(No Model.) 2 Sheets—Sheet 1.

A. O. KITTREDGE.

SHEET METAL SCROLL CUTTER.

No. 364,262. Patented June 7, 1887.

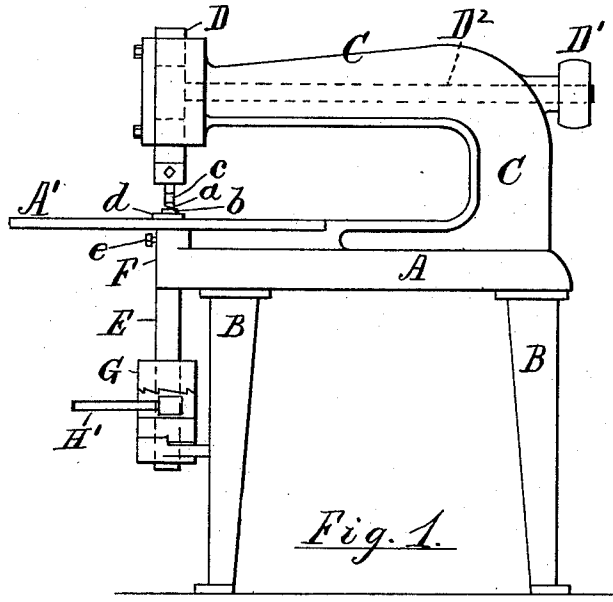


Fig. 1.

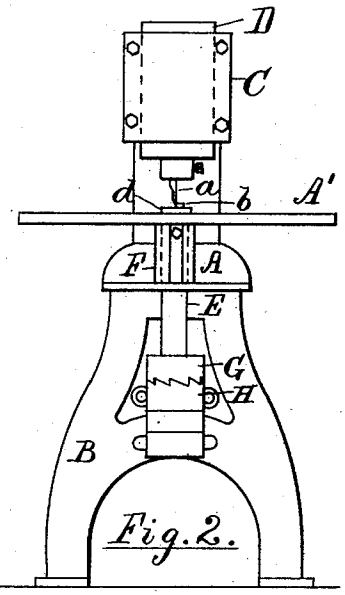


Fig. 2.

Fig. 3.

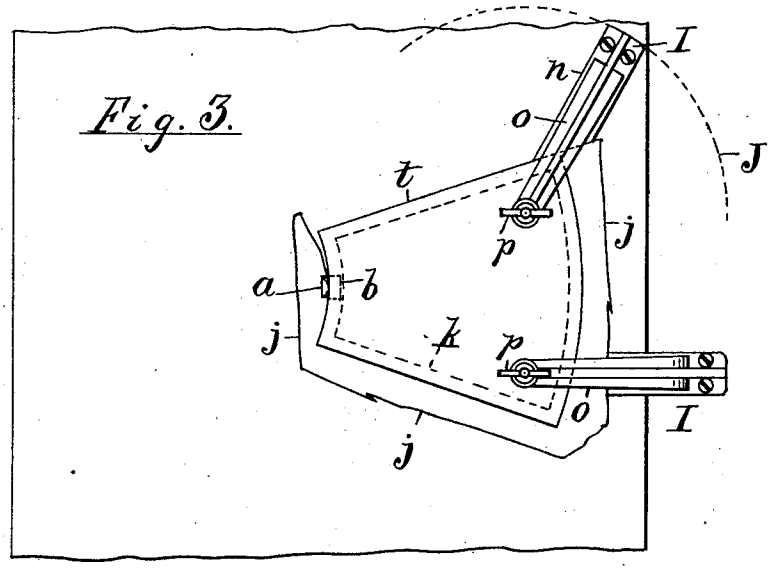
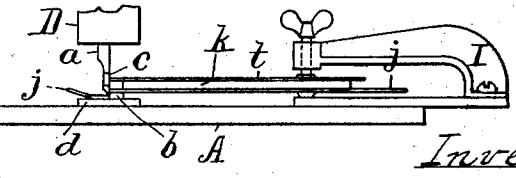


Fig. 4.



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N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2.

A. O. KITTREDGE.

SHEET METAL SCROLL CUTTER.

No. 364,262. Patented June 7, 1887.

Fig. 5.

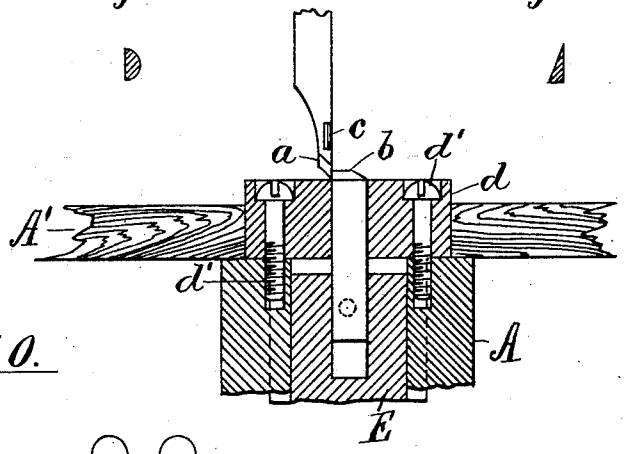


Fig. 6. Fig. 7. Fig. 8. Fig. 9.

Fig. 10. Fig. 11.

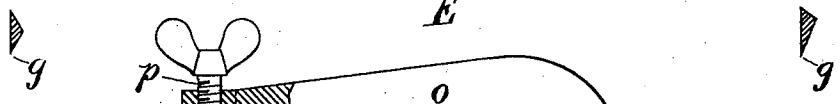


Fig. 17.

Fig. 18.

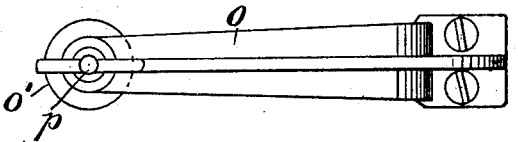


Fig. 12.

Fig. 14.

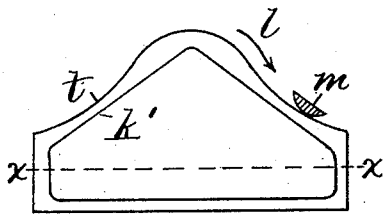
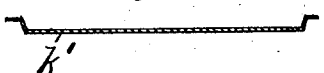


Fig. 15.



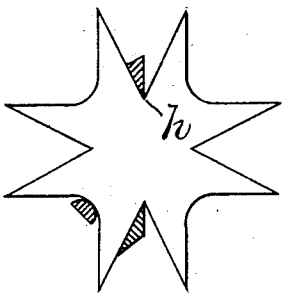


Fig. 16.

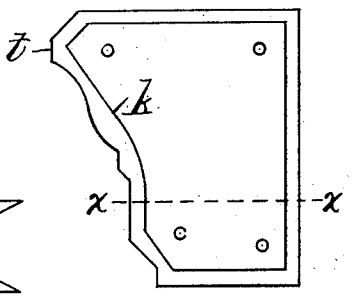


Fig. 13.



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UNITED STATES PATENT OFFICE.

ANSON O. KITTREDGE, OF SLATE HILL, NEW YORK, ASSIGNOR TO THE VULCAN COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

SHEET-METAL-SCROLL CUTTER.

SPECIFICATION forming part of Letters Patent No. 364,262, dated June 7, 1887.

Application filed September 14, 1886. Serial No. 213,474. (No model.)

To all whom it may concern:

Be it known that I, ANSON O. KITTREDGE, a citizen of the United States, residing at Slate Hill, Orange county, New York, have invented certain new and useful Improvements in the Art of Cutting Sheet Metal, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to facilitate the application of sheets of metal to a narrow reciprocating cutter to cut out the various irregular shapes required in the manufacture of cornices and sheet-metal wares; and the invention consists partly in the particular construction and use of the reciprocating cutter as a gage, partly in the construction of the templets to be used in combination with the sheets of metal, partly in the construction of the knife and metal supporting devices, and partly in the construction of certain clamps for holding the templets or patterns upon the sheets of metal during the cutting operation.

My invention will be understood by reference to the annexed drawings, in which Figure 1 is a side elevation of a cutting-machine substantially like that shown and claimed in my patent application No. 189,055, co-pending herewith. Fig. 2 is a front elevation of the same. Fig. 3 is a plan, and Fig. 4 an edge view, of the cutting devices, upon a larger scale, detached from the machine, and showing clamps applied to a sheet of metal and to a templet in contact with the cutter. Fig. 5 is a full-sized elevation, partly in section where hatched, of the upper and lower cutter, the die, and the parts of the bed and table adjacent to the same. Figs. 6, 7, 8, 9, 10, and 11 are horizontal sections of the reciprocating cutter above the shearing-edge, where the templet is fitted thereto. Fig. 12 is a plan of a templet for a cornice-bracket miter. Fig. 13 is a section of the same on line *x x* in Fig. 12. Fig. 14 is a plan of a templet for a sheet-metal elbow, and Fig. 15 is a section of the same on line *x x* in Fig. 14. Fig. 16 is a plan of a star-shaped templet. Fig. 17 is a side view, partly in section, of the same clamp shown in Figs. 3 and 4, but upon a larger scale; and Fig. 18 is a plan of the same.

My present improvements are adapted to any machine in which a lower cutter is surrounded by a supporting-table and another cutter is reciprocated in contact therewith, so that the mere application of the sheet metal to such cutters suffices to trim it to any desired shape, the cutting-edges being preferably so narrow as to admit the turning of the sheet metal with facility during the cutting operation to produce curved cuts of short radius.

In Figs. 1 and 2, A is the bed of the machine, B the legs or frame supporting the same, and C a goose-neck supporting the reciprocating cutter-slide D.

D′ is a pulley affixed upon a shaft, D^2, which operates through the goose-neck to reciprocate the slide by a crank-pin in the manner already well known for cutting and punching machines.

a is the upper cutter; *b*, the lower cutter; *c*, a pattern-face formed of flat, curved, or angular shape upon the cutter *a* on a line with the cutting-edge, and *d* is a die affixed to the bed A and perforated to permit the vertical adjustment of the lower cutter therein.

In the drawings a table, A′, is shown supported upon the bed around the die *d*, and the lower cutter is shown affixed in the upper end of a slide, E, mounted in a vertical bearing, F, upon the front end of the bed. The slide E is provided at the level of the operator's knee with a cam, G, having inclined faces, against which a movable cam, H, is fitted to raise and lower the cutter *b* when desired. The cam H is provided with two bars, H′, between which the knee of the operator may be placed to turn the cam and to raise and lower the cutter *b* when it is desired to separate the cutters to introduce some part of the sheet remote from the edge before commencing the cut. The means for thus separating the cutters is not claimed herein, as it is fully shown and claimed in my co-pending patent application No. 181,311; but the upper cutter is assumed to reciprocate, when in use, with a short and rapid stroke, so as to cut with facility whenever the metal is presented thereto.

In Figs. 3 and 4, *j* represents the sheet metal, and *t* a templet of sector shape clamped thereto by two clamps, I, which in my invention serve to hold the templet upon the sheet metal until the latter is wholly cut out to the shape of the

former. A separating-plate, *k*, of wood or pasteboard, is shown inserted between the templet and the sheet metal, *j;* and the templet, when the sheet metal is laid upon the lower cutter, as shown in Fig. 4, is thus raised a short distance above the cutting-edge of the knife *a*, and bears against the pattern-face *c* upon that side of the reciprocating cutter which coincides with the line or joint of the two cutting-edges. By applying the edge of the templet to such pattern-face the operator may readily guide the sheet metal into contact with the knife to cut out an exact fac-simile of the templet.

The pattern-face *c* may consist of the flat side of the knife, or be made of various shapes adapted to operate with templets of concave or convex outline, the sections in Figs. 6 to 11, inclusive, showing a variety of such forms adapted to various uses. Thus the rectangular form in Fig. 6 is adapted to fit against straight or convex templets; the abrupt curve in Fig. 7 to cut small concave lines; the acute forward edge in Fig. 8, which corresponds with the point of the cutting-knife, to penetrate acute angles upon that side of the knife in the templet; the convex section in Fig. 9 to fit concave curves of large radius; the acute edge at both front and rear, as in Fig. 10, to fit acute internal angles in the templet, both at the front and rear of the knife, and the modification in Fig. 11 to cut forms differing but slightly from those last described.

In the pattern, of star shape, shown in Fig. 7, certain acute and concave internal angles are shown, with the pattern-faces of various knives in contact therewith, to illustrate the mode of operation, the knife being introduced into the sheet-metal blank in some cases at the apex of the angle, and in others at the edge of the sheet of metal, which is then moved toward the knife until the angle of the templet, as at *h* in Fig. 1, comes in contact with the rear edge of the pattern-face, as at *g* in Figs. 9, 10, and 11.

In cutting a reflex curve, as in Fig. 14, the sheet metal would be moved in the direction of the arrow *l* beside the convex pattern-face, as *m*, while a similar cutter, or one of greater convexity, as shown in Fig. 7, may be used with the composite outline of the bracket-miter shown in Fig. 12. In such case the re-entrant angles may be cut by entering the point of the cutter in each of the same, and cutting out therefrom along the side of the templet.

The object of the separator is obviously to hold the edge of the templet in contact with the pattern-face upon the knife, and its function may be effected by riveting a piece of wood or pasteboard of suitable thickness to the templet, as indicated at *k* in Figs. 3 and 12, or by indenting or recessing the body of the templet, as is shown in Figs. 14 and 15, the separator *k'* in such figures being produced by forming the main part of the templet like a shallow flat tray or with several small bosses.

However made, the templet is clamped to the sheet metal during the cutting operation by any suitable means; but that I have devised and shown herein is especially adapted to shift the clamp out of the way without removing its grip, and to thus expose the entire margin of the templet in succession to the cutter.

In Fig. 3 the sheet of metal *j* is represented as having been wholly cut along the line lettered *t* and partly along the concave line at the end of the templet, the cutters *a* and *b* both being shown in their proper relations to the sheet metal and to the templet at such point.

My clamp, as shown in Figs. 17 and 18, is constructed with a foot, *n*, and an arm, *o*, the former having a disk, *n'*, swiveled therein by pivot n^2, and the arm having a screw, *p*, fitted therein and carrying upon its point a disk, *o'*, concentric with the disk *n'*. The foot is applied beneath the sheet metal and the arm above the templet, and the tightening of the screw presses the disks together upon both and holds them firmly in the desired position.

The swiveling of the disks permits the clamp to be turned thereon, as is indicated by the dotted circle J in Fig. 3, without affecting the screw, and the application of the clamp near the corners of the templet thus permits the successive exposure of the sides which terminate at such corner without loosening or removing the clamp.

The construction of the die *d*, which is shown in detail in section in Fig. 5, is intended to admit the application of the clamp to the sheet metal quite near the cutters, the die serving chiefly to sustain the sheet metal at the same level above the table as the lower disk of the clamps, and at the same time to hold and steady the lower cutter when the latter is adjusted vertically, as in the construction of Figs. 1 and 2. To effect these objects the die is shaped as a circular disk attached rigidly to the bed A; as by screws *d'*, and perforated to snugly fit the cutter *b*, which is clamped in the upper end of the slide E, as by set-screw *e*. The lower cutter is projected above the top of the die only enough to permit the slight movement of the upper cutter against its cutting-edge, and is beveled or sloped at its opposite edge to facilitate the movement of the sheet metal over its top toward such cutting-edge.

The pattern-face *c* is clearly shown in Fig. 5 with its highest convex surface vertically over the junction-line of the two cutters, and as the templet is supposed to be held in contact with such pattern-face during the entire cutting operation, it is obvious that the lines cut upon the sheet metal correspond accurately with the size of the templet itself.

By the use of my improvements two or more sheets of metal may be clamped to a single templet and cut out at the same time; and as the machine itself is not cumbered with any automatic attachments the sheet metal may also be applied to it independently of the

clamps and templets, and guided during the cutting operation entirely by a scribed line, the same as in cutting wood with a scroll-saw. In such method of applying the sheet metal the die *d* serves to support the sheet metal above the table A′ for the convenient application of the operator's fingers.

From the above description it will be seen that the pattern-face claimed herein is nothing more nor less than a gage-surface on the moving cutter, substantially on a line with the joint of the cutting-edges, so that the side of the cutter acts directly, even when in motion, as a gage to press the templet against during the cutting operation. Such gage-surface may therefore be the full width of the cutter, as in Fig. 6, or of any other required shape, as illustrated in Figs. 7 to 11, inclusive. It is also obvious that the function of such gage-surface would be the same if the upper cutter were fixed and the lower one reciprocated.

In place of the screws *d′*, screws may be inserted upward through the table into the die, and the upper surface of the latter be thus preserved smooth and unbroken.

Having thus set forth my invention, what I claim herein is—

1. In a sheet-metal-scroll-cutting machine having a pair of narrow shearing-cutters, a cutter provided with a gage-surface or pattern-face on a line with the joint of the cutting-edges and adapted to fit the edge of a templet during the cutting operation, substantially as shown and described.

2. In a sheet-metal-scroll cutter having a pair of narrow cutters operating by shearing the sheet metal, the combination, with the fixed and reciprocating cutters, of a pattern-face formed upon one of the cutters on a line with the cutting-edges and adapted to fit a templet, substantially as shown and described.

3. In a sheet-metal-scroll-cutting machine, a stationary cutter surrounded by a work-table, and a reciprocating cutter having a pattern-face of different profile from the shearing-edge formed upon the neck of the cutter above such edge and adapted to fit the edge of a templet, as and for the purpose set forth.

4. In a sheet-metal-scroll-cutting machine, a stationary cutter surrounded by a work-table, and a reciprocating cutter having a pattern-face convex toward the line of the cutting-edge and vertically over the same, substantially as herein set forth.

5. In a sheet-metal-scroll-cutting machine, a stationary cutter surrounded by a work-table and having a raised die fitted thereto and elevated above the surface of the table, in combination with a reciprocating cutter having a pattern-face formed above and on a line with the cutting-edge, as and for the purpose set forth.

6. In a sheet-metal-scroll-cutting machine, a stationary cutter surrounded by a work-table, and a reciprocating cutter having a pattern-face formed above and on a line with its cutting-edge, in combination with a templet laid above the material to be cut and raised therefrom by a separator into contact with the pattern-face, substantially as herein set forth.

7. The combination, with a templet for use with a sheet-metal-scroll-cutting machine, of a separator attached thereto and adapted to clamp upon the surface of the sheet metal, substantially as herein set forth.

8. The combination, with the table of a sheet-metal-scroll-cutting machine, of the templet-clamp, consisting in a foot and arm adapted to embrace the templet and the sheet metal, and provided with concentric opposed jaws constructed to turn or swivel upon said foot and arm when clamped upon the sheet metal, and freely movable upon the table with the sheet metal, substantially as shown and described.

9. The combination, with the table of a sheet-metal-scroll-cutting machine, of the templet-clamp, consisting in a foot and arm adapted to embrace the templet and the sheet metal, and provided with concentric opposed jaws constructed to turn or swivel upon said foot and arm when clamped upon the sheet metal, said clamp being constructed entirely separate and removable from the table, substantially as shown and described.

10. The combination, with a templet for a sheet-metal-scroll-cutting machine, of a separator adapted to lie upon the sheet metal, and a clamp embracing the sheet metal, the separator, and the templet and holding them together during the cutting operation, as and for the purpose set forth.

11. The combination, with a templet for a sheet-metal-scroll-cutting machine, of a separator adapted to lie upon the sheet metal, and a clamp embracing the sheet metal, the separator, and the templet, and provided with swiveling jaws pressed upon the clamp and sheet metal, as and for the purpose set forth.

12. In a sheet-metal-scroll-cutting machine, the combination, with the work-table, a lower cutter projected above the same, and a reciprocating upper cutter, of a templet laid above the sheet metal, a clamp having a foot fitted beneath the sheet metal and holding the templet thereon, and a die fitted about the lower cutter and sustaining the sheet metal above the table at substantially the same height as the clamp, as and for the purpose set forth.

13. In a sheet-metal-scroll-cutting machine having a pair of narrow shearing-cutters, a cutter provided with a gage-surface or pattern-face on a line with the joint of the cutting-edges, in combination with a templet secured to the sheet metal and pressed against such gage-surface during the cutting operation, substantially as shown and described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ANSON O. KITTREDGE.

Witnesses:
JENNIE VAN WYCK,
THOS. S. CRANE.