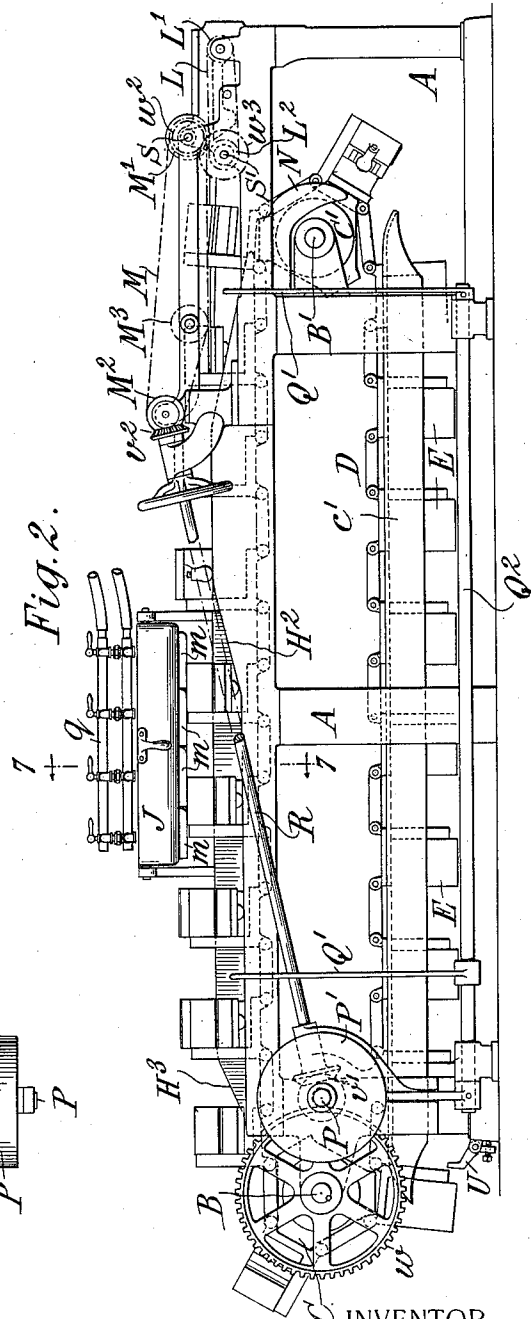
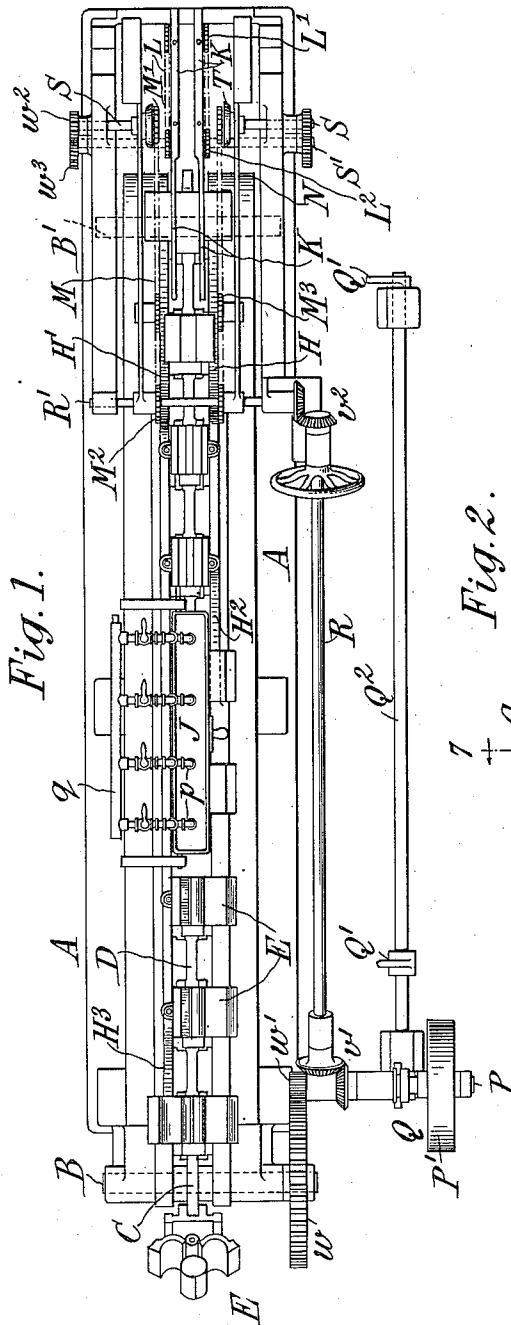


P. KRUSE.
MACHINE FOR MAKING CAN BODIES.
APPLICATION FILED AUG. 7, 1911.

1,046,088.

Patented Dec. 3, 1912.

3 SHEETS—SHEET 1.



WITNESSES:

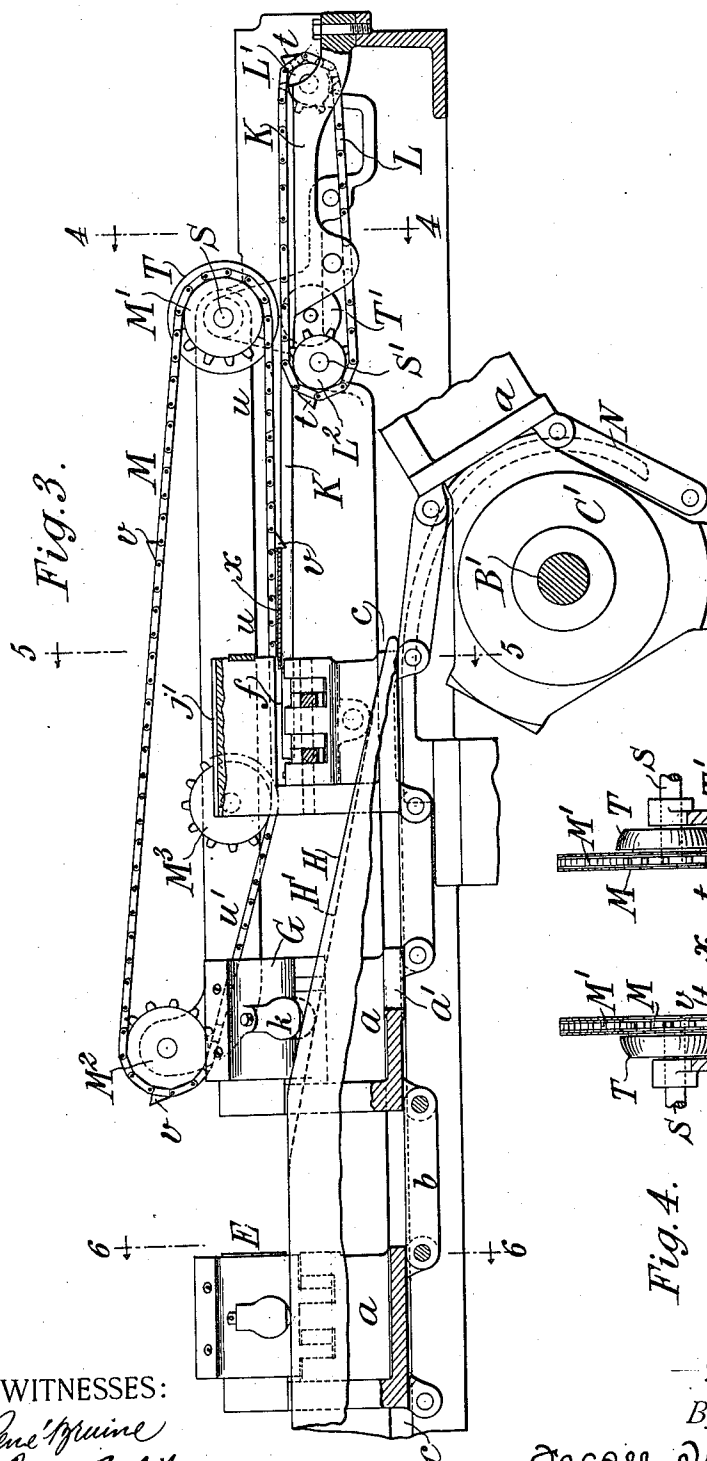
Rene Gruine
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INVENTOR
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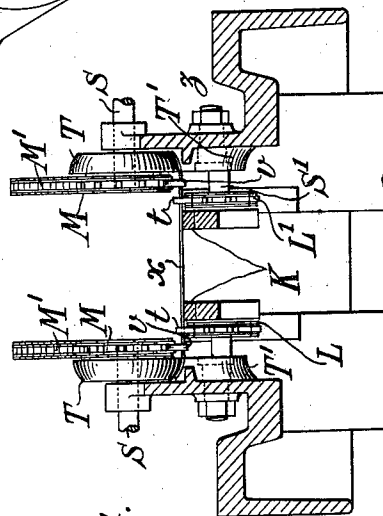
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5.

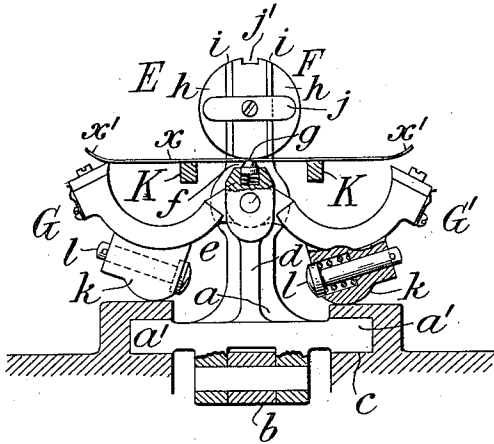


Fig. 6.

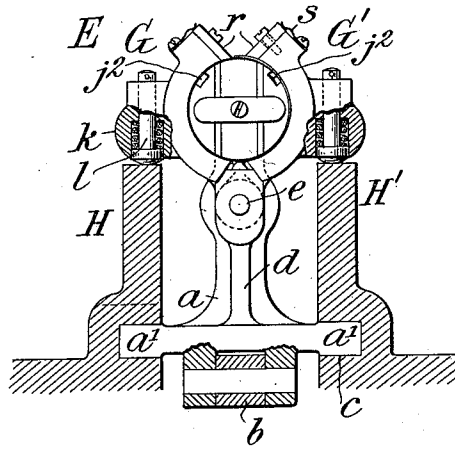


Fig. 8.

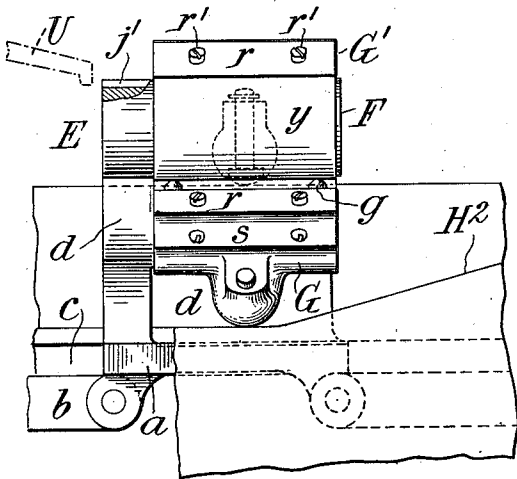
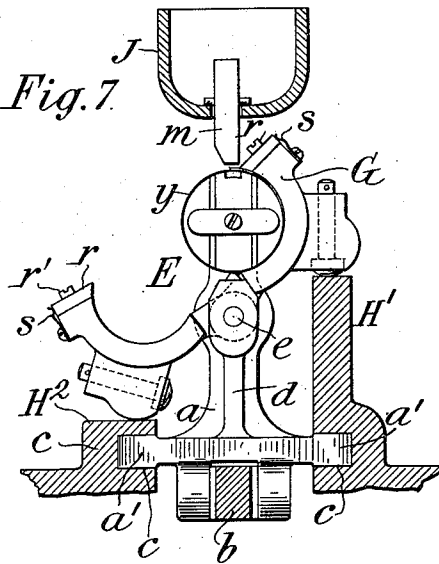


Fig. 7.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING CAN-BODIES.

1,046,088.

Specification of Letters Patent.

Patented Dec. 3, 1912.

Application filed August 7, 1911. Serial No. 642,886.

To all whom it may concern:

Be it known that I, PETER KRUSE, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Machines for Making Can-Bodies, of which the following is a specification.

This invention provides a machine for making lap-seam can bodies.

It comprises means for wrapping a sheet or blank around a former horn, for holding it in position against such horn while being soldered, and for subsequently releasing and ejecting the can body. In the preferred construction of the machine, the formers are carried by the links of an endless chain with their horns projecting rearwardly, and feeding means are provided for pushing the body blanks forward into position beneath the horns, whereupon hinged folding wings or jaws are displaced to wrap the blank around the horn. One of these folder jaws moves in advance of the other, so that the inside lap of the seam shall be forced against the horn sufficiently in advance of the outside lap to prevent their colliding. The inside lap folder preferably moves away after the blank has been securely clamped by the outside lap folder, in order to afford ample space for the operation of the soldering device.

The accompanying drawings show a machine constituting the preferred embodiment of my invention.

Figure 1 is a plan of the machine on a small scale; Fig. 2 is a side elevation thereof; Fig. 3 is a fragmentary side view on a larger scale, being partly in longitudinal section and showing principally the feeding means; Fig. 4 is a fragmentary transverse section cut in the plane of the line 4—4 in Fig. 3; Fig. 5 is a fragmentary vertical transverse section in the plane of the line 5—5 in Fig. 3 showing one of the formers with its folders open; Fig. 6 is a vertical transverse section in the plane of the line 6—6 in Fig. 3 showing one of the formers with its folders closed against the horn and the blank wrapped around the latter; Fig. 7 is a fragmentary vertical transverse section showing the former with one of its folders dropped, this being the position during and after the soldering operation; Fig.

8 is a side elevation of Fig. 7 partly in section.

Referring to the drawings, the machine comprises any suitable framing A for supporting the moving parts. This frame provides bearings for two sprocket shafts B B' which carry sprocket wheels C C', by which is carried an endless chain D on which are carried the successive formers E E. The chain D is constructed of alternate links *a* and *b*. The links *a* constitute slides, being formed with lateral flanges *a'* which move in slideways *c* formed in some suitable part of the main frame A, or in some special frame supported by the main frame as desired; the slideways *c* are extended substantially the length of the main frame so as to engage the slide links *a* while the latter are executing their working travel along the upper part of the machine. Similar slideways may be provided for engaging them during the return movement of the chain beneath the machine, but it is sufficient to provide supports *c'* over which they may slide and which will serve to prevent undue sagging of the chain. The links *b* *b* are or may be simple connecting bars united by pins or pintles to the links *a*.

Each of the formers E comprises a forming horn or mandrel F, and two hinged folding jaws or wings G G' which I will call folders. Each link *a* carries one of the formers. To this end each link is formed with a rigid projection *d* to which the horn F is integrally connected or rigidly attached. The swinging jaws or folders G G' are pivoted to the projection *d* by means of a hinge pin *e*. Between the upper part of the projection *d* and the horn F is left a gap or narrow space *f* (Fig. 5) into which the body blank *x* is to be pushed by the feeding mechanism to the position shown in Fig. 5. Spring-pressed pins or buttons *g* are provided for frictionally gripping the blank when in this position to prevent its accidental displacement.

The horn F for a cylindrical can is made cylindrical with its exterior of the exact size of the interior of the can body to be formed. For a can of oval form or otherwise varied from the cylindrical, the horn will be correspondingly changed in exterior contour. The folders G G' should also have their inner faces of corresponding contour

so as to fit closely to the exterior of the can body. For round cans the same horn F and folders G G' may be used for slightly different sizes of can bodies, by making the horn adjustable in size in any well known manner, as for example by constructing it with removable sides or cheek pieces *h h* (Fig. 5) and providing filling pieces or plates *i i* between these cheek pieces and the middle member of the horn (this middle member being preferably fastened fixedly to the projection *d*), so that by substituting thicker or thinner filling pieces *i i* the horn may be enlarged or diminished in size. An end clamp *j* is provided for holding the cheeks and filling pieces in place. Any other means may be substituted for adjusting the size of the horn, the one shown being a well known expedient.

The folders G G' are freely hinged to the projection *d* as stated, and may swing from the fully open position shown in Fig. 5 to the fully closed position shown in Fig. 6. In so swinging they fold the blank *x* around the horn and clamp it into tight contact therewith. To impart to them these swinging movements, cam faces are provided constructed preferably as inclined planes H and H' (Fig. 3) which act upon bosses *k k* formed on the respective folders. As the folder G for the inner lap of the seam must act in advance of the folder G' for the outer lap, the cam incline H which operates the folder G is given a quicker pitch than the incline H' for the folder G', as clearly shown in Fig. 3.

In order to impart to the folders a desirable degree of yielding movement, each is provided with a spring pressed plunger *l* passing through the boss *k*, and which as the folder approaches its closed position comes into bearing upon the incline H or H'. The proportions are such that the folders close the blank firmly against the horn shortly before the plunger *l* passes onto the top of the cam inclines, so that in completing the lift imparted by the cams these plungers are pressed in against their springs, whereby the folders are held closed with a yielding pressure determined by the resilience of the springs. This construction allows for variations in the thickness of the sheet metal blanks, and also compensates for wear or for any slight inequalities or imperfections. The lost motion thus provided also enables a certain degree of adjustment to be made in the size of the horn, without necessitating an alteration in the folders, so that slightly different sizes of cans can be made by merely changing the size of the horn in the manner described.

The soldering mechanism is shown at J. No novelty is claimed for this mechanism, and any known or suitable construction of soldering device may be provided. The

one shown consists of an elongated receptacle through which project a continuous series of soldering irons *m m*. The soldering irons are heated to the required degree by gas jets from burners *p p* fed with gas from a pipe *q* under the control of suitable cocks. The receptacle serves to inclose the flames from the burners. Any other method of heating may be provided however. The solder may be applied to the blanks either before or after folding around the horn and according to any of the well known methods, that is to say, by the use of solder wire, or by flowing solder into the seam from a tank of molten solder, or in any other way.

Inasmuch as most soldering means require more space to work upon than is afforded between the folders G G' when closed as shown in Fig. 6, it is desirable to afford the additional room by dropping one of the folders while keeping the other pressed into position to clamp the seam fast and hold it in position during soldering and long enough thereafter to enable the solder to set. For this purpose it is the inner lap folder which must be dropped so that the outer lap folder G' may hold the seam. This position is shown in Fig. 7, the folder G having been dropped down and the folder G' being held closed to clamp the blank which now forms the can body *y*. Thus is afforded ample room for the soldering device to act upon the seam. For thus dropping the folder G its cam rail H instead of being continued level like the rail H', is caused to descend upon an incline H², shown in Fig. 2, and indicated also in Fig. 8.

An important detail resides in the provision of the folders G G' with elastic or yielding terminal or edge portions where they engage the seam. These portions are formed each as a plate *r* having slotted engagement with fastening screws *r'* (or other fastening means whereby the plate may move outward or inward relatively to the folder). Each plate *r* is pressed inwardly by one or more leaf springs *s* carried on the folder. The required movement is very slight, being sufficient only to provide a give or take engagement with the seam. By means of this yielding edge portion the respective flaps of the seam are pressed down closely but yieldingly against the horn, notwithstanding the presence of any slight inequalities in the sheet metal of the blank.

The means for feeding the blanks to the formers will now be described.

My machine is well adapted to the application of automatic feeding means, but is equally adapted to hand feeding. Assuming that the blanks are fed by hand, they are laid one by one upon supporting bars K, their position being determined by any suitable gages not shown. The blank thus fed

remains motionless until engaged by infeeding pushers t which in the construction shown are carried by endless feed chains $L L$, which chains are carried over sprockets $L' L^2$ at opposite ends and driven from any suitable gearing. As it is impracticable for the infeeding pushers t to carry the blank forward far enough to introduce it into its proper former, I provide an intermediate feed or carrier consisting preferably of a second pair of endless chains $M M$ which are carried upon sprockets $M' M^2$ at opposite ends and driven by any suitable gearing. A pair of idler sprockets M^3 is provided bearing upon the lower stretch of the chains between the main sprockets. The function of these intermediate sprockets is to change the direction of the chains, so that the portion $u u$ between the sprockets M' and M^3 travels horizontally and in the same plane as the gap f (Fig. 5) by which the blank enters the former. The portion u' between M^3 and M^2 is inclined as shown, so that it rises above the plane of the portion u . The chains $M M$ carry feeding pushers $v v$ which engage the rear edge of the blank, and being caused to move faster than the pushers $t t$ carry the blank beyond the latter and move it forward at a speed faster than that at which the formers are traveling, so that they push the blank into the gap f of the former and continue to move it forward until it is seated completely therein. At this instant the former has passed the sprockets M^3 , and the pushers, having begun to ascend the inclined portion u' of the chains, are thereby sufficiently lifted above the plane of the blank to disengage themselves therefrom, leaving the blank held in the former as shown in Fig. 5.

The parts are so proportioned that as the main carrier chain D breaks around the sprocket C' , the ascending former E finds a clear space through which to move up into position; in this movement it is guided by curved guides N by which each link a is directed from the sprocket to the guiding ways $c c$. During this time the blank is supported on the bars $K K$. As soon as the former has risen far enough so that its carrying link a is entering the ways c , and shortly before it reaches the position of the rearmost former in Fig. 3, the rapidly traveling chains M push the advancing edge of the body blank x into the gap f . The blank in this movement is slid over the bars $K K$, which uphold and guide it until it is fully seated in the former. The speed of the chains M is such that their pushers $v v$ shove the blank into the former gap during the forward travel of the pusher, and until, just before the pushers free themselves from the blank as described, the blank becomes firmly seated in the former.

The chains $L L$ and $M M$ are arranged in

different vertical planes, as shown in Fig. 4, and are adjustable laterally, as are also the bars $K K$, to adapt the machine to different sizes of body blanks.

The machine is driven by a belt or other means applied to a driving shaft P , which is shown as having a belt pulley P' . This pulley is preferably free on the shaft, but adapted to be coupled thereto by a clutch Q of any known description which is operated by one or more controlling handles Q' through a rock shaft Q^2 ; or any other means may be provided for starting or stopping the machine at will. The shaft P carries a pinion w' which drives a gear-wheel w on the sprocket shaft B , whereby motion is imparted to the main carrier chain D and the formers. By miter gears v' motion is communicated from shaft P to an inclined shaft R , which through miter gears v^2 drives the transverse shaft R' carrying the sprocket wheels M^2 . From this shaft motion is communicated through the chains $M M$ to the sprocket wheels M' which are carried on separate shafts $S S$ so as to leave a clear space between the sprockets. These shafts are provided with spur gears w^2 which mesh with larger gears w^3 on shafts S' which carry the sprockets L^2 by which the chains L are driven. The ratio of gearing is such as to drive the chains M faster than the chains D and L for the purpose described.

It is desirable to curl or bend the end portions of the body blank, being the portions destined to come at and adjacent to the seam. A suitable bending means consists of pairs of rollers between which the blank is fed, and which seize the ends thereof and bend them in order to round or curl their edge portions. These rollers are best seen in Fig. 4, and comprise a convex-faced upper roll T and a concave-faced lower roll T' . The rolls $T T$ are shown as mounted on the shafts $S S$. The rolls $T' T'$ are mounted to turn freely upon adjustable studs z fixed in the side frames. Thus the edge-curling rolls are located so as to act upon the blank while it is being fed toward the former. The result of this edge curling is shown in Fig. 5, where the slightly upturned portions x' have been acted upon by the respective pairs of rolls. This edge curling of the blank greatly improves the can and facilitates its manufacture. The rounding or curling of the edge portions may be of the same radius as the can body, but preferably is made with a somewhat less radius.

It is desirable to provide means for discharging the finished can bodies from the machine. This is best done automatically. As before stated, the can bodies are held by the folder G' for a sufficient time after soldering to permit the solder to set. It is then desirable to open or turn back the folder G' , thereby restoring it to the posi-

tion shown in Fig. 5. This releases the can body, which is then held solely by friction upon the horn. For thus turning back the folder G' the rail which engages it is formed with a downward incline H³ sufficiently remote from the soldering device. The can bodies may be removed at any subsequent point by means of a suitable stripper. This stripper may consist of an arm or stationary projection of any sort occupying relatively to the moving former the position indicated in dotted lines at U in Fig. 8, where its engaging end is arranged to enter a groove j' formed along the top of the horn (or along any other convenient portion of the horn, as for example in the cheek pieces h h, in which case it is convenient to apply two grooves as shown at j² j² in Fig. 6). As the former moves forward its groove j' is entered by the stripper U, and the latter consequently encounters the edge of the sheet metal can body at its front or advancing end, so that the can body is stopped by the stripper, and the continued forward movement of the former carries its horn out of the can body. Two or more strippers may be used if desired, and located in any suitable or convenient relation to the horn. It is preferable to locate the stripper U in the position shown in Fig. 2, where it will engage the can body after the latter has been carried by its former to the lower side of the sprocket C, so that the can body when ejected will fall free of the former and may drop into a chute or other conveyer which will lead the finished bodies out of the machine. The stripper U in Fig. 2 is shown pivoted and with an adjusting screw whereby it may be caused to enter more or less deeply into the groove j' as desired.

It is not necessary that the wing folders G G' be internally shaped so as to conform closely to the exterior contour of the can body. These folders may in fact be hollowed out to a larger contour, so that they need not necessarily make contact with the can body except where their adjustable edge portions or spring pressed plates r r are provided. By this means a considerable latitude for adjustment of the size and precise contour of the horn is admissible. It will be seen that because of the location of the axis of the pivot pin e the spring pressed plates r r as they approach their final closed position (Fig. 6) move in a direction substantially tangential to the cylindrical surface of the horn, and consequently act to stretch the sheet metal closely around the horn during their final movement, whereby the blank as it is formed into the can body is made to closely hug the horn, irrespective of whether the folding wings or jaws G G' make internal contact with it or not.

It must not be inferred from the particularity with which I have described all the

details of the machine which contains the preferred embodiment of my invention, that the latter is limited by any means to such details, as in fact my invention is susceptible of a wide range of modification, and may be varied within considerable limits according to the particular use to be made of the machine. My invention is understood to cover such modifications, variations or departures from the precise construction shown as would be apparent to a skilled mechanic or engineer, or within the proper exercise of their skill in re-designing the machine.

What I claim is:—

1. In a can body making machine, a succession of traveling formers each formed with a gap opening rearwardly for receiving the blank, combined with feeding means for pushing the successive blanks into the gaps of the successive formers while the latter are advancing, said feeding means comprising a preliminary feed for carrying the blanks toward the formers, and a secondary feed moving faster than the preliminary feed and faster than the formers and adapted to carry the blanks from the preliminary feed and push them into the gaps of successive formers during the travel thereof.

2. In a can body making machine, a succession of traveling formers each formed with a gap opening rearwardly for receiving the blank, combined with feeding means for pushing the successive blanks into the gaps of the successive formers while the latter are advancing, said feeding means comprising an endless chain moving faster than the formers and having pushers for engaging the blanks.

3. In a can body making machine, a succession of traveling formers each formed with a gap opening rearwardly for receiving the blank, combined with feeding means for pushing the successive blanks into the gaps of the successive formers while the latter are advancing, said feeding means comprising stationary supports for the blanks, and an endless chain for moving the blanks over said supports into the former gaps, said chain traveling faster than the formers.

4. In a can body making machine, a succession of traveling formers each formed with a gap opening rearwardly for receiving the blank, combined with feeding means for pushing the successive blanks into the gaps of the successive formers while the latter are advancing, said feeding means comprising pushers, and means for moving said pushers adapted to move them in the plane of said gaps during the feeding-in movement, and to divert them away from said plane at the end of said movement to free the pushers from the blanks.

5. In a can body making machine, a succession of traveling formers each formed with a gap opening rearwardly for receiving

ing the blank, combined with feeding means for pushing the successive blanks into the gaps of the successive formers while the latter are advancing, said feeding means comprising an endless chain having pushers, and means for directing said chain whereby its pushers move in the plane of said gaps during the feeding-in movement, and are then inclined away from said plane to free the pushers.

6. In a can body making machine, traveling formers comprising each a horn and folders for wrapping a blank around such horn, stationary cams traversed by the former for so moving said folders, and a yielding medium interposed between the folders and cams whereby to communicate the cam thrust yieldingly to the folders.

7. In a can body making machine, a former comprising a horn, folders for wrapping a blank around such horn, cams for so moving said folders, and spring pressed plungers carried by said folders and engaging said cams to communicate the cam thrust yieldingly to the folders.

8. In a can body making machine, a former comprising a horn and folders for wrapping a blank around such horn, said folders pivoted beneath the horn and engaging the blank at their outer edge portions with a movement approximately tangential to the horn, whereby their friction against the blanks draws it tightly around the horn and having a yielding outer edge portion for elastically pressing the blank against its horn.

9. In a can body making machine, a former comprising a horn, and a swinging folder for wrapping a blank around said horn, said folder having a yielding outer edge portion for elastically pressing the blank against the horn.

10. In a can body making machine, a former comprising a horn, and a swinging folder for wrapping a blank around said horn, said folder having a movable outer edge portion and means for pressing the latter yieldingly against the horn.

11. In a can body making machine, a former comprising a horn, and a swinging folder for wrapping a blank around said horn, said folder having an obliquely movable plate forming its edge portion and a spring reacting against the folder for pressing said plate yieldingly toward the horn in direction to draw the edge portion of the blank tightly against the horn.

12. In a can body making machine, a former comprising a horn and pivoted folders for wrapping a blank around the horn, yielding means for communicating movement to said folders, and one of said folders having a yielding outer edge portion for elastically pressing the blank against the horn.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

PETER KRUSE.

Witnesses:

CHAS. J. ELLSMITH,
CHARLES THOMA, Jr.