

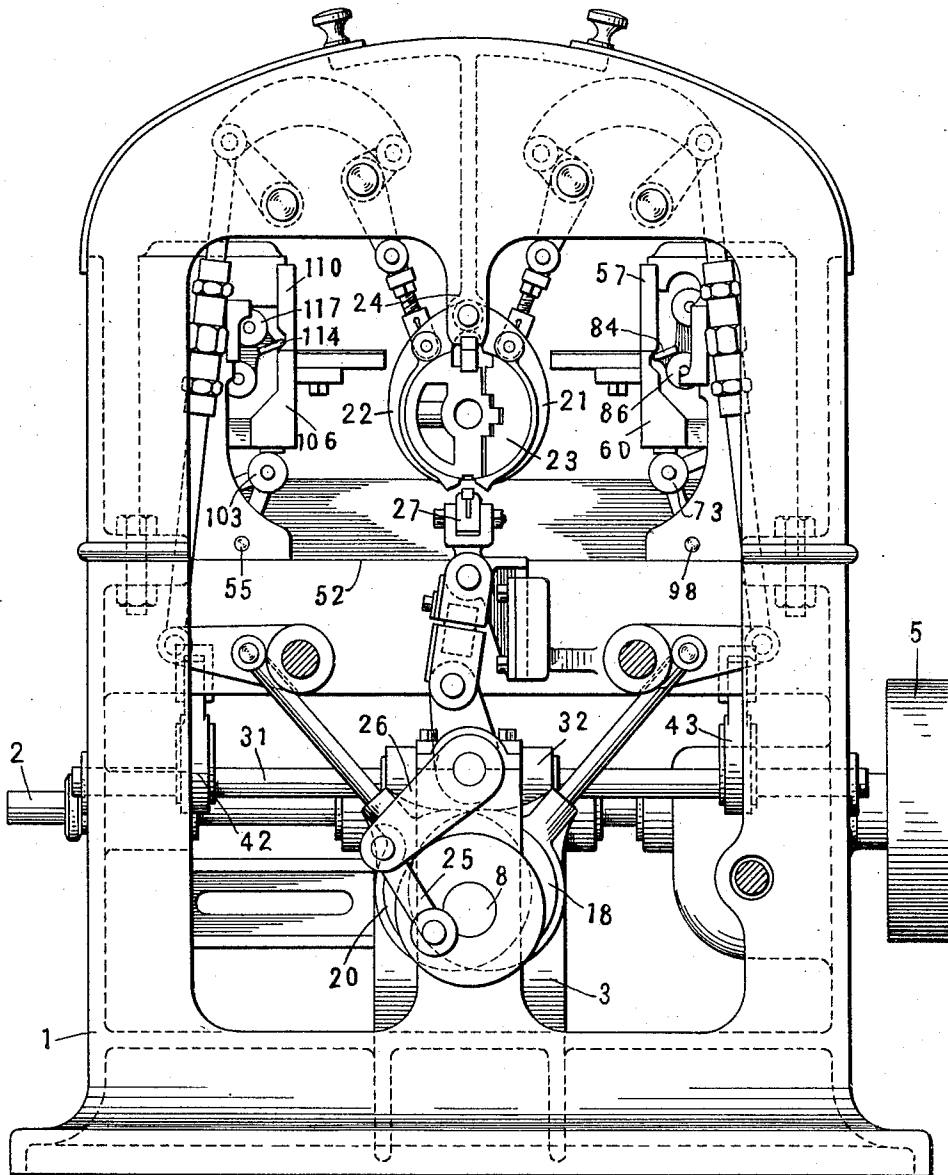
C. W. GRAHAM.
EDGE FORMING MECHANISM FOR CAN BODY BLANKS.
APPLICATION FILED JAN. 28, 1910.

1,055,973.

Patented Mar. 11, 1913.

5 SHEETS—SHEET 1.

Fig. 1.



WITNESSES
J. C. Murphy
Adelle H. Murphy

Charles W. Graham INVENTOR,
BY *Wilson, Kent & Ramsey* ATTORNEYS

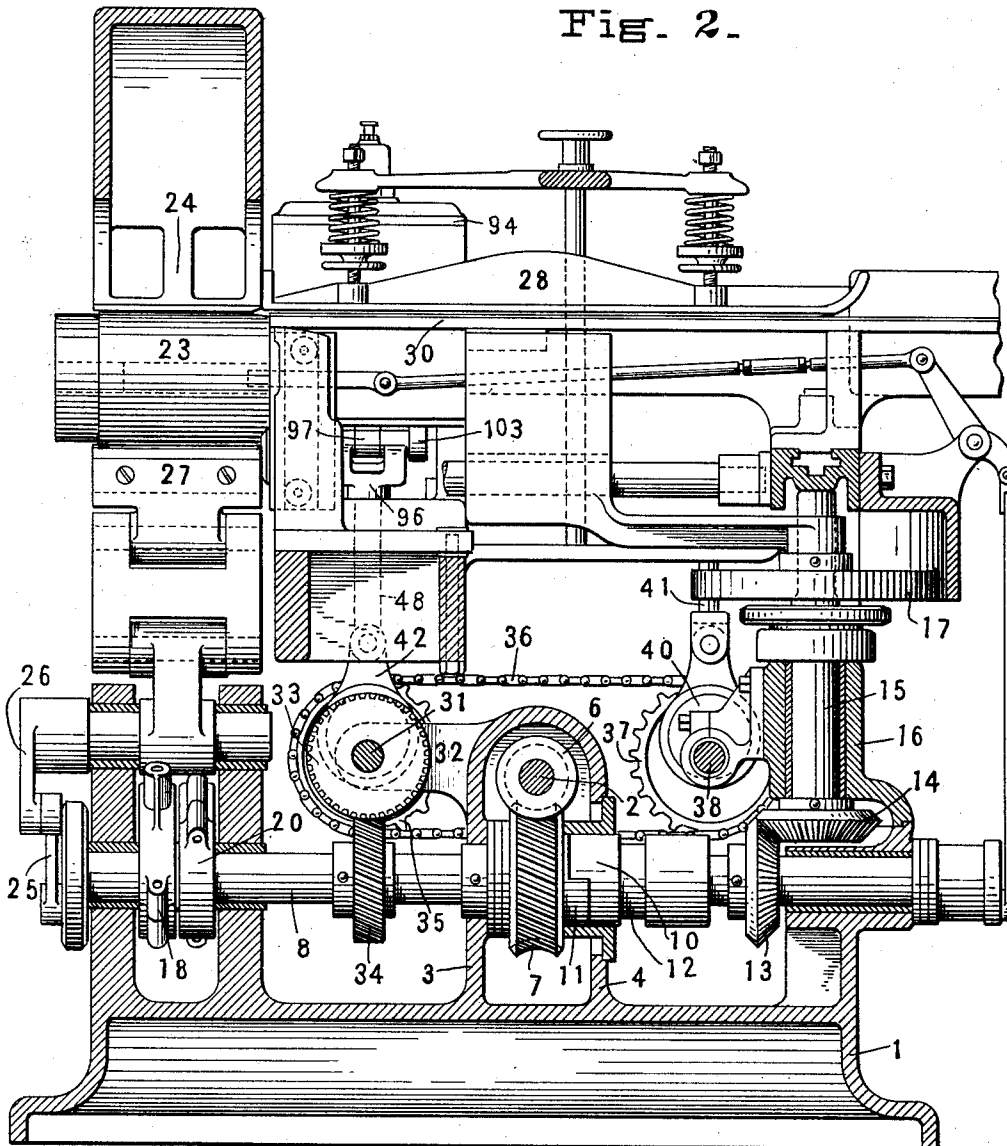
C. W. GRAHAM.
EDGE FORMING MECHANISM FOR CAN BODY BLANKS.
APPLICATION FILED JAN. 28, 1910.

1,055,973.

Patented Mar. 11, 1913.

5 SHEETS—SHEET 2.

Fig. 2.



WITNESSES:
J. H. H. H. H.
Adelle Heringberg

Charles W. Graham, INVENTOR,
BY *Wilson, Kent & Ramsey*
ATTORNEYS.

C. W. GRAHAM.
EDGE FORMING MECHANISM FOR CAN BODY BLANKS.

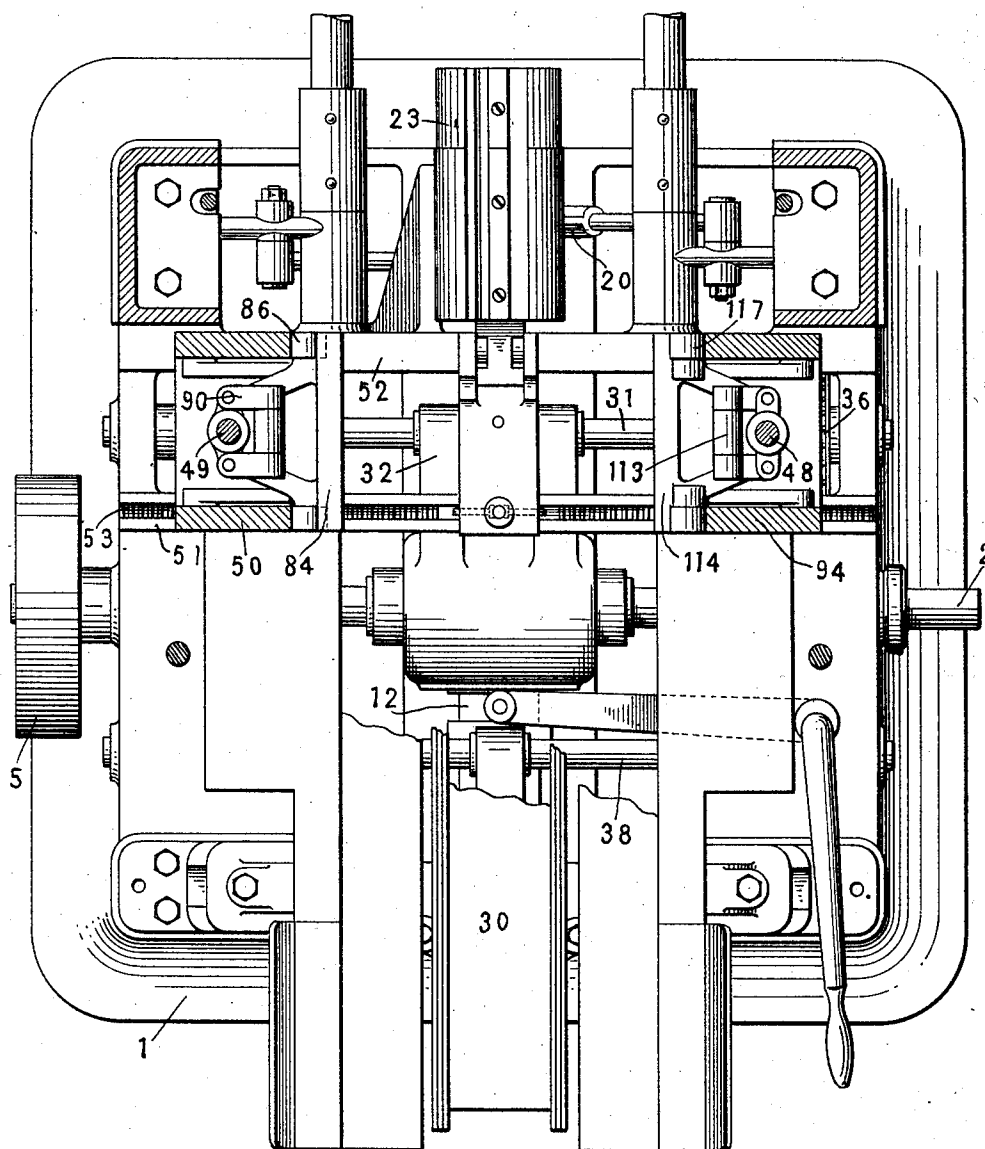
1,055,973.

APPLICATION FILED JAN. 28, 1910.

Patented Mar. 11, 1913.

5 SHEETS—SHEET 3.

FIG. 3.



WITNESSES:
J. J. Gault
Adelle Bonigberg

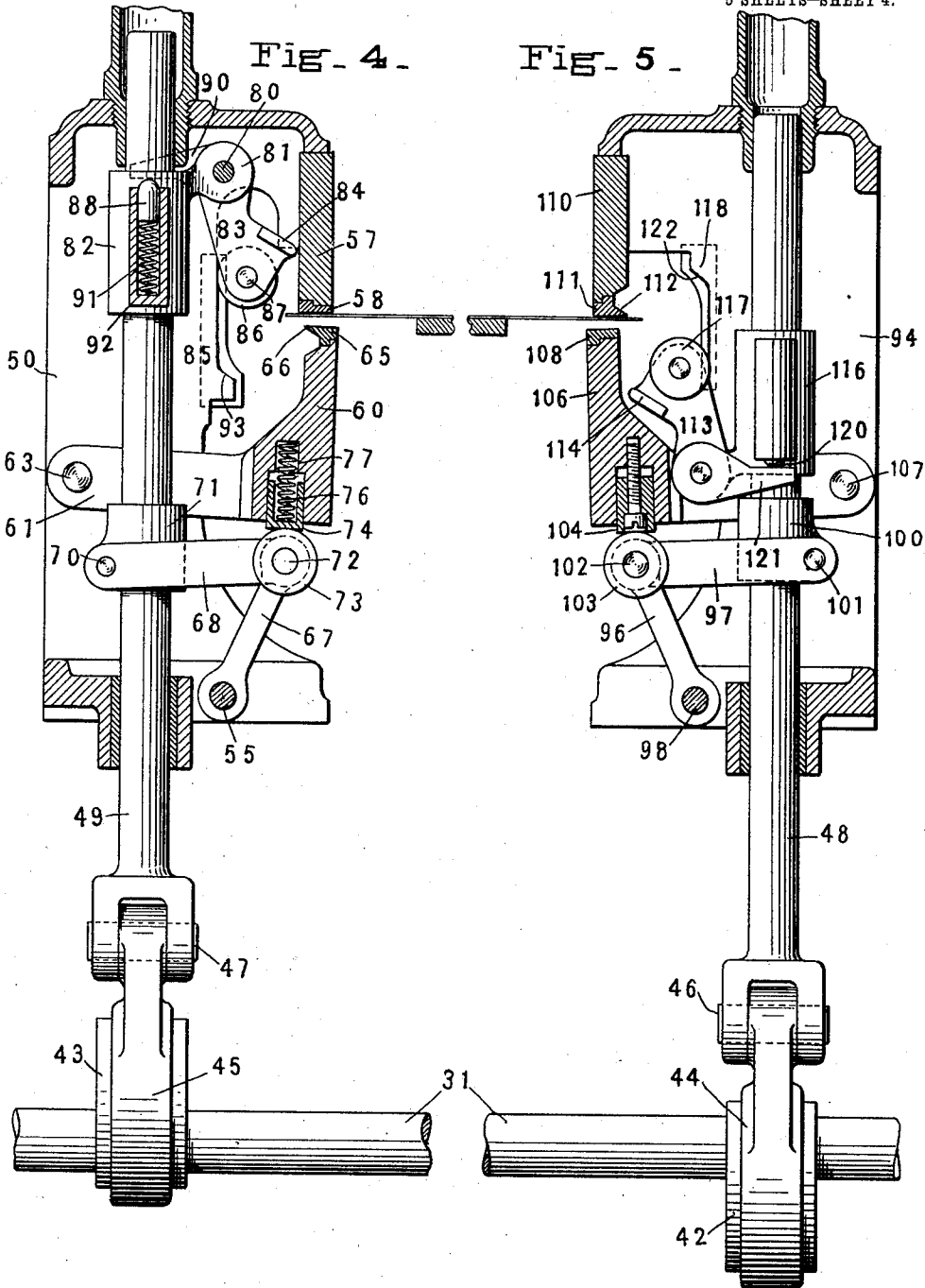
Charles W. Graham INVENTOR,
BY *Wilson, Kent & Ramsey* ATTORNEYS

C. W. GRAHAM.
EDGE FORMING MECHANISM FOR CAN BODY BLANKS.
APPLICATION FILED JAN. 28, 1910.

1,055,973.

Patented Mar. 11, 1913.

5 SHEETS—SHEET 4.



WITNESSES:

J. A. H. H. H.
A. H. H. H.

INVENTOR,

Charles W. Graham
BY *Wilson, Kent & Ramsey*
ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES W. GRAHAM, OF ROME, NEW YORK.

EDGE-FORMING MECHANISM FOR CAN-BODY BLANKS.

1,055,973.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed January 28, 1910. Serial No. 540,566.

To all whom it may concern:

Be it known that I, CHARLES W. GRAHAM, residing at Rome, in the county of Oneida, State of New York, have invented certain new and useful Improvements in Edge-Forming Mechanism for Can-Body Blanks, of which the following is a specification.

This invention relates broadly to means for working sheet metal and more particularly to means for treating blanks which are to be formed into can bodies.

One of the objects of the invention is to provide new and improved means for forming hooks or flanges upon the opposite sides of a suitably formed blank of tin, or like material.

Another object is to provide means of the above character which will edge a blank for can bodies so that the hooks will be of uniform size and shape.

Another object is to provide edging mechanism wherein friction and vibration of moving parts are substantially eliminated, thus minimizing wear and noise of operation.

Another object is to provide edging mechanism which will be compact, of few operative parts, thus minimizing the space occupied by this mechanism in a can body forming machine.

A further and more specific object of the invention is to provide a bending means whose initial movement is substantially normal to the surface of the blank, and which after engagement with said blank follows the edge thereof about the edge forming member, the construction being such that there is no scraping action between the surface of the tin and the edge forming means.

Other objects and aims, more or less broad than those stated above, will be in part obvious and in part specifically adverted to in the course of the following detailed description, in which the elements, combinations, and arrangements of parts constituting the invention are set forth; and the scope of the application thereof will be indicated in the appended claims.

In the accompanying drawings wherein is illustrated one of various embodiments of my invention: Figure 1 is a rear elevation of a can body forming machine showing a portion of the "edging" mechanism. Fig. 2 is a view in vertical section of said machine, showing the means employed to drive

the "edging" mechanism. Fig. 3 is a top plan view of said machine, showing the position of the edge forming mechanisms relative to the horn. Fig. 4 is a vertical, sectional view taken through the housing of the edging mechanism showing, partly in section and partly in elevation, the edging mechanism upon the left hand side of the machine. Fig. 5 is a similar view showing the edging mechanism employed upon the right hand side of the machine. Fig. 6 is a view in elevation of the edging mechanism, with the parts in a position different from that shown in Fig. 4. Fig. 7 is a similar view, with the parts in different position from that shown in Fig. 5; and Fig. 8 is a rear elevation of one of the edging devices.

Similar reference characters refer to similar parts throughout the several figures of the drawings.

In the accompanying drawings, wherein is illustrated a machine embodying the above and other features of my invention, there is shown a frame comprising broadly a base 1 upon which are erected various standards which support the driving shafts and other operative parts of a can body making machine, said standards being preferably formed integral with the base portion, as shown.

The various operative parts of the machine are driven from the main drive shaft 2, which extends transversely of the machine near the central portion thereof and is journaled in bearings on the frame. Drive shaft 2 is provided exteriorly of the machine with the pulley 5, which may be driven from any suitable source of power. This shaft is provided with a worm wheel 6 which meshes with the worm wheel 7 loosely mounted upon a main operating shaft 8, said worm wheel 7 having a clutch face 11 thereon formed integrally with the worm and adapted to coöperate with a corresponding clutch member 10 slidable upon a suitably formed portion 12 of the shaft 8. Shaft 8 drives, as by means of the bevel gears 13 and 14, an upright shaft 15 journaled in a standard 16, and from this shaft is driven the mechanism 17 employed to feed the blanks through the machine. This mechanism will not be specifically described herein since it forms a part of my application entitled can body forming mechanism, filed of even date herewith, Serial No. 540,569. The opposite end

of shaft 8 operates, by means of eccentrics 18 and 20 and various connected parts, the jaws 21 and 22 which are employed to bend the edged blanks about the horn 23 which bears against a yoke 24 located centrally of the machine. Shaft 8 also drives, as by means of the link 25 and crank 26, the bumping mechanism 27 employed to jam the interlocked flanged portions of the can body against the horn 23. Mechanism denoted by 28 mounted upon the top portion of the machine is adapted to maintain the blanks flatwise against the bed 30.

The various operative parts of the machine with the exception of the driving shaft 2 and the operating shaft 8 form no part of the present invention but are referred to generally in order that the construction and operation of the edging mechanism and its relation to the other blank treating mechanisms may be more readily understood.

A counter shaft 31 is suitably journaled in brackets 32 carried by standard 3, and this shaft is provided with a spiral gear 33 which meshes with the spiral gear 34 upon the shaft 8 and is driven thereby. Counter shaft 31 drives, as by means of the sprocket 35 and chain 36 which runs upon the sprocket 37, a second counter shaft 38, the latter operating by means of the eccentric 40 and rod 41, mechanism for notching the blanks, said mechanism not being shown herein since it constitutes no part of my present invention.

Located upon counter shaft 31 adjacent the ends thereof are oppositely disposed eccentrics 42 and 43, and connected with sleeves 44 and 45 mounted upon said eccentrics by means of pivots 46 and 47 are vertically disposed rods 48 and 49 which operate edging mechanism now to be particularly described.

Referring now to Figs. 3 to 8 inclusive, 50 denotes a box or housing which rests upon ways 51 and 52 which extend transversely of the machine and are suitably supported in the side walls thereof. Way 51 is provided with a rack 53 which meshes a pinion 54 carried upon the shaft 55 journaled in the lower portion of the housing and extending transversely thereof, said shaft being provided with a squared end 56 adapted to receive a wrench or other turning instrument. The purpose of this rack and pinion construction is to enable the housing to be conveniently adjusted laterally of the machine, as when it is desired to operate upon blanks of different dimensions. Fixedly carried upon the housing 50 is a plate or clamping member 57, the lower end of which is provided with a blank engaging member or jaw 58, and cooperating with the clamping member 57 and arranged in opposed relation thereto is a movable clamp-

ing member 60, the same being carried upon arms 61 and 62. These arms are pivotally supported at 63 and 64 upon the housing 50 and straddle the vertically disposed rod 49. Clamping member 60 is provided with a jaw 65 which cooperates with the jaw 58 carried by the clamping member 57 to clamp and hold a blank adjacent an edge thereof as shown in Fig. 6 of the drawings. The swinging clamping member 60 is actuated by mechanism which will now be described: 67 denotes a link which is journaled upon the shaft 55, said link at its upper end being bifurcated to receive the end of the second link 68, which is pivoted thereto. Link 68 at its opposite end is bifurcated to straddle the vertically disposed rod 49, and is journaled upon laterally extending studs 70 provided upon the bracket or collar 71 fixed upon rod 49. Link 67 is provided at its upper end with laterally extending ears or studs 72, upon which are journaled rollers 73. Resting on rollers 73 is a block 74 which is located in a slot 75 extending transversely of the clamping member 60. Springs 76, located in pockets 77 formed in the clamping member 60, and interposed between the same and block 74, form a resilient support for the clamping member upon the rollers 73. Screws 78 extending loosely through block 74 and threaded into the clamping member 60 retain said block 74 within its slot. Link 67 is inclined inwardly, as shown, so that when rod 49 is moved downwardly the link will be moved toward a vertical position, which movement will operate to swing the clamping member 60 upward and cause it to cooperate with the fixed clamping member 57 to clamp and hold the interposed blank. Mounted upon the pivot 80 supported in ears 81 formed upon a casting 82, fixedly secured upon the vertical rod 49, is a carrier 83 for the edging blade 84, said blade extending transversely of the carrier, and located adjacent the clamping jaw 57 within the housing. Cam members 85 fixed upon the sides of the housing are traversed by rollers 86 carried upon the pivot pin 87, which extends transversely of the carrier 83. The rollers are maintained in engagement with the surfaces of cams 85 by means of plungers 88 which engage tail pieces 90 of carrier 83. Plungers 88 are urged to operative movement by means of extensile springs 91, suitably housed in boxes 92 formed in casting 82. The various parts are so positioned that when the rod 49 is moved downwardly the jaws of the clamping members 57 and 60 engage and hold the blank just prior to the engagement of the bending blade 84 therewith. This blade, when the rod 48 is moved downwardly, first moves in a straight line, normal to the surface of the exposed edge of the blank. When, however, the bending

blade 84 engages the blank and the rollers 86 reach the abruptly curved portions 93 of the cams 85, the further movement of the rod 49 and the traversing of rollers 86 upon said cams cause the bending blade to partake of a compound movement, whereby it follows substantially the contour of the edge forming portion of the jaw 65, bending the edge portion of the blank thereabout.

The above description is directed to the mechanism for flanging one edge of the blank. The mechanism for flanging the opposite edge thereof, which is of a similar character, will now be described.

A housing 94, similar to housing 50, but located upon the opposite side of the machine upon the ways 51 and 52, is similarly adjusted transversely of the machine as by means of the pinion 95, which engages the rack 53 of way 51. Links 96 and 97, pivotally connected, respectively to the shaft 98 and the bracket 100 upon the vertically disposed rod 48 at 101, and pivotally connected together as at 102, carry the rollers 103 upon which rests the block 104. This block is positioned in the longitudinally extending slot 105 of the swinging clamping member 106; springs being interposed between the block and the clamping member, as in the above described construction. Clamping member 106 is pivotally supported, as at 107, upon inwardly extending studs upon the housing 94, and is provided at its upper end with the jaw 108.

110 indicates a fixed clamping member carried by the housing 94, and this clamping member carries the jaw 111, which is provided with the tapered edge portion 112 which slopes inwardly and upwardly. This part constitutes the forming member for the flanged portion of the blank, and corresponds to the portion 66 of the other edging means.

The carrier 113 for the edging blade 114 is pivotally mounted at 115 upon ears of a casting 116 fixedly secured to the rod 48, and has rollers 117 which traverse the paths of cams, one of which is shown at 118 in Fig. 5, said cam being mounted upon the housing 94. The rollers 117 of the carrier 113 are maintained in engagement with the cam paths by means of the plungers 120, which engage with tail pieces 121 of the carrier, said plungers being forced outwardly by means of extensile springs suitably housed in the casting 116. When rod 48 moves upwardly the edging blade is first moved in a corresponding direction along a right line normal to the edge of the blank, until it engages the same, at which point the rollers 117 engage with the abruptly curved portion 122 of the cam path, whereupon the edging blade moves in a compound curve to bend the edge portion of the blank about the edge forming portion of the jaw,

as shown in Fig. 7 of the drawings, and in a manner similar to that already described in connection with the first described edging mechanism.

Having thus described the construction of this embodiment of my invention the operation thereof may now be understood. Assuming the blank to be edged to have been fed between the clamping jaws of the edging mechanism, as shown in Figs. 4 and 5, wherein the opposed edging mechanisms are shown in their proper relation, in so far as their vertical positions are concerned, the simultaneous upward and downward movements of rods 48 and 49 will, through the links 67, 68, and 96, 97, respectively, swing the clamping members 60 and 106 upward, whereby the blank will be firmly clamped and held adjacent the edge portions thereof. It will be noted that during the upward swinging movements of the clamping members 60 and 106 they are moved outwardly, and that such swinging movement tends to take out any slack there may be in the clamped blank and stretch it taut between the opposed edging devices. The opposed clamping jaws are so positioned as to permit lateral edges of the blank to project slightly beyond the same and into the path of travel of blades 84 and 114. Substantially simultaneously with the closing of the clamping jaws upon the blank, the blades 84 and 114, moving in opposite directions, strike the projecting portions of the blank and bend them into the positions shown in Figs. 6 and 7 of the drawings, as has been previously explained. Movements of the rods 48 and 49 in the opposite direction will return the edging members to the positions shown in Figs. 4 and 5, which permits the edged blank to be fed forward so that the succeeding blank may be brought into operative position. The above cycle of operations is then repeated, the blades 84 and 114 operating to edge the succeeding blanks in the manner above described. The driving parts for the edging mechanism are so proportioned as to feed into and discharge one blank from the edging mechanism during each revolution of the shaft.

It will thus be seen that I have provided simple and efficient edging mechanism, which, while simple, is of the most substantial construction, the operative parts of the mechanism for each side of the machine being compactly arranged in a single housing. The driving means for the edging device is also of a simple construction, comprising merely vertically reciprocating rods which are driven from eccentrics mounted upon a common shaft.

Another advantage inherent in the present invention lies in the fact that the entire edging mechanism is readily adjustable to accommodate blanks of varying widths.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which as a matter of language, might be said to fall therebetween.

It will be understood that when the housings 50 and 94 are adjusted laterally for operation upon blanks of a different size, corresponding adjustments are made of the eccentrics 42 and 43 on their shaft 31.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an edging mechanism, in combination, a pair of members adapted to clamp and hold a blank adjacent an edge thereof, a movably mounted bending member, means for moving said bending member into engagement with the edge portion of the blank, a fixed cam which coöperates with said bending member to cause the latter to bend the edge of the blank about a portion of one of said clamping members, rotary means upon the bending member for traversing said cam, and means for maintaining said rotary means in engagement with the cam.

2. In an edging mechanism, in combination, a pair of members adapted to clamp and hold a blank adjacent an edge thereof, a movably mounted bending member, means for moving said bending member into engagement with the edge portion of the blank, a fixed cam which coöperates with said bending member to cause the latter to bend the edge of the blank about a portion of one of said clamping members, rotary means upon the bending member for traversing said cam, and spring means carried by the support of said bending member for maintaining said rotary means in engagement with the cam.

3. In an edging mechanism, in combination, a housing, a clamping member mounted thereon, a movable clamping member pivotally supported upon said housing, said clamping members being adapted to clamp and hold a blank adjacent an edge thereof, a rod slidably mounted in said housing, a bending member pivotally supported upon said rod, a cam carried by the housing, and a roller upon said bending member adapted to traverse said cam when said rod is moved to carry the bending member into engagement with the exposed edge portion of the blank.

4. In an edging mechanism, in combina-

tion, a housing, a clamping member fixedly supported thereon, a clamping member pivotally mounted thereon, said clamping members being adapted to clamp and hold a blank adjacent an edge thereof, a rod slidably mounted in said housing, a suitably driven eccentric for reciprocating said rod, a bending member pivotally mounted on said rod, cams carried by the housing, rollers carried upon said bending member adapted to traverse said cams, and means connected with said housing for elevating said pivotally mounted clamping member when said rod is moved in such a direction as will cause the bending member to engage with the exposed edge portion of the blank.

5. In an edging mechanism, in combination, a pair of housings, a fixed clamping member carried by each of said housings, a movable clamping member pivotally mounted upon each of said housings, said clamping members being adapted to clamp and hold a blank adjacent its opposite edges, a rod slidably mounted in each of said housings, a bending member pivotally mounted on each of said rods, fixed cams and means for simultaneously moving said rods in opposite directions whereby said bending members will strike and bend the opposite projecting edges of said blank in corresponding directions and means connected with said oppositely moving rods for imparting to said movable clamping members clamping movements simultaneously in the same direction.

6. In an edging mechanism, in combination, two pairs of clamping members, each of which is adapted to clamp and hold a blank adjacent an edge portion thereof, a pair of bending members, a pair of suitably guided rods each of which supports one of said bending members, eccentric means for reciprocating said rods in opposite directions, whereby said bending members are caused simultaneously to strike and bend the projecting edges of said blank in opposite directions, cam means coöperating with said bending members during the bending operation, and means carried by said rods for operating said clamping members simultaneously in the same direction.

7. In an edging mechanism, the combination with a pair of fixed clamp members, of a pair of movable clamp members both movable simultaneously in the same direction toward the fixed clamp members, a pair of bodily movable edge folder members moving simultaneously in opposite directions transversely of the blank past said fixed clamp members, a pair of reciprocating rods moving simultaneously in opposite directions for imparting to said edge folder members their bodily movements and a pair of fixed cams for imparting to said edge folder members movements inwardly toward each

other as they are bodily moved by said reciprocating rods, substantially as specified.

8. In an edge folding mechanism, the combination with a supporting member upon which the blank rests at its middle portion, a pair of upper fixed clamp members under which the blank passes, a pair of lower movable clamp members and a pair of edge folders, substantially as specified.

9. In an edge folding mechanism, the combination with a supporting member upon which the blank rests at its middle portion, a pair of upper fixed clamp members under which the blank passes, a pair of lower movable clamp members and a pair of bodily movable edge folders, a pair of reciprocating rods moving simultaneously in opposite directions for imparting to said edge folders their bodily movements, a pair of fixed cams for moving the edge folders inward toward each other as they are bodily reciprocated by said rods, substantially as specified.

10. In an edge folding mechanism, the combination with a supporting member upon which the blank rests at its middle portion, a pair of upper fixed clamp members under which the blank passes, a pair of lower movable clamp members and a pair of bodily movable edge folders, a pair of reciprocating rods moving simultaneously in opposite directions for imparting to said edge folders their bodily movements, a pair of fixed cams for moving the edge folders inward toward each other as they are bodily reciprocated by said rods, and means connected to said oppositely moving rods for simultaneously moving said movable clamp members in the same direction to clamp the blank against the fixed clamp members, substantially as specified.

11. In an edging mechanism, the combination with a fixed support upon which the blank rests at its middle portion, of an upper fixed clamp member, a lower movable clamp member, an operating rod reciprocating transversely to the plane of the blank, a bodily movable and inwardly swinging edge folder member pivotally connected to said operating rod and a fixed cam for imparting to said edge folder member its inward swinging movement as it is bodily reciprocated by said rod, substantially as specified.

12. In an edging mechanism, the combination with a fixed support upon which the blank rests at its middle portion, of an upper fixed clamp member, a lower movable clamp member, an operating rod reciprocating transversely to the plane of the blank, a bodily movable and inwardly swinging edge folder member pivotally connected to said operating rod and a fixed cam for imparting to said edge folder member its inward swinging movement as it is bodily reciprocated by said rod, and connecting

means for imparting to said lower movable clamp member an upward clamping movement from said operating rod simultaneously with the downward bodily movement of said edge folder member, substantially as specified.

13. In an edging mechanism, in combination, means adapted to clamp and hold a blank adjacent the opposite edges thereof, and a cam controlled member mounted adjacent each of said clamping members and provided with a blade adapted to strike and bend the opposite projecting edges of said blank simultaneously in opposite directions.

14. In an edging mechanism, in combination, two pairs of opposed members adapted to clamp and hold a blank adjacent its edges, and a bodily movable pivotally mounted cam controlled edge folder blade located adjacent each pair of clamping members adapted to strike and bend the projecting edge of the blank, and fixed cams for imparting to said edge folder blades inward movements toward each other as they are bodily moved, substantially as specified.

15. In an edging mechanism, the combination of edge folders, movable devices for operating said folders, blank clamping means, said means comprising stationary and movable members and means pivotally connected to the movable edge folder operating devices and to a stationary portion of the frame adapted to operate the clamping means, substantially as specified.

16. In an edging mechanism, the combination of edge folders, oppositely movable members for operating said folders, blank clamping means, each comprising a stationary and a movable member and means pivotally connected to each of the folder operating members and to a stationary portion of the frame and adapted to operate the movable member of the clamping means.

17. In an edging mechanism, the combination of edge folders, movable devices for operating said edge folders, blank clamping means, said means comprising stationary and movable members, a link pivotally connected to the movable edge folder operating devices and a second link pivotally connected to the first named link and to a stationary portion of the frame and adapted to operate the clamping means.

18. In an edging mechanism, the combination of edge folders, oppositely movable members for operating the folders, blank clamping means each comprising a stationary and a movable member, a link pivotally connected to each of the movable edge folder operating devices, a second link pivotally connected to each of the first named links and to a stationary portion of the frame and adapted to operate the clamping means.

19. In an edging mechanism, the combination of edge folders, oppositely movable

members for operating the folders, blank clamping means each comprising a stationary and a movable member, means pivotally connected to each of the folder operating members and to a stationary portion of the frame and adapted to operate the movable member of the clamping means and a resiliently mounted member interposed between each movable clamping member and the pivotally mounted clamping member operating means.

20. In an edging mechanism, the combination of clamping members, a movable edging blade, a fixed cam for determining the path of the blade, said blade being spring controlled to cause it to follow the contour of the cam, substantially as specified.

21. In an edging mechanism, the combination of blank clamping members, an edging blade, bodily movable and pivotally mounted, a fixed cam for determining the path of the blade, said blade being spring controlled to cause it to follow the contour of the cam.

22. In an edging mechanism, the combination of blank clamping devices and reciprocating operating members, said members each carrying a spring controlled edge folder and having pivoted thereto one end

of a link motion for operating the clamping devices, substantially as specified.

23. In an edging mechanism, the combination of a pair of oppositely disposed blank edging and clamping devices, movable toward and from each other, means for adjusting said devices bodily, said devices each comprising clamping members and an edging blade pivotally mounted on a reciprocating operating member, the pivotal point being fixed with regard to the operating member, and clamp operating means pivotally connected to the operating member, substantially as specified.

24. In an edging mechanism, the combination of edge folders, reciprocating rods for operating said folders, blank clamping devices, each comprising a stationary element and a movable element and a member pivotally connected to each of said rods and adapted to operate the movable element of each clamp.

In testimony whereof I have affixed my signature in the presence of two witnesses.

CHARLES W. GRAHAM.

Witnesses:

B. W. COULDOCK,
FRANK J. KENT.