(No Model.)

4 Sheets—Sheet 1.

H. T. CROSBY.

SOLE ROUNDING MACHINE.

No. 602,211. Patented Apr. 12, 1898.

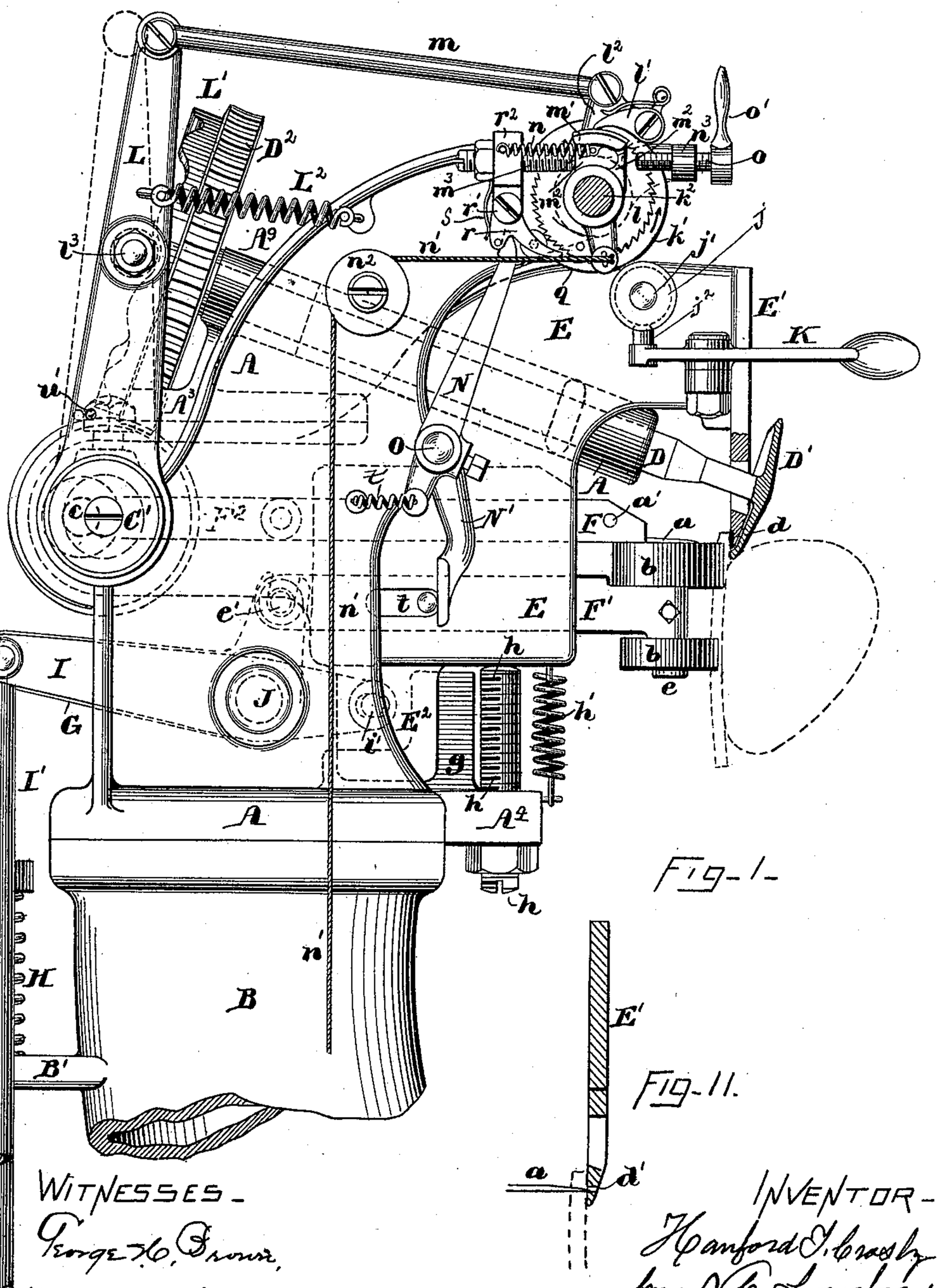

Fig. 1.

Fig. 11.

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INVENTOR—
Hanford T. Crosby
by W. E. Lombard
his Attorney.

(No Model.)

4 Sheets—Sheet 2.

H. T. CROSBY.

SOLE ROUNDING MACHINE.

No. 602,211. Patented Apr. 12, 1898.

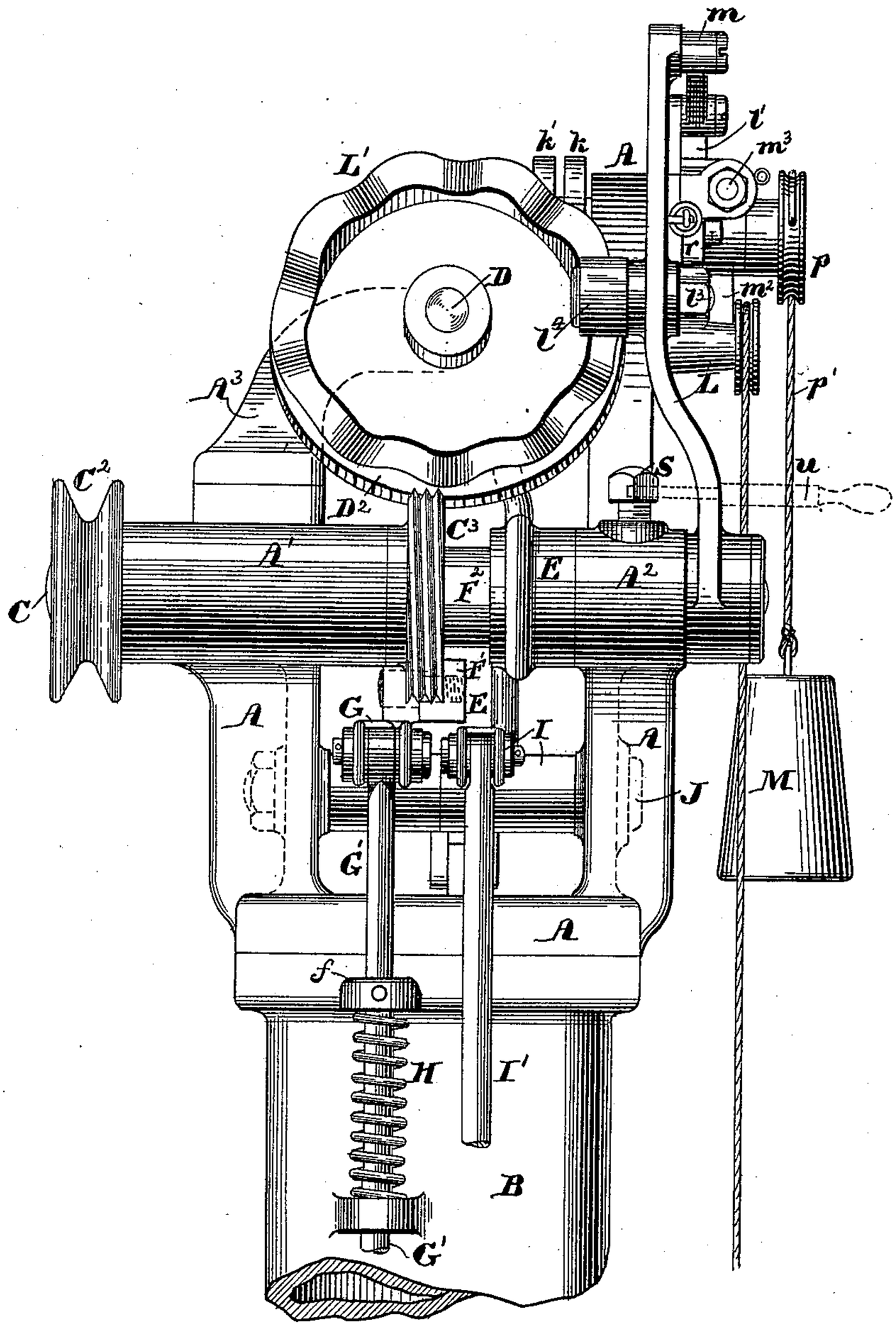

Fig. 2.

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(No Model.) 4 Sheets—Sheet 3.

H. T. CROSBY.

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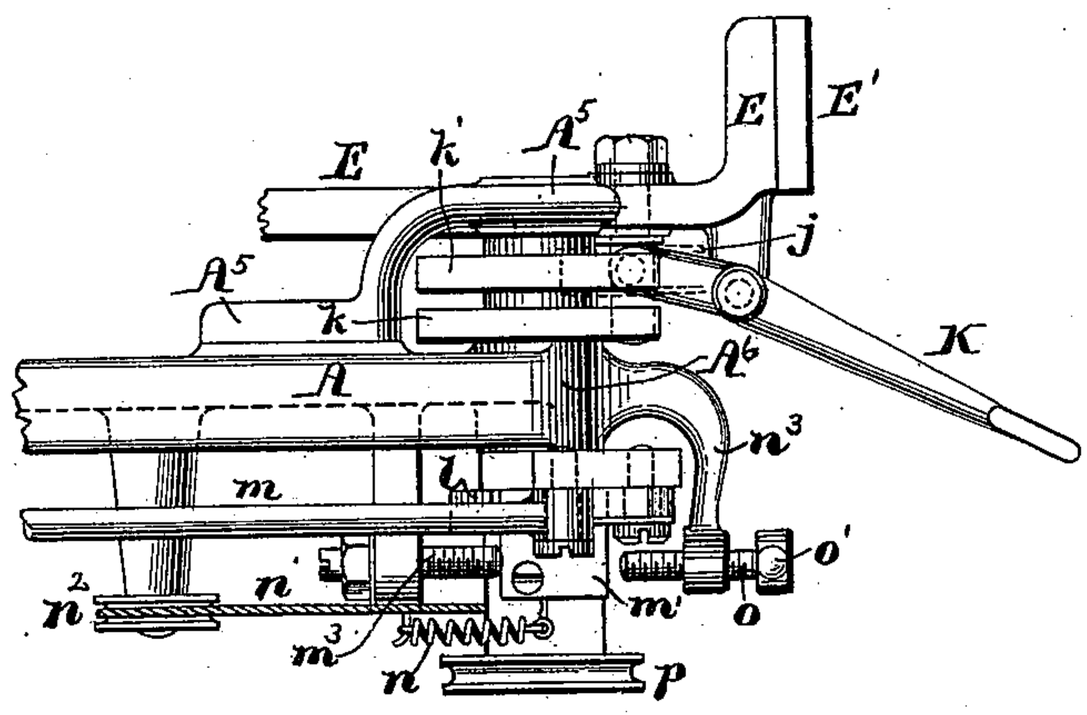

Fig. 3.

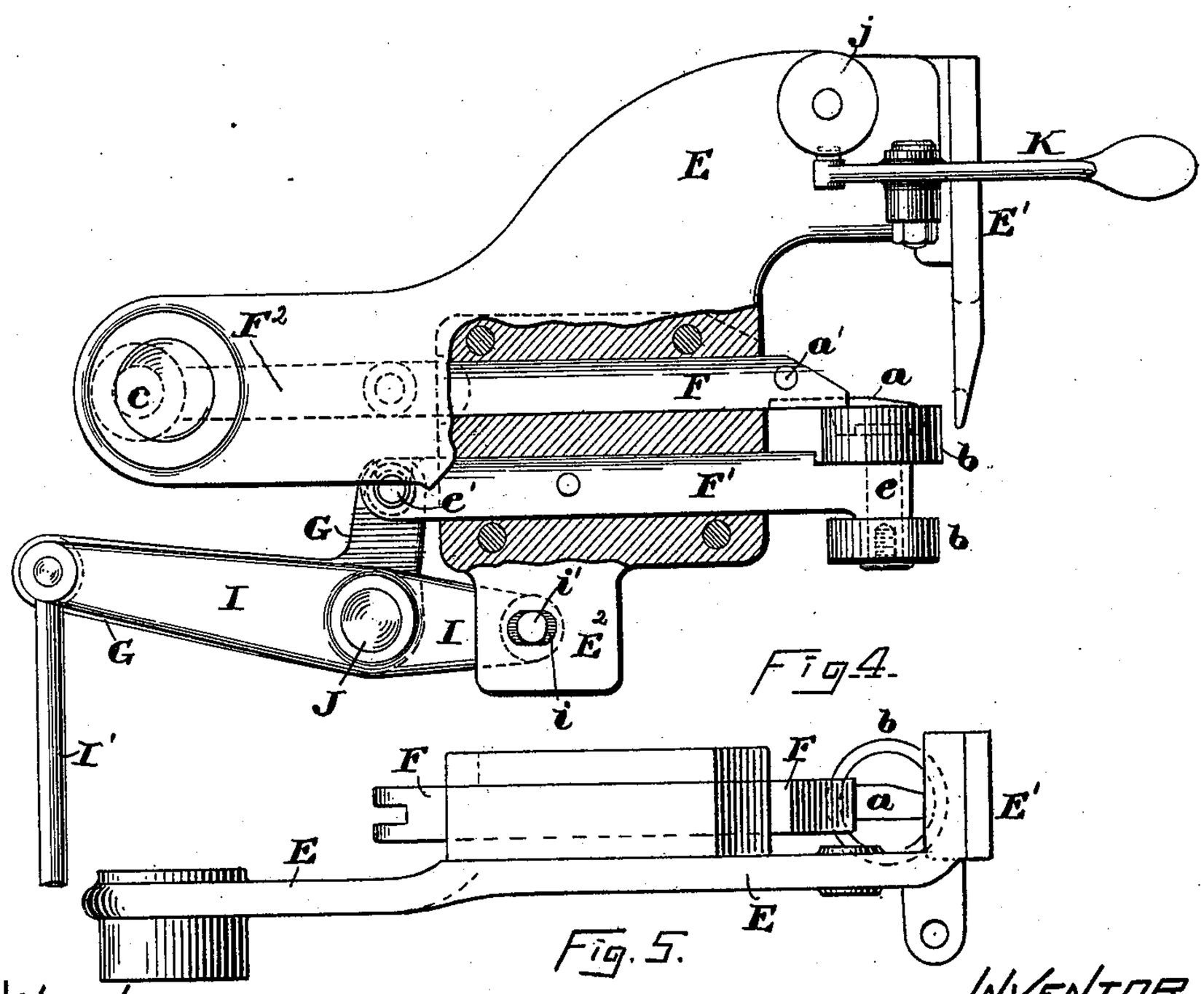

Fig 4.

Fig. 5.

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4 Sheets—Sheet 4.

H. T. CROSBY.

SOLE ROUNDING MACHINE.

No. 602,211. Patented Apr. 12, 1898.

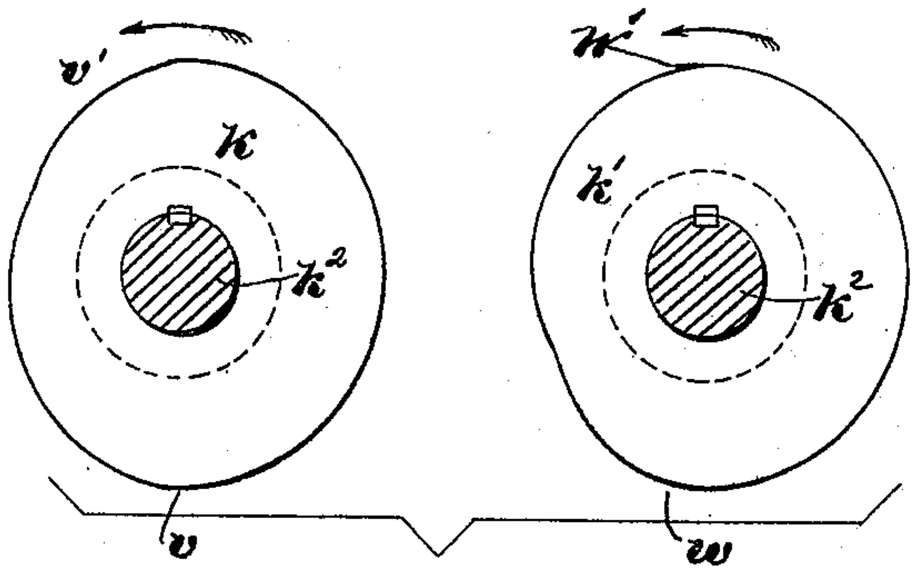


Fig. 7.

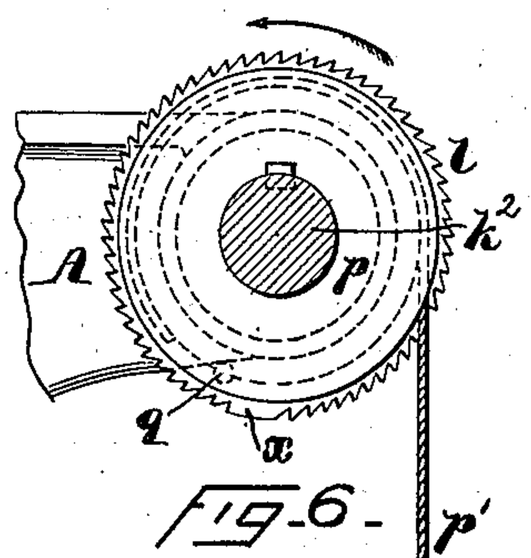
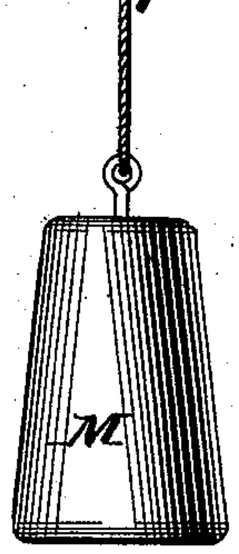


Fig. 6.



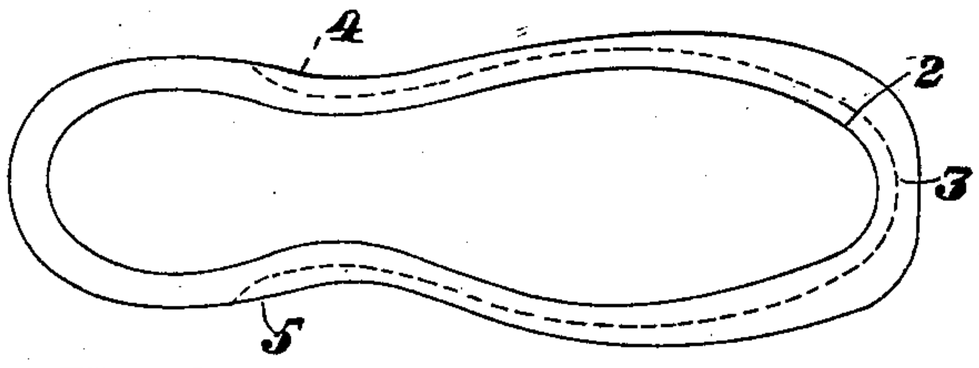


Fig. 8.

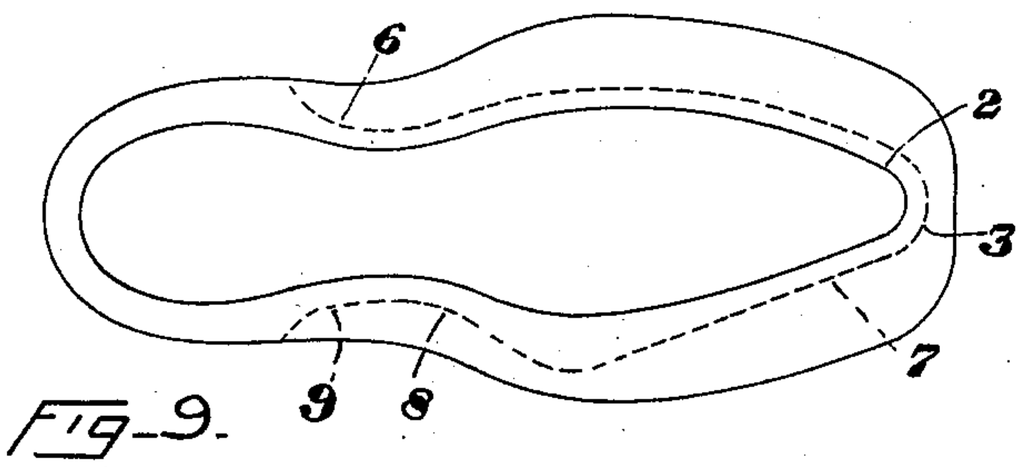


Fig. 9.

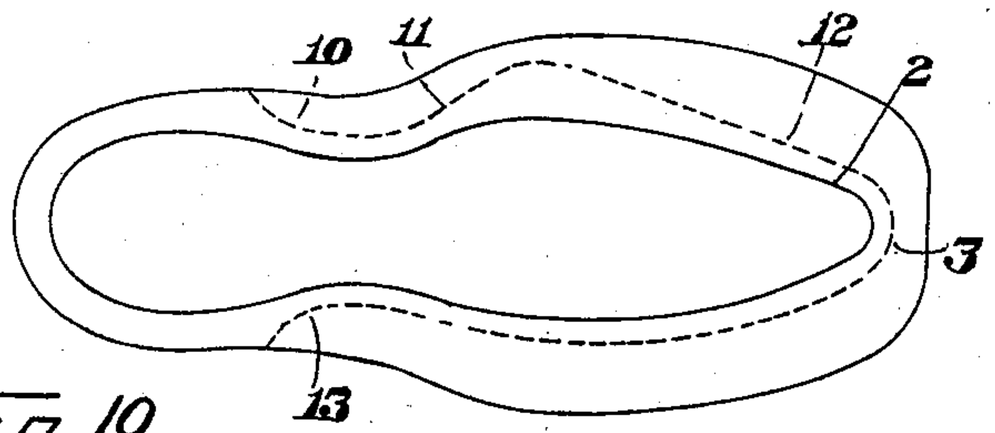


Fig. 10.

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UNITED STATES PATENT OFFICE.

HANFORD T. CROSBY, OF BOSTON, MASSACHUSETTS.

SOLE-ROUNDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 602,211, dated April 12, 1898.

Application filed July 17, 1897. Serial No. 644,892. (No model.)

To all whom it may concern:

Be it known that I, HANFORD T. CROSBY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Sole-Rounding Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to sole-rounding machines; and it consists in certain novel features of construction, arrangement, and combination of parts, which will be readily understood by reference to the description of the accompanying drawings and to the claims hereto appended and in which my invention is clearly pointed out.

Figure 1 of the drawings is a side elevation of the head of my improved sole-rounding machine with the weight-carrying pulley on the cam-shaft removed. Fig. 2 is a rear elevation of the main parts of the machine-head. Fig. 3 is a partial plan of the front portion of the machine. Fig. 4 is a sectional elevation of the pivoted tool-carrying arm, the cutter-stock, the gage-roll-carrying slide, and the levers for operating the same. Fig. 5 is a plan of the tool-carrying head. Fig. 6 is a side elevation of a portion of the front end of the frame of the head, the ratchet-wheel, pulley, and weight. Fig. 7 represents side elevations of two cams. Figs. 8, 9, and 10 are diagrams illustrating some of the different forms of work which may be done on my improved sole-rounding machine, and Fig. 11 is a sectional detail illustrating a modification of the anvil-blade and its coöperation with the cutting-blade.

In the drawings, A is the frame of the head of the machine, secured upon a suitable column B and provided with the bearings A′ and A^2, in which are mounted the driving-shaft C and the fixed journal C′, said shaft C being driven by the pulley C^2 and a suitable belt.

A^3 is a bracket secured to the frame A and having mounted in bearings thereon the feed-shaft D in an inclined position, said shaft having secured to its front end the feed-disk D′ and to its rear end the worm-wheel D^2, the teeth of which are engaged by the worm C^3, mounted upon the inner end of the shaft C, as shown in Fig. 2.

The feed-disk D′ has its inner surface at its periphery roughened to assist in feeding the shoe, which is held by the operator in the position indicated by dotted lines in Fig. 1 with the periphery of the disk bearing against the inseam.

E is an arm mounted at its rear end upon the fixed journal C′ and movable about said journal to a limited extent and has secured to its front end the plate E, which depends therefrom to a point just within the lower edge of the feed-disk D′, said plate having its lower end beveled and having an opening therethrough for the passage of the shaft D, as shown in Fig. 1.

The arm E has formed therein suitable guideways, in which are mounted so as to be movable endwise therein the slides F and F′, which carry at their front ends the cutting-blade *a* and the pressure-rolls *b b*, respectively.

The rear end of the slide F has pivoted thereto one end of the connecting-rod F^2, the opposite end of which is fitted to the crank-pin *c* upon the end of the driving-shaft C, by which said slide is reciprocated to and from the anvil-plate E′, the cutting edge of the blade *a* after piercing the sole abutting against a soft-metal plate *d*, inserted in the rear face of the anvil-plate E′, as shown in Fig. 1, or it may pass through an opening *d′* in said anvil-plate E′, as shown in Fig. 11.

The slide F′ has set in its front end the non-revoluble stud *e*, upon which is fitted so as to be revoluble thereon the pressure-rolls *b b* in positions to act upon the tread-surface of the sole of the boot or shoe when placed in the position indicated by dotted lines in Fig. 1.

The rear end of the slide F′ has set therein a pin *e′*, which is engaged by the slotted end of the short arm of the elbow-lever G, the long arm of which has pivoted thereto the upper end of the rod G′, the lower end of which is pivoted to a treadle (not shown) in such a manner that a depression of the front end of the treadle will cause a rearward movement of the slide F′ and the rolls *b b* preparatory to placing the shoe in position to be operated upon.

The rod G′ is moved upward and the slide F′ and rolls *b b* are moved toward the front to press the sole of the shoe against the feed-

disk D′ by the tension of the spring H, which surrounds said rod between the arm B′, projecting from the column B, and the collar *f*, firmly secured upon said rod, as shown in Figs. 1 and 2.

The arm E has formed on its lower edge two downwardly-projecting ears E^2, which bear one against each side of the L-shaped lug *g*, formed integral with and projecting upward from the base-plate of the frame A, and serve as guides to said head in its upward and downward movements, and the limit of its downward movement is determined by the adjustable screw-stop *h*, set in and projecting upward from an extension A^4 of the frame A, against which stop said head is normally held by the force of gravity and the tension of the spring *h*′.

The ears E^2 have horizontally-elongated holes *i* cut through them, with which the pin *i*′, set in the short arm of the lever I, engages to move said arm E upward about the pin C′ when the end of the long arm of the lever I is depressed through the medium of the rod I′, pivoted thereto, and a treadle (not shown) connected to the lower end of said rod I′.

The levers G and I are mounted upon a common fulcrum-pin J, set in the frame A, as shown in Figs. 1 and 2.

The cutter *a* is secured to the slide F by means of the clamping-screw *a*′, as shown in Fig. 1.

The mechanism hereinbefore described, with the addition of an adjustable stop to be described, is sufficient to round or trim a sole of the style shown in Fig. 8, the outline of which represents a blank of leather from which the outer sole of a boot or shoe is to be shaped after it is tacked to the last and upper, the full line 2 indicating the outline of the shoe at the inseam, and the dotted line 3 indicating the line of cut to be made by the cutter *a*, as the shoe is fed toward the left of the operator as he faces the front of the machine, for a shoe in which the edge of the sole maintains a constant distance from the inseam.

In Figs. 9 and 10 I have illustrated forms of soles of a right and left shoe, respectively, in which the edge of the sole varies in distance from the inseam upon the outside near the ball of the foot.

It will be observed that in my improved sole-rounding machine the feed-disk D′ always maintains the same relation to the inseam when feeding the shoe, and consequently in order to vary the width of projection of the sole. The position of the cutter *a* relative to said feed-disk must be varied. To accomplish this, I raise the front end of the arm E the required distance by means of the lever I, the rod I′, and the treadle connected thereto. As the width of the projection of the sole edge beyond the inseam between certain points on the outside of the shoe is a constantly varying one, it follows that the amount of lift to be imparted to the arm E while that portion of the sole is being fed past the cutter must be a constantly increasing or diminishing one. To accomplish this, I mount upon the arm E, near its front end, an anti-friction-truck *j*, arranged to be revoluble upon and movable endwise of a stud *j*′, carried by said arm E, as shown. The truck *j* has formed therein a circumferential groove to receive the pin j^2, set in the short arm of the lever K, by means of which it may be moved endwise of the stud *j*′ to locate it beneath either one of two cams *k* and *k*′, mounted upon and firmly secured to a shaft k^2, mounted in a bearing A^6 on the frame A and in the bracket A^5, secured to said frame, as shown in Fig. 3. The roll *j* and the cams *k k*′ serve as the upper stop to limit the upward movement of the arm E when the operator places his foot upon the treadle connected to the rod I. The shaft k^2 is intermittently turned about its axis by means of a ratchet-wheel *l* keyed thereto, and the pawl *l*′, pivoted to a lever l^2, mounted loosely upon said shaft k^2 and having pivoted thereto one end of the rod *m*, the other end of which is pivoted to the upper end of the lever L, fulcrumed upon the journal C′ and having set therein near the middle of its length a stud l^3, upon which is mounted the roll l^4, which is acted upon by the cam L′, secured to the worm-wheel D^2 and revoluble therewith, said cam having a series of throws adapted to impart to said lever a series of vibrations, acting in coöperation with the spring L^2, to each revolution of the feed-disk D′. A shield *m*′, secured to one end of the lever m^2, mounted loosely upon the shaft k^3, projects over the ratchet-wheel in close proximity to its periphery and covers a portion of the teeth thereof, as shown in Fig. 1. The shield-carrying arm of the lever m^2 is normally held in contact with the adjustable stop m^3 by the spring *n*, and when in that position the pawl *l*′ will not engage the teeth of the ratchet when its arm is vibrated.

In order to enable the operator to throw the pawl *l*′ into engagement with the teeth of the ratchet *l*, I connect the end of the lower arm of the lever m^2 to a lever not shown, but suitably mounted upon the column of the machine in suitable position to be operated by the knee of the operator by means of the cord *n*′, which passes over a grooved pulley n^2, as shown in Fig. 2.

A stop-screw *o*, set in an arm n^3, secured to or formed in one piece with the frame A and provided with means, as the handle *o*′, for operating it by hand, limits the rearward movement of the shield *m* and determines the amount of movement to be imparted to the ratchet *l* and the cams *k* and *k*′ at each forward movement of the pawl *l*′, thereby controlling the speed of rotation of the camshaft k^3.

To the left-hand end of the shaft k^3 is secured a grooved pulley *p*, to which is attached a cord *p*′, which is wound around said pulley and has attached to its free end a weight

M, which tends to rotate the shaft k^3 and the cams k and k' in the reverse direction to the motion imparted thereto by the action of the pawl l' upon the ratchet l.

A pin q, set in the ratchet-wheel l, limits the descent of the weight M and the consequent rotation of said cams thereby by coming in contact with the frame A, as shown in Figs. 1 and 6.

A stop-pawl r is pivoted at r' to a bracket r^2 on the frame A, and is pressed into engagement with the teeth of the ratchet l by the spring s, and is withdrawn from such engagement by the action thereon of the arm N, secured upon one end of the rocker-shaft O, upon the other end of which is secured the arm N', which is engaged by the pin t, set in the slide F', when said slide is in its extreme forward position, as in Fig. 1, or whenever the shoe is removed from the machine.

The operation of my invention is as follows: If it is desired to round out the sole of a shoe in which the sole edge is to be at a uniform distance from the inseam and the parts of the machine are in the positions indicated by full lines in Fig. 1, the operator moves the lever L into the position indicated in dotted lines in Fig. 1 and secures it in said position so that the cam L' will not act upon the truck l^4 by passing the pin u through the hole u' in said lever till the inner end of said pin u engages the set-screw S, as indicated in dotted line in Fig. 2. He then places his foot upon the treadle connected with the rod G' to move the slide F' and the rolls b b to the rear. The shoe is then placed in position, as indicated in dotted lines in Fig. 1, with the heel end of the shoe toward his left and the tread-surface of the sole toward the rolls b b, with the periphery of the feed-disk resting against the inseam at the point 4. The treadle is then released, when the rolls b b press the sole against the feed-disk and the anvil-surface, when, power being applied to the driving-shaft, the shoe begins to move toward the left, the arm E being held firmly between the upper and lower stops. The cutter is rapidly reciprocated, cutting a short section of the sole at each forward movement as the shoe is fed by the disk D' till the point 5 on the other side of the shoe is reached, the operator meantime guiding the shoe and pressing it upward against the periphery of the feed-disk, the sole being cut to the shape indicated by the dotted line 3, when the pressure-rolls b b are moved back by the operator depressing the treadle connected to the rod G', and the shoe is removed from the machine.

If it is desired to round out soles of shoes that have the sole edges upon the outside of the shoe at variable distances from the inseam, as indicated by the dotted lines 3 in Figs. 9 and 10, the pin u is withdrawn from the lever L, when said lever will assume the position shown in full lines in Fig. 1, with the truck l^4 in position to be acted upon by the cam L'.

Assuming that the shoe to be operated upon is one for the right foot, or, as illustrated in Fig. 9, the operator, after retracting the rolls b b, as before described, and moving the lever K to the right to bring the roll j beneath the cam k, places the shoe in position, as before described, so that the point 6 is between the feed-disk D' and the cutter a, the treadle controlling the rolls b b is released to permit the sole to be gripped between said rolls and the feed-disk D'. The treadle connected with the rod I is depressed to raise the front end of the arm E till the roll or truck j contacts with the cam k at the point v, when, the driving-shaft being revolved, the shoe is fed to the left, the cutter a cutting along the dotted line 3, Fig. 9, until the toe is turned and the point 7 is reached, when the operator throws the pawl into action upon the ratchet by means of the knee-lever, and the shaft k^2 and cams k and k' are revolved in the direction indicated by the arrows on Figs. 1 and 7, and the arm E, with the cutter a and anvil-plate E', is moved up and down by the combined action of the operator's foot and said cam, as the radius of the cam-surface acting upon said truck j varies, the cutter severing the leather along the dotted line 3 between the points 7 and 8. When the point 8 is reached, the knee-lever is released, the action of the pawl l' upon the ratchet is suspended, and the rotation of the cams k and k' ceases, with the point v' on the cam k resting on the truck j, and the cutting continues until the point 9, Fig. 9, is reached, when the operator removes his foot from the treadle connected with the rod I' and places it upon the treadle connected with the rod G', thereby retracting the slide F' and the rolls b b and removes the shoe. He then releases the treadle, and the rolls b b are moved forward beyond their position when pressing upon the sole, during which extra forward movement the pin t, set in the slide F', comes in contact with and moves the arm N' toward the front against the tension of the spring t', secured to the lower end of the arm N, thereby disengaging the stop-pawl r from the teeth of the ratchet l, when the force of gravity, acting upon the weight M, will cause it to descend and move the cams back to their normal positions or until the pin q comes in contact with the frame A, as shown in Figs. 1 and 6.

If the sole to be operated upon is on a left shoe, as shown in Fig. 10, the operator moves the lever K to the left, to move the truck j beneath the cam k' at the point w, and places his foot upon the treadle connected with the rod I to raise the arm E, the feed-disk bearing upon the inseam at the point 10, and as soon as the shoe has fed to the point 11 the knee-lever is operated to move the shield m' and permit the pawl l' to engage the teeth of the ratchet l, which continues to act thereon until the cam k' has made a half-revolution and the point w' thereon is in contact with the

truck *j* and the shoe has been fed till the point 12 is in front of the cutter *a*. When the knee-lever is released, the rotation of the cams ceases and the cutting continues on the dotted line 3 from 12 to 13. When the shoe is removed, the rolls *b* advance, the stop-pawl is tripped, and the cams are turned back, as before.

It will be understood that by varying the contour of the cams any desired variation in the projection of the sole edge beyond the inseam may be obtained.

The same cams may be used in rounding out soles on shoes of different sizes, having the same proportionate variation in the projection of the sole edges, by simply adjusting the stop *o*, so that when the knee-lever is operated the shield *m'* will uncover less or more teeth of the ratchet, so that the pawl *l'* will move the cams faster when a small sole is being rounded than when a larger shoe is being operated upon, or vice versa.

The cams *k* and *k'* are intended to have only a semirotation in either direction about their axes and to prevent an excess of movement being imparted thereto by the action of the pawl *l'* thereon. On account of any oversight or carelessness on the part of the operator a portion of the periphery of the ratchet-wheel *l*, as at *x*, is left smooth or without teeth, so that when the pawl has turned the ratchet to this point it will play back and forth upon the blank space without turning the ratchet.

In two other applications of mine for patents for improvements in sole-rough-rounding machines filed, respectively, September 10, 1897, and December 18, 1897, and numbered, respectively, 651,197 and 662,365, are shown and described but not claimed many of the parts shown, described, and claimed in this application.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a sole-rounding machine the combination of a feed-disk revoluble in an inclined plane and arranged to engage the inseam of a boot or shoe to be acted upon; a horizontally-reciprocating cutter movable in a direction at right angles to the line of feed of the sole; a vertically-arranged anvil-surface between said cutter and feed-disk, and in close proximity to the latter near the lowest portion of its periphery; a pressure-roll to bear against the tread-surface of the sole and force it into contact with said anvil-surface and the feed-disk; means for revolving said feed-disk; and means for imparting a rapid reciprocation to said cutter.

2. In a sole-rounding machine the combination of a feed-shaft mounted in fixed inclined bearings; a feed-disk carried by said shaft; means for imparting to said shaft and disk a constant rotation; an arm pivoted to the main frame at its rear end; means for moving said arm about its pivot, at the will of the operator; stops to limit the movements of said arm in both directions; a vertically-arranged anvil-surface carried by said arm with its operative end in close proximity to the rear face of said feed-disk; a pressure-roll carried by said arm and arranged to bear against the tread-surface of the shoe-sole to be acted upon; means for retracting said roll to permit the placing of the shoe in position; a horizontally-arranged slide fitted to a bearing in said arm; a cutter carried by the front end of said slide; and means for imparting to said slide a rapid reciprocation in a direction at a right angle to the plane of feed of the shoe-sole.

3. In a sole-rounding machine the combination of the fixed frame A'; the bracket A^3; the driving-shaft C provided with the crank-pin *c* and pulley C^2; the feed-shaft D; the feed-disk D'; the worm-wheel D^2; the worm C^3 carried by the shaft C; the arm E mounted upon a fulcrum-pin in axial line with the shaft C; the slides F and F' fitted to bearings in said arm E; the cutter *a* carried by the slide F; the rod F^2 connecting said slide to the crank-pin *c;* the pressure-roll *b* carried by the slide F'; the elbow-lever G connected to said slide F; the rod G and the spring H for reciprocating said slide; the anvil-plate E'; and stops to limit the upward and downward movements of the head E.

4. In a sole-rounding machine the combination of the driving-shaft C provided with the crank *c;* the worm C^3; the shaft D mounted in fixed bearings; the worm-wheel D^2 and feed-disk D' carried by said shaft D; the pivoted arm E; the screw-stop *h* to limit the downward movement of the front end of said head; the anvil-plate E', the truck *j* and the lever K carried by said arm; the slides F and F' fitted to and movable endwise in bearings in said arm; the cutter *a* carried by said slide F; the rod F^2 connecting the said slide F to the crank *c;* the pressure-rolls *b b* carried by the slide F'; a spring for moving said slide and rolls toward the front; means for retracting said rolls; means for raising the front end of the arm E; the shaft k^2; the cams *k* and *k'* and the ratchet-wheel *l* all firmly secured upon the shaft k^2; the levers l^2 and m^2 loosely mounted upon said shaft; the pawl *l'* carried by the lever l^2; the shield *m'* carried by the lever m^2; the stops m^3 and *o;* a spring for holding the lever m^2 normally in contact with the stop m^3; and means for moving said lever into contact with the stop *o*.

5. In a sole-rounding machine the combination of a feed-disk revoluble about a fixed axis; a pivoted arm; an anvil-plate, a reciprocating cutter and a spring-pressed roll all carried by said arm; means for moving said arm about its pivot; an adjustable stop to limit the downward movement of said arm; an automatically-varying stop to limit and vary the upward movement of said arm; and means for imparting a rapid reciprocation to

said cutter in a plane at right angles to the plane of feed of the shoe for the purpose specified.

6. In a sole-rounding machine the combination with a feed-disk revoluble about a fixed axis, of a pivoted arm; an anvil-plate, a reciprocating cutter and a spring-pressed roll all carried by said arm; means for moving said arm about its pivot; an adjustable stop for limiting the downward movement of said arm; a pair of cams mounted upon a common shaft; means for intermittently moving said shaft and cams about their axes in one direction to a limited extent; means for automatically returning said cams to their normal position; and a revoluble truck carried by said pivoted arm and arranged to engage the periphery of one or the other of said cams to limit the upward movement of said arm; and means for moving said truck lengthwise of its axis to transfer it from beneath one cam to a position beneath the other cam as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 14th day of July, A. D. 1897.

HANFORD T. CROSBY.

Witnesses:
N. C. LOMBARD,
PHILIP H. FRAKER.