

A. J. ROBERTS.  
HORSESHOE MACHINE.

No. 39,778.

Patented Sept. 1, 1863.

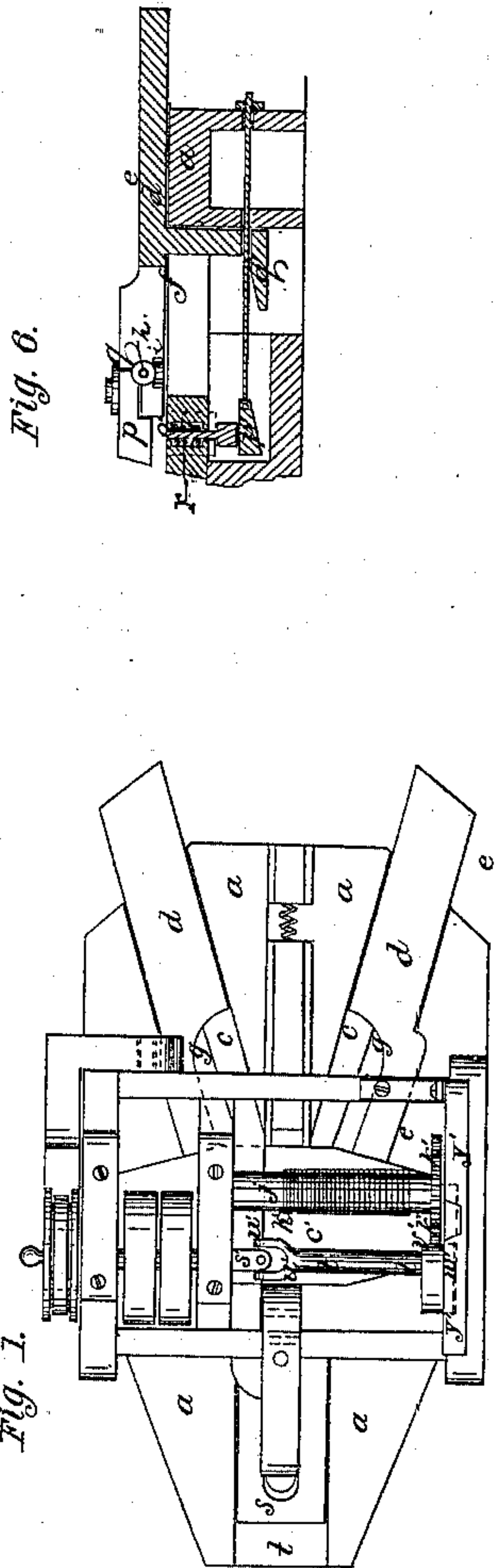
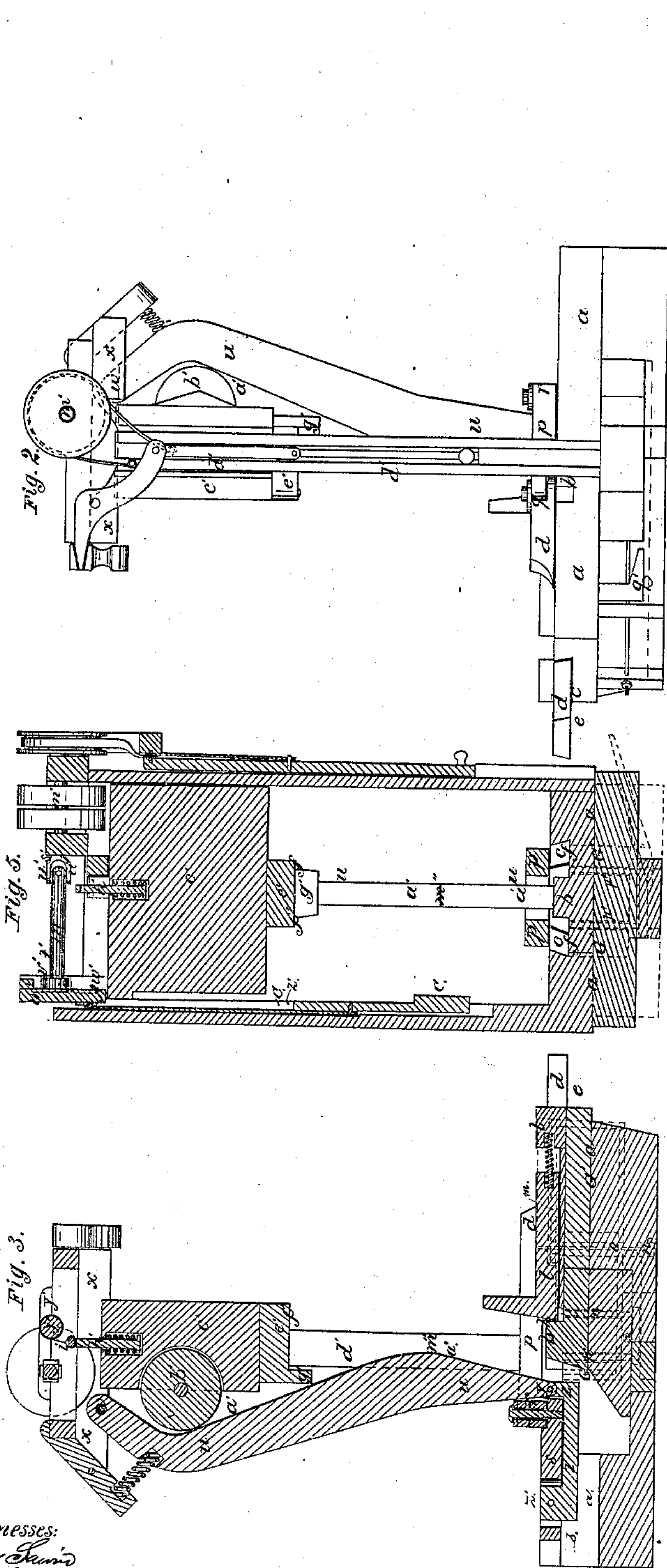
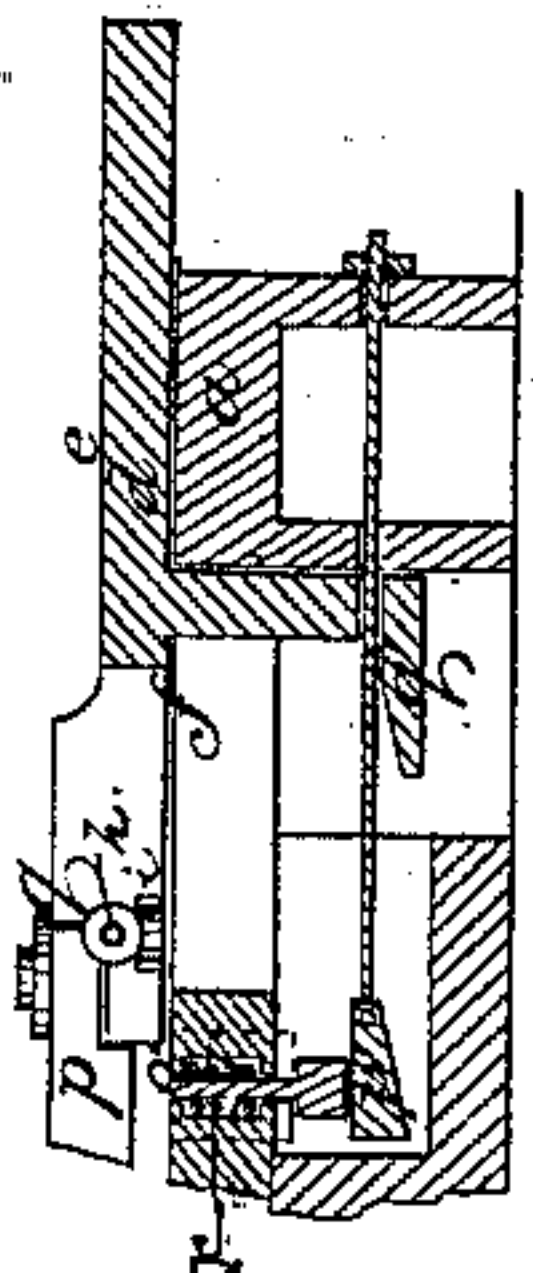


Fig. 6.



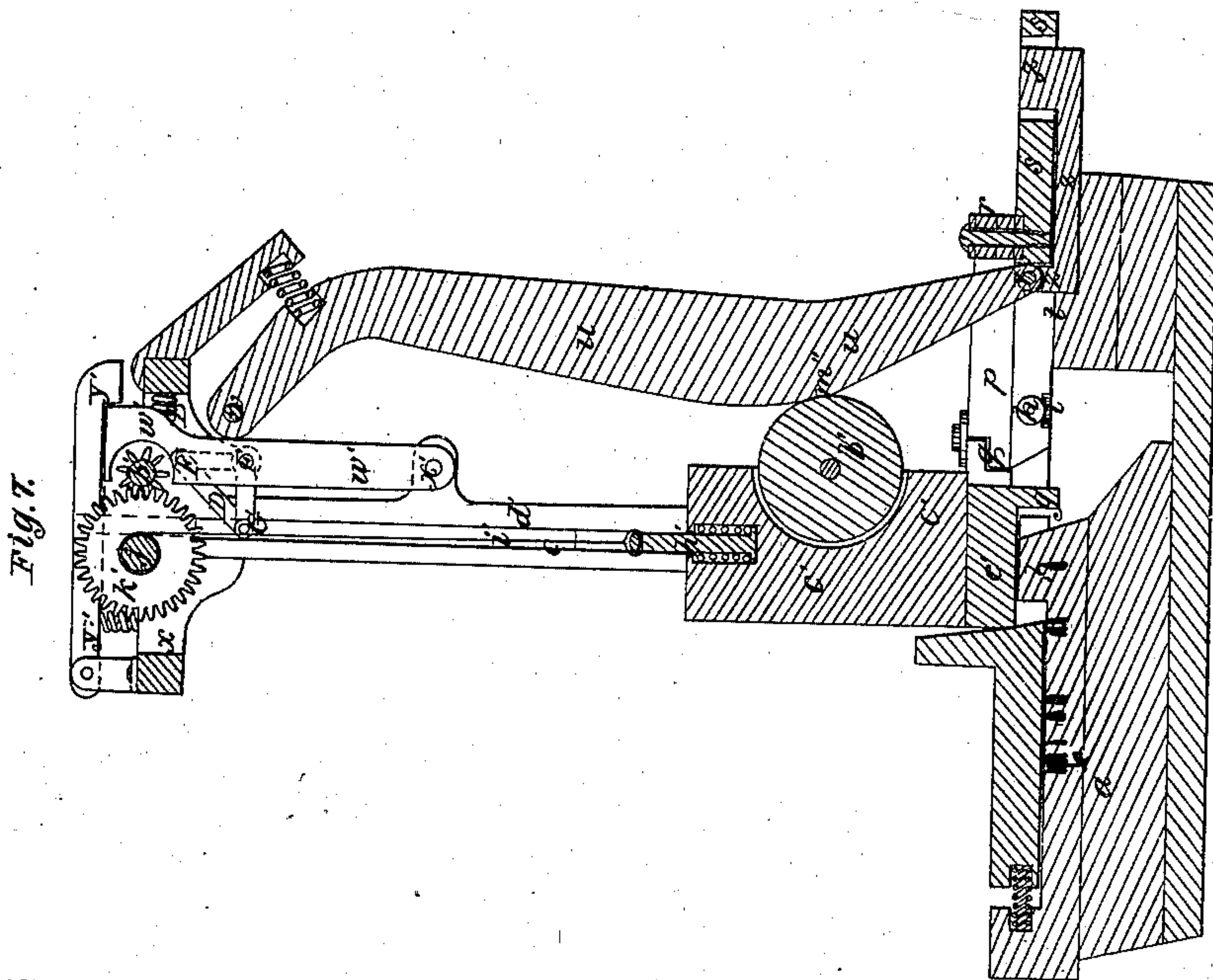
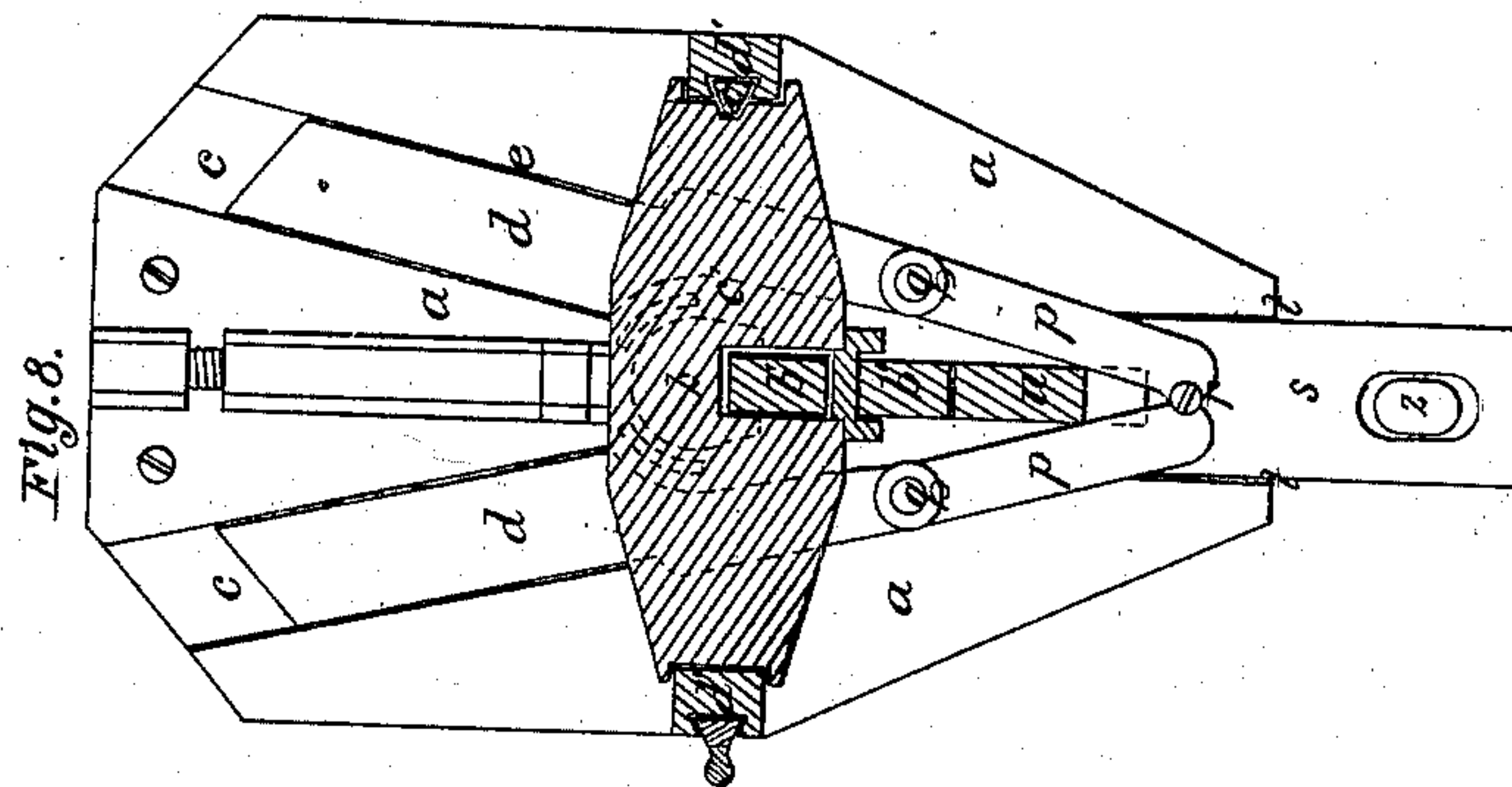
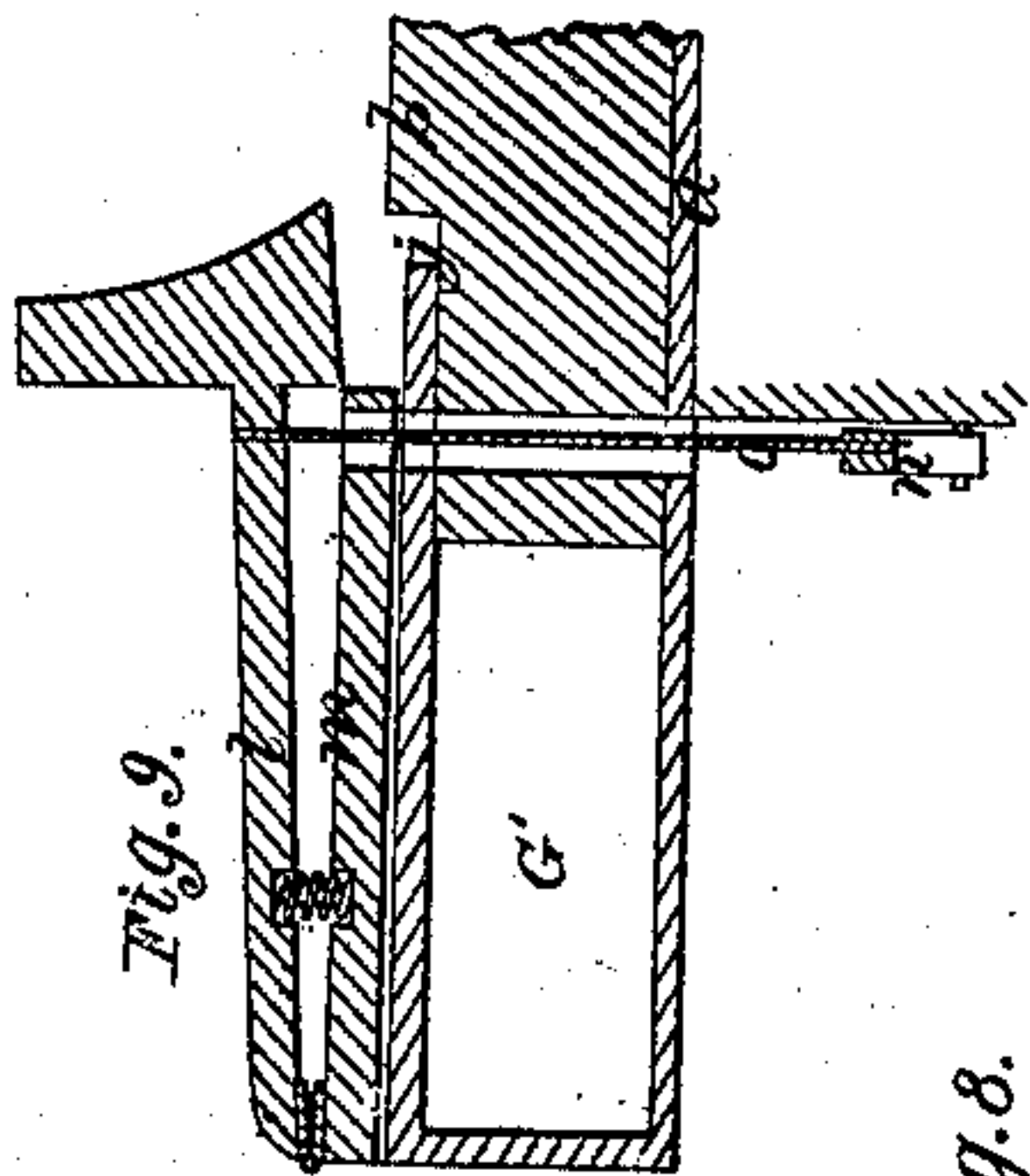
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Witnesses:

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN MACHINES FOR MAKING HORSESHOES.

Specification forming part of Letters Patent No. 39,778, dated September 1. 1863.

*To all whom it may concern:*

Be it known that I, ANDREW J. ROBERTS, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Manufacturing Horseshoes; and I do hereby declare that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements by which my invention may be distinguished from all others of a similar class, together with such parts as I claim and desire have secured to me by Letters Patent.

The present invention relates to certain new and useful improvements in machines for making horseshoes, the essential features of which consist—

First. In a peculiar arrangement of horizontal sliding formers or benders, provided with suitable pressure-rollers, and used in conjunction with a stationary mold block of the shape of the shoe, the said formers or benders being so arranged at an angle with regard to each other and to the said mold block that when operated by means of any suitable mechanical devices in a forward direction they will press or bend the metallic bar of which the shoe is to be made around the said mold block, and at the same time narrow its points as desired, whereby a perfect shaped shoe is readily produced.

Secondly. In the use of a heavy weight or drop, moving between and guided by vertical bars or standards of the machine, for the purpose of actuating the formers or benders, and thus pressing the metallic bar around the mold-block used, the said weight being connected with the said formers in such a manner, by means of any suitable arrangement of mechanical devices, as to cause them to be moved in a direction toward the mold-block by its simple downward movements or fall. On the lower surface of this weight a lip or projection is placed in proper position, as the said weight falls, to strike against and bend the points of the metallic bar or shoe to form the "calks."

Thirdly. In grooving the shoe by means of devices so arranged and operated by the movements of the sliding formers as to force the

punches used up against the under surface of the shoe, and there firmly hold the same in readiness to act upon the shoe when the weight drops and strikes against the top surface of the shoe.

Fourthly. In allowing the weight to drop, when it shall have reached the height from which it is to fall, by means of a peculiar arrangement of mechanical devices operated by the upward movement of the weight in such a manner as to disconnect at the proper moment the devices employed for the raising of the same.

Fifthly. In a peculiar arrangement of mechanical devices so operated by the downward movement of the weight as to reconnect and again place in readiness the devices employed for the raising of the weight.

I have also made several other improvements in the construction and arrangement of horse-shoe-machines that are quite essential to the more perfect working of the same, and which will be hereinafter particularly referred to.

In the accompanying plates of drawings my improvements are represented, of which, in Plate 1, Figure 1 is a plan or top view; Fig. 2, a side view; Fig. 3, a central longitudinal vertical section; Fig. 4, a transverse horizontal section; Fig. 5, a transverse vertical section through the center of the drop-weight, and Figs. 6 and 9 are detail views, to be hereinafter more particularly referred to. In Plate 2, Fig. 7 is a central longitudinal vertical section with the weight in its lowest position, and Fig. 8 a transverse horizontal section through the center of the weight.

*a a* in the accompanying drawings represent the platform or foundation-plate of the machine, in which, at or near its center, is inserted a stationary mold-block, *b*, with its periphery made of the shape of the inside edge of a shoe. In the upper surface of the platform *a* two ways or grooves, *c c*, are formed at an acute angle to each other, with the apex toward the mold-block, and in each of which an arm or plate, *d*, of two sliding horizontal formers or benders, *e e*, is inserted and made to move forward and back on the plane *f* by means of a peculiar arrangement of mechanical devices, to be herein described. The inside edge of each of these arms *d* is cut or curved out at *g* corresponding to the curved periphery of the



mold-block, and each one has also attached to the same two pressure-rollers, *h* and *i*, one upon the inside edge and the other set in its lower surface, the two being so arranged with regard to each other that, as the said formers are moved forward, the one, *h*, will bear and travel upon the upper surface of the metallic bar of which the shoe is made, and thus prevent the same from being forced up off its plane or seat, while the other, *i*, presses against its edge in such a manner as to gradually bend or form the bar around the mold-block, thereby giving to the bar the desired curvilinear shape for a shoe, as is apparent without further description. But as it is desired to lessen the width of the shoe gradually at or near its "points," the periphery of the mold-block *b* is therefore so formed at the places where the points of the shoe-bar are pressed against it that the distance between its periphery and the pressure-roller *i* shall be sufficiently decreased so that the roller *i* shall not only operate to bend the bar, but also to press the same in such a manner as to accomplish the desired result.

*j*, Figs. 9 and 3, is a slot in the platform *a* for the insertion of the metallic bar within the same, and in its proper position against the point *k* of the mold-block, where it is securely held and prevented from "wabbling" or moving during the bending operation by simply holding the plate or bar *l*, hinged to a sliding plate, *m*, of the platform, down upon the same, through the treadle or lever *n* and connecting cord or rod *o*.

*p p* are two bars or arms attached by a pivot to the end *q* of each of the arms *d d*, the opposite ends *r* of the same being secured together upon a common center or bolt, and then both attached to the upper surface of a horizontal sliding plate, *s*, moving in a groove, *t*, of the platform *a*. The formers *e e* being thus arranged and secured to each other, and to the sliding plate *s*, as described, a reciprocating rectilinear motion is imparted to the same in order to bend the metallic bar properly inserted and held on the platform *a*, and to thus form the shoe by means of the following arrangement of devices, viz:

*u* is a vertical cam rod or lever turning upon a fulcrum, *w*, of the upper frame-work, *x*, of the machine. To the lower end *y* of the rod *u* is attached one end of a horizontal and parallel bar, *z*, underneath the sliding plate *s*, the other end of which, by its vertical arm *z'*, is secured to the outer end of the said plate *s*, the object and advantage of which method of securing the cam-rod *u* to the plate *s* is to prevent the liability of too much strain upon the said plate *s* when moved, which would necessarily tend to throw it out of place as it is moving forward to operate the benders toward the mold-block, and to form thereby the shoe; but, however, it is evident that in lieu thereof it (the vertical lever) could be attached directly to the said sliding plate *s*. Upon the edge *a'* of this cam-lever *u* bears or travels a friction-wheel, *b'*, attached to a heavy drop-

weight, *c'*, in one side of which the said wheel is inserted having proper bearings. This weight *c'* moves between and is guided by two vertical bars or standards, *d' d'*, situated, respectively, on opposite sides of the platform *a*, and also has secured to its under surface, or forming a part thereof, a projecting plate, *e'*, of the same shape, but of little larger dimensions, than the mold-block *b*, the said plate *e'* having upon its lower surface a raised bead, *f'*, and a vertical lip or projection, *g'*, at one end thereof, for purposes to be described.

In order to raise the weight or drop *c'*, and thus place it in readiness to accomplish the purpose for which it is specially intended—i. e., the operation of the machinery for bending, &c., the shoe—I have attached to the rod *h'*, secured in the top portion thereof, a rope, *i'*, or other suitable device, that is passed upward over a drum, *j'*, having bearings in the upper frame-work, *x*, of the machine, and upon which the rope is wound. On one end of this drum *j'* is a gear-wheel, *k'*, engaging with a toothed pinion, *l*, of the driving-shaft *m'* of the machine, to which shaft motion may be imparted by any of the well-known modes. When the weight *c'* has been raised to the desired height, the gear-wheel *k'* and toothed pinion *l'*, above described for the raising of the same, are disconnected, as will be presently set forth, and the drum *j'*, being thus free to turn, allows the weight *c'* to drop or fall, guided by the standards *d' d'* as it falls, and by means of its bearing upon the edge of the cam lever *u*, through the friction-wheel *b'*, turns the lever *u* upon its fulcrum, and thereby imparts a forward movement to the formers or benders *e e* toward the stationary mold-block *b*. This forward movement of the benders, caused by the descent of the weight, continues until the wheel *b'* has reached the point *m''* of the cam's surface, when it ceases, because of the peculiar formation of the cam-lever, and the formers *e e* are held stationary as the weight *c'* falls with its full force and all its accumulated power upon the upper surface of the metallic bar previously bent around the mold-block by the benders *e e*. The drop *c'*, after having fallen, and consequently formed the metallic bar into a shoe, is again raised by means of the drum *j'*, the gear of which has been reconnected with the pinion of the driving-shaft, as will be described, to its proper height, when the same movements occur as specified, the shoe formed during the meantime having been removed from the platform and a new bar inserted therein.

Attached to the lever-cam *u* is a spiral or other suitable spring that serves to retract the same, and consequently the formers *e e*, and thus bring them back to their original position to again act upon the metallic bar, the said spring also always causing the cam-lever *u* to keep up against the friction-wheel of the weight.

Inserted within the platform *a* of the machine, upon each side of the mold-block *b* and



in their proper position, are vertical punches *o' o'*, Fig. 6, the lower ends of which respectively rest upon beveled pieces or levers *p' p'*, hung in the said platform *a* in any proper manner.

Attached to the under surface of each of the sliding formers *e e* and in the same horizontal plane with the beveled levers *p' p'* are beveled pieces *q' q'*, the two pieces *p'* and *q'* being so arranged and constructed with regard to each other that as the said formers *e e* are moved toward the mold-block *b* the one, *q'*, by sliding under the other, *p'*, shall so raise the latter, and consequently the punches *o' o'*, as to cause the latter to impinge against the metallic bar—bent around the mold-block—and, being securely held there, are forced by the pressure and force of the drop upon the shoe to sufficiently penetrate the same, and thereby form the groove or slot usually made therein, the punches *o' o'* being retracted by the spiral spring *r'*, attached to the same, as the formers or benders *e e* move back to their original position, as has been described. The weight *c'* also in dropping, by means of its projecting lip *g'*, bends or turns down the "points" of the shoe a sufficient distance to form the desired "calks," and, furthermore, bevels its surface correspondingly with the projection *f'* of the weight, the object of which is to cause the shoe where placed upon the horse's hoof to bear only upon its outside edge.

From the above description it will be seen that by the falling of the weight or drop *c'*, arranged, constructed, and operating substantially as described, a shoe is instantaneously formed, and that also by the use of a weight for operating the mechanism employed for the formation of horseshoes a great amount of power, force, or pressure is easily obtained, and a quick formation of horseshoes in every particular practically and successfully obtained.

In order to allow of the devices employed for the raising of the weight to be disconnected at the proper moment, whereby the weight will be left free to fall, the driving-shaft *m'* is made in two distinct portions, *s' t'*, attached together by a universal joint, *w'*, the end *v'* of the portion *t* thereof, and to which the pinion *l'*, above referred to, is secured, having its bearing within a vertical swinging frame, *w'*, hinged at *x'*, a spring-catch, *y'*, serving to hold the said frame *w'* in proper position to engage the pinion *l'* with gear *k'*.

Placed within a groove, *z'*, of one of the standards *d'* is a vertical sliding bar, *A*, the upper end of which is secured to the spring-catch *y'*, while the other end is caught by the weight as it rises, thus disconnecting the catch *y'* from the swinging frame *w'*, whereby, from the action of the spiral spring *B* upon the frame *w'*, the pinion and gear are instantly disconnected, the universal joint, as is evident without further description, permitting the same. The pinion *l'* and gear *k'*, after being thus disconnected, and the weight *c'* having fallen, are then recon-

nected in order that they may again operate to raise the said weight by means of the following devices, viz: *C* is a vertical rod, moving in a groove of the standard *d*, and placed behind the vertical sliding bar hereinbefore referred to; *D*, a triangular lever or arm turning at its angle upon a center or fulcrum, *E*, and attached at the end of each of its arms, *F* and *G*, respectively, to the swinging frame *w'*, and the upper end of the vertical rod *C*. This vertical rod *C* extends down the standard *d'* of the platform *a* to a point nearly to the upper plane thereof, and is so arranged upon the said standard, and susceptible of vertical play or motion, that the weight, when falling, shall pull or draw upon the same, and thereby, through the right-angular lever *D* attached thereto and to the swinging frame as above described, turn the said frame sufficiently to re-engage the pinion *l'* with the gear *k'*, where they are again held by the spring-catch *y'*, previously referred to. Thus it will be seen from the above description that the weight or drop *c'* not only operates the mechanism employed for bending and forming the shoe, but also renders the machine in reality a self-acting one, the advantages of which are readily apparent and need therefore no further particular allusion thereto. It is also evident that the devices employed for disconnecting and connecting the mechanism for raising the weight can be made susceptible of easy adjustment at pleasure, thus readily allowing of a greater or lesser amount of vertical travel to the weight, and whereby any desired amount of pressure may be secured upon the metallic bar of which the horseshoe is formed.

Having thus described my improvements, I shall state my claims as follows:

1. Operating the various mechanical devices employed in machines for making horse shoes by means of the vertical or up-and-down movement of a heavy drop-hammer.

2. Bending the points of the shoe to form the calks by means of the lip projection *g'* upon the under surface of the drop-weight, arranged and operating substantially as set forth.

3. The arrangement of the vertical cam-lever *u*, sliding plate *s*, and arms *p p*, attached to the arms *d d* of the formers *e e*, in combination with the drop-weight, the whole operating together in the manner described, and for the purposes set forth.

4. The use of the beveled piece *q'*, attached to the sliding formers or benders *e e*, and beveled piece *p'*, upon which the punches *o' o'* rest, the two being so arranged with regard to each other as to raise or lower the said punches, substantially in the manner and for the purpose described.

5. Disconnecting the devices employed for raising the drop weight by means of the vertical rod *A*, spring lever-catch *y'*, and vertical swinging lever *w'*, that forms the bearing for one end of the driving-shaft, arranged and operating as set forth.



6. The means described for reconnecting the devices employed for the raising of the weight after the same has fallen, the same consisting of the vertical rod *c* and angular swinging arm or lever *D*, turning upon a fulcrum, arranged and operating substantially as hereinabove described.

7. The combination of the two-part driving-shaft *m'*, attached together as described, with the swinging lever *u*, and spring-catch *y'*, op-

erating substantially as and for the purposes specified.

8. The arrangement of the two plates or bars *l* and *m* for holding the metallic bar in proper position while being bent around the mold-block, substantially as described.

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