C. E. ENNES.

CAN CLOSING MACHINE.

APPLICATION FILED AUG. 13, 1918.

1,369,920.

Patented Mar. 1, 1921.

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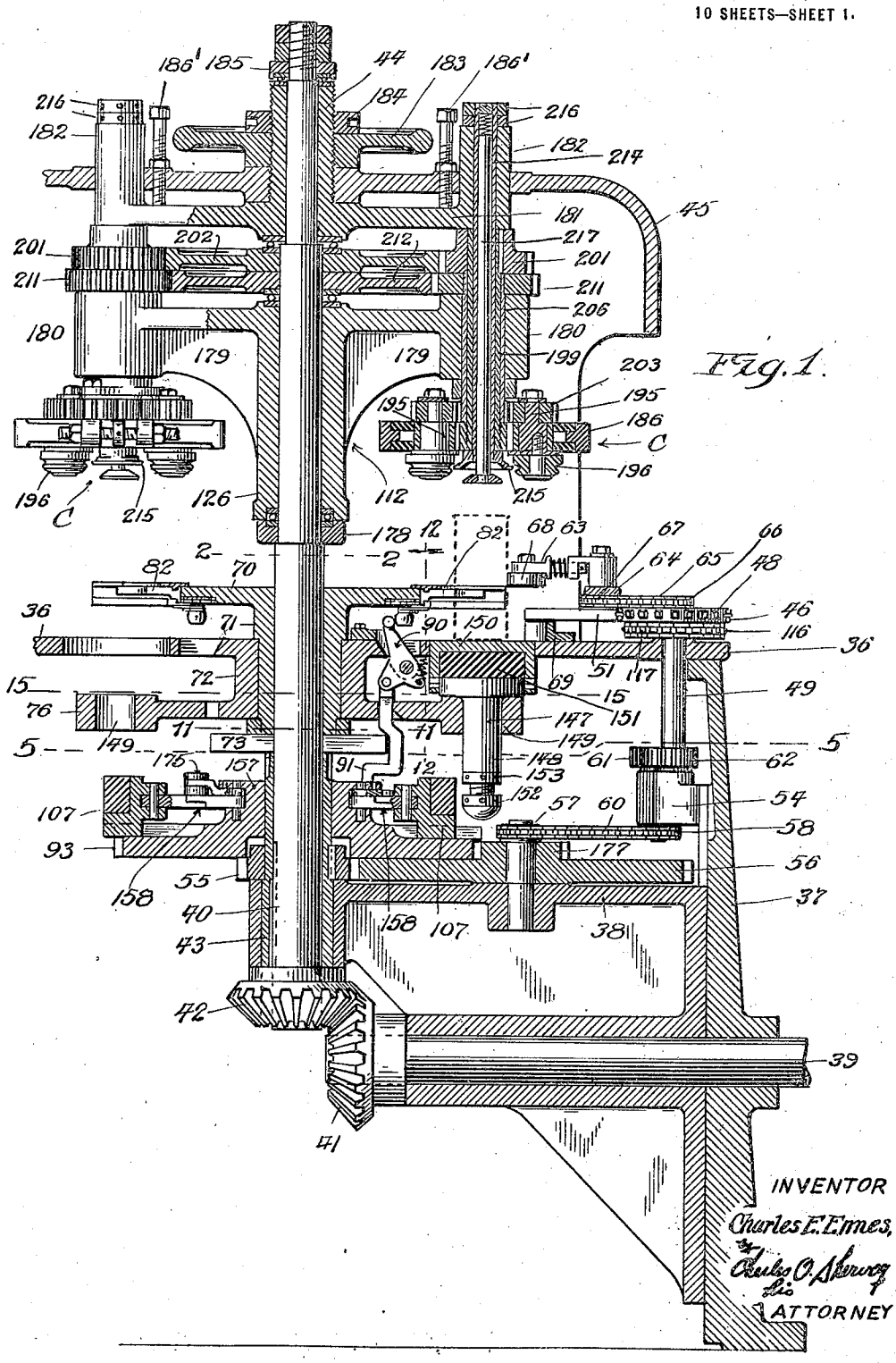


Fig. 1.

INVENTOR

Charles E. Ennes,

by Charles O. Skinner

his

ATTORNEY

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CAN CLOSING MACHINE.

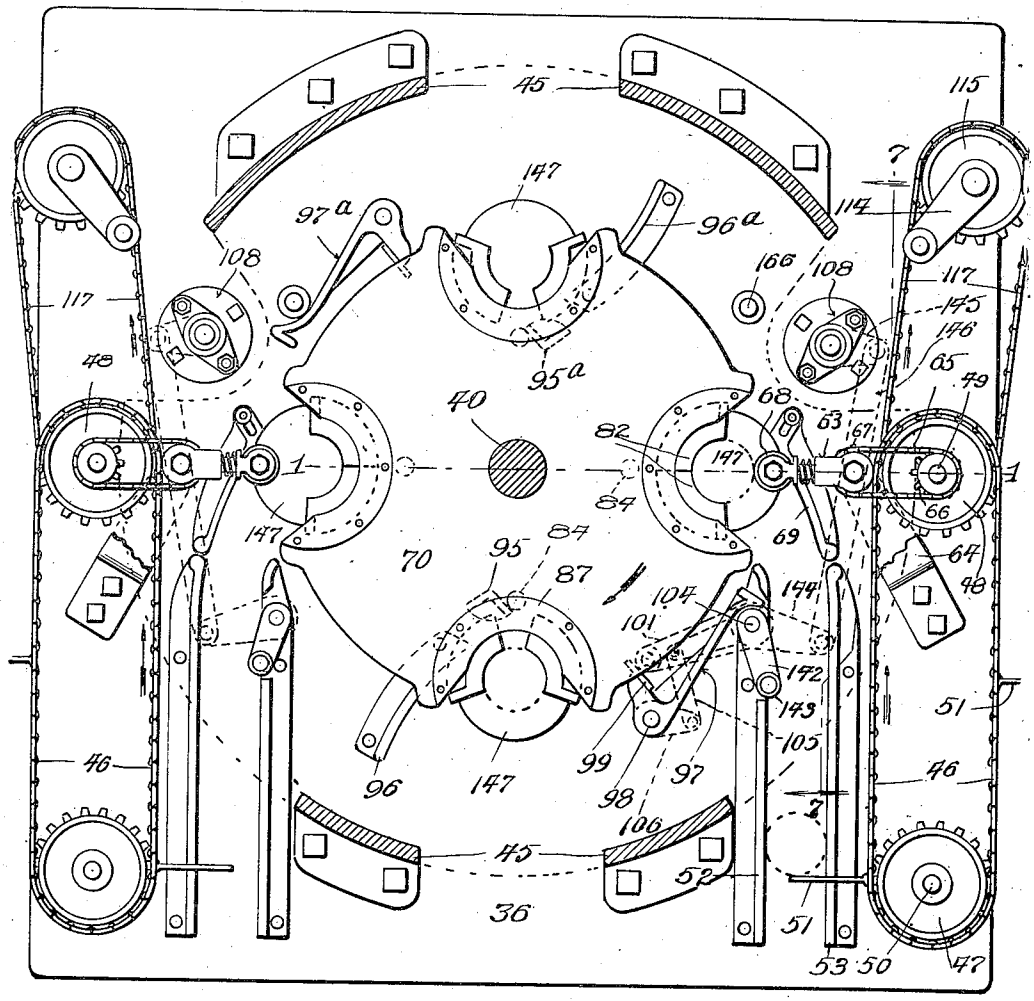
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10 SHEETS—SHEET 2.

Fig. 2.



INVENTOR

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10 SHEETS—SHEET 3.

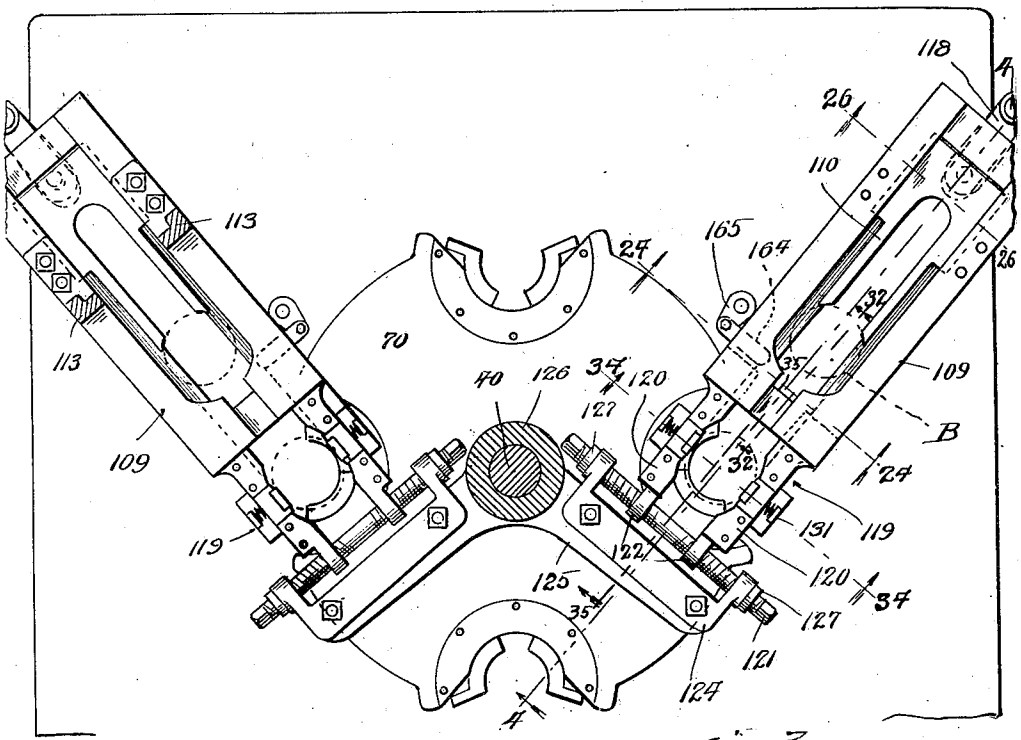


Fig. 3.

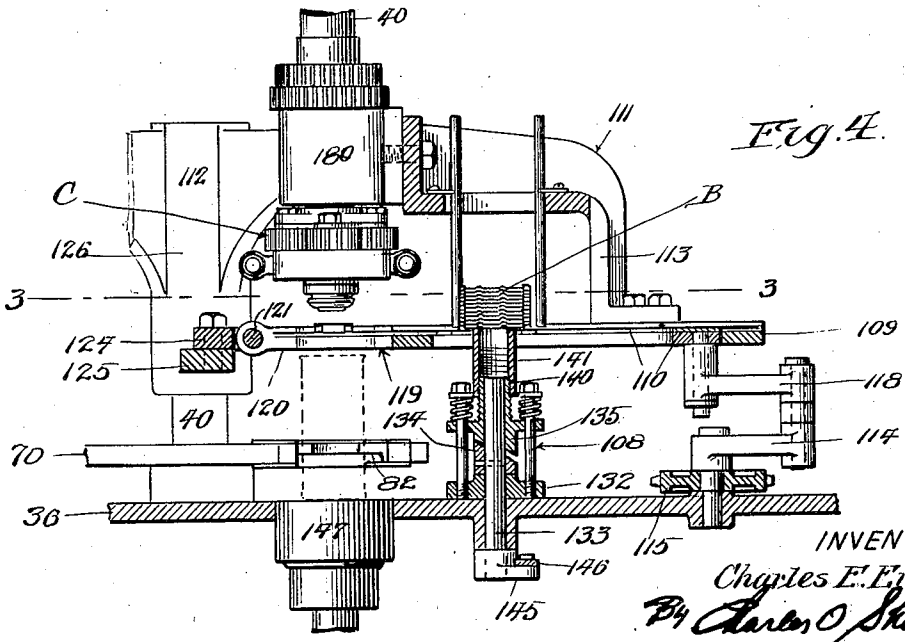


Fig. 4.

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Patented Mar. 1, 1921.

10 SHEETS—SHEET 4.

Fig. 5.

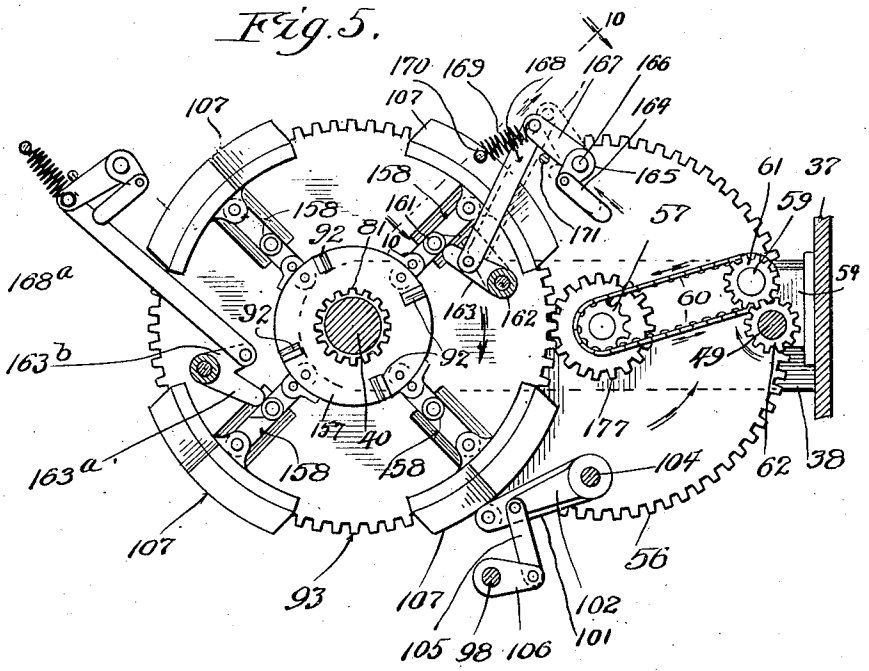


Fig. 7.

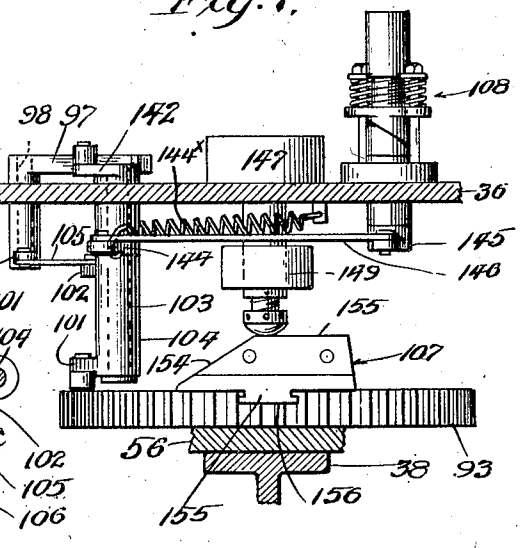
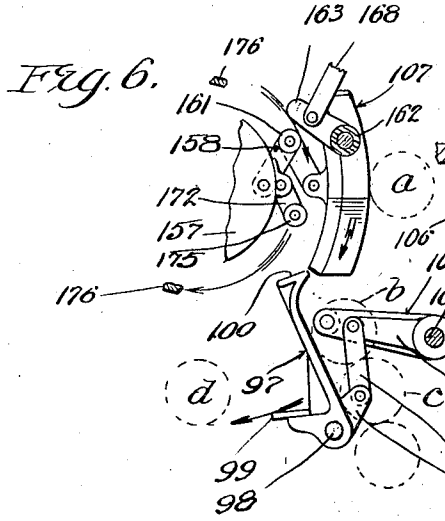


Fig. 6.



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CAN CLOSING MACHINE.

APPLICATION FILED AUG. 13, 1918.

1,369,920. Patented Mar. 1, 1921.

10 SHEETS—SHEET 5.

Fig. 8.

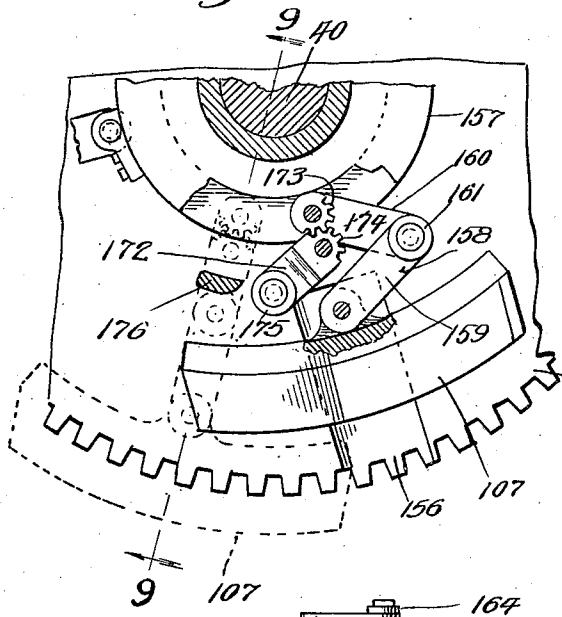


Fig. 9.

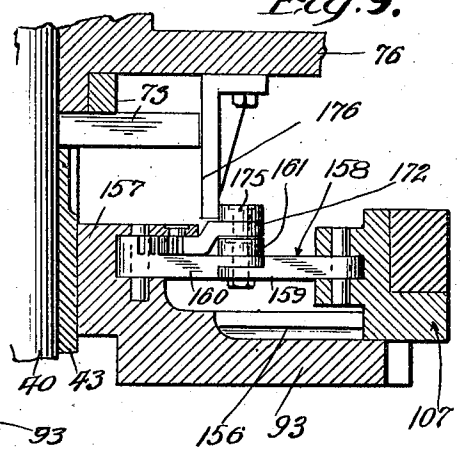
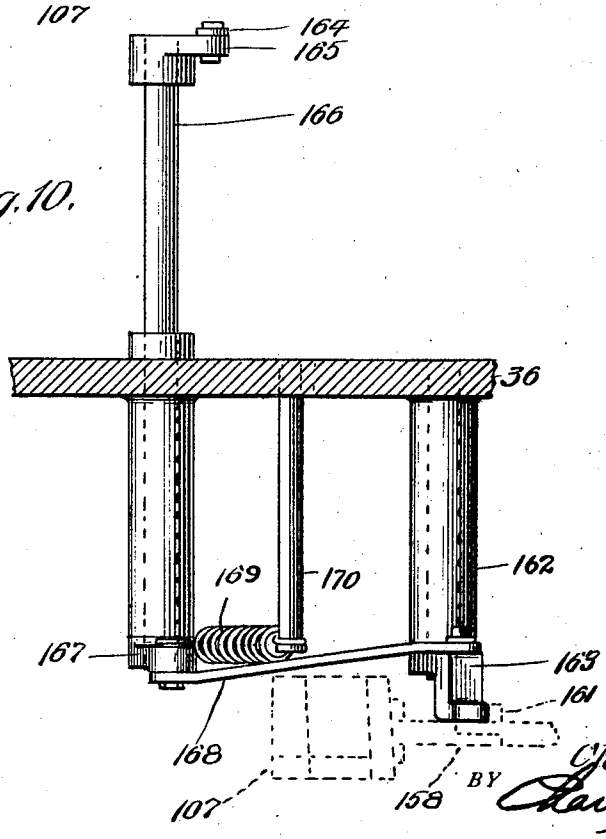


Fig. 10.



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10 SHEETS—SHEET 6.

Fig. 11.

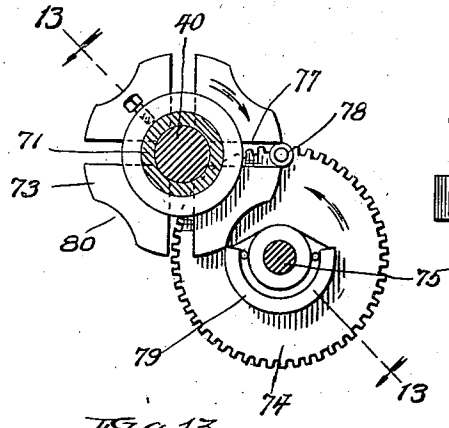


Fig. 12.

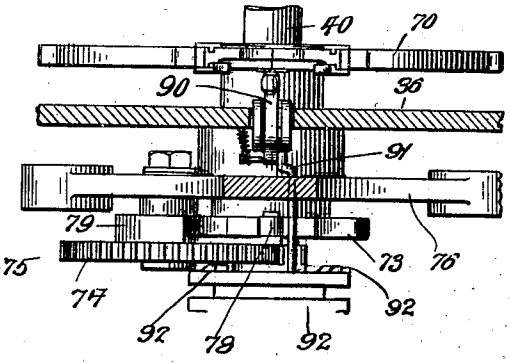


Fig. 13.

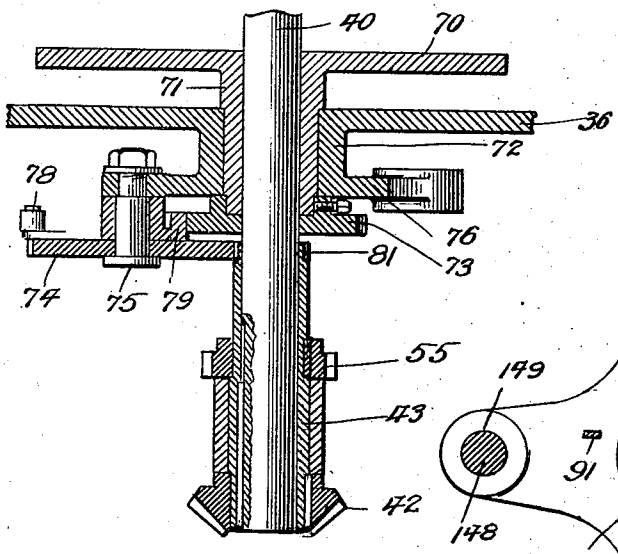


Fig. 14.

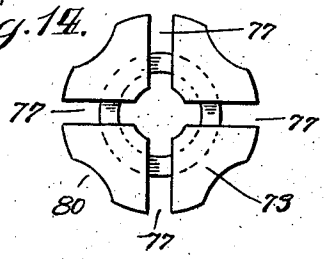
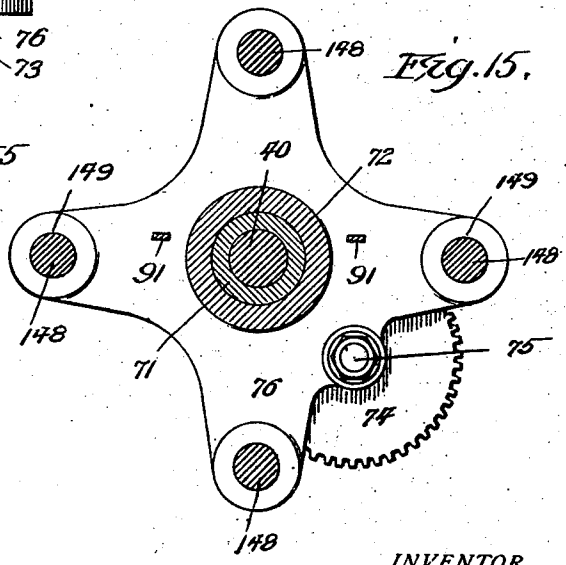


Fig. 15.



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Patented Mar. 1, 1921.

10 SHEETS—SHEET 7.

Fig. 16.

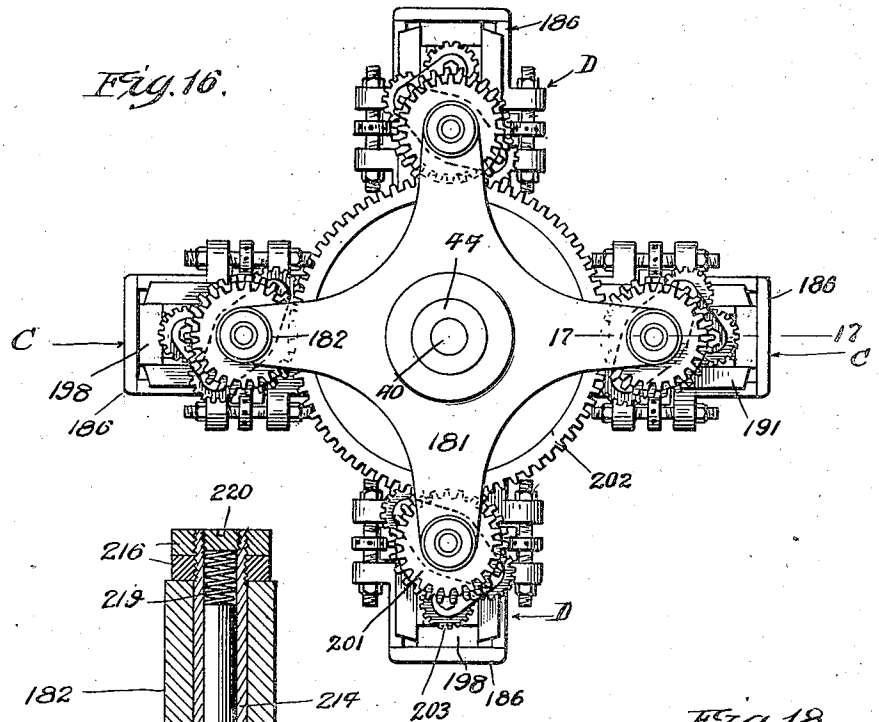


Fig. 17.

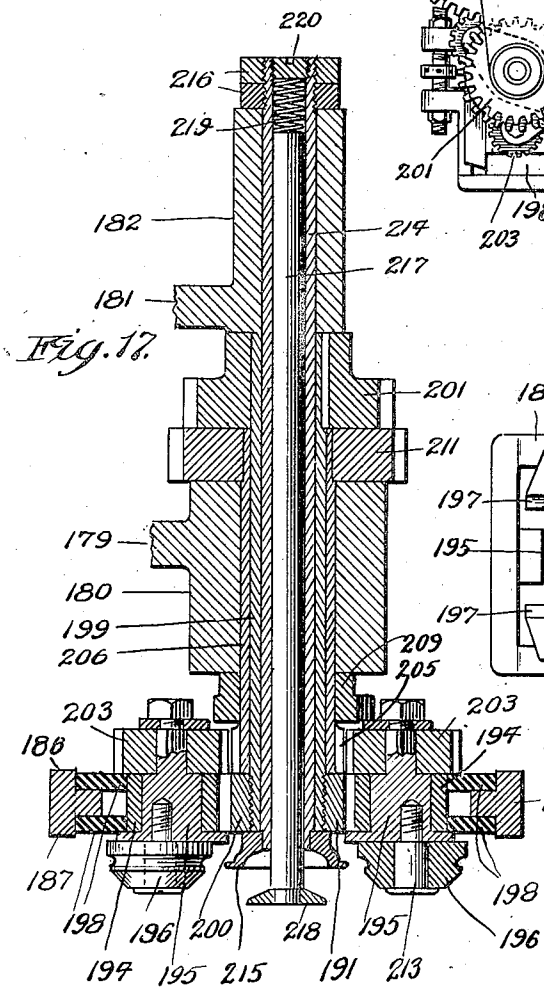
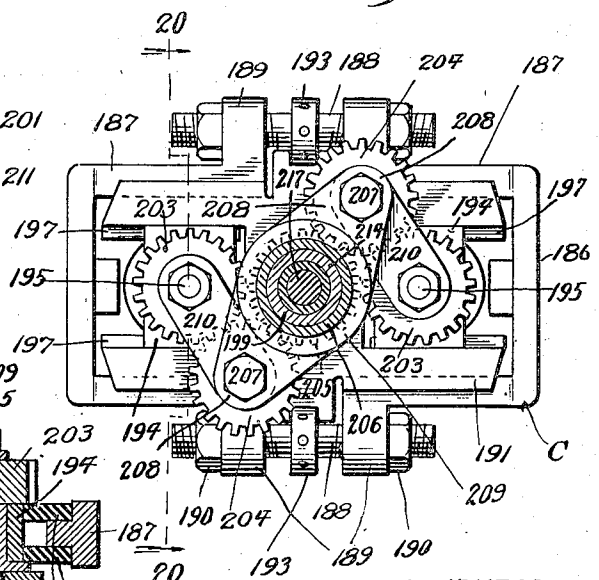


Fig. 18.



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CAN CLOSING MACHINE.

APPLICATION FILED AUG. 13, 1918.

1,369,920. **Patented Mar. 1, 1921.**

10 SHEETS—SHEET 8.

Fig. 19.

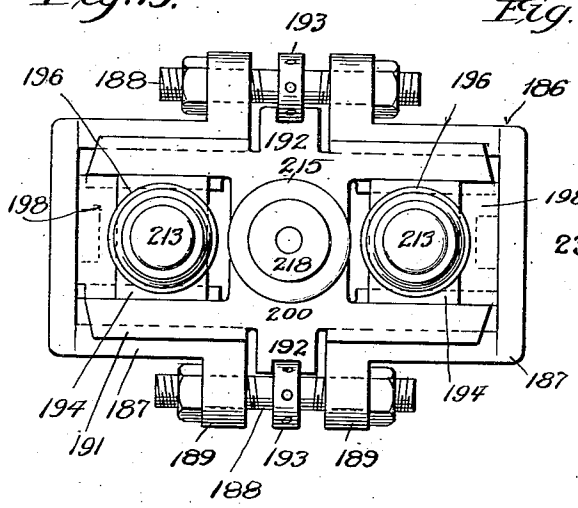


Fig. 21.

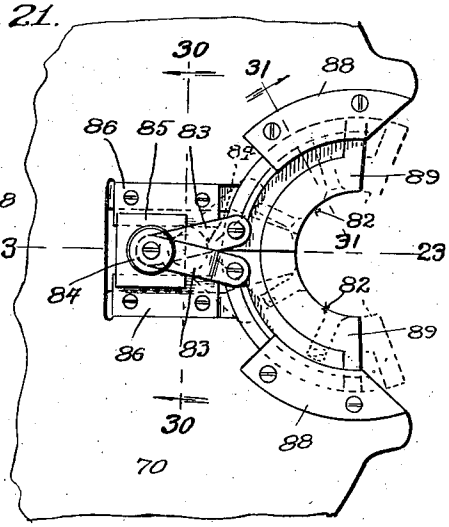


Fig. 20.

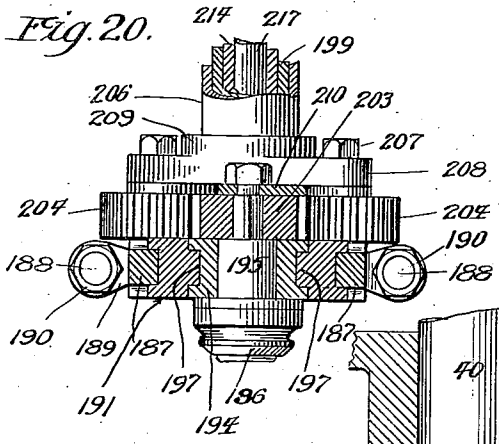


Fig. 22.

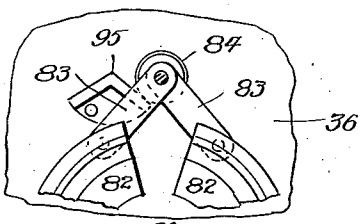
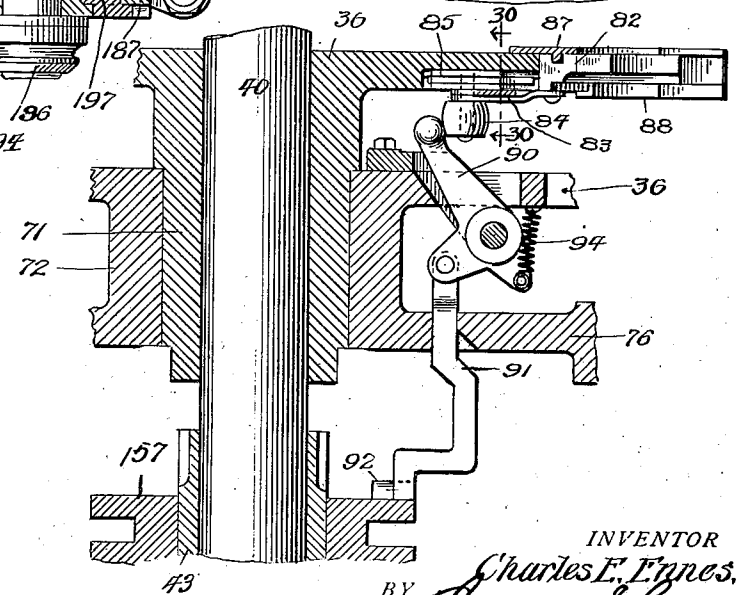


Fig. 23.



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CAN CLOSING MACHINE.

APPLICATION FILED AUG. 13, 1918.

1,369,920.

Patented Mar. 1, 1921.

10 SHEETS—SHEET 9.

Fig. 24.

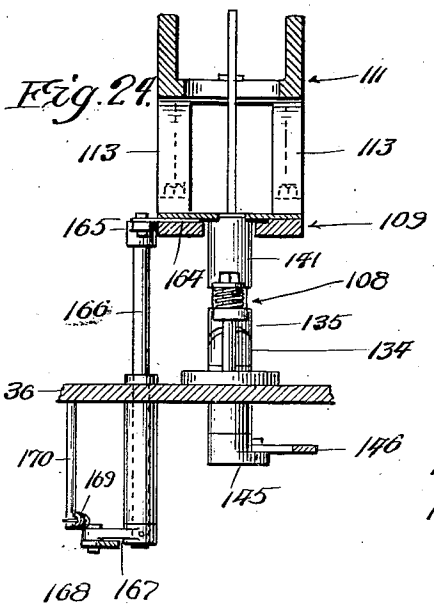


Fig. 26.

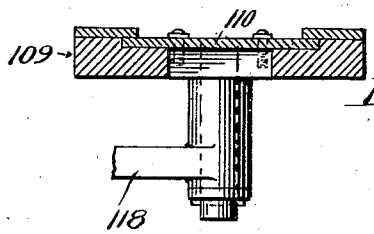


Fig. 27.

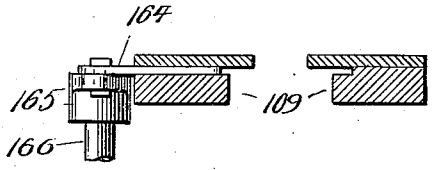


Fig. 25.

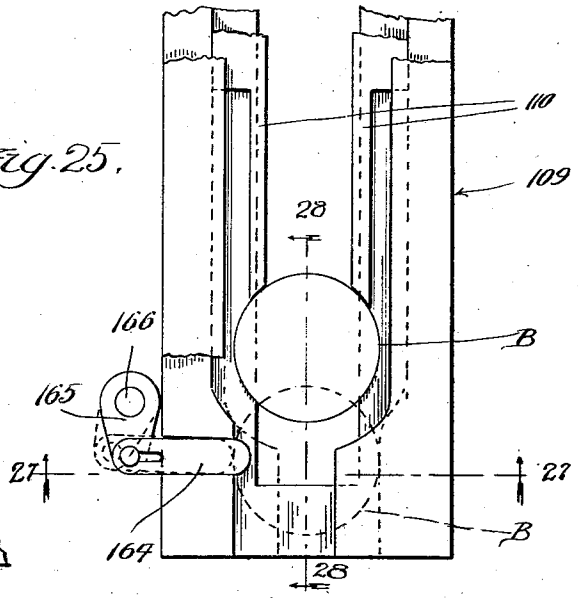


Fig. 28

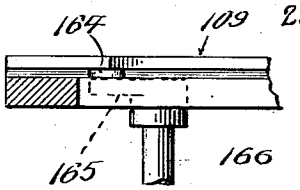
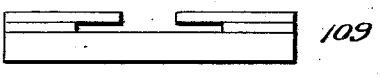


Fig. 29.



INVENTOR

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CAN CLOSING MACHINE.

APPLICATION FILED AUG. 13, 1918.

1,369,920. Patented Mar. 1, 1921.

10 SHEETS—SHEET 10.

Fig. 30.

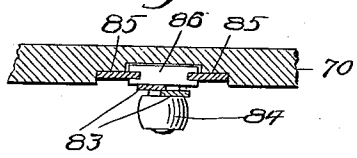


Fig. 31.

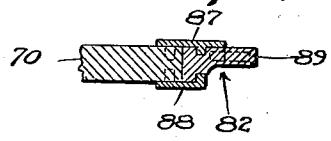


Fig. 32.

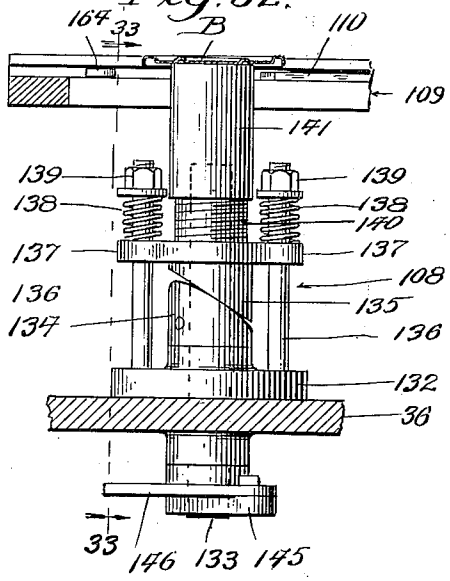


Fig. 33.

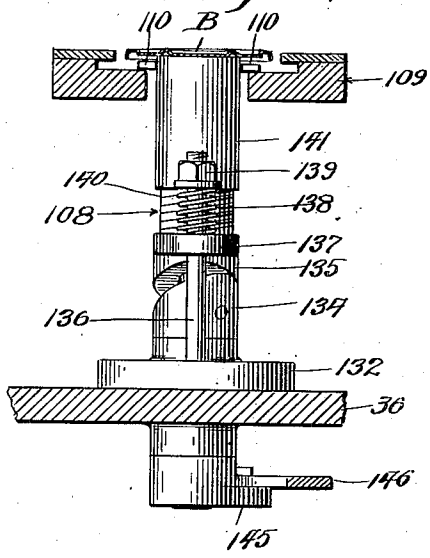


Fig. 34.

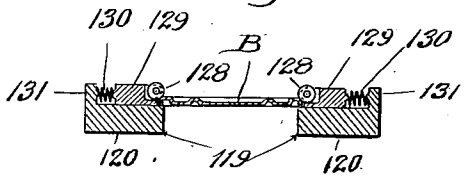
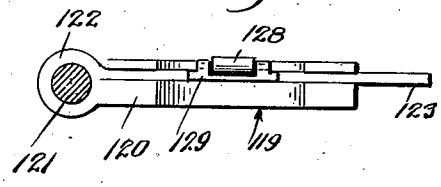


Fig. 35.



INVENTOR

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BY Charles O. Sherrey,

His ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES E. ENNES, OF CHICAGO, ILLINOIS.

CAN-CLOSING MACHINE.

1,369,920. Specification of Letters Patent. Patented Mar. 1, 1921.

Application filed August 13, 1918. Serial No. 249,643.

To all whom it may concern:

Be it known that I, CHARLES E. ENNES, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Can-Closing Machines, of which the following is declared to be a full, clear, and exact description.

This invention relates to can closing machines, and its primary object is to provide a can closing machine of improved construction for automatically feeding can ends to the can bodies, and forming a double seam between the can ends and can bodies. Another object is to provide improved means for feeding filled can bodies to the seaming rolls and bringing them to a position of rest without danger of spilling any of the contents. Another object is to provide improved means for controlling the operation of the end feeding mechanism, whereby a can end will be fed from a stack of can ends each time a can body is fed to the seaming rolls. Another object is to provide means for bringing the can body and can end into operative position relative to the seaming rolls only when a can end has been fed into position upon a can body. Another object is to provide ejecting means for can bodies that are conveyed to the turret wheel, and not acted upon by the seaming rolls, as is the case when no can end is fed to the can body. Another object is to provide a can closing machine of simple, practical and substantial construction, automatic in all of its operative parts.

With these and other objects in view, the invention consists in the several novel features hereinafter fully set forth and claimed.

The invention is clearly illustrated in the drawings accompanying this specification, in which:

Figure 1, is a central, vertical, cross section through part of a can closing machine embodying one form of the present invention, the line of section being indicated at 1—1 in Fig. 2; Fig. 2, is a plan of the table, can conveying mechanism and associated parts, the main drive shaft being shown in section taken on the line 2—2 in Fig. 1, and the parts thereabove being omitted from the view; Fig. 3, is a plan of the can end feeding mechanism and turret wheel, the main drive shaft being illustrated in section, and the line of section being indicated at 3—3 in Fig. 4; Fig. 4, is a vertical section through the can end feeding mechanism taken on line 4—4 of Fig. 3; Fig. 5, is a plan of the can body lifting mechanism which brings the can bodies and can ends into operative position relative to the seaming rolls, the main drive shaft being shown in section, and the line of section being indicated at 5—5 in Fig. 1; Fig. 6, is a plan of a plunger raising cam shoe and one can ejector showing the shoe in retracted or inoperative position, and the ejector in operative position to eject a can which has not been acted on by the first seaming rolls; Fig. 7, is a view, partly in vertical section and partly in elevation of the can body raising mechanism and ejecting mechanism, the line of section being indicated at 7—7 in Fig. 2; Fig. 8, is a detail plan of a fragment of a cam shoe driving gear wheel; Fig. 9, is a detail section taken on line 9—9 of Fig. 8; Fig. 10, is a view partly in side elevation and partly in vertical section of a certain toggle link trip mechanism, the line of section being indicated at 10—10 in Fig. 5; Fig. 11, is a plan of a certain "Geneva" stop movement for intermittently rotating the turret wheel, the main drive shaft being shown in section and the line of section being indicated at 11—11 in Fig. 1; Fig. 12, is a view partly in vertical section and partly in elevation of the turret wheel and "Geneva" stop movement, the line of section being indicated at 12—12 in Fig. 1; Fig. 13, is a vertical section taken on the line 13—13 of Fig. 11; Fig. 14, is a plan of the "Geneva" wheel; Fig. 15, is a view partly in plan and partly in horizontal section of a plunger supporting member, the line of section being indicated at 15—15 in Fig. 1; Fig. 16, is a plan of the seaming heads and seaming roll mechanism; Fig. 17, is a detail vertical section of one of the seaming heads taken on line 17—17 of Fig. 16; Fig. 18, is a detail plan of one of the seaming heads; Fig. 19, is a view of one of the seaming heads looking from below; Fig. 20, is a detail cross section through one of the seaming heads, taken on line 20—20 of Fig. 18; Fig. 21, is a view of a fragment of the turret wheel looking from below and showing one of the can body locking mechanisms; Fig. 22, is a plan of two can holding jaws and the means for retracting the jaws from a can; Fig. 23, is a detail, vertical section illustrating the can holding jaw actuating mechanism, the line of section

being indicated at 23—23 in Fig. 21; Fig. 24, is a detail view partly in vertical section and partly in elevation of the can end lifting mechanism and certain members of the control mechanism for the can body raising shoes, the line of section being indicated at 24—24 in Fig. 3; Fig. 25, is a plan of a fragment of the can end feed mechanism; Fig. 26, is a detail cross section of the can end feed mechanism taken on the line 26—26 of Fig. 3; Fig. 27, is a detail cross section taken on line 27—27 of Fig. 25; Fig. 28, is a detail, longitudinal section taken on line 28—28 of Fig. 25; Fig. 29, is an end view of the feed slide guide seen in Fig. 25; Fig. 30, is a detail, vertical section taken on line 30—30 of Fig. 23; Fig. 31, is a detail vertical section taken on line 31—31 of Fig. 21; Fig. 32, is a detail view, partly in side elevation and partly in vertical section, of the can end lifter, and a fragment of the can end feed mechanism, the line of section being indicated at 32—32 in Fig. 3; Fig. 33, is a detail cross section taken on line 33—33 of Fig. 32; Fig. 34, is a detail, vertical cross section of a certain can end chuck taken on line 34—34 of Fig. 3, and Fig. 35, is a detail view of the chuck partly in vertical section and partly in side elevation, the line of section being indicated at 35—35 in Fig. 3.

In general, the can closing machine illustrated in the drawings, comprises can body conveying mechanism, can end feeding mechanism, seaming mechanism, can lifting mechanism for bringing the cans into operative position relative to the seaming rolls, a turret wheel for moving the cans from a first seaming head to a second one, control mechanism for the can end feed mechanism, control mechanism for the can body raising mechanism, can ejecting mechanism, gearing and operative connections operated from a single main driving shaft. I shall proceed to describe each of these instrumentalities in detail.

As illustrated in the drawings, the machine is capable of operating on four cans at a time; that is, two first seaming heads are shown, which may operate on two cans at a time, and two second seaming heads are shown which may operate on two cans at a time. Inasmuch as the mechanism for handling the cans on one side of the machine is substantially the same as that of those for handling the cans on the other side of the machine, I shall describe only one set of mechanism in detail, and refer generally to the other set.

The frame and drive shafts.

Referring first to Fig. 1, and 2, the reference character 36, designates a table supported by a frame 37. Below the table is a bracket 38, which is bolted to the frame 37, and, in bearings provided on said bracket 38, is a horizontal power-driven shaft 39, and the main vertical drive shaft 40. A bevel gear 41, upon the end of the shaft 39, meshes with a bevel gear 42, upon a sleeve 43, which has a splined connection with the shaft 40; the upper end of the drive shaft 40, is journaled in a bearing 44, which is supported by a hood or cover 45, that rests upon the table and is bolted thereto.

The can body conveyer.

The can body conveyer is the form of a chain 46, which is trained around sprocket wheels 47, 48, fast on shafts 49, 50. The chain 46, has horizontal fingers 51, upon certain of its links which fingers are spaced equidistance apart, and engage the can bodies and propel them between guide rails 52, 53, to a turret wheel 70. Any suitable form of conveying mechanism may be employed for delivering the cans into the path of the fingers 51, in timed relation thereto. The shaft 49, extends down below the table and is journaled in a bearing 54 (see Fig. 5) secured to the frame 37. The shaft 49, is driven from the sleeve 43, by gearing which may comprise a pinion 55, keyed to the sleeve 43, a gear wheel 56, rotatively mounted on the bracket 38, and in mesh with the pinion 55, sprocket wheels 57, 58, one mounted on the shaft of the gear wheel 56, and one mounted on a shaft 59, journaled in the bearing bracket 54, a sprocket chain 60, trained around said sprocket wheels 57, 58, and pinions 61, 62, one fast on the shaft 59, and the other fast on the conveyer chain shaft 49. In the arrangement of the parts illustrated the ratio of the gearing between the main drive shaft and conveyer chain 46, is such that each of the can conveyer fingers 51, moves through a distance equal to the distance between them, during each cycle of operation of the machine thereby conveying a can to the turret wheel 70, in timed relation thereto.

Operating in conjunction with the fingers of the conveyer chain 46, is an arm 63, which acts to move the can bodies into the locking jaws of the turret wheel at the first seaming position. Said arm 63, moves in timed relation with the fingers 51, and engages the can body while the conveyer chain is propelling it toward the turret wheel and moves the can body along a curved line from the straight line of movement (given it by the conveyer chain) into the jaws of the turret wheel. In the form shown, the arm 63, is rotatively mounted on a bracket 64, bolted to the table and is driven fron the shaft of the sprocket wheel 48, by a sprocket chain 65, trained around sprocket wheels 66, 67, fast on the shafts of the sprocket wheel 48, and arm 63, respectively. Preferably, the end of the arm 63, is provided with a roller

68, for engagement with the cans, and the roller is journaled on a spring pressed extension of the arm to allow for slight inequalities of the cans. A rail extension 69, is adjustably secured to the table beyond the rail 53.

The turret wheel.

Rotatively mounted on the table 36, is the turret wheel 70, which moves the cans from the first seaming rolls to the second seaming rolls. Said turret wheel has a hub 71, which surrounds the drive shaft 40, and extends down through the table, which is formed with a bearing 72, for the reception of the hub 71. The latter is shouldered near its upper end and the shoulder rests on the table. The turret wheel is intermittently rotated in the direction indicated by the arrow thereon in Fig. 2, in timed relation with the conveyer fingers 51, and other operative parts of the machine and the mechanism for intermittently rotating the turret wheel comprises a "Geneva" stop movement wheel 73 (see also Figs. 11 to 15, inclusive) and a "Geneva" gear wheel 74, which is journaled on a stud shaft 75, secured in a plunger guiding bracket 76, below the table 36, and connected thereto by the bearing member 72. The "Geneva" wheel 73, is secured to the lower end of the turret hub 71, and contains four slots 77, which radiate out from its axis, in which slots travels a crank pin or rollers 78, that is mounted on the "Geneva" gear wheel 74. Said gear wheel 74, has an accurate hub portion 79, secured to it, which coöperates with reëntrant accurate notches 80, in the periphery of the "Geneva" wheel 73, to positively hold the turret wheel stationary during its interval of rest. Once during each cycle of rotation of the gear wheel 74, the roller 78, enters one of the slots 77, of the "Geneva" wheel, and rotates it through an arc of ninety degrees, thereby moving the can locking jaws of the turret wheel from one set of seaming rolls to the next set. The gear wheel 74, meshes with a pinion 81, at the upper end of the sleeve 43, and receives its motion therefrom.

The turret wheel is formed with a plurality of can receiving openings which are equally disposed around its periphery, four being illustrated, and said openings are arcuate in form. Guided to move in said openings are can locking jaws 82 (see also Figs. 21 and 22) which, after a can body has been placed between the jaws, are moved around the can body to lock it to the turret wheel. Said locking jaws are of arcuate formation and when in open position occupy practically a semicircle whereby a can body may be readily slid into the semicircular opening between the jaws. To the inner end of each jaw 32, is pivotally secured a jaw actuating link 83, both links being pivotally connected together by a pin upon which is mounted a jaw actuating roller 84. A slide block 85 is secured to the pivot pin of the roller 84, and is guided to move radially upon guide bars 86, secured to the underside of the turret wheel. Movement of the roller 84 from the position shown in full lines in Fig. 21, to that shown in dotted lines, causes the locking jaws to be moved from the position shown in full lines to that shown in dotted lines, where they lock the can to the turret wheel against lateral displacement. The jaws 82, are guided between guide plates 87, 88, secured to the upper and lower faces of the turret wheel. The guide plates are arcuate in form and have arcuate ribs that guide the jaws in their movements. For the purpose of holding can bodies of different diameters removable facings 89, may be used on the jaws 82, for which may be substituted others having an internal radius corresponding with the radii of the can bodies to be operated on. These facings may be screwed or otherwise secured to the jaw blocks 82.

The means shown for closing the jaws around the can bodies comprises a bell crank lever 90, pivotally supported on a bracket secured to the table. The upper arm of the bell crank lever 90, lies immediately behind the path of movement of the jaw actuating rollers 84, as they are carried around by the turret wheel, and to the other arm of the bell crank lever 90, is secured a push rod or bar 91, which is guided to move in a vertical direction by the bracket 76. Cams 92, carried by a plunger raising gear wheel 93, engage the lower end of the push rod 91, and lift it, thereby swinging the bell crank lever upward and outward away from the center of the shaft. The upper arm of the bell crank lever thereupon moves the roller 84, outward, thus moving the jaws 82, around the can body. A spring 94, secured to the bell crank lever and underside of the table, operates to return the bell crank lever back to normal position after the cams 92 pass the rod 91. It is to be understood that there are four cams 92, one for each set of jaws 82, and so disposed on the gear wheel 93, as to actuate the bell crank lever 90, at the first seaming station only, immediately after a can body has been placed between the jaws by the conveyer chain 46 and arm 63.

The jaws remain clasped around a can body until retracted after the second seaming operation has been performed or when retracted by mechanism which becomes effective for ejecting a can body upon which no can end has been placed by the can end feeding mechanism. The means for releasing a completed can from the jaws after

the second seaming operation has been performed, may comprise a cam 95 (see Figs. 2, and 22) secured to the table 36, and lying in the path of movement of the rollers 84, when in their outer position; that is, the position in which the jaws are in their clasping position. The cam 95, has an inclined face against which the rollers 84, may strike, when moved by the turret wheel; as they pass the cam 95, the rollers 84, are forced toward the shaft thereby retracting the jaws. A discharge cam or guide rail 96, is secured to the table 36, slightly beyond the cam 95, in position to engage completed cans and deflect them from the jaws 82.

The incomplete can ejector.

In case a can end is not fed to a can body, while in the first seaming position it is desirable that such can be ejected from the machine without being acted on by the seaming rolls, the means for ejecting incomplete cans will now be described.

Between the turret wheel and table is a can ejecting lever 97, (see Figs. 2, 6, and 7) which is secured upon a vertical shaft 98, journaled in a downwardly projecting boss formed on the underside of the table. Said can ejecting lever 97, has one arm 99, which normally lies in the path of movement of the cans as they are moved from the first seaming rolls to the second seaming rolls. This position of the lever 97 is seen in Fig. 2, and at such times the lever is inactive. When a can moves past the arm 99, of the can ejecting lever 97, it swings said lever to the position shown in Fig. 6, where its end 100, is in position to engage the roller 84, of the next set of jaws of the turret wheel. It will remain in this position unless a can end is fed to the can body held by the jaws at the first seaming position. If no can end is fed to the can body, the roller 84, strikes the end 100 of the ejecting lever, and is forced back thereby retracting the jaws and releasing the can body.

Referring to Fig. 6, and assuming that the reference character *a*, indicates a can body at the first seaming position and that no can end has been fed to it, movement of the turret wheel in the direction of the arrow will first bring the jaw actuating roller 84, into engagement with the end 100 of the can ejecting lever, thereby releasing the can, whereupon the continued rotation of the turret wheel brings the can body into engagement with the ejecting lever, as seen at *b*, which arrests its movement and forces it out from between the jaws to the position seen at *c*, where it may be removed. When, however, the can end is fed to the can body, and the first seaming operation has been performed, the can is moved by the turret wheel to the position seen at *d*, which is the second seaming position, during which time the can ejecting lever 97, is moved back out of the path of the roller 84, and can body.

The means for moving back the can ejecting lever 97, comprises an arm 101 (see Figs. 5, 6, and 7) which is connected to a second arm 102, by a hub 103, journaled upon a pin 104. A link 105, connects the arm 102, with an arm 106, secured to the lower end of the shaft 98, of the can ejecting lever 97. When the lever 97, has been moved to active position (see Fig. 6) the arm 101, has thereby been moved to a position in the path of movement of the can body raising shoes 107, each of which travels in a path adjacent the periphery of the wheel 93, except when a can end has not been fed to a can body, in which case they are moved closer to the center of the wheel. When the shoe is in active position, it engages the end of the arm 101, and moves it from the position shown in Fig. 6, to that shown in Figs. 5, and 2, thereby moving the can ejecting arm into inactive position out of the path of the roller 84, and can body, permitting the can to pass to the second seaming position.

The can end feed mechanism.

The can end feed mechanism is best illustrated in Figs. 2, 3, 4, 24 to 35, inclusive. The can ends B, are arranged in a stack (see Fig. 4) and the stack is supported on a cap lifter 108, which is secured to the table 36, and which operates to normally hold the can ends free of the feed slide as will appear later. Extending in line with the stack of can ends and the first seaming position is a feed slide support and guide 109, in which is slidably guided a feed slide 110, which is forked at one end, as shown, and the ends of the forked portion are adapted under certain conditions, to engage the edge of the lowermost can end and feed it forward over the can body. Ways or grooves are provided in the guide member 109, for the feed slide to slide in. The guide member 109, is supported by a bracket 111, which is secured to the seaming head supporting spider 112. The bracket 111, is forked to provide two arms 113, which are bolted to the guide member 109. The feed slide 110, is reciprocated back and forth by a crank 114, mounted on the shaft of a sprocket wheel 115, which is driven from a sprocket wheel 116 (see Fig. 1) by a sprocket chain 117, trained around said sprocket wheels 115, 116. A link 118, connects the crank 114, with the feed slide 110, and in the operation of the machine one complete revolution of the sprocket wheel 115, moves the feed slide forward and backward once, thereby feeding a cap end (if the latter is in feeding position)

to a can body and bringing the feed slide into position ready to feed another can cap to another body.

The guide member 109, is supported in a plane immediately above the tops of the can bodies and the feed slide moves the can ends to a position immediately above the can bodies. At the forward end of the guide member 109, and forming a continuation thereof, is a chuck or can end holder 119, which comprises two spaced parallel bars 120, carried at one end by a rod 121, having right and left screw threads thereon that engage with threads in ears 122, formed on the ends of the bars 120. The outer ends of the bars 120, have narrow extensions 123, that rest in slots formed at the forward ends of the guide member 109, and are supported thereby. The screw threaded connection between the rod 121, and ears 122, of the chuck bars 120, afford means for adjusting said bars 120, toward or away from each other to accommodate can ends of large and small diameter. The rod 121, is rotatively mounted in a bracket 124, bolted to a horizontal web 125, formed on the hub 126, of the seaming head spider 112. Clamp nuts 127, threaded upon the outer ends of the rod 121, bear against the ends of the bracket 124, and hold the rod in place therein.

The opposing edges of the bars 120, are grooved to form a continuation of the grooves in the guide member 109. The can ends are slid through said grooves from the stack to the first seaming position, and at said position rollers 128, are mounted above the grooves which temporarily hold the can end in place. The rollers 128, are journaled in blocks 129, which are mounted in the bars to move transversely thereof, and springs 130, interposed between the blocks and upstandidng lugs 131, on the bars 120, act to yieldingly hold the rollers 128, in position over the grooves. When a can end has been fed to the first seaming position, it is held between the rollers 128, and the bottom of the groove (see Fig. 34) and afterward forced upward by a can body. The springs 130, permit the rollers to be spread apart while the can end passes them.

The can end lifter 108, comprises a stationary base member 132, secured to the table 36, through which extends a rock shaft 133. Above the base member 132, is a cam block 134, which is fixedly secured to the rock shaft 133. Slidably and rotatively mounted on the rock shaft 133, above the cam block 134, is a can end lifting member 135, whose lower face is engaged by the cam face of the cam block 134, and raised and lowered thereby when the cam block is rocked. The opposing faces or ends of the lifting member 135, and cam block 134, are inclined or oblique, and when the lifting member is lowered the two faces or ends lie flat against each other; when, however, the cam block is given a partial rotation, the oblique cam face causes the lifting member to be lifted slightly, thereby lifting the stack of can ends out of the path of movement of the feed slide. Rotation of the lifting member 135, is prevented by two guide pins 136, which are secured in the base member 132, and extend through ears 137, formed on the lifting member 135. Compression springs 138, interposed between nuts 139, threaded on the upper ends of the pins 136 and the ears 137, act to depress the lifting member 135, whenever the cam block is turned to bring its oblique end into parallel relation with the oblique end of the lifting member. For the purposes of adjustment to accommodate long and short cans, the upper end portion 140, of the lifting member 135, is externally threaded and an internally threaded sleeve 141, is secured upon said threaded end portion 140, and may be turned up or down thereon to position its upper end with respect to the guide member 109. In practice, the upper end of the sleeve 141, should lie immediately above the plane of the feed slide when the lifting member is in raised position to thereby hold the stack of can ends out of the path of movement of said feed slide. It is lowered to bring the lowermost can end into the path of movement of the feed slide each time a can body is fed past a trip arm on its way to the first seaming position as will be presently set forth.

Secured on the vertically extending rock shaft 104, (see Figs. 2 and 7) is a trip arm 142, which projects into the path of travel of the can bodies between the guide rails 52, 53. The trip arm may have a roller 143, secured upon its free end if so desired. Below the table 36, an arm 144, is secured to the rock shaft 104, which arm 144, is connected to an arm 145, on the can end lifting rock shaft 133, by a link 146. The arrangement is such that when a can body moves past the trip arm 142, it swings it to the left, as viewed in Fig. 2, thereby swinging the arms 144, 145, to the left, and turning the cam block 134, into position with its oblique cam face parallel with the cam face of the lifting member 135, whereupon the springs 138, force the lifting member down, thus permitting the lowermost can end to rest on the bottom of the grooves of the guide member 109, in front of the feed slide, which is then ready to feed the can end forward to the can body at the first seaming position. A spring $144^{\times}$ secured to the arm 144 and to the table 36 acts to return the arm 144 and parts connected thereto to normal position, immediately after can body has passed the trip arm 142.

It is to be observed that although the feed

slide is reciprocated each time a can body conveyer finger travels through the guideway between the guide rails 52, 53, if for any reason no can is conveyed by it past the trip arm 142, the stack of can ends will remain in their raised position, and no can end will be fed forward. However, each time a can body passes the trip arm, the lifting member 135, is lowered, and a can end is fed forward to the can body. The timing may be such that a can end reaches the can body just as the latter reaches the first seaming position or immediately thereafter.

The can body lifter.

After a can body and end have been fed to the first seaming position and locked to the turret wheel, the can body and can end are raised to the seaming rolls, and the first seaming operation is performed; afterward the can is lowered to the table, moved to the second seaming position, raised to the second seaming rolls, the second seaming operation is performed, the can is again lowered to the table and finally discharged from the jaws of the turret wheel.

Directly under the seaming heads are can body lifting plungers 147 (see Figs. 1, 2) which move up and down through holes in the table 36, and have stems 148, that are guided in bearings 149, formed in the bracket 76 (see also Fig. 15). Preferably, each plunger head 150, is separate from the body of the plunger and of inverted cup-like formation. Interposed between the plunger body and head of each plunger is a block of resilient material 151, such as rubber, to allow the plunger head to give or yield slightly when the can is forced upward against the seaming head. The lower end of each plunger is made vertically adjustable by means of an extension 152, which is in the form of a headed screw threaded stem that screws into the lower end of the plunger stem 148. A lock nut 153, threaded on the stem 152, and screwed up against the lower end of the plunger stem 148, locks the parts together. The lower end of the plunger may be rounded off, if desired, as shown.

Normally the upper faces of the plungers are flush with the upper face of the table 36, whereby the can bodies may be readily moved from the table to the plungers, and means are provided for lifting each plunger after a can has been placed upon it. Said means comprises the plunger lifting cam shoes 107, which are carried by the gear wheel 93 (see Figs. 1, 5, 6, 8, and 9). Normally said shoes 107, travel in a path coincident with the plungers, and as they pass underneath the plungers they raise them thereby lifting the cans to the seaming rolls. Each shoe 107, is formed at its forward end with an inclined or oblique cam face 154, which engages the lower end of its associated plunger stem and raises it. Back of the inclined cam face of each shoe is a straight horizontal face which supports the plunger and can in seaming position during the operation of the seaming rolls. Conveniently the plunger engaging portions of the shoes are made of harder material than the body portion, and secured thereto by screws or the like.

The shoes 107, are slidably mounted upon the gear wheel 93, to move in radial lines; as shown, they have flanged lugs 155, upon their lower sides that slide in undercut radial grooves 156, formed in the upper face of the gear wheel 93. The purpose of making said shoes movable in radial directions, is to render them ineffective in case no can ends are fed to the can bodies, whereby a can body may not be lifted to the seaming rolls unless a can end has been supplied to it. This mechanism is as follows:

Each shoe 107, is connected to the hub 157, of the gear wheel 93, by a toggle joint 158, (see also Figs. 8 and 9) the links 159, 160, of which are provided with a roller 161, at the point of pivotal connection with each other. Under normal working conditions, links of the toggle joint lie in straight lines holding the shoes at their outer or working positions. When, however, a can end is not fed to a can body the toggle joint for the shoe which is to lift that can is moved to the position shown in Fig. 8, whereby the shoe is moved toward the middle of the gear wheel 93, out of its normal path in which it would engage and raise the plunger.

The toggle breaking means will now be described. Pivotally supported, on a lug 162, (see Figs. 5, 6 and 10) which projects down from the table, is a toggle tripping arm 163, the free end of which normally lies in the path of movement of the toggle joint rollers 161, around the axis of the gear wheel 93. When the arm 163, is in such position, a toggle joint roller, upon reaching the arm 163, will strike the end of the arm 163, which arrests movement of the roller 161, and the continued rotation of the gear wheel 93, will cause the links 159, 160, to be swung toward each other until the roller 161, is deflected far enough to pass the end of the arm 163. The result is that the shoe connected to such toggle joint is drawn back to the position seen in Figs. 6, and 8, out of its normal path where it would otherwise engage and raise the plunger at the first seaming station. The arm 163, is however, moved out of the path of the oncoming roller 161, each time a can end is fed to the can body. Extending into the path of travel of the can ends from the stack to the first seaming position, is a finger 164 (see Figs. 3, 24, 27 and 28) which, as shown, is guided in one side of the guide member 109, to move transversely thereof. Said finger 164, is adjustably but fixedly secured

to an arm 165, fast on the upper end of a rock shaft 166, which extends down through the table, and is journaled therein, and has secured upon its lower end an arm 167, which is connected to the toggle tripping arm 163, by a link 168. In operation, when a can end (see Fig. 25) is moved past the finger 164, as shown in dotted lines in said figure, the finger is pushed back out of the path of the can end, the toggle tripping arm 163, is thereby swung out of the path of the roller 161, permitting the shoe to continue in its normal path. A coiled tension spring 169, secured to a support 170, carried by the table, and connected to the arm 167, acts to hold the toggle tripping arm in active position, and a stop 171, limits the movement of the arms 167, 163, and positions the toggle tripping arm in the path of the rollers 161.

After a toggle joint has been folded, it is again straightened before the shoe reaches a first seaming position. As shown, the means for accomplishing this result comprises a toggle straightening arm 172, one for each toggle joint, which is pivotally supported on the hub 157, of the gear wheel 93, above the link 160, of the toggle joint. Each link 160, has a segmental rack 173, which meshes with a segmental rack 174, on the arm 172, associated with it, and each arm 172, extends over the roller 161, and has a roller 175, journaled on its upper side. Secured to and projecting down from the table is a cam 176, which lies in the path of movement of the rollers 175, when the toggle links are folded back, and as a roller 175, passes the cam 176, it is swung outward thereby swinging the link 160, of the toggle joint outward and straightening the joint, thus restoring the shoe 107 back to normal active position. It is to be understood that if the toggle joint has not been acted on by the toggle tripping arm 163, the roller 175, passes by the cam 176, unaffected by it. The gear wheel 93, receives its motion from a pinion 177, on the conveyer driving gear wheel 56, and is continuously rotated thereby, the timing being such that immediately after a can body has been placed on a plunger, and a can end fed to it, a shoe is in position to raise the plunger; simultaneously at the second seaming position, a shoe is ready to raise the plunger at said second seaming position.

The seaming mechanism.

Directly above the turret wheel 70, the main drive shaft 40, is stepped down to provide a shoulder upon which rests a collar 178 (see Fig. 1) which supports the spider 112. Said spider has arms 179, at the outer ends of which are bosses 180, in which the shafts of the seaming heads are journaled. Above the spider 112, is an upper spider 181, formed with bosses 182, in which the upper ends of certain of the seaming head shafts are journaled. The upper spider is formed with the bearing member 44, in which the upper end of the main drive shaft is journaled and said bearing member is externally screw threaded, and has an adjustment wheel 183, threaded upon it, which wheel rests upon the hood 45, and supports the spider 181, and parts carried thereby. A lock nut 184, threaded on the member 44, above the adjustment wheel locks the parts in adjusted position. The drive shaft 40, is provided with a thrust bearing 185, above the member 44, which sustains the shaft 44. The adjustment wheel 183, may be turned to raise and lower the drive shaft 40, spiders 112, 181, and seaming heads to accommodate the seaming rolls to long and short can bodies. Set screws 186^1, threaded in the hood and bearing on the upper spider 181, act in conjunction with the adjustment wheel 183, to hold the spider in position.

The seaming heads.

The seaming heads are best illustrated in Figs. 1, 16 to 20, inclusive. The first seaming heads are designated by the reference character C, and the second seaming heads by D. They are identical in construction except the seaming rolls, which are constructed in accordance with the well-known shapes commonly used in can seaming machines. In each head a rectangular frame 186, is employed, which comprises two similar companion yoke-like frame members 187, adjustably connected together by two right and left screw threaded pins 188, threaded in ears 189, formed on the yoke-like members 187. Set nuts 190, threaded on the outer ends of the pins 188, bear against the ears 189, and lock the pins in place. Secured on the frame 186, is a head block 191, the outer side edges of which are channeled to receive the side bars of the yoke-like frame members 187. Notched lugs 192, project from the sides of the head block 191, between the ears 189, of the frame members, and annular flanges 193, on the screw threaded pins 188 enter said notches and centralize the head block with respect to the frame 186. The ends of the head block are forked to receive slide blocks 194, which carry eccentric pins 195, for the seaming rolls 196. The side edges of the slide blocks are channeled to receive ribs 197, formed on the inner or opposing faces of the forks of the head block 191. Said slide blocks are capable of adjustment toward or away from the center of the head block to accommodate can ends of large and small diameter. Blocks of rubber or other resilient material 198, are interposed between the end bars of the yoke-like frame members and slide blocks, which allow for slight outward movement of the slide blocks and seaming rolls in passing

over the side seams of can bodies. The slide blocks 194 are adjusted toward each other by turning the screw-threaded pins 188 in the proper direction. By turning the screws in the proper direction the frames 186 are drawn toward each other, thereby forcing the rubber blocks 198 toward each other and therewith the slide blocks 194. By turning the screws in the reverse direction the frames 186 are moved apart thereby permitting the slide blocks to separate to accommodate cans of larger diameters.

The head block 191 is secured to a tubular head rotating shaft 199, and is supported thereby. Conveniently the shaft 199, may be screwed into the central or hub portion 200, of the head block. Said tubular shaft 199, extends up through the boss 180 of the spider 112, and has a head rotating pinion 201, keyed upon its upper end, which meshes with a gear wheel 202, keyed on the main drive shaft 40. Continuous rotation of the seaming heads is thereby imparted from the continuously rotating drive shaft.

In addition to the bodily rotatorial movement of the seaming rolls around the axis of the head, imparted to them by the rotating head, the seaming rolls have independent body rotatorial movements around the axes of the eccentric pins 195, a complete bodily rotatorial movement of the seaming rolls occurring during each seaming operation of the seaming head. To accomplish this result, a pinion 203, is keyed to the reduced upper end of each eccentric pin 195, which pinions mesh with idler pinions 204, that, in turn, mesh with a roll rotating pinion 205, upon a tubular shaft 206, which surrounds the head rotating shaft 199. The idler pinions are journaled on studs 207, carried by arms 208, that extend out from a central hub 209, loosely mounted on the tubular shaft 206, and links 210, connect the studs of the pinions 203, 204, to keep them in spaced relation in mesh with each other.

The tubular shaft 206, of the roll rotating pinion 205, extends up through the boss 180, and has a driven pinion 211, keyed to it, which meshes with a gear wheel 212 keyed on the main drive shaft 40. The ratio between the gearing for rotating the head and for independently rotating the seaming rolls is such that each roll is given one complete bodily rotation around the axis of its eccentric pin for each seaming operation. The stud pins 213, which support the seaming rolls are eccentrically disposed in the eccentric pins 195, so that during each seaming operation, the rolls are bodily carried around the axis of the eccentric pins thereby gradually performing the operation of curling the edges of the can body and can end.

Extending in the head rotating shaft 199, is a tubular stem 214, which carries upon its lower end a mandrel 215, against which the can ends are pressed during the seaming operation, and the upper end of said stem 214, passes up through the boss 182, of the upper spider 181, and has lock nuts 216 threaded upon its upper end, one of which bears against the upper end of the boss 182. Within the tubular stem 214, is a stem 217, that carries a can end centering and steadying the disk 218, with which the can ends contact immediately after the can bodies have lifted the can ends above the chuck. The stem 217, and disk 218, are spring pressed in a downward direction by a coiled compression spring 219, held under compression between the upper end of the stem 217 and a plug 220, threaded in the upper end of the tubular stem 214.

As above stated, the operative mechanisms at both sides of the machine are substantially alike, but in the mechanism illustrated on the left side of the machine, as viewed in Fig. 2, the ejecting lever 97^a and its associated parts are located at a place beyond the guide rails of the left side of the machine, but nevertheless between the first and second seaming positions.

In the toggle tripping mechanism at the left side of the machine, the link 168^a (see Fig. 5) in place of being connected directly to the arm 163^a, is connected to a branch 163^b, thereof. The jaw unlocking cam 95^a, and can discharging cam 96^a, are of the same form and arrangement as those for the right side of the machine.

The timing of the operative parts of the particular structure illustrated, is as follows:

Three complete revolutions of the main drive shaft 40, make one cycle of operation. The gear wheel 56, is thereby turned around once, and the conveyer chain moved one step. The gear wheel 93, carrying the cam shoes, is turned one quarter way around; the "Geneva" gear wheel is turned around once, and the "Geneva" wheel and turret wheel turned one quarter way around arriving at its position of rest just prior to the time the cam shoes approach the plungers; the seaming heads are turned around ten times and the seaming rolls bodily turned around once on their eccentric pins.

Operation.

In the operation of the machine, the can bodies are delivered to the conveyer chain by any suitable timing mechanism, and placed in the path of the conveyer fingers 51. The finger conveys the can past the trip arm 142, and swings it back, thereby turning the cam block 134, of the can end lifter, permitting the lifting member 135 to lower the lowermost can end of the stack into the path of movement of the feed slide 110, which thereupon feeds said can end forward until it reaches a position in the chuck 119,

at or immediately after the conveyer finger and arm 63, have delivered the can body into the space between the can locking jaws 82, of the turret wheel 70. When the can body has passed the trip arm 142 the spring 144× returns it and the parts connected thereto to normal position. While moving past the finger 164, the can end pushes said finger back, thereby swinging the toggle tripping arm 163, out of the path of the toggle roller 161, permitting it to pass freely and thereby permitting the cam shoe 107, which at that time passes the arm 163, to continue in its normal path. Immediately after the can body and can end have been delivered to the locking jaws, one of the cams 92, engages and lifts the rod 91, thereby swinging forward the bell crank lever 90, against the jaw actuating roller 84, and thereby turning the jaws 82, around the can body. The gear wheel 93, has now brought the cam shoe 107, referred to, into engagement with the plunger upon which the can body is resting, and raises said plunger to its uppermost position. The can body is thereby raised, and on its way to the seaming rolls it picks up the can end and carries it to the first seaming rolls. When the can reaches the seaming position, the seaming rolls 196, have been spread apart by the eccentric pin contrivance, but during the seaming operation the seaming rolls, in addition to revolving bodily around the can end, a number of times, revolve bodily around the axes of the eccentric pins, thereby approaching the mandrel and curling under the edges of the can body and can end. During the seaming operation, the flat horizontal face of the cam shoe travels under the plunger and holds the can in seaming position. The continued rotation of the gear wheel 93, carries the cam shoe from beneath the plunger, whereupon it drops to normal position with its upper face flush with the table. The crank pin 78, of the "Geneva" gear wheel 74, thereupon enters a slot 77, in the "Geneva" wheel 73, and turns it quarter way around, bringing the can to a position of rest on a plunger in the second seaming position. While traveling from its first to its second seaming position, the can engages the arm 99, of the can ejecting lever 97, and swings the end of said lever into position to engage the succeeding jaw actuating roller 84, and unlock the jaws connected to that roller, in which position it remains until a succeeding can (upon which the first seaming operating has been performed) travels toward the lever 97. In such case, the succeeding cam shoe engages the arm 101, and swings the lever 97, back to normal position. Immediately after the can reaches the second seaming position, a cam shoe engages the plunger at the second seaming position and raises the can to the second seaming rolls, which perform the second seaming operation, and crowd the curled edges of the can body and can end tightly against the side of the can body. It is understood that while the second seaming operation is being performed, another can body and can end are being operated on by the first seaming rolls. After the second seaming operation is performed, the turret wheel is again given a quarter turn by the "Geneva" stop movement, and at the commencement of this movement the jaw actuating roller 84, at the second seaming position strikes the cam 95 and is thereby moved back, thus retracting the jaws 82, and releasing the finished can. The continued movement of the turret wheel brings the can into engagement with the discharge cam 96, which deflects the can from the jaws. Thereupon it may be discharged from the machine by any suitable means.

In the description of the operation it is assumed that a can end was fed to the can body. If, however, for any reason, as for instance the supply of can ends is exhausted, the feed slide fails to feed a can end to the can body, whereby the finger 164 and toggle tripping arm 163, are not shifted, the toggle roller 161, strikes against the end of the tripping arm 163, thereby swinging back the links of the toggle joint and moving the cam shoe (which is connected thereto) back out of the path in which it would engage and lift the plunger at the first seaming position. Consequently, the can is not lifted to the seaming rolls and the first seaming operation is not performed, and the can body is not spoiled. When the turret is turned to bring the can to second seaming position, the jaw actuating roller of the jaws, holding this can, meets the lever 97, and is pushed back, thereby unlocking the jaws. The continued rotation of the turret wheel brings the can into engagement with the side of the lever 97, which deflects it from the jaws. The continued rotation of the turret bringing the empty jaws toward the second seaming position carries the roller 175, of the toggle straightening arm into engagement with the cam 176, and the cam shoe is thereupon moved out to normal position. A succeeding cam shoe, which remains in its normal position, traveling in its normal path, engages the arm 101, and swings the ejecting lever back out of position where it would otherwise trip the jaw actuating roller and deflect a can.

From the above, it is quite obvious that filled can bodies are conveyed safely to the jaws of the turret and gradually brought to a position of rest on the plunger, without any danger of spilling any of the contents; that unless a can end is fed to the can body, the first seam is not made, but the can body is ejected in uninjured condi-

tion, and that in the seaming operations, the seaming rolls are gradually but firmly forced toward the mandrel thereby gradually, but regularly and evenly curling the edges and swaging them against the sides of the can bodies.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention; I desire, therefore, not to limit myself to the exact form of the construction shown and described, but intend in the following claims, to point out all of the invention disclosed herein.

I claim as new, and desire to secure by Letters Patent:

1. In a can seaming machine, seaming rolls, a can conveyer having positively acting individual can engaging members for conveying cans in a rectilinear line, toward said rolls, and a rotatorial arm movable in an arc of a circle across the path of movement of the conveyer and arranged to engage the sides of the can bodies, and operating simultaneously in conjunction with said conveyer to deflect can bodies from the conveyer in a transverse direction along a parabolical curve, starting with a long radius and ending with a short radius, and deliver them into register with said seaming rolls, said arm being timed to come into engagement with the cans while they are moving positively with the conveyer, to thereby cause a continuous, uninterrupted movement of the cans to the seaming rolls.

2. In a can seaming machine, seaming rolls, an endless can body conveyer, located at one side of said rolls, and having fingers for conveying can bodies in a rectilinear line, toward said rolls, and a rotatorial arm arranged to engage the sides of the can bodies and moving across the path of said fingers in synchronism with said fingers, and coöperating therewith to deflect the can bodies from the fingers, in a transverse direction along a parabolical curve, starting with a long radius and ending with a short radius, and deliver them into register with the seaming rolls, said arm being timed to come into engagement with the cans while they are moving positively with the conveyer, to thereby cause a continuous, uninterrupted movement of the cans to the seamings rolls.

3. In a can seaming machine, seaming rolls, an endless can body conveyer for conveying can bodies toward the rolls, and a rotatorial arm arranged to engage the sides of the can bodies and operating simultaneously with and in conjunction with the conveyer to transfer can bodies laterally from the conveyer into register with the seaming rolls.

4. In a can seaming machine, an intermittently rotated turret wheel having can clasping members disposed around its periphery, seaming rolls, an endless can body conveyer having positively acting individual can engaging members for conveying can bodies toward the seaming rolls, and a swinging arm acting on said can bodies in conjunction with said conveyer to transfer can bodies to the can clasping members of the turret wheel, said arm being timed to come into engagement with the cans while they are moving positively with the conveyer, to thereby cause a continuous, uninterrupted movement of the cans to the seaming rolls.

5. In a can seaming machine, an intermittently rotated turret wheel having can clasping members disposed around its periphery, first seaming rolls thereabove, means for intermittently rotating said turret wheel to bring the can clasping members in succession into register with said first seaming rolls, a can body conveyer terminating adjacent said rolls, and an arm moving in synchronism with said conveyer and acting on said can bodies in conjunction therewith to transfer can bodies to the can clasping members while they are in register with the first seaming rolls.

6. In a can seaming machine, first seaming rolls, an endless conveyer chain having can body conveying fingers thereon, a rotatorial arm having a spring pressed roller carrying member and roller for engaging and transferring can bodies from the chain to the first seaming rolls, said arm moving in synchronism with the fingers of the conveyer chain.

7. In a can closing machine, a can end feed slide, a guide therefor, means for reciprocating said feed slide, a can end lifter forming the sole support for holding a stack of can ends with the endmost can end out of the path of movement of the feed slide, a can body guide, a trip arm lying in the path of movement of the can bodies, and operative connections between said trip arm and can end lifter for actuating said can end lifter to thereby move the endmost can end into the path of movement, each time a can body actuates the trip arm.

8. In a can closing machine, a can end feed slide, a guide therefor, means for reciprocating said feed slide, a can end lifter forming the sole support for holding a stack or can ends with the lowermost can end above the path of movement of said feed slide, a can body conveyer, and means operated by the can bodies, for actuating the can end lifter to thereby lower the stack of can ends with the lowermost one in the path of movement of the feed slide.

9. In a can closing machine, a can end feed slide, a guide therefor, means for reciprocating said feed slide, a can end lifter having a vertically movable lifting member

arranged to hold a stack of can ends with the lowermost one above the path of movement of the feed slide, a can body conveyer, a can body guide, and trip means operated by can bodies passing through said guide operatively connected with said can end lifter and arranged to lower the lifting member to thereby bring the lowermost can end into the path of the feed slide.

10. In a can closing machine, a can end lifter having a vertically reciprocatory can end lifting member for supporting a stack of can ends and a rotatorial cam block having a cam face arranged to lift said lifting member, and a can operated trip arm operatively connected with said cam block and arranged to turn the same, to thereby lower the lifting member.

11. In a can closing machine, a can end lifter having a vertically reciprocatory can end lifting member, and a rocking cam block, said lifting member and cam block having co-acting cam faces whereby the lifting member is raised, springs for depressing said lifting member, a trip arm and operative connections between the trip arm and cam block for turning said cam block.

12. In a can closing machine, a can end lifter having a lifting member for supporting a stack of can ends and provided with a vertically adjustable extension, a rocking cam block therebelow, said lifting member and cam block having co-active oblique faces, a can operated trip arm and operative connections between said trip arm and cam block for actuating said cam block.

13. In a can closing machine, a can end chuck having laterally moving spring pressed rollers for releasably holding can ends in the chuck, a can end guide, a can end feed slide, reciprocable in said guide, and arranged to feed can ends to said chuck.

14. In a can closing machine, seaming rolls, an intermittently rotated turret wheel provided with can holding members, means for intermittently rotating said turret wheel to bring the can holding means in succession into register with said seaming rolls, a can lifting plunger for lifting the cans to said seaming rolls, and rotatory plunger lifting means mounted co-axially with said turret wheel and having bodily movable plunger lifting members.

15. In a can closing machine, seaming rolls, an intermittently rotated turret wheel provided with can holding members, means for intermittently rotating said turret wheel to bring the can holding means in succession into register with said seaming rolls, a can lifting plunger for lifting the cans to said seaming rolls, a rotatory cam shoe support mounted co-axially with said turret wheel, and a cam shoe on said support rotating bodily therewith and adapted to engage and lift said plunger.

16. In a can closing machine, seaming rolls, an intermittently rotated turret wheel provided with can holding members, means for intermittently rotating said turret wheel to bring the can holding means in succession into register with said seaming rolls, a can lifting plunger for lifting the cans to said seaming rolls, a continuously rotating cam shoe wheel mounted co-axially with said turret wheel, and a cam shoe carried by said wheel and arranged to engage and lift said plunger.

17. In a can closing machine, seaming rolls, an intermittently rotated turret wheel provided with can holding members, means for intermittently rotating said turret wheel to bring the can holding means in succession into register with said seaming rolls, a can lifting plunger for lifting the cans to said seaming rolls, a rotating cam shoe wheel, a cam shoe movably carried by said wheel and arranged to engage and lift said plunger, automatic means for retracting said shoe from its normal path of movement, and automatic means for restoring said shoe to its normal position.

18. In a can closing machine, first seaming rolls, and second seaming rolls, an intermittently rotated turret wheel provided with can holding means, mechanism for intermittently rotating said turret wheel to bring said can holding means in succession, into register with said seaming rolls, can lifting plungers, one for the first seaming rolls and one for the second seaming rolls, a rotatory cam shoe carrying wheel, and plunger lifting cam shoes carried by said wheel, there being one shoe for each can holding means, said cam shoes operating to engage and lift the plungers during the periods at which the turret wheel is at rest.

19. In a can closing machine, first seaming rolls and second seaming rolls, an intermittently rotated turret wheel provided with can holding means, mechanism for intermittently rotating said turret wheel to bring said can holding means in succession, into register with said seaming rolls, can lifting plungers, one for the first seaming rolls and one for the second seaming rolls, a continuously rotating cam shoe carrying wheel mounted co-axially with said turret wheel, plunger lifting cam shoes carried by said wheel, and mechanism for rotating said cam shoe carrying wheel in timed relation to the turret wheel to bring the cam shoes into lifting engagement with the plungers during the periods at which the turret wheel is at rest.

20. In a can closing machine, first seaming rolls and second seaming rolls, an intermittently rotated turret wheel provided with a plurality of can holding means disposed around its periphery, a "Geneva" stop movement for intermittently rotating said turret

wheel to bring said can holding means in succession, into register with said seaming rolls, can lifting plungers, one for each can holding means, a continuously rotating cam shoe carrier mounted co-axially with said turret wheel, plunger lifting cam shoes carried by said carrier, and means for rotating said carrier in timed relation to said turret wheel to bring the shoes into lifting position during the periods that the turret wheel is at rest.

21. In a can closing machine, first seaming rolls and second seaming rolls, an intermittently rotated turret wheel, provided with can holding means, mechanism for intermittently rotating said turret wheel to bring the can holding means in succession into register with the seaming rolls, can lifting plungers, one for each can holding means, a continuously rotated cam shoe carrier, plunger lifting cam shoes carried by said carrier, and having an active and an inactive position, means for moving said cam shoes into active and inactive positions, and mechanism for rotating said carrier in timed relation with the turret wheel to bring the active cam shoes into lifting position during the periods at which the turret wheel is at rest.

22. In a can closing machine, first seaming rolls and second seaming rolls, an intermittently rotated turret wheel provided with can holding means, mechanism for intermittently rotating said turret wheel to bring the can holding means in succession into register with the seaming rolls, can lifting plungers, one for each can holding means, a continuously rotated cam shoe carrier, plunger lifting cam shoes carried by said carrier, and having an active and an inactive position, mechanism for rotating said carrier in timed relation with the turret wheel to bring the active cam shoes into lifting position during the periods at which the turret wheel is at rest, can end feed mechanism, cam shoe trip mechanism, operated by the can ends, for moving a cam shoe to inactive position whenever the can end feed mechanism fails to feed forward a can end, and means for restoring the cam shoe to active position.

23. In a can closing machine, a plurality of can lifting plungers, disposed around a common center, a continuously rotating cam shoe carrier, having radially extending guides, a plurality of plunger lifting cam shoes slidably mounted in said guides, a toggle joint connection between each cam shoe and the carrier, an arm normally lying in the path of movement of said toggle joint and operating to break said toggle joints when they pass said arm, to thereby move the cam shoes to inactive position, can end operated trip mechanism for moving said arm out of the path of movement of said toggle joints, and means for straightening said toggle joints to restore the cam shoes to active position.

24. In a can closing machine, a plurality of can lifting plungers disposed around a common center, a continuously rotating cam shoe carrier, plunger lifting cam shoes carried by said carrier, there being one cam shoe for each plunger, and movable from an active to an inactive position, can end feed mechanism, a finger extending into the path of movement of the can ends, and cam shoe retracting mechanism normally acting to retract said cam shoes from active to inactive position, said finger acting, when depressed by a can end, to move the cam shoe retracting mechanism into inactive position.

25. In a can closing machine, an intermittently rotated turret wheel provided with can locking means, mechanism for locking the can locking means around a can, can lifting plungers, a continuously rotating cam shoe carrier, plunger lifting cam shoes carried thereby, and having an active and an inactive position with respect to the plungers, a can ejecting lever having an arm normally lying in the path of movement of the cans conveyed by the turret wheel, and a combined can unlocking and ejecting arm, an arm arranged to be engaged by the cam shoes when traveling in their active positions and operative connections between said ejecting lever and last mentioned arm.

26. In a can closing machine, a seaming head comprising a rotatory roll carrier, rotatory roll supports journaled in said roll carrier on axes parallel with the axis of rotation of the carrier, seaming rolls eccentrically mounted directly on said roll supports, and differential gearing for continuously rotating said roll carrier and roll supports in one direction, whereby the seaming rolls are bodily rotated with respect to the carrier.

27. In a can closing machine, a seaming head comprising a rotatory frame, a tubular frame rotating shaft, eccentric pins journaled in said frame, a roll rotating shaft, gearing between said eccentric pins and roll rotating shaft, differential gearing for said shafts, whereby the eccentric pins are given independent rotation continuously in one direction in the frame, and seaming rolls eccentrically mounted directly on said eccentric pins.

28. In a can closing machine, a seaming head comprising a frame, a frame rotating shaft, bearing blocks slidably mounted in said frame, eccentric pins journaled in said blocks, seaming rolls eccentrically mounted on said pins, pinions mounted on said pins, a roll rotating shaft, a pinion thereon, idler pinions between the pinions on the eccentric pins and the pinions on the roll rotating shafts, idler pinion supports mounted co-

axially with said shafts, links between the idler pinions and eccentric pin pinions, and gearing for rotating said shafts at different speeds, whereby the seaming rolls are bodily rotated around the axes of the eccentric pins.

29. In a can closing machine, a seaming head comprising a frame consisting of two yoke-like frame members, screws for adjustably connecting said frame members together, a head block carried by said frame, blocks slidably mounted on said head block, resilient members interposed between the ends of the yoke-like frame members and blocks, eccentric pins journaled in said blocks, seaming rolls eccentrically mounted on said eccentric pins, gearing for rotating said frame and gearing for rotating said eccentric pins in their blocks; substantially as and for the purpose set forth.

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