Sheet 1-4 Sheets.

S. Walton,

File-Cutting Machine,

No. 68,815. Patented Sep. 10, 1867.

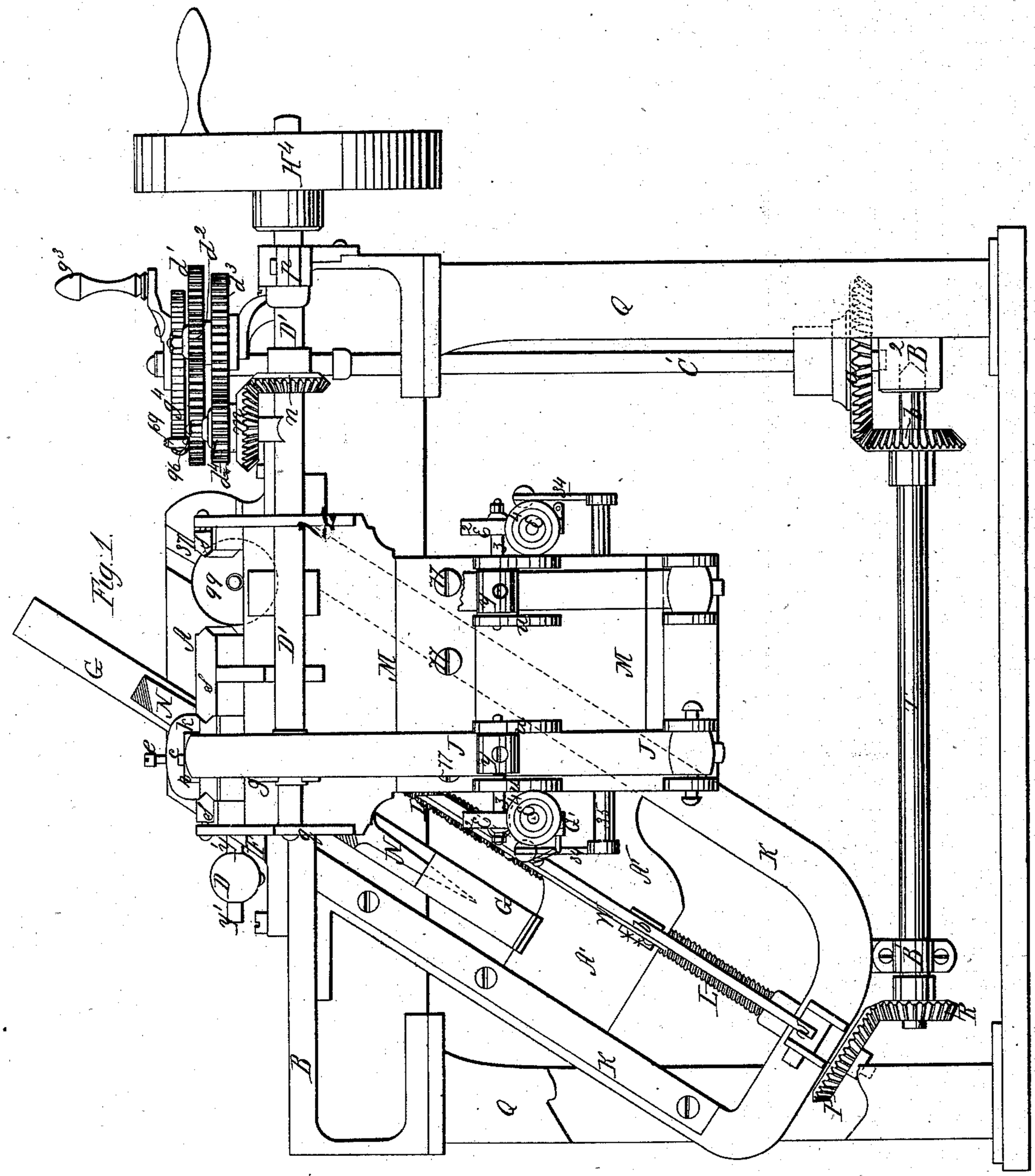


Fig. 1.

Witnesses,
John E. Brann
Wm. S. Brown

Inventor;
Samuel Walton

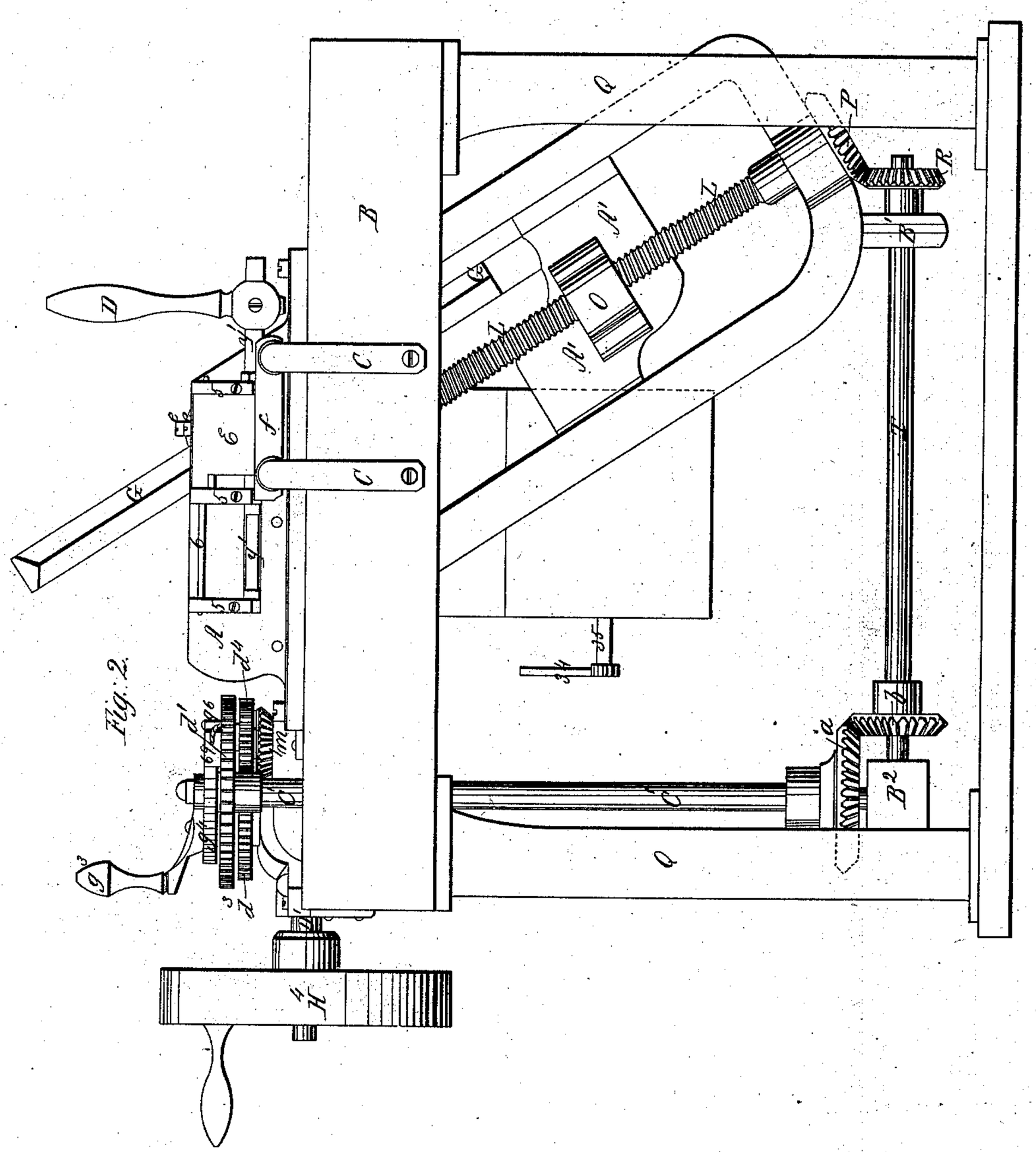
Sheet 2 - 4 Sheets.

S. Walton,

File-Cutting Machine,

No. 68815.

Patented Sep. 10, 1867.



Witnesses;
John E Crane
Wm S Bown

Inventor;
Samuel Walton

Sheet 3 - 4 Sheets.

S. Walton,

File-Cutting Machine,

No. 68815. Patented Sep. 10, 1867.

Fig. 3.

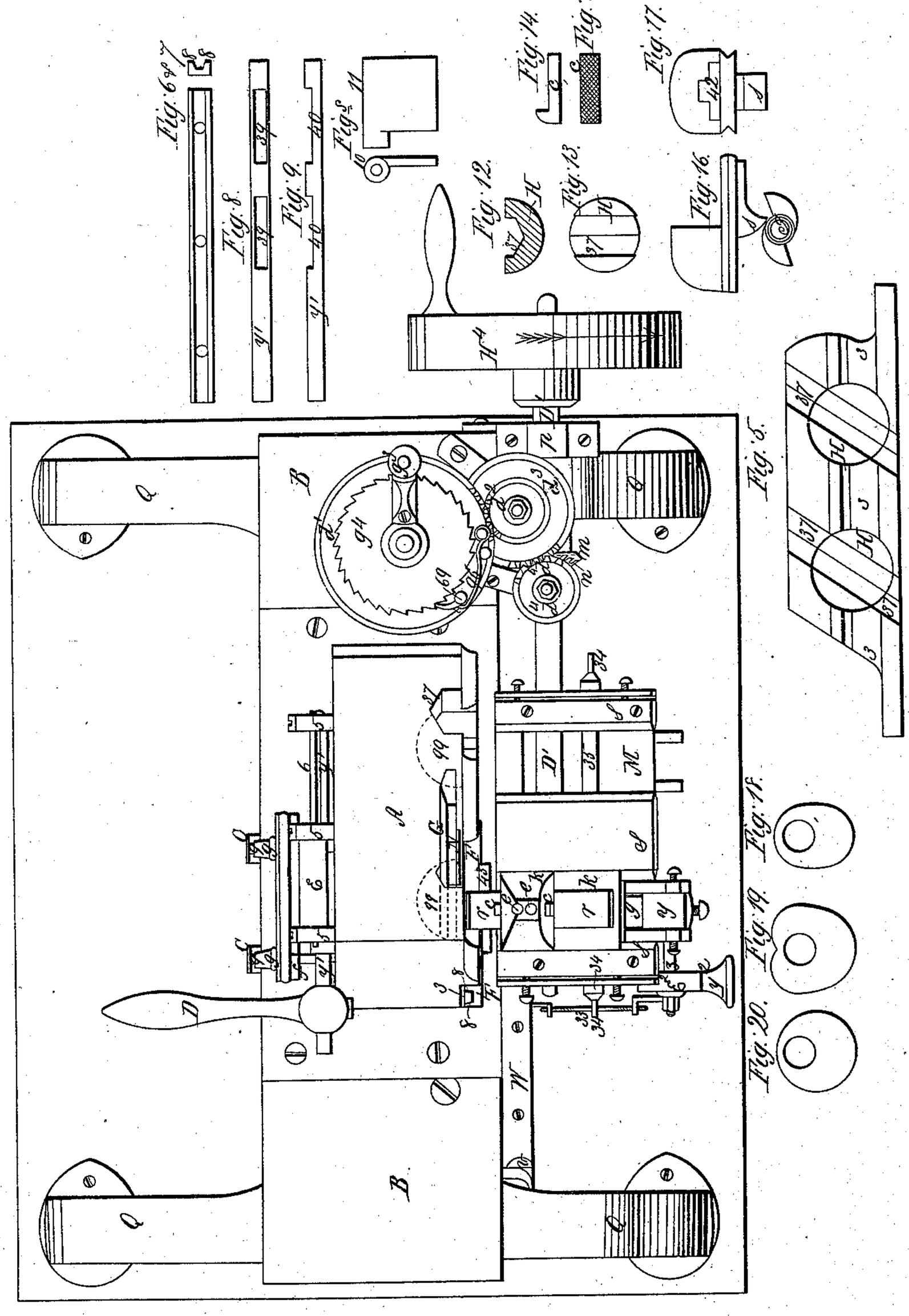


Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11. Fig. 12. Fig. 13. Fig. 14. Fig. 15. Fig. 16. Fig. 17. Fig. 18. Fig. 19. Fig. 20.

Witnesses;
John E Crane
Wm S Brown

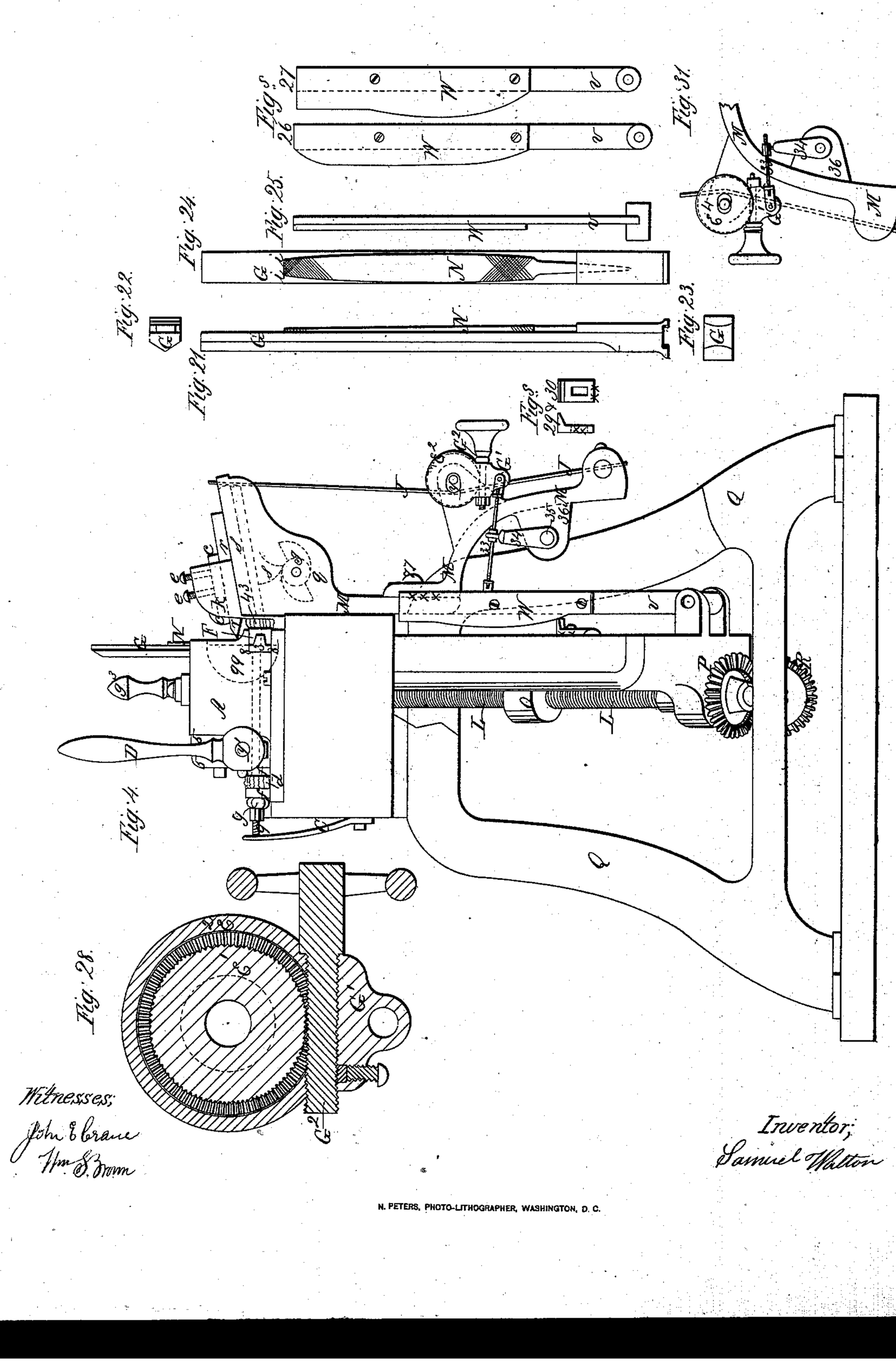
Inventor;
Samuel Walton

Sheet 4-4 Sheets.

S. Walton,

File-Cutting Machine,

No. 68,815. Patented Sep. 10, 1867.



Witnesses:
John C. Crane
Wm. S. Brown

Inventor;
Samuel Walton

United States Patent Office.

SAMUEL WALTON, OF BALLARDVALE, MASSACHUSETTS.

Letters Patent No. 68,815, *dated September* 10, 1867.

IMPROVED MACHINE FOR CUTTING FILES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, SAMUEL WALTON, of Ballardvale, in the town of Andover, in the county of Essex, and State of Massachusetts, have invented certain new and useful improvements in Machines for Cutting Files, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1, sheet 1, is a front elevation, after a portion of one front leg Q has been removed.

Figure 2, sheet 2, is a rear side view.

Figure 3, sheet 3, is a plan or top view.

Figure 4, sheet 4, is an end view, after a portion of the end and leg Q have been removed.

Figure 5, sheet 5, is a front view of a detached head-block, A, shown in figs. 1, 2, 3, 4.

Figures 6 and 7 are side and end elevations of a detached double-face plate or parallel bar, F, shown in figs. 1, 3, and 4.

Figures 8 and 9 are two different side elevations of a detached eccentric-shaft y', shown in figs. 1, 2, 3, and 4.

Figures 10 and 11 are end and rear side of the tongs E, shown in figs. 2 and 3.

Figures 12 and 13 are transverse central section and front elevation of the slotted half-hemispheric ball H, which fits in the socket 99, seen in fig. 1, in the front side of the head-block A, and shown by dotted lines in figs. 3 and 4.

Figures 14 and 15 are edge and bottom side of the gib or key *c*, shown in figs. 1, 3, and 4.

Figure 16 is a side, and Figure 17 an end view of a detached hammer, *k*, shown in figs. 1 and 3, with an end view of the cam I, shown beneath fig. 16, which moves the hammer *k* up the incline S.

Figure 18 is an end view of the binder-cam Y, shown in figs. 1, 3, and 4, and which acts against the spring J, to regulate the blow of the hammer.

Figures 19 and 20 are end views of cams, which I sometimes employ instead of the cam I.

Figure 21, sheet 4, is an edge, and Figures 22 and 23 are end views of the shield G, shown in figs. 1, 2, 3, and 4.

Figure 24 is a front or face side of the shield G, with a file-blank, N, in the position to be cut.

Figure 25 is an edge view of the lever *v*, shown in figs. 1 and 4, with an edge view of a former, W, on one side thereof.

Figures 26 and 27 are top sides of the lever *v*, each having a different-shaped former, W, connected therewith.

Figure 28 is a vertical central section of the adjusting device, which regulates the tension of the spring J, by means of the cam Y, and which serves as an intermediate accurate adjustable connection between the former and the actuating spring J.

Figures 29 and 30 are edge and front side of the actuating guide-plate *x x*, shown in figs. 1 and 4, and which acts against the operating edge of the former W, when the carriage A^1 moves upward.

Figure 31, on sheet 1, shows an end of the front stand M, and one regulating device, an arm, and a short connecting-rod, 33.

In constructing my improved file-cutting machine the bed B is permanently secured to the tops of the supporting legs Q, and a head-block, A, is fastened to the top of the bed-plate. From the under side of the bed-plate, and at an angle, as shown in figs. 1 and 2, the carriage-frame K is suspended. The edges of the carriage A^1 fit grooves or guide-ways in the inner edges of the frame K, and the carriage is moved up or down in said grooves by a feed-screw L, arranged at the same angle with the frame. The top end of the feed-screw has its bearing in the under side of the bed-plate, and the lower end in the bottom end of the frame, while the body of the screw works in and through a nut, O, cast in one with or fastened to the back side of the carriage.

On the extreme lower end of the screw L is a bevel gear, P, which engages with a bevel gear, R, on one end of the horizontal shafts T, one bearing and support, B^1, of which depends from the lower extremity of the frame K, and the other bearing, B^2, may be arranged on a cross-girt at the opposite end of the machine. This latter bearing may form a step for the vertical shaft C^1, which has a bevel gear, *a*, on the lower end, gearing into a bevel-gear, *b*, on the end of the shaft T, directly under the gear *a*.

The upper part of the shaft C^1 has a bearing in or connected with the bed-plate B. Near the top of the

latter shaft, a spur-gear, d^1, is secured, and in front of the gear d^1 a a small gear, d^2, is arranged on a vertical stud. The two latter gears engage with each other.

Below the gear d^2, and connected therewith, is a larger gear, d^3, which gears into a small gear, d^4, on a vertical stud, like that first named. Beneath the spur-gear d^4, and connected therewith, is a bevel gear, m, which gears into a bevel gear, n, on the driving-shaft D^1; this driving-shaft is supported near its driving end in a bearing, p, and at the opposite end in a bearing formed in one of the brackets q, of the front stand M.

On the shaft D^1, and directly under the hammer or hammers k, a cam or cams, I, are secured, and an actuating spring, J, having its lower end confined near the lower end of the front stand, and its top end, bearing against the outer end of the hammer, throws the hammer and the chisel r, or the cut end thereof, against the file-blank at every revolution of the shaft D^1 and cam I, which acts upon the horn s, secured to the under side of the hammer; these last-named parts being clearly shown in fig. 16, and in dotted lines in fig. 4.

To the middle portion of the spring J, and against its forward side, I apply a binder-cam, Y, arranged on and secured to a shaft, Z, passing through ears or bearings u, projecting from the front stand M.

On the projecting end of the shaft Z I secure a semicircular grooved pulley, E^1, shown in fig. 28. This pulley is enclosed in a metallic case, E^2, from the lower side of which an ear, G^1, extends, and a screw, G^2, passes through the case at the junction of the ear with the same, and engages with the semicircular groove in the edge of the pulley, which groove has a screw-thread formed therein to fit the screw G^2. The ear G^1 of the case E^2 is connected with the lever v, to which the former W is applied, by means of an adjustable connecting-rod, 33, at one end of the front stand. To the middle portion of this connecting-rod the top end of an arm, 34, is attached. Said arm is fastened to the end of a longitudinal shaft, 35, arranged in ears as bearings 36, on the rear side of the front stand. To the opposite end of the shaft 35 is secured another arm, like the first named, and a short connecting-rod, 33, shown in fig. 31, connects the top end of the arm with the ear G^1 of the case E^4, or regulating device at the right-hand end of the front stand, as shown.

In the front side of the head-block A two grooves, 37, are formed, at an angle, as shown in fig. 5. These grooves extend across the head-block, but only appear above and below the sockets 99. The half-hemispheric balls are grooved like the head-block, but not as deep, and fit into the sockets, as shown in fig. 5. A shield, G, fits into each ball, and extends above the same and the head-block a suitable distance, and below the ball to the top of the carriage A^1, where each shield is seated.

The lower or forked end of each shield is formed with rounded inner surfaces, as shown in fig. 23, to allow said shields to rock or move when the ball moves in the socket, to accommodate a file-blank, thick at one edge and thin at the other edge like a knife-file. Directly in front of the shield G and the file-blank N, and fitting into a longitudinal groove, 3, in the head-block, is a double-face plate or parallel bar, F, both projecting flanches 8, of which bear against the file-blank, being drawn in that direction by rods 9, which connect with said face-plate, and pass through the head-block, and through two parallel bars f, which have a packing of rubber or other elastic or yielding substance, d, between them, and nuts g to screw up and clamp the bars f and packing d against the back side of the tongs E, which are pivoted, and swing on rod 6, passing through stands or brackets 5, secured to the back side of the head-block A. This yielding substance or device d, between the bars f, insures sufficient pressure of the double-face plate against the file-blank N, even though the file-blanks vary considerable in thickness. The eccentric-shaft y' has its bearings and support in the stands 5, and may be turned by the handle D, moved downwards to compress the packing or spring d, and draw the face-plate hard against the file-blank, and by moving said handle upward, to release the pressure of the face-plate, the springs C, fastened to the back of the bed B, forcing the rods 9 and the face-plate forward. The clamping and releasing of the file-blank to remove cut files and replace file-blanks is, when the machine is set and adjusted for operation, all performed by movement of the handle D, to turn the eccentric-shaft y^1, and bring the flattened portion 39, or the rounded portion 40, into action or bearing against the inner surface of the lower portion of the tongs E. Directly in front of the face-place F, and between the adjustable gibbed inclines S, the hammer k is arranged to slide. This hammer is moved backward to a position to give the blow, by means of the revolving cam I, acting against the horn s, secured to the under side thereof, and in the forward direction to impart the blow by a spring, J, as hereinbefore described. The chisel r passes through the body of the hammer in a mortise, 42, made to receive it, and a key or gib, c, file-cut on the under side, is held down on to the chisel, to keep it in its place, by set-screws e, passing through the top of the hammer. The file-cut surface on the under side of the key c prevents the action of the hammer and chisel breaking the set-screws. Between the inner end of the hammer and the front side of the face-plate F, I employ a rubber or other elastic or spring substance 43, to relieve or ease the blow of the hammer, and keep the face-plate parallel with the working end of the chisel.

In adjusting this machine for cutting any particular kind of files, or files of any similar dimensions, the screw G^2 is turned to bring the binder-cam Y to bear against the spring, and properly adjust or regulate the tension of the spring to give the required force and motion to the hammer and chisel at every revolution of the cam I; and when files of different dimensions are to be cut, requiring a heavier or lighter blow of the hammer, the screw G^2 is turned to readjust the cam Y on the spring J, as before. Any and all other adjustments of the spring to regulate the blow of the hammer, as for cutting the corner i of the file, fig. 24, where the blow must be light, to and along the middle portion of the file, whether straight or broad at the middle, or of any other shape—all such adjustments of the spring and regulating of the blow of the hammer are performed by the former W, actuated by the adjustable guide-plate $x\,x$, as the carriage rises or is fed upward; said former being attached to the lever v, connected with the adjusting device and the cam Y, by the connecting-rod 33, as clearly shown in figs. 3 and 4.

Two or more binder-cams Y may be adjusted, and the tension of two or more springs J regulated and con-

trolled by one former, W. To do this I employ a longitudinal shaft, 35, having a vertical arm, 34, at each end. One of these arms has its top end connected with the rod 33, shown in figs. 3 and 4, and the opposite arm connects with a shorter rod 33, shown in fig. 31. This short rod connects the latter arm with the adjusting device E^4, or the case-wheel and screw, at the right-hand end of the front stand, so that when the former W is acted upon by the plate x x, as the carriage moves upward, both of the binder-cams Y are adjusted at the same time, and by the same simple device. The shape of the former W is susceptible of unlimited variations, and one former may be easily removed from the lever v and replaced by another former, to correspond with length or shape of the file-blank to be cut. Two different-shaped formers are shown in figs. 26 and 27.

A pulley, H^4, on one end of the shaft D^1, receives the driving-belt from some rotating pulley, and said belt gives power and motion to the working parts of the machine, operating the cam or cams I to force back the hammer, as before stated, and operating the feed by means of the bevel gears n and m, to the spur gear d^4, moving gear d^3, and gear d^2, connected with gear d^3, and above it, gearing into gear d^1, near the top of the shaft C^1, thus driving the latter shaft, and by bevel gears a and b, one on the lower end of the shaft C^1, and the other on the shaft T, and by a bevel gear, R, on the opposite end of the shaft T, gearing into the gear P on the lower end of the screw L, so the screw is rotated slowly and evenly, feeding the carriage A^1 and the shield G, and file-blank N, upward, with great precision and accuracy, and slower or faster, according to the fineness of the cut of the file. The slow or fast feed is obtained by exchanging the gears d^2 or d^4, or either of them, for larger or smaller gears, the plates of the studs on which said gears rotate being arranged to swing round or be moved so as to accommodate different sizes of gears. After the file-blank N has been cut, the handle D is turned upward to a vertical position, bringing the inner side of the lower portion of the tongs E on to the flattened surface 39 of the eccentric-shaft y', by turning said shaft, releasing the face-plate from the file, when it may be removed, and another file-blank placed in position on the shield. The carriage is then moved downward by turning the handle g^5, secured to the top of a loose ratchet-wheel, g^4, on the top end of the vertical shaft C^1, first having disengaged the pawl from the tooth of the wheel with which it may be engaged. The spring 96, which holds the pawl in contact with the ratchet-wheel, also holds it back when out of play. When the carriage has been run down to bring the top end or the corner i of the file-blank level with the cutting edge of the chisel, the handle D is turned downward to or near a horizontal position, clamping the blank between the shield G and the double-face plate F, the pawl 69 thrown into action with the teeth of the ratchet-wheel, and the machine set in motion. The plate x x acts upon the former W, and through the rod 33 and adjusting device, and the cam Y, the tension of the spring J and the blows of the hammer are adjusted and regulated from a light blow at the point or corner of the file-blank, to a heavy or full blow on the middle portion, the cam or cams Y being perfectly under the control of the former W, and all the operating parts of the machine work together, making the machine perfectly automatic in its operation, requiring no attendant or operator to guard or regulate any part when once set and adjusted. The length of the bed B and all the longitudinal shafts or other parts may be greatly extended, so that a series of ten or twenty or more hammers and other connections may be arranged to operate together, each and every hammer being thrown back by a cam, I, on the driving-shaft D^1, and forward to impart the blow, each by a separate spring, J, controlled by a binder-cam, Y, and all the cams Y adjusted on the spring J to regulate the blows of all the hammers by one single former W, applied and arranged as shown and described.

It will be observed that the back of the shield G is V-shaped, and fits into a V-shaped groove in the half ball H, so that when the file-blank is clamped between the face-plate and the shield, there can be no lateral motion or movement of the shield to obstruct or prevent the accurate and perfect cutting of the teeth on the file, parallel with each other; and no wearing of the back of shield, or of the groove in the half ball H, can prevent the direct longitudinal movement of the shield in the V-shaped groove.

It will also be observed that the positive, even, and continuous feeding of the carriage, shield, and file-blank upward, meets the blow of the hammer and chisel, and slightly raises the point or edge of each tooth of the file, producing the same result, but more perfectly than can be performed by hand-cutting; whereas, if the feed were not continuous, even, and positive, the shield and file-blank would yield to the blow of the hammer, and the much desired raising of the point or edge of the teeth would not be accomplished.

The front stand M is, as will be seen, made in two parts, and fitted and fastened together by bolts or screws 77, at x x x, fig. 4, so that if either the lower or upper portion, or any part or projecting ear or bearing should be broken or injured, only that injured portion would have to be repaired; besides, the said front stand is much easer made or repaired, or handled, in two parts than in one whole piece.

The direction of rotation of the pulley H^4 is indicated by an arrow in fig. 3, and said pulley is generally made in two parts, one of the parts fastened to the shaft, so that the driving-belt may be shipped from the fast pulley on to the loose pulley to stop the machine.

In the use of any of the ordinary file-cutting machines, the greatest number of files cut per day of ten hours, and files of given dimensions, say twelve-inch bastard files, is from twelve to fourteen dozen files; whereas in the use of my improved machine for cutting files, I have, and do (with a two-hammer machine) cut daily from thirty-six to forty dozen of twelve-inch bastard files, and of a very superior quality.

Having fully described my improvements in machines for cutting files, what I claim as new, and for which I respectfully solicit the grant of Letters Patent, is—

1. I claim the head-block A, constructed as shown and described, with one or more sockets, 99, and grooves 37 and 3, arranged in the manner and for the purpose set forth.

2. I claim the half hemisphere ball or balls H, or the equivalent thereof, in combination with the head-block A, substantially, in the manner and for the purpose set forth.

3. I claim the shield G, constructed as shown and described, and applied to the carriage, and arranged to slide in the groove made in the half ball H, as and for the purpose specified.

4. I claim the adjustable gibbed inclines S, in combination with and applied to the top of the front stand M, in the manner and for the purpose substantially as described.

5. In combination with the adjustable gibbed inclines, as above described, I claim the hammer *k* and cutter *e*, constructed and arranged to operate for the purpose and substantially as described.

6. I claim the combination of the shaft 35, and arms 34, the short rod 33, the adjusting devices E^1 and E^2, with the lever *v*, and the former W, all arranged to operate substantially as and for the purpose specified.

7. In combination with the parts last above claimed, I claim the cam Y, or a series of like or similar cams, acting against the springs J, in the manner substantially as described for the purpose specified.

8. In combination with the movable carriage A, and applied to the lever *v*, I claim the former W, and the guide-plate *x' x*, on the moving carriage, arranged substantially as described.

9. In connection with the head-block A, I claim the tongs E, and the eccentric-shaft *y'*, constructed and arranged for operation substantially as and for the purpose set forth.

10. In combination with the tongs and eccentric-shaft, I claim the parallel bars *f*, and the elastic or spring substance *d*, the nuts *g*, and rods 9, arranged for operation substantially as and for the purpose specified.

11. In combination with the parts last above claimed, I claim the double-face plate F in the manner and for the purpose described.

12. I claim the spring C, bed B, plate F, and rods 9, when combined and arranged as and for the purpose set forth.

13. I claim the combination of all the operative parts specified, arranged to operate substantially as and for the purpose or purposes shown and described.

SAMUEL WALTON.

Witnesses:

JOHN E. CRANE,

D. J. WALTON.