S. Hall,

Shearing Metal,

No. 4,856, Patented Nov. 18, 1846.

Witnesses:

John Whittier
Richard Sandyke

Inventor:

Samuel Hall

UNITED STATES PATENT OFFICE.

SAMUEL HALL, OF NEW YORK, N. Y.

MACHINERY FOR CUTTING SHEET METAL INTO OVAL SHAPES.

Specification of Letters Patent No. 4,856, dated November 18, 1846.

To all whom it may concern:

Be it known that I, SAMUEL HALL, of New York, in the county and State of New York, have invented a new and useful improvement on the twin circular shears cutting-machine for cutting sheet-iron, brass, copper, tin, and other metals into round, square, or oval pieces and other forms; 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 annexed drawings, making a part of this specification, in which—

Figure 1 is a perspective view of the machine; Fig. 2, a vertical section of one of the sides of the cutter-frame; Fig. 3, a longitudinal elevation; Fig. 4, a back end view; Fig. 5, a front end view; Fig. 6, an upper view, or top view.

The following pieces are applied to the machine for cutting the different shapes. Fig. 7 is a plain center-bolt, with nut which can be placed into the lower sliding center-gage *w* when circular pieces are to be cut. Fig. 8 is a female center-bolt in which the double-slot center piece Fig. 9 can be placed. Fig. 10 is a hollow center-bolt in which Fig. 11 a center-bolt can be placed, on which patterns of oval shapes are fastened by means of a nut. Fig. 12 is a center pin which can be placed into the female center bolt Fig. 8. Fig. 13 is an oval pattern which can be fastened to the center bolt Fig. 11 by means of a nut screwing the pattern against the shoulders on the bolt. Fig. 14 is a sliding center-spring which can be fastened to the center bolt Fig. 10 with a nut. Fig. 15 is a clamp which fits on any of the center bolts and can be placed by means of a nut at any required point in the slot on the under side of the slide bench. Fig. 16 is the lower sliding center gage into which the center-bolts can be placed. Fig. 17 is the combination for cutting oval forms by patterns. Fig. 18 is a spiral. Fig. 19 is a piece to be cut into a cover.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation.

The circular shears letter *a*, *a* in Figs. 1, 3, 5, 6, are a pair of cast-steel round cutters fastened to their respective shafts letter *d''*, *d''* which are placed in an iron frame, which is in two parts letter B, B, in Fig. 1, 2, 3, 4, 5, 6 the frame being so constructed as to allow a bearing for each shaft at the back end of the machine letter *c c*, in Fig. 2, and at the front end two iron boxes are fastened for the bearing of the other ends of the shafts letter *c''*, *c''*, in Figs. 1, 3, 5, 6, wherein they can revolve.

At the end of the upper cutter shaft, at the back end of the machine, and at the lower cutter shaft at the front end of the machine, a resisting center-pin letter *d*, is placed, which are screwed in the stands letter *f*, *f* in Figs. 1, 3, 4, 5, 6, and by turning the nuts attached to the same they can be tightened against the centers of each shaft, which operates to keep the cutter edges close and permanent to each other.

Letter *g*, in Fig. 1, 3, 4, 5, 6 is a spur wheel fastened to the upper cutter shaft, also the spur wheel letter *i*, which is geared to the spur wheel letter *j*, the last being fastened to the lower cutter shaft.

Letter *h*, is a driving-wheel which is geared to the spur wheel fastened to the upper cutter shaft. The driving wheel has two bearings in the frame as represented in Fig. 2 at *k*, *k*.

Letter *l*, *l*, in Figs. 1, 3, 6 are slots for the back-slide letter *m*, to move in which is kept to the same by two bolts, letter *n*, *n*,

Letter O, in Figs. 1, 3, 6, are bolts which connect the two frame-pieces B, B together.

Letter *p*, in Figs. 1, 3, 4, 5 is the upper sliding center-gage which can be moved on the upper part of the machine so as to place the point of the set screw letter *q*, exactly over the center point of the lower sliding center gage. The bolt which can be moved in the slot of the upper part of the machine fastens the upper sliding center gage to the frame when the binding nut letter *r*, in Figs. 1, 3, 4, 5 is screwed up. Letter *s*, *s*, in Figs. 1, 2, 3, 4, 5, 6 are legs cast on the sides of the cutter frame B, which are fastened to the lower bench letter *t*, in Figs. 1, 3, 4, 5 6 by means of bolts letter *u*, *u*.

Letter *v*, in Figs. 1, 3, 4, 5, 6 is the bench for the lower sliding center gage, on which two ribs are fastened by means of bolts, between these ribs the lower sliding center-gage letter *w* in Figs. 1, 3, 6 and 16 is placed. On the upper surface of one of the ribs letter l^4, in Figs. 1, 3, 5, 6, a scale of feet and parts can be marked, commencing from the edge of the cutters by which the diameter of any circle to be cut can very readily be obtained.

Letter x in Figs. 1, 2, 6 is a screw by which the lower sliding center gage is moved, this screw revolves in the boxes letter y, y, in Figs. 1, 3, 4, 5, 6 which are fastened to the lower bench.

Letter z is a carrier which is screwed on the screw x and to which the center bolts are fastened.

Letter a^2 in Fig. 5, is a roller over which a cord is placed when oval shapes are to be made, the one end of the cord must be fastened to the hollow center bolt Fig. 10 when placed through the lower sliding center gage, and at the other end, a weight, sufficient to press the pattern against the roller b^2, must be applied. A hole is made in the lower bench for the cord to pass through.

At letter c^4 in Figs. 1, 3, 4 on the back end of the screw x a spur wheel w' may be fastened to have a connection with wheels which may be attached to the lower bench for the purpose of cutting sheet copper and brass into spiral pieces to be drawn into wire.

In using the above described machine for the purpose of cutting circular or square pieces it will depend on the depth of the recess back of the cutters in the frame and the length of the slide bench, to what size they can be cut, as the surplus must pass through the recess, which may be made any length required by lengthening the shafts of the cutters and the cutter frame.

In using the machine for cutting circular pieces I first move the lower sliding center gage to one half of the diameter of the circle given, which is done very readily by turning the screw letter x in Figs. 1, 3, 6, which moves the center gage by the carrier z, a scale of feet and parts being marked on the rib l^4 commencing from the cutters. Then I place the piece to be cut on the head of the center bolt which passes through the lower sliding center gage, and then screw the set screw in Figs. 1, 3, 4, 5, which is attached to the upper sliding center gage, onto the piece which fastens the same at the center point of the center bolt, an indentation being on the head of the same to correspond with the point of the set-screw; when the machine is set in motion the cutters operate immediately on the piece so fastened by cutting and feeding themselves till the same has made one revolution. The center bolts may be used having a plain surface without the indentation.

Oval shapes are obtained according to the shapes of the patterns fastened to the center bolt Fig. 11 which revolves in the hollow center bolt Fig. 10, a weight being applied to a cord which is sufficient to press the pattern against the roller b^2, in Fig. 5 one end of the cord being fastened to the hollow center bolt Fig. 10, the other end passing over roller a^2 in Fig. 5, and from thence through the under bench, where the weight is fastened. Screw x is for moving the carrier z and slide w attached thereto.

Square pieces or strips are obtained by gaging the back slide letter m in Figs. 1, 3, 6, from the cutting edge of the cutters, according to the given width, and keeping one side of the piece against the back slide, while the cutters are feeding. A slide may be fastened in front.

The sliding gage Fig. 14 is used when the upper sliding center gage is dispensed with and when the machine is used for cutting ovals and spirals. The double-slot center piece Fig. 9 is used when more than one bearing on the piece to be cut is required.

The whole or parts of the machine can be made or steel or iron, or some parts of wood, and can be operated by any motive power.

The advantages of a machine of the above description are obvious, as a much greater facility in cutting is obtained, over the common shears.

In order to cut an oval figure the operator must place the hollow center bolt Fig. 10 in the slide w, and must insert into the said hollow center bolt the center pin Fig. 11; to the lower end of which center pin the oval pattern Fig. 13 must be fastened by a nut N^2 or other means. He then brings the oval pattern against the roller b^2 Figs. 5 and 17 in which position it is held by cord c^2 and weight w^2 the cord being attached to the hollow bolt Fig. 10 and extended over a pulley a^2 placed below the cutters. He then adjusts the sheet of metal to be cut upon the head of the center pin Fig. 11 to which the pattern Fig. 13 is affixed, and which revolves with it and secures it by the screw Q^2 attached to the gage Fig. 14. The machine is then put in motion and the edge of the piece of metal applied to the revolving cutters which cut it to the form of the pattern affixed to the center pin. The lower bar Q^3 is to be fastened to the center bolt Fig. 10 by means of a nut and collar on center bolt 10, the nut being below the bar and the collar above it, as shown in Fig. 17.

To cut a circular piece of metal into a spiral strip such as that represented in Fig. 18 the carrier z connected to the screw x must be attached to the hollow bolt Fig. 10; and a cog wheel w' on the screw x brought into gear with a cog wheel w^2 on the crank shaft. The piece of metal to be cut being secured to the carriage or slide w, in the manner above described, and brought in contact with the cutters, and the crank shaft S^2 being turned the metal will be gradually drawn toward the cutters during their operation of turning and cutting the metal which will produce a continuous thin parallel spiral piece as shown in Fig. 18.

When the piece to be cut into the form of an ellipsis for a cover of a vessel and a hole is

required on each side of the center, and a hole or dot is not wanted in the center, the piece to be cut is to be put on the two pins *p p* shown in Fig. 9 set at the required distance apart by slots and nuts and the center pin P^2 inserted into the bore of the center bolt Figs. 8 or 10 and attached to the slide *w* as above described which will enable the operator to hold and turn the piece to be cut without the use of the centers *p* and Q Figs. 1 and 14. In adjusting the sheet of tin before bringing it in contact with the cutters, the holes 19—19 must be put on the adjustable pins *p p* Fig. 9. Several sheets may be thus placed and applied to the cutters simultaneously.

All that I claim in the above described machine for cutting metal is—

The mode of shearing plates of metal into elliptical forms by the means described above—namely the combination of the lower sliding center gage, or slide *w*,—the sliding center gage Q Q^2 Q^3—14 the hollow center bolt 10—the center bolt 11—pattern Fig. 13—the pulley a^2 cord c^2 and weight w^2 with the cutters *a*, *a*, as arranged and operated for cutting oval figures.

SAMUEL HALL.

Witnesses:
WM. P. ELLIOTT,
J. FRANCIS MAHER.