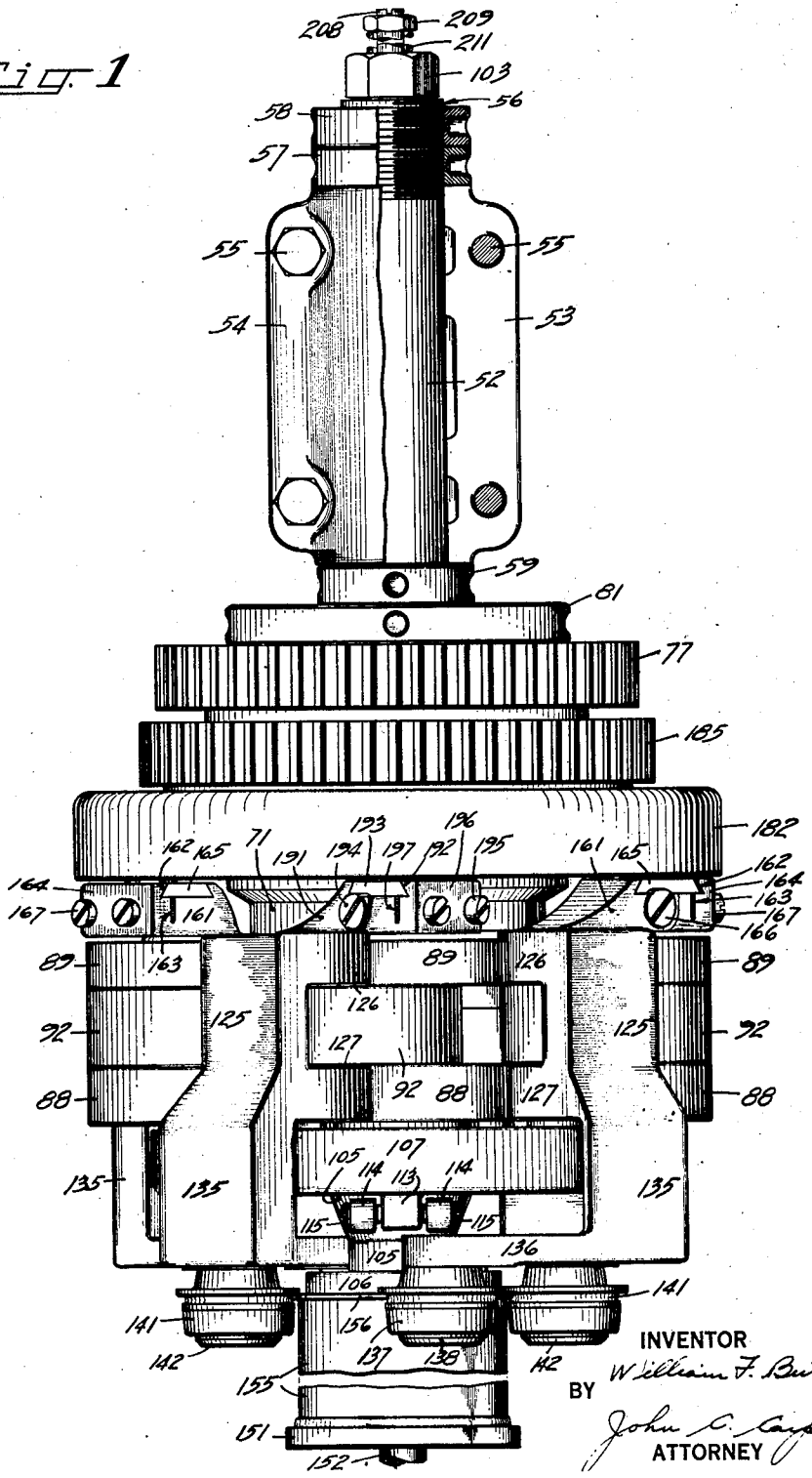
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DOUBLE SEAMING HEAD

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Fig. 1



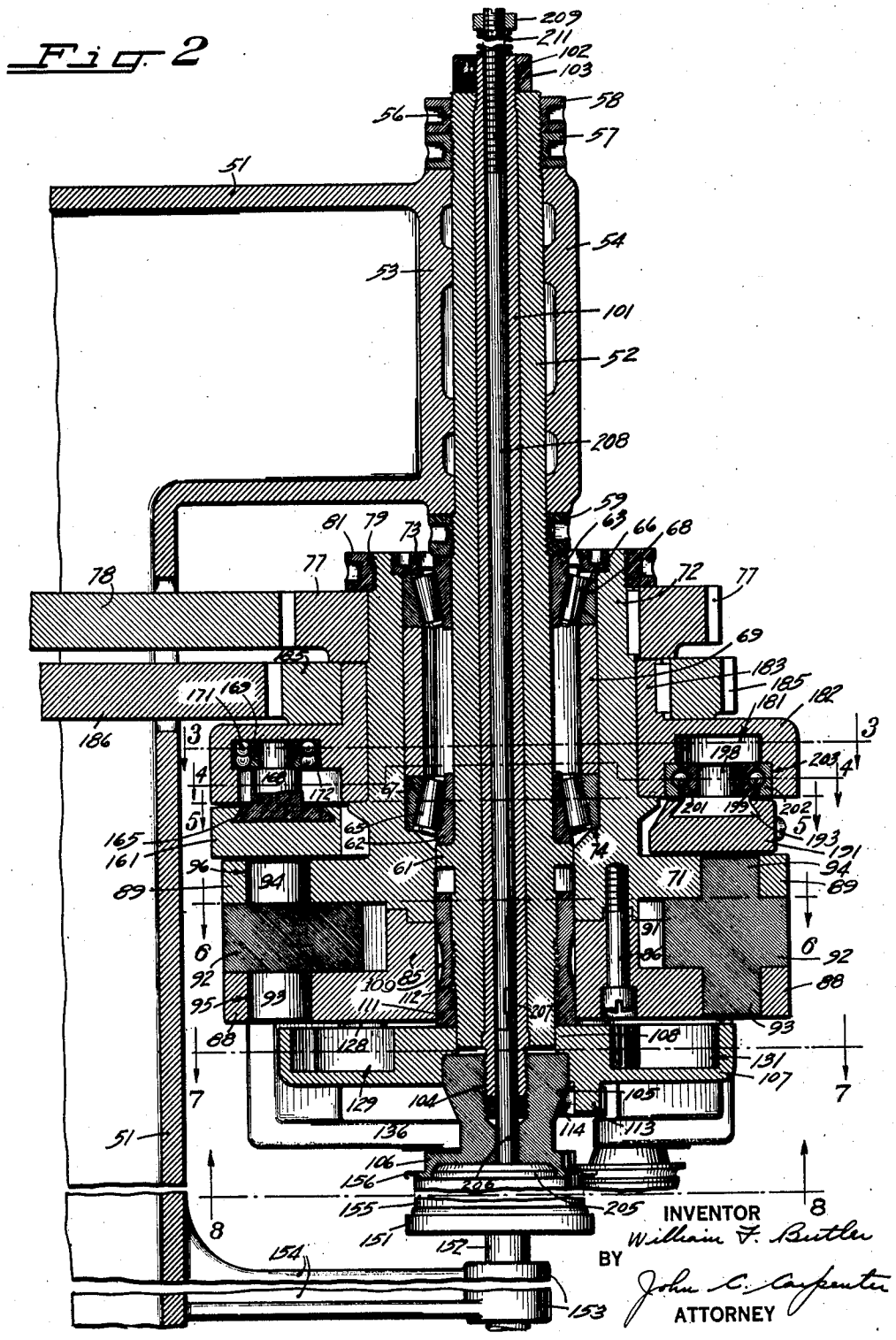
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Fig. 2



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Fig. 3

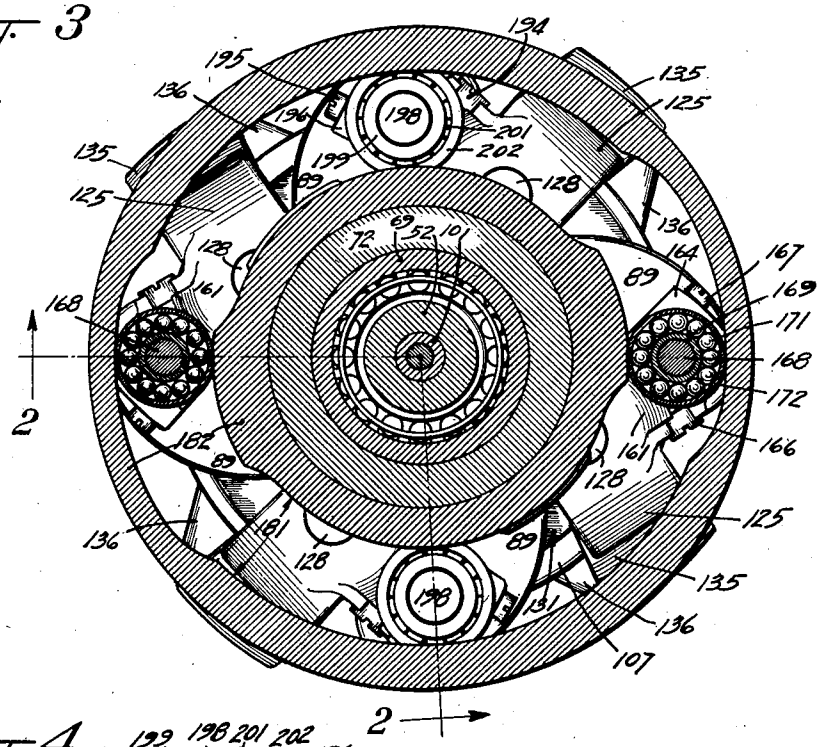
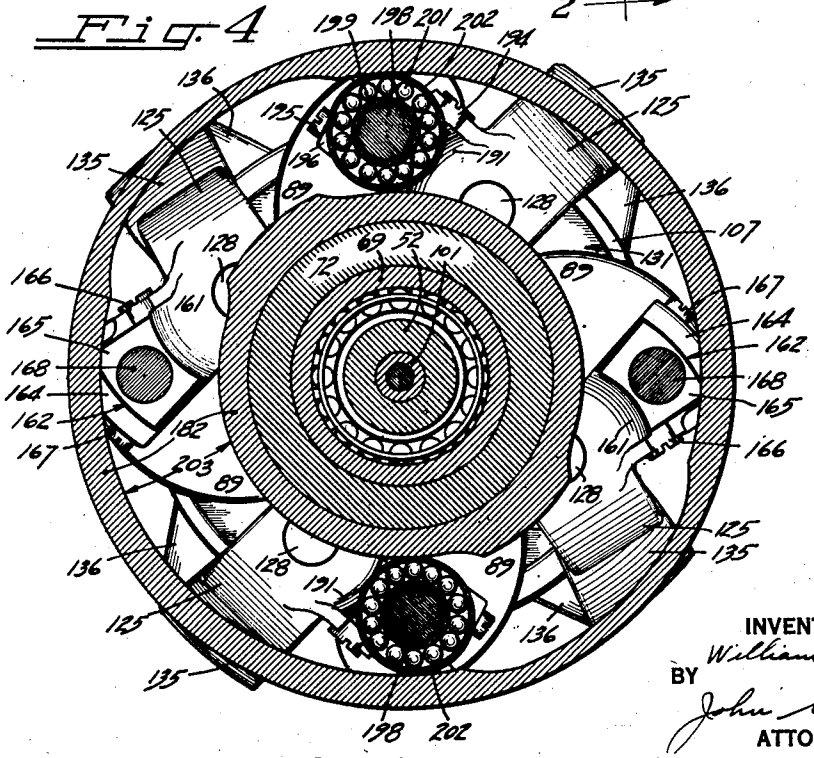


Fig. 4



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Fig. 5

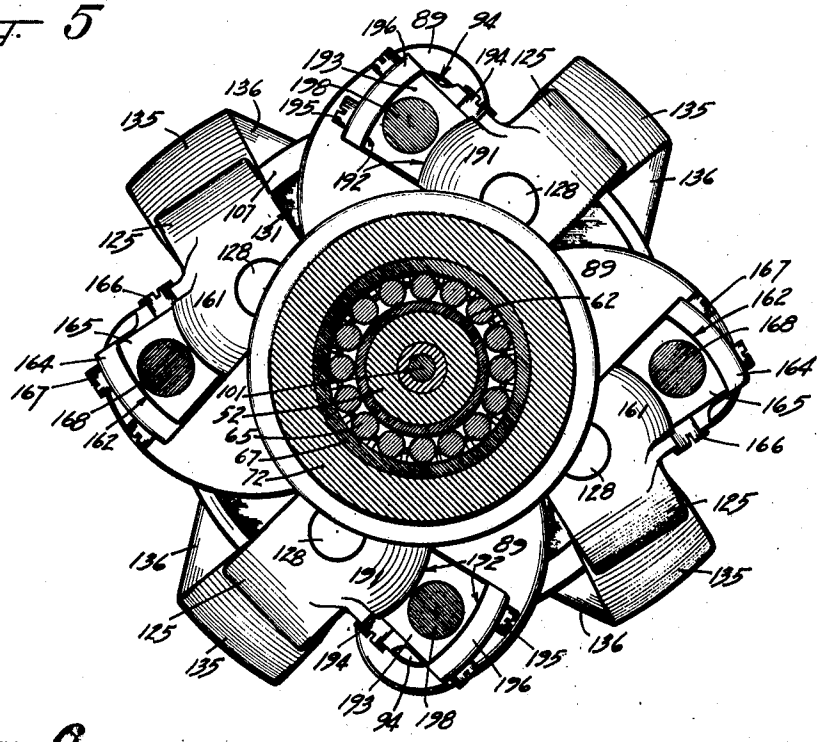
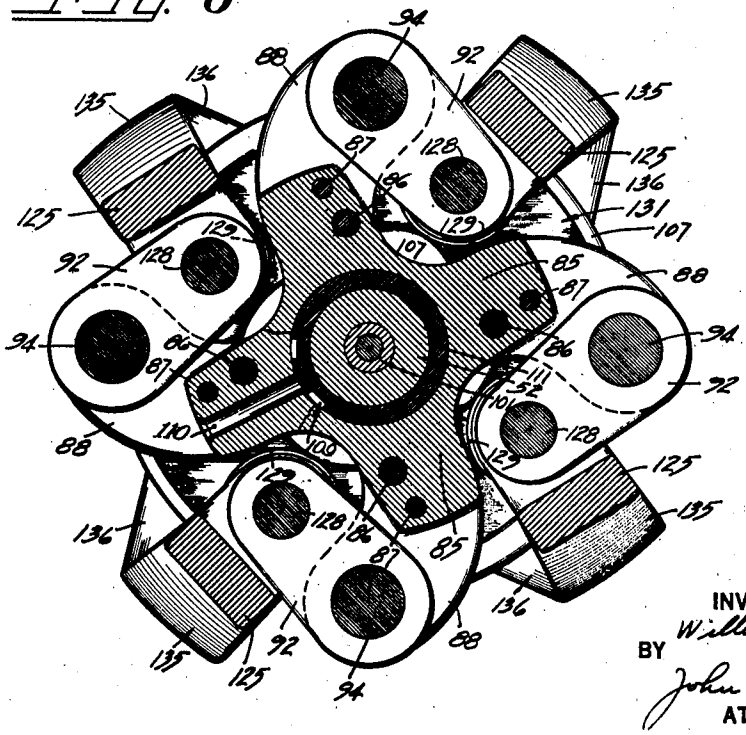


Fig. 6



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Fig. 7

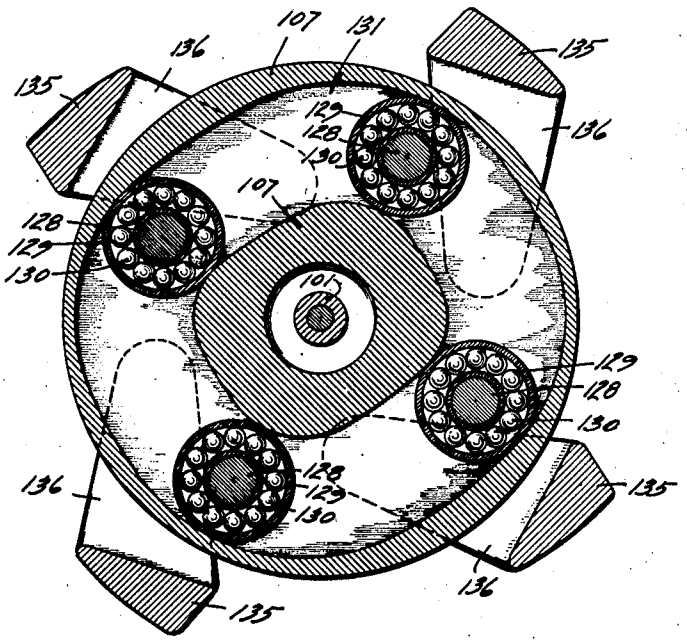
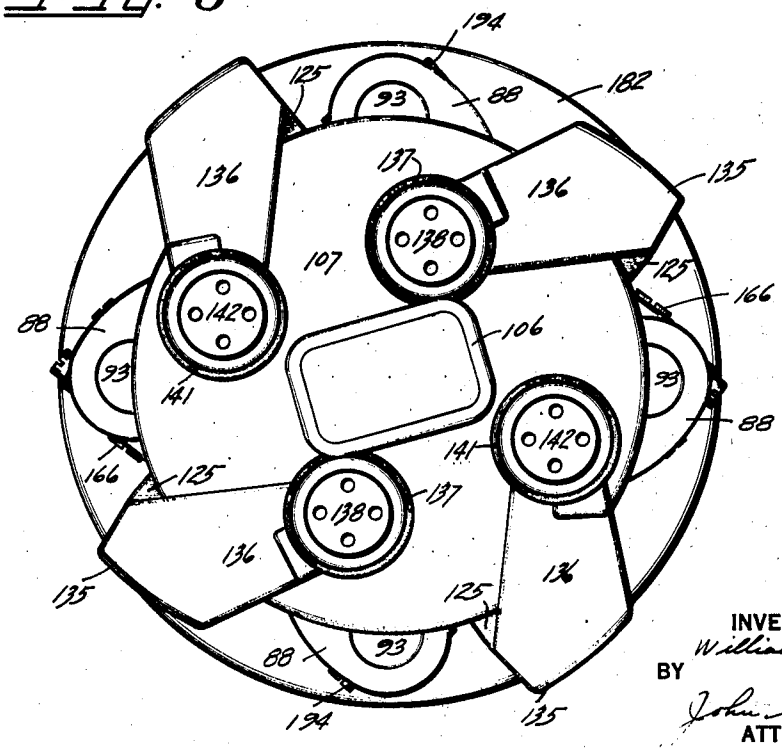


Fig. 8



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UNITED STATES PATENT OFFICE

1,972,866

DOUBLE SEAMING HEAD

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Application July 6, 1931, Serial No. 548,923

14 Claims. (Cl. 113—24)

The present invention relates to seaming heads such as are used in the interfolding of flanges of metallic containers and their covers and has more particular reference to a seaming mechanism adaptable for non-circular as well as circular containers.

The principal object of the present invention is the provision of seaming head mechanism of simple construction capable of high speed seaming on non-circular as well as circular containers.

An important object of the invention is the provision of seaming mechanism of closely fitting, closely related parts operating in a seaming head of extreme compactness.

A further important object of the invention is the provision of a seaming mechanism made up of easily replaceable units providing simplicity of assembly of the parts.

An important object of the invention is the provision of accurately adjusting features for a seaming head whereby proper coordination of the inter-related parts is easily obtained.

Numerous other objects of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a front elevation partially broken away of an improved construction of seaming head embodying the present invention;

Fig. 2 is a longitudinal sectional view of the head, the view being taken substantially along the broken line 2—2 in Fig. 3 and illustrating the seaming head connected with a part of a seaming machine;

Figs. 3 to 7 inclusive, are plan sectional views taken at different levels in Fig. 2, the respective levels being substantially indicated in that figure by the broken lines 3—3, 4—4, 5—5, 6—6, and 7—7; and

Fig. 8 is a bottom or underside plan view of the seaming head as viewed from a plane substantially located along the broken line 8—8 in Fig. 2.

The preferred form of apparatus disclosed in the drawings for the purpose of illustrating the present invention comprises a support housing or frame 51 (Fig. 2) which may be part of a seaming machine of either the single spindle or the multiple spindle type. When the machine has a single spindle the housing 51 is stationary, whereas if the machine is multiple spindle, this housing may form part of a rotating element or turret.

The housing 51 supports the seaming head proper which is suspended from a head sleeve 52 held in a split bearing formed by a semi-circular boss 53 of the frame 51 and a bearing cap 54 secured thereto by bolts 55 (see also Fig. 1). The head sleeve 52 may be adjusted vertically within the bearing, the upper end of the sleeve being threaded at 56 for this purpose. An adjusting nut 57 is threadedly connected with the threaded portion 56 of the sleeve 52 and rests upon the upper end of the frame bearing. A locknut 58, also engaging the upper end of the threads 56, cooperates with the nut 57 to lock the two nuts together. A similar third nut 59, is threadedly engaged on the sleeve 52 intermediate its length and clamps against the lower faces of the bearing parts 53, 54 these three nuts holding the sleeve 52 in its adjusted position.

The head sleeve 52 is also provided with an annular shoulder 61 formed therein near its lower end which supports a roller bearing ring raceway 62 positioned on the sleeve. A similar ring raceway 63 surrounds the head sleeve 52 directly beneath the nut 59 as illustrated in Fig. 2. Tapered roller bearings 65, 66 roll over the respective raceways 62, 63 being held in operative position by engagement with exterior ring raceways 67, 68 held in spaced positions by a spacer bushing 69.

All of the moving parts of the seaming head are directly or indirectly mounted on these bearings 65, 66 and are thus carried with a minimum of friction. An upper rotary head frame 71 having an upwardly extending collar part 72 constitutes a principal support for this purpose. The collar section 72 encloses the spacer bushing 69 previously described and also the raceways 67, 68 fixed in and rotary with the frame 71. A clamping nut 73, threadedly engaging within the upper end of the collar part 72, holds against the upper raceways 68 and clamps the roller bearing unit against a shoulder 74 formed in the upper head frame 71.

Rotation of the head frame 71 is effected by rotation of a spur gear 77 keyed to the collar part 72. The gear 77 meshes with and is driven by any suitable driving gear 78 which may constitute an element of the main driving system connected with the particular seaming mechanism with which the seaming head is to be used. By means of such a connection the head frame 71 and parts carried thereby are continually rotated on a vertical axis, and around the stationary sleeve 52. It will be observed by reference to Fig. 2 that the collar 72 extends above the gear 77 and is thread-

ed at 79 to accommodate a clamping nut 81 which is mounted thereon. This nut clamps against the gear 77 and locks it in position.

A lower head frame 85 (Figs. 2 and 6) is secured by bolts 86 to the lower end of the upper frame 71. Dowel pins 87 (Fig. 6) are used as locating elements for this connection. By removing the bolts 86, the head may be readily taken apart and replacements or substitutions made as desired, this construction also providing great ease in assembly.

The frame 85 is formed with extending arms 88 which correspond in shape and size to similar arms 89 (see also Fig. 5) formed in the upper frame 71, the two sets of arms being spaced one above the other to provide recesses 91. Links or pivoted arms 92 are mounted in these recesses (Fig. 6), there being four sets of arms 88, 89, four recesses and four links. Each link 92 is formed with lower and upper shaft extensions 93, 94 for oscillatory engagement in vertical bores 95, 96 formed in the arms 88, 89. These links 92 provide the proper contour travel of the seaming rollers as they move around the can, this travel being dependent upon the shape of the can being seamed, as will be hereinafter fully described. The seaming levers are thus flexibly connected with the rotary part of the head by the links 92.

A chuck sleeve 101 (Fig. 2) is located inside and centrally of the head sleeve 52, the upper end of the former being threaded at 102 and extending above the end of the sleeve 52 to accomodate a locknut 103 threadedly secured to the sleeve 101 and supporting it from above on the sleeve 52.

The lower end of the chuck sleeve 101 (Fig. 2) is threaded at 104 for engagement within the upper neck 105 of a chuck 106 (Fig. 8) which is supported thereby. A pattern cam 107 (Fig. 7) for guiding the seaming rollers in a proper path around the can is mounted beneath the head frames 71, 85 and is provided with a shoulder 108 which rests upon the upper end of the neck 105 of the chuck 106. This cam 107 surrounds the lower end of the head sleeve 52, being adjustably movable thereon, and is clamped in adjusted position by an adjusting bushing 111 threadedly connected at 112 to the lower end of the head sleeve.

This bushing 111 is located interiorly of the lower frame 85 and is provided with a series of spaced vertically disposed spanner slots 109 (see also Fig. 6) which may be engaged by any suitable tool inserted through a horizontal slot or channel 110 formed in the frame part 85. In adjusting the chuck 106 vertically relative to the supporting chuck sleeve 101 the former is brought into proper vertical and also into proper angular position by movement on the threaded end of the chuck sleeve 101.

To provide for a close angular adjustment the cam 107 has a depending lug 113 (Figs. 1 and 2) which projects downwardly between two spaced lugs 114 extending outwardly from the chuck 106. Screws 115 threaded through the lugs 114 from opposite sides engage and locate the lug 113 relative to the lugs 114, the cam being correspondingly located. The adjusting bushing 111 is then turned on its threaded connection 112 to clamp it tightly against the upper face of the positioned cam 107 and its shouldered part 108 is thus brought tightly against the chuck neck 105.

Four seaming rollers are illustrated in the drawings, two of the rollers being used for the purpose of forming the first operation in double seaming and the other two for the second or final operation. Each seaming roller is carried on the lower end of a seaming lever, these levers being of similar shape and size. The levers are positioned at equal intervals around the seaming head, the two first operation rollers being located on opposite sides and along a diametrical line passing through the center of the chuck. In similar manner the second operation seaming rollers are also diametrically opposed but these are positioned in between or at 90 degrees from the first operation rollers.

Each seaming lever comprises a vertically extending body 125 (Figs. 1, 5, 6 and 8) which projects inwardly in two spaced lugs 126, 127 which support a vertically extending pin 128 pivotally connected to one of the links 92. In this arrangement the seaming levers extend in the direction of the length or axis of the head. In my drawings this axis is vertical and is the axis of rotation. This pin 128 also projects downwardly from the lower lug 127. A cam roller 129 (Figs. 2 and 7) is rotatably mounted on this lower part of the pin 128, a roller bearing 130 being interposed between pin and roller.

A cam groove 131 is formed in the upper face of the pattern cam 107 and the cam rollers 129 are located and have movement within this groove. The shape of the groove 131 insures a proper following of the can seam by the seaming rollers as the seaming head revolves around the stationary chuck 106 as will be hereinafter fully described.

It will be observed by reference to Fig. 6 that this movement control of the pin 128 of each lever 125 is applied at a point directly below its pivotal connection with its link 92. In other words the oscillatory movement of the links 92 effect a bodily shifting of the pins 128 and with them the seaming levers, causing the latter to travel around the can and follow its shape. If a circular can is being seamed the chuck 106 will be circular as well as the cam groove 131 in which case the pins 128 and the seaming levers will follow a circular path without any radial shifting.

Each seaming lever 125 extends outside of the head frames 71, 85 and a lower section 135 (Figs. 1, 7 and 8) extends across the outside of the cam 107. An arm 136 is formed integrally with this section 135 and extends inwardly toward the center of the seaming head. A seaming roller is rotatably carried at the inner extremity of each arm 136.

The seaming levers associated with the first operation of seaming carry first operation seaming rollers 137 rotatably mounted on studs 138 threadedly engaged in their respective arms 136. In like manner the two opposite seaming levers associated with the second operation of seaming carry second operation seaming rollers 141 which are rotatably mounted on studs 142 carried by their lever arms 136.

These seaming rollers may be provided with anti-friction roller or ball bearings mounted between roller and stud. It is these seaming rollers that are caused to travel in certain paths and at certain times by the proper movement of their respective levers. Each of the seaming levers 125 is thus shifted on its pivot 128 in order that the seaming roller associated therewith may be brought into and out of seaming position to effect seaming of the can and its cover.

For holding the can, there is provided a can lift plunger 151 (Fig. 2) which is mounted on the upper end of a stem 152 having sliding movement within a bearing 153 formed on the outer

end of an arm 154 projecting from the frame 51. The stem 152 is raised and lowered in proper time relation to the other operations of the machine by suitable mechanism in the usual and preferred manner. Such a plunger 151 is adapted to support a can 155 on which a cover 156 has preferably been loosely applied. As the can and cover are raised with the rising plunger 151, the cover is seated against the chuck 106 in the usual manner, and can and cover so clamped between plunger and chuck, is held stationary throughout the seaming operation.

Each seaming lever is caused to pivot on its pivotal connection 128 by a cam control applied to the upper end of the lever. This will now be described, the first operation seaming levers 125 being first considered. These levers are provided with lateral extensions 161 (Figs. 1 and 5) which are formed as integral parts of the levers and which extend upwardly and to one side of the main vertical body thereof. The upper face of each extension 161 is grooved at 162, the spaced walls of the groove being undercut or V-shape, these walls in lateral extent following an arc of a circle as described from the center of the pivot pin 128. The outer part of each extension 161 beyond its groove 162 is vertically slotted at 163 to weaken the section and to form a yielding wall 164.

A slide 165 is located in each groove 162 and its opposite sides are formed to correspond to the V-shape side walls of the groove. Each slide is movable laterally of its groove for adjustment purposes. An adjusting screw 166 is threadedly engaged within each lateral extension 161 and its head is adapted to engage one end edge of the slide 165 definitely locating the slide, laterally, within its groove.

After each slide 165 has been adjusted in position within its groove 162 and against the head of the screw 166, the opposite edges of the slide are tightly clamped by springing inwardly of the yielding wall 164. This springing action is effected by clamping screws 167 which threadedly engage the lateral extension 161 and pass through the wall 164. In this way each slide 165 is held in exact position on its associated seaming lever 125.

Each slide 165 carries a stud 168 (Figs. 2 and 3) which carries a ball race 169 of ball bearings 171 rotatably supporting a cam roller 172. Each cam roller 172 operates within a cam groove 181 formed in the upper section of a face cam 182 provided with an upwardly extending sleeve 183 which is rotatably mounted on the collar section 72 of the head frame 71. This cam 182 also revolves around the stationary chuck sleeve 101 but has in addition a slight rotative movement relative to the head frames 71, 85 and parts carried thereby.

The rotations of the head frame and the cam are effected by which is commonly known as differential gearing, the sleeve 183 of the cam supporting a gear 185 keyed thereto. The gear 185 meshes with and is driven by a suitable gear 186 located directly beneath the other member of the differential gearing namely, the gear 78. The gear 186 may be any suitable part of the mechanism of the seaming machine.

The gears 78, 186 are rotated at a uniform speed but the gear 185 being larger than the head gear 77 or stated differently the gear 186 being smaller than gear 78, the effect is a retarding movement of the cam 182 relative to the revolving seaming head frames. In one complete cycle of operation of the machine, that is, during all necessary actions relating to the completion of seaming of a single can, the cam 182 is caused to make one complete revolution over each of the cam rollers 172 carried by the two first operation seaming levers 125.

In similar manner the two second operation seaming levers 125 are cam controlled and their seaming rollers 141 move in and out to effect the second operation of seaming. Each lever 125 associated with the second operation of seaming is provided with a lateral extension 191 (Figs. 1 and 5) which is grooved at 192 to accommodate a slide 193 also having side walls formed as arcs. Each slide 193 is also adjustable within its grove 192.

For this purpose an adjusting screw 194 cooperates with clamping screws 195 to locate and hold the slide in position. The clamping of a slide is made by the springing of an outer wall part 196 made yielding by a slot 197 cut in the extension 191. In a manner similar to the slides 165, each slide 193 carries a stud 198 (Figs. 2, 4 and 5) on which is mounted a ball race 199 retaining frictionless ball bearings 201 within a cam roller 202. Each roller 202 is located within a second and lower cam groove 203 formed in the cam 182 directly beneath the cam groove 181.

The shape of the cam grooves 181, 203 are such as to hold their respective seaming levers with their seaming rollers separated and away from the chuck 106 as the can 155 with its cover 156 is clamped into seaming position. Immediately following and while both the seaming head and the roller actuating cam 182 are revolving around the fixed chuck sleeve 101, the cam groove 181 first operates to pivot the seaming levers 125 connected with the first operation seaming rollers 137 so that these rollers are brought into seam closing position against the can and its end or cover flanges.

At this time the cam groove 203 is holding the second operation rollers 141 away from the chuck and out of seaming position. As the first operation of seaming is completed by the seaming rollers 137, the second operation rollers 141 are moved into their seam forming position. The rollers 137 are thereupon moved out of seaming engagement with the can. Following the completion of the second operation of seaming, the second operation rollers 141 are moved away from the can seam and the can fully seamed is free to be lowered with a lowering of the plunger 151.

A knockout pad 205 may be located within the chuck 106 (Fig. 2) which is preferably carried on the lower end of a vertical rod 206 extending upwardly through the chuck and having a tongue and groove connection 207 with a vertical rod 208 slidably located inside of the chuck sleeve 101 and carrying a nut 209 at its upper end. A spring 211 surrounds the rod 208 and is interposed between the nut and the upper end of the chuck sleeve. This normally holds the knockout pad 205 inside the chuck. Any suitable means may be provided for depressing the rods 208, 209 and pad 205 to strip off the seamed can from the chuck as the can is being discharged, this being the usual construction in double seaming machines.

These operations of seaming take place automatically while the seaming head is revolving at a relatively high speed, this speed of rotation being maintained while a can is coming into seaming position, while it is being seamed and while it is leaving the head after seaming. The seaming rollers are thus automatically caused to fol-

low the proper synchronism with the other parts of the machine.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a seaming head for uniting can ends to cans, the combination of a stationary chuck for holding a can and end to be seamed, a head frame having rotative movement around said chuck, a supporting link pivoted on and carried by said frame and having a cam roller rotatably mounted on its free end, a stationary cam associated with said chuck and having a cam track traversed by said link cam roller during its rotation around said chuck, a seaming lever pivotally mounted on said link and extending outside of and carried around said stationary cam and having a seaming roller and a cam roller, and a movable cam associated with said head frame and having rotative movement relative to and on the axis of said chuck and also of said frame, said movable cam having a cam track traversed by said lever cam roller whereby said seaming roller follows the contour of said can and end and also moves into can seaming position.

2. In a seaming head for uniting can ends to cans, the combination of a stationary chuck for holding a can and end to be seamed, a head frame having rotative movement around said chuck, a supporting link pivoted on and carried by said frame, a seaming lever pivoted on and carried by said link and extending vertically and carrying a seaming roller at its lower part, a stationary cam associated with said chuck for moving said link on said frame to cause said seaming roller to follow the contour of said can and end, and means for adjusting said cam relative to said chuck.

3. In a seaming head for uniting can ends to cans, the combination of a stationary chuck for holding a can and end to be seamed, a head frame having rotative movement around said chuck, a supporting link pivoted on and carried by said frame, a seaming lever pivotally mounted on said link and having a seaming roller and carrying an adjusting slide, a cam roller mounted on said slide, means for adjusting said cam roller relative to said lever by movement of said slide in said lever, and cam means operating through said cam roller for causing said seaming roller to move into and out of operative position.

4. In a seaming head for uniting can ends to cans, the combination of a stationary chuck, an upper head frame having rotative movement around said chuck, a lower head frame removably secured to said upper frame, supporting links having pivotal extensions pivotally mounted on and confined between said frames, and seaming levers pivotally mounted on said links and carrying seaming rollers for effecting the seaming operation during their rotation around said chuck and cams controlling both ends of each lever.

5. A seaming head having, in combination, fixed and rotary parts, seaming levers extending in the direction of the axis of said head and having movable connections with a supporting and revoluble part thereof, seaming elements carried by said levers and movable thereby towards and from the axis of the head, a fixed pattern cam having connections with said levers to mainly determine the path of said seaming elements, and a cam for giving inward and outward movement to other parts of said levers.

6. A seaming head having, in combination, seaming levers extending in the direction of the axis of the head, means for revolving said levers with the head, seaming devices carried and operated by said levers, and two grooved face cams arranged on said seaming head transversely to the head and cooperating with said seaming levers, and levers for moving different parts of the said seaming levers inward and outward, one cam being fixed and the other cam being revoluble.

7. A seaming head having, in combination, seaming levers extending in the direction of the axis of the head, means for revolving said levers with the head, seaming devices carried and operated by said levers, and two grooved face cams arranged on said seaming head transversely to the head and cooperating with said seaming levers, and levers for moving different parts of the said seaming levers inward and outward, one cam being fixed and the other cam being revoluble, and adjustable means connecting said seaming levers with said revoluble cam.

8. A seaming head having, in combination, seaming levers extending in the direction of the axis of the head, seaming devices carried by the lower parts of said levers, movable means for supporting the median parts of said levers and revolving them with the head, a pattern cam for directing the inward and outward movement of the lower parts of the levers, and a cam for directing the inward and outward movement of the upper parts of the levers.

9. A seaming head having, in combination, rotary and fixed parts arranged transversely to the axis of the head and comprising a pattern cam fixed at the lower part of the head, a supporting and driving rotary part above said cam, seaming levers movably connected with said driving part and extended down to and engaged by said pattern cam and also extended upward, a seaming cam above said driving part and having adjustable means to operate the upper parts of said levers, and seaming elements carried by the lower parts of the seaming levers.

10. A seaming head having in combination seaming levers arranged at the outer vertical sides of the head and in the direction of the axis of the head so as to be bodily movable inward and outward, seaming elements carried by the said levers, a rotary part of the head having movable connections with the median parts of said levers, and means for moving inward and outward the upper and lower parts of the levers, each lever being independent of the other levers.

11. A seaming head having, in combination, a rotary part, a rotary cam above said rotary part, a fixed cam below said rotary part, a seaming lever extending past said rotary part and having means connecting it with said rotary cam and said fixed cam, means movable inward and outward relative to the axis of the seaming head and movably pivoting said lever on said rotary part, and seaming means carried by said lever.

12. A seaming head having, in combination, a rotary part, a fixed pattern cam below said rotary part, seaming levers extending past said rotary part and flexibly connected therewith so as to have bodily movement, first and second operative seaming means carried respectively by said levers, cam tracks extending around the

seaming head and connected respectively with said seaming levers, and connections whereby said pattern cam also operates said levers.

13. In a seaming head for uniting can ends to cans, the combination of a stationary chuck, a head frame having rotative movement around said chuck, supporting links mounted on vertical pivots carried in said frame, seaming levers mounted on vertical pivots carried by said links and extending along the side of the seaming head in an upward and downward direction, seaming rollers carried by the lower parts of said levers, means for moving said links in and out on their pivots to cause said seaming rollers to follow the contour of said chuck, and means for independently moving said levers in and out on their pivots to bring said seaming rollers into and out of seaming position on a can and end clamped on said chuck.

14. In a seaming head for uniting can ends to cans, the combination of a stationary chuck for holding a can and end to be seamed, a head frame having rotative movement around said chuck, a seaming lever extending in an upward and downward direction along the outer side of the head and movably connected with and carried by said frame and rotating therewith, a seaming roller carried by said lever, means for causing bodily movement inward and outward of said lever relative to said frame while traveling therewith, said means comprising a cam also rotating around said chuck and around the chuck axis but at a different speed from the speed of rotation of said frame for shifting said lever to move said seaming roller toward said can and end to effect the seaming thereof.

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