

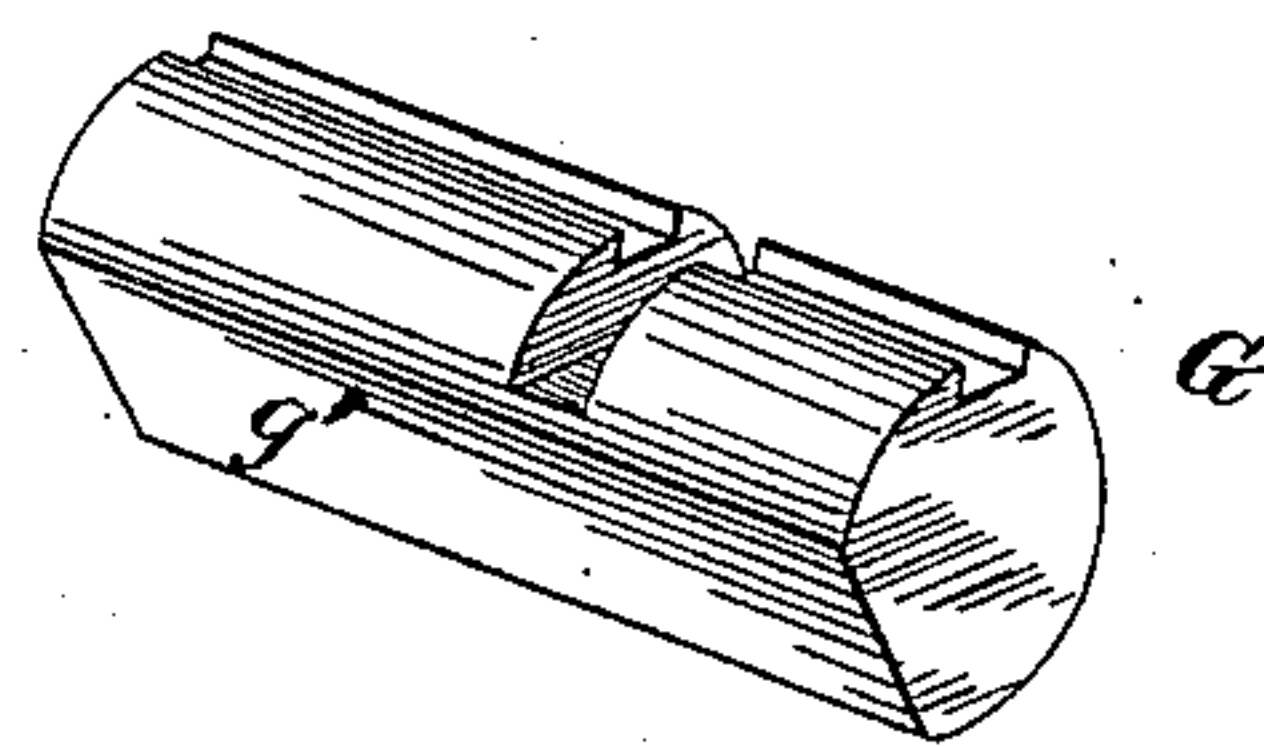
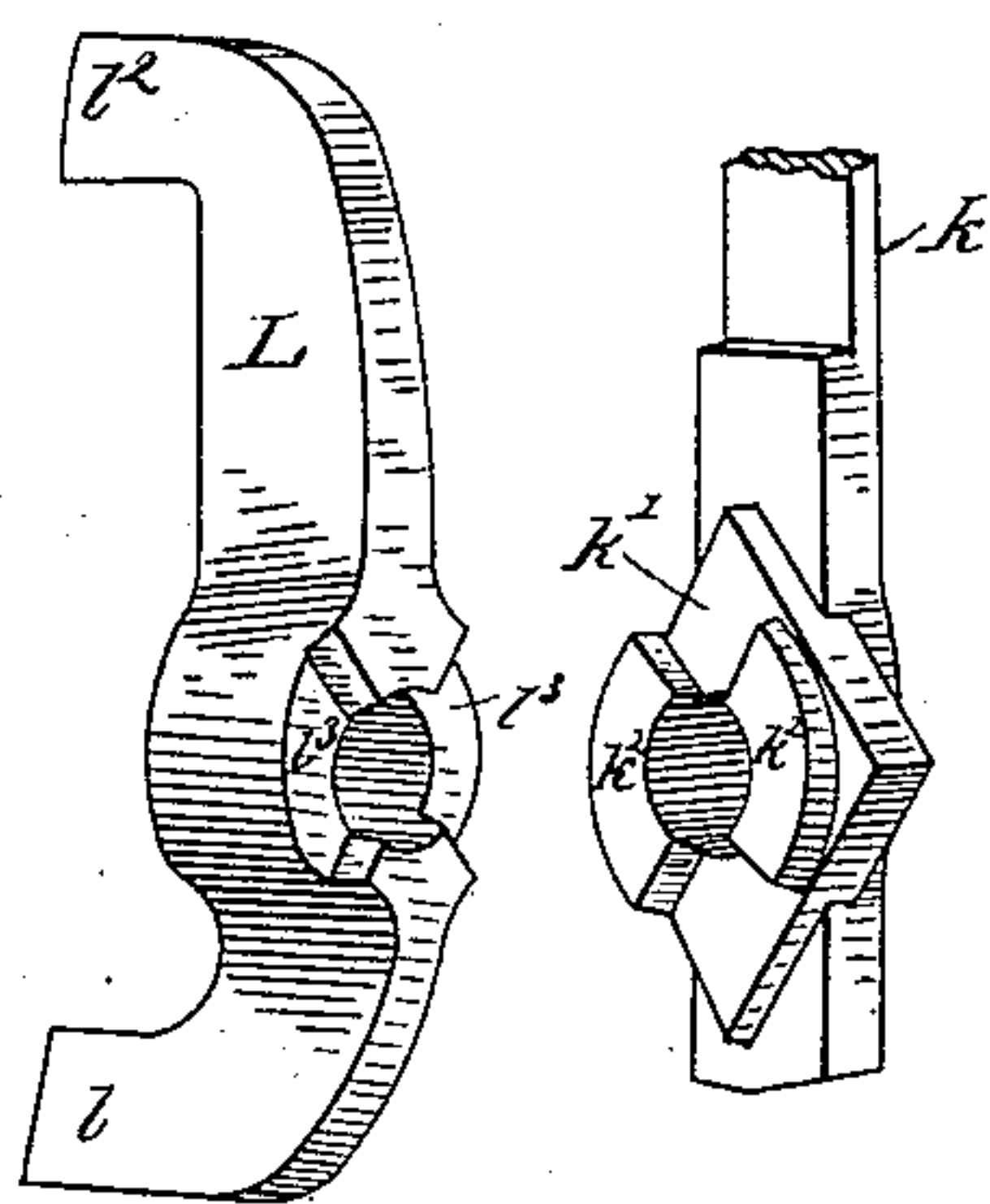
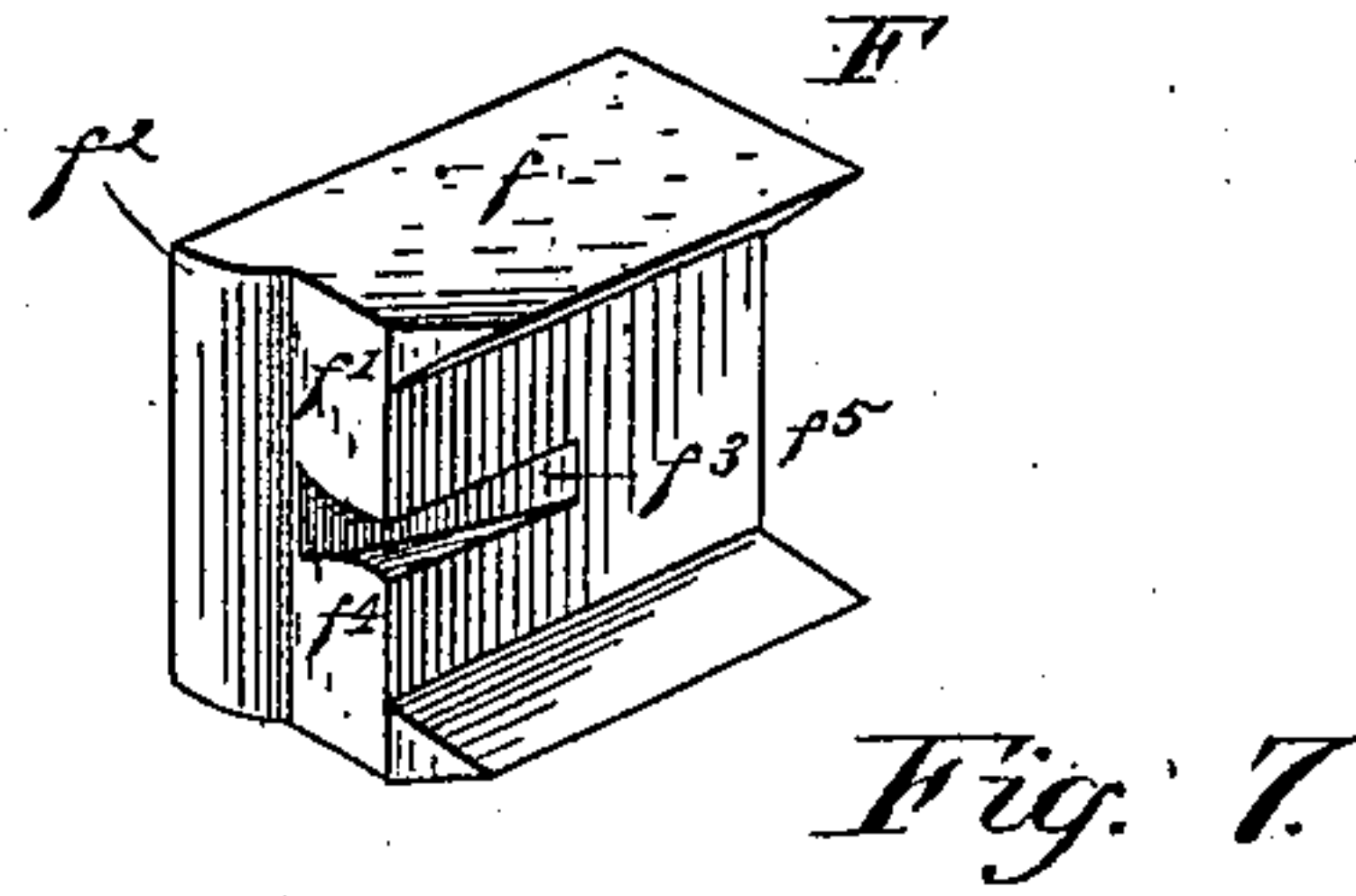
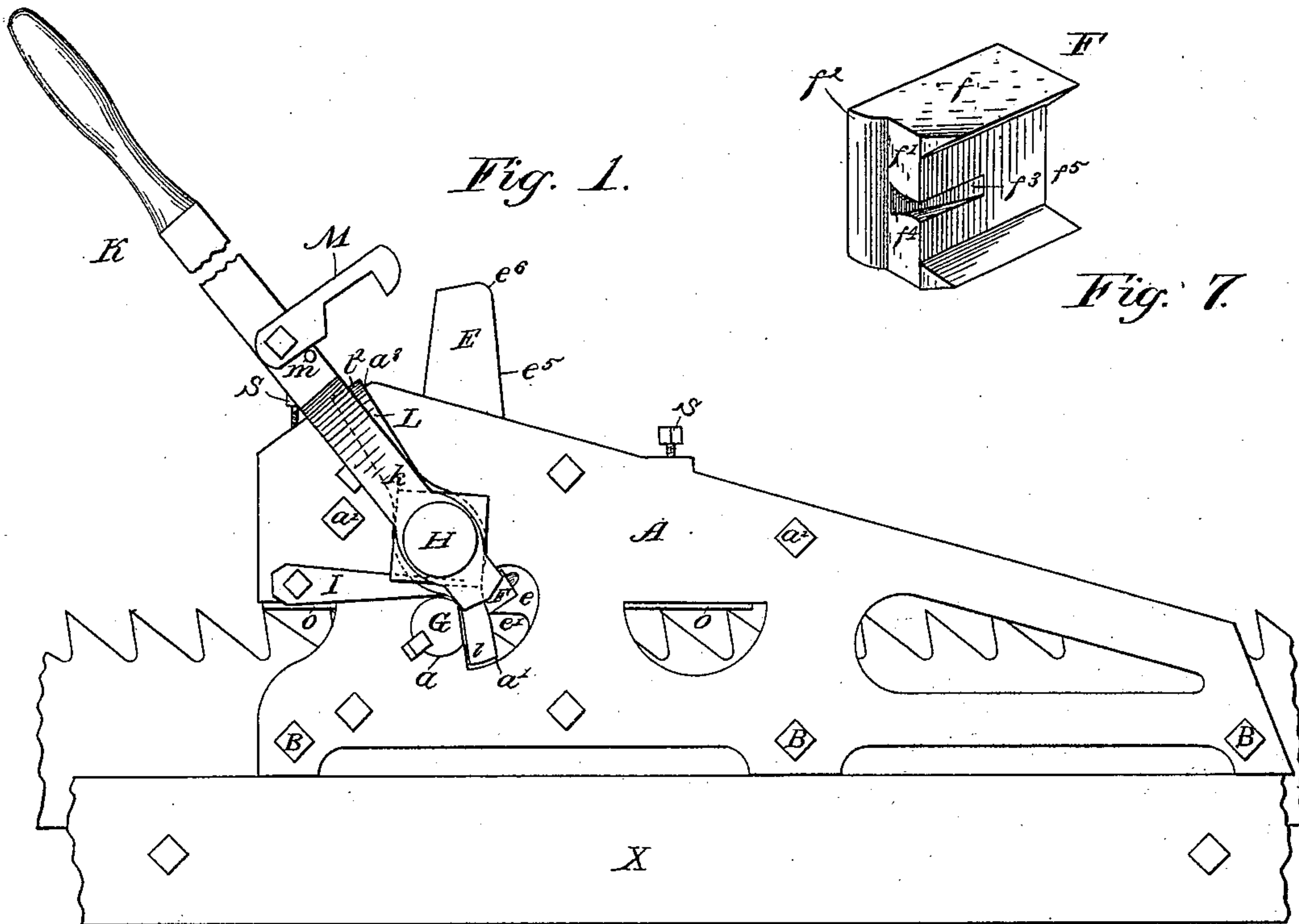
(No Model.)

2 Sheets—Sheet 1.

P. R. WARD.  
SAW SWAGING MACHINE.

No. 326,360.

Patented Sept. 15, 1885.



WITNESSES

Fig. 5.

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(No Model.)

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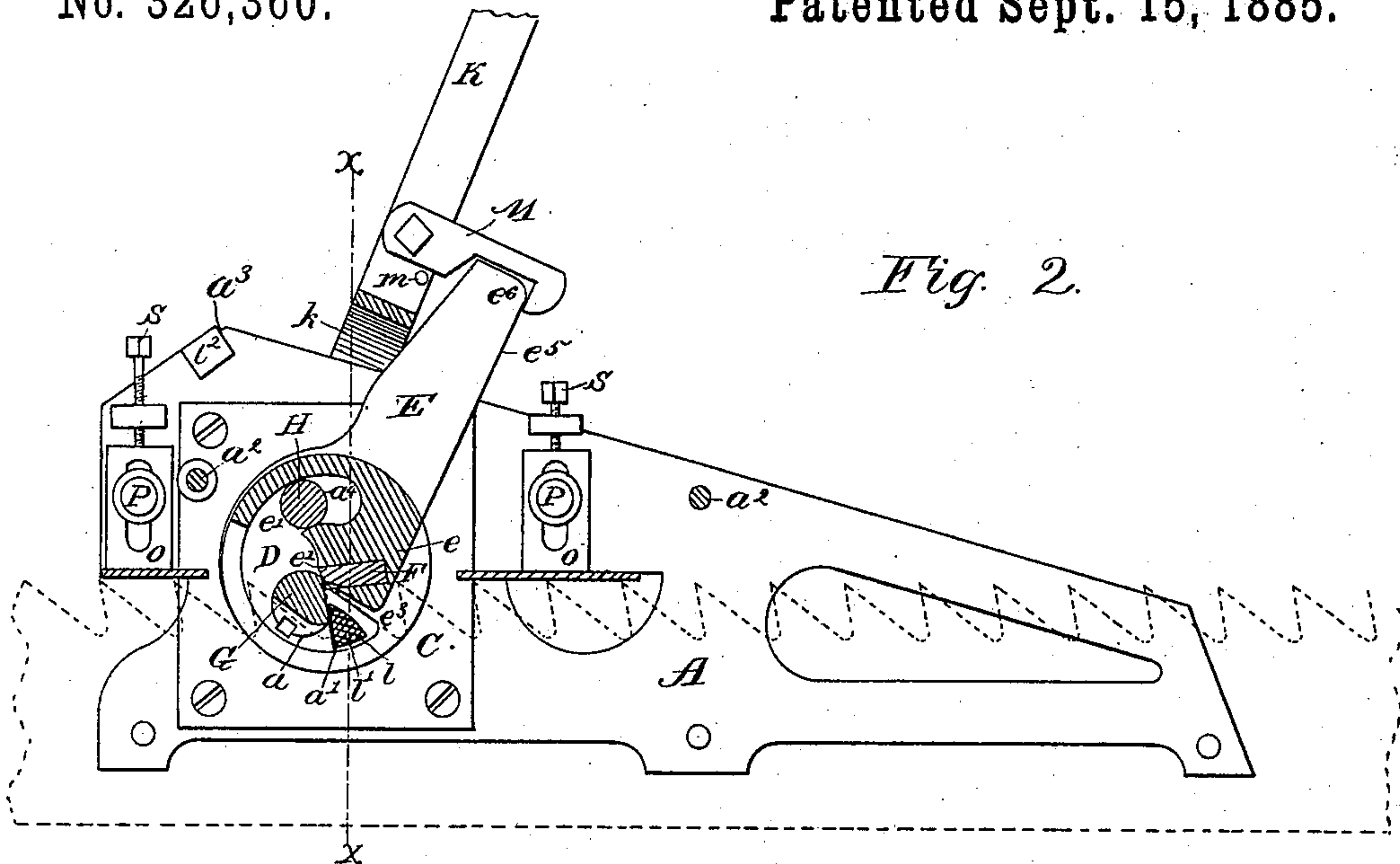


Fig. 2.

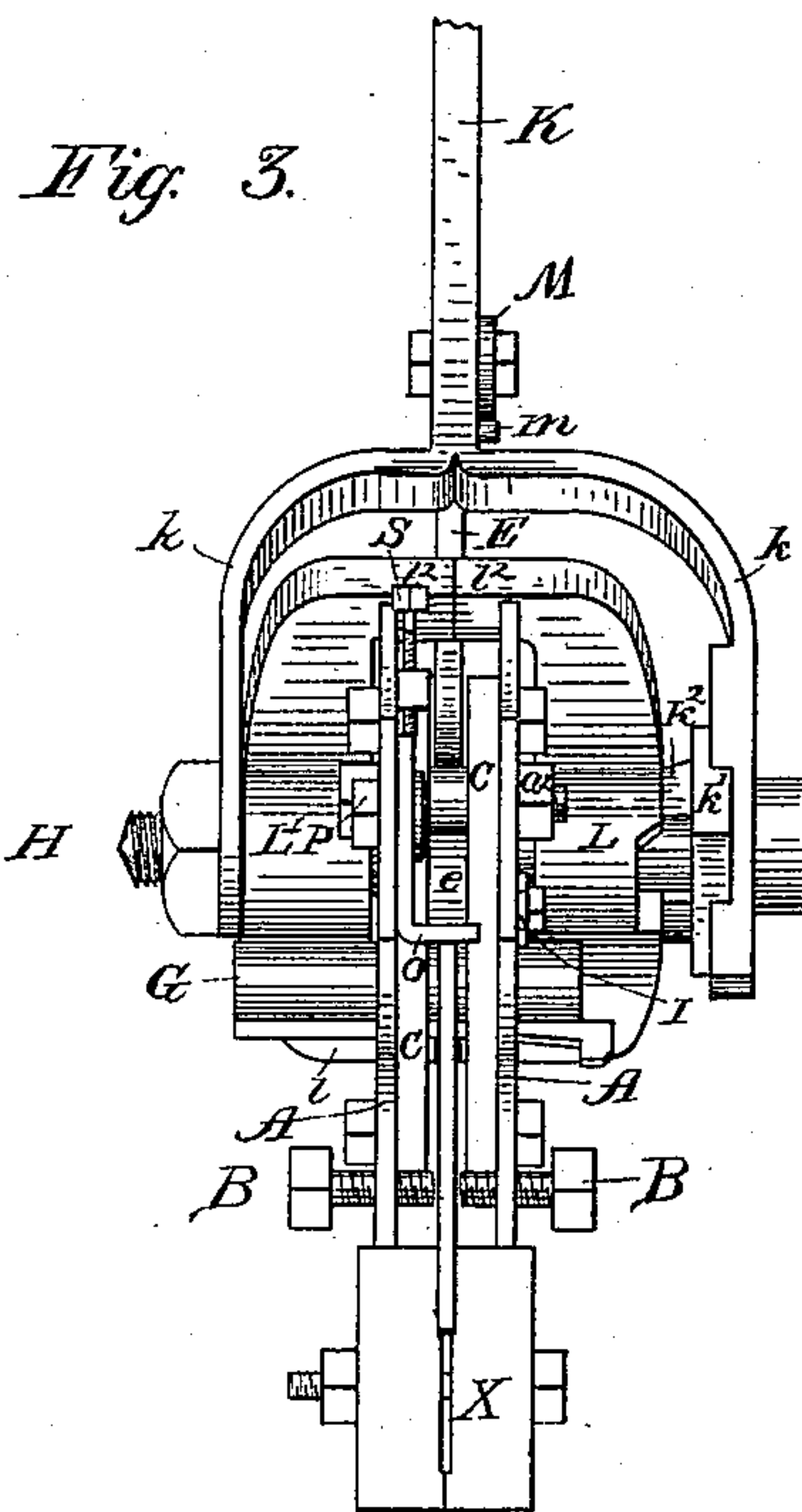


Fig. 3.

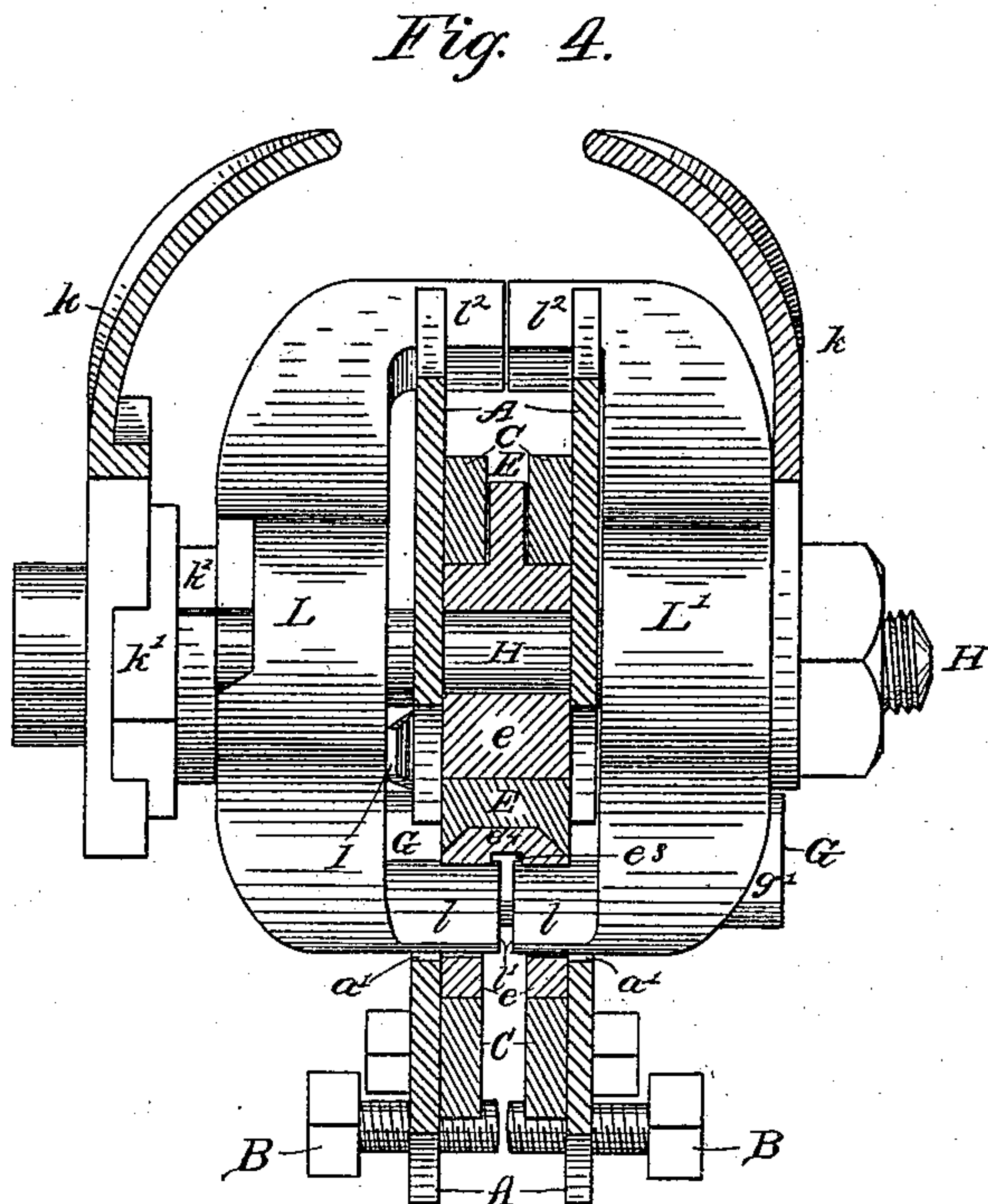


Fig. 4.

WITNESSES

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# UNITED STATES PATENT OFFICE.

PHILIP R. WARD, OF QUINCY, ILLINOIS.

## SAW-SWAGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 326,360, dated September 15, 1885.

Application filed July 21, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, PHILIP R. WARD, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented a new and useful Improvement in Saw-Swaging Machines, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to an improvement in saw-swaging machines; and it consists in the peculiar construction and combination of devices, that will be more fully set forth hereinafter and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a vertical longitudinal central sectional view of the same. Fig. 3 is an end elevation. Fig. 4 is a vertical sectional view taken on the line  $x x$  of Fig. 2. Figs. 5, 6, and 7 are detailed perspective views.

The frame of the machine is composed of the sides A, which are preferably of the shape shown, and are long enough to extend for a suitable distance over the toothed edge of the saw that is to have the points of its teeth spread or widened.

Through the sides of the frame, at the ends thereof, near the lower side, extend set-screws B, which bear on opposite sides of the saw and steady the frame thereon.

Re-enforce plates C are bolted to the inner sides of sides A, near the front ends of the latter, and in these re-enforce plates are made aligned circular openings D, in which, between the sides, is socketed the circular head  $e$  of a lever, E. The head  $e$  has an opening,  $e'$ , extending through about two-thirds of its circumference, and radially from this opening, and communicating therewith, is a recess,  $e^2$ , in which is secured a swaging-die, F. This die is set slightly out of the center of the head  $e$ , and is provided with an angular face having the side  $f$ , the side  $f'$ , and a quarter circular shoulder,  $f^2$ , at the upper edge of the side  $f'$ .

A groove,  $f^3$ , is made in the lower side of the die, which groove is of just sufficient width to receive and admit of the passage of the points of the saw-teeth before they are swaged, and communicates at its outer end with a broader segmental opening,  $e^3$ , made centrally in the lower side of the circular head. The inner end of the groove  $f^3$ , at the

side  $f'$  of the face of the die adjacent to the shoulder  $f^2$ , is widened on opposite sides, so as to form a recess,  $f^4$ , at this point, which exactly corresponds to the shape of the points of the saw-teeth when the latter have been swaged. The die has a dovetailed groove,  $f^5$ , on its under side, and the lower side of the recess  $e^2$  has a dovetailed tongue,  $e^4$ , which fits in the groove  $f^5$  and secures the die in the recess, and enables the latter to be taken out and replaced when desired.

Aligned openings  $a$  are made in the sides eccentrically with respect to the openings D, and through these openings and through the opening  $e'$  in the circular head of the lever extends a mandrel, G, which is keyed in place, and is provided with a flat side,  $g'$ , against which the face  $f'$  of the die closes when the lever is moved.

$a'$  represents substantially V-shaped openings, which communicate with the openings  $a$  in the sides.

The sides A are secured together by bolts  $a^2$ . Aligned rectangular notches  $a^3$  are made in the upper front corners of the sides, and through the sides above the openings  $a$  are made circular openings  $a^4$ , through which and through the upper portion of the opening  $e'$  in the circular head passes a bolt, H. A flat spring, I, is secured at one end to the outer side of one of the sides A, and has its free end, which bears outwardly from the side, above the mandrel.

K represents an operating-lever having bifurcated lower outwardly-curved ends,  $k$ , which straddle over the upper side of the frame, and are journaled on opposite ends of the bolt H, which thus serves as a shaft.

Secured to the inner side of one of the ends  $k$  is a cam,  $k'$ , having opposite inclined faces  $k^2$ .

L L' represent clamps that work on the bolt H, and have at their lower ends the inwardly-extending lugs  $l$ , which enter the openings  $a'$ , and are roughened on their opposing faces, as at  $l'$ , to enable them to take a tight grip on the opposite sides of the saw when the clamps are pressed against it, as will be hereinafter fully described. The upper ends of the clamps have studs  $l^2$ , that project inwardly and work in the notches  $a^3$ . The clamp L bears against the free end of the spring I, and on the outer side of said clamp are made recesses  $l^3$ , which



receive the projecting faces  $k^2$  of the cam when the operating-lever is in the position shown in Fig. 1.

To the operating-lever is pivoted a pawl or latch, M, adapted to engage with the upper end of the lever E, which lever has an inclined rear side,  $e^8$ , and is slightly rounded at its upper rear corner, as at  $e^6$ . A stud,  $m$ , limits the downward play of the latch M.

The operation of my invention is as follows: The saw to be swaged is secured in a clamp, X, in a horizontal position, teeth upward, and on the upper edges of the clamp X my machine is placed, and the screws B set so as to prevent lateral movement of the frame over the saw, the teeth of the latter being in line laterally with the opening  $e^3$  of the circular head of the die-lever and with the groove  $f^3$  in the die, so as to pass therethrough as the machine is moved along over the saw-teeth. The die-lever is in its initial position when, as shown in Fig. 1, one of the teeth of the saw is between the side  $g$  of the mandrel and the face  $f'$  of the die. When the operating-lever is moved rearwardly from the position shown in Fig. 1, the projecting faces of the cam  $k$  move out of the recesses  $l^2$  of the clamp  $h$  and bear on the faces between said recesses of the clamp, forcing the latter inwardly against the pressure of the spring I, and binding the saw firmly between the roughened ends of the clamps. The clamps remain in this position while the levers are being moved rearwardly. When the die-lever reaches the position shown in Fig. 2, the point of the tooth of the saw that is being operated upon is pinched between the side  $g$  of the mandrel and the side  $f'$  of the die, which spreads the point of the tooth laterally on each side, and causes it to fill the recess  $f^4$ , which gives the proper form to the point. After the operating-lever has been moved far enough to cause the die-lever to swage the saw-tooth, its movement is reversed, and the latch M moves over the rounded upper rear corner of the die-lever and releases the die-lever, and as the operating-lever continues to move forwardly, the faces of the cam  $k$  drop into the recesses of clamp L, and the latter is moved outwardly to release the saw, when the machine is moved far enough to operate on the next tooth, and so on until all the teeth of the saw have been swaged.

A machine thus constructed is adapted for spreading the points of saw-teeth of varying kinds, whether rotary, gang, muley, or other kind of mill-saw.

Adjustable brackets or stops O are secured between the sides of the frame by screws P, that pass through vertical slots in the brackets, and these brackets are adjusted by means of bearing-screws S, so as to bear on the points of the saw-teeth, as shown.

Having thus described my invention, I claim—

1. The combination, in a saw-swaging machine, of the frame having the mandrel, the die-lever having the die, the operating-lever having the cam, the clamps operated by the cam for grasping the saw while swaging the teeth, and the spring for moving one of the clamps when released by the cam, substantially as described.

2. The combination, in a saw-swaging machine, of the frame having the mandrel, the die-lever having the die, the operating-lever having the latch to engage with the die-lever and move the same and release it when the saw-tooth is swaged, and the clamps operated by the operating-lever for grasping the saw while swaging the teeth, substantially as described.

3. The combination, in a saw-swaging machine, of the frame, the mandrel, the die-lever having the die, and the operating-lever having the latch for engaging with the die-lever to move the same and release the die-lever when the saw-tooth is swaged, substantially as described.

4. The combination, in a saw-swaging machine, of the frame, the operating-lever, and the pivotal bolt therefor, the clamps on said bolt, the cam for applying the clamps to the saw to hold the latter while being swaged, and the spring to release the clamps when the operating-lever is reversed, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

PHILIP R. WARD.

Witnesses:

JAS. E. McDAVITT,  
WILLIAM W. CRALLE.