H. Low.

Shearing Sheet Metal.

No. 45,841. Patented Jan. 10, 1865.

Fig 1.

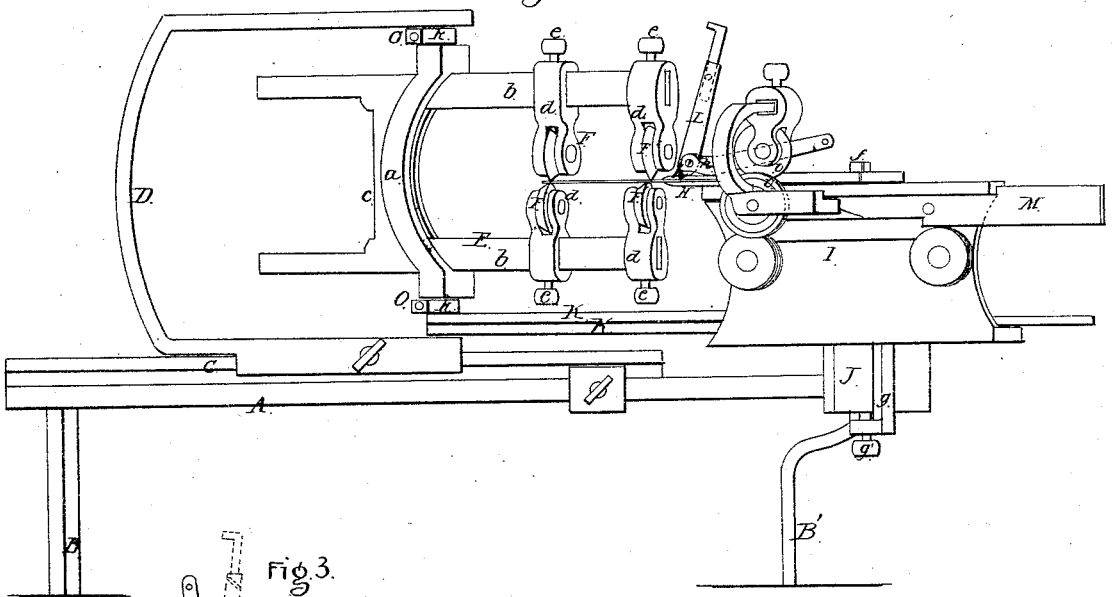


Fig 3.

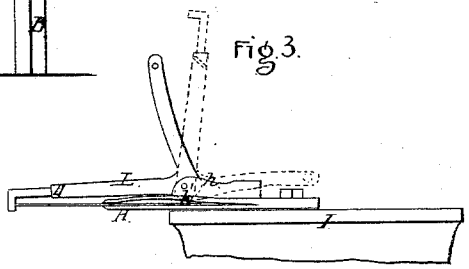
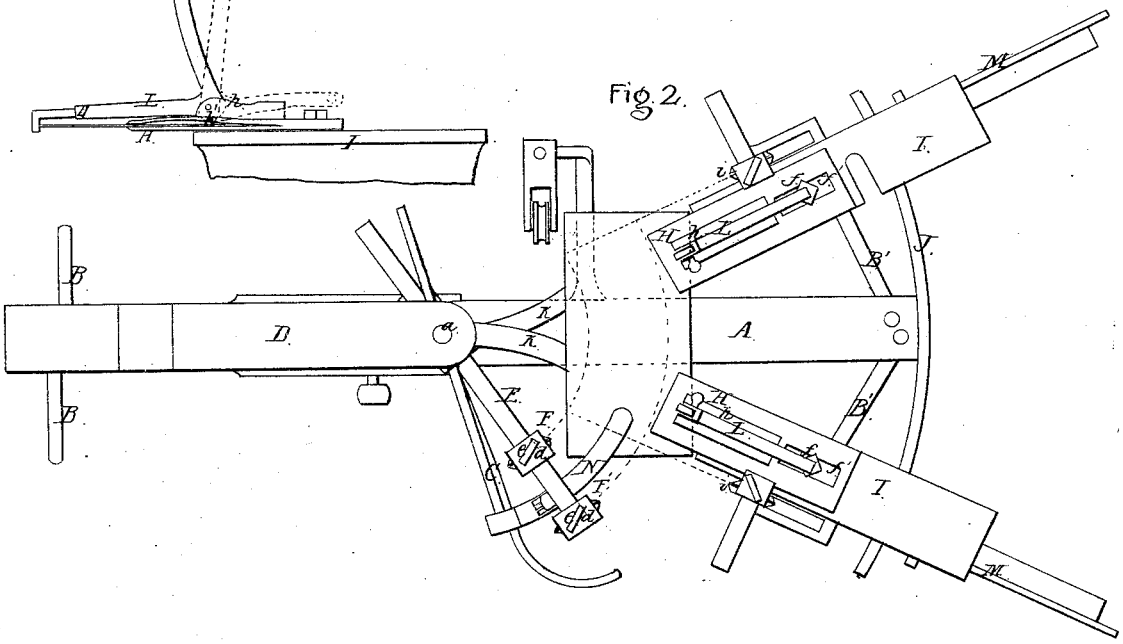


Fig 2.



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Sheet 2, 2 Sheets.

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Fig. 4.

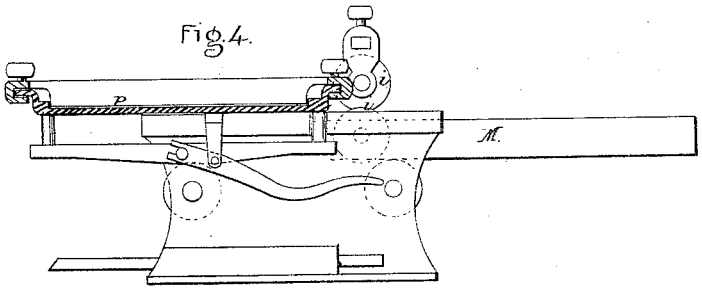


Fig. 5.

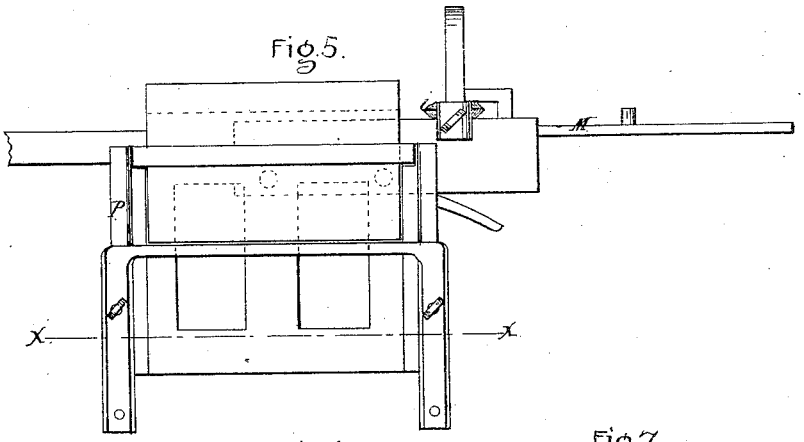


Fig. 6.

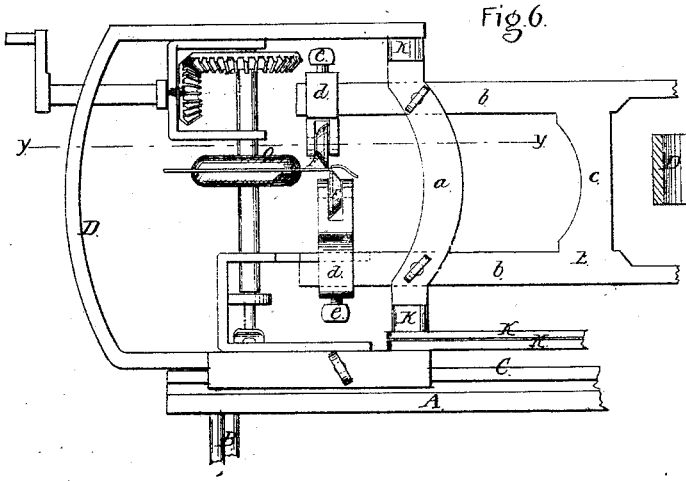
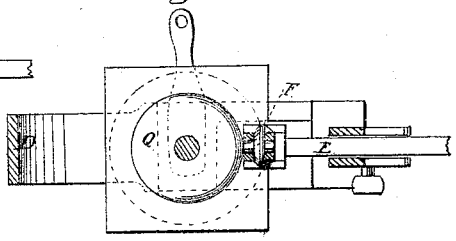


Fig. 7.



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UNITED STATES PATENT OFFICE.

HOSEA LOW, OF WAUKON, IOWA.

IMPROVED MACHINE FOR CUTTING SHEET METAL.

Specification forming part of Letters Patent No. 45,841, dated January 10, 1865.

To all whom it may concern:

Be it known that I, HOSEA LOW, of Waukon, in the county of Allamakee and State of Iowa, have invented a new and Improved Machine for Cutting Sheet Metal; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of this invention. Fig. 2 is a plan or top view of the same. Fig. 3 is a detached elevation of the gage and clamp used to adjust and hold the sheet metal in the required position. Fig. 4 is a sectional elevation of the squaring-shears, the line *x x*, Fig. 5, indicating the plane of section. Fig. 5 is a plan or top view of the same. Fig. 6 is a partial side elevation of my machine when used as circular shears. Fig. 7 is a horizontal section of the same, taken in the plane indicated by the line *y y*, Fig. 6.

Similar letters of reference indicate like parts.

This invention relates to a machine for cutting sheet metal, in which two sets of cutters are arranged in one frame or in two frames, the open ends of which point in the same direction, and which turn on the same center in such a manner that by the action of these cutters two concentric circles can be cut in one operation.

The frame which carries the cutters is so arranged that it can be lengthened and shortened from the center, and that circles of different diameters and corresponding to one and the same bevel can be cut out without changing the cutters.

The carriages which carry the clamps for holding the sheet metal and also the side cutters are connected to the movable center by hinged sliding arms, which lengthen and shorten as the center moves to or from the clamps, and by the action of which the positions of the clamps adapt themselves automatically to the position of the center and to the required bevel. The side cutters consist of slides carrying a pair of circular cutters each, and they are used for cutting off the bevels and also for squaring.

The sheet-metal plate to be cut is adjusted in the desired position by means of gages, which may be moved simultaneously, if desired, and which also serve as cams or eccentrics to lock the clamps after the sheet-metal plate has been adjusted in its position. An additional clamp extends through between the two pairs of cutters, which serve to cut out the concentric circles. This clamp is attached to swivel-arms, which swing on the center of the cutter-frame, and it serves to steady the sheet-metal plate while the operation of cutting proceeds. By reversing the position of the cutter-frame and introducing a circular revolving clamp the machine can be changed for circular shears to cut out the bottoms and other circular portions of vessels and other articles.

A represents a frame or bench, made of wood, metal, or other suitable material, and supported by four (more or less) legs, B B′, two in front and two in the rear.

The longitudinal bar which connects the legs B and B′ supports the T-shaped strip C, which forms the guide for the U-shaped adjustable standard D. The open ends of this standard form the bearings for the slotted shaft *a*, in which the cutter-frame E is adjusted. The shaft *a* is curved, as clearly shown in Fig. 1 of the drawings, so that the plate of sheet metal to be acted upon by the cutters can be passed into or beyond the center round which the cutters move.

The cutter-frame E consists of two horizontal bars, *b*, which are connected by a vertical rod, *c*, and the bars *b* form the guides for the cutters F F. These cutters are secured in sleeves *d*, which are adjustable on the bars *b* by means of set-screws *e*, and two sets of cutters may either be arranged in one and the same frame, as shown in the drawings, or two frames might be placed side by side, their open ends pointing in the same direction, and each carrying its own set of cutters.

The plate of sheet metal to be cut is secured between two clamps, H H, which are secured to carriages I I by means of set-screws *f* passing through slots *f′*, so that said clamps can be adjusted backward and forward, according to the size of the plate to be clamped and to the position in which said plate is to be brought.

The carriages I I are transversely adjustable on a guide, J, to which they are secured by sleeves *g* and set-screws *g′*, and said sleeves and carriages are connected to each other by

pivots in such a manner that the carriages can turn independent of the sleeves, and that they can always be adjusted in a radial position, according to the position of the central slotted shaft, *a*.

In order to render the carriages self-adjusting in relation to the center of the cutter-frame, two arms, K K, are hinged to the central shaft, and these arms extend through suitable guides in the lower parts of the carriages in such a manner that said carriages are compelled to accommodate themselves to the varying positions of the radial arms as the same are lengthened and shortened in moving the U-shaped standard D back and forth on the guide-strip C. At the same time, if said standard is secured in any desired position by its set screw or set screws, the carriages are rendered rigid, and require no further adjustment.

The sheet metal plate to be cut is adjusted in the requisite position by gages L, a detached elevation of one of which is shown in Fig. 3 of the drawings. These gages are hinged to lugs *h*, which project from the upper jaws of the clamps, and they are made in the form of elbow-levers, the elbow of each of which forms an eccentric cam, *h'*, so that when the gage is turned down to the position shown in black outlines in Fig. 3 of the drawings the clamp is open, and the plate of sheet metal can be readily adjusted in the same; but if said gage is turned up to the position shown in red outlines in said figure, the jaws of the clamp are compressed and made to confine the plate of sheet metal in the desired position.

The two gages L L may be connected together by a cross bar, so that both will open and close simultaneously, or they may be operated separately, if desired, and they are intended to be adjustable in length. The outsides of the carriages I I form the guides for slides M M, which carry the cutters *i i*, to cut off the bevels and also for squaring.

After the sheet-metal plate is secured in the desired position in the clamps H H, the slides with the cutters *i i* are pushed forward, and said cutters are in such a position that the lines drawn parallel with their cutting-edges, when properly prolonged, will pass through the center of the shaft *a* or some point beyond the center, as may be preferred. The plate of sheet metal is thus cut off to the required bevel, as indicated in red outlines in Fig. 2 of the drawings, and after this has been accomplished the cutters F F′ are brought in operation, and the plate assumes the desired segmental shape.

During the time the plate is exposed to the action of the cutters F F′ it is supported by a clamp, N, which projects from arms O, between said cutters, as shown in Fig. 2 of the drawings. The arms O have their bearings in boxes *k*, which turn loosely on the axle *a*, and said arms are so arranged that they can be drawn in and out and adjusted in the desired position by set-screws or in any other suitable manner.

If desired, either of the slides M M, with the cutters *i i*, may be used for squaring off plates of sheet metal, and in that case a suitable squaring-frame, P, (see Figs. 5 and 6 of the drawings,) is secured to the top of the carriage I in place of the clamp H, and after the plate has been adjusted in the desired position the slide M is pushed along in its guides, and by the action of the cutters *i* the plate is squared.

For circular cutting, the cutter-frame E is reversed to the position shown in Figs. 6 and 7 of the drawings, the cutters F or F′ are removed, and a clamp, Q, is secured in the U-shaped standard D, which consists of two circular disks, to which a rotary motion is imparted by suitable gearing and a crank, R, as clearly shown in Fig. 6 of the drawings.

The sheet-metal plate to be cut is secured in the clamp Q, and, by turning the same around the edge of the plate, is carried through between the cutters F in the frame E, and a circular disk is produced fit for a bottom of a vessel or for any other purpose where a circular disk of sheet metal may be required.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The employment or use, in machines for cutting sheet metal, of two sets of cutters, F F′, arranged in one and the same oscillating frame E, or in two frames, the open ends of which point in the same direction, substantially as and for the purpose set forth.

2. The combination of the cutter-frame E with the slotted shaft *a*, substantially as described, so that said frame can be lengthened and shortened from the center.

3. The combination of the central shaft, *a*, with the adjustable U-shaped standard D and cutter-frame E and clamps H, substantially as set forth, so that the center round which the cutters turn can be brought in any desired position in relation to the clamps.

4. The radial sliding arms K K, applied in combination with the carriages I I, movable center *a*, and cutter-frame E, in the manner and for the purpose substantially as set forth.

5. The employment or use of a slide, M, carrying a pair of circular cutters, *i*, and moving in rectilinear guides, substantially as described, for the purpose of cutting off bevels or for squaring plates of sheet metal.

6. The gages L, applied in combination with the clamps H, substantially as described, and acting in the double capacity of gages and of eccentric cams, for compressing the clamps.

7. The employment of the adjustable plate-holder N, in combination with the cutters F F′ and cutter-frame E, constructed and operating substantially as and for the purpose set forth.

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Witnesses:
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A. E. ROBBINS.