Feb. 1, 1955 P. A. KETCHPEL 2,700,855

PACKAGING MACHINE

Filed June 30, 1948 7 Sheets-Sheet 1

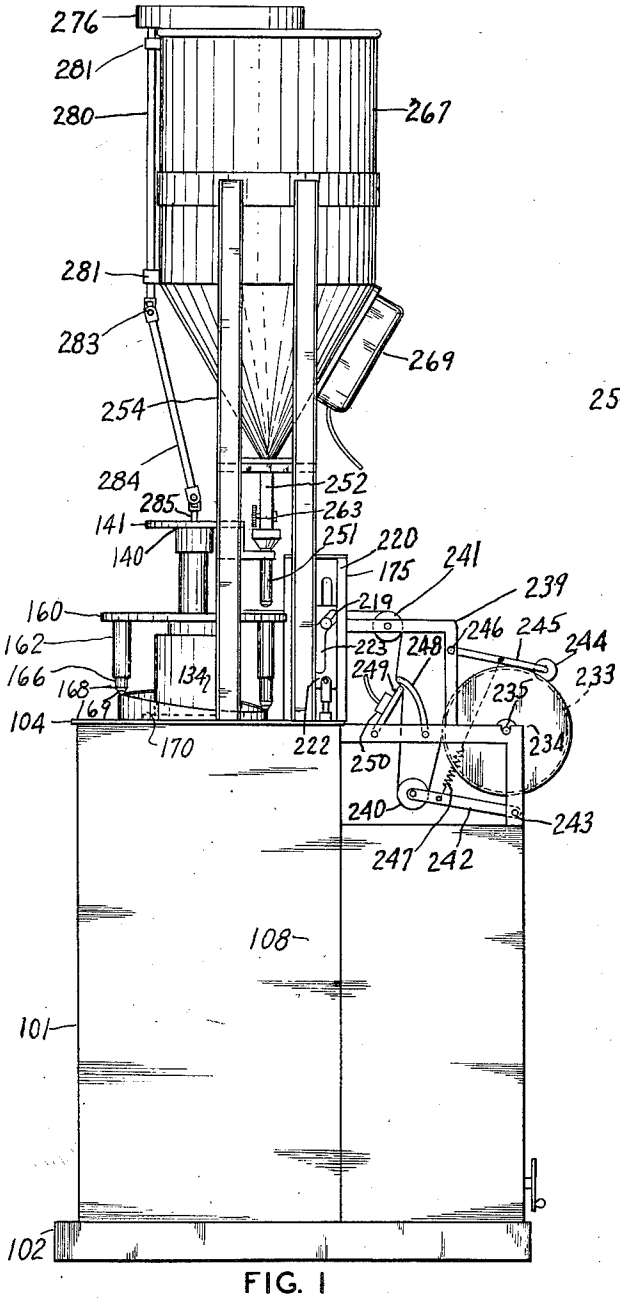


FIG. 1

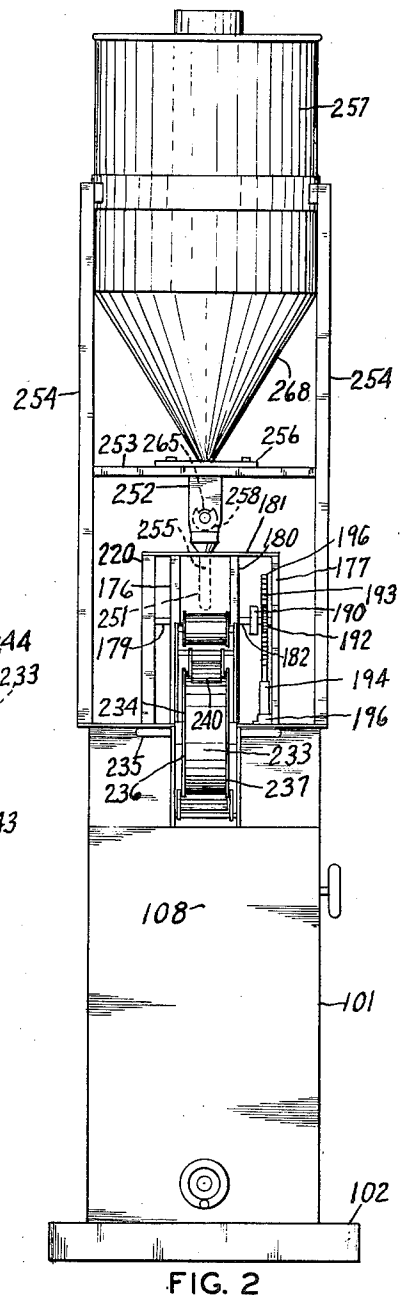


FIG. 2

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Feb. 1, 1955 P. A. KETCHPEL 2,700,855

PACKAGING MACHINE

Filed June 30, 1948 7 Sheets-Sheet 2

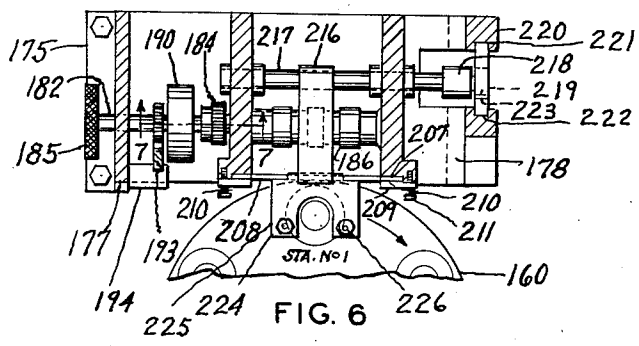


FIG. 6

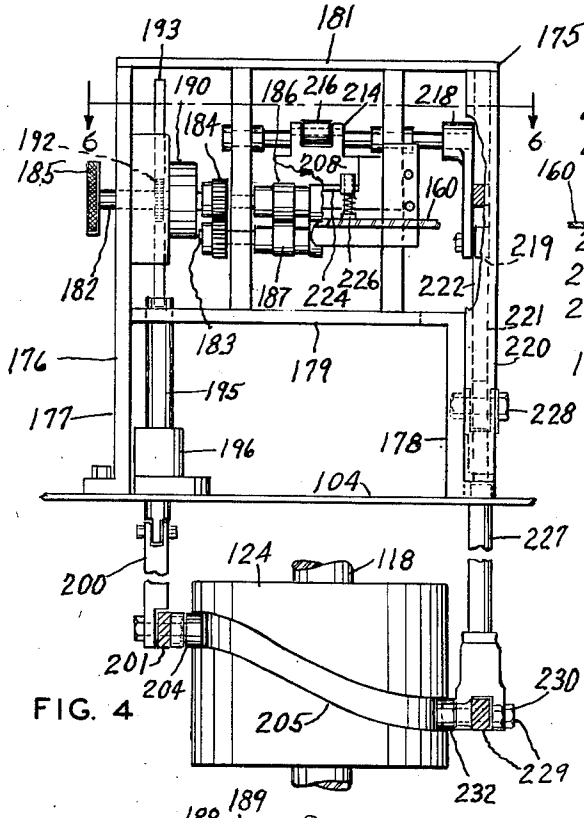


FIG. 4

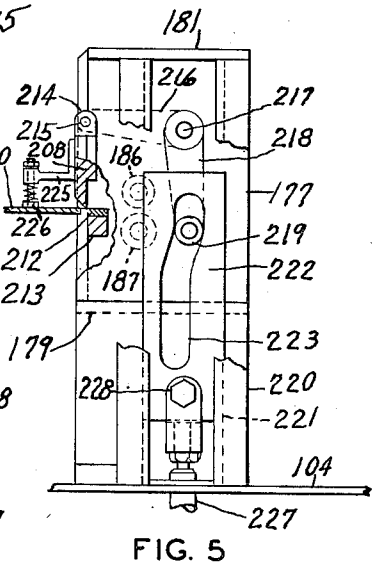


FIG. 5

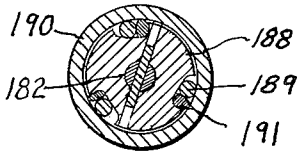


FIG. 8

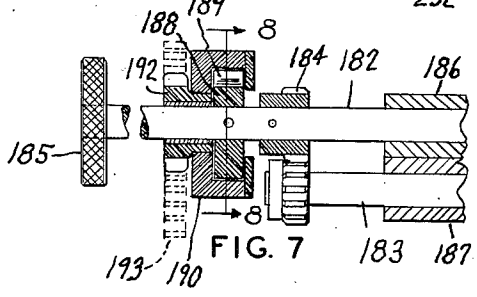


FIG. 7

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Feb. 1, 1955 P. A. KETCHPEL 2,700,855

PACKAGING MACHINE

Filed June 30, 1948 7 Sheets-Sheet 3

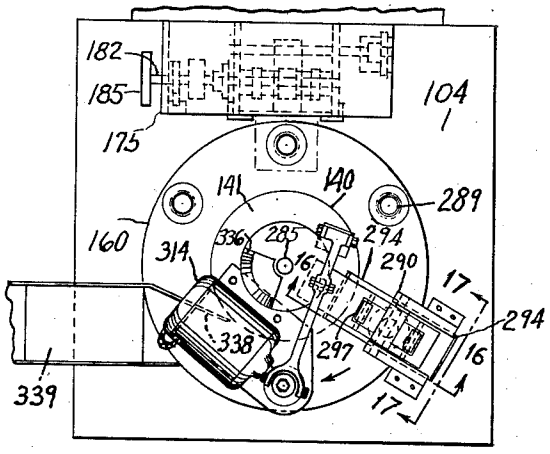


FIG. 12

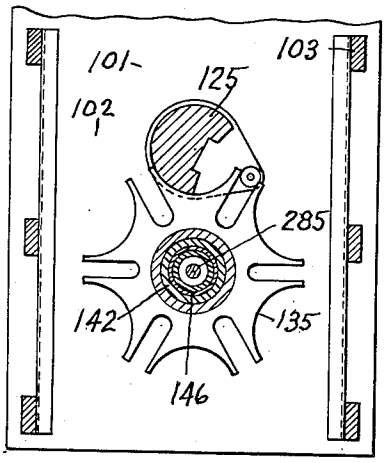


FIG. 11

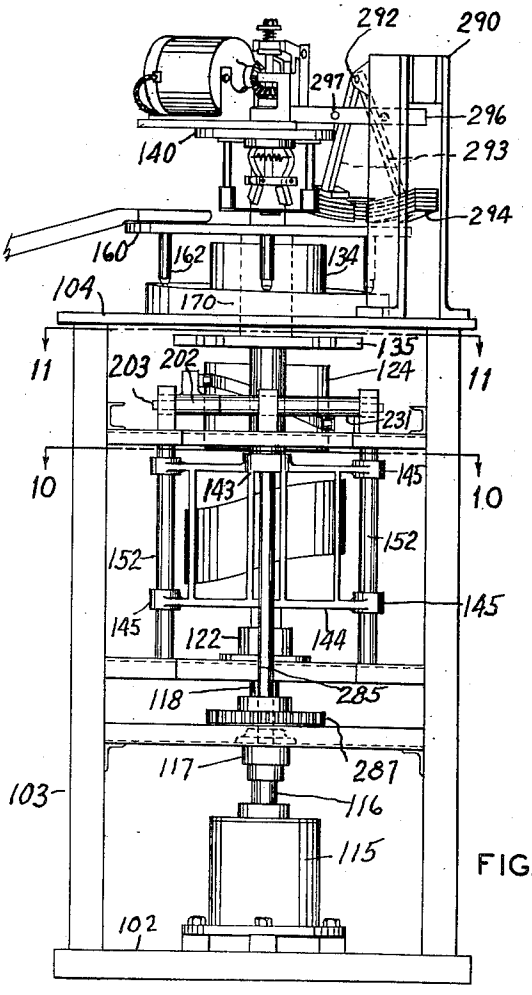


FIG. 9

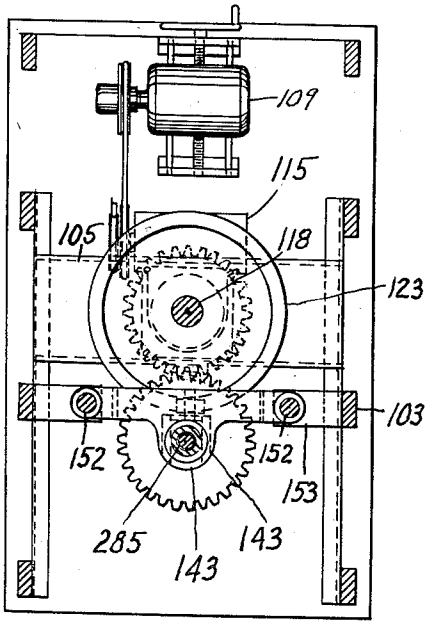


FIG. 10

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Feb. 1, 1955 P. A. KETCHPEL 2,700,855

PACKAGING MACHINE

Filed June 30, 1948 7 Sheets-Sheet 4

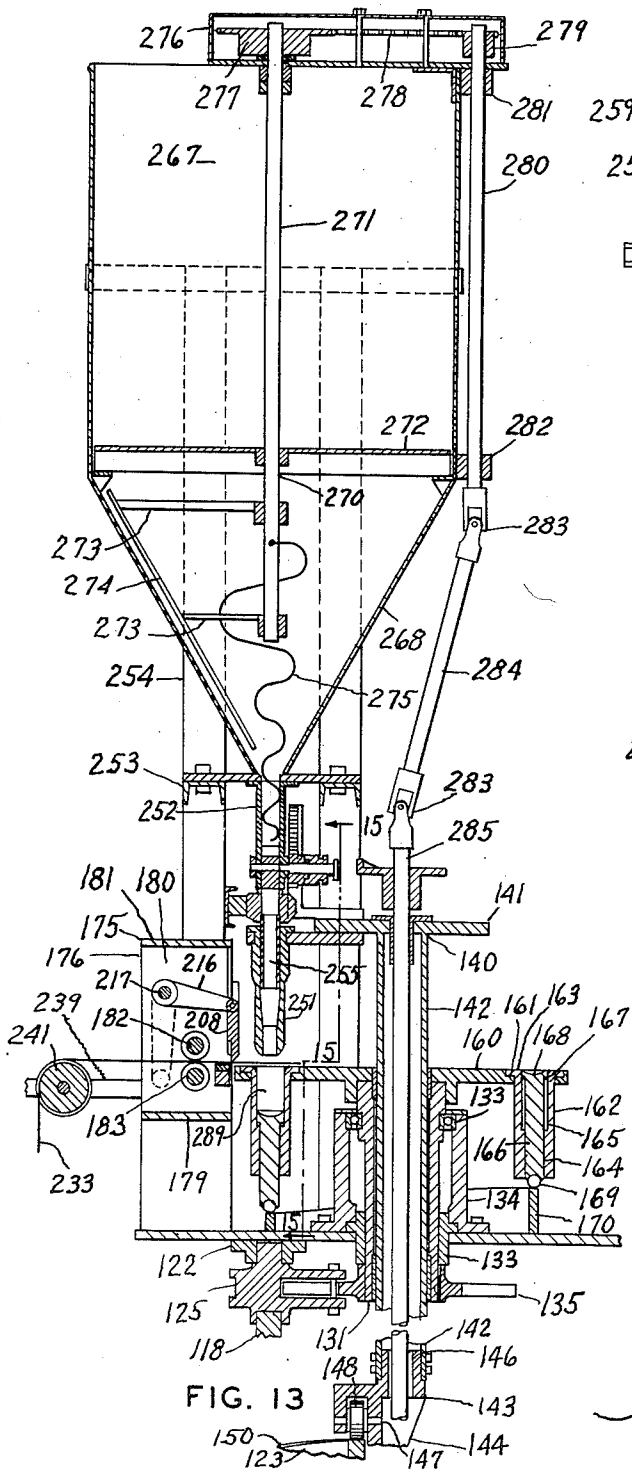


FIG. 13

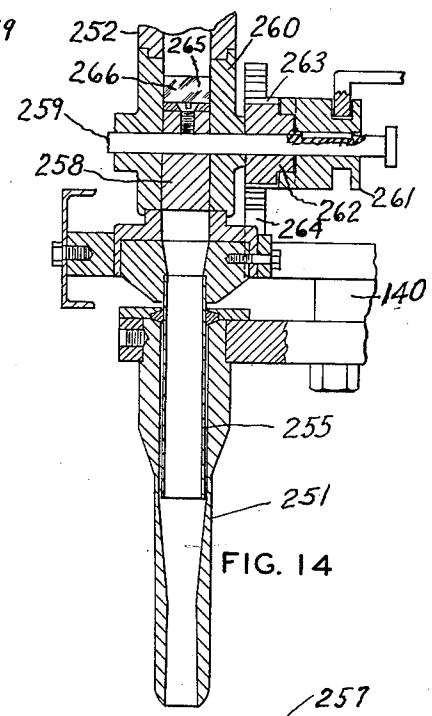


FIG. 14

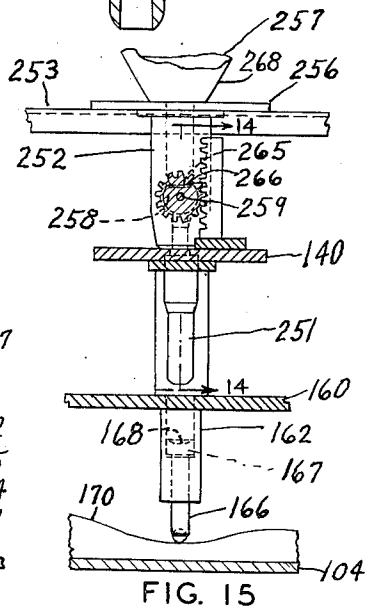


FIG. 15

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Feb. 1, 1955 P. A. KETCHPEL 2,700,855

PACKAGING MACHINE

Filed June 30, 1948

7 Sheets-Sheet 5

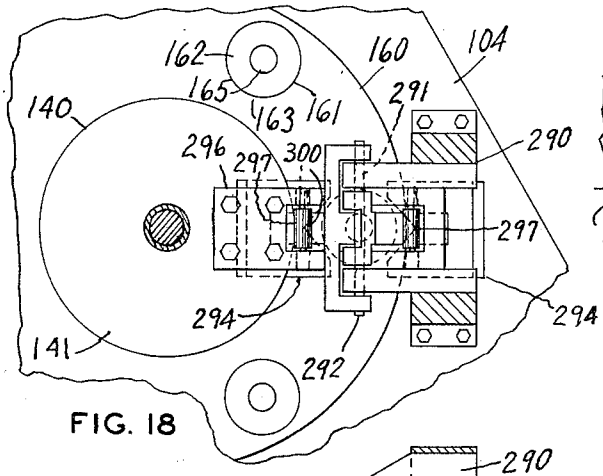


FIG. 18

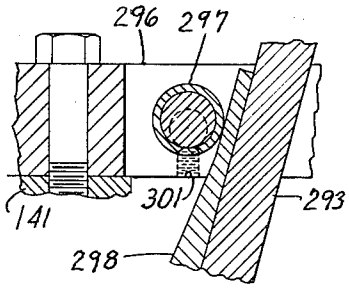


FIG. 19

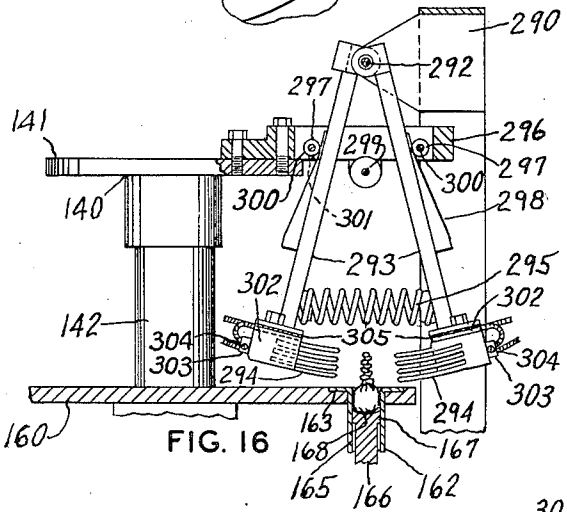


FIG. 16

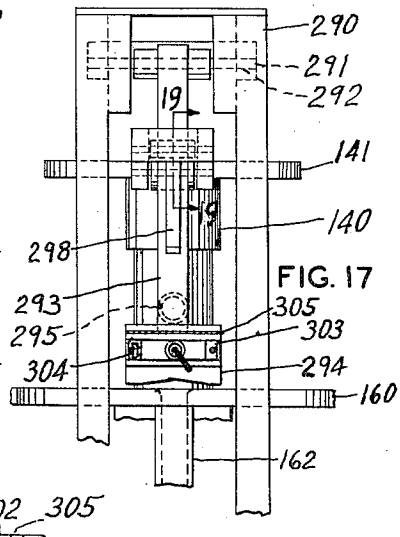


FIG. 17

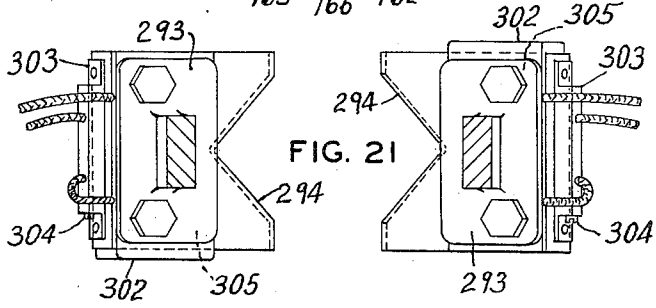


FIG. 21

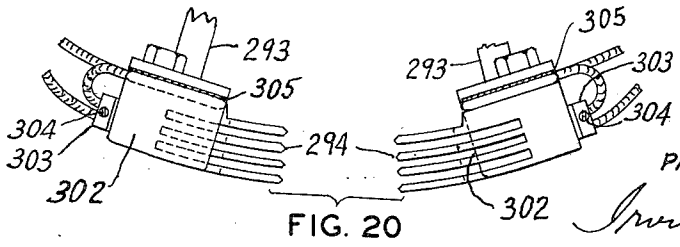


FIG. 20

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PACKAGING MACHINE

Filed June 30, 1948 7 Sheets-Sheet 6

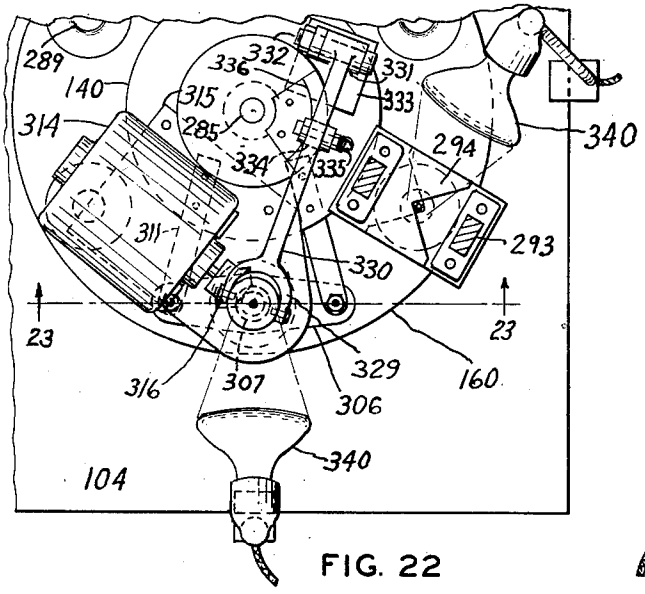


FIG. 22

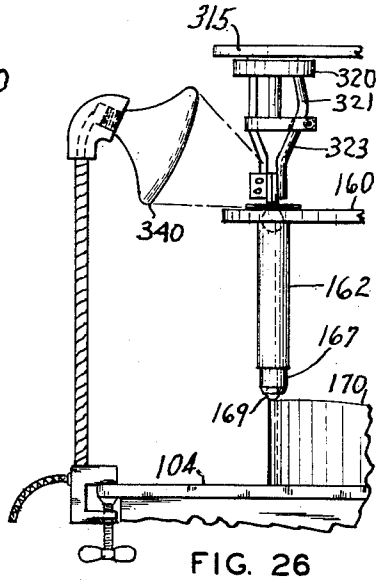


FIG. 26

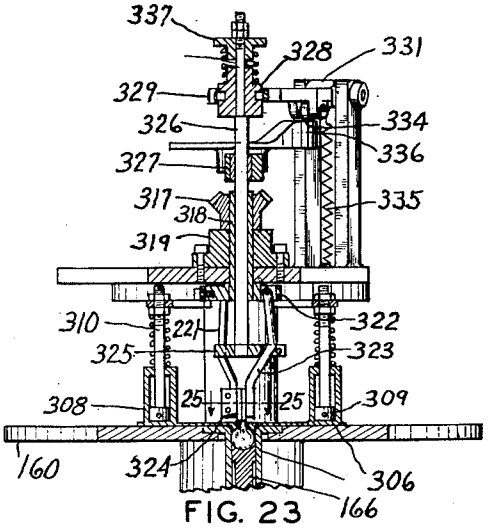


FIG. 23

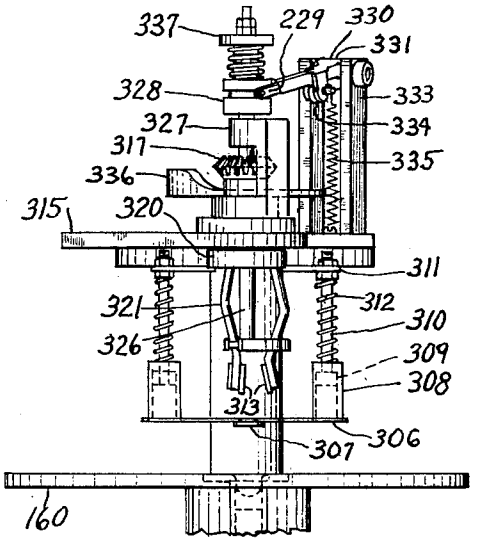


FIG. 24

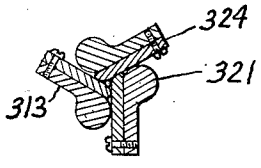


FIG. 25

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PACKAGING MACHINE

Filed June 30, 1948 7 Sheets-Sheet 7

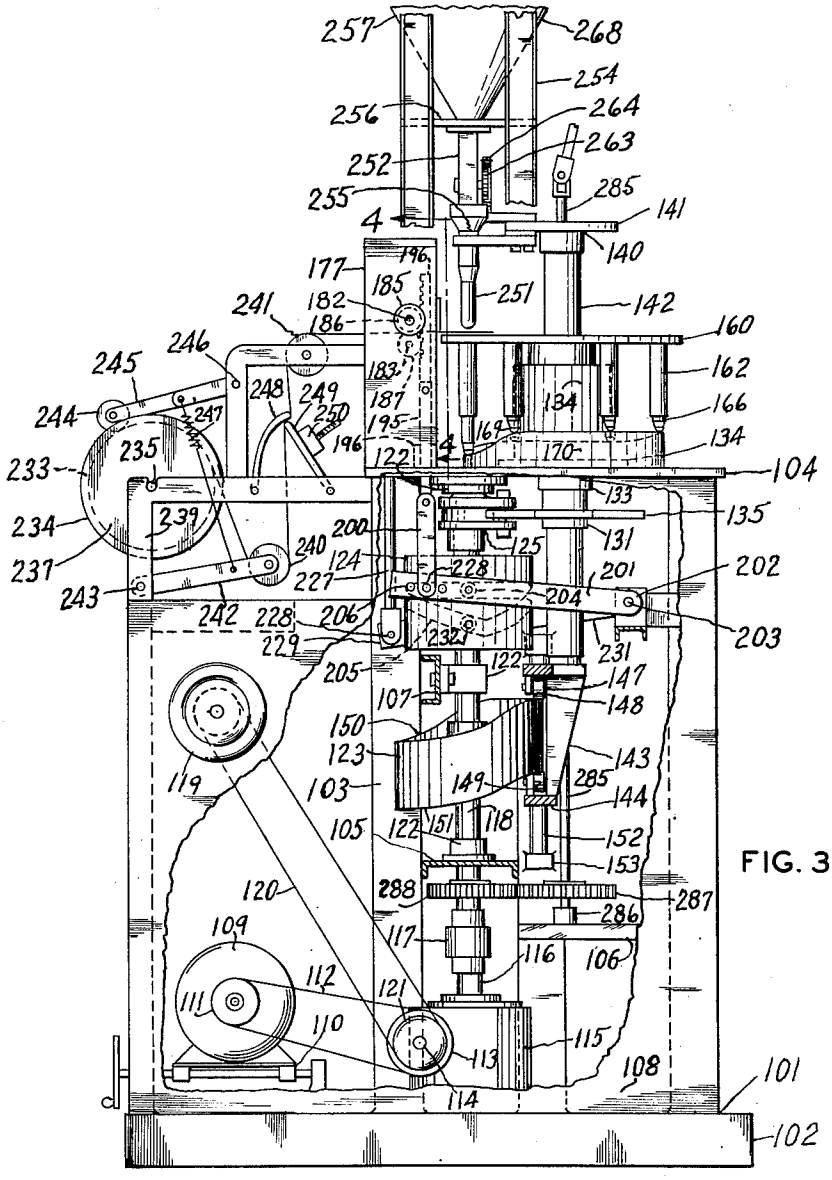


FIG. 3

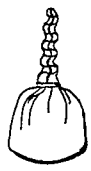


FIG. 27

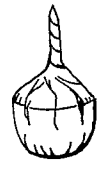


FIG. 28

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United States Patent Office 2,700,855 Patented Feb. 1, 1955

2,700,855

PACKAGING MACHINE

Paul A. Ketchpel, West Englewood, N. J., assignor to Ketchpel Engineering Company, West Englewood, N. J., a corporation of New Jersey

Application June 30, 1948, Serial No. 36,225

7 Claims. (Cl. 53—94)

My invention relates to a packaging machine and various component parts of such machines.

It is an object of the invention to provide a mechanism for supporting a roll of material and controlling the movement with which the roll will rotate as a web of material is pulled along intermittently.

Another object of the invention is to provide a double roll feed mechanism for feeding a web of material intermittently.

Another object is to provide a mechanism including an electrical switch for stopping the motor of the machine when the end of the roll of material runs out.

Another object is to provide a shearing mechanism for shearing off sheets of a web of material as it is fed intermittently through the shearing mechanism.

A further object is to provide a punch and a die mechanism for forming a container from a flat piece of material.

Another object of the invention is to provide a mechanism for filling said container through the punch while the punch is still within the container.

Another object of the invention is to provide a rotary worktable which is rotated intermittently by a Geneva cam mechanism whereby a container is formed, filled and closed, and then removed from the table at successive stations in the movement of the rotary worktable.

Another object of the invention is to provide a mechanism for gathering the open ends of the container together and closing the package with a crimping mechanism.

Another object is to provide a mechanism for closing and heat-sealing the container with a crimping mechanism.

A further object is to provide a mechanism for twisting the preformed ends of a container and twisting them to a fine tapering tail which may be done with or without heat-sealing as desired.

A further object of the invention is to provide a hopper mechanism for holding a six to eight hour supply of material, including an agitator for keeping the material agitated to insure a uniform quantity in the feeding, a metering device for intermittently discharging a measured quantity of material from the hopper into a tube for filling the container located in a rotary table at the lower end of the tube, said metering device being operated in time relation with the machine to avoid spillage of the material on the rotary table.

It is a further object of the invention to provide a machine with improvements in the design of its cams, levers, and other operating parts, which shall have long life as well as rapid and efficient operation.

For a fuller understanding of the nature and objects of the invention, reference is had to the following detailed description in connection with the accompanying drawings, in which:

Fig. 1 is a view in elevation of the entire machine.

Fig. 2 is a rear view of the machine shown in Fig. 1.

Fig. 3 is an enlarged view of the mechanism shown in Fig. 1 with some parts removed and other parts broken away to better illustrate the invention.

Fig. 4 is a sectional view taken along line **4—4** of Fig. 3 and is somewhat diagrammatic to illustrate the cam and link mechanism which operates the material shearing and feeding mechanism.

Fig. 5 is a side elevation view of Fig. 4 with parts omitted.

Fig. 6 is a sectional view taken along line **6—6** of Fig. 4.

Fig. 7 is an enlarged sectional view taken on the line **7—7** of Fig. 6.

Fig. 8 is a sectional view taken along the line **8—8** of Fig. 7, with some parts removed.

Fig. 9 is a front elevational view of the mechanism shown in Fig. 3 with the sheet metal covering plates removed, the material feed mechanism and the other material metering mechanism omitted; the crimper and tail-twisting mechanism which was not shown in Fig. 3 is now shown for the first time in this view.

Fig. 10 is a sectional view taken along line **10—10** of Fig. 9.

Fig. 11 is a sectional view taken along line **11—11** of Fig. 9 with some parts omitted for the sake of clarity.

Fig. 12 is a plan view of the mechanism shown in Fig. 9.

Fig. 13 is an enlarged view of the reverse side of the mechanism shown in the upper part of Fig. 1 with some parts removed and other parts shown in section.

Fig. 14 is an enlarged sectional view taken along the line **14—14** of Fig. 15 illustrating the metering wheel, feed tube, and punch mechanism.

Fig. 15 is an enlarged sectional view taken along the line **15—15** of Fig. 13 with some parts removed.

Fig. 16 is an enlarged sectional view of the crimping mechanism taken along line **16—16** of Fig. 12 with some parts removed.

Fig. 17 is an end elevational view of the crimper mechanism illustrated in Fig. 16.

Fig. 18 is a plan view of the mechanism illustrated in Fig. 16.

Fig. 19 is a sectional view of an adjustable eccentric mechanism taken along the line **19—19** of Fig. 17.

Fig. 20 is an enlarged side elevational view of the crimping jaws shown in Fig. 16 illustrating also the arrangement of the electrical heating unit and thermostat control mounted thereon.

Fig. 21 is a plan view of the mechanism shown in Fig. 20.

Fig. 22 is an enlarged view of a portion of the crimping and the tail-twisting mechanism shown in Fig. 12 with a heating element added.

Fig. 23 is a sectional view taken along line **23—23** of Fig. 22 and illustrates the product clamping and tail-twisting mechanism in their lowered operating position.

Fig. 24 is an elevational view of the mechanism shown in Fig. 23 with the product clamping and tail-twisting mechanism shown in their raised inoperative position.

Fig. 25 is a sectional view of the tail-twisting fingers taken along the line **25—25** of Fig. 23.

Fig. 26 is an elevational view of part of the mechanism shown in Fig. 22 showing the tail-twisting mechanism provided with a heating element and illustrates one means of heat-sealing the package as the tail of the container is twisted.

Fig. 27 illustrates one form of the product that may be produced with the machine and closed solely by the crimping mechanism.

Fig. 28 illustrates another form of the product which has been closed by use of both the crimping mechanism and the tail-twisting mechanism.

Referring to the drawings, Figs. 1, 2 and 3, a frame **101** is provided for the machine comprising a baseplate **102** and upstanding legs **103** and a stationary table **104**. Channel members **105**, **106** and **107** are fastened to and extend across from one side of the machine to the other between the legs for supporting the various shaft-bearings of the machine. The metal cabinet **108** may be used on the outside of the frame for enclosing the mechanism and improving the appearance of the machine.

In operation the motor **109** is adjustably mounted on the standard motor take-up **110**. The rotary motion of the motor **109** is transmitted through the pulley **111**, V-belt **112**, pulley **113** to high speed shaft **114** on the speed reducer **115**. A low speed shaft **116** extends out of the speed reducer **115** and is connected by a coupling **117** to a vertical cam shaft **118**.

A hand wheel **119** is conveniently mounted to the upper framework and connected by V-belt **120** and pulley **121** for rotating the cam shaft **118** by hand when setting up the machine. The cam shaft **118** is mounted in three bearings **122** which are supported to various members of the frame. The cam shaft is further provided with a sliding-head cam **123**, a paper-feed cam **124** and a Geneva crank **125**.

A hollow spindle **131** shown in Fig. 13 is mounted in bearings **132** and **133** in a bearing housing **134** mounted on the top of the stationary table **104**. A Geneva cam **135** is mounted on the lower end of the spindle **131**

and the shaft 118 imparts intermittent motion to the spindle 131 through the Geneva crank 125 and cam 135. As shown in Fig. 11 the Geneva cam 135 in the present case is designed for a six station movement. More or less stations can be had by designing the Geneva cam as required.

A sliding head 140 comprising a plate 141 and a tubular shaft 142 are mounted for vertical sliding movement within the spindle 131. The lower end of the tubular shaft 142 is bolted to a cam follower 143. The cam follower 143 comprises the frame 144, having four bearings 145 provided at each corner, a post 146 on which the tube is bolted, and journals 147 in which the cam rollers 148 and 149 are mounted at the top and bottom of frame 144. The cam follower 143 cooperates with the cam 123 so that the cam contours 150 and 151 act alternately on the rollers 148 and 149, respectively and causes the cam follower 143 to move up and down as the cam shaft 118 rotates. The bearings 145 of the cam follower 143 are mounted on two guide shafts 142 which are supported at their ends in projection 153 extending inwardly from the leg members 103 of the main frame. Thus, the sliding head 140 and its tubular shaft 142 are adequately mounted at its upper and lower end for accurate reciprocation in generous size bearings which will have long life and maintain the accurate alignment of the sliding head 140.

A rotary worktable 160 is mounted on the upper end of the spindle 131 and rotates intermittently therewith. The worktable 160 is provided with a number of shouldered recesses 161 in which products sleeves 162 are mounted. Each product sleeve 162 has a flange 163 at its upper end which fits into a recess 161 in the rotary table 160. The sleeve 162 is provided with a small bore 164 at its lower end and a little larger bore at its upper end, which has the function of a die as will be described later. A plunger 166 is mounted in the bore 164 and it has a flange 167 which slides in the large bore 165. The upper end of the plunger 166 may be provided with a spherical seat 163. The plunger 166 is provided with a ball bearing 169 at its lower end which rests on a ring cam 170 mounted rigidly on the stationary table top 104. The ring cam 170 being of varying height causes the plunger 166 to raise and lower the plunger 166 in the products sleeve 162 as the worktable 160 rotates for purposes which will be described later.

As best shown in Fig. 13, one of the sleeves 162 is arranged to stop at station No. 1 directly over the cam shaft 118 and in front of the paper feed mechanism 175 now to be described.

The paper feed mechanism 175 is best illustrated in Figs. 4–8. It comprises a frame 176 which is bolted to the top of the stationary table 104. The frame 176 may be constructed with plates, including a long end wall 177 and a short end wall 178 which are connected with a bottom plate 179. Two vertical intermediate walls 180 are mounted on top of the bottom wall and are bolted to a top plate 181. The intermediate walls 180 and the end walls 177 are provided with journals for a roller feed shaft 182. The intermediate walls 180 are provided with other journals for a roller feed shaft 183. The gears 184 are mounted on these shafts and cause them to rotate together. The upper roller feed shaft 182 extends out through the end wall 177 where it is provided with a hand wheel 185 for manual operation. Both feed shafts 182 and 183 are equipped with rubber rollers 186 and 187 for advancing a web of paper or other material as they are rotated. The roller shaft 182 has a clutch hub 188 pinned with it. The clutch hub 188 is driven by a roller clutch mechanism comprising a roller 189, an oscillating casing 190 and a resilient member 191 which pushes the roller into gripping engagement between the hub 188 and the casing 190 when the casing is rotated in one direction.

The casing 190 is mounted on the hub of a gear 192 freely mounted on the shaft 182. It is oscillated by a paper-feed rack 193 which is mounted for reciprocation in a guide 194 fastened to the end wall 177. The rack 193 is attached to a shaft 195 mounted for vertical reciprocation in a bearing 196 located on the stationary table 104. A link 200 is connected at its upper end to the shaft 195 and at its lower end to a lever 201. The lever 201 is provided with a hub 202 at the other end which is pivotly mounted to a shaft 203 mounted in the framework of the machine. Approximately midway between the hub 202 at its outer end the lever 201 is provided with a cam roll 204, best shown in Fig. 3. This cam roll 204 engages a groove 205 in the paper feed cam 124 which causes the lever 201, the link 200, the shaft 195 and the rack 193 to move up and down and to rotate the material or paper rolls 186 and 187 intermittently. A series of holes 206 in the cam lever 201 provide means for reducing or increasing the distance the rack 193 reciprocates and the amount of rotation the rubber rolls 186 and 187 to vary the amount of paper to be fed.

Intermediate walls 180 are provided with guides 207 on their front faces in which a shear blade 208 is mounted. The shear blade 208 is confined within the guides 207 by guide plates 209 held against the face of the intermediate walls by springs 210 mounted under the head of cap screws 211. A cooperating shear blade 212 is mounted stationary on a bar 213 which extends across between the intermediate walls 180 to locate the shear blade 212 where the paper moves out from the two rubber feed rollers 186 and 187.

The shear blade 208 is provided with two lugs 214 which is pivotly connected by a pin 215 to a lever 216 that is mounted on a shaft 217 journaled in the intermediate upright walls 180. A lever 218 is mounted on the outer end of shaft 217 and is provided with a cam roller 219. Mounted on each side of the short end wall 178 are guide bars 220, each provided with a groove 221 in which a cam plate 222 is moved up and down. Cam plate 222 is provided with a cam groove 223 and is engaged by the cam roller 219 and thus vertical reciprocation of the cam plate 222 causes oscillating movement of the shaft 217 to move the shear blade 208 past the shear blade 212 to shear off the web of paper being moved forward between rubber rollers 186 and 187. Shear blade 208 may be provided with a sheet hold down mechanism 224 for holding the material after a sheet has been severed by the shear blade 208 to prevent mis-placement on top of the rotary worktable 160. The hold down mechanism 224 may consist of an angle 225 and two resiliently mounted plungers 226. Thus a sheet of paper is sheared from the web and clamped down on the rotating worktable over the die within products sleeve 162 at station No. 1. A link 227 is pivotly attached by a bolt 228 to the lower end of the cam plate 222 and is connected at its lower end to a lever 229 by a bolt 230. The lever 229 is provided with a hub 231 at its opposite end and mounted on shaft 203 in the same manner as lever 201. Approximately mid way between the ends of lever 229 there is provided a cam roller 232 which engages the cam groove 205 in the paper feed cam 124 which causes the lever 227 and the cam plate 222 to reciprocate and causes the levers 218 and 216 to move the shearing blade 208 to cut sheets from the web of material.

A roll of material 233 from which the containers are to be formed, is assembled on a spool 234 comprising a shaft 235 on which a cheek 236 is rigidly mounted and has a removable cheek 237 at its opposite side. The spool 234 is set in slots 238 in the framework 239. The web or roll of material 233 is fed down under a dancing roll 240 and then vertically over another roller 241 from where it enters the rubber rollers 186 and 187. The dancing roll 240 is supported by a yoke 242 pivoted at 243 in the framework 239. A weight 244 is fastened to the outer end of an arm 245 pivoted at 246 to the framework 239 and serves to create a brake on the roll of material. A tension spring 247 is attached to arm 245 at one end and to yoke 242 at the opposite end. As the yoke 242 lowers, by reason of excess movement of the roll of material 233, the spring 247 creates heavier pressure between weight 244 and the roll of material 233 in order to control the freedom with which the roll of material will continue to rotate, thus the mechanism just described permits the roll of material to rotate continuously at a moderate rate while the feed rollers pull the paper or material forward with an intermittent motion.

Between the rollers 240 and 241 there is mounted a safety mechanism which automatically shuts off the machine when the end of the material runs out. This safety mechanism comprises a U-shaped member 248 and a horizontally U-shaped member 249 of a little narrower width. The horizontally U-shaped member 249 has attached thereto a mercury switch 250. The web of material running between rollers 240 and 241 passes between the upper

end of horizontally U-shaped member **249** and the upper end of U-shaped member **248** holding them in upright pivotal position. Should the web of material break, or run out, the V-shaped member **249** will drop to substantially horizontal position causing the mercury switch to shut off the current to the motor, thus automatically stopping the running of the machine.

As best shown in Figs. 13 and 14, a punch **251** is mounted to the sliding head **140** and reciprocates up and down with it. A metering housing **252** is mounted on a channel member **253** extending between the two upright frame members **254** from the stationary table **104**. A feed tube **255** is mounted within the lower end of the metering housing **252** and extends down into the punch **251**. The upper end of the metering housing **252** is bolted to a flange **256** on the bottom of the hopper **257** which permits material to be packaged to flow into the metering housing **252**. The metering housing is provided with a metering wheel **258** mounted on a shaft **259**. One end of the shaft extends from the housing **252** and is splined to receive a clutch member **261**. A cooperating clutch member **262** is freely mounted on the metering shaft **259**. A gear **263** is provided on the outside of the clutch member **262** and is engaged by a rack **264** which is mounted and reciprocates with sliding head **140**. The metering wheel is provided with a cavity **265** and when the clutch **261** is engaged with the cooperating clutch member **262**, reciprocation of the sliding head **149** and rack **264** causes the metering wheel **258** to revolve and rotate the cavity **265** from under the hopper to a lower position causing the material to be packaged which has dropped into the cavity **265**, to drop through the feed tube **255** and through the punch **251**. The metering wheel **258** oscillates continuously bringing down pre-determined quantities of material to be packaged into the feed tube **255** and the punch **251**. The cavity **265** may be provided with an insert **266** in order to vary the capacity of the cavity **265** as desired.

Referring to Fig. 1 a hopper **257** is shown comprising cylindrical upper portion **267** and a lower conical portion **268**. A vibrator mechanism **269** is attached to the lower portion of the hopper **257** in order to provide vibration of the hopper causing the material to be packaged to be vibrated, thus aiding it in its downward flow to the metering cavity **265**.

If preferred, an agitator mechanism **270** may be provided in the hopper as shown in Fig. 13, and comprises a shaft **271** mounted in a channel member **272** at the base of the spherical section **267** of the hopper. Agitator arm **273** is mounted on the shaft **271** carrying a blade **274** running parallel to the conical incline of the conical portion **268**. A spiral member **275** is mounted to the lower end of the shaft **271** extending down into the metering housing **252** and revolves with the shaft **271** to insure that the material to be packaged flows into the cavity **265** of the metering wheel **258**.

Shaft **271** extends through the center portion of the hopper **257** extending below the upper surface of the hopper and into a speed reducing box **276**. A large sprocket **277** is mounted upon the upper end of shaft **271**. A chain **278** connects sprocket **279** with a smaller sprocket **279**. A shaft **280** mounted in a bearing **281** in the speed reducing box **276** and extending down is mounted in a bearing **282** mounted on the outside of the hopper. The shaft **280** is driven through a universal coupling **283** and flexible shaft **284** by a shaft **285** extending up through sliding head **140** and tubular shaft **142**.

The shaft **185** extends down near the bottom of the framework of the machine and is mounted in bearing **286** of the cross member **106**. The shaft **285** is provided with a gear **287** which cooperates with a gear **288** mounted on the cam shaft **180**.

In the Fig. 13, the products sleeve **162** is shown with its product raising plunger **166** shown in its lower position, providing a cavity **289** within the sleeve **162**. After the web of material has been pushed out between rubber rollers **186** and **187** past the shear blade **208** beyond the punch **251**, a single sheared sheet is disposed upon the surface of the table centrally located below the punch **251**. The cavity **265** is aligned with the punch **251** so that when the punch **251** descends it presses the sheared sheet of material into the cavity or die **265** down to the spherical seat **168** of the plunger **166**, thus forming a small bag or container. The punch then rises and the table indexes the container to No. 2 station.

The ring cam **170** increases in height from the position of the No. 1 station to successive stations thus causing the product to rise in the cavity **265** so that by the time it reaches the No. 3 or crimping station, the edges of the containers will be extending up above the top of the worktable **160** in readiness for crimping.

As best shown in Figs. 16, 17 and 18, the crimping mechanism comprises a frame member **290** mounted on the stationary table **104** provided with bearings **291** in which a shaft **292** provides a pivot for a pair of crimping legs **293** on which a pair of crimping jaws **294** are attached. Legs **293** are normally held apart at their lower end by a spring **295**. The legs **293** are mounted in a frame **296** which is attached to the sliding head **140** and is provided with rollers **297** that cooperate with cams **298** on the legs **293**. Another roller **299** is supported by the frame **296** and is mounted along a medial line between legs **293**. When the sliding head **140** moves downwardly it carries frame **296** containing rollers **297** downwardly so that rollers **297** rest upon the outer face of cams **298** compressing the legs **293** and cause the jaws **294** to come together. The jaws **294**, comprising a series of plates equally spaced apart, have V-shaped faces as shown in Fig. 21, which gather the upper ends of the container together, crimping the same so that the upper portion of the container is closed, as shown in Figs. 16 and 27, to seal the contents within the container. The roller **299** is provided to act as an auxiliary means in the event the upper portion of the container should for any reason jam within the plates of the crimping jaws **294** and the spring **295** should not have sufficient pressure to force the jaws **294** apart. The upward movement of roller **299** will come in contact with the inner faces of the legs **293** actually forcing them apart. It is evident that the mechanism could be rearranged to have the spring **295** pull the crimper jaws together with a resilient pressure and use roller **299** or cam **298** mounted on the inner side of the legs **293** for forcing them apart.

The rollers **297** are mounted on an eccentric pin **300** which is held in place by a set screw **301** in the frame **296** in such manner that they may be adjusted closer or further away from the cams **298** to adjust the degree of pressure on the legs **293** and correspondingly on the jaws **294** thus applying a greater or lesser degree of pressure to the upper ends of the container as desired.

Heating elements **302** are attached between legs **293** and crimping jaws **294** extending over the top of the jaws and down one side thereof as shown in Figs. 20 and 21, so that heat may be applied to the upper edges of the container when the crimping action takes place in order to seal the upper portion of the container under both heat and pressure.

A thermostat control **303** is used to control the degree of heating elements applied to the jaws **294**. Thermostat control **303** is provided with adjustable means in the form of an adjusting screw **304**. Insulating element **305** is provided between the jaws **294** and the bottom of the legs **293**.

When the upper ends of the container is to be tail twisted in order to seal the container, it is first subjected to mild degree of pressure by the crimping jaws **294** to preset the upper edges of the container. The container is then moved to station No. 4 where a clamp **306** provided with depending circular boss **307** having an opening therethrough descends over the container so that the upper preset edges of the container pass through the opening in the depending boss **307** thus causing the container to be rigidly clamped against rotation between the depending boss **307** and the seat **168** of the plunger **166**. The clamp **306** is supported at the bottom of plunger housing **308** by bolts **309** riding within plunger housing **308**. Bolt heads **309** are attached to bolts **310** which are adjustably screwed to upper plates **311**. Plates **311** are attached to sliding head **140**. When the sliding head **140** descends and the clamp **306** reaches the upper level of the worktable **160**, the helical springs **312** within which bolts **310** pass are compressed and the bolt heads telescope within plunger housings **308** as shown in Fig. 23. At the end of the downward movement the tail twisting fingers **313** come into position surrounding the upper ends of the container placing said upper end between the fingers so that the tail twisting fingers **313** may be rotated or brought together upon the upper end of the container. A continuously rotating motor **314** which is mounted on a plate **315** bolted to the sliding head **140** is equipped with a bevel

gear 316 mounted at the end of its shaft driving another bevel gear 317. Bevel gear 317 is attached to tubular shaft 318 which, in turn, is mounted in bearing 319. Bearing 319 is mounted in plate 315 which is attached to the sliding head 140. At the lower end of the tubular shaft 318 there is mounted a ring 320 having three equally spaced cut-outs 322 therein, within each of which there is pivoted the upper ends of the tail twisting legs 321. The tail twisting legs 321 are formed with bent in portions 323, approximately in the central part thereof terminating in vertical portions comprising tail twisting fingers 313. Each of the tail twisting fingers 313 has attached thereto resilient pods 324 on which there may be substituted hardened metal plates (not shown) depending upon whether or not the tail twisting is to be heat sealed under pressure or sealed under pressure without heat.

Legs 321 are open and closed by a ring 325 having a series of cut-outs within which rollers are mounted to coact with the bent in portions 323 of the tail twisting legs 321 in order to open and close the tail twisting fingers 313. The tail twisting fingers 313 are opened when the shaft 326 descends so that the ring 325 which is attached to shaft 326 is forced downwardly against the bent-in portions 323 causing the fingers to spread apart. A shaft 326 reciprocates vertically within the tubular shaft 318 and extends up through bearing 327. A grooved sleeve 328 is operably connected to a yoke 329 which is attached to the end of lever 330. The lever 330 is provided with a hub 331 at its upper end which is pivotly connected by a pin 332 in a bracket 333 which is mounted on the sliding head 140. Approximately midway between the two ends of the lever 330 and it is provided with a cam roller 334. A spring 335 is attached to the lever and to the sliding head 140 to provide downward pressure upon the lever 330 to spread the tail twisting fingers 313 to normally open position as shown in Fig. 24. A cam 336 mounted on shaft 285 which extends up through the sliding head 140 cooperates with cam roller 334 in order to raise the lever 330 which in turn moves the shaft 326 in upward position in order to close the tail twisting fingers 313. A spring 337 is seated around the shaft 326 and between a collar 337 and the grooved sleeve 328 for providing a resilient pressure upon the tail twisting fingers 313. Since the ring 320 is attached to the tubular shaft 318 driven by the bevel gear 317, the tail twisting legs 321 are pivotly attached to the ring 320 which is continuously rotated. The tail twisting fingers are necessarily also continuously rotated and simultaneously opening and closing as the shaft 326 reciprocates vertically so that the fingers, when in closed position, twist and seal the upper ends of the container causing a twist such as is shown in Fig. 28.

When a container has been sealed, such as hereinbefore described, the tail twisting fingers 313 open and the entire clamp and its associated mechanism rises with the sliding head 140 as shown in Fig. 24. After the table 160 indexes to the next station, the cam ring 170 increases in height pushing the plunger 166 upwardly until it comes level with the top of the table 160 and when the table indexes to carry the container from the tail twisting station to station No. 5, the container is pushed up level with the top of the table and contacts rake 338 mounted across the top of the table, causing the container to move to a chute 339 dropping into the chute where it slides into shipping containers, not shown.

It should be noted that the container may be filled or other type of material added at subsequent stations. Especially will it be more desirable to load liquids into the containers at subsequent stations.

For certain types of products packaged in the containers, it is desirable to seal the upper ends or tails of the containers and for such cases, I have provided heating elements 340 for supplying heat to the crimping jaws 294 and tail twisting fingers 313. Heating elements 340 may be in the form of infrared ray lamps as shown, or other well known means of heating elements.

The machine has been designed to use various types of web material from which the containers may be made; such as wax paper, glassine, cellophane, diafane, Pliofilm and metal foils. Most of these may be closed and sufficiently sealed by either the crimper or the tail twister for many purposes without heat sealing. However, when hermetically sealed packages are desired, many such materials may be coated with a heat sealing medium and by equipping the crimper or tail twister with heating elements and using such heat sealing material, the machine will produce such packages.

This invention is designed to automatically package single measure units, particularly of small quantities, as hereinafter mentioned. This machine is designed to package granular material, powder, seeds, small uniform articles such as ball bearings, nuts and bolts, soap chips, candy, pills, drugs, coffee, tea, sugar, tobacco, small metal parts, insecticides or any fungible material. It is also within the scope of this machine to package liquids of every kind and description within sealed containers, such as individual measured portions of cream for tea and coffee, individual portions of condiments, such as ketchup, chili sauce, Worcestershire sauce, salad oil, etc.

By increasing the size of the various parts of the machine, or increasing the size of certain functional parts of the machine hereinabove described, it is possible to package larger objects such as fruits and vegetables of almost every kind and description.

In place of the hopper as hereinabove described other types of feed mechanism may be adapted for feeding different types of materials, such as fruits and vegetables of larger sizes which may be automatically packaged in the type of package hereinabove described, except on a larger scale.

It is also within the scope of this invention to permit the filling of the container at a station other than the station where the punch forms the container. That is the filling may be done at any other station than at the station where the container is formed, and such filling may be done manually.

I claim:

1. A packaging machine of the character described, comprising in combination, a frame, a rotatable worktable mounted on said frame and adapted to move successively past a forming station, a crimping station, and a discharge station, means for rotating said worktable intermittently in one direction, said worktable having a plurality of dies arranged circumferentially about its center, each die comprising a sleeve, a plunger slidably mounted within each of said dies, displacement means for raising and lowering each of said plungers respectively, in successive stages coinciding with said intermittent movement of said worktable, a vertically sliding head passing through the center of said worktable and arranged for reciprocation therein, a hollow punch positioned at said forming station and secured to said sliding head to reciprocate therewith, each of said dies being sequentially positioned beneath the punch at the forming station, means for automatically supplying a sheet of wrapper material at the forming station, said punch co-operating with said die at the forming station to form a hollow container from said wrapper material in said positioned die, a hopper for the medium to be packaged, said hopper having a housing at its bottom leading to said hollow punch, a metering mechanism mounted in said housing and having a receptacle for receiving said medium from the hopper, actuating means operatively connected with said sliding head for discharging the contents of said receptacle in timed sequence at the forming station, a pair of crimping members located at the crimping station, said crimping members including cam surfaces, follower means on said sliding head for engaging said cam surfaces and actuating said crimping members, means for elevating the filled containers to a position whereby said crimping members will perform the crimping operation on the upper portion of the wrapper material, and a rake member in proximity with the top of said table for ejecting the completed container therefrom at the discharge station.

2. A packaging machine of the character described, comprising in combination, a frame, a rotatable worktable mounted on said frame and adapted to move successively past a forming station, a crimping station, and a discharge station, means for rotating said worktable intermittently in one direction, said worktable having a plurality of dies arranged circumferentially about its center, each die comprising a sleeve, a plunger slidably mounted within each of said dies, displacement means for raising and lowering each of said plungers respectively, in successive stages coinciding with said intermittent table movement, a vertically sliding head passing through the center of said worktable and arranged for reciprocation therein, a hollow punch positioned at said forming station and secured to said sliding head to reciprocate therewith,

each of said dies being sequentially positioned beneath the punch at the forming station, means for automatically supplying a sheet of wrapper material to the forming station, said punch co-operating with each die at the forming station to form a hollow container from said material in said positioned die, a hopper for the medium to be packaged, said hopper having a housing at its bottom leading to said hollow punch, an agitator mechanism mounted within the interior of said hopper for stirring the medium therein, said agitator comprising a revolving shaft, arms supported by, and extending radially from, said revolving shaft, and a spiral member secured to said revolving shaft, said spiral member extending longitudinally into said housing conduit, a metering mechanism mounted in said housing and having a trap for receiving said medium from the hopper, actuating means operatively connected with said sliding head for discharging the contents of said trap in timed sequence at said forming station, a pair of crimping members defining a crimping station, said crimping members including cammed surfaces, follower means on said sliding head for engaging said cammed surfaces and for actuating the crimping members, means for elevating the filled containers to a position whereby said crimping members will perform the crimping operation on the upper portion of the wrapper material, and a rake member in proximity to the top of said table for ejecting the completed container therefrom at the discharge station.

3. A packaging machine of the character described, comprising in combination, a frame, a rotatable worktable mounted on said frame and adapted to move successively past a forming station, a crimping station, and a discharge station, means for rotating said worktable intermittently in one direction, said worktable having a plurality of dies arranged circumferentially about its center, each die comprising a sleeve, a plunger mounted within each of said dies, displacement means for raising and lowering each of said plungers respectively in successive stages coinciding with the movement of the worktable, a vertically sliding head passing through the center of said worktable, a hollow punch positioned at said forming station and secured to said sliding head to reciprocate therewith, each of said dies being sequentially positioned beneath the punch at the forming station, means for automatically supplying a sheet of heat sealing container material at the forming station, said punch co-operating with said die at the forming station to form a hollow container from said material, a hopper for the medium to be packaged, said hopper having a housing at its bottom leading to said hollow punch, a metering mechanism mounted in said housing and having a trap for receiving said medium from the hopper, actuating means operatively connected with said sliding head for discharging the contents of said trap in timed sequence, crimping members located at a crimping station, said crimping members having cammed side surfaces and terminating in a pair of opposed jaws, follower means on said sliding head for engaging said cammed surfaces for moving said jaws in an arcuate path for closing said jaws, heating elements positioned in said jaws for heat sealing said containers, and a rake member in proximity to the top of said table for ejecting the completed container therefrom at the discharge station.

4. In a packaging machine, a rotatable worktable adapted to move successively past a forming station, a crimping station, and a discharge station, one surface of said worktable being provided with a plurality of dies equally spaced circumferentially about the worktable center; a punch member positioned away from said worktable center at said forming station, said member being constrained to perform reciprocating motion in a plane perpendicular to said surface to an extent at which said member can be reciprocated to first extreme positions in which said member penetrates any die positioned at said forming station to a predetermined depth and to a second extreme position in which said member is fully withdrawn from said positioned die; a frame structure supporting said worktable and said member; and driving means for rotating said worktable intermittently to successively position each die in turn at said forming station, said driving means including feeder means for automatically placing a sheet of container material over each die when said each die is positioned at said forming station, said driving means further including means for reciprocating said member in a timed relation with respect to the intermittent worktable rotation at which said member attains said first extreme position and forces at least a portion of said sheet into said each positioned die to form a container therein and then is withdrawn from said container before this die is rotated away from said forming station whereby containers are successively formed in each of said dies; crimping means positioned at said crimping station above said worktable; means for elevating the formed container and positioning the same at said crimping station where said crimping means will crimp the upper portion of said container material; means for further elevating the formed and crimped container to the surface of said worktable at the discharge station; and means for removing said container at the discharge station.

5. A packaging machine as set forth in claim 4 wherein said punch member is hollow and is provided with a discharge opening at its lower end, said machine further including a hopper containing container filler; and a metering mechanism connected between said hopper and said hollow member and actuated when said hollow member is in said first extreme position to supply a predetermined quantity of said filler through said member to said formed container before said member is reciprocated from said one extreme position whereby said container is filled by the punch member.

6. A packaging machine as set forth in claim 5 wherein said crimping means includes two normally separated crimping members which are forced together to close the open end of the filled container when said filled container is positioned at the crimping station.

7. In a packaging machine, a rotatable worktable, one surface of said worktable being provided with a plurality of dies equally spaced circumferentially about the worktable center, each die being arranged to be moved to a forming station, a crimping station and a discharge station; a punch member positioned away from said worktable center, said punch member being constrained to perform reciprocating motion in a plane perpendicular to said surface to an extent at which said member can be reciprocated to a first extreme position in which said member penetrates any die positioned at said forming station to a predetermined depth and to a second extreme position in which said member is fully withdrawn from said positioned die; a frame supporting said worktable and said punch member; and driving means for rotating said worktable intermittently to successively position each die in turn at said forming station, means for automatically placing a sheet of container material over each die when said die is positioned at said forming station, means for reciprocating said punch member in a timed relation with respect to the intermittent worktable rotation at which said member attains said first extreme position and forces at least a portion of said sheet into said each positioned die to form a container therein and then is withdrawn from said container before this die is moved away from said forming station whereby containers are successively formed in each of said dies, means for elevating the formed containers and positioning the same at said crimping station; a crimping mechanism for crimping said elevated container at said crimping station; and means for moving said crimped container to said discharge station whereat the crimped container is discharged from said machine.

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