

No. 617,622.

Patented Jan. 10, 1899.

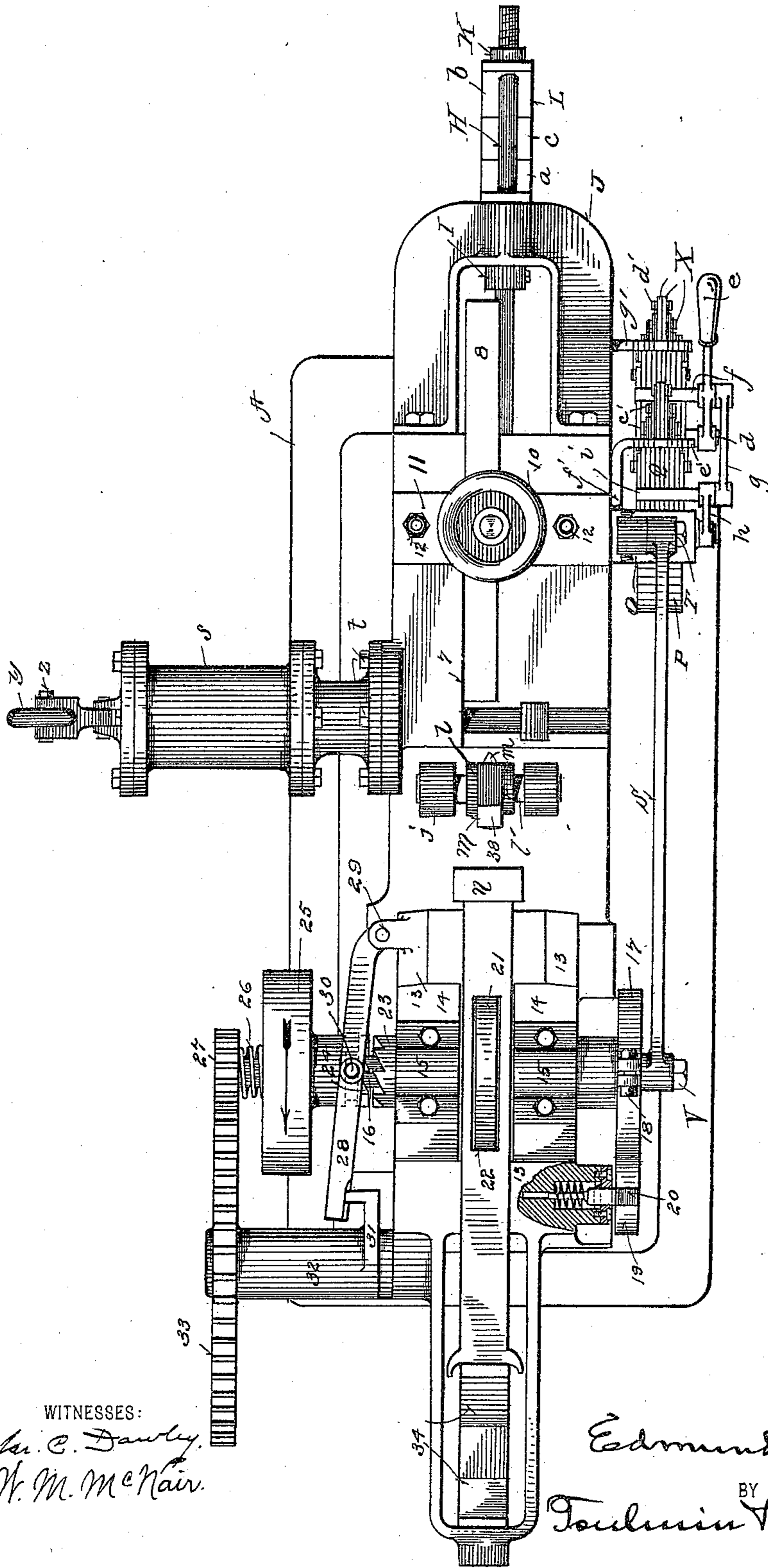
E. WILLIAMS.

MACHINE FOR FORMING DIE BARBS.

(Application filed Mar. 31, 1898.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Jas. C. Dawley.
 H. M. McNair.

INVENTOR

INVENTOR
Edmund Williams

BY

BY
Foulson & Whittemore

ATTORNEY **S.**

No. 617,622.

Patented Jan. 10, 1899.

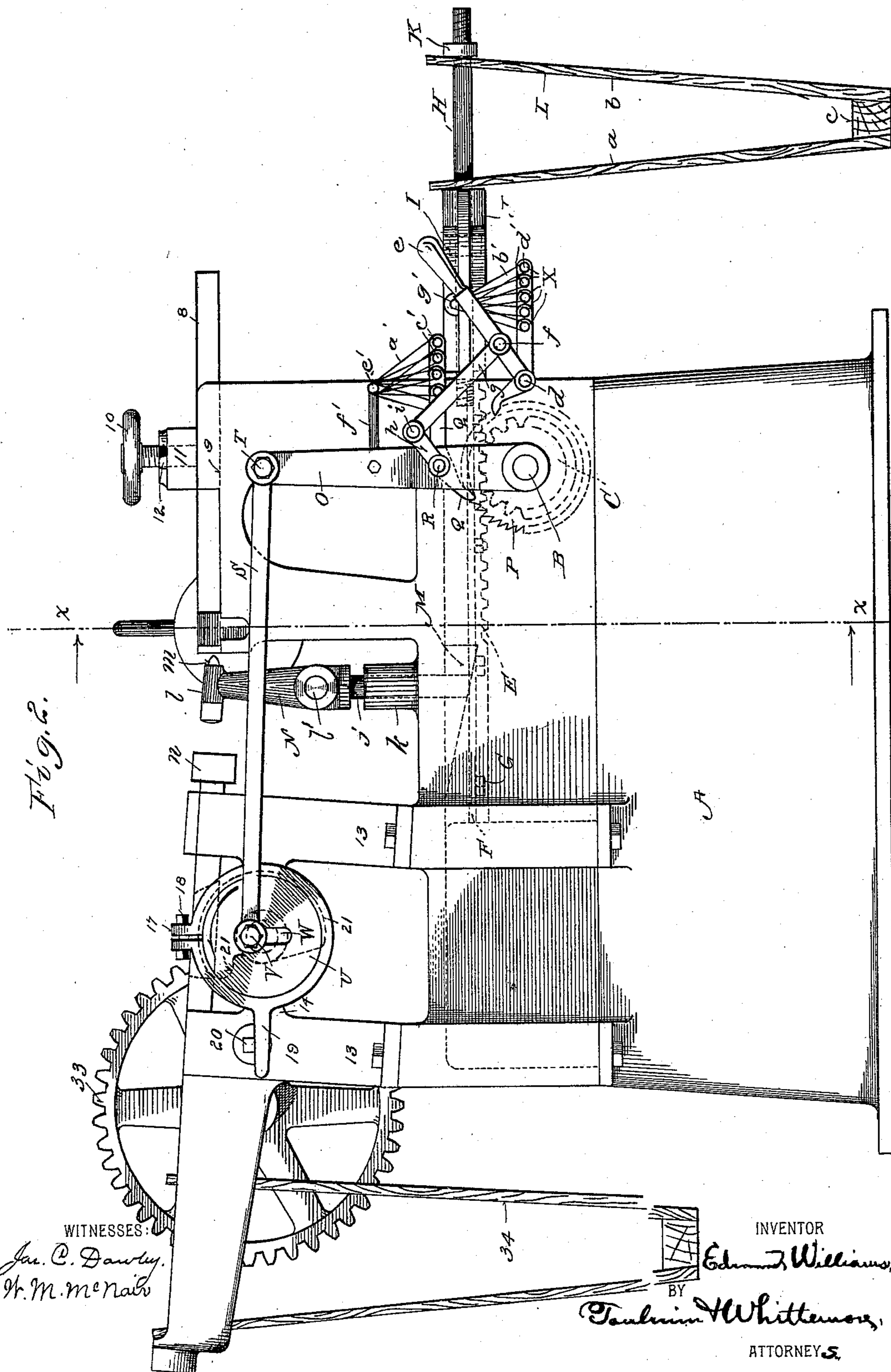
E. WILLIAMS.

MACHINE FOR FORMING DIE BARBS

(Application filed Mar. 31, 1898.)

(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

Jas. C. Dawley.
 H. M. McNaile

INVENTOR

Edmund Williams

BY

BY
Pauline Whittern,

ATTORNEY 5

No. 617,622.

Patented Jan. 10, 1899.

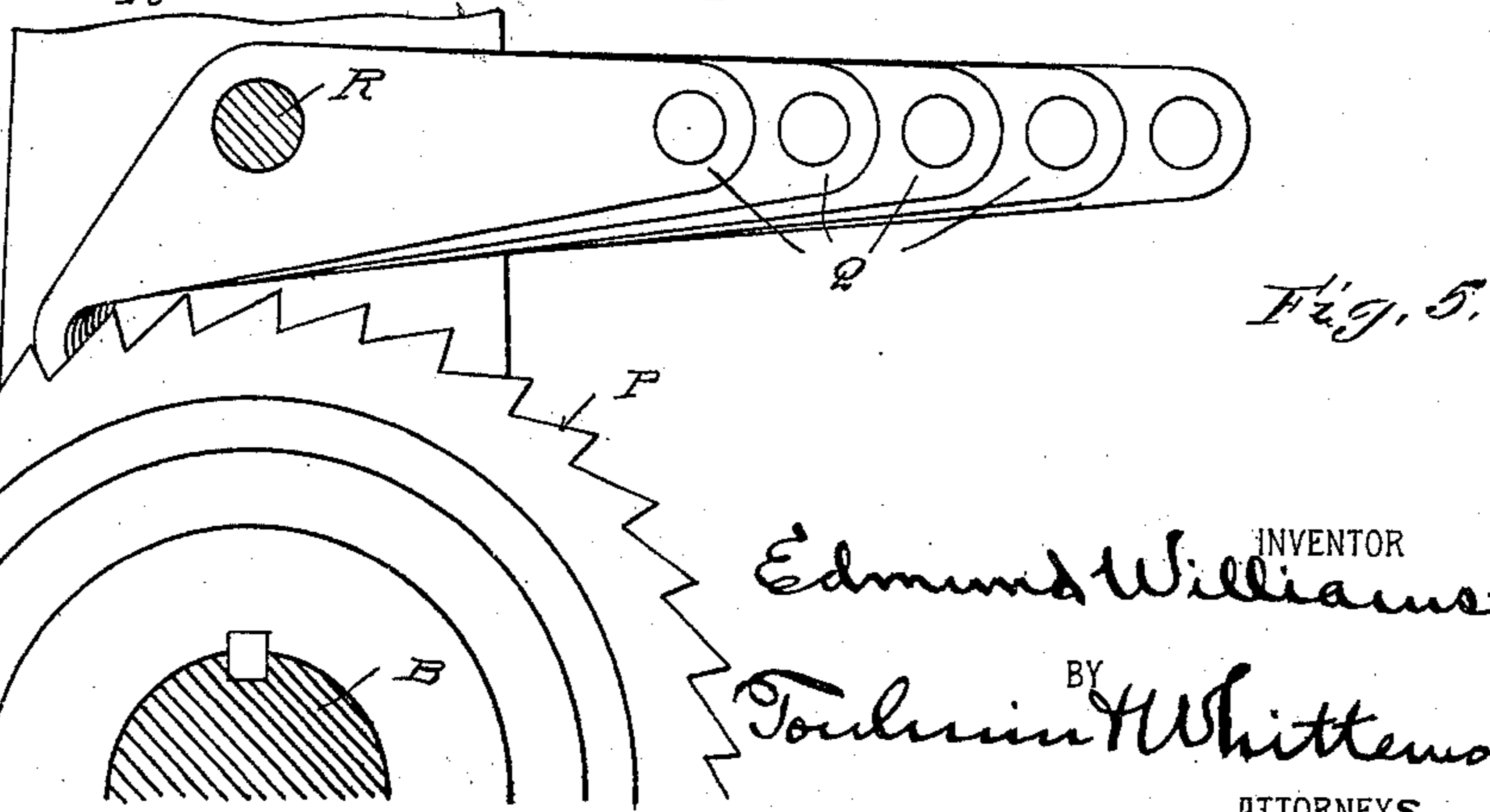
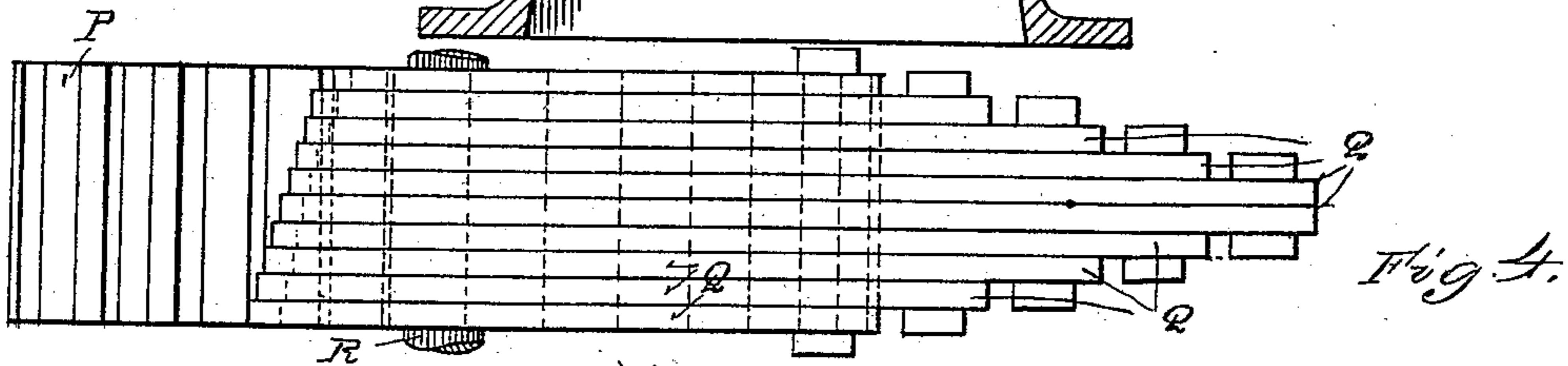
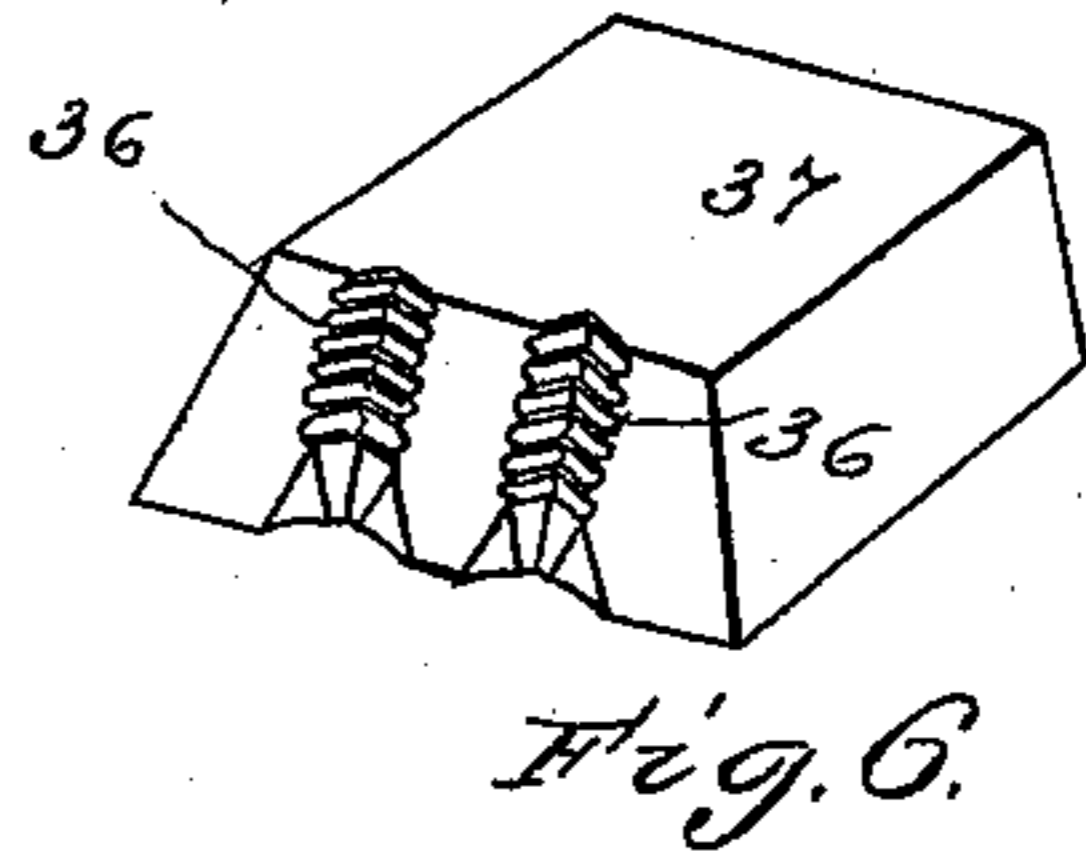
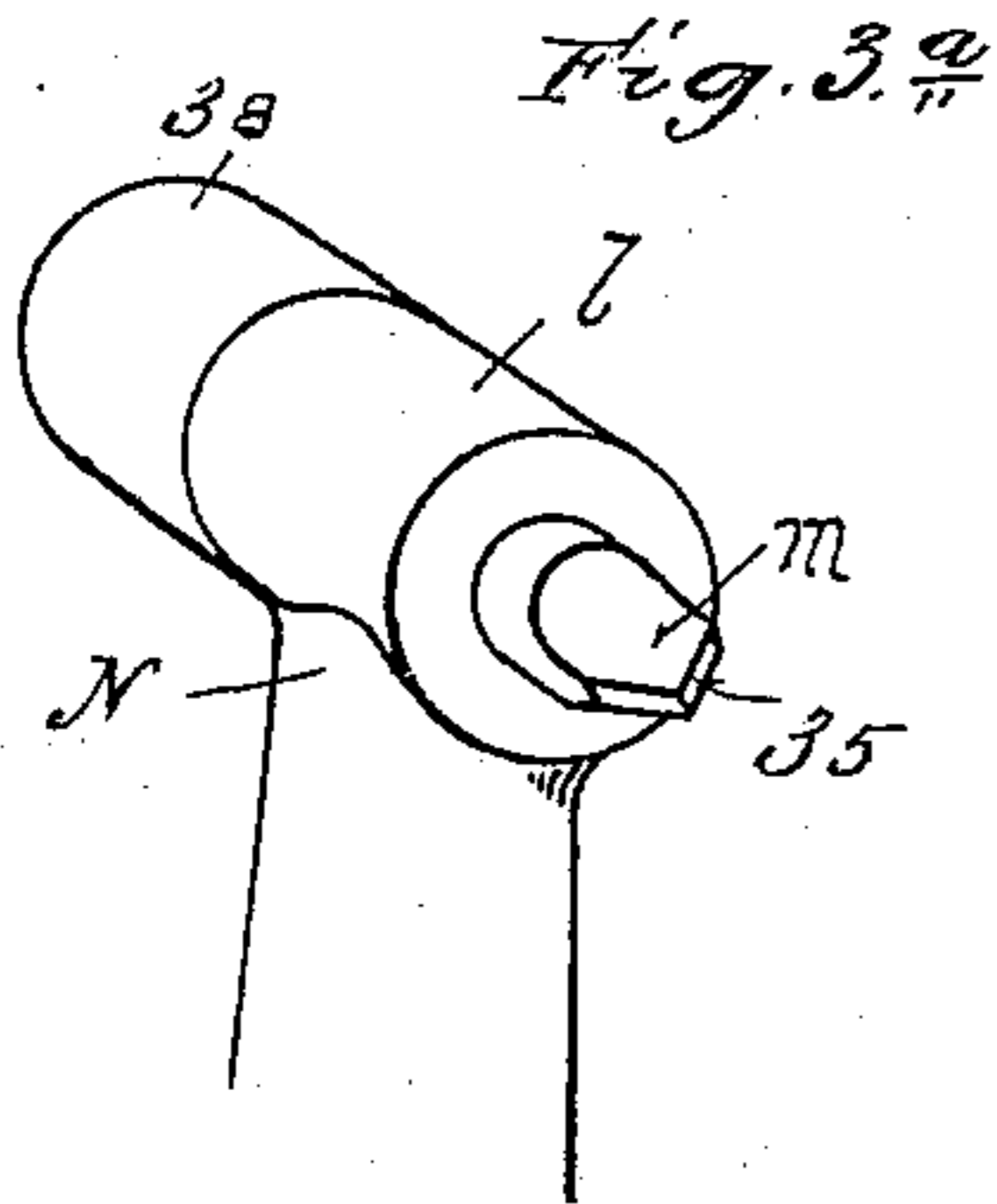
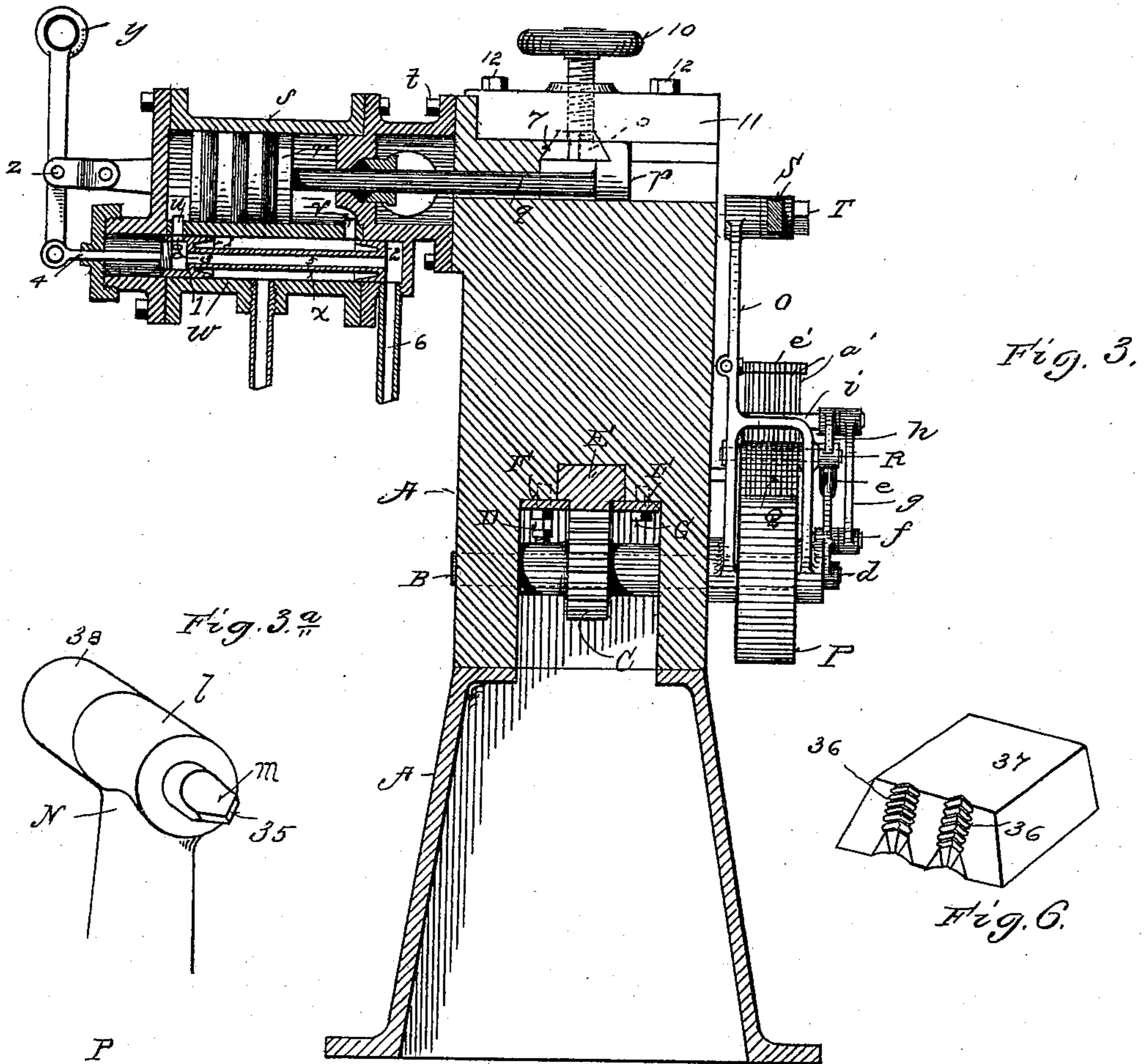
E. WILLIAMS.

MACHINE FOR FORMING DIE BARBS.

(Application filed Mar. 31, 1898.)

(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

Jos. C. Dawley.
 H. M. McKair.

INVENTOR

Edmund Williams INVENTOR

BY

BY
Toulmin & Whittmore

ATTORNEYS.

UNITED STATES PATENT OFFICE.

EDMUND WILLIAMS, OF FINDLAY, OHIO, ASSIGNOR OF ONE-HALF TO THE
SALEM WIRE NAIL COMPANY, OF SAME PLACE.

MACHINE FOR FORMING DIE-BARBS.

SPECIFICATION forming part of Letters Patent No. 617,622, dated January 10, 1899.

Application filed March 31, 1898. Serial No. 675,906. (No model.)

To all whom it may concern:

Be it known that I, EDMUND WILLIAMS, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented certain new and useful Improvements in Machines for Forming Die-Barbs, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in nail-die-barbing machines.

The objects of my invention are, first, to provide improved mechanism for operating and adjusting the position of the barb-cutting tool, whereby the barbs will be made closer together or farther apart; second, to provide means for gripping the die and holding the same under pressure—such as by steam, water, compressed air, &c.; third, means for preventing the movement of the ram before the machine is ready to be started, and, fourth, mechanism for automatically stopping and starting the machine.

My invention also relates to details of construction hereinafter appearing, and particularly pointed out in the claims.

In the accompanying drawings, on which like reference letters and numerals indicate corresponding parts, Figure 1 is a plan view of my improved die-barbing machine complete. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical sectional view on the line $x x$ of Fig. 2 looking in the direction of the arrows; Fig. 3^a, an enlarged perspective view of a portion of the barbing-tool holder and barbing-tool. Fig. 4 is a detail enlarged view of the pawls for regulating the movement of the rack and showing their manner of engagement with the ratchet-wheel; Fig. 5, a side elevation of the same, and Fig. 6 a detail view of a die after it has been operated upon by the machine.

The letter A represents a suitable base or bed structure in which is mounted a shaft B, carrying a gear-wheel C, secured to said shaft by means of a set-screw D or in any other suitable manner. This gear-wheel C meshes with a rack E, held in position by guide-strips F, secured to the bed by screws G. These guide-strips also act as a track on

which the rack may travel. To the outer end of this rack is secured a rod or extension H. Upon this rod or extension is mounted a collar I, which may be adjusted to vary the outward movement of said rack by coming in contact with a projection J from the bed. This projection may be bolted or in any other manner secured to the bed, as shown in Fig. 1. A portion of the outer end of the rod H, which projects beyond the frame J, is screw-threaded to receive a nut K. Between this nut K and the frame J is interposed a spring L, preferably formed of arms $a b$, with an interposed block c at their lower end. These arms are preferably formed of wood; but it will be understood that I do not limit myself to any particular kind of spring. This spring is for normally holding the collar I against the frame J before the machine has been operated by mechanism presently to be described and to return the rack to such normal position when the rack-operating mechanism is released. The tension of the spring L may also be regulated by adjusting the nut K on the extension H. The upper side of the rack E is cut out, as shown at M in dotted lines in Fig. 2, to form an incline upon which the barbing-tool holder N rides, as will hereinafter appear.

Referring now to the operating mechanism for operating the rack, it will be seen that the shaft B is extended to one side of the machine. On this extension is mounted a bifurcated lever O and a ratchet-wheel P fitting within the bifurcated lever. A number of pawls Q are pivoted on a through-bolt R, extending through the arms of the lever. In practice they are so arranged that but one pawl comes in contact with any single tooth of the ratchet-wheel P at one time, as clearly shown in Fig. 4. This arrangement is for the purpose of permitting the ratchet-wheel to be rotated different distances at a time, whereby the rack may also be moved longitudinally different distances for the purpose of permitting the barbing-tool holder N, with its barbing-tool, to be lowered on the incline M more or less, as desired. Thus it will be seen that I have provided for making the barbs closer together or farther apart, as may be desired.

In order to cause the pawls to operate the

ratchet-wheel P, I provide means for reciprocating the bifurcated lever and its pawls, consisting of a pitman S, connected at one end to the lever O by a stud or bolt T and at its other end to a wheel U by means of a bolt V, which may be adjusted up and down in a slot W in said wheel. By adjusting said bolt V to or from the center of said wheel in said slot the pitman is given more or less throw when the wheel U is rotated, and consequently the lever O and its pawls will be given a greater movement, thereby permitting the ratchet-wheel P to be operated more or less. In order to hold the ratchet-wheel P and the rack E to any adjusted position, I provide locking-dogs X, corresponding in number with the pawls above described and for convenience located slightly to the rear of and below said pawls. These dogs are pivotally mounted on a stud or projection *d*, extending from the bed of the machine. In order to release these pawls and dogs simultaneously, as is necessary when setting the machine, I provide a lever *e*, also pivoted on the stud *d*. To this lever, by means of a pin *f*, which extends across all of the dogs, is connected a link *g*. The other end of this link is connected to one end of a link *h* by means of a pin *i*, which also extends across and is adapted to be brought into contact with all of the pawls Q. The link *h* is also pivoted to the bifurcated lever O. It will thus be seen that when the lever *e* is pulled down the pins *f* and *i* come in contact with the pawls and dogs, respectively, and throw them out of engagement with the ratchet-wheel P. In order to again bring the pawls and dogs into engagement with the ratchet-wheel P, I provide elastic bands *a'* and *b'*, respectively, which engage with pins *c'* and *d'*, projecting from the pawls and dogs, respectively. The elastic bands connecting with the pawls are attached to a stud or projection *e'*, extending from an arm *f'*, carried by the bifurcated lever O, while the elastic bands *b'* are attached to a stud *g'*, secured to the bed of the machine. When the dogs and pawls are out of engagement with the ratchet-wheel P, the rack is then free to be slid to its normal position by means of the spring L. This operation raises the barbing-tool holder N, with its barbing-tool, to the position desired for cutting the first barb in the die and which position may be determined by the position of the collar I on the rod or extension H.

I will now describe my barbing-tool holder. This consists of a bifurcated standard *j*, adapted to project through a boss *k*, cast or otherwise secured to the machine-bed. As before mentioned, the lower end of this bifurcated standard rests on the incline M and is adapted to move up and down on said incline. In this bifurcated standard is pivotally mounted the holder proper, *l*. This holder carries the barbing-tool in its upper end, as shown at *m*, which is adapted to receive blows from a ram *n*, presently to be described. The die to be operated upon by the

tool *m*, as shown at *o* in dotted lines in Fig. 3, is gripped by a grip or gripping-jaw *p*. This grip has a stem or projection *q*, which engages with a piston *r*, mounted in a cylinder *s*, secured to the bed of the machine by bolts *t*. This cylinder has ports *u* and *v* opening into the interior of the same and which are adapted to conduct the power medium to either side of the piston, as desired. A valve-chamber *w* communicates with said cylinder through said ports. Within this valve-chamber are two longitudinally-slidable valves 1 and 2, formed integral with the pipe *x*. The valve 1 has a hole or opening 3, which may communicate with the port *u*. This hole or opening leads to the interior of said valve and communicates with said pipe *x*. Thus when the hole or opening 3 is brought opposite the port *u* by operating the lever *y*, pivoted on the fulcrum *z*, projecting from the cylinder through the connecting-rod 4, screwed into the end of the valve 1 and pivoted at its other end to said lever, the pressure fluid may pass through the port *u*, the hole or opening 3, and the passage 5, the latter communicating directly with the exhaust-passage 6. When the valve 1 is in this position, the pressure medium may pass into the valve-chamber around the pipe *x*, and through the port *v*, which will cause the piston *r* to move to its outer limit, and the grip *p* will thus grip the die and hold it securely against the shoulder 7 in the bed. When the reverse movement of the grip is desired, the lever *y* is thrown in the opposite direction and the port *v* is brought into communication with the exhaust 6. At such time the port *u* will be uncovered by the valve 1 and the pressure fluid will have free access to the cylinder through the port *u*, thus causing the latter to be forced to its "in" position, which action will release the die.

In order to provide additional means to prevent the die from being forced back when great pressure is brought to bear on it, I provide a longitudinally-movable block 8, which fits in a groove 9 in the bed. This block is held to any adjusted position by a hand-screw 10, which extends through a head-plate 11 and bears against said block. This head-plate is secured to the bed by means of screws 12 or in any other suitable manner.

I will now refer to the mechanism for operating the ram, as also the slotted wheel U. Suitable standards 13 and cross connections 14 form a frame structure in which is mounted in bearings 15 a driving-shaft 16, on one end of which is rigidly secured the slotted wheel U. This slotted wheel carries a split band 17, securely fastened to said wheel by means of a bolt 18. This band has secured to or formed integral therewith an extension 19, which is adapted to be engaged by a spring-detent 20 to prevent the wheel U from rotating backward when the machine is being set to cut a die or when the pawls and dogs are out of engagement with the ratchet-wheel P,

which it might otherwise do. The position of this extension 19 beneath the spring-detent 20 also serves to indicate the correct position of the machine for starting. A cam 21, mounted on a shaft 16, (shown in full lines in Fig. 1 and in dotted lines in Fig. 2,) is adapted to project within an opening 22 in the ram *n* and throw said ram out of contact with the barbing-tool *m*. When the cam 21 is out of engagement with the ram, the spring 34 will instantly force the ram against the barbing-tool with such pressure that a barb is formed in the die. In order to rotate the shaft 16, I provide a clutch mechanism consisting of a female member 23 and a male member 24. The female member is rigidly secured to said shaft, while the male member is cast or otherwise secured to the pulley-wheel 25 and is adapted to slide longitudinally on said shaft. In order to slide said pulley and male member into engagement with said female member, I provide a spring 26, which abuts against the driving-gear 27 and also against the slidable male member. In order to stop the operation of the machine at the proper time, I provide a cam-operated lever 28, which is horizontally pivoted to some portion of the machine structure, as shown at 29. A stud or projection 30, carried by said lever, engages with the male member of said clutch and is adapted to move said male member out of engagement with said female member when the lever is operated. In order to operate this lever, I provide a cam 31, which is carried by a sleeve 32, projecting from or secured to the driven gear 33. This cam comes in contact with the lever 28 at just the proper time to stop the movement of the ram when the barbs in the die are completed. In practice it will be seen that the ram is so mounted that it inclines toward the die slightly; but it is obvious that it might move in one plane.

Referring again to the spring-detent 20, it will be understood that its upper surface is beveled to permit the extension 19 to throw the detent back and permit the extension to pass, but that it is straight along its under side to hold said extension from turning in the opposite direction.

In Fig. 3^a I have shown the upper portion of my tool-holder N with the die-barbing tool M mounted therein. This die-barbing tool may have its cutting-point 35 formed of straight edges, such as illustrated, or it may have its cutting-point formed in any other suitable manner, whereby the die-barbs 36 in the die-plate 37 may be formed as illustrated in Fig. 6 or in any other suitable manner. It will be observed that the die-plate 37 has two barbing-dies formed therein. In order to form these two barbing-dies in this die-plate, it is necessary to shift the barbing-tool holder proper, *l*, on the bolt *l'*, carried by the bifurcated standard *j*. When this barbing-tool holder proper, *l*, is shifted to the proper position, the ram *n* is operated to come in contact with the head 38 of the barbing-tool, which

action causes the tool to be forced into the die-plate, thereby forming one of the die-barbs. The tool-holder M is thus lowered automatically sufficiently to permit the barbing-tool to form a second die-barb in the plate, and so on until each of the die-barbs have been formed.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a die-barbing machine, the combination with a bed, a die-seat in said bed, a grip and pressure mechanism to cause it to bind a die-block against said seat, a tool-holder consisting of a vibrating and a reciprocating part, the vibrating part carrying a tool proper opposite the die-block, a ram for successively acting upon said tool to drive it against the die-block, adjusting means mounted in the bed and working against the reciprocating part of the tool-holder to successively adjust the tool opposite to different places on the die-block, operating means for intermittently actuating such adjusting mechanism in one direction, and hand means for quickly returning such adjusting means to the normal position.

2. In a die-barbing machine, the combination with a bed, a seat therein for a die-block, a grip having a stem with a piston, a cylinder for said piston and suitable valves and ports for admitting and emitting the pressure fluid into and out of said cylinder, the grip acting laterally with respect to the remainder of the machine; a tool-holder consisting of a vertically-mounted reciprocating part and a vibrating part, the latter carrying a tool proper opposite the die-block, a reciprocating ram for intermittently driving such tool against the die-block, a spring for driving the ram, a cam for returning it and devices for operating the cam; adjusting mechanism for acting on the reciprocating part of the tool-holder to adjust the tool opposite to different places on the die-block, such mechanism consisting of a rack with an inclined surface, operating means for intermittently actuating the rack in one direction, such means being itself operated by the same means that drives said cam, so that the ram and the adjusting mechanism will be actuated at the proper relative times, and a hand device for quickly returning the rack to its normal position.

3. In a die-barbing machine, the combination with a bed, a rack mounted therein, a shaft also mounted in said bed and carrying a gear and a ratchet-wheel, said gear adapted to mesh with said rack, one or more pawls engaging with said ratchet-wheel, and means for operating said pawls to rotate said ratchet-wheel, an incline carried by said rack and a die-barbing-tool holder carrying a barbing-tool and mounted in said bed and adapted to be supported by said incline and be adjusted in accordance with the movement of said rack.

4. In a die-barbing machine, the combina-

with a bed a shaft mounted therein having a gear-wheel and a ratchet-wheel rigidly mounted thereon, a rack also carried by said bed and meshing with said gear-wheel, a lever
 5 pivoted on said shaft and carrying one or more pawls successively engaging with said ratchet-wheel, means for reciprocating said lever to cause said pawl or pawls to rotate said ratchet-wheel when reciprocated in one
 10 direction, and one or more dogs adapted to engage with said ratchet-wheel to hold the same when said lever is reciprocated in the opposite direction, a barbing-tool holder carrying a barbing-tool supported on an incline
 15 carried by said rack and adapted to permit the barbing-tool holder, with its barbing-tool, to be adjusted when said rack is adjusted.

5. In a die-barbing machine, the combination with a bed, of a shaft carried thereby
 20 and having a gear-wheel and a ratchet-wheel keyed or otherwise secured thereto, a lever pivoted on said shaft, a plurality of pawls carried by said lever, no two of which pawls are of the same length; means for pressing
 25 said pawls successively in contact with said ratchet-wheel, mechanism for reciprocating said lever more or less as desired, a plurality of pivoted locking-dogs also adapted to engage with said ratchet-wheel and to prevent
 30 said ratchet-wheel from rotating in one direction when one or more of said pawls are taking a new hold of said ratchet-wheel, and a die-barbing-tool holder carrying a barbing-tool supported by an incline on said rack and
 35 adapted to adjust itself on said incline when the rack is adjusted.

6. In a die-barbing machine, the combination with a bed adapted to carry a die, a rack supported on said bed, a spring device for
 40 holding said rack in normal position, an adjustable collar for regulating the movement of said rack by said spring device, a shaft also carried by said bed having a gear-wheel and a ratchet-wheel mounted thereon, said gear-wheel being in mesh with said rack, pawls for
 45 operating said ratchet-wheel in one direction, and dogs for holding said ratchet-wheel from rotating in the opposite direction, hand mechanism for disengaging said pawls and dogs from said ratchet-wheel whereby said rack
 50 may be set to normal position, adjustable means for reciprocating said lever, whereby said rack is operated more or less according to the adjustment of said mechanism, an incline on said rack, and a barbing-tool holder carrying a barbing-tool, supported on said incline and adapted to be adjusted when said rack is operated, whereby a number of barbs are formed on said die.

60 7. In a die-barbing machine, the combination with a bed adapted to support a die, a barbing-tool holder carrying a barbing-tool mounted in said bed and supported upon an incline carried by a movable rack, and a ram
 65 adapted to engage with said barbing-tool to cause it to barb said die, and operating mechanism for operating said ram.

8. In a die-barbing machine, the combination with a bed carrying a die, fixedly mounted thereon, of a die-barbing tool adapted to
 70 barb said die with a succession of barbs, a ram for operating said barbing-tool a spring engaging with said ram to cause the ram to contact with said die-barbing tool, and a cam mounted on a shaft and adapted to engage
 75 with said ram to operate the same away from said barbing-tool, and clutch mechanism for automatically starting and stopping said shaft whereby the movement of the ram is controlled.

9. In a die-barbing machine, the combination with a bed, a gripping device for fixedly holding a die-block, an adjustable barbing-tool holder carrying a barbing-tool and mounted
 80 in said bed, adjusting means for periodically adjusting said holder, a frame structure carried by said bed a shaft mounted in said frame structure and a ram slidably mounted in said frame structure, said ram having a slot therein, a cam adapted to extend within
 85 said slot and rigidly mounted on said shaft whereby when said cam is operated said ram will be thrown out of contact with said barbing-tool and means to cause said ram to come in contact with said barbing-tool to cause the
 90 latter to barb said die, a female clutch secured to said shaft, a male clutch slidably mounted on said shaft and having a driving-pulley connected therewith to rotate said clutch, and means for automatically engaging
 95 and disengaging said male clutch with said female clutch, substantially as shown and described.

10. In a die-barbing machine, the combination with a bed adapted to support a die, a
 105 barbing-tool holder carrying a barbing-tool, mounted therein, a frame structure mounted thereon, a shaft mounted in said frame structure, a slotted wheel carried by said shaft, a pitman adjustable in said slot, a lever operated by said pitman, said lever carrying pawls adapted to operate a rack through intermediate mechanism, said rack having an incline supporting said barbing-tool holder, whereby
 110 when the rack is operated the barbing-tool will be adjusted, mechanism adapted to operate said ram to cause it to engage with said barbing-tool whereby said barbing-tool is brought into engagement with said die to form barb-dies therein, a cam carried by said shaft and adapted to throw said ram out of engagement with said barbing-tool, a female clutch rigidly connected with said shaft, a male clutch secured to a driving-pulley loosely
 115 mounted thereon, a spring for engaging with said male and said female clutches, a pivoted lever engaging with said male clutch and a cam adapted to be brought into contact with said lever to disengage said male clutch from said female clutch at predetermined intervals;
 120 substantially as shown and described.

11. In a die-barbing machine the combination with a frame structure carrying a ram-operating shaft, a slotted wheel rigidly mount-

ed on the end of said shaft, a pitman connected with said wheel and adjustable in said slot and also connecting with an operating mechanism for regulating the adjustment of
5 a die-barbing-tool holder carrying a barbing-tool, a strap about said slotted wheel and adapted to be gripped thereto, said strap having an extension, and a spring-detent for engaging with said extension to prevent said

wheel from rotating in one direction, whereby the initial operating position of the machine is indicated.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUND WILLIAMS.

Witnesses:

W. C. STONE,

WM. THOMAS.