A. L. KRONQUEST AND J. C. TALIAFERRO.

CAN CLOSING MACHINE.

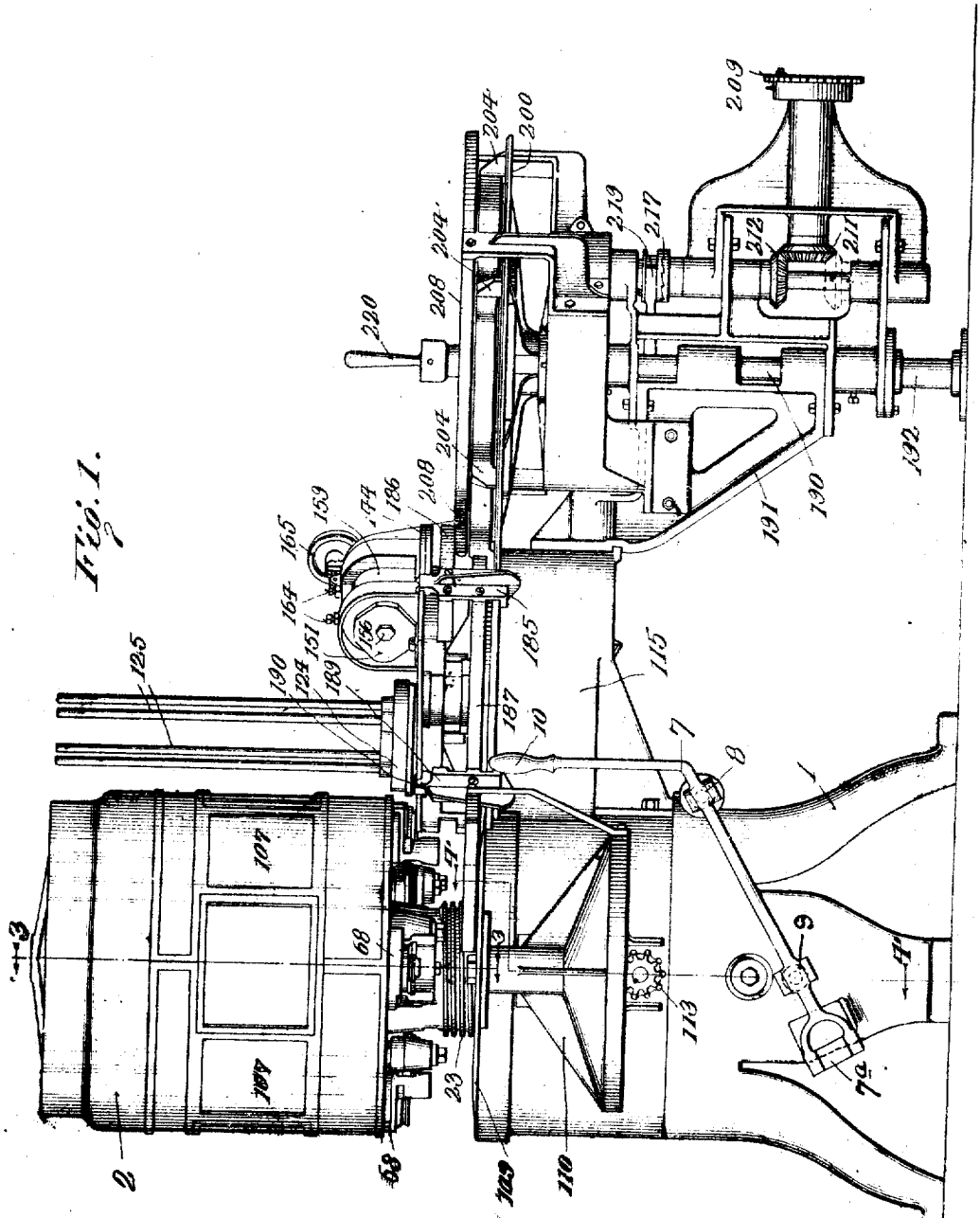
APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Robert H. Moore
Arthur M. Gordon

Inventors
Alfred L. Kronquest
John C. Taliaferro
By Sturtevant Mason & Atty's

A. L. KRONQUEST AND J. C. TALIAFERRO.

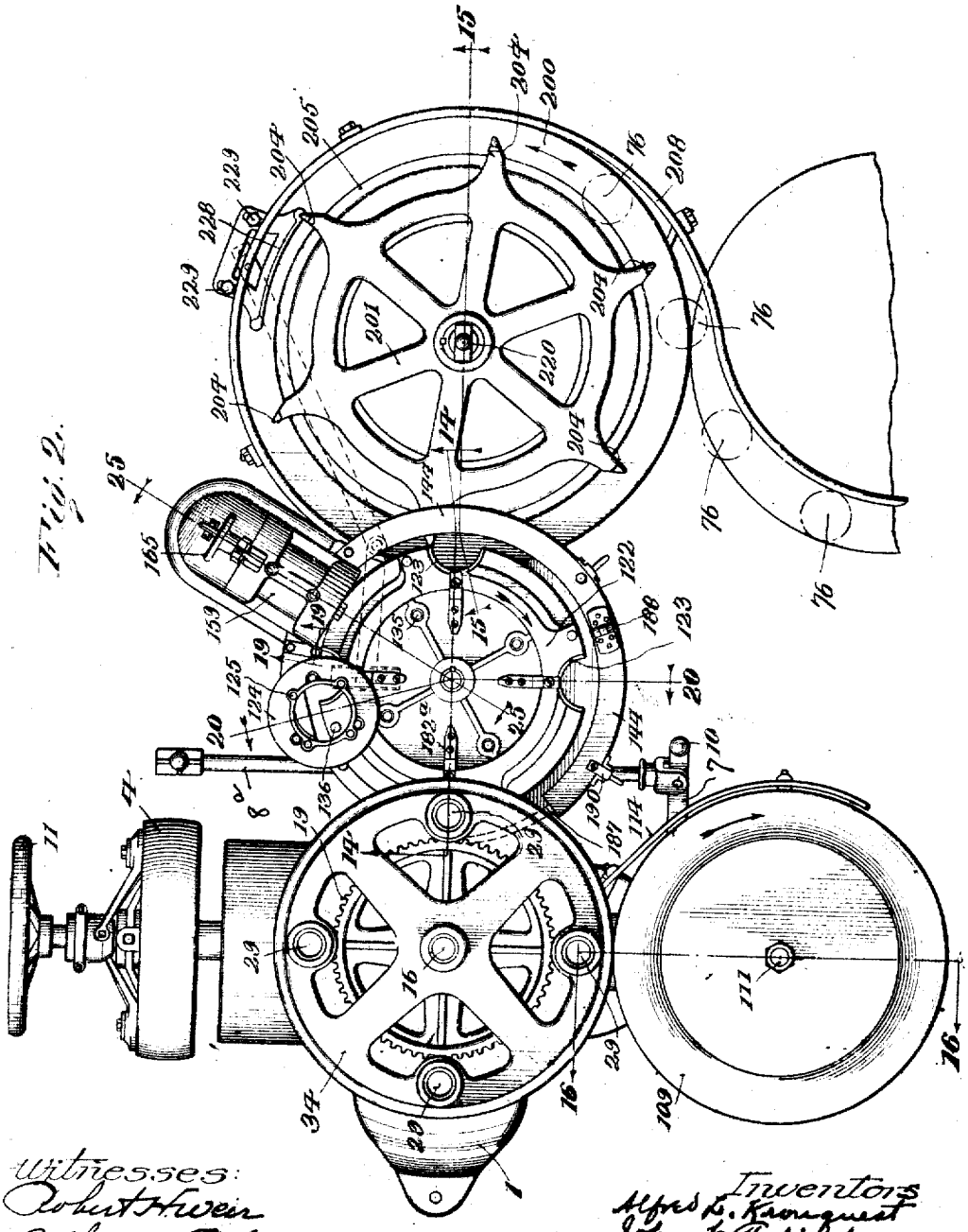
CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 2.



Witnesses:
Robert H. Weir
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John C. Taliaferro
By Sturtevant Massey & Mitchell
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CAN CLOSING MACHINE.

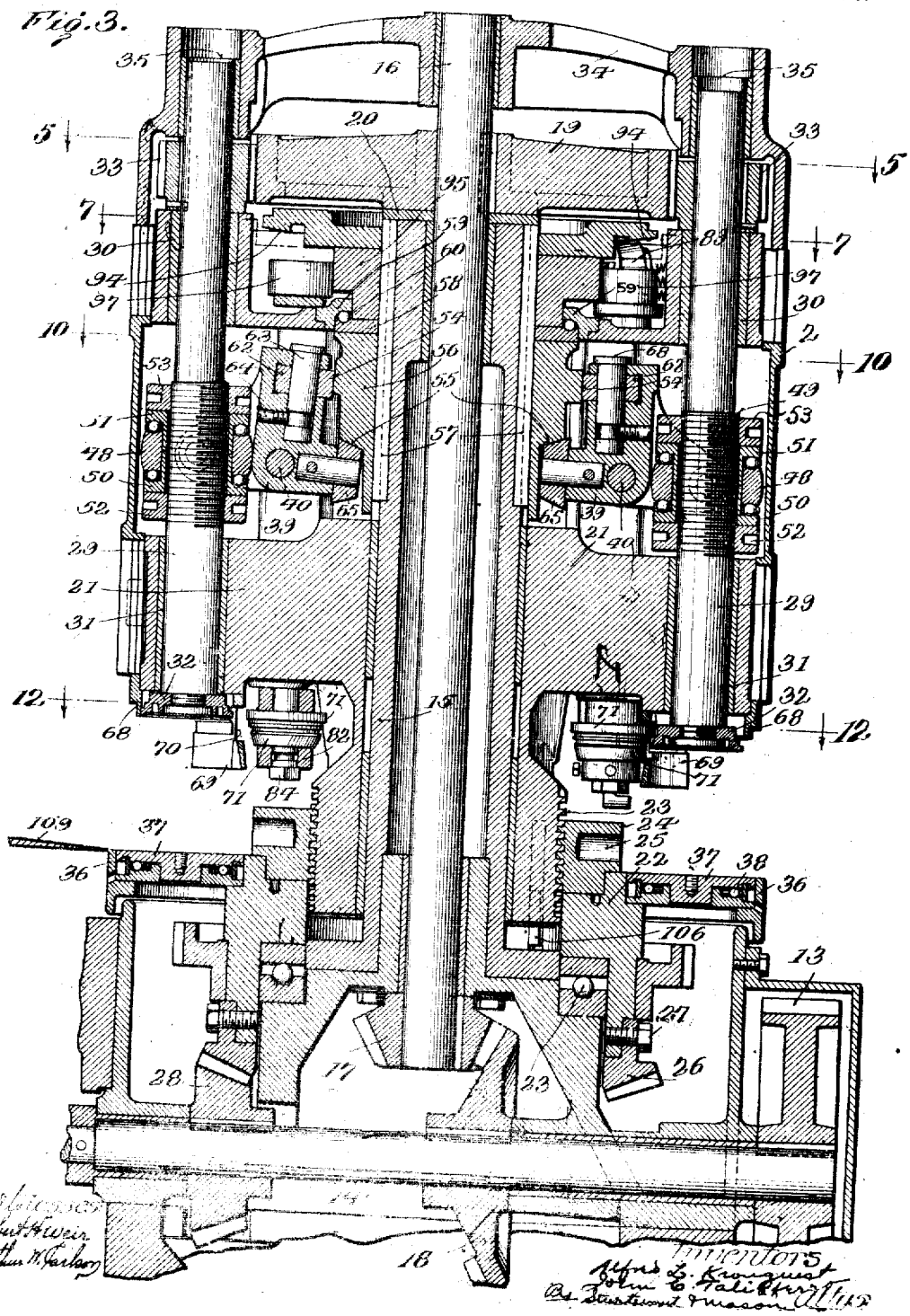
APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 3.

Fig. 3.



Witnesses
Robert H. Weir
Arthur M. Carlson

Inventors
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By Townsend & Mason
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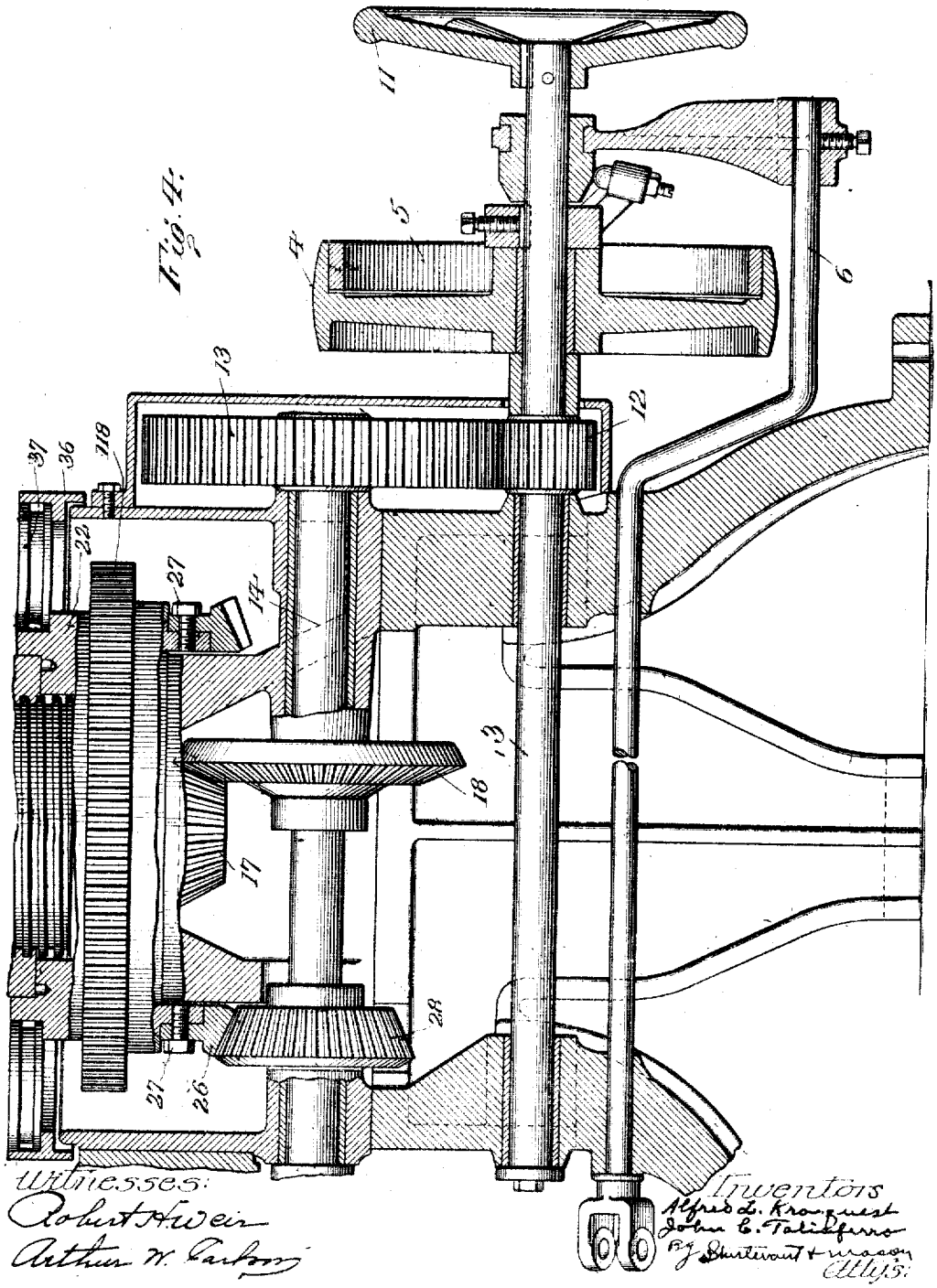
CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650. **Patented Aug. 3, 1920.**

18 SHEETS—SHEET 4.

Fig. 4.



Witnesses:
Robert H. Weir
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Inventors
Alfred L. Kronquest
John C. Taliaferro
By Shurtleff & Mason
Attys.

A. L. KRONQUEST AND J. C. TALIAFERRO.

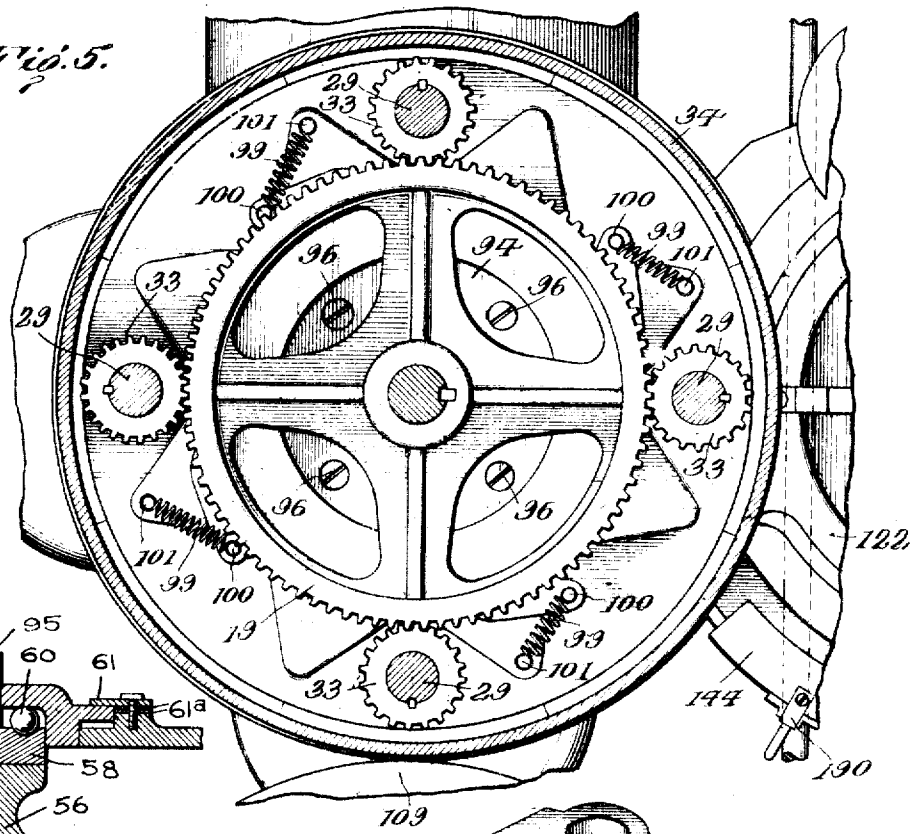
CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650. **Patented Aug. 3, 1920.**

18 SHEETS—SHEET 5.

Fig. 5.



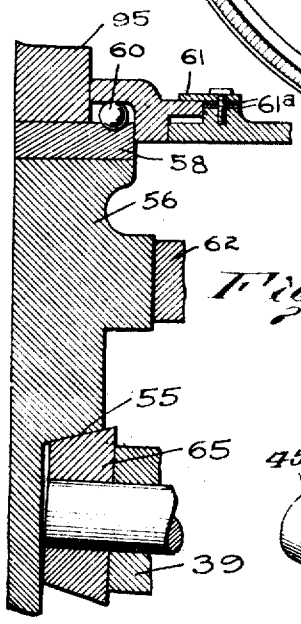


Fig. 3a

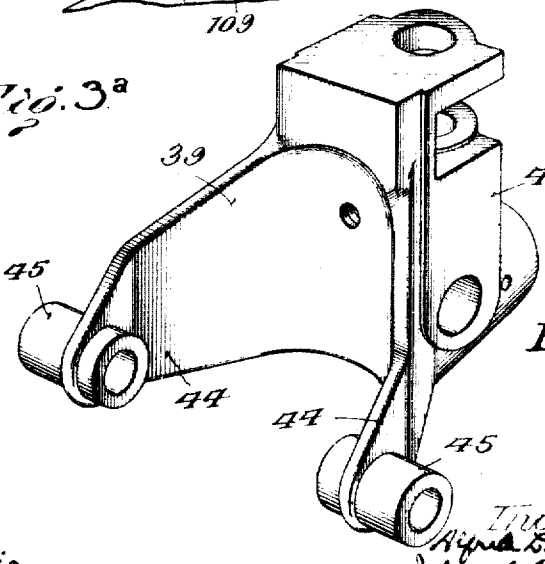


Fig. 6

Witnesses:
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Arthur W. Carlson

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Alfred L. Kronquest
John C. Taliaferro
By Shurtleff & Mason
Attys.

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CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 6.

Fig. 7.

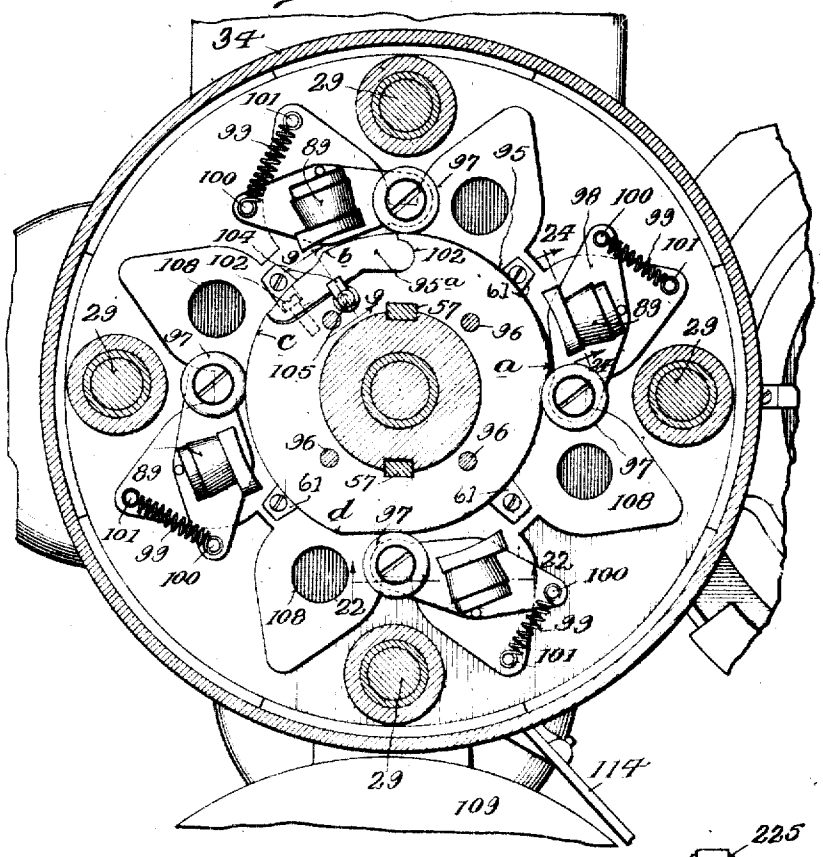


Fig. 8.

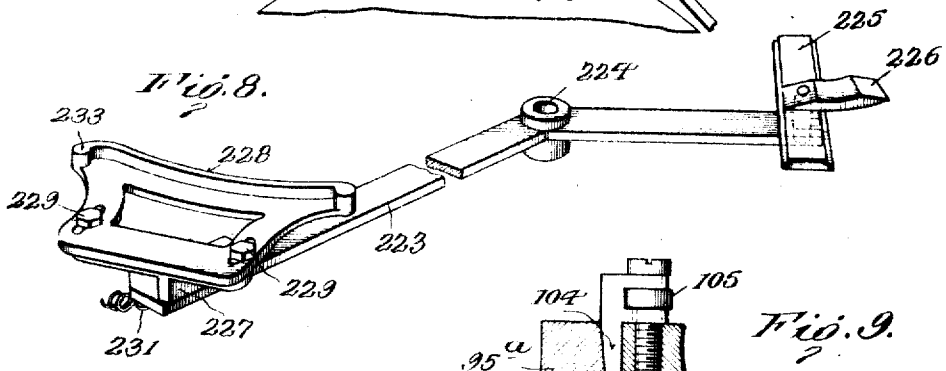
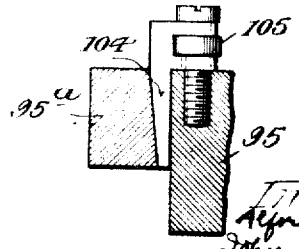


Fig. 9.



Witnesses:
Robert H. Weir
Arthur W. Carlson

Inventors
Alfred L. Kronquest
John C. Taliaferro
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CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

16 SHEETS—SHEET 7.

Fig. 10.

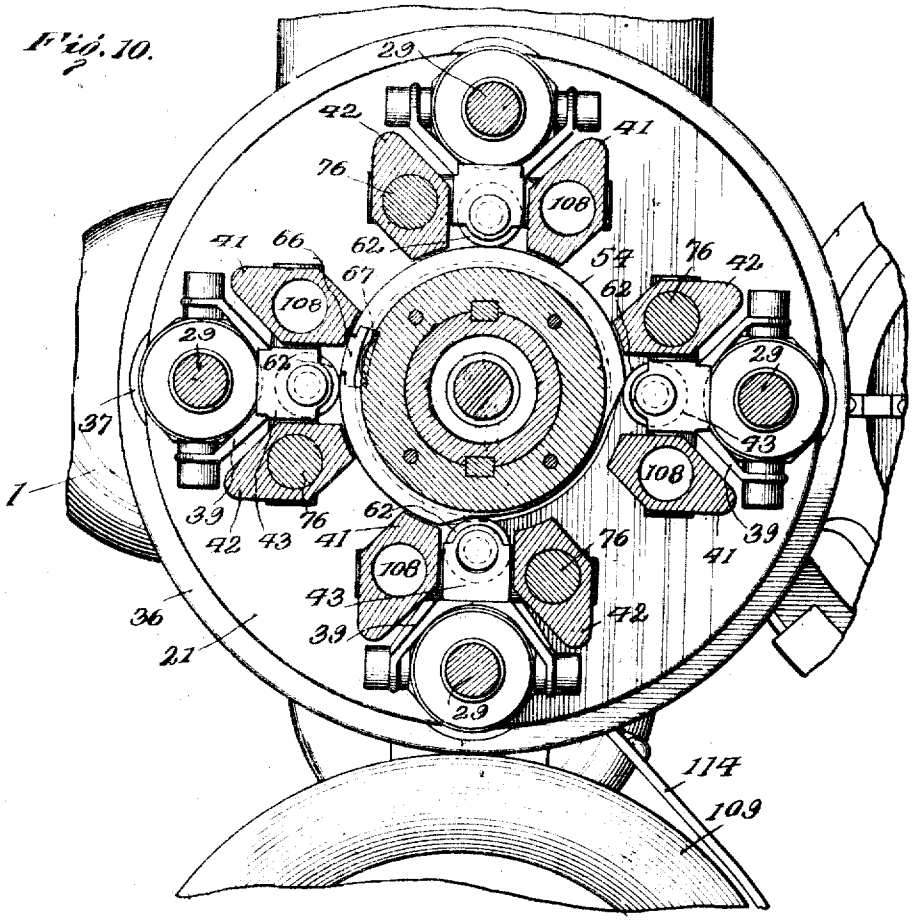
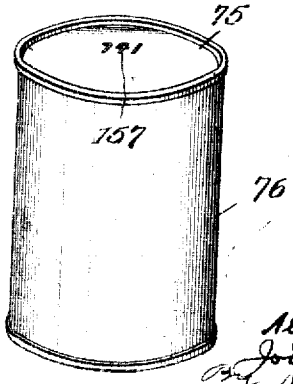


Fig. 11.



Witnesses:
Robert Howie
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Inventors
Albert L. Kronquest
John C. Taliaferro
By Sturlevant & Mason
Attys.

A. L. KRONQUEST AND J. C. TALIAFERRO.

CAN CLOSING MACHINE.

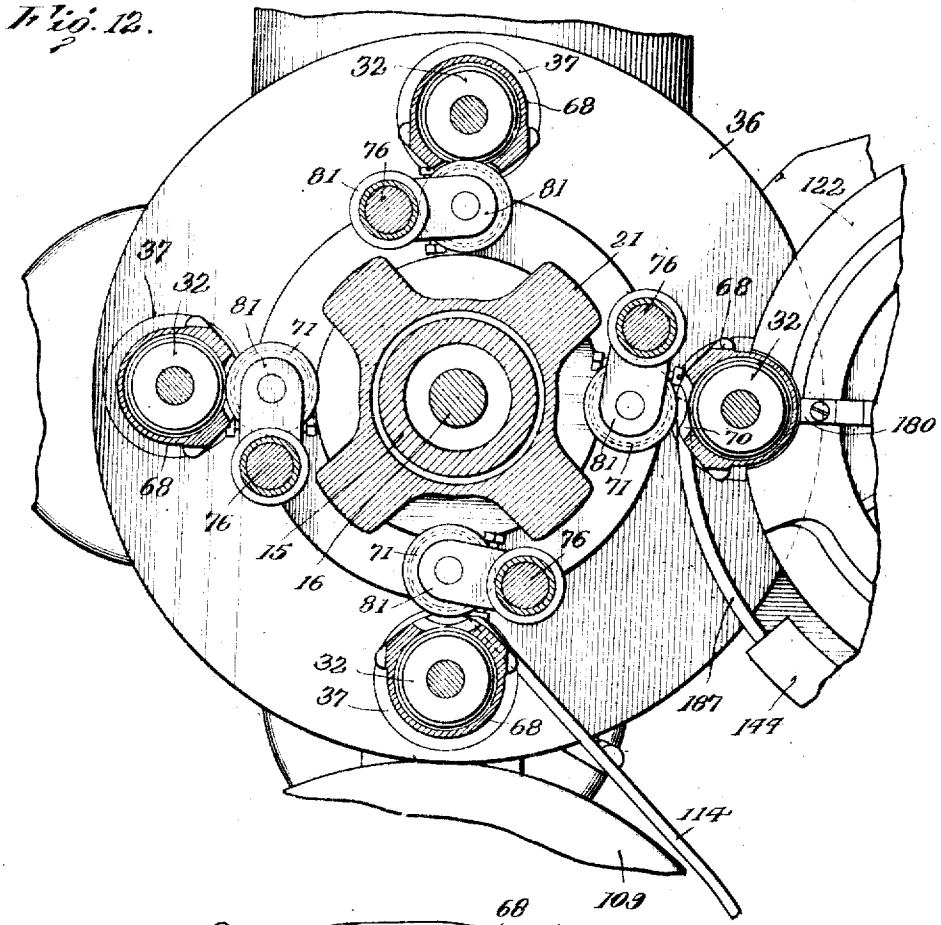
APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 8.

Fig. 12.



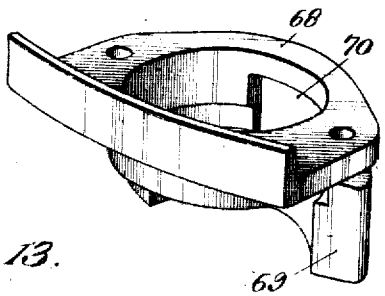


Fig. 13.

Witnesses:
Robert H. Weir
Arthur N. Carlson

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Alfred L. Kronquest
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CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 9.

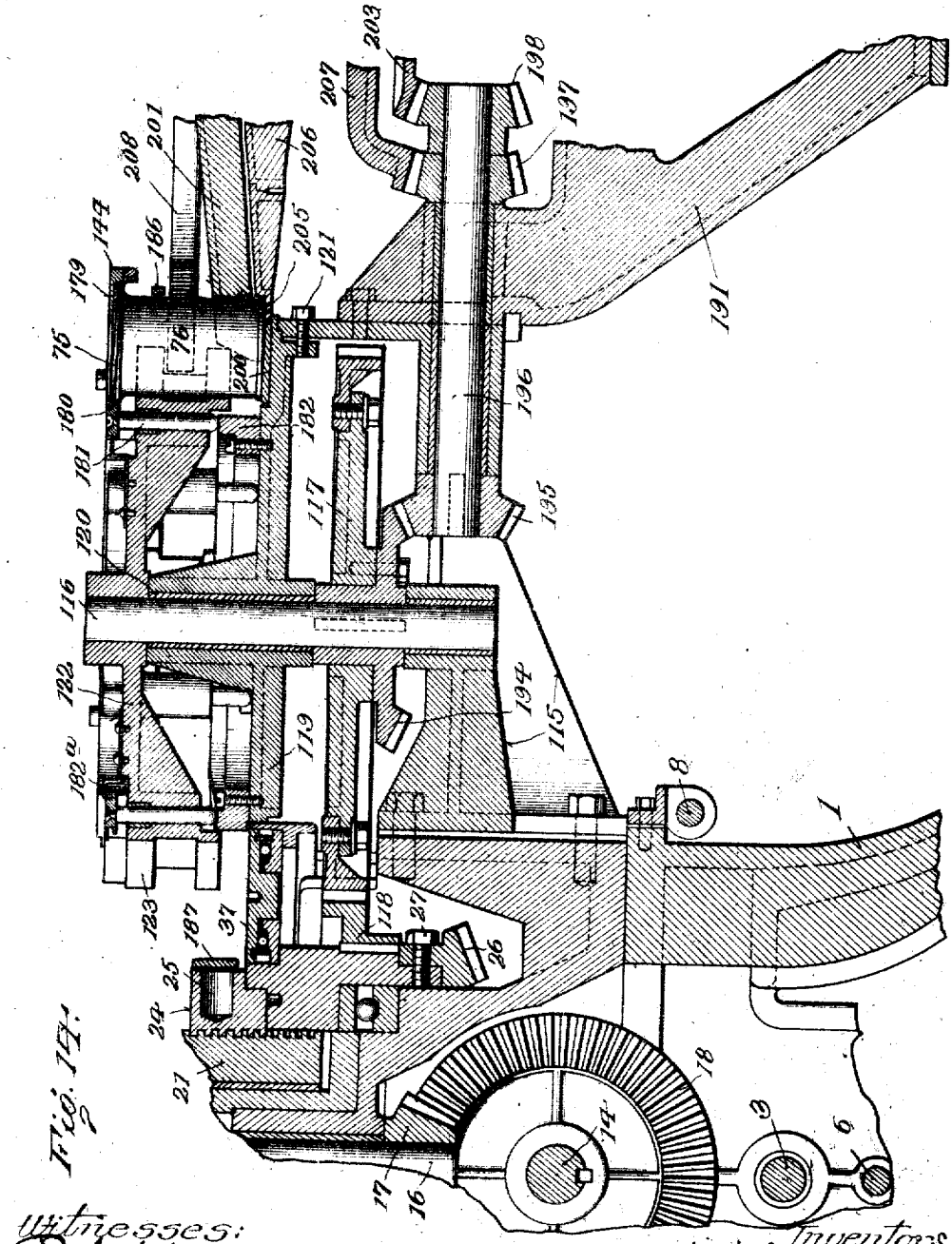


Fig. 17.

Witnesses:
Robert Weir
Arthur M. Carlson

Inventors
Alfred L. Kronquest
John C. Taliaferro
By Shurtleff & Thompson
Attys.

A. L. KRONQUEST AND J. C. TALIAFERRO.

CAN CLOSING MACHINE.

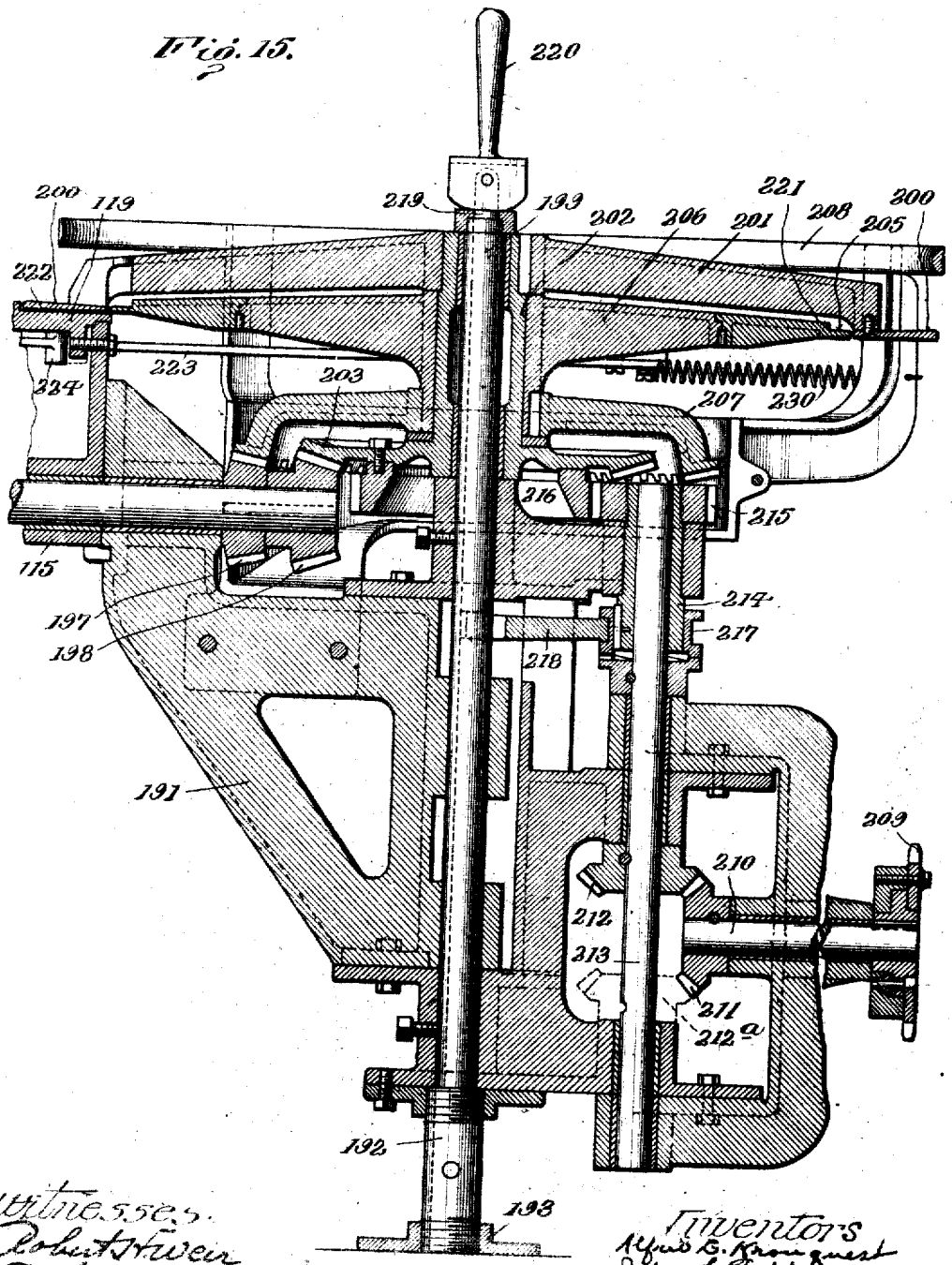
APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 10.

Fig. 15.



Witnesses:
Robert H. Ewer
Arthur M. Carlson

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Alfred B. Kronquest
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By Shurtleff & Ewerson
Attys

A. L. KRONQUEST AND J. C. TALIAFERRO.

CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650

Patented Aug. 3, 1920.

18 SHEETS—SHEET 11.

Fig. 16.

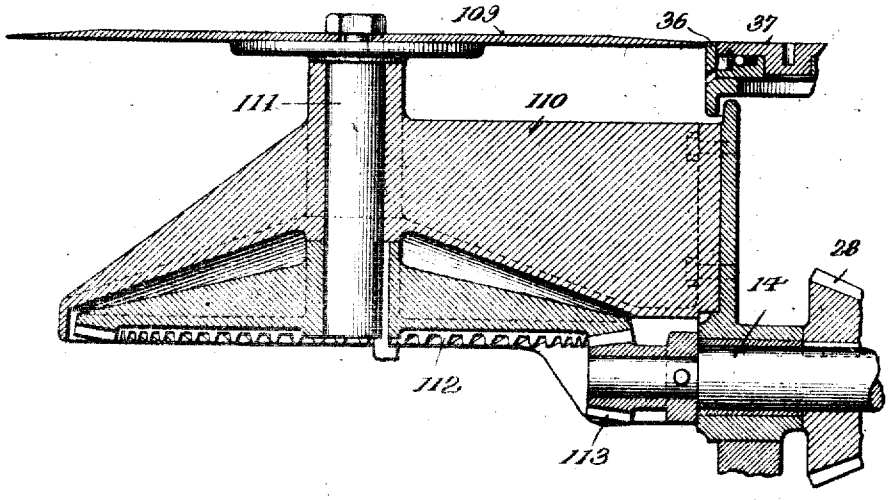
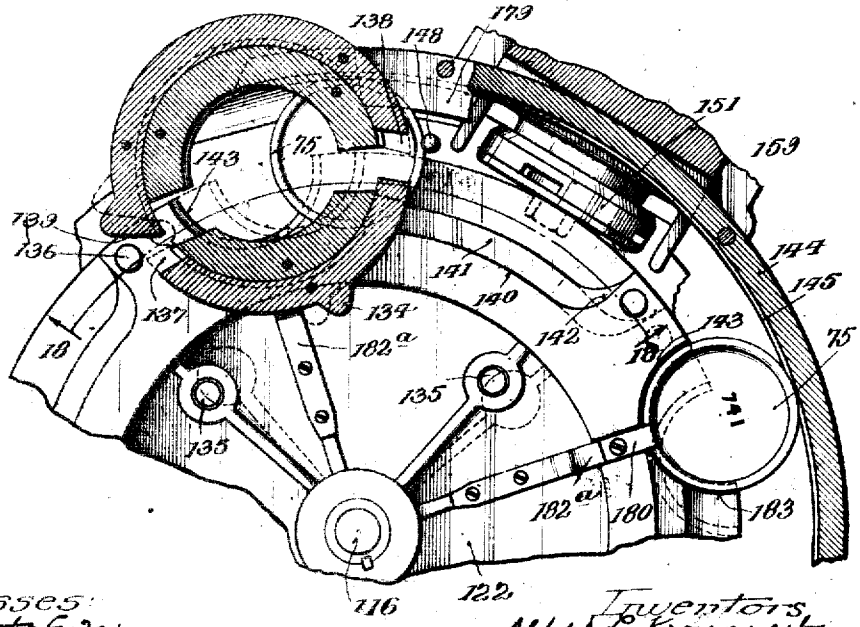


Fig. 17



Witnesses:
Robert H. Weir
Arthur M. Carlson

Inventors
Alfred L. Kronquest
John C. Taliaferro
By Shurtleff & Mason
Attys.

A. L. KRONQUEST AND J. C. TALIAFERRO.

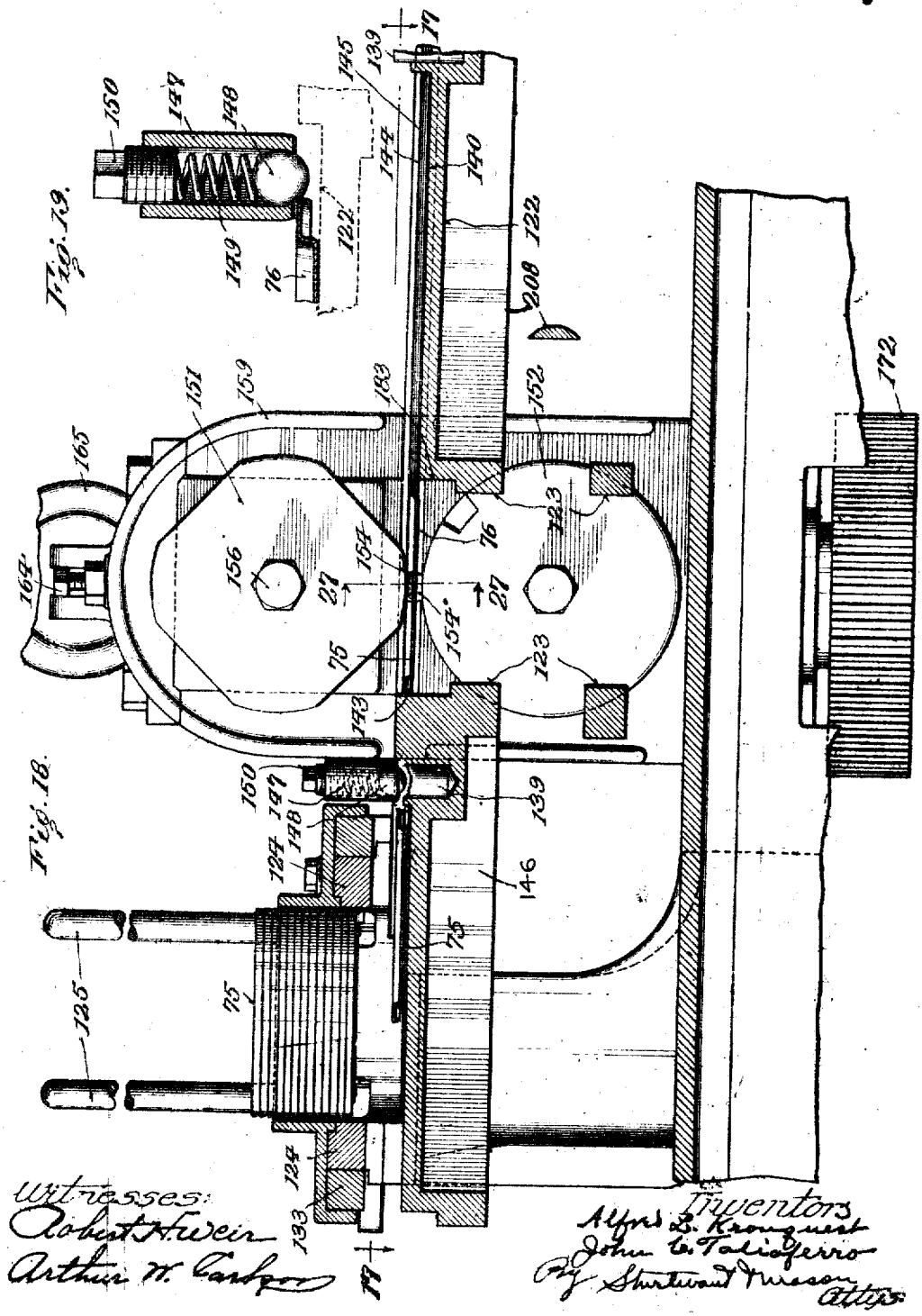
CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 12.



A. L. KRONQUEST AND J. C. TALIAFERRO.

CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 13.

Fig. 20.

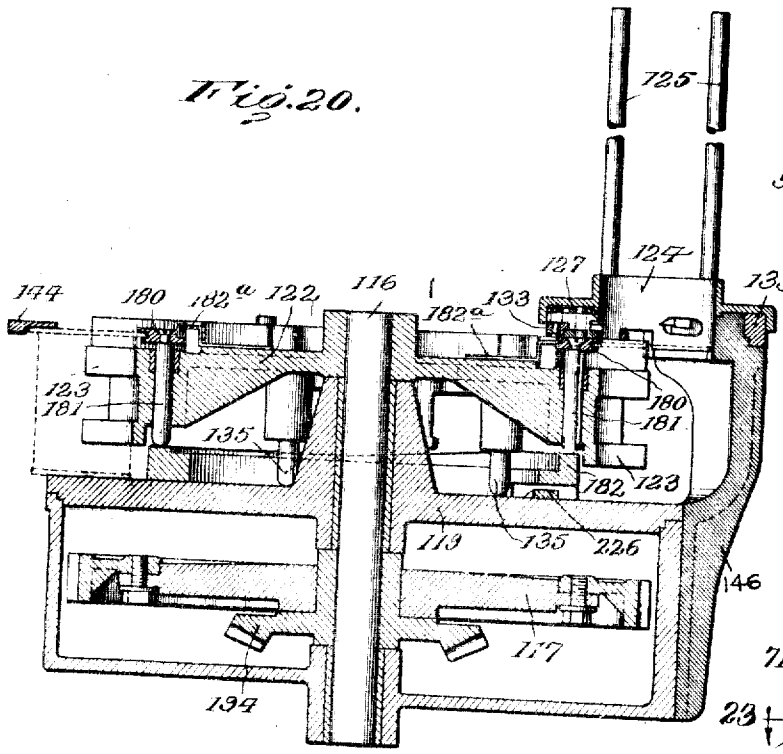


Fig. 22.

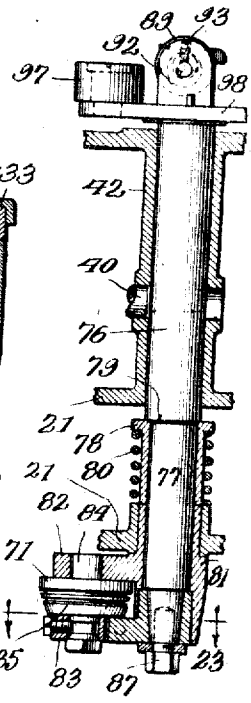


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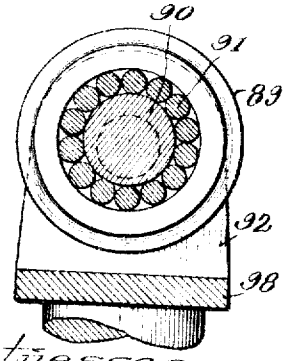


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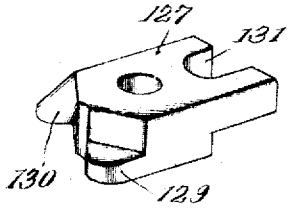
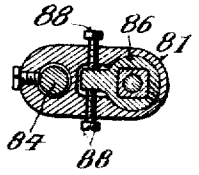


Fig. 23.



Witnesses:
Robert H. Weir
Arthur W. Carlson

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John C. Taliaferro
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A. L. KRONQUEST AND J. C. TALIAFERRO.

CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 14.

Fig. 25.

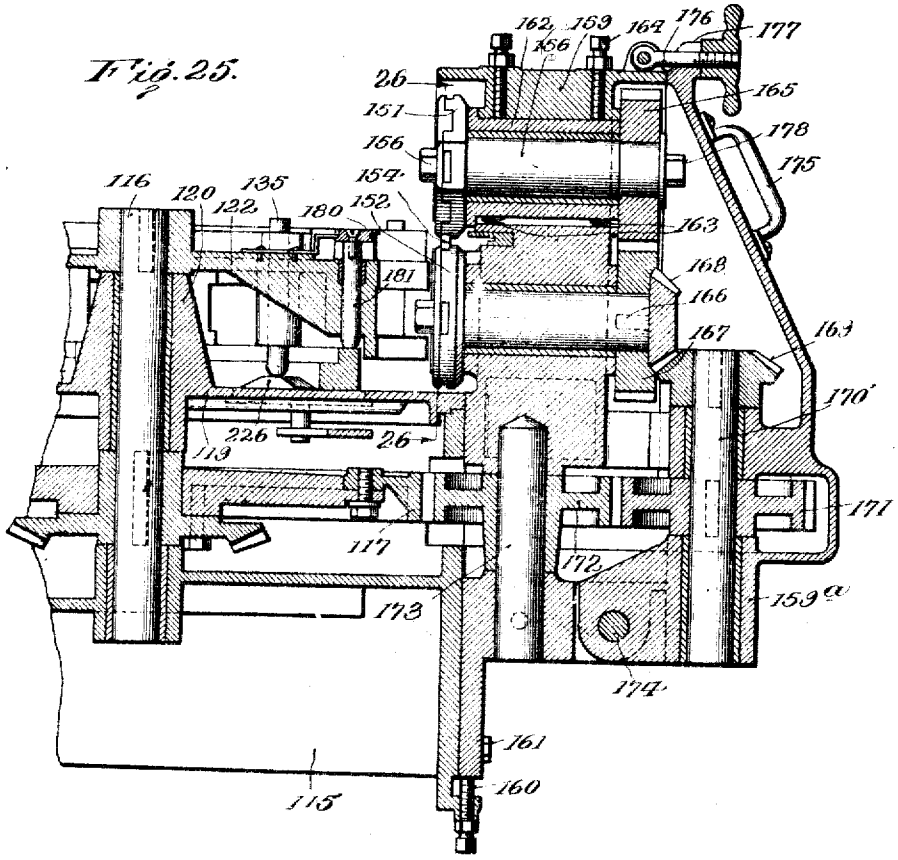


Fig. 27.

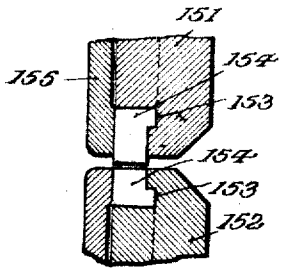


Fig. 26.

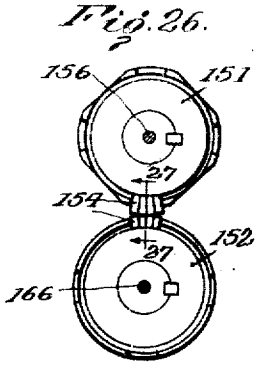
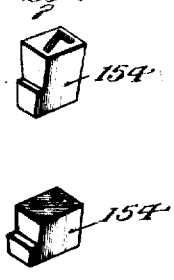


Fig. 28.



Witnesses:
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CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 15.

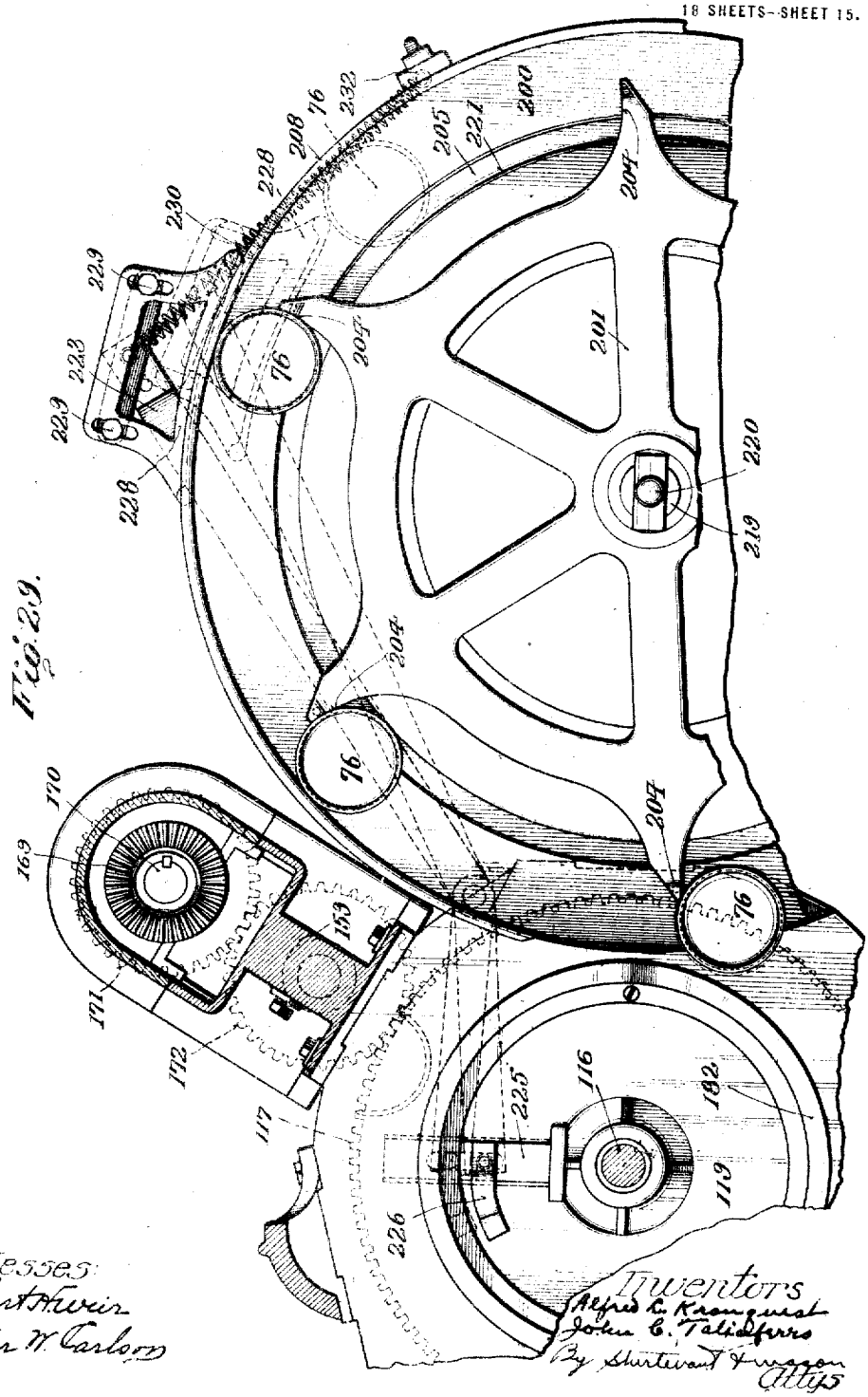


Fig. 29.

Witnesses:
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Alfred L. Kronquest
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CAN CLOSING MACHINE.

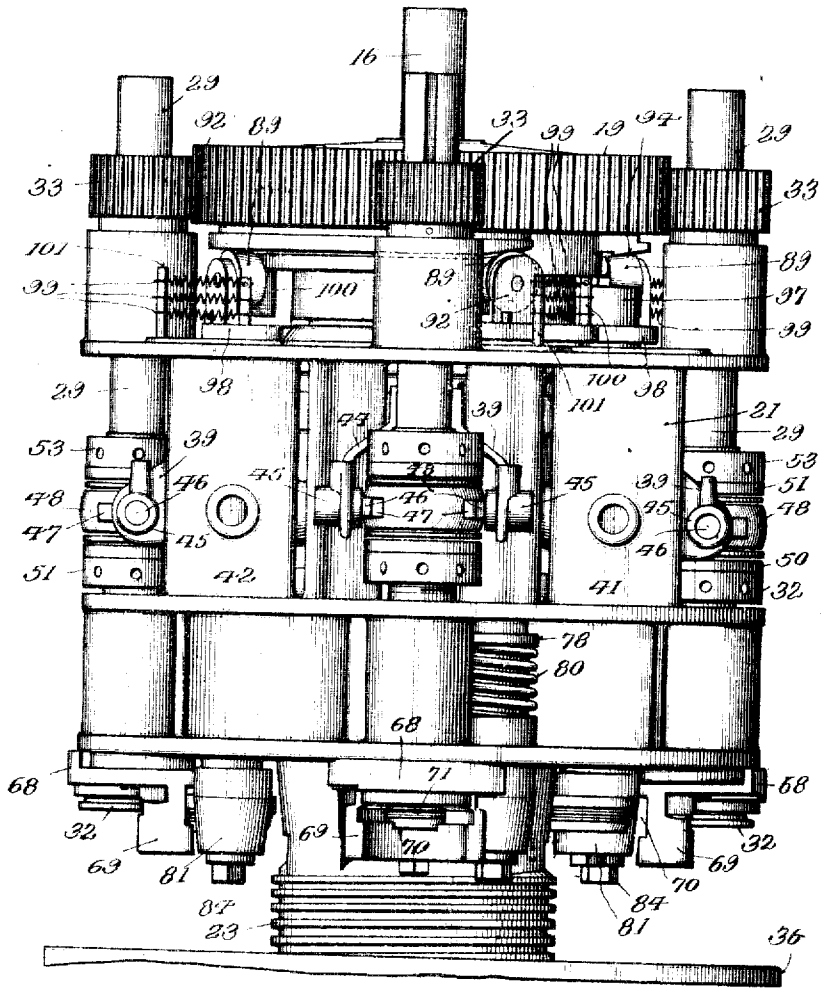
APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS--SHEET 16.

Fig. 30.



Witnesses:
Robert H. Weir
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CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 17.

Fig. 31.

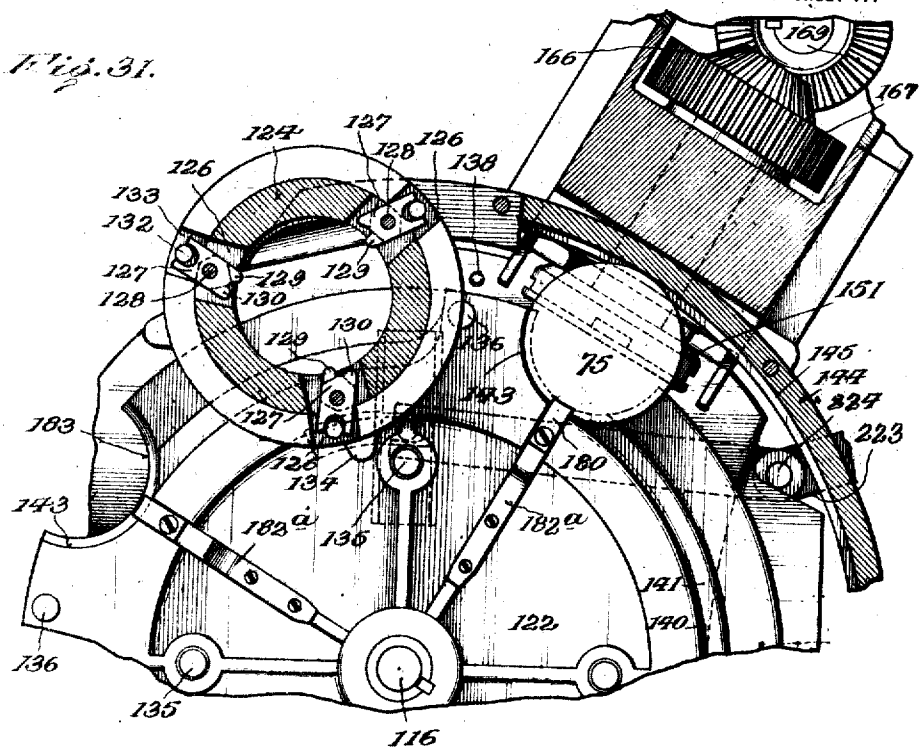
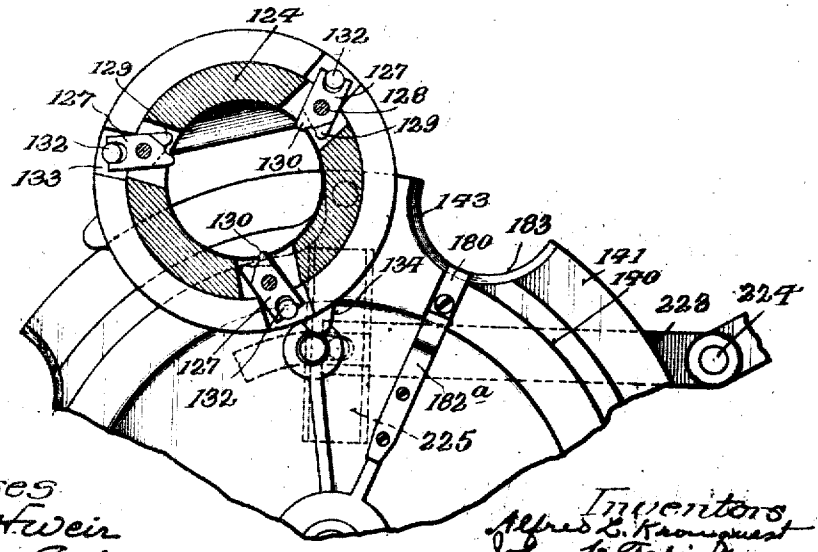


Fig. 32.



Witnesses
Robert F. Weir
Arthur W. Carlson

Inventors
Alfred L. Kronquest
John C. Taliaferro
By Sturtevant Duncan & Co.
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CAN CLOSING MACHINE.

APPLICATION FILED MAY 23, 1918.

1,348,650.

Patented Aug. 3, 1920.

18 SHEETS—SHEET 18.

Fig. 33

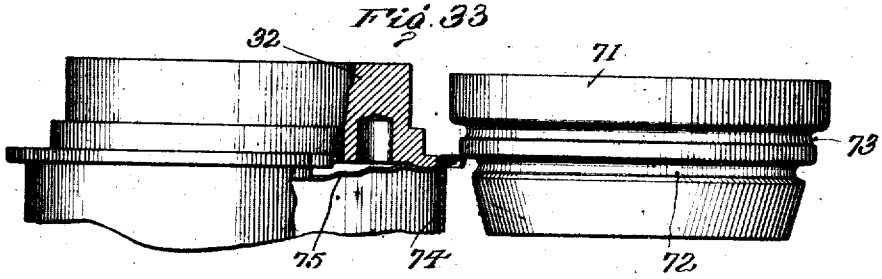


Fig. 34.

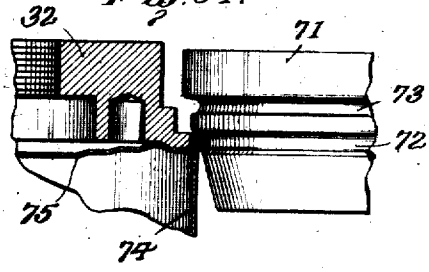


Fig. 35.

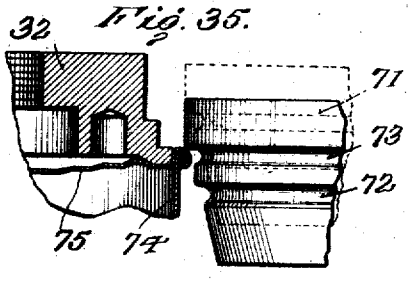
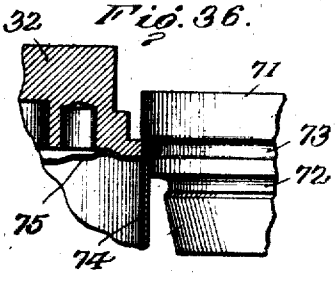


Fig. 36.



Witnesses:
Robert H. Weir
Arthur M. Carlson

Inventors
Alfred L. Kronquest
John C. Taliaferro
By Sturtevant Thurston
Attys.

UNITED STATES PATENT OFFICE.

ALFRED L. KRONQUEST, OF CHICAGO, ILLINOIS, AND JOHN C. TALIAFERRO, OF BALTIMORE, MARYLAND, ASSIGNORS TO CONTINENTAL CAN CO., INCORPORATED, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

CAN-CLOSING MACHINE.

1,348,650. Specification of Letters Patent. Patented Aug. 3, 1920.

Application filed May 23, 1918. Serial No. 236,145.

To all whom it may concern:

Be it known that we, ALFRED L. KRONQUEST and JOHN C. TALIAFERRO, citizens of the United States, residing at Chicago, in the county of Cook, State of Illinois, and Baltimore, Maryland, have invented certain new and useful Improvements in Can-Closing Machines, of which the following is a description, reference being had to the accompanying drawing and to the figures of reference marked thereon.

The invention relates to new and useful improvements in can closing machines and more particularly to a can closing machine wherein an end or a cover is secured to the can body by a double seaming mechanism.

An object of the invention is to provide a continuously operating can closing machine wherein the can body travels continuously in a forward direction and in a curved path and wherein means is provided for assembling can ends or covers and the can bodies, for rounding up the can body, for seating the can end or cover in the can body and for double seaming the end or cover to the can body.

A further object of the invention is to provide a machine of the above character with means for marking the cover as it passes from a stack holder to assembled position relative to the can body to which it is to be attached.

A still further object of the invention is to provide a machine of the above character wherein the can body and its cover are assembled by a mechanism located outside of the seaming machine, which assembling mechanism includes devices for gradually lowering the cover on the can body as they move forward to the seaming machine, so that said cover registers with and rests on the can body as it enters the seaming machine.

A still further object of the invention is to provide a machine of the above character wherein the assembling mechanism and the seaming mechanism coöperate in rounding up the can body preparatory to the seating of the cover in the can body by the chuck of the seaming machine.

Another object of the invention is to provide a machine of the above character wherein the cover or end is attached to the can body by a single seaming roll having a first operation groove formed therein and a second operation groove formed therein, said grooves being disposed one above the other and means is provided for moving the seaming roll and can body relative to each other for bringing about the operation of the first and second seaming grooves in succession.

Still another object of the invention is to provide a seaming machine wherein the seaming roll is fixedly secured to the spindle which carries the same and means is provided for positively operating the spindle, the spindle being of sufficient length so that the metal thereof may yield to permit the seaming roll to pass the side seams of the can body, thus doing away with all yielding pads or cushions heretofore used for such purpose.

Still another object of the invention is to provide a seaming mechanism wherein the seaming roll is provided with first and second operation grooves, which seaming roll is positively operated by a can having an adjustable section for varying the tightness of the first operation and wherein also the seaming roll may be bodily shifted relative to its supporting spindle, so that the tightness of both operations may be simultaneously varied.

Still another object of the invention is to provide a seaming machine of the above character wherein the seaming roll has first and second operation grooves and wherein said seaming roll is operated positively by a cam with means for permitting the withdrawal of the seaming roll from the can between the first and second operations, so that the can may be removed for inspection.

Another object of the invention is to provide a closing machine wherein the can travels continuously forward in a curved path in an upright position, which machine has means for rounding up the can body, for assembling the cover and the can body, for seating the cover in the can body while it is

rounded up and for seaming the cover to the can body with a mechanism for timing the can bodies as they are delivered to the assembling mechanism, which marks and places the cover on the can body, which timing mechanism presents the can body to the view of the operator for inspection.

A further object of the invention is to provide a machne of the above character in which the timing of the cans is brought about by rotating traveling supports for the can bodies, which supports have different speeds of travel, so that the can bodies are gradually shifted by a rotation thereof until brought into contact with the timing fingers.

Still another object of the invention is to provide means associated with the timing mechanism for determining whether covers are to be fed from the stack, so that covers will only be fed as a can body passes to the can body and cover assembling mechanism.

Still another object of the invention is to provide a marker for a machine of the above character, which marks the cover while it is traveling and which marker includes means whereby it may be readily changed so as to vary the identifying mark placed on the cover.

These and other objects will in part be obvious and will in part be hereinafter more fully described.

In the drawings which show by way of illustration one embodiment of the invention;

Figure 1 is a side elevation of a machine embodying the improvements;

Fig. 2 is a plan view of the same;

Fig. 3 is a vertical sectional view on the line 3—3 of Fig. 1;

Fig. 3ª is a view in detail showing in section the cam for operating the chucks and the means for taking up wear in the same;

Fig. 4 is a vertical sectional view on the line 4—4 of Fig. 1;

Fig. 5 is a horizontal sectional view on the line 5—5 of Fig. 3;

Fig. 6 is a perspective view of the rocking frame, which raises and lowers the chuck spindle;

Fig. 7 is a sectional view on the line 7—7 of Fig. 3;

Fig. 8 is a perspective view of the cam which releases the covers from the stack and the controlling means operated upon by the can bodies for rendering said cam operative or inoperative;

Fig. 9 is a sectional view on the line 9—9 of Fig. 7;

Fig. 10 is a sectional view on the line 10—10 of Fig. 3;

Fig. 11 is a perspective view of a metal can having a cover marked and attached thereto by the improved machine;

Fig. 12 is a sectional view on the line 12—12 of Fig. 3;

Fig. 13 is a perspective view of the chuck housing and the half mold which rounds up the can body and holds the cover seated in the can body;

Fig. 14 is a sectional view on the line 14—14 of Fig. 2;

Fig. 15 is a sectional view on the line 15—15 of Fig. 2;

Fig. 16 is a sectional view on the line 16—16 of Fig. 2;

Fig. 17 is a sectional view on the line 17—17 of Fig. 18;

Fig. 18 is a sectional view on the line 18—18 of Fig. 17;

Fig. 19 is a sectional view on the line 19—19 of Fig. 2;

Fig. 20 is a sectional view on the line 20—20 of Fig. 2;

Fig. 21 is a perspective view of one of the cover supporting and releasing dogs;

Fig. 22 is a sectional view on the line 22—22 of Fig. 7;

Fig. 23 is a sectional view on the line 23—23 of Fig. 22;

Fig. 24 is a sectional view on the line 24—24 of Fig. 7;

Fig. 25 is a sectional view on the line 25—25 of Fig. 2;

Fig. 26 is a sectional view on the line 26—26 of Fig. 25;

Fig. 27 is a vertical sectional view on the line 27—27 of Fig. 18;

Fig. 28 is a perspective view respectively of the male and female dies for marking the cover;

Fig. 29 is a view partly in plan and partly in section of the assembling mechanism and the timing mechanism showing a can passing from the timing mechanism onto the assembling mechanism and also showing the cover releasing mechanism in full line position for releasing the cover and in dotted line position, so that no cover will be released;

Fig. 30 is a side view of the upper portion of the seaming machine with the cover plates removed;

Fig. 31 is a view partly in plan and partly in horizontal section through the stack holder just above the supporting and releasing dogs for the covers and also through the marking mechanism, showing the holding dogs in position where the stack rests on the lower arm of the dog;

Fig. 32 is a similar view of the cover releasing mechanism only, but showing the dogs shifted so as to release the lowermost cover from the stack;

Fig. 33 is a view partly in side elevation and partly in section showing the chuck, the can body, the can cover and the seaming roll, with the parts positioned for the seaming roll to move into engagement with the flange on the cover to perform the first operation thereon;

Fig. 34 is a similar view but showing the

seaming roll as having finished the first operation;

Fig. 35 is a similar view but showing the seaming roll lowered in full lines and positioned for the second operation;

Fig. 36 is a similar view but showing the seaming roll as having finished the second operation.

The improved machine is intended for attaching a cover or can end to a can body and includes a rotating seaming mechanism having a plurality of rotating chucks with seaming devices associated with each chuck, so that as the seaming machine rotates, the cover may be double seamed to the can body and during a portion of a rotation of the seaming machine. The machine also includes an assembling mechanism, which takes the cover or can end from a stack and also a can body and assembles the can body and cover. The cover as it passes from the stack to assembling position is marked by a marking device which imprints an identifying mark in the metal. The cover is gradually lowered onto the can body and is preferably released at its outer edge and dropped onto the can body when closing filled cans at the point where the can body is taken over by the assembling mechanism to be fed to the seaming mechanism. This prevents any tendency of the filled can to spill or slop at this point. The cover is positively conveyed with the can body and is centered over the same and is finally released when the can body is positioned in the seaming machine underneath the chuck of the seaming mechanism which moves down to seat the cover in the can body. The assembling mechanism is provided with a half mold cooperating with a half mold on the seaming machine for rounding up the can body prior to the seating of the cover therein. It is understood that the assembling mechanism is provided with a plurality of can body feeding half molds and also with a continuously rotating cover feeding means. The machine is also provided with a timing mechanism which receives the cans in semitimed relation and during the travel of the timing mechanism the can bodies will be timed so as to be fed into the assembling mechanism at the proper time interval. This timing mechanism includes rotating supports for the can, onto which the can bodies are delivered and these supports travel at different speeds, so that the can will be retarded by a rotating movement of the can body until it is brought against the timing finger. The cover releasing mechanism is controlled by means operated upon by the can bodies on the timing mechanism. The machine is particularly adapted for closing filled cans and the timing mechanism is also adapted to receive the cans directly from the filling machine. The can bodies coming from the filling machines will be semitimed, that is, so many cans will be delivered to the timing mechanism per minute. The seaming machine is driven preferably from any suitable source of power and the seaming machine in turn operates the assembling mechanism and the timing mechanism and the timing mechanism operates the filling machine.

Referring more in detail to the drawings, the improved machine will be described under the following groups of mechanisms.

One:—The seaming mechanism.

Two:—The can body and cover assembling and marking mechanism.

Three:—The timing and inspection mechanism.

Seaming mechanism.

The improved seaming mechanism consists of a supporting frame or base 1, on which is mounted a rotating turret 2. Mounted in suitable bearings in the supporting frame or base 1, is the main shaft 3, which is driven by a belt wheel 4. This belt wheel is loose on the shaft and may be clutched thereto by a suitable clutch mechanism indicated at 5. This clutch mechanism is operated by a clutch shifting rod 6, which may extend through to the front of the machine where it can be operated by a suitable lever 7 pivoted at 7^a and connected to the rod 6 at 9 (see Fig. 1). This lever is provided with a handle 10. The lever 7 is connected at 8 to a sliding rod 8^a which permits the machine to be started from either side. The main shaft 3 is also provided with a hand wheel 11 which facilitates the turning of the shaft for adjustment and inspection of the operation of the machine. The main shaft 3 carries a gear wheel 12 which meshes with a gear wheel 13 on a shaft 14, also mounted to rotate in suitable bearings in the frame or base 1. Mounted on the frame or base 1 is a vertical column 15 about which the turrent 2 rotates. Mounted in suitable bearings in the column 15 is a vertical shaft 16. This shaft 16 carries a bevel gear 17 at its lower end, which meshes with a bevel gear 18 on the shaft 14. A gear wheel 19 is located near the upper end of the shaft and is keyed thereto. This gear wheel 19 rests on a wear plate 20 at the upper end of the column 15. The turret 2 consists of an upper body section 21 which is free to rotate about the column 15 and a lower body section 22, which is mounted on ball bearings 23 on the frame or base 1. The upper body section 21 is formed with a threaded part 23. A threaded ring nut 24 engages the threaded part 23. This ring nut is formed with suitable openings 25 for a spanner wrench which may be used for turning the ring. The ring rests on the lower section 22 of the turret. By turning this threaded ring

nut, the upper section is raised and lowered relative to the lower section. This is for adjusting the machine for cams of different heights. The lower section 22 is provided with a bevel gear 26 which is secured thereto by suitable bolts 27. This bevel gear meshes with a bevel gear 28 attached to the shaft 14, so that as the shaft 14 rotates the turret 2 will be rotated thereby. Mounted in the turret 2 as shown in the present embodiment of the invention, are four chuck spindles 29. These chuck spindles are all similar in construction. The upper section 21 of the turret is formed near its upper end with a bearing sleeve 30 for the chuck spindle and near its lower end with a bearing sleeve 31 also for supporting the chuck spindle. At the lower end of the chuck spindle there is a chuck 32 which is secured to the chuck spindle in the usual manner. Splined on the chuck spindle is a gear wheel 33 which meshes with the gear wheel 19. The chuck spindle is free to move in the gear 33 to a limited extent. At the upper end of the turret there is a cap 34 which freely engages the upper end of the shaft 16 and which is provided with bearing sleeves 35 for the extreme upper ends of the chuck spindles. The gears 33 are located between the upper section of the turret and the cap 34 and are held from end wise movement by these parts. It will be noted that the gear 18 will rotate the central shaft 16 in a different direction from the rotation of the turret by the gear 28. As the turret rotates, the chuck spindles will travel bodily with the turret. The gear 19 rotating in the opposite direction however, will spin the chuck spindles and said chuck spindles will be rotated rapidly although the turret may travel comparatively slowly.

The lower section of the turret 22 is provided with a laterally extending table 36 in which are mounted rotatable supports 37. There is a support in alinement with each chuck spindle. These supports are detachably mounted in the table and include ball bearings 38, so that the support may be rotated freely through the action of the chuck spindle engaging the can which rests on the support.

The chuck spindle 29 is raised and lowered in the turret positively by a rocking frame 39 which is shown in Figs. 3, 6 and 10. Said rocking frame is fulcrumed on a pin 40 which is mounted in the upper section of the turret. The turret is provided with spaced members 41 and 42, between which the body portion 43 of the rocking frame is located and the pin 40 has bearings in these members 41 and 42. The rocking frame 39 has spaced arms 44 which straddle the chuck spindle 29. At the outer end of each arm is a sleeve 45. Each sleeve 45 is provided with a pin 46 (see Fig. 30). These pins 46 engage grooves 47 formed in a collar 48, which freely surrounds the chuck spindle 29. The chuck spindle is provided with a threaded section 49. Sleeves 50 and 51 freely surround the threaded section of the chuck spindle and extend into the collar 48 (see Fig. 3). There are ball bearings between the flanges on the sleeves 50 and 51 and the collar. Threaded rings 52 and 53 are screwed onto the chuck spindle above and below the sleeves 50 and 51. This provides a connection between the rocking frame 39 and the chuck spindle, which will cause the chuck spindle to move endwise in its bearings when the rocking frame is swung about its fulcrum, but will at the same time permit the chuck spindle to rotate freely in said bearings and in this connection to the rocking frame. The rocking frame 39 is oscillated positively for moving the chuck spindle up and down by two cams 54 and 55. These cams 54 and 55 as herein shown are formed on the same sleeve member 56. This sleeve member 56 slides onto the column 15 and is keyed thereto by keys 57 engaging key ways in the column. Above the sleeve 56 carrying these cams, is a hardened wear plate 58. A retaining plate 59 is secured to the upper section of the turret 21 and balls 60 are placed between this retaining plate and the hardened plate 58. The upper section of the turret 21 has a central opening which permits the cam sleeve 56 to be placed on the column. After the turret has been placed on the column the retainer plate is placed in position and said retainer plate is held in position by clips 61, which are screwed to the upper face of the turret section 21, see Fig. 7. Each rock frame is provided with a roller 62 which is adapted to engage the cam 54. Said roller is mounted on a pin 63 which is held in place by a set screw 64. Each rock frame is also provided with a roller 65 which engages the cam 55 on the sleeve 56. It will be noted that the cam 54 is a horizontally acting cam and operates to swing the rock lever outwardly at its upper end, thus moving the chuck spindle downwardly in its bearings. The cam 55 is a vertically acting cam and operates on the roller 65 to move the rock frame in the opposite direction and thus lift the chuck spindles. These cams 54 and 55 are constantly in engagement with the rollers 62 and 65 respectively. The cam sleeve 56 is keyed to the column but is free to move endwise thereon. At the lower end, this sleeve is slightly spaced from the turret section 21, so that the sleeve in reality rests on the rollers 55. The upward movement of the sleeve is prevented by the retaining plate 59, which is held in place by the clips 61. Shims 61^a are placed under the clips 61 and these may be removed or added, to adjust the position of the retainer plate 59.

Of course other means may be provided for adjusting this plate. By adjusting the plate vertically the position of the sleeve 56 may be altered in order to take up any wear between the cam 55 and the rollers 65 which operate thereon. It will thus be seen that means is provided whereby the chuck spindles will be positively raised and lowered and that any wear incident to the operation of the machine may be readily taken up, so as to maintain this positive movement of the chuck spindles. The cam 54 is shown in plan view in Fig. 10 of the drawings and it will be noted that each of the rollers 62 is continuously in engagement with this cam. This cam 54 operates to lower the chuck to cause the chuck to engage the can end or cover. As will be described hereinafter, there are times when it may be desirable to remove a can which is engaged by the chuck and therefore the sleeve 56 is formed with a small yielding section 66. The sleeve is cut away to form a recess with overhanging parts and the yielding section is T shaped in cross section. A spring 67 forces this yielding section normally outwardly so as to keep the outer face thereof flush with the outer face of the cam 54. If the machine be stopped with this section 66 in engagement with the roller 62, then the chuck spindle may be readily pried up or lifted and the sections 66 will yield to permit this movement.

When the seaming machine is used for seaming covers to filled cans, then of course the turret rotates about a vertical axis. The can bodies are placed on the rotatable supports 37 underneath the chucks. At the region of each chuck there is a housing 68 which is attached to the turret section 21 and this housing extends about the chuck, so as to house the chuck when it is at its extreme upper position as shown at the left hand of Fig. 3 of the drawings. Said housing has a depending half mold flange 69, which operates in conjunction with a half mold on the assembling mechanism to be hereinafter described for rounding up the can body. Said depending half mold flange has an opening 70 therethrough to permit the seaming roll to operate upon the cover for seaming the same to the can body. After the filled can body and the cover which is placed thereon, are placed on the rotatable support 37, the chuck is positively moved downwardly, engaging the cover, seating the same in the can body and then rotates the cover and can body until after the seaming operation has been performed, after which the chuck spindle will be positively raised, the housing 68 operating to strip the closed can from the chuck spindle. This engagement of the chuck spindle with the can and the rotating of the can, occurs during a partial rotation of the turret, so that the filled can and the cover are received at one point in the rotation of the turret, as clearly shown in Fig. 2 and discharged therefrom at a point substantially 270° therefrom.

The cover is seamed to the can body in the present embodiment of the invention by a single seaming roll 71. In Figs. 33 to 36 inclusive, the seaming roll and the operation thereof is clearly shown. This seaming roll 71 is provided with a first operation groove 72 and a second operation groove 73. In these figures the chuck is indicated at 32. A portion of the can body is indicated at 74 and the cover or end to be attached thereto is indicated at 75. In Fig. 33 the chuck is shown as having seated the cover in the can body and is rotating the cover and can body. The seaming roll 71 is positioned with its first operation groove 72 directly in front or in line with the can cover. The seaming roll is moved to the left as viewed in Fig. 33 to the position shown in Fig. 34 and as the can body and cover are being rotated by the chuck, the first operation is performed as clearly shown in Fig. 34. The seaming roll 71 is then moved away from the seam and lowered to the full line position shown in Fig. 35, where the second operation groove 73 is directly in front or in line with the seam. The seaming roll 71 is then moved toward the can and as the can continues its rotation the second operation will be completed as clearly shown in Fig. 36 of the drawings. With this understanding of the operation of the seaming roll, the mechanism for supporting and moving the seaming roll into engagement with the cover and flange on the can body will now be described. The seaming roll 71 is carried at the lower end of a supporting spindle 76 (see Fig. 22). This supporting spindle is mounted in the member 42 of the upper turret section 21. As clearly shown in Fig. 10 of the drawings, the spindle 76 carrying the seaming roll is located at one side of the chuck spindle. Said spindle 76 at its lower end is formed with a reduced section 77, which has a flange sleeve 78 engaging a shoulder 79 formed by this reduced section 77. A spring 80 surrounds this sleeve and bears against the turret section 21 at its lower end, while the upper end of the spring engages the flange on the sleeve 78. This spring normally raises the spindle 76. Freely mounted on the lower end of the spindle 77 is the supporting frame 81 for the seaming roll 71. Said frame 81 has spaced arms 82 and 83. The seaming roll 71 is located between these arms and is carried by a bearing pin 84 which is held in place by a set screw 85. The frame is formed with a recess in which is located a positioning dog 86 (see Fig. 23). This positioning dog has a square recess which engages the end of the spindle 76, said end of

the spindle being tapered and square in cross section to fit said recess. A bolt 87 holds the dog in place. Adjusting bolts 88 are threaded through the frame 81 and engage the side faces of the positioning dog 86. As above noted this frame 81 is freely mounted on the spindle, so far as rotating movements are concerned. By adjusting these screws 88 it will readily be seen that the frame may be angularly adjusted about the longitudinal axis of the spindle 76. The spindle is moved endwise in its supporting bearings by a roller 89 which is mounted on an eccentric support 90, friction balls 91 being placed between the roller and the eccentric support. The eccentric support is secured to an upright arm 92 attached to a plate at the upper end of the spindle. Said eccentric support is held in the upright arm 92 by a set screw 93 and by adjusting the support, the eccentric is shifted so as to raise or lower the roller 89. This roller 89 is adapted to engage a cam 94 (see Figs. 3 and 30). The cam 94 is keyed to the column 15 by the keys 57. Beneath the cam 94 is another cam 95 which is likewise keyed to the column by the keys 57. These cams 94 and 95 are secured to the sleeve 56 by suitable bolts 96, which pass down through the same (see Figs. 5 and 7). The weight of these two cams and the sleeve 56 as above noted are carried by the rollers 55 and the upward movement of the cam 49 is prevented by the retaining plate 59.

The spindle 56 is oscillated by a roller 97 which coöperates with the face cam 95. These rollers 97 are attached to the plate at the upper end of the spindle which carries the arm 92. This plate is indicated at 98 in Figs. 7 and 22 of the drawings. The spindles are turned about their longitudinal axis to hold the rollers in engagement with the cam 95 by springs 99. As clearly shown in Fig. 30 of the drawings, there are a series of springs which are attached at one end to a post 100 and at their other ends to a post 101. The post 100 is mounted on the plate 98 and the post 101 is mounted on the upper section 21 of the turret. It will be clear from Figs. 7 and 12 that the seaming rolls are on the same side of the longitudinal axis of the spindle as the rollers 97, which oscillate the same. It will also be clear from Fig. 12 that the outward movement of the roller 97 through the action of the cam 95 thereon, moves the seaming roll into engagement with the cover and the flange on the can body. The shaping and construction of the cam 95 is clearly shown in Fig. 7 of the drawings. The section of the cam from *a* to *b* operates upon the roller 97 for moving the seaming roll to perform the first operation. The seaming roll controlled by the roller 97 at the extreme right of Fig. 7 is away from the chuck, so that the can and cover may be placed underneath the chuck. The cam 95 is held from rotation. As the roller 97 travels along from *a* to *b* on this cam, the seaming roll will be moved into contact with the cover and perform the first operation which is shown in Fig. 34 of the drawings. The cam 95 is provided with an adjustable section 95ª which is shaped so as to have a pivotal connection with the cam disk at 102. At the other end of this section 95ª there is a limiting screw 103, which limits the outward movement of the free end of the section and said free end is forced outwardly by a wedge 104 (see Fig. 9 of the drawings). This wedge is raised and lowered by a screw 105 which is threaded into the cam disk 95. By raising the wedge from the position shown in Fig. 9 and tightening the screw 102, the section 95ª will be swung toward the center of the cam and this will decrease the outward movement of the roller 97 and consequently decrease the outward movement of the seaming roll toward the chuck and thus make the first operation seam looser. By an adjustment of the section 95ª radially outward from the center, the tightness of the first operation may be increased. After the roll 97 passes off from the high point of the section 95ª, the springs 99 will withdraw the seaming roll 71 from engagement with the seam to the position shown in Fig. 35 of the drawings. While in this position the roll 89 will move the spindle downwardly, compressing the spring 80. This is caused by the shaping of the cam 94 as clearly shown in Fig. 30 of the drawings. At about the point *c* the seaming roll is again moved toward the chuck to begin the second operation and when the point *d* is reached the second operation has been completed as shown in Fig. 36 of the drawings. It was the downward movement of the spindle carrying the seaming roll that positioned the second operation groove in alinement with the cover so as to permit this second operation to be performed. After passing the point *d* the seaming roll is quickly withdrawn from engagement with the seam on the can and then the can is ejected from the seaming machine. As clearly shown in Fig. 30 of the drawings, the cam 94 has a cut away section and the extreme upward movement of the spindle carrying the seaming roll is limited by the frame 81 coming in contact with the upper section 21 of the turret. This permits the spindle to be readily removed after taking off the cap 34 and the gear wheel 19 and without removing the cam 94.

By adjusting the section 95ª the degree of tightness of the first operation may be readily varied. In order that the can may be inspected after the first operation has been finished and before the second operation be-

gins, the cam 54 which moves the chuck up and down, is provided with the yielding section 66 above described. The can and cover are placed in the machine and the machine turned by hand through a sufficient angular movement to complete the first operation and withdraw the seaming roll from the flange of the cover and then the machine stopped. At this time the roll 62 will be directly opposite the yielding section 66, the seaming roll will be out of contact with the can and the chuck may be pried up or lifted and the can removed for inspecting the first operation seaming. The degree of tightness of both the first and second operations may be simultaneously adjusted by aid of the screws 88 and the positioning dog 86 as shown in Figs. 22 and 23. It will therefore, be noted that after the proper adjustments between the first and second operations have been secured by shifting of the section 95ª, that the seaming roll may be shifted for varying the tightness of the seam or for positioning said roll for different size cans without altering the fixed adjustment between the first and second operations. If these first and second operations are properly adjusted relative to each other then an adjustment of the seaming roll by means of the screws 88 to secure proper tightness or finishing of the seam necessitates that the first operation will be properly finished and the work of the seaming roll properly distributed between the first and second operations.

It will be noted that the seaming roll is moved positively into engagement with the flange of the cover in the forming of the seam. It will also be noted that the spindle 76 which carries the seaming roll at one end and the roll 97 for oscillating the same at its other end is relatively long. By the use of this relatively long spindle which moves about its longitudinal axis in forcing the seaming roll into contact with the cover, no spring cushions or the like are necessary to permit the seaming roll to pass over cross seams, such as the side seam in the can, for the reason that the metal in the spindle itself will yield to the tortional strain sufficiently to permit the seaming roll to pass the cross seam.

The section 23 of the turret 2 as above described has a threaded connection with a ring nut 24. This section 23 has a splined connection with the section 22 as clearly shown in Fig. 3, wherein a key 106 carried by the part 22 engages a groove in the part 23. This insures that the section 22 will remain in a predetermined position relative to the section 21 and therefore the rotatable supports 37 will always be in alinement with the axis of the chuck spindles. When it is desired to operate upon a can of different height, the threaded ring 24 is turned so as to lift the turret. All the parts of the turret, also the cams 94 and 95 and 56 will be raised with the turret. The gear wheel 19 however, will not be shifted but is of sufficient width to permit the gears 33 to be raised and lowered with the turret and maintain operative connection therewith. The cap plate 34 will of course move up and down with the turret. The moving parts are completely housed by closing face plates indicated at 107 in Fig. 1 of the drawings. These may readily be removed to obtain access to the devices for operating the chuck spindle and also the devices for operating the seaming rolls. The seaming roll is of course shifted when cans of different diameters are operated upon and this is accomplished by changing the positioning dogs 86 which are formed so that the projecting part thereof will extend at different angles to the rectangular recess in the dog. These are readily accessible to the operator from beneath the turret. The housing for the chucks and the half mold rounding up sections carried thereby will also have to change for cans of different diameters. From the above it will readily be seen that the seaming mechanism for securing the cover to the can body is of comparatively few parts and is comparatively free from springs, so that the machine is capable of running at high speed day in and day out, without requiring attention from skilled operators. Furthermore, the machine is readily adjusted for different size cans or for regulating the tightness of the seam and these adjustments may be made by relatively unskilled operators, for the reason that when going from one size can to the other no necessity of adjustment between the first and second seam operations are necessary, as these are positively maintained and simultaneously adjusted. While in the present embodiment of the invention, the machine is shown as provided with four chuck spindles, it will be understood of course that the number of spindles may be varied as the manufacturer desires, without departing from the spirit of the invention, as for example, in operating upon large cans such as gallon cans, it may be desired to make the machine with three spindles instead of four and then again in operating upon very small cans, it may be desirable to increase the number of spindles. It will also be understood that from certain aspects of the invention, two seaming rolls may be used in connection with each chuck instead of the single seaming roll having first and second operation grooves. To this end the upper section of the turret 21 is shown as provided with openings 108 in which the second spindles would be placed.

The closed cans are discharged from the rotating closing machine to a receiving table or disk 109. This disk or table is shown in

Figs. 1, 2 and 16 of the drawings. Bolted to the frame or supporting base 1 is a bracket 110. The disk or table 109 is fixed to a short vertical shaft 111 journaled in said bracket. The gear wheel 112 is keyed to the lower end of the shaft for rotating the same. On the end of the shaft 14 is a beveled gear 113 which meshes with the gear wheel 112. This positively rotates the disk or table 109. A guide rail 114 (see Fig. 2) extends into the closing machine between the upper rotating turret and the rotating support 36 and this guide rail operates to direct the cans from the closing machine to the rotating table or disk 109. The closing machine rotates in a counter clockwise direction as shown in Fig. 2 and therefore, the disk or table 109 rotates in a clockwise direction.

Cover marking and assembling mechanism.

Bolted to the supporting frame or base 1 is a bracket 115 on which is mounted the assembling mechanism for placing the cover on the can body and for marking the cover as it is conveyed from the stack holder to assembling position. This assembling mechanism is driven from the main shaft of the closing machine. Mounted in the bracket 115 is a short vertical shaft 116. Keyed to said shaft is a gear wheel 117 which is adapted to mesh with a gear wheel 118 secured to the lower section 22 of the rotating turret so that as the turret rotates, the shaft 116 will be rotated thereby and in timing therewith. Mounted on the shaft 116 is a stationary table 119. A bearing sleeve 120 is located between the shaft 116 and the table 119. This table is secured by a bolt 121 to the bracket 115. An assembling turret 122 is keyed to the upper end of the shaft 116 and rotates therewith. This assembling turret is provided with four half molds 123. As above noted, the shaft 116 rotates in exact timing with the turret of the closing machine. There is one half mold on the assembling turret for each half mold in the closing machine and these are so disposed as to mate with each other just as the can is fully positioned in the closing machine and underneath a rotating chuck. The half molds are of proper diameter to round up the can body for the seating of the cover therein. The can bodies are delivered to the assembling turret by a timing mechanism to be hereinafter described. Said timing mechanism places the can body in the assembling turret at a point diametrically opposite where the can body is delivered to the closing machine. The covers are placed in a stack holder 124. This stack holder is carried by the bracket 115. Said stack holder consists of a supporting base from which extend vertical rods 125. As clearly shown in Fig. 18, the covers 75 are stacked and placed between these rods. The base of the stack holder 124 is formed with three recesses 126. Located in each recess is a stack supporting and cover separating dog 127. These dogs are pivoted at 128. Each dog has a lower finger 129 which is formed with a substantially flat or horizontal upper surface on which the stack at times rests. As shown in Fig. 31 of the drawings, this finger 129 extends into the central opening in the stack holder and the covers rest on these fingers 129 of the three dogs. Each dog is also provided with a separating finger 130 which has a tapered upper surface and a substantially horizontal or flat under surface. When the dogs are swung about their pivots, the stripper or separating finger 130 will engage the stack between the lowermost cover and the cover just above the same, separate the lowermost cover from the stack and hold the stack while the finger 129 is moved from underneath the lowermost cover, so this lowermost cover will drop onto the cover guideway. When the dogs are turned in the opposite direction, then the stripper or separator 130 will release the stack and the stack will descend onto the fingers 129. The tapered upper surface of the separator or stripping finger serves to lift positively the stack from the lowermost cover so as to insure the freeing of the lowermost cover from the stack.

The rear end of each dog is formed with a recess 131. Located in each forked end of the dog formed by the recess 131, is a pin 132. These pins are carried by a ring 133, which has a limited movement about the center of the stack holder. When the ring is turned in one direction, then the dog 129 projects into the center opening of the stack holder and supports the stack. When the ring is turned in the opposite direction, that is in a counter clockwise direction as viewed in Fig. 31, then the separator or stripping finger 130 will extend into this opening in the stack holder and the fingers 129 will be withdrawn as clearly shown in Fig. 32 of the drawings.

The ring 133 is formed with a projection 134. The rotating turret is provided with a series of pins 135, which are at times raised so as to strike this projection 134 and to turn the ring through a limited movement, after which the pins 135 will pass the projection 134. In Fig. 32 of the drawings the pin is shown as engaging the projection 134 and as having just completed the movement of the ring. This ring is held frictionally in whatever place it may be moved to and therefore will remain in this position until it is positively returned. Mounted on the assembling turret is another series of pins 136. Each ring has a cut away portion 137 and also a cut away portion 138. The side wall 139 of the cut away portion 137 is inclined and is extended as clearly shown in Fig. 17

of the drawings. The pin 136 is adapted to engage this inclined wall 139 when the parts are in the position shown in Fig. 17 and through the cam action of the pin on the inclined wall the ring will be turned in a clockwise direction and bring the parts back again to the position shown in Fig. 31. The case is also cut away to allow the pin 136 to travel freely through the same after having moved the ring. Through the action of the pins 135 and 136 the dogs 127 are operated to perform the functions above described. That is, to drop the stack on the finger 129 when the ring is moved by the pin 136, which in a sense, forces the cover from the stack and positions the same ready for dropping when released onto the assembling turret. Then the pin 135 if raised to a sufficient height to engage the projection 134 will move the dogs so as to release this lowermost position cover and permit the same to drop onto the assembling turret. The position of the pins 135 are controlled by the cans fed to the assembling turret, so that if no can is fed to the assembling turret then no cover will be released. This controlling means will be hereinafter described.

The assembling turret is formed with an elongated cut away section 140. This cut away section forms a ledge 141 which terminates at its forward end at 142 and at its rear end at 143. The pin 135 which releases the cover is so positioned that the cover will drop onto this ledge 141 near the forward end 142 thereof. Extending about the turret and concentric therewith, is a fixed guiding and supporting rail 144. This guiding and supporting rail has a ledge 145 so that the cover is supported by the ledges 141 and 145 and will be held from sidewise movement in a direction radially of the assembling turret by the guide rail 144 and the assembling turret itself. The supporting and guide rail 144 is attached to a bracket 146 which also supports the stack holder. These parts are suspended so that the turret moves underneath the stack holder. The bracket 146 is in turn fixed to the bracket 115 which supports the parts of the assembling mechanism. Mounted on the bracket 146 is a yielding cover detaining device shown in detail in Fig. 19 of the drawings. Said detaining device includes a sleeve 147 in which is located a ball 148. The lower end of the sleeve is contracted so as to permit the ball to extend a slight distance below the end of the sleeve but so as to prevent the ball from dropping from the sleeve. A spring 149 forces the ball downwardly against its seat at the lower end of the sleeve. A screw 150 is threaded into the upper end of the sleeve 147 and serves as an abutment for the spring 149. This ball 148 is in the path of movement of the cover and will stop the cover and cause it to slide backwardly on the ledges 141 and 145 until the cover comes in contact with the end 143 of the cut away portion 140. Then the cover will be positively pressed forward and the ball will yield to permit it to pass. In machines of the type described, it is well known that when a cover is released and drops onto a metal supporting ledge, there is more or less of a rebound or dancing of the cover. By dropping the cover onto the supporting ledge at a point well in advance of the shoulder, which positively engages and moves the cover forward, it will have time to settle down to a stationary position on the ledge before it is brought against the timing shoulder which carries it forward. As the cover moves forward through the rotation of the assembling turret, it is first presented to a marking device which is herein shown, consisting of two rotating marking wheels 151 and 152. These marking wheels are shown in detail in Figs. 25, 26 and 27 of the drawings. Each marking wheel is formed with a seat 153 adapted to receive a die type 154. The die types are held in place on their seats by cover plates 155. These cover plates are secured to the wheels by bolts 156. By releasing the bolts the cover plate may be readily removed and the die types changed. In Fig. 28 of the drawings, I have shown a pair of die types for impressing the numeral 7 in a cover. One of these die types 154 has the raised numeral 7 thereon and is therefore referred to as the male die type, while the other has a recess to receive this raised numeral 7 and is generally referred to as the female die type. As the cover moves forward with the turret, it passes between these marking wheels 151 and 152. The marking wheels are timed with the travel of the turret, preferably so as to engage the cover at a point near the center thereof as clearly shown in Fig. 11 of the drawings wherein the cover is shown as marked at 157 by three die types having the numerals 7, 4 and 1. These wheels 151 and 152 are positively rotated. The wheel 151 is carried by a shaft 158 which is mounted in the bracket 159 which is likewise attached to the bracket 115 supporting the parts of the assembling mechanism. This bracket 159 is bolted to the bracket 115 but is vertically adjustable thereon and is held in said position by an adjusting screw 160 and also by clamping bolts 161. The shaft 158 is mounted in an adjustable bearing 162 located in the bracket 159, see Fig. 25. There are springs 163 underneath this bearing and set screws 164 which engage the upper face of the bearing. On the outer end of the shaft 162 is a gear wheel 165. The wheel 152 is mounted on a short shaft 166 which is located in a suitable bearing sleeve in the bracket 159. This short shaft carries a gear wheel 167 which meshes with the gear wheel 165. It also carries a

bevel gear wheel 168 which meshes with a bevel gear 169 on the vertical shaft 170. The shaft 170 carries a gear 171 which meshes with a gear 172 on the shaft 173 and this gear 172 meshes with the gear 117 which drives the turret. It will therefore be seen that the wheels 151 and 152 are driven positively by the same gear wheel which turns the turret and therefore these wheels 151 and 152 will rotate in timing with the turret. By adjusting the brackets which support the shafts carrying the wheels 151 and 152, the die types may be brought into proper alinement so as to operate upon the cover without lifting the same from its supporting ledge or bending the cover in any way. The impression made in the metal may be varied by aid of the set screws 164. If these are turned down, then the type will be brought closer together and the imprint made in the metal will be deeper. On the other hand, if they are turned up, then the springs 163 will position the upper wheel and the imprint will be of less depth. The bracket 159 is made sectional. The outer section indicated at 159^a is pivoted to the inner section by a pivot bolt 174. The section 159 is provided with a handle 175. A locking bolt 176 pivoted to the main section of the bracket, drops between ears 177 on the section 159^a and serves to lock this section in place. By lifting this bolt the section 159^a may be swung outwardly, which will cause the gear 167 to move out of mesh with the gear 168. As clearly shown in Fig. 26 of the drawings, I have shown each wheel as provided with four recesses in which die types may be placed. These recesses may be loaded with types having different characters thereon. After the gear 167 has been withdrawn from mesh with the gear 168, the gear wheel 165 may be turned so as to bring another set of type into coöperative action with the cover. This gear is provided with a head 178, which is adapted to receive a wrench for the turning of the same and may also be provided with suitable indicating marks to show when each group of type is properly set, so as to be in correct timing with the movements of the assembling turret. If the packer changes his pack and desires to change the identifying mark imprinted in the cover, this may be quickly done by bringing the gears to a point where they are unmeshed, thus turning the die wheels to bring the proper set of dies into coöperative action, after which the part 159 is returned to operative position causing the gears to mesh and the machine is then ready for imprinting the new identifying mark in the covers. It will be understood that each die wheel makes a complete rotation while the turret is moving through 90° when said turret is provided with four stations and therefore each die wheel may be loaded with the different groups of types and only one set will be operative to imprint a mark on the covers as they pass along with the assembling turret.

The supporting and guiding rail is formed with an overhanging member 179 and the cover moves along underneath this overhanging member. At the inner side, the cover when seated against the timing shoulder on the assembling turret is supported by a vertical movable head 180. This head has a groove in its outer face adapted to receive the edge of the cover. The head 180 is carried by a supporting pin 181. This supporting pin rides onto a cam rail 182. The upward movement of the head is limited by a clip 182^a. The ledge 141 is entirely cut away corresponding to the shape of the cover at the rear end of the ledge as indicated at 183 in Fig. 17 of the drawings. The entire support for the inner edge of the cover therefore is the vertical movable head 180. The cam rail 182 is shaped so as to lower this head 180, as the assembling turret rotates. The rail 144 is curved downwardly, so as to also carry the outer edge of the cover downwardly as the assembling turret rotates. Therefore, after the cover is marked, it is gradually lowered as it moves forward. This is for the purpose of bringing the cover down onto the can body preparatory to the seating of the cover in the can body when it reaches the seaming machine.

As clearly shown in Fig. 14 of the drawings, the can bodies are placed in the half molds carried by the assembling turret. The guide rail 144 is cut away as indicated at 184 of the drawings. This cut away section however, does not extend quite to the ledge 145 so that the cover passes said cut away section. Just as the can body reaches a point in line with the center of the closing machine and the assembling machine, that is when it is fully positioned in the half mold, then the guiding ledge 145 is cut away which permits the cover to drop at its outer edge onto the can body, although the inner edge of the cover is still held by the head 180. The purpose of dropping the cover at this time onto the can body, is to prevent the can from spilling at the point where it changes from the control of the timing mechanism to the control of the assembling turret. Any tendency of the liquid contents of the can to spill or slop at this time will be prevented by the cover, especially as there is only a slight tendency to spill if at all, as the can body is moving continuously forward in the curved path as will be more fully noted hereinafter. It is understood that the cam rail 182 is shaped so as to cause this gradual lowering of the cover by the downward movement of the head 180. The guide rail 144 may be made in one piece or in sections and said guide

rail is not only supported by the bracket carrying the stack, but also by the bracket carrying the marking mechanism and by a bracket 185 which in turn is attached to the bracket 115. The can body is held in the half mold in the assembling turret by a guide rail 186 which strips or moves the can body from the timing mechanism and it is also held by a second rail 187 which extends around underneath the turret of the seaming machine, as clearly shown in Fig. 2 of the drawings. This insures that the can body will be properly held in the half mold of the turret of the assembling machine until the half mold of the seaming machines rotates to a position to coöperate with the half mold on the assembling machine for rounding up and centering the can body underneath the chuck. The guide rail 187 is in a lower plane than the half mold on the seaming machine, so that it does not in any way interfere with the rotation of the turret in the seaming machine. The guide rail 144 also extends to a point adjacent the seaming machine as clearly shown in Fig. 2 of the drawings. The extreme section of the guide rail 144 is hinged at 188 and is held resting on a bracket 189 by a locking dog 190 which may be of any suitable construction. This permits the guiding rail to be readily lifted to remove a can if found desirable.

From the above it will be apparent that a mechanism has been provided wherein the covers are fed from a stack onto an assembling turret which operates to position the cover and the can body with the cover, directly above the can body to lower the cover onto the can body, releasing the outer edge of the cover so that it may drop onto and rest on the can body to prevent spilling and to still maintain control of the cover and can body until these parts are positioned in the seaming machine directly underneath the chuck and on the rotatable support of the seaming machine. It will be understood that in the assembling mechanism, the can slides along the table 119. The chuck of the seaming machine is timed so as to engage the cover and seat the same in the can body before the can body is entirely released from control of the half molds, so that the cover is seated while the can body is rounded up. The half molds however, will at once release the can body, so as to prevent any frictional drag thereof during the rotation of the can body by the chuck.

Timing mechanism and inspection table.

The closing machine also includes a timing mechanism which is associated with the assembling mechanism and one of the purposes of this timing mechanism is to receive the cans in semitimed relation and deliver the same in timed relation to the assembling turret. Another purpose of the timing mechanism when operating upon filled cans is to cause the can to travel for a certain period of time where it may be readily inspected and the contents of the can added to or taken from, as desired. At this time also, an overflowing mechanism may be used if desired in order to insure that each can has exactly the same amount of liquid contents. The timing mechanism is attached to and driven from the assembling mechanism. As shown in the drawings, a bracket 191 is attached to the bracket 115 and this bracket 191 is also supported by a standard 192, carrying a base plate 193. On the lower end of the shaft 116 is a bevel gear wheel 194. This gear wheel meshes with a second bevel gear wheel 195 on a shaft 196. The shaft 196 carries two gear wheels 197 and 198 and these gear wheels 197 and 198 operate the parts of the timing mechanism. Extending vertically through the timing mechanism is a fixed tubular standard 199. Mounted to rotate about the tubular standard 199 is an annular table 200. The annular table is carried by radially extending arms 201 which are fixed to a sleeve 202 mounted upon suitable bearings so as to rotate about the tubular standard 199. Keyed to this sleeve is a bevel gear 203 which meshes with the bevel gear wheel 198. Therefore, the annular supporting table may be timed so as to have a speed of travel corresponding with the speed of travel of the half molds in the assembling turret and likewise a speed of travel corresponding to the speed of travel of the half molds of the turret on the seaming machine. The rotating arms 201 are provided with timing fingers 204 and these timing fingers support the annular table as herein shown. It will be noted that there are six timing fingers while there are four half molds on the assembling mechanism. Inasmuch however, as the speed of travel of the annular table at the point of support for the can body is the same as that of the half molds, the can bodies may be readily transferred from these timing fingers into the half molds. The timing mechanism includes also a second supporting member of table 205, on which a portion of the can body rests. This supporting table is fixed to a disk 206 which is attached to a sleeve mounted to turn freely about the sleeve 202. A bevel gear 207 is secured to the disk 206 and meshes with the bevel gear 197. It will be noted that the gear wheel 207 is larger in diameter than the gear wheel 203 and therefore, the supporting table 205 will have a speed of travel less than the speed of travel of the annular table 200. In Fig. 2 of the drawings is shown diagrammatically a filling machine. The can bodies are indicated at 76. These can bodies are transferred from the

rotating filling machine by the aid of a guide rail 208 onto the annular table 200. As noted above, the filling machine will deliver these can bodies in semitimed relation to each other; that is, a certain number of filled can bodies per minute and the can bodies will be placed on the table 200 somewhere between the timing fingers, preferably midway between the timing fingers as shown in Fig. 2. As the table 200 rotates, the can body will be carried along therewith and the guide rail will cause the can body to engage the slow table or support 205. Inasmuch as this slow table or support engages only the outer edge portion of the filled can, it will cause the can to rotate about its own center, dragging it back on the support 200 until finally the can body will be placed against the timing finger 204. This positioning of the filled can against the timing finger, as noted, is caused by a rotation of the can and it is well known that when a can is rotated about its own center to change its position, the liquid contents will have a movement if any movement at all, about its center of rotation, which will prevent any slopping or spilling of the liquid contents. It is the bodily movements of the liquid in the can at right angles to the longitudinal center of the can, which causes spilling and all such movements are avoided in the machine described. As the can body from the time is is filled until the time it is closed, moves forward continuously without any stopping or starting movements and also in a continuous curved path without any angular movement and inasmuch as the filled can body has its continuous forward movement in the same general direction although a curved path and any retarding of the can for timing purposes is caused by the rotation of the can about its own center, all spilling or slopping is avoided.

It is quite essential that the filling machine should be driven in proper timing with the closing machine and therefore means is provided for operating the filling machine directly from the closing machine. To this end a sprocket wheel 209 is provided, from which the filling machine is driven by a suitable sprocket chain or otherwise. This sprocket wheel is mounted on a shaft 210 carrying a bevel gear 211, which meshes with a bevel gear 212 on a vertical shaft 213. At the upper end of the vertical shaft, there is a sleeve 214 carrying a gear 215, which meshes with a gear 216 bolted to the bevel gear wheel 203. Between the sleeve 214 and the shaft 213 there is a suitable clutch which includes a shifting member 217. This shifting member is controlled by an arm 218 carried by a rod 219, which in turn is controlled by a cam and lever 220. When the parts are positioned as shown in Fig. 15, the clutch members are in engagement and the sprocket wheel 209 will be driven in timing with the closing machine. If however, the rod 219 is raised by turning the hand lever 220, then these clutch members will be separated and the filling machine stopped. It is sometimes necessary to have a driving connection turning oppositely from that of the timing mechanism in order to operate the filler in the proper direction. This may be readily accomplished by removing the bevel gear 212 and positioning the same as indicated in dotted lines at 212^a which would cause the sprocket wheel 209 to turn in the opposite direction.

The slow table 205 is provided with a ledge 221, which helps to position the can bodies. The guide rail 208 extends underneath the rotating turret of the assembling mechanism and guides the can body until fully seated in the half mold of the assembling mechanism. The guide rail 186 extends over the rotating tables and serves to strip or shift the can body from the rotating tables onto the table of the assembling machine. It will be noted from Fig. 15 of the drawings that the annular table 200 of the timing mechanism extends over the table 119 of the assembling mechanism. The table 119 has a segmental recess 222 to receive this table 200. The table 119 is stationary, while the table 200 rotates.

The means for controlling the release of the covers when a can body is delivered to the assembling mechanism by the timing mechanism, includes a lever 223 (see Figs. 8 and 29). This lever 223 is fulcrumed at 224 on the frame 115 and extends underneath the table 119 (see Fig. 25). The table 119 is provided with a radially extending recess in which is mounted a sliding bar 225. This sliding bar carries a cam 226. When the bar 225 is at the inner end of its movement as shown in Fig. 29, the pin 135 which operates upon the stack ring, will ride up onto this cam 226 and will be raised so as to engage the projection 134. If this bar 225 is moved outwardly and the cam positioned as shown in dotted lines in Fig. 29, then the pin 135 will not engage the same. It will therefore not be raised and no cover will be released. On the outer end of the lever 223 there is a bracket 227. This bracket carries a plate 228 which is bolted thereto by bolts 229, so that it may be readily adjustable thereon. As clearly shown in Fig. 29, the can body as it passes this plate 228 will force the same outward to the full line position and this moves the bar 225 inwardly, placing the cam in the path of movement of the pin 135, so that when a filled can body passes this controlling plate 228, a cover will be released from the stack and this will be released at a point of time so that the cover and can body will be properly assembled as described above. A spring 230 engages a

pin 231 on the lever 223 and also engages a bracket 232 and normally operates to move the cam 226 out of the range of the pins. The end of the plate 228 is curved as indicated as 233, so as to permit the can body to readily shift the plate outwardly and this occurs after the can body is positioned against the timing finger, so that the engagement of the can body with the controlling plate 228 will not cause spilling of the contents of the can body.

Operation.

It is thought that the operation of the can closing machine will be apparent from the description which has been given and therefore, the movement of the can body and the covers through the machine will only be briefly referred to.

When the machine is used in connection with a filling machine, the filled can bodies are delivered in semi-timed relation onto the supporting table 200 which rotates continuously. The can bodies move forward continuously in a curved path without any angular movements. The can body is gradually guided by the rail 208 toward the center of the timing mechanism until it finally rests on both tables 200 and 205. Inasmuch as the table 205 is traveling slower than the table 200, it will retard the movement of the can body on the table 200 and this will be accomplished by a rotation of the can about its longitudinal center and this will cause the can to drop back on the table 200 until it is brought into engagement with a timing finger 204. It will then be carried along positively as the table 200 rotates. As the can body passes by the controlling plate 228 of the timing mechanism, the cam controlling the pins 135 will be shifted so as to raise the pin and cause the cover ring to be turned in a counter clockwise direction, thus releasing the cover which drops onto the rotating turret of the assembling mechanism. The cover will be yieldingly retarded by the ball 148 and caused to slide back on the turret until it is positioned against the timing shoulder on the turret. At this time the cover is supported by the head 180 and the groove or ledge in the rail 144. The turret is timed so as to bring the cover directly over the filled can body which is placed in the half mold in the turret. Here again the curved rail transfers the filled can body to the rotating turret and this is done without in anyway retarding the movement of the can body and while the can body still moves forward in a continuous curved path. As the cover passes from the stack holder to the assembling position, it passes through a marker which impresses an identifying mark therein. It is also lowered by the downward movement of the head 180 and the downward pitch of the ledge on which the cover is supported on the rail 144. Just as the can body is fully seated or placed in the half mold in the assembling turret and is about to be controlled thereby the cover at the outer edge drops onto the filled can so that the cover now rests on the can and the head 180. The cover and the can are moved forward together and will be placed underneath the chuck of the seaming mechanism. The half mold of the seaming mechanism coöperates with the half mold on the assembling turret to round up the body. The chuck descends, seats the cover in the can body and then rotates the can body and cover together. As the turret of the seaming machine continues its movement, the seaming roll is brought into contact with the flange on the can cover and the first operation is performed, after which the seaming roll is withdrawn, shifted vertically and again brought into contact with the cover to perform the second operation or finishing the seam. Then the roll is again withdrawn from the cover, the chuck moves up and releases the can, the can being stripped from the chuck by the housing about the chuck and a guide rail strips the closed can from the machine onto the receiving table.

While the filled can is traveling on the table of the timing mechanism, it may be inspected to see whether it is properly filled, readily removed if desired, or some of the contents removed or filled to a greater extent as desired. It will of course be understood that suitable overflowing mechanism may be readily applied to operate on the can while it is on the timing mechanism so as to insure each can being filled of liquid content to a uniform extent.

Having thus described the invention, what is claimed as new is:—

1. The combination with a seaming mechanism having continuously traveling seaming devices, each including seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body, and a housing for said chuck having a half mold associated with each chuck, of a continuously rotating assembling mechanism for positioning a can end relative to a can body and for delivering the same to a seaming device in alinement with the chuck and rotatable member and a series of half molds carried by the assembling mechanism and cooperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck.

2. The combination with a seaming mechanism having continuously traveling seaming devices, each including seaming means, a chuck and a coöperating rotatable member having a movement relative to each other

for seating a can end in a can body, and a housing for said chuck having a half mold associated with each chuck, of a continuously rotating assembling mechanism for positioning a can end relative to a can body and for delivering the same to a seaming device in alinement with the chuck and rotatable member and a series of half molds carried by the assembling mechanism and cooperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, said seaming mechanism and said assembling mechanism being constructed and arranged so that the can body travels continuously and forwardly in a curved path as it passes from the assembling mechanism to the seaming mechanism.

3. The combination with a seaming mechanism having continuously traveling seaming devices, each including seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seaming a can end in a can body, and a half mold associated with each chuck, of a continuously rotating assembling mechanism for positioning a can end relative to a can body and for delivering the same to a seaming device in alinement with the chuck and rotatable member, a series of half molds carried by the assembling mechanism and coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, and a timing mechanism for receiving the can bodies in semitimed relation and for delivering the same in timed relation to the half molds in the assembling mechanism.

4. The combination with a seaming mechanism having continuously traveling seaming devices, each including seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body and a half mold associated with each chuck, of a continuously rotating assembling mechanism for positioning a can end relative to a can body and for delivering the same to a seaming device in alinement with the chuck and rotatable member, a series of half molds carried by the assembling mechanism and cooperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, and a timing mechanism for receiving the can bodies in semitimed relation and for delivering the same in timed relation to the half molds in the assembling mechanism, said seaming mechanism, said assembling mechanism and said timing mechanism being constructed and arranged so that the can body travels continuously and forwardly in a curved path as it passes through the timing mechanism, the assembling mechanism and the seaming mechanism.

5. The combination with a seaming mechanism having continuously traveling seaming devices, each including seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body, and a half mold associated with each chuck, of a continuously rotating assembling mechanism for positioning a can end relative to a can body and for delivering the same to a seaming device in alinement with the chuck and rotatable member, a series of half molds carried by the assembling mechanism and cooperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, and a timing mechanism for receiving the can bodies in semitimed relation and for delivering the same in timed relation to the half molds in the assembling mechanism, said seaming mechanism, said assembling mechanism and said timing mechanism being constructed and arranged so that the can body travels continuously and forwardly in a curved path as it passes through the timing mechanism, the assembling mechanism and the seaming mechanism, said timing mechanism and said assembling mechanism being operated from the seaming mechanism and in timing therewith.

6. The combination with a seaming mechanism having continuously traveling seaming devices, each including a seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body, and a housing for said chuck having a half mold associated with each chuck and an assembling mechanism for positioning a can end relative to a can body and for delivering said can end and can body to a seaming device in alinement with the chuck and rotatable member, said assembling mechanism including a continuously rotating turret having a series of half molds coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck.

7. The combination with a seaming mechanism having continuously traveling seaming devices, each including a seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body and a housing for said chuck having a half mold associated with each chuck, of an assembling mechanism for positioning a can end relative to a can body and for delivering said can end and can body to a seaming device in alinement with the chuck and rotatable mem-

ber, said assembling mechanism including a continuously rotating turret having a series of half molds coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, said rotating turret of the assembling mechanism and said seaming mechanism being so constructed and arranged that the can body moves continuously at the same rate of travel and in a curved path as it passes from the assembling mechanism to the seaming mechanism.

8. The combination with a seaming mechanism having continuously traveling seaming devices, each including a seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body, and a half mold associated with each chuck, of an assembling mechanism for positioning a can end relative to a can body and for delivering said can end and can body to a seaming device in alinement with the chuck and rotatable member, said assembling mechanism including a continuously rotating turret having a series of half molds coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, a stack holder associated with the assembling mechanism and means operated by the turret of the assembling mechanism for releasing a can end and for placing a can end directly above a can body positioned in a half mold in the turret.

9. The combination with a seaming mechanism having continuously traveling seaming devices, each including a seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body and a half mold associated with each chuck, of an assembling mechanism for positioning a can end relative to a can body and for delivering said can end and can body to a seaming device in alinement with the chuck and rotatable member, said assembling mechanism including a continuously rotating turret having a series of half molds coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, a stack holder associated with said rotating turret, means carried by the turret for releasing a can end from the stack and means carried by the turret for supporting one edge of the can end and a fixed guide rail having a supporting ledge for supporting the other edge of said can end.

10. The combination with a seaming mechanism having continuously traveling seaming devices, each including a seaming means, a chuck and a coöperating rotatable member having a movement relative to each other for seating a can end in a can body, and a half mold associated with each chuck, of an assembling mechanism for positioning a can end relative to a can body and for delivering said can end and can body to a seaming device in alinement with the chuck and rotatable member, said assembling mechanism including a continuously rotating turret having a series of half molds coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, a stack holder associated with said rotating turret, means carried by the turret for releasing a can end from the stack and means carried by the turret for supporting one edge of the can end and a fixed guide rail having a supporting ledge for supporting the other edge of said can end, said turret being cut away directly above the half mold for positioning the can body to permit the can end to be lowered onto the can body, said can end supporting means being constructed so as to lower the can end as the turret travels.

11. The combination with a seaming mechanism having continuously traveling seaming devices, each including a seaming means, a chuck and coöperating rotatable member having a movement relative to each other for seating a can end in a can body, and a half mold associated with each chuck, of an assembling mechanism for positioning a can end relative to a can body and for delivering said can end and can body to a seaming device in alinement with the chuck and rotatable member, said assembling mechanism including a continuously rotating turret having a series of half molds coöperating successively with the half molds of each seaming device for rounding up the can body preparatory to the seating of the end in the can body by the chuck, a stack holder associated with said rotating turret, means carried by the turret for releasing a can end from the stack and means carried by the turret for supporting one edge of the can end and a fixed guide rail having a supporting ledge for supporting the other edge of said can end, said turret being cut away directly above the half mold for positioning the can body to permit the can end to be lowered onto the can body, said can end supporting means being constructed so as to lower the can end as the turret travels, said guide rail having its supporting ledge cut away so as to drop the can end onto the can body at the time of delivery of a can body to the turret and means for delivering the can bodies to the half molds in the turrets.

12. The combination with a seaming mechanism rotating about a vertical axis and including a plurality of seaming de-

vices, each having a seaming means, a chuck and a coöperating rotatable member, of an assembling mechanism including a table on which the can bodies are moved, a rotating turret having means for moving the can bodies and delivering the same in succession to the seaming devices, a guide rail coöperating with said turret for directing the can bodies, a stack holder for the can ends, means operated by the turret for releasing the can ends, said turret having means for positioning a can end directly above each can body, means for delivering the can bodies to the turret of the assembling mechanism and means located between the stack holder and the point where the can bodies are delivered to the turret for impressing an identifying mark in the can end.

13. The combination with a seaming mechanism rotating about a vertical axis and including a plurality of seaming devices, each having a seaming means, a chuck and a coöperating rotatable member, of an assembling mechanism including a table on which the can bodies are moved, a rotating turret having means for moving the can bodies and delivering the same in succession to the seaming devices, a guide rail coöperating with said turret for directing the can bodies, a stack holder for the can ends, means operated by the turret for releasing the can ends, said turret having means for positioning a can end directly above each can body, means for delivering the can bodies to the turret of the assembling mechanism and means located between the stack holder and the point where the can bodies are delivered to the turret for impressing an identifying mark in the can end, said marking means including opposed rotating marking wheels having coöperating dies and means for positively driving said wheels in timing with the movements of the turret.

14. The combination with a seaming mechanism rotating about a vertical axis and including a plurality of seaming devices, each having a seaming means, a chuck and a coöperating rotatable member, of an assembling mechanism including a table on which the can bodies are moved, a rotating turret having means for moving the can bodies and delivering the same in succession to the seaming devices, a guide rail coöperating with said turret for directing the can bodies, a stack holder for the can ends, means operated by the turret for releasing the can ends, said turret having means for positioning a can end directly above each can body, means for delivering the can bodies to the turret of the assembling mechanism and means located between the stack holder and the point where the can bodies are delivered to the turret for impressing an identifying mark in the can end, said marking means including opposed rotating marking wheels having coöperating dies and means for positively driving said wheels in timing with the movements of the turret, and means whereby said rotating wheels may be disconnected from the positive operating means therefor and shifted so as to bring another set of dies carried by the wheels into effective operation.

15. The combination with a seaming mechanism rotating continuously about a vertical axis and including a plurality of seaming devices, of a continuously rotating turret for feeding can ends successively to said seaming devices, a stack holder associated with said rotating turret, means operated by the turret for releasing the can ends from the stack holder and a marking device associated with said turret and including opposed marking wheels having cooperating dies between which the can end passes, whereby an identifying mark is impressed therein and means for driving said rotating wheels positively in timing with the turret.

16. The combination with a seaming mechanism rotating continuously about a vertical axis and including a plurality of seaming devices, of a continuously rotating turret for feeding can ends successively to said seaming devices, a stack holder associated with said rotating turret, means operated by the turret for releasing the can ends from the stackholder and a marking device associated with said turret and including opposed marking wheels having cooperating dies between which the can end passes, whereby an identifying mark is impressed therein and means for driving said rotating wheels positively in timing with the turret, said rotating wheels having means for supporting a plurality of sets of cooperating dies and means whereby said wheels may be disconnected from the positive operating means therefor and repositioned for bringing a different set of dies into effective operation.

17. The combination with a seaming mechanism rotating continuously about a vertical axis and including a plurality of seaming devices, of a continuously rotating turret for feeding can ends successively to said seaming devices, a stack holder associated with said rotating turret, means operated by the turret for releasing the can ends from the stack holder and a marking device associated with said turret and including opposed marking wheels having cooperating dies between which the can end passes, whereby an identifying mark is impressed therein, a shaft for supporting each wheel, gears carried by the shaft and meshing with each other for positively rotating the wheels, means for driving one of said shafts in timing with the turret.

18. The combination with a seaming mechanism rotating continuously about a vertical axis and including a plurality of seaming devices, of a continuously rotating turret for feeding can ends successively to said seaming devices, a stack holder associated with said rotating turret, means operated by the turret for releasing the can ends from the stack holder and a marking device associated with said turret and including opposed marking wheels having cooperating dies between which the can end passes, whereby an identifying mark is impressed therein, a shaft for supporting each wheel, gears carried by the shaft and meshing with each other for positively rotating the wheels, means for driving one of said shafts in timing with the turret, and means for supporting one of said shafts whereby the same may be shifted bodily vertically to vary the impression of the identifying mark in the can end.

19. The combination with a seaming mechanism rotating continuously about a vertical axis and having a plurality of seaming devices, a rotating turret associated with the seaming mechanism and operated in timing therewith for delivering can ends in succession to the seaming devices, a stack holder associated with said turret, said turret having a ledge for supporting the can ends at one side thereof and a timing shoulder for positively moving the can ends forward, means operated by the turret for releasing the can ends from the stack holder, said means being timed so as to drop the cover on the turret at a point in advance of the timing shoulder and yielding means for engaging the can end and placing the same against the timing shoulder.

20. The combination with a seaming mechanism rotating continuously about a vertical axis and having a plurality of seaming devices, a rotating turret associated with the seaming mechanism and operated in timing therewith for delivering can ends in succession to the seaming devices, a stack holder associated with said turret, said turret having a ledge for supporting the can ends at one side thereof and a timing shoulder for positively moving the can ends forward, means operated by the turret for releasing the can ends from the stack holder, said means being timed so as to drop the cover on the turret at a point in advance of the timing shoulder and yielding means for engaging the can end and placing the same against the timing shoulder, a table below said turret on which the can bodies are moved by the turret, said turret having means in alinement with the timing shoulder for the can end for positioning and moving a can body on said table, and a guide rail for the can bodies coöperating with the turret.

21. The combination with a seaming mechanism rotating continuously about a vertical axis and having a plurality of seaming devices, a rotating turret associated with the seaming mechanism and operated in timing therewith for delivering can ends in succession to the seaming devices, a stack holder associated with said turret, said turret having a ledge for supporting the can ends at one side thereof and a timing shoulder for positively moving the can ends forward, means operated by the turret for releasing the can ends from the stack holder, said means being timed so as to drop the cover on the turret at a point in advance of the timing shoulder and yielding means for engaging the can end and placing the same against the timing shoulder, a table below said turret on which the can bodies are moved by the turret, said turret having means in alinement with the timing shoulder for the can end for positioning and moving a can body on said table, a guide rail for the can bodies coöperating with the turret, and timing means for placing the can bodies on the table and against the positioning means for the can bodies carried thereby.

22. The combination with a seaming mechanism rotating continuously about a vertical axis and having a plurality of seaming devices, of an assembling mechanism for positioning a can end relative to a can body and for delivering the positioned can end and can body to each seaming device, said assembling mechanism including a turret rotating about a vertical axis, a stationary table on which the can bodies are moved, said turret having a series of half molds for positioning the can bodies, a guide rail coöperating therewith, a timing mechanism including a support rotatable about a vertical axis, said table of the assembling mechanism being provided with a segmental recess whereby said support of the timing mechanism may extend into said recess underneath the half mold, so that the can body may be seated in the half mold on the turret while still on the movable timing support and timing fingers associated with said timing support, said timing mechanism including a rotatable member traveling at a slower speed than said rotatable support and engaging the can bodies for positioning the same against the timing fingers.

23. The combination with a seaming mechanism having a rotating turret provided with a series of half molds, a chuck and a coöperating rotatable support associated with each half mold and seaming means associated with each chuck, of an assembling mechanism including a rotating turret having a series of half molds coöperating in succession with the half molds on the turret of the seaming mechanism for positioning a

can body on a rotatable support and for rounding up the can body for the seating of the can end therein, a stationary table on which the can bodies are moved by the turret of the assembling mechanism, a guide rail for directing the movements of the can bodies, and means for placing a can end on the turret of the assembling mechanism and over the can body, supporting the can end independent of the can body, and lowering the can end onto the can body during the travel of the can body.

24. The combination with a seaming mechanism having a rotating turret provided with a series of half molds, a chuck and a coöperating rotatable support associated with each half mold and seaming means associated with each chuck, of an assembling mechanism including a rotating turret having a series of half molds coöperating in succession with the half molds on the turret of the seaming mechanism for positioning a can body on a rotatable support and for rounding up the can body for the seating of the can end therein, a stationary table on which the can bodies are moved by the turret of the assembling mechanism, a guide rail for directing the movements of the can bodies, means for placing a can end over each can body, supporting the can end independent of the can body, moving the can end with the can body, and lowering the can end onto the can body, said turret of the assembling mechanism and the guide rail for the can bodies being so disposed as to cause said can bodies to travel forwardly in a continuous curved path as the can body passes from the assembling mechanism to the seaming mechanism.

25. The combination with a seaming mechanism having a rotating turret provided with a series of half molds, a chuck and a coöperating rotatable support associated with each half mold and seaming means associated with each chuck, of an assembling mechanism including a rotating turret having a series of half molds coöperating in succession with the half molds on the turret of the seaming mechanism for positioning a can body on a rotatable support and for rounding up the can body for the seating of the can end therein, a stationary table on which the can bodies are moved by the turret of the assembling mechanism, a guide rail for directing the movements of the can bodies, means for placing a can end on the turret of the assembling mechanism directly above each can body, said turret of the assembling mechanism and the guide rail for the can bodies being so disposed as to cause said can bodies to travel forwardly in a continuous curved path as the can body passes from the assembling mechanism to the seaming mechanism and a timing mechanism for receiving the can bodies in semitimed relation and for feeding the can bodies in timed relation one after another into the half molds on the turret of the assembling mechanism.

26. The combination with a seaming mechanism rotating continuously about a vertical axis, said seaming mechanism including a rotating turret having a series of half molds, a rotating table having a series of rotatable supports in alinement with the half molds, a series of chucks in alinement with the half molds and seaming means associated with each chuck, of an assembling mechanism including a table on which the can bodies are moved, a guiding rail for directing the can bodies, a rotating turret having a series of half molds adapted to coöperate with the half molds on the turret of the seaming machine for placing a can body on the rotatable support of the seaming machine and for rounding up the can body to receive the can end, said turret having a recess directly above each half mold for positioning a can end, a stack holder for the can ends, means operated by the turret for releasing a can end from the stack holder, vertically movable means carried by the turret for supporting one side of the can end in the recess above the half mold, a guide rail for supporting the other side of said can end, means for placing the can bodies in the half molds, said means for supporting the can end operating to lower the can end to a position directly over the can body and operating to release the can end whereby it will drop at its outer edge onto the can body just as the can body is fully seated in the half mold for preventing spilling of the contents of the can body.

27. The combination with a seaming mechanism rotating continuously about a vertical axis, said seaming mechanism including a rotating turret having a series of half molds, a rotating table having a series of rotatable supports in alinement with the half molds, a series of chucks in alinement with the half molds and seaming means associated with each chuck, of an assembling mechanism including a table on which the can bodies are moved, a guiding rail for directing the can bodies, a rotating turret having a series of half molds adapted to coöperate with the half molds on the turret of the seaming machine for placing a can body on the rotatable support of the seaming machine and for rounding up the can body to receive the can end, said turret having a recess directly above each half mold for positioning a can end, a stack holder for the can ends, means operated by the turret for releasing a can end from the stack holder, vertically movable means carried by the turret for supporting one side of the can end in the recess above the half mold, a guide rail for supporting the other

side of said can end, means for placing the can bodies in the half molds, said means for supporting the can end operating to lower the can end to a position directly over the can body and operating to release the can end whereby it will drop at its outer edge onto the can body just as the can body is fully seated in the half mold for preventing spilling of the contents of the can body, said means for placing the can bodies in the half molds on the turret of the assembling mechanism being constructed and arranged so that the can body moves continuously forward in a curved path at a uniform rate of travel.

28. A double seaming machine including in combination a supporting frame, a turret mounted to rotate thereon, said turret having an upper and a lower section, a supporting table carried by the lower section, a plurality of chucks carried by the upper section and rotating therewith, means for rotating the chucks, devices for moving the chucks endwise, a rotatable support on the table in alinement with each chuck, a seaming roll associated with each chuck, devices for operating the seaming rolls, a housing carried by the turret and surrounding the chuck, said housing having a half mold for centering the can body underneath the chuck, said half mold being cut away to permit the operation of the seaming roll.

29. A double seaming machine including in combination a supporting frame, a turret mounted to rotate thereon, said turret having an upper and a lower section, a supporting table carried by the lower section, a plurality of chucks carried by the upper section and rotating therewith, means for rotating the chucks, devices for moving the chucks endwise, a rotatable support on the table in alinement with each chuck, a seaming roll associated with each chuck, devices for operating the seaming rolls, a housing carried by the turret and surrounding the chuck, said housing having a half mold for centering the can body underneath the chuck, said half mold being cut away to permit the operation of the seaming roll and means carried by the turret for inclosing the operating devices for the seaming rolls and the chucks.

30. A double seaming machine including in combination a supporting frame, a turret mounted to rotate thereon, said turret having an upper and a lower section, a supporting table carried by the lower section, a plurality of chucks carried by the upper section and rotating therewith, means for rotating the chucks, devices for moving the chucks endwise, a rotatable support on the table in alinement with each chuck, a seaming roll associated with each chuck, devices for operating the seaming rolls, a housing carried by the turret and surrounding the chuck, said housing having a half mold for centering the can body underneath the chuck, said half mold being cut away to permit the operation of the seaming roll, and means for adjusting the turret with the parts supported thereby toward and from the table.

31. A double seaming machine including in combination a supporting frame, a column extending upwardly therefrom, a vertical shaft extending through the column, a turret mounted to rotate about the column, a plurality of chucks carried by the turret, means operated by the vertical shaft for rotating the chucks, a sleeve surrounding the column and keyed thereto, a rocking frame for moving each chuck endwise, a horizontal face cam and a vertical face cam carried by the sleeve, a roller carried by each rocking frame and engaging continuously the vertical face cam for lowering the chucks, a roller carried by each rocking frame and engaging continuously the horizontal face cam for raising the chucks, a seaming roll associated with each chuck and having a first and second operation groove formed therein.

32. A double seaming machine including in combination a supporting frame, a column extending upwardly therefrom, a vertical shaft extending through the column, a turret mounted to rotate about the column, a plurality of chucks carried by the turret, means operated by the vertical shaft for rotating the chucks, a sleeve surrounding the column and keyed thereto, a rocking frame for moving each chuck endwise, a horizontal face cam and a vertical face cam carried by the sleeve, a roller carried by each rocking frame and engaging continuously the vertical face cam for lowering the chucks, a roller carried by each rocking frame and engaging continuously the horizontal face cam for raising the chucks, a seaming roll associated with each chuck and having a first and second operation groove formed therein, and means for adjusting the sleeve vertically to take up wear in the parts.

33. A double seaming machine including in combination a supporting frame, a column extending upwardly therefrom, a vertical shaft extending through the column, a turret mounted to rotate about the column, a plurality of chucks carried by the turret, means operated by the vertical shaft for rotating the chucks, a sleeve surrounding the column and keyed thereto, a rocking frame for moving each chuck endwise, a horizontal face cam and a vertical face cam carried by the sleeve, a roller carried by each rocking frame and engaging continuously the vertical face cam for lowering the chucks, a roller carried by each rocking frame and engaging continuously the horizontal face cam for raising the chucks, a seaming roll

associated with each chuck and having a first and second operation groove formed therein, said horizontally disposed cam having a yielding section formed therein whereby the machine may be stopped with the roll of one of the rocking frames in contact with said yielding section and the chuck raised, said yielding section being disposed so that the chuck may be raised between the first and second seaming operations so that the can may be removed for inspection.

34. A double seaming machine including in combination a rotating turret, a plurality of rotating chucks carried thereby, a rocking frame for moving the chucks endwise, a seaming roll associated with each chuck and having first and second operation grooves, means for operating the seaming roll, a stationary sleeve having a horizontal face cam and a vertical face cam, a roll carried by each rocking frame and continuously engaging the vertical face cam for lowering the chucks, a roll carried by each rocking frame and continuously engaging the horizontal face cam for raising the chucks and means for adjusting the sleeve vertically for taking up wear in the parts.

35. A double seaming machine including in combination a rotating turret, a plurality of rotating chucks carried thereby, a rocking frame for moving the chucks endwise, a seaming roll associated with each chuck and having first and second operation grooves, means for operating the seaming roll, a stationary sleeve having a horizontal face cam and a vertical face cam, a roll carried by each rocking frame and continuously engaging the vertical face cam for lowering the chucks, a roll carried by each rocking frame and continuously engaging the horizontal face cam for raising the chucks and means for adjusting the sleeve vertically for taking up wear in the parts, said vertical face cam having a yielding section formed therein, said yielding section being disposed so as to permit the chuck to be raised between the first and second operations, for permitting the removal of the can for inspection.

36. A double seaming machine including in combination a chuck, a seaming roll for double seaming the can end to the can body, said seaming roll having a first operation groove formed therein which is uniform in cross section throughout and also a second operation groove formed therein which is uniform in cross section throughout, said grooves being parallel and spaced one above the other, means for causing a relative rotation between the seaming roll and the can, means for automatically moving the seaming roll into and out of contact with the flange on the can end, and means for automatically moving the can end and seaming roll relatively in an endwise direction after the first seaming operation has been finished for bringing the seaming roll into position for performing the second operation.

37. A double seaming machine including in combination a chuck, a seaming roll having an annular first operation groove uniform in cross section throughout and a second operation groove uniform in cross section throughout, a spindle having its axis parallel with the chuck, a frame at one end of the spindle supporting said seaming roll, said seaming roll being eccentric to the axis of the spindle, means for oscillating the spindle to carry the seaming roll into contact with the flange of the can body, and means for automatically moving the spindle endwise after the first seaming operation has been completed for positioning the seaming roll relative to the flange on the can end for the second seaming operation.

38. A double seaming machine including in combination a chuck, a seaming roll having an annular first operation groove uniform in cross section throughout and a second operation groove uniform in cross section throughout, a spindle having its axis parallel with the chuck, a frame at one end of the spindle supporting said seaming roll, said seaming roll being eccentric to the axis of the spindle, means for oscillating the spindle to carry the seaming roll into contact with the flange of the can body and means for moving the spindle endwise for positioning the seaming grooves relative to the flange of the can body, said means for oscillating the spindle including a cam engaging a roll carried by the spindle, said cam having an adjustable section whereby the tightness of the seam by the first operation may be varied.

39. A double seaming machine including in combination a chuck, a seaming roll having an annular first operation groove uniform in cross section throughout and a second operation groove uniform in cross section throughout, a spindle having its axis parallel with the chuck, a frame at one end of the spindle supporting said seaming roll, said seaming roll being eccentric to the axis of the spindle, means for oscillating the spindle to carry the seaming roll into contact with the flange of the can body and means for moving the spindle endwise for positioning the seaming grooves relative to the flange of the can body, said means for oscillating the spindle including a cam engaging a roll carried by the spindle, said cam having an adjustable section whereby the tightness of the seam by the first operation may be varied, and means for adjusting the frame on the spindle whereby the tightness of both the seams formed by the first and second operation grooves may be simultaneously varied.

40. A double seaming machine including in combination a chuck, a seaming roll hav-

ing a seaming groove formed therein, a spindle having its axis parallel with the axis of the chuck, means rigidly attached to the spindle for supporting the seaming roll at one end of the spindle with the center of the seaming roll at one side of the axis of the spindle whereby oscillations of the spindle will move the seaming roll toward and from the chuck, a rotating cam, means rigidly connected to the other end of the spindle and engaging said cam whereby said cam positively operates the spindle and positively moves the seaming roll into engagement with the flange of the can end for forming the seam, said spindle being of sufficient length whereby the material thereof will permit sufficient torsional twist to allow the seaming roll to pass the side seam of the can body.

41. A double seaming machine including in combination a chuck, a seaming roll having a seaming groove formed therein, a spindle parallel with the chuck, a frame mounted at one end of the spindle and carrying the seaming roll, said seaming roll being eccentric to the axis of the spindle, a roll carried at the other end of the spindle for oscillating the same, a cam engaging the roll for oscillating the spindle whereby the seaming roll is positively forced into engagement with the flange on the can end for forming the seam, said spindle being of sufficient length whereby the material thereof will permit sufficient torsional twist to allow the seaming roll to pass the side seam in the can body.

42. A double seaming machine including in combination a chuck, a seaming roll having a first operation groove of uniform cross section throughout and a second operation groove of uniform cross section throughout, said grooves being parallel, a spindle parallel with the chuck, a frame mounted at one end of the spindle and carrying said seaming roll, said seaming roll being eccentric to the axis of the spindle, a roll mounted at the other end of the spindle for oscillating the same to cause the seaming roll to engage the can end, a cam engaging said roll for positively moving the spindle, said spindle being of sufficient length so that the material thereof will permit a torsional twist of the spindle to allow the seaming roll to pass the side seam in the can body.

43. A double seaming machine including in combination a chuck, a seaming roll having a first operation groove of uniform cross section throughout and a second operation groove of uniform cross section throughout, said grooves being parallel, a spindle parallel with the chuck, a frame mounted at one end of the spindle and carrying said seaming roll, said seaming roll being eccentric to the axis of the spindle, a roll mounted at the other end of the spindle for oscillating the same to cause the seaming roll to engage the can end, a cam engaging said roll for positively moving the spindle, said spindle being of sufficient length so that the material thereof will permit a torsional twist of the spindle to allow the seaming roll to pass the side seam in the can body, said frame being adjustably connected to the spindle whereby the position of the seaming roll may be shifted for varying the tightness of both the seams formed by the first and second operation grooves.

44. A double seaming machine including in combination a chuck, a seaming roll having a first operation groove of uniform cross section throughout and a second operation groove of uniform cross section throughout, said grooves being parallel, a spindle parallel with the chuck, a frame mounted at one end of the spindle and carrying said seaming roll, said seaming roll being eccentric to the axis of the spindle, a roll mounted at the other end of the spindle for oscillating the same to cause the seaming roll to engage the can end, a cam engaging said roll for positively moving the spindle, said spindle being of sufficient length so that the material thereof will permit a torsional twist of the spindle to allow the seaming roll to pass the side seam in the can body, said frame being adjustably connected to the spindle whereby the position of the seaming roll may be shifted for varying the tightness of both the seams formed by the first and second operation grooves, said cam for operating the spindle having an adjustable section formed therein so disposed that the tightness of the seam formed by the first operation may be adjusted independently of the adjusting of the seaming roll on the spindle.

45. A double seaming machine including in combination a chuck, a seaming roll having a first operation groove of uniform cross section throughout and a second operation groove of uniform cross section throughout, said grooves being parallel, a spindle parallel with the chuck, a frame mounted at one end of the spindle and carrying said seaming roll, said seaming roll being eccentric to the axis of the spindle, a roll mounted at the other end of the spindle for oscillating the same to cause the seaming roll to engage the can end, a cam engaging said roll for positively moving the spindle, said spindle being of sufficient length so that the material thereof will permit a torsional twist of the spindle to allow the seaming roll to pass the side seam in the can body, said frame being loosely connected to the spindle, a dog fixed to the spindle and having a projecting member, screws carried by the frame and

engaging opposite faces of the projecting member, whereby the adjustment of the screws will shift the frame on the spindle.

46. A double seaming machine including in combination a chuck, a seaming roll having a first operation groove of uniform cross section throughout, and a second operation groove of uniform cross section throughout, said grooves being parallel, a spindle parallel with the chuck, a frame mounted at one end of the spindle and carrying said seaming roll, said seaming roll being eccentric to the axis of the spindle, a roll mounted at the other end of the spindle for oscillating the same to cause the seaming roll to engage the can end, a cam engaging said roll for positively moving the spindle, said spindle being of sufficient length so that the material thereof will permit a torsional twist of the spindle to allow the seaming roll to pass the side seam in the can body, said frame being loosely connected to the spindle, a dog fixed to the spindle and having a projecting member, screws carried by the frame and engaging opposite faces of the projecting member, whereby the adjustment of the screws will shift the frame on the spindle, said dog being readily detachable from the spindle whereby another dog having a differently disposed projecting member may be substituted therefor, for positioning the seaming roll for operating on cans of different diameters.

47. A double seaming machine including in combination a rotating chuck, a rotatable support coöperating therewith, a seaming roll having a first operation groove of uniform cross section throughout and a second operation groove of uniform cross section throughout, said grooves being arranged in parallel planes, a spindle, a frame mounted on the spindle and carrying the seaming roll, said seaming roll being located at one side of the axis of the spindle, means at the upper end of the spindle for oscillating the same for causing the seaming roll to engage the can end, cam means for depressing the spindle for placing one of the operating grooves in alinement with the can end and a spring for raising the spindle against the cam and operating to place the other groove in alinement with the can end.

48. The combination with a seaming mechanism, an assembling mechanism for positioning the can ends relative to the can bodies and delivering the same to the seaming mechanism, a stack holder with the can ends associated with said assembling mechanism, a timing mechanism for delivering the can bodies to the assembling mechanism, said assembling mechanism having a rotating turret for carrying the can ends, vertically shiftable pins mounted on the turret for releasing the can ends from the stack, a controlling mechanism operated by the can bodies on the timing mechanism for raising said pins, whereby a pin becomes operated to release a can end when a can body passes said controlling mechanism.

49. A seaming mechanism, an assembling mechanism for positioning a can end and a can body relative to each other and feeding the same to the seaming mechanism, a stack holder associated with the assembling mechanism, a timing mechanism for delivering the can bodies to the assembling mechanism, said assembling mechanism having a rotating turret for feeding the can ends and can bodies, a series of pins carried by the turret, said pins being shiftable vertically from operative to inoperative position and operating when raised to release a can end from the stack, a lever having a cam for raising the pins, said lever having a controlling plate adapted to be engaged by a can body on the timing mechanism whereby when a can passes said controlling plate a can end is released from the stack.

50. A timing mechanism for receiving can bodies in semitimed relation and for delivering the same in timed relation to an operating mechanism, said timing mechanism including two rotatable supports onto which the can body is directed, means whereby said rotating supports travel at different speeds, timing fingers associated with the support traveling at the greatest speed, whereby said support traveling at the slowest speed will cause the can bodies on the supports to rotate about the center of the can and be gradually retarded or shifted rearwardly on the rapidly traveling support against the timing fingers and a guide rail coöperating with said supports.

51. A timing mechanism for receiving can bodies in semitimed relation and for delivering the same in timed relation to an operating mechanism, said timing mechanism including an outer support rotating about a vertical axis, timing fingers associated with said support, a support located within said first named support and rotating about the same axis and at a slower speed than the outer support, said supports being flush with each other and adapted to receive the can bodies whereby they are partly carried upon each support, said slow rotating support operating to rotate the can body about its longitudinal center for retarding the can body and moving the same backwardly on the outer support, into contact with the timing fingers and a guide rail associated with said rotating supports.

In testimony whereof, we affix our signatures.

ALFRED L. KRONQUEST.
JOHN C. TALIAFERRO.

Correction in Letters Patent No. 1,348,650.

It is hereby certified that in Letters Patent No. 1,348,650, granted August 3, 1920, upon the application of Alfred L. Kronquest, of Chicago, Illinois, and John C. Taliaferro, of Baltimore, Maryland, for an improvement in "Can-Closing Machines," an error appears in the printed specification requiring correction as follows: Page 14, line 25, claim 3, for the word "seaming" read *seating;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 30th day of November, A. D., 1920.

[SEAL.]

L. B. MANN,

Acting Commissioner of Patents.

Cl. 113—14.