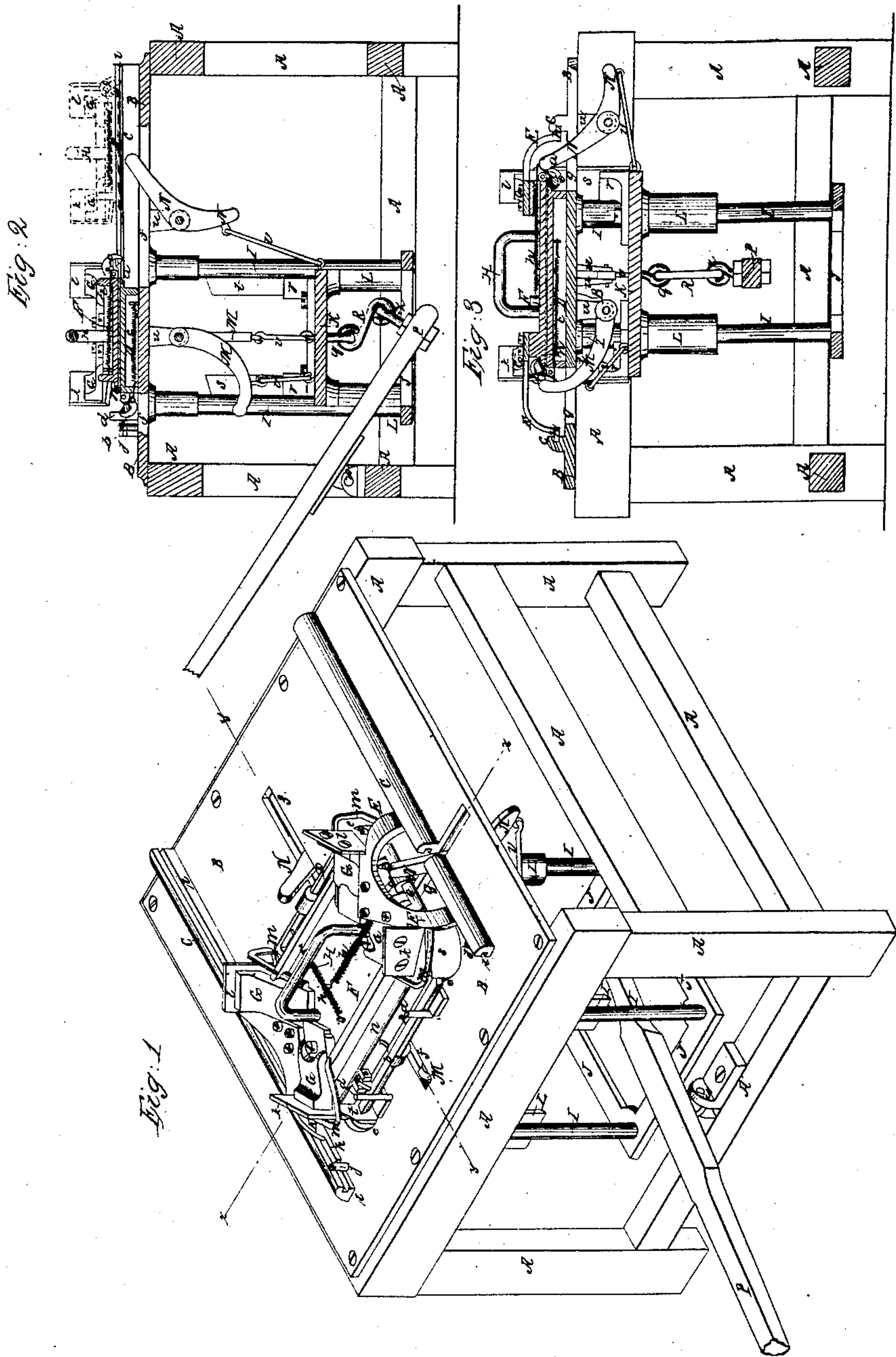


*E. F. Coates,
Edging Sheet-Metal,*

No 17,364,

Patented May 26, 1857.



UNITED STATES PATENT OFFICE.

ELIAS F. COATES, OF MYSTIC BRIDGE, CONNECTICUT.

IMPROVED MACHINE FOR CUTTING AND BENDING SHEET METAL.

Specification forming part of Letters Patent No. **17,361**, dated May 23, 1857.

To all whom it may concern:

Be it known that I, ELIAS F. COATES, of Mystic Bridge, in the county of New London and State of Connecticut, have invented certain new and useful improvements in machines for cutting and bending sheets of tin or other metals for roofs of houses at one operation; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents a perspective view of the machine. Fig. 2 represents a central vertical and longitudinal section through the same at the red line *x x* of Fig. 1, and Fig. 3 represents a vertical transverse section through the same taken at the red line *y y* of Fig. 1.

Similar letters of reference, where they occur in the several figures, denote like parts of the machine in all of them.

The nature of my invention relates to the cutting and bending of sheets of tin or other metal at one operation, so as to form the locks by which they are to be afterward united on the roof.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

A represents a substantial frame, of wood, iron, or parts of both, upon which is arranged a table, B, having ways C C upon it, in which there are grooves for a carriage to traverse in, as will be hereinafter explained.

Upon the table B is permanently fixed a bed or platform, D, which has projecting flanges *a* upon two of its four sides, (it being of an oblong-square form,) and hinged flanges or wings *b b* on its other two sides. The flanges or wings *b b* are hinged to the bed-piece D, and to each of them is attached one end of a helical spring, *c*, the other ends of said springs, respectively, being connected to the table or under side of the bed D. These springs draw the flanges or wings *b* away from the bed, and studs or pins *d d* are so arranged behind each of the wings as to prevent them from turning back too far, and said studs also perform another duty—viz., serve as gages for the properly laying and holding of the sheet of metal to be cut and bent upon the bed D.

At or near each corner of the bed D is made an opening, *e*, through the table for the trav-

eling shear-blades to pass through, and these openings should be large enough to allow the shear-blades to pass through from below, as well as to allow the pieces of tin that are clipped from the corners of the sheet of metal that is to be operated upon to drop through out of the way. Four slots, *f f* and *g g*, are also made through the table B, the former passing longitudinally, and the latter transversely, of the table, so as to be at right angles to each other, and have their crossing point, if produced, at the center, or thereabout, of the bed D. Through these four slots the ends of four levers hung underneath the table project at proper times to operate the wings, as will be described.

In the grooves *i*, which are formed in the ways C C, the tongues *h* slide, and to these tongues are united by curved pieces E a carriage or sliding bed, F, which can traverse first over the stationary bed D and then away from it to remove and replace the sheets; and studs *j j* are arranged at or near one end of the ways C, so that said carriage shall be stopped directly over the stationary bed D.

On adjustable stocks G, at each of the four corners of the traversing carriage, are fixed the four shear-blades *k k l l*, the former having their edges inclined, so as to pass over the lock on the sheet without touching it when the carriage is run back, and the edges of the latter may be square with the blade. Around these shear-blades are arranged, respectively, a check-piece, *m*, just far enough from said blades to allow their fellows, which are hung underneath the table, to pass up between said check-pieces and the blades *k l*, the object of said check-pieces being to prevent the corners of the sheets from bending up against the action of the lower blades when they are brought up to cut off said corners.

On two of the four sides of the traversing carriage are projecting flanges *n n*, and on the other two sides are hinged folding wings *o o*, made substantially in the same manner as the flanges *a* and wings *b* on the stationary bed D, but so disposed as that the flanges *n* shall be over the wings *b* and the wings *o* over the flanges *a*, and thus each hinged wing acts in connection with a fixed flange. The wings *o* are raised up by helical springs *p p*, attached to them and to the carriage or bed F, and they also, as those *b*, heretofore described, are

drawn against a stop to prevent them from going too far, or out of the reach of the arms of the levers which are to operate them.

H is a handle, by which the traversing carriage is run in its ways to and fro; but this may be done by any other mechanical means. An inclination is given to the grooves *i* in the ways C, as will be seen by inspection of the drawings, Fig. 1, so that as the carriage F is drawn toward the stationary bed D it will continuously approach said bed, until at the end of its movement it will be close enough to rest upon the sheet of tin previously placed on said bed; and, as the carriage is run back after the sheet is properly cut and bent, it gradually rises out of the way, so that the finished sheet may slide off from the bed D. The under surface of the traversing carriage and the upper surface of the stationary bed always preserve their parallelism toward each other, and they, or either of them, may have an adjustment or motion toward each other to adapt them to sheets of varied thickness, or to clamp the sheet between them, should the sheets be of such a character as to require clamping, to hold them more rigidly against the action of the shears and bending devices.

Underneath the table B is suspended four rods or columns, I I I I, united at their lower ends by a quadrangular frame, J, to give them firmness and rigidity. These columns I form ways upon which a platform, K, can rise and fall in a perpendicular line; and in order to cause said platform to be steady and true in its movements long supporting-pieces L are united to said platform, which have round bearings formed in them to guide the platform. On this platform K, at its corners, respectively, are placed stocks *r r r r*, made adjustable on said platform, to which are attached shear-blades *s s* and *t t*, two of which have inclined and the other two square edges, but so arranged with regard to the blades *k k* and *l l* on the carriage F that the inclined edge of one blade shall act against the straight edge of another blade, and thus the drawing cut of the shears is preserved.

To lugs *u* on the under side of the table B are hinged four levers, two of which are of the form of those shown at M, and the remaining two of the form of that shown at N, Figs. 2 and 3. These levers are all united to the platform K by links *v*, so that as said platform is raised or lowered it shall operate the levers M N, the former, M, working in con-

nection with the hinged wings *b b* on the fixed bed D, and the latter one, N, operating in connection with the hinged wings *o* on the traversing carriage F, said levers working through the slots *f g*, which are made through the table B. A lever, P, is hinged at *w* to one of the pieces, A', of the frame which forms its fulcrum, and at the extreme end of the lever is a dead-eye, *z*, which is connected to a similar dead-eye, *q*, on the under side of the platform K by a link, R. Through this arrangement of parts the platform K is raised or lowered, as may be required. Where the points of the levers M N strike against their wings a swell or sort of cam is placed, so that said wings will freely move upon their pivots and close over or under the flanges in connection with which they operate.

The operation of the machine is as follows: The carriage F, with all its attachments, being run back in the ways C, as seen in red lines in Fig. 2, the sheet of tin is placed upon the bed D, being guided and held thereto by the pins or studs *d d*. The carriage F is now drawn forward over the bed D until it comes up to the stops *j j*. The sheet to be acted upon is then between the respective faces of the bed and the carriage. The lever P is pressed down, which brings the platform K upward, and its blades first coming against the corners of the sheets and forming a shear with the blades *k l* of the carriage F, these corners are clipped off. The wings now being struck respectively by their levers M N are caused to turn over the flanges *a n*, and the sheet is bent up on its opposite edges, as seen by the red section-lines in Fig. 3, which form the locks that unite them when laid on the roof. The carriage F is again run back, the finished sheet slipped off and another placed on the bed for a second similar operation, and so on, cutting and bending a sheet at every vibration of the lever up and down.

Having thus fully described the nature and object of my invention, what I claim therein as new, and desire to secure by Letters Patent, is—

The cutting and bending of sheets of tin or other metal for roofs by one operation and through a combination of devices substantially such as herein described and represented.

ELIAS F. COATES.

Witnesses:

NICHOLS B. BATES,
E. P. RANDALL.