Dec. 21, 1937. N. P. BACH 2,102,605

CAN AND COVER FEEDING MECHANISM

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Fig. 1

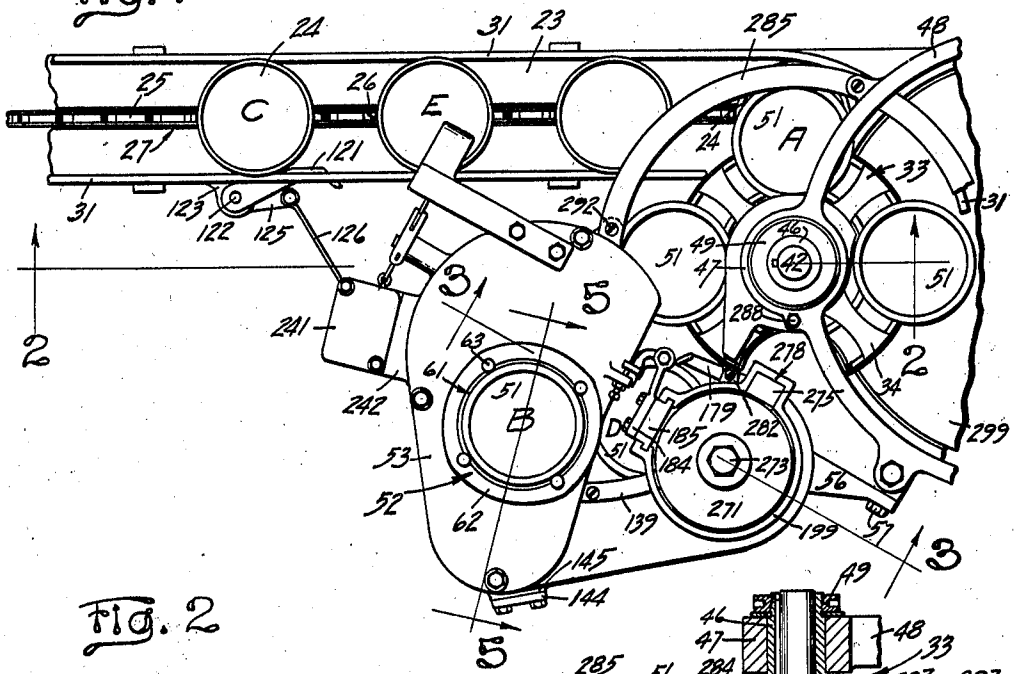
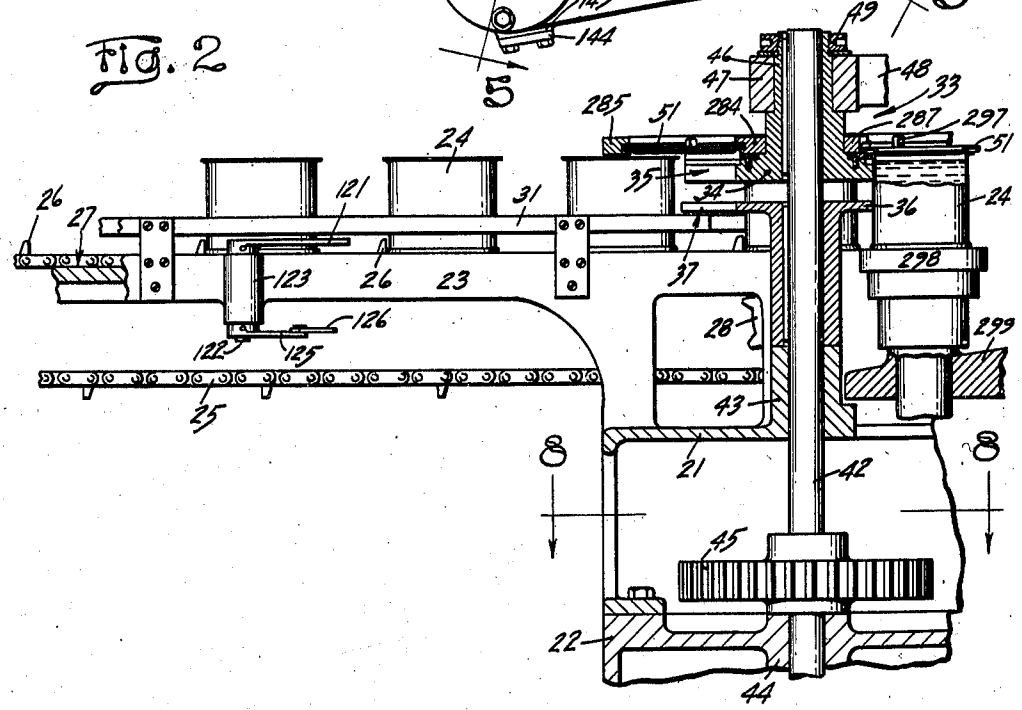


Fig. 2



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CAN AND COVER FEEDING MECHANISM

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Fig. 3

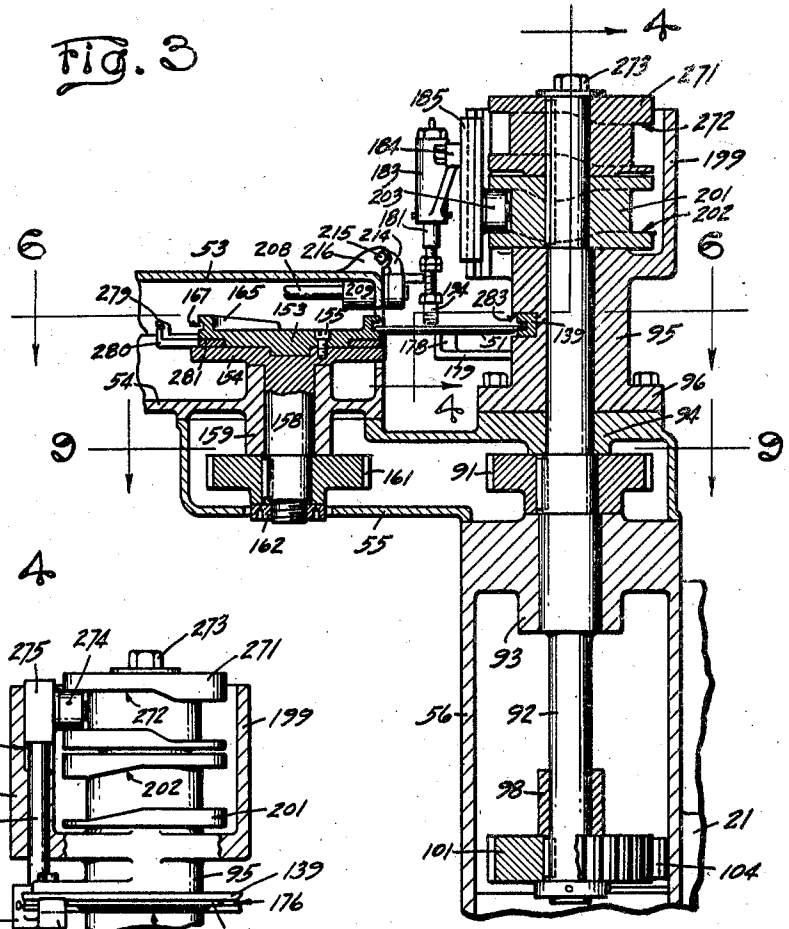
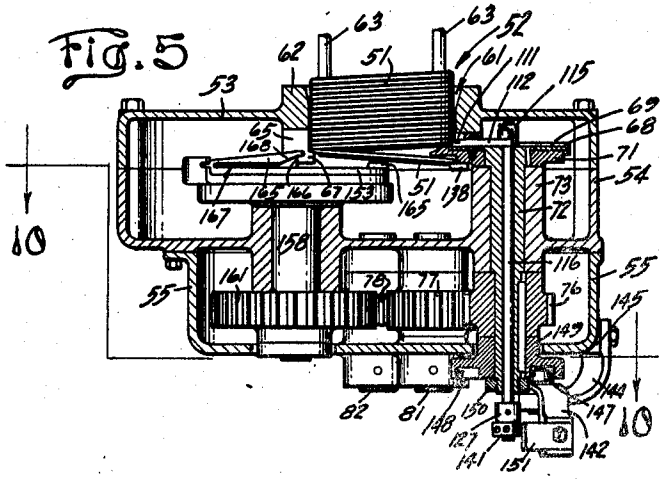


Fig. 4

Fig. 5



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CAN AND COVER FEEDING MECHANISM

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Fig. 6

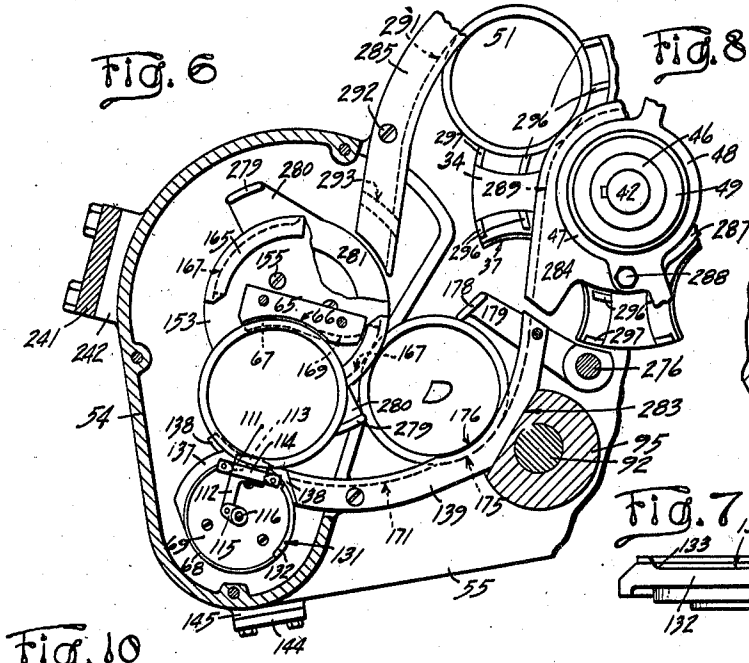


Fig. 8

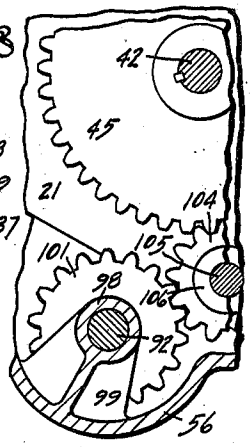


Fig. 7

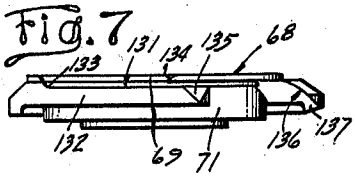


Fig. 10

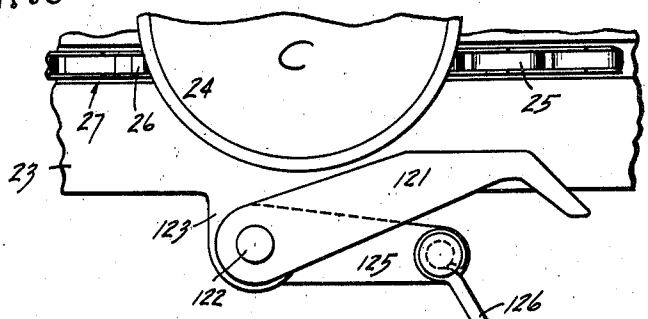
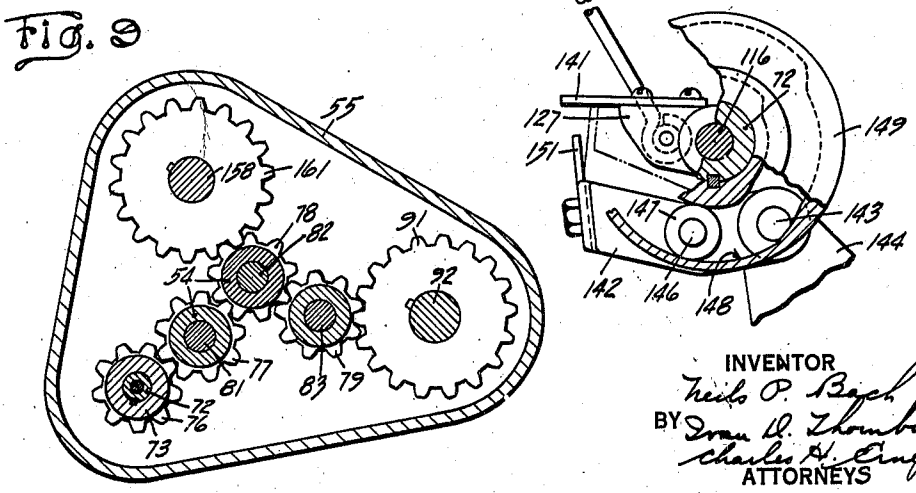


Fig. 9



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CAN AND COVER FEEDING MECHANISM

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Fig. 11

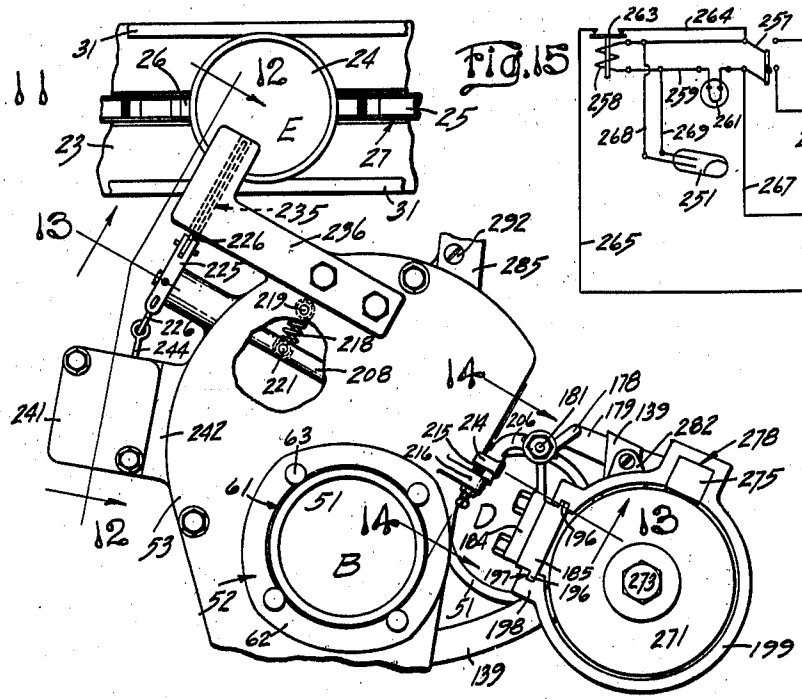


Fig. 15

Fig. 12

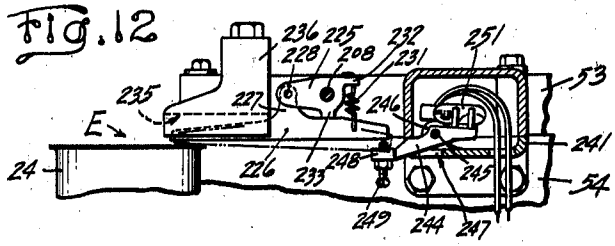


Fig. 13

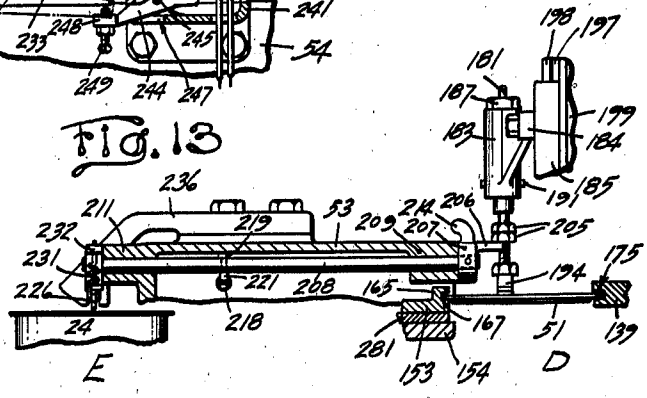
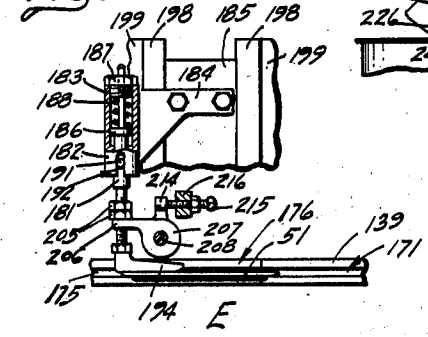


Fig. 14



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Patented Dec. 21, 1937 2,102,605

UNITED STATES PATENT OFFICE

2,102,605

CAN AND COVER FEEDING MECHANISM

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Application May 17, 1934, Serial No. 726,165

12 Claims. (Cl. 113—114)

The present invention relates to can and cover feeding mechanism for can making machinery and has particular reference to control devices including can and cover detectors for individually effecting a proper feeding of the can and also the cover to the end that there will always be a cover for a can.

The invention contemplates the feeding of cans and complementary can covers from separate sources of supply and the bringing together of these in superimposed relationship in a can closing machine or the like, and further contemplates the automatic control of such feeding by preventing the passage of a can if there is no corresponding can cover.

An object of the present invention is the provision of detecting instrumentalities in a can and cover feeding mechanism for detecting the presence of cans and can covers simultaneously and while at separate detecting stations located in different places so that a can without a corresponding cover will be arrested in its passage through the apparatus.

Another object of the invention is the provision of electric control devices in such can and cover feeding mechanism for stopping the operation of feeding in the event that a can is present without a corresponding cover, such devices being inoperative and the feeding actions uninterrupted in the absence of both.

A further object of the invention is the provision of can and cover feeding mechanism comprising cover separating devices actuated by a passing can in the can feeding section for removing individual can covers from a magazine of covers and for presenting the same to the cover feeding elements and also devices operating to stop the can and the cover feeding mechanism when there is a failure of feeding of a cover from the magazine and by the cover feeding elements.

Numerous other objects and advantages 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 top plan view of a mechanism embodying the present invention parts being broken away;

Fig. 2 is a vertical sectional view taken substantially along the line 2—2 in Fig. 1;

Fig. 3 is an enlarged fragmentary vertical sectional view taken substantially along the line 3—3 in Fig. 1;

Fig. 4 is a fragmentary section detail taken substantially along the broken line 4—4 in Fig. 3, parts being shown in elevation;

Fig. 5 is an enlarged fragmentary sectional view taken substantially along the line 5—5 in Fig. 1;

Fig. 6 is a plan sectional view taken substantially along the line 6—6 in Fig. 3;

Fig. 7 is a side elevation of one of the can cover feeding elements;

Fig. 8 is a fragmentary plan sectional view taken substantially along the line 8—8 in Fig. 2 and showing the parts on a slightly larger scale;

Fig. 9 is a plan sectional view taken substantially along the line 9—9 in Fig. 3;

Fig. 10 is an enlarged fragmentary plan view partly in section as viewed substantially along the broken line 10—10 in Fig. 5;

Fig. 11 is a top plan view similar to Fig. 1 drawn to a larger scale and shown with parts removed;

Figs. 12, 13 and 14 are fragmentary sectional views taken respectively and substantially along the lines 12—12, 13—13 and 14—14 in Fig. 11; and

Fig. 15 is a wiring diagram of the electric circuit utilized in the apparatus.

The apparatus illustrated in the drawings as a preferred embodiment of the invention comprises a fully automatic mechanism in which either cans having a bottom end or can bodies without ends are conveyed along the runway in timed order to a station A (Fig. 1). In the description and claims that follow the word "can" will be used to refer to either cans or can bodies. At station A each can is introduced into the pocket of a revolving turret. This turret may constitute a feed or transfer element for a double seaming machine or the like and is so considered in the present embodiment.

Can covers are stored in a magazine at a station B (Fig. 1) and the lowermost cover in the stack is individually separated by actuation of a no-can-no-cover device which is set in motion by a can passing through a trip station C. If no can passes this station C no cover is released. The cover release mechanism can only be operated through the no-can-no-cover trip device, which in turn can only be operated by a can. Therefore, if there is no can, there can be no cover.

When a can actuates the trip device the released cover is removed from the bottom of the magazine and deposited at a cover testing station D where it pauses in its travel. Detecting instrumentalities operating in part at station D move down from above for each cycle of operation of the apparatus to detect the presence or ab-

sence of a cover at this station. In the event that a cover is present the detecting or testing action terminates and the can passes on to the station A. The cover is simultaneously removed from the station D and can and cover come into aligned relation at the station A where the cover enters into the top of the same pocket which receives the can.

In the event that there is a failure in the feeding of a can cover to the testing station D, when the cover detecting or testing devices move down from above, a can detecting or testing element is set in motion which is effective at a station E in the line of travel of the can. If there is a can in proper position at this station at such a time, then an electric control circuit is utilized to stop the entire operation of both can and cover feeding.

In the event, during any one cycle of operation of the apparatus, that there is no can and also no cover at the respective stations E and D, the electric control device just referred to remains inoperative and the feeding action of both can and cover mechanisms continue to operate.

The mechanism herein shown in some detail as a preferred embodiment of the present invention includes a frame 21 (Figs. 1 and 2) which is carried on a base 22 of a double seaming or other suitable machine. The frame 21 is provided with a horizontal table 23 over which cans 24 are conveyed through the stations C and E and into the station A.

A chain conveyor 25 constitutes a feeding element for the cans 24 and is provided with spaced can engaging fingers 26, the upper run of the chain moving in a slot 27 cut in the top of the table. In the machine end this chain passes over and is actuated by a sprocket 28 (Fig. 2) which may be suitably mounted and rotated.

Spaced guide bars 31 hold the cans 24 in line on the table. These bars are disposed on each side of the chain 25 and provide a direct line of passage for the cans. At station A the cans pass from the table and come into a revolving transfer turret unit 33.

Turret unit 33 is preferably formed by two turret sections which are an upper turret 34 (Fig. 2) having spaced can and cover receiving pockets 35 and a lower turret 36 having aligned can receiving pockets 37. Both turret sections are mounted on and keyed to a vertical shaft 42 journaled in an intermediate bearing 43 formed in the frame 21 and in a lower bearing 44 formed in the base frame 22. The shaft 42 may be considered as a main power shaft for the apparatus and is driven in any suitable manner as by driving connection applied through a gear 45 (Figs. 2 and 8) keyed to the shaft and located directly above the bearing 44.

The hub of the upper turret section 34 extends up and is reduced in size adjacent its top end as at 46 where it is journaled within a bearing 47 of a bracket 48 (Figs. 1 and 2) bolted to the top of the table 23. A locknut 49 is threadedly secured to the upper extremity of the turret hub.

The can covers, designated by the numeral 51, are stored within a magazine indicated generally by the numeral 52 (Figs. 1, 5 and 11) and this magazine is carried on a cover plate 53 which in turn is carried by a housing 54 which rests upon and is secured to a gear case 55. The gear case 55 is mounted on a vertical tubular housing 56 (see also Fig. 3) which is preferably bolted as at 57 (Fig. 1) to the side of the frame 21.

The stack of covers 51 within the magazine 52 extends at the bottom into a tapered opening 61 (Fig. 5) formed centrally of a boss 62 which is an integral part of the cover plate 53. Vertically extending guide rods 63 are carried by the boss 62 and these rods retain the can covers in stack formation within the magazine.

The stack of covers extending into the opening 61 is supported at one side on a stationary block 65 (see also Fig. 6) which is secured to the under side of the cover plate 53. Block 65 is formed with a circular pocket 66 in which a number of the lower can covers rest. A shoulder 67 formed in the block directly engages and supports the lowermost cover in the stack.

On the opposite side of the can covers, that is, diametrically across from the shoulder 67, the lowermost cover rests upon an annular ridge 68 (Figs. 5, 6 and 7) of a separator disc 69. This disc also constitutes an active element in the separation of a can cover from the stack when the no-can-no-cover trip device, previously referred to and located at station C, is actuated by a passing can. Disc 69 is secured to the top of a disc body 71 which is keyed to the upper end of a vertically disposed sleeve 72 journaled in a bearing 73 carried in the bottom wall of the housing 54.

As long as the apparatus is operating, the sleeve 72 and parts carried thereby are rotated and for this purpose a gear 76 is keyed to the sleeve just beneath the bearing 73. This gear is located within the gear case 55 and is connected by a gear train to the machine power shaft 42.

Gear 76 (Figs. 5 and 9) meshes with an idler gear 77 which in turn meshes with a second idler gear 78, the latter meshing with a third idler gear 79. The gears 77, 78, 79 are respectively mounted on stationary stub shafts 81, 82, 83. These shafts are supported at their lower ends in the gear case 55 and at their upper ends in the housing 54.

Gear 79 meshes with a gear 91 (Figs. 3 and 9) which is keyed to a vertical shaft 92. Shaft 92 is journaled in a bearing 93 formed in the top of the tubular housing 56, in a bearing 94 formed in the gear case 55 and in a bearing 95 formed in a bracket 96. Bracket 96 is supported by and is bolted to the gear case adjacent the bearing 94. The shaft 92 is associated with the mechanism relating to the cover detecting or testing operation at station D as will be hereinafter fully described.

The lower end of the shaft 92 extends down into the tubular housing 56 and is journaled in a bearing 98 (Figs. 3 and 8) which forms a part of a bracket 99 projecting from the side wall of the housing. A gear 101 is carried on and is keyed to the end of the shaft 92. This gear meshes with an idler gear 104 mounted on a short stationary shaft 105 held in a boss 106 formed in the frame 21. The gear 104 meshes with and is rotated by the main power shaft turret gear 45.

Except when the lowermost cover 51 is being separated from the magazine it is supported, in addition to the shoulder support 67 and the ridge 68 of the separator disc 69, on a tongue 111 (Figs. 5 and 6) formed on the forward end of a trip finger 112. As long as the stack of covers is supported by the trip finger no separation of a cover from the stack takes place. The forward end of the finger 112 slides in a notch or recess 113 formed in a bar 114 which is secured to the under side of the magazine boss 62. This mounting permits free sliding movement of the finger together with a slight rocking movement back and forth within the notch.

The opposite end of the finger 112 is pivoted to

an arm 115 which is secured to the upper end of a vertical rock shaft 116. This shaft extends centrally of and has movement within the sleeve 72. The shaft 116 is partially turned when a can 24 operates the no-can-no-cover trip device at station C and this shifting of the shaft and the withdrawing of the finger 112 from the stack will now be more fully considered.

A trip lever 121 (Figs. 1, 2 and 10) is mounted on the upper end of a rock shaft 122 carried in a boss 123 formed as an integral part and at the side of the table 23 adjacent the station C. The lever 121 is located between the table and the lower edge of the front guide bar 31 and its free end normally rests within the path of travel of the cans 24 being conveyed over the table by the chain 25. When a can engages the lever during its passage through station C, it forces the end of the lever back from the position of Figs. 1 and 10 thereby rocking the shaft 122.

A lever arm 125 is secured to the lower end of the rock shaft 122 and pivotally connects with a link 126 the opposite end of which pivotally connects with an arm 127 secured to the lower end of the shaft 116. Turning of the shaft 122 is in this way communicated to the shaft 116 and the finger 112 is withdrawn from its supporting position beneath the stack of can covers. The lowermost can cover is thereupon freed to be separated from the stack by the continuous rotation of the disc 69 with the rotating sleeve 72 in the following manner.

When the tongue 111 of the finger 112 is drawn back from beneath the lowermost can cover 51 in the stack, the disc ridge 68 alone supports that side of the stack of covers. This ridge is not continuous and when the end of the flush part of the ridge moves from under the stack, with the rotation of the disc head 71 and the disc 69 thereupon, the adjacent side of the stack drops and the lowermost cover moves down and away from the cover next above.

Ridge 68 extends substantially through 270° (Figs. 6 and 7) along the periphery of the disc and between the ends of the ridge the disc's edge is cut away or grooved in a setback peripheral wall 131. The disc body 71, on which the separator disc is mounted, is provided with a flange 132 which is located directly beneath the peripheral set-back wall of the disc and the upper surface of this flange at one end extends upwardly in an inclined track 133.

Accordingly when the groove section 131 moves adjacent the edge of the lowermost can cover and when the stack lowers on that side the entire stack momentarily rests upon the flange 132. A separator knife edge 134 is formed in the periphery of the disc 69 and is at one end of the ridge 68. This knife edge enters between the two lower covers in the stack, i. e., above the lowermost can cover and beneath the can cover directly above it. This action lifts the latter and with it the stack of covers along that side. Rotation of the disc continues and the ridge 68 thereupon again picks up the weight of the stack on that side as before, with the exception of the lowermost cover which is beneath.

This separation on one side of the lowermost cover from the stack of covers leaves the cut-out cover still on the upper surface of the flange 132. The flange 132 terminates at one end in an inclined surface 135. The flange supported side of the cut-out cover moves down this incline as the rotating disc body 69 brings the incline beneath the cover and this action tilts the cover to such a position that its lower edge passes beneath an inclined surface 136 of an arcual projection 137 formed on the disc body.

This position of the separated cover is illustrated in Fig. 5 and when so positioned one edge of the cover rests upon a cut-away or thinned end 138 of a guide bar 139 (see also Fig. 6) mounted in the housing 54. It is from this position that the cover is next moved along this guide bar into the testing station D.

Before proceeding with a consideration of further movement of the separated cover, attention is directed again to the can trip lever 121 and parts associated with it. Unlike most devices of this character no springs are employed for returning the end of the lever into the can path after a moving can has passed following actuation of the trip lever. Instead a loose connection is had between the trip lever actuated parts and a positive restoring device, cam actuated which is formed and which operates in the following manner.

The arm 127 carries a plate 141 which extends out beyond the arm as best illustrated in Fig. 10. In the positive return movement of the trip lever 121, this plate is engaged and the arm 127 is moved back by the restoring device, this action shifting all connected trip parts.

A lever arm 142 is provided as a part of this device and is pivotally mounted on a stud 143 which is carried in the lower end of a bracket 144 (Figs. 5, 6 and 10) bolted to a pad 145 formed on the gear case 55. The arm 142 carries a pin 146 on which a cam roller 147 is rotatably mounted.

This roller operates within a groove 148 formed in the under face of a cam 149 which is keyed to and is continuously rotated by the sleeve 72. A locknut 150 threadedly engaging the lower end of the sleeve holds the cam in position on the sleeve.

It is just after the can 24 has passed the trip finger 121 that the cam 149 shifts the lever arm 142 in a clockwise direction (Fig. 10). In this action a plate 151, which is secured to the end of the lever arm, strikes against the plate 141 moving it and the arm 127 and restoring the trip lever 121 and connected parts to their normal positions.

It will be observed that the trip finger remains in an actuated position after movement by a can or by the cam 149 until it is again moved positively by the cam or can as the case may be. The loose connection, it will be observed, refers to the independent mounting of the arms 127, 142 and involves the opening and closing of the distance between the plates 141, 151.

The further movement of the separated cover toward the station D will now be considered. This movement of the cover begins when it is in the inclined position shown in Fig. 5, with one of its edges resting on the cutaway portion 138 of the guide bar 139 and with its opposite edge supported at a higher level on the shoulder 67 of the block 65. When in this position the cover is directly above a continuously rotating feed device which now comes into play to advance the cover along the guide bar 139 and to position it into the station D.

The rotating feed device comprises a disc 153 (Figs. 3, 5 and 6) which is secured to the top of a disc body 154 by screws 155. The disc body 154 extends down as a vertical depending shaft 158 which is journaled in a bearing 159 formed in the bottom wall of the housing 54. The lower end of the shaft 158 projects beyond the end of the

bearing 159 and carries a gear 161 which is keyed on a reduced diameter end of the shaft and the gear is held in place by a locknut 162. Gear 161 (see also Fig. 9) meshes with and is driven by the idler gear 78 and through this connection the disc 153 is rotated.

Disc 153 carries cover engaging elements formed integrally therewith. There are a pair of these elements which are diametrically opposed and formed on the rim of the disc as elongated lugs 165. The front end of each lug is cut back or recessed at 166 and this recess merges into a groove 167 formed in the outer peripheral surface of the lug, the top boundary wall of recess and groove including a connecting inclined wall 168.

Rotation of the disc 153 brings the forward edge of the adjacent lug 165 into engagement with the edge of the separated cover and movement of the cover begins, the edge which rests on the shoulder 67 passing into a short downwardly inclined groove 169 formed in the block 65.

The opposite edge which is supported on the thinned end 138 of the guide bar 139 is simultaneously carried forward along a groove 171 cut in the inner edge of the guide bar. The inclined groove 169 lowers that side of the cover during this movement so that by the time it reaches the station D it is in a horizontal position.

At the station D the guide bar groove 171 merges into a groove 175 formed in the wall of an offset pocket 176. The advancing cover, entering the pocket 176 strikes against a lug 178 formed on the free end of a lever 179 and its movement is interrupted. Description of the lever 179 and its operation will be given in connection with the release of the cover from the station D which does not take place, however, until after the detecting operation.

Engagement of the lug 178 assisted by the continued movement of the disc lug 165 exerts a slight pressure on the cover edge which squeezes it between its points of contact and moves it sidewise into the pocket 176, its adjacent edge seating within the groove 175. At the same time the opposite edge of the cover rolls around the front of the disc lug 165 passing into the recess 166, down under the inclined surface 168 and into the groove 167.

This lateral shifting of the cover removes it from the propelling influence of the lug 165 and disc 153 and the latter continues its rotation while the groove 167 of the disc passes by the now stationary cover. It is during this pause that the cover detecting operation takes place.

A plunger 181 (Figs. 3, 11, 13 and 14) is located at station D and yieldingly slides in a bearing 182 formed in the lower end of a tubular member 183 projected laterally from the side of a bracket 184. Bracket 184 is secured to a vertically movable slide 185 which will be hereinafter explained.

Plunger 181 is formed with an enlarged head 186 and above this the plunger is reduced in diameter and its top end passes through a nut 187 threadedly engaged in the top of the tubular member 183. A coiled spring 188 encircles this part of the plunger and is interposed between the nut 187 and the head 186, this spring being confined within the member. A horizontal pin 191 extends through the plunger 181 and projects out from either side and these ends extend within diametrically opposed vertical slots 192 cut in the bearing 182 and prevent the plunger from turning. The lower end of the plunger 181 is also reduced in diameter and carries a foot 194 on its lowermost extremity.

The plunger unit just described is periodically lowered and raised by the slide 185 and passes into the zone of rest of a cover pausing at the station D. The vertical edges of slide 185 (Figs. 3, 11 and 14) are formed with projecting tongues 196 which slide within grooves 197 cut into guide ways 198 forming a part of a tubular wall 199. This wall 199 is an enlarged upward extension of the bearing 95 and provides a housing for and encircles a cam 201 keyed to a reduced upper end of the shaft 92. It is this cam that lowers and raises the plunger unit through the action of a cam groove 202 on a roller 203 carried by the slide.

Cam 201 is continuously rotated with the shaft 92 and in each cycle of the cam movement the slide 185 moves down within its guideways and the plunger unit lowers and its foot 194 enters the zone of rest of the cover 51. If a cover is present in the pocket 176 at such a time the foot 194 engages and rests on the top of the cover. The downward movement of both foot and plunger 181 is accordingly arrested and the continued downward movement of the slide is then taken up by the spring 188. No further testing actions take place under such conditions.

In the event that there is no cover at the station D when the testing plunger 181 moves down, the plunger continues its further descent and sets in motion a can testing device effective at the station E. This actuation of the can testing device is brought about as follows.

A pair of locknuts 205 (Fig. 14) which are threadedly secured to the lower end of the plunger 181 move into engagement with and actuate a lever arm 206 in the latter part of the plunger stroke. These locknuts may be adjusted as desired and are locked on the plunger in such a position that as long as a cover stops the further movement of the plunger the nuts do not shift the lever arm. The arm 206 is part of a collar 207 (Figs. 1, 3, 11, 12, 13 and 14) which is secured to one end of a horizontal rock shaft 208 journaled in depending bearings 209, 211 formed in the top of the housing cover 53.

The lever arm 206 in unactuated position is horizontal as shown in Fig. 14 and is so held with a stop lug 214 on the collar 207 abutting against an adjustable setscrew 215 threadedly secured in a lug 216 projected from the top of the housing 53. These elements 214, 215 are retained in such engagement by a spring 218 (Fig. 11) stretched between a pin 219 depending from the under side of the housing cover 53 and a pin 221 secured in the shaft 208.

As the plunger 181 moves down and the nuts 205 engage and actuate the arm 206, the shaft 208 moves in a counter-clockwise direction (as viewed in Fig. 14) against the resistance of the spring 218. This actuates the can testing device which is controlled from the opposite end of the shaft adjacent the bearing 211.

The can testing device includes a lever 225 (Figs. 11 and 12) secured directly to the shaft and this lever carries a can detecting beam 226, the beam being formed with a vertical extension 227 at its center to provide for a pivot pin connection 228 with the lever. One end of a spring 231 is joined to the rear end of the beam 226 and its opposite end is embedded in a lug 232 projecting laterally from the lever 225. This spring normally holds the adjacent top edge of the beam against a pad 233 formed on the bottom of the lever. The lever 225 and beam 226 may thus

be moved as a unit or the beam may be rocked on its pivot pin 228.

The forward end of the beam 226 projects over the line of travel of the cans 24 and has vertical movement in a slot 235 (Figs. 11 and 12) formed in a bracket 236 which in turn is bolted to the top of the housing cover 53.

The actuation of the shaft 208 just described moves the can testing lever and beam 225, 226 in a counter-clockwise direction (as viewed in Fig. 12) around the shaft as a center and the forward end of the beam is lowered into the line of travel of the cans 24. If there is no can in the station E this unit movement of lever and beam continues without performing any work.

If, however, a can is present at the station E the forward end of the beam strikes on its top flange and as further movement of the shaft 208 carries the lever down, the beam rocks on its pivot 228. This carries the beam away from the pad 233 as the spring 231 yields and the rear end of the beam descends and strikes against and actuates an electric switch to be described. Actuation of this switch working through the electric control device previously mentioned immediately stops the operations of the entire mechanism as will now be fully explained.

The electric switch is housed in a covered bracket 241 (Figs. 11 and 12) which is bolted to a boss 242 formed on the side of the housing cover 53. This bracket supports a switch lever 244 pivoted on a pin 245 mounted in lugs 246 projecting upwardly from the bottom of the bracket.

One end of the switch lever projects through a slot 247 in the bracket and extends beneath the rear end of the beam 226. This end of the lever preferably terminates in an enlarged head 248 which carries an adjustable setscrew 249 the upper end of which is engaged when the electric switch is actuated. The opposite end of the switch lever 244 carries a mercury switch 251 having electric contact points that are electrically closed by a globule of mercury in the usual manner.

The electric control device circuits are shown in the wiring diagram of Fig. 15 and reference should now be had to that figure. There are three separate circuits involved which may be designated as (1) a primary circuit, (2) a secondary or motor circuit and (3) a shunt circuit. The primary circuit conveys electrical energy from a main source such as an electric generator 255 along a wire 256 through a service switch 257, through the winding of a solenoid 258 and back along a wire 259, in which a lamp 261 may be included, through the service switch 257 and thence to the generator by a wire 262.

Current passing through this circuit energizes the solenoid 258 which in turn closes a contact switch 263 forming a part of the secondary or motor circuit. In the motor circuit, current passes from the electric generator along a wire 264, through the switch 263, a wire 265, and into a motor 266. From the other side of the motor the current flows back to the generator along a wire 267.

The motor 266 as used in the present description is intended to indicate broadly any suitable driving force for the working parts of the apparatus. Obviously such a driving force with its coordinated connections will vary in design according to the kind of power mechanism utilized and no attempt is made in the instant case to do other than merely suggest a driving element which will operate in the proper synchronism the various moving parts of the machine.

As long as the motor circuit is maintained closed, the motor 266 keeps the mechanism operating, but when a can is detected at the station E and there is no corresponding cover at station D, then upon the actuation of the mercury switch 251 which follows the third or shunt circuit comes into play. Establishment of this shunt circuit nullifies the motor circuit and causes the motor and mechanism to stop.

In the shunt circuit current passes from the generator and wire 256 along a wire 268 through the mercury switch 251, which is then closed, along a wire 269 and back to the wire 259. This shunt circuit does not contain the resistance which is offered by the winding of the solenoid 258 and accordingly when established diverts current away from the solenoid which is thereupon deenergized. This permits the switch 263 to open, by spring or other well known automatic switch device, breaking the motor circuit.

During these testing or detecting operations at stations D and E the stop lug 178 of the lever 179 (Fig. 6) holds the cover against movement in the pocket 176 at the station D but as soon as the detecting period is over if the machine is not stopped the cover is released. To accomplish such a release the stop lug 178 is depressed or moved to a horizontal position below the cover.

Lowering of the stop lug 178 is effected primarily by a cam 271 (Figs. 1, 3 and 6) having a cam groove 272 cut in its outer periphery, the cam being keyed to the upper end of the vertical shaft 92 adjacent to and just above the cam 201. The cam 271 is clamped in place on the shaft by a stud 273 threadedly secured in the shaft end, a washer being interposed between the head of the stud and the cam. As the cam rotates its groove 272 imparts a vertical reciprocating movement to a cam roller 274 (Fig. 4) which rides in the groove.

Roller 274 is carried on a square head 275 formed in a vertical rod 276. This rod 276 is mounted in a bearing 277 formed in the vertical housing wall 199 and its square head slides in a squared recess 278 formed in the wall above the rod bearing. This prevents turning of the rod on its vertical axis. The lever 179 is secured to the lower end of the rod 276 and in each cycle of rotation of the cam 271, the rod is lowered and the lug 178 is dropped below the path of the cover. The cover thereupon begins its passage from station D to station A.

The further advancement of the cover is effected by cover feeding elements associated with the disc 153. There are two of these elements, diametrically disposed on the disc and during the detecting operations, one of these elements is approaching the stationary cover, being advanced by the rotating disc.

Each feeding element comprises a finger 279 (Figs. 3 and 6) formed as a vertical projection on the outer end of a horizontal arm 280 and both arms extend laterally from the periphery of an annulus 281 which is mounted on the disc body 154 being clamped firmly in place by the disc 153. The approaching finger 279 engages and sweeps the cover out of the pocket 176 and moves it along the groove 175 of the guide bar 139.

Mention has already been made of the guide bar being supported in the housing 54. The forward end of this bar is connected to a lug 282 (Figs. 1 and 11) formed in the cam housing 199 and the bar intermediate its length, that is ad-

jacent station D, is carried in a slot 283 (Figs. 3 and 6) cut in the side of the bearing 95.

By the time the advancing cover arrives at the end of the guide bar 139 it has passed beyond the wall of the disc 153 and out of the groove 167. From this point on and until it comes into station A it is guided between grooved and spaced supporting guide members 284, 285 (Fig. 6). The guide member 284 is enlarged in a circular annular section 287 which is mounted on and loosely surrounds the hub of the upper turret 34. This part of the guide member is bolted at 288 to the stationary bracket 48.

A groove 289 is provided in the inner vertical edge of the guide member 284 and provides a supporting track for one side of the cover 51. This groove is in horizontal alignment with the groove 175 of the bar 139 and accordingly the cover passes without interruption from one to the other.

On the opposite side the cover is supported during its advancement in a groove 291 formed in the inner vertical edge of the guide member 285 which in the present embodiment is a circular bar located concentrically to the turret shaft 42. One end of this guide bar is bolted to the housing 54 as at 292 (Figs. 1 and 6). This end of the bar also extends into the housing 54 and terminates adjacent the feed disc 153. Its groove 291 is in horizontal alignment with the disc groove 167 and accordingly the cover passes without interruption from one to the other.

A transverse groove 293 cuts across the inner end of the guide bar 285 and provides clearance for the fingers 279 of the cover feeding elements. Almost simultaneously with the transfer of the cover from the guide bar 139 and the disc 153 to the guide members 284, 285 and while still propelled by one of the fingers 279, the cover enters into an advancing pocket of the rotating turret 33. The cover passes into the upper part of the can and cover receiving pocket 35 still moving along the guide members and when it is fully seated in the pocket the finger sweeps on and passes under the guide bar 285 and through the groove 293.

The cover receiving pocket 35 of the turret 33 is provided with a series of cover centering lugs 296 (Fig. 6) and a cover advancing lug 297. The advancing po ket in the action just described first passes under the cover while cover and turret are moving at the same speed and then the lug, passing through a space between the ends of the guide bar 139 and the guide member 284, engages behind and picks up the cover. This advances it along its guideways while centering it in the pocket and against the centering lugs 296.

At this time both can and cover are approaching the station A and the cover already in the turret pocket moves above and in alignment with the can as the latter enters into the same turret pocket. At the station A this alignment is completed and from thereon can and cover are conveyed along in the same turret pocket, the cover being held above the can in spaced relation thereto.

After leaving the station A the rotating turret 33 may transfer the aligned can and cover to any suitable place depending on what subsequent operation machine is required. For the purpose of illustrating one way of disposing of the aligned cans and covers, uniting or sealing of the can and the cover is shown. Accordingly Fig. 2 of the drawings shows a lifter plate 298 of a seaming machine 299 and in this embodiment the turret 33 functions as a feeding element for the seaming machine.

The can passes onto the lifter plate 298 and thereupon leaves the turret pockets 35, 37 and the guide rail 31. In like manner the cover leaves the guide members 284, 285, and in so doing the cover may pass down an inclined part of the guide and move directly onto the top of the can, the centering lugs 296 and the advancing lug 297 keeping the parts sufficiently aligned until fully assembled.

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 mechanism for feeding can parts, the combination of detecting instrumentalities located at a testing station for a can part, other detecting instrumentalities located at a second testing station for another can part, feeding devices for moving said can parts into their respective testing stations, and means associated with one of said instrumentalities and effective on the failure of feeding of a can part into its testing station for operating the other of said detecting instrumentalities at the other station.

2. In a mechanism for feeding can parts, the combination of detecting instrumentalities located at a testing station for a can part, other detecting instrumentalities located at a second testing station for another can part, feeding devices for moving said can parts into their respective testing stations, means associated with one of said instrumentalities and effective on the failure of feeding of a can part into its testing station for operating the other of said detecting instrumentalities at the other station, and devices associated with the latter of said instrumentalities for stopping the operation of said mechanism when a can part is present at its testing station without the first mentioned can part being present at its testing station.

3. In a can and cover feeding mechanism, the combination of a conveyor for moving cans through a can testing station, cover conveying means for moving covers through a cover testing station, can detecting means effective at said can testing station for detecting the presence of a can, and yieldable means operatively connected to said can detecting means for detecting the presence of a cover at said cover testing station and in the absence of said cover for directly actuating said can detecting means.

4. In a can and cover feeding mechanism, the combination of a conveyor for moving can bodies through a can testing station, cover conveying means for moving covers through a cover testing station, independent means for detecting the presence of a said can body and its corresponding cover at their respective stations, and electric means associated with said detecting means and controlled from said cover testing station for stopping the operation of said conveyor and said conveying means when a can body is present at said can testing station without a corresponding cover being present at said cover testing station.

5. In a can and cover feeding mechanism, the combination of a conveyor for moving can bodies through a can testing station, cover conveying means for moving covers through a cover testing

station, independent means for detecting the presence of a said can body and its corresponding cover at their respective stations, and electric means associated with said detecting means for stopping the operation of said conveyors when a can body is present at said can testing station without a corresponding cover being present at said cover testing station, said detecting means for said can being operative independently of and not affecting said electric means when a can body is absent from said can testing station.

6. In a can and cover feeding mechanism, the combination of a conveyor for moving cans through a can testing station, a cover magazine for holding can covers in stacked formation, means actuated by a can in said can conveyor for releasing a cover from said magazine, cover conveying means for moving a said released cover along a path of travel to and through a cover testing station, means for temporarily retaining a said cover at said cover testing station, and interconnected means for detecting the presence of a said can and a said released cover at their respective stations, the means for detecting the presence of a can at said can testing station being directly actuated by said cover detecting means in the absence of a cover at said cover testing station.

7. In a can and cover feeding mechanism, the combination of a conveyor for moving cans through a can testing station, a cover magazine for holding can covers in stacked formation, means actuated by a can in said can conveyor for releasing a cover from said magazine, cover conveying means for moving a said released cover along a path of travel to and through a cover testing station, means for temporarily retaining a said cover at said cover testing station, interconnected means for detecting the presence of a said can and a said released cover at their respective stations, one of said detecting means being actuated by the other in the absence of a can part at one of said testing stations, and means for further conveying said cover into axial alignment with said can for a subsequent operation.

8. In a can and cover feeding mechanism, the combination of a conveyor for moving cans through a can testing station, a cover magazine for holding can covers in stacked formation, means actuated by a can in said can conveyor for releasing a cover from said magazine, means for restoring said can actuated means into position for actuation by a subsequent can moving with said can conveyor, cover conveying means for moving a said released cover along a path of travel through a cover testing station, and interconnected means for detecting the presence of a said can and a said released cover at their respective stations, the means for detecting the presence of a can at said can testing station being actuated by said can cover detecting means in the absence of a released cover at said cover testing station.

9. In a can and cover feeding mechanism, the combination of a conveyor for moving cans through a can testing station, a cover magazine for holding covers in stacked formation, cover separating devices, trip devices for normally supporting said stack of covers against separation, means actuated by a can in said can conveyor for releasing said trip devices from stack supporting position and for rendering said cover separating devices effective to separate a said cover, means for feeding said separated cover in a path of travel toward said moving cans and through a cover testing station, means for detecting the presence of a separated cover at said cover testing station, and means for detecting the presence of a can at said can testing station, one of said detecting means being actuated by the other in the absence of a can part at one of said testing stations.

10. In a can and cover feeding mechanism, the combination of a continuously moving conveyor for moving cans through a can testing station, a cover magazine for holding covers in stacked formation, cover separating devices for individually removing covers from said stack, means for feeding said separated cover in two stages through a cover testing station in a path of travel toward said moving cans, means for temporarily holding said cover at said cover testing station, and means for detecting the presence of said cover while it is held at said cover testing station, said detecting means having an interconnected part actuated in the absence of said cover to further detect the presence of a moving can during its passage through said can testing station.

11. In a can and cover feeding mechanism for a double seaming machine, the combination of a conveyor for moving cans through a can testing station and into a double seamer, a cover magazine for holding can covers in stacked formation, means actuated by a can in said can conveyor for releasing a cover from said magazine, spaced rotatable cover conveying means for moving a said released cover along a path of travel to and through a cover testing station and into said double seamer, interconnected means operable at said cover testing station for detecting the presence of a said can and a said released cover at their respective stations, the means for detecting the presence of said can body being directly actuated to engage a said can body at its testing station by the movement of said cover detecting means, and means associated with said double seamer for further conveying said cover into axial alignment with said can for a subsequent operation.

12. In a can and cover feeding mechanism, the combination of a conveyor for moving cans through a can testing station, cover conveying means for moving covers through a cover testing station, operatively connected means for detecting the presence of a cover and can at their said stations respectively, the movement of said cover detecting means in the absence of a cover at the cover testing station, actuating said can detecting means to move the latter into the path of a can at the can testing station.

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