

April 29, 1924.

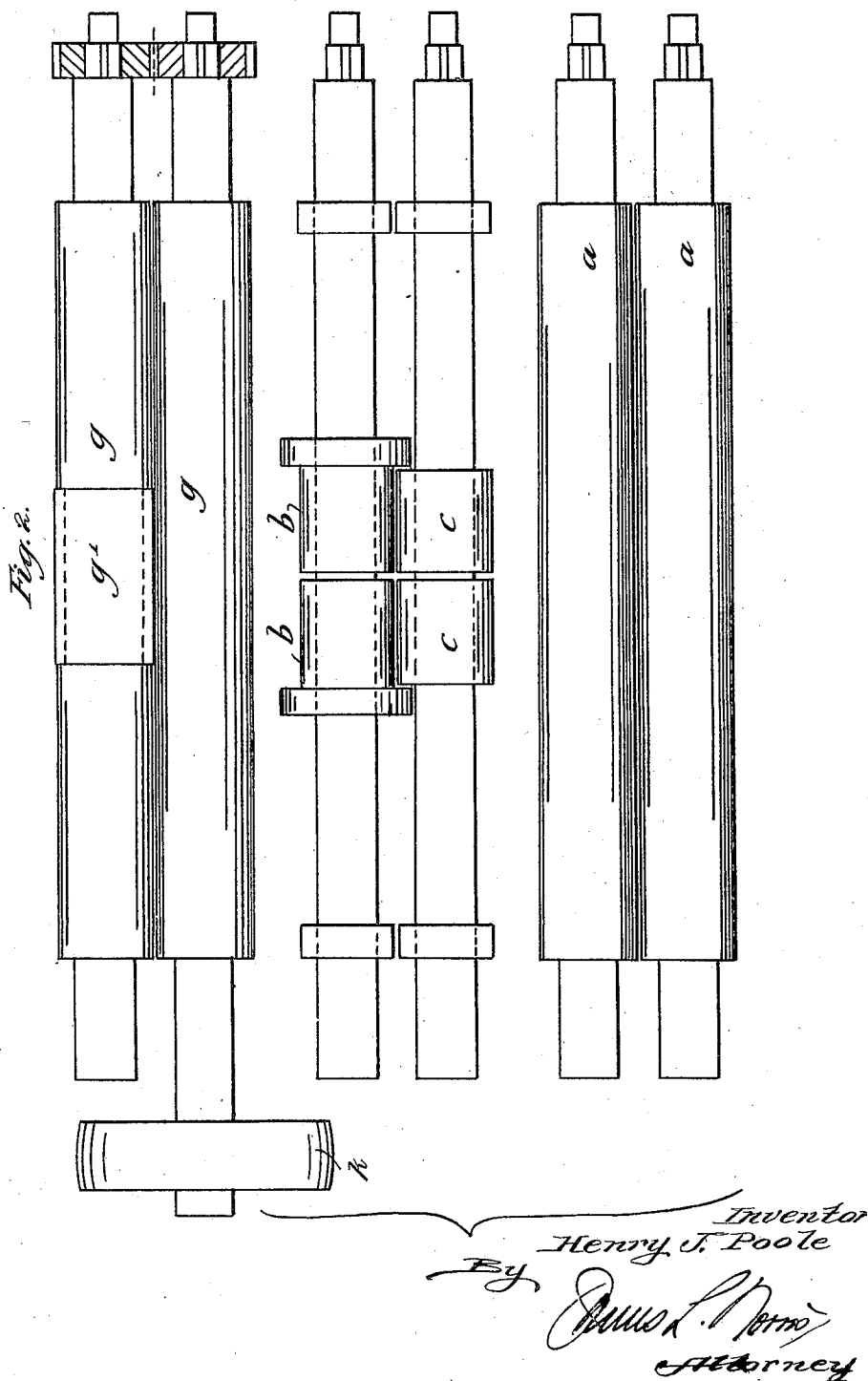
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H. J. POOLE

BOX MAKING MACHINE AND THE LIKE

Filed Feb. 14, 1921

3 Sheets-Sheet 2



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Fig. 3.

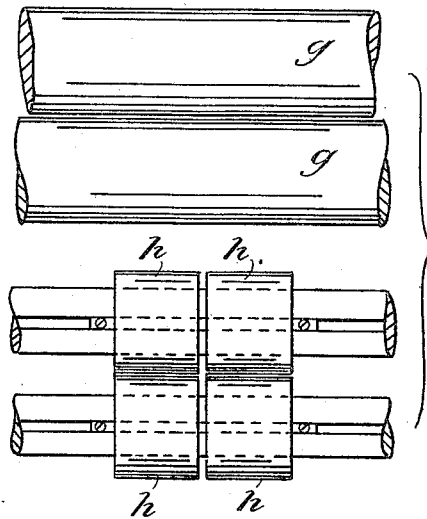


Fig. 4.

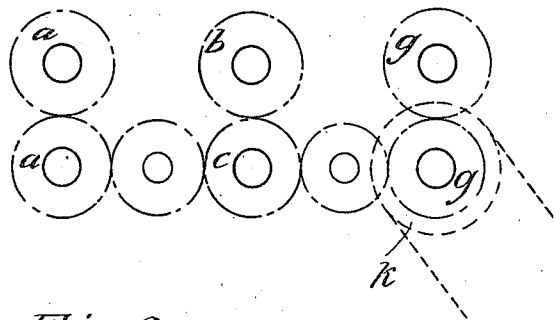


Fig. 6.

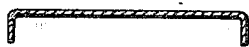


Fig. 8.

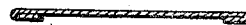


Fig. 7.



Inventor
Henry J. Poole
By *James L. Norris*
Attorney

UNITED STATES PATENT OFFICE.

HENRY JEFFREY POOLE, OF LONDON, ENGLAND.

BOX-MAKING MACHINE AND THE LIKE.

Application filed February 14, 1921. Serial No. 444,813.

To all whom it may concern:

Be it known that I, HENRY JEFFREY POOLE, a subject of the King of Great Britain, residing in London, England, have invented certain new and useful Improvements in Box-Making Machines and the like, of which the following is a specification.

This invention relates to apparatus for folding over the edges of sheet metal blanks for reinforcement or other purposes—an operation which is usually performed at an early stage of the construction of boxes from tinplate or other sheet metal. The invention is not, however, restricted to the manufacture of boxes merely, but is equally applicable to the manufacture of other articles from sheet metal in which the operation of turning over the edges of a blank is involved.

According to the invention the operation is effected partly by rolls and partly by stationary formers, the blank being fed by a pair of feed rolls through a second pair of rolls adapted to turn over two opposite edges of the blank through 90°, the inclined operative surfaces of the stationary formers gradually turning the edges inwards through a further 90° and a third pair of rollers flattening out the inturned edges and also dragging the blank through the formers.

The invention will be more specifically described with reference to the accompanying drawings, wherein Fig. 1 is a vertical elevation partly in section of an apparatus embodying the invention; Fig. 2 an elevation of the three pairs of rolls; Fig. 3 partial elevations of two pairs of rolls used in a modified apparatus in lieu of the third pair of rolls; Fig. 4 a diagram showing the gearing of the several sets of rolls; Fig. 5 a plan view of one of the stationary formers; and Figs. 6, 7 and 8 are cross-sections of the metal strip after its passage through the several forming mechanisms.

The blanks are fed by hand to the first pair of rolls *a, a* from a feed table (not shown) provided with adjustable guides which guide the blanks to the rolls *a* which feed them to the second pair of rolls by which the edges of the blanks are turned through an angle of 90°, as shown in Fig. 6, and the operative parts of which comprise a flanged roll *b* on one of the roll spindles and a plain roll *c* on the other spindle embraced by the flanges of roll *b*. As shown in the drawings each of these rolls is preferably

made in two parts which are adjustable axially on the roll spindles for dealing with blanks of different widths and determining the width of the folded edge, and are arranged to be interchangeable on their spindles with each other or with other pairs of cooperating rolls of different diameters and depths of flanges. The two formers *d* which effect the second stage of the operation are also adjustable along the fixed bar *e* on which they are mounted and which is located between the second and third pairs of rolls. The operative surfaces of these formers consist of inclined ramps *d'* which increase in width from front to rear and by their action gradually turn inwards the opposite edges of the blank which, in the machine shown, have already been turned downwards through 90° by the rolls *b, c*. The inward folding of the edges is completed by steel pins *f* screwed into the formers so as to be replaceable and forming substantially continuations of the ramps *d'*. The shape of the metal strip at this stage is as shown in section in Fig. 7. The third pair of rolls *g, g* by means of which the edges are flattened out, as shown in section in Fig. 8, and the blanks dragged through the formers, may have a central rubber portion *g'* on one or both adapted to grip the body portion of the blank and thereby obviate local stretching of the blank along its two edges, or as indicated in Fig. 3, the rolls *g, g* may be plain and an additional pair of feed rolls may be interposed between them and the stationary formers. In the latter case, each feed roll preferably takes the form of two short sleeves *h*, adjustably mounted on the roll spindle so that they can be set for blanks of different widths or grip the blank just inside the inturned edges or at any other desired part. For narrow blanks single sleeves or feed rolls would suffice.

The bearing blocks *i* of each pair of rollers are provided with springs *j* for individually controlling the pressure applied by the rollers. The driving power is preferably applied through one of the last pair of rolls which may be provided for the purpose with a belt pulley *k* mounted on an extension of the roll spindle, and the rolls are geared in a series as shown in Fig. 4 so as to give the appropriate directions of rotation.

The edges of the lids of tin boxes are not

usually reinforced in this way, but a slightly modified arrangement of the apparatus enables the invention to be applied to the formation of the lid. In this case only one edge of the blank, viz, the hinge edge, is first turned over, and the former used in effecting or completing this part of the operation is designed to make a beading along the edge instead of folding it flat. The lid blank is then fed between two pairs of operating rolls of the character already described adapted to turn the opposite edges, viz, the hinge edge and that opposite to it, downwards or upwards at right angles to the plane of the blank.

Provision may be made for the automatic individual feeding of the blanks from a stack of blanks on the feed plate or elsewhere.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. Apparatus for folding over the edges of sheet metal blanks for boxes, comprising rolls which cooperate to bend the edge of the blank at an angle of 90° to the body of the blank and a stationary former operating on the turned edge to turn said edge inwardly through a further 90°.

2. An apparatus according to claim 1, wherein the stationary former comprises an inclined ramp and a steel pin detachably secured in the body of the former and forming a continuation of the ramp.

3. An apparatus for folding over the

edges of sheet metal blanks for boxes, comprising rolls which cooperate to bend opposite edges of the blank through 90° and stationary formers operating on the turned edges to turn said edges through a further 90°, and rolls operating to flatten out the inwardly turned edges of the blank.

4. An apparatus for folding over the edges of sheet metal blanks for boxes, comprising a flanged roll made in two parts adjustably mounted upon the same shaft, a plain roll made in two parts adjustably mounted on a shaft parallel with said first shaft, with which plain rolls said first-named rolls cooperate to turn opposite edges of a blank through 90° and a pair of stationary formers adjustably mounted parallel with the axis of the roll shafts and adapted to complete the inward turning of the edges of the blank, substantially as described.

5. An apparatus for folding over the edges of sheet metal blanks for boxes, comprising a pair of feed rolls, a pair of rolls adapted to turn opposite edges of a blank fed to them by the feed rolls through 90°, stationary formers operating to complete the inward turning of the edges of the blank, a pair of flattening rolls and means for gripping the blank between the inturned edges to avoid local stretching of the blank along its two edges during passage of the blank through the flattening rolls.

In testimony whereof I have signed my name to this specification.

HENRY JEFFREY POOLE.