2 Sheets—Sheet 1.

N. W. SPAULDING.

Manufacture of Saw-Teeth.

No. 205,311. **Patented June 25, 1878.**

Fig. 1.

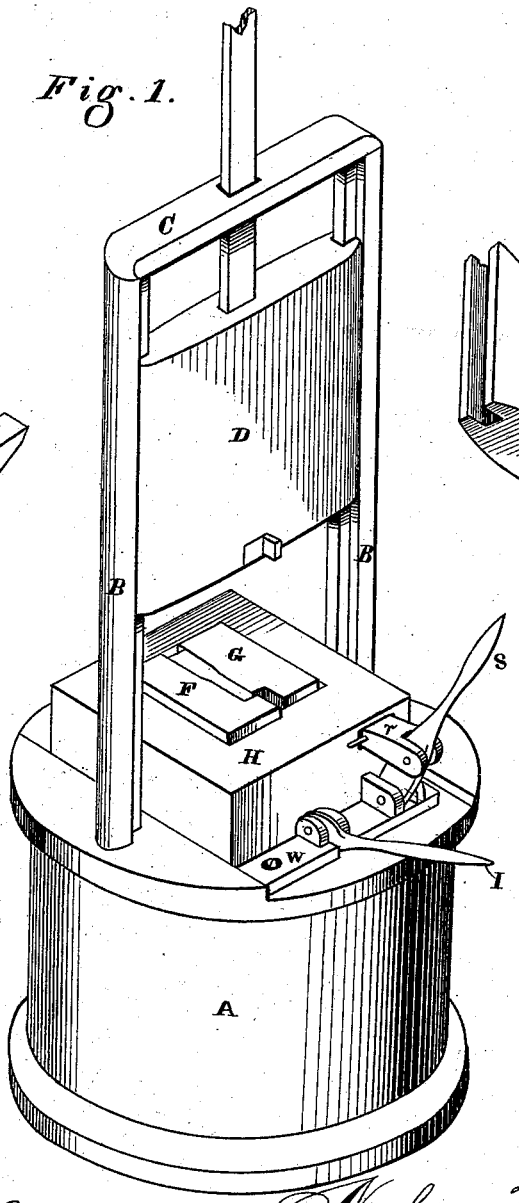


Fig. 2.

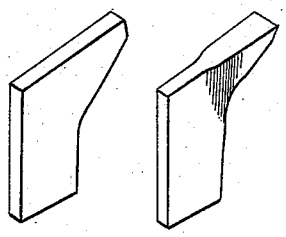
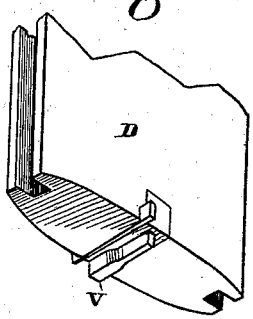


Fig. 3.



Witnesses
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2 Sheets—Sheet 2.

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Fig. 4.

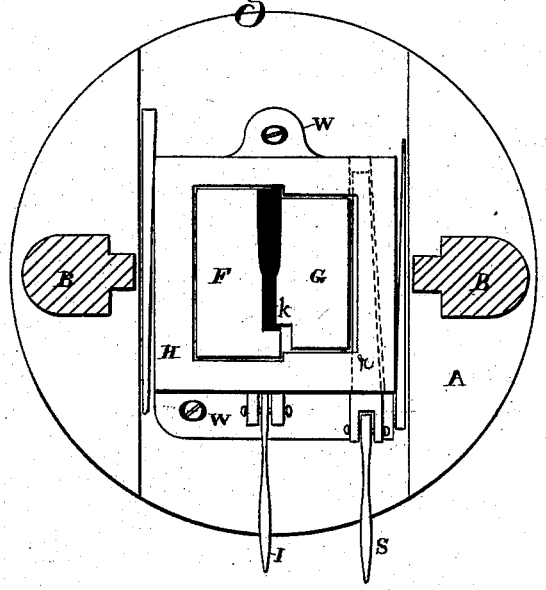


Fig. 5

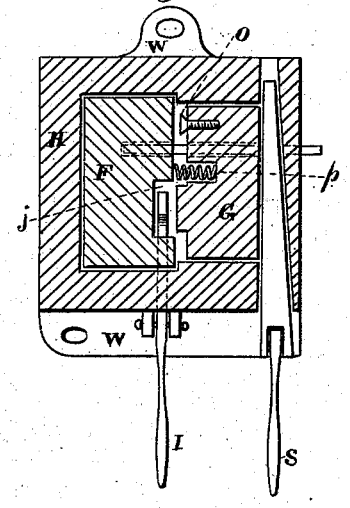


Fig. 6.

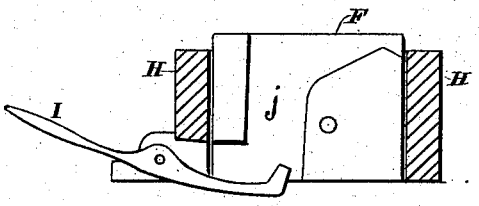
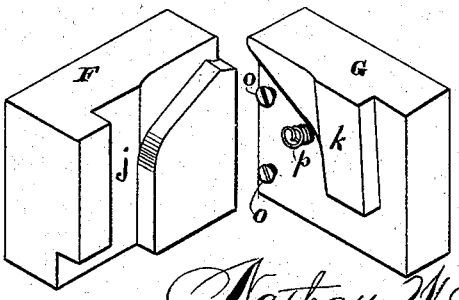


Fig. 7.



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UNITED STATES PATENT OFFICE.

NATHAN W. SPAULDING, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN THE MANUFACTURE OF SAW-TEETH.

Specification forming part of Letters Patent No. **205,311**, dated June 25, 1878; application filed February 16, 1878.

To all whom it may concern:

Be it known that I, NATHAN W. SPAULDING, of the city and county of San Francisco, and State of California, have invented a new and useful Improvement in the Manufacture of Saw-Teeth; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention has reference to the manufacture of insertible saw-teeth, and relates more particularly to a novel method and apparatus for giving form and body to the sheet-metal blanks from which such teeth are made.

I will first explain that these blanks are cut or stamped out of sheet metal in about the shape of an inserted saw-tooth. They are therefore in this stage of a uniform thickness at all points. A saw-tooth, however, requires to be thicker through that portion extending from its cutting-point back to a line drawn upward coincident with the front edge of the body of the tooth, so that it will cut a kerf wider than the thickness of the saw-blade, to give clearance and prevent friction of the blade against the sides of the cut.

To produce this result is the object of my invention.

My machine consists of two jaws, which not only serve to clamp and hold the heated blanks as they are separately operated upon, but which are also adapted to form a mold of the proper form and shape, into which that portion of the blank to be spread will project, so that when pressure is brought to bear upon the blank that portion which extends into the mold will be spread, thickened, or upset, so as to fill and fit the mold.

My method of condensing or upsetting the point of the blank which is thus secured is by means of a sudden pressure exerted upon the back or upper edge of the blank, preferably produced by a drop-hammer, all as hereinafter more fully described.

Referring to the accompanying drawings, Figure 1 is a perspective view of my machine. Fig. 2 is a view of a saw-tooth before and after spreading. Fig. 3 shows the under side of the drop-block. Fig. 4 is a top view of the machine. Fig. 5 is a horizontal section. Fig. 6 is a vertical section. Fig. 7 is a perspective of the two jaws or dies.

A is the pedestal or base upon which my machine is constructed. If I use a drop-hammer, (which I shall ordinarily do,) I construct two upright guides, B B, on the pedestal or base, one on each side, and these guides I connect at their upper ends by a cross-beam, C. D is the drop-block or driver, which is arranged to move between the guides B B in the usual way, and to which the forming-hammer is secured, as hereinafter specified; or a tilt-hammer or other device capable of exerting a blow or sudden pressure could be used, if preferred.

The tooth-holder I secure upon the pedestal or base A, directly between the guides B B. It consists of a metal block or frame, H, which has an opening or chamber, preferably rectangular in form, passing down through it. In this opening or chamber I place the two dies or jaws F G. These jaws could both be made movable, or one can be made stationary and the other movable. I prefer the latter plan.

In the present instance the die or jaw F is fixed in one side of the opening, and the other, G, is movable to or from it. A pin passes through the side of the block H and into a hole in the movable die, so that the die can move to or from the fixed die upon it, but be prevented by it from moving up or down.

The fixed jaw or die F has an open recess or excavation, *j*, in its outer face corresponding to the shape of the saw-tooth, while the movable jaw or die has a corresponding projection, *k*, on its outer face. This projection is shallower than the recess, so that when the two jaws are forced together the projection will follow into the recess *j*. I therefore call this projection a "follower."

Below that part of the follower *k* which corresponds with the point of a saw-tooth I arrange one or more set-screws, *o*, and a projecting spiral spring, *p*, as represented at Figs. 5 and 7. This follower and the set-screws allow me to regulate the opening or space between the two faces to fit and clamp blanks of different thicknesses. For instance, if the blank

is thin, I turn the screws farther in, so as to allow the follower to enter the opposite corresponding recess a sufficient distance to firmly clamp the blank between the two opposing faces. If it is thicker, I turn the screws out, so as to lessen the amount of entrance of the follower. I am thus able to fit the dies to any desired thickness of blank.

The spring *p* extends out farther than the set-screws, so that when the pressure on the movable die is relieved the spring will force it back and release the tooth readily. I also cut away a thin portion of the outer face of each die, extending from near the middle of each die to the end where the point of the tooth is formed, thus leaving a space on each side of the point of the blank extending about half the length of the back of the tooth. The remaining portion of the blank being clamped between the jaws, the throat of the blank will then rest upon the inclined ledge in the recess which corresponds with it.

The movable die can be moved toward the fixed die by means of a cam, wedge, or other mechanical power. I have represented a wedge, *r*, in the present instance, which passes through a hole in the block H just behind the movable die, and projects from the block at one side. A lever-handle, *s*, is arranged to operate this wedge, so that by forcing the lever inward the movable jaw or die is forced toward the fixed jaw; but by drawing it outward the pressure upon the movable jaw is relieved, and the spring *p* forces it away from the fixed jaw.

I also make a series of holes horizontally through the wedge, near its outer end, and when I have ascertained the thickness of blank to be operated upon and the distance the wedge must be forced in to clamp the movable jaw upon it, I place a pin in the hole nearest that point, so that the workman need not exercise so great care in forcing the wedge in, as the pin will stop it at the proper point.

To facilitate the ready removal of the tooth from between the jaws or dies after it has been formed, I use a lever, I, which is pivoted at its middle, one end of which extends under the block and is turned upward, so as to form a bearing for the base of the blank or tooth to rest upon, while the opposite end projects outward from the block H, so as to be operated conveniently by the workman.

When the tooth has been formed and the jaws or dies separated, so as to release it, a downward pressure on the projecting end of the lever will force the tooth upward, so that it can be grasped with a pair of tongs and removed from the recess.

The hammer *v*, which is secured to the drop-block or driver D, is a narrow piece of steel, corresponding to the thickness of the tooth to be spread; and this hammer is arranged directly above the cavity in which the tooth is placed, so that when the block is dropped the hammer will strike fairly upon the back of the blank or tooth. This hammer is removable, so that, when desired, a thicker or thinner one can be substituted for it, according to the thickness of the tooth to be spread. The block or frame H is also adjustable sidewise, in order to permit the adjustment of the tooth-cavity to the hammer when a thick or thin tooth is being formed. This is accomplished by elongating the screw-holes in the lugs *w*, through which the screws pass which fasten the block to the bed-plate or base.

By loosening the screws the block can be shifted in either direction slightly, and again secured by turning down the screws.

Having ascertained the thickness of the blank to be spread, the first thing to be done is to see that the hammer is of a proper or corresponding thickness. Next I take out the movable die and set the set-screws to the proper point to regulate the width of the recess so that it will correspond with the thickness of the blank, and then replace it. I then adjust the recess to the hammer by shifting the block, and the machine is ready for use.

The blanks having been properly heated, I drop one, base downward, into the recess between the dies, so that the under side of its point will rest upon the inclined ledge in the recess. I then close the movable jaw upon it, so as to clamp it between the two jaws, as before described. The back part of the blank will be firmly griped and clamped between the jaws, while the point from near the middle of the back will rest in the enlarged portion of the recess upon the inclined ledge. The hammer is now allowed to drop upon the back of the blank. As it strikes the blank the rear portion, being, as before stated, clamped between two sides, which prevent it from spreading, and its upper edge being below the top of the sides, is forced downward between the sides, while the front portion or point, which rests upon the inclined ledge, is spread and thickened by the blow, so as to fill the enlarged recess, and thus give the desired shape and form to the tooth. The compression of the metal also draws the point forward, and any surplus metal is worked down the incline into the shank of the tooth and out at the tooth-point. This latter portion can be afterward trimmed off in pointing or sharpening the teeth.

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

1. The metal block or frame H, with its central opening, in which a fixed jaw or die, F, and a movable jaw or die, G, are arranged, said fixed jaw or die having a recess or excavation, *j*, in its outer face, while the movable jaw has a corresponding projection, *k*, on its opposing face, said projection serving as a follower to admit of the adjustment of the die-faces to blanks of different thicknesses, substantially as and for the purpose herein set forth.

2. The fixed jaw or die F, provided with a recess or excavation, *j*, in its outer face, in combination with the movable jaw or die G, with its projection *k*, and set screw or screws *o*, the two jaws being secured in a block or frame, H, and operated by a wedge, *r*, or equivalent device, substantially as and for the purpose described.

In witness whereof I have hereunto set my hand and seal.

NATHAN W. SPAULDING. [L. S.]

Witnesses:
JNO. L. BOONE,
FRANK A. BROOKS.