

June 24, 1924.

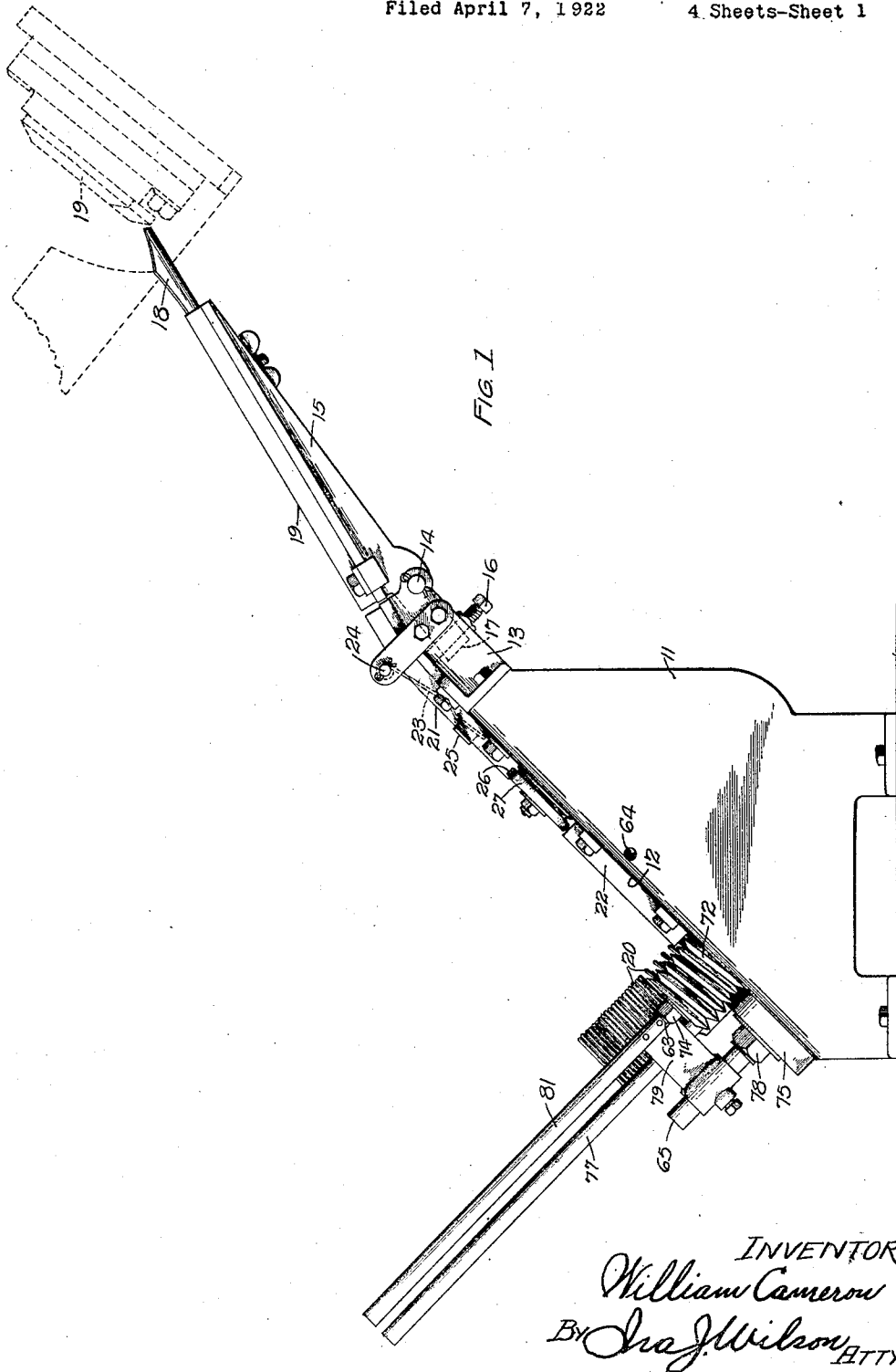
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W. CAMERON

CAN END CURLING AND STACKING MECHANISM

Filed April 7, 1922

4 Sheets-Sheet 1



INVENTOR:
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FIG. 3

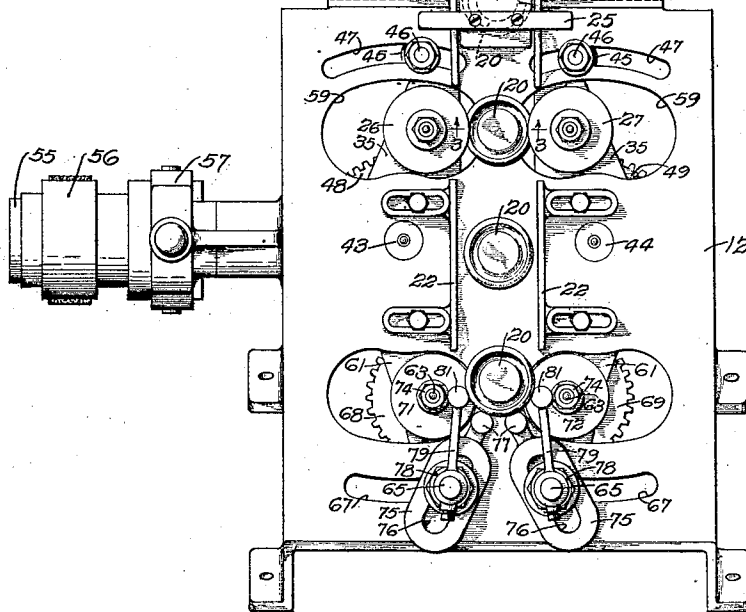
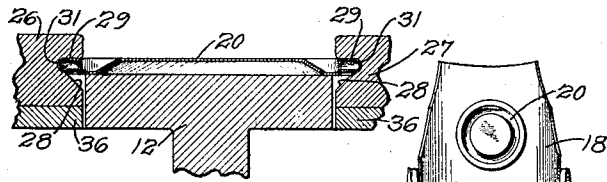


FIG. 2

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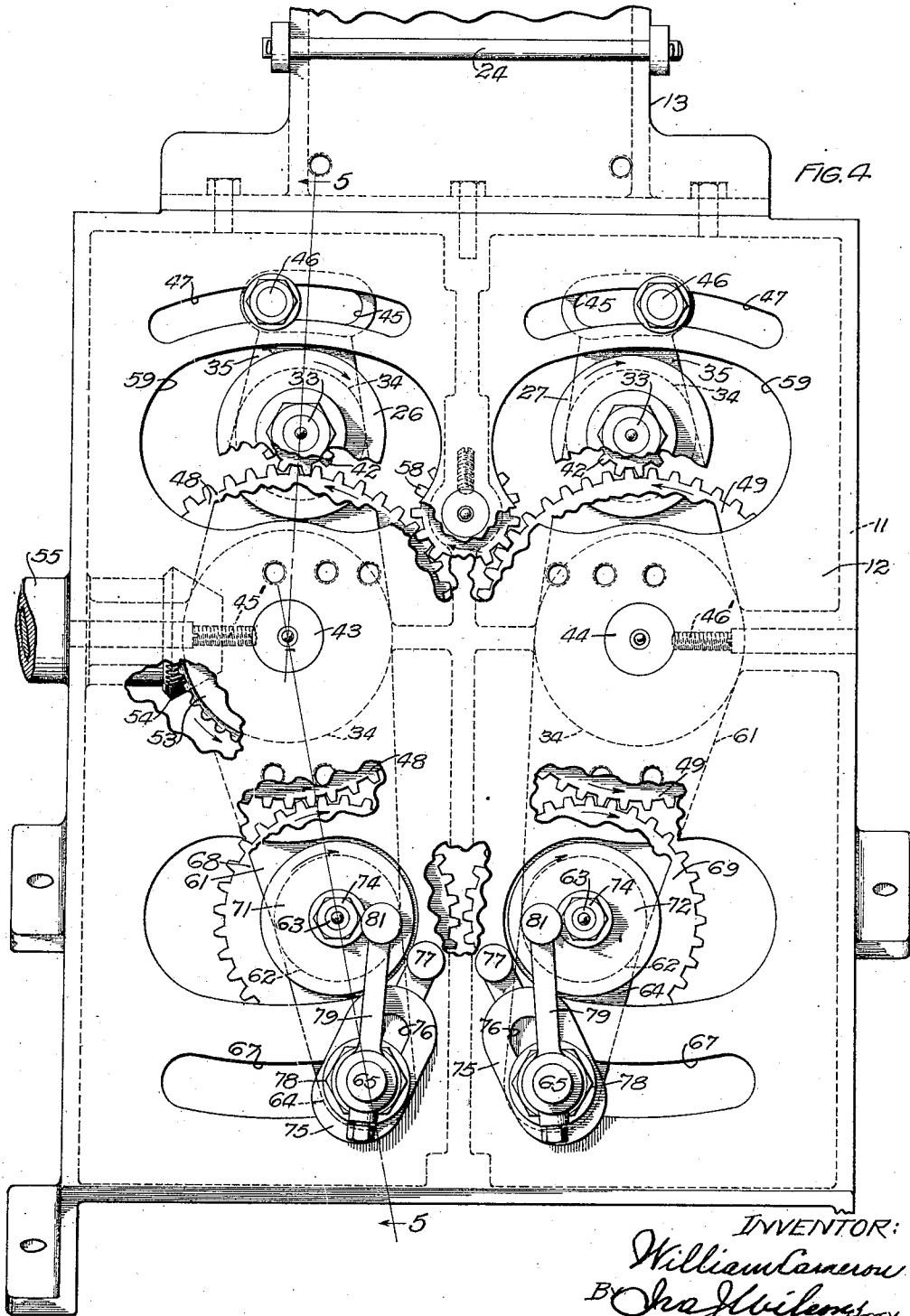
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CAN END CURLING AND STACKING MECHANISM

Filed April 7, 1922

4 Sheets-Sheet 3



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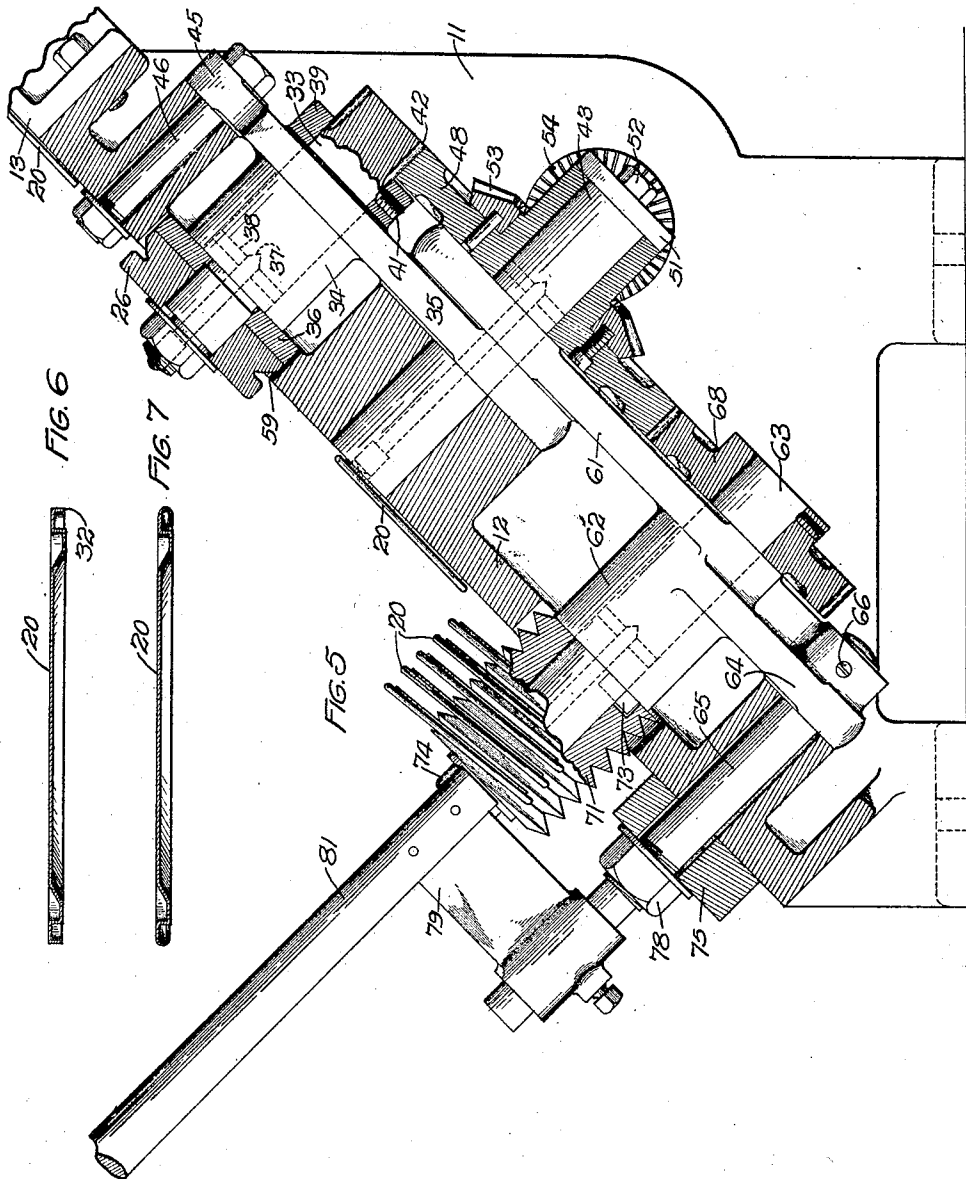
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CAN END CURLING AND STACKING MECHANISM

Filed April 7, 1922

4 Sheets-Sheet 4



INVENTOR:

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UNITED STATES PATENT OFFICE.

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CAN-END CURLING AND STACKING MECHANISM.

Application filed April 7, 1922. Serial No. 550,253.

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 to the manufacture of can ends or covers made of tin with the circumferential margin curled inwardly to form a channel adapted to accommodate a sealing material which insures a tight seal when the ends are double seamed onto the can bodies. The primary purpose of my invention is to provide a machine which is adapted to receive the can ends directly from the die press, by which they are stamped out, and to rapidly, accurately and uniformly curl the edges of these ends and then stack them one upon the other in accessible position from which they may be lifted out and transferred to the magazine of the next machine in the line.

Another object of my invention is to provide a machine of the character indicated which will not only be reliable and accurate in operation, but which is also capable of adjustment to accommodate the machine to various sizes of can ends.

A further novel and advantageous feature of the invention resides in the shape of the grooves formed on the perimeters of the flanging rollers, and which are adapted to curl and shape the edges of the can ends so as to produce a curled flange of the required shape and dimensions.

Another feature is found in the driving mechanism for the various operating parts which is adapted to drive both the curling and stacking rolls at the desired speeds and in the requisite directions, and which is also so constructed and arranged that the rolls may be adjusted to accommodate the machine to various sizes of can ends and without impairing or disturbing their driving relation with the driving mechanism.

Other objects and many of the inherent advantages of this invention should 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:

Figure 1 is a side elevation of a machine embodying my invention;

Fig. 2 is a plan view thereof;

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

Fig. 4 is an enlarged plan view with portions of the table or bed broken away to more clearly show the arrangement of the underlying driving mechanism;

Fig. 5 is a sectional view on the line 5—5 of Fig. 4;

Fig. 6 is a sectional view of a can end before being subjected to the curling operation; and

Fig. 7 is a similar view of an end after the edges thereof have been curled.

Referring now to the drawings more in detail, reference character 11 indicates generally the base or frame of the machine, which as will be apparent from Fig. 1, slopes downwardly from front to rear providing an inclined top or table 12 upon which the curling operation is performed and beneath which the driving mechanisms are mounted. The upper end of the base is provided with an inclined extension 13, bolted or otherwise secured thereto, and upon this extension there is fulcrumed upon a bar or shaft 14 a forwardly extending arm 15 which is adjustably supported at any desired inclination by a pair of set screws or abutment screws 16 threaded through the rearwardly projecting arms 17 and adapted to engage beneath the extension 13. Upon the outer end of the arm 15 there is adjustably mounted a plate 18, which may be adjusted to project into proximity to the lower die 19 of a die press by which the can ends are punched out from a sheet of metal, the ends being adapted to drop onto this plate and slide down the arm 15, the extension 13 and the top 12 by gravity.

It will be observed that the arm 15 is provided with adjustably mounted side plates 19 forming between them a guide channel for the can ends 20, and likewise the extension 13 is provided with adjustable side plates 21 forming a continuation of the channel. Upon the table 12 there are adjustably mounted similar side plates 22, all of the plates forming together a substantially continuous guide channel down which

the ends will slide from the plate 18. The adjustability of these side plates enables the channel to be widened or narrowed to accommodate can ends of various sizes which may be required from time to time. For the purpose of preventing the can ends from leaving the channel when they pass over the hump formed on the extension 13, I prefer to mount above the channel at this point a guard plate 23 which is pivoted upon a rod 24 extending transversely of the channel and is held at its free or lower end above the bottom of the channel, so that the can ends may pass therebeneath, by a transversely extending bar 25 screwed to the plate and resting upon the upper edges of the side plates 21. This bar serves as a handle by which the plate may be swung back out of the channel to permit access thereto in case the channel should become clogged. The channel provides therefore an inclined chute down which the can ends will travel from the die press to the operating mechanisms, which will now be described.

On opposite sides of the chute between the side bars 21 and 22, there is rotatably mounted a pair of curling rollers 26 and 27. These rollers are rapidly rotated both in the same angular direction, as indicated by the arrows in Fig. 4, by driving mechanism which will be later described, and each roller is provided on its periphery with a curling groove disposed at the proper height to receive the edges of a can end traveling down the chute. Each groove comprises, as will be apparent from Fig. 3, an upwardly inclined portion 28, a flat top portion 29 disposed perpendicularly to the axis of rotation of the roller, and a curved portion 31 joining the portions 28 and 29. The rollers are so spaced on the machine that the distance between the two portions 31 of the opposed rollers is slightly less than the maximum diameter of the can ends to be operated upon, and as the can ends travel in succession down the chute into engagement with these rapidly revolving rollers, the action of the rollers causes the can end to spin or revolve between them until its edges have been curled inwardly sufficiently to permit the passage of the end between the rollers. When this occurs the end has been sufficiently and accurately curled and it will pass between the rollers on down the chute to the stacking mechanism which will be later described. The spinning of the ends and the curling of the edges thereof are facilitated by the fact that one of the curling rollers, preferably roller 27 is larger than the other, thereby causing a slippage between the ends and the rollers which aids the curling action. The can end as it comes from the die press is shaped substantially as shown in Fig. 6, the perimeter being down-turned to form a flange 32 extending downwardly or

downwardly and slightly outwardly. As the edge of this flange engages the inclined portion 28 of the curling rollers, it is gradually curled inwardly until, when it has been sufficiently reduced in diameter to pass between the curling rollers, it is shaped substantially as shown in Fig. 7.

Each of the curling rollers 26 and 27 is fixedly mounted upon the upper end of a shaft 33 which is journaled in a bearing hub 34 formed on an arm 35, a washer 36 being preferably interposed between each roller and its bearing hub 34. Oil is supplied to the bearing from the upper end of the reduced portion of the shaft through an oil channel 37 terminating in lateral branches 38. Upward displacement of each shaft 33 is prevented by a collar 39 secured thereon below the arm 35 by one or more set screws 41. The lower end of the shaft is provided with a pinion which may be either secured thereto or preferably formed thereon, as indicated by reference character 42.

The arms 35 are pivoted upon vertically disposed stationary shafts 43 and 44 respectively, extending through the top 12 and retained in position by set screws 45' and 46', respectively. The outer end of each arm 35 is slotted, as indicated at 45, and an adjusting bolt 46 extending through this slot and upwardly through a corresponding slot 47 in the bed is adapted to adjustably lock the arm in position to maintain the curling rolls 26 and 27 the requisite distance apart. When these bolts are loosened the arms, with the curling rolls carried thereby, may be adjusted toward and from each other, the combined actions of the slots 45 and 47 permitting of a wide range of adjustment.

The gear wheels 48 and 49 are rotatably mounted upon the lower ends of the shafts 43 and 44 respectively, and are maintained against displacement by washers 51 locked to the lower ends of their respective shafts by lag screws 52 threaded into the shafts. To the lower face of gear 48 there is secured a bevel pinion 53 which meshes with and is driven by a driving pinion 54 mounted on the main drive shaft 55 which is driven by a belt pulley 56 through a clutch 57 of any preferred construction. This pinion drives the gear 48 in a counter-clockwise direction, viewing Fig. 4, thereby driving the curling roll 26 in a clockwise direction, and at high speed. An idler gear 58 meshing with the gears 48 and 49 drives the gear 49 and curling roll 27 in the same angular direction as the gear 48 and curling roll 26, and it is the action of these curling rolls which rapidly revolve in the same direction that causes the can end engaged thereby to spin and have its edges curled inwardly before the end passes between the rolls. The top 12 is provided with slots 59 to permit adjusting movements of the rolls with the arms 35.

It will be manifest that since the arms 35 are mounted concentrically with their respective gear wheels 48 and 49, any adjusting movement of these arms and the curling rolls does not disturb the driving relation between the gears 48 and 49 and their respective driven pinions 42.

Upon each of the shafts 43 and 44 there is also pivoted a rearwardly extending arm 61 which is shaped to provide a bearing 62 for a shaft 63, and is extended beyond its bearing, as indicated at 64, to receive a bolt or rod 65 tapped into the extension 64 and locked therein by a set screw 66 and extending upwardly through a slot 67 which permits adjusting movements of these arms and the shafts 63 carried thereby, similarly to the adjustment provided for the curling rolls.

Upon the lower ends of the shafts 63 there are fixedly mounted the driven gears 68 and 69, respectively, meshing with and driven by the gears 48 and 49, so that the shafts 63 are revolved both in the same direction. Upon the upper ends of the shafts 63 are mounted screw-threaded members 71 and 72 connected through lugs or keys 73 with their respective shafts to revolve therewith and locked against displacement by nuts 74 threaded onto the upper ends of the shafts 63. These screw threaded members intersect the path of travel of the curled can ends 20 after they leave the curling rolls, and they are spaced apart so that the ends will pass partially therebetween and be lifted by the action of the screws as the members are revolved.

Upon each of the rods 65 there is disposed immediately above the top 12, an arm 75 provided with an elongated slot 76 and carrying at its inner end an upright rod 77, these rods being arranged to extend upwardly between and parallel with the screw members 71 and 72. The position of the rods 77 may be adjusted by moving the arms 75 into the required position with respect to their rods 65 which are threaded adjacent the member 75 to accommodate nuts 78, which when tightened down, clamp the arm 75 and the arm 61 in adjusted position.

Upon each rod 65, above its clamping nut 78, there is adjustably mounted another arm 79 carrying at its forward end an upwardly extending rod 81. These rods preferably extending forwardly beyond the rods 77, as shown in Figs. 1, 2 and 4. Since the rods are inclined with respect to the vertical, as will be apparent from Fig. 1, they provide above the screw members a magazine in which the can ends are stacked and from which the ends may be readily removed. These ends are fed by the screws 71 and 72 into the magazine in succession from the bottom thereof, thereby gradually raising

the stack in the magazine, and at the same time leaving the upper end of the stack freely accessible so that the ends may be removed without interfering with the continued delivery of ends into the magazine. Upon loosening the clamping nuts 78 the screw members and the rods 81 may be adjusted toward and from each other to accommodate the machine to can ends of various sizes, and the rods 77 may also be adjusted toward and from each other, as well as forwardly or rearwardly, to position them properly for the can ends to be operated upon.

In the operation of my invention, the can ends, stamped out substantially into the shape shown in Fig. 6, are delivered in succession from the die 19 from the die press into the upper end of the chute down which they slide by gravity until they engage the curling rollers 26 and 27. These rollers revolving rapidly in the same direction spin the can ends and curl the edges thereof substantially into the shape shown in Fig. 7, and when thus curled an end is sufficiently reduced in diameter so that it will pass between the rolls on down the chute into position to be picked up by the elevating screws and delivered into the lower end of the magazine where the curled ends are evenly stacked.

It is believed that my invention and many of its inherent advantages will be understood from the foregoing without further description, and it should be manifest that the details of construction illustrated and described are capable of considerable modification and variation without departing from the essence of the invention, as defined in the following claims.

I claim:

1. In a machine of the character described, the combination of a base, an inclined chute thereon, curling members disposed above said base on opposite sides of the chute center, stacking members disposed above said base on opposite sides of the chute center, a pair of driving elements mounted within the base and each adapted to drive the members on its respective side of said chute center, and means whereby each member may be adjusted concentrically of its driving element.

2. In a machine of the character described, the combination of a base, driving mechanism mounted in said base, a pair of curling rollers and a pair of stacking members disposed in spaced relation above said base and connected with said driving mechanism, means whereby said rollers and members may be adjusted in arcuate paths toward and from each other, members extending above said stacking members and providing a magazine into which can ends are delivered by said stacking members, and

means whereby said magazine members may be individually adjusted.

3. In a machine of the character described, the combination of a pair of curling rollers disposed in spaced relation, a pair of stacking members also disposed in spaced relation, means for adjusting said rollers and members individually in arcuate paths, and a plurality of magazine members arranged to receive can ends delivered by said stacking members, said magazine members being adjustable bodily with said stacking members and also adjustable individually relatively to the stacking members.

4. In a machine of the character described, the combination of a base providing an inclined chute, curling mechanism mounted on said base and adapted to curl the edges of can ends during their travel along said chute, a magazine, means mounted on said base for lifting the curled ends from the chute and delivering the same in succession into said magazine and driving mechanism within the base for operating said curling mechanism and lifting means.

5. In a machine of the character described, the combination of can end curling mechanism, means for adjusting said mechanism to accommodate can ends of various sizes, a magazine, stacking mechanism for stacking the curled ends in said magazine, common driving means for said mechanisms, and means for adjusting said stacking mechanism to accommodate the same to can ends of various sizes.

6. In a machine of the character described, the combination of a pair of curling rollers, driving gears therefor, means for adjusting said rollers toward and from each other about the axes of said gears, can end stacking members also driven by said gears, and means for adjusting said members toward and from each other about the axes of said gears.

7. In a machine of the character described, the combination of an inclined chute, curling rollers at opposite sides of said chute between which can ends travel, means for adjusting said rollers toward and from each other, stacking members also disposed at opposite sides of said chute in the path of travel of can ends in said chute, means for adjusting said stacking members toward and from each other, common driving means for rotating said rollers and members, and a magazine into which the can ends are delivered in succession by said members.

8. In a machine of the character described, the combination of a can end guiding chute, an upwardly extending magazine, means for elevating can ends from said chute into the lower end of said magazine, curling mechanism for curling the edges of can ends during their travel along

the chute toward said magazine, and means for operating said curling mechanism and elevating means.

9. In a machine of the character described, the combination of a base, a magazine projecting upwardly from said base, means for delivering can ends upwardly into said magazine, can end curling mechanism including curling rollers arranged in spaced relation to permit the passage of can ends between the same, and means for directing can ends to said curling rollers and from the curling rollers to said can end delivery means.

10. In a machine of the character described, the combination of a plurality of curling rollers, a plurality of stacking members, a magazine into which can ends are delivered by said members, means for rotating all of said members and rollers and means for adjusting said members and rollers to can ends of various sizes.

11. In a machine of the character described, the combination of a pair of curling rollers, driving pinions connected thereto, driving gears meshing with said pinions respectively, an idler connecting said driving gears, stacking members, driven gears connected to said stacking members and meshing with said driving gears respectively, and means for applying power to one of said driving gears.

12. In a machine of the character described, the combination of a pair of driving gears mounted in spaced relation upon parallel axes, forwardly and rearwardly extending arms fulcrumed concentrically with each driving gear, a curling roller carried by each forwardly extending arm, a pinion connected with each roller and meshing with its respective driving gear, a stacking member carried by each rearwardly extending arm, a driven gear connected with each stacking member and meshing with its respective driving gear, all of said arms with their respective rolls and stacking members being adjustable about the axes of their respective driving gears, and means for locking all of said arms in adjusted position.

13. In a machine of the character described, the combination of a pair of driving gears, a pair of driven gears meshing with their respective driving gears, a stacking member connected to each driven gear, means for adjusting said stacking members toward and from each other about the axes of said driving gears as centers, a plurality of inclined rods extending above said stacking members to provide a magazine into which can ends are delivered by said members, and means for adjustably supporting said rods.

14. In a machine of the character described, the combination of a pair of pivotally mounted arms, a stacking member car-

ried by each arm, a plurality of magazine rods connected to each arm, said rods being adjustable bodily with and also independently of said arms, and means for locking 5 said arms and rods in adjusted position.

15. In a machine of the character described, the combination of a pair of driving gears, a pair of driven pinions meshing therewith, curling rollers connected with 10 said pinions, a pair of driven gears meshing with said driving gears, stacking members connected with said driven gears, arms mounted concentrically with said driving gears upon which the curling rolls and 15 driven pinions are mounted, arms mounted concentrically with said driving gears upon which the stacking members and driven gears are mounted, magazine forming rods connected with said last-mentioned arms, and 20 means whereby all of said arms may be locked in adjusted position.

16. In a machine of the character de-

scribed, the combination with a base having an inclined top provided with a can end guiding chute, of a plurality of rotatable 25 curling rollers disposed on opposite sides of said chute in position to curl the edges of can ends passing between the same, a magazine projecting upwardly from said base, means for elevating can ends curled by said 30 rollers upwardly into said magazine, and means for driving said curling rollers and said elevating means.

17. In a machine of the character described, the combination of means for guid- 35 ing advancing can ends, rollers for curling the edges of the advancing ends, a magazine, means for delivering the curled ends into said magazine, and means for driving said rollers and said delivering means, the 40 rollers, delivering means and magazine all being adjustable to accommodate can ends of various sizes.

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