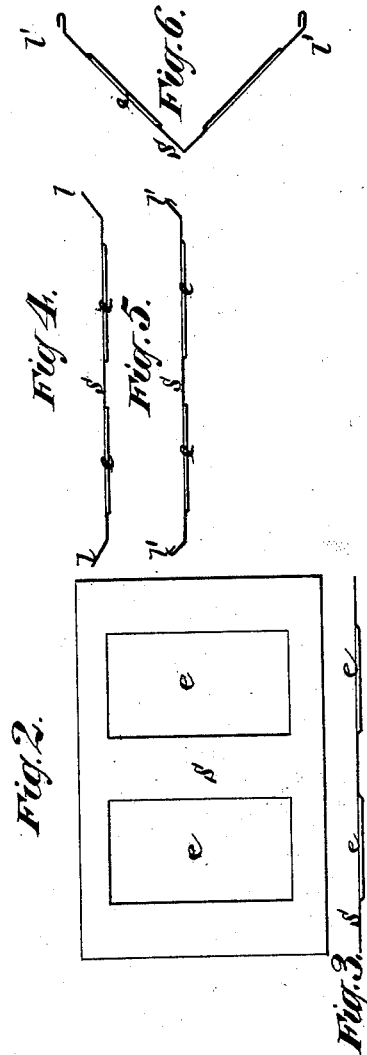
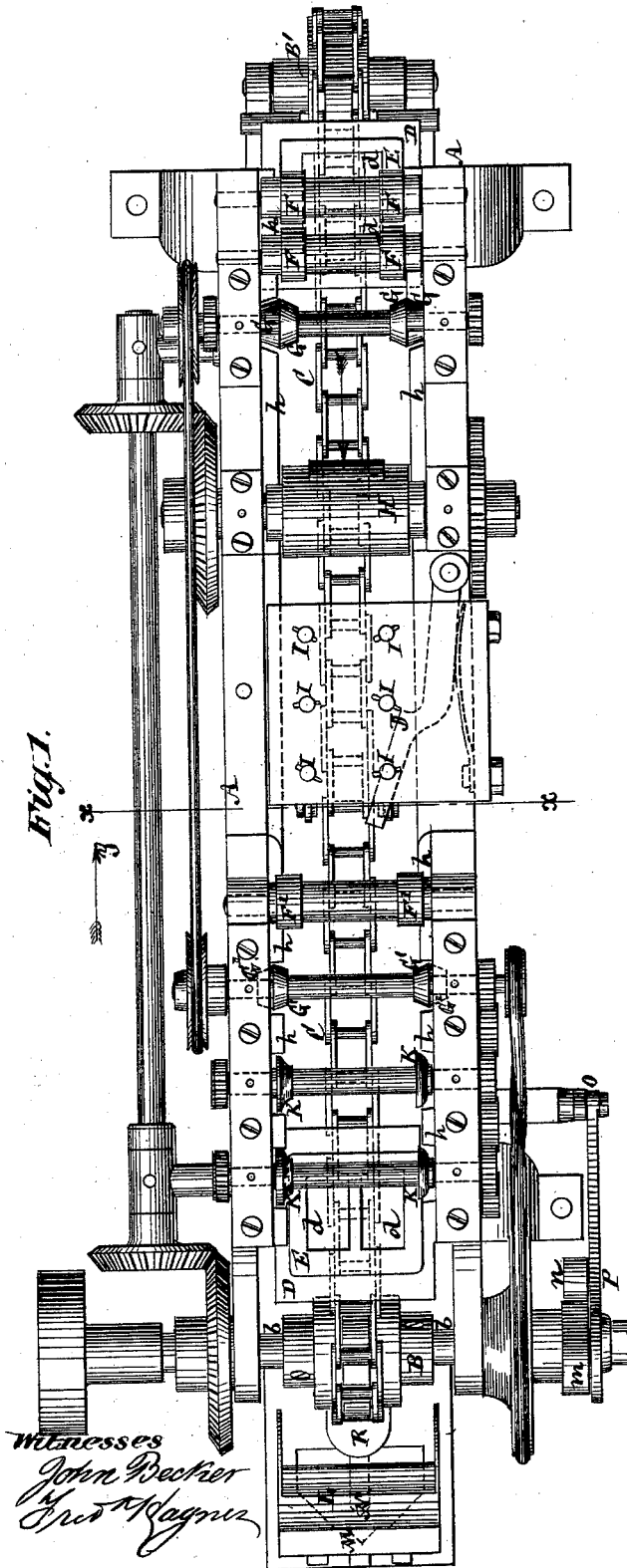


H. MILLER.
Machine for Making Sheet-Metal Can-Body.
No. 216,434. Patented June 10, 1879.

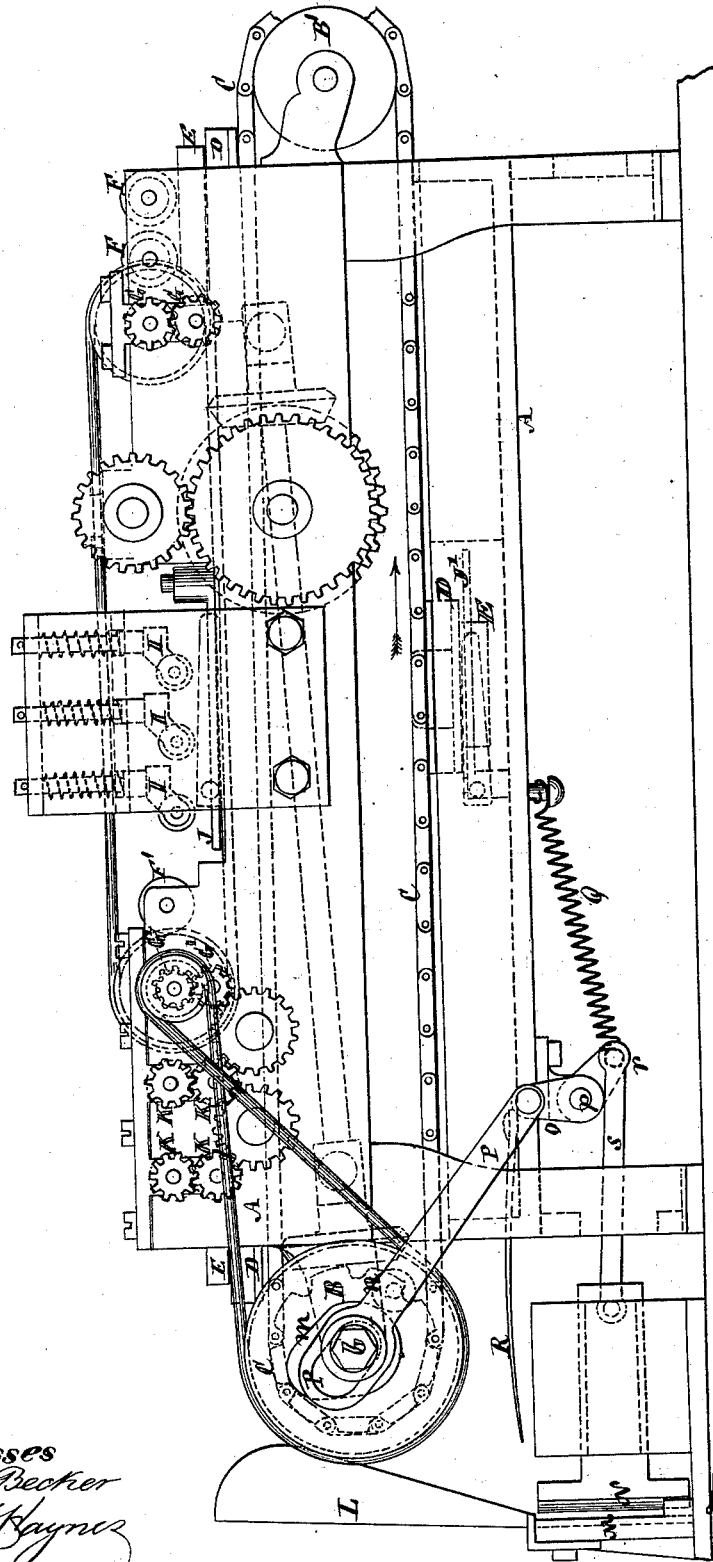


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Fig. 2.



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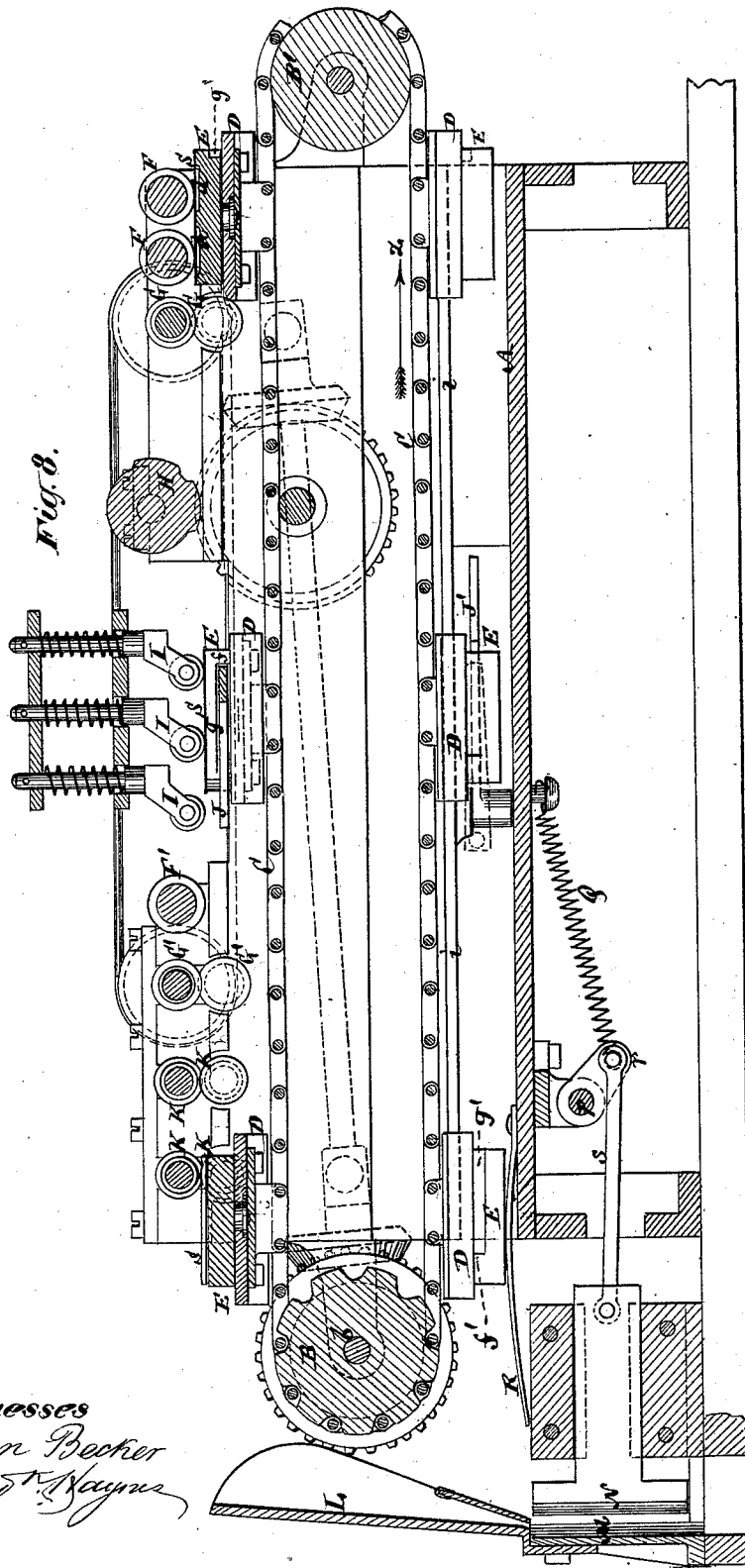
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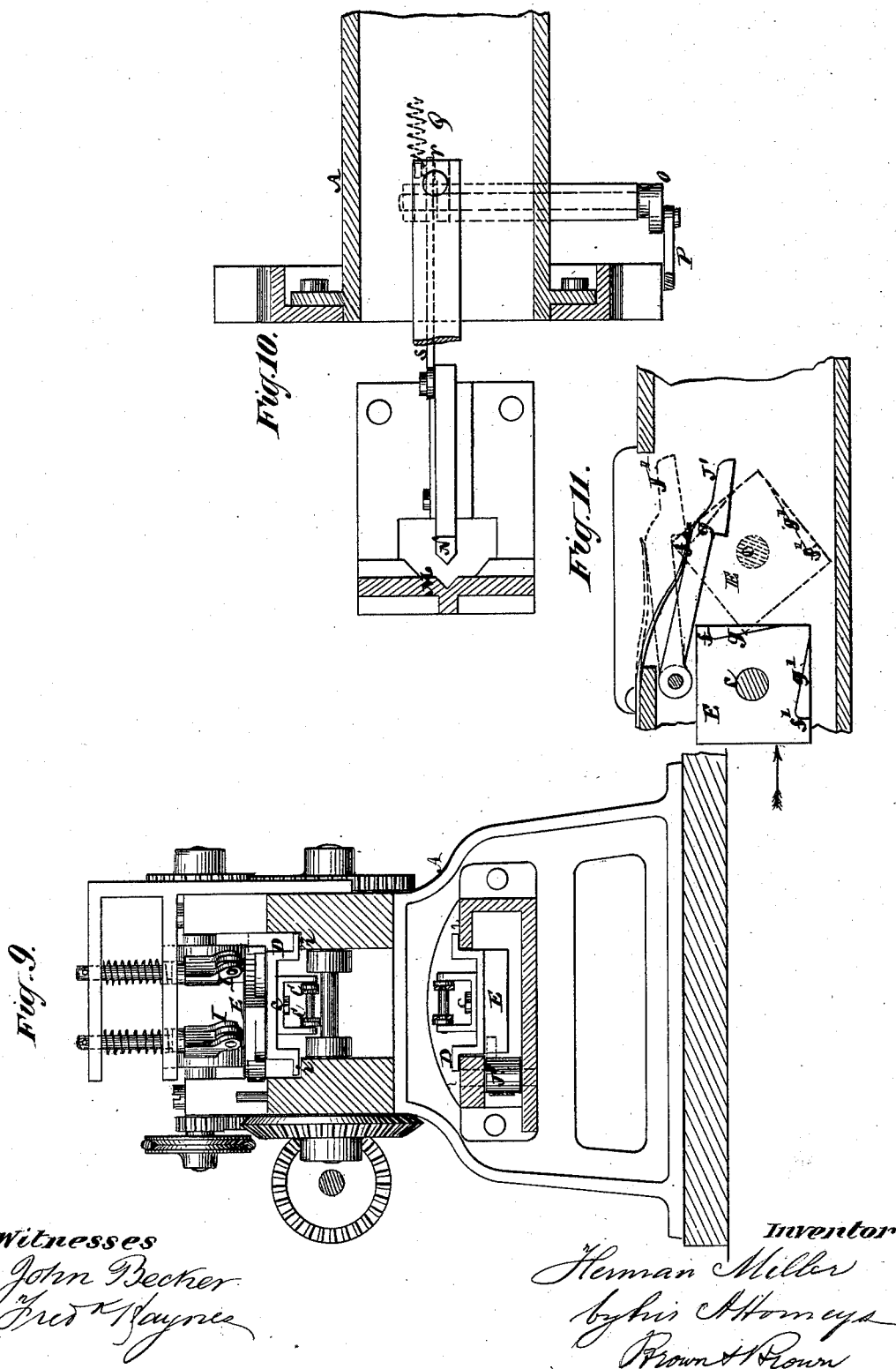
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UNITED STATES PATENT OFFICE.

HERMAN MILLER, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR MAKING SHEET-METAL CAN-BODIES.

Specification forming part of Letters Patent No. **216,434**, dated June 10, 1879; application filed April 16, 1879.

To all whom it may concern:

Be it known that I, HERMAN MILLER, of the city and State of New York, have invented certain new and useful Improvements in Apparatus for Making Sheet-Metal Can-Bodies, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

This invention more particularly relates to the manufacture of sheet-metal can-bodies, which are usually of a parallelogram form in their transverse section, and which are composed of two plates bent intermediately of their length to form two sides, respectively, of a can-body, also which have panels raised on them, and have two of their opposite edges turned to form hook-shaped lap-joints or seams extending up the sides of the can-body.

Previously to this invention it has been customary in making such can-bodies to prepare and form the plates of which said bodies are composed by a series of operations in different machines or apparatuses—as, for instance, to separately trim the edges of the plates, to form or raise the panels on the plates, to edge them so that they will form hook-shaped lap joints or seams, and to bend the plates intermediately of their lengths or between the panels to form of each plate two adjacent can-sides.

The general object of this invention is to perform these several operations in a continuous manner by one and the same machine, or to perform two or more of said operations in a continuous manner by the same apparatus, but preferably to perform all of said operations successively by the same machine; and the invention consists in certain means, or combinations of means, for thus economizing time and labor in preparing and forming the plates.

In the accompanying drawings, Figure 1 represents a plan of a machine or apparatus constructed in accordance with my invention. Figs. 2, 3, 4, 5, and 6 are face and edge views of a plate used to form two sides of a can at different stages in the progress of the work. Fig. 7 is a side elevation of the machine. Fig. 8 is a vertical longitudinal section thereof; Fig. 9, a vertical transverse section of the same on the line $x x$ in Fig. 1, looking in di-

rection of the arrow y ; and Figs. 10 and 11 represent horizontal sections, in part, upon a larger scale, in illustration of certain means for bending the plate intermediately of its length, and of means for turning the plate-holder to its normal position from that given it during the progress of the work to effect the trimming of the plate.

A is the main frame of the machine. At the opposite ends of this frame, which may be of any suitable construction, are pulleys or drums, B B', around which an endless flexible carrier or chain, C, is passed, and with one, B, of which it engages, in order that it may be positively driven to travel in the direction indicated by the arrow z in Fig. 8, the shaft b of said pulley B being in such case the driving-shaft; but said chain may have the necessary motion imparted to it by any suitable means. Attached to said chain C are a series of work-carriers, D, arranged at any suitable distance apart. These carriers have connected with or mounted on their exterior surfaces, by means of central pivots c , work-holders or formers E, on which, in succession, as they, in common with their carriers D, commence to make their upper travel, the metal plates or sheets S to form either half of each can-body are placed, said work-holders or formers E being of such a size on their work-holding faces or surfaces as to leave a sufficient lap of the plates as will provide for trimming the edges of the latter and for paneling said plates.

Each plate S, as its holder or former E and carrier D of the latter commence to make their upper travel, passes under any number of holding-down rollers F, (see Figs. 1, 7, and 8,) to guide and keep the plate well down on its holder E, as by the continued motion of the chain C it is conducted to and passed between an upper and lower pair of rotary trimming cutters or shears, G G, arranged to trim two opposite and parallel overlapping edges of the plate. Each work or plate holder or former E has duplicate recesses d , (see Fig. 8,) or it might be corresponding projections, in or on its face, to form the panels in the plate S as the latter, by the continued motion of the chain C, passes under a matching forming-roll, H, which has dies formed to match with

the panels in the plate-holder. Figs. 2 and 3 show face and edge views of the plate after the latter has had the panels *c* formed in it.

The chain *C* next conveys each plate in succession, with its holder *E* and carrier *D*, from the matching or paneling roll *H* to and under a series of casters or swiveling pressure-rollers, *I*, which bear upon the plate, and serve to hold it in position while its pivoted holder *E* is turned a quarter round from the pivot *c* as a center, in order to place the two edges of the plate which have not yet been trimmed in a parallel relation with the chain, for the purpose, as hereinafter described, of subsequently trimming them. This turning of the plate with its holder *E* is effected by a shoulder, *f*, formed by a beveling recess, *g*, in one side of each holder *E*, (see Figs. 1, 8, and 9,) coming in contact with a spring-pawl, *J*, pivoted to one side of the main frame. A similar construction and combination of parts is more clearly exhibited in Fig. 11 for turning each holder *E* back to its normal position during the lower course of the travel of the chain *C* by a shoulder, *f'*, formed by a beveling recess, *g'*, in another side of the holder *E*, coming in contact with a spring-pawl, *J'*, which view, Fig. 11, will more clearly explain the action of the shoulder *f* on the spring-pawl *J* during the passage of the holder *E*, with plate resting thereon, under the pressure-rollers *I*.

Guiding ribs or projections *h* on the interior of the sides of the main frame serve to retain the intermittently turning or rotating plate-holders *E* in position, before and after they have been turned, during the travel of the chain *C*; but these guiding ribs or projections are omitted where the turning of said plates occurs. Fixed guides or rails *i* are also provided for supporting and directing the work-carriers *D* during the travel of the chain *C*.

In Figs. 8 and 9 a plate-holder, *E*, is represented as in the act of being turned while under the pressure-rollers *I*, which bear down on the plate.

After each plate-holder *E* has been turned to present the two untrimmed edges of the plate resting on it into parallel relation with the chain *C*, the latter, by its continued motion, conveys the plate-holder and plate under any desired number of further holding-down rollers *F'*, which guide and keep the plate well down on its holder *E* as it is conducted to and passed between a second set of upper and lower rotary trimming cutters or shears, *G'*, *G'*, to pare or trim the remaining edges of the plate not previously trimmed.

The paneled plate, having its several edges trimmed, is then or next carried forward along with its holder *E* by the chain *C*, so as to bring the overlapping edges of the plate on the sides thereof which are parallel with the chain *C* between suitably-constructed upper and lower edging-rollers *K*, arranged in sets, one in advance of the other, and so that each set successively operates to increasingly bend the

overlapping edges of the plate, first to give them the form represented at *l* in Fig. 4, and, ultimately, the hook-shaped form represented at *l'* in Fig. 5, in order to produce the desired hook-shaped lap-joints or seams up the sides of the cam, as hereinbefore referred to. Only certain of these edging-rollers *K* are here shown, as the invention is not restricted to any particular construction of them, which will vary with the form of joint it is required to produce, and said rollers may be constructed and arranged as in edging-machines already in use for making hook-shaped lap-joints.

The several pairs of rotary shears *G*, *G'*, the paneling-roll *H*, and the edging-rollers *K* are all positively driven in proper relation with each other by means of suitable toothed gears and bands and pulleys deriving their motion from the drum-shaft *b*, as represented in the drawings, or they may be otherwise suitably driven.

Each plate *S*, in succession, having been thus paneled, trimmed, and edged by or during the continuous travel of the chain *C*, is next shot or passed from over the back end of the chain down a hopper or guide, *L*, at the bottom of which it is received into or across a female angular or *V* shaped former, *M*, (see Figs. 1, 7, 8, and 10,) after which a sliding *V*-shaped male creaser, *N*, comes forward, and striking the plate in or across its middle, between the panels, causes said plate *S* to be bent between its panels into an approximately right-angled shape, to form two adjacent can-body sides, as shown in Fig. 6. The sliding or reciprocating *V*-shaped male creaser *N* is or may be operated by a cam, *m*, on the drum-shaft *b*, acting against a roller, *n*, carried by a slotted rod, *P*, which, by its attachment to a crank, *o*, on a rock-shaft, *p*, serves to give motion by a crank, *r*, and rod *s*, to the creaser *N*, to give to it the necessary forward projection to bend the plate, and a spring, *Q*, draws back said creaser and returns the slotted rod *P* to its normal position after the plate has been bent, and as the *V*-shaped creaser *N* retires the paneled edge and bent plate is delivered below the *V*-shaped former *M*, for use in conjunction with a similarly-formed plate to produce the can-body.

After each plate-holder *E* has delivered its plate *S* to be bent intermediately of the panels of the latter, as described, it is supported and held in position by a spring, *R*, to provide for its proper entry between the sides of the main frame, and for the proper entry of its carrier *D* over rails or supporting-guides in the lower course of the travel of the chain *C*, and as the latter makes its lower travel the shoulder *f'*, on one side of each plate-holder *E*, in succession striking the spring-pawl *J'*, causes said plate-holder to be turned one-fourth round, to adjust it to its normal position for a repetition of the operation as before, as the motion of the chain *C* carries it upward to its original starting position.

I claim—

1. In an apparatus for making sheet-metal can-bodies, the combination, with an endless flexible carrier or chain and a series of plate-holders connected therewith and capable of being intermittently turned or rotated, of rotary shears arranged in advance and in rear of the position in which the plate-holders are rotated, whereby first one pair of opposite edges of the plate, and subsequently another pair of opposite edges thereof, are trimmed, substantially as specified.

2. The combination of an endless flexible traveling carrier or chain, a series of intermittently turning or rotating plate-holders connected therewith, mechanism for automatically turning or rotating said plate-holders during the travel of the chain, and rotary shears arranged in advance and in rear of the position in which said plate-holders are rotated, essentially as and for the purpose herein set forth.

3. The combination, with an endless flexible traveling carrier or chain, of a series of plate-holders carried by said chain and a series of edging-rollers for bending the overlapping edges of the plates carried by said holders, essentially as described.

4. The combination of an endless flexible traveling carrier or chain, a series of intermittently turning or rotating plate-holders connected with said chain of paneled construction, a matching paneling-roll having dies formed to match with the panels in the plate-holders, and rotary shears arranged in advance and in rear of the position in which each plate-holder is turned, essentially as and for the purposes described.

5. The combination of an endless flexible traveling carrier or chain, a series of plate-holders of paneled construction carried by said chain and capable of being intermittently turned or rotated, a paneling-roll having dies

formed to match with the panels in the plate-holders, rotary shears arranged in advance and in rear of the position in which said plates are turned, and a series of edging-rollers, substantially as and for the purposes herein set forth.

6. The combination, with an endless flexible traveling carrier or chain and a series of plate-holders carried by said chain, of a female angular or V shaped former arranged to receive the plates from the holders at the back end of the travel of the chain and a reciprocating creaser operating to bend the plates within said former, essentially as described.

7. In an apparatus for making sheet-metal can-bodies, the combination, with an endless flexible traveling carrier or chain and a series of plate-holders of paneled construction carried by said chain and capable of being intermittently turned or rotated, of a paneling-roll having dies formed to match with the panels in the plate-holders, rotary shears for trimming the edges of the plates, edging-rollers for forming the edges of the plates to make the joints or seam, and mechanism for bending the plate intermediately of its length, substantially as and for the purposes herein set forth.

8. The combination, with the endless traveling-chain C, of the work-carriers D, the plate-holders E, pivoted to said carriers and formed with a shoulder, *f* or *f'*, and the spring-pawl G or G', for the purpose of turning the plate-holders during their travel with the chain, essentially as described.

9. The combination of the swiveling pressure-rollers I with the pivoted plate-holder E, capable of being intermittently turned or rotated, and the endless traveling chain C, substantially as specified.

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Witnesses:

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