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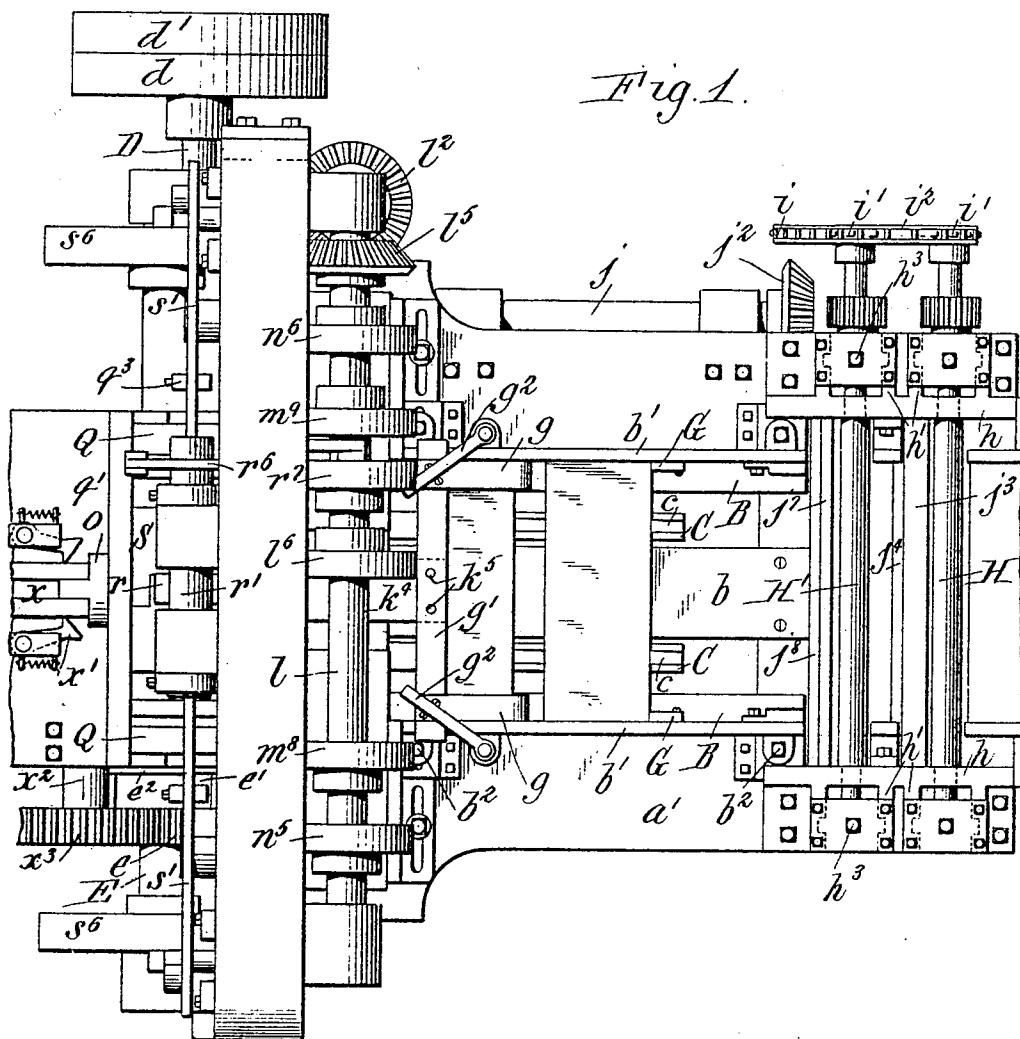
No. 813,772.

PATENTED FEB. 27, 1906.

W. CAMERON.
MACHINE FOR MAKING CAN BODIES.

APPLICATION FILED MAY 22, 1903.

4 SHEETS—SHEET 1.



Witnesses:

E. A. Volk.

R. W. Gunser.

William Cameron Inventor.

By Wilhelm F. Bonner.

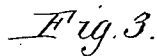
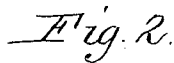
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APPLICATION FILED MAY 22, 1903.

4 SHEETS—SHEET 2.



William Cameron Inventor.
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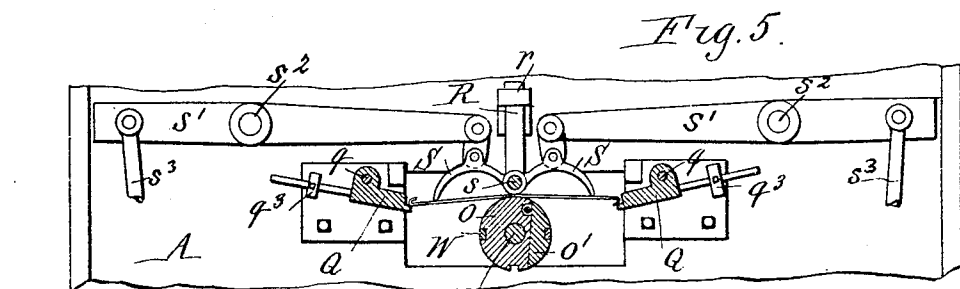
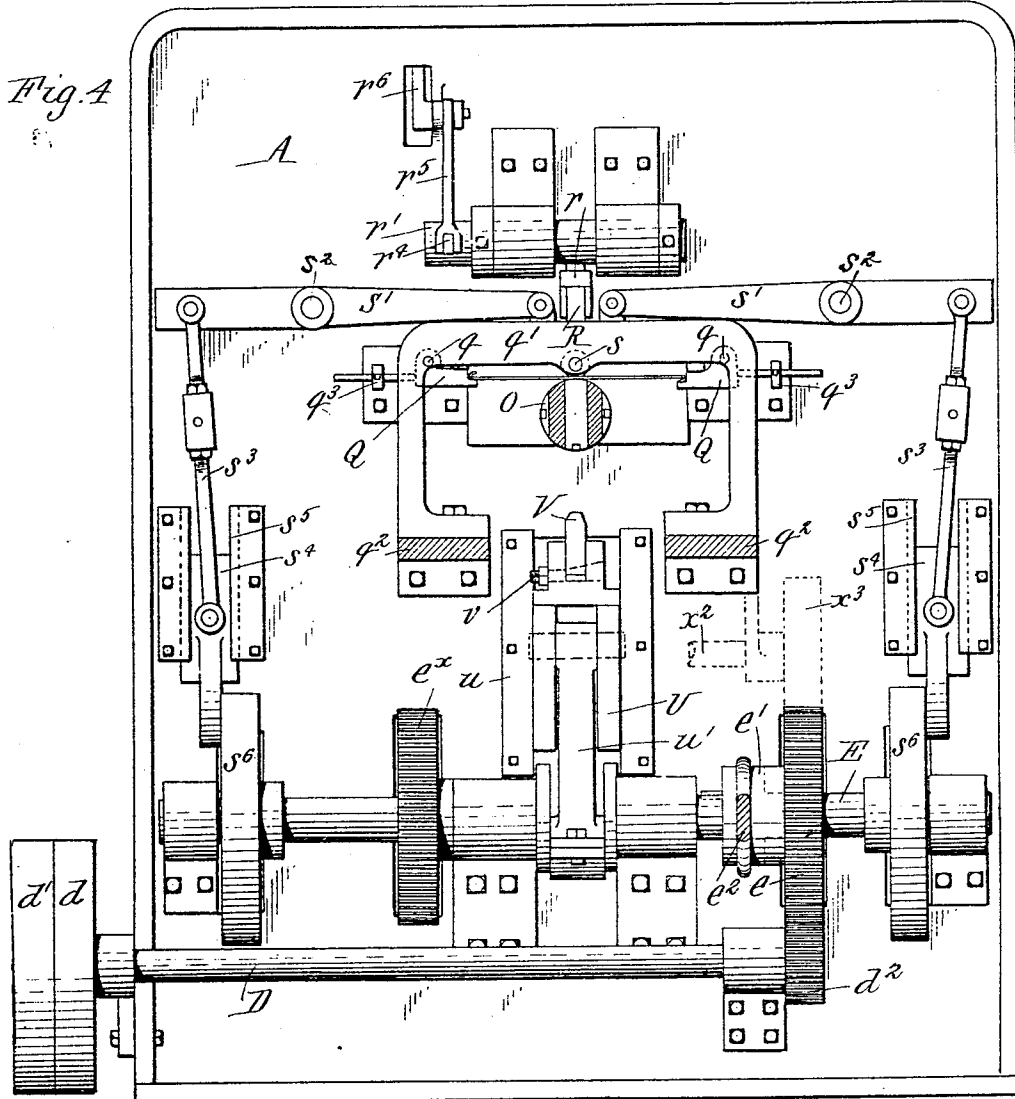
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E. A. Volk. }
R. W. Gurner. } Witnesses: P. William Cameron Inventor.
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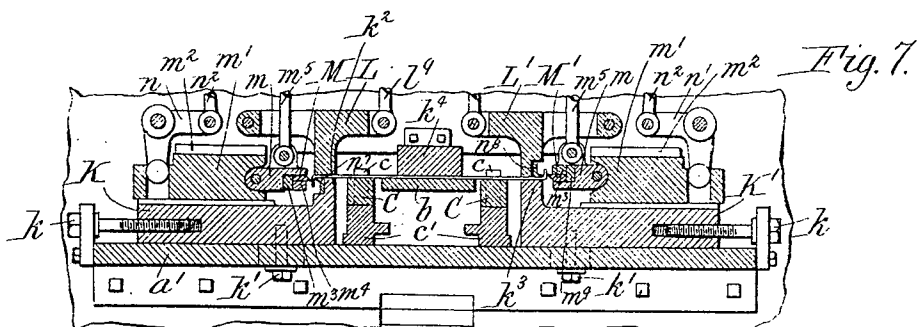
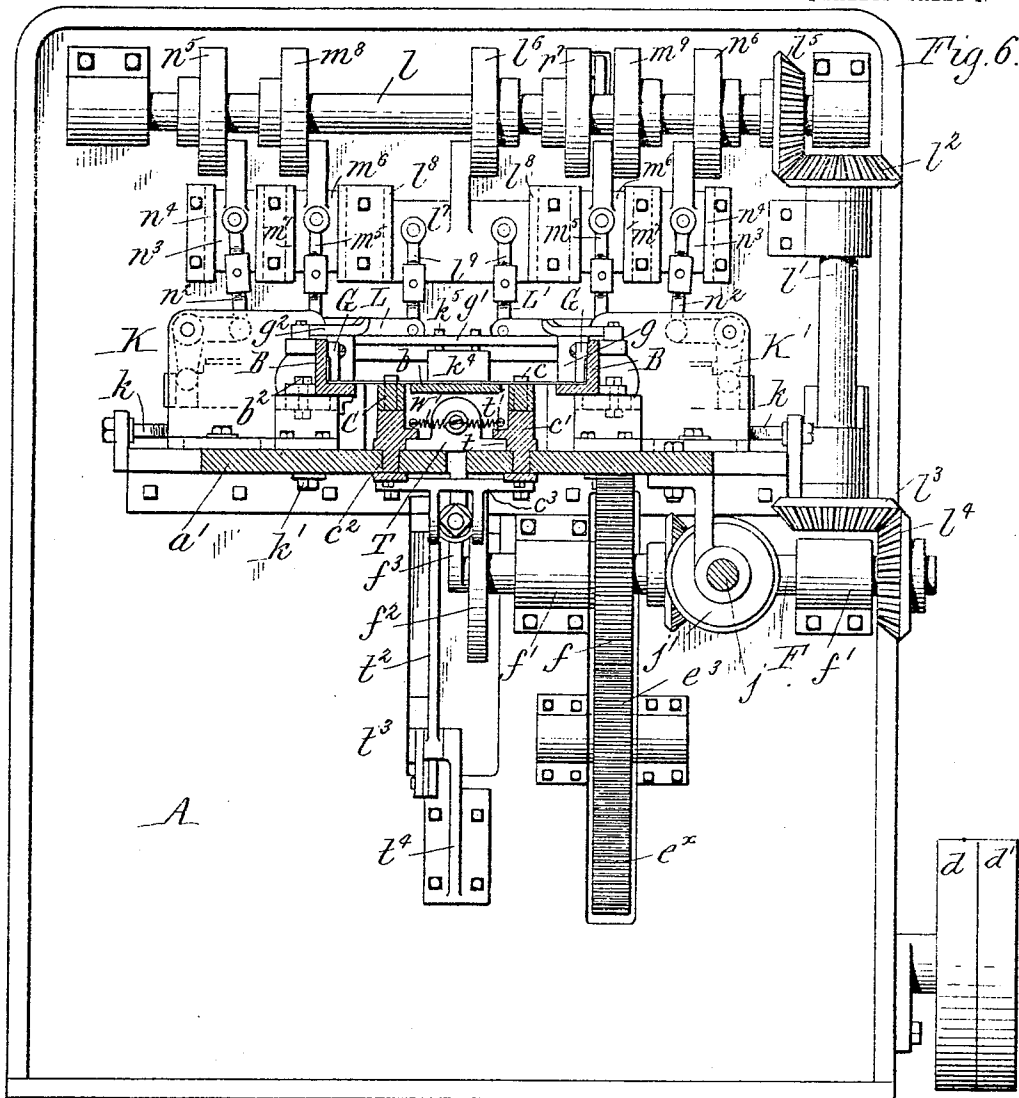
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4 SHEETS—SHEET 4.



E. A. Volk. } Witnesses:
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By Wilhelm Sommer Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM CAMERON, OF CHICAGO, ILLINOIS, ASSIGNOR TO TORRIS WOLD,
OF CHICAGO, ILLINOIS.

MACHINE FOR MAKING CAN-BODIES.

No. 813,772.

Specification of Letters Patent.

Patented Feb. 27, 1906.

Application filed May 22, 1903. Serial No. 158,310.

To all whom it may concern:

Be it known that I, WILLIAM CAMERON, a citizen of the United States, and a resident of Chicago, in the county of Cook, in the State of Illinois, have invented new and useful Improvements in Machines for Making Can-Bodies, of which the following is a specification.

This invention relates to a machine for making sheet-metal can-bodies or tubes of that kind in which the meeting longitudinal edges of the sheet forming the body or tube are joined by interlocked seam-hooks formed on the edges of the sheet. The machine is of that type in which the sheet-metal blanks from which the can-bodies are formed are conveyed to an edging mechanism in which the opposite longitudinal edges of the blank are bent to form oppositely-projecting seam-hooks and are then conveyed to a forming mechanism in which the blanks are bent by forming-jaws into tubular form around an expanding forming-horn with these seam-hooks overlapped, the seam-hooks being interlocked by expanding the horn and the interlocked seam-hooks pressed or hammered to tightly close and complete the seams, after which the bodies are removed from the forming-horn ready to have the seams soldered.

The object of the invention is to provide a rapid, efficient, and desirable machine of this character which is of simple, strong, and inexpensive construction.

In the accompanying drawings, consisting of four sheets, Figure 1 is a plan view of a can-body-making machine embodying the invention. Fig. 2 is a central vertical sectional elevation thereof. Fig. 3 is a fragmentary horizontal section, on an enlarged scale, through the expanding-horn and associated parts. Fig. 4 is a front sectional elevation of the machine. Fig. 5 is a fragmentary sectional elevation showing the body-forming mechanism. Fig. 6 is a transverse sectional elevation in line 6 6, Fig. 2. Fig. 7 is a transverse sectional elevation of the edging mechanism.

Like letters of reference refer to like parts in the several figures.

The main frame of the machine, which may be of any suitable construction, comprises in the form shown in the drawings a main upright standard or casting A, an upright transverse standard a , arranged in rear of the casting A, and a horizontal bed-plate a' , which

connects and is supported by said standards. The body-blanks are fed successively to a horizontal support on the bed in position to be carried forward to the edging mechanism by a primary conveyer. The blank-support consists of parallel horizontal side and center rails B b , secured to supporting-blocks on the bed. The side rails B are provided with upright flanges b' , between which the blanks are placed and guided and which are adjustably secured by bolts b^2 or in any other manner permitting the side rails to be adjusted nearer to or farther from each other to accommodate blanks of different widths.

The primary conveyer for carrying the body-blanks to the edging mechanism is constructed as follows: C represents horizontal reciprocating feed-bars arranged parallel with and between the center and side rails of the blank-support. The bars are provided with feed-dogs c , which are pivoted to swing vertically in openings in the feed-bars, the rear ends of the dogs being weighted, so as to hold the front ends thereof up above the tops of the feed-bars in position to engage the rear edges of the body-blanks to move the same forwardly on the blank-supports in the forward movements of the feed-bars. When the bars move rearwardly, the front ends of the dogs are depressed by engagement with the blanks and pass beneath the blanks. The feed-bars are secured to horizontally-reciprocating slides c' , which are provided with depending reduced portions or ribs which engage and work in longitudinal slots c^2 in the bed-plate. (See Fig. 6.) The slide-bars c' are connected beneath the machine-bed by a head or yoke c^3 .

The feed-bars are reciprocated by the following mechanism: D, Figs. 2 and 4, represents a horizontal drive-shaft which is journaled in suitable bearings on the front side of the main standard and is provided at one end with the usual tight and loose drive-pulleys d d' . The drive-shaft is provided at its inner end with a gear-wheel d^2 , which meshes with and drives a gear-wheel e , loose on a horizontal shaft E, hereinafter termed the "hammer-shaft," which is journaled in suitable bearings on the front side of the main standard above the drive-shaft. The loose gear-wheel e is operatively connected with the hammer-shaft to drive the latter by a clutch of any suitable construction, which is op-

erated by a lever e^2 , which extends to a point within the reach of the operator. In the construction shown the clutch consists of a collar splined on the hammer-shaft and provided with teeth adapted to interlock with teeth on the gear-wheel e when the clutch-collar is moved toward said gear-wheel. A gear-wheel e^x , fixed to the hammer-shaft, extends through a hole in the main standard and meshes with and drives a gear-wheel e^3 , mounted on a shaft e^4 , which is supported in suitable bearings on the rear side of the main standard. The gear-wheel e^3 meshes with and drives a gear-wheel f , secured to a horizontal crank-shaft F, which is journaled in suitable bearings f' on the rear side of the main standard. The crank-shaft F is provided with a crank-disk f^2 , the wrist-pin of which is connected by a pitman or link f^3 with the head connecting the feed-bar slides.

G represents swinging dogs which are pivoted at their upper ends to the upright flanges of the side rails of the blank-support, with their lower free ends adapted to engage the body-blanks to hold the latter from rearward movement during the rearward movement of the feed-bars.

g represents bent clamp-springs, which are secured at their upper ends to a cross-bar g' , which is seated in notches in the vertical flanges of the side rails of the blank-support and retained therein by horizontally-swinging arms g^2 , pivoted on the side rails. The free forwardly-extending ends of the clamp-springs bear on the tops of the blanks at their opposite sides and press them firmly down on the supporting-rails. These clamp-springs arrest the blanks before they enter the edging mechanism and prevent the blanks from being thrown partially into the edging mechanism by the primary conveyer when the machine is operated rapidly.

The can-body blanks can be placed successively upon the blank-support in position to be engaged and carried forward by the primary conveyer; but as it requires great exertion and rapidity on the part of the person feeding the machine to supply the blanks fast enough for the machine when in rapid operation a feed mechanism is shown for supplying the blanks to the primary conveyer. The attendant supplies sheets long enough to produce several body-blanks to the feeding mechanism, which is provided with a cutter or shears by which the long sheets are cut into blanks of the proper size for the bodies, these blanks being fed to the primary conveyer by the feed mechanism. The latter is constructed as follows: Two pair of feed-rolls H H' are journaled in a suitable upright frame h on the bed of the machine. The upper roll of each pair bears in boxes which are movable vertically in guides or ways h' in the sides of the frame h and is pressed toward the lower roll, so as to grip the sheet between the

rolls by springs h^2 . The tension of the springs is adjusted to exert the desired pressure on the rolls by adjusting-screws h^3 . The rolls are driven by any suitable mechanism. For instance, a horizontal shaft I is journaled beneath the machine-bed and is provided with a sprocket-wheel i , around which and a sprocket-wheel i' on the journal at one end of each of the lower rolls runs a sprocket-chain i^2 . The upper rolls are driven from the lower rolls by intermeshing gear-pinions on the journals for the upper and lower rolls, respectively. The shaft I is driven from the crank-shaft F by a longitudinal shaft j , provided with bevel-gears j' j^2 , meshing with bevel-gears on the crank-shaft and shaft I.

j^3 represents a vertical cutting-plate which is arranged between the two pairs of feed-rollers. The cutting-plate is provided with a horizontal opening on the plane of the spaces between the rollers of each pair through which the sheet passes.

j^4 is a knife or cutter which is mounted to reciprocate vertically in ways j^5 on the rear standard. The knife is moved across the opening in the cutting-plate and cuts the sheet by a shearing action in a well-known manner. The knife is reciprocated by a cam j^6 , secured to the shaft I and provided with a cam-groove, into which projects a stud or roller secured to an arm projecting from the knife.

j^7 represents a stationary vertical plate arranged in front of the front pair of rollers and provided with a guide-opening through which the blanks pass, and j^8 is a gage-plate which is mounted to reciprocate vertically in suitable guides on the frame of the feed mechanism. The lower end of the gage-plate is connected to one end of a lever g , which is pivoted intermediate of its ends to the bed of the machine and is connected at its opposite end to the reciprocating knife, thus causing the gage-plate to move oppositely to the direction of movement of the knife. The front edge of the long sheet is placed by the operator between the rolls of the rear pair, which grip the sheet and move it forwardly while the knife is down until the front edge of the sheet contacts with the gage-plate and is thereby arrested, the rollers slipping to permit the stoppage of the sheet. The knife thus rises and severs a blank from the sheet and the gage lowers out of the path of the blank, which is moved forwardly by the front pair of feed-rolls and dropped on the blank-support in position to be engaged and moved forwardly by the rear pair of feed-dogs on the primary conveyer. The knife then lowers, the gage-plate rises, and the rear pair of feed-rolls feed the remainder of the sheet forwardly against the gage-plate. A blank is thus cut and dropped on the blank-support prior to each forward movement of the primary conveyer.

The edging mechanism which forms the seam-hooks on the opposite longitudinal edges of the body-blank is constructed as follows, (see particularly Figs. 6 and 7:) K K' represent edger frames or boxes, in which the edging mechanism is mounted. These frame are supported on the bed and provided with adjusting-screws k for operating the frames nearer to or farther from each other to properly operate upon blanks of different widths. The frames are secured when adjusted by clamping-bolts or the like k' . The edger-frames are provided at their inner ends with horizontal supports $k^2 k^3$ for the side edges of the blank. These supports are arranged in front of the side rails of the blank-support, with their top faces on the horizontal plane of the supporting-faces of the side rails of the blank support. The blank is moved onto the supports of the edger-frames, where it is temporarily held by a weight k^4 , Fig. 2, arranged between the two edger-frames. The weight k^4 rests upon the center rail of the blank-support and is provided at its rear end with vertical pins k^5 , which engage loosely in holes in the cross-bar g' . The rear end of the weight is beveled, so that the blank can pass under the weight which holds the blank in proper position in the edging mechanism until it is firmly clamped by the clamping-levers of the edging mechanism. L L' represent the clamping-levers, which are pivoted, respectively, to the edger-frames K K' and are provided with depending clamping portions located above the supports $k^2 k^3$ of the edger-frames and between which and said supports the blanks are firmly held by the clamping-levers while the hooks are being formed.

The clamping-levers are operated to clamp and release the blanks by the following mechanism: l represents a horizontal shaft journaled in suitable bearings on the rear side of the main standard above the edging mechanism. This shaft, which is hereinafter termed the "edger-shaft," is driven from the crank-shaft F by a vertical shaft l' , journaled in suitable bearings on the main standard and provided at its opposite ends with bevel gear-wheels $l^2 l^3$, which intermesh with bevel gear-wheels $l^4 l^5$, secured, respectively, to the crank-shaft F and the edger-shaft l . The edger-shaft is provided with a cam l^6 , having a cam-groove into which projects a stud or roller secured to an arm projecting from a slide l^7 , which is mounted to reciprocate vertically in suitable ways l^8 on the main standard. The slide l^7 is connected to the inner ends of the clamping-levers by links l^9 , which are preferably adjustable in length. M M' represent the hook-forming tools which are secured to vertically-swiveling levers m , pivoted at their outer ends on slides m' , arranged to slide horizontally toward and from each other in ways m^2 on the lower portions of the edger-frames. When the blank is fed into the edging mechanism,

the hook-forming tool M stands above and the tool M' below the adjacent edges of the blank. The hook-forming levers are provided with adjustable gage-pieces $m^3 m^4$, respectively, which in the normal position of the levers engage and properly center the blank on the supports of the edger-frames. The hook-forming levers are connected by adjustable links m^5 to slides m^6 , arranged to reciprocate vertically in ways m^7 on the main standard. The slides are provided with projecting arms which carry studs or rollers which project into cam-grooves formed in cams $m^8 m^9$, secured to the edger-shaft. These cam-grooves are so shaped that the hook-forming tools are moved simultaneously in opposite directions, one up and the other down.

$n n'$ represent bell-crank levers which are pivoted at their angles on the edger-frames. The bell-crank levers have depending arms, which engage in slots in the slides carrying the hook-forming tools, and horizontally-projecting arms, which are connected by adjustable links n^2 to slides n^3 , mounted to reciprocate vertically in ways n^4 on the main standard. The slides n^3 are provided with projecting arms, which carry studs or rollers, which project into cam-grooves formed in cams $n^5 n^6$, secured to the edger-shaft. The cam-grooves of the cams $n^5 n^6$ are so shaped that the slides are moved simultaneously toward and from each other. The body-blank is fed into the edging mechanism by the primary conveyer and is left on the supports of the edger-frame with one edge overhanging a beveled lip n^7 on the support of the edger-frame K and the other edge projecting beyond a beveled lip n^8 on the clamping-lever L'. The clamping-levers are then lowered by their described operating means and firmly grip and hold the blank. The cams for the hook-forming tools then operate to move the tool M downwardly and the tool M' upwardly, so as to bend the edges of the blank, one down and the other up, as shown in Fig. 7. The slides carrying the hook-forming tools are then moved toward each other by their cams, so that the hook-forming tools bend the partially-formed hooks inwardly over the beveled lips on the support of the edger-frame K and the clamping-lever L' to complete the hooks. The slides are then separated, the hook-forming levers returned to their initial position, and the clamping-levers raised to release the can-body blank, which is then moved forwardly by the primary conveyer to the body-forming mechanism.

The body-forming mechanism comprises a stationary expanding forming-horn, swinging jaws which shape or bend the blank around the horn to conform to the shape of the latter with the seam-hooks overlapped, means for expanding the horn to interlock

the seam-hooks, and a hammer for pressing the hooks to complete or close the seam.

The forming-horn projects forwardly from the main standard beneath the path of the blank as it is fed forwardly from the edging mechanism through a suitable opening in the main standard. The horn comprises a stationary section O, which is provided at its rear end with a shank passing through a hole in the main standard and secured to the latter and to the bed-plate, and a swinging expanding-wing O', which is hinged at its upper edge to the stationary section and adapted to swing away therefrom to expand the can-body for the purpose of interlocking the seam-hooks. The lower side of the stationary section of the horn is provided with a longitudinal groove which receives the seam when the latter is pressed by the hammer. The expanding-wing is moved outwardly by an expanding-pin P, which is movable longitudinally in an axial hole in the stationary section of the horn and is provided with inclined faces p , adapted to engage pins p' , projecting inwardly from the expanding-wing. The expanding-pin is moved longitudinally by mechanism hereinafter described.

Q, Figs. 4 and 5, represent supports which hold and guide the side edges of the hooked blank when it is moved forwardly to the body-forming mechanism. These supports are arranged at opposite sides of the horn to swing on shafts q , secured at one end to the main standard and at the other end to a frame q' , supported by horizontal bars q^2 , secured at their rear ends to the main standard and at their front ends to means not shown. The supports Q are provided at their inner edges with lips or flanges which are normally held substantially on the horizontal plane of the top faces of supports on the edger-frames by counterbalancing-weights q^3 , secured to the supports Q. When the body-blank is moved into the body-forming mechanism, it rests upon the forming-horn and swinging side supports in a substantially horizontal plane, as indicated in Fig. 4. R represents a clamping-block which is arranged above the horn and is movable vertically in a guide-opening in a bracket r , projecting forwardly from the main standard. The rear lower corner of the clamping-block is beveled, and when the blank is moved into the body-forming mechanism it lifts the clamping-block, the weight of which prevents the blank from being thrown beyond the forming-horn by the primary conveyor. The clamping-block is positively forced downwardly to clamp the blank between the same and the horn by a rock-shaft or roller r' , which is journaled in suitable bearings on the main standard above the clamping-block and is provided with inclined faces r^2 , adapted to engage inclined faces on an upwardly-projecting portion r^3 of the

clamping-block. The rock-shaft is provided at one end with a rock-arm r^4 , connected by a link r^5 with one arm of a lever r^6 , which is pivoted on the main standard with its other arm extending through a hole in the standard and provided with a stud or roller which engages in a cam-groove in a cam r^7 , secured to the edger-shaft. The lever is rocked by this cam and oscillates the rock-shaft r' to clamp the blank at the proper time.

S represents the swinging jaws for bending the blank into body form around the horn. These jaws are pivoted to a shaft s , which is secured at its rear end to the main standard and at its forward end to the yoke or frame q' . The forming-jaws are connected by links to the inner ends of levers s' , which are pivoted on pins s^2 , projecting from the main standard, and are connected at their outer ends by adjustable links s^3 to slides s^4 , mounted to reciprocate vertically in suitable ways s^5 on the front side of the main standard. The slides are provided with projecting arms which carry studs or rollers projecting into cam-grooves formed in cams s^6 , secured to the hammer-shaft E. These cams s^6 , through the medium of the slides, levers, and connecting-links, swing the forming-jaws downwardly toward each other, so as to embrace the horn and bend the blank around the same. The link connecting one of the levers with its operating-slide is so adjusted that said jaw moves somewhat in advance of the other for the purpose of insuring the proper overlapping of the seam-hooks. When the forming-jaws engage the blank and force the sides of the same downwardly, the swinging side supports for the blank tilt, as indicated in Fig. 5, until the edges of the blank disengage the supporting lips or flanges on the side supports.

The horn-expanding pin is reciprocated to expand the horn and cause the overlapped seam-hooks of the blank to interlock by the following mechanism: T represents a slide which is movable horizontally in ways t , formed by the bed-plate and horizontal ribs t' on the slides c' of the primary conveyor. The rear end of the expanding-pin P is secured to the slide T in any suitable manner. The latter is provided with a depending lug which passes through a slot in the bed-plate and is connected to one arm of a bell-crank lever t^2 , which is pivoted at t^3 on a bracket t^4 , projecting rearwardly from the main standard. The other arm of the bell-crank lever is connected to a fixed arm on a slide U, which is mounted to reciprocate vertically in suitable ways u on the main standard. This slide, which constitutes the movable support for the hammer which closes the body-seam, is reciprocated by a pitman u' , connected to the slide-head and to a crank on the hammer-shaft E. When the hammer-slide is raised to press the seam and before it strikes the seam, the expanding-pin is moved rearwardly

by the described connections, and its inclined faces engage the pins on the expanding-wing of the forming-horn, thereby moving the latter outwardly so as to expand the can-body and cause the seam-hooks to interlock.

While the horn and can-body are maintained in their expanded condition, the hammer V on the hammer-slide strikes the interlocked hooks, pressing or closing the seam and forcing the latter inwardly into the groove in the bottom of the forming-horn in the usual manner. The hammer is preferably adjustable on the hammer-slide by means of ordinary adjusting-wedges v. While the hammer V is shown as a separate block on the supporting-slide U, it moves with and is, in effect, a part of the slide, and it need not be a separate part.

W, Figs. 3 and 6, represents stripping fingers or devices for moving the can-body off of the forming-horn. These fingers are pivoted intermediate of their ends on vertical pivot-pins w, secured to the slide carrying the expanding-pin, on opposite sides of the latter. The rear ends of the stripping-fingers are connected by a spring or springs w' to the rear end of the horn-expanding pin or other suitable part movable with the slide T. The springs tend to draw the rear ends of the stripping-fingers together and spread or separate the front ends thereof. The inward movement of the rear ends of the stripping-fingers and outward movement of their front ends is limited by adjustable stop-screws w² on the slide T. The forward portions of the stripping-fingers work in longitudinal grooves in opposite sides of the forming-horn and are surrounded by the can-body when the latter is formed on the horn. When the horn-expanding pin is moved rearwardly and the seam has been pressed by the hammer, the front ends of the stripping-fingers are drawn rearwardly out of the can-body and are spread by the springs w', so that when the stripping-fingers move forwardly upon the downward movement of the hammer-slide the front ends of the fingers engage the rear end of the can-body and push the latter off of the forming-horn. The expanding-pin and stripping-fingers are carried by the same slide and move together, the expanding-pin acting to expand the forming-horn on the rearward movement of the slide and the stripping-fingers acting to push the body off of the forming-horn upon the forward movement of the slide.

When the body is shoved off of the forming-horn, it passes onto the horn or body support of the soldering mechanism, the front end of which horn is shown at x. The body is then in position to be engaged by the conveyer-dogs x' of the conveyer for the soldering mechanism and moved forwardly past the soldering devices. The soldering mechanism

and its conveyer are not fully shown in this application, but are fully shown and described in my application for United States Letters Patent filed on the 16th day of April, Serial No. 152,867. It is only necessary for an understanding of the present machine to state that the conveyer of the soldering mechanism is operated from a shaft x², which is driven by a gear-wheel x³ on said shaft meshing with the loose gear-wheel e, secured to the hammer-shaft. This wheel is driven positively from the drive-shaft D and the conveyer of the soldering mechanism continues in operation to feed the can-bodies forwardly on the soldering-horn when the clutch device e', before referred to, is operated to stop the body-forming mechanisms. In case a can-body becomes jammed in the edging or forming mechanisms or the machine becomes clogged for any reason it can be stopped by disengaging the clutch e' from the wheel e without stopping the conveyer for the soldering mechanisms, which thus carries the can-bodies past the soldering devices and prevents the burning of the bodies.

I claim as my invention—

1. The combination of an edging mechanism, a reciprocating conveyer for carrying the blanks to the edging mechanism, a feed mechanism comprising a movable gage, a cutter for dividing a sheet into blanks, feed-rolls for moving the sheet to the cutter, and feed-rolls for moving the blanks from the cutter to the reciprocating conveyer, substantially as set forth.

2. The combination of edging mechanism, a reciprocating conveyer for carrying the blanks to the edging mechanism, and a feed mechanism comprising a reciprocating gage, a reciprocating cutter for dividing a sheet into blanks, rolls for feeding the sheet to the cutter and gage, and rolls for moving the blanks to said reciprocating conveyer, substantially as set forth.

3. The combination of edging mechanism, a reciprocating conveyer for carrying the blanks to the edging mechanism, and a feed mechanism comprising a gage, a cutter for dividing a sheet into blanks, means for oppositely reciprocating said gage and cutter, a yielding roll frictionally engaging the sheet for feeding the same to the cutter and gage, and a yielding roll frictionally engaging the blanks for moving the same to said reciprocating conveyer, substantially as set forth.

4. The combination of a blank-support, an edging mechanism, a reciprocating blank-conveyer, means to engage the blanks to hold them from rearward movement, a cross-bar arranged above said conveyer, yielding fingers which are secured to said cross-bar and bear on the blanks to hold the latter down on said support and from movement in advance of the conveyer-dogs, and a weight

loosely retained in position by said cross-bar for holding the blank in the edging mechanism, substantially as set forth.

5. The combination of an expansible forming-horn around which the body is formed, a horn-expanding device, and fingers for moving the body off of said forming-horn, said fingers being connected to and movable with said expanding device, substantially as set forth.

6. The combination of an expansible forming-horn around which the body is formed, a reciprocating horn-expanding device, fingers connected to said expanding device for moving the body off of said forming-horn, said expanding device acting to expand the horn when said device is moved in one direction and said fingers acting to move the body when said device is moved in the opposite direction, substantially as set forth.

7. The combination of an expansible forming-horn around which the body is formed, a horn-expanding device, fingers connected to move with said expanding device to move the body off of said forming-horn, and a single device for operating said expanding device and fingers, substantially as set forth.

8. The combination of an expansible forming-horn around which the hooked body-blank is shaped, a device for expanding the horn to interlock the seam-hooks, fingers which move the body longitudinally along said horn, a movable support for a seam-closing hammer, means for operating said hammer-support, and operating means for said horn-expanding device and blank-moving fingers actuated by said hammer-support, substantially as set forth.

9. The combination of an expansible forming-horn around which the body is formed, a longitudinally-movable expanding-pin, longitudinally-arranged fingers which engage the body and move the same off of said forming-horn, a slide-head on which said expanding-pin and fingers are mounted, and means for reciprocating said slide-head, substantially as set forth.

10. The combination of an expansible forming-horn around which the body is formed, a longitudinally-movable expanding-pin, longitudinally-arranged fingers which work in grooves in said horn, means for spreading said fingers to engage the can-body to move the same off of the forming-horn, a slide-head on which said expanding-pin and fingers are mounted, and means for reciprocating said head, substantially as set forth.

11. The combination of a frame, an expansible forming-horn around which the body is

formed, a reciprocating conveyer for moving the blank to said forming-horn, fingers for engaging the body to move the same off of said forming-horn, a slide carrying said fingers, said slide working in ways formed by said frame and said reciprocating conveyer, substantially as set forth.

12. The combination of a frame, a forming-horn around which the body is formed, reciprocating feed-bars for moving the blank to said horn, slides carrying said feed-bars, guides in said frame in which said slides work, fingers which engage the body to move the same off of the forming-horn, and a slide-head carrying said fingers, said slide-head working in ways formed by said frame and the slides for said reciprocating feed-bars, substantially as set forth.

13. The combination of a frame, an expansible forming-horn around which the body is formed, reciprocating feed-bars for moving the blank to said forming-horn, slides for said feed-bars which reciprocate on said frame, an expanding device, fingers which engage the body to move the same off of said forming-horn, a slide-head on which said expanding device and fingers are mounted, said slide-head working in ways formed by said frame and said slides for the reciprocating feed-bars, substantially as set forth.

14. The combination of body-forming mechanism, a drive-shaft, a clutch device for coupling said drive-shaft with said forming mechanism, and an operating device for the conveyer of the soldering mechanism which is driven by said drive-shaft, whereby said body-forming mechanism can be stopped without stopping said operating device for the conveyer of the soldering mechanism, substantially as set forth.

15. The combination of a body-forming mechanism, a drive-shaft, gearing connecting said drive-shaft and body-forming mechanism including a loose gear-wheel, a clutch device for operatively connecting said loose gear-wheel to said drive-shaft and gearing connecting said drive-shaft to the conveyer of the soldering mechanism, whereby said body-forming mechanism can be stopped while said conveyer for the soldering mechanism continues in motion, substantially as set forth.

Witness my hand this 15th day of May, 1903.

WILLIAM CAMERON.

Witnesses:

LELAND A. BABCOCK,
GEORGE C. EDWARDS.