No. 665,088. Patented Jan. 1, 1901.

J. GOULD, JR.

CAN BODY MACHINE.

(Application filed Mar. 5, 1900.)

(No Model.) 9 Sheets—Sheet 1.

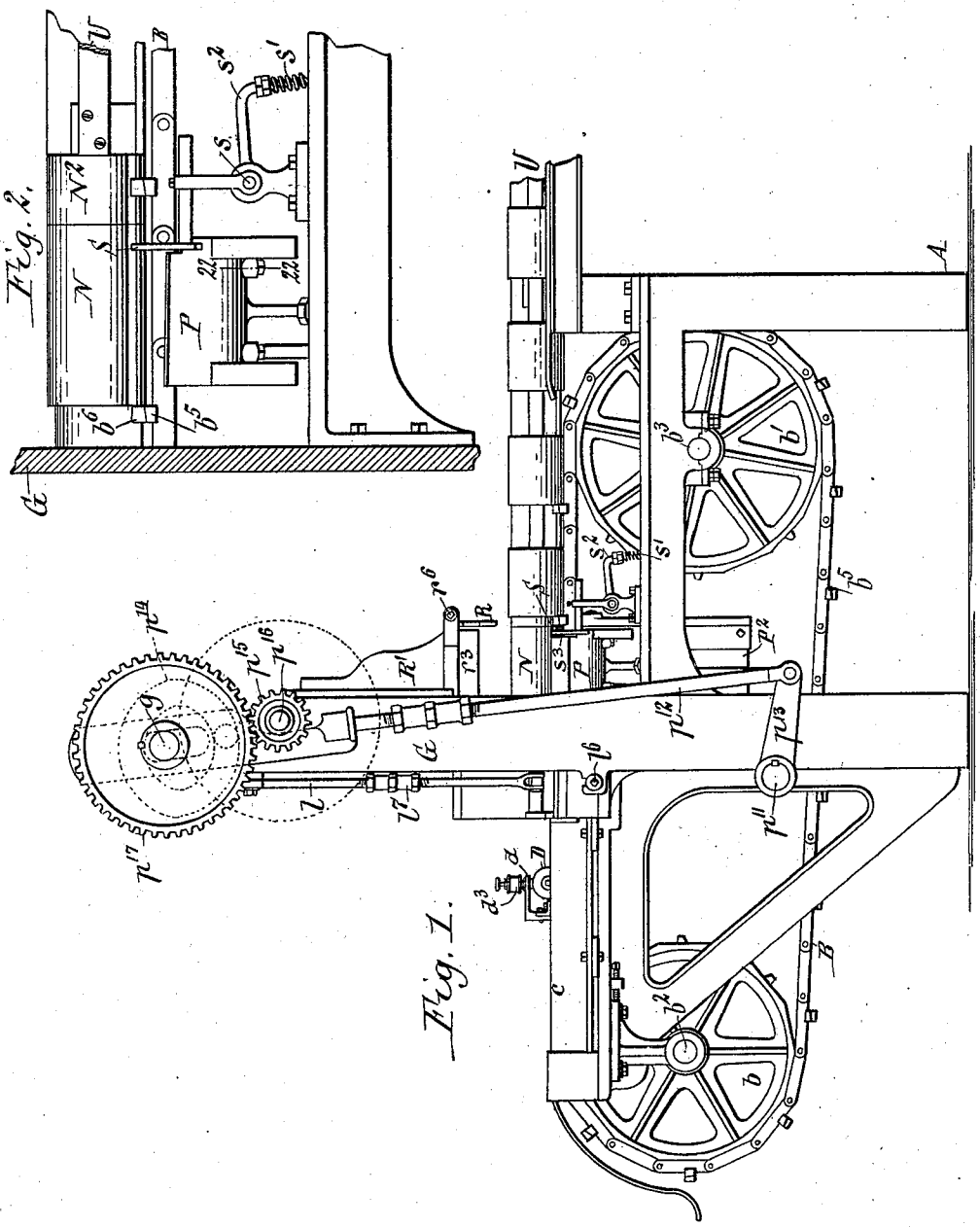


Fig. 2.

Fig. 1.

Witnesses:
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Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 665,088.

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9 Sheets—Sheet 2.

Fig. 4.

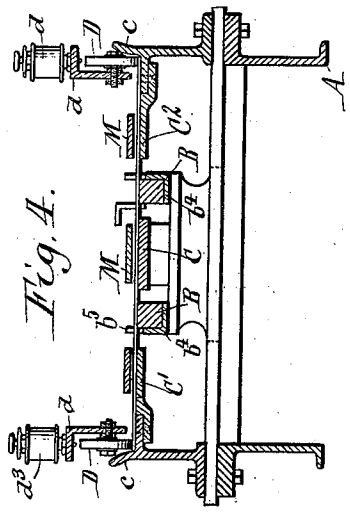


Fig. 3.

Witnesses:
E. A. Volk.
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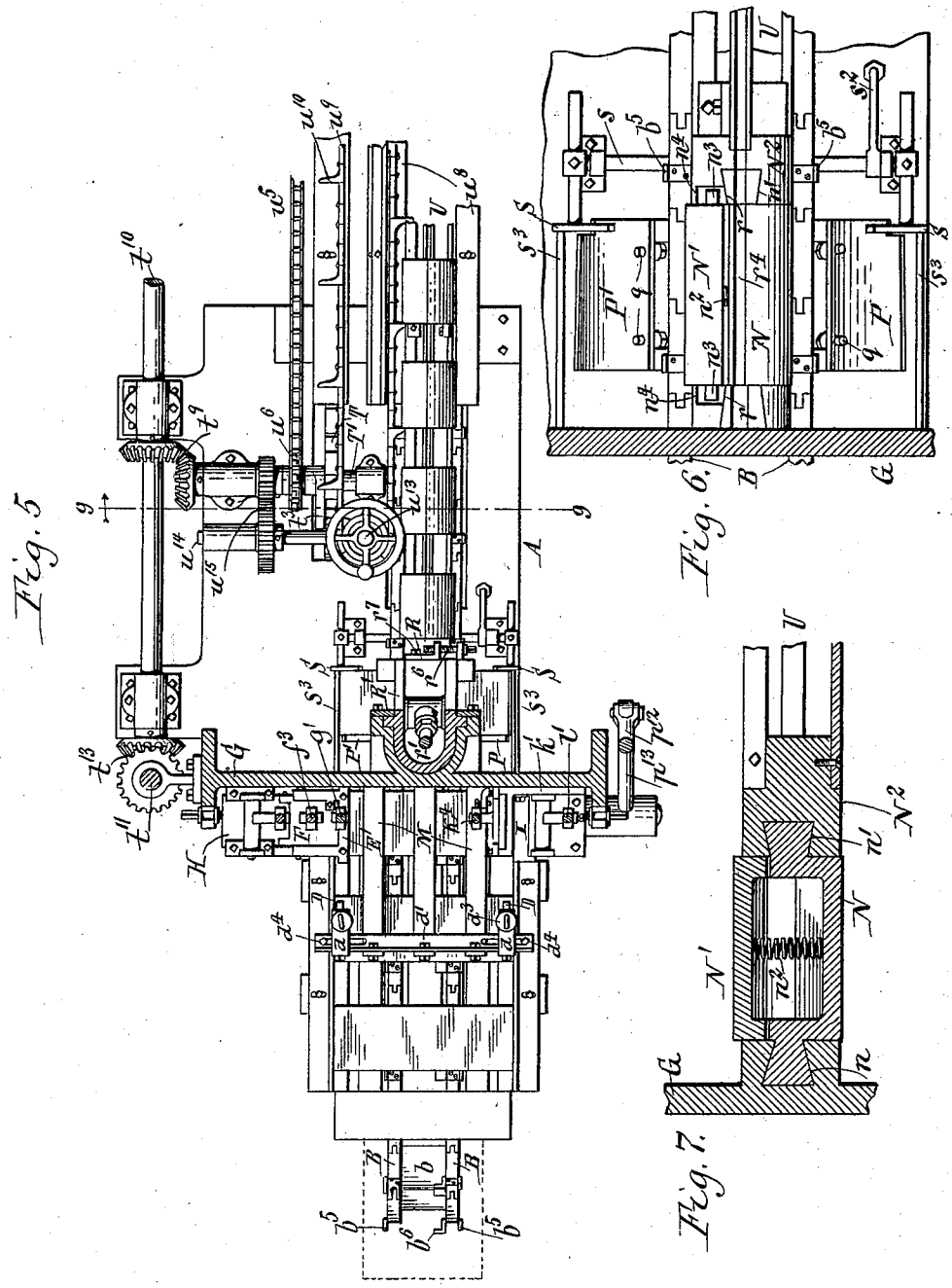


Fig. 5

Fig. 6.

Fig. 7.

Witnesses:
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F. F. Schenzinger

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(No Model.) 9 Sheets—Sheet 4.

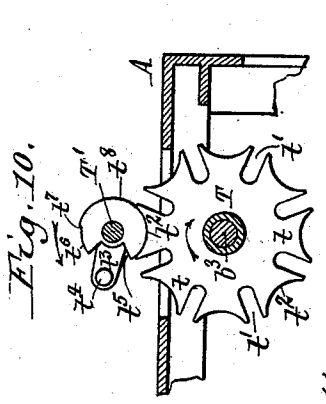


Fig. 10.

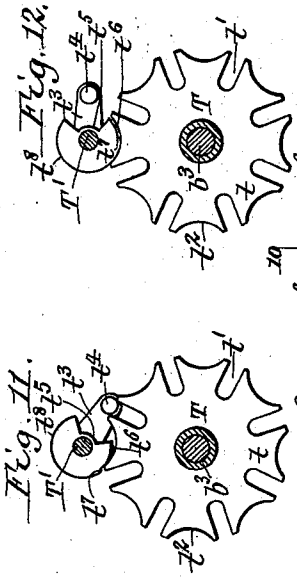


Fig. 12.

Fig. 11.

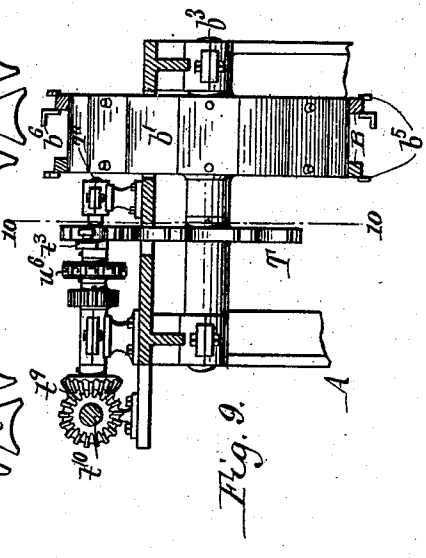


Fig. 9.

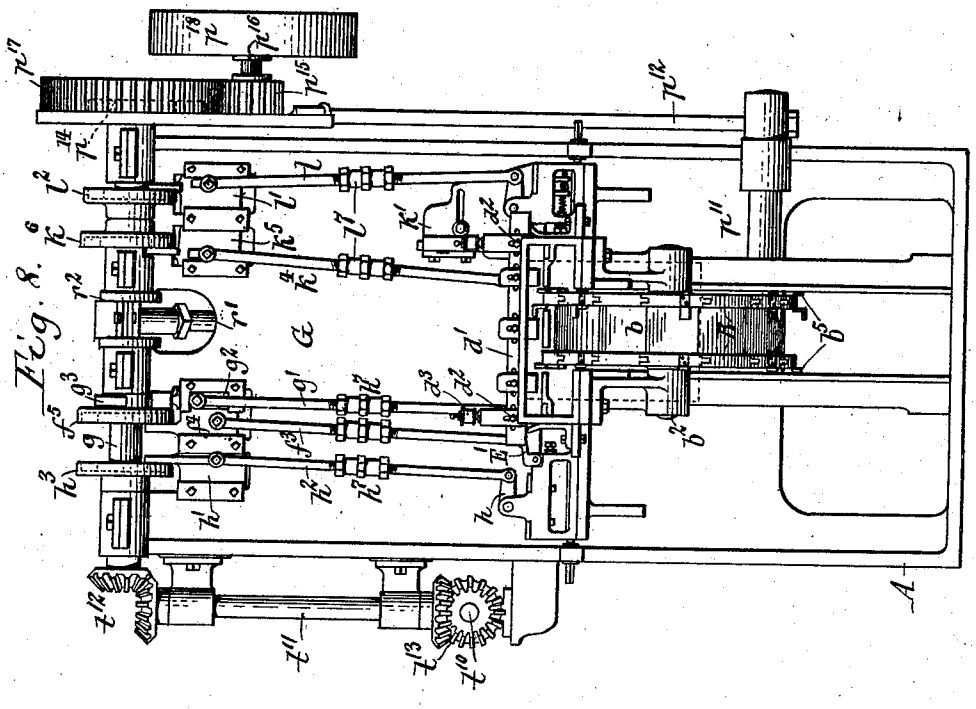


Fig. 8.

Witnesses:
C. A. Volk.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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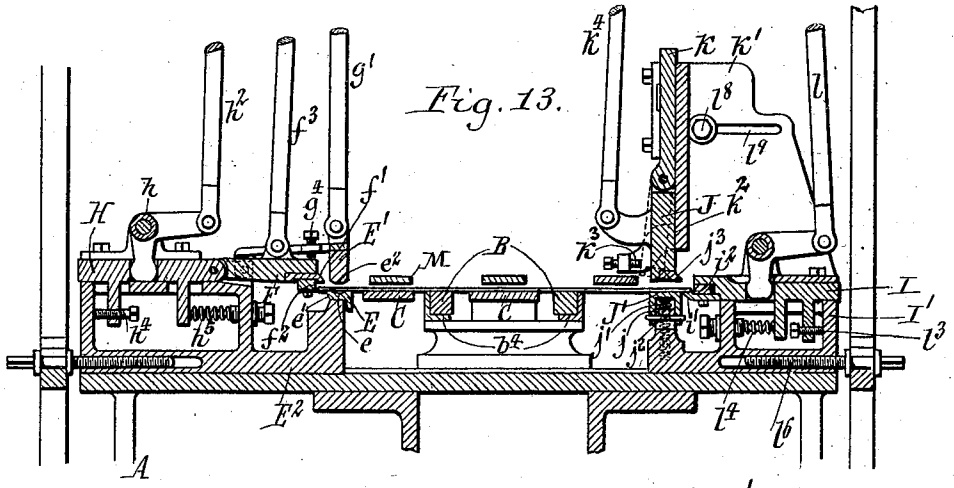


Fig. 13.

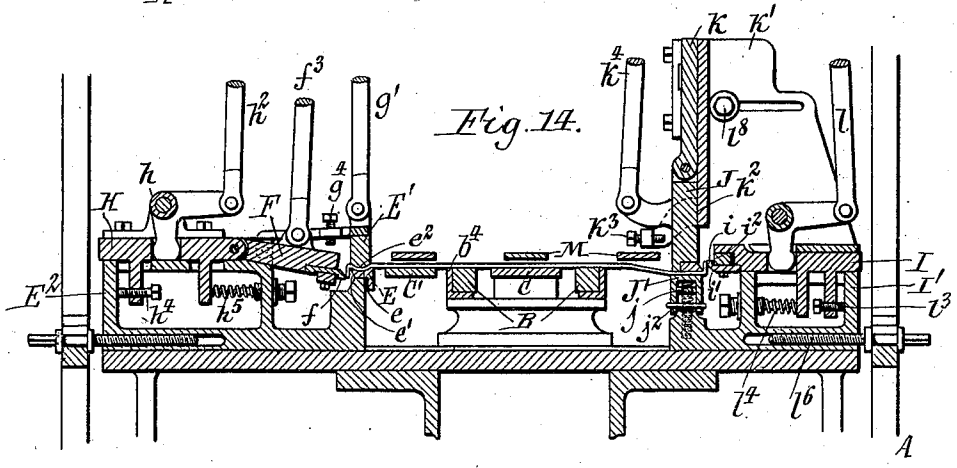


Fig. 14.

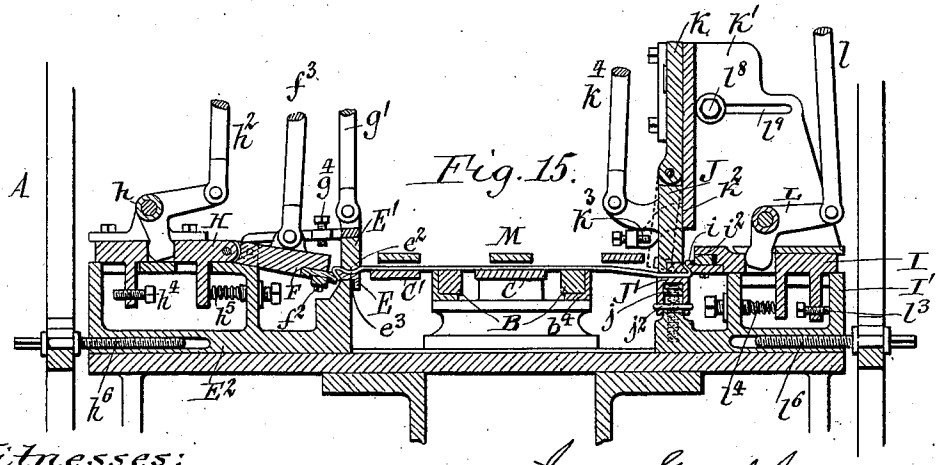


Fig. 15.

Witnesses:
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No. 665,088. Patented Jan. 1, 1901.

J. GOULD, JR.

CAN BODY MACHINE.

(Application filed Mar. 5, 1900.)

(No Model.) 9 Sheets—Sheet 6.

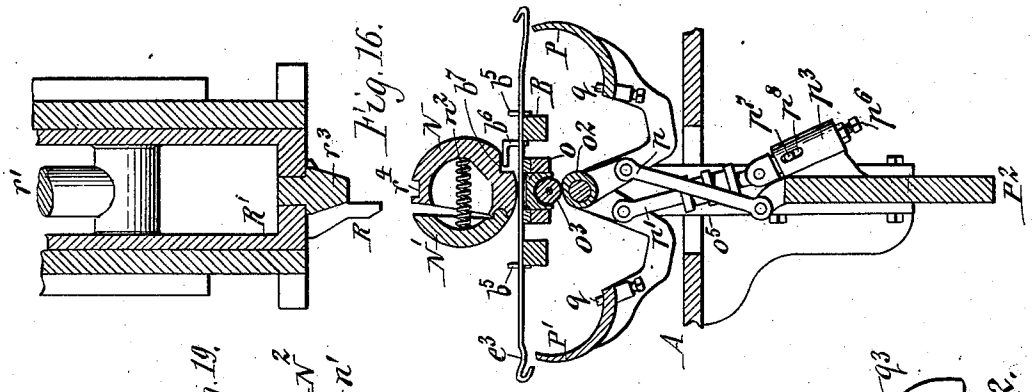


Fig. 16.

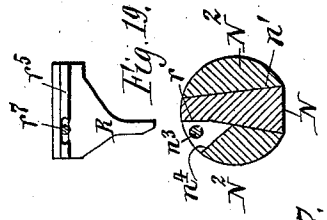


Fig. 19.

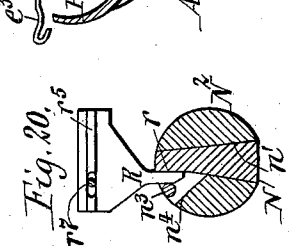


Fig. 20.

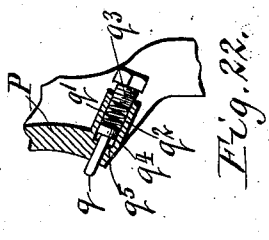


Fig. 22.

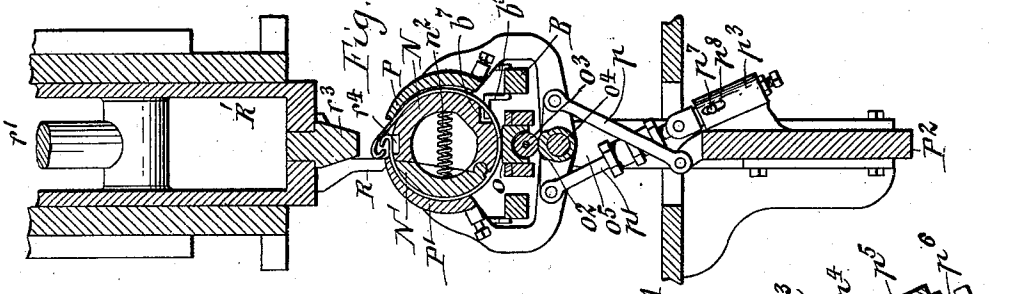


Fig. 17.

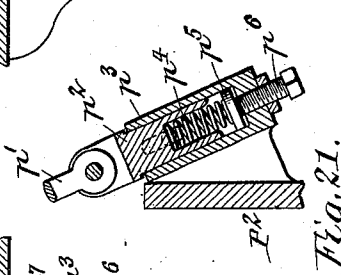


Fig. 21.

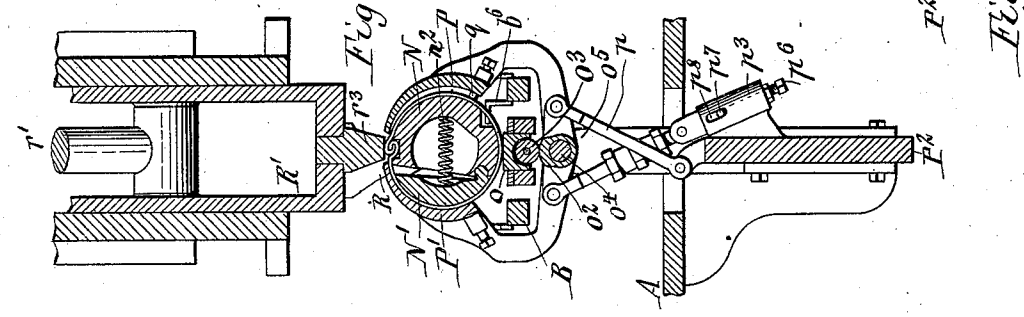


Fig. 18.

Witnesses:
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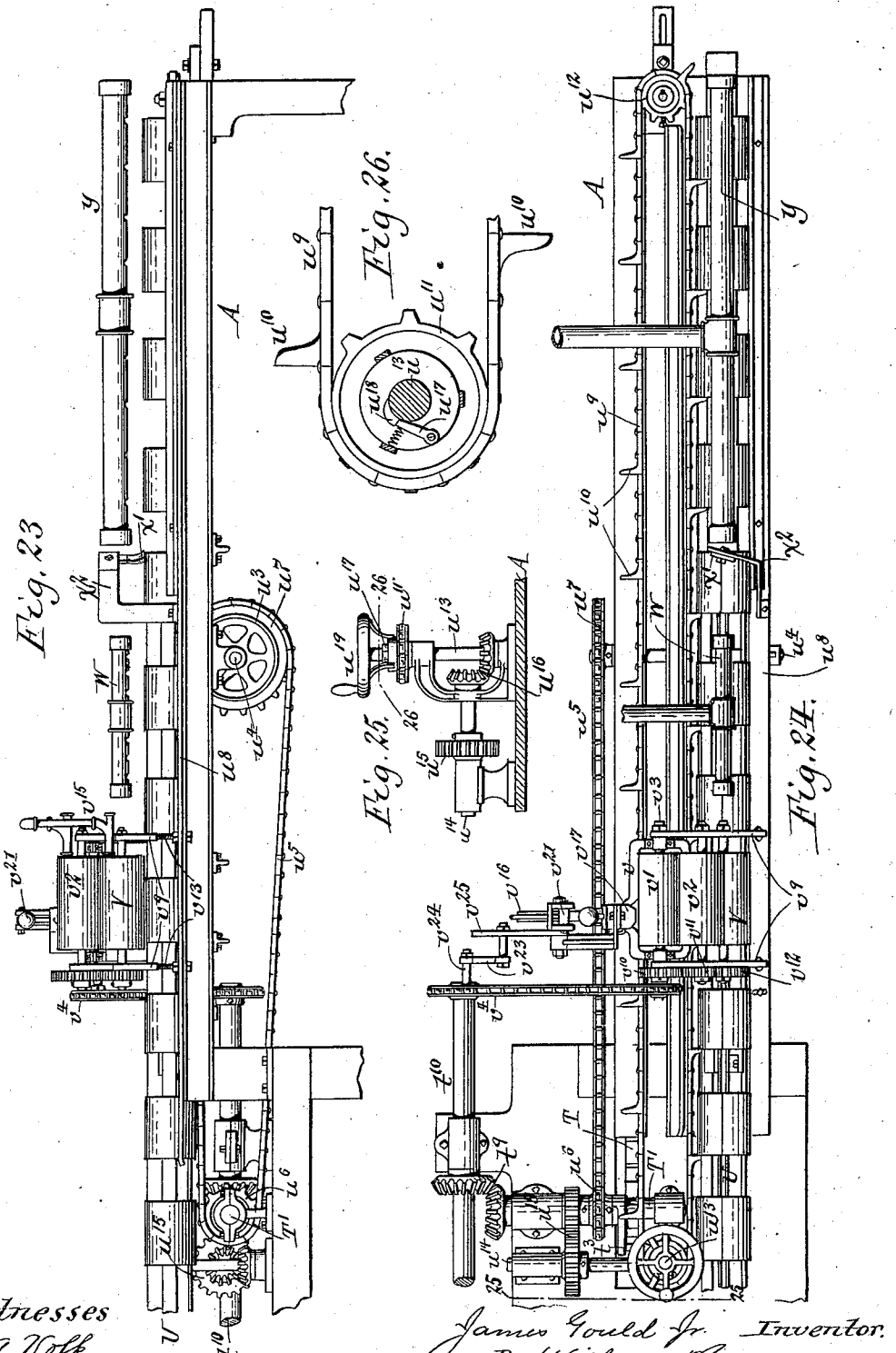
No. 665,088. Patented Jan. 1, 1901.

J. GOULD, JR.

CAN BODY MACHINE.

(Application filed Mar. 5, 1900.)

(No Model.) 9 Sheets—Sheet 7.



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J. GOULD, JR.

CAN BODY MACHINE.

(Application filed Mar. 5, 1900.)

(No Model.) 9 Sheets—Sheet 8.

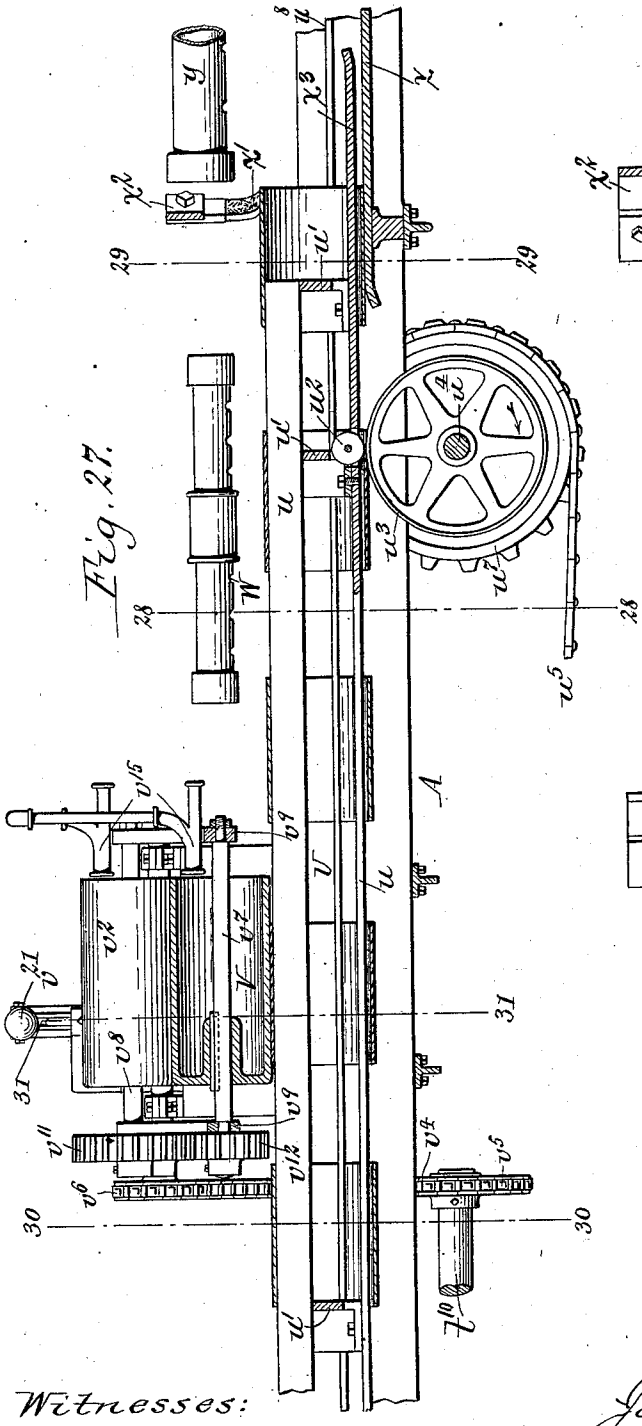


Fig. 27.

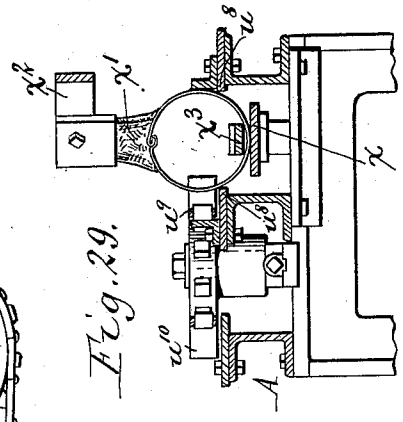


Fig. 29.

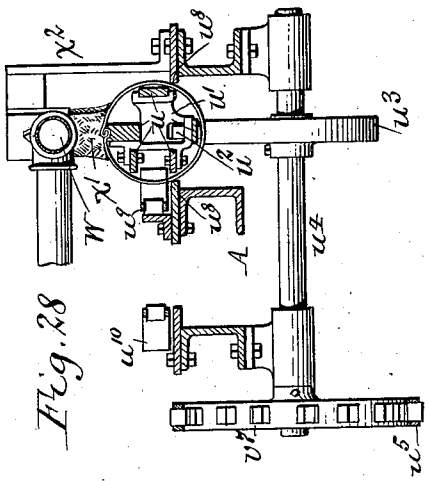


Fig. 28.

Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 665,088. Patented Jan. 1, 1901.

J. GOULD, JR.

CAN BODY MACHINE.

(Application filed Mar. 5, 1900.)

(No Model.) 9 Sheets—Sheet 9.

Fig. 30.

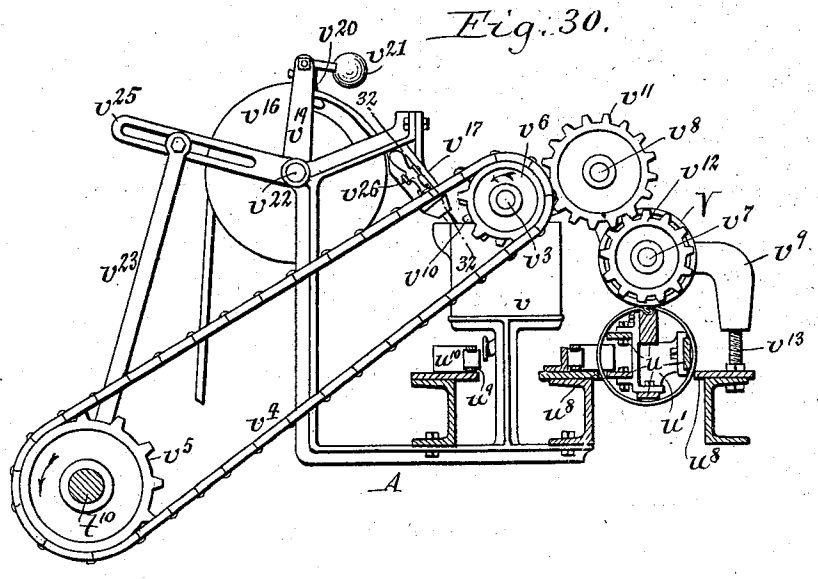


Fig. 31.

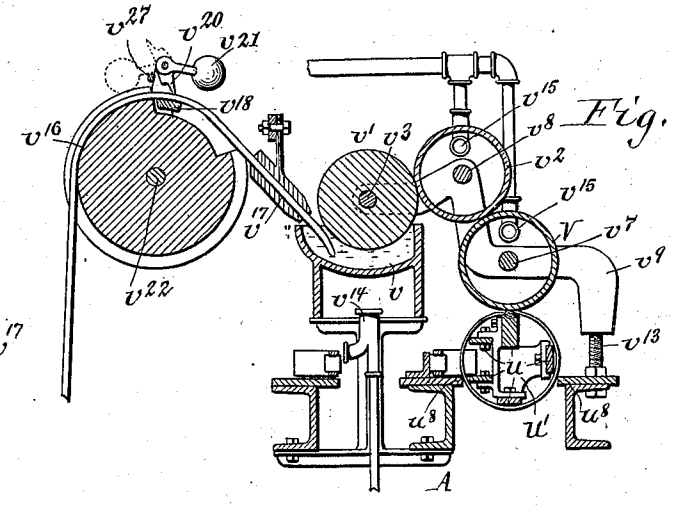
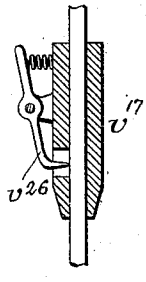


Fig. 32.



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Attorneys.

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UNITED STATES PATENT OFFICE.

JAMES GOULD, JR., OF BERKELEY, CALIFORNIA.

CAN-BODY MACHINE.

SPECIFICATION forming part of Letters Patent No. 665,088, dated January 1, 1901.

Application filed March 5, 1900. Serial No. 7,369. (No model.)

To all whom it may concern:

Be it known that I, JAMES GOULD, Jr., a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Improvements in Can-Body Machines, of which the following is a specification.

This invention relates to can-body machines which shape the bodies of tin cans and solder the seams of the same. In the operation of these machines the blanks are fed successively by the operator upon a primary conveyer, which carries each blank step by step past the shaping mechanism, whereby the blank is bent into cylindrical form and the ends of the same are secured together by an interlocking joint, forming a double seam. After the can-body has been thus formed the same is delivered to a secondary conveyer, which moves the same past the soldering mechanism, whereby the seam of the can-body is soldered.

The objects of this invention are to provide a simple and reliable fluxing device whereby liquid flux is applied uniformly to the edges of the blank, which are seamed and soldered together; to improve the construction of the mechanism whereby the blank is bent into cylindrical form and its hooks are interlocked; to provide a drive mechanism for the conveyer which causes the conveyer to move intermittently forward to feed the blank to the forming mechanism and backs up slightly after each forward movement, so that the conveyer clears the blank and does not interfere with the forming operation; to provide a soldering mechanism which applies the solder uniformly to the seam of the can-body; to improve the construction of the wiping device whereby the surplus solder is removed from the seams of the cans, and to provide means which permit the secondary conveyer, which carries the can-bodies past the soldering mechanism, to be operated by hand independent of the can-shaping mechanism when the latter is clogged, thereby preventing the can-bodies from being injured by the heat of the soldering-steel.

In the accompanying drawings, consisting of nine sheets, Figure 1 is a side elevation of the front or can-shaping part of the machine. Fig. 2 is a side elevation, partly in section, of the forming mechanism whereby the blank is bent into cylindrical form. Fig. 3 is a vertical longitudinal section of the front part of the machine. Fig. 4 is a vertical cross-section, on an enlarged scale, in line 4 4, Fig. 3. Fig. 5 is a horizontal section, on an enlarged scale, in line 5 5, Fig. 3. Figs. 6 and 7 are fragmentary horizontal sections in lines 6 6 and 7 7, Fig. 3, respectively. Fig. 8 is a front elevation of the machine Fig. 9 is a fragmentary vertical cross-section in line 9 9, Fig. 5. Fig. 10 is a vertical cross-section in line 10 10, Fig. 9, showing the position of the driving mechanism of the primary conveyer preparatory to moving the conveyer forward one step. Figs. 11 and 12 are similar views showing different positions of this driving mechanism. Fig. 13 is a fragmentary cross-section, on an enlarged scale, in line 13 13, Fig. 3, showing the position of the folding mechanism preparatory to operating upon a blank. Figs. 14 and 15 are similar views showing different positions of the folding mechanism while forming the seam flanges or hooks on the side edges of a blank. Fig. 16 is a fragmentary vertical cross-section, on an enlarged scale, in line 16 16, Fig. 3, showing the position of the forming mechanism preparatory to bending the blank into cylindrical form and seaming the edges of the same. Figs. 17 and 18 are similar sections showing different positions of the can-forming mechanism. Fig. 19 is a cross-section in line 19 19, Fig. 3, showing the means for expanding the forming-horn in its inoperative position. Fig. 20 is a similar view of the same parts in an operative position. Fig. 21 is a fragmentary vertical section in line 21 21, Fig. 3, showing the means whereby one of the forming-jaws is yieldingly connected with its actuating mechanism. Fig. 22 is a fragmentary vertical section, on an enlarged scale, in line 22 22, Fig. 2. Fig. 23 is a fragmentary side elevation of the rear part of the machine comprising the soldering and cooling devices. Fig. 24 is a top plan view of the same. Fig. 25 is a vertical transverse section in line 25 25, Fig. 24. Fig. 26 is a horizontal section, on an enlarged scale, in line 26 26, Fig. 25. Fig. 27 is a central longitudinal sectional elevation of the rear part of the machine. Figs. 28, 29, 30, and 31 are transverse sections in

lines 28 28, 29 29, 30 30, and 31 31, Fig. 28, respectively. Fig. 32 is a fragmentary sectional view, on an enlarged scale, of the solder-feed device, taken in line 32 32, Fig. 30.

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

A represents the main frame of the machine, which may be of any suitable construction to support the different working parts of the machine.

B B represent a pair of endless chain belts which constitute the primary conveyer, whereby the blanks are carried successively past the fluxing, folding, and forming devices. These belts are separated by an intervening space and pass with their receiving and delivery portions around receiving and delivery sprocket-wheels b b', which are secured to transverse shafts b^2 b^3, respectively. The upper operative portions of the conveyer-belts run over horizontal rails b^4, which are secured lengthwise to the frame. Each of the belts is provided at suitable intervals with primary feed wings or fingers b^5, the wings of both belts being arranged transversely in line so as to form pairs.

While the fluxing and folding devices are operating upon a blank the latter is supported upon a feed-table consisting of a central section C and two side sections C' C², the several sections being flush with the top of the operative part of the belts. The central section of the feed-table is arranged lengthwise between the conveyer-belts, and the side sections are arranged lengthwise on the outer side of the operative parts of the belts. The outer sections of the feed-table are provided with longitudinal side flanges or guides c, which are engaged by the side edges of the blanks and whereby the latter are held in place on the feed-table and belts. The central section of the feed-table is rigidly secured to the frame, but the side sections and side guides are capable of transverse adjustment thereon to adapt the machine to different widths of blanks for making cans of different diameters.

D D represent two fluxing-wheels, of felt, leather, or similar material, whereby a coating of liquid flux is applied to the side edges of the blanks of sheet-tin as the same are carried forward by the belts toward the shaping mechanism. These wheels are arranged vertically near the front end of the operative portion of the belts and are adapted to bear with their lower portions against the upper side of the blank, along the side edges thereof, as shown in Fig. 4. Each of the fluxing-wheels is pivoted transversely to an overhanging bracket d, which is adjustably secured to a transverse bar d', so as to permit of raising and lowering the fluxing-wheel or moving the same inwardly or outwardly for adapting the fluxing-wheels to different sizes of blanks. The means for effecting this adjustment shown in the drawings consists of a clamping-bolt d^2, passing through a vertical slot in the bracket and a horizontal slot in the cross-bar d'. The liquid flux is supplied to the fluxing-wheels from reservoirs d^3, each of which is supported on the bracket of its respective fluxing-wheel and has the outlet nipple or nozzle on its bottom arranged to deliver the flux on top of the fluxing-wheel. As the blanks of tin are moved forwardly by the primary conveyer-belts the side edges of the blanks are moved in contact with the lower part of the fluxing-wheels, whereby the latter are turned and carry the flux against the edges of the blanks. This construction of the fluxing device causes the flux to be applied uniformly and insures coating the entire side margins of the blank. The transverse bar d' may be supported in any suitable manner, preferably by means of bolts d^4, passing through transverse slots in the bar, as shown in Fig. 5, and entering screw-threaded openings in the tops of the side guides c, which construction permits the latter to be adjusted with reference to the cross-bar d'.

After the flux has been applied to the blank the latter is moved forward one space and presented to a folding mechanism, whereby the side edges of the blank are folded preparatory to being interlocked and seamed. This folding mechanism is best shown in Figs. 1, 3, 5, 8, and 13 to 15 and is constructed as follows:

E E' represent a pair of coöperating lower and upper clamping-jaws which are arranged below and above, respectively, the left portion of the blank when the latter comes to rest at the folding mechanism. The lower clamping-jaw E is arranged to support the blank on its under side near its left-side edge and is provided on its upper side with a longitudinal channel or groove e, which is concave in cross-section, and on its outer longitudinal side with a bevel-face e', which inclines inwardly from the upper side of this jaw to the lower side thereof, as shown in Figs. 13 to 15. The jaw E is mounted on a transversely-adjustable carriage E². The upper clamping-jaw E' is arranged above the path of the blank and is provided on its under side with a convex face e^2, which is adapted to coöperate with the concave face e of the lower jaw E. While the blank is being fed to the folding mechanism the clamping-jaws E E' and adjacent parts are in the position shown in Fig. 13. After the blank comes to rest at the folding mechanism the upper jaw E' moves downwardly toward the lower jaw, whereby a downwardly-curved bend e^3 is formed lengthwise in that portion of the blank between the jaws, as shown in Fig. 15, which bend facilitates the interlocking of the folds or hooks of the blank, as will be hereinafter described. The upper jaw is provided at its upper end with an outwardly-projecting bifurcated arm which is pivoted at its outer ends by longitudinal pivots to the carriage E², as shown in

Fig. 8, so that the inner end of the arm turns in a vertical plane and raises and lowers the upper jaw E′.

F represents a folding blade or jaw forming part of the mechanism whereby a flange or hook is formed on the left end of the blank. This jaw is movably arranged above the left end of the blank when the same rests at the folding mechanism and is provided with a flat lower face f and a beveled inner face f', which inclines from the lower side of the jaw to the upper side thereof. The folding-jaw is capable of both a downward-and-upward and an inward-and-outward movement. After the left edge of the blank has been clamped between the clamping-jaws E E′ the folding-jaw F first moves its lower face f downwardly against the end of the blank and bends the same downwardly over the outer edge of the lower clamping-jaw E, forming a flange on the blank, which is arranged at right angles to the body, as shown in Fig. 14. After this flange has been thus bent on the left end of the blank the folding-jaw is moved inwardly a short distance while in engagement with the flange, whereby the latter is bent inwardly at an angle between the bevel-faces of the folding-jaw and lower clamping-jaw and forms a downwardly and inwardly projecting hook on this end of the blank, as represented in Fig. 15. The folding-jaw now moves outwardly from underneath the lower jaw and then moves upwardly together with the upper jaw E′, so as to clear the blank.

f^2 represents a side guide or gage which is arranged on the inner end of the folding-jaw and with which the left edge of the blank is adapted to engage for the purpose of centering the same when it reaches the folding mechanism.

The upward-and-downward movement of the folding-jaw is effected by a connecting-rod f^3, which is pivoted at its lower end to the upper side of the folding-jaw F and at its upper end to a vertically-reciprocating slide f^4, which is guided on a standard G, rising from the main frame. This slide is raised and lowered by a cam f^5, which is secured to a horizontal shaft g, journaled transversely in bearings on the upper end of the standard and which is provided with a cam-groove receiving a roller or projection on the slide f^4. The downward movement of the upper clamping-jaw E′ takes place about the same time as the downward movement of the folding-jaw and is effected by a connecting-rod g', pivoted at its lower end to the upper clamping-jaw E′ and at its upper end to a vertically-reciprocating slide g^2, which is guided on the standard G. This slide is depressed by a cam g^3, arranged on the shaft g and engaging with a roller or projection on the upper end of the slide g^2. The upper clamping-jaw E′, together with the rod g' and slide g^2, are raised by the folding-jaw F, which latter during its upward movement engages with its upper side against the lower end of an adjusting-screw g^4, arranged on the arm of the upper jaw. By this means the folding-jaw and upper jaw are raised together, but the folding-jaw is permitted to move laterally independent of the jaw. The folding-jaw F is pivoted at its outer end to a transversely-movable slide H, which is guided in a way on the top of the supporting-carriage E^2. This slide is reciprocated by an elbow-lever h, which is pivoted on the carriage E^2 and connected with its lower arm to the slide H, while its upper arm is connected with a vertically-reciprocating slide h' by a connecting-rod h^2. The slide h' is guided in a way on the upper part of the standard G and is raised and lowered by a cam h^3, which is secured to the shaft g and which is provided with a cam-groove receiving a pin or roller on the slide h'. The cam h^3 is so constructed that it moves the slide h' inwardly positively, but permits the outward movement of the same to be shifted for adjusting the folding-jaw properly to the edge of the blank to produce the desired width of hook or flange on the same. The means for adjusting the outward movement of the slide H shown in the drawings consists of a horizontal adjusting-screw h^4, arranged in a depending lug on the slide H and engaging with a shoulder formed on the carriage E^2. The slide H is yieldingly held in its outermost position by a spring h^5 bearing with one end against a depending lug on the slide H and an adjusting-screw arranged on the carriage E^2. When it is desired to form seam flanges or hooks on blanks of different widths for producing cans of different diameters, the carriage E^2 is adjusted transversely on the frame, so as to bring the folding device mounted thereon into the proper position with reference to the edge of the blank which is operated upon. This adjustment may be effected by any suitable means, but preferably the means shown in the drawings, Figs. 13 to 15, consisting of a horizontal adjusting-screw h^6, journaled transversely in the main frame and engaging with a threaded opening in the carriage E^2. Upon shifting this carriage transversely on the frame the connecting-rods f^3 g' h^2 are lengthened or shortened to suit the position of the carriage, this adjustment of each connecting-rod being effected by dividing the same into two sections and connecting the two sections by a turnbuckle h^7, as shown in Figs. 3 and 8.

I represents a folding-jaw which forms part of the mechanism whereby an upwardly-projecting seam flange or hook is formed on the right side or end of the blank and which is so arranged that the blank rests with its right end upon the same when the blank comes to rest at the folding mechanism. This jaw is provided with an upper flat face i, which is normally flush with the top of the feed-table and belt, and an inner beveled face i', which inclines from the upper side of the jaw to the lower side thereof, as represented in Figs. 13 to 15. The folding-jaw I is guided in hori-

zontal ways on a transversely-adjustable carriage I'.

i^2 represents a side guide or gage which is arranged on the right folding-jaw above its flat upper face and with which the right edge of the blank is adapted to engage for the purpose of centering the same when it reaches the folding mechanism.

J J' represent the upper and lower jaws of a clamp which forms part of the mechanism whereby the upwardly-projecting seam hook or flange is formed on the right-hand end of the blank. The lower clamping-jaw J' is arranged below the blank when the latter is in a position to be folded and supports the same on its under side near its right edge, as shown in Fig. 13. The lower clamping-jaw is yieldingly supported, so as to permit the same to descend when the blank is pressed downward upon the same by the upper clamping-jaw J. As shown in Figs. 13 to 15, the lower clamping-jaw is movably mounted on the carriage I', the jaw being guided on the carriage by an upright guide-lug j, formed on the carriage I' and engaging with a recess in the under side of the lower clamping-jaw J'. The latter is yieldingly held in an elevated position by a spring j', arranged in said recess and bearing with its ends against the lower jaw J' and the flange j of the carriage. The upward movement of the lower clamping-jaw is arrested by a stop, so that the upper horizontal face or top of this jaw is normally flush with the top of the feed-table and the operative part of the conveyer-belts. The stop for this purpose shown in the drawings consists of a transverse pin j^2, secured to the lower clamping-jaw and adapted to engage with the upper end of a vertical slot in the flange j of the carriage I' when the lower jaw is in its highest position. The upper clamping-jaw J is arranged above the path of the blank in line with the lower clamping-jaw J' and is provided on its under side with a flat face and on its outer side with a beveled face j^3, which inclines inwardly from the lower side of the upper clamping-jaw. This jaw has an upward-and-downward movement and also an inward-and-outward movement. While the blank is being fed to the folding mechanism the folding-jaw I is in its outermost position, the lower clamping-jaw J' is in its uppermost position, and the upper clamping-jaw J is raised and moved into its outermost position, as shown in Fig. 13. After the blank has been fed to the folding mechanism the upper clamping-jaw is depressed, so as to clamp the blank against the lower jaw and also depress the blank and lower jaw. The right end of the blank rests on the right-hand folding-jaw while the adjacent inner part of the blank is thus depressed, whereby the outer end of the blank is turned upwardly into a flange which is arranged at right angles to the body, as represented in Fig. 14. While the upper and lower clamping-jaws are still in this depressed position the folding-jaw I moves inwardly, whereby the inner beveled face of this jaw presses the flange on the blank against the beveled face of the upper clamping-jaw and forms the flange on the blank into an inwardly-projecting hook, as represented in Fig. 15. After this hook has been thus formed the folding-jaw I moves outwardly away from the seam-hook into its retracted position, and the upper clamping-jaw J first moves inwardly from underneath the seam-hook, as represented by dotted lines in Fig. 15, and then upwardly until it reaches the position shown by dotted lines in Fig. 13. During the upward movement of the clamping-jaw J the lower clamping-jaw J' is also raised by its spring to its highest position, whereby this end of the blank is raised flush with the top of the feed-table and belt. Preparatory to beginning the next downward stroke the upper clamping-jaw is moved outwardly into the position shown in Fig. 13. The upper clamping-jaw J is pivoted at its upper end to a vertically-movable slide k. The latter is guided in ways on the upper part of a standard k' on the carriage I'. The outward movement of the upper clamping-jaw is limited by a stop k^2, which is preferably formed by the adjacent part of the carriage I', and the inward movement of this jaw is limited by a stop k^3, which preferably consists of an adjusting-screw mounted on a bracket connected with the standard k'.

k^4 is a connecting-rod which is pivoted at its lower end to a lug on the inner side of the upper jaw J and pivoted at its upper end to a vertically-movable slide k^5. The latter is guided in ways on the standard G of the main frame and is raised and lowered by a cam k^6, which is secured to the shaft g and which is provided with a cam-groove receiving a pin or roller on the slide k^5. Upon moving the slide k^5 and connecting-rod k^4 downwardly the first part of this movement causes the rod to turn the upper clamping-jaw J outwardly from its position against the inner stop k^3, as shown in dotted lines in Fig. 13, to its position against the outer stop k^2, as shown in full lines in the same figure. The upper jaw J remains in this outer position while being moved downwardly until the upper clamping-jaw reaches the end of its downward stroke and the upwardly-projecting flange has been bent on the blank. During the subsequent upward movement of the connecting-rod k^4 the upper jaw J is first swung inwardly from the outer position against the outer stop k^2 (shown in full lines, Fig. 14) to the inner position against the inner stop k^3, as shown in dotted lines in the same figure, after which the upper jaw J remains in this inwardly-retracted position to the end of the upward stroke of the connecting-rod k^4. The slide k is fitted in its ways comparatively tight by means of a leather packing, so as to produce sufficient friction to resist the up-

ward-and-downward movement of the slide k until the upper clamping-jaw j reaches the limit of its laterally-swinging movement.

The transverse movement of the slide I is produced by an elbow-lever L, which is pivoted to the carriage I′ and has its lower arm connected with the slide I, while its upper arm is connected by a rod l with a vertically-reciprocating slide l'. The latter is guided in ways on the upper part of the standard G and is raised and lowered by a cam l^2, which is secured to the shaft g and which is provided with a cam-groove receiving a pin or roller on the slide l'. The cam l^2 moves the slide inwardly in a positive manner; but the outward movement of the slide is effected by a spring l^4, interposed between a depending lug on the slide and an adjusting-screw on the carriage I′, as shown in Figs. 13 to 15. The outward movement of the slide is adjusted by a screw l^3, arranged in a depending lug on the slide and engaging with the adjacent part of the carriage I′.

For the purpose of adapting the machine for folding seam-hooks on the ends of the blanks of different widths the carriage I′ is adjustable transversely in ways on the main frame, this adjustment being effected by an adjusting-screw l^6, journaled in the main frame and working in a screw-threaded opening in the carriage, as shown in Figs. 13 to 15. Upon adjusting the carriage I′ each of the connecting-rods l k^4 is also lengthened or shortened, as may be necessary, by means of a turnbuckle l^7, which connects the two sections of the connecting-rod. After adjusting the carriage I′ the same is securely held in place by a clamping-screw l^8, passing through a horizontal slot l^9 in the standard of the carriage and entering a screw-threaded opening in the standard of the main frame. The driving mechanism of the devices which form the seam-hooks on opposite ends of the blank are so timed that both upper clamping-jaws are moved downwardly at the same time toward the lower clamping-jaws, respectively, and the opposite folding-jaws move inwardly and outwardly simultaneously. By this mechanism for folding the edges of the blank the same is securely held in place while being bent and the bending operation is effected by gradual and successive steps without stretching the metal and with the expenditure of a minimum amount of power.

M represents retaining-plates, whereby the blanks are held down upon the feed-table and conveyer-belt while being carried from the fluxing-wheels to the folding mechanism. These plates are arranged lengthwise over the central and side parts of the path of the blanks, and each plate is adjustably secured at its front end to the cross-bar d'. After the seam hooks or flanges have been folded on the blank the latter is advanced another step or space by the primary conveyer and presented to the forming mechanism, which bends the blank into cylindrical form and seams the ends of the blank together. This forming mechanism is best shown in Figs. 1, 2, 3, 5, 6, 7, and 16 to 22 and is constructed as follows:

N N′ represent the two sections of an expansible and contractible forming-horn, around which the blank is bent into cylindrical form and upon which the ends of the blank are seamed or secured together. This horn is of substantially cylindrical form and arranged lengthwise over the central part of the feed-table in rear of the standard G. The division between the two sections of the horn is on one side of a vertical center line through the horn, so that one section of the horn is larger than the other section. The larger section, N, of the horn is arranged on the right side and secured at its front end to the rear side of the standard G by a dovetail connection n, as shown in Fig. 7, while the other section, N′, is pivoted at its lower end to the lower part of the stationary section, so that the upper part of the movable section can move toward and from the stationary section.

N^2 represents a cylindrical supporting-head which is connected with the rear end of the horn by a dovetail joint n', as shown in Figs. 7, 19, and 20. The movable section of the horn is pressed away from the stationary section by a spring n^3, interposed between the horn-sections. This outward movement of the movable section may be limited in any suitable manner, the means for this purpose (shown in Figs. 6, 19, and 20) consisting of pins n^3 n^3, arranged on opposite ends of the movable section and engaging with shoulders n^4 n^4 on the adjacent part of the standard G and the head N^2. These stop devices limit the expanding movement of the movable section, which is produced by the pressure of the spring n^2. The latter allows the movable section to close against the stationary section when the pressure of the spring is overcome. After the blank comes to rest under the horn the blank is clamped at its center against the under side of the stationary section of the horn by a vertically-movable clamping-jaw o. This jaw is guided in a way formed in the rear end of the feed-table and is moved downwardly away from the horn by springs o', interposed between the table and the clamping-jaw, as shown in Fig. 3. The clamping-jaw o is moved upwardly toward the horn by rotary cams o^2, engaging with rollers o^3 on the under side of the clamping-jaw o. The cams o^2 are mounted on a horizontal arbor o^4, which is arranged lengthwise below the clamping-jaw o and supported at its ends on brackets o^5, which are secured to the adjacent part of the main frame, as shown in Figs. 3, 16, 17, and 18.

P P′ represent two forming-jaws whereby the blank is bent into cylindrical form around the horn and each of which is provided with a concave bearing-face conforming to the

horn. Each of the forming-jaws is pivoted at its bifurcated inner end on the arbor o^4.

P^2 represents a vertically-reciprocating slide which is guided in ways on the brackets o^5 and which is connected at its upper end by an oblique link p with the right-hand forming-jaw P. The left-hand forming-jaw P′ is yieldingly connected with the slide P^2, so as to permit these parts to have a limited independent movement with reference to each other, the yielding connection for this purpose (shown in the drawings) consisting of an oblique link p', pivoted at its upper end to the jaw P′ and pivoted at its lower end to a follower p^2; a guide-socket p^3, arranged on the slide P^2 and receiving said follower; a spring p^4, arranged in said socket and bearing with its upper end against the follower; a disk p^5, bearing against the lower end of the spring p^4, and an adjusting-screw p^6, arranged in the bottom of the socket p^3 and bearing against said disk. The cams o^2 are secured to one of the forming-jaws, preferably to the arms of the jaw P, as shown in Figs. 3, 16, 17, and 18. The upward movement of the follower p^2 in the socket p^3 is limited by a pin p^7, arranged on the follower and projecting through a longitudinal slot p^8 in the socket. The slide P^2 is raised and lowered by a rock-arm p^9, which is connected by a link p^{10} with the slide, as shown in Fig. 3. The rock-arm p^9 is connected with a horizontal rock-shaft p^{11}, which is journaled transversely in the lower part of the frame. The rock-shaft is operated by a connecting-rod p^{12}, connected at its lower end to a rock-arm p^{13} on the outer end of the rock-shaft p^{11} and provided at its upper end with a roller or projection which engages with a cam-groove in a cam p^{14}, mounted on the shaft g. The latter is driven by a gear-pinion p^{15}, mounted on a short shaft p^{16} and meshing with a gear-wheel p^{17} on the shaft g, and a driving-belt passing around a driving-pulley p^{18} on the shaft p^{16}, as represented in Figs. 1 and 8. While the blank is being carried under the horn, the clamping-jaw o is depressed, the slide P^2 is lowered, so that the forming-jaws stand below the path of the blank, and the follower p^2 is moved upwardly in its highest position in the socket p^3 by the spring p^4. After the blank comes to rest under the horn the slide P^2 is raised, whereby the forming-jaws are moved upwardly toward opposite sides of the horn. During the first part of this upward movement of the forming-jaws the cams o^2 are turned and operate the clamp, so that the central part of the blank is clamped against the under side of the horn, and during the remainder of the upward movement of the forming-jaws the latter engage with the ends of the blank and bend them around opposite sides of the horn, as represented in Fig. 17. The relative movement of the two forming-jaws is such that the left forming-jaw moves upwardly slightly in advance of the right forming-jaw. This causes the left end of the blank having the downwardly or outwardly projecting hook to be bent around the horn in advance of the right-hand end of the blank, thereby permitting the upwardly or inwardly projecting hook on the right end of the blank to lap over the left hook without interfering with the latter. When the slide P^2 reaches the end of its upward movement, the right forming-jaw has bent the right end of the blank its fullest extent around the adjacent side of the horn. Before the slide P^2 reaches the end of its upward movement the left forming-jaw bends the left end of the blank around the movable section of the horn and moves the same against the stationary section, so that the further inward movement of the left forming-jaw is arrested, which causes the slide P^2 upon completing its upward movement to slightly compress the spring p^4. As the left part of the blank is bent around the horn the extreme outer end of this part of the blank lying beyond the left forming-jaw is caused to lie closely against the adjacent part of the horn and conform to the curved surface thereof by reason of the preliminary concavo-convex bend e^3, which has been formed in this part of the blank by the clamping-jaws E E′, thereby permitting the hook on the right end of the blank to pass freely over the left hook. In the absence of the preliminary bend e^3 in the left end of the blank the latter would project tangentially from the horn when pressed against the same by the left forming-jaw and prevent the right end of the blank from passing over the left end of the blank. The movable section of the horn stands normally in its expanded position and is pressed inwardly by the corresponding forming-jaw. The spring acting against the movable section opposes this inward movement and holds the section snugly against the blank and the latter snugly against the forming-jaw, whereby the blank is folded smoothly and evenly around the horn.

In order to avoid any slack in the blank while bending it around the horn, which otherwise would interfere with the proper seaming of its edges, each forming-jaw is provided on the lower part of its face with yielding presser-pins q. Each of these pins is guided in the forming-jaw and pressed outwardly by a spring q', arranged in a socket q^2 on the forming-jaw and bearing with one end against a screw q^3, which closes the outer end of the socket, and bearing with its opposite end against a head q^4 on the inner end of the presser-pin, as shown in Fig. 22. In the retracted position of the forming-jaws the presser-pins are projected outwardly to their fullest extent, the movement of the pins in this direction being limited by their heads bearing against shoulders q^5 in the sockets. During the last portion of the upward and inward movement of the forming-jaws the presser-pins bear yieldingly against the lower parts of the blank and press the same closely

against the horn, thereby smoothing out any slack which may be present in this part of the blank and causing the hooks to overhang one another properly preparatory to seaming the same.

R R represent two wedges, whereby the forming-horn and the blank bent around the same are expanded, so as to interlock the hooks of the blank and give the can a definite diameter. These wedges depend from the front and rear end of a vertically-movable slide R′, arranged above the horn, and are adapted to move down and up between the pins n^3 of the movable horn-section and bearing-faces r on the opposing part of the stationary section of the horn. The slide R′ is guided in ways on the rear side of the standard G and is raised and lowered by a connecting-rod r', connected at its lower end to the slide R′ and at its upper end to a crank r^2 on the shaft g, as shown in Fig. 3.

r^3 represents a hammer, whereby the hooks of the blanks are seamed together and which is arranged lengthwise on the under side of the slide R′. While the blank is fed underneath the horn and bent around the same, the slide is raised so that the wedges and hammer clear the horn, as shown in Figs. 16 and 19. After the blank has been formed around the horn the slide R′ descends, and during the first part of this movement its wedges pass between the pins n^3 and bearing-faces r of the horn-sections, as shown in Fig. 20, whereby the movable section of the horn is moved away from the stationary section, thereby interlocking the hooks of the blank and gaging the diameter of the can. After the horn and blank have been thus spread or expanded by the wedges the hammer presses the interlocked hooks of the blank downwardly against the top of the stationary horn and closes the hooks of the same together, as represented in Fig. 18. Upon moving the movable horn-section laterally while expanding the horn the left forming-jaw is also moved outward the same extent as the movable horn-section. This movement of the left forming-jaw is permitted while the slide P^2 is still in its elevated position by reason of the yielding connection between the slide P^2 and this jaw. The upper side of the stationary horn-section is preferably provided with a longitudinal groove r^4, which receives the seamed part of the blank and causes the rib or bead which is produced on this part of the blank by the several thicknesses of metal to project inwardly from the blank, leaving the outer side smooth and cylindrical. After the blank has been thus seamed the slide R′, carrying the hammer and wedges, is raised and the slide P^2 is lowered, so as to retract the forming-jaws below the path of the blanks, thereby leaving the seamed blank free to be removed from the horn and permitting another unseamed blank to be fed under the horn. If the pivot of the horn becomes worn more unevenly, the can-body formed from the blank on the horn while in this condition is liable to have a conical shape, which would interfere with the application of the heads to the ends of the can-body. In order to avoid this conical formation of the can-body, the wedges R are adjustable transversely on the slide, which permits the wedges to be adjusted, so that one end of the movable horn-sections is shifted outwardly more than the other a sufficient extent to preserve the cylindrical form of the horn and the can-body formed on the same. As shown in the drawings, Figs. 3, 5, 19, and 20, each wedge is provided with a horizontal guide-rib r^5, which engages in a horizontal guide-groove in the adjacent end of the slide R′, and the wedge is adjusted transversely by a screw r^6, journaled on said slide and working in an internally-screw-threaded ear on the wedge. After adjustment the wedge is held in position by a clamping-screw r^7 passing through a horizontal slot in the wedge and entering a screw-threaded opening in the slide R′.

S S represent two front gages which are engaged by the front edge of the blank as the latter comes to rest under the forming-horn and whereby the blank is squared or alined with reference to the forming horn and jaws. These gages are arranged on opposite sides of the rear part of the horn and in the path of the unformed blank and are secured to a transverse rock-shaft s, which is journaled on the main frame below the feed-table, as shown in Figs. 1, 2, 5, and 6. This shaft is turned in a direction for moving the gages forward by a spring s', interposed between an arm s^2 on the rock-shaft s and the adjacent part of the frame. The forward movement of the front gages is limited by stops s^3, which may be formed by rearward extensions of the side guides c. As the blank is carried from the folding mechanism to the forming mechanism the front edge of the blank engages with the front gages. If one side of the blank moves slightly in advance of the other side, the advancing side strikes the front gage on its respective side first and is held back until the other side of the blank also reaches its gage, thereby alining the blank preparatory to bending the same around the forming-horn. If the blanks are moved farther than the normal position of the front gages, the latter yield against the pressure of the spring s', and when the ends of the blanks are bent upwardly away from the gages and around the horn the gages are returned to their normal position by the spring.

After the blank has been formed into a cylindrical can-body and seamed on the forming-horn the can is removed rearwardly from the horn and moved forward another space by an auxiliary feed wing or finger b^6, which engages with the rear edge of the tubular can-body, near the lower side thereof, and passes through a longitudinal groove b^7 in the stationary section of the forming-horn.

One of these auxiliary feed-wings is secured to the right-hand conveyer-belt in line with each main feed-wing of this belt. While the can-body is being removed from the forming-horn, the movable section of the latter is held in its expanded position by the spring n^2, thereby centering the can-body and holding the same against moving laterally, whereby the can-body is prevented from catching against any shoulders on the head N^2 or other adjacent parts of the machine.

In order to disengage the main feed-wings from the rear edge of the blank after the latter has been carried underneath the forming-horn, and thereby prevent the blank from being kinked when subsequently raised by the forming-jaws, the primary conveyer-belts are moved slightly backward after each intermittent forward movement of the belts. The driving mechanism for producing this movement of the belt is constructed as follows:

T represents a star-wheel secured to the inner end of the shaft b^3 of the delivery sprocket-wheel b' and provided with teeth t, which are separated by radial slots t' and each of which is provided in its outer end with a concave recess or seat t^2.

T′ represents a horizontal shaft which is journaled transversely in the frame above the star-wheel and which makes one rotation in the direction of the arrow, Fig. 10, for each intermittent forward movement of the primary conveyer.

t^3 represents a rotary crank-arm secured to the inner end of the shaft T′ and provided with a crank-pin t^4, which is adapted to engage successively with the teeth of the star-wheel and turn the latter one space or step at a time. The hub of the crank-arm is provided on its periphery with a recess t^5 on the same side of the center on which the crank-pin t^4 is arranged; a low concentric face t^6, arranged in rear of said recess; an outwardly-trending cam t^7, arranged at the rear end of the low concentric face, and a high concentric face t^8, extending from the cam t^7 to the front side of said recess. While the folding and forming mechanisms are operating upon blanks the primary conveyer-belts are standing still, and during this time the high concentric part t^8 of the crank-hub engages with the concave recess of one tooth of the star-wheel, as shown in Fig. 10, and locks the same and the belts connected therewith against movement in either direction. After the folding and forming operations have been completed and the blanks are ready to advance another step or space the recess t^5 of the crank-hub is presented to the operative tooth of the star-wheel and unlocks the same, and the crank-pin t^4 engages with the front side of the operative tooth and turns the star-wheel in the direction of the arrow until the crank-pin clears the tooth, as represented in Fig. 11. The distance which the crank moves the star-wheel while in engagement with a tooth of the same is more than one space; but this movement of the star-wheel is limited by the next following tooth engaging with the low concentric part t^6 of the crank-hub, as shown in Fig. 11. As the crank-pin leaves the star-wheel the cam t^7 on the crank-hub engages with the trailing part of the next following tooth of the star-wheel and turns the latter backwardly or in the direction opposite to the arrow until the high concentric part t^8 of the crank-hub engages with the concave face of the respective tooth, as shown in Fig. 12. As the crank-hub continues its movement in this direction its high concentric face t^8 bears fully against the concave face of the operative tooth, as shown in Fig. 10, thereby locking the star-wheel against turning until the crank-pin engages with the opposite side of the operative tooth of the star-wheel. By this means of driving the primary conveyer-belts the latter move the blank forward to the desired place and then back up slightly, whereby the wings of the belts are disengaged from the rear edge of the blank and the latter is left perfectly free to be operated upon. This is particularly desirable in the forming mechanism, in which the blank is liable to be kinked if its rear edge remains in engagement with the main feed-wings of the belts when the forming-jaws bend the blank around the forming-horn. During the first part of the rearward movement of the crank-pin t^4, while in engagement with a tooth of the star-wheel, the crank-pin slides from the outer end of the tooth toward the inner end or base thereof, and during the last part of the rearward movement of the crank-pin, while in engagement with the tooth, the crank-pin slides from the inner end or base of the tooth toward the outer end thereof. By this means the point of contact between the crank-pin and the star-wheel gradually approaches the pivot of the star-wheel during the first part of its movement while in engagement with the star-wheel tooth, and during the last part of this movement of the crank-pin the point of contact between the crank-pin and star-wheel gradually recedes from the pivot of the star-wheel, whereby the primary conveyer is started easily and slowly and is moved forwardly with a gradually-increasing speed during the first part of the stroke and with a gradually-decreasing speed during the last part of the stroke, thereby avoiding displacement of the blanks and also avoiding undue wear upon the machine. Furthermore, this means of driving the primary conveyer permits of driving the machine faster, thereby increasing the capacity of the same without danger of displacing the blanks, which would be the case if the movement of the blanks were started and stopped suddenly. The shaft T′ is driven from the shaft g by intermeshing bevel gear-wheels t^9, secured to the shaft T′, and a longitudinal shaft t^{10} and an upright shaft t^{11}, connected at its upper end by a pair of bevel-gears t^{12} with the shaft g and at its

lower end with the longitudinal shaft t^{10} by a pair of bevel-gears t^{13}.

After the can-body has been removed from the forming-horn the same is presented to the soldering devices, whereby the same is hermetically sealed and which is constructed as follows:

U represents the soldering-horn or internal guide which supports the cans during the operation of soldering the seams thereof. This horn is arranged lengthwise in the rear of the forming-horn and consists of a number of longitudinal guide-bars u, which are connected at intervals by cross-heads u'. The uppermost bar u of the soldering-horn supports the cans on their upper inner side and is provided with a longitudinal groove which receives the seam rib or bead on the inner side of the can. The front ends of the bars forming the soldering-horn are connected with the head N^2 on the rear end of the forming-horn, and its rearmost cross-head u' is provided on its under side with a supporting-roller u^2, which runs on the top of a supporting-wheel u^3. The latter is secured to a transverse shaft u^4, which is journaled in the lower part of the main frame and which is turned in the direction of the arrow, Fig. 27, by a chain belt u^5, passing around sprocket-wheels u^6 u^7, secured to the shafts T' and u^4, respectively, as shown in Figs. 23 and 24.

u^8 u^8 represent two longitudinal side guides, which are secured to the main frame and which support the cans on opposite sides below the center while the can-bodies are moved past the soldering devices. As the can-bodies move rearwardly from the forming-horn they pass upon the front end of the soldering-horn.

u^9 represents a continuously-moving chain belt which has feed-wings u^{10} and constitutes the secondary conveyer, whereby the can-bodies are moved lengthwise over the soldering-horn and past the soldering devices. This belt is arranged with its rearwardly-moving operative portion lengthwise on the left side of the soldering-horn and passes around receiving and delivery sprocket-wheels u^{11} u^{12}. The delivery sprocket-wheel u^{12} is journaled on an upright stud on the frame and the receiving sprocket-wheel u^{11} is mounted on an upright shaft u^{13}. This shaft is driven from a horizontal counter-shaft u^{14}, connected by a pair of gear-wheels u^{15} with the shaft T' and connected by a pair of bevel-gears u^{16} with the upright shaft u^{13}, as shown in Fig. 25. It sometimes happens that a blank is caught in the folding or forming mechanism which necessitates stopping the machine to put the machine in order. If the can-bodies were permitted to remain for a considerable length of time under the soldering device while the machine is so stopped, the can-bodies are liable to be burned. In order to avoid this, the receiving sprocket-wheel u^{11} is connected with its driving-shaft u^{13} by a clutch, which compels the sprocket-wheel to move forwardly with the shaft, but permits the sprocket-wheel to move forwardly independently of the shaft. This permits the secondary conveyer to be operated by hand independent of its driving mechanism when the folding and forming mechanisms are clogged, thereby enabling the can-bodies which are underneath the soldering device to be cleared out. The clutch for this purpose (shown in the drawings, Figs. 25 and 26) consists of a spring catch or pawl u^{14}, pivoted on the receiving sprocket-wheel u^{11} and engaging with the front side of a driving-lug u^{18} on the side of the upright shaft u^{13}. During the forward movement of this shaft its lug engages the clutch-pawl and drives the receiving sprocket-wheel and conveyer-belt running around the same forward; but when the sprocket-wheel is turned forward independently of the shaft the pawl trips over the lug without affecting the shaft. The sprocket-wheel is preferably provided with a crank-wheel u^{19} for turning the same.

As the can-bodies are carried rearwardly along the soldering-horn the seam thereof is first moved past a soldering device, which applies solder to the same and which is constructed as follows:

V represents a soldering roller or steel arranged lengthwise over the front part of the soldering-horn and adapted to apply solder to the outer side of the seam on the upper side of the can-body. The solder for this purpose is supplied from a solder-melting pot v, which is arranged in rear of the soldering-horn and from which the solder is carried to the soldering-roller by a feed-roller v', immersed with its lower part in the molten solder in the pot, and an intermediate or transfer roller v^2, which runs in contact with the upper part of the feed-roller and soldering-roller and transfers the solder from the feed-roller to the soldering-roller. The solder-feed roller is mounted on a longitudinal shaft v^3, which is journaled in bearings on the main frame and which is turned constantly in the direction of the arrow, Fig. 30, by a chain belt v^4, passing around sprocket-wheels v^5 v^6, secured, respectively, to the shafts t^{10} v^3. The soldering-roller and transfer-roller are secured to shafts v^7 v^8, which are journaled with their ends in rock-arms v^9 v^9 and are driven by a train of intermeshing gear-wheels v^{10} v^{11} v^{12}, secured, respectively, to the front ends of the shafts v^3 v^8 v^7, as shown in Figs. 24, 27, and 30. The rock-arms are pivoted at their inner ends on the shaft v^3 of the solder-feed roller and rest at their front ends on vertical adjusting-screws v^{13} v^{13}, arranged on the adjacent part of the frame. The solder in the melting-pot is kept in a molten state by one or more burners v^{14}, arranged below the pot, and the feed-roller is heated by contact with the melted solder in the pot. Each of the rollers V v^2 is preferably made hollow and heated, so as to keep the solder in a molten state while passing over the same by burners v^{15}, which are arranged to deliver a flame

against the inner side of the rollers v^7 v^8. The screws v^{13} are so adjusted that the lowermost part of the soldering roller or steel is separated from the uppermost guide-bar u of the soldering-horn by a space which is less than the thickness of the seam of the can-body. As the can-body moves rearwardly along the soldering-horn the seam of the can-body moves between the horn and the soldering-roller and lifts the latter slightly. The front edge of the periphery of the soldering-roller is rounded to facilitate the passing of the can-body underneath the same. As the can-body passes the under side of the soldering-roller the latter while retating in contact with the same applies solder to the same. The distance between the can-bodies as the same are fed along the soldering-horn is less than the length of the soldering-roller, so that the latter passes from one can-body to another without dropping to its lowest position except when the operator misses feeding a blank. As the transfer and soldering-rollers rise and fall the driving gear-wheels v^{11} v^{12} are unaffected, because the arms v^9, supporting the same, swing concentrically with the solder-feed roller v'. This construction of soldering device insures a uniform application of solder along the entire length of the seam and effects a saving in the use of solder over the former method, in which a quantity of solder was applied at the front end of the seam and spread lengthwise toward the other end of the seam. Fresh solder is introduced into the melting-pot to make up for the solder which is removed by the feed-roller. This solder is preferably supplied in the form of wire, which is unwound from a reel and passes over a curved guide v^{16}, thence downwardly through an oblique guide v^{17}, and into the melting-pot, as shown in Fig. 31. The solder-wire is fed forward intermittently by a gripper, which has a forward and backward movement and which grasps the solder-wire during its forward movement, but releases the solder-wire during its backward movement. This gripper consists of a lower jaw v^{18}, fixed on a rock-arm v^{19} and engaging with the under side of the solder-wire, and a movable upper jaw v^{20}, which is pivoted on the rock-arm and held in engagement with the upper side of the solder-wire by a weight v^{21}. The rock-arm v^{19} is secured to a rock-shaft v^{22}, which is operated by a connecting-rod v^{23}, connected at one end with a crank v^{24} on the sprocket-wheel t^{10}, and connected at its other end to an arm v^{25} on the rock-shaft v^{22}, as shown in Figs. 24 and 30. The solder-wire is prevented from moving backward with the gripper by a spring-catch v^{26}, pivoted on the guide v^{17} and engaging with the solder-wire in the same, as shown in Fig. 32. When it is desired to stop the feed of solder-wire into the melting-pot, the movable jaw of the feed-gripper is thrown backward against a stop v^{27}, as shown in dotted lines in Fig. 30, in which position the gripper is inoperative and the arm carrying the same moves back and forth idly.

After the can-bodies have been carried past the soldering roller or steel the same are carried past the under side of a burner W. The burner is arranged lengthwise over the path of the can-bodies and its flame is directed downwardly against the seam of the can-body, whereby the solder on the same is thoroughly melted and caused to soak or creep into the crevices of the seam, thereby insuring sealing the same hermetically. As the can-bodies move along the rear part of the soldering-horn the lower parts of the can-bodies pass between the rollers u^2 u^3. After the can-bodies leave the rear end of the soldering-horn they are guided and supported by the side guide bars or rails u^8, which extend beyond the rear end of the soldering-horn, and by a bottom guide-rail x, which extends rearwardly from the soldering-horn and supports the can-bodies on the under side, as shown in Figs. 27 and 29.

The surplus solder is removed from the top or outer side of the seam by a wiper or brush x', of asbestos or similar material. This wiper is arranged obliquely in the path of the upper part of the can-bodies, and as the cans pass underneath the same the surplus solder is wiped off from the seam and discharged from one side of the can-body. The wiper may be supported in any suitable way—for instance, by means of a bracket x^2, secured to the main frame. By arranging the wiper in rear of the soldering-horn the solder which is wiped off from the can-bodies is not deposited on the uppermost rail of the soldering-horn, where it would accumulate and interfere with the passage of the can-bodies. By arranging the wiper obliquely the solder is carried laterally from the can-body and prevented from accumulating on the wiper and being deposited in a lump on one of the can-bodies when the solder cools and hardens.

When the rear end of a can-body reaches the wiper, the pressure of the latter upon this end of the body is liable to tip up the front end of the can-body and displace the same. In order to avoid this, a longitudinal retaining-bar x^3 is provided, which is adapted to bear against the inner lower side of the can-body and hold the same down in its normal horizontal position while the operator is operating upon the can-body. This retaining-bar is secured to the lower rear part of the soldering-horn, as shown in Fig. 27. After the surplus solder has been wiped from the seam of the can-body the latter is carried with its seam underneath a perforated air-pipe y, whereby jets of air are delivered against the seam and the solder on the same is cooled. After passing the cooling device the can-bodies are discharged by the secondary conveyer-belt from the tail end of the machine.

When the machine is fully in operation, the

several operations of fluxing, folding, forming, soaking, wiping, and cooling are effected simultaneously on different blanks in the usual manner.

I claim as my invention—

1. In a can-body machine, the combination with a folding-jaw adapted to support one edge of a can-body blank and having a reciprocating movement parallel with the plane of the blank, of a pair of movable clamping-jaws which grasp the blank near its edge and move the body of the same transversely to the folding-jaw, whereby the end of the blank is turned at right angles to the body, and means whereby the folding-jaw is moved inwardly parallel with the plane of the blank and the end of the blank is bent into hook shape, substantially as set forth.

2. In a can-body machine, the combination with a folding-jaw adapted to support one edge of a can-body blank and having a reciprocating movement parallel with the plane of the blank, a lower yielding clamping-jaw which is adapted to support the blank on its under side near one edge, an upper movable clamping-jaw which bears against the upper side of the blank opposite the yielding jaw and moves the latter downwardly together with the body of the blank resting on the same, whereby the edge of the blank resting on the folding-jaw is turned up, and means whereby the folding-jaw is moved inwardly parallel with the plane of the blank and the end of the blank is bent into hook shape against the upper clamping-jaw, substantially as set forth.

3. In a can-body machine, the combination with a folding-jaw adapted to support one edge of a can-body blank and having a reciprocating movement parallel with the plane of the blank, a lower yielding clamping-jaw supporting the blank on its under side near the folding-jaw, and an upper clamping-jaw which first moves downwardly and carries the blank downwardly against the pressure of the lower clamping-jaw and thereby turns the end of the blank upwardly, then holds the blank while the folding-jaw moves inwardly and bends the end of the blank into hook shape, and then moves inwardly, so as to clear the hook of the blank, substantially as set forth.

4. In a can-body machine, the combination with a support, of a horizontally-reciprocating folding-jaw adapted to support the end of a can-body blank and guided in said support, a lower clamping-jaw guided on said support and held yieldingly in its elevated position by a spring, a vertically-reciprocating slide guided on said support, an upper clamping-jaw adapted to bear with its lower end against the upper side of the blank and pivoted at its upper end to the slide so as to oscillate inwardly and outwardly, stops which limit the oscillating movement of the upper clamping-jaw, and an actuating-rod connected with the inwardly-projecting lug on the upper clamping-jaw, substantially as set forth.

5. The combination with a can-forming horn consisting of a stationary section, a movable section pivoted at one end to the stationary section and adapted to be closed against the stationary section in the can-forming position of the sections, but movable at its free end away from the stationary section, a stop device whereby the opening movement of the movable section to its expanded position is limited, and a spring whereby the movable section is yieldingly held in its expanded position, of forming-jaws, and means whereby said jaws are moved against the sections of said horn for folding the can-blank around the same, thereby pressing the movable section out of its expanded position into its can-forming position, substantially as set forth.

6. In a can-body machine, the combination with the forming-horn consisting of a stationary section and a movable section, and the seaming-hammer arranged above the horn, of a wedge connected with the hammer and adapted to engage between said horn-sections and spread the same, substantially as set forth.

7. In a can-body machine, the combination with the forming-horn consisting of a stationary section and a movable section, of a slide movable toward and from the horn, a seaming-hammer secured to said slide, and a wedge which is capable of transverse adjustment on said slide and which is adapted to engage between said horn-sections for spreading the same, substantially as set forth.

8. In a can-body machine, the combination with the forming-horn consisting of a stationary section and a movable section, of a slide movable toward and from the upper side of the horn, a seaming-hammer secured to said slide, and wedges which are adjustably secured to the slide at opposite ends of the hammer and which are adapted to engage between the horn-sections at opposite ends thereof, substantially as set forth.

9. In a can-body machine, the combination with the forming-horn, and the oscillating forming-jaws whereby the blank is bent around the horn, of a movable clamping-jaw whereby the central part of the blank is clamped against the forming-horn, and a rotary cam which is connected with one of said forming-jaws and whereby the clamping-jaw is operated, substantially as set forth.

10. In a can-body machine, the combination with the forming-horn, and the concave forming-jaws whereby the blank is bent around the horn, of presser-pins guided in the forming-jaws and yieldingly held by springs in a projected position from the face of said jaws, substantially as set forth.

11. In a can-body machine, the combination with the expansible forming-horn consisting of a stationary section and a movable section, of a slide movable toward and from

the horn, a forming-jaw adapted to bend one end of the blank against the stationary section of the horn and connected by a link with said slide, and a forming-jaw adapted to bend the other end of the blank against the movable section of the horn and having a yielding connection with said slide, substantially as set forth.

12. In a can-body machine, the combination with the expansible forming-horn consisting of a stationary section and a movable section, of a slide movable toward and from the horn, a forming-jaw adapted to bend one end of the blank against the stationary section of the horn and connected by a link with the slide, a forming-jaw adapted to bend the other end of the blank against the movable section of the horn, a link connected at one end with the jaw bearing against the movable section of the horn and connected at its lower end with a follower, a socket which is arranged on the slide and in which said follower is guided, a spring arranged in said socket and bearing with its ends against said follower and against an adjusting-screw working in the bottom of the socket, and a stop whereby the outward movement of the follower in said socket is limited, substantially as set forth.

13. In a can-body machine, the combination with the shaping mechanism, and the conveyer-belt whereby the blanks are carried past the shaping mechanism and which passes around supporting-wheels, of a star-wheel connected with one of said supporting-wheels and provided with a number of teeth having concave faces in their outer ends, and a rotary arm provided with a crank-pin adapted to engage with the sides of said teeth for turning the star-wheel and having a hub which is provided with a convex portion adapted to engage successively with the concave faces of said teeth and lock the star-wheel against movement and provided with a recess which receives the teeth of the star-wheel and permits the star-wheel to turn when its teeth are engaged by the crank-pin, substantially as set forth.

14. In a can-body machine, the combination with the shaping mechanism, and the conveyer-belt which is provided with carrying-wings whereby the blanks are carried past the shaping mechanism and which passes around supporting-wheels, of a star-wheel connected with one of said supporting-wheels and provided with a number of teeth having concave faces in their outer ends, a rotary arm having a crank-pin which is adapted to engage with the side of said teeth and having a hub which faces the outer ends of said teeth and which is provided on its periphery with a recess, a low concentric part extending rearwardly from the recess, an outwardly-trending cam arranged in rear of the low concentric part, and a high concentric part arranged between the cam and the recess, said hub presenting during each rotation first its recess to the adjacent tooth of the star-wheel and permitting the same to be turned by the crank-pin, then presenting its low part to the next following tooth of the star-wheel and limiting the forward movement thereof, then engaging its cam with said tooth and moving the star-wheel backward slightly so as to disengage the wings of the conveyer-belt from the blank, and then engages its high concentric part with the concave face of the operative tooth and locks the star-wheel against turning, substantially as set forth.

15. In a can-body machine, the combination with the shaping mechanism, the soldering mechanism, and the driving mechanism, of a primary conveyer whereby the blanks are fed to the shaping mechanism and which is geared with said driving mechanism, a secondary conveyer whereby the blanks are fed to the soldering mechanism, and a clutch which is interposed between the driving mechanism and the secondary conveyer and which compels the secondary conveyer to move forward with the driving mechanism but permits the secondary conveyer to move forwardly independent of the driving mechanism, substantially as set forth.

16. In a can-body machine, the combination with the shaping mechanism, the soldering mechanism and the driving mechanism, of a primary conveyer whereby the blanks are fed to the shaping mechanism, and which is geared with said driving mechanism, a secondary conveyer whereby the blanks are fed to the soldering mechanism, a shaft geared with the driving mechanism and provided with a driving-lug, a driving-wheel supporting the secondary conveyer and mounted loosely on said shaft, and a spring-pawl mounted on said driving-wheel and engaging with said driving-lug, substantially as set forth.

17. In a can-body machine, the combination with the soldering-horn, and the conveyer whereby the can-body blanks are carried along said horn, of a soldering-roller arranged lengthwise over the horn and adapted to apply solder to the seams of the can-body blanks, a solder-melting pot arranged adjacent to the horn, a feed-roller adapted to be immersed with its lower portion in the molten solder in the pot, and a transfer-roller engaging with the feed-roller and soldering-roller, substantially as set forth.

18. In a can-body machine, the combination with the soldering-horn, and the conveyer whereby the can-body blanks are carried along said horn, of a soldering-roller arranged lengthwise over the horn and adapted to apply solder to the seams of the can-body blanks, a solder-melting pot arranged adjacent to the horn, a feed-roller adapted to be immersed with its lower portion in the molten solder in the pot, a transfer-roller engaging with the feed-roller and soldering-roller, and a support which carries the transfer-roller and

soldering-roller and which is capable of turning concentrically with the feed-roller, substantially as set forth.

19. In a can-body machine, the combination with the soldering-horn, and the conveyer whereby the can-body blanks are moved along said horn, of a hollow soldering-roller arranged lengthwise of the horn and adapted to apply solder to the seams of the can-body blanks, a solder-melting pot arranged adjacent to the horn, a feed-roller arranged in said pot and mounted on a driving-shaft, a hollow transfer-roller engaging with the feed-roller and soldering-roller, burners arranged to deliver flames into said transfer and soldering rollers, rock-arms supporting the shafts of the transfer and soldering rollers and turning with their inner ends on said driving-shaft while their free ends are adapted to rest on the adjusting-screws, and intermeshing gear-wheels connected with the shafts of the several rollers, substantially as set forth.

20. In a can-body machine, the combination with the soldering mechanism and the horn or internal guide over which the can-body blanks are moved past the soldering mechanism, of an external guide which supports the can-body blanks from the outer side after the same leave the horn or internal guide, a wiper or brush which is arranged in rear of said horn and with which the seams of the can-body blanks are engaged for removing the surplus solder therefrom, and a retaining-bar which extends rearwardly from the lower portion of the soldering-horn and engages with the lower inner side of the can-body blanks, whereby the latter are prevented from being displaced by the pressure of the wiper or brush against the same, substantially as set forth.

21. In a can-body machine, the combination with the soldering-mechanism and the horn over which the can-body blanks are moved past the soldering mechanism, of a brush or wiper arranged obliquely in the path of the seams of the can-bodies and adapted to remove the surplus solder from the seams and carry the same laterally away from the path of the seams, substantially as set forth.

Witness my hand this 2d day of March, 1900.

JAMES GOULD, JR.

Witnesses:
THEO. L. POPP,
JNO. J. BONNER.