W. GREEN.

Sheet-Metal Can-Machine.

No. 196,351. Patented Oct. 23, 1877.

FIG. 1.

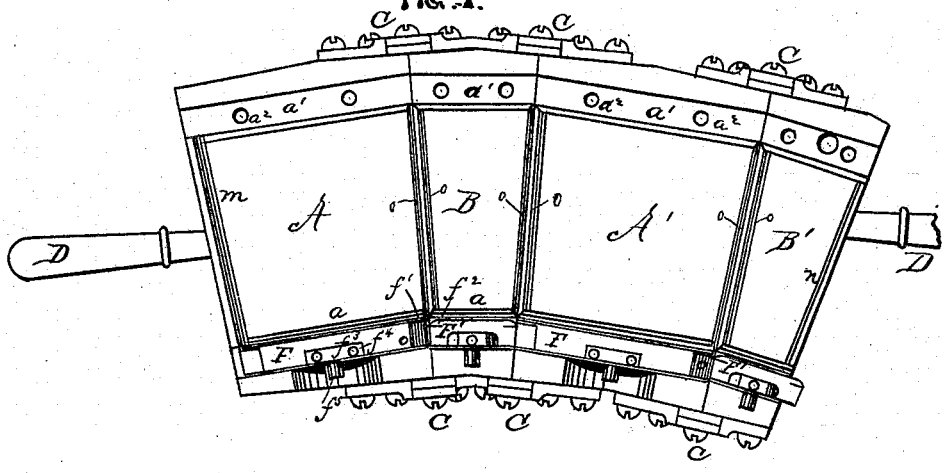


FIG. 3.

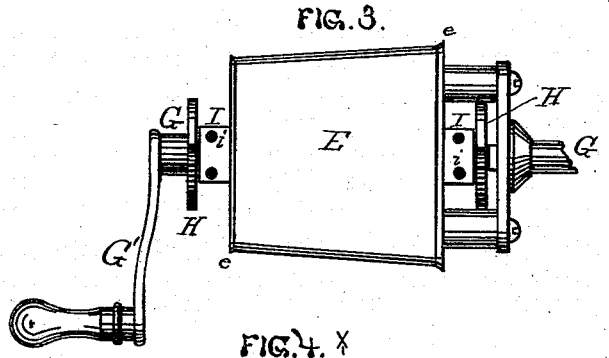


FIG. 5.

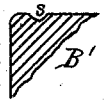


FIG. 4.

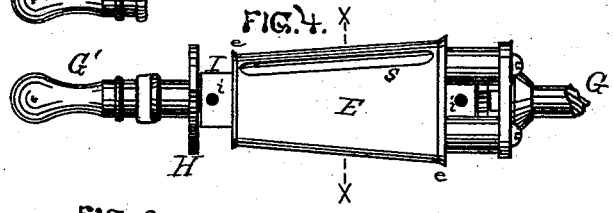


FIG. 2.

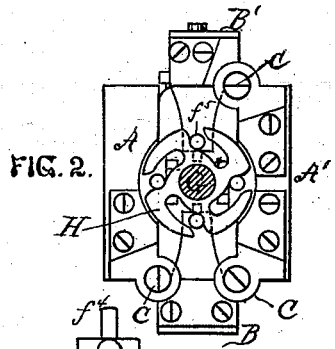


FIG. 8.

FIG. 6.

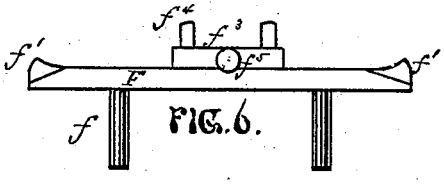
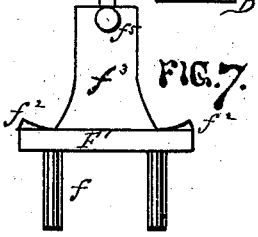


FIG. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM GREEN, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN SHEET-METAL-CAN MACHINES.

Specification forming part of Letters Patent No. **196,351**, dated October 23, 1877; application filed April 7, 1877.

To all whom it may concern:

Be it known that I, WILLIAM GREEN, of Chicago, in the county of Cook and State of Illinois, have invented certain Improvements in Sheet-Metal-Can-Forming Machines, of which the following is a specification:

This invention relates to the same class of machines as that shown in, and illustrated by, the Letters Patent granted to me February 8, 1876, and numbered 173,120, and is an improvement on that machine. It is designed to perform the same function—viz., to form the body of the can from one piece of metal, bringing the seam at one corner, and to bend the edges of the top and bottom upon all the four sides inward at an angle to the plane of the sides, forming flanges to support the top and bottom when soldered in place; but it performs an additional function as well, in that it bends the edges at the top and bottom of the sides first outwardly and then inwardly, thus forming, instead of a flange merely, a V-shaped groove upon the inside of the edges, such groove having great advantages over a simple flange in the manufacture of those cans which are to be hermetically sealed, and also in others, because the joint between the ends and sides can be made tighter and with less solder. There are also other features changed from my previous machine, the nature of which will be fully understood from what is hereunder written, when taken in connection with the drawing herewith filed, forming a part of this specification, and in which drawing—

Figure 1 is a top view of the forming-dies when opened to receive the blank. Fig. 2 is a face view of the end of the machine when closed upon the can. Fig. 3 is a side view, and Fig. 4 a top view, of the forming-block. Fig. 5 is a transverse section of a portion of the forming-block upon the line *x x* of Fig. 4. Figs. 6 and 7 are views of the movable dies, one being such as are used on the wide side and the other upon the narrow side of the can. Fig. 8 shows the manner of holding one of the movable dies in place against accidental displacement.

Like letters of reference indicate like parts in all the figures.

In said drawing, A A′ are the die-blocks for shaping the wide sides of the can, and B B′ those for shaping the narrow sides. C C are hinges joining all these blocks together, and D D are the handles by which they are operated. The edges at the ends of the acting surfaces of these die-blocks are beveled off at an angle outward to the plane of their faces, as shown at *a a*. The forming-block E is of the same construction as that shown in my previous patent, except in the particulars hereinafter specified. It is provided at each end with outsetting flanges *e*, which, when the die-blocks are closed around it, set into the space left in the latter by the bevels *a*. In this way I give the can ends the outward bend, as will be readily understood.

The second or inward bend is imparted to the metal of the can by means which I will now describe.

Across each end of the die-blocks are cut grooves a^1, into which are placed movable dies F and F′, those marked F being in die-blocks A A′, and those marked F′ in die-blocks B B′. These dies are movable in that they are free to slide in and out upon the pins projecting from their under surfaces, and lettered *f*, such pins working in appropriate recesses a^2, opening into the grooves a^1. Upon their sides next the die-blocks these dies present a perpendicular or inclined surface, according to the angle desired to be given to the metal of the can by the inward bend. The dies F are beveled off at their ends from their faces toward their backs, as shown by the drawing, with the exception of a sharp lip, f^1, at their inner corners. This lip rises slightly above the plane of the face of the die. The dies F′, at their inner corners, are given blunt lips f^2, also rising above the face of those dies, and upon the sides toward the beveled edge *a* of the die-blocks are rounded off to such an extent that when the series of die-blocks are folded around the forming-block the lips f^1 will fold on the outside of lips f^2—that is, between such lips and the face of the die-block. These lips f^1 and f^2 serve to effectually bend the metal at the corners of the can.

Centrally between ends of each of these dies, and upon the outside thereof, away from contact with the metal of the can, are risings or standards f^3, from the faces or tops of which rise the pins or guides f^4, one or more, the office of which will be shortly explained.

From the outward side of the standards project pins f^5, whose function will likewise be made to appear from what is below written.

The forming-block is pierced centrally its entire length for the reception of a shaft, G, rotated by the crank G′. At each end this shaft bears a cam-wheel, H, whose peculiar construction will be fully understood from Figs. 2, 3, and 4.

At each end the forming-block is provided with four-sided projections I, centrally placed, and inclosing the shaft G, and pierced with recesses *i i*, so located that when the die-blocks are folded around the forming-block the pins f^4 will enter the recesses.

The cam-wheel H being provided with four openings, when the blocks are brought to the position shown in Fig. 2, the pins f^5 enter the openings, one in each, as shown in said figure.

By applying power to the crank G′ and turning it to the left, the cam-acting surfaces in the wheel H, acting upon the pins f^5, draw all the dies toward the center of the shaft with the same speed and at the same time, and thereby the extreme end of the can, being the outward part of the portion previously bent outward by the closing of the die-blocks upon the forming-block, is given the final and inward turn.

The parts thus described are duplicated at the other end of the machine, and operated by the same shaft at the same time, and this enables me to finish both ends of the can at one operation.

The machine shown is calculated for the manufacture of cans whose ends form rectangles, and therefore the standards f^3 upon the short dies are much longer than those upon the long dies. They should be so adjusted as to meet that portion of the cam by which they are operated upon, and, of course, can be varied to suit the size and form of can to be produced. The pins f and f^4 secure an even movement of the dies, and prevent twisting and lateral play.

The machine shown is also made to form cans with round corners. This necessitates the hollowing out of the die-blocks, or, rather, the giving them a raised lip at each side, in such manner that when the blocks are folded up the adjoining lips upon the adjacent sides of the blocks will present a rounded surface, conforming to the corner of the forming-block. To allow these lips *o* to come close together and form an unbroken surface, I bevel them off toward the adjacent blocks, as shown in Fig. 1.

It will be noticed that the die-block A, at its outside edge, is made to project at right angles to its face to such an extent that it almost spans the corner of the former-block. The sheet is placed upon the open blocks in such position that one end thereof will be bent by this flange *m* down upon the uppermost side of the forming-block, the two ends of the sheet meeting over the groove *s*, located near one corner of the former-block, and constructed as shown by the drawing.

The die-block B′, at its outer edge, is provided with a flange, *n*, which, when the block is folded down upon the former, dents the metal ends down into the groove, thereby locking them together, and enabling me to form a tight and firm seam between them.

The die-block B′ is narrower than its opposite block, because the flange *m* performs part of the work which would devolve upon it if constructed like the other. In consequence of this fact, the die F′ projects beyond it at one side.

In Figs. 6 and 7 the dies are shown upon an enlarged scale.

The die F′ in block B′ is prevented from falling out by a screw, *v*, inserted from the outside of the block, the head of the screw being at liberty to enter the hole such a distance as will permit the necessary movement to the die.

By means of a spring, *v′*, coiled around the screw, and compressed between its head and the bottom of the enlarged part of the hole, as shown in Fig. 8, this die F′ is at all times, when unemployed, kept in position ready for duty.

The movable dies, instead of the construction shown, may be made with their divisions at the centers of the sides, each one thus occupying a corner instead of a side, and having an L shape, and when so made the pins by which they are actuated in operation should be placed in the angles.

What I claim as new is—

1. The former E, shaft G, and cams H, in combination with the die-blocks and movable dies inserted in the die-blocks, substantially as and for the purpose set forth.

2. The movable dies F and F′, beveled at the ends, provided, respectively, with lips f^1 and f^2 at their inner corners, and combined together, substantially as set forth.

3. The movable dies F and F′, provided with pins f and f^4, substantially as specified.

4. The combination of the series of movable dies, provided with pins f^5, with the series of cams H, substantially as set forth.

5. The former E, having a groove, *s*, at one corner, in combination with the die-block B′, having the flange *n*, essentially as described and shown.

6. The die-blocks having the lips *o* at their adjacent sides, and the bevel to allow the lips to meet when they are folded around the former E, substantially as specified.

WILLIAM GREEN.

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