(No Model.) 2 Sheets—Sheet 1.

E. DUNNING.

SAW SWAGING MACHINE.

No. 346,844. Patented Aug. 3, 1886.

Fig. 1

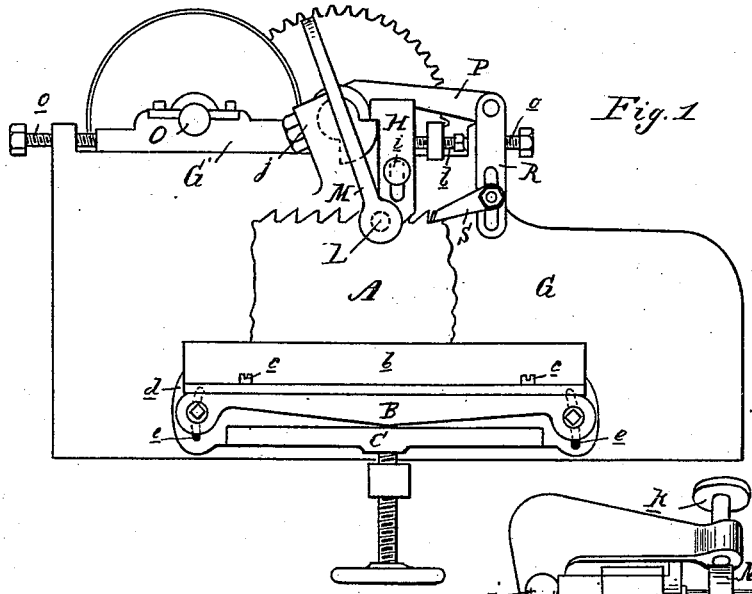


Fig. 2

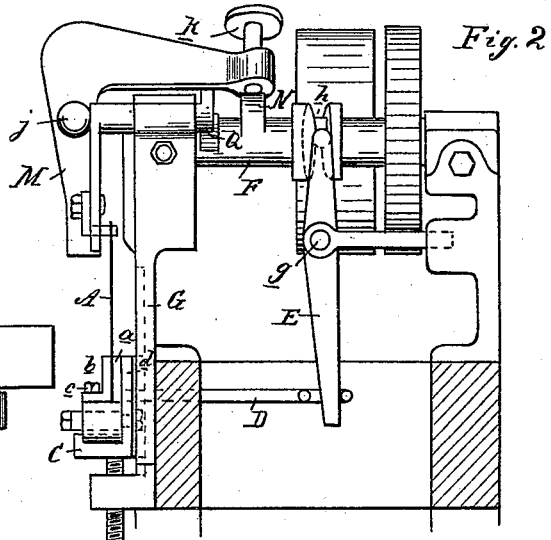
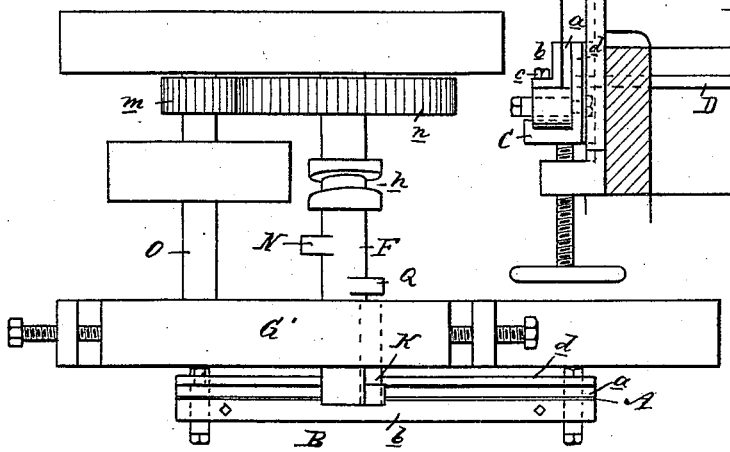


Fig. 3



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(No Model.)

2 Sheets—Sheet 2.

E. DUNNING.

SAW SWAGING MACHINE.

No. 346,844. Patented Aug. 3, 1886.

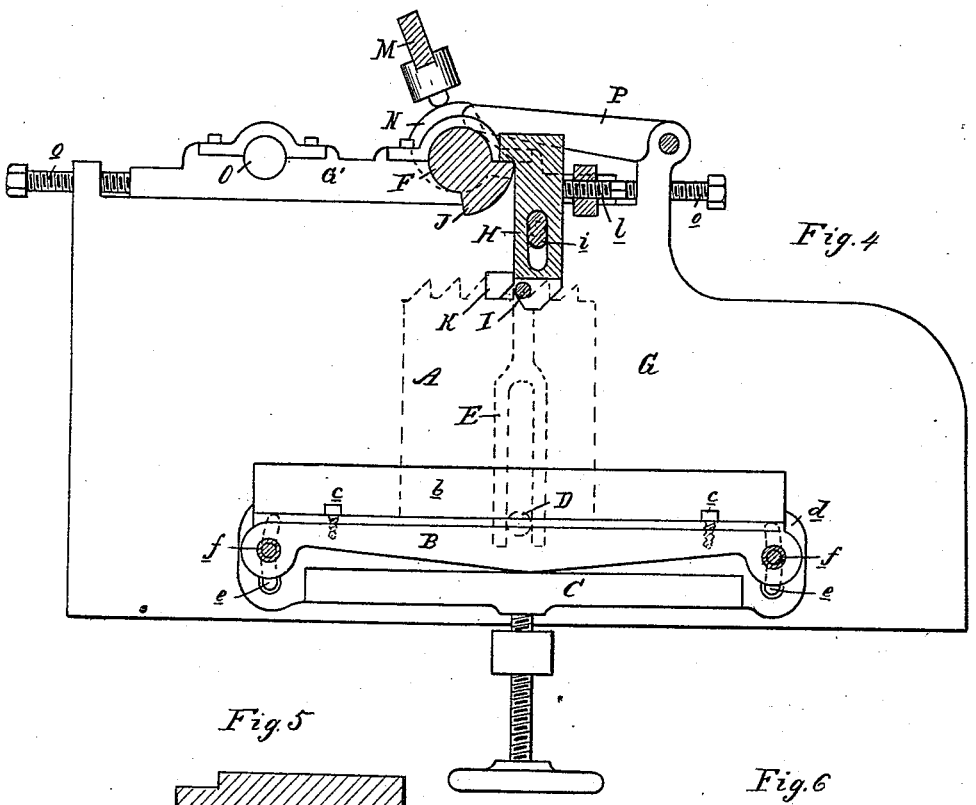


Fig. 4

Fig. 5

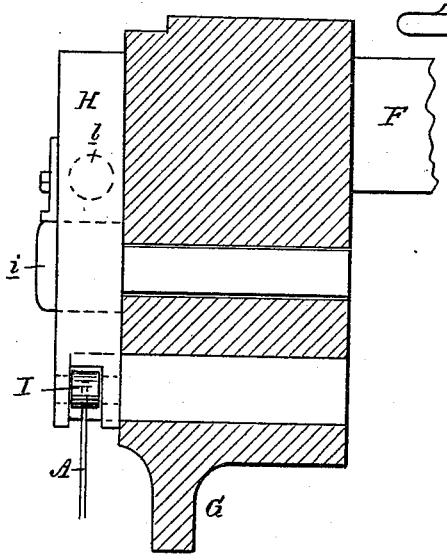
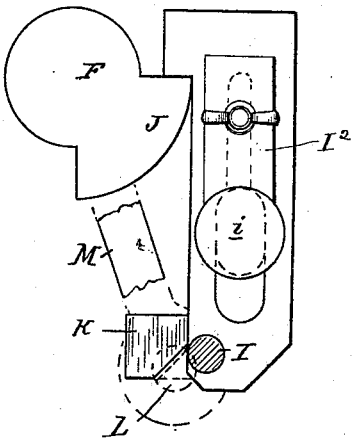


Fig. 6



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UNITED STATES PATENT OFFICE.

ELISHA DUNNING, OF BLUFFTON, ASSIGNOR OF ONE-HALF TO SQUIRE DAVIES, OF MUSKEGON, MICHIGAN.

SAW-SWAGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 346,844, dated August 3, 1886.

Application filed April 8, 1886. Serial No. 198,221. (No model.)

To all whom it may concern:

Be it known that I, ELISHA DUNNING, of Bluffton, in the county of Muskegon and State of Michigan, have invented new and useful Improvements in Saw-Swaging Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to new and useful improvements in saw-swaging machines; and the invention consists in the peculiar construction, arrangement, and operation of the different parts, and their combination, all as fully hereinafter set forth.

In the drawings which accompany this specification, Figure 1 is a front elevation of my improved machine. Fig. 2 is a side elevation thereof. Fig. 3 is a plan. Fig. 4 is a front elevation, with some parts represented in section. Fig. 5 is a detached side elevation of the rolling die. Fig. 6 is a diagram elevation showing the relative position and shape of the dies.

A represents a saw to be swaged.

B is an adjustable saw-rest, having two vertical parallel guide-flanges, *a b*, which hold the saw-blade in position. The guide-flange *b* is made separate, to permit of adjusting it to saws of various gages by means of adjusting-screws *c*.

C is a bed-plate, provided with a vertical flange, *d*, to which the saw-rest is movably and adjustably secured in the following manner: The vertical flange *d* of the bed-plate is provided with the curved slots *e*, into which are adjustably secured the shouldered bolts *f*, projecting some distance from the face of the flange *d*, and engaging loosely into corresponding holes in the ends of the saw-rest, which latter is also supported in the center upon the bed-plate underneath, all so arranged that the saw-rest has a tilting adjustment by means of the bolts *f*, and is at the same time free to be moved sidewise from and toward the face of the flange *d*. Such a movement is communicated to the saw-rest in the operation of the device by means of the following connection: D is an arm firmly secured at one end to the saw-rest, and, projecting laterally therefrom through an opening in the flange *d*, engages with the end of the lever E, so as to have a certain amount of lost motion. The lever is pivotally secured at *g*, and engaged with its upper end in a cam-groove, *h*, on the shaft F, all so arranged that at each revolution of the shaft F the saw-rest is first pushed laterally outward the required distance, to permit the saw to pass the stationary die when the saw-feed is advancing the saw, and then drawn back again by a reverse movement, as will appear more fully hereinafter.

The bed-plate C is secured to an iron frame, G, in any suitable manner which will permit of a vertical adjustment up or down. The frame G is suitably secured upon legs, and supports the operating parts of the machine.

H is a die-holder, slotted upon its lower end so as to straddle the saw. It carries the round die I, journaled in its lower end, and works on the loose pin *i*, passing through a slot in the die-holder. A cam, J, secured on the shaft F operates against the upper end of the die-holder in such manner as to give the die-holder first a lateral pressure, which presses the die against the tooth, and then carries it up perpendicularly along the cutting-face of the tooth and past the point. The travel of the die-holder is regulated by a suitable stop-plate, I^2, adjustably secured thereto and striking against the pin *i* when the holder is down, and a set-screw, *l*, against which the back of the movable die-holder bears, keeps the face of the die in line with the face of the tooth.

K is a stationary die set into the frame G in rear of the movable die I, and projecting sufficiently from the face of the frame to support the back of the tooth in swaging. To this end the stationary die is cut away at the lower front corner, so as to form a bevel of the necessary degree to fit the back of a tooth, and a triangular side bearing, against which the inner side of the tooth may rest.

L is a movable side clamp arranged to bear against the outer side of the tooth. It is secured into the free end of the bell-crank lever M, pivoted at *j*, and worked by the cam N, secured on the shaft F. To regulate the pressure of this side clamp the lever M is provided with the set-screw *k*, which bears against the face of the cam.

The shaft F is driven from the counter-shaft

O by means of intermediate gears, *m n*, and is journaled in the movable top frame, G′, which has adjusting-screws *o*, for adjusting it laterally to regulate the pressure of the cam J against the movable die-holder.

P is a feed-lever worked by a cam, Q, on shaft F. It is secured to a rock-shaft, which actuates the rock-arm R, to which the feed-finger S is adjustably and pivotally secured, all so arranged that at each revolution of the shaft the saw is advanced one tooth.

In practice, the machine being constructed and arranged as shown and described, and with the movable dies arranged to work simultaneously and in the necessary relative position to each other and to the stationary die, as required for the proper performance of the operation of swaging, the parts will operate perfectly automatic, the feed-motion advancing the saw after every operation of the dies one tooth, the lateral motion given to the saw-rest carrying the finished tooth past the stationary dies.

Having now described the construction and operation of the machine, I wish to call special attention to the following points: The machine is the first automatically-operating one I am aware of, and much time is saved, especially in swaging band-saws, as the machine after being started needs no further attention. The movable die is rolling, which reduces the friction in working and wears much longer than in the machines in present use, where such die cannot roll. The movable die-holder actuates the die in a superior and novel manner. It draws the material from the base of the tooth toward the cutting-point and passes beyond it, making thereby a stronger and more finished tooth than in the old machines, and doing the work just where it is needed. The movable die-holder holds the die more firmly, as it embraces the saw upon both sides, being slotted some distance up from the lower end. The stationary die firmly bears against the back of the tooth, and acts in connection with the movable side die to hold the tooth in position for the movable die to operate against it. The pressure of the movable die can be regulated to a nicety by means of the adjustability of the top frame, G′. All the working parts are open to full view, and the operator can watch the operation of the dies, and see just what they are doing and how they are doing the work, and adjust all the parts correctly. The whole operation of swaging, depending only on the mechanical operation of parts, effects a uniformity of work, and as the teeth are all uniform and in line as they leave the machine, much time is saved in sharpening, either by hand or by the automatic sharpener. By means of the adjustable saw-rest various degrees of hook can be given, thus adapting the machine to the different needs or ideas of different filers.

What I claim as my invention is—

1. In a swaging-machine, the combination of a stationary die, a movable die, a saw-rest, which supports and guides the saw, and means for moving said rest intermittently in and out of position to obtain a clear path for feeding the saw, substantially as described.

2. In combination with the stationary swaging-die, a saw-rest for holding and guiding the saw, and means for moving the saw-rest in and out of position to carry the saw clear of the stationary die while feeding, substantially as described.

3. In a saw-swaging machine, the combination of the saw-rest B, the end supports, *f*, thereof, and the means for intermittently reciprocating it thereon, substantially as described.

4. In a saw-swaging machine, a saw-rest for adjustably supporting the saw, the same consisting of the rest B, the adjustable end supports, *f*, thereof, and the bed-plate C, having the slots *e*, substantially as described.

5. In a saw-swaging machine, the combination of the rest B, having central supports and end supports, the bed-plate C, having the slots *e*, and the supports *f*, forming the adjustable end supports for the rest B, all arranged substantially as described.

6. In a saw-swaging machine, the combination of the rest B, having central support and end supports, the vertically-adjustable bed-plate C, having the slots *e*, and the end supports, *f*, of the rest B, adjustably secured in the aforesaid slots, all arranged substantially as described.

7. In a saw-swaging machine, the vertically-adjustable and laterally-moving saw-rest B, having stationary guide-flange *a* and adjustable guide-flange *b*, substantially as described.

8. In a swaging-machine, the combination of the laterally-movable saw-rest B, end supports, *f*, the arm D, the lever E, and the cam *h*, all arranged to operate substantially as described.

9. In a saw-swaging machine, the combination, with the stationary die K, of a laterally-movable saw-rest, means for imparting an intermittent lateral reciprocating movement to said saw-rest, and a feeding device for imparting a progressive movement to the saw in the interval between each lateral reciprocation of the saw-rest, substantially as described.

10. In an automatic saw-swaging machine, a laterally-movable saw-rest, a saw-feed, and dies arranged and operating substantially as described, combined with the shaft F and a series of cams secured thereon to operate the dies, the feed, and the saw-rest, substantially as described.

11. In a saw-swaging machine, the combination, with a stationary die, of a movable die-holder and a rolling die carried thereby and arranged to operate by first pressing against the face of the tooth and then along the face thereof toward the cutting-point, substantially as described.

12. In a saw-swaging machine, the combination, with a stationary die, of a movable die-holder, a die carried thereby, and means

arranged to operate said die by first pressing against the face of the tooth and then along the face thereof toward the cutting-point and beyond the same, substantially as described.

13. The combination, with the stationary die K, of the movable die-holder H, the actuating-shaft F, having cam J, and the top frame, G′, having adjusting devices, substantially as described.

14. The combination, with the stationary die K, of the movable die-holder H, having a slotted end and carrying the die I, substantially as described.

15. The combination, with the stationary die K, of the movable die-holder H, carrying the die I, the pin *i*, on which the die-holder works, the cam J, and the set-screw *l*, all arranged to operate substantially as described.

16. The combination, with the stationary die K, of the movable side clamp, L, the bell-crank lever M, which carries said side clamp, the adjusting-screw K, and cam N, all arranged substantially as described.

ELISHA DUNNING.

Witnesses:
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HARRY S. LATIMER.