No. 696,358. Patented Mar. 25, 1902.

T. BAILEY.

MACHINE FOR DOVETAIL CORRUGATING SHEET METAL.

(Application filed June 22, 1901.)

(No Model.) 2 Sheets—Sheet 1.

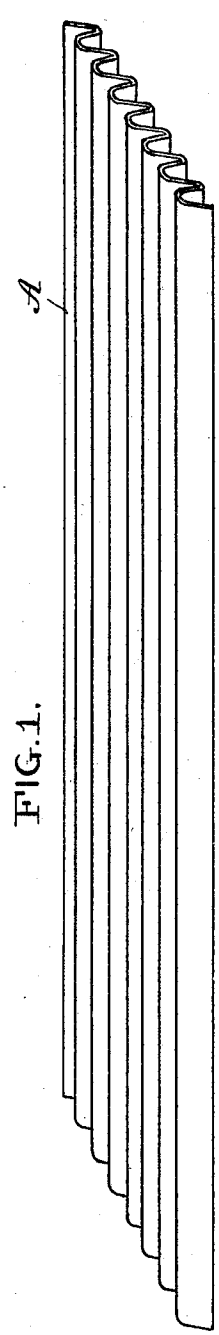


FIG. 1.

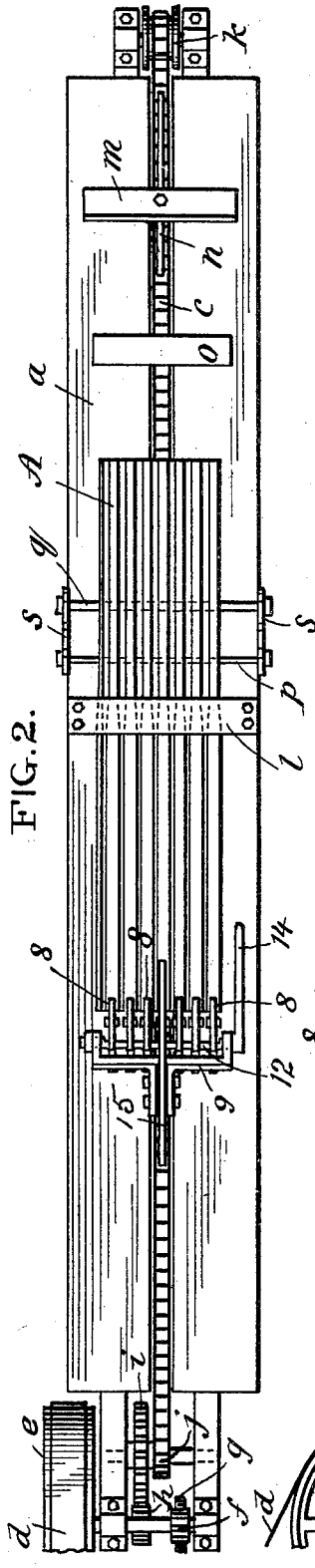


FIG. 2.

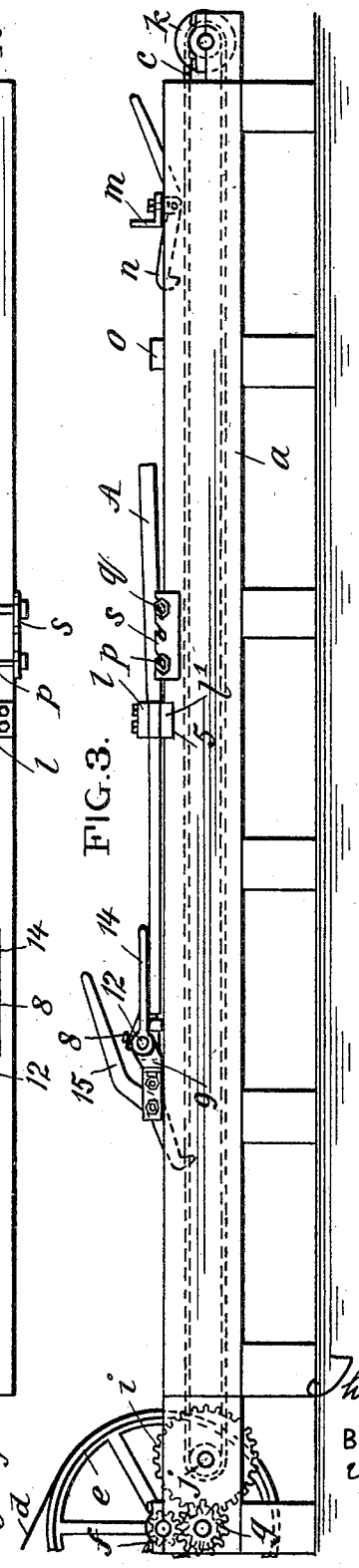


FIG. 3.



FIG. 5.

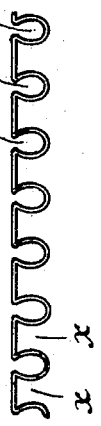


FIG. 4.

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No. 696,358. Patented Mar. 25, 1902.

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MACHINE FOR DOVETAIL CORRUGATING SHEET METAL.

(Application filed June 22, 1901.)

(No Model.) 2 Sheets—Sheet 2.

FIG. 6.

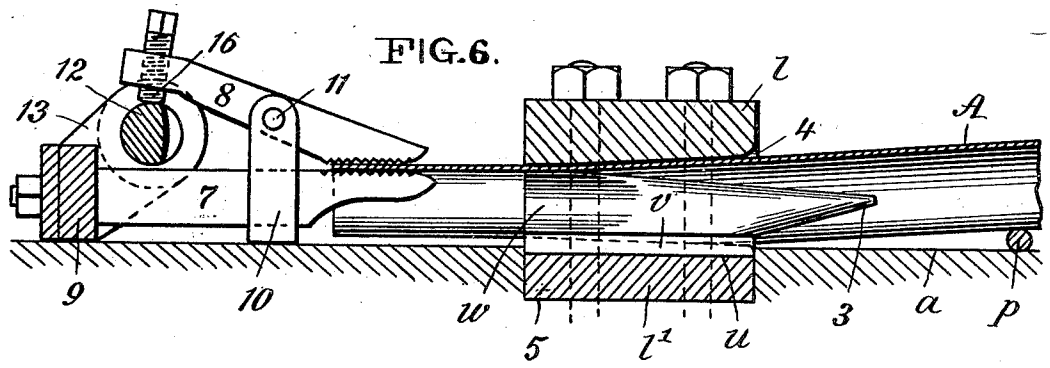


FIG. 7.

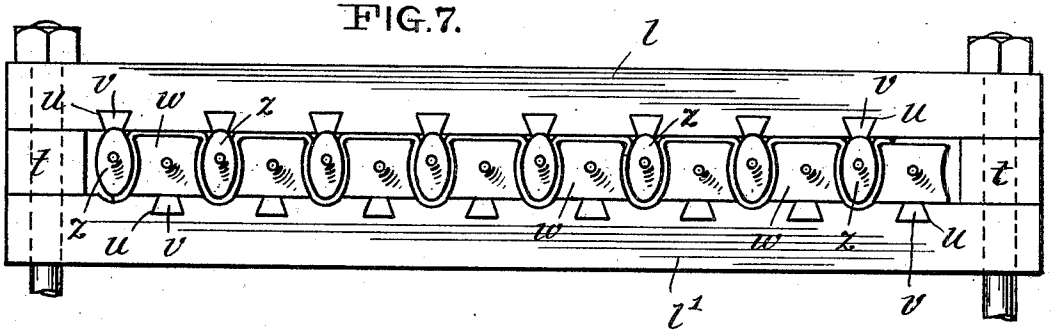


FIG. 8.

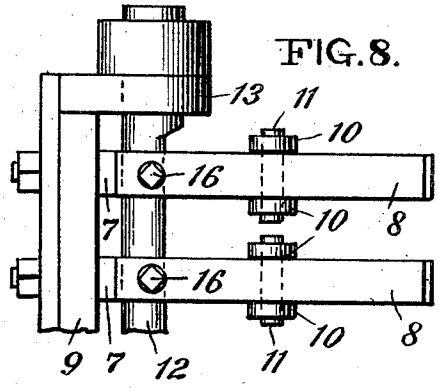
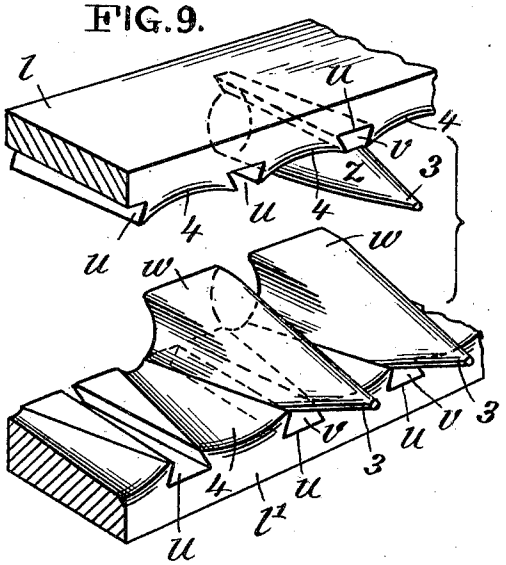


FIG. 9.



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UNITED STATES PATENT OFFICE.

THOMAS BAILEY, OF NEW YORK, N. Y.

MACHINE FOR DOVETAIL-CORRUGATING SHEET METAL.

SPECIFICATION forming part of Letters Patent No. 696,358, dated March 25, 1902.

Application filed June 22, 1901. Serial No. 65,540. (No model.)

To all whom it may concern:

Be it known that I, THOMAS BAILEY, a citizen of the United States of America, and a resident of New York city, county and State of New York, have invented certain new and useful Improvements in Machines for Dovetail-Corrugating Sheet Metal, of which the following is a specification.

My invention consists of improvements in machinery for dovetail-corrugating sheet metal whereby it is designed to simplify, cheapen, and facilitate more rapid production of such sheets, as hereinafter described, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective view of a sheet prepared for the operations of the improved machinery to be described by being previously crimped like ordinary crimped or corrugated sheets. Fig. 2 is a plan view of a draw-bench which is one of the elements of my improved apparatus. Fig. 3 is a side elevation of said bench. Fig. 4 is an end view of a dovetail-corrugated sheet, showing a particular form of corrugations which I produce more particularly for outside walls of buildings, but which may be used for partitions. Fig. 5 is an end view of a sheet the corrugations of which are alike on both sides of the sheet. Fig. 6 is a detail of the drawing apparatus in vertical longitudinal section of the draw-bench, enlarged for greater clearness. Fig. 7 is a rear elevation of the gang of dies used on the draw-bench, the forms being such as are used in producing the ribs and grooves represented in Fig. 4. Fig. 8 is a detail of the grippers used on the draw-bench in plan view, also enlarged. Fig. 9 represents details of the gang of drawing-dies in perspective view and also enlarged.

A represents a metal sheet previously crimped lengthwise preparatory to the operations of the improved apparatus about to be described for rapidly and effectively converting the crimps into dovetail corrugations. The said apparatus comprises a draw-bench *a*, which has a central longitudinal slot *b*, along which an endless chain *c* runs a little below the surface of the bench, being impelled by the driving-gear comprising the power-belt *d*, driving-pulley *e*, and reducing-gears *f g h i* at one end of the bench and the sprocket-wheel *j*, said chain being carried over a pulley *k* at the other end of the bench. On the surface of the bench and firmly fixed thereto is a die-box *l*, containing a gang of dies corresponding in number to the number of crimps of the sheet *a*, through which the sheet is to be drawn for reducing the crimps into the form of dovetail corrugations. There is also on the bench a pusher *m* for entering one end of the sheets into and forcing it through the dies far enough for being caught by a series of grippers arranged in a gang adapted to grip the sheet in the lower turns of the crimps for pulling the sheet through the dies.

The sheet A is placed on the bench with one end abutting against the pusher *m*, said pusher being at rest, and the other end in close proximity to the die-box *l*. A hook-lever *n*, pivoted to the pusher, is then engaged by the attendant with the endless chain *c*, which sets the pusher in motion and forces it along far enough to properly enter the sheet in the dies. The pusher is then stopped by disengaging the hook-lever from the chain. Then the grippers, being at rest on the bench, are connected by the attendant with the projecting end of the sheet and are also connected with the chain *c*, which pulls the sheet through the dies and completes the shaping of the corrugations. The attendant then disconnects the grippers from the chain and releases the sheet from the grippers and removes the sheet from the bench.

On the bench is a cleat *o* between the pusher *m* and the die-box, and between said cleat and the die-box is a rod *p*, and, if desired, another one *q*, on which the sheet is placed to begin. The rod or rods support the sheet a little higher than the plane in which the sheet is passed through the dies, but not so high as to obstruct the entry of the end of the sheet into the dies, said dies being adapted to permit such entry and then depress the sheet, the purpose being to cause the sheet to bend slightly between the rod or rods *p q* and the dies, as indicated in Fig. 3, for arching the sheets when they are to be used between floor-beams for supporting fireproof flooring or in any other like positions

for supporting weights. The purpose of the cleat *o* is to prevent the ends of the sheets next the dies from being pitched too high.

The rods *p* and *q* are adjustable toward and from the dies, as indicated by the series of bearings for them at *s*, Figs. 2 and 3, and different sizes of rods may be substituted according as it may be desired to vary the arching pitch of the sheets.

The bends may be amplified somewhat by an attendant bearing down on the rear ends of the plates while being drawn into the dies.

The construction of the dies and the die-box is as follows: Two strong metallic bars *l l'* of like form and dimensions are taken, said bars being about as long as the width of the bench *a* and firmly bolted together at the ends with suitable intermediate distance-pieces *t*, corresponding to the vertical thickness of the dies, and they are scored transversely at suitable intervals apart with taper dovetail grooves *u* for reception of the dies, which are provided with corresponding tongues *v* to enter the grooves, and thus connect the dies. The tapers of the said tongues and grooves are directed so that the stress of the work on the dies tends to force them in tight. The mode of connection is also advantageous as a detachable one to facilitate changing the dies for substituting different shapes for producing corrugations of different forms, as illustrated in Figs. 4 and 5, which show two different forms, and it is obvious that various other different forms may be produced.

The gangs of dies comprise two series. The dies of one series are attached to the upper bar *l* of the box, and those of the other series are attached to the lower bar *l'*, and the dies of each series are placed in alternate relation with those of the other series.

When the corrugations of both sides of the sheet are alike, as in Fig. 5, the dies of both series will be alike; but if it be desired that they differ in shape on the respective sides—for example, as in Fig. 4—then the dies will differ correspondingly. Thus *w*, Figs. 6, 7, and 9, indicates the lower series of dies attached to lower bar *l'* of the die-box and being of the shape adapted for producing the grooves *x* in the under side of the sheet of Fig. 4, and *z* indicates the upper dies attached to the upper bar *l* of the die-box and being of the shape adapted to produce the form of grooves shown at 2 in the upper side of the sheet in said figure.

The dies are pointed and extended frontward beyond the box to facilitate entering the ends of the crimps of the sheets presented to them, and the edges of the bars of the box are dressed out, as at 4, between the dies for clearance, affording free entrance of the crimped sheets, and from the points of the dies the shapes change rearwardly to the exact counterparts of the forms to be produced, as is usual in drawing-dies and as seen in Fig. 7.

The die-box is set in a recess 5 in the bench *a* and firmly but detachably bolted down, so that different die-boxes may be substituted. Different dies may also be substituted in the boxes, the connecting-ribs *k* being the same.

The grippers consist of a series of pairs of gripping-fingers 7 and 8 to grip part or all of the upper bends of the crimps of the sheets, whereof the lower fingers 7 are connected at one end to a cross-head 9 and have near their gripping end a yoke 10, resting on the bench and extending upward, so as to have the upper fingers 8 pivoted in the yoke at 11, back of which pivots 11 the fingers reach over a cam-shaft 12, carried at its ends in bearings 13, attached to the cross-head 9 and having a hand-lever 14 for turning it to open or close the jaws by turning the shaft one way or the other.

The cross-head 9 has a hook-lever 15 pivoted to it for connecting the grippers with the endless chain *c* when the grippers have been closed to draw the sheet through the dies and for disconnecting said grippers when the sheet has been drawn through. Then the grippers are opened and the sheet removed.

The gripping-fingers 8 have adjustable bearing-points 16, resting on the cam-shaft 12, whereby they may be individually adjusted with respect to their grip on the sheets.

What I claim as my invention is—

1. The combination with the draw-bench, endless chain and means for operating the chain, said bench having the longitudinal slot above the chain, of the die-box and dies therein attached to the bench, movable pusher located on the bench in front of the dies, hook-lever on the pusher for connecting with the chain, movable gripping-jaws located on the bench behind the jaws, and the hook-lever for connecting the grippers with the chain.

2. The combination with the slotted draw-bench, pusher, grippers, endless chain, means for operating said chain, and hook-levers for connecting said pusher and grippers respectively with the chain, of a gang of corrugating-dies comprising two series, one of which acts on one side of the sheet and the other series acts on the other side of said sheet, said dies of the two series arranged in alternate order in the gang.

3. The combination with the draw-bench, pusher, grippers, endless chain, means for operating said chain, said bench having the longitudinal slot, and means for connecting said pusher and grippers with the chain respectively, of a gang of corrugating-dies, comprising two series, one of which acts on one side of the sheet, and the other series acts on the other side of said sheet, said dies detachably connected to their respective supports by dovetail ribs and grooves adapted to maintain tight connection with their supports by the stress of the work on the dies.

4. The combination with the draw-bench and the plurality of dies arranged in a gang, of the series of pairs of grippers arranged to

engage the upper bends of the crimped sheet projecting from the dies, cross-head carrying the gripping-fingers, cam-shaft carried on said cross-head and adapted to effect the grip of the fingers on the sheets, and means for operating the cross-head.

5. The combination with the draw-bench, pusher, corrugating-dies, grippers, and means for operating the pusher and grippers, of one or more sheet-bending rods located in advance of the dies.

Signed at New York city this 15th day of June, 1901.

THOMAS BAILEY.

Witnesses:
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A. P. THAYER.