(No Model.) 6 Sheets—Sheet 1.

A. M. STICKNEY.

MACHINE FOR CUTTING SOLES OR OTHER FORMS.

No. 529,883. Patented Nov. 27, 1894.

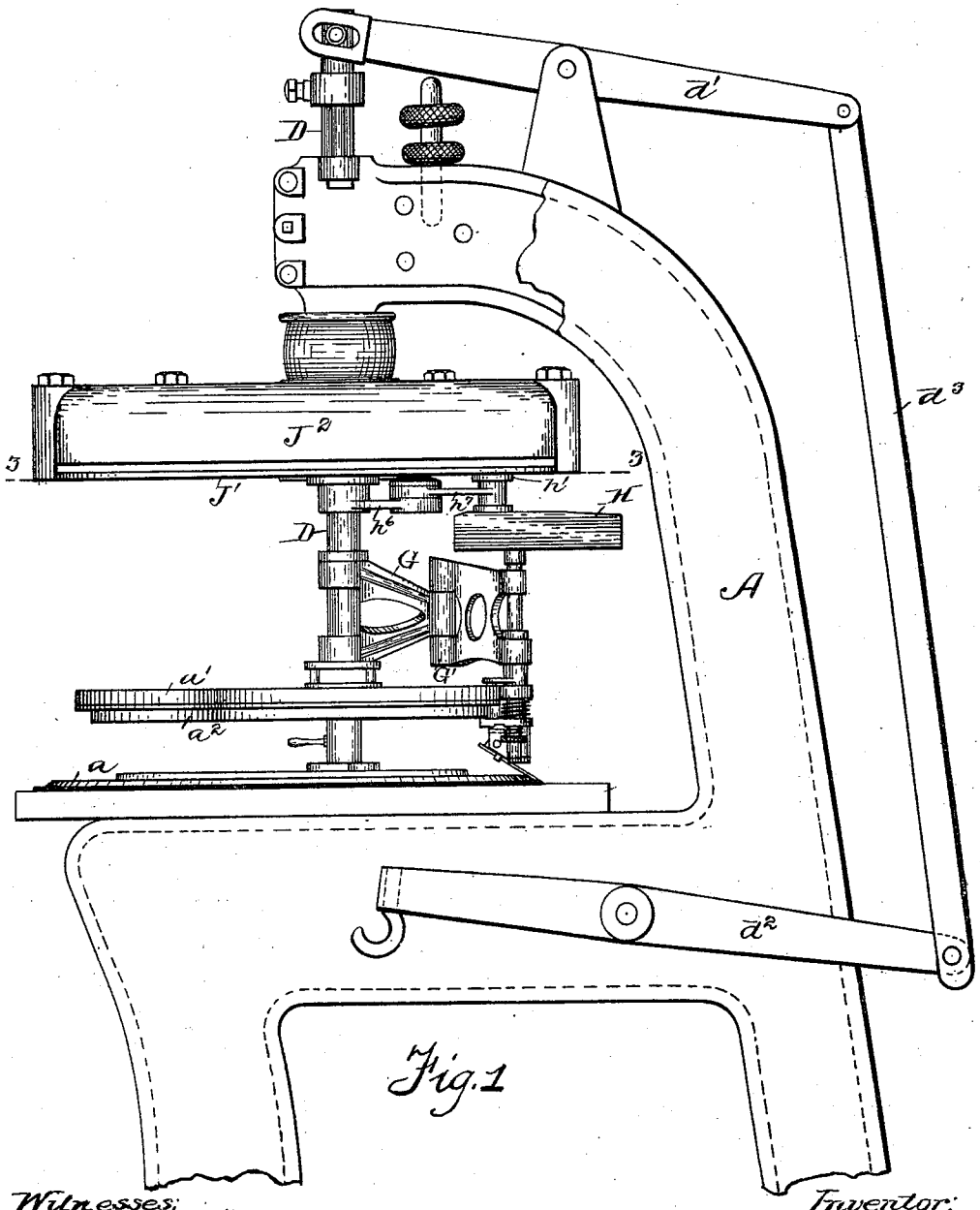

Fig. 1.

Witnesses;
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John R Snow

Inventor;
Allison M. Stickney
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(No Model.) 6 Sheets—Sheet 2.

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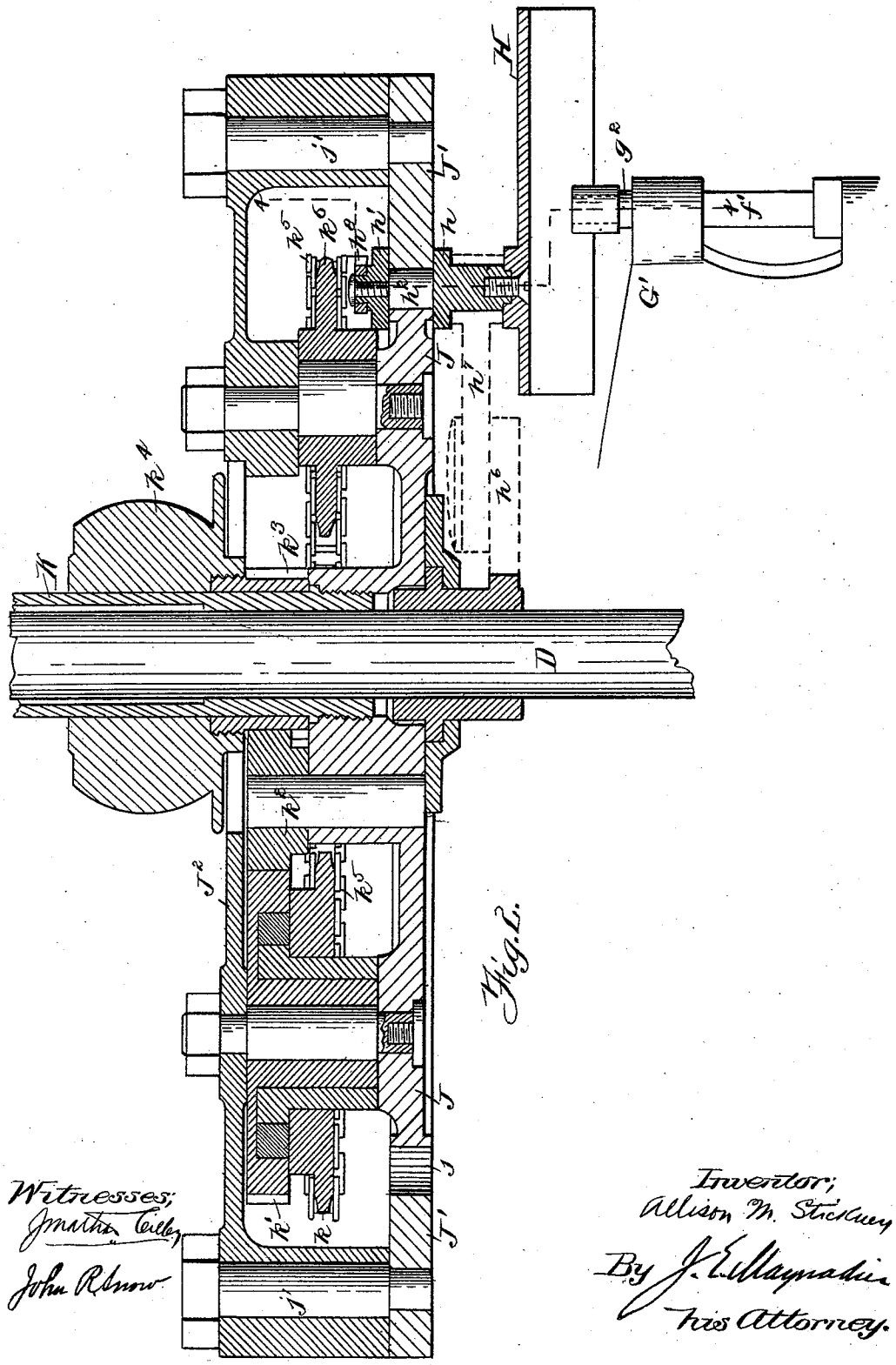

Fig. 2.

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(No Model.) 6 Sheets—Sheet 3.

A. M. STICKNEY.

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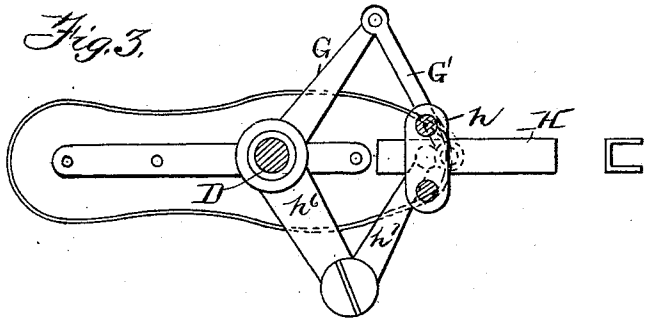
Fig. 3.



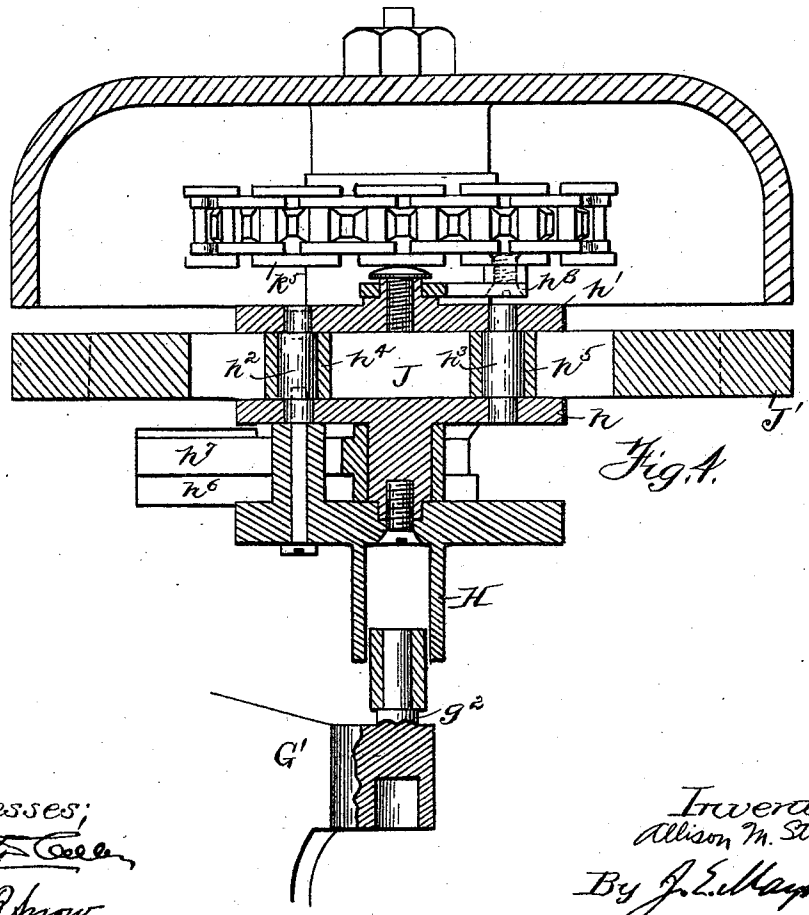


Fig. 4.

Witnesses;
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(No Model.) 6 Sheets—Sheet 4.

A. M. STICKNEY.

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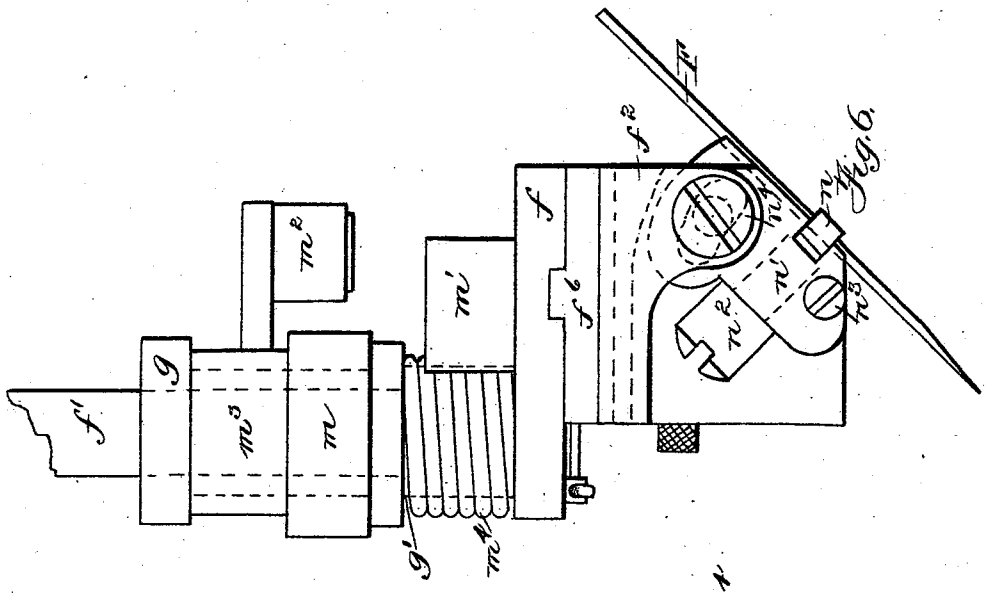

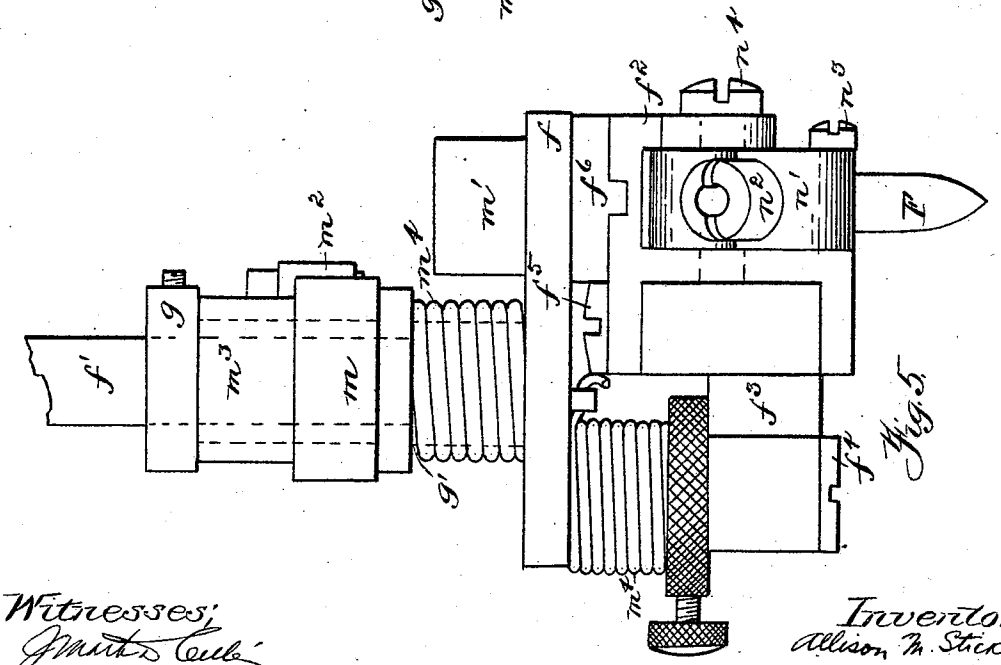

Witnesses;
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his Attorney.

(No Model.) 6 Sheets—Sheet 5.

A. M. STICKNEY.

MACHINE FOR CUTTING SOLES OR OTHER FORMS.

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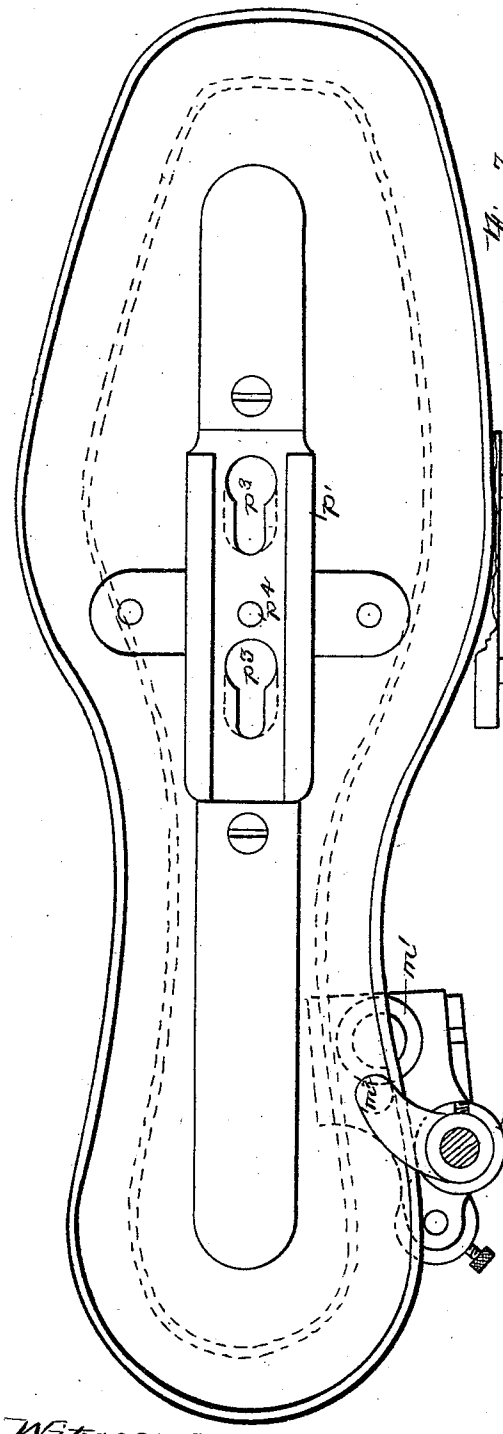

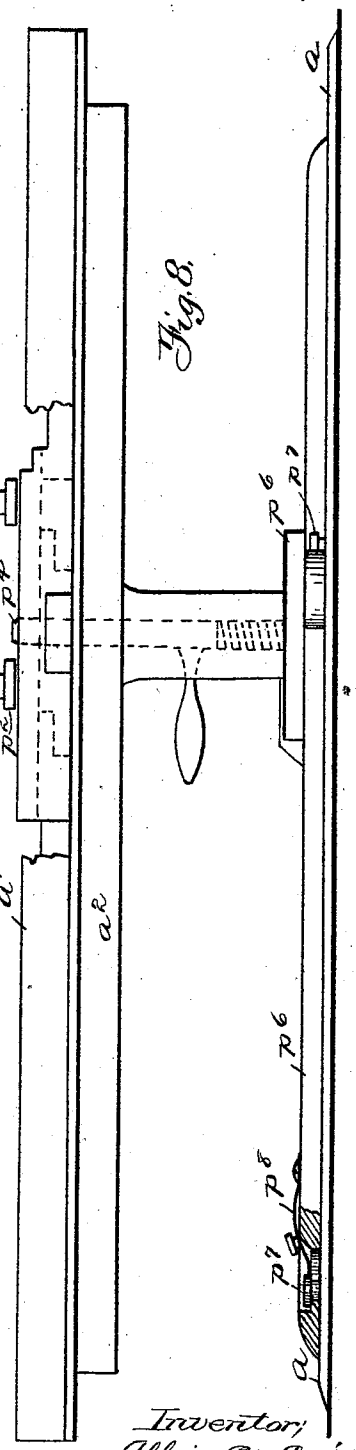

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(No Model.) 6 Sheets—Sheet 6.

A. M. STICKNEY.

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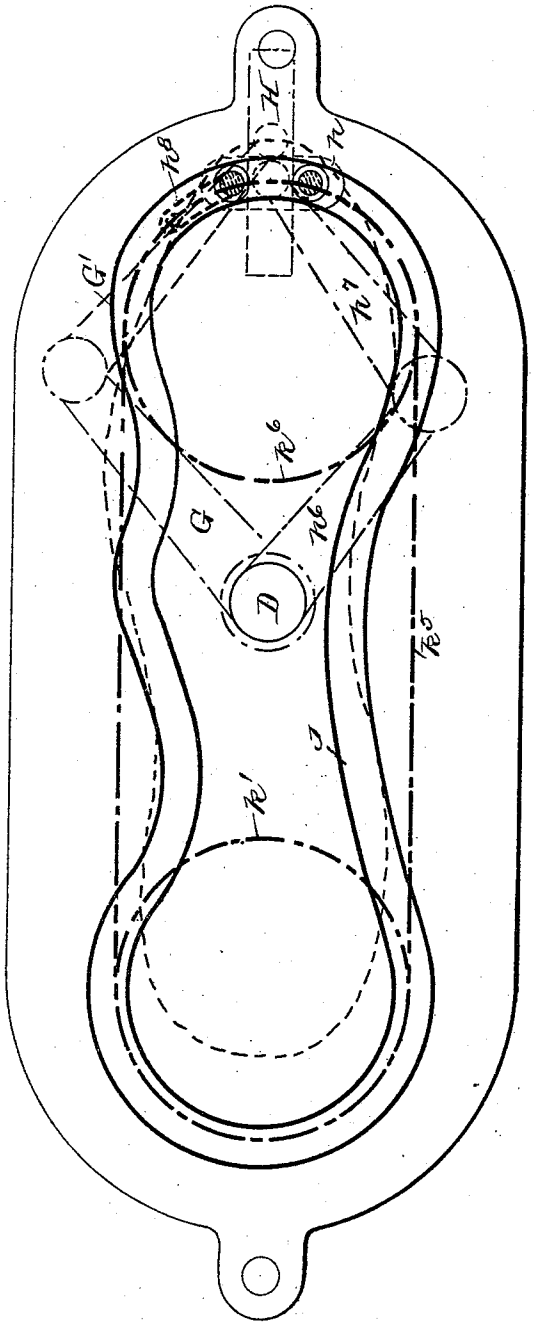

Fig. 9.

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UNITED STATES PATENT OFFICE.

ALLISON MORRIS STICKNEY, OF MEDFORD, ASSIGNOR TO THE WELLMAN SOLE CUTTING MACHINE COMPANY, OF BOSTON, MASSACHUSETTS.

MACHINE FOR CUTTING SOLES OR OTHER FORMS.

SPECIFICATION forming part of Letters Patent No. 529,883, dated November 27, 1894.

Application filed June 21, 1894. Serial No. 515,323. (No model.)

To all whom it may concern:

Be it known that I, ALLISON MORRIS STICKNEY, of Medford, in the county of Middlesex and State of Massachusetts, have invented an Improved Machine for Cutting Soles or other Forms, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of a machine embodying all the features of my invention. Fig. 2 is a sectional elevation illustrating the means for driving the grooved bar by which motion is imparted to the knife carrier. Fig. 3 is a section on line 3—3, of Fig. 1. Fig. 4 is a section on line 4—4 of Fig. 2. Figs. 5 and 6 are elevations of the knife carrier. Figs. 7 and 8 are a plan and an elevation of the forms for guiding the parts of the knife carrier. Fig. 9 is a diagram showing the shape of the slot for guiding the grooved bar, and the general relation of other parts to that slot.

Machines for the purpose of cutting soles, and the like from sheet material were known before my invention; and such machines consist essentially of means for clamping the sheet material to be cut and means for moving and guiding a knife carrier in a desired path; but certain practical difficulties as to moving and guiding the knife carrier and the knife have existed in all machines of this class known before my present invention, especially in machines designed for cutting sheets of rubber compound into soles and taps for rubber boots and shoes.

My invention consists first in means for moving the knife carrier; secondly in means for compelling the main portion of the knife carrier to move in the desired path; and thirdly in a novel connection of the knife carrier with its knife block, by which the knife blade is always held in proper position for cutting, and prevented from getting into the position of a scraping blade instead of a cutting blade.

The frame A of my improved machine carries the bed B, upon which the sheet material is clamped by the form *a*, when the stem D is depressed by the levers d' d^2 and link d^3. In some machines of this class the material is clamped between the bed B and form *a* by raising the bed B; that bed being lowered away from form *a* when the sheet material is to be placed in the machine, and raised to clamp the material; and as to this it is obvious that the material may be clamped in place in any suitable way.

My improved knife carrier consists of two main parts, a plate *f* with a spindle f' secured to it, and a knife block f^2 upon which the knife clamp is secured as described below. The spindle f' of the carrier is supported by the arms G and G′ so that the spindle may turn on its axis and also move bodily toward and from the stem D as required; for the arm G is free to turn about stem D and the arm G′ is hinged to arm G. See Fig. 1. The collar *g* and shoulder g' prevent endwise movement of spindle f' in arm G′. The stud g^2 shown fast in the upper box of arm G′ is in function an extension of spindle f', but for convenience of construction it is made fast to arm G′, for it is desirable that spindle f' may be readily detached from arm G′, and this is better accomplished by making stud g^2 separate from spindle f', rather than by making stud g^2 in one piece with spindle f', and making the boxes on the outer end of arm G′ in two parts; which would be necessary if spindle f' and stud g^2 were one piece. Stud g^2 enters the groove in the grooved bar H. This grooved bar H is fast to the lower plate *h* of a sliding frame composed of the plates *h* and h' connected by the studs h^2 h^3 which carry the anti-friction rolls h^4 h^5 which move in the guide slot formed by the space between the two plates J and J′; the outer edge of plate J being parallel with the inner edge of plate J′ to form that guide slot *j*, so that when the sliding frame (composed of plates *h* h' and studs h^2 h^3) is compelled to move the rolls h^4 h^5 will follow slot *j*, and the grooved bar H will extend across slot *j*.

The arms h^6 h^7 while not essential are desirable as they serve to prevent the sliding frame from cramping.

The plate J is fast to the sleeve K which is fast to the arm of frame A, and the plate J′ is fast to the cover J^2; which is secured to plate J by the screw bolts j'. See Fig. 2. The sprocket wheel *k* is fast to gear k' which is driven by pinion k^2 which meshes with pin-

ion k^3 fast to pulley k^4; so that when pulley k^4 is rotated sprocket wheel k is also rotated carrying with it its chain k^5 and causing the idler sprocket k^6 to rotate. All these parts, K to k^6 inclusive, are in prior machines, and so are the plates J and J′ arranged to form a guide slot j, except that I have modified the form of the slot j as shown in Fig. 9.

Premising that the spindle f' must be guided in some suitable way so that it shall move in a path approximately to the outline of the sole or other article to be cut from the sheet material clamped between the form a and bed B, the first feature of my invention will now be understood; for the rotation of pulley k^4 will compel the sprocket chain k^5 to move with its wheels k and k^6, and as the link h^8 connects the chain k^5 with plate h' of the sliding frame, that frame will move with chain k^5, the two rolls h^4 h^5 of the sliding frame being guided by slot j, between the edges of plates J J′; and consequently the grooved bar H will also move bodily in a path corresponding to the slot j; but it will always stand across slot j, by reason of the fact that the position of the sliding frame to which bar H is fast is always controlled by the rolls h^4 h^5 in slot j, and bar H is mounted crosswise of the sliding frame. As the stud g^2 is in effect an extension of spindle f' that spindle will be compelled to move with the grooved bar H, as that bar moves; but the stud g^2 is also free to move in the groove of the bar H; and, therefore, the spindle f' and stud g^2 (which so far as their operation is concerned may be regarded as one piece, as above stated) may move in a path which differs from the path in which the sliding frame and bar H move by reason of the movement of stud g^2 lengthwise of bar H; and it is this combination of the spindle of the knife carrier with the grooved bar H which constitutes the first feature of my invention. The main advantage of this feature of my invention is that the power to compel the spindle of the knife carrier to move in its path is always applied by the bar H substantially in the line of movement of the spindle; for the bar H is always crosswise of the line of movement of the spindle and the spindle is free to move in the groove of the bar as its line of movement requires.

It will be obvious that the means for driving the grooved bar H may be widely varied, but for cutting articles of sinuous outlines such as soles and taps, I prefer to drive the bar H through the sliding frame, as shown, and to guide that frame in the peculiar path shown in Fig. 3, that shape of slot j being practically adapted for a large number of styles and sizes of soles and taps. The sprocket chain and its wheels are also the most practical means, in my judgment, for driving the sliding frame; although other means are well known.

The second feature of my invention consists in the combination of two forms or patterns with three bearings on the knife carrier as the means for guiding the carrier in the desired path, which approximates closely to the outline of the article to be cut. The pattern or form a', best shown in Figs. 7 and 8, is sole shaped for a sole, or tap shaped for a tap, but is larger than the form or pattern a^2. The three bearings m m' m^2 are provided with rollers, to lessen friction, the roller m turning on a sleeve m^3 which rotates on spindle f' but is controlled by spring m^4 one end of that spring being fast to sleeve m^3 and the other end fast to plate f. The second bearing m' is a roller on a stud fast to plate f, and the third bearing m^2 is a roller on a stud fast to the arm of sleeve m^3. When these three bearings are arranged in proper relation to forms a' and a^2 as shown in Fig. 7, the spring pressure of bearing m^2 on the inner surface of form a' keeps the bearing m against the outer surface of form a' and the bearing m' against the outer surface of form a^2; and thereby the spindle f' and plate f of the knife carrier are compelled to travel in the desired path, which, as before stated, approximates to the exact outline of the article to be cut from the sheet material. In practice the form or pattern a^2 is made to correspond in outline with the form a whose outline is that of the article to be cut, but the form a^2 may be used with either one of several of the forms a each of which differs slightly from the other. For example any form a^2 suited to a certain size of sole may be used not only with a form a for that size and style but also with forms a for the next succeeding or preceding sizes or of somewhat different styles. The form a' is laid out from the form a^2 in such a way as to make sure that the spring bearing m^2 will keep the bearings m and m' against the forms a' and a^2. This means of guiding the main part of the carrier by three bearings and two forms gives an easy motion to the carrier and is a more efficient and smoother working way than any other known to me.

The knife block f^2 is connected with the plate f by means of link f^3 whose outer sleeve turns upon screw stud f^4, which is fast in plate f; and whose inner sleeve is connected with knife block f^2 by means of screw stud f^5, as clearly shown in Fig. 5; but as this link connection alone would leave the knife block f^2 free to move in all directions about the studs f^4 and f^5 the knife block is also connected to the plate f by means of slide f^6; a tongue on one side of slide f^6 fitting a groove in the knife block f^2, see Fig. 5; and a tongue on the upper side of slide f^6 fitting a groove in plate f, see Fig. 6; and as these two tongues and their grooves are crosswise relatively, all axial motion of the knife block is prevented while it is allowed to move bodily with relation to plate f, its motion being controlled by the contact of the blade F with the edge of form a. The spring m^4, one end of which is fast to the plate f and the other end fast to the adjusting collar of link f^3, tends to

press the blade F against the edge of form a, and allows blade F to yield slightly as required by the differences in outline or in size between forms a and a^2; but as it is highly desirable that form a should be of thin sheet metal, (commonly tinned iron in factories making rubber boots and shoes) the spring m^4 should be a light spring and it is for this reason that form a should not vary widely from form a^2, as above explained. The main advantage of this, the third feature of my invention is that the blade F is always held in proper position for cutting, by means of slide f^6 and its crossed ways which allow the requisite bodily motion of the blade F, but prevent it from getting crosswise of the line of cut; that is prevent it from getting into the position of a scraping blade and hold it always in position to cut. If blade F were moved in the arc of a circle about either of the pivots f^4 or f^5, or about a single pivot out of line with the cutting edge of the blade F it would be at the proper position for cutting at only one point in the arc, and would get out of its true position for cutting more and more as it moved in its arc. This is a practical difficulty of much importance in all prior machines, and it is especially objectionable where the cut must be on a level and where the material to be cut is a sheet of rubber compound.

The blade F is held in a clamp composed of the bridle n whose threaded tang passes through the other member n' of the clamp, and into the nut n^2, so that by turning the nut in one direction, the blade is firmly clamped; while by turning the nut in the other direction the blade is unclamped so that it can readily be removed for sharpening, and replaced. The member n' of the clamp is held to the knife block f^2 by the screw n^3, and the slant of the blade F is adjusted by the screw n^4 and the slot in n', as clearly shown in Fig. 6. The form a' is secured to stem D as clearly shown in Figs. 7 and 8, where p represents one portion of a lock, which is fast to the lower end of stem D; and p' represents the other portion of the lock, fast to form a'; the two portions being shown separated in Fig. 8. When the heads p^2 of the studs on the portion p are inserted in the recesses p^3 of the portion p' fast to form a', the form is moved endwise until the bolt p^4 enters the bolt hole p^5. The form a is locked to the foot p^6, which is fast to form a', in a similar manner, the headed studs p^7 entering slots in the foot p^6, and one of these studs is locked in place by the spring catch p^8; but these details will be familiar to all skilled in the art without further description.

What I claim as my invention is—

1. In a machine for cutting forms from sheet material the combination of the knife carrier; a grooved bar receiving in its groove the spindle of the knife carrier; and means for moving that grooved bar bodily in its proper path, the motion of the grooved bar moving the knife carrier, all substantially as described.

2. The combination of the knife carrier; two forms; two bearings one co-operating with one form, and the other with the other form; a third bearing; and a spring co-operating with the third bearing to keep the two bearings each against its form, substantially as described.

3. The combination of the knife block; the knife carrier; a slide; ways for the slide on the knife carrier; and ways for the slide on the knife block crosswise of those on the knife carrier, substantially as described.

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