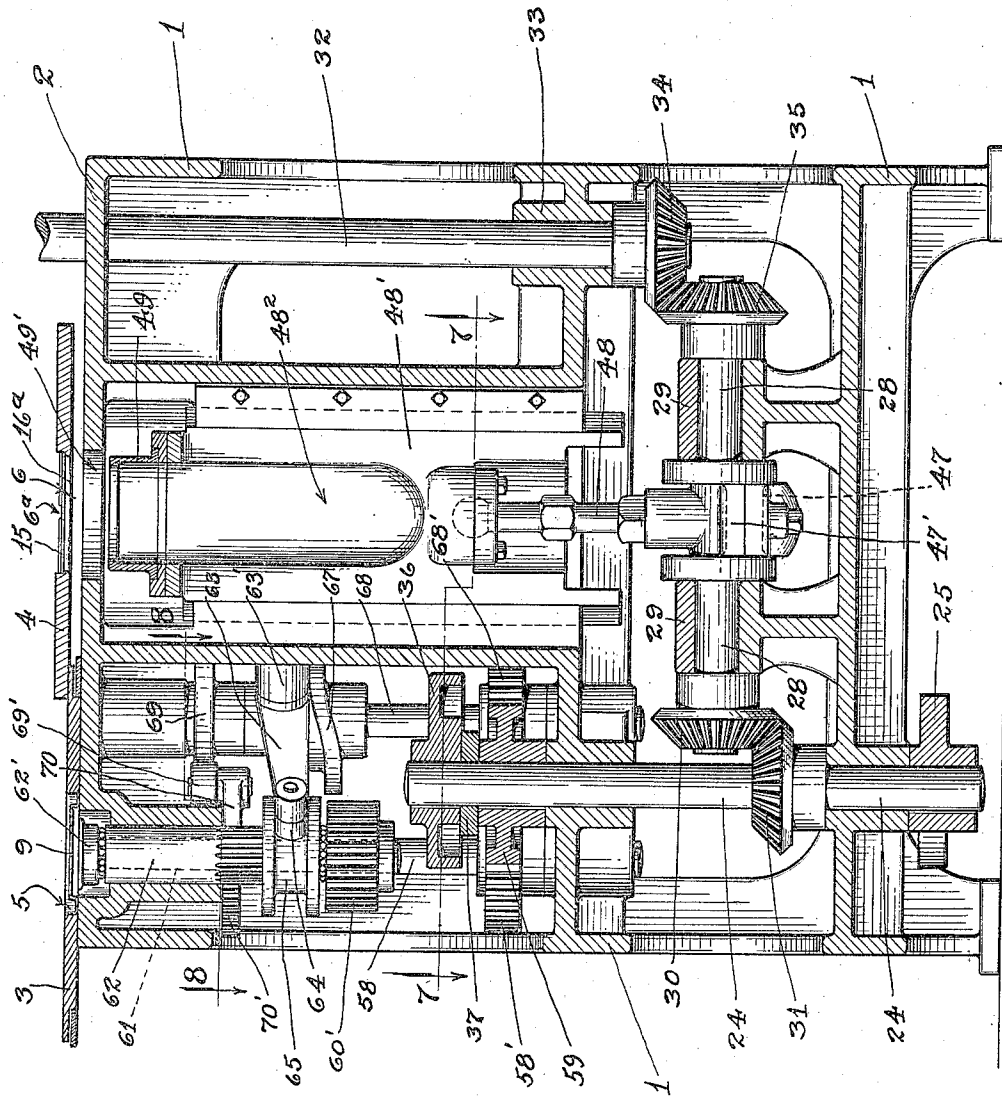


Fig. 3.

INVENTOR.
J. S. Thornburgh
BY *[Signature]*
Attorney.

I. D. THORNBURGH.

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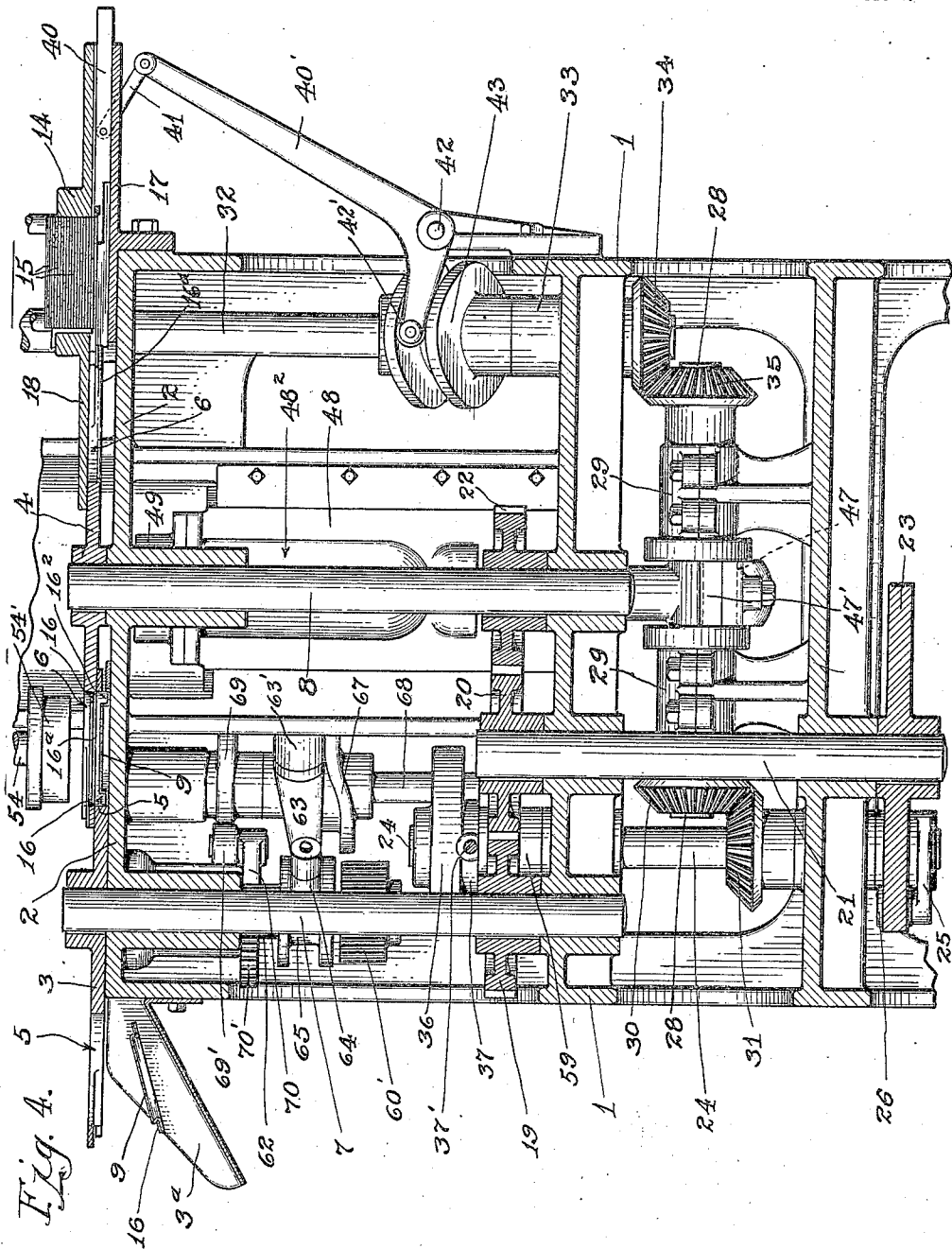
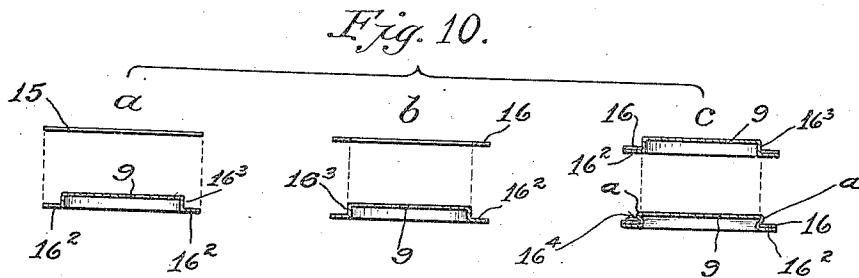
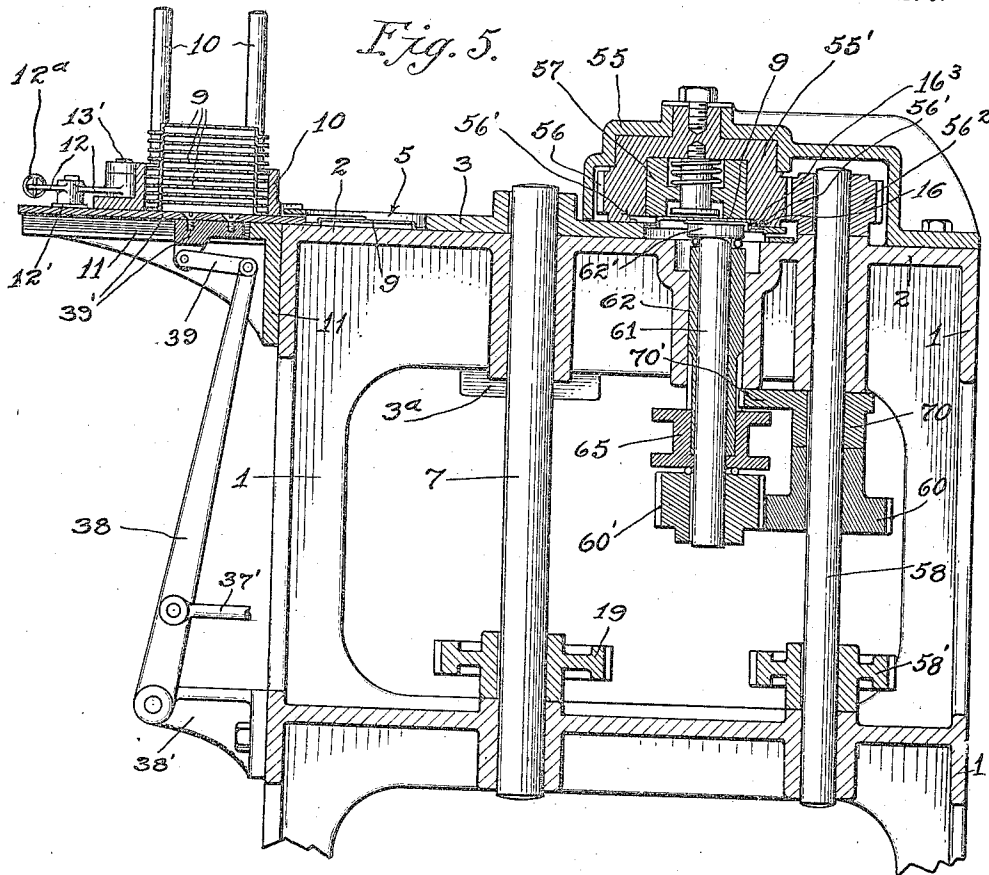
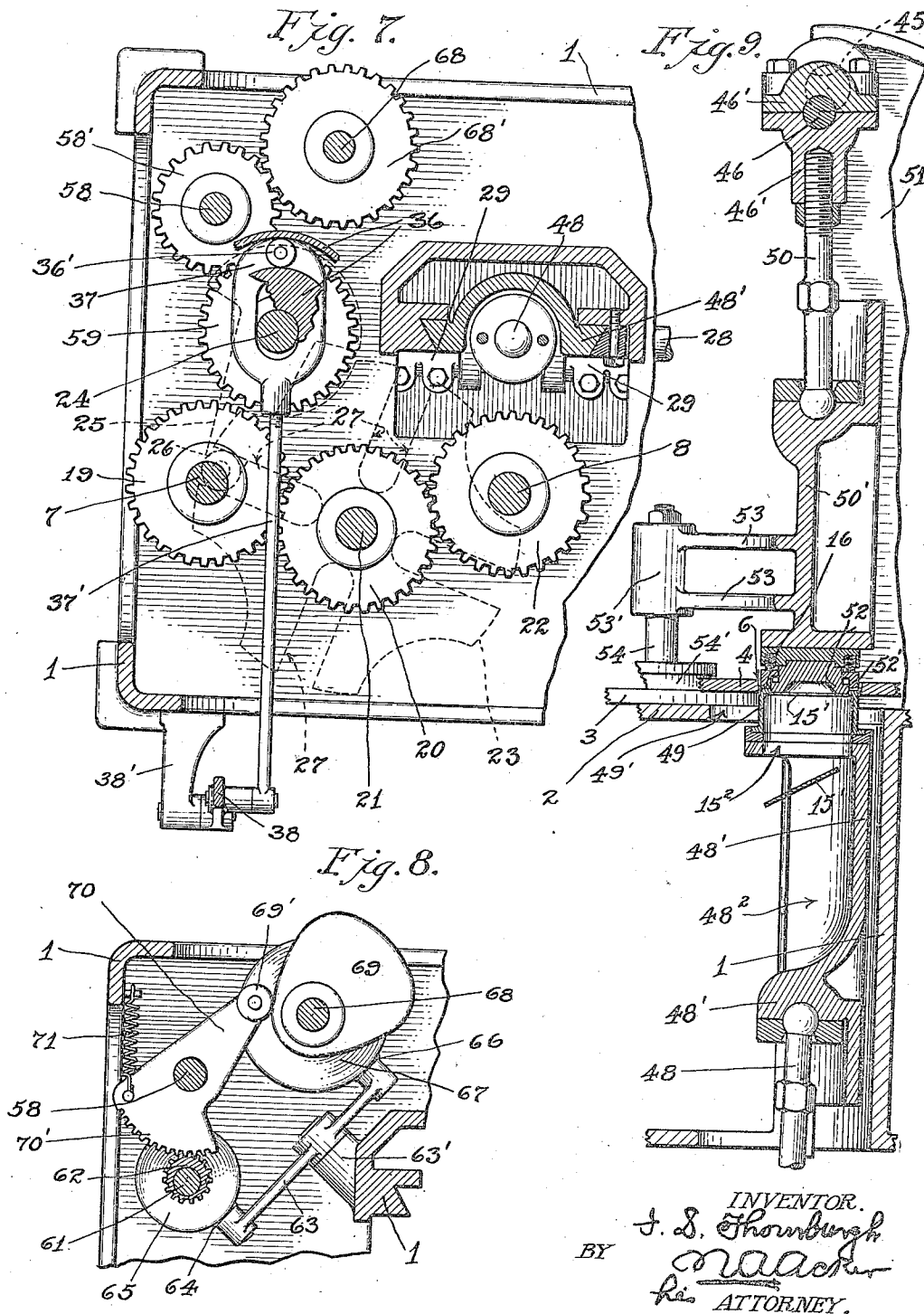


Fig. 4.

INVENTOR,
J. D. Thornburgh
BY *[Signature]*
his ATTORNEY.



INVENTOR.
J. D. Thornburgh
 BY *Naaner*
 his ATTORNEY.



UNITED STATES PATENT OFFICE.

IVAN D. THORNBURGH, OF BERKELEY, CALIFORNIA, ASSIGNOR TO AMERICAN CAN COMPANY, OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF NEW JERSEY.

APPARATUS FOR ASSEMBLING AND SECURING RING-LINERS TO CAN ENDS.

1,363,542.

Specification of Letters Patent.

Patented Dec. 28, 1920.

Application filed October 19, 1918. Serial No. 258,844.

To all whom it may concern:

Be it known that I, IVAN D. THORNBURGH, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented certain new and useful Improvements in Apparatus for Assembling and Securing Ring-Liners to Can Ends, of which the following is a specification.

The hereinafter described invention relates to means for positioning a gasket ring liner in axial alinement with a straight flanged unfinished can end, assembling the same relative to the flange of the said end and thereafter completing or finishing the can end so as to hold or retain the assembled liner relative to its flange.

In mechanism ordinarily employed for assembling gasket liners relative to the flange of a can end it is customary either to apply the ring liner to the edge of the can end and retain the same thereon by a curl being given to an upstanding circumferential flange or wall of the outstanding straight flange of the can end, or to assemble the ring liner relative to an uncurled outstanding flange of the can end having a circumferential groove formed in the outer surface of its connecting wall member by causing a distortion of the inner circumferential edge of the ring liner to permit of the same passing an overhang of the circumferential groove in the connecting wall member of the can end.

The object of the present invention is to dispense with the curl heretofore given to the upstanding circumferential wall of the flange of the can end and to dispense with grooving the connecting wall member of the flange prior to assembling or applying the gasket liner to the flange of the can end, and thus in the latter case, avoiding the necessity of distorting the inner circumferential edge of the ring liner as assembled relative to the flange of the can end.

In the preferred embodiment of an apparatus for carrying out the hereinafter described invention, there is utilized means for feeding a straight flanged unfinished can end from a holder or magazine to a seat within a can end carrier, means for feeding a disk blank from a holder or magazine to within an aperture formed in a ring liner carrier turret, mechanism for cutting a ring liner from the positioned disk of gasket

liner material combined with mechanism for actuating the turrets to position the cut ring liner in axial alinement with a positioned can end at an assembling station of the apparatus, and mechanism for assembling the liner relative to the flange of the positioned can end, and groove forming means for grooving the connecting wall of the can end after the gasket liner has been applied or assembled relative to the flange thereof, in order to secure or retain the gasket liner in fixed relation relative to the flange of said can end. While in the present case the apparatus is so constructed as to cut a gasket ring liner from a disk of liner material, it will be apparent that the ring liners may be fed to the rotating turret from a stack of previously cut ring liners, or that the same may be cut from a web of liner material, although, preference is given to the severing or cutting of the gasket liner from disks of liner material and transferring the cut ring liner to an assembling station and in axial alinement with a can end there positioned; the essence of the invention residing in the formation of a groove in the connecting wall member of the can end for holding an assembled liner relative to the flange thereof after the said liner has been applied to said flange, and by so doing, preventing, obviating or overcoming the distortion of the circumferential edge of the ring liner as heretofore applied to a previously grooved can end provided with an outstanding flange, one form of such type of mechanism being fully set forth and described in my pending application entitled, Organized apparatus for grooving can ends and applying ring liners thereto, Serial Number 257,636, filed October 10, 1918.

In order to comprehend the invention as set forth in the preferred embodiment thereof, reference should be had to the accompanying sheets of drawings, wherein,

Figure 1 is a general plan view of the apparatus illustrating the can end carrier or conveying turret together with its associated can end feed mechanism, and the gasket blank and ring carrier turret and its associated feeding mechanism and the position of the cutting mechanism for severing a ring liner from a disk of liner material, also disclosing the position of the mechanism for assembling the ring liner relative to a positioned can end, and the position of the means

for grooving the connecting wall of the flanged can end after the assembling of the ring liner relative thereto in order to hold the same in its assembled position.

5 Fig. 2 is a front elevation of the upper portion of the apparatus or the mechanism supported above the rotating turrets, illustrating the drive means for the apparatus, the can end carrier turret and the gasket
10 blank and ring liner carrier turret, and the upper ring cutting die, together with the can end feeding mechanism and the disk blank feeding mechanism.

Fig. 3 is a sectional view of the lower portion of the apparatus taken on the sectional
15 line 3—3 Fig. 1 of the drawings and viewed in the direction of the arrows, illustrating the lower die of the cutting mechanism and the groove forming mechanism and its associated driving parts.

Fig. 4 is a central sectional view of the lower part of the apparatus taken on the
20 line 4—4 Fig. 1 of the drawings and viewed in the direction of the arrows, illustrating the can end carrier turret and the disk blank and ring liner carrier turret, with the mechanism for actuating the same, also illustrating the feed mechanism for conveying a disk
25 blank from the stack contained within a holder to the apertures of the disk carrier turret and the plunger for assembling a cut ring liner relative to a can end in axial alignment therewith.

Fig. 5 is a transverse sectional view taken
35 on the line 5—5 Fig. 1 of the drawings and viewed in the direction of the arrows, illustrating the can end holder magazine and the means for feeding can ends successively therefrom to within the apertures of the
40 rotatable can end turret, and also illustrating the mechanism for grooving the connecting wall member of the flanged can end after a ring liner has been assembled on the flange thereof.

Fig. 6 is a detailed sectional view of the can end holder or magazine and the supporting cut-out knives or blades associated therewith, said view being taken on the sectional
45 line 6—6 Fig. 1 of the drawings and viewed in the direction of the arrows.

Fig. 7 is a broken plan sectional view taken on the irregular line 7—7 Fig. 3 of the
50 drawings, illustrating the arrangement of the drive gears for actuating the various parts of the apparatus, parts being removed for clearness of the drawing, the Geneva drive mechanism being illustrated in dotted
55 lines.

Fig. 8 is a plan sectional detailed view of parts controlling the action of the grooving
60 mechanism, said sectional view being taken on the irregular line 8—8 Fig. 3 of the drawings and viewed in the direction of the arrows.

Fig. 9 is a longitudinal sectional elevation

taken on the line 9—9 Fig. 1 of the drawings, and viewed in the direction of the arrows, said view illustrating the die-cutting mechanism for cutting a ring liner from liner material.

Fig. 10 is a diagrammatic view illustrating,

(a), the relationship of a disk blank relative to a straight flanged unfinished can end;

(b), the relationship of a cut ring liner
75 to the inner shoulder of the partially formed can end; and at

(c), the relationship of the assembled can end and gasket ring liner to the finally formed can end with its gasket liner held in
80 position by an overhang of the groove of the connecting wall member of the can end, the various parts of the view, taken in connection one with the other, illustrating the successive operations performed in the apparatus
85 designed for carrying out the invention.

In the drawings, the numeral 1 is used to designate any suitable form of a suitable frame capable of sustaining the working parts of the apparatus, and which, in the
90 present case is formed with a top bed plate 2. Over the said bed plate 2 work two horizontally disposed movable turrets 3 and 4, the former being provided with a series of spaced circumferentially disposed
95 can end receiving apertures 5, and the latter with a series of circumferentially disposed spaced liner receiving and sustaining apertures 6. The turrets 3 and 4 are mounted respectively on the upper ends of
100 the vertical shafts 7 and 8, Figs. 1, 4 and 7 of the drawings. Can ends 9 to be grooved are maintained in stack formation within an open bottomed end holder or magazine 10 supported at one side of the machine by a
105 bracket 11 projected from the frame of the machine, the stack of ends within the holder or magazine being upheld by the supporting blades 12, Figs. 1, 2, 5 and 6 of the drawings. Above the bed plate 2 at a position substantially
110 at right angles to the holder 10 is situated an open bottomed holder or magazine 14, adapted in the present case to contain a stack of disk blanks 15 composed of suitable liner material from which the gasket
115 ring liners 16 are cut, Fig. 10 of the drawings, said holder being supported by a bracket 17 projected from the frame of the apparatus and being provided with a projecting extension 18 adapted to partly over-
120 hang the turret 4, Figs. 1 and 4 of the drawings.

The shaft 7 carrying the can end apertured turret 3 is driven by means of a gear
125 19 secured to the lower end portion thereof, Figs. 4, 5 and 7 of the drawings, meshing with a gear 20 secured to a lower vertical shaft 21 within the frame of the machine, which said gear in turn meshes with a gear
130 22 fixed to the lower end of the shaft 8 for

the turret 4. The shaft 21 for imparting rotation to the turret shafts 7 and 8 is intermittently driven by means of the Geneva wheel 23 fixed to the lower end thereof, Figs. 3, 4 and 7 of the drawings. Intermittent movement is transmitted to the Geneva wheel 23 from the continuously driven vertical shaft 24 through the medium of the Geneva arm 25 secured to said shaft, the following roll 26 carried at the outer end thereof working in and out of the radial slots 27 formed in said Geneva wheel. Motion is imparted to the shaft 24 from the horizontally disposed driven shaft 28 working within bearings 29 within the frame of the machine, by means of the bevel gears 30 and 31, secured respectively to the shafts 28 and 24, Figs. 3 and 4 of the drawings, and said shaft 28 is driven from the vertical shaft 32, mounted in bearings 33 and 33', Figs. 2, 3 and 4 of the drawings, by means of a bevel gear 34 secured to the lower end thereof meshing with a similar gear 35 fixed to the outer end of the shaft 28.

To the upper end of the vertical shaft 24 there is secured an under grooved cam 36, Figs. 3 and 4 of the drawings, with which coacts a following roller 36' carried at the inner enlarged end 37 of a reciprocating rod 37'. Said enlarged end 37 of the rod 37' is slotted to straddle the shaft 24, the outer end of the rod 37' being pivotally connected to the lower portion of a throw lever 38, pivoted at its lower end to a bracket 38' projected from the frame structure of the machine, Fig. 5 of the drawings. The lever 38 at its upper end is connected by a link 39 to a horizontally reciprocating feed slide 39' working within a guide-way formed in the upper surface of the supporting bracket 11 for the can end holder. As the slide is thrown inward the head thereof moves from between the rolls 12' of the cut out blades 12 of the can end holder or magazine 10, when the tension of the spring 12^a draws inwardly the outer ends of said cut out blades, causes the inner ends to swing outwardly to release the stack of can ends within the holder. At a previous operation the lowermost can end below said blades has been placed within the path of movement of the reciprocating slide, which forces the same from within the holder through its outlet opening and moves the can end within one of the apertured openings 5 positioned to receive the same while the turret 3 is at a state of rest. The can end is moved within the sphere of the apertured opening 5 through a radial cut-out section in the under face of the turret 3 adjacent each opening 5 and during its inward movement it slides on the upper surface of the bed 2 of the machine. It will be understood that as the slide 39' is moved outwardly the rolls 12' are engaged by the head thereof and sep-

arated or forced apart, causing the free ends of the cut out blades fulcrumed to the bracket 11 at 13', Fig. 1 of the drawings to swing inwardly within the holder 10 beneath the stack of can ends to support the same as the slide 39' moves from beneath the same. But the blades at this time cut out the lowermost can end, which is left in the path of the slide, as seen in Fig. 6.

The disks of liner material are removed successively from within the holder 14 by means of the reciprocating cut-out slide 40, Fig. 4 of the drawings, which slide is actuated by a fulcrumed lever 40' which is connected at its upper end by a link 41 to the said slide 40. The lever 40' is fulcrumed at 42 to a bracket projecting from the frame of the machine and at its free inwardly projecting end carries a following roll 42' which works within the groove of a cam 43 secured to the vertical shaft 32. During the rotary motion of the said shaft 32 the lever 40' is thrown inwardly and outwardly to impart an inwardly and outwardly reciprocating stroke to the cut-out slide 40, which moves beneath the holder 14 and removes the lowermost disk blank of the stack of blanks 15 contained within said holder, and delivers the cut out lowermost blank to within one of the apertured openings 6 of the turret 4, said cut-out disk during its transfer from the holder through the aperture of the said disk moving beneath the overhang wall or projection 18 of the holder 14, the said disk-blank moving within a positioned aperture 6 of the turret 4 through the radial cut out portion 6' in the upper surface of the turret 4 adjacent to each of the apertures 6 and connecting therewith, there being provided a grooved section 6^a in which the cut out blade 40 works as moved to position a liner disk within a positioned aperture 6, which aperture at such time stands at rest beneath the overhang 18 of the holder 14, and in radial alinement therewith, Figs. 1 and 4 of the drawings.

Rotary motion is imparted to the shaft 32 for actuating the driven shaft 28 by means of the beveled gear 44 secured to the upper end thereof, meshing with a similar gear 44' secured to one end of the horizontally disposed drive shaft 45, Figs. 1 and 2 of the drawings, there being secured to the opposite end of the drive shaft 45 a belt pulley 45' over which is adapted to travel a power belt not shown for transmitting power therefrom to an outside source of supply. The drive shaft 45 is formed with a central crank section 46, to which is secured a crank head 46' Fig. 2 of the drawings, and the driven shaft 28, Fig. 3 of the drawings, is also provided with a crank section 47, to which is secured a crank head 47'. The crank head 47' is connected by a crank arm 48 to a vertically movable slide block 48' which works

in guideways within the frame of the machine, Fig. 3 of the drawings, and which at its upper end carries a die-ring 49, which is adapted to project or work through an aperture 49' in the bed 2 of the apparatus. The crank head 46' of the drive shaft 45 is connected by a crank arm 50 to a vertically movable or reciprocating slide block 50' which works within guide-ways of a super-structure 51, Fig. 2 of the drawings, and the said slide 50' carries at its lower end the cutting die-member 52, Figs. 2 and 9 of the drawings, which said cutting-die is surrounded by a spring held ejector ring 52'. The vertically movable slide head 50' carries an arcuate bracket 53, Figs. 1, 2 and 9 of the drawings, which carries at its outer end and holds within the head 53' thereof a vertically disposed stem 54 of an assembling plunger 54' which is adapted on its downward stroke to move within and through one of the apertures 6 of the turret 4 when the same is positioned in registry with one of the apertures 5 of the turret 3 with a cut ring liner 16 in axial alinement with the straight outstanding flange of a can end 9, Fig. 4 of the drawings, at such time, to remove or force the ring liner 16 from off its retaining seat 16^a and press the same onto the flange 16² of the can end 9, Fig. 4 of the drawings.

The turret 4 receives during a period of rest into one of its apertures 6, a disk blank 15 at the station A of the apparatus and is thereafter transferred by the step rotation of the turret 4 to within the sphere of the die cutting members situated at the station B of the apparatus, Fig. 1 of the drawings, and after the cutting of the ring liner the same is conveyed supported within a shouldered seat of the aperture 6 by the step rotation of the turret 4 to the assembling station C, of the apparatus, by which time the unfinished flanged can end 9 delivered into one of the apertures 5 of the turret 3 at the can end feed station D, has been transferred from said station by the step rotation of the turret 3, and placed in axial alinement with the cut ring liner at the station C, where during a period of rest in the movements of the turrets 3 and 4 the assembling plunger is brought into operation by the downward movement of the slide block or head 50' to force the cut ring liner 16 from its seat 16^a onto the flange 16² of the positioned can end. The assembled can end and liner is then transferred from the station C by a step rotation of the turret 3 to place the assembled member at the station E for the grooving of the connecting wall member 16^a of the can end to permit the circumferential groove 16⁴ to retain the assembled ring liner 16 onto the flange 16² by an overhang shoulder α Fig. 10 of the drawings.

At the assembling station and above the

rotatable turret 3 and at a point approximately opposite the can end feed mechanism is located a housing 55, Fig. 5 of the drawings, within which housing is mounted for rotary movement a die ring block 55', having cut on the outer face thereof the gear teeth 56. This die ring block is provided in the lower central portion thereof with a die ring 56', and within the said block 55' is mounted a spring-pressed ejector block 57. Rotary motion is imparted to the die ring head 55' from the continuously driven vertically disposed shaft 58 through the medium of the gear 56² meshing with the teeth of the said block, Figs. 3, 5, 7 and 8 of the drawings, which said shaft at its lower end carries a gear 58' for meshing with the gear 59, secured to the upper portion of the shaft 24, and beneath the slotted head 37 of the connecting rod 37' for actuating the can end feed lever 38. The shaft 58 intermediate its length has secured thereto a gear 60 which meshes with a gear 60' secured to the lower end of a vertically disposed shaft 61, Fig. 5 of the drawings. The shaft 61 is extended through an eccentric bushing 62 and at its upper end carries a groove forming roll 62'. The said shaft 61 derives its rotary motion from the shaft 58 and in addition to its rotary motion it has vertical movement imparted thereto, which motion is given to the said shaft by means of a rock lever 63, Figs. 3 and 8 of the drawings, which lever is fulcrumed to a bracket 63', and carries at its outer end a following roll 64, which works within a grooved collar 65 secured to the lower end of the eccentric bushing 62. At its inner end the rock lever 63 carries a following roll 66 which works within the peripheral groove of a cam 67 secured to the vertical shaft 68, continuous rotation being transmitted to the shaft 68 from the shaft 58 through the medium of the gear 58' meshing with the gear 68' secured to the lower end of the shaft 68. On the shaft 68 and above the peripheral grooved cam 67 is secured a cam 69, which coacts with a following roll 69' secured to one end of a lever 70, mounted for oscillation on the shaft 58, and which lever terminates in an enlarged gear segmental head 70', the teeth of which mesh with the external teeth of the segmental bushing 62. During the rotation of the shaft 68 the cam 69, coacting with the following roll 69', oscillates the lever 70 to cause the segmental gear end thereof to actuate the eccentric bushing 62, said lever 70 having its roller 69' maintained against the surface of the cam 69 by the tension of the spring connection 71. It will thus be noted that a continuous rotary motion is transmitted to the shaft 61 carrying the groove forming roll 62', and that vertically reciprocating motion is imparted thereto during this continuous rotation through the me-

dium of the rock lever 63, while eccentric motion is transmitted to the said shaft by the action of the eccentric bushing 62, for moving or throwing the forming roll 62' carried by the shaft 61 toward and from the die ring 56' of the rotating die ring head 55'. The groove forming roll 62' of the shaft 61 coacts with the die ring 56' for acting against the inner surface of the connecting wall member 16³ of the positioned can end 9 with its gasket liner 16 assembled relative to its flange 16², for pressing the metal thereof downwardly over the die ring 56' for the grooving of the said connecting wall member of the can end to provide an overhang *a* for retaining the assembled gasket liner 16 in place relative to the outstanding flange of the can end. After the completion of the grooving operation the shaft 61 through the described cam actuated mechanism is lowered to place the groove forming roll from within the sphere of the aperture 6 of the turret 3, when the spring pressed block 57 lowers or moves the finished can end with its assembled liner fully within the aperture 6, it being understood that as the shaft 61 is raised the groove forming die bears against the under-surface of the body member of the can end and moves the same upwardly from within the aperture 6 to place its vertical connecting wall member in radial alinement with the die ring 56', a portion of the peripheral wall of the outstanding flange of the can end at all times being maintained within the aperture 6 of the turret 3.

It will be noted that in the preferred embodiment of an apparatus for carrying out the described invention there are five distinct stations employed, A, being the feeding station for delivering disks of liner material to the apertures of the intermittent rotating turret 4; B, the station at which the ring liner is cut from the disk of liner material; D, the station for the delivery of ungrooved or unfinished can ends to the apertures of the intermittently rotating turret 3; C, the station for the assembling of the ring liner relative to the flange of the can end conveyed thereto and in axial alinement with the ring liner by the intermittent or step rotation of the turret 3, and E, is the station at which the grooving of the can end is performed for securing or holding the assembled ring liner relative to the flange of the can end.

While cutting mechanism has been illustrated for the cutting of a ring liner from disks of liner material, it is obvious that in case previously cut ring liners are fed from the holder or magazine 14 to within the apertures 6 of the turret 4, the cutting mechanism may be dispensed with, and it is also obvious that instead of utilizing disks of liner material or feeding previously cut ring liners, that a web of liner material may be

utilized from which to cut the ring liners; in such case, the web of liner material being so disposed as to travel or move over the surface of the rotating turret 4 and between the same and the cutting members for the severing of a ring liner.

Where a ring liner is cut from liner material, as for instance, a disk of liner material, it is necessary that the central core piece 15' be disposed of, and for this purpose, the slide carrying the die 49 is provided with a discharge channel 48² which communicates with an aperture 15² through which the core piece falls into the discharge channel 48², Figs. 3 and 9 of the drawings.

After the grooving of the can end for the retention of the gasket ring liner, the step rotation of the turret 3 advances the can end above the discharge chute 3^a Fig. 4 of the drawings, at which point the can end falls from within the aperture 5 of the turret 3.

While the apparatus for carrying out the invention has been disclosed in its preferred embodiment, I do not wish to be understood as confining or limiting myself to the details of the working parts herein shown and described, but on the contrary wish to be understood as claiming the invention as broadly as the state of the art 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, having embodied therein an assembling station and a forming station spaced one from the other, means for receiving and positioning straight flanged can ends to the assembling station and transferring the same with an assembled ring liner to the forming station, means for positioning a gasket ring liner at the assembling station and in axial alinement with a can end, reciprocation means at said station for applying the gasket liner to the flange of the held can end and mechanism at the forming station adapted to act upon the can end transferred thereto with its assembled liner to groove its connecting wall member for the retention of the liner relative to the flange of the can end.

2. In an apparatus for the described purpose, the combination with interconnected mechanism for receiving and placing in axial alinement at an assembling station a flanged can end and a gasket ring liner, means at said station for assembling the alined members, devices for transferring the assembled members to a forming station, and co-acting working instrumentalities at said station for grooving the connecting wall member of the can end for the retention of the assembled liner relative to the flange thereof.

3. The combination with interconnected mechanism for assembling a ring liner relative to the outstanding flange of a can end, and devices for grooving the connecting

wall member of the flanged end for the retention of the assembled liner relative to the flange thereof.

4. In an apparatus for the described purpose, the combination with means for cutting a ring liner from liner material, devices for transferring the ring liner to an assembling station, means for positioning at said station and in axial alinement with the liner a can end provided with an outstanding flange and transferring the same with the liner assembled relative to the flange thereof to a forming station, devices at the assembling station for applying the liner to the flange of the can end, and reciprocating devices situated at the forming station for grooving the connecting wall member of the can end for the retention of the assembled liner relative to the flange thereof.

5. An apparatus for the described purpose, the same comprising assembling means and forming means spaced therefrom for grooving the connecting wall member of the can end to retain the liner relative to the flange thereof, mechanism for positioning a ring liner and a can end provided with an outstanding flange in axial alinement at the assembling means for the applying of the liner by the assembling means to the flange of the can end, and means for transferring the assembled members to the said forming means.

6. In an apparatus for the described purpose, the combination with co-acting instrumentalities for cutting a ring liner from flat liner material, of interconnected instrumentalities for positioning the liner and a can end provided with an outstanding flange in axial alinement, means for assembling the alinement members, and devices for grooving the connecting wall member of the can end to retain the assembled liner relative to the flange thereof.

7. In an apparatus for the described purpose, the combination with co-acting instrumentalities for grooving at the inner edge of the applied gasket liner the connecting wall member of a can end provided with an outstanding flange, of means for positioning between said forming instrumentalities a can end with a gasket liner assembled relative to the outstanding flange thereof, means for automatically positioning the gasket liner on the flange of the can end, and mechanism for actuating said working parts in timed relation.

8. In an apparatus for the described purpose, the combination with a groove forming die, of means for positioning within the sphere thereof a can end provided with an outstanding flange having an assembled gasket ring liner thereon, means for automatically positioning the gasket liner on the flange of the can end, and devices co-acting

with the forming die for grooving at the inner edge of the applied gasket ring liner the connecting wall member of the can end to retain the assembled liner relative thereto.

9. In an apparatus for the described purpose provided with a cutting station, an assembling station and a forming station spaced one from the other, carrier means for positioning at the assembling station a can end provided with an outstanding flange and transferring the same with an assembled liner to the forming station, carrier means for transferring a cut ring liner from the cutting station to the assembling station and positioning the same for axial alinement with a can end, co-acting means at the cutting station for severing a ring liner from liner material, means at the assembling station for applying the liner to the flange of the can end, and co-acting instrumentalities situated at the forming station for grooving the connecting wall member of the can end to retain the assembled liner relative to the flange thereof, and mechanism for actuating the mentioned working parts in timed relation.

10. In an apparatus for the described purpose provided with a cutting station and an assembling station spaced therefrom, reciprocating cutting mechanism situated at the cutting station and an assembling plunger situated at the assembling station, connection between the cutting mechanism and the said plunger whereby the same work in unison, devices for delivering liner material to the cutting mechanism for the severing of a ring liner therefrom, and transferring the said liner to the assembling station, devices for positioning a flanged can end at the assembling station to have a liner applied to the flange thereof and transferring the said end with its applied liner to a forming station, and co-acting devices situated at the forming station for grooving the connecting wall member of the can end to retain the assembled liner relative to the flange thereof.

11. In an apparatus for the described purpose, the combination with co-acting mechanism for cutting and assembling ring liners relative to the outstanding flange of can ends, of means for grooving the connecting wall member of the can end to retain the assembled liner relative to the flange thereof.

12. In an apparatus for the described purpose, the combination with reciprocating assembling means for applying a gasket ring liner to the outstanding flange of an axially alined can end, forming mechanism adapted to act relative to the connecting wall member of the can end at the inner edge of and above the liner to shape the same to retain the assembled liner relative to the flange of the can end, means for transferring the assembled can end and liner from the assembling

bling means to the forming mechanism, and devices for actuating said working parts in timed relation.

13. In an apparatus for the described purpose, the combination with a forming die, of means for positioning a gasket lined can end to within the sphere of said die, a forming roll co-acting with said die to shape the connecting wall member of the can end at the inner edge of and above the liner for retaining the assembled gasket liner relative to the flange of the can end, and inter-connected working instrumentalities for imparting rotary reciprocating and radial movement to the forming roll.

14. In an apparatus for the described purpose, the combination with a forming die, of means for positioning a straight flanged can end with an assembled gasket liner relative to the die with its vertical connecting wall member in parallel relation to said die, a forming roll adapted to co-act with the die for acting against the connecting wall member of the can end to shape the same to retain the assembled liner relative to the flange thereof, and means for imparting rotary, vertical and radial movement to the said forming roll.

15. In an apparatus for the described purpose, the combination with an intermittently operated carrier adapted to receive and advance can ends provided with an outstanding flange having a gasket liner assembled relative thereto within the sphere of forming mechanism, said mechanism comprising a rotary head provided with an internal forming die, a reciprocating forming roll adapted to move a can end with its assembled liner within the sphere of the forming die with the connecting wall member of the can end in parallel relation to said die, and to co-act with said die to shape said wall member on the can end to retain the assembled liner relative to the flange thereof, with means for imparting rotary, vertical and radial movement to said forming roll, and interconnected mechanism for actuating said working parts in timed relation.

16. In an apparatus for the described purpose, the combination with a rotary member provided with an internally disposed die, of a forming roll adapted to co-act with said die for shaping the connecting wall member of a flanged can end with an assembled liner thereon to retain the liner relative to the flange of the can end, co-operating automatic means for holding a succession of can ends and carrying them within the sphere of operation of said roll, and means for imparting rotary, vertical and radial movements to said forming roll.

17. In an apparatus for the described purpose,

the combination with automatic means for assembling a ring liner relative to the outstanding flange of a can end, and co-acting forming devices adapted to act relative to the connecting wall member of the can end at the inner edge of the applied ring liner for shaping the same to retain the assembled liner relative to the flange of the said can end.

18. In a machine for the described purpose, the combination with means for assembling gasket liners relative to the outstanding flange of can ends, of co-acting rotary forming devices adapted to act relative to the connecting wall members of the can end to shape the same to retain the assembled liner relative to the flange of the can end, and means for imparting rotary, vertical and radial movement to at least one of said rotary forming devices.

19. In an apparatus for the described purpose, the combination of inter-connected working instrumentalities for successively alining flanged can ends and gasket liners, assembling the alined members and shaping the connecting wall member of the can end at the inner edge of and above the liner to retain the assembled liner relative to the flange of the can end, and means for actuating said inter-connected working instrumentalities in timed relation.

20. In an apparatus for the described purpose, the combination with a rotatable can end turret provided with a series of circumferentially vertically disposed spaced can end apertures, of a rotatable liner carrier provided with a series of spaced vertically disposed liner apertures adapted to register with the apertures of the can end turret, devices for delivering can ends successively to the apertures of the said can end turret, devices for delivering liners successively to the apertures of the liner turret, means for assembling the liners relative to the flange of the can ends when the apertures of the turrets are in registry, mechanism for imparting step rotation to said turret for placing the liner and can ends in axial alignment and transferring the members so assembled to a forming station, and means at said station for shaping the connecting wall member of a can end at the inner edge of and above the liner to retain the assembled liner relative to the flange thereof.

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

IVAN D. THORNBURGH.

Witnesses:

N. A. ACKER,
D. B. RICHARDS.