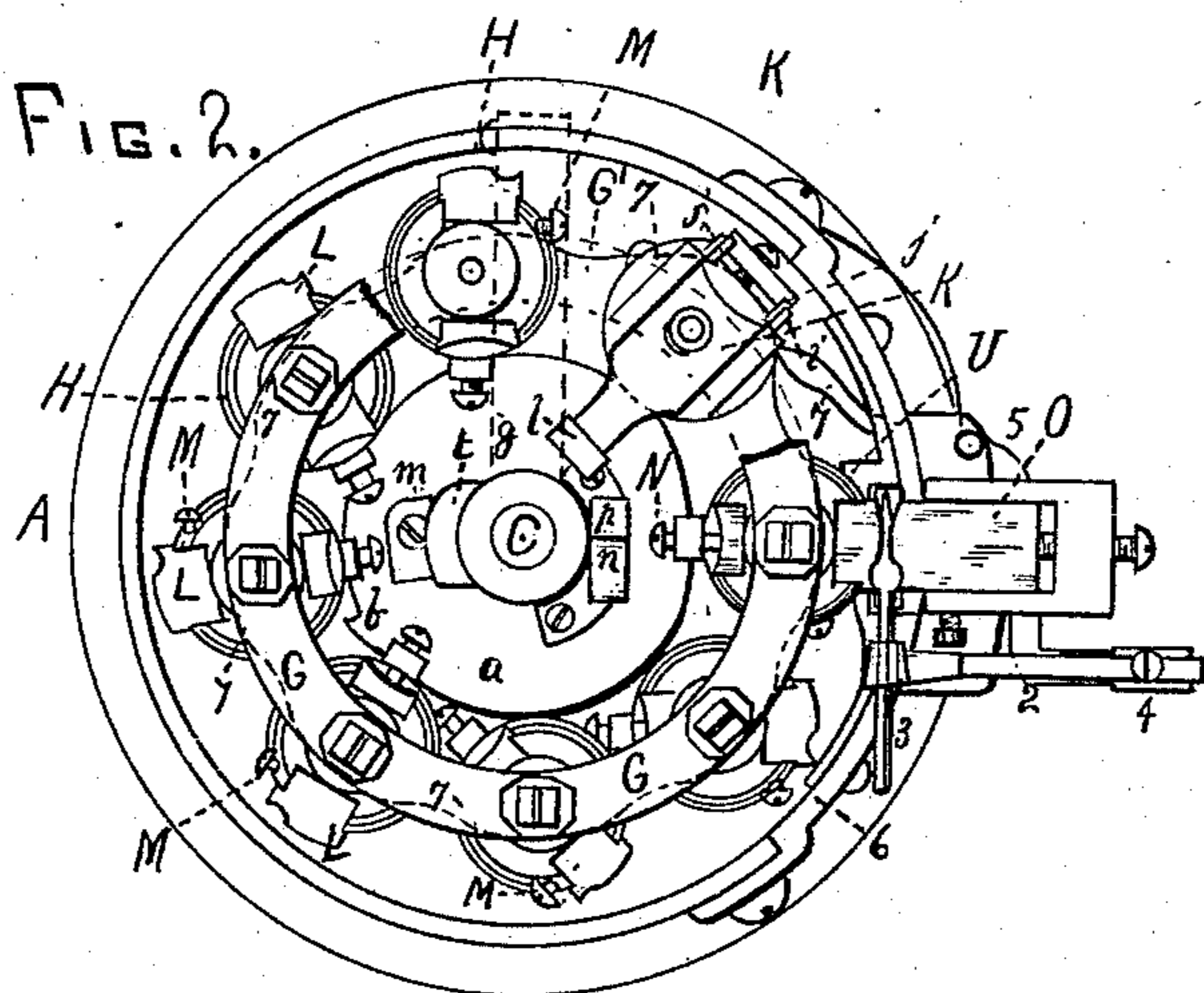
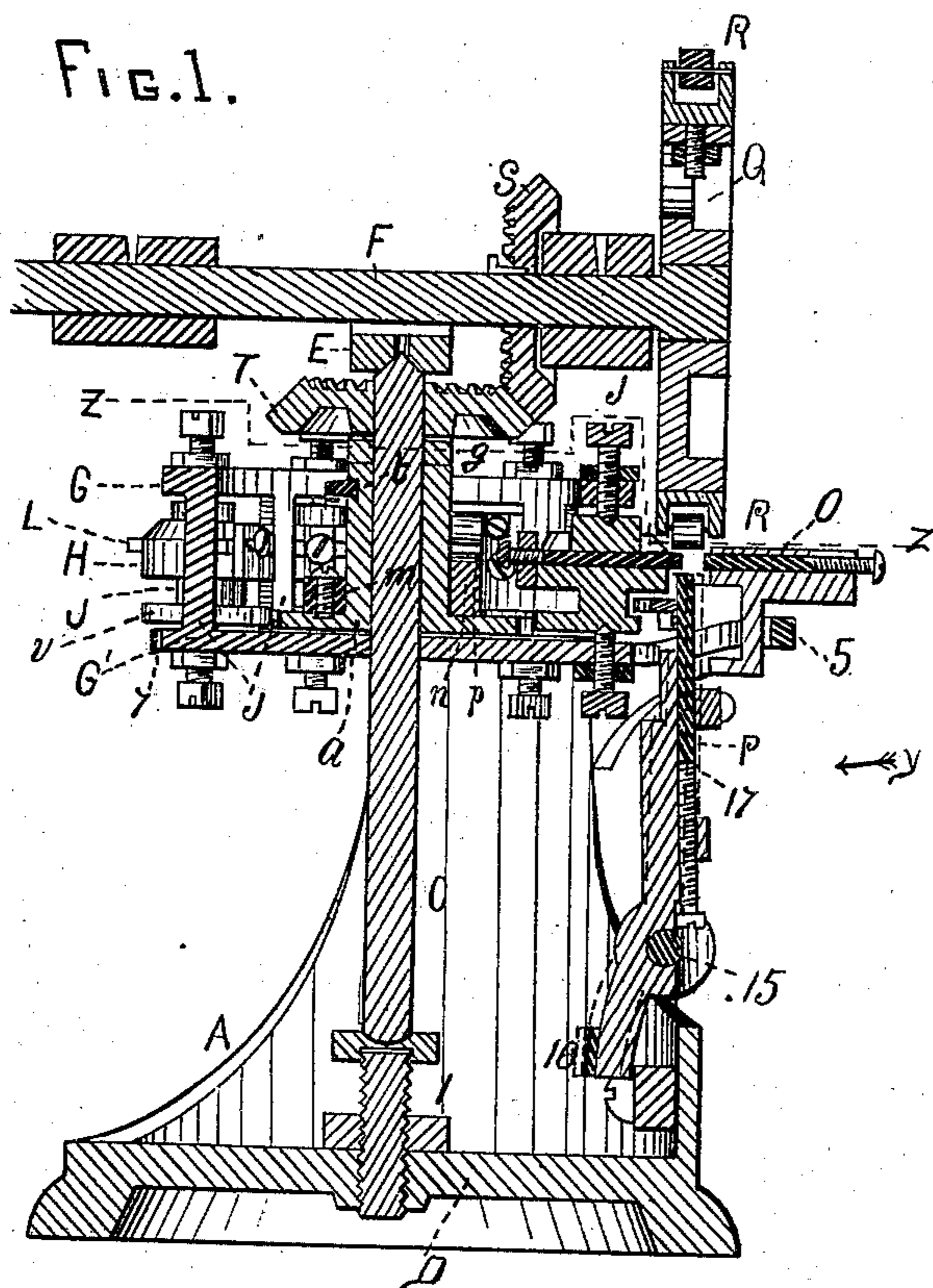


J. A. HUTCHINSON.
Machine for Forging Horseshoe Nails.

3 Sheets--Sheet 1.

No. 232,353.

Patented Sept. 21, 1880.



WITNESSES.

Arthur G. Morey.
William R. Maulon.

INVENTOR.

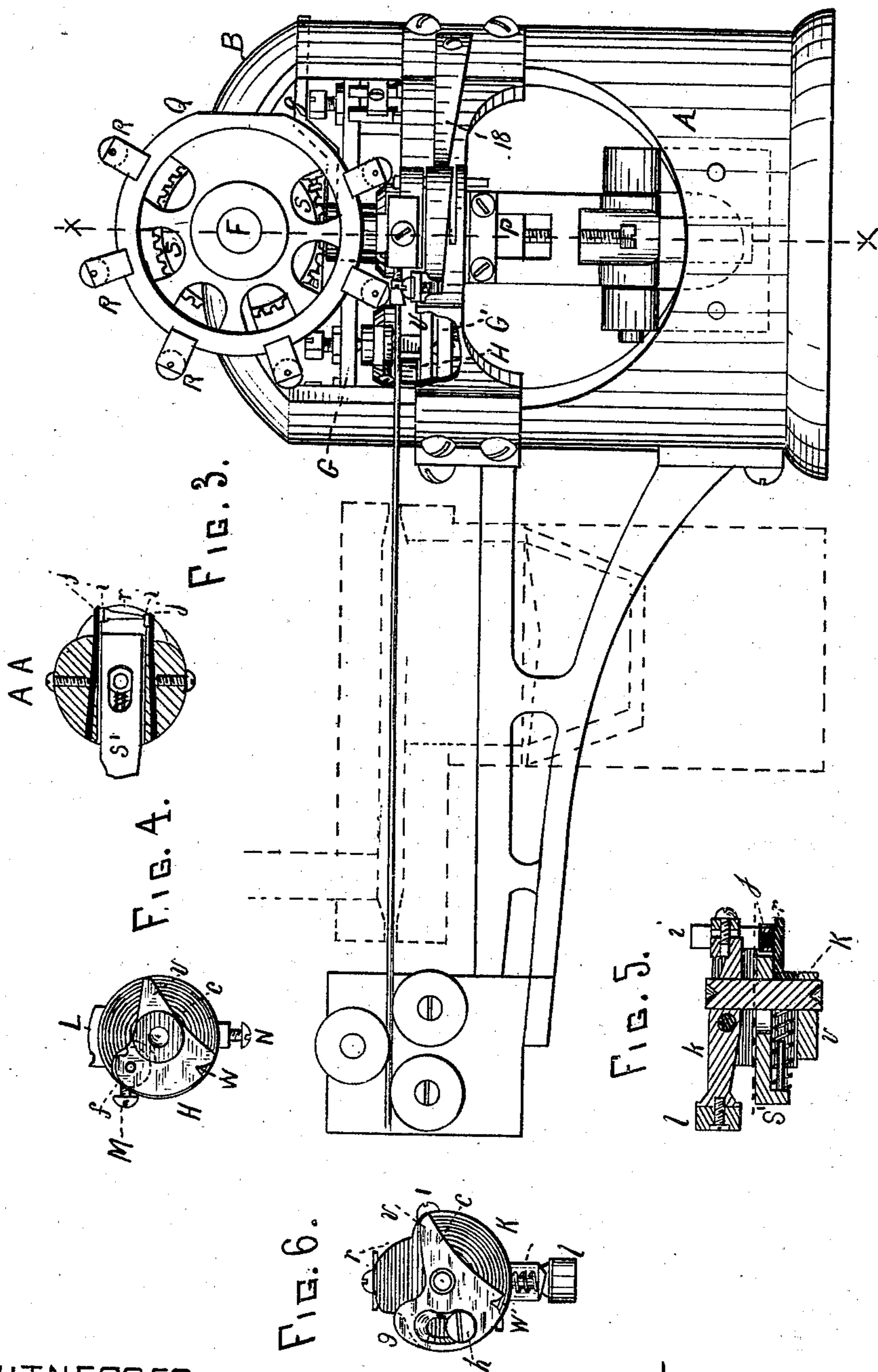
John A. Hutchinson By
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J. A. HUTCHINSON.
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3 Sheets—Sheet 2.

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FIG. 7.

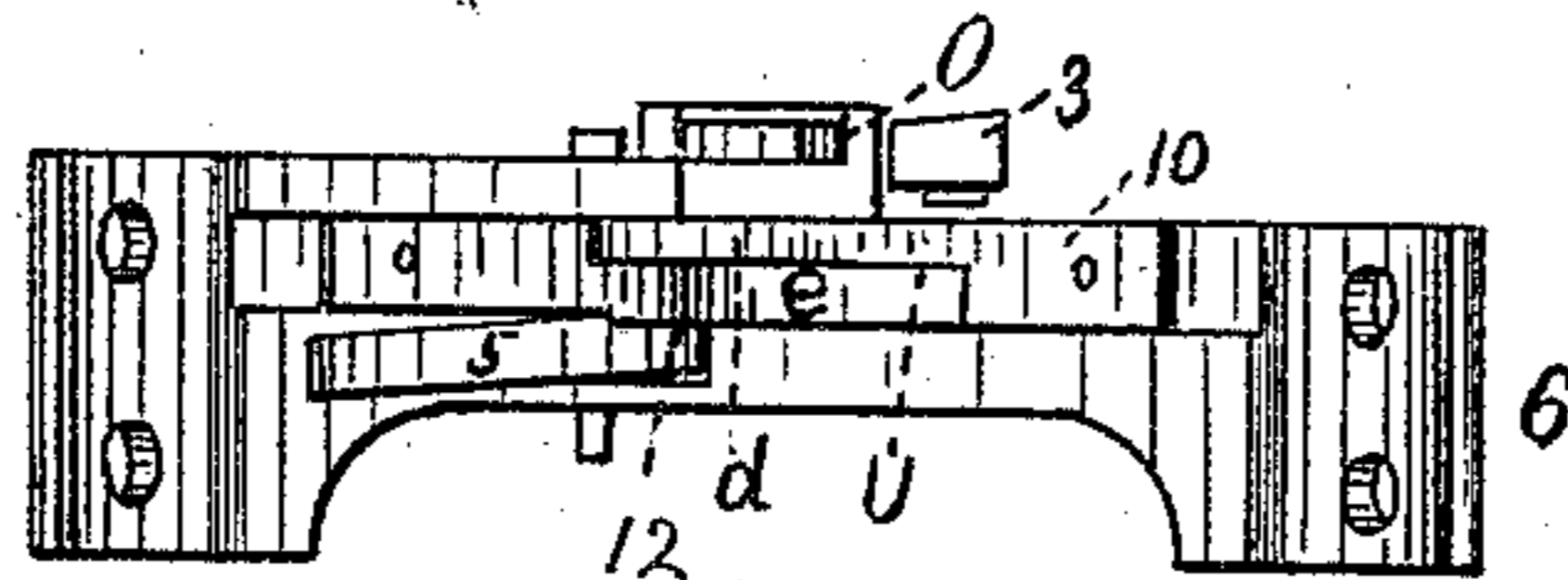


FIG. 8.

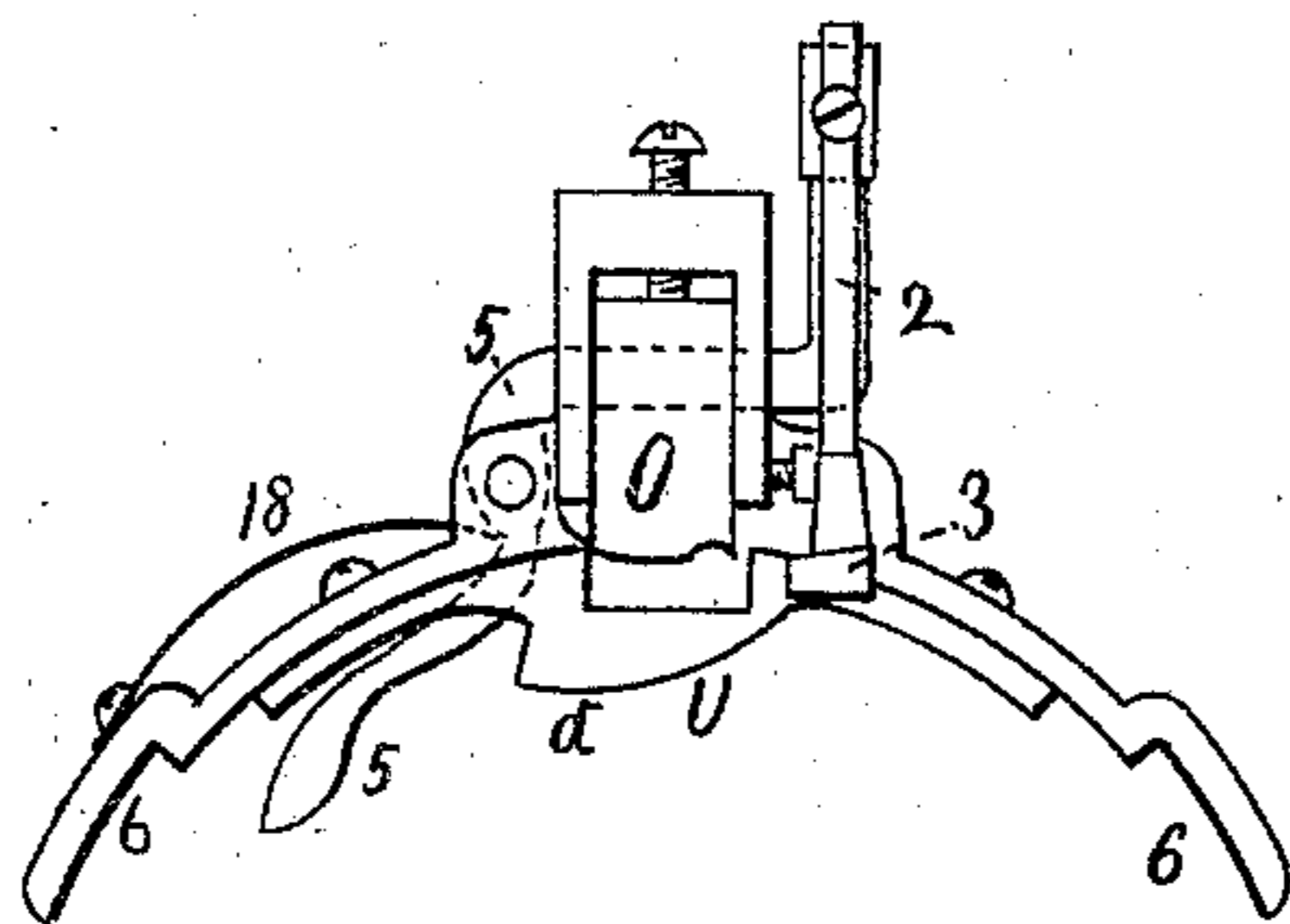
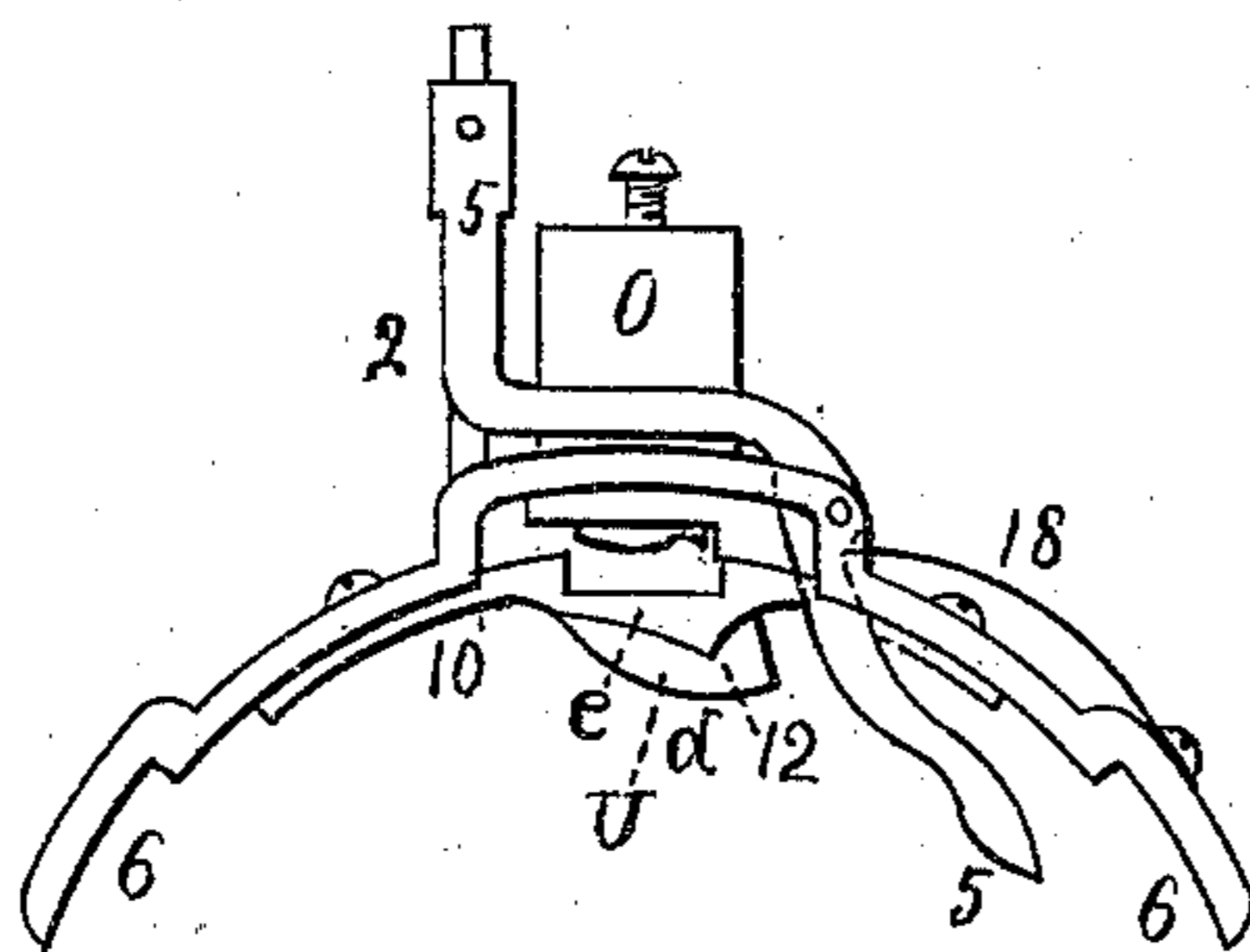


FIG. 9.



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UNITED STATES PATENT OFFICE.

JOHN A. HUTCHINSON, OF CHICAGO, ILLINOIS.

MACHINE FOR FORGING HORSESHOE-NAILS.

SPECIFICATION forming part of Letters Patent No. 232,353, dated September 21, 1880.

Application filed February 16, 1880.

To all whom it may concern:

Be it known that I, JOHN A. HUTCHINSON, of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Nail-Machines, of which the following is a specification, reference being had to the accompanying drawings, illustrating the improvement, in which—

Figure 1 is a vertical sectional elevation of a nail-machine embodying my improvements, taken on line *x*, Fig. 3; Fig. 2, a plan view of the die-wheel and side mechanism. The line of horizontal section above the view is shown at *z*, Fig. 1. Fig. 3 is a side elevation of the machine, looking in the direction of dart *y*, Fig. 1; Fig. 5, a vertical section of the nail-feeder cutter and nail-carrier removed from the other parts and enlarged; Fig. 6, an inverted view of the nail-rod feeding, nail-cutting, and nail-carrying devices; Fig. 7, an inside elevation of the devices for operating the rod-feed, nail cutter and carrier; also the device for operating the four-motion guide; Fig. 8 a plan or top view of Fig. 7; Fig. 9, an inverted view of Fig. 8.

The present invention relates to a machine for forging nails, but more especially horse-shoe-nails; and the nature thereof, in brief, consists in a wheel fixed to a vertical shaft and having journaled thereto, near its periphery, a series of vertical shafts which support rotating die-heads for forming the edges of the nails in conjunction with a stationary die, also support a nail-cutter for severing the nail from the nail-rod and a carrier for delivering the nails—the die-heads are brought into position to bring the dies, cutter, and carrier to their work by cams, and the flat sides of the nails are formed by means of an anvil and roller-dies on a die-wheel rotating in a vertical plane; and in rollers placed outside of the furnace to guide the nail-rod and hold it in position to be fed to the dies by the cutters which sever the nails from the rod; and in a four-motion guide to keep the rod off the die during the forging of the flat sides of the nail by the rollers of a die-wheel and to move the rod laterally under and between the cutters, as the whole is to be hereinafter described and shown.

A substantial frame, A D, of cast-iron, is

made of such form as to support the mechanism hereinafter described, and better to adapt it for that purpose the top part is made in the form of a dome, as shown at B, a portion of the latter and the periphery A being cut away to give space for the working parts, the base D being solid. A frame of this description is not essential to the machine further than that it is found to be compact and as strong and cheap, or cheaper, than other forms for the purpose.

A shaft, C, is placed vertically in the frame A, and has suitable bearings on a step, I, which is fastened to base D, and a bearing at its top end in a bar, E, which is part of the frame, at right angles to the shaft C.

A wheel having an upper ring, G, and a lower disk, G', is keyed to the shaft C, and supported a suitable distance apart by studs (shown at J, Fig. 1, Sheet 1,) cast solid to the rim and disk G G', or otherwise made rigid to them.

Journaled to the parts G G', to rotate in horizontal planes, are seven die-heads, H, and a feed-cutter and carrying-head, K. The die-heads H, respectively, are provided with dies L, which are adjustable longitudinally on the heads by means of set-screws N, and are held in fixed positions by means of set-screws M.

The dies have suitable seats in the die-heads, and the set-screws are tapped into the heads for the purpose stated. This adjustment is necessary in order to forge nails of a required width. The means for adjusting the dies, however, I do not consider new.

The edges of the dies are formed as shown, so that when brought in contact with the nail-rod one edge of a nail will be properly formed, the opposite edge of the nail being formed by a die, O, which has an end face corresponding to the form which the edge of the nail is to have, and which has a suitable seat in a bracket projecting out from the frame A, and may be adjusted to or from the dies L by set-screws similar to screws M N.

The flat sides of the nails are formed by anvil P and the roller-dies R on roller-wheel Q. This wheel Q, with rollers attached, is a well-known device in horse-nail machines, and is therefore not claimed.

The shaft F, supporting the wheel Q, has

bearings in the frame of the machine, and to it the power to drive the mechanism is applied. The means for communicating power to the die-wheel $G\ G'$ consists of bevel-gear S and T attached, respectively, to the shafts F and C .

In contradistinction to the ordinary method of driving the die-heads H by gear, I bring them into position to forge the edges of the nails between the dies L and O by means of cams, and by the same means operate the cutters to feed the nail-rod to the dies. The construction of the cams is, first, a guide-cam, V , Figs. 4, 5, and 6, attached to the under sides of the die-heads, Figs. 4 and 6 being inverted and enlarged views of those shown in Figs. 1, 2, and 3. There is a notch, W , on each cam V , which engages a projection, b , on a disk, a , which disk is stationary, and is provided with a sleeve surrounding the shaft C , between the parts G' of the die-wheel and the bevel-gear T , and the sleeve is supported by an arm, g , attached to the frame A of the machine by bolts; and by so engaging the projection the die-heads are brought partially round and move forward against the edge of the disk till the concave side c of the cam V is operated on by cam d of compound cam U , Figs. 7, 8, and 9, so as to give so much turn to die-heads H as to bring the dies L properly onto the nail-rod and opposite to the die O as to forge the edges of the nail. The heads H then move forward without turning on their axes till the cams V again come in contact with the projections b on disk a .

It is observed that anti-friction rollers (indicated by dotted lines f , Fig. 4) may be pivoted to the cam U to lessen the friction in passing the cam d .

The cam U , Fig. 6, on the cutter and carrying-head, is provided with a curved slot in its larger part, through which a screw, h , is put, that the cam may swing on its pivot and be adjusted to bring the nail-cutters $i\ i$ and $j\ j$ onto the nail-rod at the proper time to sever the nail from the rod and at the same time cut off the point of the nail.

An anvil, P , has its stock pivoted to the frame A at 15, Fig. 1, so as to oscillate in a vertical plane. An ordinary spring, 16, holds it in the position shown, and a cam, 7, for each die projects out from the disk G' to put the anvil in the position shown by dotted lines 17, for the purpose hereinafter set forth.

The lower cutters, $j\ j$, are secured to the head K so as to lie on ledge r , and they are placed just far enough apart to receive the cutters $i\ i$ between them, to operate as shears to sever the nail from the rod and to cut off the point of the nail.

The ledge r lies under the tilt-lever k , and parallel to it, and the cutters $i\ i$ are secured vertically to the outer end of the tilt-lever k . This tilt-lever k is pivoted to the head K , and to its inner end is pivoted an anti-friction roller, l , which is operated on to manipulate the cutters $i\ i$, as follows: The wheel $G\ G'$ be-

ing in the position shown, the lever k past the dies O , and the anvil P in a vertical position, the nail-rod is placed on the anvil P by hand. The machine is then put in motion, and the dies L are brought to their work by the cams $v\ d$, as stated, and strike the nail alternately with the rollers R , and at the same time the guide 3, by means of arm 2, lever 5, spring 18, and cam 7, brings the nail to and from the anvil P till the nail is forged. The cutter and carrier-head K , Fig. 4, in passing round, brings the roller l of tilt-lever k under a cam, t , Figs. 1 and 2, and raises the cutters $i\ i$ to pass over the forged nail, and, passing farther round, the roller moves onto a cam, n , Figs. 1 and 2, and thereby is tilted so that the cutters grasp the nail, and, passing farther round, carries the nail forward, and the rod with it, far enough to form a blank for another nail, and then the roller l moves onto the cam p , and is raised, so that the cutters $i\ i\ j\ j$ cut off the nail, as stated, and leave it on the ledge r .

The means for bringing the cutters properly to face the nail consists of a cam, 10 $e\ d$, Figs. 7, 8, and 9, on which the projection 9, Fig. 6, of cam v operates, the construction being such that the cutters move forward straight while the nail is being drawn forward to form the blank, as stated, for the next nail, and while the nail is being cut off. The nail, after it is severed, is carried on the ledge r till a punch, S' , Fig. 5, and detail $A\ A$, comes in contact with a cam, m , Figs. 1 and 2, and pushes the nail out.

The nail-rod will, after the first nail has been formed, be fed by the cutters $i\ i$ automatically.

It is proper to state that the nail, when the edges are being formed, is held by the spring-arm 2 a little above the anvil, to prevent burrs being formed on it.

The nail-rod is brought laterally to the anvil and dies by means of a sleeve, 3, Figs. 2, 3, 7, and 8, attached to a spring-arm, 2, which is rigidly attached to the outer end of a curved lever, 5. This lever is pivoted to a frame, 6, and projects inside of the frame and is operated on by the cams 7, on the periphery of the disk G' , to carry the nail-rod inward from the stationary die O during the operation of the rollers R , to prevent burrs from being formed on the edges of the nails, as would be the case if the nails were forged on their flat sides when their edges bore against the stationary die.

A spring, 18, Figs. 3, 8, and 9, holds the lever 5 so the nail will bear against the die O , unless the lever is operated on by the cam 7, as stated. The frame 6 also supports the compound cam U , and is bolted to the frame A .

I claim and desire to secure by Letters Patent—

1. The loosely-pivoted die-heads H , carrying the dies L , in combination with the die-wheel $G\ G'$, stationary disk a , inside of the die-

wheel, the cams *v* and the cam *d* of the compound cam *U*, for putting the dies in position to forge the edges of the nails, in conjunction with the stationary die *O*, as specified.

5 2. The feed - cutters and carrying - head *K*, consisting of carrying - head *K*, tilt - lever *k*, carrying cutters *i i*, lower cutters, *j j*, cam *v*, and cams *e* 10, for feeding the nail-rod and cutting the nails from the rod, as and for the purpose specified.

10 3. The combination of the head *K*, tilt-lever *k*, cutters *i i j j*, ledge *r*, spring-punch *S*, and cams *t m*, for cutting and discharging the nail, as specified.

15 4. The loosely-pivoted die-heads *H*, dies *L*,

die-wheel *G G'*, stationary die *O*, anvil *P*, hammer-rollers *R*, and guide *3*, constructed and operating as specified.

5. The combination of the dies *L*, carried by the die-heads in the die-wheel *G G'*, with the stationary die *O*, for swaging the edges of the nails, as specified. 20

6. The cutters *i i j j*, combined in the head *K* and with the ledge *r* and tilt-lever, as specified.

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Witnesses:

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