

J. C. Cooke,

File-Cutting Machine,

N^o 29,130.

Patented July 10, 1860.

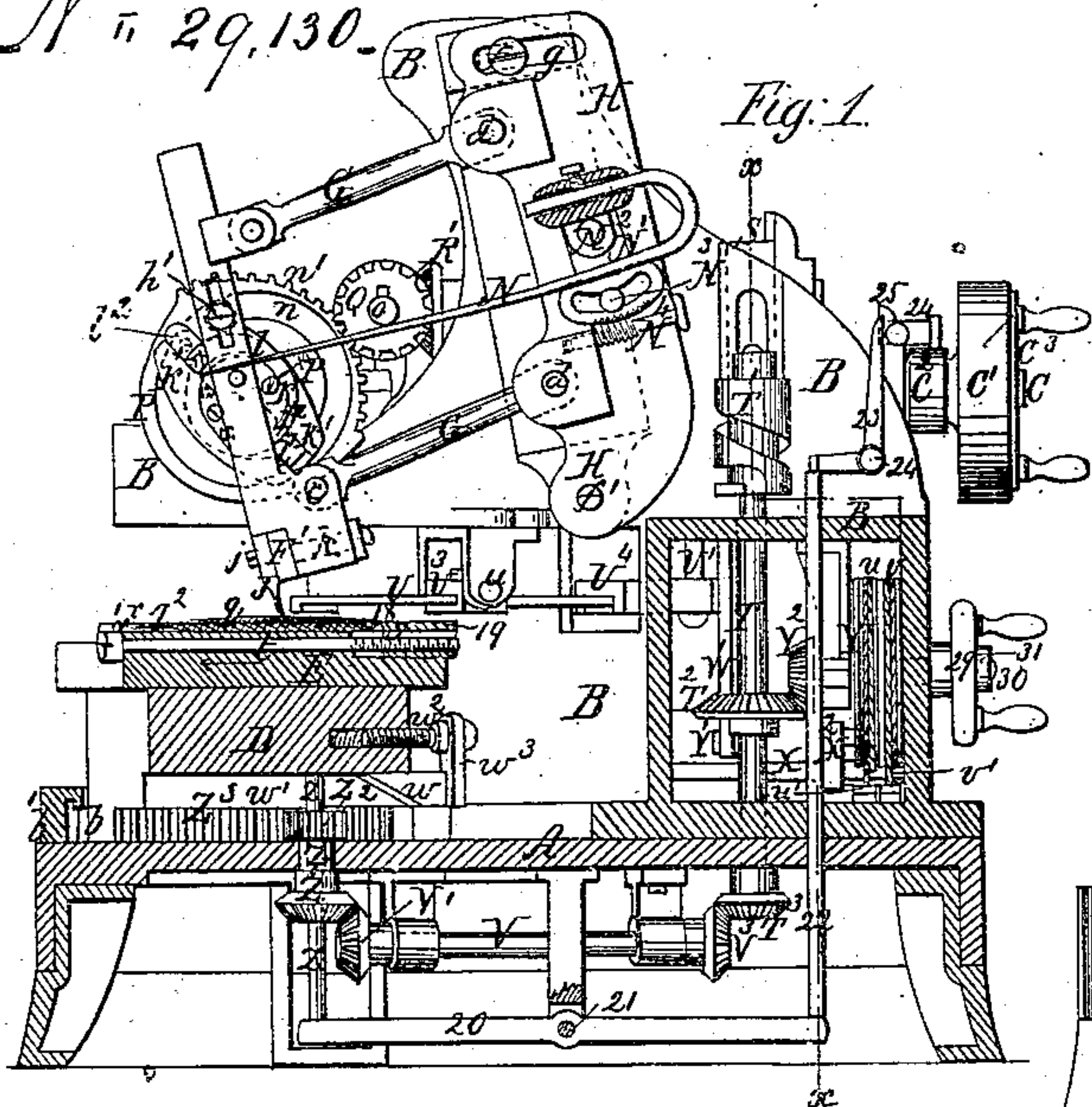


Fig. 1.

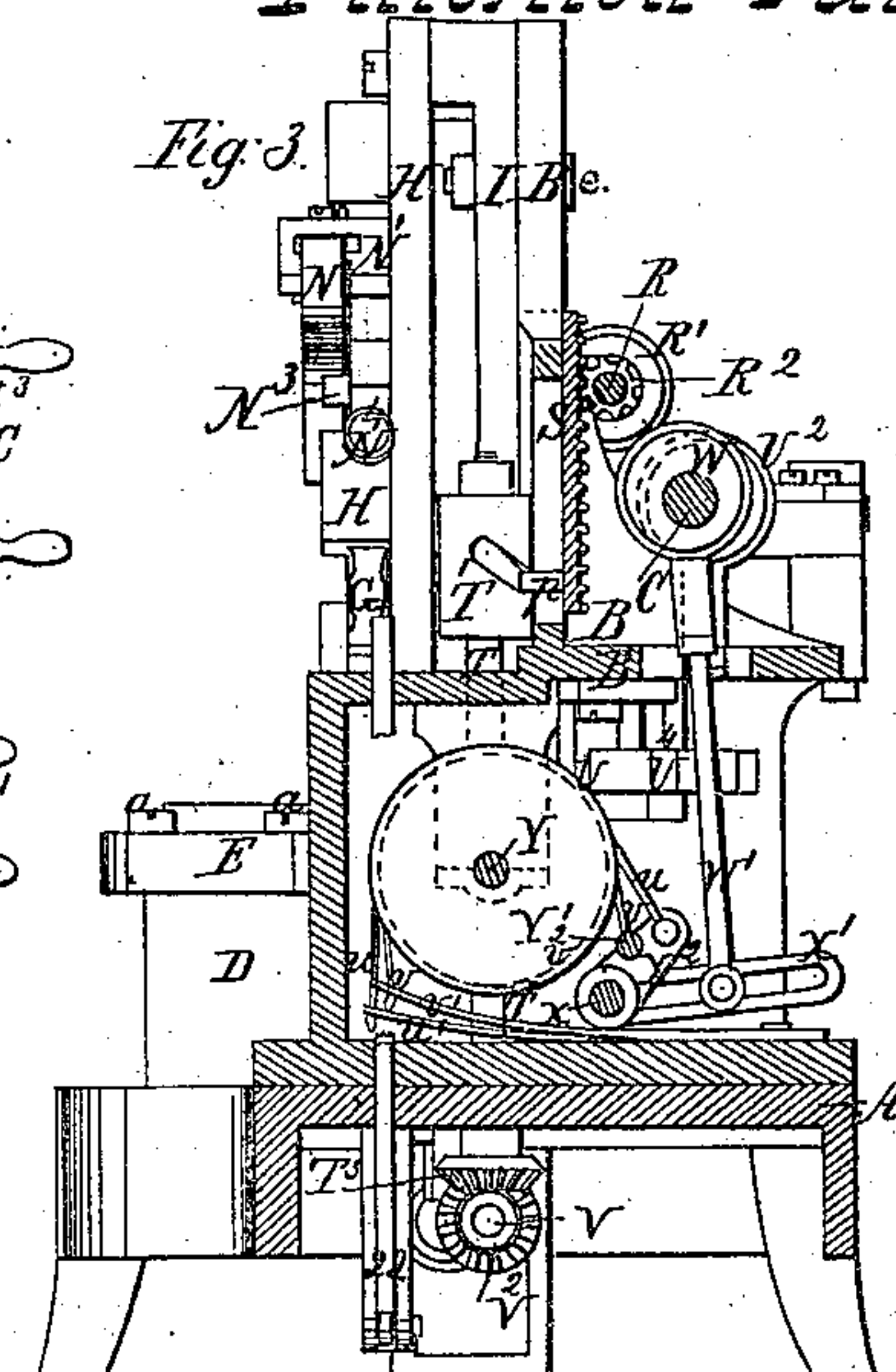


Fig. 3.

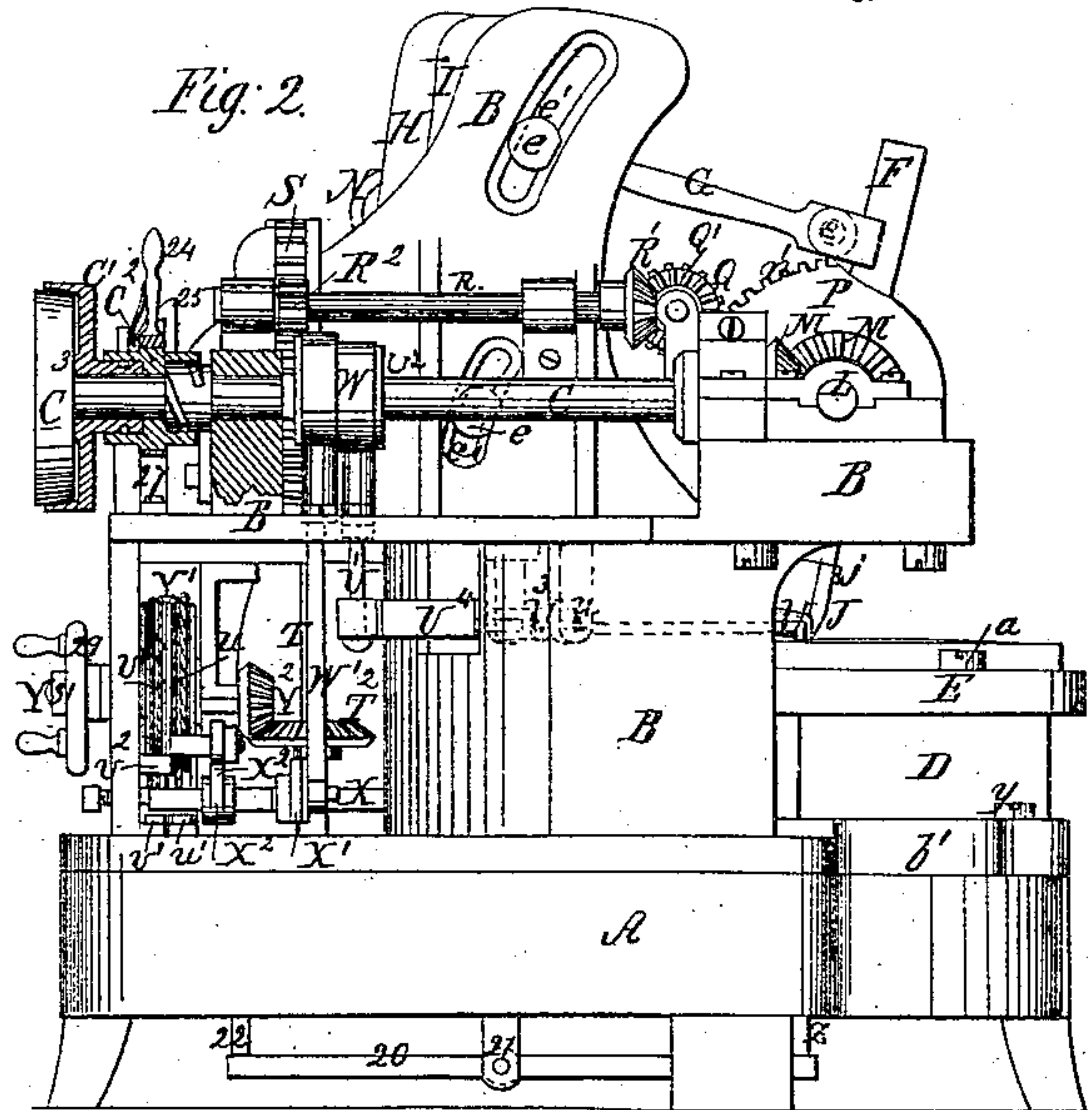


Fig. 2.

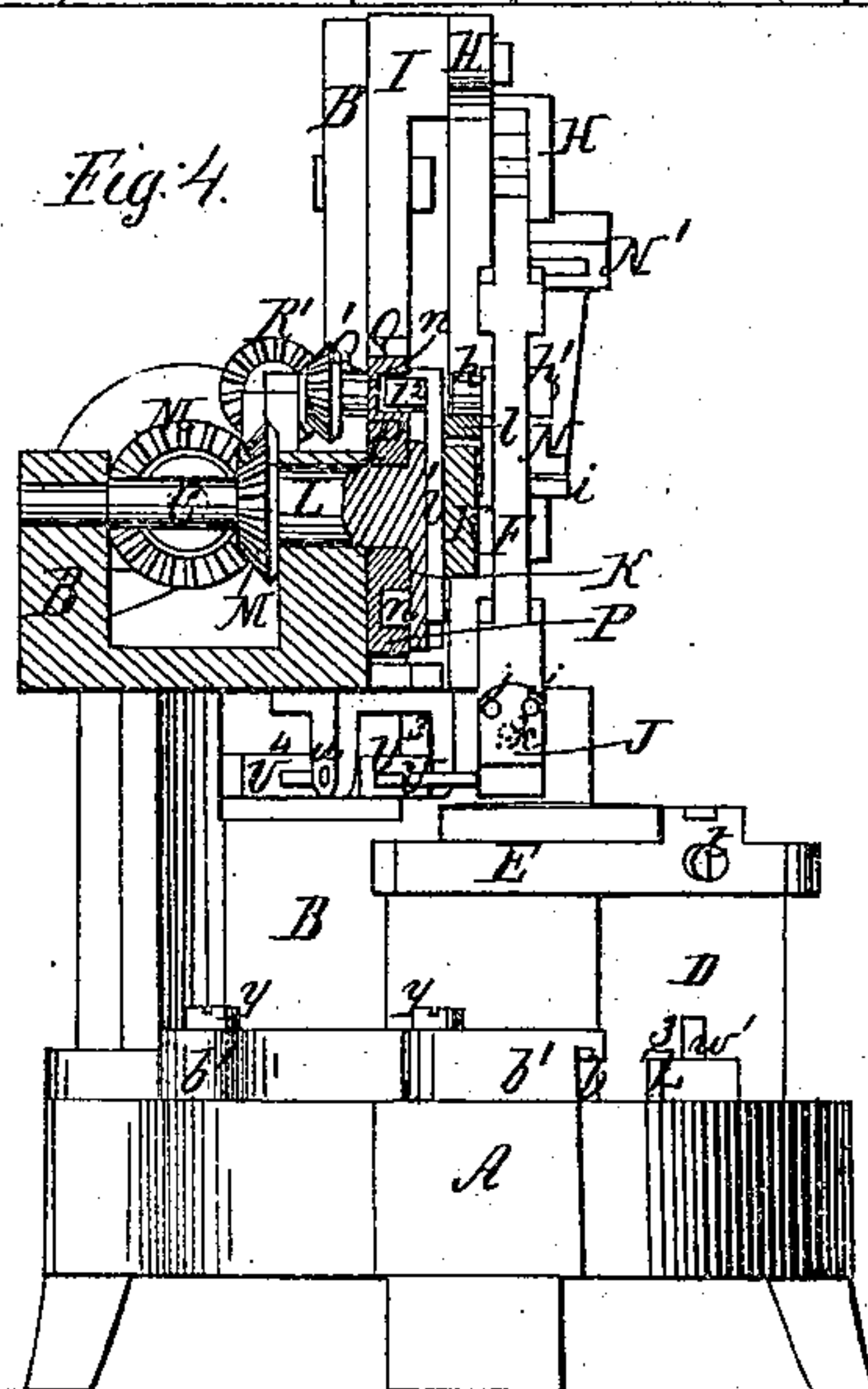


Fig. 4.

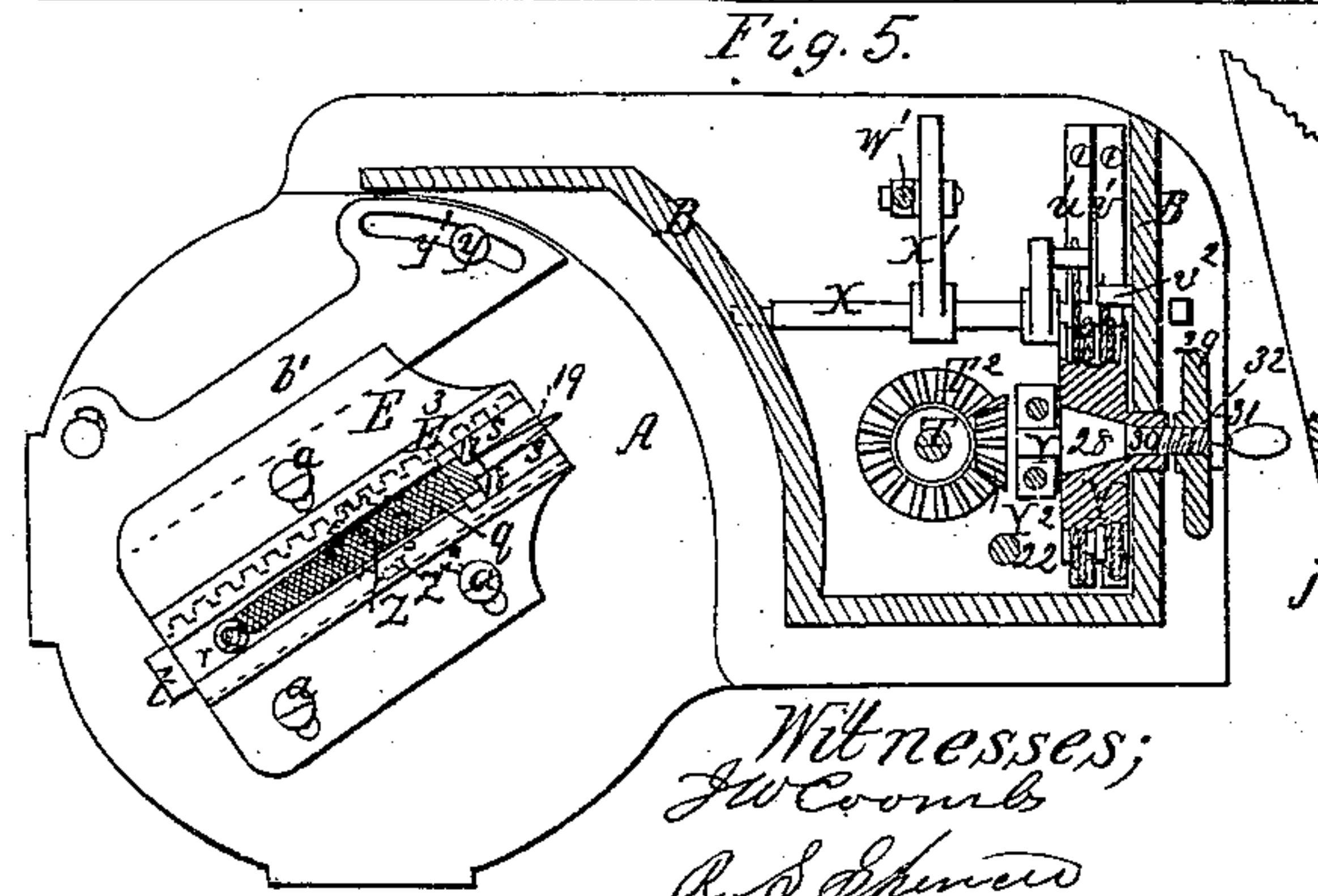


Fig. 5.

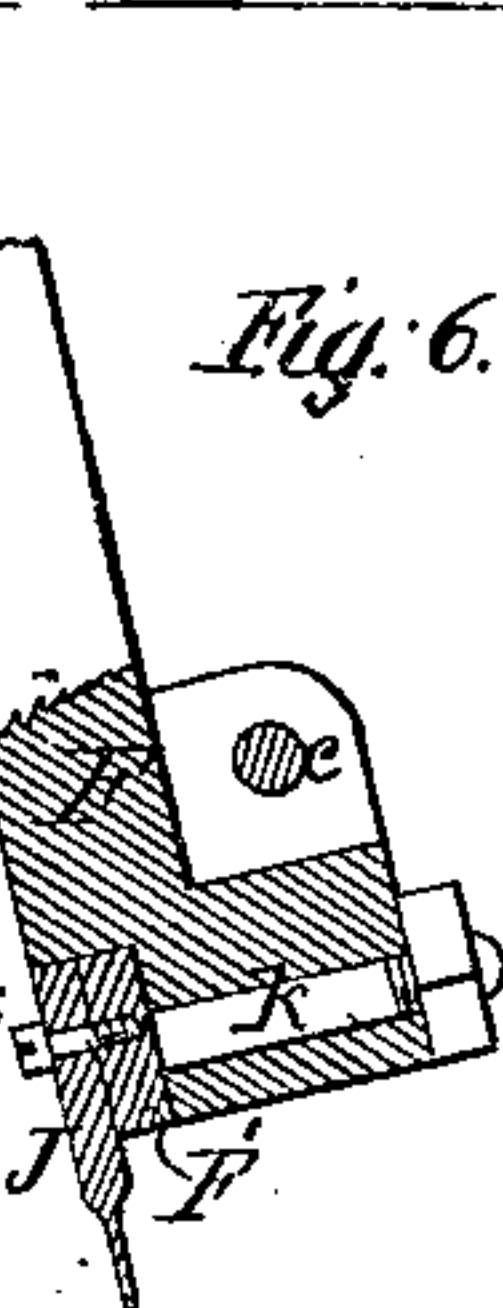


Fig. 6.



Fig. 7.

Witnesses;
J. W. Coombs
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J. C. Cooke
per [signature]
Attorney

UNITED STATES PATENT OFFICE.

JAS. C. COOKE, OF MIDDLETOWN, CONNECTICUT, ASSIGNOR TO HIMSELF AND D. C. SAGE,
OF SAME PLACE.

MACHINE FOR CUTTING FILES.

Specification of Letters Patent No. 29,130, dated July 10, 1860.

To all whom it may concern:

Be it known that I, J. C. COOKE, of Middletown, in the county of Middlesex and State of Connecticut, have invented certain
5 new and useful Improvements in Machinery for Cutting Files; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part
10 of this specification, in which—

Figure 1, is a front elevation of a machine with my improvements representing the bed plate and some other parts of the framing and the file bed and carriage in
15 section. Fig. 2 is a rear elevation of the same with the driving pulley and clutch and one of the bearings of the main shaft in section. Fig. 3 is a vertical section transverse to Figs. 1, and 2, taken nearly as indicated by the line x, x , in Fig. 1, and showing
20 all the parts on the left of that line. Fig. 4, is an elevation of the end of the machine at the left hand of Fig. 1, with the chisel operating cam and the bearing of the shaft of said cam in section. Fig. 5, is a horizontal section of the machine. Figs. 6, and
25 7, are views of some of the details of the machine which are hereinafter explained.

Similar letters and numbers of reference
30 indicate corresponding parts in the several figures.

My invention consists in a certain mode of applying the chisel stock in a file cutting machine whereby the chisel is caused to
35 operate in such a manner as to tend to throw up or raise the edge of the cut above the surface of the file blank in a similar manner to that in which it is done in cutting files by hand.

40 It also consists in a certain construction of the chisel stock whereby the cutter may be caused in its operation so to adjust itself to the face of the file blank as to cut to a uniform depth all across the blank.

45 It also consists in certain means of controlling the force applied to the chisel to produce the cut whereby such force is proportioned to the width of the several parts of the blank and consequently to the resistance offered to the cut and hence the cuts are
50 made of uniform depth from end to end of a file notwithstanding its varying width.

It also consists in an improvement in the

means attached to the file bed for securing the ends of the file blank and in an improved
55 contrivance which presses down the blank upon the bed at a point near the chisel at the time of the operation of the chisel but which is removed from the file at the time of the feed movement thereof. 60

It also consists in an improved arrangement of the file carriage in combination with the feeding mechanism to provide for the adjustment of the carriage to vary the
65 angle of the cut, without disturbing the feed mechanism. And it further consists in an improved stop-motion for uncoupling the driving pulley or gear from the main shaft of the machine and thereby stopping the
70 machine when the cut has proceeded to the end of the file blank or as far along as it may be desired.

To enable others skilled in the art to make and use my invention I will proceed to describe its construction and operation. 75

A, is a strong bed plate and B, a stout standard which constitutes the main framing of the machine. The form of these parts may be understood by a comparison of the several figures of the drawing. C, is
80 the main shaft arranged horizontally in bearings on the back part of the standard B.

D, is the carriage to which the file bed E, on which the file blank g , is supported during the cutting operation, is secured by bolts
85 a, a , said carriage having attached to one side of it a guide strip b , which is fitted to slide in a guide in a plate b' , bolted to the bed plate A.

F, is the principal portion of the chisel
90 stock consisting of a stout iron bar attached by pin joints c, c , to two parallel rods G, G, of equal length which are arranged to vibrate upon pins d, d , which attach them securely to a plate H, which is secured firmly
95 to the front of a plate I, which is bolted securely to the standard B, the said rods having always an upward inclination from the stock toward the plate H, (see Fig. 2). The bolts e, e , which secure the plate I, to the
100 standard pass through two slots e', e' in the standard which are curved in the form of arcs described from the centers of the pins c, c , while the chisel J, rests on the file blank. These slots permit the plate I, to be
105 raised or lowered to vary the inclination of

the two rods G, G, without altering the inclination of the chisel stock.

The plate H, is secured to the plate I, by means of two bolts f, f' , the latter f' , fitting snugly into a hole in the plate H, and screwing into the plate I, and the former f , passing through a slot g , in the plate H, and screwing into the plate I, the slot g , being made in the form of an arc described from the center of the bolt f' , to permit the adjustment of the plate H, to vary the inclination of the chisel stock. The chisel is used without a hammer and produces its cut by a direct blow upon the file blank. The stock is raised to effect the blow by the action, upon a roller h , fitted to a stud h' , secured to and projecting from back of it, of a cam K l , which is fast upon a shaft L, which is arranged transversely to the main shaft in bearings in the standard B, and geared with the said shaft by a pair of miter wheels M, M, and the blow is given at a proper point in the revolution of the cam by means of a powerful spring N, which is secured in a block N', bolted to the plate H, and which always bears upon a stud i , secured to and projecting from the front of the chisel stock.

The movement given to the chisel stock by the cam and spring above mentioned, is caused by the rods G, G, working from the two fixed points d, d' , to have a compound character that is to say it has a direct longitudinal motion without any change of its inclination and a slight horizontal motion which is produced by the movement of the points c, c' , in arcs of circles. This horizontal movement during the descent of the stock is toward the plate H, and toward the heel of the file blank and has the effect of making the chisel throw up the cut in a direction toward the heel of the file in which direction the chisel stock has its downward inclination. By adjusting and securing the plate I, in a higher position, the rods G, G, are caused to have a greater inclination from a horizontal position and by that means the chisel stock is caused to have a greater amount of horizontal movement, and so to throw up the cut more; and by adjusting and securing the said plate in a lower position the opposite effect is produced.

To provide for regulating the force of the blow of the chisel the block N', to which the spring N, is attached is arranged to swing on a screw N², which attaches it to the plate H, and the said block is secured to the said plate by a second screw N³, passing through a curved slot in the block described from the screw N². By slackening the screw N³, and turning the block on the screw N², in one direction or the other and then tightening up the screw N³, again the force exerted by the spring on the stud i , is caused to be increased or diminished ac-

ording to the direction in which the block has been turned. To facilitate the turning of the block a screw N⁴, is employed, said screw having a journal turned in it so that it may turn freely without moving endwise in a bearing in the plate H, and being so arranged that its thread gears with notches in the bottom of the block N. By turning this screw when the screw N³, is slackened the block can be turned with great ease.

The chisel J, is not attached rigidly to the bar F, which constitutes the principal portion of its stock but is secured rigidly by screw bolts j, j' , or other convenient means to a holder F', best shown in Fig. 6, which represents the lower part of the bar F, in section. This holder is made with a shaft k , which is fitted to turn in a bearing in the lower part of the bar F, the axis of the shaft when in its bearing occupying a position transverse to the rod F, as well as to the line of the edge of the chisel. To prevent the impact of the blow acting too severely upon the shaft k ; the head of the holder F', is made concentric with the shaft and fitted snugly into a seat of corresponding form in the bottom of the bar F. By the construction of the chisel stock of two pieces F, and F', combined as described and the use of a firm solid file bed the edge of the chisel on coming into contact with the file blank will be caused to adjust itself to the face thereof and if the steel is of equal softness all across the blank a cut of uniform depth from one edge to the other will be produced. The chisel which I employ is made concave on both sides as shown in Fig. 1, as I find that it stands better in that form than when having a regular taper and less grinding is required whenever regrinding becomes necessary.

The cam K l , by which the chisel stock is lifted is of a peculiar construction which is best illustrated by Figs. 4, and 7, the latter of which exhibits a face view of the said cam detached from the machine, the object of such construction being to enable it to lift the chisel higher that it may give a heavier blow on the wider parts of the file blank where owing to the greater bearing for the edge of the chisel the cut would be less deep if the force of the blow were uniform. The said cam is composed of two principal parts K, and l , of which K, is fixed relatively to its shaft, and l , is movable relatively thereto. The body K, of the cam is firmly secured by screws m, m' , to the face of an elliptic or oblong plate K', which is keyed to the shaft L, and its periphery is composed of two nearly semicircular arcs of different radius 12, 13, both concentric with the shaft and united on one side of the axis by an abrupt radial line 14, and on the other side by a gradual curve 15. The other part or piece l , is of the form of an arc

greater than a quadrant, its interior corresponding with the smaller arc 12, and its exterior with the larger arc 13, of the body K. It is attached rigidly to a straight slide 5 l' , which is fitted to slide in a groove which extends radially all across the face of the plate K' , at the back of the body K, the central line of the said slide crossing the axis of the shaft at 90° from the radial line 14. By the movement of this slide the piece 10 l , may be brought close against the smaller arc 12, and radial line 14, of the body K, so that its exterior may be made to constitute a continuation of the larger arc 13, of the body as shown in Fig. 7, in black outline or 15 be thrown out from the body as shown in Fig. 1, and in red outline in Fig. 7. The said slide l' , has attached to its back an antifriction roller l^2 , which as the cam rotates works around a groove n , in the face of 20 a plate P, which is fitted to turn loosely on the shaft L, and which has on its edge a toothed sector n' , the pitch line of which is concentric with the said shaft, and which gears with a pinion Q, which is fitted to 25 turn freely on a fixed horizontal stud o , secured to the standard B. To this pinion Q, there is secured a miter wheel Q' , gearing with a miter wheel R^1 , which is fast on a horizontal shaft R, which is arranged in 30 bearings on the standard B, above the bearings of the main shaft C, and furnished also with a pinion R^2 , which gears with a toothed rack S, that is fitted to slide longitudinally and vertically in a guide in the standard B. 35 This rack is furnished with a stud v , which passes through a slot in the standard and enters the groove in a cam T' , which is fast on an upright shaft T, which constitutes 40 part of a train of gearing for effecting the movement of the carriage D, to feed the file blank to the chisel, which will presently be fully described. The above mentioned cam T' , has a very slow rotary movement while 45 the machine is in operation, and its action on the toothed rack S, produces by means of the pinion R^2 , miter wheels R' , Q' , pinion Q, and sector n' , a very slow movement of the grooved plate P, in the opposite direction to the revolution of the cam, which 50 is indicated by arrows in Figs. 1, and 7, during the whole or a part of the operation according to the shape of the groove in the cam which is made to suit the shape of the 55 file.

A portion of the groove n , in the plate P, from the point 16, to the point 17, is concentric with the shaft L, and of such radius that while the roller l^2 , attached to the slide 60 l' , is in that part of the groove the said slide will be kept in such a position that the piece l , will lay snugly against the body K, of the cam as shown in Fig. 7, in black outline, but the remaining portion of the groove is eccentric to the shaft L, and as the roller

passes along that portion the slide is moved in such manner as to throw the piece l , out from the body K, of the cam to the position shown in red outline in Fig. 7, and bring it back again to the position shown in black 70 outline in the said figure, the position shown in red being arrived at when the roller is at the point in the groove which is farthest from the center of the shaft L. The piece l , does not commence to move out from the 75 body of the cam till it comes in contact with the roller l^2 . The fall of the chisel stock occurs when the end 17, of the piece l , passes the roller l , on the said stock, and this always occurs at a given point in the revolution 80 of the shaft L, and the cam; but the point in the said revolution at which the piece l , arrives at its greatest distance from the body K, of the cam varies with the position of the plate N, and hence the fall of 85 the chisel stock may take place at the time of or before or after the arrival of the said piece l , at its greatest distance from the body K, of the cam and so may be greater or less and produce a heavier or lighter blow according to the position of the plate N. Now 90 it has been before explained that the position of this plate N, depends upon the cam T, and if this cam be properly shaped to suit the form of the file carriage D, and feed be 95 properly adjusted the force of the blow can be made precisely in proportion to the width of the file throughout the whole of its length thereby producing a uniform depth of cut. The same means of controlling the force may 100 be applied to a hammer in a file cutting machine having a hammer striking upon the chisel.

In a machine for cutting only straight or parallel sided files a simple cam may be used 105 in place of the compound cam K l ; and the plate P, and the cam T' , and all the gearing between them would be unnecessary, but to cut straight or parallel sided files in this machine it would only be necessary to uncouple the cam T' , or any wheel in the gearing and secure the plate P, in a fixed position. 110

The file blank g , is secured to the bed E, which is faced or lined with soft metal, by 115 means of a fixed dog r , and a movable dog s . The fixed dog r , consists simply of a little circular plate of hard steel with a sharp chisel like edge supported a little above the bottom of the bed by a thin ring r' , and secured to the bed by a screw r^2 . The movable dog s , consists of a block of hard steel fitted to slide horizontally between suitable guides provided for it in the bed and contains a groove 19, to receive the tang of the 120 file blank and a sharp chisel like edge 18, on each side of the said groove to indent itself into the heel of the file blank. The bed E, is fitted with a screw l , which turns freely therein, but is confined longitudinally, and 130

which screws into the dog *s*, and by turning this screw in the proper direction when the file blank has been placed on the bed with its tang in the groove 19, of the dog *s*, the said dog is brought up to the heel of the file blank and caused to force the point of the latter tang in the groove 19, of the dog *s*, the said dogs are caused to indent themselves into the point and heel of the blank and so hold it very firmly.

The contrivance which presses and holds down the blank upon the bed at the time of the operation of the chisel consists of a stout spring or elastic lever *U*, of steel working on a fulcrum *u*, and having one end which is situated over the carriage *D*, turned downward that it may press upon the blank only near the chisel and the other end connected by a rod *U'*, with an eccentric *U²* on the main shaft *C*. The revolution of this eccentric causes the lever *U*, to be pressed down upon and raised up from the blank once for every operation of the chisel and the said eccentric is so arranged upon the shaft relatively to the position of the chisel operating cam *K* *l*, that it causes the lever to press on the blank with the greatest force at the time of the descent of the chisel and so to hold the blank firmly down. The lever is raised from the blank at the time of the feed movement of the carriage *D*, and hence offers no obstruction to the movement of the carriage, and in going over the blank a second time to produce a cross cut does not injure the first cut. To enable this lever *U*, to be adjusted to press on the blank at a proper distance from the point where the chisel strikes it, the bar of steel of which it is principally composed is fitted to slide through an iron fulcrum piece *U³* and fitted with an adjustable block *U⁴* at the end which connects with the eccentric and is secured in the said fulcrum piece and has the said block secured to it by set screws. The said lever being elastic adapts itself to the varying thicknesses of the blank or blanks.

The feed movement of the carriage is produced by an eccentric *W*, on the main shaft. This eccentric is connected by a rod *W'*, with the arm *X'*, of a rock-shaft *X* (see Figs. 1, 3, 4, 5,) which works in bearings in the lower part of the back of the standard *A*; and another arm *X²* of the said rock-shaft is connected with a strong band *u*, of cat-gut leather or other material which passes more than once around a pulley *Y'*, on a short horizontal shaft *Y*, which works in bearings in the standard. The other end of the said band is attached to a strong spring *u'*, which is secured to the bed plate. The same pulley has another band *v*, passing around it in a similar manner and one end of this band is connected with a spring *v'*, like the spring *u'*, and its other end is connected with a fixed stud *v²*, or other

fixed part of the machine. The springs keep both bands always tight. As the eccentric *W*, in its revolution depresses the arm *X'*, of the rock-shaft, the arm *X²*, moves downward also, and so draws the band *u*, tighter upon the pulley *Y'*, and so causes it to turn the pulley a little way and with it the shaft *Y*, and as the eccentric raises the arm *X'*, the band *u*, is slackened again and the spring *u'*, draws it back around the pulley as far as the pulley had previously moved, the pulley being prevented moving back with the band *u*, by the band *v*, which constitutes a friction brake. I do not claim this part of the feed mechanism but have explained it to facilitate the explanation of the feature which I do claim. The shaft *Y*, carries a bevel toothed wheel *Y²*, which gears with a larger bevel toothed wheel *T²*, on the shaft *T*, before described, as carrying the cam *T'*, which controls the variation of the force of the blow on different parts of the file. This shaft *T*, carries at its lower end a miter wheel *T³*, which gears with another miter wheel *V²*, on a horizontal shaft *V*, arranged in bearings under the bed plate *A*, and this shaft *V*, is geared by a pair of miter wheels *V'*, *Z'*, with a short upright shaft *Z*, which is fitted to a bearing under the carriage *D*, and which carries a pinion *Z²* gearing with a toothed rack *Z³*, formed upon or secured to the carriage.

The shafts *T*, *V*, *Z*, and their gearing transmit motion from the shaft *Y*, to the rack *Z³*, and so to the carriage *D*, the movement of the latter being in the direction of the arrow shown upon it in Fig. 1, and the cut being commenced at the point of the blank. The shaft *Z*, is so arranged relatively to the guide plate *b'*, which guides the movement of the carriage, and the pinion is so proportioned in diameter that the axis of the said shaft is in a plane passing longitudinally and vertically through the center of the carriage and of the file bed as illustrated in the plan view Fig. 5, where the rack and pinion are shown in dotted outline. The guide plate *b*, is secured to the bed plate by screws *y*, *y*, which screw into the bed plate by screws *y*, *y*, which screw into the bed plate and pass through slots *y'*, *y'*, in the guide plate which are constructed in the form of arcs of such radius as to permit of the adjustment of the said plate and of the carriage only in a circular direction concentric with the axis of the shaft *Z*. This adjustment provides for all the necessary variations in the angle of the cut of the files without altering the adjustment of the chisel while the position of the shaft *Z*, and its pinion *Z²*, makes the feed mechanism always in condition for operation, whatever the direction in which the carriage may be set, and it is in this adjustment of the carriage relatively to the feed

gearing that my improvement in the feed motion consists.

The stop motion consists of an adjustable wedge w , (see Fig. 1) attached to the carriage, a rod z , sliding through the shaft Z, which is made hollow for its reception, a straight lever 20, which works on a fixed fulcrum 21, below the bed plate a vertical rod 22, working through the bed plate and through guides in the standard B, and an elbow lever 23, working on a fixed fulcrum 24, secured in the standard B. The wedge w , is fitted to slide horizontally in a longitudinal groove w' , in the lower part of the carriage, and is attached to the carriage by means of a screw w^2 , which screws into a tapped hole in that end of the carriage toward which the heel of the file blanks are placed, the said screw being fitted to turn freely in a lug w^3 , formed on the head of the wedge but being prevented moving longitudinally independently of the wedge. By screwing this screw into or from the carriage, the wedge is carried into or drawn out from the groove w' , which is wide enough to receive the upper part of the rod z . This rod rests upon one arm of the lever 20, the other arm of which supports the rod 22, which is situated under one arm of the lever 24. The wedge w , is so adjusted by the screw w^2 , that when, in the operation of cutting a file, the cut has proceeded along the whole length or as nearly so as desired, the said wedge comes into operation on the upper end of the rod z , and presses down the said rod upon the lever 20, and so causes the said lever to press the rod 22, upward against the lever 23, and thus causes the latter lever to push the coupling 24, which operates the movable portion C^2 , of the clutch C^2 , C^3 , which couples the driving pulley C' , with the main shaft C, from under the stationary hook 25, by which the said lever has been locked in a position to keep the pulley coupled, thus permitting the clutch to be shifted by a spring 27, to uncouple the pulley from the shaft, when the machine stops. The wedge w , can be adjusted by the screw w^2 , to cause the liberation of the clutch lever at any point in the movement of the carriage, according to the length of the file. The clutch C^2 , may be of any known construction but I have represented one of the friction kind.

To provide for the running back of the carriage rapidly by hand when the cut has proceeded from one end of the file to the other the pulley Y' , is not permanently secured to the shaft Y, but is bored for a portion of the distance through it in a conical form to fit a cone 28, on the shaft as shown in Fig. 5, and its hub is extended a short distance through the outer bearing of the shaft in the standard B. Outside of this projecting portion of the hub the shaft Y,

has cut upon it a screw 30, to which is fitted a hand wheel or crank 29, and a nut 31, the nut being fitted very tightly but the wheel or crank being fitted easily. By screwing this hand wheel or crank tightly up against the hub of the pulley the conical portion of the bore of the latter is brought tightly against the cone on the shaft which is thus secured to and caused to revolve with the pulley. But by unscrewing this wheel or crank from the hub and screwing it back against the nut the shaft can be turned easily by the wheel or crank the friction between the nut and the wheel or crank being greater than the friction between the cone 28, and the bore of the pulley which is held stationary by the friction of bands w , v , while the shaft is turned.

I do not claim securing the file blank upon the bed by means of a screw and clamps or dogs fitted to the ends of the file.

Having thus described my invention I will proceed to state what I claim and desire to secure by Letters Patent—

1. The attachment of the chisel stock at two points to two vibrating rods G, G, by which it is made to receive a movement of a character substantially as herein specified for the purpose of throwing up the cut.

2. Providing for shifting the two fixed centers d , d , on which the vibrating rods G, G, work for the purpose of giving the chisel a greater or less degree of horizontal movement by means of a movable plate N, or its equivalent so applied as to provide for the raising and lowering of said centers.

3. The construction of the chisel stock of two parts F, F', one of which is capable of a rolling or oscillating movement substantially as and for the purpose herein specified.

4. Providing for controlling the force applied to the chisel so that it shall be always in proportion to the varying width of a file blank my means of a compound cam K l applied and governed substantially as herein described to give a greater or less lift to the chisel or hammer according as the width is greater or less at the part presented to the chisel.

5. The combination of the single chisel edged dog r , applied at the point of the blank and the double or grooved chisel edged dog s , applied at the heel of the blank substantially as herein specified.

6. The employment for holding down the file blank at the time of the operation of the chisel, of a presser which possesses sufficient elasticity in a proper direction to enable it to adapt itself to the varying thickness of the blank and to blanks of different thickness and which is raised from the blank before and kept raised during the feeding operation substantially as herein set forth.

7. Making the guide or guides for the file carriage D, adjustable around the axis of a

feed pinion gearing with a rack formed upon or attached to the said cariage substantially as and for the purpose herein specified.

8. So combining a clutch lever by which
5 the driving pulley or gear may be uncoupled from the main shaft of the machine, with an adjustable wedge attached to the file carriage substantially as herein de-

scribed that the said wedge may be made to act upon the said lever to uncouple the 10 pulley or gear at such point in the movement of the carriage as may be desired.

JAS. C. COOKE.

Witnesses:

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