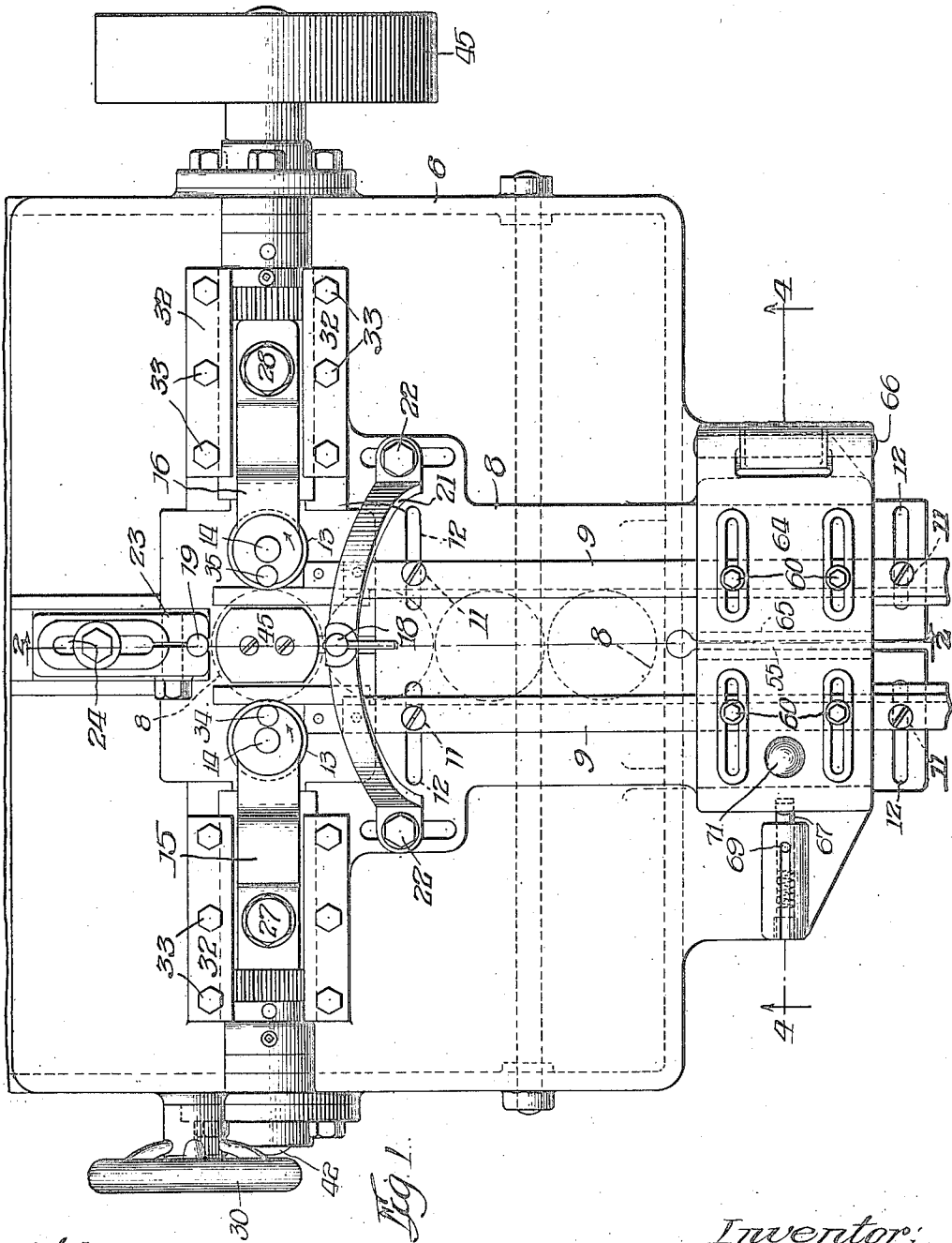


W. CAMERON.
CAN END CURLING AND STACKING MECHANISM.
APPLICATION FILED MAR. 20, 1919.

1,433,696.

Patented Oct. 31, 1922.
4 SHEETS—SHEET 1.



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By *Rondell Wilson*

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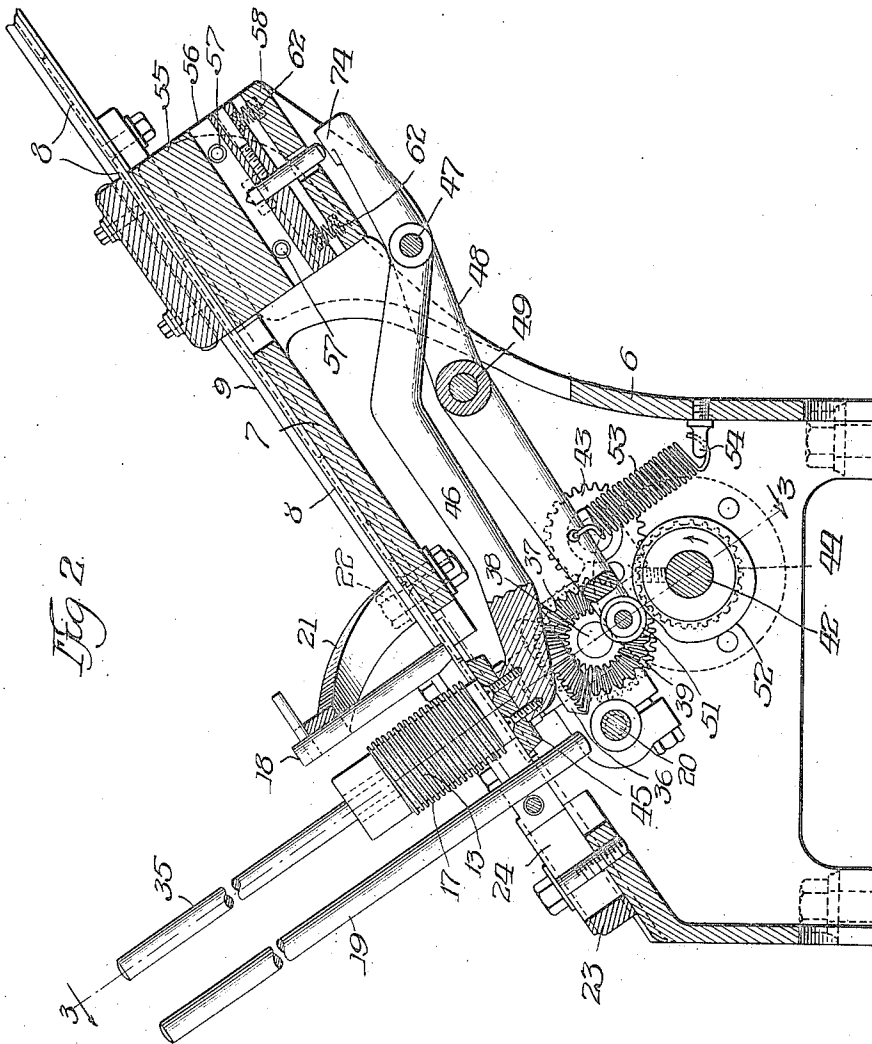


Fig. 2.

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4 SHEETS—SHEET 3.

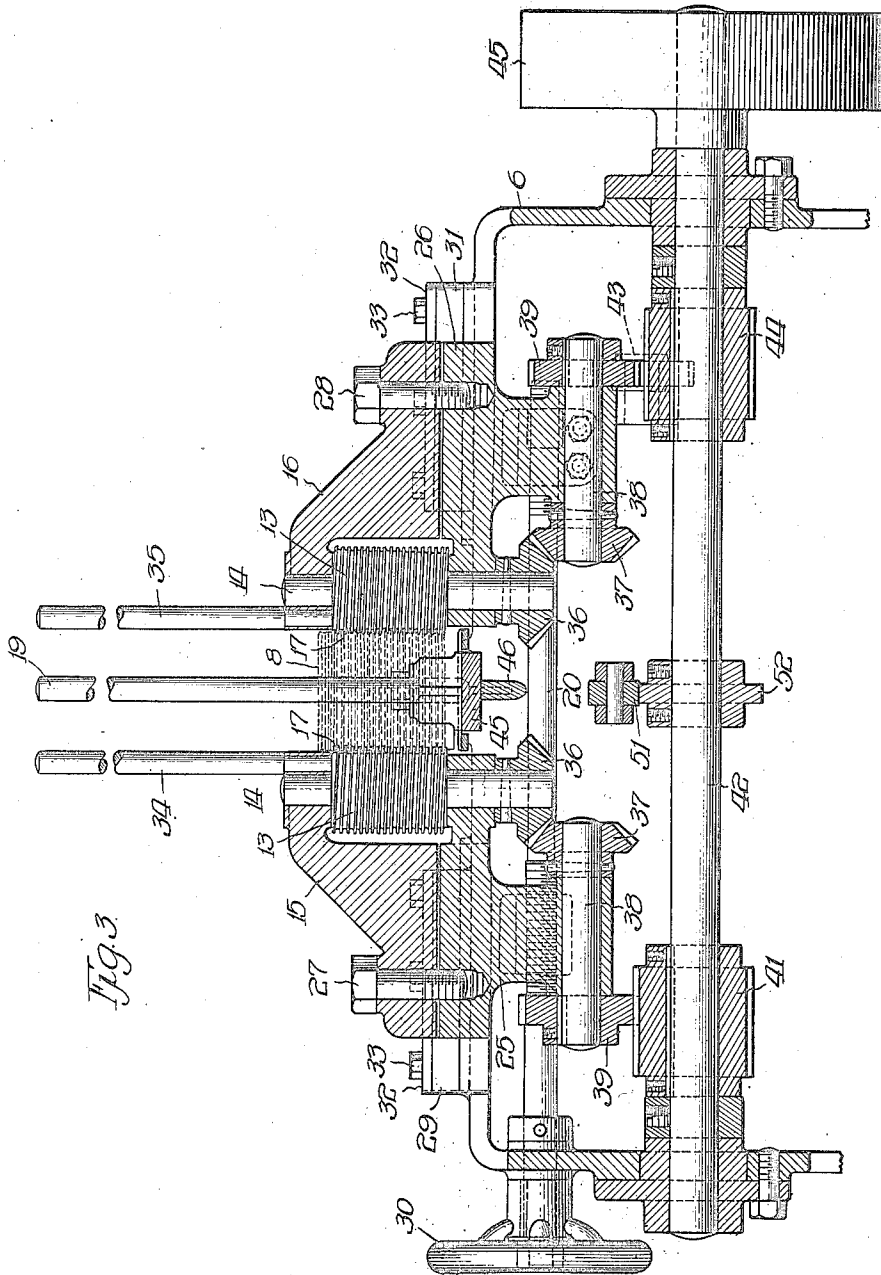


Fig. 3

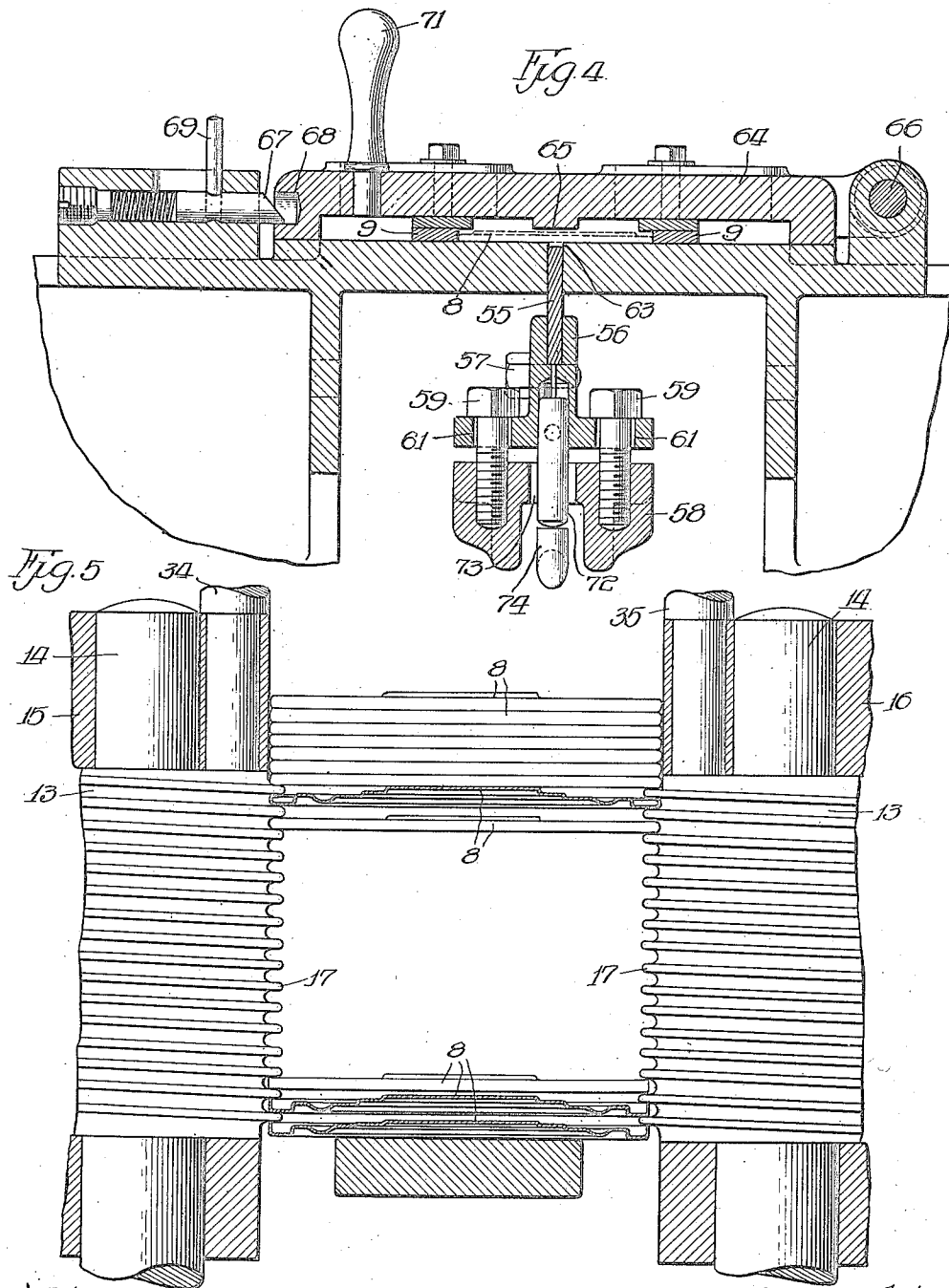
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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CAN-END CURLING AND STACKING MECHANISM.

Application filed March 20, 1919. Serial No. 283,787.

To all whom it may concern:

Be it known that I, WILLIAM CAMERON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Can-End Curling and Stacking Mechanism, of which the following is a specification.

This invention relates in general to mechanisms for curling or turning inwardly the edges of sheet metal blanks or the like and stacking the blanks in accessible position, and the embodiment of my invention disclosed herein, for purposes of illustration, comprises a mechanism for curling the edges of can ends preparatory to the operation of double seaming them onto can bodies.

One of the primary objects of this invention is to provide a mechanism which will automatically deliver the uncurled can ends in succession to the curling mechanism, which will automatically curl the edges thereof, and stack the curled ends in superposed relation so that they are accessible for ready removal to the magazine of the machine which next operates upon the curled ends.

Another object of my invention is to provide novel curling devices by which the can ends will be accurately and uniformly curled, which devices are simple in construction and automatic in their operation.

A further object is to provide novel mechanism for delivering the uncurled ends with accuracy to the curling device so that injury to the ends or to the mechanism, which might result from an inaccurate or incomplete delivery of the ends to the curling device, is obviated. A further purpose is to provide a mechanism which will lift can ends delivered thereto and stack them by adding to the bottom of the stack so that the upper portion of the stack is at all times accessible for removal without interfering with the stacking mechanism.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following description, when considered in connection

with the accompanying drawings. Referring to the drawings,—

Fig. 1 is a plan view of a curler embodying my invention;

Fig. 2 is a longitudinal sectional view 55 taken on the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 2;

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

Fig. 5 is an enlarged view of the curling rolls.

While my invention is shown herein as a detached and independent machine, it should be understood that in practice it is customarily attached to or connected with a press which stamps out the can ends from metal blanks, with the result that the ends are delivered from the press directly to the chute of the curling mechanism without being handled, but my invention is equally useful so far as its functions are concerned irrespective of whether the can ends are delivered thereto automatically by another machine or manually.

By reference to the drawings it will be apparent that the mechanism embodying my invention comprises primarily a base or frame 6 upon which the operating mechanisms are mounted, this base being formed to provide an inclined top 7, down which the can ends will slide by gravity. In order to guide the ends, which are designated by reference character 8, in their downward travel, the top 7 is provided with a pair of under-cut bars or guides 9 forming a chute down which the ends will slide in succession. These guide bars are adjustably mounted upon the frame by means of bolts or screws 11 which pass through the bars and through elongated slots 12 formed in the plate 8 so that the guide bars may be adjusted toward and from each other to accommodate can ends of larger or smaller diameters. The curling mechanism proper is disposed at the lower end of this chute and consists of a plurality, preferably two, of curling rolls 13 fixed upon shafts 14 suitably journaled for rotation in the blocks 15 and 16 respectively. Each roll is provided

with circumferential threads 17 arranged in spiral relation on the roll, the successive convolutions of the threads being spaced apart longitudinally of the roll a sufficient distance at their lower ends to accommodate the edges of a can end 8, as shown in Fig. 5. From the bottom toward the top of each roll the spacing of the threads is gradually diminished, as is also their depth, so that, as a can end is fed upwardly by the rolls its edges are gradually turned by the threads from a position normal to the diameter of the end, as shown at the bottom of Fig. 5, to the position shown at the top of Fig. 5, wherein the edges are projected diametrically inwardly of the end. These curling rolls are rotated in the same direction with the result that a can end engaged between them is revolved by frictional contact with the rotating rolls so that all points on its circumference are successively subjected to the curling action of the rolls thereby producing a uniformly and accurately curled end.

While the rolls in the present embodiment of my invention are shown as mounted with their axes in parallel relation and their diameters are gradually increased from bottom to top, it will be manifest that if preferred the rolls might be of uniform diameter throughout their lengths in which instance they would be mounted with their upper ends nearer together than their lower ends in order to secure the requisite curling action.

The ends are maintained in position between the rolls during the curling operation by front and rear guide posts or rods 18 and 19 respectively. The post 18 is carried by a yoke or arch 21 adjustably mounted by bolt and slot connections 22, as shown on the top plate 7, so that the post may be adjusted toward or from a median point between the rolls to accommodate can ends of various diameters. The post 19 similarly is carried by a block 23 which is also mounted upon the top plate of the machine by a bolt and slot connection 24 which permits a similar adjustment of this post for the same purpose.

The blocks 15 and 16, in which the curling rolls are maintained, are also adjustable toward and from each other to accommodate the machine to can ends of various diameters. These blocks are carried, as shown, upon members 25 and 26, respectively, to which they are secured by bolts 27 and 28. These members in turn are mounted in guideways 29 and 31 formed in the main casting 6 of the machine, in which guideways they are held by overlying plates 32 which are maintained in position by bolts 33. In order to adjust the rolls to the requisite position I employ a transversely extending shaft 20 threadedly engaged by means of oppositely angled threads with the

elements 25 and 26 so that upon rotation of the shaft 20, by means of the hand wheel 30, the elements 25 and 26 are simultaneously adjusted, equal amounts but in opposite directions.

Upon the blocks 15 and 16 there are also mounted the upright posts or rods 34 and 35 which, together with the post 19, provide a magazine in which the can ends are stacked as they are delivered upwardly in succession by the curling rolls. Since the rolls and the magazine are all positioned at an incline relatively to the vertical, it will be obvious that the ends will remain in the magazine in stacked relation from which they may be readily removed from the top or from the open front side thereof without interfering with the operation of the machine and without danger to the operative. The curling rolls are both driven at the same speed and in the same direction by driving mechanism which will now be described. Each roll shaft 14 is equipped at its lower end with a bevel pinion 36 which meshes with and is driven by a bevel pinion 37 mounted upon a counter-shaft 38 which shafts are journaled in depending portions of the elements 25 and 26, as shown in Fig. 3. Each shaft 38 is provided at its other end with a gear 39. The gear 39, shown at the left in Fig. 3, is driven directly by a pinion 41 mounted on the main drive shaft 42. In order that the curling rolls may be both driven in the same direction, an idler gear 43 is interposed at the other side of the machine between the gear 39 and its driving gear 44 also mounted on the drive shaft 42. This drive shaft may be driven from a belt pulley 45, or in any other preferred manner, and it will be manifest that upon rotation of the shaft 42 the curling rolls will be simultaneously driven at the same speed and in the same direction by the gear trains just described. It should be noted in this connection that the driving pinions 41 and 44 are relatively long so that lateral adjustment of the curling rolls, by means of the hand wheel 30 as previously described, may be effected without causing the gear 39, shown at the left in Fig. 3, or the idler gear 43 to become unmeshed from their respective pinions 41 and 44. The machine may be employed, if desired, simply for stacking previously curled ends by simply adjusting the screws apart so that they will not operate as curlers but will only serve to elevate and stack the ends.

It will be apparent from Fig. 2 that the lower ends of the curling screws are disposed somewhat above the chute down which the can ends are fed and this construction permits a can end to be disposed in diametral alignment between the rolls before it is engaged by the threads. For the purpose of transferring or elevating a can end thus positioned, to where it will be en-

gaged by the lower ends of the threads on the curling rolls, I have provided a transferring device comprising a plate 45 mounted upon a lever 46 which is fulcrumed at 47 upon another lever 48. The lever 48 is fulcrumed on the main frame at 49 and carries at its rear end a roller or follower 51 disposed in the path of a cam 52 mounted upon the main drive shaft 42. A tractile spring 53, attached at one end to the lever 48 and at its other end to a lug 54 on the main frame 6, serves to maintain the follower 51 at all times in engagement with its cam 52. The transferring plate 45 is normally disposed in alignment with the bottom of the can chute and each time this plate is elevated it transfers a can end positioned thereon into operative relation to the threads of the curling rolls.

In order to insure that the can ends in the bottom of the chute will be properly positioned on the transferring plate, I have found that the presence of at least four ends above this lowermost end in the chute is necessary. I have, therefore, provided mechanism for determining the presence or absence of this requisite number of ends in the chute and this mechanism controls the transferer so that the transferer will be operated only when this requisite number of can ends are in the chute and in the absence of this number no transferring operation will be performed.

Referring now more particularly to Figs. 2 and 4, it will be observed that at a point in the chute substantially four can ends removed from the transferring plate 45, I have mounted a feeler 55 which consists of a plate clamped at its lower edge in a channel formed in an elongated member 56, bolts 57 being employed to clamp the feeler 55 in position. The member 56 is mounted upon the enlarged end 58 of the lever 48 by means of bolts 59 passing through apertures 61 in the member 56 and threaded at their lower ends into tapped openings formed in the enlargement 58. Expansion springs 62 normally urge the feeler 55 upwardly with respect to the lever end 58 as far as is permitted by the heads of the bolts 59. When the lever 48 is oscillated upon its fulcrum by the cam 52, its outer end 58 moves up and down carrying with it the feeler 55 which, on the upward movement, is projected through a slot 63 formed in the plate 8 into the chute down which the can ends are fed.

Directly above the feeler 55 the chute is covered by a plate 64 having a depending rib 65 disposed in alignment with the feeler. This plate is pivoted to the frame of the machine at 66 and at its opposite end is locked in position by a sliding spring bolt 67 which engages in a socket 68 in the edge of the plate 64 to lock the same in the posi-

tion shown in Fig. 4. Upon release of the locking bolt by means of an upwardly projecting pin 69, the plate may be swung back on its pivot through the instrumentality of a handle 71 with which it is equipped, carrying with it the underlying sections of the guide bars 9 attached thereto by bolts 60, so that access to the ends at this point may be had. The member 56 which carries the feeler is provided with a depending pin 72 which projects downwardly through an aperture 73 in the lever end 58 where its lower end engages the overlying end 74 of the lever 46.

The operation of this can end feeling and transferring mechanism is as follows: At each upward movement of the feeler 55, induced by the lever 48, this feeler is projected into the can end chute. After the chute, from its lower end to the feeler, is filled with can ends so that one or more ends are disposed between the upper edge of the feeler 55 and the rib 65, upward movement of the feeler will be limited by engagement with an end or ends in the chute. The ends are of such thickness that this upward movement of the feeler will be arrested before the outer end 58 of the lever 48 has completed its up stroke. A relative movement between the members 56 and 58 will thereupon take place against the force of the springs 62 and this relative downward movement of the pin 72 will cause the lever 46 to rock on its fulcrum 47 thereby elevating the transferring plate 45 to transfer a can end from the chute into position to be engaged by the curling rolls. Should the feeler 55 in its upward movement encounter no can ends in the chute, the upward limit of its movement will correspond with the upward limit of the outer end 58 of the lever 48 so that no relative movement between the members 56 and the outer end 58 of the lever will be produced. The lever 46, under these conditions, will remain idle and no transferring operation will be performed. It will thus be manifest that at each actuation of the lever 48, if there are a sufficient number of can ends in the chute above the transferring plate to insure the proper positioning of an end on said plate, the transferer will be operated to deliver an end to the curling rolls, but if, on the other hand, there are not sufficient ends in the chute to insure the proper position of the lowermost end, then no transferring operation will take place until the number of ends in the chute has been replenished. In so far as the operation of the stacking and curling mechanism is concerned, it will be manifest that any suitable means other than that shown may be utilized to deliver the can ends to the rolls.

It is believed that my invention and its mode of operation will be readily under-

stood from the foregoing without further description, and while I have shown and described a preferred embodiment thereof, it should be manifest that the invention is not circumscribed by the details disclosed but that its scope is defined only by the following claims.

I claim:

1. In a can end curler, the combination of a plurality of curling screws adapted to receive the edges of can ends between the successive threads thereof, said screws being nearer together at the delivery end than at the receiving end thereof, means for operating said screws, means for delivering can ends to said screws and means for stacking said ends above said screws.

2. In a can end curler, the combination of a plurality of curling screws, means for feeding can ends successively to said screws, and a magazine above said screws in which the ends are automatically stacked upon delivery to the lower end thereof by said screws.

3. In a can end curler, the combination of a plurality of curling screws, means for delivering can ends successively to the lower ends of said screws, and a magazine in which the curled can ends are stacked above the screws as they are delivered upwardly by the screws.

4. In a can end curler, the combination of a plurality of curling screws, means for delivering can ends to the screws, means for operating said screws, and means above said screws for maintaining the can ends in stacked relation after they have been delivered by the screws.

5. In a mechanism for operating upon blanks, the combination of a plurality of screws arranged in spaced relation at an incline to the vertical, means for delivering blanks to the lower ends of said screws, means for rotating said screws to elevate said blanks in succession, and a magazine above the screws in which the blanks are stacked as they are delivered in succession by said screws, said magazine being open at one side to permit the removal of the blanks therefrom.

6. In a machine for operating upon can ends, the combination of a plurality of screw members adapted to elevate can ends in succession, means for delivering can ends to the lower portion of said screw members, and a magazine disposed in inclined position above said screw members to receive can ends therefrom, the upper side of said magazine being open to facilitate removal of the ends from said magazine.

7. In a can end curler, the combination of curling mechanism, a chute in which the can ends are delivered edgewise in succession into proximity to said mechanism, and means actuated by can ends in said chute for

delivering the lowermost end from the chute to said mechanism.

8. In a can end curler, the combination of curling mechanism, an inclined chute extending beneath said mechanism, a device for lifting can ends from said chute to said mechanism, and means controlled by can ends in said chute for controlling the operation of said lifting device.

9. In a can end curler, the combination of curling mechanism, a chute for delivering can ends beneath and into proximity to said mechanism, a device for lifting the lowermost end in said chute into co-operative relation with said mechanism, and means controlled by the presence or absence of ends in said chute for controlling the operation of said device.

10. In a can end curler, the combination of curling mechanism, a chute, a device for transferring can ends successively from said chute to said mechanism, and means for controlling the operation of said device, said means including a feeler adapted to be intermittently projected into said chute, and an operative connection between said feeler and said device.

11. In a can end curler, the combination of a plurality of upwardly extending curling screws, an inclined chute, a device for transferring can ends from said chute to the lower ends of said screws, means controlled by the presence or absence of a can end in said chute for controlling the operation of said device, and a magazine above the chute for maintaining the can ends in stacked relation upon delivery from said curling screws.

12. In a can end curler, the combination of a plurality of curling rolls, means for delivering can ends to the lower ends of said rolls, means for stacking the ends curled by said rolls and means whereby said rolls may be adjusted to accommodate can ends of various diameters.

13. In a can end curler, the combination of a plurality of curling rolls, means for delivering can ends thereto, means whereby said rolls may be adjusted to various sized ends, a magazine to which the curled ends are delivered by the rolls, and means whereby the size of said magazine may be adjusted to accommodate ends of various sizes.

14. The combination of a plurality of screws disposed on an incline and adapted to elevate can ends flatwise in succession, means for delivering can ends to the receiving ends of said screws, and an inclined open-sided magazine above the screws in which the can ends are stacked from the bottom as the ends are successively delivered by the screws and through the open side of which the ends may be removed.

15. The combination of a pair of screws arranged in spaced relation in inclined posi-

tion, rods extending parallel with the axes of and above said screws to provide an inclined open-sided magazine, and means for operating said screws to cause the delivery thereto of can ends into the bottom of said magazine.

16. The combination of a plurality of upwardly extending screw-threaded members, means for delivering can ends in succession to the lower ends of said members, means for rotating said members to feed can ends upwardly between said members, means for adjusting said members to accommodate can ends of different sizes, and a magazine above said members to the bottom of which the can ends are delivered in succession by said members and in which said ends are maintained in superposed stacked relation.

17. The combination of upwardly extending can end curling mechanism, means for delivering can ends in succession to the bottom of said mechanism, a magazine above said mechanism, and means for operating said mechanism to curl the can ends and deliver them upwardly into said magazine at the bottom thereof.

18. The combination of a plurality of rotatable screw-threaded members, means for delivering can ends in succession to the lower ends of said members, means for rotating said members to feed the can ends upwardly between said members, and means above said members for maintaining the can ends in superposed stacked relation as they are delivered upwardly in succession from said members.

19. The combination of a magazine adapted to contain can ends, rotatable means for delivering can ends in succession upwardly into said magazine and means for simultaneously adjusting said magazine and delivery means to accommodate can ends of various sizes.

20. The combination of a magazine adapted to contain can ends in superposed stacked relation, and means below said magazine for curling can ends and delivering the same in succession upwardly into said magazine.

21. The combination of means for operating upon can ends, an inclined chute extending into proximity to said means, a transferer for transferring can ends from said chute to said means, a feeler adapted to be projected into said chute intermittently to detect the presence or absence of a can end therein, and mechanism controlled by said feeler whereby said transferer is actuated.

22. The combination of mechanism for operating upon can ends, an inclined chute for conveying can ends into proximity to

said mechanism, a transferer for transferring can ends from said chute to said mechanism, a device for detecting the presence or absence of a can end in said chute, and means controlled by said detector for actuating said transferer.

23. The combination of mechanism for operating upon can ends, a conveyor for conveying can ends into proximity to said mechanism, means including a lever for transferring the ends from said conveyor to said mechanism, means for detecting the presence or absence of a can end on said conveyor, a lever for actuating said detector and a connection between said levers for actuating said transferring means under the influence of said detector.

24. In a can end edge curling and stacking machine, the combination of a plurality of spaced rotatory rolls having spirally arranged edge curling grooves formed thereon, the bottoms of said grooves being spaced closer at the upper ends of the rolls than at the lower ends, whereby the can ends may be fed to said rolls at their lower ends and discharged at their upper ends, and roll rotating means.

25. In a can end edge curling and stacking machine, the combination of a table, a plurality of spaced rotatory rolls having spirally arranged edge curling grooves formed thereon, journaled on said table, and arranged to receive the can ends from the table and to discharge the can ends at their upper ends one under the other, and a guard secured to said table for holding the can ends in stacked condition.

26. In a can end edge curling and stacking machine, the combination of a table, a plurality of spaced rotatory rolls having spirally arranged edge curling grooves formed thereon, journaled on said table, and arranged to receive the can ends from the table and to discharge the can ends at their upper ends one under the other, and a plurality of parallel rods extending up from said rolls around the stacked can ends.

27. In a can end curling and stacking mechanism, the combination of an inclined chute down which can ends are adapted to travel, an inclined magazine above the chute adapted to contain curled ends, and mechanism for curling the edges of can ends delivered by said chute and for elevating said curled ends into said magazine.

28. In a can end curling and stacking mechanism, the combination of can end conveying means, a plurality of rotary can edge curling devices, a magazine, and screw means for elevating the curled ends into said magazine.

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