

No. 886,960.

PATENTED MAY 5, 1908.

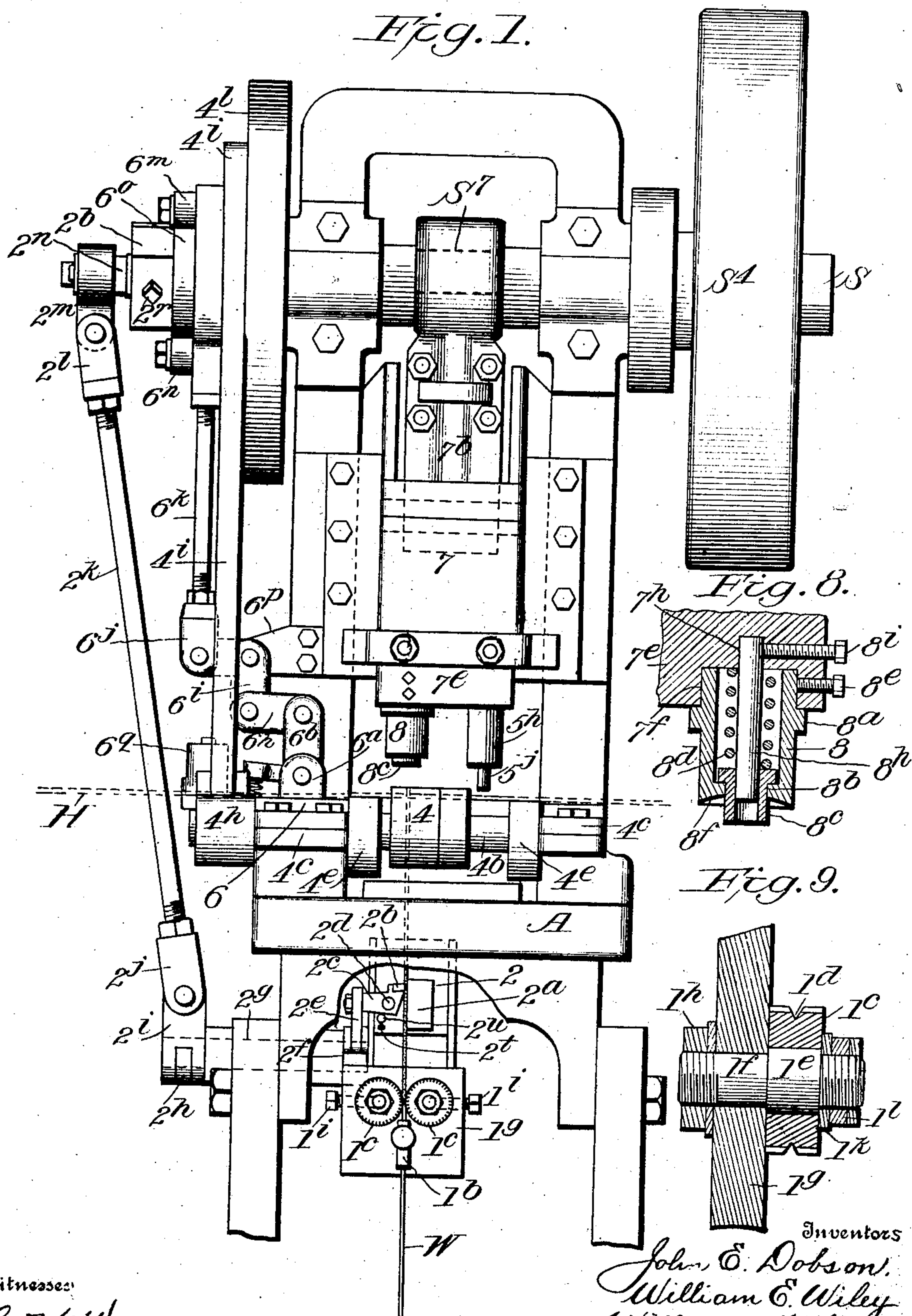
J. E. DOBSON, W. E. WILEY & W. H. HART.

MACHINE FOR MAKING ROOFING NAILS.

APPLICATION FILED FEB. 1, 1906.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

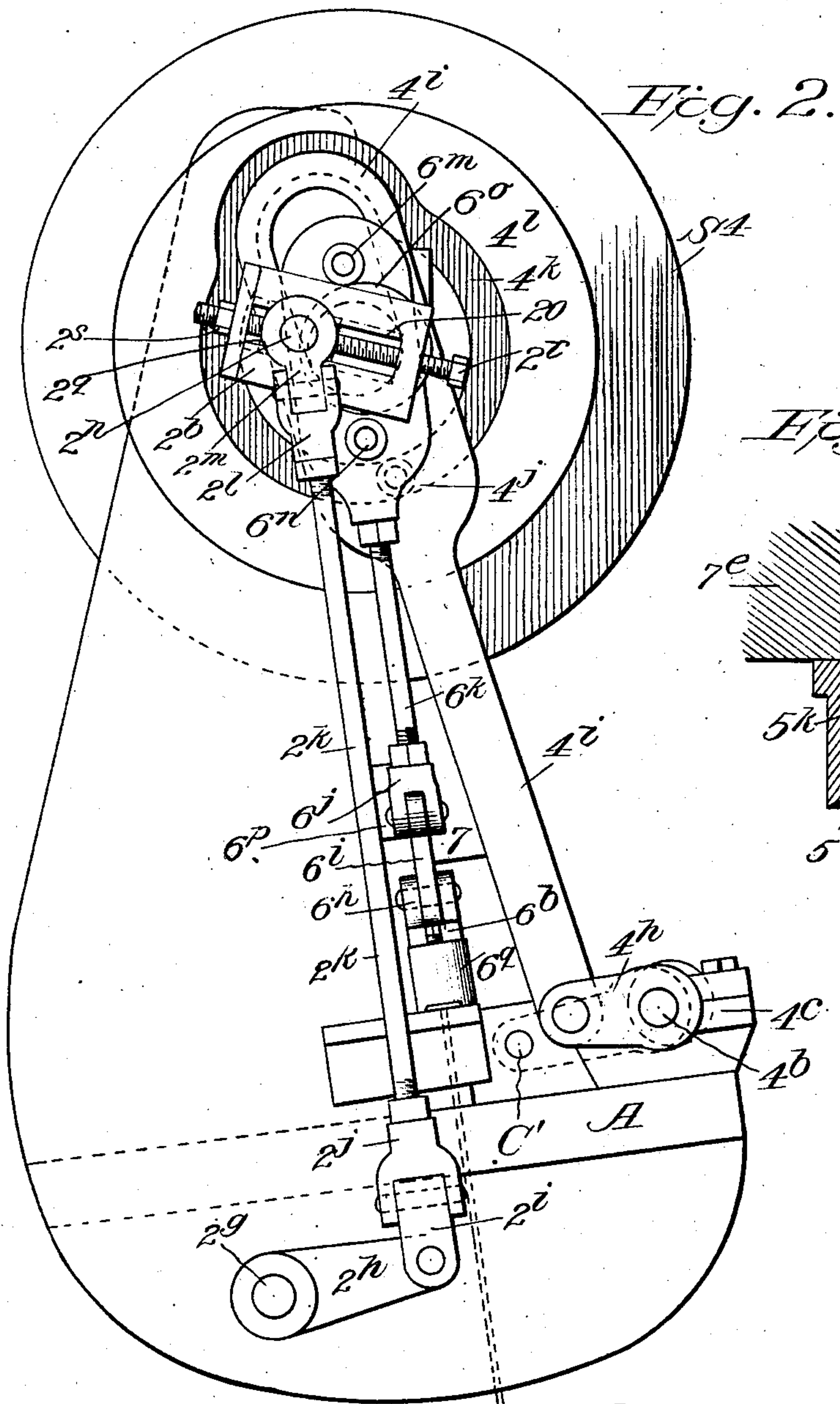


Fig. 10.

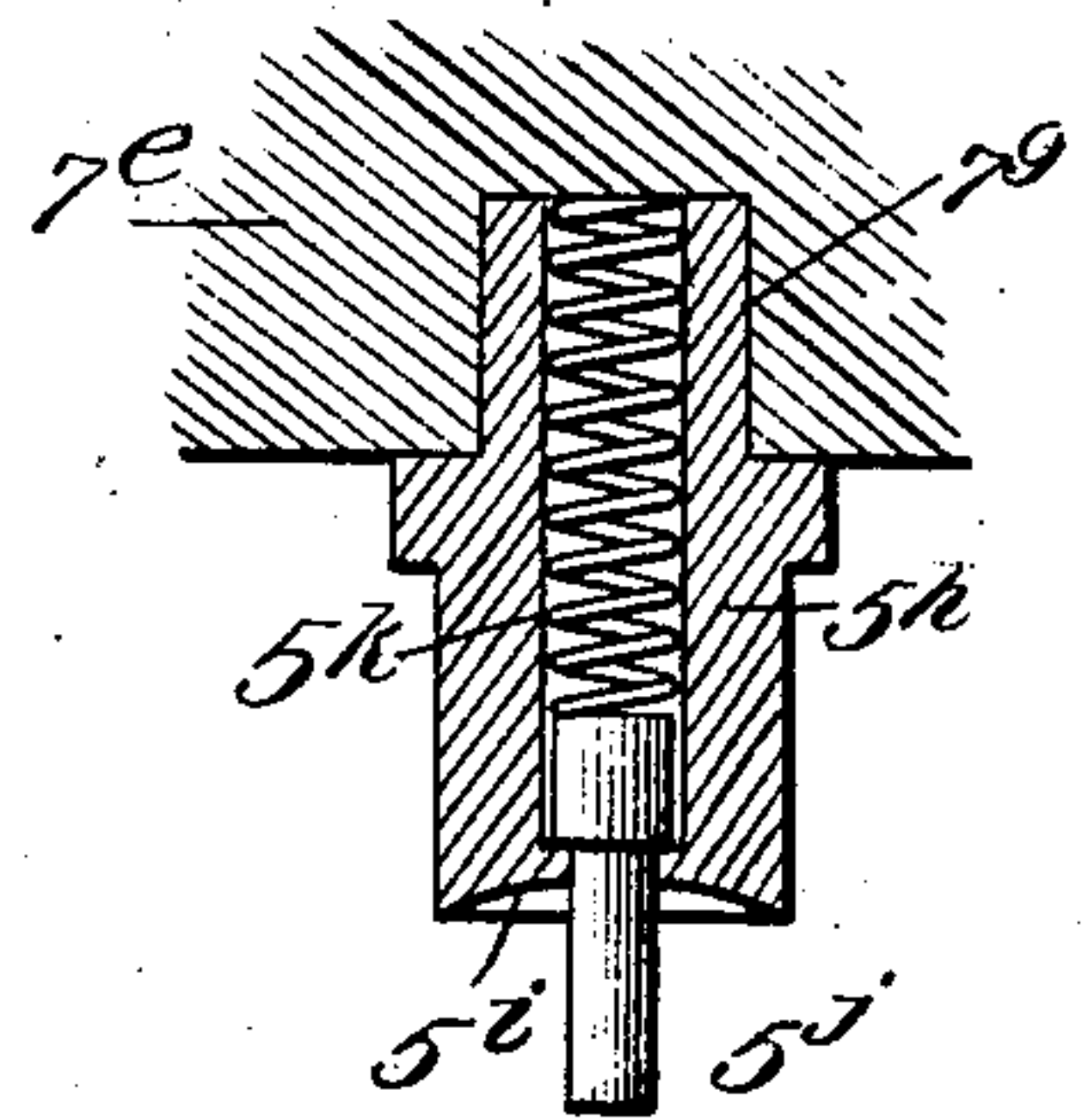
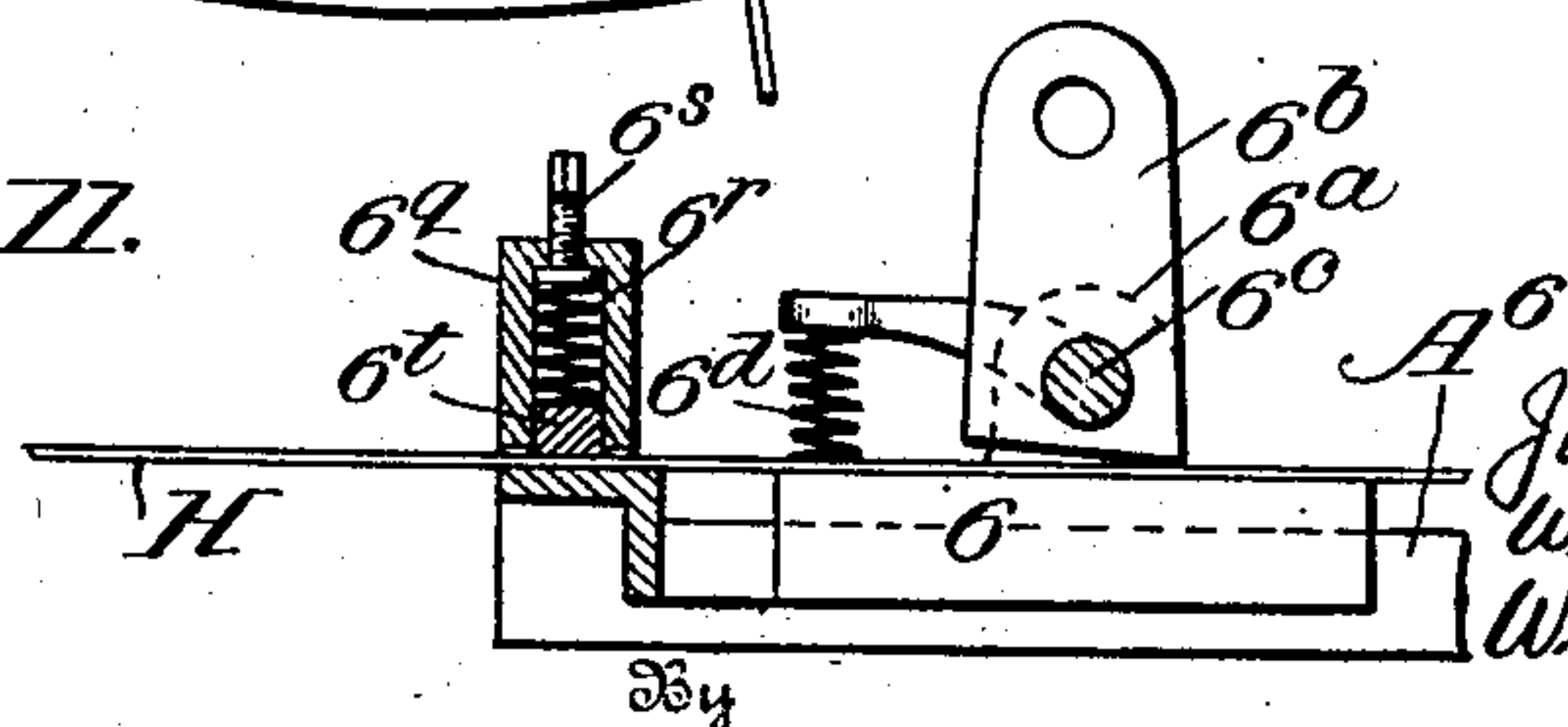


Fig. 11.



Witnesses

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4 SHEETS—SHEET 3.

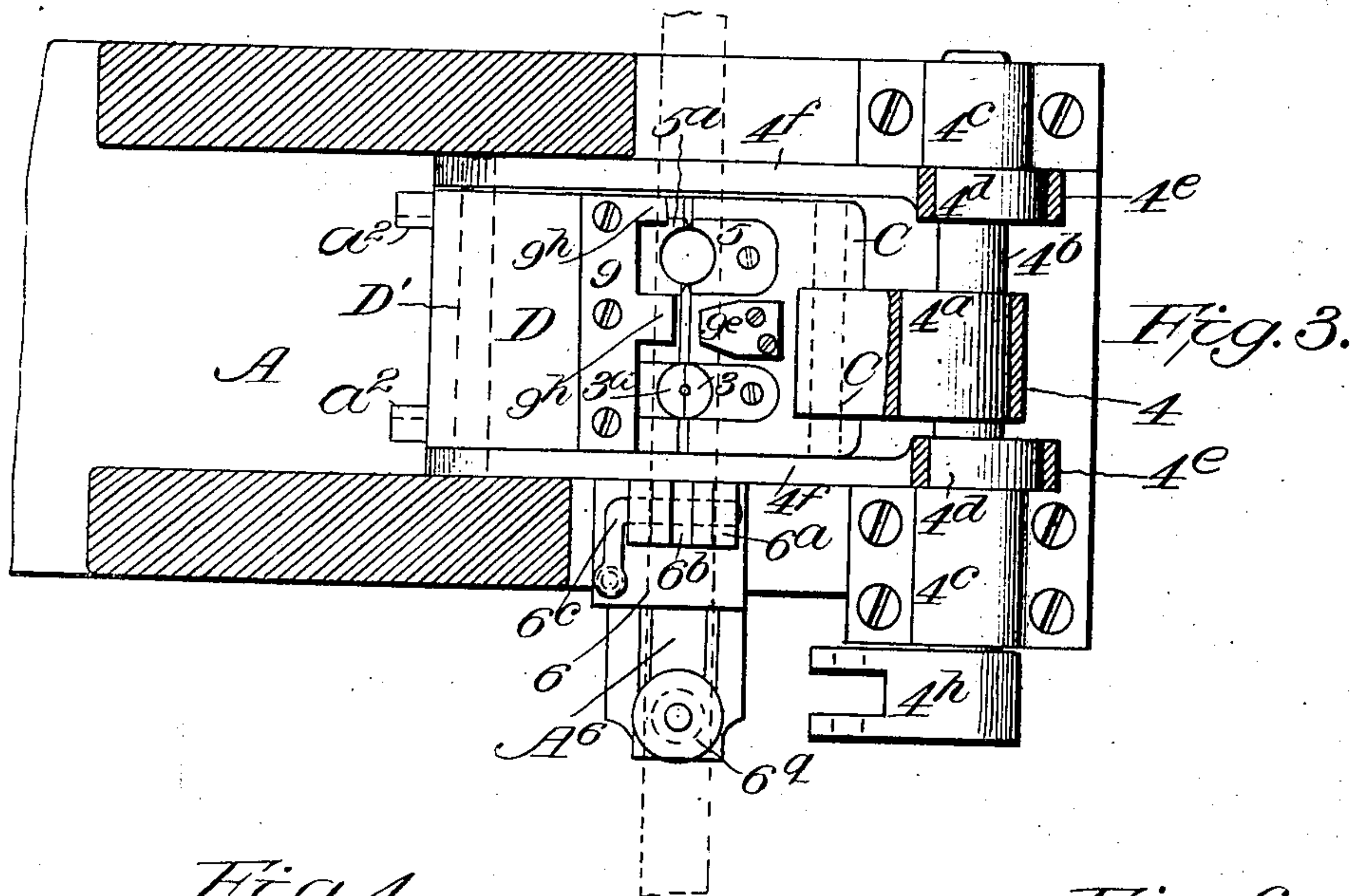


Fig. 4.

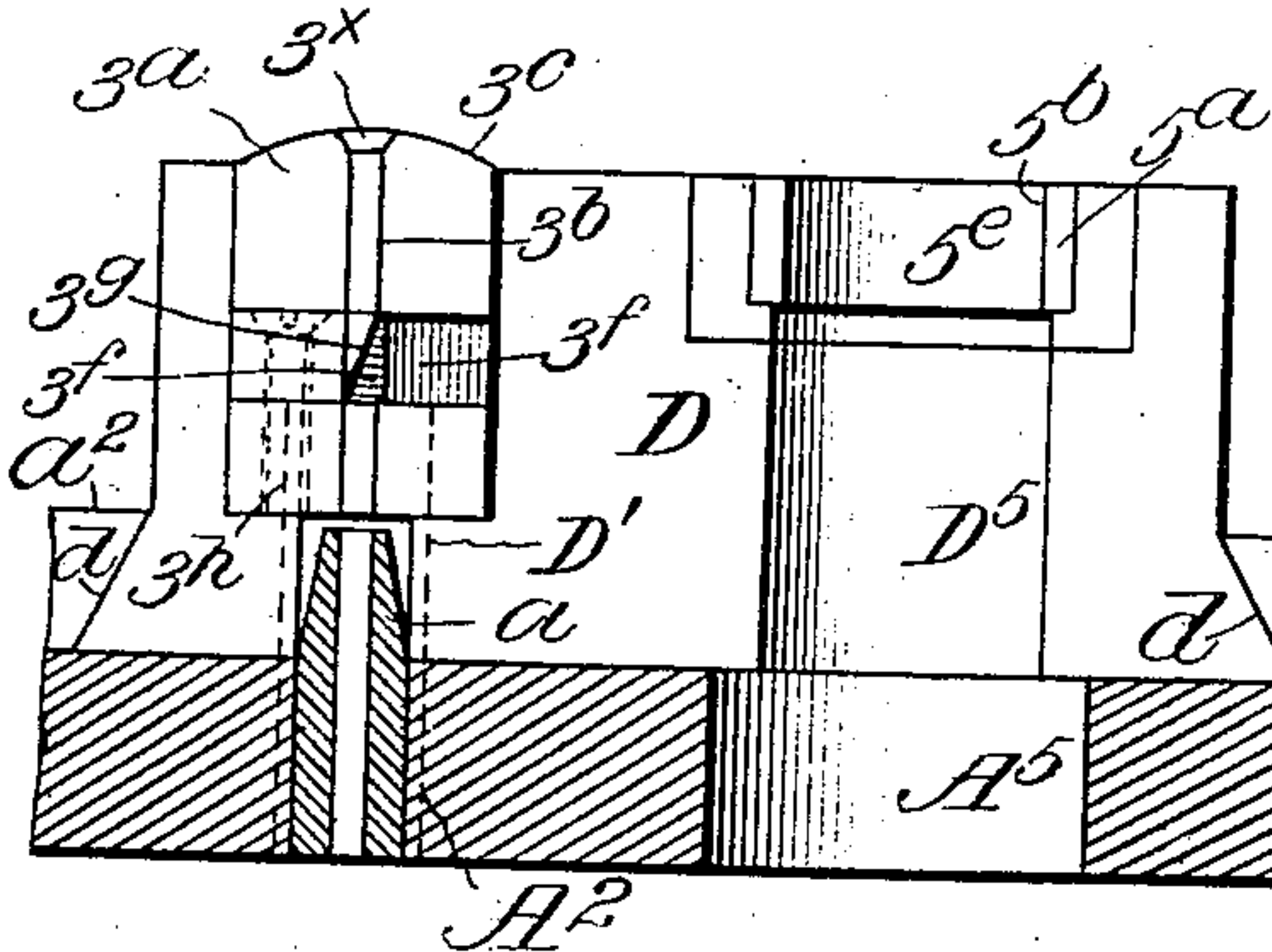


Fig. 6.

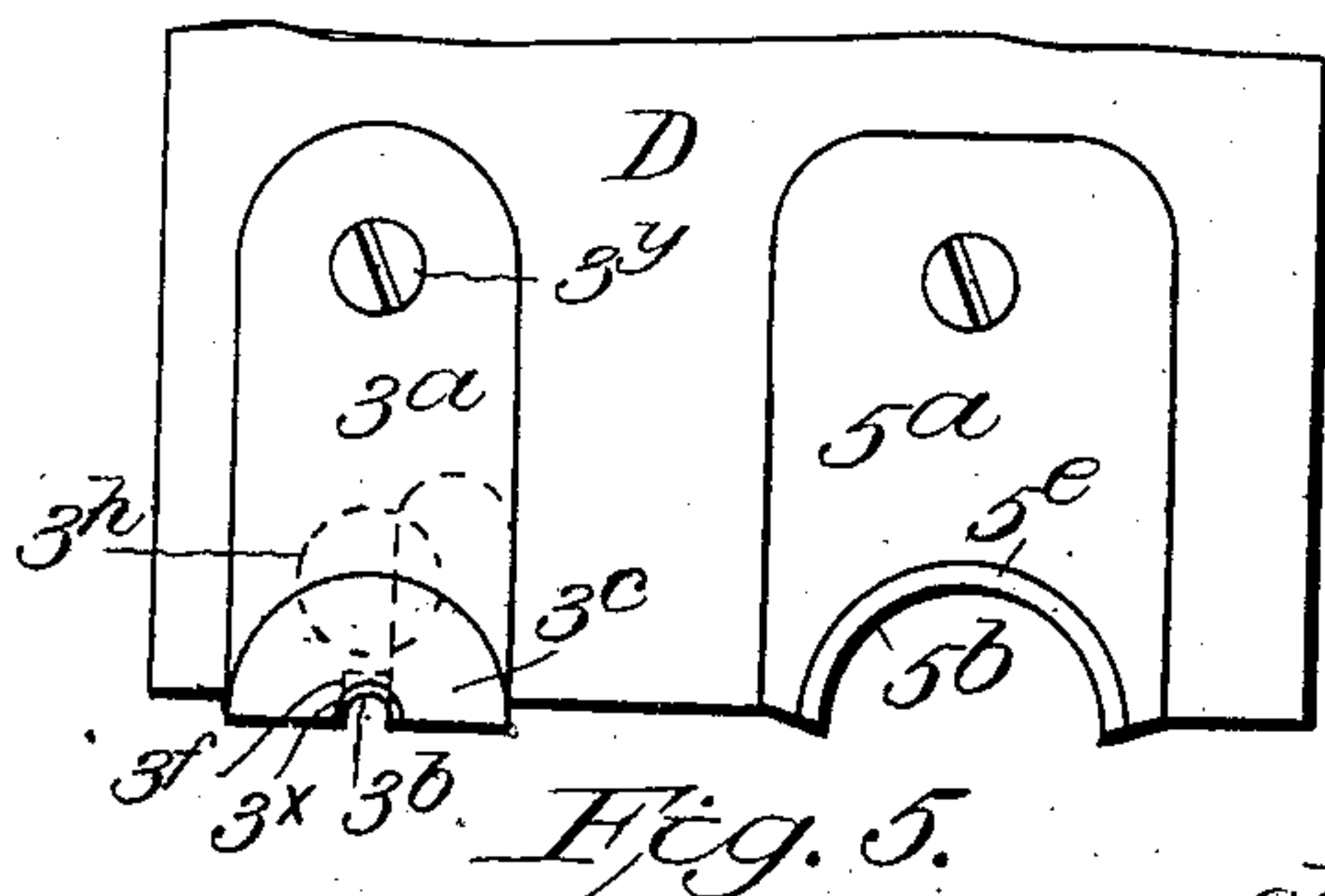
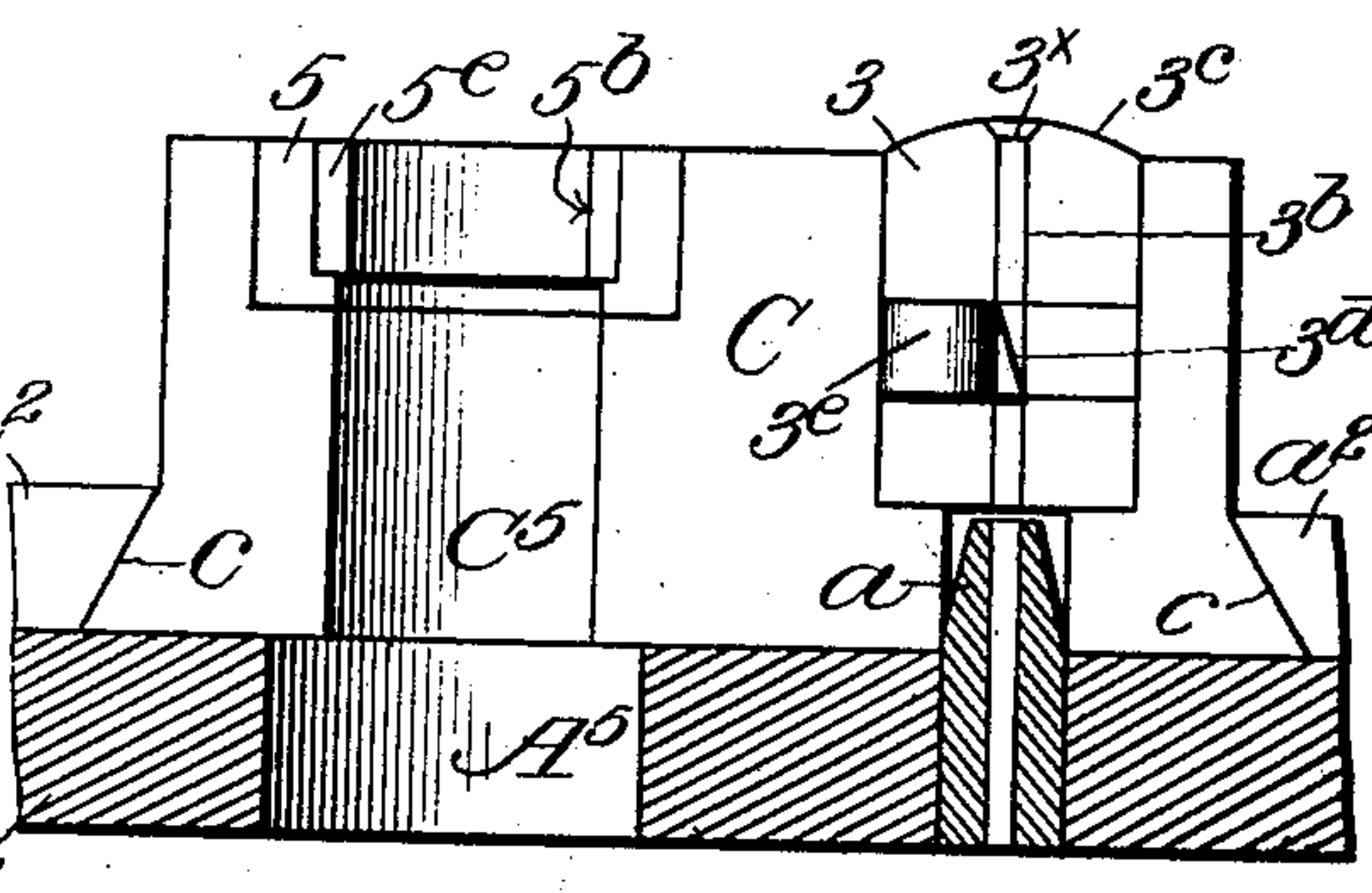


Fig. 5.

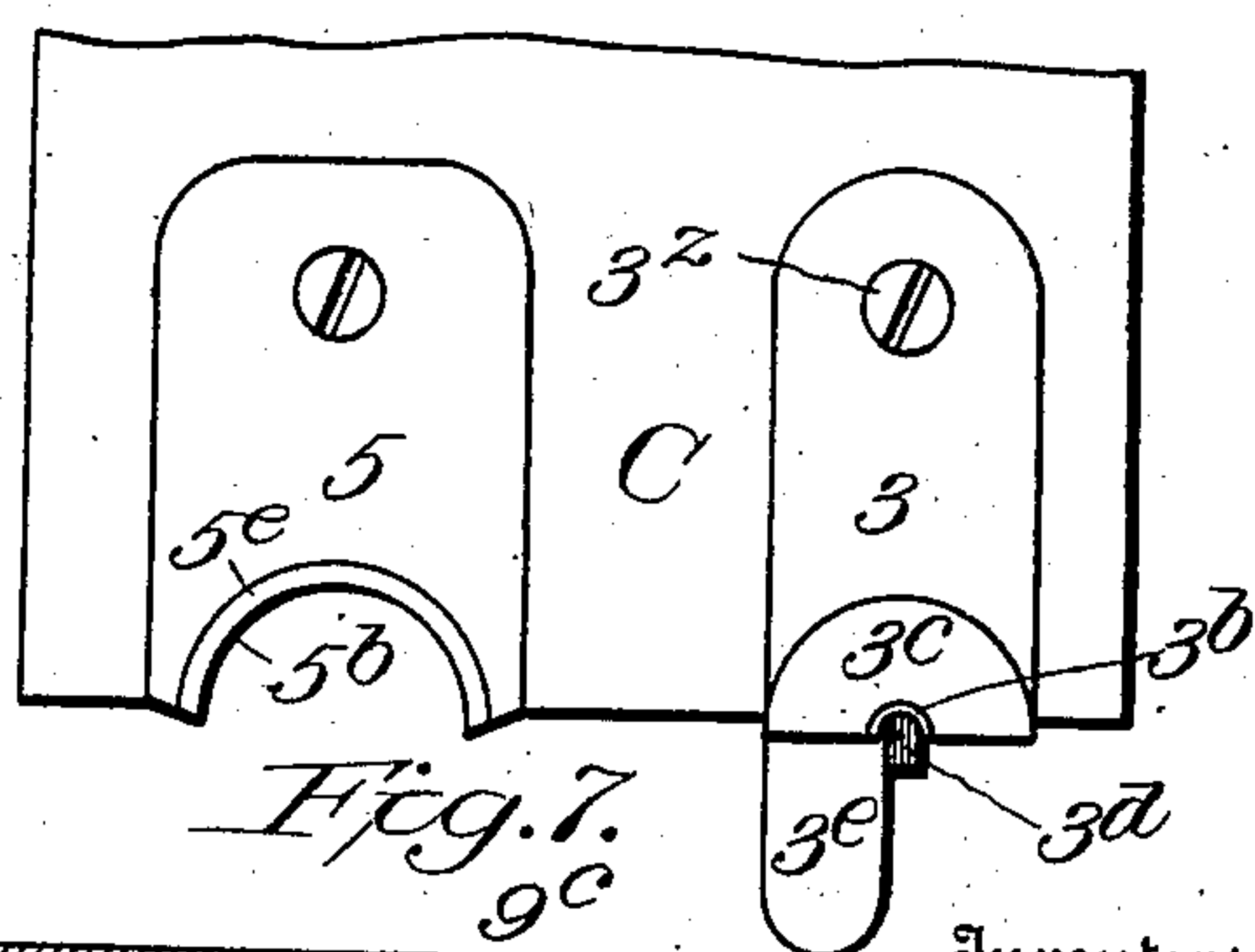
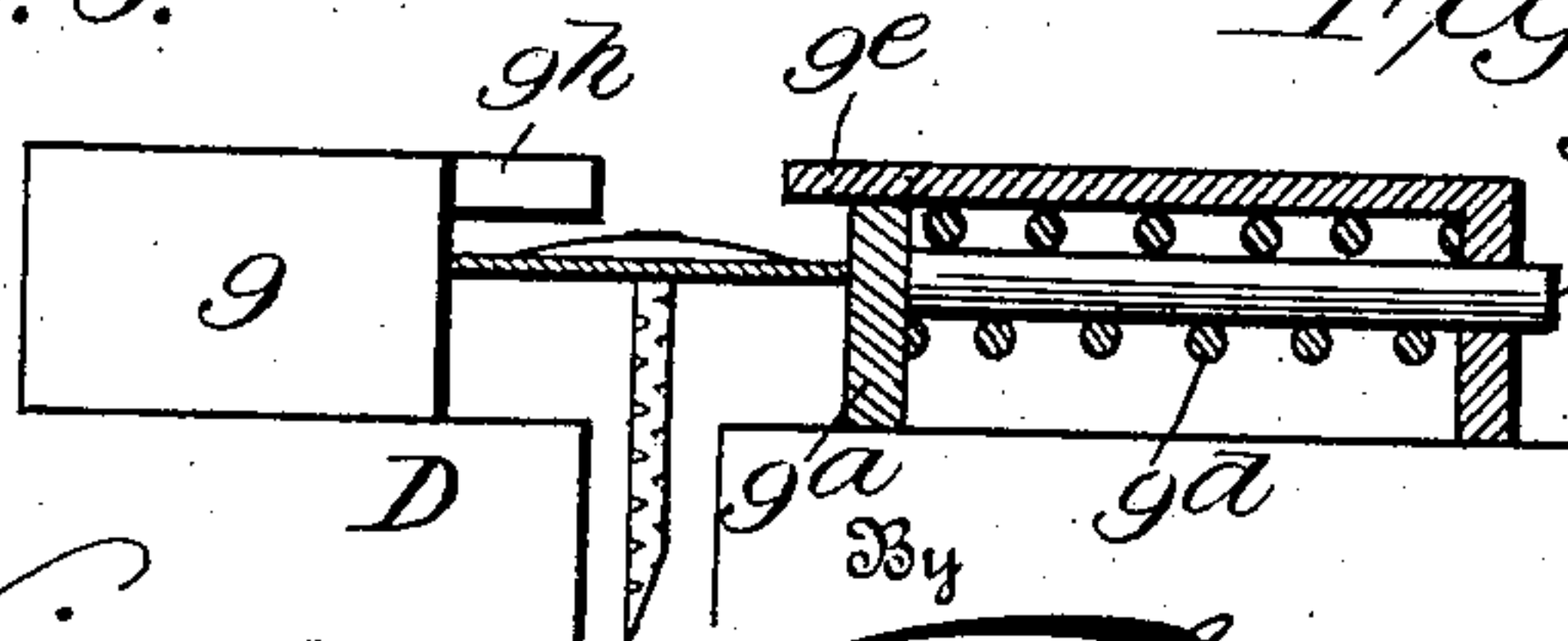


Fig. 7.



Witnesses



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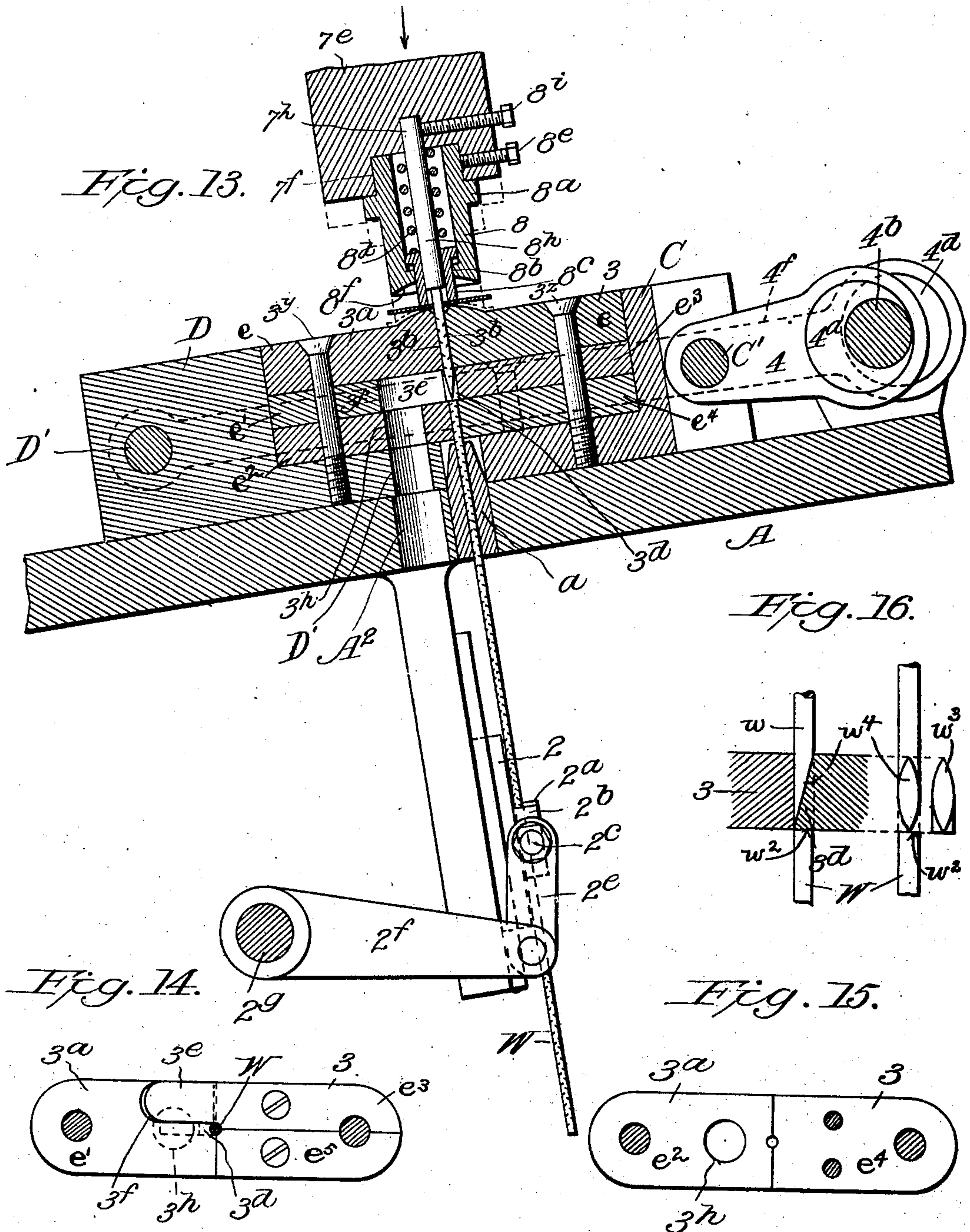
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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MACHINE FOR MAKING ROOFING-NAILS.

No. 886,960.

Specification of Letters Patent.

Patented May 5, 1908.

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To all whom it may concern.

Be it known that we, JOHN E. DOBSON, of Ypsilanti, Washtenaw county, Michigan, and WILLIAM E. WILEY and WILLIAM H. HART, both of Battle Creek, Calhoun county, Michigan, have invented certain new and useful Improvements in Machines for Making Roofing-Nails; and we hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is a novel machine particularly designed for producing roofing nails having large metallic heads and wire nail shanks.

It is also adapted to produce nails of various sizes having metal heads, and also for producing nail strips or metal straps with a plurality of nail shanks or points attached thereto.

The invention is adapted to produce from strap metal and wire, complete nails or nailing strips.

We preferably employ wire to form the nail shanks, and strap metal or hoop stock to form the nail heads.

The invention in brief comprises mechanism for feeding the strap metal, mechanism for feeding the wire; mechanism whereby the wire is caused to penetrate the strap; mechanism whereby the wire is severed in nail lengths; mechanism whereby the wire is riveted to the strap; and mechanism whereby the attached shanks are severed from the wire.

It also embodies mechanism for barbing the wire; mechanism for concavo-convexing the heads; and mechanism for pointing the shanks.

All of these operations are performed by the machine illustrated in the drawings, which is particularly adapted for producing the roofing nails having pointed and barbed wire shanks and concavo-convex round heads of sheet or strap metal.

The invention will be clearly understood from the following description of the said machine, and the parts and combination of parts for which protection is desired are set forth in the claims following the description.

In said drawings—Figure 1 is a front elevation of the operative parts of the machine. Fig. 2 is an end elevation of Fig. 1. Fig. 3 is a transverse section showing a top plan

view of the slides and dies and their operative parts. Fig. 4 is an enlarged inner end view of the slide D and the dies attached thereto. Fig. 5 is a top plan view of Fig. 4. Fig. 6 is an inner end view of the slide C and dies attached thereto. Fig. 7 is a top plan view of Fig. 6. Fig. 8 is an enlarged sectional view through the heading and swaging dies. Fig. 9 is an enlarged sectional view of one of the barbing rollers. Fig. 10 is an enlarged sectional view through the upper punching dies. Fig. 11 is a detail sectional view of the strap-feeding device. Fig. 12 is a detail sectional view of the strap positioning devices. Fig. 13 is an enlarged transverse sectional view through the wire severing and pointing dies, and the heading dies, showing the parts ready to head the severed nail and rivet it to the strap. Figs. 14 and 15 are detail views of parts of the pointing and severing dies. Fig. 16 is a detail view illustrating the pointing of the wire.

We will now describe the machine as illustrated in said drawings, like parts therein being similarly lettered.

The wire is fed into the machine from an ordinary coil. It passes up through a guide-tube 1^b, by which it is straightened. Any other suitable straightening device may be used. From tube 1^b it passes between barbing or roughening rollers 1^c, which are preferably serrated and have an annular V-shaped groove 1^d, preferably of slightly less diameter in cross section than the diameter of the wire, so that as the wire passes between these rolls it is roughened or serrated by the points of the serrations at the sides of the groove.

Preferably the rolls 1^c are journaled on stud bolts 1^e, which have a reduced portion 1^f passing through a supporting plate 1^g attached to the main-frame and secured by nuts 1^h. The parts 1^f pass through slots in plates 1^g, so that the rolls may be adjusted toward and from each other, by means of bolts 1ⁱ tapped through the ends of the plate, and when adjusted they are secured in position by tightening nuts 1^h. The rolls 1^c are retained in position on the bolts 1^e by washers 1^k and nuts 1^l, (see Fig. 9.)

The rolls 1^c might be rotated positively, but in the construction shown in Fig. 9, the wire is pulled between the rolls, which bite thereon, by means of a reciprocating pulling device, shown in Fig. 1, comprising a sliding

plate 2, having a fixed jaw 2^a and a movable jaw 2^b, which jaw 2^b is mounted on a lever 2^c pivoted on the plate at 2^d, and this lever is pivotally connected by a link 2^e to an arm 2^f on a rock-shaft 2^g journaled in the main-frame and having on its outer end a crank-arm 2^h, to which is pivotally connected a shackle link 2ⁱ, to which is pivoted a bracket 2^j, which moves at right angles to the link 2ⁱ, and which is connected by a rod 2^k, to a yoke 2^l, pivotally connected to a link 2^m, pivoted on a stud 2ⁿ, which is adjustably mounted on a plate 2^p attached to the main-shaft S of machine.

As shown, the stud 2ⁿ is attached to a sliding block 2^q, engaging a T-slot 2^r in plate 2^p and adjustable therein by means of a bolt 2^r, which is rotatable, but not longitudinally movable, in the slot. When adjusted to the proper position the stud can be locked by means of a nut 2^s as shown. By this means the degree of movement imparted to the wire feeding device is easily regulable, and the extent and amount of wire fed at each reciprocation of the plate 2 exactly determinable.

When the plate 2 moves toward the wire barbing rolls, the jaw 2^b opens and slides along the wire. On the reverse movement jaw 2^b first closes, biting the wire against jaw 2^a, and then pulls the wire forward through the barbing rolls, feeds the wire forward into position to be seized by the dies 3, 3^a, hereinafter referred to. The extent of the opening movement of the jaw 2^b may be regulated by an adjusting bolt 2^t tapped through a stud 2^u on plate 2.

The end of the wire is fed through an opening in the base plate A of the machine, and through a guide-tube *a*, which projects in line with the dies and from which the wire emerges directly in position to be seized by the holding and cutting dies 3, 3^a. These dies are constructed substantially alike, with the exceptions hereinafter noted and are adapted to hold the wire firmly while its end is secured to the head, also to sever the wire into nail lengths; and also to point the wire.

The two dies 3 and 3^a are respectively secured to opposite reciprocating slides C and D, which are mounted upon the base-plate A and are moved toward and from each other, so as to open and close the dies at the proper time, as hereinafter described.

The die 3 has a central vertical groove 3^b in its face for the reception of the end of wire W, fed thereto as above described. Its upper face is made convex as shown at 3^c to assist in imparting a concavo-convex form to the nail-head as hereinafter explained. It is also provided with a beveled shearing-lug 3^d, which is adapted both to cut the wire as the dies come together, and also to impart a sharp beveled point thereto. It further preferably has a finger 3^e, which projects from its

face, adjacent to the shearing-lug, and is adapted to enter a recess 3^f in the opposed die 3^a.

The die 3^c is constructed with a half groove 3^b and convex end 3^c, similar to die 3, but instead of a shearing-lug, it has a recess 3^f, the inner edge of which is beveled as shown at 3^g to correspond with the face of the lug 3^d, so that as the two dies come together, the beveled lug 3^d shears off the wire, pointing the sheared off portion, as shown at *w*⁴ in Fig. 16, and leaving a straight end *w*² on the wire to be fed in.

The cuttings *w*³ from the wire pass through the recess 3^f and out through an opening 3^h in the lower side of the die 3^a and through an opening D' in slide D and an opening A² in base-plate A, to any suitable receiver. The dies 3 and 3^a may be secured in suitable recesses in the opposed ends of slides C and D, as shown, by means of screws 3^z and 3^y respectively, so the dies can be removed when necessary.

Dies 3 and 3^a are preferably made in sections as indicated in Figs. 4, 6, 13 and 15, for the purpose of lessening the cost of repairs of these dies. The outer part of each die, which contains the grooves 3^b and 3^x, may be made in one longitudinal section *e*. The part *e* of die 3^a which contains the recess 3^f may be made in another section *e'*, as the principal wear on this die will be at the shearing-lug 3^g, and the part below the recess 3^f which contains the opening 3^h, may be made in another section *e*². By this means the parts of the die which are subjected to the most wear can be quickly replaced without necessitating the making of entire dies. Similarly the die 3 may have the portion containing finger 3^e and the shearing-lug 3^d, made separable from the upper and lower parts as shown at *e*³, so that they can be renewed when required without necessarily making an entire new die. The part of die 3 below section *e*³ may be another section *e*⁴. The section *e*³ may be longitudinally divided as indicated in Fig. 14, the left-hand part *e*⁵ being separable from the finger 3^e. Each die 3 and 3^a of course, can be made in one piece but constructing them in sections facilitates repairs and lessens the cost.

The slides C and D are provided on their sides with beveled flanges *c* and *d*, engaging beveled guides *a*² on base-plate A, by which the slides are guided in their reciprocation. The slides are preferably moved to and from each other to close and open the dies at the proper times, by the following means, (see Fig. 3.) The slide C is pivotally connected by a bolt C' to an eccentric strap 4, which engages an eccentric 4^a on a shaft 4^b journaled in bearings 4^c on the main-frame. On the same shaft 4^b are mounted eccentrics 4^d, which are engaged by yokes 4^e on rods 4^f, which are pivotally connected at their rear

ends to a pin D' in slide D. Preferably the rods 4' are arranged at opposite sides of the slides. As the eccentrics 4^a and 4^d are set oppositely on the shaft 4^b, the slides C and D with their dies are caused to approach and recede simultaneously, and thus a quick opening and closing movement of the dies is effected. The dies 3, 3^a, project beyond the inner faces of slides C and D, as the latter are not intended to contact.

The shaft 4^b is rocked at proper times, to open and close the dies, as follows: On one end of the shaft is keyed an arm 4^b, which is pivotally connected to the lower end of a bar 4ⁱ, the upper end of which is slotted to embrace shaft S, and is provided with a roller 4^j, engaging a race-cam 4^k in a disk 4^l, keyed on the main-shaft S, as shown.

In the inner faces of slides C and D and adjacent dies 3, 3^a, are also preferably secured female punching dies 5 and 5^a. These punching dies are preferably provided with semi-circular recesses 5^b in their opposed faces, so that when the dies close together, they form a perfectly circular opening corresponding in size and form to the size and contour of the nail-head, which it is desired to produce. In the example shown the nail heads are circular. These dies 5, 5^a may have their working faces formed by semi-circular segments 5^c of hardened steel, so that these segments can be replaced if worn, or segments of the desired form may be substituted in case it is desired to change the size or shape of the nail head, without necessitating making entirely new dies. Below the dies 5 and 5^a the slides C and D are recessed as shown at D⁵ and C⁵, so that the punchings or completed nails can drop through these dies and openings A⁵ in the base-plate into a suitable chute, by which the nails are discharged into a receptacle.

The heads of the nails are preferably formed from strap metal, which can be procured in long strips or rolls, and which is fed into the machine, past the dies 3, 3^a and 5, 5^a, and at right angles to the wire, in the following manner: Mounted on the base plate A at one side of the slides C, D, and moving at right angles thereto is a slide 6, guided by a dovetail groove on a rib A^c on the base A. On the outer side of this slide 6 are lugs 6^a, between which is a dog 6^b (see Fig. 11,) which is adapted to bite the metal strap H which passes between it and the slide 6 when the dog is moved inward, but will release the strap when the dog is moved outward. Preferably the dog is mounted on a shaft 6^c journaled in ears 6^a, and said shaft has one end bent around, as shown, and engages the upper end of a spring 6^d interposed between the end of the shaft 6^c and the slide 6, said spring tending to cause the dog 6^b to bite the strap.

The dog is pivotally connected by a link

6^b to a bell crank lever 6ⁱ, pivoted at its end upon a bracket 6^h, attached to an adjacent stationary part of the main frame; and the other arm of lever 6ⁱ is pivotally connected to a shackle 6^j on the lower end of a rod 6^k which is slotted at its upper end to embrace shaft S, and is provided above and below the shaft with friction rollers 6^m and 6ⁿ, which engage a cam 6^o on shaft S, so located that at the proper time, the slide 6 is reciprocated and the proper amount of strap metal fed forward for each reciprocation thereof. As the dog is tilted inward, it first bites the strap H firmly, and then pulls it inward. As the dog is tilted outward, it first releases the strap and compresses spring 6^d, until the slide 6 moves outward.

In order to prevent the strap H slipping backward by frictional contact with the slide 6, a frictional retainer may be employed, consisting of a spring pressed block 6^t, confined in a tubular guide 6^q, and pressed outward by a spring 6^r, the tension of which is regulable by a screw 6^s.

The strap H is fed in when the dies 3, 3^a and 5, 5^a, are open and between the dies and cooperating devices which co-act with the dies to shape the head of the nail in the strap metal, to force the end of the wire through the strap metal, to swage the end of the severed wire to the strap metal, and to subsequently punch the completed head with the attached barbed and pointed shank, from the metal strap. These co-acting devices are mounted on a reciprocating slide 7, which moves perpendicularly to the slides C and D, and is guided in its movement by guides attached to the frame of the press, as shown. This slide 7 is reciprocated by means of a pitman 7^b, pivotally connected to one end of the block and engaging a crank S⁷ on shaft S. As shown, said shaft is provided with a heavy belt fly-wheel S⁴, which may be belted to any suitable driver.

To the lower end of slide 7 is detachably attached a head stock 7^e, which is provided with a recess 7^f on its under side directly over the dies 3 and 3^a, and also with a recess 7^g directly over the punching dies 5 and 5^a. In the recess 7^f is fitted the upper end of a sleeve die 8, which is provided with a collar 8^a to give it a firm bearing against the under side of the head 7^e, and which has an internal flange 8^b, on its lower end, see Fig. 8, upon which is supported the upper flanged end of a pressing ring 8^c, which is forced downward by means of a very stout spring 8^d contained within the die 8. The sleeve die 8 is held in position by means of a bolt 8^e tapped through the head 7^e as shown. The presser ring 8^c normally projects below the end of the sleeve die 8, and is adapted to contact with the strap as the head 7 descends, before the die 8 comes in contact therewith. The under side or lower end of the die 8 is concave,

as at 8^c , corresponding to the convex surfaces of the dies 3, 3^a , so that when this sleeve die descends upon the closed dies 3, 3^a and clamps the strap metal H therebetween the latter will be concavo-convexed around the upper end of the nail shank or wire as hereinafter explained.

Before the sleeve die comes in contact with the strap H, the presser ring 8^c engages the strap and forces it against the projecting end of the wire shank w , (which has just been severed from the wire S by the dies 3, 3^a) and is firmly held in said dies with its end projecting slightly above the ends thereof. As the sleeve die and ring descend, the latter forces the strap against the end of the wire w , and compresses the spring 8^d until the pressure becomes sufficient to cause the end of the shank w to penetrate the strap metal, whereupon the spring snaps the ring downward, forcing the strap H directly against the upper surface of the dies 3, 3^a , leaving the upper end of the wire projecting about $\frac{1}{8}$ " to $\frac{3}{16}$ " above the strap. Then the sleeve die descends still further and catching the strap between its lower end and the dies 3, 3^a , imparts a concavo-convex shape to the part of the strap, surrounding the upper end of the wire-shank.

Simultaneously with this shaping operation the nail shank is swaged to the strap by means of a heading rod 8^h , the lower end of which is guided in ring 8^c , and its upper end is securely fastened in a recess 7^h in head 7^e by a bolt 8^i as shown. This header rod is so positioned that after the strap is punched by the wire, and just about as the dies 3, 3^a and 8 begin to concavo-convex the portion of the strap around the wire, the header strikes the end of the shank and flattens the same, riveting and swaging the shank to the strap, and because of a slight flow of the metal in the shank, it shoulders or swages the shank both above and below the head or strap, securely fastening the shank to the strap. The dies 3 and 3^a have a slight cavity or enlargement 3^x just at the upper ends of the recesses 3^b , as shown in Figs. 4 and 6, to permit formation of this under shoulder on the shank. In this way the shank is swaged to the head in the most secure manner and the several operations are performed practically simultaneously, or in close succession. Thus the shank is severed from the wire and pointed by the closing of the dies 3, 3^a ; almost simultaneously the descent of the die 8, ring 8^c and header 8^h cause first the perforation of the strap, the concavo-convex shaping of the strap around the head of the shank and the swaging of the shank to the head. Instantly thereafter the slide 7 is retracted, the dies 3, 3^a open and the strap is fed forward with the attached shank thereto and, at a succeeding operation, while another shank is being fastened to the strap metal as described, the

previously attached shank and shaped head are separated from the strap metal by a punching device, which comes in operation simultaneously with the shank attaching operation and is operated by the slide 7 as follows:

Attached to the head 7^e , in the opening 7^e thereof, is a punching die 5^h , see Fig. 10, adapted to operate with the dies 5, 5^a , to cut the finished nail from the strap. This punching die 5^h has its lower end concaved as at 5^i to correspond with the convexity of the nail head imparted by the dies 3, 3^a and 8, and, as it descends, it cuts the head and the attached shank from the strap and discharges the completed nail downward through die 5 and opening A^5 as described.

In order to get the strap firmly upon the die 5 and 5^a before the male die 5^h strikes the strap, I preferably employ a presser finger 5^j , which goes through die 5^h and is pressed downward by a spring 5^k in the hollow of 5^h . This finger not only assists in positioning the nail head over dies 5, 5^a , but it furthermore acts as ejector to throw the nail when severed out of the dies, and thus insure clearance thereof, so that an incoming nail will not be obstructed.

The strap H may be guided in its travel through and between the dies by means of a guide bar 9 secured to the slide D in line with the travel of the strap H, as shown in Figs. 2, 3 and 12; and by a guide 9^a attached to the slide C opposite the bar 9. This guide 9^a is preferably attached to a rod 9^b guided in a block 9^c , attached to slide C and pressed forward by a spring 9^d . The object of this construction is to keep the strap H always positioned against the guide 9. As the strap H may vary slightly in width, it is desirable to have a self-adjusting spring pressed guide like 9^a to insure the certain positioning of the attached shank wires relatively to the dies in their movements therebetween. The guide 9^a may have an overhanging lip 9^e , which serves to prevent the strap H arising thereover, and the guide 9 may be provided with fingers 9^h projecting over the strap for the same purpose. These fingers prevent the strap rising or lifting with the upper dies during their upward movement.

The machine above described is an efficient rapidly acting machine, and when the punching dies are used, will produce complete perfect nails, with strap metal or sheet metal heads. By omitting or removing the punching dies and their co-acting dies the machine will produce a continuous nailing strap or strip provided with a series of nailing points which can be very usefully employed for different purposes but which article is not claimed in this application.

Obviously many parts of the machine are capable of variation or change within the scope of this invention; the principal and

essential features of the machine shown are several sets of dies, or their equivalents, and the means for operating the dies and parts in proper time are easily capable of variation, and therefore we do not confine ourselves to the particular construction of parts shown except where specifically set forth in the claims. As instances of possible changes, the barbing rollers could be used to also feed the wire; or the dies could be used to barb the wire; the severing of the wire might be performed before or after the heading operation; and the shanks could be pointed before or after the attachment to the nailing strip; the punching operation might also be performed by the dies which perform the heading and swaging operations by a further movement thereof and a proper construction of the dies. All of these more or less obvious changes we consider within the scope of our invention as they embody the essential features and steps thereof.

Having described our invention what we claim as new and desire to secure by Letters Patent is:—

1. The combination with dies adapted to hold a wire with its end projecting, of an opposed die and a spring presser ring attached to said die adapted to cause the wire end to penetrate the head before the dies come together, and a header rod located within the die and presser ring.

2. The combination in a nail making machine of means for feeding a metal strap, means for feeding a wire, means for causing the wire end to penetrate the strap, means for swaging the end of the wire to the strap, means for severing a nail shank from the wire, means for pointing the shank, and means for subsequently severing the end of the strap to which the wire shank is attached from the body of the strap.

3. In a nail machine the combination of means for feeding a metal strap, means for feeding a wire, means for causing the end of the wire to penetrate the strap, mechanism for swaging the wire to the strap, means for severing the wire, means for barbing the wire and means for subsequently severing the end of the strap to which the wire is secured from the body thereof.

4. In a nail machine, the combination of means for feeding a sheet metal strap, means for feeding a wire, means for causing the end of the wire to penetrate the strap, and mechanism for swaging the wire to the strap, and means for severing the wire, means for concavo-convexing the part of the strap trans-fixed by the wire, and means for subsequently severing the end of the strap to which the severed piece of wire is secured from the body thereof.

5. The combination in a roofing nail making machine, of means for feeding a metal strap, means for feeding a wire, means for

forcing the strap against the wire and causing the latter to perforate the strap, means for severing a nail length from the wire and pointing the severed end, and means for swaging the severed portion of the wire to the strap; with means for subsequently cutting the part of the strap to which the cut wire is attached from the body of the strap, thereby forming a complete nail.

6. The combination in a roofing nail making machine, of means for feeding a metal strap, means for feeding a wire, means for causing the wire to perforate the strap, means for severing the wire into a nail length and pointing the severed end, means for swaging the severed portion of the wire to the strap, means for concavo-convexing the strap around the wire to form the nail head, and means for subsequently punching the nail head to which the cut wire is attached from the strap.

7. In a roofing nail machine, the combination of means for feeding a metal strap, means for presenting a severed piece of wire thereto, means for forcing the end of the severed wire through the strap, means for concavo-convexing the part of strap around the wire, means for swaging the end of the wire to the strap, and means for subsequently severing the portion of the strap to which the wire is secured from the body of the strap.

8. The combination of means for feeding a wire, means for barbing the wire, means for severing a nail length from the wire, pointing the same and holding it during the heading operation, means for feeding a metal strap over the end of the severed wire while held in the dies, means for forcing the wire end through the strap and swaging it thereto, means for forming the adjacent part of the strap into a head around the wire, and means for subsequently severing the head and attached wire from the strap.

9. In a nail machine, the combination of means for feeding a wire, dies adjacent the line of wire feed adapted to sever a nail length from the wire, point its end and hold it during the heading operation, means for feeding a metal strap over the end of the severed wire, dies adjacent the line of wire feed adapted to cause the severed wire to puncture the strap and to head the wire above and below the strap, and means adjacent the line of strap feed for subsequently severing the nail head and attached shank from the strap during the next shank-attaching operation.

10. In a roofing nail machine, the combination of means for feeding a wire, dies adjacent the line of wire feed adapted to sever a nail length from the wire, point its end and hold it during the heading operation, means for feeding a metal strap over the end of the severed wire, and dies constructed and arranged to cause the severed wire to puncture the strap, and to head the wire above and be-

low the strap, and to impart a concavo-convex shape to the nail head; with means adjacent the line of feed of the metal strip for subsequently punching the nail head and attached wire shank from the strap.

11. The combination of the co-acting wire holding dies, each having a convex end with an opposed die having a concave end adapted to co-act with the holding dies to shape the nail head, and a header-rod within the concave ended die.

12. For the purposes described, opposed dies having respectively a concave and a convex end adapted to shape the nail head; with a presser ring, and a header rod in one of the dies, substantially as set forth.

13. A wire clamping die composed of opposite similar members adapted to clamp a wire between them, one of said members having a beveled shearing edge and the other member having a beveled shearing lug adapted to sever the wire diagonally and thereby point it as the die is closed.

14. In combination, a wire clamping die composed of opposite similar members adapted to clamp a wire, one of said members having a beveled shearing edge and the other member having a beveled shearing lug adapted to diagonally sever the wire as the die is closed; with a co-acting heading die adapted to head the severed wire while held by the first dies for the purpose described.

15. A wire pointing die composed of opposite similar members, one of said members having a recess and a shearing edge and its other member having a finger adapted to enter the recess, and a beveled shearing lug adapted to sever the wire as the die is closed.

16. In a nail making machine, the combination of opposite slides, wire cutting and pointing die members attached to adjacent ends of said slides, and adjacent punching die members also attached to adjacent ends of said slides, and means for moving the slides to open and close the dies; with means for feeding a wire, a head moving at right-angles to the slides, a punching die thereon

adapted to cooperate with the punching die on the slides; a swaging die attached to said head cooperating with the wire clamping dies, and means for feeding a strap between the dies.

17. In a nail making machine, the combination of opposite slides, wire cutting and pointing die members attached to adjacent ends of said slides, and means for moving the slides to open and close the dies; with means for feeding a wire; a head moving at right-angles to the slides, a swaging die attached to said head cooperating with the wire clamping die, a presser ring and a header rod connected to the swaging die, and means for feeding a strap between the swaging and cutting dies.

18. In a nail making machine, the combination of opposite slides, wire cutting and pointing die members attached to adjacent ends of said slides, punching die members attached to adjacent ends of said slides and means for moving the slides to open and close the dies; with means for feeding a wire, a head moving at right-angles to the slides, a punching die thereon adapted to cooperate with the punching die on the slides, and a swaging die, presser-ring and header-rod attached to said head and cooperating with wire clamping dies, said presser-ring being connected with said swaging die, and said header-rod being arranged in said ring and die, and means for feeding a strap between the dies.

In testimony that we claim the foregoing as our own, we affix our signatures in presence of two witnesses.

JOHN E. DOBSON.
WILLIAM E. WILEY.
WILLIAM H. HART.

Witnesses for John E. Dobson:

EDWARD P. ALLEN,
FRANK T. CODRINGTON.

Witnesses for Wm. E. Wiley and Wm. H. Hart:

CHARLES R. SYLVESTER,
DANIEL A. TAYLOR.