

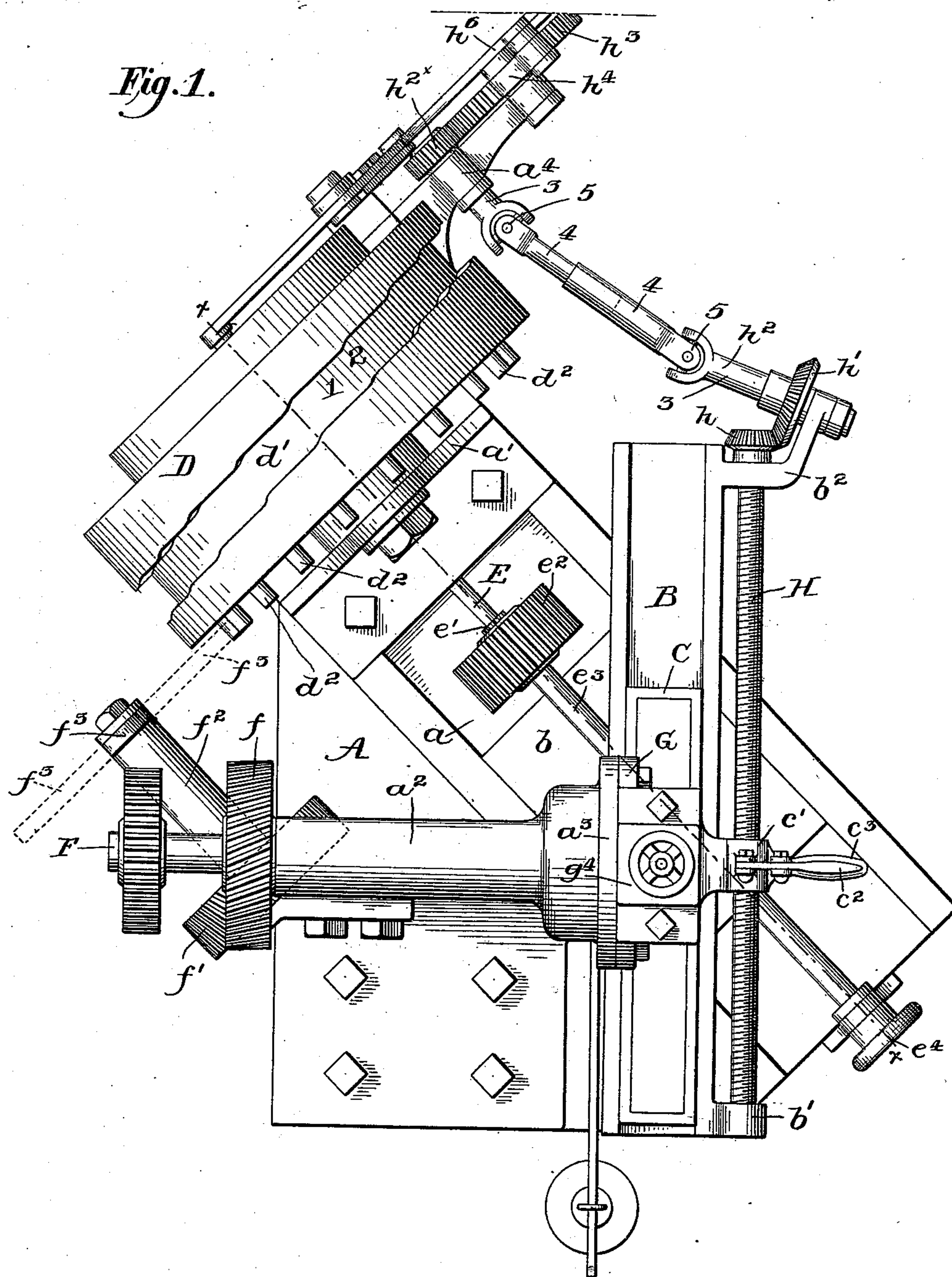
(No Model.)

3 Sheets—Sheet 1.

J. LYNCH.  
MACHINE FOR PUNCHING RASPS.

No. 550,078.

Patented Nov. 19, 1895.



Witnesses.

Andrew Blount

Irma S Heller

Inventor.

John Lynch,  
per John F. Nolan  
Attorney

Attorney.

(No Model.)

3 Sheets—Sheet 2.

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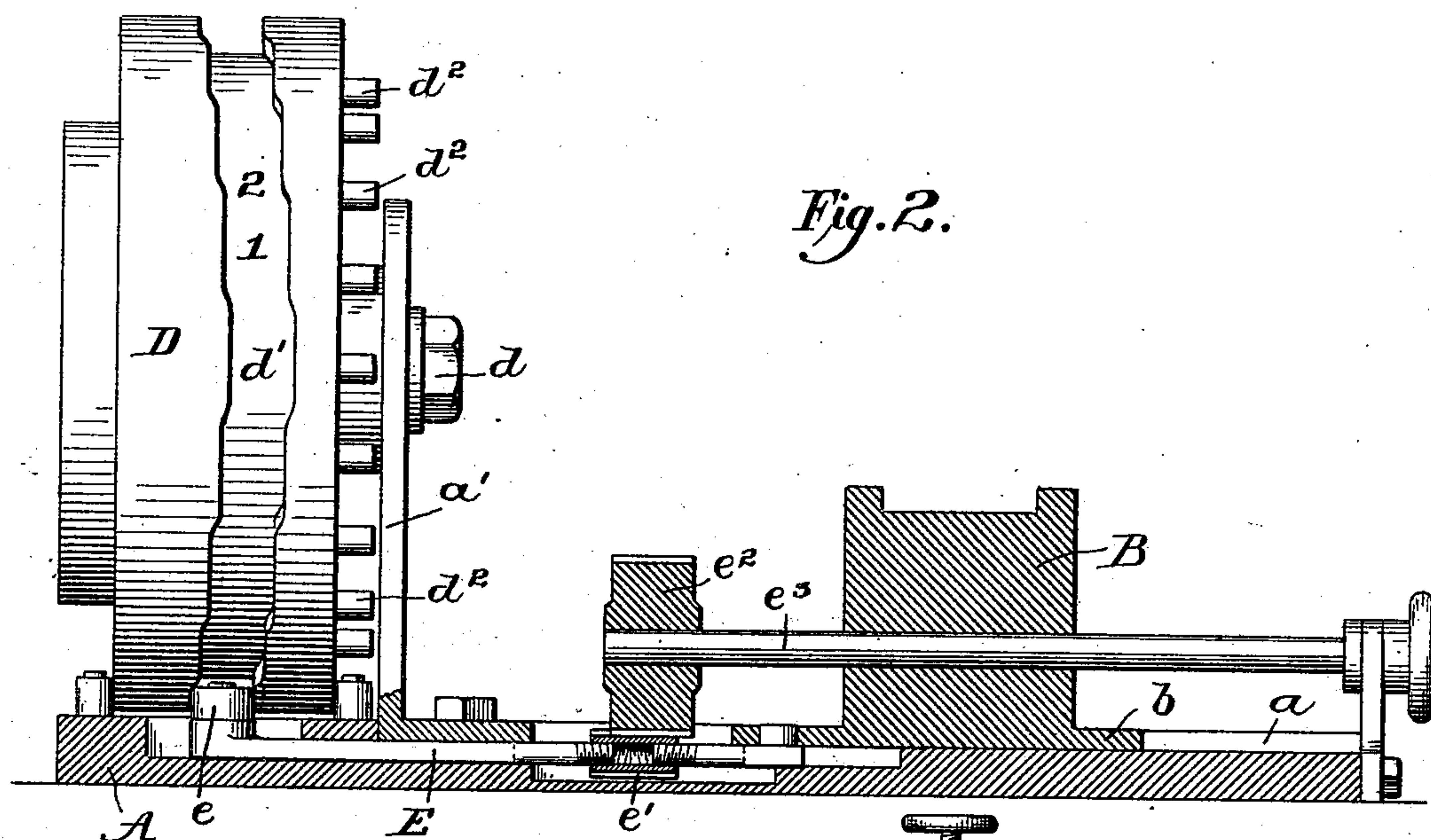


Fig. 2.

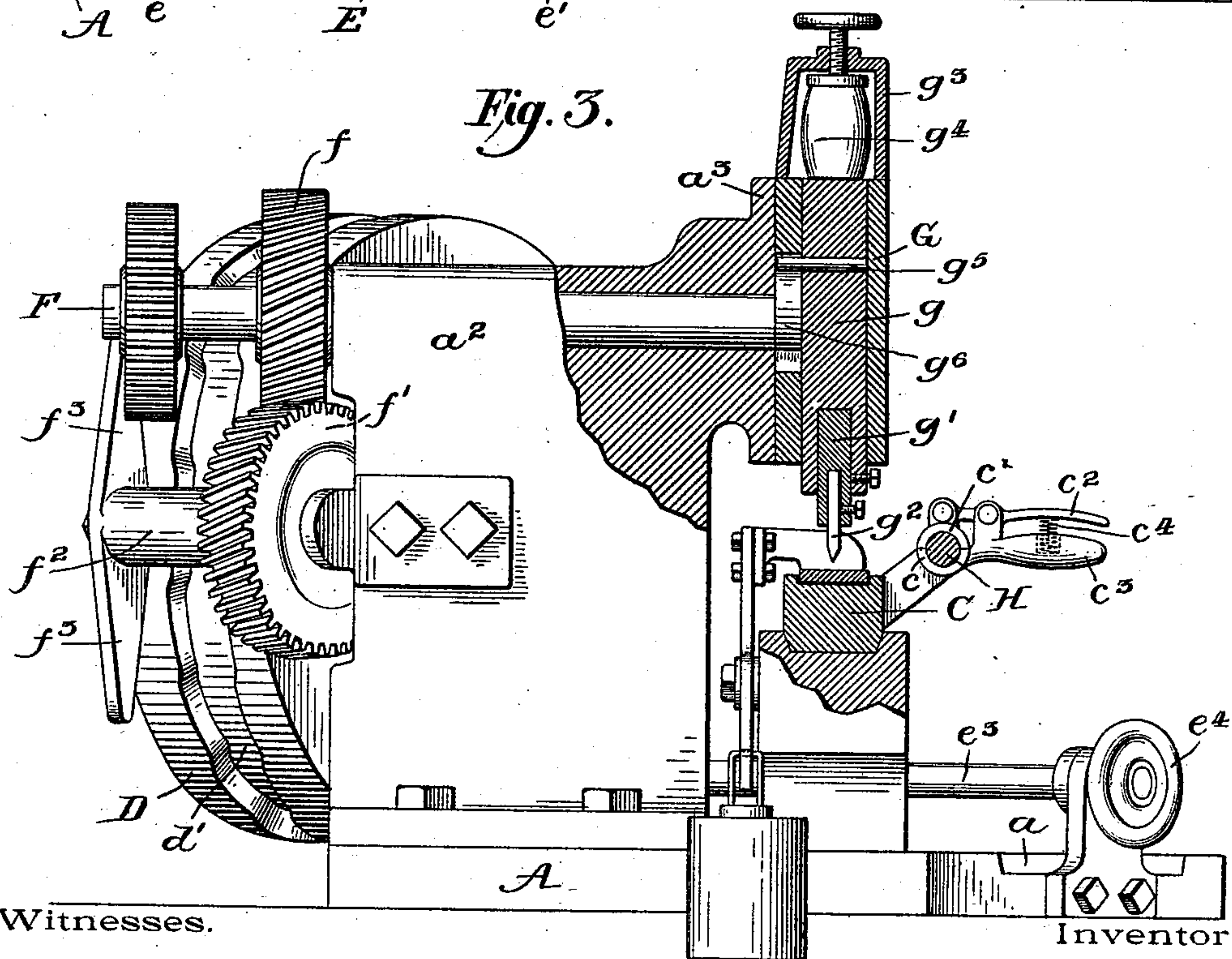


Fig. 3.

Witnesses.

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Attorney.



(No Model.)

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Fig. 4.

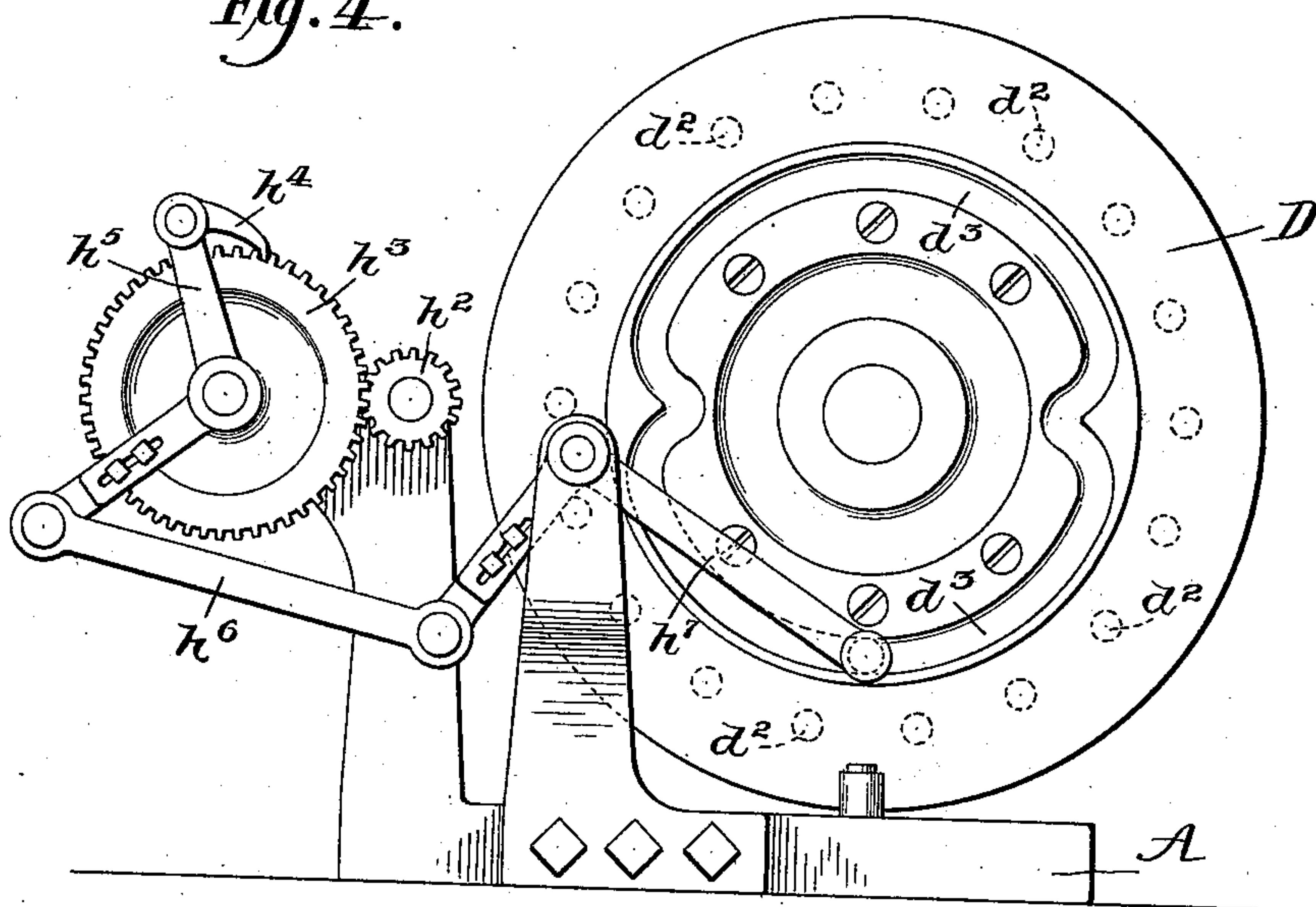
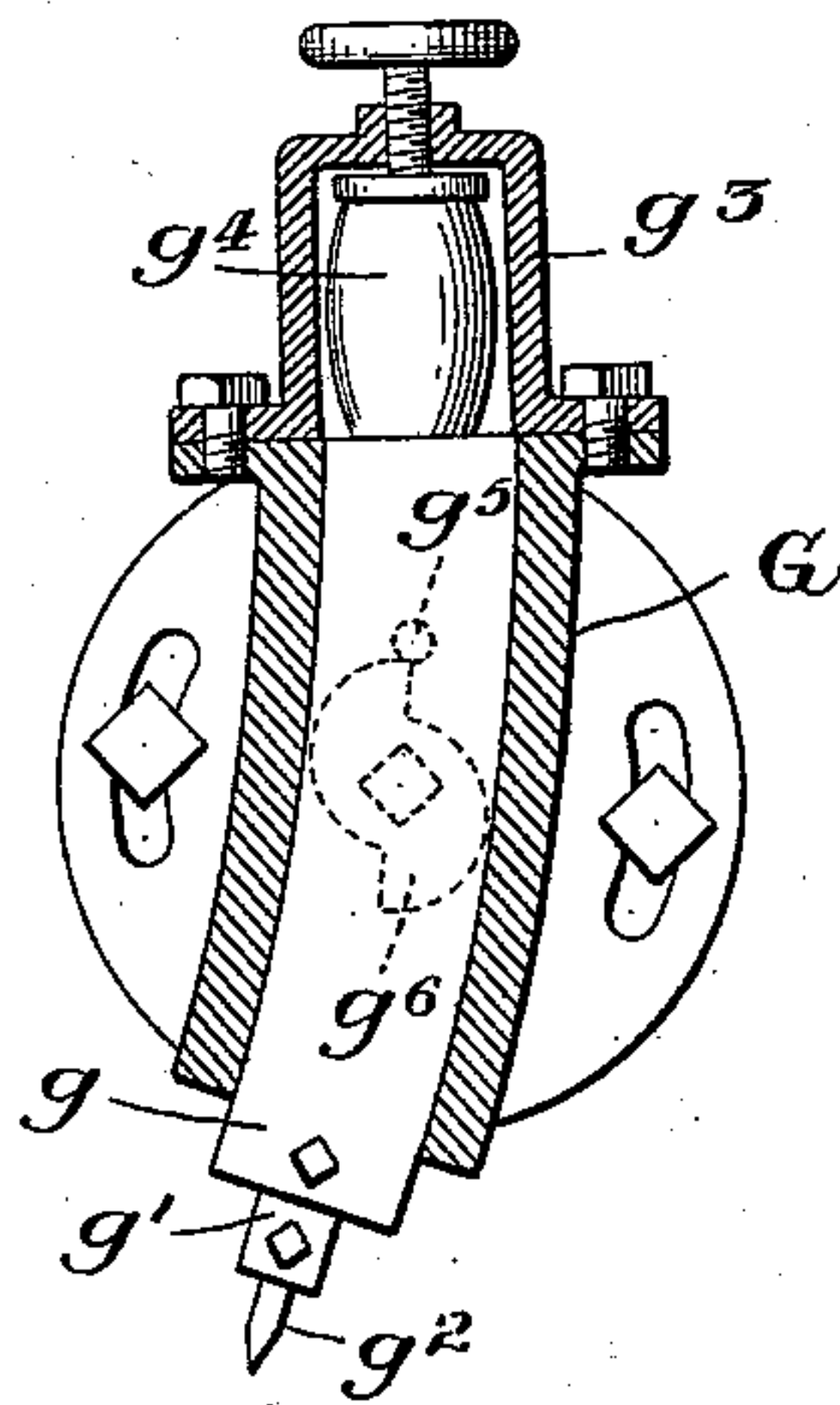


Fig. 5.



Witnesses.

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*Ira S. Heller*

Inventor.

*John Lynch,*  
*per John F. Nolan*  
Attorney.



# UNITED STATES PATENT OFFICE.

JOHN LYNCH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF  
TO CHARLES F. VAN HORN, OF SAME PLACE.

## MACHINE FOR PUNCHING RASPS.

SPECIFICATION forming part of Letters Patent No. 550,078, dated November 19, 1895.

Application filed February 2, 1895. Serial No. 537,048. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN LYNCH, a subject of the Queen of Great Britain and Ireland, (but having declared my intention to become a citizen of the United States,) residing in the city and county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Punching Rasps, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to that class of rasp-punching machines wherein is employed, in conjunction with a reciprocative punch, a laterally and longitudinally movable rasp-supporting slide, the parts being so constructed and organized that the punch in its reciprocations strikes up from the intermittently-moving blank transverse rows of teeth. Such rows being parallel and their teeth being uniformly spaced, there result sharply-defined space-lines between the successive teeth irrespective of the angle or position of the rasp—that is to say, the space-lines run in intersecting angles from edge to edge and end to end of the rasp. The action of the teeth during the use of the rasp is to form grooves in the surface being acted upon instead of uniformly reducing the surface. Hence hand-made rasps with irregularly-arranged teeth, are preferred to machine-cut rasps of the character described.

The object of my invention is to construct a machine whereby rasps with irregularly-arranged teeth shall be automatically produced; and to this end the invention as generally stated consists in the combination, with the punch and other essential elements of the machine, of means whereby an irregular intermittent transverse or diagonal motion is imparted to the rasp-blank.

The invention also comprehends various novel features of construction and organization that will be hereinafter described and claimed.

Referring to the drawings, Figure 1 is a plan of a machine embodying my invention. Fig. 2 is a partial vertical section thereof as on the line  $x x$  of Fig. 1, the cam-drum being shown in elevation and the blank-holding de-

vice removed. Fig. 3 is a front elevation of the machine, partially in section. Fig. 4 is an elevation of the drum and the ratchet mechanism connected therewith. Fig. 5 is a longitudinal section through the punch-case.

A designates the bed of the machine, in which there is formed a diagonal guideway  $a$ . Fitted to this guideway is a slide  $b$ , upon which is formed or supported a longitudinal carrier B for the usual blank-holding slide C, whereby the carrier may be moved diagonally on the bed and the slide be moved longitudinally on the carrier, the movements being at an angle of forty-five degrees to each other, more or less. Rising from the bed-plate at one end of the diagonal guideway is a standard  $a'$ , upon which is supported a stud or bearing  $d$  for a rotatable drum D. In this drum is formed a circumferential camway  $d'$ , the throw or pitch of which is equal to the lateral movement to be imparted to the blank-holding slide. The camway comprises a continuous series of step-like portions 1, the connecting parts 2 of which are so formed as to impart an irregular intermittent step-like action to the carrier during the rotation of the drum, as hereinafter explained.

Engaged with the camway is a roller  $e$  on one end of a diagonally-disposed rod E, the other end of which rod is connected with the slide of the carrier, whereby the movements just mentioned are imparted to the latter. The rod is preferably constructed in two parts, the opposed ends of which are oppositely threaded and are connected with a corresponding threaded turnbuckle  $e'$ . This turnbuckle is toothed similarly to a pinion, and it is engaged by a gear-wheel  $e^2$  on a shaft  $e^3$ , which extends through the carrier and has its bearings in a bracket on the bed-plate. The outer end of the shaft is provided with a hand-wheel  $e^4$ , whereby the shaft may be readily turned in a manner to operate the turnbuckle, and thus effect the lengthening or the shortening of the rod for a purpose hereinafter stated.

The driving-shaft F is mounted in a standard  $a^2$  on the bed-plate, motion being imparted to the shaft from a suitable source of power. On the outer end of this shaft is a skew-gear  $f$ , with which engages a corresponding gear  $f'$



on a lower sleeve  $f^2$ , the axis of which is preferably parallel to that of the drum, as seen. On the outer end of the sleeve are two oppositely-projecting tappet-arms  $f^3$ , which during the rotation of the sleeve travel adjacent to the inner face of the drum. On this face of the drum, near its periphery, is a series of tappet-studs  $d^2$ , set at regular intervals apart, whereby, during the rotation of the tappet-arms they successively engage the studs and advance the drum step by step to effect the intermittent traverse of the carrier, as above described.

Bolted to a flange  $a^3$  on the standard  $a^2$  is a curved casing  $G$ , in which is fitted a correspondingly-shaped plunger  $g$ . To the lower end of this plunger is secured the stock  $g'$  for the usual punch  $g^2$ . Contained in a cap  $g^3$  on the casing is the pressure-gum  $g^4$ , which is similar in construction and operation to that used in file-cutting machinery of well-known construction. On the plunger is a pin or stud  $g^5$ , which extends into the path traversed by a cam-head  $g^6$  on the end of the driving-shaft; whereby during the rotation of the shaft the plunger is periodically raised by the cam and forcibly depressed by the pressure-gum. This punch-reciprocating mechanism being old, no detailed description thereof is necessary. The curved form of casing and plunger is new, however, in this relation, the object being to effect a stroke of the punch closely approaching that given thereto by the stroke of a hammer in hand-work, the teeth thus produced being more efficient and desirable than those heretofore made by rasp-punching machines.

As above explained, the blank-bearing slide is moved diagonally in irregular steps by the action of the cam-drum. Hence the successive teeth will be cut by the punch at irregular intervals. If the hand-wheel  $e^4$  be turned from time to time, as above stated, the irregular disposition of the teeth will be still more effectually insured.

The longitudinal traverse of the slide  $C$  is effected by means of a screw  $H$ , having its bearings in laterally-extending brackets or lugs  $b' b^2$  on the carrier, the slide being provided with a suitably-disposed nut portion  $c$ , through which the screw extends. The upper part of the nut comprises a separate cap-piece  $c'$ , supported on the inner arm of a thumb-lever  $c^2$ , fulcrumed to a lug on a projecting handle portion  $c^3$ , the outer member of the lever being held in the raised or operative position by means of a spring  $c^4$ , interposed between the same and the handle. Hence by grasping such handle and depressing the outer arm of the lever the cap will be disengaged from the screw, so as to permit the ready adjustment of the slide to any point throughout the length of the screw. On one end of the screw is a bevel-wheel  $h$ , with which coacts a corresponding wheel  $h'$  on an extensible shaft  $h^2$ , the latter having its bearings in a standard  $a^4$  and

the bracket  $b^2$ , respectively. On the opposite end of the shaft is a pinion  $h^8$ , with which engages a spur-wheel  $h^3$ , whereby during the intermittent rotation of the spur-wheel the shaft  $h^2$  is turned to effect through the intermediate gear-wheels the operation of the screw. Engaging with the teeth of the spur-wheel is a pawl  $h^4$  on one arm of a lever  $h^5$ , the other arm thereof being connected by means of a link  $h^6$  with one arm of a bell-crank lever  $h^7$ , fulcrumed on a standard adjacent to the outer face of the drum. The other arm of the lever  $h^7$ , is provided with a roller that engages an appropriate cam-groove  $d^3$  in the face of said drum, whereby during the rotation of the latter the lever is actuated to effect the reciprocation of the pawl and perforce the intermittent advancement of the spur-wheel.

The shaft  $h^2$  is extensible, as above stated, so that it will permit the requisite lateral or diagonal traverse of the carrier. In the present instance the shaft comprises two end sections 3 3, coupled by two telescoping splined sections 4 4, which are connected to the end sections by universal joints 5 5. (See Fig. 1.)

I claim—

1. In a machine for punching rasps, the combination with a punch and its supporting and operating parts, of a carrier slide mounted to move in a diagonal way or guide of the bed plate, means for imparting an irregular step by step movement to said slide, a blank holding device mounted on said slide and movable longitudinally at an angle to the movement of said slide and also movable therewith, and means for operating the said device, substantially as specified.

2. In a machine for punching rasps, the combination with a punch and its supporting and operating parts, a blank holding device arranged to move longitudinally and laterally beneath the punch, a carrier which supports said device and which is movable diagonally with relation to the longitudinal movement of the said device, to effect the lateral movement of said device, and means for imparting an irregular step-by-step movement to the said carrier and for advancing the said blank holding device at predetermined intervals, substantially as specified.

3. In a machine for punching rasps, the combination with the punch and its supporting and operating parts, of a carrier mounted to move laterally of the punch in a diagonal way or guide of the bed, means for imparting an irregular step-by-step movement to the said carrier, a blank holding device mounted on said carrier, and an auxiliary device for varying the movement of the said carrier, substantially as specified.

4. In a machine for punching rasps, the combination with the bed having a diagonal way or guide, of a carrier mounted in said way or guide, a blank holding device mounted on said carrier, a cam drum, a connection be-



tween the said drum and the slide, and means for varying the length of said connection, substantially as specified.

5. The combination with the bed and the diagonally movable carrier thereon, of a drum provided with a circumferential cam-way, comprising a continuous series of step-like projections, means for rotating the said drum, and adjustable connection between said drum and the carrier, and a blank holding device on said carrier capable of a longitudinal movement with relation thereto, substantially as specified.

6. In a machine for punching rasps, the combination of a bed having a diagonal guide way, of a carrier slide mounted to move in said guide way, means for imparting an irregular movement to the said slide, and a blank-holding device mounted on the said carrier and arranged to move longitudinally thereon at an angle to the movement of the said carrier, and also with said carrier slide, substantially as specified.

7. The combination of the horizontal bed having a diagonal guideway, and the carrier mounted to slide in said guideway, of a cam-drum, gear and tappet mechanism for actuating the said drum, a two-part rod connecting the drum and the carrier, a toothed turn-buckle which adjustably connects the ends of the rod sections, and a gear wheel engaging the said turn-buckle and provided with means whereby it may be actuated, substantially as specified.

8. The combination with the horizontal stationary bed having a diagonal guide way therein, the carrier mounted in said way, and means for imparting an irregular step-by-step movement to the said carrier, of the blank holding carrier mounted to move longitudinally on the said carrier and also therewith, a screw-shaft mounted on the said carrier and operatively connected with the blank holding slide, and means for actuating the said shaft, to advance the said slide at predetermined intervals, substantially as specified.

9. The combination with the bed, having a diagonal guide way, the carrier slide mounted thereon, means for actuating said slide, the blank holding device mounted on said carrier and adapted to move longitudinally upon said carrier and also diagonally therewith, and means for advancing the blank holding slide at predetermined intervals, together with the curved guide or case mounted on said bed, the punch bearing plunger in said guide or case, and means for actuating the said plunger, substantially as specified.

10. The combination of the bed having the diagonal guideway, the main driving shaft mounted on said bed, the cam drum, the tappet device for actuating said drum, gearing between said tappet device and the main shaft, the carrier slide mounted to move in the said guide way, an adjustable rod connecting the said drum and slide, a blank holding device mounted to move longitudinally on the said carrier and also therewith, a screw shaft mounted on said carrier and operatively engaging the said blank holding device, an extensible, universally jointed shaft geared to said screw shaft, and gearing between said extensible shaft and the said cam drum, substantially as specified.

11. The combination with a carrier capable of a movement in a diagonal path, and a blank holding slide movably carried thereby, of a screw shaft engaged with the said slide, a cam drum, an extensible jointed shaft geared with the screw shaft, gear on said extensible shaft, a pawl engaging the said gear, and a connection between the said drum and said pawl whereby the latter is actuated to operate the said pawl, substantially as specified.

In testimony whereof I have hereunto affixed my signature in the presence of two subscribing witnesses.

JOHN LYNCH.

Witnesses:

JOHN K. NOLAN,  
ANDREW V. GROUFE.