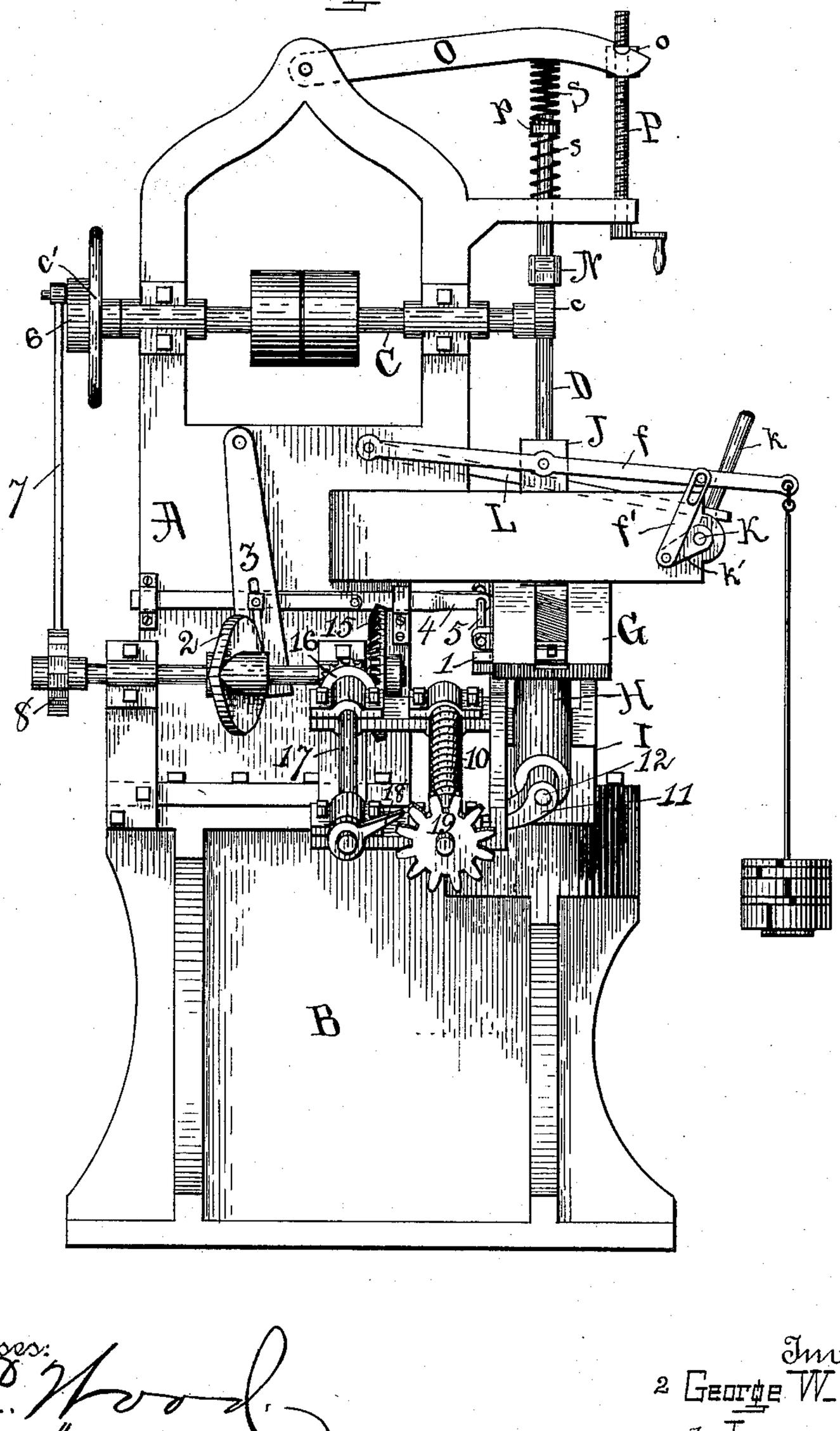
(No Model.) 3 Sheets—Sheet 1.

# J. & G. W. STOKES.

## RASP CUTTING MACHINE.

No. 376,400. Patented Jan. 10, 1888.

Fig. 1.




Witnesses:
A. P. Wood.
Henry A. Kebbel

Inventors:
2 George W. Stokes.
1 James Stokes.

By their Attorney
Albert A. Wood.

(No Model.) 3 Sheets—Sheet 2.

# J. & G. W. STOKES.

## RASP CUTTING MACHINE.

No. 376,400. Patented Jan. 10, 1888.

Fig. 3.

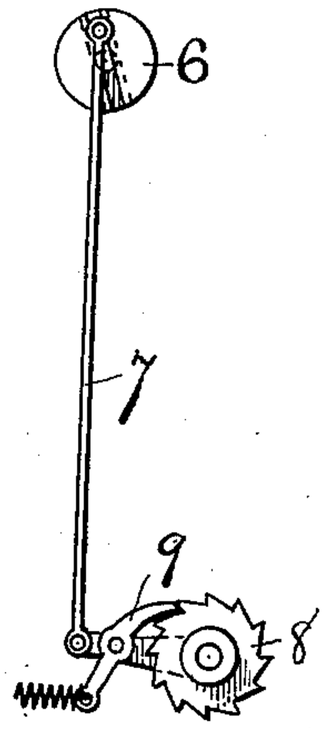



Fig. 2.




Witnesses:
A. P. Wood
Henry Hebbel

Inventors:
George W. Stokes.
James Stokes.
By their Attorney
Albert A. Wood

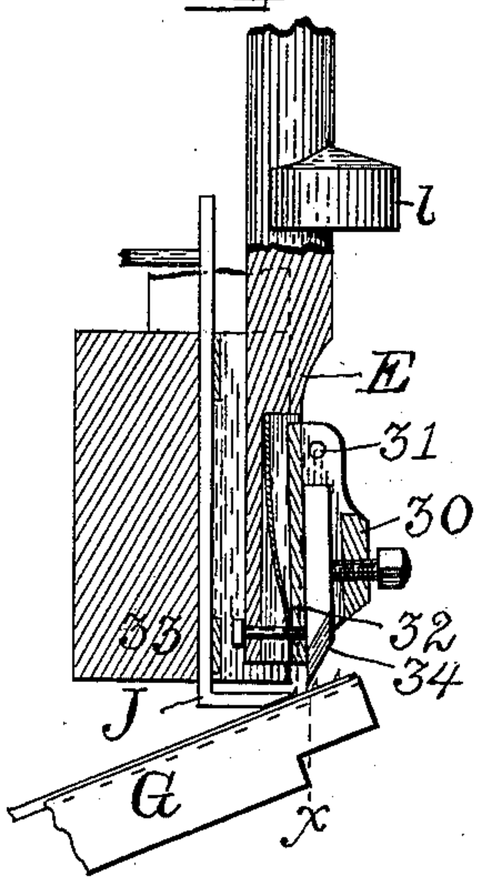
(No Model.) 3 Sheets—Sheet 3.

# J. & G. W. STOKES.

## RASP CUTTING MACHINE.

No. 376,400. Patented Jan. 10, 1888.

Fig. 5.



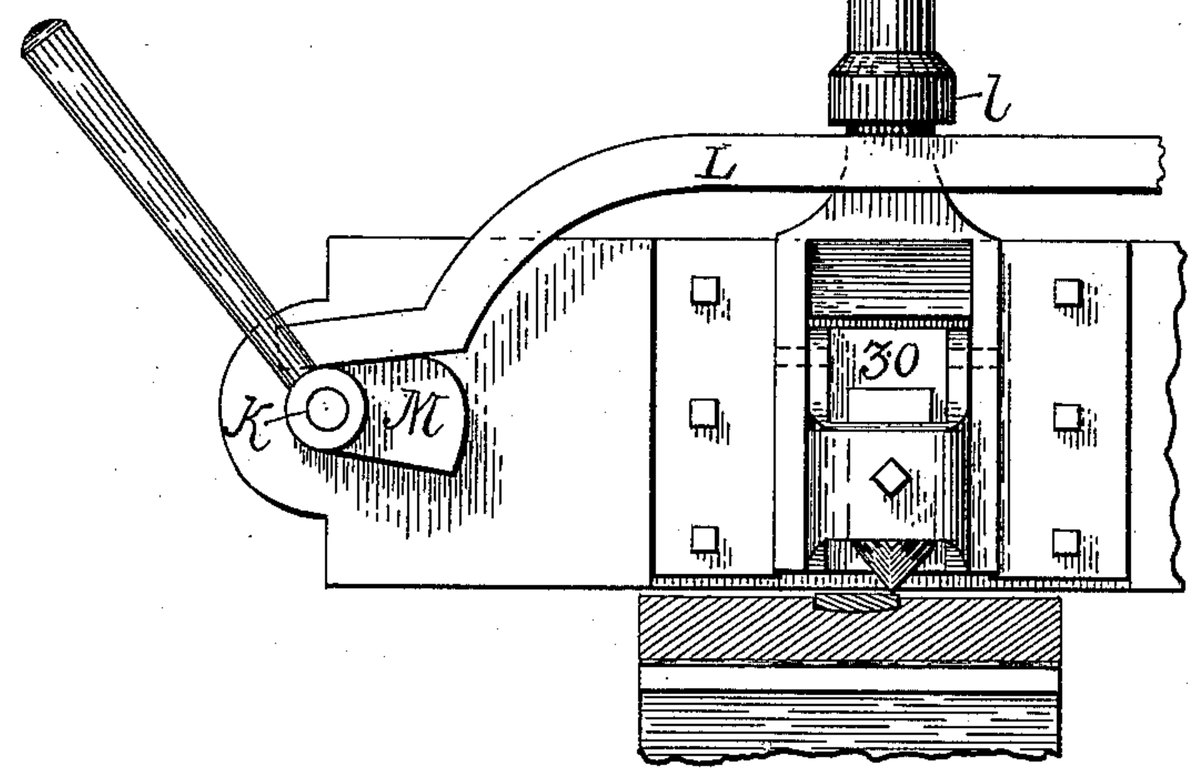




Fig. 4.




Fig. 6.

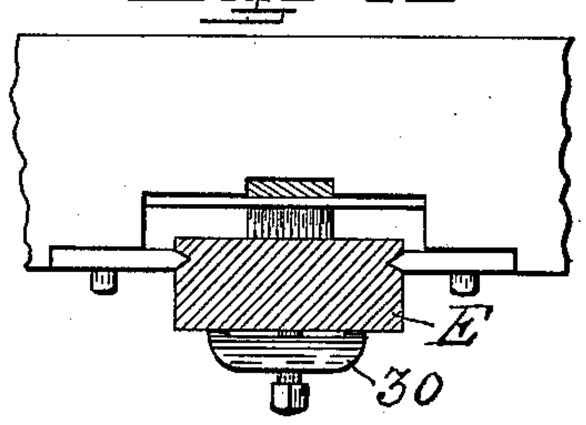



Fig. 7.

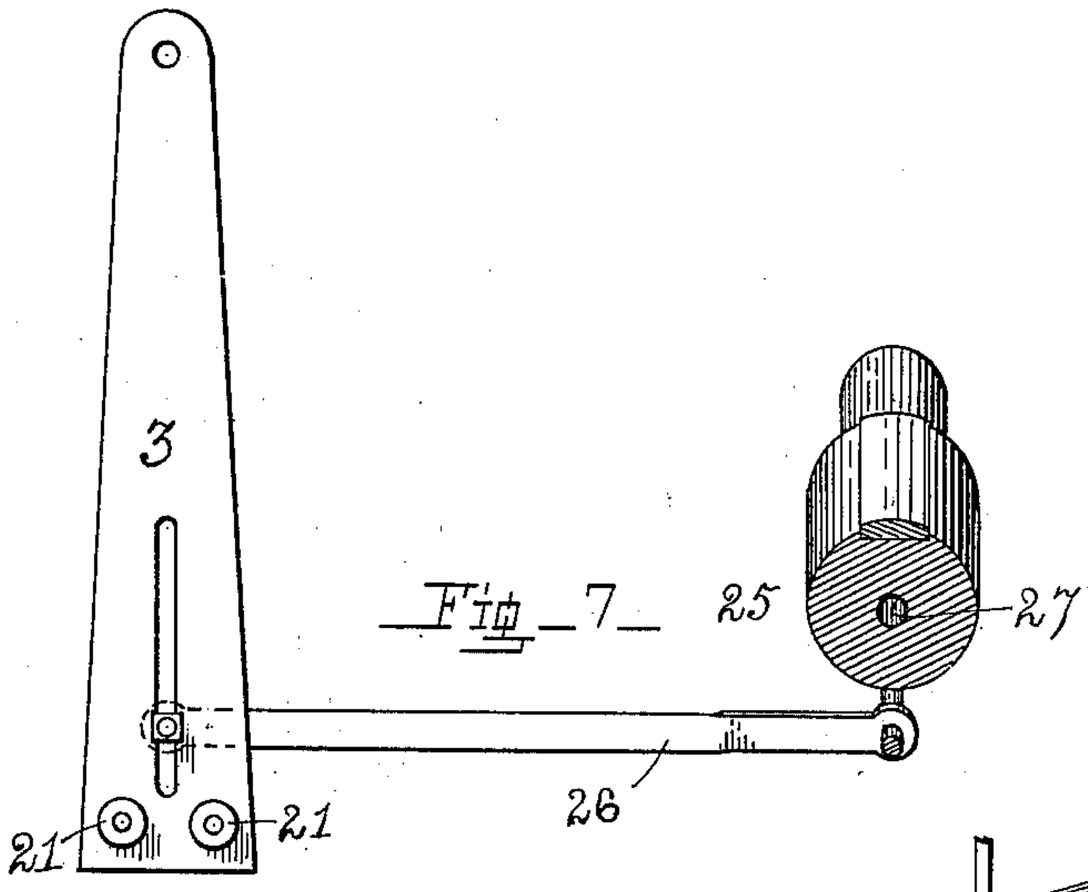
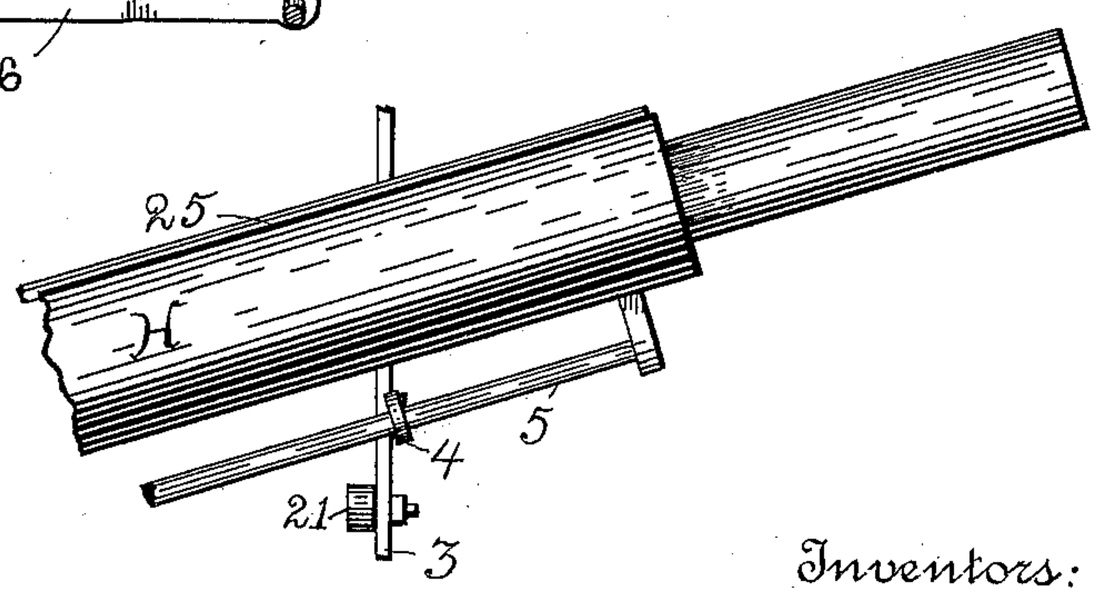



Fig. 8.




Witnesses:
A. P. Wood
Henry Ketchell

Inventors:
2 George W. Stokes
1 James Stokes
By their Attorney
Albert A. Wood

# UNITED STATES PATENT OFFICE.

JAMES STOKES AND GEORGE W. STOKES, OF ATLANTA, GEORGIA.

## RASP-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 376,400, dated January 10, 1888.

Application filed September 1, 1887. Serial No. 248,551. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES STOKES and GEORGE W. STOKES, citizens of the United States, residing at Atlanta, in the county of Fulton and State of Georgia, have invented a new and useful Rasp-Cutting Machine; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In rasp-cutting machines as heretofore constructed difficulty has been experienced in preventing the breaking of the punch, as well as in raising the teeth to a proper and uniform height and form. A rasp-punch should, to form a correct tooth, travel the entire length of the indentation for the purpose of raising the metal for the tooth, instead of forcing the displaced metal down and into the body of the rasp, merely throwing up a burr around the indentation, which has heretofore been the principal objection to machine-cut rasps. We overcome these objections with a device which causes the tool to travel against and raise the teeth, and have also devised feeding mechanism and other details by which we are enabled to make rasps having teeth that are equal in height and form to those that are hand-cut and more regular and perfect in other respects, all of which will be hereinafter fully described.

In the accompanying drawings, Figure 1 is a side elevation showing most of the details of the machine, including the feeding mechanism, but not the hammer and punch. Fig. 2 is a front view showing most of the parts shown in Fig. 1. Fig. 3 is a view of the feeding-ratchet and its actuating crank and pitman. Fig. 4 is a view of a portion of the side of the machine opposite to that shown in Fig. 1, showing the front of the hammer, its guides and cam, and lever by which the hammer is held in suspension when not in operation. In this figure the rasp and the reciprocating table on which it rests are shown in section on the line *x*, Fig. 5. Fig. 5 is a view of a few of the details from the same direction as Fig. 2, showing the arm of the frame and the hammer in section central to the hammer in Fig. 4. Fig. 6 is a plan of a portion of the top of the arm, the connecting parts being shown in section on that line. Fig. 7 is an enlarged view of the oscillating lever through which the reciprocating motion is communicated to the rasp-table, showing in connection therewith the parts that are substituted for those shown in Figs. 1 and 2 and that are used when the machine is operating upon the curved sides of shoe-rasps or others having such curved sides. This view is from the same point as the view shown in Fig. 1. Fig. 8 is a view of the parts shown in Fig. 7, but from the same direction as the view shown in Fig. 2.

In the figures, like reference-marks indicating corresponding parts in the several views, A is the frame, which rests on the base B.

C is the principal shaft of the machine, and has on one end a cam, *c*, and on the other end a crank, *c'*, and is also provided, when necessary, with tight and loose driving-pulleys, and may have a hand-wheel to turn the shaft in setting the punches, and also serve as a fly-wheel for preserving an equality of speed.

D is the hammer-rod, and E is the hammer, running in guides F.

G is the rasp-table, in a central groove of which the rasp is placed, resting on a bed of soft metal, as is usual in rasp and file cutting. The bed G is carried in the trunnion H. The trunnion H slides lengthwise in the frame I and oscillates to allow the presser J (best shown in Fig. 5) to keep the upper surface of the rasp level crosswise. The presser J is forced down by the weighted lever *f*, and the pressure is relieved by depressing the lever *k* on the shaft K, to which is also fastened the crank *k'*, which is connected to the lever *f* by the slotted link *f'*. The lever L, Fig. 5, is pivoted at one end to the frame, and has its free end resting on the cam M, which is secured to the shaft K. The hammer-rod is reciprocated by being carried up by the cam *c* working against the tappet N, and is carried down by the spring S between the arm O and the collar *p* on the hammer-rod. The spring *s*, on being compressed by the expansion of the spring S, becomes about equal to it in tension, thus leaving the hammer to strike with only the force of its momentum. The tension of the spring S is regulated by the screw P, which passes through an arm of the frame

and the nut *o* in the free end of the arm O, this arm O being pivoted at its other end to the frame.

By depressing the lever *k* the cam will be partially revolved and the lever L will be raised, and by contact with the projection *l* on the hammer-rod will raise it and carry the tappet beyond the reach of the cam, by reason of which the blows of the hammer may be made to cease instantly or be started on any desired stroke.

It will be observed that in turning the rock-shaft K, as above described, the lever L will have been raised while the link *k'* is traveling the length of its slot, which will stop the blows of the hammer before the pressure on the rasp will be relieved, and that the continued turning of the rock-shaft to relieve the pressure on the rasp will not raise the hammer-rod higher, and, also, that the reverse motion of the rock-shaft will apply the pressure to the rasp-blank and level its surface crosswise before the hammer makes its first blow.

Nearly all of the parts above described apply equally as well to file-cutting machines, and some of them are in use in such machines.

The parts hereinafter described are mostly only applicable to rasp-cutting machines.

The attachment of the rasp-table to the trunnion is by grooves in the table, which fit and slide on the ways 1 on the top of the trunnion. The lateral motion is given to this table, which causes the teeth to be punched in rows across the rasp, by the cam 2 through the lever 3 and the link connecting it to the sliding bar 4, attached at one end to the rod 5 on the table, which is best shown in Fig. 1, except the lever 3, with its rollers 21, which is best shown in Fig. 7. The lateral motion of the table is caused to be intermittent and to move only between the blows of the hammer by the cam being moved intermittently by the crank 6, pitman 7, ratchet 8, and pawl 9. (Shown best in Fig. 3.) The longitudinal movement of the table is produced by the screw 10 working in the half-nut 11 on the rock-shaft 12. The rock-shaft 12 extends through the trunnion, and has at the other or upper end a handle, 13, by which the shaft may be partially revolved and the half-nut made to engage with or leave the screw.

It is necessary to disengage the half-nut from the screw to slide the trunnion and table down to commence the cutting of the rasp at the proper place. It will be fed up by the screw, the half-nut being held in engagement by the hand or a weight pressure on the lever 13. The screw 10 is driven by the pair of bevel-gears 15 and 16, these gears being in the proportion of two to one in the order named, for reasons that will be hereinafter stated. The gear 16 is on one end of the shaft 17, and on the other end is the arm 18, which at each revolution engages with the star-wheel 19, which it turns a sufficient distance to revolve the screw sufficiently to feed the trunnion and carry the rasp-blank forward the distance of one row of teeth. The cam 2 should have sufficient lead to carry the table on passing its extreme points to a position that will cause the punch to make the longitudinal rows of teeth alternate in the lateral rows. Both the lateral and the longitudinal movements of the table must occur while the punch is not in contact with the rasp, which action is insured by so setting the crank 6 as to cause the pawl to engage with the ratchet and move the feeding mechanism while the punch is up.

The gears 15 and 16 are in the proportion of two to one, for the reason that the table is fed upwardly the distance of one lateral row of teeth at each revolution of the gear 16 and arm 18. Therefore, as the table is moved out and back at each revolution of the cam 2, so the table must be fed up twice at each revolution of the cam. The movement of the feeding mechanism being intermittent, the proportion of the pitch of the screw 10, the star-wheel, and the arm 18 must be such as to insure an entire single longitudinal movement of the table and the disengagement of the arm 18 on a single forward movement of that arm.

In Figs. 7 and 8 is shown a trunnion, 25, in the top of which is the groove for the rasp. In cutting the oval sides of shoe or other rasps this trunnion is substituted for the one marked II in the other figures. An oscillating motion is given to it by the link 26, connecting with the lever 3, which produces the motion which is necessary to cause the teeth to be punched in lateral rows. The rock-shaft 12, Fig. 1, passes in the same manner through the hole 27, Fig. 7, and the table is moved longitudinally in the way shown in the preceding figures; but while in these figures the trunnion is shown as rocking for the purpose of allowing the presser J to keep the upper surface of the blank level crosswise, in Figs. 7 and 8 the trunnion is shown as rocking to produce the lateral rows, the function of the presser being simply to hold the blank in position during the process.

The hammer E is recessed in its outer side, (see Figs. 5 and 6,) and the punch-socket 30 is hinged therein by pivots 31. The spring 32 presses the socket outwardly as far as the screw 33, passing loosely through the back of the hammer-head, will permit. The punch 34, being driven into the rasp-blank, will be carried against the tooth by the inclination of the bevels on the back of the punch and the more ready yielding of the metal in front of it, which will cause the teeth to be raised very nearly, if not quite, as much as the total displacement of the metal by the punch. The essential feature of this part of the device is the elastically-held punch, the details of which may be somewhat changed without a departure from the spirit of this invention.

This invention as shown is applied to a combination machine for rasps having both flat and oval sides or oval sides only, in which, for the purpose of providing for the oscillating table shown in Figs. 7 and 8, the trunnion

H is used to carry the rasp-table, and is provided for rasps with the groove *h*, in which the edge of the plate *h'* runs and prevents its turning, instead of that being one of the functions of the presser. The plate *h'*, however, would not be used in cutting files, and might be dispensed with in rasp-cutting if sufficient pressure is provided to resist the tendency of the lateral movement of the table to rock the trunnion. We, however, prefer to use the groove and plate in this form of machine. In a machine for cutting flat rasps only, the trunnion would not be needed, but any form of trunnion that would carry the slides 1 and the shaft 12 and have the same longitudinal movement would answer.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a rasp-cutting machine, the combination of the hammer E and rod D, provided with reciprocating mechanism, the projection *l*, the lever L, the cam M, and the presser J, lever *f*, and connection by slotted link *f'* with crank *k'* on the rock-shaft K, for the purpose specified.

2. In a rasp-cutting machine, feeding mechanism consisting of the combination of the crank 6, pitman 7, pawl and ratchet 8 and 9, cam 2, arm 3, carrying rollers 21, and connection from the arm to the laterally-sliding table G, substantially as shown and described, and for the purpose specified.

3. In a rasp-cutting machine, feeding mechanism consisting of the revolving-arm 18, star-wheel 19, screw 10, and half-nut 11 on a rock-shaft, 12, and handle 13, for the purpose of giving an intermittent movement, substantially as shown and described.

4. In a rasp-cutting machine, the combination of the feeding device consisting of the crank 6, pitman 7, pawl and ratchet 8 and 9, cam 2, arm 3, carrying rollers 21, and the interchangeable trunnion 25, connecting with the arm 3 by means of the link 26, which gives it an oscillating movement, said interchangeable trunnion being interchangeable with the trunnion 4, substantially as set forth.

5. In a rasp-cutting machine, the combination of a punching hammer-head, E, the adjusting-screw 33, the flat spring, and the punch 34, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES STOKES.
GEORGE W. STOKES.

Witnesses:
A. P. WOOD,
A. A. WOOD.