

March 4, 1930.

M. JAEGER

1,749,347

MULTIPLE HEAD SEALING MACHINE

Filed April 17, 1922

7 Sheets-Sheet 1

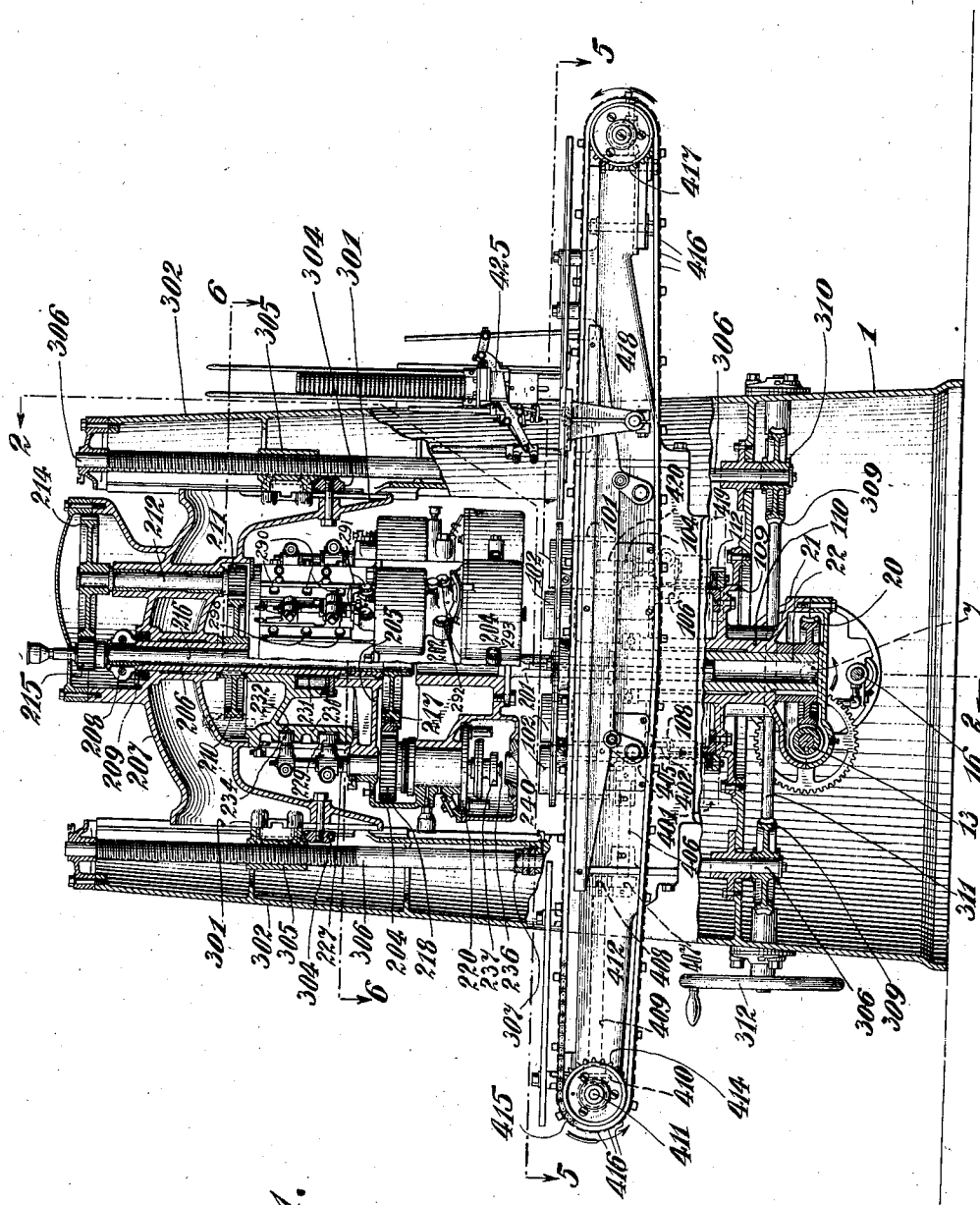


Fig. 1.

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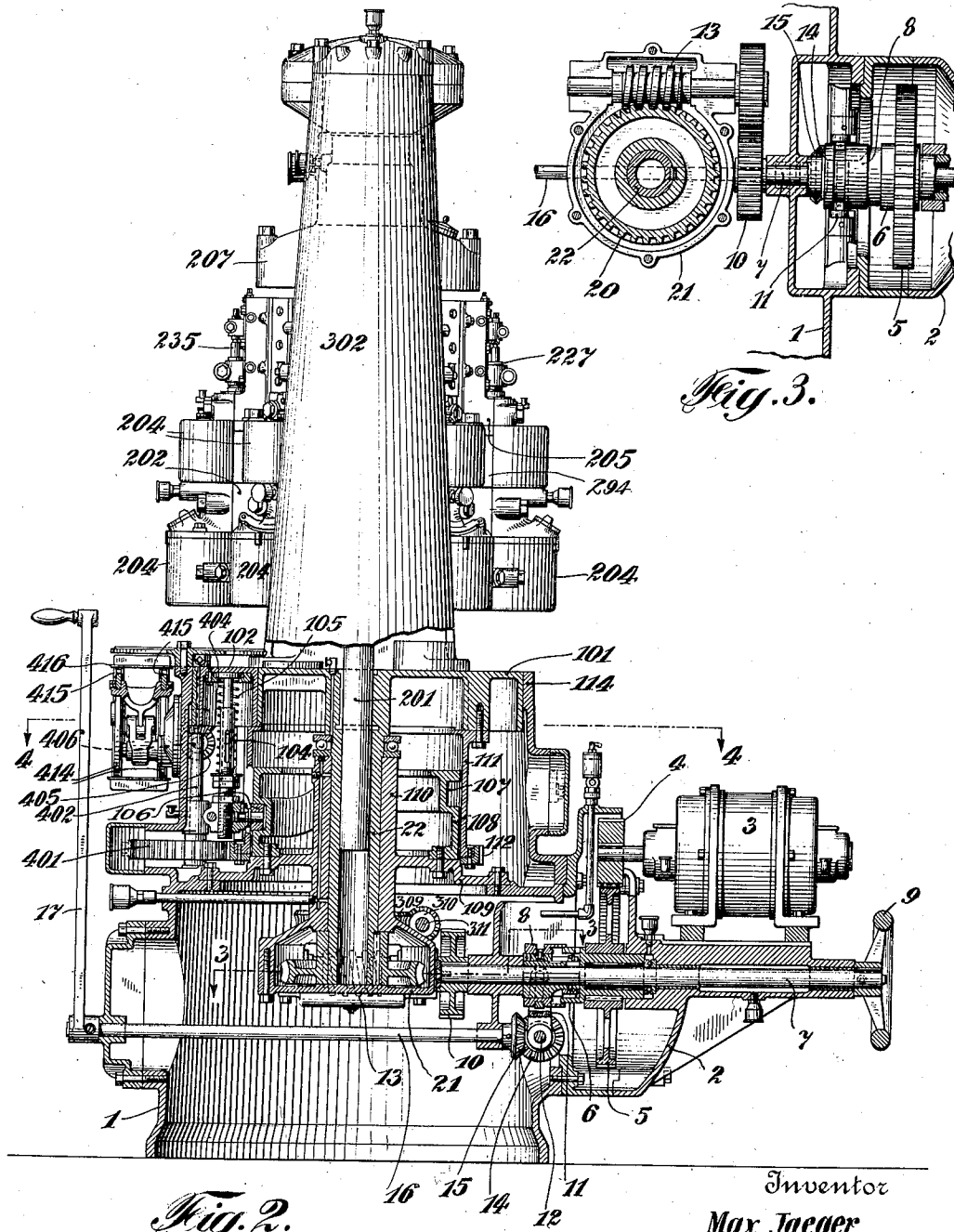


Fig. 2.

Fig. 3.

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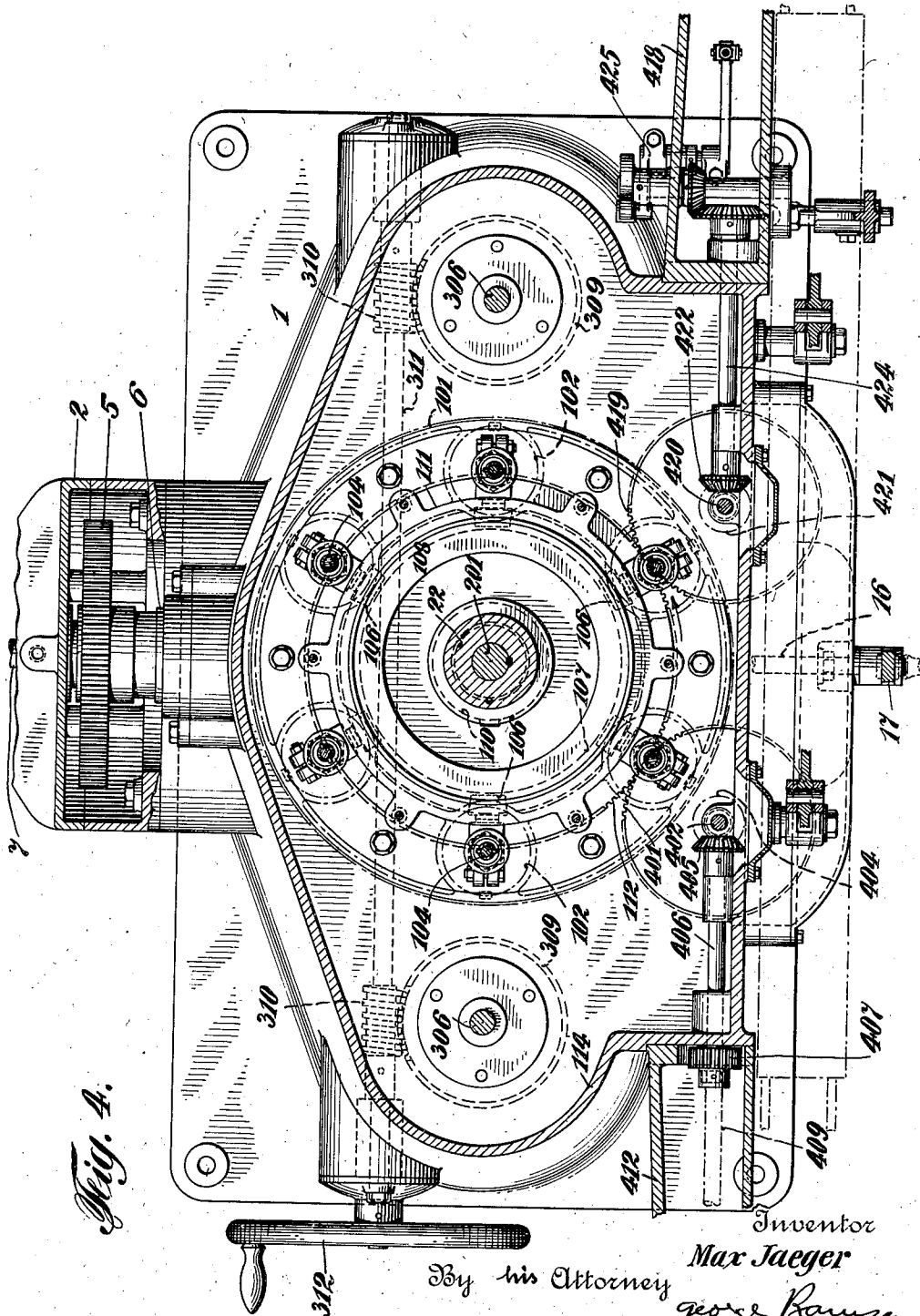
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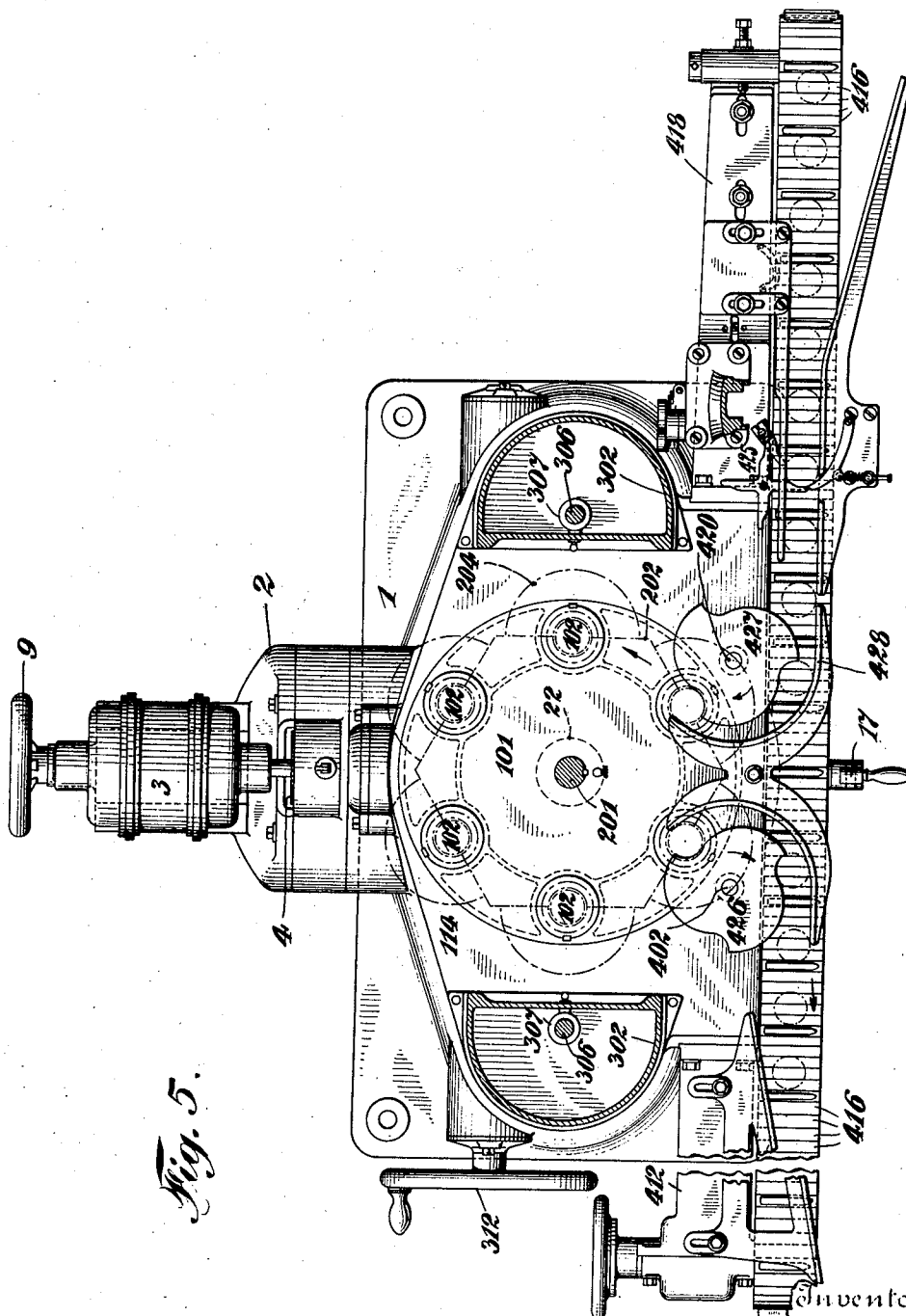


Fig. 5.

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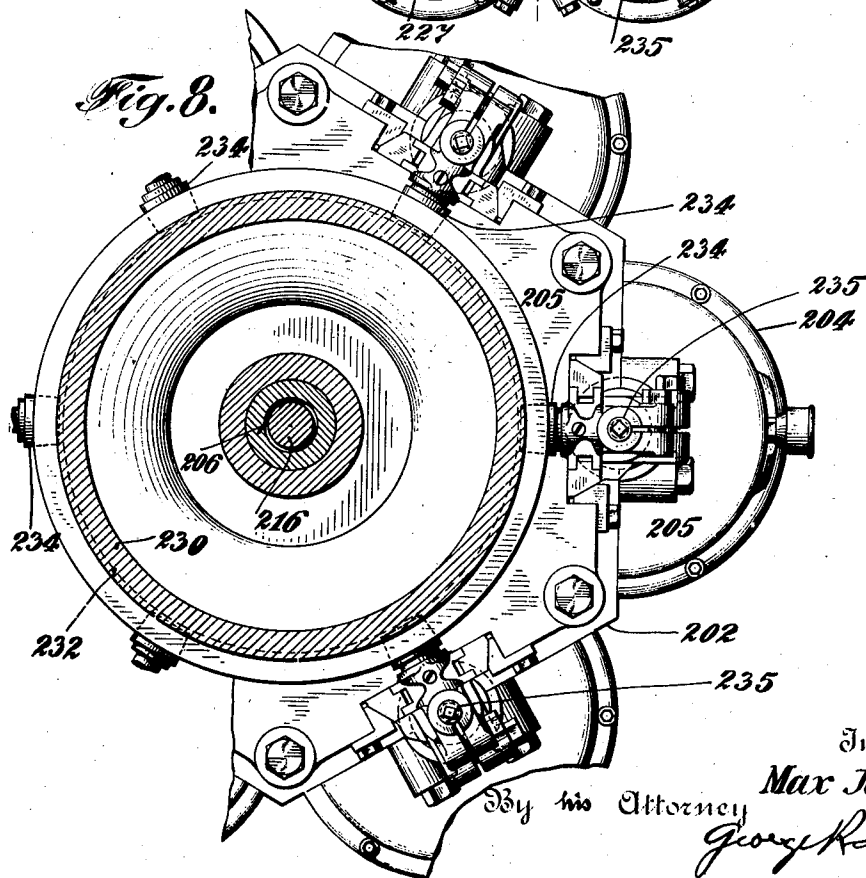
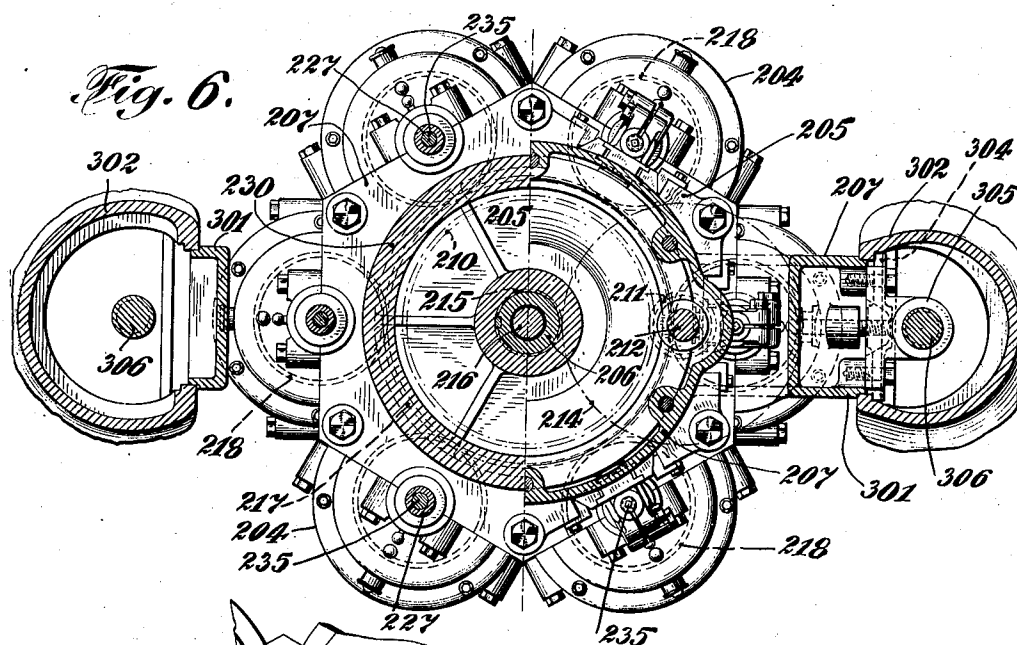
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MULTIPLE HEAD SEALING MACHINE

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7 Sheets-Sheet 5



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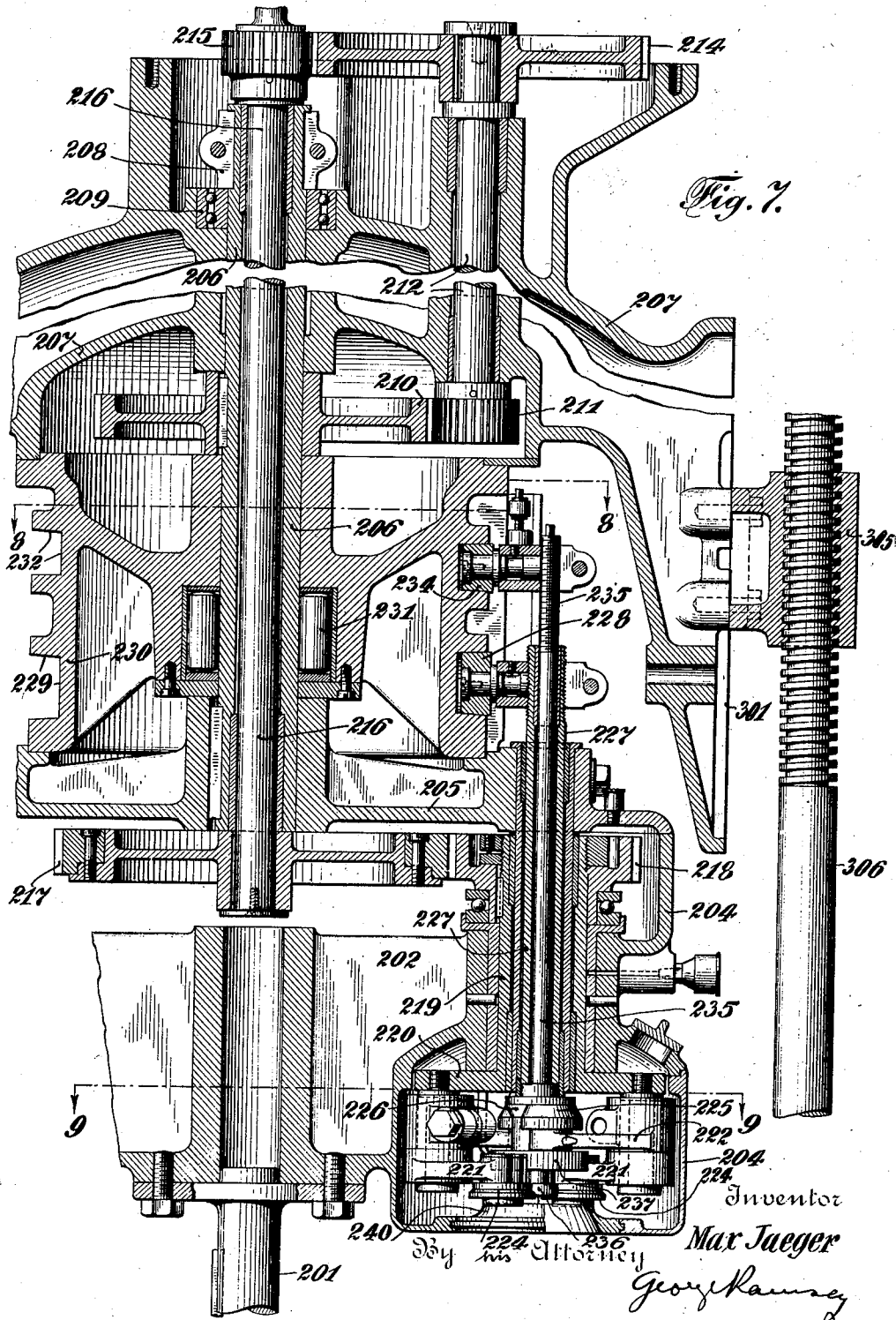
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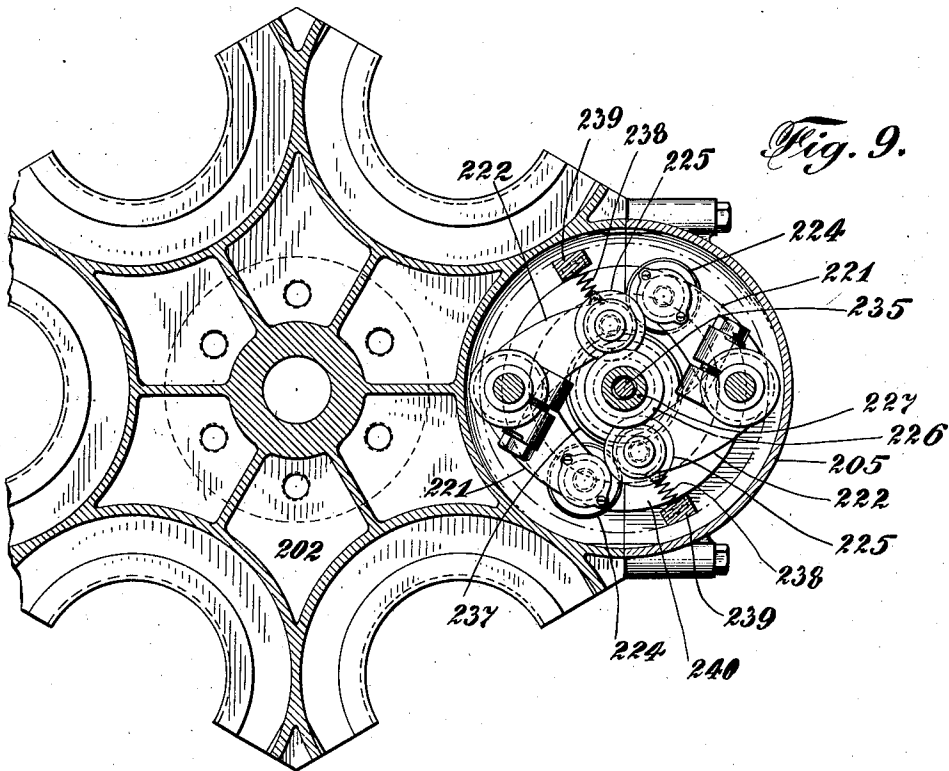


Fig. 9.

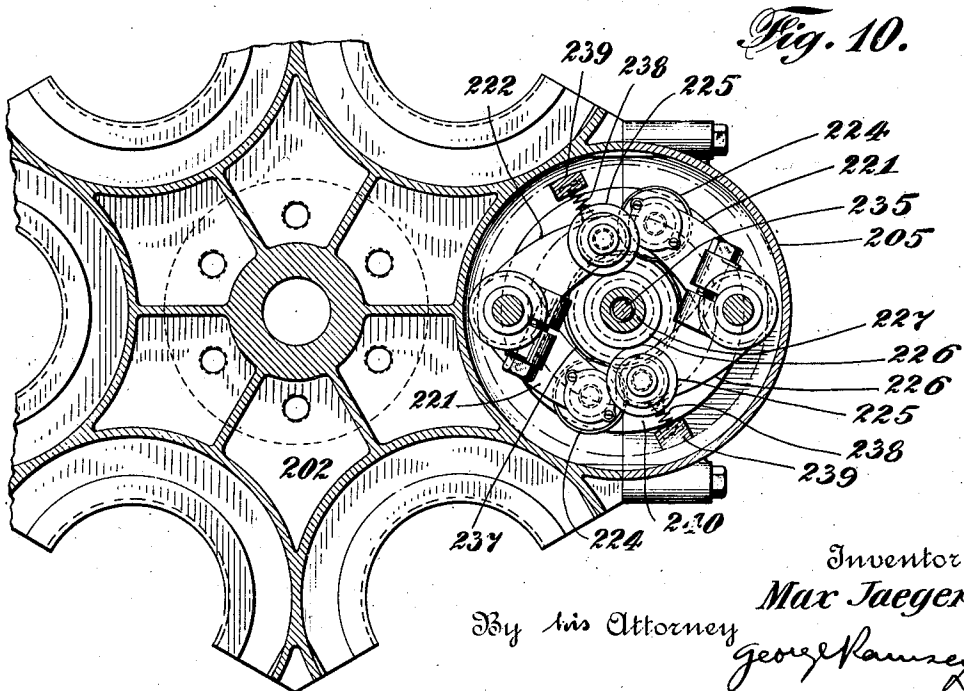


Fig. 10.

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UNITED STATES PATENT OFFICE

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MULTIPLE-HEAD SEALING MACHINE

Application filed April 17, 1922. Serial No. 553,899.

This invention relates to packaging and more specially to a machine for sealing caps on glass jars or the like.

Heretofore in the art of sealing caps upon glass jars and the like it has been customary to perform the sealing operation at a single station. The single station operation made it necessary that the package be conveyed to the station and stopped while the sealing operation was performed and then the package would be conveyed from the machine. This procedure is slow because a second sealing operation could not be begun until after the first sealing operation has been finished. It also necessitated an intermittent feed whereby the packages could be stopped and started. The time to make the seal was necessarily arranged to be as short as possible and therefore the parts were subjected to sudden and heavy pressures which frequently broke the containers.

The present invention overcomes the difficulty of the known art by providing an improved machine for forming seals on glass jars or the like wherein the sealing operation is performed while the package is traveling. In view of the fact that a number of sealing members are arranged to be successively operated it follows that a plurality of sealing operations may be occurring in different stages at the same time and without interrupting the progress of packages passing through the machine since the sealing operation occurs while the package is moving. Under these conditions a continuous train of packages may be conveyed through the machine without any stop or start motion so that the difficulties with slopping or spilling the contents of well filled containers is overcome. The continuous operation adapts itself for use with automatic cap applying devices which apply caps as the packages pass the cap applying station so that the whole apparatus is automatic and continuous in its operation after packages leave the filling machine.

One embodiment of the invention may be generally described as comprising a base frame carrying a continuously moving conveyor adapted to transfer packages to a trans-

fer mechanism which places the packages on a rotating platform provided with tables adapted to be raised and lowered. A plurality of sealing heads are mounted directly over the platform, one over each table and are constructed to rotate in unity with the platform so that when packages are placed upon the tables and the tables are raised the sealing heads become effective to seal the packages during one revolution of the platform and the multiple sealing head frame. A suitable take-off mechanism is provided adjacent that portion of the platform where the sealing operation is completed so that the sealed packages are re-transferred to the conveyor mechanism whereby packages may be delivered from the machine for final packing and shipping. A suitable cap applying mechanism is arranged adjacent the conveyor and automatically applies the caps as the packages are fed in the machine. To facilitate a combination for various heights of packages the sealing head is adapted to be raised and lowered in its entirety so as to be effective at predetermined heights within control of the operator.

Having generally described the invention the principal object thereof is a package sealing machine for sealing caps on glass jars or the like wherein the sealing operation occurs during the continuous movement of the package through the machine.

Another object of the present invention is a machine of the character specified and wherein the sealing operation is performed by a plurality of spinning heads adapted to clamp packages upon a suitable package table whereby the packages are prevented from rotating during the spinning operation while the packages are being carried around a circular path.

Another object of the invention is a machine of the class described wherein the sealing mechanism is mounted upon an arched frame between a pair of vertical pillars which are provided with simultaneously operative raising devices to permit the sealing mechanism to be raised and lowered as desired.

Another object of the present invention is a machine of the class described wherein the

sealing operation is performed by spinning members which are rotated by a shaft which carries the frame in which the spinning members are mounted.

5 A still further object of the present invention is a machine of the character described, with a stationary cam in the base of the machine for raising package tables as the platform rotates and stationary cam in the top of
10 the machine for lowering clamping devices whereby caps are automatically clamped on packages prior to and during the spinning operation.

Other and further objects of the present invention will in part be obvious and will in part be pointed out hereinafter in the specification following wherein like parts are designated by like characters throughout the several figures thereof.

20 Realizing that the present invention may be embodied in constructions other than those specifically shown and described it is desired that the description herewith shall be considered as illustrative and not in the
25 limiting sense.

Figure 1 is an elevational view showing parts of the machine in section;

Figure 2 is also an elevational view taken on section line 2—2 of Figure 1;

30 Figure 3 is a detail plan view of the driving gears taken on section line 3—3 of Figure 2.

Figure 4 is a plan view of the machine taken on section line 4—4 of Figure 2;

35 Figure 5 is a plan view taken on section line 5—5 of Figure 1;

Figure 6 is a plan view through the spinning heads taken on section line 6—6 of Figure 1;

40 Figure 7 is an enlarged vertical sectional view of one spinning head and connected parts;

Figure 8 is a plan view taken on section line 8—8 of Figure 7;

45 Figure 9 is also a plan view taken on section line 9—9 of Figure 7, and shows the spinning rolls before the spinning operation has begun;

50 Figure 10 is a view similar to Figure 9 and shows the position of the spinning rolls when the spinning operation has been completed;

Main drive

Referring now to the drawings and more
55 specially to Figures 1, 2, and 3 thereof, the base frame 1 carries a motor frame 2 upon which is mounted a motor 3 that carries a drive gear 4 to which is connected a gear 5 that carries a positive clutch member 6 and
60 is mounted to rotate upon a main shaft 7. A movable corresponding clutch member 8 is keyed to the main drive shaft 7 which shaft is mounted in the motor frame 2 and is provided on one end with a hand wheel 9 and on the
65 other end with a gear wheel 10. The movable

member 8 of the clutch is in engagement with the lever arm 11 on a shaft 12, which carries a bevel gear 14 which meshes with the control shaft bevel gear 15 on the control shaft 16 which is provided with operating handle 17, so that the operation of the handle will throw
70 the movable clutch member into and out of engagement with the clutch device attached to the driving gear 5. The gear wheel 10 (Fig. 3) drives a stud shaft which carries a
75 worm 13 and engages the main drive worm wheel 20. This main drive worm wheel is enclosed in casing 21 and is mounted on the lower end of a tubular main shaft 22.

Table platform

Referring now more specially to Figures 1, 2, 3, 4, and 5, the tubular main shaft 22 carries a table platform 101 which is provided with pockets in which are mounted vertically movable tables 102 that are in the form
85 of pistons that fit in the pockets. These tables each carry a telescoping rod 104 which is normally maintained in extended position by coil spring 105. The lower end of this rod
90 104 is adjustably connected with the cam roll 106 which is adapted to follow the cam groove 107 in the stationary cam 108 which is fixedly secured on the bearing plate 109 that carries the bearing 110 for the tubular main
95 shaft 22. The table platform 101 carries a depending sleeve 111 on which is mounted a large annular gear 112 which drives the package conveyor mechanism, as will later be explained. A platform cover casing 114
100 is mounted upon the base frame 1 and encloses the table platform mechanism. In the embodiment shown in the drawings there are six of the vertically moving table members and cooperative mechanism for the operating
105 of the same, however, there may be any convenient number of such units.

Spinning head frame

The spinning head frame is illustrated
110 more specially in Figures 1, 2, and 7 and comprises a sliding main shaft 201 which is keyed to the tubular main shaft 22 in order to be driven thereby and is adapted for vertical movement therein, as will later be explained.
115 The spinning head frame 202 (Figs. 9 and 10) is secured to the upper end of the sliding main shaft 201 so that the spinning head frame rotates consonantly with the table platform 101. The spinning head frame carries
120 a plurality of cover frames 204 which enclose the spinning mechanism and which connect the spinning head frame 202 with a cover plate 205 so that the cover plate and head frame rotate as a unit. The cover plate 205
125 is keyed to an upper tubular main shaft 206 which is supported in an arch frame 207 by means of a collar 208 which rests on a ball bearing 209. The upper tubular main shaft carries a driving gear 210 which meshes with
130

a countershaft pinion 211 mounted on a countershaft 212 which rotates in bearings in the stationary arch frame 207. This countershaft carries on its upper end a driving gear 214 which engages a pinion 215 on a central shaft 216 that is mounted to rotate within the upper tubular main shaft 206. This central shaft 216 carries a driving gear 217 that engages spinning head gears 218 of each spinning head. Each spinning head gear 218 is secured to a tubular spinning head shaft 219 which carries a flange 220 on which the arms for the spinning rollers are mounted. These arms (see Figs. 7, 9, and 10) are formed in two pieces, 221 and 222, with the arms 221 carrying spinning rollers 224 and the arms 222 carrying cam rollers 225 which engage a control cam 226 mounted on a hollow control rod 227 which is adjustably connected with a roller 228 that is adapted to follow a lower groove 229 in a stationary cam 230. This cam 230 is fixedly secured to the arch frame 207 and consequently is held against rotation while the spinning head frame rotates around and beneath the cam. A roller bearing 231 for the upper main shaft 206 is mounted in the cam 230. The cam 230 is also provided with an upper groove 232 in which rollers 234 travel, and each roller 234 is adjustably connected to a pressure rod 235 which extends through the tube 227 and carries on the lower end thereof a head 236 (Fig. 1) that is adapted to rest on a cap and to place sufficient pressure on said cap to slightly displace a corresponding coil spring 104 in the corresponding package table and thus clamp a capped package on the table. The tubular member 227 carries an anvil 237 (Fig. 1) which is adapted to rest on the head of the cap during the spinning operation. The stationary cam 230 therefore performs the function of causing each tubular member 227 and also each pressure member 235, to have a vertical movement while the spinning head is rotating around the axis of the main shafts. This vertical movement of the tubular member 235 causes the control cam 226 to swing the roller arms in such manner as to compress the coil springs 238 (Figs. 9 and 10) which are supported on the posts 239, and to bring the spinning rollers 224 inwardly in a gradual movement to spin the head of the cap against the side wall of a suitable glass container. Prior to the beginning of the spinning operation the head 236 is brought into engagement with the cap and the package is tightly clamped between the head and the table, as stated in order to hold the cap in place and to prevent rotation of the package during the spinning operation. After the spinning operation is completed the package table 102 is lowered and the head 236 is raised so that the package is free to be removed from the table. As the package is raised into the zone of the spinning head it is guided by

the removable funnel 240 (Figs. 1 and 7) so that it is properly positioned relatively to the anvil 237. The funnels 240 and also the spinning heads may be changed by merely removing the cover frames 204 so that the size of the cap accommodated may be determined at will.

The metal work inclosing each spinning head is split as indicated by line 294 in Fig. 2; and thus by removing cap screws 290, 291, 292 and 293 each spinning head may be removed as a unit including the spinning rolls, the spinning anvil, cam rollers 228 and 234 and gear 218.

Arch frame

The arch frame illustrated more specially in Figures 1 and 7 comprises the arch frame member 207 which is provided on each side with a guide member 301 which slides on the guide faces on the twin vertical posts 302 that are carried by the base frame 1. The guide members 301 are provided with shoes 304 which may be operated to clamp the guide members 301 against the twin vertical posts when desired. These guide members 301 are also provided with threaded sleeves 305 which are mounted on vertical shafts 306, one of which is arranged in each of the twin posts. These vertical shafts are supported vertically by collars 307 (Fig. 1) and are connected with worm wheels 309 that are driven by worms 310 mounted on the operating shaft 311 which is journaled in the base frame 1 and is provided with a hand wheel 312, so that by unloosening the shoes 304 and operating the hand wheel 312 the arch frame 207 and all of the spinning mechanism is raised and lowered. The sliding main shaft 201 telescopes in the tubular main shaft 22 and maintains a driving connection while the raising and lowering operation takes place so that the machine may be adjusted to accommodate different height jars without stopping the operation thereof.

Package supply mechanism

The package supply mechanism will be described in general terms in connection with the combination of other features of the machine in view of the fact that the package mechanism is claimed specifically in my co-pending application, Serial No. 375,240, filed Apr. 20, 1920.

Referring to Figures 1, 2, 4, and 5 the large annular gear 112 engages the driven gear 401 (Figure 4), which is mounted on the vertical shaft 402 that carries on its upper end a bevel gear 404 in mesh with a corresponding bevel gear 405 on a horizontal stub shaft 406. This stub shaft 406 is provided with a pinion 407 that engages a corresponding pinion 408 on the drive shaft 409 that carries on its outer end a bevel gear 410 which drives the conveyor shaft 411 at the outer end of the con-

veyor frame 412 which is carried by the main base frame 1. This conveyor shaft carries a pair of sprocket wheels 414 upon which is mounted the sprocket chains 415 that carry the conveyor plates 416. These sprocket chains 415 extend lengthwise of the machine around a companion pair of idler sprocket wheels 417 adjustably mounted on the end of the conveyor frame 418 which is also carried by the main base frame 1. From the connected parts it will be clear that when the annular gear 112 is rotated counter-clockwise the sprocket wheel 414 will be turned in the direction of the arrows shown in Figure 1.

The annular gear 112 also meshes with a driven gear 419 (Figure 4). This driven gear is connected with the vertical shaft 420 that carries on its upper end a bevel gear 421 which meshes with a corresponding bevel gear 422 on a short horizontal shaft 424 and this shaft drives the cap feeding mechanism which is generally indicated at 425 in Figure 1. The vertical shafts 402 and 420 carry on their upper ends, package spacers 426 and 427 respectively. These members cooperate with the package guides 428 as transfer members to take packages from the conveyor and position the same upon the package tables and also remove sealed packages from the table and reposition the same on the conveyor to be removed from the machine.

From the foregoing specific description it will appear that the present machine is adapted to rapidly and economically form seals on caps of glass containers while the packages are in continuous movement.

Having thus described my invention, what I claim is:

1. In a machine of the class described, a frame, a platform rotatably mounted in the frame, tables on the platform, a spinning head comprising spinning mechanism over each table, means to rotate the platform, and means driven by the platform to rotate the spinning mechanism and to maintain each spinning head directly over a predetermined table, said means comprising a sliding connection whereby the distance between said platform and the spinning mechanism may be increased or diminished.

2. In a machine of the class described, a frame, a platform rotatably mounted in the frame, tables on the platform, a spinning head comprising spinning mechanism over each table, means to rotate the platform, means driven by the platform to rotate the spinning mechanism at a substantially greater speed than that of the container and to maintain each spinning head directly over a predetermined table, said means comprising a sliding connection whereby the distance between said platform and the spinning mechanism may be increased or diminished,

and devices to increase or diminish said distance.

3. In a machine of the class described, a frame, a platform rotatably mounted in the frame, tables on the platform, a spinning head comprising spinning mechanism over each table, means to rotate the platform, a cam to raise and lower the tables as the platform rotates, means driven by the platform to rotate the spinning heads and to drive the spinning mechanism and to maintain each spinning head directly over a predetermined table, said means comprising a sliding connection whereby the distance between said platform and the spinning mechanism may be increased or diminished.

4. In a machine of the class described in combination a table platform, a plurality of tables mounted upon the platform, a stationary cam for raising said tables, a spinning head frame mounted over said platform, spinning heads carried by said frame, a stationary spinning head cam adapted to control the operation of the spinning heads, means to drive said platform and said frame at the same speed, and gearing driven by said frame to operate the spinning heads.

5. In a machine of the class described in combination a rotating table platform a plurality of vertically movable tables mounted upon the platform, a stationary cam beneath said platform for raising and lowering said tables, a rotatable spinning head frame mounted over said platform, spinning heads carried by said frame, a stationary spinning head cam adapted to control the operation of the spinning heads, means to drive said platform and said frame at the same speed, and gearing driven by said frame to operate the spinning heads.

6. In a machine of the class described in combination a rotating table platform, a plurality of vertically movable tables mounted upon the platform, a stationary cam beneath said platform for raising and lowering said tables, a rotatable spinning head frame mounted over said platform, spinning heads carried by said frame, an arch for carrying said frame, a stationary spinning head cam adapted to control the operation of the spinning heads, means to raise and lower said arch, means to drive said platform and said frame at the same speed, and gearing driven by said frame to operate the spinning heads.

7. In a machine of the class described the combination of a rotating package support, a spinning head frame above said support, a plurality of spinning heads carried by said frame, means to rotate said frame, and driving means for said spinning heads comprising a shaft attached to and driven by the spinning head frame.

8. In a machine of the class described the combination of a rotating package support, a sealing head frame above said support, a

plurality of sealing heads carried by said frame, means to rotate said frame, driving means for said sealing heads comprising a shaft attached to and driven by the head frame.

9. In a machine of the class described the combination of a rotating package support, a sealing head frame above said support, a plurality of sealing heads carried by said frame, means to rotate said frame, driving means for said sealing heads comprising a shaft attached to and driven by the head frame, and means to change the distance between the sealing heads and the support while the machine is in operation.

10. In a machine of the class described the combination of a rotating package support, a spinning head frame above said support, a plurality of spinning heads carried by said frame, means comprising a shaft attached to the support to rotate said frame, and driving means for said spinning heads comprising a shaft attached to and driven by the frame.

11. In a machine of the class described, a vertical main platform shaft, a platform connected to said shaft, a spinning head frame, spinning heads upon said frame, sliding driving connections between the main platform shaft and the spinning head frame whereby the platform and the spinning head both revolve at the same speed, and gearing driven by the said frame to rotate the spinning heads.

12. In a machine of the class described, a vertical main platform shaft, a platform connected to said shaft, a spinning head frame, spinning heads upon said frame, sliding driving connections between the main platform shaft and the spinning head frame whereby the platform and the spinning head both revolve at the same speed, and gearing driven by the said frame to rotate the spinning heads, and means to raise and lower said spinning head frame while the machine is in operation.

13. In a machine of the class described, a base frame, a pair of screws extending vertically from said base frame, sealing mechanism comprising a plurality of sealing heads rotatable about a common axis supported mediately by said screws, a countershaft in said base frame and geared to said screws to rotate them simultaneously to elevate said sealing mechanism, driving means in said base frame, and means to actuate said sealing mechanism, said actuating means comprising a telescopic connection to said driving means whereby said sealing mechanism may be elevated without disturbing the operative connection thereto.

14. In a machine of the class described, a base frame, a rotating platform carried by the base frame, a spinning frame rotatably mounted above the platform, spinning heads carried by said spinning frame, means driven

by the platform to effect rotation of the spinning frame and a simultaneous and continuous rotation of the spinning heads and a slidable connection between said means and said platform to permit vertical movement between said frame and said platform.

15. In a machine of the class described, a rotating spinning frame, a plurality of spinning heads carried by said spinning frame, and means to rotate the spinning heads, said means comprising a shaft movable in a vertical direction and arranged to rotate synchronously with the spinning frame.

16. In a machine of the class described, a plurality of hollow vertical pillars, vertical guide ways in the inner sides of said pillars, a frame supporting spinning mechanism, said frame cooperating with said guide ways, threaded sleeves associated with said frame and mounted on the shafts within said pillars, threaded vertical shafts in said pillars cooperating with said sleeves to provide means for raising and lowering said sealing mechanism; and means to clamp said frame to said pillars to maintain it in a desired vertical position.

17. In a machine of the class described, a base frame, a plurality of hollow pillars extending vertically from said base frame, guide ways on said pillars, a frame carrying spinning mechanism, said spinning mechanism frame cooperating with said guide ways, threaded sleeves associated with said spinning mechanism frame, threaded vertical shafts mounted within said hollow pillars, said shafts cooperating with said threaded sleeves, bearings for each end of said vertical shafts, and means to rotate said vertical shafts to raise and lower the spinning mechanism.

18. In a machine of the class described, a base frame, a rotating platform carried by the base frame, a plurality of tables stationary with respect to said platform, but movable in a vertical direction, a spinning frame rotatably mounted above the platform, spinning heads suspended by said spinning frame and means driven by the platform to effect rotation of the spinning frame and continuous rotation of the suspended spinning heads.

19. In a machine of the class described, the combination of a platform, a plurality of tables on said platform adapted to support containers and to resist rotation thereof, a rotating spinning frame, a plurality of spinning heads carried by said spinning frame, and means to rotate the spinning heads to spin a metal cap on a receptacle, said means comprising a shaft movable in a vertical direction and arranged to rotate synchronously with the spinning frame.

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