

(No Model.)

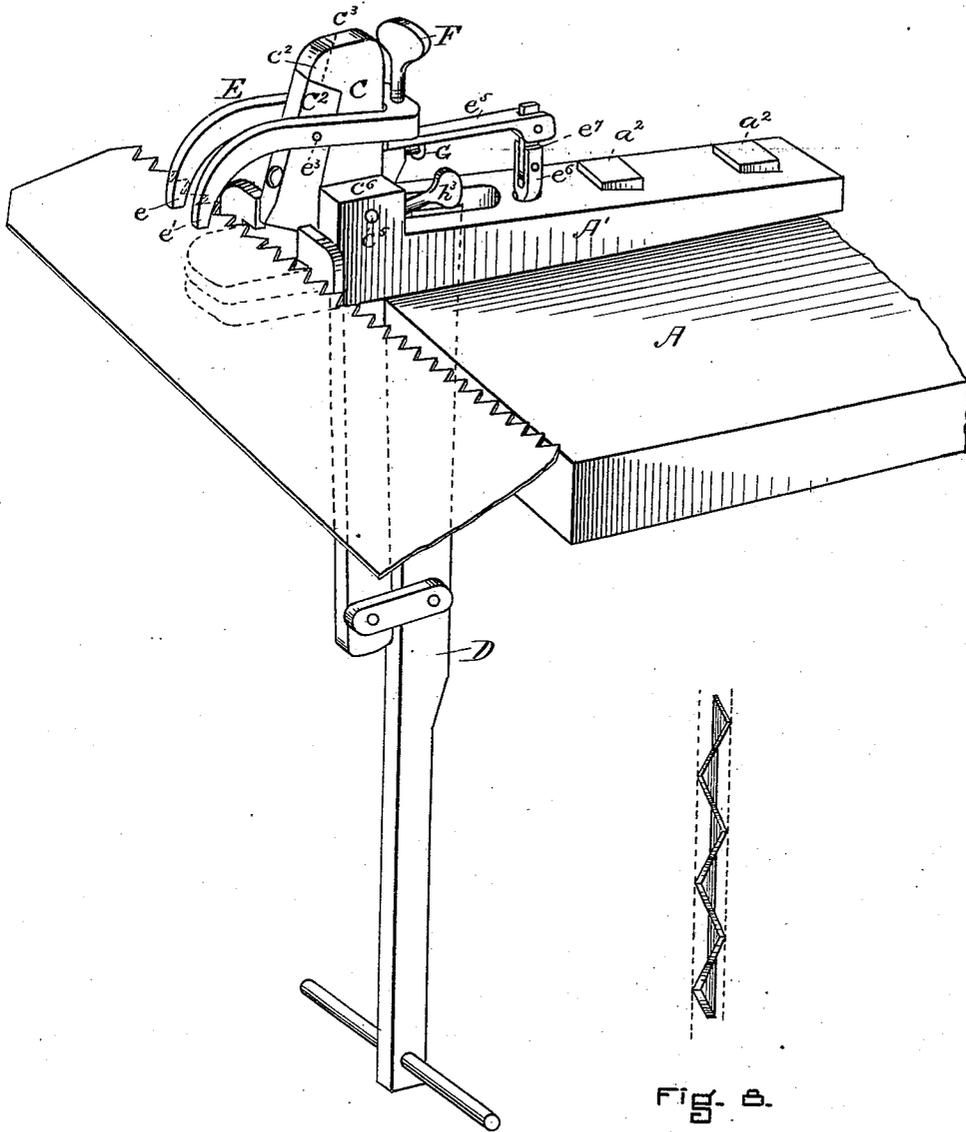
3 Sheets—Sheet 2.

J. LAYBOLT.

MACHINE FOR PUNCHING AND SETTING SAWS.

No. 330,499.

Patented Nov. 17, 1885.



WITNESSES.

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FIG. 2.

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UNITED STATES PATENT OFFICE.

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MACHINE FOR PUNCHING AND SETTING SAWS.

SPECIFICATION forming part of Letters Patent No. 330,499, dated November 17, 1885.

Application filed May 15, 1885. Serial No. 163,556. (No model.)

To all whom it may concern:

Be it known that I, JOSIAH LAYBOLT, of Wakefield, in the county of Middlesex and State of Massachusetts, a subject of Victoria, Queen of Great Britain and Ireland, have invented a new and useful Improvement in Saw Punching and Setting Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The essential features of the invention are, first, an arm carrying a bed adapted to support a punching die or block, or a setting-block, which arm is adapted to be fastened to a bench or other suitable support; second, a vertically-vibrating lever pivoted to said arm and supporting upon its side the saw-tooth punch or saw-set, adapted to be operated by a lever pivoted to the arm and to the lower end of the tooth, punch, or saw-set-supporting lever, and to be moved by foot-power or by a treadle; third, a jaw or clamping device for holding the saw-blade during the setting of the teeth, and which automatically governs or regulates the degree or extent of the set of each tooth, so that all the teeth, regardless of the thickness or inequalities of the saw-blade, are caused to project a uniform distance from the median line of the blade from end to end.

The invention further relates to various details of construction, all of which will hereinafter be more fully described.

Referring to the drawings, Figure 1 is a perspective view of a machine containing the features of my invention, showing the tooth punch and die in place. Fig. 2 is also a perspective view showing the saw-set in place. Fig. 3 is a vertical central section of the device, as shown in Fig. 2, and upon the line x x of Fig. 5, representing the position of the saw blade and teeth in relation to the saw-set and set-block before the operation of the set. Fig. 4 is a vertical central section upon the same line as Fig. 3, representing the position of the saw blade and tooth in relation to the saw-set and set-block at the completion of the setting operation. Fig. 5 is a plan view of the device as represented in Fig. 2. Fig. 6 is a vertical central section of the upper part of the device shown in Fig. 1 upon the line x x

of Fig. 7. Fig. 7 is a horizontal section on the line y y of Fig. 6. Fig. 8 is an edge view of the complete saw-blade.

A represents a portion of a bench or support to which my device is attached. It is provided with a recess, a , extending in from its front edge to receive the operative levers.

A' is a horizontal arm which has the bolt-holes a' , (see Figs. 3 and 4,) whereby, by means of the bolts a'' , it is fastened to the bench or other support A. This arm A' carries at its front end the bed or support B, for either the set-block B', as shown in Figs. 3 and 4, or the die-block B'', as shown in Fig. 1. This bed B is adapted to support either the set-block or die-block, and each block is secured thereto by means of screws or bolts passing from the under surface thereof through holes formed in the bed for their reception.

C is the lever or arm which supports or carries either the tooth-punch C' or the set C'', and it has the inclined surface c , against which the set or punch is held by the screw or bolt c' , and the shoulder c'' , which laps upon or extends over the upper edge, c'' , of the set or punch.

In Figs. 1, 6, and 7 the punch is shown in position, and in Figs. 2, 3, and 4 the set. The lever C passes down through the slot c'' in the arm A', and is pivoted at c'' to the lugs or projections c'' , which extend upward from the arm A'. It is vibrated by means of the lever D, which is pivoted at D' to the arm A', the end of the lever entering the slot c'' , and this lever is connected with the lower end of the vibrating punch and set-operating lever by means of the link d , which is pivoted to the operating-lever at d' and to the punch and set holding lever at d'' . This operating-lever D has a cross bar or pin, d'' , by which it is adapted to be oscillated by foot-power, either applied directly to the pin or by means of a treadle.

The saw-blade is held upon its supporting-block while its teeth are being set by the jaw E, which preferably is made with two arms or fingers, e e' , which extend outward from the end piece, e'' , and are curved downwardly. (See Figs. 2, 3, and 4.) The jaw is pivoted at e'' to the set-block, and it is operated to

bring its bearing-surfaces e^4 upon the upper surface of the saw or saw-blank by means of the lever e^5 , which is connected with the post e^6 by the link e^7 , which is pivoted at e^8 to the post e^9 . The outer end, e^{10} , of the lever projects under the back portion, e^2 , of the jaw, and there is preferably arranged to form the connection between the jaw and this lever the screw stud or post F, which is movable up and down in the block e^2 of the jaw E, and the lower end of which bears upon the upper surface of the lever e^5 near its end. There is arranged to extend outward from the lever C the rod or support G, which is preferably in the form of a screw, and horizontally adjustable in relation to the said lever, the surface of which acts as a fulcrum-point upon which the lever e^5 is caused to turn during the movement of the lever C.

Before the operation of the device the position of the parts are as shown in Fig. 3, the end of the lever e^5 resting upon the stop g . Upon the movement of the lever C the fulcrum-point G is caused to be advanced upwardly, and in so doing moves the lever e^5 upwardly, and thereby throws the block e^2 of the jaw upward and the surfaces e^4 downward upon the blade of the saw or saw-blank, and thereby holds the saw blade or blank during the operation of the set. The extent of movement and necessary adjustment of the jaws is varied by means of the screw F and the position of the push-block and fulcrum G.

The operation of this regulating or governing jaw or device is substantially as follows: The saw-blade is placed in position, the teeth projecting below the saw-set, then upon the movement of the lever C the surfaces e^4 of the jaw or set-regulating device are brought down upon the upper surface of the saw-blade somewhat in advance of the movement of the saw-set, or so that they find a bearing or rest upon the saw-blade before the set finishes its operation, and the difference between the lower level of these surfaces, or the contacting part of this jaw, and the thickness of the saw-blade determines the extent of the bending of the tooth or the angle which it shall bear to the saw-blade. If the blade is comparatively thin, then the jaw or surfaces can advance farther and the teeth will be more inclined to the saw-blade. If it be thicker, the jaw or surfaces e^4 cannot advance so far, and the angle of the bend of the tooth will not be quite as great. It will be seen that by this automatic governing or regulating mechanism each tooth is set according to the thickness of the metal of the blade, so that if the blade of the saw varies in thickness the teeth are bent so that their outer edges must come to the same line. Of course it is understood that in setting a saw the alternate teeth are bent to oppose each other.

In Fig. 7 I represent an edge view of a saw blade and tooth, showing or illustrating the operation of this device upon a saw-blade of unequal thickness.

It is obvious from this description that the jaw E operates to govern the degree of the set automatically, and that the extent of the set is governed or controlled by the thickness of the saw-blade, so that its own imperfections are used in obtaining a perfect set or cutting-edge.

To gage the work I employ a clamp, H, which has the arms h h' , which lap upon the die-block or set-block, and these arms are held rigidly in place by the clamping-screw h^2 . This gaging device is horizontally movable to and from the lugs e^6 by means of the screws h^3 , so that the gage may be set in any desired location.

To accurately space the saw-teeth I use a point or guide, M, which is made of thin metal, the end of which turns outward, as shown in Fig. 7, and which has a slot, m , through which the screw m' , which fastens it to one arm of the clamp, passes. This point is adapted to engage with the saw-teeth, and to locate the relation of the saw-blade to the punch. By providing the plate with a slot it is made adjustable for varying the size of the teeth.

Of course the die and set blocks and the punch and set may be varied in size and form to suit the requirements of the work.

The stud e^6 is preferably a screw-stud, and it may be vertically adjustable in the arm A'.

In the operation of punching the edge of the saw blade or blank to form teeth, the saw-blank is placed upon the die-block and properly gaged by the gaging devices in relation to the punch, and the punch moved down thereon, cutting out or severing therefrom the sections of the margin which are removed to form the teeth. When it is used as a saw-set, the punch and die block are removed and the set and set-block substituted. The set regulating or governing jaws are then brought down upon the saw-blade and hold it firmly during the bending or setting of the teeth by the set. I am enabled by this mechanism to obtain a perfect set of each tooth, and also of the teeth in relation to each other, whether the metal of the blade be of uniform thickness or varied, so that all the teeth shall project a uniform distance from the median line of the saw-blade from end to end, which is very essential for the purpose of obtaining a good cutting-edge.

It will be observed that the slot e^4 and arm A' extend forward sufficiently to form a recess beneath the die-block, through which the waste from the saw-edge, when the punch is used, may escape.

I would state that for the operation of punching teeth the parts shown in Fig. 1 are used, and that for the operation of setting the teeth the parts shown in Fig. 2 are employed.

I would not be understood as confining myself to the especial means herein described for automatically operating the jaw E, as I may use any mechanical equivalents for the mechanism herein specified, provided the jaw is caused to operate, in discovering the

variation in the thickness of the saw-blade, so that the set of the saw-teeth may be governed or regulated to correspond.

5 I claim and desire to secure by Letters Patent of the United States—

1. The combination, in a saw-setting device, of the arm A', having the bed B, adapted to support the die-block or a set-block, the
10 lever C, adapted to support the punch or set, and the operating-lever D, all substantially as and for the purposes described.

2. The combination of the block A', the set-block B', having the surface shaped as described and supported by the bed B, the set
15 C', adapted to have an oscillating movement to and from the bed imparted to it, the jaw E, and the lever e' and its contact-point G, for regulating the extent or degree of the set
20 governed or controlled by the thickness of the saw-blade, all substantially as and for the purposes described.

3. The combination of the lever C, adapted to support a set or punch, with the jaw E, the
25 lever e', and the movable fulcrum G, substantially as described.

4. The combination of the set-block B' and the oscillating saw-set C' with the jaw E, pivoted, as described, the lever e', and movable
30 fulcrum-point G, all substantially as and for the purposes set forth.

5. In a saw-setting machine, the jaw E, pivoted, as described, and having the two arms e e', with the lever e', operated as described, all substantially as and for the purposes
35 set forth.

6. The combination of the set-block B' and the oscillating set C' with the jaw E, the lever e', and the adjusting screw or stud F, all
40 substantially as and for the purposes described.

7. The combination of the set-block B' and the oscillating set C', the jaw E, lever e', and the adjustable fulcrum point or support G, all substantially as and for the purposes described.

8. The combination of the set-block B' and the oscillating set C', the jaw E, the lever e', and the stop g, all substantially as and for the purposes described.

9. The combination of the lever C, having
50 the inclined surface c and shoulder c', with the punch or set having the inclined surface, as described, with its upper edge in contact with the shoulder c', all substantially as and for the purposes set forth.

10. The combination of the lever C, carrying the set or punch, with the operating-lever D, pivoted at D', all substantially as and for the purposes described.

11. The combination of the support A',
60 carrying the bed for the support of the set-block, the lever C, supporting the set, the jaw E, lever e', and the operating-lever D, all substantially as and for the purposes described.

12. In a saw-setting machine, the saw-set
65 governing or regulating jaw E, the lever e', and the contacting point or surface G, in combination with the saw-set C', supported as described, and mechanism for operating the same, whereby the jaw is caused by the thick-
70 ness of the saw-blade to adjust or regulate the degree or extent of the set of each tooth, all substantially as and for the purposes described.

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Witnesses:

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