

July 8, 1958

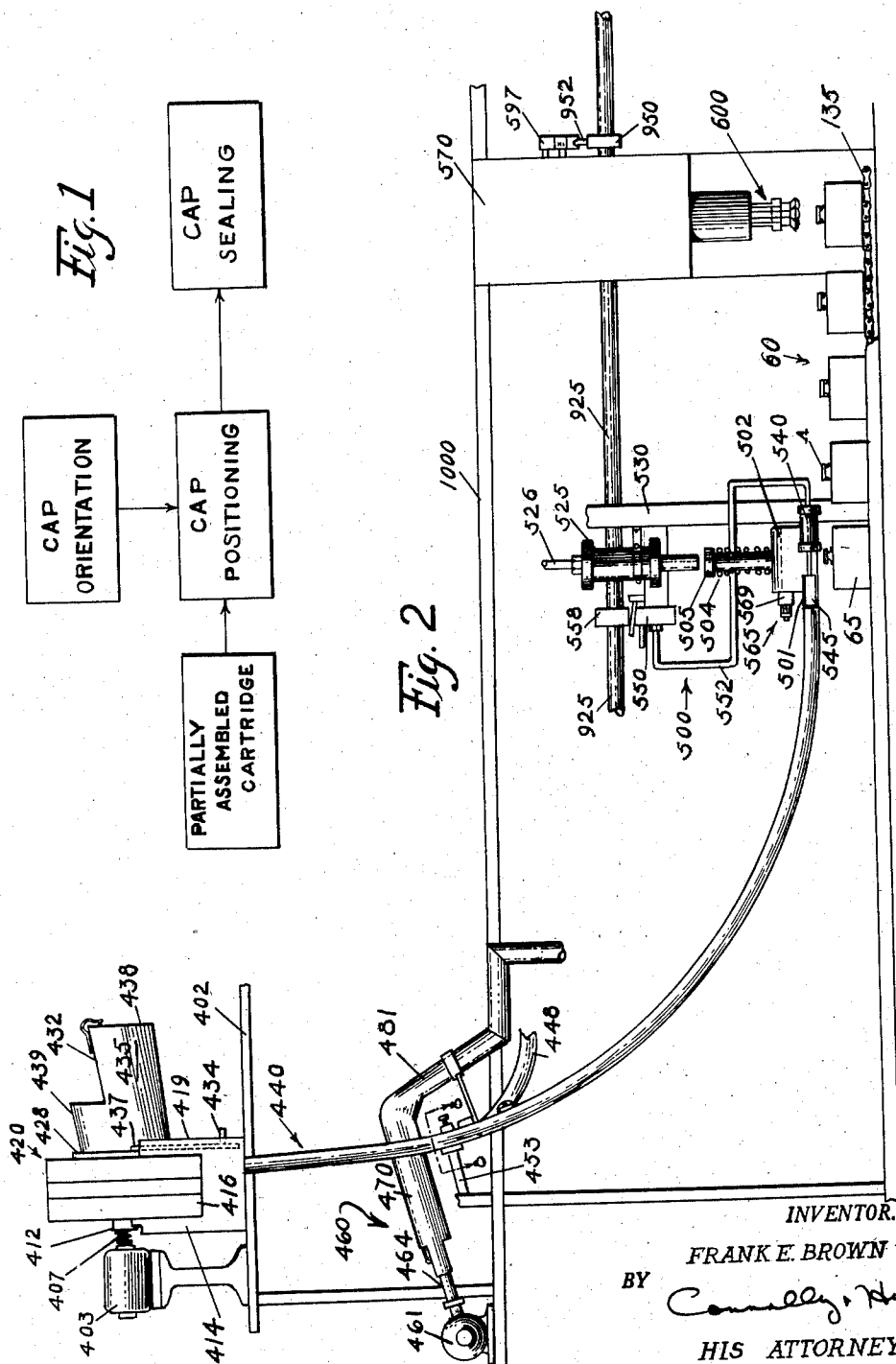
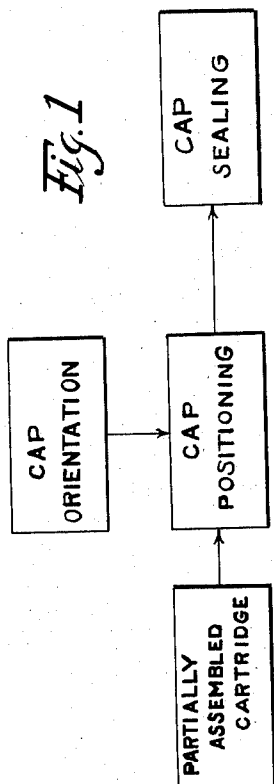
F. E. BROWN

2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 1



July 8, 1958

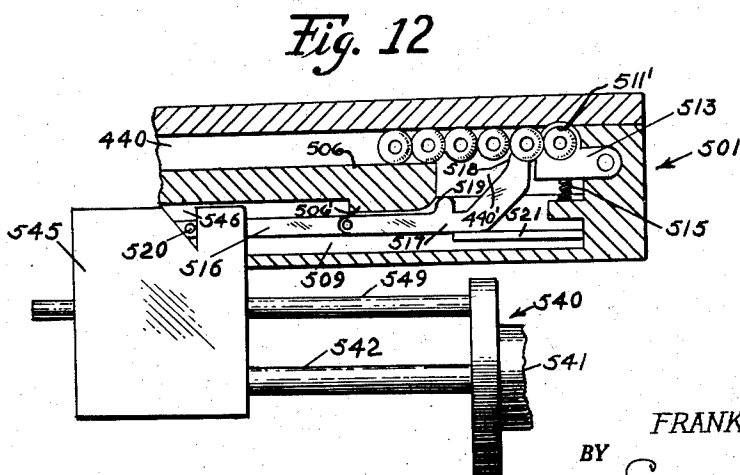
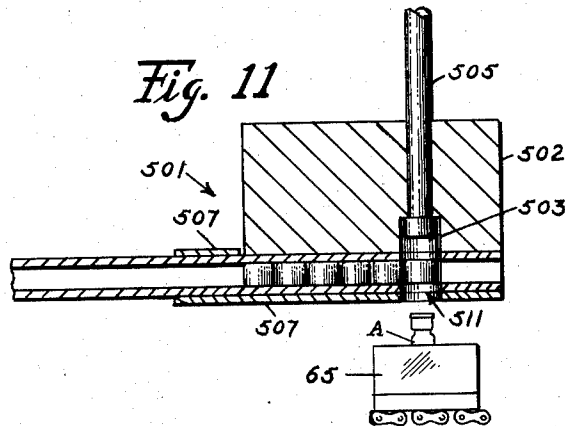
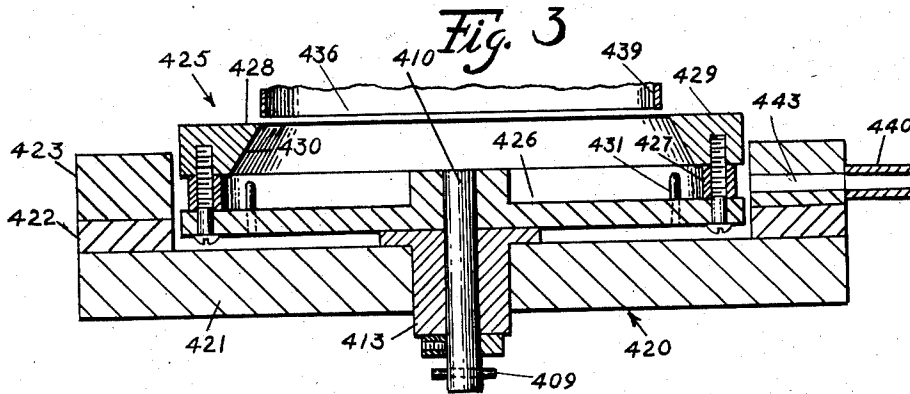
F. E. BROWN

2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 2



INVENTOR.
FRANK E. BROWN
BY *Connelley & Hutz*
HIS ATTORNEYS

July 8, 1958

F. E. BROWN

2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 3

Fig. 5

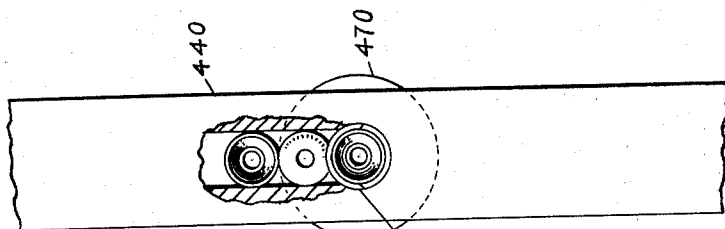


Fig. 6

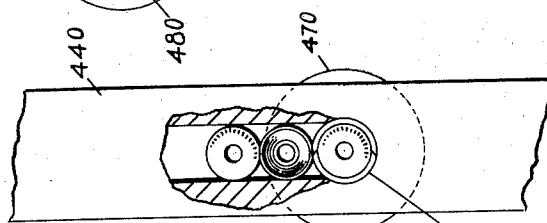


Fig. 4

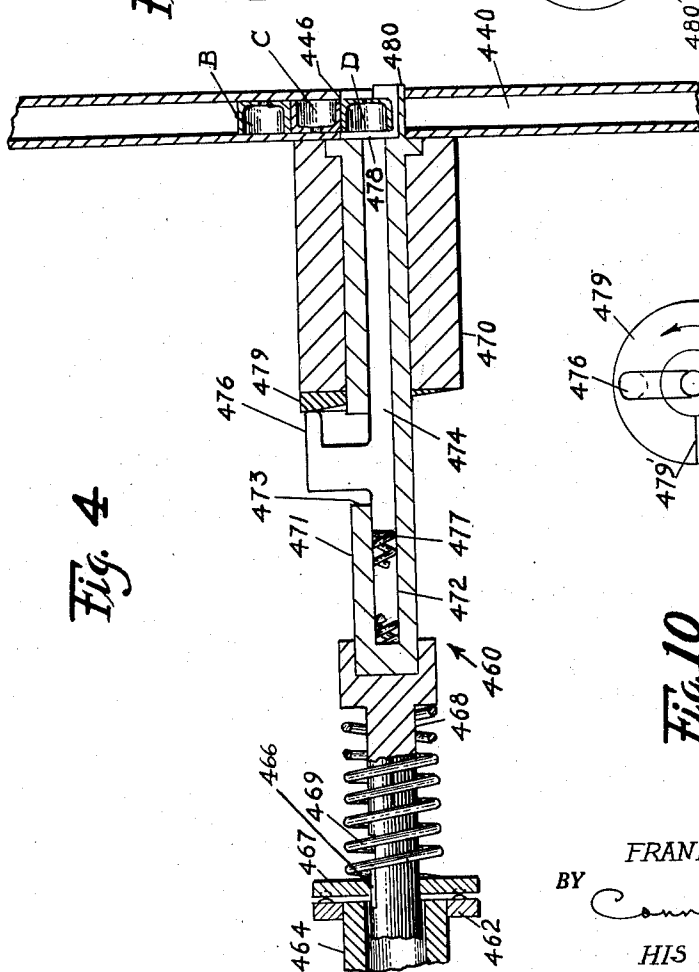
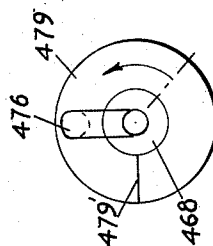


Fig. 10



INVENTOR.
FRANK E. BROWN
BY *Connelley & Hutz*
HIS ATTORNEYS

July 8, 1958

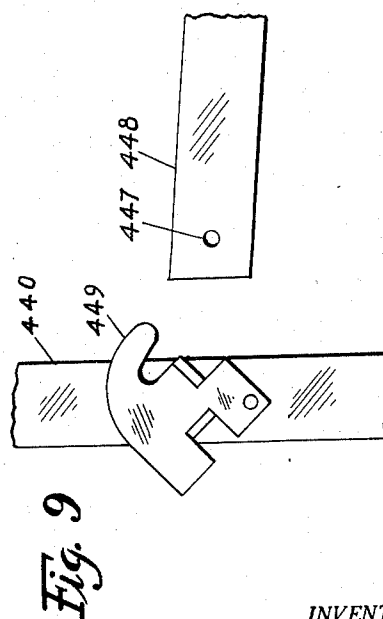
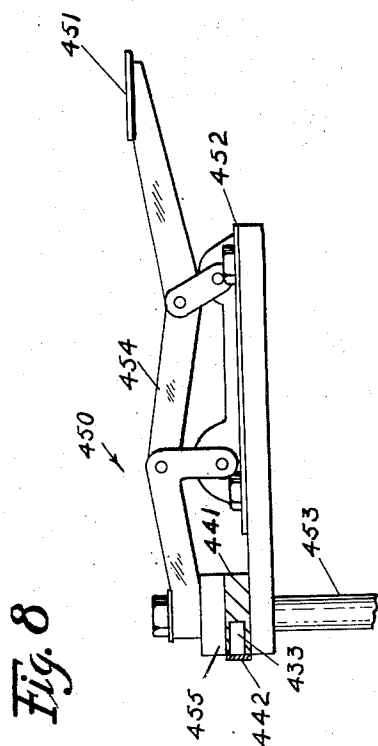
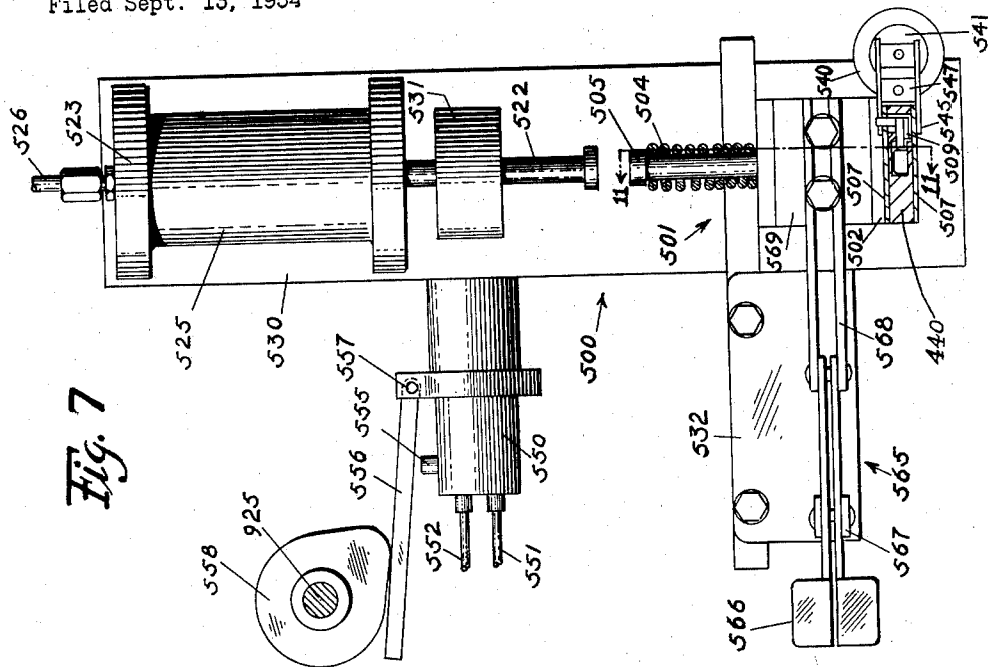
F. E. BROWN

2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 4



INVENTOR.
FRANK E. BROWN
BY *Connelly & Huty*
HIS ATTORNEYS

July 8, 1958

F. E. BROWN

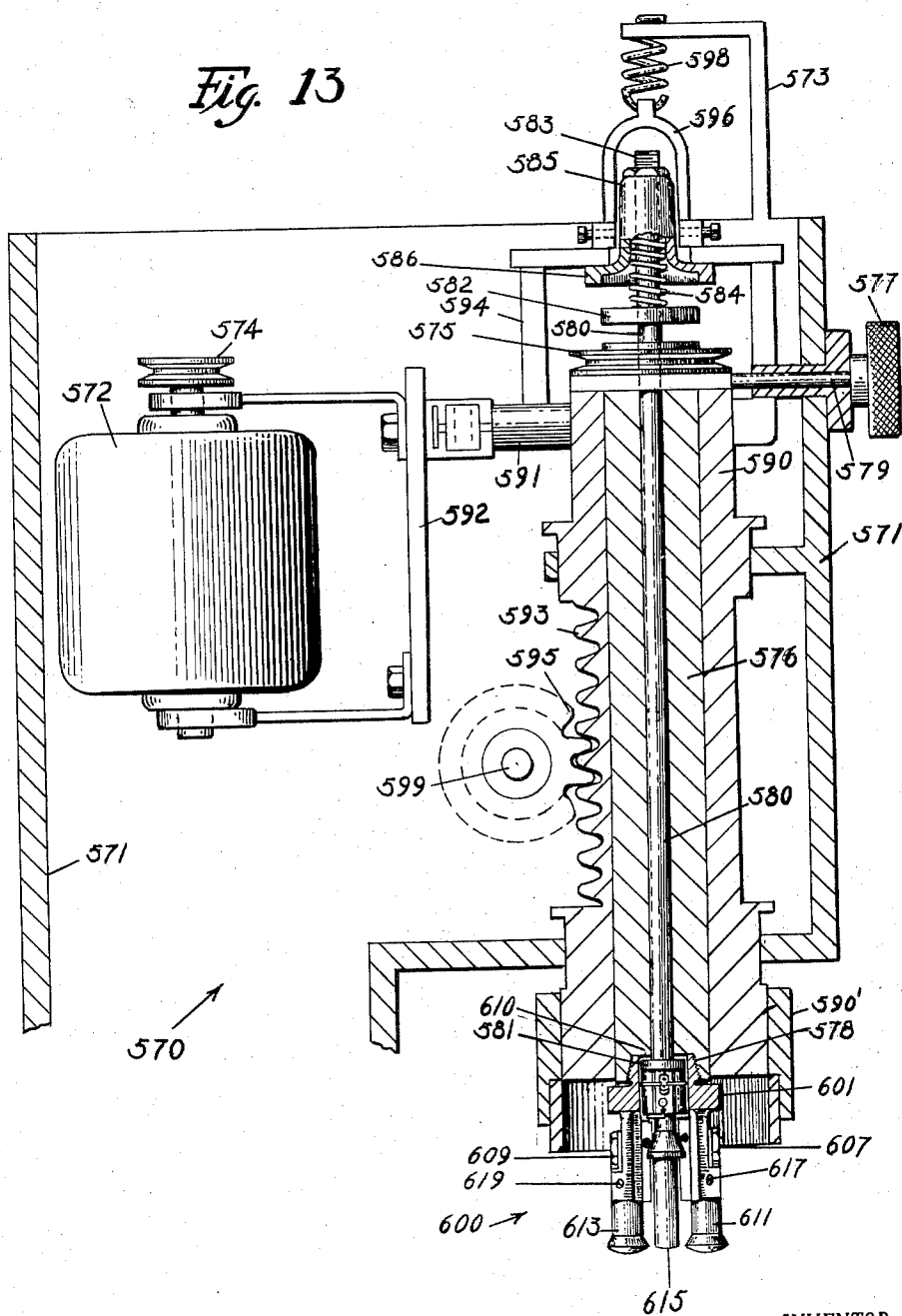
2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 5

Fig. 13



INVENTOR.

FRANK E. BROWN

BY

Connally & Hutch
HIS ATTORNEYS

July 8, 1958

F. E. BROWN

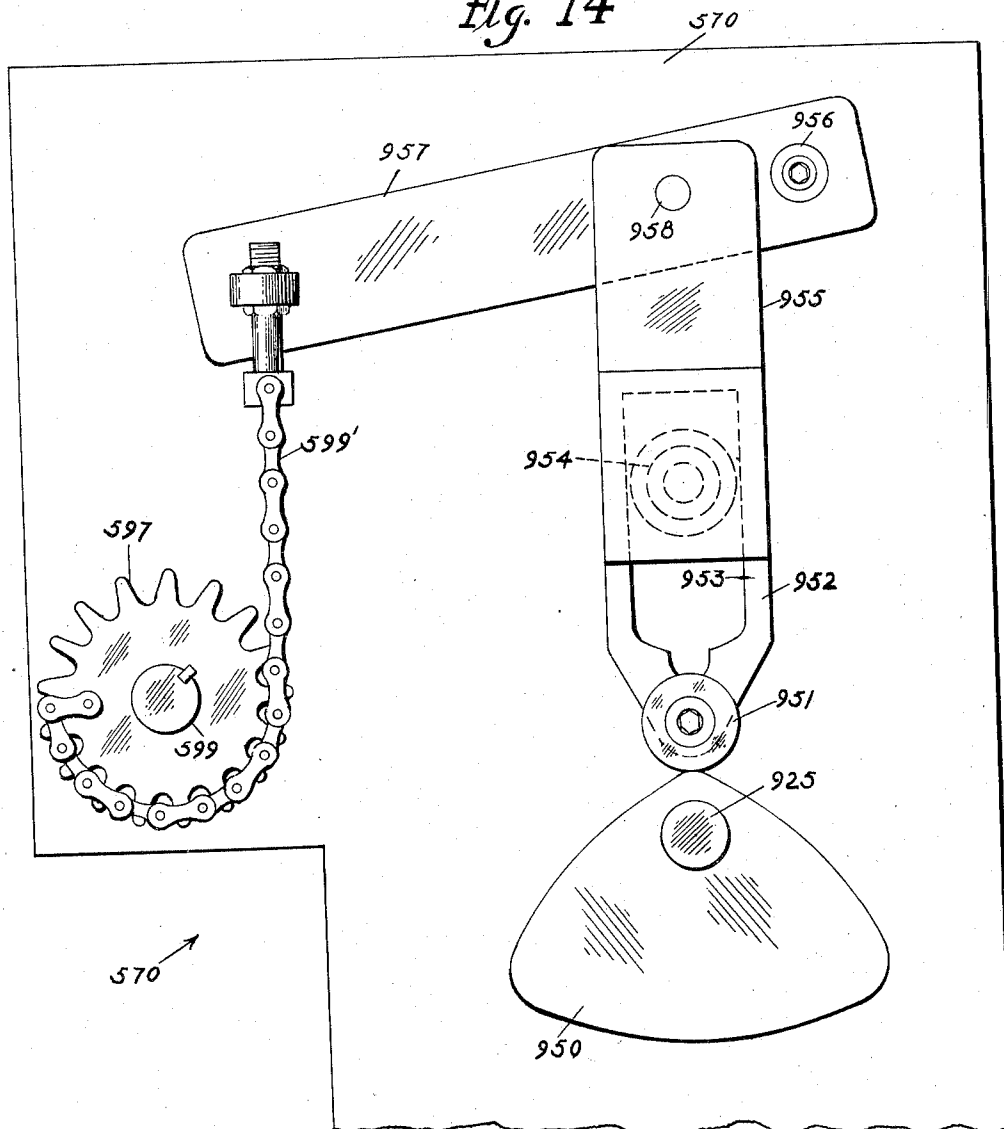
2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 6

Fig. 14



INVENTOR.

FRANK E. BROWN

BY

Connolly & Hunt
HIS ATTORNEYS

July 8, 1958

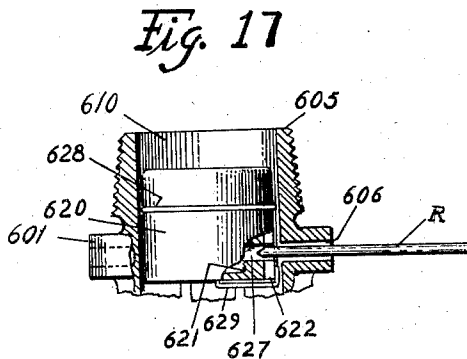
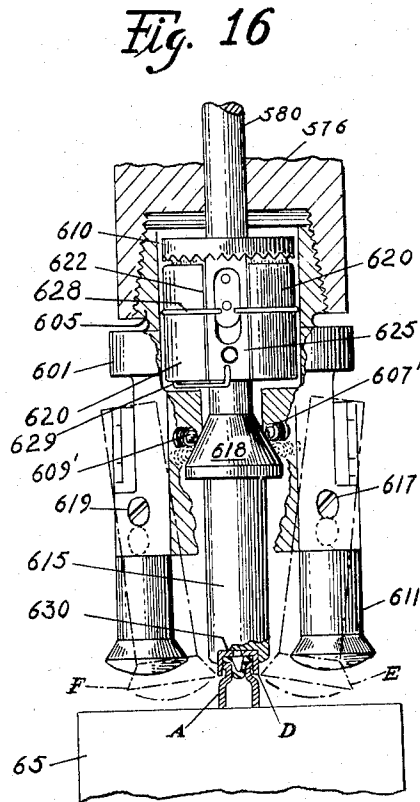
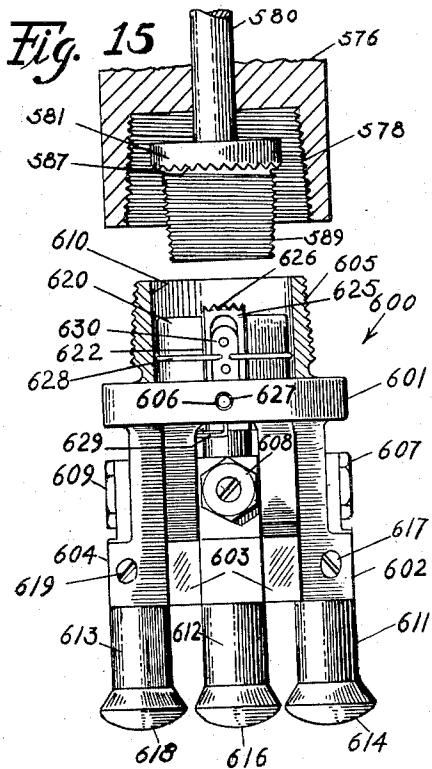
F. E. BROWN

2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 7



INVENTOR.
FRANK E. BROWN
BY *Connelly, Hutz*
HIS ATTORNEYS

July 8, 1958

F. E. BROWN

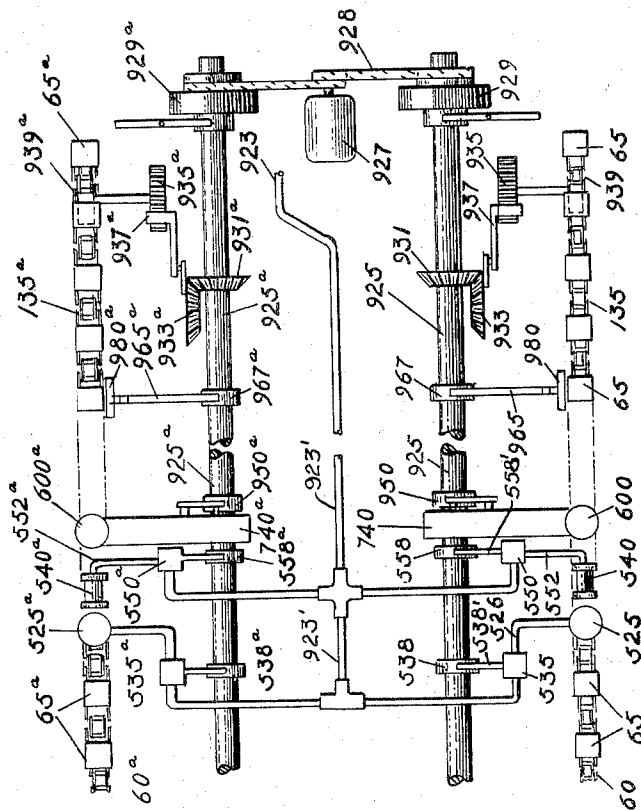
2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Filed Sept. 13, 1954

8 Sheets-Sheet 8

Fig. 18



INVENTOR.

FRANK E. BROWN

BY

Counally, Butz

HIS ATTORNEYS

2,841,940

MACHINE FOR APPLYING END CLOSURES TO HYPODERMIC SYRINGES

Frank E. Brown, Burbank, Calif., assignor to Chas. Pfizer & Co., Inc., Brooklyn, N. Y., a corporation of Delaware

Application September 13, 1954, Serial No. 455,567

11 Claims. (Cl. 53—311)

This invention relates to a machine for assembling hypodermic syringes and more particularly to a simplified and compact mechanism for feeding, orienting, and applying metallic end closures to cylindrical containers, such as glass hypodermic syringe vials and the like. More specifically, the instant invention is directed to an assembly which is capable of simultaneously supplying an assortment of metallic end closures to a plurality of groups of glass vials at a high rate of speed and oriented in a predetermined position permitting registry with the ends of the glass vials, sequentially and synchronously applying the end closures to the groups of vials, and sealing the closures thereafter.

Although many types of hypodermic syringes have been long known in the art for the administration of various medicaments, the majority of the operations associated with the assembling, filling and sealing of the syringes are, even to this day, performed by hand. In a few limited instances, one or two of the operations have been partially mechanized, but before the advent of the instant invention, complete mechanization had not been achieved. A particular difficulty precluding application of well-known automatic packaging techniques, commonplace in other nonanalogous arts, has been the critical importance attached to the necessity for maintaining substantially complete sterility during the assembling, filling and sealing operations. A crucial condition in this requirement, which has heretofore prevented application of automatic packaging techniques on either a practical or economical basis, has been the fact that the component parts of any such mechanism must be readily disconnectable for sterilization and decontamination, and must be capable of retaining such condition over extended periods of operation. The enormity of this obstacle will become apparent when cognizance is taken of the difficulty encountered in retaining sterile conditions in even a small cubic content of any given air space with the result that it has heretofore been impossible to realize a machine of such small size as to be capable of being protected against contamination on an economically practicable basis.

Applicant, on the other hand, has fully overcome this problem by devising a fully automatic assembling, filling and sealing mechanism which is capable of constructing a filled hypodermic syringe cartridge with attached dispensing needle in a fully automatic, uninterrupted operation at a high rate of speed. The details of this machine are more specifically set forth in my copending application Serial No. 455,564, filed September 13, 1954 now currently issued as U. S. Letters Patent No. 2,765,606 on October 9, 1956. As therein described, machine includes a pair of parallel conveyor lines including vial supporting and transporting blocks, a pair of removable storage chambers for retaining and continuously supplying the vials through chute type feed means to parallel first assembly stations in a sequential predetermined oriented manner. Each of the first assembly stations includes a structure for receiving the vials from

the feed chute structures and for cooperating with a plunger stopper supplying and orienting mechanism including means adapted to insert the plunger stoppers in the large open end of the vials. Plunger stoppers are supplied from a single storage hopper through a transporting mechanism including means to select the plunger stoppers according to orientation and for conveying them to said first assembly stations in position for insertion into the vials in a predetermined manner. After insertion of the plunger stoppers, the vials are deposited in sequence in the blocks on the respective conveyors and are transported to a second station where an inspection operation occurs to determine if the plunger stoppers were properly inserted, and if not, to eject the defective vials from the line. Thereafter, the vials proceed through a third station for automatic filling, and subsequently to a fourth station including structure for applying the end stoppers in the vials. The end stoppers are synchronously fed to the applying mechanisms from independent storage hoppers through feed chutes having structure for ejecting improperly oriented stoppers. The filled vials then proceed to a closure cap applying station where metallic ferrules are applied over the end stoppers. The ferrules are subsequently spun into a gas-tight, friction-fit seal before proceeding to a final station at which sheath protected needles are selectively fed and applied to the cartridge assemblies, the protected needles being supplied from independent storage hoppers in a predetermined oriented relationship to a unique applying assembly operating synchronously with the conveyors. The details of the vial supplying and plunger stopper applying mechanisms are more particularly set forth in my copending application, Serial No. 455,565, filed September 13, 1954. The details of the inspecting, filling and stopper applying mechanisms are set forth in my copending application Serial No. 455,566, filed September 13, 1954. The details of the needle feeding and applying mechanism are set forth in my copending application Serial No. 455,568, filed September 13, 1954, now currently issued as U. S. Letters Patent No. 2,765,467 on October 9, 1956. The present application is concerned with applying a metallic closure member or ferrule to the partially assembled syringe cartridge.

The cartridge assembly is more particularly described in my copending application Serial No. 264,992, filed January 4, 1952, now currently issued as U. S. Letters Patent No. 2,737,949 on March 13, 1956, and as therein shown, comprises a cylindrical container or vial, preferably of glass, having one free large open end and a second open end terminating in a reduced neck portion with a radial annular lip. A resilient stopper is situated in the neck portion and a second resilient plunger member is situated in the other open end to seal the vial with an included medicament. A perforated metallic ferrule or closure cap is positioned to overlie the end stopper and includes a terminal edge clamped in frictional fit relationship with the underside of the vial annular lip positively sealing the stopper therein and forming a seating structure for receiving and retaining a dispensing needle carried in a protective sheath which is adapted to fit over the ferrule to position the needle in contact with the end stopper. The assembled and filled cartridge is thus adapted for use in syringe dispensers of conventional type.

Although all of the component parts of the cartridge assembly are in essence difficult to supply, position and apply in a non-complex, inexpensive operation, particular care must be exercised in applying the metallic ferrule to the partially assembled cartridge due to the relatively fragile nature of the glass vial. Another difficulty is the tendency of the thin metallic ferrule to bend if not properly handled. This problem is of particular significance

in the assembly sequence obtained in said fully automatic machine of my said copending application in that the ferrule is applied after the cartridge has been substantially completely assembled and filled with the result that excessive breakage at this point would be prohibitively expensive. Accordingly, the instant invention is particularly directed to providing a mechanism capable of applying and sealing metallic ferrules to glass vials in a continuous high speed operation without excessive breakage of the vials or damage to the ferrule.

Having broadly described the invention, reference will now be made to a particular example of the same which will be better understood by reference to the accompanying drawings, in which:

Fig. 1 is a block diagram illustrating the operation of the machine;

Fig. 2 is a side elevation view of the machine;

Fig. 3 is a sectional view along the center line of the closure cap feeding mechanism;

Fig. 4 is a sectional view, partly in elevation for the sake of clarity, of the closure cap sorting mechanism;

Figs. 5 and 6 are plan views, partly in section, illustrating the cap sorting mechanism of Fig. 4 in separate stages of operation;

Fig. 7 is an end view, partly in section, of the closure cap positioning and applying mechanism;

Fig. 8 is a sectional view along the line 8-8 of Fig. 2;

Fig. 9 is a schematic view of the closure cap feed chute arrangement;

Fig. 10 is a schematic end view of the control cam arrangement for the sorter mechanism of Fig. 4;

Fig. 11 is a vertical sectional view of the cap positioning and applying mechanism along the line 12-12 of Fig. 7;

Fig. 12 is a transverse section view, partly in elevation, of the cap positioning and applying mechanism;

Fig. 13 is a section view, partly in elevation, of the cap spinning mechanism;

Fig. 14 is a side elevation view of the cap spinning mechanism illustrating the control components;

Figs. 15 and 16 are side elevation views, partly in section, illustrating the details of the spinner unit of the cap spinning mechanism;

Fig. 17 is a fragmentary sectional view, partly in elevation, illustrating a further detail of the cap spinner unit; and

Fig. 18 is a top plan schematic view of the drive and control mechanism for the machine of Figs. 1 to 17 inclusive.

The present invention may be briefly described as comprising four sequential steps in a cartridge assembling operation (see Fig. 1) in which a plurality of metallic ferrules are (a) selectively supplied from a central source in continuous sequence, (b) selectively examined for proper orientation and physical defects with automatic discharge of defective and improperly oriented members, (c) sequentially applied to the substantially completely assembled cartridge in an uninterrupted manner, and (d) sealed about the radial annular lip of the cartridge in a pressure fit contact with the end stopper producing a gas-tight end closure. In practice, the mechanism preferably includes a single storage hopper with means for selectively directing the ferrules or end caps to a feed chute in a continuous uninterrupted sequence; an inspection mechanism cooperatively assembled with said feed chute for detecting and ejecting defective or improperly oriented caps and for selectively feeding properly oriented caps for application to the partially assembled cartridges; a dividing structure in said feed chute for directing the caps to a pair of parallel assembly lines intermittently transporting the partially assembled cartridges; a cap applying structure associated with each of the divided feed chutes and including mechanism for synchronously applying the caps to the cartridges as they register during passage in the parallel assembly lines; and independent cap

spinning mechanism adjacent each cap applying station for cooperating with the cap covered cartridges to spin the caps in cooperation with the end stopper and annular vial lip into a gas-tight fit.

The present invention contemplates employing a pair of parallel chain type conveyor lines, only one of which is particularly illustrated in the drawing, and which comprises a chain 135 supporting a plurality of spaced article supporting blocks 65. The blocks 65 are adapted to receive, individually, partly assembled hypodermic syringe cartridge A which has previously been filled with medication and stoppered as more particularly described in said copending application, Serial No. 455,566, filed September 13, 1954.

As shown in Figs. 2 and 3, the mechanism for supplying and applying the closure caps or ferrules to the glass vials includes a stationary elevated support structure including a table surface 402 upon which is mounted a motor 403 connected via a spring urged releasable coupling member 407 which is adapted to selectively cooperate with a second coupling member 409 carried on a driven shaft 410 supported in a bearing 413 carried by a bearing block 412 (Fig. 2) in an upstanding support structure 414. The support structure 414 may be of any desired form but preferably includes an annular recess 416 and a pair of opposed guideways 419, only one of which is illustrated in Fig. 2 for a purpose hereinafter apparent. The annular recess 416 extends transversely of the support structure and is so constructed as to receive an annulus 420 comprising a circular end plate 421 having a central opening receiving the bearing member 413 for rotatably supporting the driven shaft 410 therein. A pair of annular members 422 and 423 are connected to end plate 421 to provide a recessed area into which the metallic ferrule feeding structure 425 may be inserted.

The feeding structure includes a second plate member 426 in the form of a disc or the like which is fixedly connected with the inner end of shaft 410 and which carries an annulus 428 by means of spacer members 427 on securing bolts 429. The annulus or ring member is chamfered on its inner leading edge as at 430 and the rotatable plate member 426 includes radially spaced axially directed pins or pegs 431 for a purpose hereinafter explained. It is preferred that the pins 431 and the spacer members 427 are so radially positioned with respect to each other in cooperation with the spacing between ring member 428 and plate 426 that the end closure members adapted to be used with the mechanism may readily fit between the pins during movement radially outwardly from the center of the mechanism into contact with adjacent spacer members 427 which are so positioned that only one end closure cap may pass therebetween at a time.

The annular structure 420 as previously indicated, is adapted to seat within support 414 carried on the table 402 in such manner as to position an outlet passageway 443 in annular ring 423 in a vertical direction in registry with a feed chute 440. The passageway 443 lies radially outwardly of the spacer members 427 and in cooperation with the inner wall of ring member 428 form a drop out opening permitting the closure caps to pass from between plate 426 and ring 428 to the feed chute 440.

In order to continuously supply the closure caps through the separating wheel 425, a stationary storage hopper or bin assembly 435 is provided with a guide plate 437 which is adapted to be interchangeably received within the guideways 419 of member 414. The hopper is generally formed as a semi-frusto conical chamber 438 having a second differently dimensioned semi-frusto conical compartment 439 mating therewith, the forward ends of the respective semi-frusto conical sections terminating in an annular outlet mouth 436 of a size registering with the axially outer but radially inner edge of ring 428. The hopper is provided with a pivoted lid

432 for the purpose of receiving a supply of closure caps into the chamber 438.

The hopper assembly with its attached guide plate is preferably formed of a rust and contamination resistant material, as for example, stainless steel, and may readily be disconnected from cooperative relationship with the separating wall structure 425 for purposes of sterilization. To implement removal of the same from seating engagement in the stationary guideways 419, the guide plate 437 is provided with a finger lift bar 434. It is also usually preferred to construct the separator wheel from non-corrosive, contamination resistant materials, such as stainless steel or tantalum, while the spacer members 427 are preferably of Teflon material.

From the above description, it will be readily appreciated that the present construction results in a relatively inexpensive and simplified arrangement for continuously feeding closure caps in a sterile condition, at a relatively high rate of speed. This arrangement permits the hopper assembly 435 to be connected with the wheel unit immediately after a sterilization treatment, which may take place while the caps are deposited in the hopper, by simply inserting the hopper and guide plate into the guideways 419. Thereafter, energization of the motor 403 will turn the supported wheel assembly 425 to rotate the same in direct contact with the open mouth of the hopper with the result that the end closure caps are selectively agitated by reason of their gravity feed from the hopper onto the wheel. Pins 431 tumble the caps and permit their sequential and progressive passage between pins 431 and spacers 427 through the outlet passage 443 into the inclined feed chute 440.

A unique feature of this arrangement is the simplicity and ease with which the component parts may be disconnected for resterilization without requiring a lengthy shut down of the mechanism. In this respect, the assembly 420 including the supported separator wheel 425 may be readily disengaged from the seating groove 416 in member 414 by manually disconnecting the clutch mechanism 407, 409. Obviously, a single duplicate set of each item would facilitate immediate replacement of any of the component parts in a completely sterile condition. However, it usually suffices over extended periods of operation exceeding several months in length to simply replace the hopper members 435 as they are emptied. Observation of the condition of the quantity of end closure caps within the hopper is readily had via pivoted lid 432.

The inclined feed chute structure 440 in its simplest form includes a channel shaped rail 441 of stainless steel having a covering 442 overlying the open mouth of the channel to form an enclosed passageway 433 (see Fig. 8). According to the invention, the chute is divided into readily disconnectable sections, the separate sections being interfitted together in endwise aligned relationship between the hopper feed assembly and a cap applying assembly 530 positioned to overlie a conveyor 60. The conveyor comprises an endless chain 135 carrying spaced clamp blocks 65, each block including separatable sections having a central recess which mate to form a pocket for receiving vials A. A further track section 448 connects with track section 440 midway of its descent and forms a guideway directing a line of closure caps to a second cap applying mechanism overlying an identical parallel conveyor assembly (not shown). As shown in Fig. 2, track section 448 includes an open mouth at its upper leading edge which, as shown in Fig. 9, is adapted to be received within an opening in the side of rails 440 and semi-permanently supported there by an anchor pin 447 carried on the upper side of the rail member and a cooperating pivoted clamp arm 449 carried on section 440.

The integrated track sections of Fig. 2 are supported intermediate their descent by means of an arm 453 projecting from a stanchion support assembly and carrying

a pivoted clamping linkage 450. The clamping linkage 450 is more clearly shown in Fig. 8 and includes a manually operable lever 451 pivotally carried on a stationary bracket 452 projecting from the support arm 453 and is connected by means of a linkage 454 to a clamp member 455 which is adapted to move into a pressure fit with the upper surfaces of two track sections adjacent their aligned ends. The linkage 454 and lever 451 are so constructed and proportioned as to provide a self-locking action in which plate member 455 may be positively held against the track sections under pressure to retain the sections as integral assembled units and yet allow rapid disassembly for purposes of replacement.

A cap inspecting and ejecting mechanism 460 is positioned to cooperate with the feed chute above the track division. This mechanism is more fully illustrated in Figs. 4, 5 and 6 and is operated by a drive motor 461 on the main support assembly 1000. As shown in Fig. 2, motor 461 includes a right angle gearing arrangement (not illustrated) having a laterally projecting driving shaft 464. The shaft 464 includes a clutch member 462 (see Fig. 4) for cooperating with a second clutch member 467 carried by a driven shaft 468 projecting from a cylindrical support element 470 carried by track 440. A spring 469 is interposed between a hub 466 on shaft 468 and clutch member 467 which is axially movable on the shaft by reason of a pin and slot connection 466. The clutch mechanism 462, 467 is of the overload type and is adapted to continuously drive shaft 468 so long as the torque load does not exceed a predetermined amount, and upon the occurrence of which condition the respective clutch members will disengage, member 467 being permitted to move axially rearwardly out of engagement against the resilient force of spring 469.

The driven shaft 468 includes a sleeve extension 471 having a central bore or channel 472 and a radially directed passageway 473 communicating with the channel intermediate its length. A push rod 474 is positioned in channel 472 and includes an outer cam follower arm or component 476 and a cap ejecting terminus 478. A spring 477 is positioned in the bore 472 between the end of drive shaft 468 and the movable pin 474 in such manner as to normally continuously urge pin 474 axially outwardly of the hub member. This action serves to move cam follower arm 476 into contact with a cam surface 479 on stationary member 470 and which surface is so configured that upon rotation of shaft 468 and therewith extension 471, the pin 474 is retained in a retracted position for substantially 180° of rotation. However, the pin is substantially immediately released from restraint on further movement of the shaft to permit spring 477 to urge the pin forwardly in the bore whereby terminal end 478 moves axially outwardly of the sleeve 471 into the cap feed chute. Sleeve 471 further includes a semi-cylindrical cup-like structure 480 on its forward end and which structure is positioned to intersect the feed chute 440 to block passage of the conveyor caps therewith.

As will be more readily understood by reference to Figs. 5, 6 and 10 of the drawings, the relative radial positioning of the cup member 480, cam 479 and cam follower 476 on pin 474 are so arranged as to permit sleeve 471 to rotate approximately 180° during which time the cup member 480 moves from a position with its open end inverted vertically downwardly (see Fig. 5) to a position in which its open end is directed vertically upwardly. At this point in the operation, a closure cap lying in the track above the cup member will move under the effect of gravity and the weight of additional caps in the trackway into registry with the cup member. This slight further rotational movement of sleeve 471 has sufficed to move cam follower 476 from the high point 479' (see Fig. 10) of cam 479 to the low area thereof with the result that spring 477 snaps pin 474 forward so that terminal end 478 moves into contact with the closure cap seated in cup 480.

The arrangement is such that if the closure cap is oriented with its closed end positioned to face right, as are caps B and D in Fig. 4, the pin 474 will enter the cap but without touching the same unless the cap is deformed or mashed, in which condition the force of the pin will eject the cap laterally from out of the chute through an opening 446 in the feed track 440. On the other hand, should a cap enter the cup in a position which is inverse to that previously referred to (see cap C in Fig. 4), movement of pin 474 axially of sleeve 471 will eject the cap by contact of the terminal end 473 of the pin with the enclosed end wall of the cap, in like manner to the ejection of deformed caps which are properly oriented. The ejected caps are received within an enclosed chute member 481 (see Fig. 2) interchangeably received within a clamp structure 482 carried on the feed track.

The collecting assembly 481 is adapted to convey the deformed and improperly oriented caps to a common receptacle and/or conveyor means for return to a common source of supply. In some instances, it may be desirable to provide a baffle structure in collecting chute 481, positioned with respect to the discharge opening 446 in such manner that the difference between the force of ejection of mechanism 460 on defective and improperly oriented caps, respectively, is availed of to separate the improperly oriented from the crushed and/or deformed caps. Such arrangement in its simplest form may comprise a baffle plate which will deflect the improperly oriented caps into one terminal passageway while permitting the deformed and/or crushed caps having less wind resistance to pass thereover into a second terminal passageway.

Those caps which pass the inspection station are upon further rotation of cup member 430 permitted to drop from out of the cup member to continue downwardly in the chute to the cap applying station 500 (see Figs. 2, 7, 11 and 12). A duplicate station (not shown) is provided at the end of feed chute 448. According to the present construction, the feeding takes place as a simple gravity induced action with division of the feed to chute 443 occurring when the lower chute portion of track 440 is filled. In practice, both chute sections are normally continuously filled with cap members so that additional members supplied from chute 440 merely serve to replace those ejected from the chutes via the cap inspecting unit.

The feeding of the caps from each of the chutes into the respective cap applying structures will be understood more particularly as follows. As shown in the figures, the chute 440 registers with an ejection chamber having a guide block 502 with a vertically directed passageway 503. The passageway 503 supports a reciprocating plunger member 505. At its lower end the guide block carries plate members 507 forming a first passageway registering with the feed chute 440, and a second axial passageway 509 parallel to the feedway 440. The plate members also support a dividing wall 506 having an integral cam surface 506' (see Fig. 12) for a purpose hereinafter apparent. A drop-out opening 511 (see Fig. 11) is positioned at the terminal end of the first passageway in the lower floor surface of the plate member directly beneath the passageway 503 for the purpose of permitting the closure caps to be ejected vertically downwardly onto the close end of a filled cartridge on the conveyor blocks 65 as the same proceeds directly beneath the opening 511.

The closure caps are preferably positively retained within plates 507 in a position overlying the drop-out hole 511 by means of a detent arm 513 pivoted on the plate and urged under the effect of a spring 515 to abut the side of a closure cap and clamp it against the opposed guide wall of the plate. In practice the spring 515 is so calibrated as to normally urge detent lever 513 transversely of the passageway to slightly less than half way across. This arrangement normally blocks the gravity

feed of the closure caps from out of the feed chute through the drop out opening 511.

Means to progressively and selectively feed the closure caps from the chute are positioned in the second passageway 509 and as shown in Fig. 12 comprise a slidable finger member 517 having a cap engaging tongue 518, a control cam surface 519, and an operating arm 516 carrying an actuator pin 520. The finger member 517 is normally urged laterally of the passageway by a leaf spring 521 to bring the control cam 518 into contact with the dividing wall 506 which upon retraction of the finger member from the position shown in Fig. 12, serves to prevent the tongue portion from contacting a cap positioned in the central feed passageway 440'. The dividing wall cam surface 506' terminates a short distance in front of the drop out opening 511 as shown in Fig. 12, in order that axial reciprocation of the finger member toward the closed end of the chute will serve to permit the finger member to protrude into the cap passageway and bring the tip portion 518 into contact with a closure cap which had previously been blocked by the pivoted detent finger 513. With this arrangement continued movement of the finger member in an axial direction will serve to force the detent 515 to pivot against the action of spring 513 thus permitting the closure cap to enter into registry with the drop out opening 511.

Ejection of the caps from plate 507 is obtained by reciprocating plunger 505 which is normally retained in a raised position by a spring 504 (see Figs. 2 and 7), under the action of a servo motor 525. As shown more fully in Fig. 7, the servomotor is preferably of the fluid pressure differential type and includes a stationary cylinder 523 supported on a bracket 530 and a reciprocable plunger shaft 522 fixedly connected with the movable piston in the cylinder. The plunger shaft passes through a bearing block 531 projected from bracket 530 which serves to align the end thereof with the upper end of plunger 505 in block 502. Although not necessary, it is usually preferred to include a helical spring (not shown) between support block 531 and a headed portion on the end of piston shaft 522 in order to eliminate any slack or backlash in the operation of the piston. A fluid supply line 526 communicates with the upper end of cylinder 521 and connects with a control valve assembly which is shown graphically at 535 in Fig. 18 intermediate its extent and a source of fluid under pressure.

A second servomotor of the fluid pressure differential type 540 is also supported from bracket 530 and includes a cylinder 541 which is fixedly connected to the bracket and a reciprocable piston (not illustrated) having an axially extending piston rod 542. The rod 542 is fixedly connected with a control plate 545 having a slotted end portion 546 presenting a recess for receiving pin 520 of the finger member 527 of the cap feed structure. Plate 545 includes a stabilizing bearing block 547 (see Fig. 7) which is adapted to slide over a fixed guide pin 549 mounted in the leading face of stationary cylinder 541 (see Fig. 12). The arrangement is such that the reciprocation of the piston and connected rod 542 serves to move plate 545 to in turn move slide member 517 to positively force feed the closure cap members progressively into registry with the drop out opening 511.

Control of servomotor 540 is obtained by means of a valve assembly 550, Fig. 7, mounted on bracket 530 adjacent servomotor 525. This valve assembly includes an inlet line 551 from a suitable source of fluid pressure (not illustrated) and an outlet line 552 connecting the valve with piston chamber 541. The control valve includes a plunger 555 connected to be reciprocated by a pivoted lever 556 which in turn is actuated by a cam 558 on a control shaft 925. The lever 556 is pivoted to the valve body in a conventional manner as illustrated at 557.

The control valves 535 and 550 for the servomotors are synchronized so that the motor unit 540 first operates to force feed a new closure cap into position overlying

the drop out hole, and then the motor unit 525 operates to press slide rod 505 through passageway 503 into contact with the retained closure cap to cause the same to move out of hole 511 onto the neck of an underlying cartridge as shown more clearly in Fig. 11 of the drawings.

In order to facilitate rapid and easy disassociation of the feed chute mechanism for sterilization or cleaning, the support bracket 530 includes, as shown more clearly in Fig. 7, a pivot plate 532 supporting a linkage 565 and comprising a manually operable lever 566, a pivot link 567, and an operating arm 568. Arm 568 carries a pressure plate 569 which is adapted to bear against block 502 to clamp the same against bracket 530 and hold the block, attached plate, and feed chute in a firmly secure, vibration free grip. Removal of the feed chute section is readily facilitated by manually depressing the exposed end of lever 566 while simultaneously pulling on it axially to pivot link 567, whereby arm 568 is pivoted to withdraw the pressure plate from engagement with the block. Thereafter, the block, and plate and feed chute section can be laterally withdrawn to completely free the components.

After the closure cap is positioned on the exposed neck of the cartridge A supported in the conveyor block 65 (see Fig. 11), the conveyor proceeds to an adjacent station for a cap-spinning operation which will serve to physically clamp the metal closure cap over the annular neck of the cartridge in a substantially fluid-tight seal. As shown more particularly in Figs. 13 through 17 inclusive of the drawings, the sealing station comprises a cabinet 570 housing a motor driven spinner unit 600 which is adapted to vertically reciprocate onto the closure cap covered cartridges as they proceed beneath the unit on the conveyor. Cabinet 570 comprises a housing 571 which is supported from the common apparatus support 1000, as shown in Fig. 2, and encloses an electric motor 572 carried in bearings supported by a frame 592 depending from a support yoke 591 including upstanding legs 594 and an integral yoke 596. The yoke 596 in turn is suspended by means of a spring 598 from a stationary arm 573 integral with housing 571.

Support unit 591 also carries a sleeve member 590, having rack-type gear teeth 593 along one side thereof for cooperation with a rotatable gear member 595 supported in the wall of housing 571. The lower end of the sleeve member 590 extends through an offset portion of the housing and terminates in an enlarged boss or collar 590'. The arrangement is such that sleeve 590 and motor unit 572 are resiliently urged against the action of gravity in a vertical upward direction under the action of spring 598 to normally retract the sleeve member 590 away from the cartridge carrying blocks of the conveyor.

Motor 572 operates a drive pulley 574 which is adapted to be connected via a belt (not shown) to a driven pulley element 575 fixedly connected to the upper end of a rotatable sleeve shaft 576 supported for rotation within the sleeve member 590. Shaft 576 extends the length of the sleeve member 590 and terminates in the region of boss 590' in an enlarged threaded recess 578 for a purpose hereinafter apparent. A further shaft or stationary rod 580 is positioned to extend through the center of the sleeve shaft and connects at its lower end in the region of the threaded recess 578 with the spinner unit 600. At its upper end the rod 580 carries a fixed abutment ring or flange 582 and terminates in a threaded extension 583. A spring 584 is positioned about shaft 580 between flange 582 and a rectangular, bell-shaped collar member 585, which is normally received within a mating opening in the yoke 596. The collar member 585 includes a flared terminal end 586 which normally abuts against the lower edge of the support unit 594, 596 under the action of the spring 584.

Preferably, shaft 580 is formed to have a non-circular, as for example, a rectangular cross-sectional contour, in

the region of collar member 585 for the purpose of being slidable, but non-rotatably received within a similar central opening in the collar member for the purpose of retaining the shaft or rod 580 against turning while permitting axial reciprocation of the same. The arrangement of the spring 584 is such that it normally maintains the rod 580 in its lower extensible position in which the collar member 581 projects into a central recess or channel-way 610 in the spinner mechanism 600.

A simple friction brake unit is provided to hold the sleeve shaft from rotating when assembling and disassembling the spinner unit to the sleeve shaft. It comprises a threaded rod 579 mounted in the casing side wall 571 and adapted to be moved toward or away from the sleeve shaft by means of a control knob 577. It will be understood that rod 579 binds the sleeve shaft against rotation when tightly threaded thereagainst.

The means for controlling movement of sleeve member 590 and the contained shaft 576 and rod 580, according to the present invention, takes the form of a simplified cam-actuating structure, shown more particularly in Fig. 14 of the drawings. As therein illustrated, the actuating gear 595 which normally meshes with rack teeth 593 on the sleeve member 590 is mounted on a common shaft 599 extending through the housing wall and carrying at its external end a driving gear member 597. This gear member in turn is connected via a sprocket chain 599' to the end of a pivoted lever 957 supported on a pin 956 carried by housing 570. Lever 957 is adapted to be actuated in a vertical direction to turn gear 597 by means of sprocket chain 599 through a cam follower member 955. The follower is pivotally connected to the lever at 958 and carries an adjustable cam follower yoke 952 supporting an idler roller 951. The roller is adapted to ride upon a cam member 950 fixedly carried by the main control shaft 925, and by reason of the contour of the cam, causes the follower 955 to move vertically upwardly and downwardly over a guide pin 954 projecting into a slot 953 formed in the yoke 952 to thereby rock lever arm 957 and wrap and unwrap chain 599' about the gear element 597.

The closure cap spinning mechanism 600 comprises a readily disconnectable unit which is illustrated in detail in Figs. 15 through 17 inclusive of the drawings. As therein shown, it includes a carrier or cage member 601 having three depending and radially extending paired support yokes 602, 603 and 604. Carrier 601 further includes at its upper end an axially extending, externally threaded neck 603 forming the boundary of a relatively large recess or channelway 610 centrally of the carrier member. Channelway 610 is adapted to receive and seat a detachable connector device forming an extension of rod 580. The device comprises an integral assembly of a lower closure cap contacting stud or pressure head 615, a control cam element 618, and an upper connector hub 620. Hub 620 is internally threaded as shown at 621 (Fig. 17) for receiving a threaded extension 589 on rod 580 whereby the connector assembly can be integrally connected to the rod 580 as shown in Figs. 13 and 16 of the drawings. Hub 620 further includes an external axially directed slot 622 which receives a movable locking plate 625.

Plate 625 is provided with ratchet teeth 626 along the upper leading edge thereof for mating with ratchet teeth 587 formed on the terminal face of collar 581 of the non-rotatable rod element. The plate is retained within slot 622 by means of a guide clamp 630 and a split spring element 628. Normally, plate 625 is urged upwardly in slot 622 to press ratchet teeth 626 towards engagement with teeth 587 by means of a spring element 629 carried on hub 620. The arrangement is such that upon threading spinner unit 600 into mating engagement with the lower end of sleeve 576, the threaded extension 589 on rod 580 is also threaded into the hub 620 causing plate

625 to reciprocate downwardly in slot 622 against the action of spring 629 and locking ratchet teeth 626 in engagement with the teeth 587 on the rod collar 581 to prevent rotary movement of the pressure head. It will thus be understood that connection of the head 615 with rod 580 via hub 620 takes place concurrently with the connection of collar 601 with sleeve shaft 576 via screw threads 605, 578. With this arrangement, rotation of the sleeve shaft 576 will cause rotation of the collar 601 without causing rotation of the pressure head 615. It will be understood, however, that with the parts so interconnected, as shown in Fig. 16, vertical movement of sleeve shaft 576 under the action of the sleeve member 590 will normally move rod 580 and head 615 therewith.

To facilitate connecting and disconnecting the spinner head 600, the locking plate 625 is provided with an opening 627 which is normally adapted to be aligned with an opening 606 in carrier 601 whereby projection of a rod element, R as shown in Fig. 17 of the drawings, can serve to disengage the locking plate 625 from the serrations 587. For this purpose the passageway 606 is formed to have a greater diameter within the opening 627 in plate 625. It thus will be understood that insertion of the rod R through opening 606 into opening 627 will permit a skewing of the rod to disengage the plate 625 from the locking collar before the neck 605 begins to unscrew from the sleeve shaft. At the same time, canting of the plate serves to initiate the unscrewing of hub 620 from the rod 580.

For the purpose of spinning the metal closure caps (see D in Fig. 16), into a tight frictional fit and fluid-tight seal over the stoppered cartridge units, the cage member 601 supports three spinner elements 611, 612, and 613 pivoted by means of pins 617, 619 between the yoke pairs. Each spinner member in turn carries a freely rotatable metal turning roller 614, 616 and 618 at its lower end for an obvious purpose. Each spinner element also includes a threaded screw member 607, 608 and 609 at its upper end. These screw members project through the spinner elements into the central channelway and form cam followers (see 607' and 609' comprising the ends of screw elements 607 and 609 in Fig. 16 of the drawing) for cooperating with cam element 618 on the pressure head 615.

The operation of the cap-spinning mechanism 570 will be more readily understood with reference to Figs. 13 and 16 of the drawings. In accordance with the invention, after cap positioning unit 500 has seated a metal cover cap over the cartridge and the conveyor has transported the covered cartridge to beneath spinner unit 600, the control shaft 925 has rotated a sufficient amount to begin raising follower arm 955 to thus initiate lowering of the spinner mechanism into position over the covered cartridge by means of the rack gearing 593, 595. Rotation of gear 595 through the mechanism of Fig. 14 causes sleeve member 590 and therewith support unit 591, 594, 596 to move downwardly together as a unit. Since shaft 576 is carried within sleeve member 590 and rod 580 is normally resiliently urged downwardly by spring 584, the lowering movement of the support unit carries with it rod 580 so that the sleeve shaft and the rod and therewith the attached spinning unit 600 move together as integral assembly.

With particular reference to Fig. 16, as the spinner assembly approaches cap D on cartridge A, the pressure head 615 of the central rod member contacts the upper surface of the cap and automatically centers itself over the cap by reason of a guiding recess 630 in the end of the stud shaft. As this action takes place, further downward movement of rod 580 is arrested, but the sleeve member 590 with shaft 576 continues moving downward for a slight distance to bring the peripheral edges of the roller elements 614, 616, 618 into alignment with the trailing rim of the cover cap D. This further movement

of sleeve member 590 and shaft 576 causes the spinner carriage 601 with its spinner elements to move relatively to the central stud shaft assembly whereby the cam follower screw members 607', 609' on the spinner elements ride radially outwardly on cam 618 to rock the spinner elements transversely of the pressure head to the position indicated in dotted lines as E and F in Fig. 16. This action positions the roller elements in contact with the rim edge of the cover cap whereby rotation of shaft 576 and carriage 601 will cause a metal spinning operation to take place. Due to this action, the rim edge of the cover cap is lapped beneath the annular shoulder of the glass cartridge to form a substantially fluid-tight permanent seal, the rubber closure stopper being tightly compressed against the leading rim face of the cartridge. It will be understood that the relative axial movement which takes place between rod 580 and sleeve shaft 576 serves to compress spring 584 whereby upon completion of the spinning operation, the spinner assembly is resiliently urged upwardly by both spring 598 and spring 584 to substantially completely eliminate any backlash in the gearing 593, 595. Upon completion of the spinning operation, the control cam 950 initiates raising of the spinner assembly and the conveyor moves the sealed cartridge to any conventional discharge station, or if desired, to a further station for a further assembly operation.

As will be appreciated from the operation performed by the machine of the invention it is necessary that the various assembly operations be precisely coordinated with each other. It will be noted from reference to Fig. 18 of the drawings, that a particular advantageous feature of the present invention is an arrangement which employs a pair of identical parallel drive and control shafts 925, 925a operated from a common power source 927 and adapted to control the various assembling stations. These control shafts facilitate precise initiation and stoppage of desired movements in a predetermined phase relationship and may be utilized as the sole drive power for all components of the machine. However, it has been found more economical and expedient to employ independently energized electric motors for certain of the operations performed according to the invention, as for example, the use of electric motor 403 for operating the closure cap hopping mechanism, and the electric motor 401 for operating the cap orienter-ejector 470. Obviously, these devices could be driven by one or the other of the parallel control shafts 925, 925a if so desired.

As shown in the figure, the parallel control shafts 925, 925a are connected to be simultaneously driven by a single electric motor 927, the motor being connected to the respective shafts through a dual chain drive 928 and independent selectively operable clutch mechanisms 929, 929a. The control and drive elements assembled with each shaft are identical, those pertaining to the one conveyor line of the machine being denoted with the subscript a and those to the other conveyor line of the machine without the subscript a. Accordingly, only one set of the assembled control mechanisms will be particularly described hereinafter, that being shaft 925.

As illustrated, the conveyor 60 carrying the cartridge supporting blocks 65 via the chain linkage 135 follows an endless path beneath the assembling stations 525 and 600, to a final discharge or knock-out station 980 which may be of any conventional design. The control and drive shaft 925 is mounted in parallel relationship to the conveyor and carries a bevel gear 931 which meshes with a mating gear 933 and through a linkage 937, 935 operates a sprocket wheel 939 for driving conveyor 60 in synchronized relationship with the turning of the control shaft. In practice, it is preferred that the linkage 937, 935 be of the step-by-step type comprising a driving pawl and driven ratchet wheel.

The control shaft also fixedly carries a plurality of control cams 538, 558, 950 and 967. The control cam 538

13

is connected to operate a follower arm 538' which in turn actuates a control valve 535 in a supply line 526 to the closure cap applying servo motor 525. The control cam 558 is connected to operate a follower arm 558' which in turn is connected to actuate the control valve 550 for supplying pressure fluid through line 552 to the cap positioning servo motor 540.

Fluid pressure is supplied to control valves 535 and 550 from a common source 923 through 923'.

The cam 950, as more particularly described previously, is connected to actuate the linkage mechanism for raising and lowering the spinner assembly 600 in the cap spinner housing 740 in which the control shaft 925 is journaled.

The control cam 967 is connected to operate a follower arm 965 which in turn is connected through conventional means to actuate a discharge or knock-out assembly 980 for unloading the assembled and sealed cartridges from blocks 65. Although the knock-out assembly 980 may be of any conventional construction, it is preferred to position the same so as to operate upon the conveyor blocks on the return run of the conveyor whereby the sealed cartridges can be removed by simple gravity discharge to a collecting chute or the like. It will be understood that a suitable idler sprocket or the like arrangement may be provided to support the end loop of the conveyor chain 135 in a manner analogous to drive sprockets 939 and 939a. The details of this arrangement, however, form no part of the present invention.

With the present arrangement, all of the control and drive functions, with the exception of the cap hopper mechanism 420 and the cap ejector-sorter 470, are derived from the single control shaft 925 whereby difficulties encountered in prior art prototype machines in maintaining various operations in the proper phase relationship are substantially eliminated. Synchronization of the different actions is readily attained by adjusting the relationships of cams 538, 558 and 950 and 967 with one another and at the same time orienting the crank connection for the pawl 937 driven by gear 933. It will further be appreciated that this arrangement simplifies assembly and repair of the device.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments hereof, except as defined in the appended claims.

What is claimed is:

1. A machine for orienting, feeding, applying and sealing metallic end closures over cylindrical containers, comprising a readily disconnectable storage hopper for receiving and storing a plurality of metallic closure caps, means for conveying a plurality of cylindrical containers along a path in proximity with said hopper, a readily disconnectable chute connecting with said hopper and adapted to deliver closure caps in juxtaposition with said conveying means to vertically overlie the path of said cylindrical containers, means for sequentially feeding closure caps from said hopper into said feed chute, means at the discharge end of said feed chute overlying said conveyor means for positioning said closure caps over a cylindrical container including structure for applying a so-positioned cap on an underlying container, a readily disconnectable cap spinning mechanism in overlying relationship with said conveying means in proximity with said closure cap applying means and including structure vertically overlying said conveying means along the path of movement of said cylindrical containers for moving the spinning mechanism toward and away from the containers, said spinning mechanism further including structure adapted to contact a metallic closure cap seated on a cylindrical container and to spin the cap into a friction-fit relationship with the container, and a common control shaft including structure for operating said conveying means,

14

said spinning means and said cap positioning means in a predetermined phased relationship.

2. A machine as set forth in claim 1 in which said spinning mechanism comprises a readily disconnectable carrier member, a plurality of pivoted supports mounted in said carrier member, spinning elements freely rotatably mounted on said supports, and means for pivoting said supports in a radial direction whereby said spinning elements can move toward and away from a closure cap seated on a cylindrical container.

3. A machine as set forth in claim 1 in which said conveying means comprises an endless chain, a plurality of clamping blocks supported on said chain, and structure connected with said clamping blocks and adapted to resiliently retain a cylindrical container therein.

4. A machine as set forth in claim 1 including a cap sorter and ejector mechanism connected with said feed chute intermediate said storage hopper and said discharge end, said mechanism comprising a rotatable cup-like receptacle positioned to intersect said feed chute and selectively block movement of caps therein and means for rotating said cup-like element to selectively feed closure caps to said positioning means at the discharge end of the feed chute.

5. A machine for orienting, feeding, applying and sealing metallic end closures over cylindrical containers, comprising a readily disconnectable storage hopper for receiving and storing a plurality of metallic closure caps, means for conveying a plurality of cylindrical containers along a path in proximity with said hopper, a readily disconnectable chute connecting with said hopper and adapted to deliver closure caps in juxtaposition with said conveying means to vertically overlie the path of said cylindrical containers, means for sequentially feeding closure caps from said hopper into said feed chute, means at the discharge end of said feed chute overlying said conveyor means for positioning said closure caps over a cylindrical container including structure for vertically applying a so-positioned cap on an underlying container, a cap sorting mechanism connected with said feed chute intermediate said cap positioning and applying means and said storage hopper, said sorter mechanism comprising a rotatable element having a receptacle structure projecting into said feed chute, a plunger axially movable in said rotatable element, means for rotating said element and selectively reciprocating said plunger to thereby project the plunger against a cap retained in said receptacle to effect selective ejection of caps oriented in a predetermined undesired direction, a readily disconnectable cap spinning mechanism associated with said conveying means in proximity with said closure cap applying means and including structure vertically overlying said conveying means along the path of movement of said cylindrical containers for moving the spinning mechanism toward and away from the containers, said spinning mechanism further including structure adapted to contact a metallic closure cap seated on a cylindrical container and to spin the cap into a friction-fit relationship with the container, and a common control shaft including structure for operating said conveying means, said spinning means and said cap positioning means in synchronized relationship.

6. A machine for orienting, feeding, applying and sealing metallic end closures over cylindrical containers, comprising a readily disconnectable storage hopper for receiving and storing a plurality of metallic closure caps, means for conveying a plurality of cylindrical containers along a path in proximity with said hopper, a readily disconnectable chute connecting with said hopper and adapted to deliver closure caps in juxtaposition with said conveying means to vertically overlie the path of said cylindrical containers, cap positioning and control means assembled with said feed chute at the discharge end there-

of including detent means normally blocking the path of movement of said caps in said chute but being adapted to retain a cap in position overlying a cylindrical container on said conveying means, a feeding structure connected with said chute in proximity with said detent means and including a finger member operative to force a cap against said detent means into a position overlying a cylindrical container, fluid pressure means connected with said finger member for intermittently actuating the same, and a second fluid pressure means including a plunger element adapted to contact a cap retained by said detent means and force the same onto an underlying cylindrical container, a readily disconnectable cap spinning mechanism assembled with said conveying means in proximity with said closure cap positioning and applying means, said spinning mechanism including rotatable elements adapted to contact a metallic closure cap seated on a cylindrical container and to spin the cap into a friction-fit relationship with the container, a common control shaft including structure for operating said conveying means, said spinning mechanism and said cap applying and positioning means in predetermined phased relationship, and means for rotating said control shaft.

7. A machine for orienting, feeding, applying and sealing metallic end closures over cylindrical containers comprising a readily disconnectable feed chute for receiving and storing a plurality of metallic closure caps in random orientation, an endless conveying mechanism including structure for releasably supporting a plurality of containers and transporting the containers along a substantially linear path, said feed chute having a discharge end overlying said conveyor, cap positioning and applying means connected with the discharge end of said feed chute and including structure for releasably retaining an individual cap in position over a container on said conveyor and further readily disconnectable structure for applying said cap over the container, sorting means associated with said feed chute including structure adapted to intercept the movement of the caps in the feed chute and to selectively feed the caps in sequence to said cap applying and positioning mechanism, said sorting means including a reciprocable plunger for projecting against or into an intercepted cap dependent upon the orientation of the same, and means for operating said plunger and said cap intercepting structure whereby caps oriented in one predetermined direction are passed to said cap applying and positioning means and caps oriented otherwise are ejected from said feed chute by said plunger.

8. A machine for orienting, feeding, applying and sealing metallic end closures over containers comprising readily disconnectable means for receiving and storing a plurality of metallic, cup-like closure caps in random orientation including a readily disconnectable feed chute for selectively directing the closure caps in single file towards a discharge end, readily disconnectable means associated with said feed chute for detecting and ejecting closure caps which are oriented in a predetermined relationship, readily disconnectable cap applying and positioning means connected with the discharge end of said feed chute and including structure for releasably retaining an oriented closure cap in a predetermined position and for transferring the closure cap onto a container, a readily disconnectable cap spinning mechanism in proximity with said cap positioning and applying means and including structure for spinning the open end of the closure cap into a frictional fit relationship with a container, container conveying means positioned to traverse a substantially linear path between said cap applying and positioning means and said cap spinning mechanism and including structure for releasably supporting containers thereon, and a common control shaft including structure for operating said

conveying means, said spinning mechanism and said cap applying and positioning means in synchronous relationship.

9. A spinning mechanism for sealing metallic end closures over cylindrical containers comprising a stationary support, a carrier member, a rotating means, slidable guide means mounting said rotating means upon said stationary support and permitting axial movement relative thereto, readily disconnectable means coupling said carrier member to said rotating means, a plurality of pivoted supports mounted upon said carrier member, spinning elements being freely rotatably mounted upon said supports, means for pivoting said supports in a radial direction relative to said carrier member whereby said spinning elements can move towards and away from a closure cap seated upon a cylindrical container, said spinning mechanism including a pressure member for contacting said end closure and maintaining it motionless during said spinning operation, a non-rotating rod, readily disconnectable coupling means connecting said pressure member to said non-rotating rod, said non-rotating rod and said pressure member being respectively inserted for axial movement within said rotating means and said carrier, and said pressure member including a cam surface which engages said pivoted supports to cause said spinning elements to forcibly engage said end closure and seal it when said carrier is axially moved relative to said pressure member and when said pressure member is contacting said end closure to prevent its rotation.

10. A spinning mechanism for sealing metallic end closures over cylindrical containers comprising a stationary support, a carrier member, a rotating means, slidable guide means mounting said rotating means upon said stationary support, readily disconnectable means coupling said carrier member to said rotating means, a plurality of pivoted supports mounted upon said carrier member, spinning elements being freely rotatably mounted upon said supports, means for pivoting said supports in a radial direction relative to said carrier whereby said spinning elements can move towards and away from a closure cap seated on a cylindrical container, said spinning mechanism including a pressure member for contacting said end closure and maintaining it motionless during said spinning operation, a non-rotating rod, said non-rotating rod and said pressure member being respectively inserted for axial movement within said rotating means and said carrier, readily disconnectable coupling means connecting said pressure member to said non-rotating rod, said readily disconnectable coupling means connecting said pressure member to said non-rotating rod being mounted coaxially within said readily disconnectable means coupling said carrier member to said rotatable means and both said coupling means being disconnectable by movement in the same direction to allow simultaneous detachment of said carrier member and said pressure member, and a locking member secures said pressure member with said non-rotating rod to prevent rotation of said pressure member relative to said rod.

11. The spinning mechanism set forth in claim 10 wherein said locking member is of the overriding type including a ratchet and a pawl.

References Cited in the file of this patent

UNITED STATES PATENTS

1,605,954	Jaeger	Nov. 9, 1926
1,863,223	Kantor	June 14, 1932
1,966,511	Meyer	July 17, 1934
2,152,571	Schmidt	Mar. 28, 1939
2,507,427	Underwood	May 9, 1950
2,672,269	Resina	Mar. 16, 1954
2,765,608	Ford et al.	Oct. 9, 1956

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,841,940

July 8, 1958

Frank E. Brown

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 65, for "machine" read -- the automatic machine --; column 6, line 30, for "load dos not" read -- load does not --; column 8, line 29, for "see Figs. 2" read -- see Figs. 2 --; line 54, for "finger member 527" read -- finger member 517 --.

Signed and sealed this 18th day of November 1958.

(SEAL)

Attest:

KARL H. AXLINE

Attesting Officer

ROBERT C. WATSON
Commissioner of Patent