March 11, 1930. J. COYLE ET AL 1,750,391

CAN END FEEDING MECHANISM

Filed June 5, 1928 4 Sheets-Sheet 1

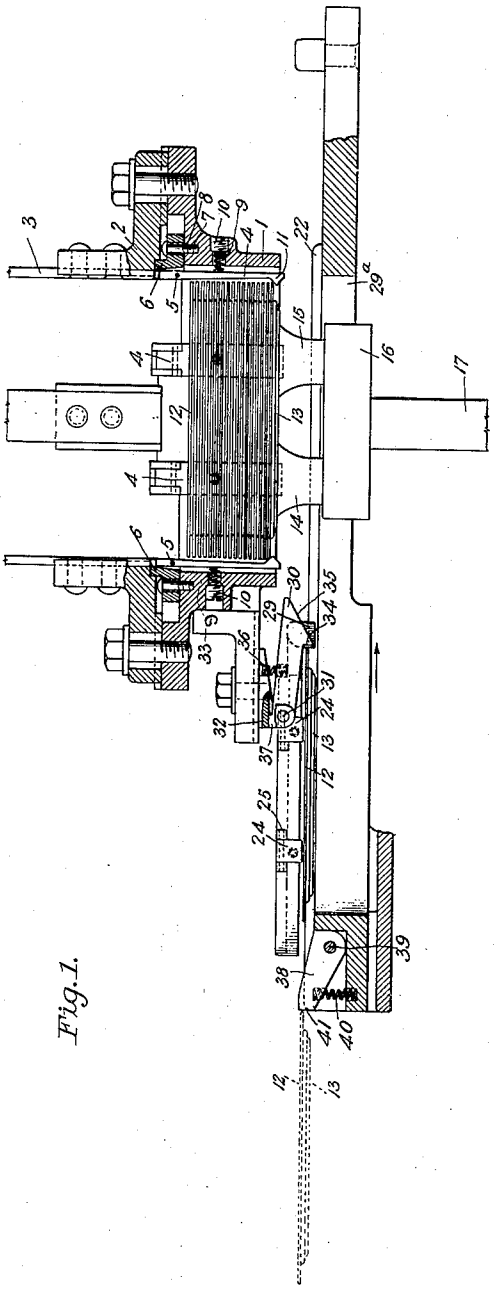


Fig. 1.

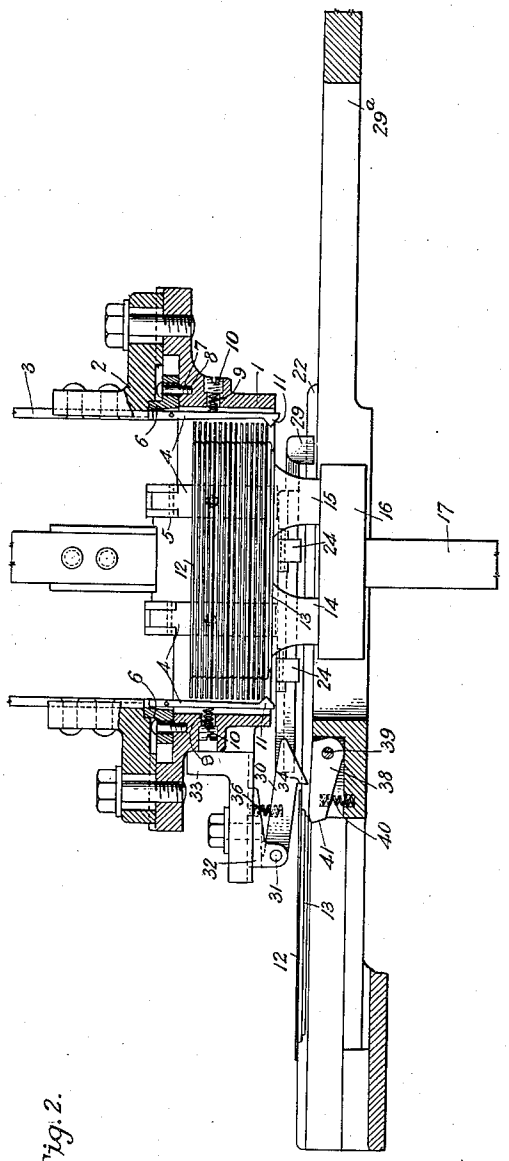


Fig. 2.

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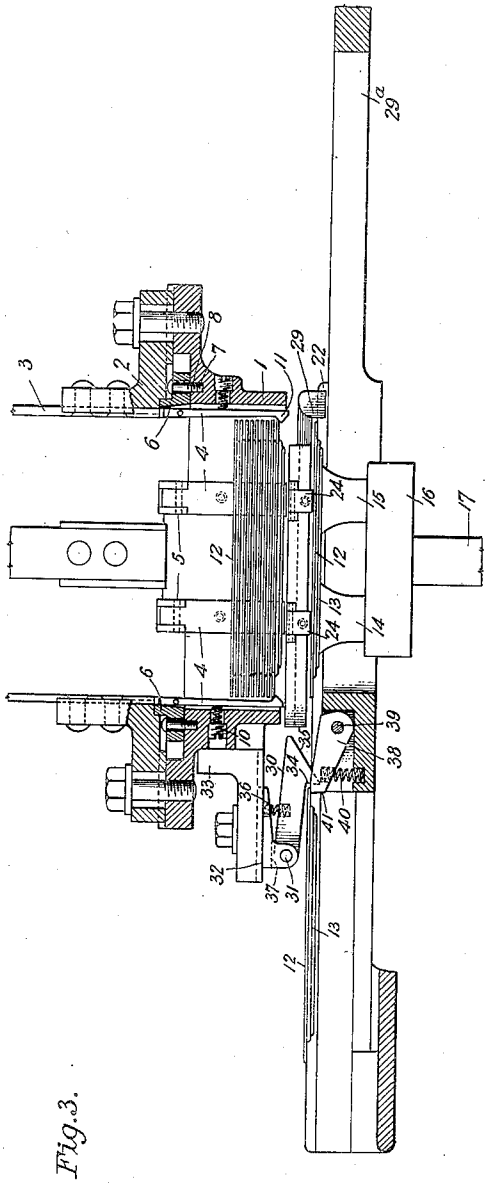


Fig. 3.

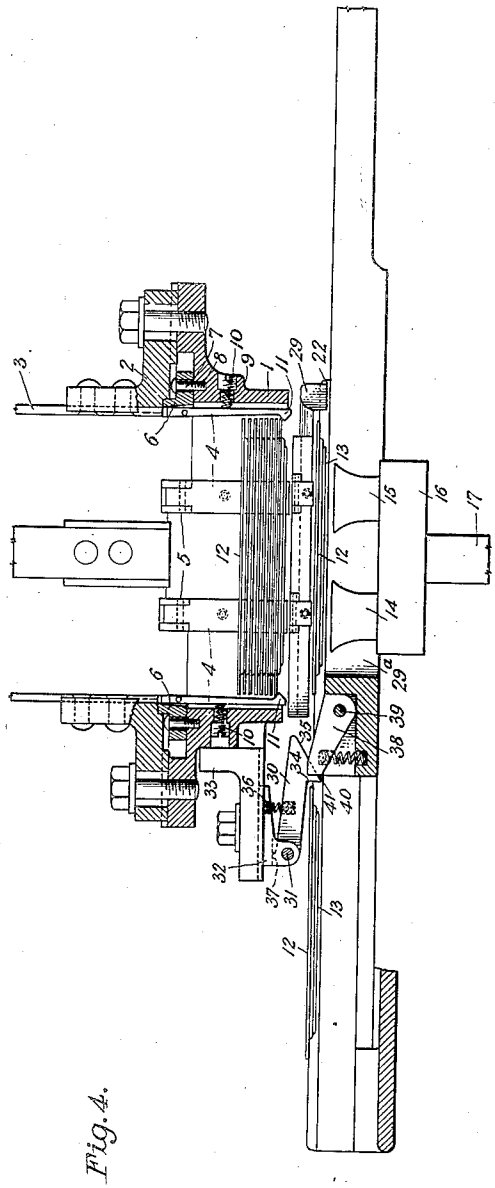


Fig. 4.

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CAN END FEEDING MECHANISM

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Fig.5.

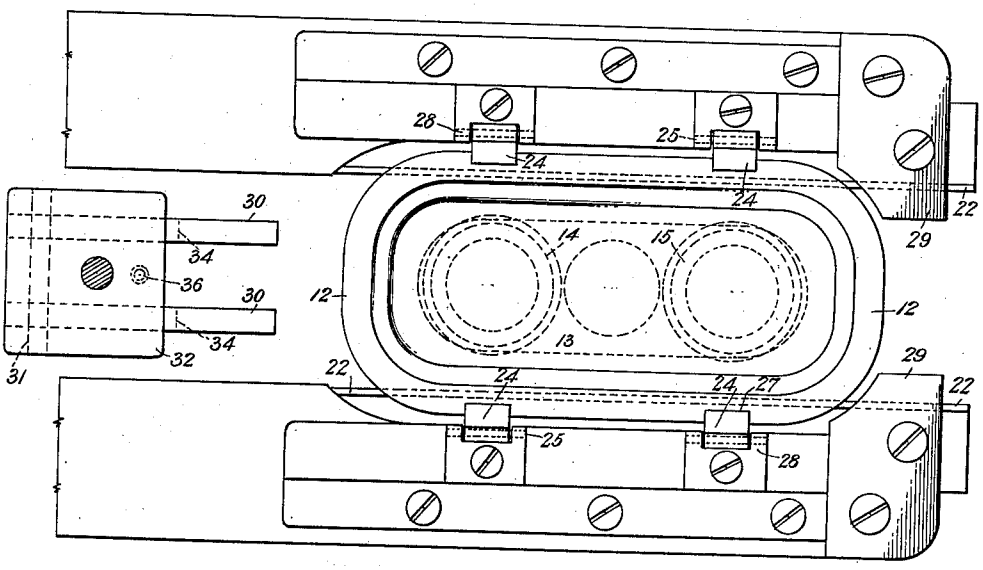
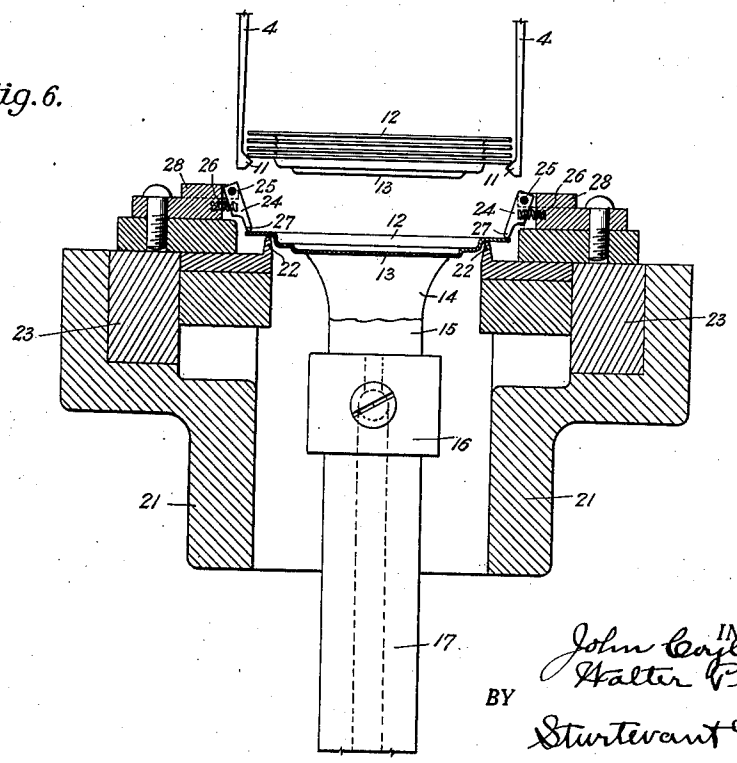


Fig.6.



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CAN END FEEDING MECHANISM

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Fig. 8.

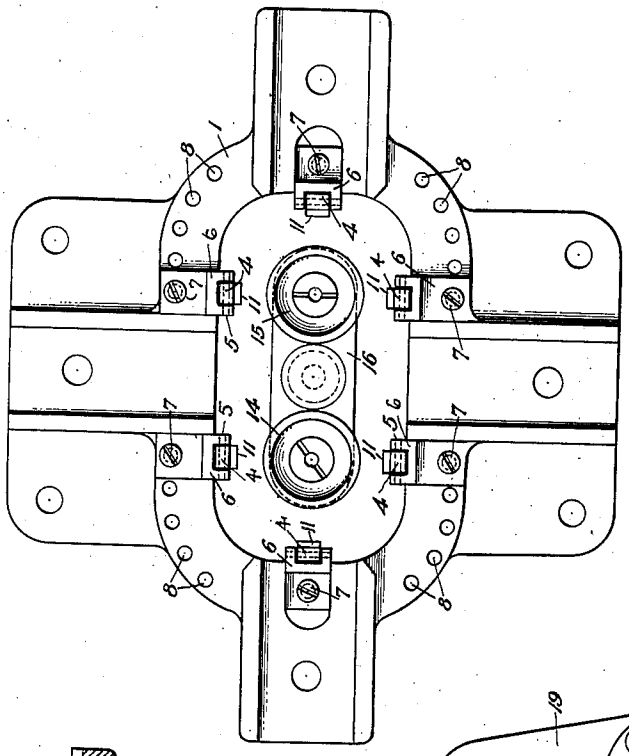
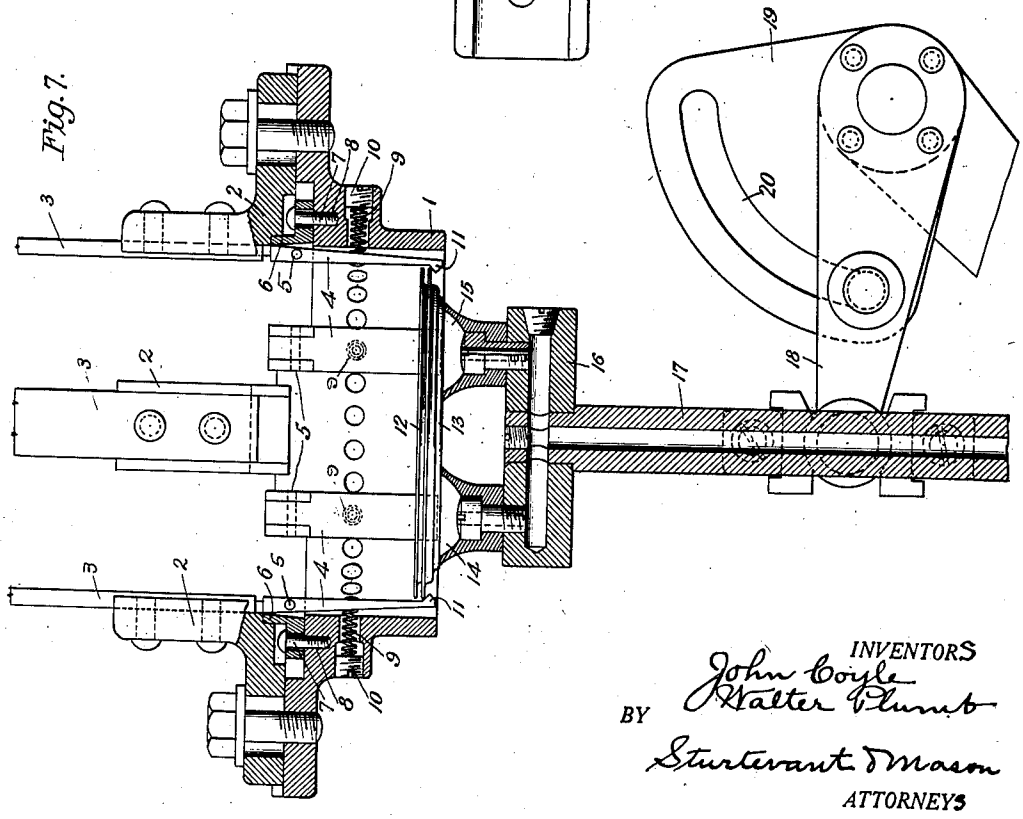


Fig. 7.



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Patented Mar. 11, 1930 1,750,391

UNITED STATES PATENT OFFICE

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CAN-END-FEEDING MECHANISM

Application filed June 5, 1928. Serial No. 282,972.

The invention relates to new and useful improvements in a can end feeding mechanism and more particularly to a can end feeding mechanism for feeding can ends which are non-circular.

An object of the invention is to provide a feeding mechanism for non-circular can ends having suction means for withdrawing the ends from a stack wherein the supporting means for the stack and the suction means are so constructed and arranged as to uniformly distribute and proportion the strain on the can end whereby any bending of the metal or warping of the end is avoided when the end is drawn from the stack.

A further object of the invention is to provide a can end feeding mechanism of the above type wherein the stack is supported by yieldable devices, the position of which may be shifted and the tension of which may be varied to suit the shaping of the can end and the conditions of the metal so as to avoid bending of the metal when the end is withdrawn from the stack.

A further object of the invention is to provide a supporting means for the stack wherein the devices which support the stack are so shaped as to aid in the separating of the ends and the releasing of one end only at a time.

A further object of the invention is to provide a feeding mechanism for non-circular can ends including a feed slide for removing the end from beneath the stack after it is released therefrom which slide is provided with yieldable devices adapted to move over the end on the slide and hold the end from springing away from the slide at any portion thereof before it is withdrawn from beneath the stack.

A further object of the invention is to provide a can end feeding mechanism of the above type wherein the suction means retains control of the end until it is positively engaged by the yielding devices so as to insure that the yielding devices will move over the end for holding the same from springing away from the feed slide.

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

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

Fig. 1 is a view in vertical section showing a portion of a machine embodying the improvements with the feed slide at the forward end of its stroke and the vacuum cups at the upper end of their stroke.

Fig. 2 is a view of a portion of the structure shown in Fig. 1 with the feed slide on its backward stroke and with the cups still at the upper end of their stroke.

Fig. 3 is a view similar to Fig. 2 but showing the feed slide positioned to receive an end and the end being positioned thereon by the feed cups.

Fig. 4 is a view of a portion of the structure shown in Fig. 3 with the feed slide at the end of its backward stroke and the feed cups released from the end.

Fig. 5 is a plan view of a portion of the feed slide and the retaining fingers, and showing in broken lines the can end and feed cups.

Fig. 6 is a transverse sectional view through the bed and feed slide showing the supporting devices for the stack and also the feed cups.

Fig. 7 is a longitudinal sectional view through the stack holder and also the feed cups and supporting means therefor.

Fig. 8 is a plan view of the parts shown in Fig. 7 with the upper portion of the stack holder removed.

The invention is directed to a feeding mechanism for feeding non-circular can ends of any profile and more particularly a non-circular can end which has a straight flange at the outer edge thereof and a depression within the limits of the edge. Ends of this type are often referred to as hat-shaped. These hat-shaped ends are stacked, one depressed portion resting within the other and the edge portion of adjacent can ends are spaced from each other when the ends are in horizontal position. It often occurs that the ends are tilted so that the edge portions are in contact at certain parts thereof. This makes it very difficult to separate the ends by mechanical devices and feed them from the stack.

In the present invention suction means is used for withdrawing the ends from the stack. The ends are supported in the stack by yielding devices which may be shifted so as to properly position the same for supporting the stack. These devices are tensioned by suitable means so that the strain on the metal due to the drawing of an end past these yielding supporting devices may be varied. The suction means is shaped and arranged so as to exert a pull on the lowermost end in the stack which is uniformly distributed. This may be accomplished by using a plurality of suction cups or a suction cup which is shaped to conform generally to the non-circular can end. When the suction pull on the end is uniformly distributed the end will be simultaneously drawn past the supporting devices therefor, and any tilting of the end which might release the same from the suction cups avoided. The end is withdrawn from the stack under the control of the suction means which places the end on a feed slide which is intermittently reciprocated by removing the end from beneath the stack and feeding the end to the seaming machine. Hold down devices are provided which are yieldingly moved over the edge of the can end at spaced points throughout the circumference thereof and these hold down devices move over the end before the suction means releases the end. Therefore, the end is held firmly down on the feed slide and the warping or springing of the end avoided.

The feed slide has pusher abutments which engage the end and move it from beneath the stack. Retaining fingers are provided which are yieldingly pressed downwardly so that the end, after passing beneath the fingers, will be engaged and held from movement when the spring is retracted.

Referring more in detail to the drawings:—Only a portion of the machine to which the improved can end feeding mechanism is applied is shown. The machine, except for the can end feeding mechanism is of the usual construction and includes means for securing the can end to a can body by a seaming mechanism. It also includes feeding-in means for feeding the ends and the can body to the seaming mechanism.

The invention as noted above has to do with a means for removing the ends from a stack and delivering the ends one at a time to this feeding-in mechanism for the ends. The ends are placed in a stack holder which includes a supporting base 1 carried by suitable bracket supports. Mounted on this supporting base 1 are a series of bracket members 2 each of which is provided with a standard 3 and these standards 3 make up an open top magazine in which the ends to be fed are placed. The stack holder is provided with a series of yielding devices which are similar in construction. These yielding devices include depending fingers 4 which are pivoted at 5 adjacent the upper end thereof to a supporting block 6. The supporting block 6 is secured to the base of the stack holder by suitable screws 7. The openings through the supporting blocks are slightly larger at the shank of the screw so that these blocks may be shifted slightly on the screw and clamped in set position. Six fingers are shown in the drawings. The supporting base portion of the stack is provided with threaded openings 8, 8 and the screw 7 may be threaded into any one of these openings and thus the block may be shifted from one set position to another. The reasons for shifting the blocks will be given more fully later.

These fingers are yieldingly pressed toward the center of the stack holder by means of springs 9 which bear against the outer face of the finger and against an abutment screw 10 threaded into the base portion of the stack holder. By adjusting the abutment screw 10 the tension of the spring may be increased or decreased as desired. Each finger at the extreme lower end thereof is provided with a V-shaped inwardly projecting nose or ledge 11. The can ends as shown in the drawings are non-circular. They are what are often referred to as rectangular with longer sides and ends which are parallel with each other and the corners are rounded. The end flange is flat or free from curl in the present type of can end. The can end is indicated at 12 in the drawings. The can end has a central depressed portion 13 and this is what causes the can end to often be referred to as hat-shaped. In Fig. 7 when the ends are stacked one on another, is shown the depressed portion of one end extending into the depressed end below and the edges or flanges of the end are thus held separated and spaced one above the other. This is the arrangement of the ends if they lie horizontal in the stack. It often occurs that the ends are tilted and one portion of the flange will be much closer to the flange directly beneath than another, and this has caused a great deal of trouble when mechanical means is used for separating the ends so as to release the lowermost end. According to the present invention the stack is supported on these yielding fingers by resting on the projecting ledges carried by said fingers. The lowermost can end is drawn past the ledges by the suction means. As soon as the end passes these ledges which yield outwardly to allow it to pass, said fingers are pressed inwardly by the springs. This inward movement of the fingers will cause the ledges to pass between the lowermost end being withdrawn by the suction means and the end just above the same. The yielding fingers serve the double function of supporting the stack and aiding in the separating of the ends by reason of these V-shaped projecting ledges by which the end is

forcibly withdrawn. As noted above the edge portion of the can end is flat and, therefore, it is the flat flange which engages the yielding fingers and which is drawn by the ledges on the yielding fingers.

The can ends are withdrawn from the stack by suction means, which, as shown in the drawings, includes two suction cups 14 and 15. These suction cups are similar in construction. They are secured to a suction head 16 carried by a supporting member 17, that is raised and lowered by a lever 18 shown in Fig. 7 of the drawings. This lever is oscillated by means of an oscillating segment 19. The lever carries a pin running in a slot 20. As shown in Fig. 7 the oscillating segment has been moved in a clockwise direction until the pin engaged the end of the slot and then the lever was lifted raising the suction cups into engagement with the lowermost end in the stack.

The suction cups will remain raised and at a dwell for a considerable period of time. When the oscillating segment 19 is moved in a counterclockwise direction the cups will not be lowered until the pin reaches the other end of the slot. This gives ample time for the suction cups to obtain a gripping hold on the lowermost can end in the stack. The feed slide at this time is being retracted and is shaped so as to permit the retracting movement even though the suction cups are raised. The suction cups when raised lift the stack slightly so as to get a firm gripping hold on the lowermost can end. Proper means is provided for controlling the movement of the support carrying the cross head on which the suction cups are mounted. When the suction cups are at the lower end of their stroke, again the oscillating segment has an extended movement before the cups are raised and this permits the can end to be moved from a position above the suction cups before they are raised. This mechanism which imparts movement to the suction cups and gives a dwell thereto may be operated continuously and, therefore, said oscillating segment may be connected to and moved in timing with the feed slide.

As noted above there are two suction cups 14 and 15. These are shown as circular cups. They are positioned relative to the can end as shown in Fig. 5 so that the pull of the suction cups is substantially equally distributed throughout the entire edge portion of the can end. In other words, the suction cups are substantially the same distance from the edges of the can ends where the can ends are supported by the stack.

As shown in Fig. 8 of the drawings the center of one of the suction cups is substantially the same distance from the three supporting devices associated with the end of the can and on which the suction cup operates, while the center of the other suction cup is substantially the same distance from the three supporting fingers with which it is associated. Thus it is that the pull of the suction cups on the can end is uniformly distributed relative to the yielding supporting fingers therefor. This enables the can ends to be drawn past the supporting ledges on the supporting fingers substantially at the same time. If the pull of the cups is not substantially uniform then one end of the can end may be released before the other and the end tilted so as to break connection with the cups. The tension on the supporting fingers as noted above may be adjusted, and thus the resistance to the withdrawing of the end at each supporting finger made substantially the same. This further aids in the adjusting and arrangement of the parts so as to insure that the can end will be simultaneously drawn past each supporting ledge.

There is often quite a difference in the stock or metal forming the ends. It is very essential that when the end is drawn past the supporting fingers therefor that the flange is not bent or mutilated. Bending of the flange may result in an improperly formed seam. Through the shifting of the fingers and the adjusting of the tension thereon, the parts may be set so that the ends may be drawn past the fingers without in any way causing bending, distorting, or mutilation of the edge of the can end.

If necessary, additional fingers may be provided and the tensions on these fingers reduced to a greater extent so as to avoid this multilating of the edge of the can end.

Directly beneath the stack holder is a supporting bed 21. Mounted on this supporting bed 21 are supporting rails 22, 22. These supporting rails are so positioned on the bed that the can end 12 when placed thereon will rest on the rails at the flange portion of the end, while the depressed central portion will extend downwardly between the rails. These supporting rails do not move. The suction cups are raised into engagement with the lowermost can end and the suction means controlled so that the cups will take a firm gripping hold on the end due to the vacuum created in the cups. The downward movement of the cups will pull the end past the yielding supporting fingers and will convey the can end under the control of the suction cups onto these supporting rails. Mounted for reciprocation on the bed is a feed slide which includes connected guide rails 23, 23. Mounted on these guide rails are hold down fingers 24, 24. As shown in Fig. 5 there are four of these hold down fingers and they are located at the sides of the can end. Each finger is pivoted at 25 and a spring 26 normally forces the lower end of the finger toward the center line of the slide. Each finger at its lower end is provided wth a projection 27. When the end is moved downward by the suction cups

it is brought into engagement with these hold down fingers causing said fingers to yield and the edge of the can end passes the fingers after which the fingers will swing toward the center line of the feed slide and overlie the can end and positively hold said can end down on the guide rails. This prevents the can end from springing up at either end thereof due to a warping of the can end during handling thereof. The hold down fingers are mounted on bracket plates 28. Each finger is pivoted to a supporting plate which is screwed to these bracket plates. The feed slide is provided with pusher abutments 29, 29. The feed slide is cut away at 29ª for a distance slightly longer than the feed stroke of the feed slide. These abutments 29, 29 are spaced from each other. The purpose of spacing the abutments and cutting away the feed slide is to permit the feed slide to be retracted while the suction cups are at the upper end of their stroke. The suction cups pass up through this cut away portion and the abutments straddle the suction cups on the retracting movement of the feed slide.

In Fig. 1 the feed slide is shown at the extreme left hand end of its stroke. The suction cups are at the top end of their stroke and in engagement with the lowermost can end in the stack. While the suction cups are in engagement with the can end and being firmly attached thereto by the creating of a vacuum in the cups the slide is moved to the right. In Fig. 2 the slide is shown as partly retracted and the vacuum cups still at a dwell in the top end of their stroke. In Fig. 3 the slide is shown retracting or moving to the right and the suction cups have moved downward pulling the can end from the stack and have placed the can end on the supporting rails or at least moved it downwardly to a position beneath the hold down fingers so that the hold down fingers swing over the top edge portion of the end as shown in Fig. 6.

In Fig. 4 of the drawings the suction cups are shown as having released the can end and the feed slide is at the end of its backward stroke ready to be moved forward conveying the can end from beneath the stack. Mounted on the stack holder are yielding trap fingers 30. There are preferably two of these fingers. Said fingers are pivoted on a rod 31 carried by a support 32 adjustably mounted on a bracket 33 which is attached to the base portion of the stack holder. Each trap finger has a downwardly projecting portion forming a vertical shoulder 34. The forward end of the trap finger is inclined as indicated at 35. A spring 36 yieldingly forces these trap fingers in a downward direction and the downward movement is limited by a stop shoulder 37 at the pivoted end of the fingers. When the feed slide moves to the left for its feed stroke the front edge portion of the end will engage the incline 35 raising the trap fingers so that they slide over the end. When the feed slide reaches the position shown in Fig. 1 the end has been carried by the vertical shoulder 34 and the trap fingers drop so that the shoulder is placed in a position to prevent the end from moving with the feed slide when it is retracted.

Also mounted on the feed slide are feeding fingers 38 which are pivoted at 39 and yieldingly pressed upwardly by a spring 40. Each finger has a vertical face indicated at 41. These fingers yield in a downward direction and when the feed slide is retracted from the position shown in Fig. 1 the fingers will yield and pass underneath the ends. As soon as the fingers 38 pass the can end they will be pressed upward by the springs beneath the same to the position shown in Fig. 4.

During this time the trap fingers hold the end from moving backward with the feed slide. On the next forward feed movement of the feed slide these fingers 38 will feed the end engaged thereby another step forward.

From the above it will be apparent that a can end feeding mechanism has been provided wherein the can ends are removed from the stack holder by a suction means which grips the lowermost can end and through its gripping contact therewith pulls it from the stack. No mechanically operated separating devices are necessary for releasing the lowermost can end from the stack so that it may drop. The suction cups pull the end by the yielding supporting fingers therefor. This insures that one can end, and one can end only will be fed from the stack at each feeding operation of the suction cups. The yielding fingers due to the shaping thereof aid in the insuring of the feed fingers wedging in between the lowermost end that is being withdrawn and the next adjacent end so as to take on and support the stack. By using two suction cups with a non-circular can end the grip of the suction cups is so distributed as to bring about a uniform pull on the edge portions and this together with the nicety of adjustment of the yielding fingers insures that the end will be stripped from the supporting fingers simultaneously without any tilting or holding back at one side or end thereof, thus causing the suction cups to lose their grip. By adjusting the tension on the supporting fingers and properly adding to or taking away from the same in number and by properly shifting said fingers various conditions of stock or metal may be taken care of so that only one end will be fed at a time and the edge portions of the end will be free from mutilation or bending or warping in any way whatever. Furthermore, the suction cups retain their hold on the can end until it is passed beneath the hold down fingers so that said end cannot spring upward at

either end thereof, but is held flat against the guide rails. When the feed slide moves for feeding the end from beneath the stack it will hold the end down and carry it from beneath the stack.

While there has been shown two suction cups arranged for equally distributing the pull exerted on the can end for removing it from the stack it will be obvious that this suction means may be otherwise constructed and accomplish the same result. It is essential, however, that the suction means shall be constructed so as to conform in a general way to the non-circular can end, and thus be made to grip the can end at a uniform distance from the supporting fingers therefor.

It is obvious that minor changes in the details of construction and the arrangement of the parts may be made without departing from the spirit of the invention as set forth in the appended claims.

Having fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. A feeding mechanism for non-circular can ends including a stack holder, suction means for withdrawing the ends one at a time from the stack, movable fingers for supporting the can ends in the stack, and a spring means for urging each finger toward the stack.

2. A feeding mechanism for non-circular can ends including a stack holder, suction means for withdrawing the ends one at a time from the stack, movable fingers for supporting the can ends in the stack, a spring means for urging each finger toward the stack, and means whereby the tension on each spring may be varied.

3. A feeding mechanism for non-circular can ends including a stack holder, suction means for withdrawing the ends one at a time from the stack, movable fingers for supporting the can ends in the stack, a spring means for urging each finger toward the stack, said fingers having V-shaped projecting ledges on which the ends rest, said projecting ledges operating to separate the lowermost can end from the stack when withdrawn by the suction means.

4. A feeding mechanism for non-circular can ends including a stack holder, a suction means for withdrawing the ends one at a time from the stack, movable fingers for supporting the can ends in the stack, a spring means for urging each finger toward the stack, said fingers having V-shaped projecting ledges on which the ends rest, said projecting ledges operating to separate the lowermost can end from the stack when withdrawn by the suction means, and independent means for varying the tension on the springs.

5. A feeding mechanism for non-circular can ends including a stack holder, suction means for withdrawing the ends one at a time from the stack, pivoted depending fingers having a V-shaped projecting ledges at their lower ends on which the stack rests, and a spring means for each finger for yieldingly forcing the same toward the stack.

6. A feeding mechanism for non-circular can ends including a stack holder, suction means for withdrawing the ends one at a time from the stack, pivoted depending fingers having V-shaped projecting ledges at their lower ends on which the stack rests, a spring means for each finger for yieldingly forcing the same toward the stack, and means for supporting said fingers whereby the same may be shifted transversely in the stack and set in different positions relative to the end.

7. A feeding mechanism for non-circular can ends including a stack holder, suction means for withdrawing the ends one at a time from the stack, pivoted depending fingers having V-shaped projecting ledges at their lower ends on which the stack rests, a spring for each finger yieldingly moving said finger toward the stack, an adjustable abutment for each spring, a supporting block to which each finger is pivoted, and means for attaching said blocks to said stack holder whereby said fingers may be shifted transversely of the stack and set in different positions relative to the can end.

8. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, and suction means for withdrawing the ends one at a time from the stack, said suction means including a plurality of suction cups disposed so as to equally distribute the pull on the can end in the region of the supporting means.

9. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, and suction means for withdrawing the ends one at a time from the stack, said suction means including a plurality of suction cups disposed so that the center of each cup is a uniform distance from the adjacent edges of the can end.

10. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction means for withdrawing the ends one at a time from the stack, a supporting bed on which the ends are placed by the suction means, yielding hold down devices adapted to move over the end and hold the same on the bed while the end is still controlled by the suction means, and feeding means for moving the end from beneath the stack while held by the hold down means.

11. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction means for withdrawing the ends one at a time from the stack, a supporting bed on which the ends are placed by the suction

means, a feed slide beneath the stack for receiving and feeding the ends, yielding hold down fingers carried by said feed slide for moving over the end and holding the same from springing away from the bed while the end is under the control of the suction means.

12. A feeding mechanism for non-circular can ends including a stack holder, yielding means for supporting the stack, suction means for withdrawing the ends one at a time from the stack, a supporting bed on which the ends are placed by the suction means, a feed slide mounted on said bed for moving transversely of the stack, yielding hold down fingers carried by the feed slide and positioned so as to move over the end when placed on the bed by the suction means before the suction means loses control of the end, and abutments carried by the feed slide for insuring the movement of the end along the bed when the feed slide is moved.

13. A feeding mechanism for non-circular can ends including a stack holder, yielding means for supporting the stack, suction means for withdrawing the ends one at a time from the stack, a supporting bed on which the ends are placed by the suction means, a feed slide mounted on said bed for moving transversely of the stack, yielding hold down fingers carried by the feed slide and positioned so as to move over the end when placed on the bed by the suction means before the suction means loses control of the end, abutments carried by the feed slide for insuring the movement of the end along the bed when the feed slide is moved, and yielding trap fingers underneath which the ends are moved by the feed slide, said trap fingers engaging the end for holding the same when the feed slide is retracted.

14. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction means for withdrawing the ends one at a time from the stack, a supporting bed on which the ends are placed by the suction means, a feed slide mounted on said bed for moving transversely of the stack, yielding hold down fingers carried by the feed slide and positioned so as to move over the end when placed on the bed by the suction means before the suction means loses control of the end, abutments carried by the feed slide for insuring the movement of the end along the bed when the feed slide is moved, yielding trap fingers underneath which the ends are moved by the feed slide, said trap fingers engaging the end for holding the same when the feed slide is retracted, and a feed finger mounted on the feed slide and yieldingly pressed upward for engaging the end yielding by the trap fingers for feeding the end on the next movement of the feed slide.

15. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction cups for withdrawing the ends one at a time from the stack, means for supporting and reciprocating the suction cups, a supporting bed, a feed slide reciprocating on said bed beneath said stack, said slide and bed having a cut away portion through which the suction cups pass, and means for raising and lowering the suction cups and giving a dwell thereto at the upper end of their stroke while the feed slide is being retracted and a dwell thereto at the lower end of their stroke while the feed slide is moving forward to carry the can end from beneath the stack.

16. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction cups for withdrawing the ends one at a time from the stack, means for supporting and reciprocating the suction cups, a supporting bed, a feed slide reciprocating on said bed beneath said stack, said slide and bed having a cut away portion through which the suction cups pass, and means for raising and lowering the suction cups and giving a dwell thereto at the upper end of their stroke while the feed slide is being retracted and a dwell thereto at the lower end of their stroke while the feed slide is moving forward to carry the can end from beneath the stack, said feed slide having yielding hold down fingers past which the end is carried by the suction cups, said fingers being movable over the end for holding the same down on the bed while the feed slide is moving said end from beneath the stack.

17. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction cups for withdrawing the ends one at a time from the stack, means for supporting and reciprocating the suction cups, a supporting bed, a feed slide reciprocating on said bed beneath said stack, said slide and bed having a cut away portion through which the suction cups pass, and means for raising and lowering the suction cups and giving a dwell thereto at the upper end of their stroke while the feed slide is being retracted and a dwell thereto at the lower end of their stroke while the feed slide is moving forward to carry the can end from beneath the stack, said feed slide having yielding hold down fingers past which the end is carried by the suction cups, said fingers being movable over the end for holding the same down on the bed while the feed slide is moving said end from beneath the stack, and trap fingers for engaging the end for holding the same when the feed slide is retracted.

18. A feeding mechanism for non-circular can ends including a stack holder having yielding means for supporting the stack, suction cups for withdrawing the ends one at a time from the stack, means for supporting

and reciprocating the suction cups, a supporting bed, a feed slide reciprocating on said bed beneath said stack, said slide and bed having a cut away portion through which the suction cups pass, and means for raising and lowering the suction cups and giving a dwell thereto at the upper end of their stroke while the feed slide is being retracted and a dwell thereto at the lower end of their stroke while the feed slide is moving forward to carry the can end from beneath the stack, said feed slide having yielding hold down fingers past which the end is carried by the suction cups, said fingers being movable over the end for holding the same down on the bed while the feed slide is moving said end from beneath the stack, and trap fingers for engaging the end for holding the same when the feed slide is retracted, said feed slide having a feed finger adapted to engage the end held by the trap fingers for feeding it forward on the next reciprocating of the feed slide.

In testimony whereof, we affix our signatures.

JOHN COYLE.
WALTER PLUMB.