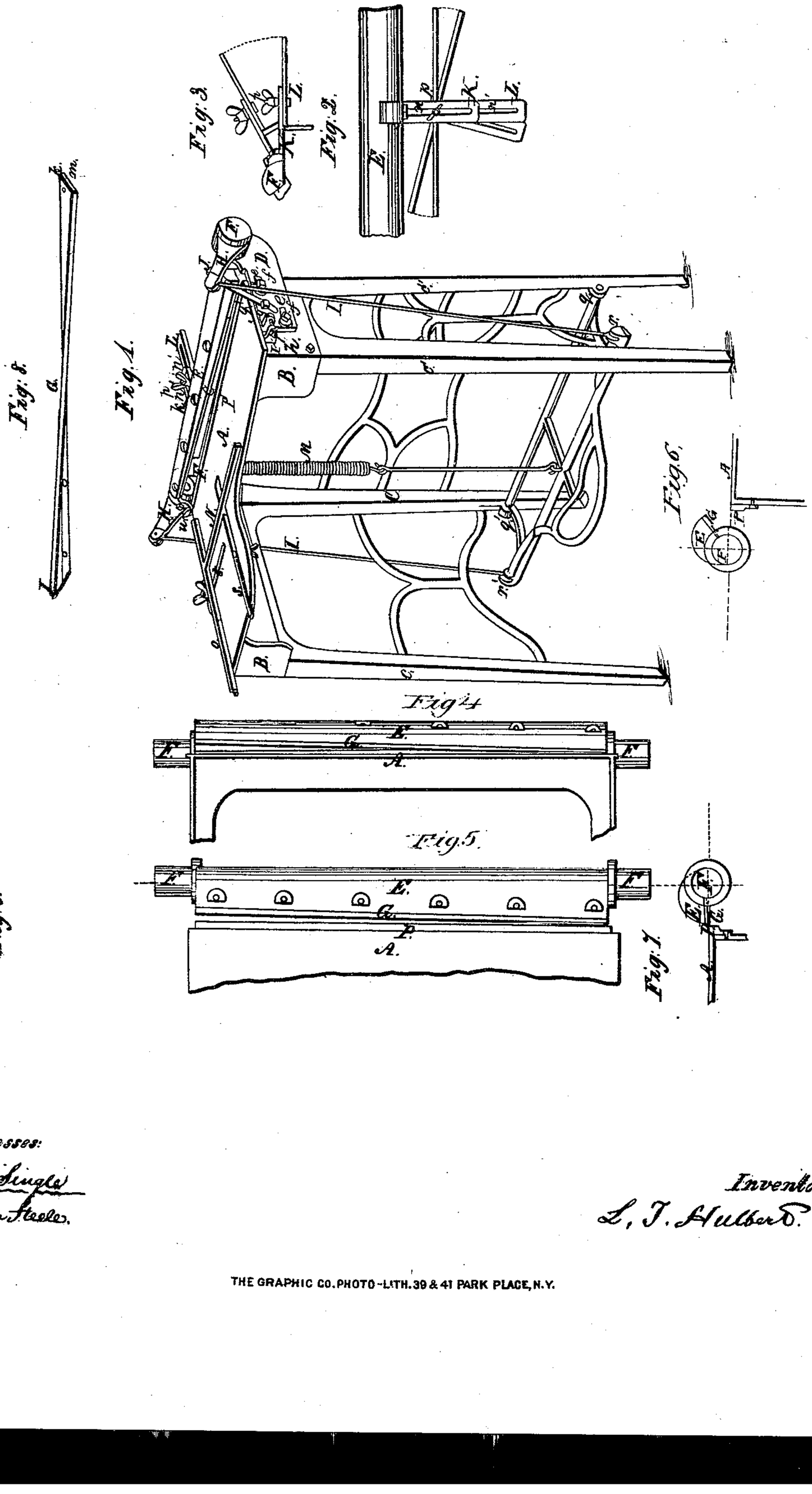
L. T. Hulbert.

Shearing Metal.

No. 42,855. Patented May 24, 1864.



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L. T. HULBERT, OF PAINESVILLE, OHIO.

IMPROVEMENT IN SHEARS FOR SHEET METAL.

Specification forming part of Letters Patent No. **42,855**, dated May 24, 1864.

To all whom it may concern:

Be it known that I, L. T. HULBERT, of Painesville, in the county of Lake and State of Ohio, have invented certain new and useful Improvements in Tinners' Squaring-Shears for Cutting Sheet Metal; 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 view in perspective of my said improved machine; Fig. 2, an enlarged plan view of the fixed arm and adjustable back gage, together with a portion of the shaft to which the said arm is secured; Fig. 3, a side elevation of the same; Fig. 4, a front elevation, enlarged, of the shaft and vibrating knife, also a partial view of the bed or table, showing its relative position therewith; Fig. 5, a plan view of the said shaft and table, showing the location of the bed or stationary knife; Figs. 6 and 7, elevations of opposite ends of the said shaft, with partial views of the said table and bed knife, showing the positions of the ends of the vibrating knife with reference to the stationary knife; and Fig. 8, a longitudinal edge view of the said vibrating knife, illustrating the intersection of the lines of their front and back edges, and also the straight form of the said lines.

The letters of reference marked thereon indicate similar parts in all the figures.

My improvements consist, first, in the employment of a vibrating shaft constructed with a broad curved surface extending longitudinally, and formed as will be described, the object being to allow a vibrating cutter of a form corresponding to the said surface to have a firm and uniform bearing on all parts of the said surface, and also to allow said cutter to be set "pitching," so that its cutting-edge shall strike on the metal first.

The second feature of my improvements is attaching to the back of the vibrating shaft aforesaid an arm carrying or supporting a back gage, as will be explained. This arrangement causes the said arm, and with it the said gage, to recede upward simultaneously with each downward vibration of the shaft and cutter, thereby increasing the space between the bed-knife (hereinafter mentioned) and the gage aforesaid, so that the cut portion of the material drops off readily, and is, therefore, free from the objections of a fixed gage, which is apt to cause the cut portion of the material to stick or bind. The said gage is made adjustable for any width of material and having square or beveled edges.

The third feature is in the arrangement by which the vibrating shaft and cutter is supported and operated—that is to say, supporting the said shaft and cutter on adjustable supports, and operating it by means of short lever arms and treadle so arranged as to constitute a compound lever power.

The following is a description of the construction and operation of my said improved machine, and which is of cast-iron, except the parts hereinafter specified.

A, Fig. 1, is a table or bed supported on a frame B, resting on two pairs of legs, C and C′. A portion of the said bed is cut away and the pair of legs C′ adapted to the narrowed space, as seen in the figure.

D is a support provided with slots *e e* and tightening-screws *f f*, also a fixed nut, *g*, into which a set-screw, *h*, works. Said screw passes through a lug, *i*, in the end of the frame B. A similar support is secured on the opposite end of the said frame, but is not seen in the drawings.

E is a somewhat semicylindrical shaft, having journals F F formed thereon, and which are placed eccentric to the line of its axis, as shown in Fig. 5. The construction of said shaft is seen in Fig. 4, which shows its flat or under side to be above the line of the axis of the journals F. A portion of this flat surface on its front side is cut away longitudinally and in a diagonal direction, forming a broad curved surface along its length. This surface is sunk somewhat lower at the back, so as to allow the vibrating knife, hereinafter mentioned, to be set pitching, as seen in Figs. 6 and 7, which represents the two ends of the said shaft, and which will also assist to explain the form and direction of the broad curved surface before mentioned.

G is the vibrating knife or blade before mentioned. It is of peculiar construction, and is unlike the spiral-edged cutting-blades now in use in various ways. Fig. 8 will assist in explaining its true form. A flat piece of iron of suitable dimensions, with a strip of steel designed for its cutting edge welded thereto,

is bent or carned so that the line of the back edge, *j k*, intersects the line of its front edge, *l m*, at their centers. The said blade is placed in the recess of the shaft before mentioned and secured by screws.

H H are lever-arms, constructed as shown in Fig. 1, and are secured on the journals of the shaft E, as shown.

I I are rods connecting said lever-arms with the tread-power, hereinafter mentioned.

J is a hooked finger catching on one of the said lever-arms. It is provided with a tightening-screw, *g'*. The holes of the bearings D, which receive the journals of the shaft E, are somewhat larger than the diameter of the said journals, and therefore fit loosely in them. *u u* are setting-screws passed through the supports D and impinging on the shaft-journals.

On the back of the shaft E is secured a permanent arm, K, Fig. 2, to which is attached an adjustable gage, L. The said arm and gage are provided with slots *n* and *n'* and thumb-screw *p*.

The lever-power by which the shaft E is operated is of the compound character. It will be seen by reference to Fig. 1 that the fulcrum of the foot-lever is some inches—say three—within that of the lever arms H, as seen at *q*, and that the point of connection between the ends of said arms and the foot-lever is still farther, as seen at *r*, the connecting-rods I I being set in a diagonal direction, thereby making the operating-power compact and of sufficient force. A spiral wire spring, M, is suspended from the under side of the table and extends down to the said treadle, as shown.

The table or bed A is provided with two slots or channels, *s* and *t*. The former is at right angles to the line of the cutting-edge of the bed knife, which will be referred to. The latter is parallel thereto. Said channels are provided with the slotted gages N and O.

P is a stationary knife or blade secured to the back of the bed A, as seen in Figs. 5 and 7. Said blade is constructed of iron, to which a strip of steel is welded similar to the vibrating blade G. With respect to the angle of shear of the said blades they can, of course, be set to any degree of cut. I prefer, however, an angle of about two and a half degrees or three degrees as best suited with my said arrangement.

It will be observed that the rotary vibrating movement of the said blade, in combination with the pitching "set" thereof, has a tendency to keep the edges of both blades in good cutting order, the return motion of the upper blade causing the edges of both to rub against each other. The said edges cannot, therefore, wear "rounding." The result of the said combination communicates to the said blades the self-sharpening property.

In placing the journals of the shaft in the bearings it is necessary to state that the centers of the said journals can be elevated above the plane of the table should the flat portion of the said shaft at any time interfere with the passing the sheet metal under it. The edge of the vibrating knife is placed in proper proximity to the bed-knife by means of the slotted arrangement of the said bearings, and the setting-screws *u u* (one only seen) placed therein and impinging on the said journals, as explained, will compensate for the wear of the said journals or the bearings, and thus keep the edge of the vibrating blade in the proper position for cutting.

The operation of the above-described machine is simple and easily understood. The sheet of metal is placed on the table and the vibrating blade set in motion by applying the foot to the tread-power. The recoil of the spring throws the blade up again after the cut. The sheet can be cut in any shape required by means of the vertical, parallel, and back gages, each of which, as stated, is provided with suitable adjustable movements, which are sufficiently obvious and need no particular description.

Having fully described the nature, construction, and operation of my improvements, what I claim therein as new, and desire to secure by Letters Patent, is—

1. The vibrating shaft E, provided with the broad curved surface, formed as described, and for the purposes specified.

2. The arm K, attached to the vibrating shaft E, as above described, and carrying or supporting the adjustable gage L, as and for the purposes set forth.

3. Supporting the shaft E, constructed as described, on the slotted adjustable supports D D, and operating it by means of the lever-arms H H, connecting-rods I I, and the foot-lever, arranged in the manner described, and for the purposes specified.

4. The compensating-screws *u u*, in combination with the shaft E, constructed as described, as and for the purpose set forth.

L. T. HULBERT.

Witnesses:
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