

(No Model.)

4 Sheets—Sheet 1.

H. A. HENDERSON.  
HEEL TRIMMING MACHINE.

No. 281,691.

Patented July 24, 1883.

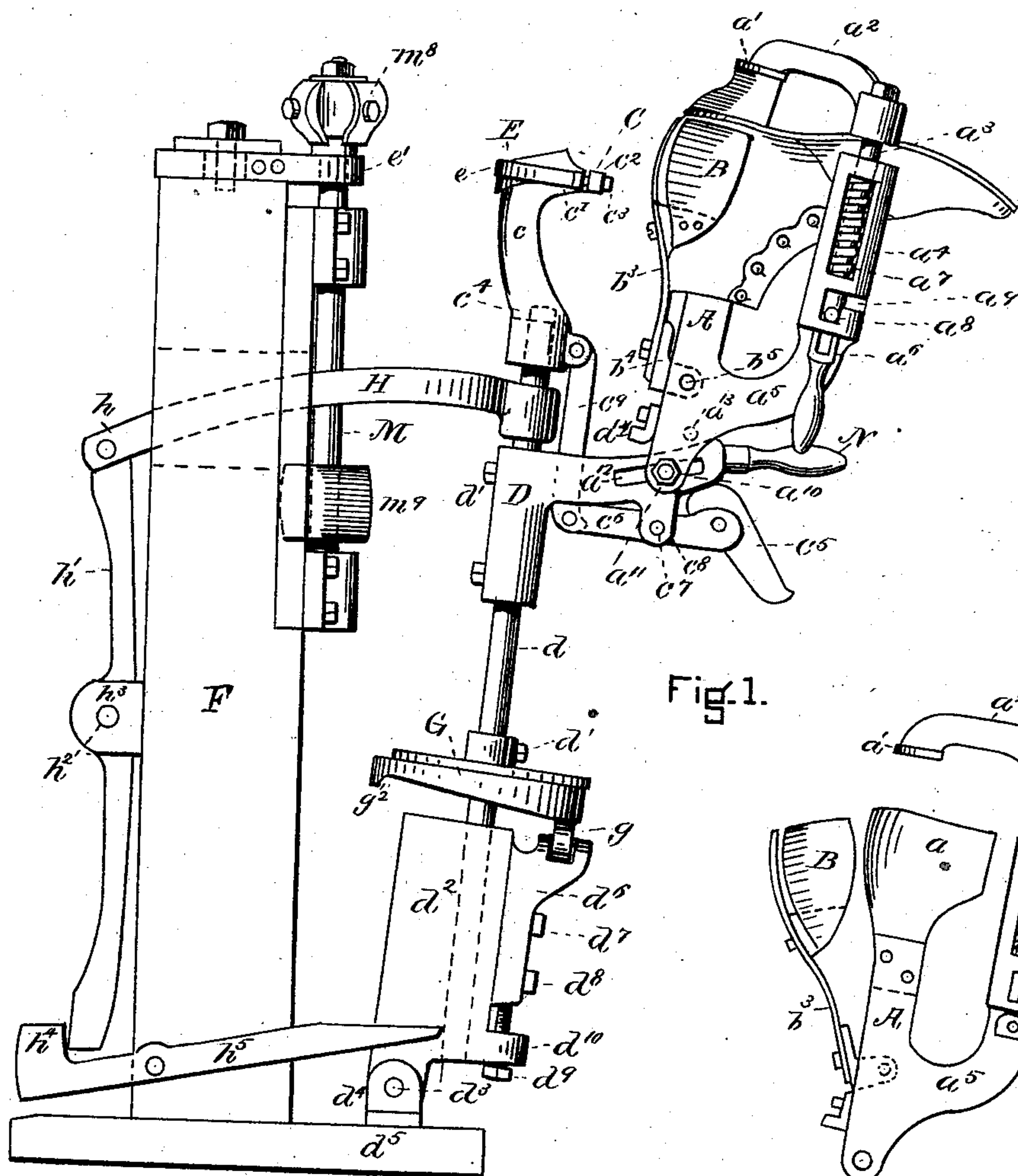


Fig-1.

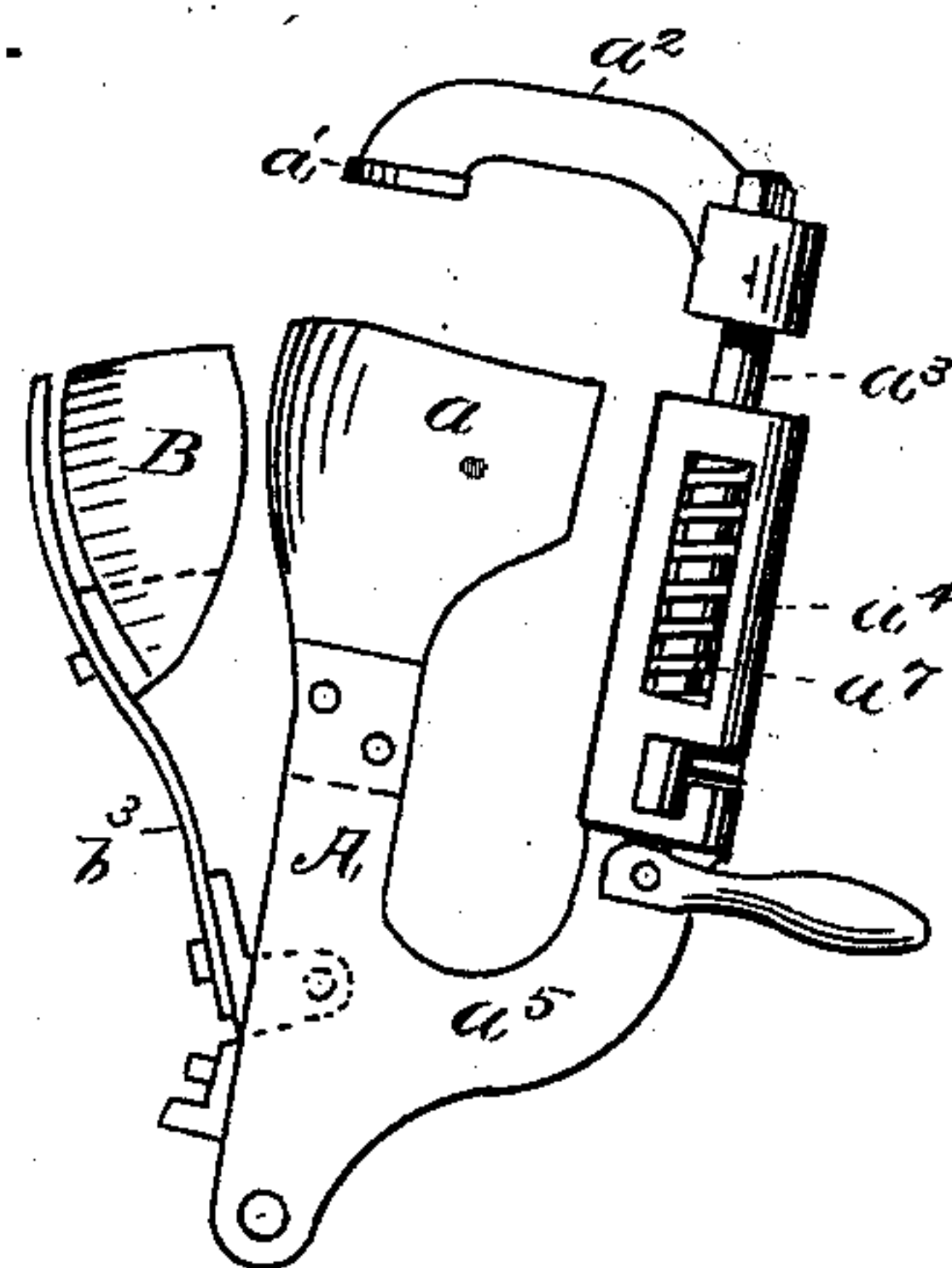


Fig. 10.

WITNESSES

WITNESSES  
*A. A. Raymond 2<sup>d</sup>*  
*A. J. Ottinger*

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Henry A. Henderson.

(No Model.)

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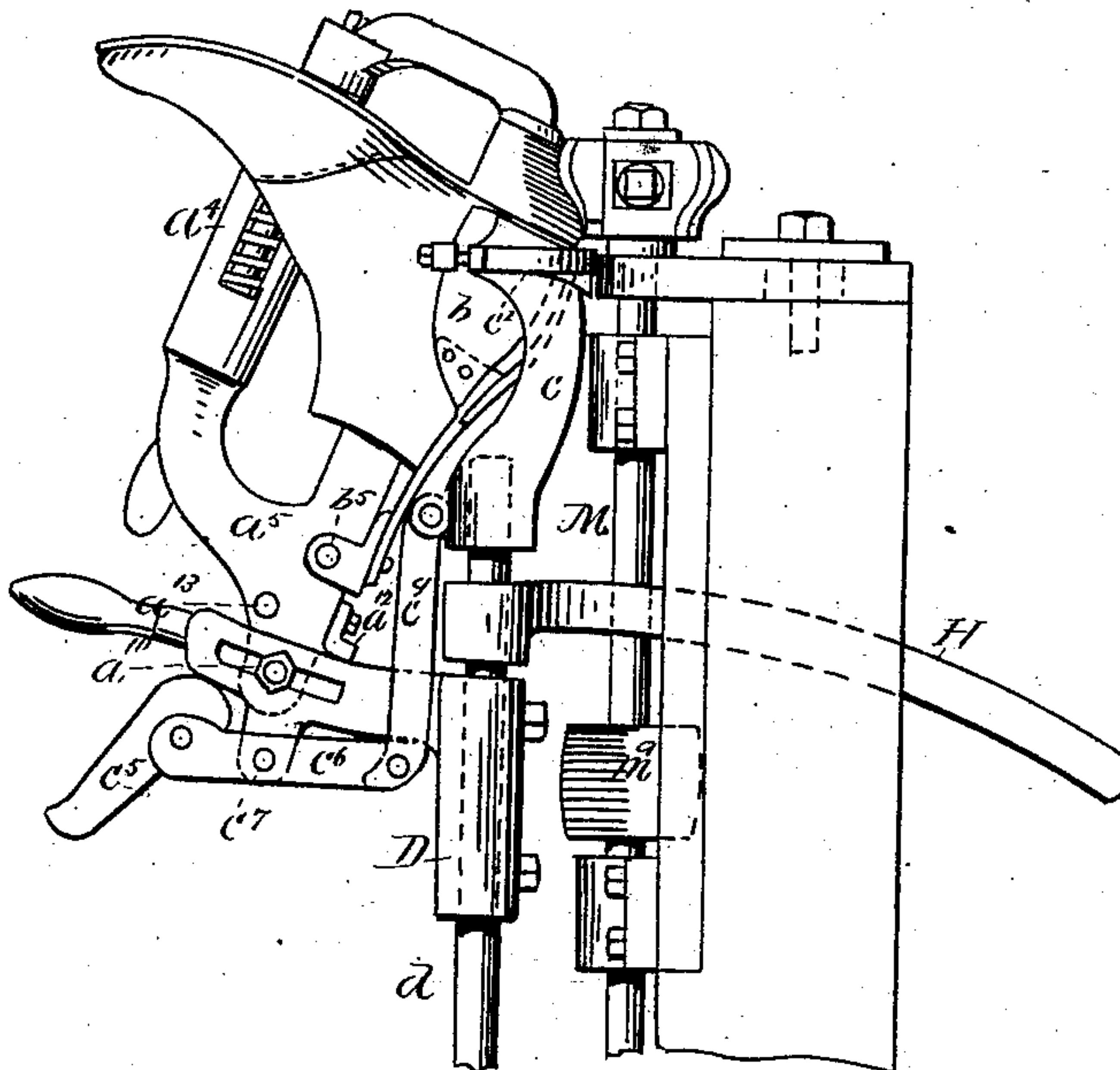


Fig. 2.

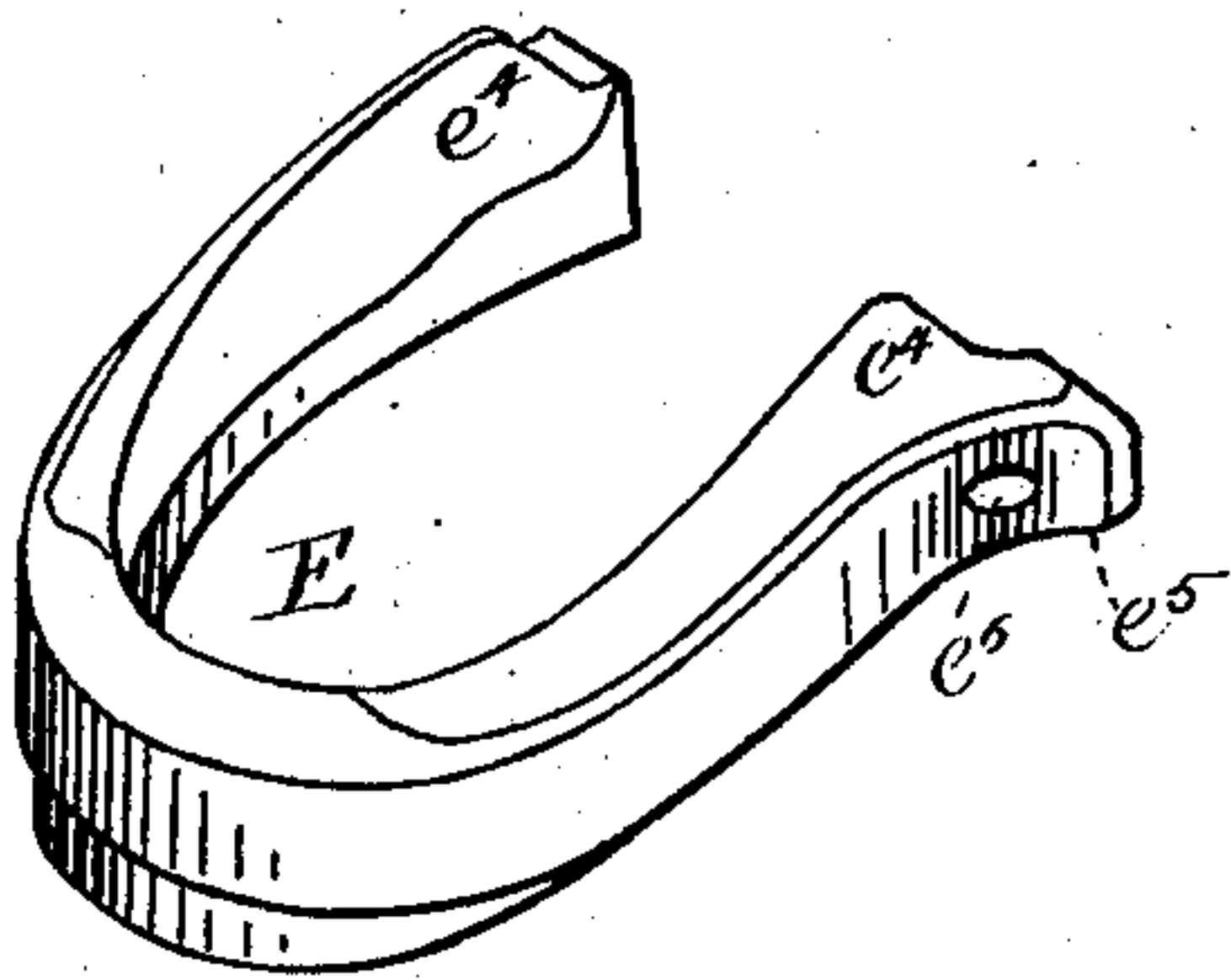


Fig. 3.

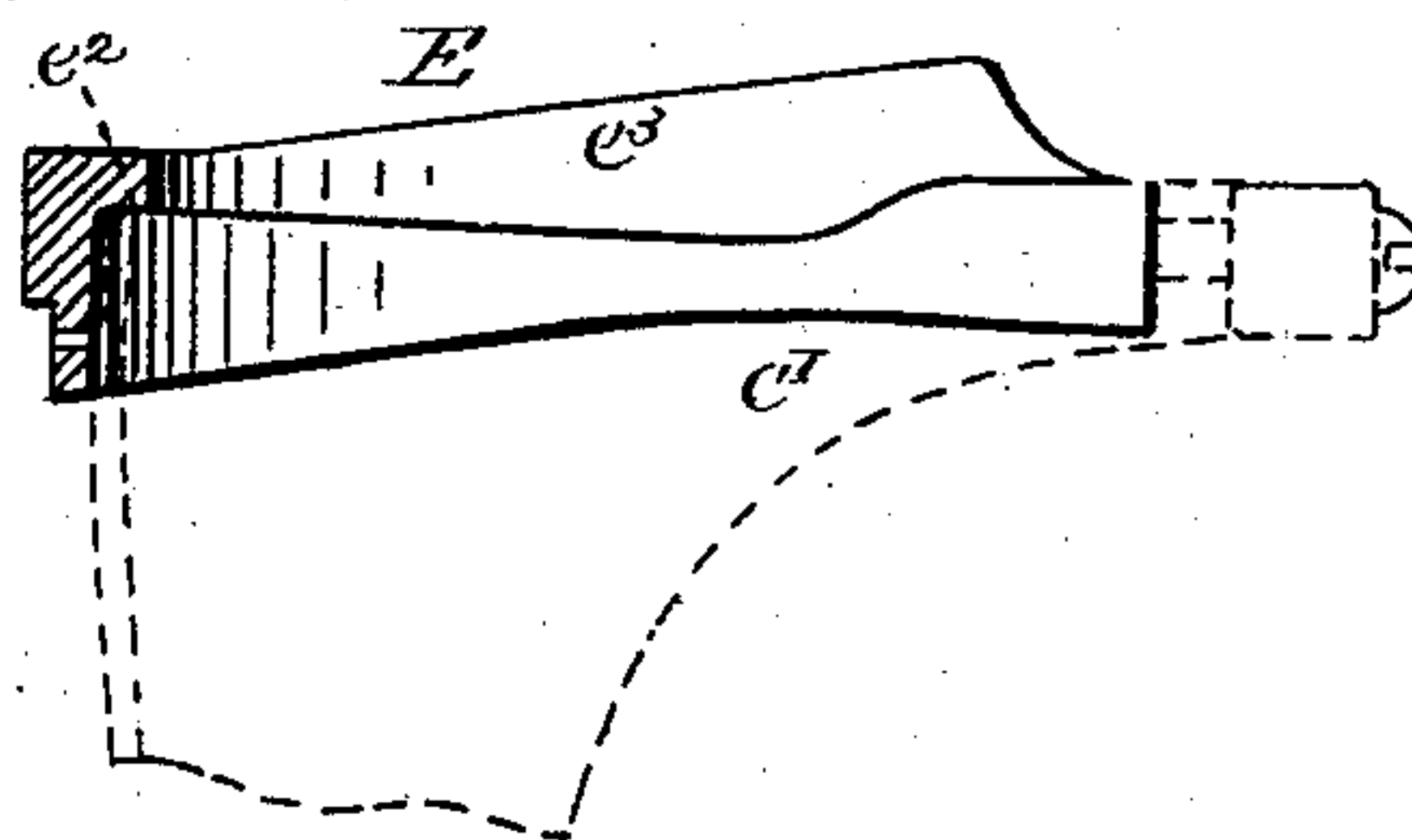


Fig. 4.

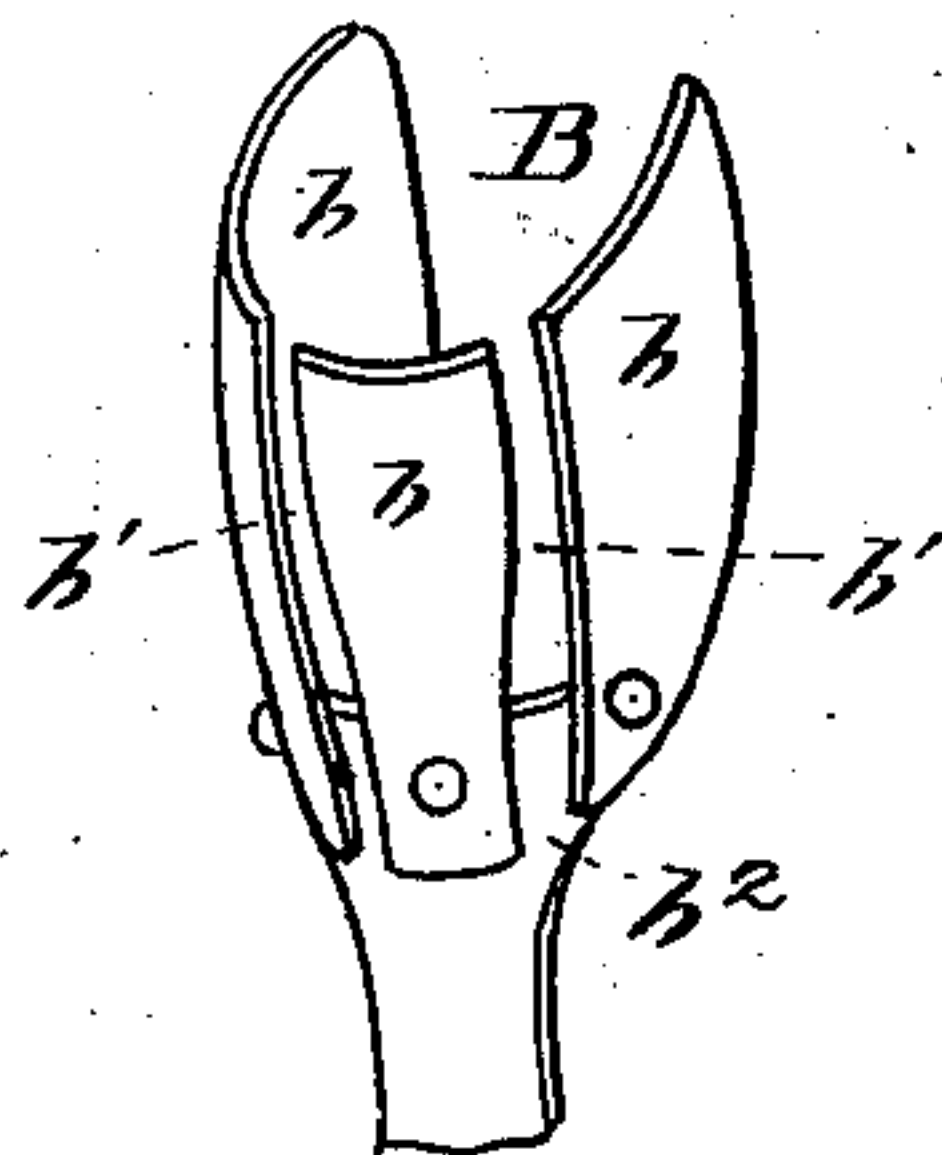


Fig. 5.

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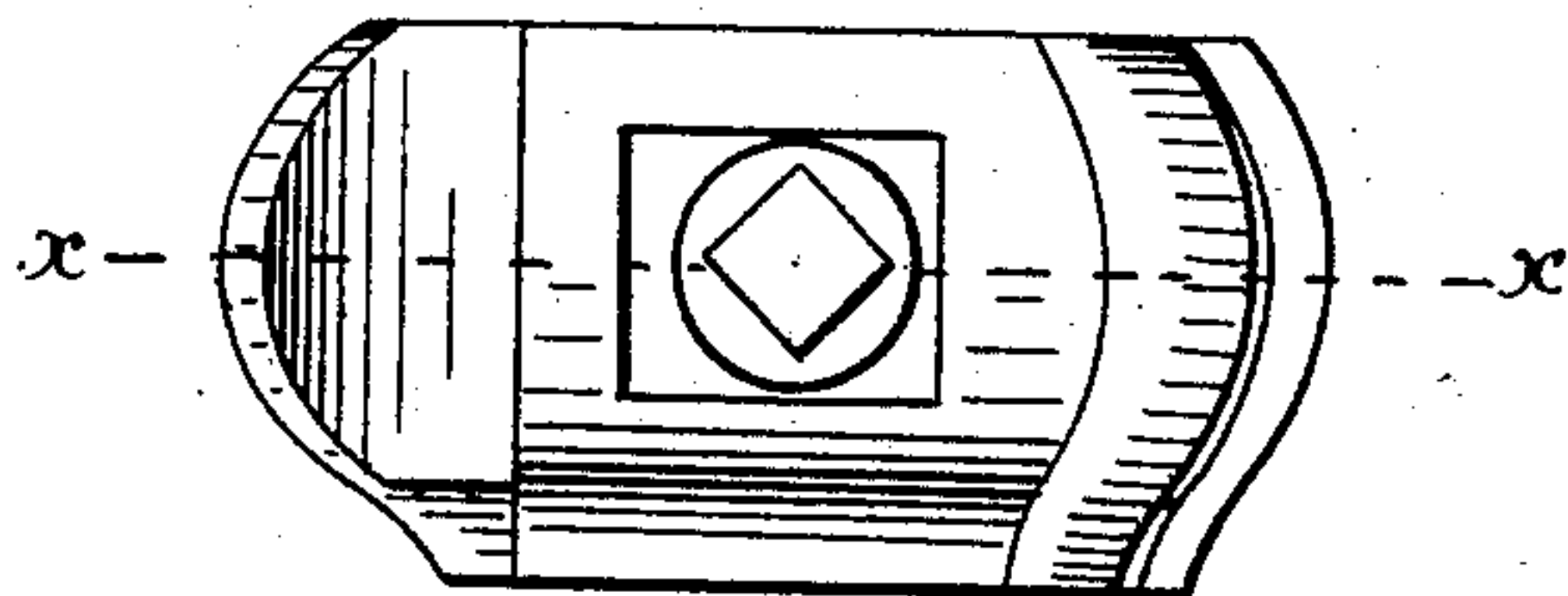


Fig. 6.

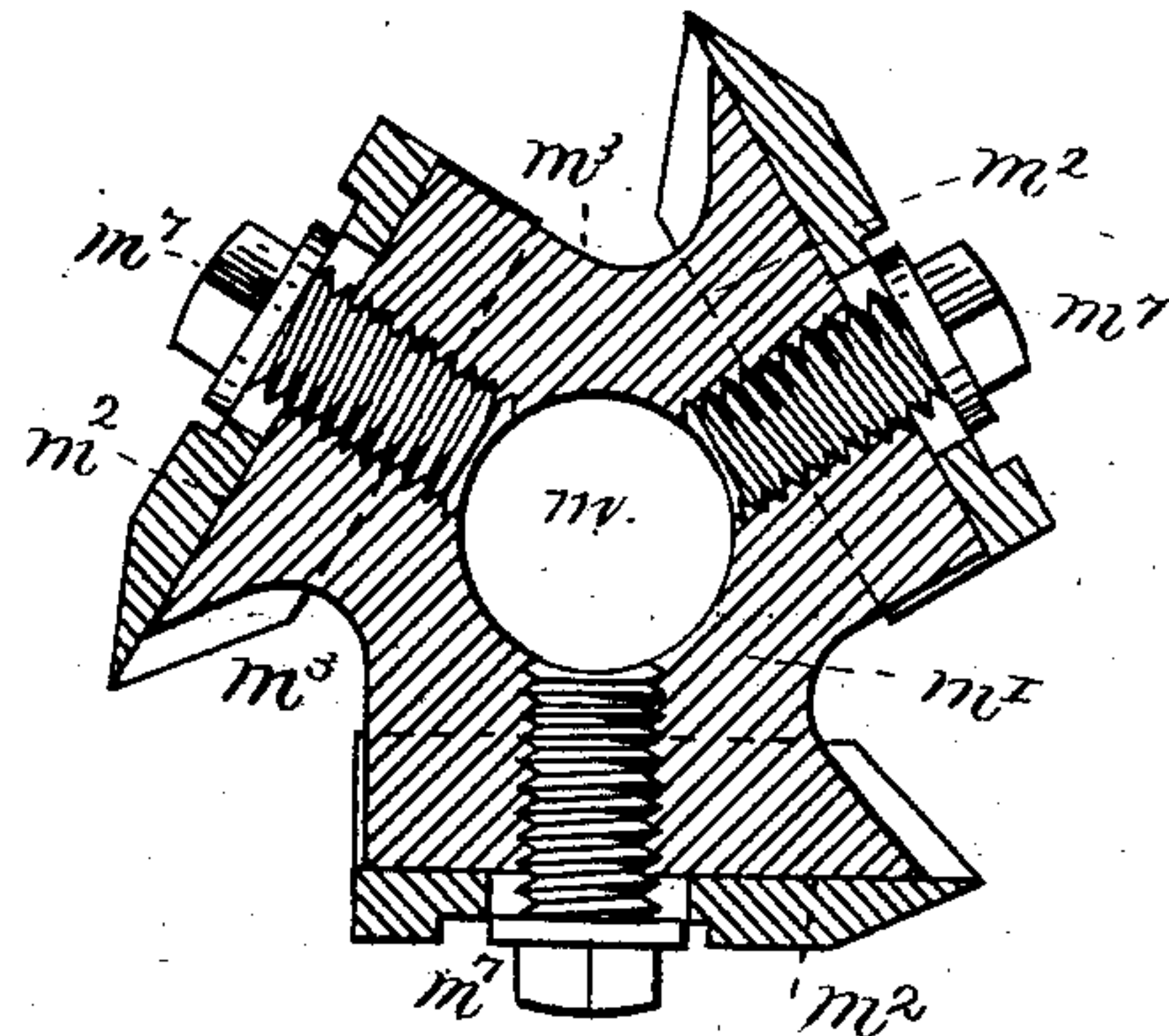


Fig. 7.

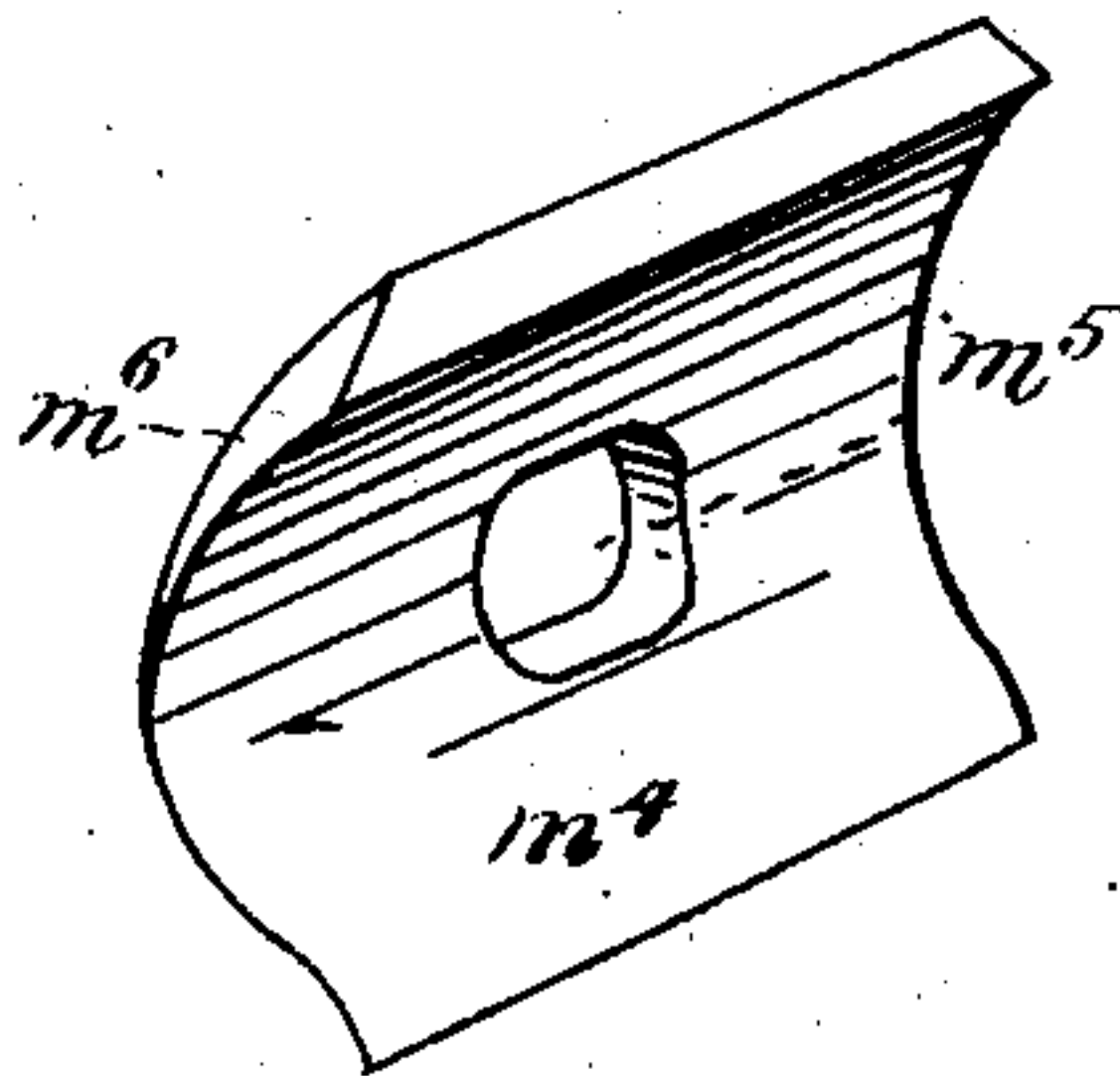


Fig. 8.

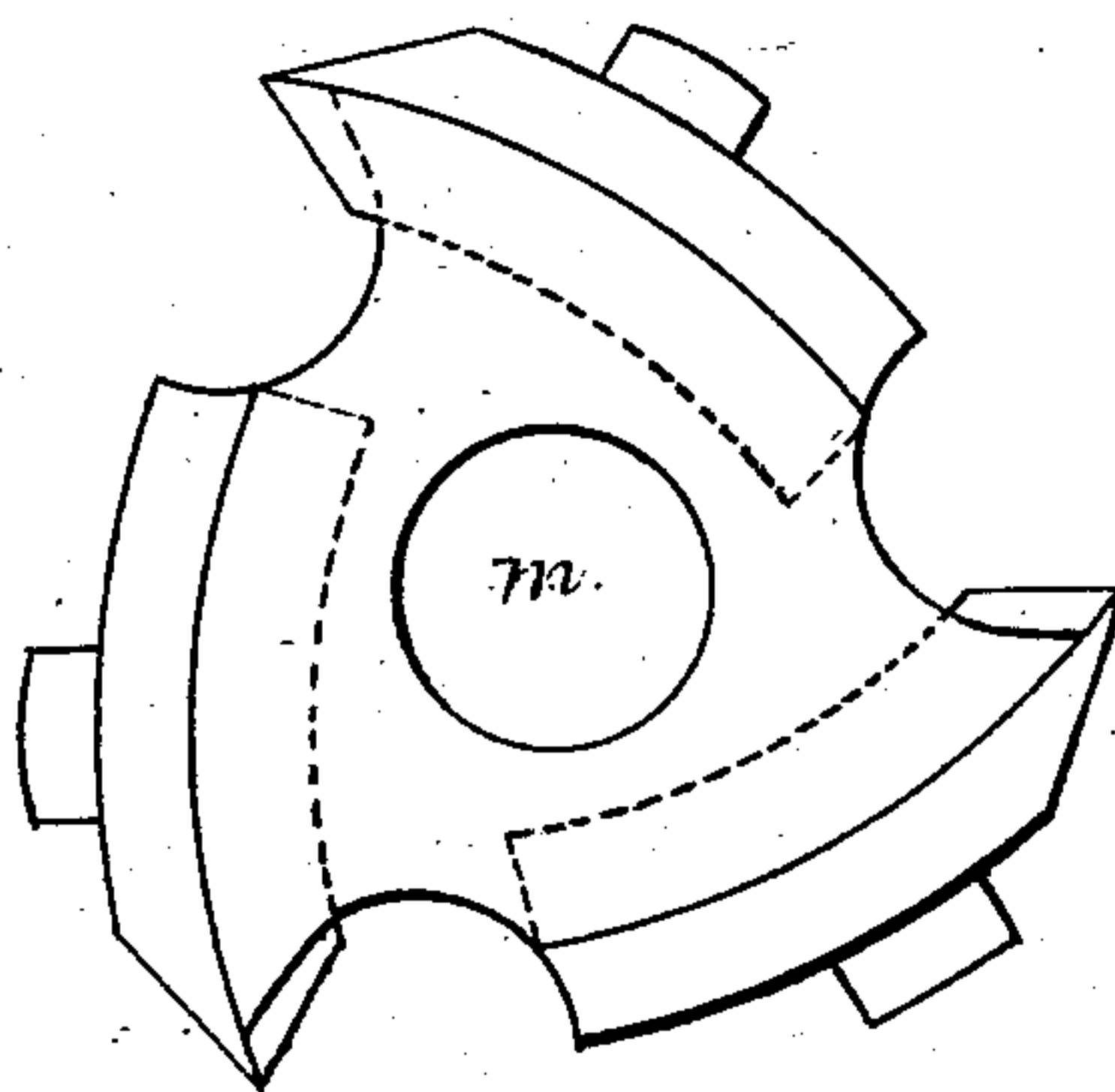


Fig. 9.

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(No Model.)

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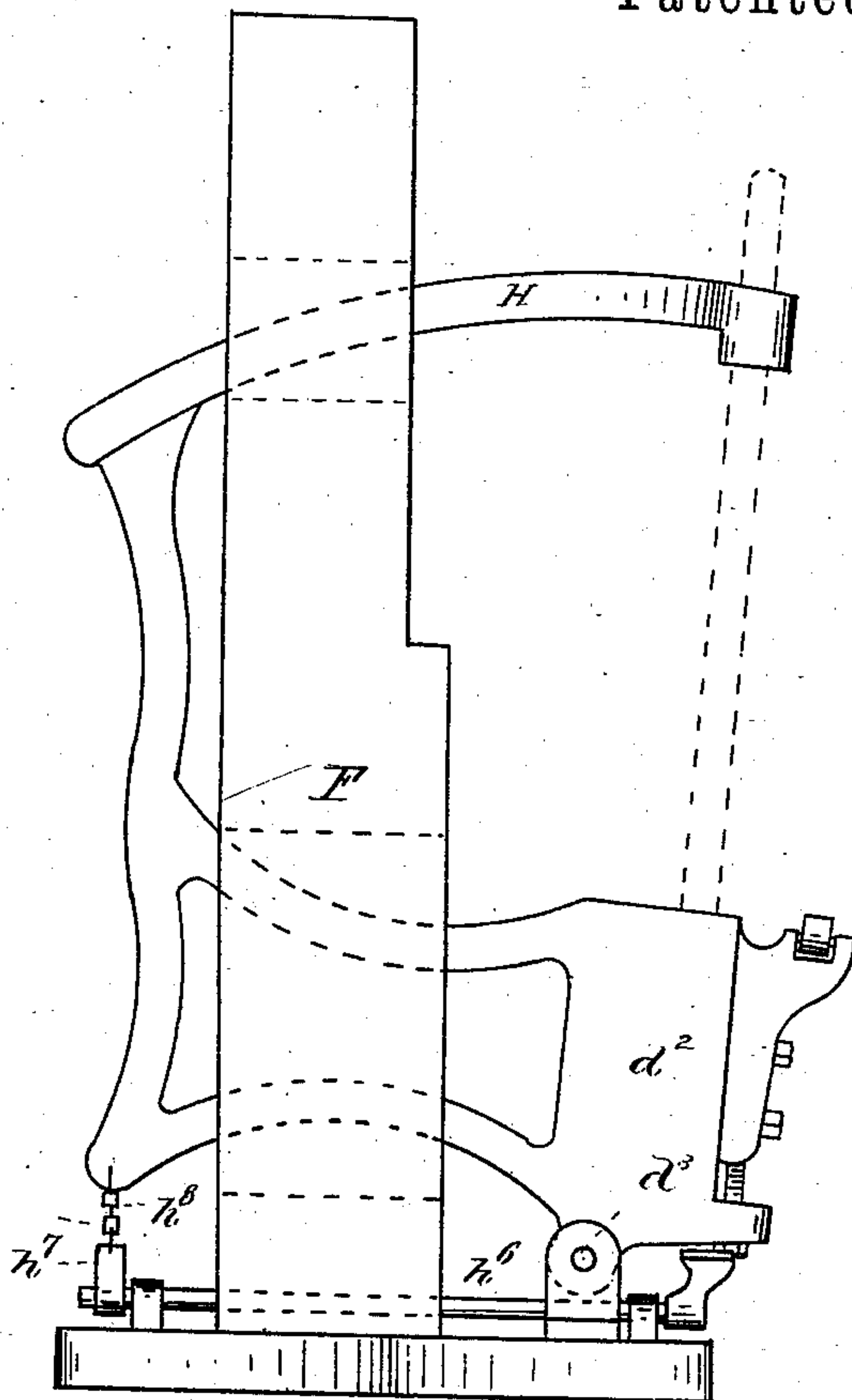


Fig. 11.

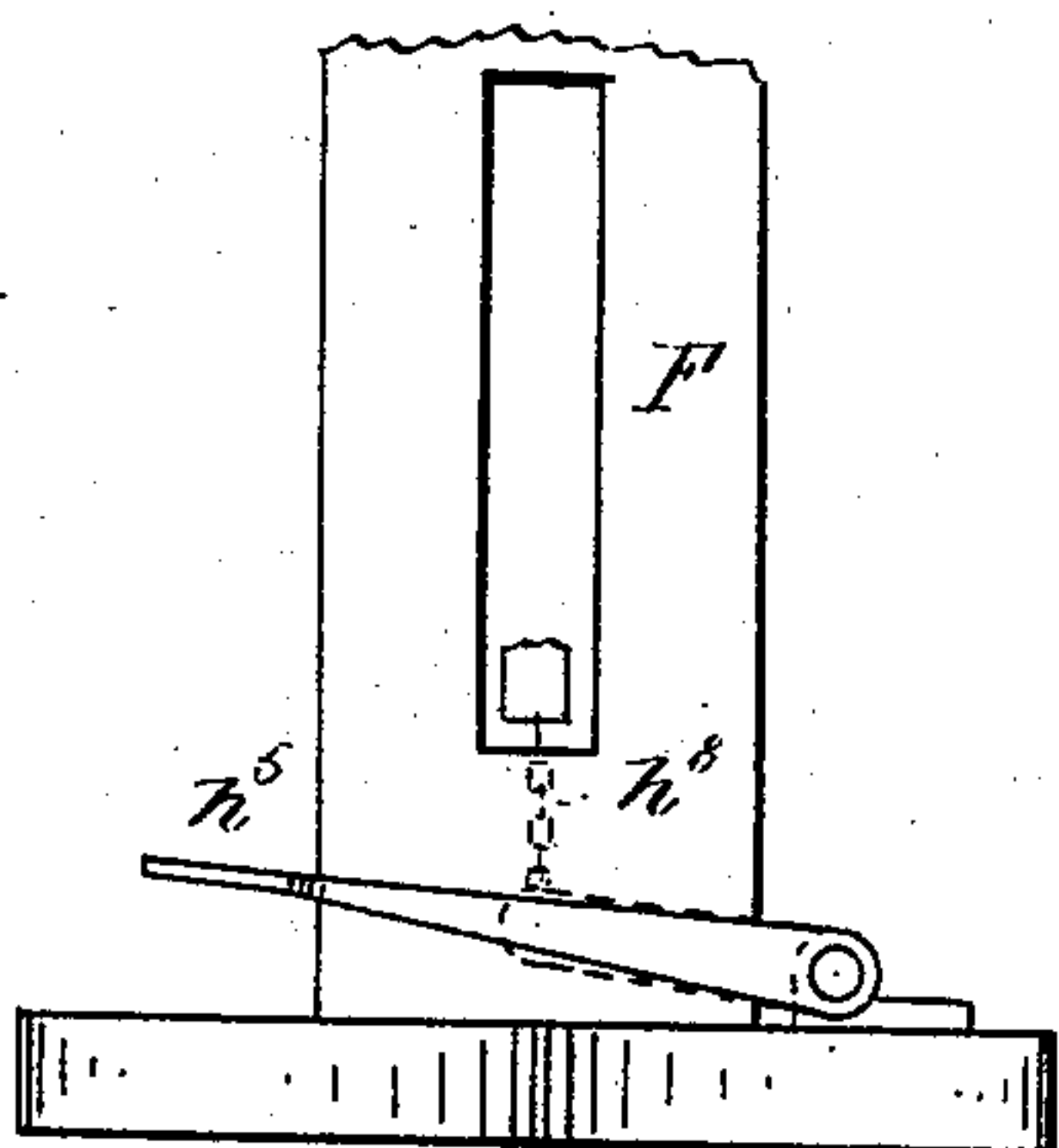


Fig. 12.

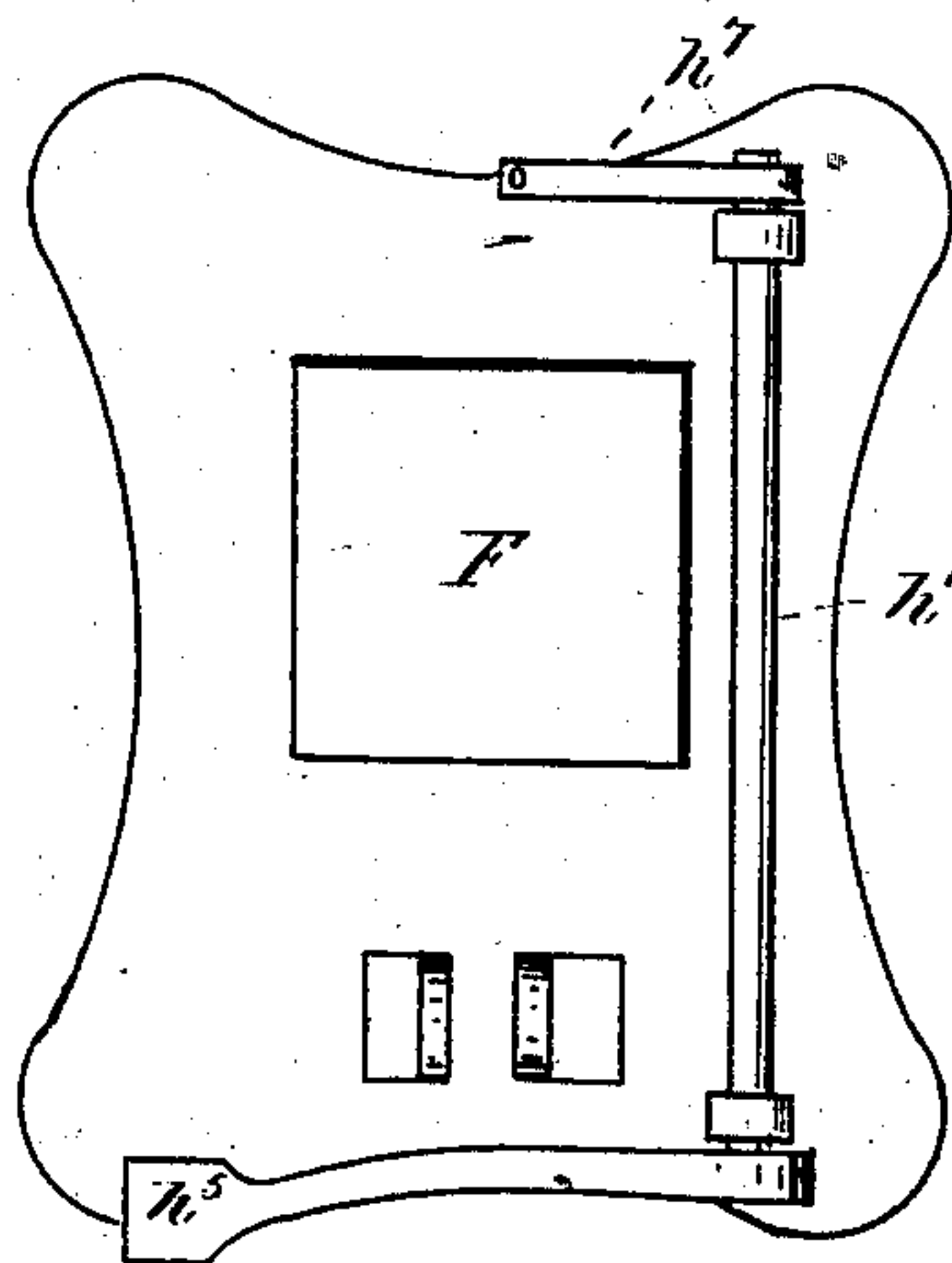


Fig. 13.

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*Henry A. Henderson*



# UNITED STATES PATENT OFFICE.

HENRY A. HENDERSON, OF LYNN, ASSIGNOR TO F. F. RAYMOND, 2D,  
TRUSTEE, OF NEWTON, MASSACHUSETTS.

## HEEL-TRIMMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 281,691, dated July 24, 1883.

Application filed October 21, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY A. HENDERSON, of Lynn, in the county of Essex and Commonwealth of Massachusetts, a citizen of the United States, have invented a certain new and useful Improvement in Heel-Trimming Machines, of which the following is a full, clear, and exact description, reference being made to the accompanying drawings, forming a part of this specification, in explaining its nature, in which—

Figure 1 represents an elevation of one side of my machine, showing a shoe jacked but not presented to the heel-trimming mechanism. Fig. 2 is an elevation of a portion of the side of the machine, showing the heel presented to the shaping device. Fig. 3 is a perspective of a detachable guide, enlarged, hereinafter described. Fig. 4 is a view of the said guide, part in section and part in elevation, also representing in dotted outline the portion of the machine to which it is secured. Fig. 5 is a perspective of the heel-holder, enlarged. Fig. 6 is an elevation of the cutter-head employed. Fig. 7 is a cross-section thereof on the line  $x x$  of Fig. 6. Fig. 8 is a perspective of one of the knives or blades of the cutter-head. Fig. 9 is a plan of a cutter-head, showing a modification in the form of the knives or blades and their supporting-block. Fig. 10 is an elevation of a portion of the jacking mechanism. Fig. 11 is an elevation representing a modification in the device for holding and removing the post upon which the jack is mounted. Fig. 12 is a detail view, and Fig. 13 is a plan of the treadle and connecting devices.

This invention is an improvement upon the heel-trimming mechanism described in Letters Patent granted Hollis C. Paine and myself, No. 220,920, dated October 28, 1879, and in Letters Patent granted me, No. 224,533, dated February 17, 1880, and in my application for patent filed December 8, 1879. It differs from the contrivances therein described in the form, construction, and operation of the cutter-head, in the manner of supporting the jacking mechanism and presenting it to the cutter-head, and in various details in the construction of the jacking mechanism and other parts of the machine, more fully described hereinafter.

The three things which I deem desirable in

a heel-trimming machine, and which I have incorporated in mine, are: first, jacking devices simply, easily, and quickly operated, and adjustable to varying sizes of shoes or boots; second, mechanism for supporting the jack which permits the jack to be accurately, speedily, and safely presented to and withdrawn from the cutter-head; third, a cutter-head which cuts with a drawing or shaving cut, and devices for moving the heel vertically up and down in relation to the cutter-head while the trimming progresses.

The jacking mechanism is very like that described in my application above named; and it consists in the post A, which supports the stump  $a$ , or a last-pin for supporting a last, the downhold  $a'$  upon the end of the curved arm  $a^2$ , which, with the arm, is provided with a vertical movement by means of the rod  $a^3$  in the sleeve  $a^4$ , supported by the arm  $a^5$ , projecting outwardly and upwardly from the post A, the cam-lever  $a^6$ , and the spring  $a^7$ , which surrounds the rod  $a^3$  and serves to hold the heel-downhold above the heel.

The pin  $a^8$  on the rod  $a^3$  and the slot  $a^9$  in the sleeve  $a^4$  serve two purposes: first, to provide for the vertical reciprocating movement of the downhold  $a'$  in one direction or on one line only—viz., upon the same line with the stump or spindle  $a$ ; second, to serve, when the downhold is lifted from the heel, to allow of its horizontal or swinging movement upon the center of the rod  $a^3$  away from the heel.

It will be observed that the shoe or boot is presented to the cutter-head inverted, that the stump is inserted within the shoe or the pin within the hole in the last if the heel of the shoe is to be trimmed with the last in the shoe, and that the side conformation of the stump is such that it acts to properly gage or place the last by the contact of the inner vertical portion of the heel part of the shoe with the vertical sides and back of the stump or last; also that the heel-downhold has a vertical movement in relation to the stump, and that in action it bears upon the upper surface of the inverted heel and compresses it firmly upon the top of the stump or bed.

In order that the varying sizes of shoes may be jacked without removing the stump and substituting another of larger or smaller size,



as the case may be, I have devised a stump which is expansible, and which I shall make the subject-matter of another application for patent.

5 As much pressure may be exerted upon the heel by the downhold  $a'$  as is desirable, and I prefer that the heel be compressed to a considerable extent by it before the trimming, in order to solidify the substance of the heel as  
10 much as possible.

The downhold  $a'$ , if desired, may act as a pattern or gage by which the conformation of the lower lift of the heel is determined, in connection with the patterns hereinafter described.  
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Thus far the jacking mechanism bears a considerable resemblance to the mechanism described in my said application. It is further provided, however, with a heel-holder, B, which consists of one or more thin metallic plates curved to approximate the form of the upper of the boot or shoe from or near the outsole upwardly toward the ankle. In Fig. 5 I have represented this holder B in perspective, and as having the side and end sections,  $b$ , separated by a space,  $b'$ , between the heel and side sections. This construction allows the holder to be adjusted upon the upper, as hereinafter described. The plate or plates is  
20 or are fastened to the curved support  $b^2$  upon the upper end of the arm  $b^3$ , and this arm is secured to the bracket  $b^4$ , which is pivoted or hinged at  $b^5$  to the post A in a manner to permit the holder to swing from and to the back  
25 of the stump  $a$ .

To jack the shoe it is inverted and placed over and upon the stump; or, if a last is used, the last is placed upon the spindle. The downhold is then moved horizontally and downwardly upon the heel, and the holder B moved against the heel portion of the upper to the position shown in Fig. 1, and the post A is then swung upon the center  $a^{10}$  toward the curved heel receiver or rest C, over which the heel-holder and stump rest, and by its upward  
30 movement the holder is compressed firmly against the last or stump within the shoe.

It will be observed that the heel-holder B acts in two capacities: first, as a protector for preventing injury to the upper-leather as it is being pushed into the heel receiver or rest, and while said heel receiver or rest is being lifted vertically and during the trimming operation; and, second, as a medium interposed  
35 between the inner surface of the heel-receiver and the shoe to enable the heel-receiver to snugly fit the stump or last and bring the heel portion of the upper of the shoe between it and the stump or last, thereby adjusting the heel-downhold in rigidly holding the shoe during the trimming operation.

The post A is supported by the bracket D, carried by the post  $d$ , and it is secured thereto by a bolt,  $a^{11}$ , which acts also as the pivot  
40  $a^{10}$ . A slot,  $a^{12}$ , in the bracket allows the center or pivot  $a^{10}$  to be moved in and out in relation to the post  $d$ , whereby the inclination

of the top or bed of the stump, and consequently of the heel, may be varied, thereby increasing or decreasing the offset or vertical contour of the heel. The post has an adjustable stop,  $a^{14}$ , which is adapted to contact with the upper surface of the bracket D for limiting the extent of the rocking movement on the pivot  $a^{10}$  toward the heel-receiver, and a stop,  $a^{13}$ , which also contacts with the upper surface of the bracket D in limiting the extent of its outward movement from the heel-receiver.  
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The heel receiver or rest C consists of the metallic frame  $c$ , which is provided with the arms  $c'$ , each of which is provided with a lug,  $c^2$ , which projects horizontally and outwardly therefrom for supporting the bolt  $c^3$ , by which the removable pattern E is fastened to the frame. The frame is further provided with the vertical cylindrical hole  $c^4$ , into which the upper end of the post  $d$  enters, and the frame, with the pattern E, has a vertical movement upon the upper end of the post by means of the cam-lever  $c^5$ , the lever  $c^6$ , pivoted at  $c^7$  to the bracket  $c^8$ , depending from the bracket D, and the link  $c^9$ , which connects the end of the lever  $c^6$  with the lower end or side of the frame  $c$ . The upper surface of the frame is level, and it forms a rest for the pattern E. The pattern is represented in perspective in Fig. 3 and in section and elevation in Fig. 4. Its outer surface,  $e$ , in connection with the pattern  $e'$ , against which it bears when the jack is moved to the cutter-head, acts as a guide and gage. The lower surface,  $e^2$ , of the projecting upper part,  $e^3$ , bears upon the upper surface of the frame  $c$ . The upwardly-projecting portions  $e^4$  serve to bear against the outer surface of the sides of the heel-holder, and to compress it against the upper and stump or last. The outwardly-projecting portions  $e^5$  at each end contain a screw-hole,  $e^6$ , into which the fastening bolt or screw  $e^7$  enters, and by which the pattern is fastened and adjusted horizontally upon the frame. A pattern of this shape, provided with horizontal adjustment, will answer for two or three consecutive sizes of shoes. For other sizes, either larger or smaller, larger or smaller patterns are used. As it is made of cast metal, and is very easily detachable from the frame  $c$ , the change does not involve much expense or trouble.  
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The bracket D is vertically adjustable on the post  $d$  by means of the set-screws  $d'$ . The post  $d$  has a long bearing at its lower end in the block  $d^2$ , which is hinged at  $d^3$  to a bracket,  $d^4$ , projecting upwardly from the base-plate  $d^5$  to swing to and from the post F. This block  $d^2$  supports a bracket,  $d^6$ , which is vertically adjustable thereon by means of the screws  $d^7$ ,  $d^8$ , and a vertical slot or slots in the bracket, and the adjusting-screw  $d^9$ , which is held by the projection  $d^{10}$  from the block  $d^2$  and bears against the under surface of the bracket  $d^6$ . The bracket  $d^6$  supports the anti-friction wheel  $g$ , and the post  $d$  has secured to it, by the set-  
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screw  $g'$ , or by any other means which provide vertical adjustment to it, the curved guide, cam, or pattern G. The shape of the cam is substantially semicircular in plan, and its under surface bears upon the anti-friction wheel  $g$ , and is inclined from the stops  $g^2$  at the ends slightly downwardly toward the opposite portion of the cam, as represented in Fig. 1, when the post  $d$  is in a vertical position. It will be observed that the post is so hinged that it has a rocking movement in relation to the cutter-head, and that it may be inclined toward the cutter-head, and with its attachments and the jack will, upon being moved to it, rest in an inclined position, with the heel against the cutter-head and the guides or gages  $e$   $e'$  in contact. The post  $d$  is secured to the post or frame F by means of the segmental bar, yoke, or frame H, which lays hold of and supports the post  $d$ , near its upper end, and passes through a slot in the post or frame F, in which it has suitable bearing, and if a bar or yoke, as shown in Fig. 1, it is connected or fastened to the lever  $h'$ , which is pivoted at  $h^2$  to a bracket,  $h^3$ , projecting outwardly from the frame F, which lever, at its lower end, engages with the upwardly-projecting portion  $h^4$  of the lever or treadle  $h^5$ ; and if it is a frame in one piece with the block  $d^2$ , as represented in Fig. 11, it is connected with the treadle by means of the rock-shaft  $h^6$ , arm  $h^7$ , and loose chain joint or link  $h^8$ .

The operation of this portion of the mechanism is as follows: The shoe having been properly jacked, the operator takes hold of the handle N, and the jack is swung round either to the right or to the left, as desired, and this, of course, will depend upon the position of the knives or blades upon the cutter-head and the direction of its revolution, and the foot is then placed upon the treadle  $h^5$ , the treadle lowered thereby, and the post and jack moved toward the cutter-head until the guide  $e$  comes in contact with the guide  $e'$ . The post  $d$ , the jack, and shoe are then turned on a center which is the axis of the post  $d$ , a little more than a half-revolution of the post, and this movement of revolution causes the cam or pattern G to lift the heel in relation to the cutter-head for a portion of the movement, or until the back portion of the heel is reached, when the movement is changed to a downward one for the completion of the rotating movement.

Of course I do not confine myself to the special methods of providing the shaft  $d$  with a swinging movement to and from the cutter-head. Neither do I confine myself to the specific mechanism described for connecting the post  $d$  with the post F; but if it is connected therewith I may use any equivalent of the segment-bar H desired. The segment-bar may have a stop for limiting the extent of the outward movement of the post  $d$  and jack, and this may be provided, as shown in Fig. 1, by the lower end of the lever  $h'$  and the projection  $h^4$  on the end of the treadle  $h^5$ . The seg-

ment-bar or its equivalent may be operated by any mechanical equivalent for the treadle and connecting-lever described.

The cutter-head shaft M has suitable bearing upon or in the frame F, and it carries at its upper end the cutter-head  $m$ , which consists of the block  $m'$ , having one or more faces,  $m^2$ , tangential to a circle struck from the center of the block, and one or more recesses,  $m^3$ , extending transversely across the block from top to bottom, either vertically or spirally. From one to three knives may be employed, as desired, and each knife is curved to fit the face  $m^2$  of the cutter-head to which it is secured, and both the face and blade are curved to approximate the vertical contour which it is desired that the finished heel shall have.

A perspective of a blade,  $m^4$ , is shown in Fig. 8. It is provided with a slot,  $m^5$ , and it has a cutting-edge formed by the bevel  $m^6$  on the outer edge. Each blade is secured to the cutter-head by the bolt or screw  $m^7$ . The cutting-edge of the knife or blade can be parallel with the axis of the cutter-head; or it can be diagonal thereto, in which case the upper corner of the blade would be in advance of the lower corner.

On some accounts I prefer the form of blade shown in Fig. 9, in which the faces of the cutter-head which support the blades are slightly curved, and the blades are also slightly curved to conform thereto. By this shape the cutting-edge is more advantageously arranged in relation to the axis of the cutter-head. The blades are fastened to the cutter-head so that the cutting-edge and a portion of each blade extends over its corresponding recess,  $m^3$ , as shown in Fig. 7, and as the blades are worn in sharpening they can be reset by means of the slot  $m^5$  and screw, so that a large portion of each blade can be used before it is discarded. By sharpening upon the outer edge of the knife, and using a guide or pattern of proper shape and edge conformation, the blade can be ground to a uniform edge without any difficulty, the pattern being placed upon the inner surface of the blade, with its edge as near the cutting-edge of the blade as desirable. The knife is then ground upon the surface  $m^6$  until its edge corresponds with that of the guide. The cutter-head is secured to the shaft by means of the washer and nut  $m^8$ , and the shaft is rapidly revolved by means of the pulley  $m^9$  and a belt connecting it with another pulley on a revolving counter-shaft. The advantages of this cutter-head for heel-trimming over other cutter-heads are that the blades are arranged to cut with a shaving cut instead of with a scraping cut; also that the knives can be easily sharpened and always maintained at a proper gage—a thing quite difficult to accomplish when the edge is formed by two bevels; also that the blades can be resharpened and used for a long period comparatively, on account of the provision for setting them as they decrease in length.

The cutter-head may have one, two, or three



blades or knives, as desired, and if more than one blade is used one or two blades may be held in reserve by setting them so that their cutting-edges shall not project from the block sufficiently to cut while the remaining blade or blades are doing the work, and then after the blade or blades first worked are dulled they may be set back and the sharp one or ones moved forward and used, thus enabling the trimming to proceed for a longer period without grinding or sharpening the knives or blades than if they were used simultaneously, or if one only were used.

It will be seen, also, that a cutter-head constructed as herein described may carry knives or blades having varying transverse contours, and adapted, as required, to trim heels of different shape successively, or to act simultaneously or successively upon different parts of the heel in giving it a shape impossible or difficult to be obtained by one blade, in which case one blade or knife would be used in giving one shape to the entire heel, and another would be used in giving a different shape to another heel; or they could co-operate to give the shape desired, one cutting the upper part of the heel, one the back, and the other the lower part.

Although I prefer that an anti-friction wheel be used for a cam-support, yet I do not confine myself to it, but may use any other suitable support for the cam to rest upon; but as the entire weight of the post and its operative and connecting mechanisms rest upon the cam-support, it is therefore desirable to locate the cam as shown, and to use an anti-friction wheel for its support. The cam is removable from the post, and it has a vertical adjustment thereon, whereby the height of the jack may be varied as desired. The height of the jack may also be varied by moving the cam-support and its holding-block vertically; and for the purposes of obtaining a fine adjustment of the jack and pattern in relation to the cutter-head, I have arranged the screw  $d^9$  under the said holding-block, by which a very slight vertical movement can be easily given them.

To vary the extent of the vertical movement of the jack in relation to the cutter-head, the cam G may be removed, and another one having a greater or less provision for this movement substituted.

The stump and heel-downhold need not have a rocking movement on the post or bracket toward the heel-receiver, although I prefer this construction, as in lieu thereof they may be stationary over the heel-receiver, and the heel-receiver may have a vertical movement after the shoe is clamped on the stump and the heel-holder adjusted, acting, as hereinbefore described, to clamp the heel-holder to the heel of the shoe.

If desired, the heel-holder may be dispensed with and the shoe jacked in the heel-receiver, in which last-named case the heel-receiver would be stationary and the heel support or stump have a substantially permanent rela-

tion thereto, with perhaps the exception of a slight longitudinal movement for the purposes of adjustment to varying sizes of shoes. Of course the pattern or gage E may be made in one piece with the heel-receiver, if desired.

In lieu of the cutter-head, a burnishing or scouring tool can be employed, if desired.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a heel-trimming machine, the combination of the post A, supporting the stump or spindle  $a$ , the heel-downhold  $a'$ , having a vertical movement in relation to the stump  $a$ , and a heel-holder, B, provided with movements to and from the stump or spindle  $a$ , substantially as and for the purposes described.

2. In a heel-trimming machine, the combination of the post A, the heel-downhold  $a'$ , and the curved arm  $a^2$ , the rod  $a^3$ , and mechanism for moving the rod vertically and the arm  $a^2$  horizontally with the heel-holder B, supported on the hinged arm  $b^3$ , substantially as and for the purposes described.

3. In a heel-trimming machine, the combination of the stump  $a$ , the vertically-movable downhold  $a'$ , and the vertically-movable heel-receiving frame  $c$ , substantially as and for the purposes described.

4. The combination, in a heel-trimming machine, of the heel-receiver C with the independent heel-holder B, having a horizontal movement in relation to the heel-receiver, all substantially as and for the purposes described.

5. The combination of the vertically-movable heel-receiver C with the independent disconnected swinging heel-holder B, all substantially as and for the purposes described.

6. In a heel-trimming machine, the detachable guide E, adapted to be fastened to the heel-receiver C, substantially as set forth.

7. In a heel-trimming machine, the combination of the heel-receiver C with guide E, provided with the upwardly-projecting portions  $e^4$ , substantially as and for the purposes set forth.

8. The combination of the heel-receiver C, provided with the arms  $c'$ , lugs  $c^2$ , and screws  $c^3$ , with the pattern E, substantially as described.

9. The combination of the swinging jacking mechanism, consisting of the stump  $a$ , the vertically-movable heel-downhold  $a'$ , and the heel-holder B, with the vertically-movable heel-receiver C and guide E, all substantially as and for the purposes set forth.

10. The combination of the frame  $c$  with the post  $d$ , arranged intermediate the jack and trimming-knife, and means for moving the frame vertically upon the post, substantially as and for the purposes described.

11. In a heel-trimming machine, the combination of a jacking mechanism having a swinging movement to and from the independent heel-receiver, said heel-receiver, the cutter-head  $m$ , the post  $d$ , and mechanism for moving the post and devices thereon to and from



the cutter-head, substantially as and for the purposes described.

12. The combination, in a heel-trimming machine, of the vertical post  $d$ , having a movement at its upper end to and from the cutter-head, and supporting the jacking mechanism and guide, the whole adapted to move in connection with the said post  $d$ , with the bar  $H$ , treadle  $h^5$ , and suitable connecting mechanism whereby the jacking mechanism is moved horizontally to the cutter-head by the foot, all substantially as and for the purposes described.

13. In a heel-trimming machine, the combination of the post  $d$ , supporting a jack and a guide, with the cam  $G$  and the hinged block  $d^2$ , substantially as and for the purposes described.

14. In a heel-trimming machine, the combination of a rotary cutter-head, with a rocking post or support,  $d$ , pivoted at its lower end, and having the movements to and from the cutter-head indicated, and carrying the heel-receiver  $C$ , with the post  $d$ , stump or spindle  $a$ , heel-downhold  $a'$ , and means for operating the same, provided with a swinging or rocking movement upon said post in relation to the heel-receiver, all substantially as and for the purposes described.

15. In a heel-trimming machine, the combination of a rotating cutter-head with a rotating jack, and a rocking post or support having the movements to and from the cutter-head indicated, upon or to which, or to a

bracket fastened thereto, the jack is secured, and a cam or pattern,  $G$ , for providing said jack with a movement upon a line parallel with the axis of the cutter, substantially as described.

16. In a heel-trimming machine, a jacking mechanism attached to a vertical support and having a rotary motion with it, the jack and the support each having a vertical motion, the jack provided with a supplemental motion vertically and independently of the support, and adapted to move beyond a vertical line parallel with the axis of the cutter-head, and when so placed to remain by its own gravity beyond such vertical line and in contact with the cutter-head, all arranged and combined substantially as and for the purposes set forth.

17. In a heel-trimming machine, the combination of the post or support  $d$ , the cam or pattern  $G$ , attached thereto and adapted to revolve therewith, and the anti-friction roll  $g$  or other cam-support, all arranged in relation to each other, to operate substantially as and for the purposes specified.

18. In a heel-trimming machine, the combination of the post or support  $d$ , the cam or pattern  $G$ , the hinged or pivoted block  $d^2$ , and the cam-support or roll  $g$ , all substantially as described.

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Witnesses:

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