(No Model.) 3 Sheets—Sheet 1.

L. E. ERICSON.

SOLE ROUNDING MACHINE.

No. 527,676. Patented Oct. 16, 1894.

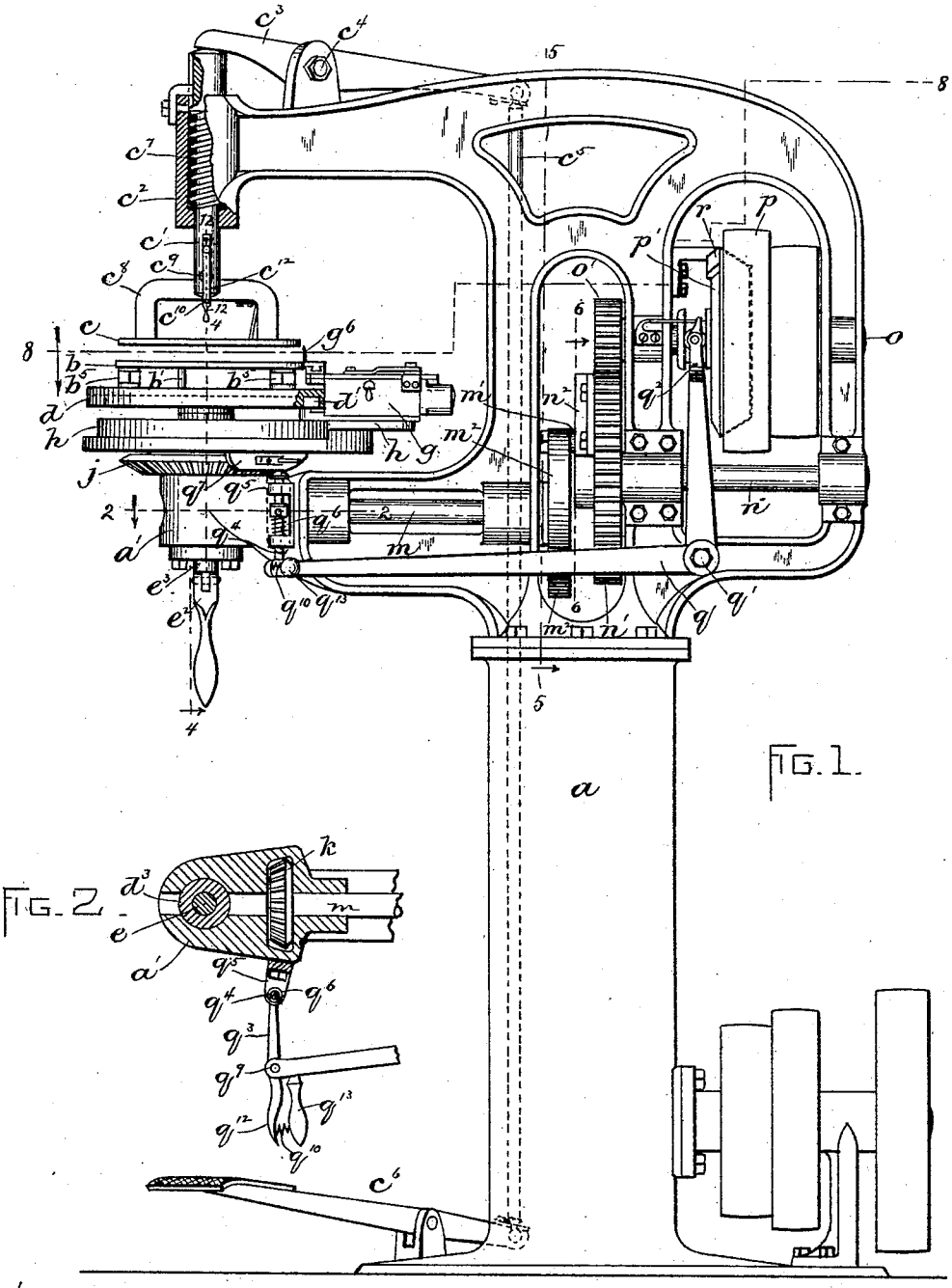

FIG. 1.

FIG. 2.

WITNESSES:
A. D. Harrison
Rollin Abell

INVENTOR:
L. E. Ericson
by Wright Brown Quinby & Attys.

(No Model.) 3 Sheets—Sheet 2.

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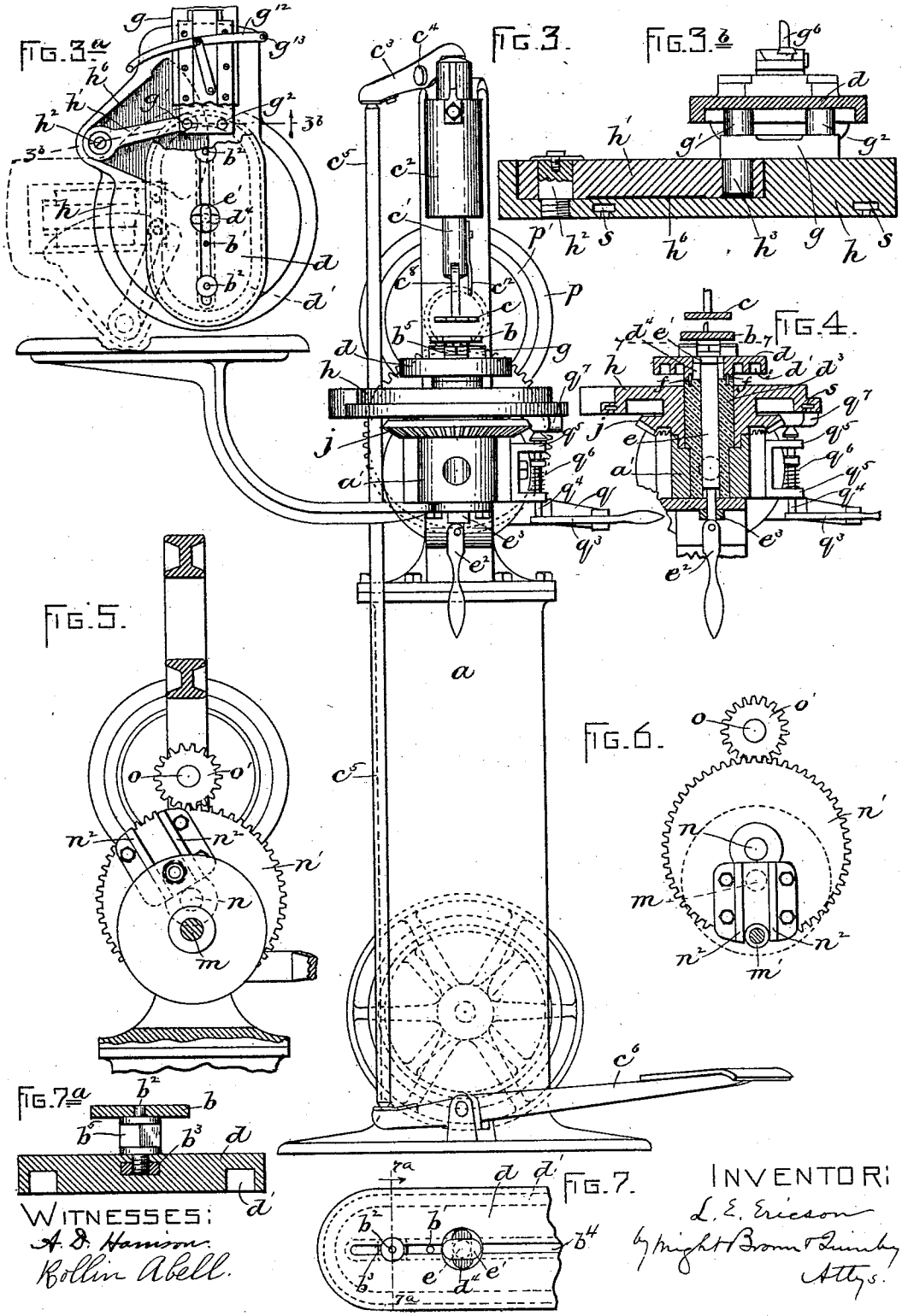
SOLE ROUNDING MACHINE.

No. 527,676. Patented Oct. 16, 1894.



WITNESSES:
A. D. Harrison
Rollin Abell.

INVENTOR:
L. E. Ericson
by Wright Brown & Quinby
Attys.

(No Model.) 3 Sheets—Sheet 3.

L. E. ERICSON.

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FIG. 8.

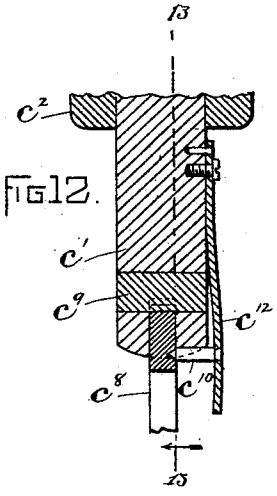


FIG. 12.

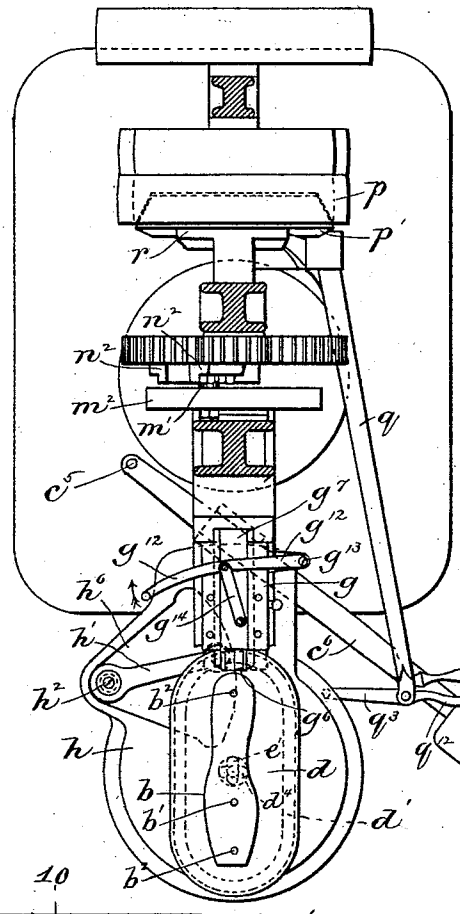


FIG. 10.

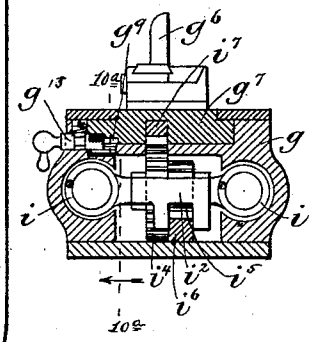


FIG. 10a.

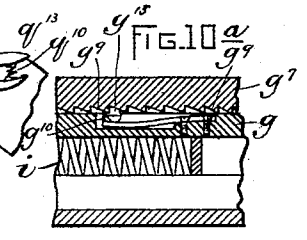


FIG. 9.

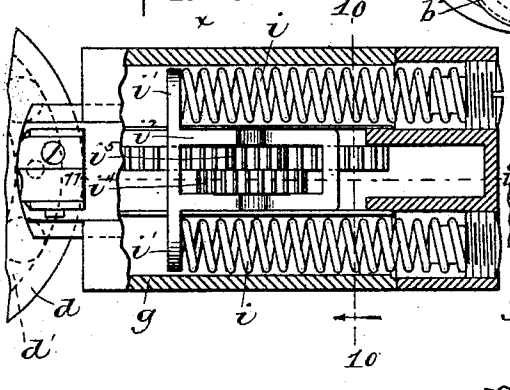


FIG. 11.

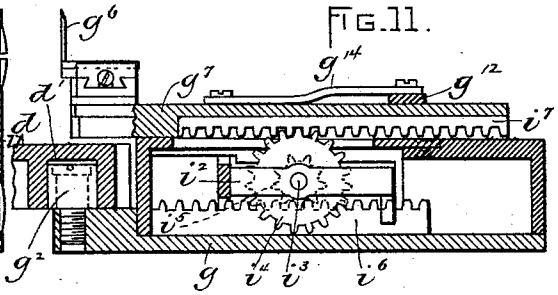
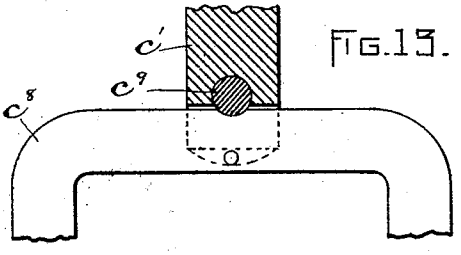


FIG. 13.



WITNESSES:
A. D. Harrison
Rollin Abell.

INVENTOR:
L. E. Ericson
by Wright Brown & Quinby
Attys

UNITED STATES PATENT OFFICE.

LEWIS E. ERICSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE FLAGG MANUFACTURING COMPANY, OF SAME PLACE.

SOLE-ROUNDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,676, dated October 16, 1894.

Application filed August 1, 1894. Serial No. 519,141. (No model.)

To all whom it may concern:

Be it known that I, LEWIS E. ERICSON, 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 is a specification.

This invention relates to machines for trimming pieces of leather into sole form by the action of a knife which is caused to travel around a pattern against which the blank to be trimmed is clamped.

The invention has for its object to provide various improvements whereby the operation of a machine of this kind may be made more efficient and desirable, and it consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification,—Figure 1 represents a side elevation of a sole-rounding machine embodying my improvements. Fig. 2 represents a section on line 2—2 of Fig. 1. Fig. 3 represents an end elevation of the machine. Fig. 3^a represents a top view of a part of the machine. Fig. 3^b represents a section on line 3^b—3^b of Fig. 3^a. Fig. 4 represents a section on line 4—4 of Fig. 1. Fig. 5 represents a section on line 5—5 of Fig. 1, looking toward the right. Fig. 6 represents a section on line 6—6 of Fig. 1, looking toward the right. Fig. 7 represents a section on line 7—7 of Fig. 4, and a plan view of the parts below said line. Fig. 7^a represents a section on line 7^a—7^a of Fig. 7. Fig. 8 represents a top plan view of the machine. Fig. 9 represents a partial top plan view and partial section of the knife-carriage. Fig. 10 represents a section on line 10—10 of Fig. 9. Fig. 10^a represents a section on line 10^a—10^a of Fig. 10. Fig. 11 represents a section on line 11—11 of Fig. 9. Fig. 12 represents a section on line 12—12 of Fig. 1. Fig. 13 represents a section on line 13—13 of Fig. 12.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the supporting standard, on which is the head or frame supporting the chief working parts of the machine.

b represents the pattern against which the sole blank to be trimmed is held by the clamp *c*. Said pattern is supported by the studs hereinafter described over the fixed cam-plate *d*, in which is formed a cam-groove *d'* the shape of which approximates that of the pattern; that is to say, the groove has the form of an ellipse the side portions of which are flattened or made parallel, as shown in Figs. 7 and 8, the length and width of the ellipse being somewhat greater respectively than the length and width of the pattern, so that the knife-carriage hereinafter described, which is caused to travel about the pattern and is guided by said groove, is moved in a path that approximates the form of the edge of the pattern, said carriage having a slide that directly supports the trimming knife and is pressed inwardly against the edge of the pattern by spring pressure, so that the path of the knife conforms exactly to the shape of the edge of the pattern.

The cam-plate has a fixed stud *b'*, and two adjustable studs b^2 b^2 which support the pattern *b*, the studs b^2 b^2 being at opposite sides of the fixed stud *b'* and affixed to slides b^3 (Fig. 7^a) which are fitted to move in a longitudinal guide-way b^4 in the cam-plate *d*, each stud b^2 being screw-threaded and provided with a clamping nut b^5 which may be turned down against the top surface of the cam-plate. The studs b^2 b^2 can therefore be adjusted to support patterns of any desired length, while the stud *b'*, which is not adjustable serves as a guide to enable the operator to properly locate the pattern, the latter being provided with three holes, one for each stud. The pattern rests loosely on the upper ends of the nuts b^5, and may be readily raised from the upper ends of the studs. The cam-plate is supported by a stud d^3 (Fig. 4), which is rigidly attached to an arm *a'* forming a part of the supporting frame. The cam-plate is detachably secured to the stud b^3 by means of a clamping bolt *e* having an elongated head *e'* (Fig. 7) formed to pass through a slot d^4 in the cam-plate *d*, and provided at its lower end with a cam-lever e^2 which when turned to one position presses against a plate e^3 bearing on the under side of the arm *a'* and draws the head *e'* downwardly onto a seat formed for it around the slot d^4, the bolt-head *e'* being turned at

right angles with the slot d^4. The cam-plate may be released by moving the cam-lever to release the pressure of the bolt and then giving the bolt a quarter-turn, bringing its head into line with the slot d^4, whereupon the cam-plate may be raised from the stud d^5. Dowel-pins $f\ f$ (Fig. 4) secure exactness of position of the cam-plate when it is in place.

g represents the knife-carriage, which rests loosely on the flat upper surface of a rotating driver h, which is a flat plate rigidly affixed to a bevel-gear j hereinafter described, said gear being journaled in a suitable fixed bearing in the standard a'. The gear j is positively rotated by the driving-shaft, and rotates the driver h. Motion is imparted from the driver to the knife-carriage by a coupling h' connected at one end by a stud or pivot h^2 with the driver, and at the other end by a stud or pivot h^3 with the carriage. (See Fig. 3^a.) The carriage g has two trundle-rolls $g'\ g^2$ which enter the cam-groove d', one of said rolls being on the stud h^3. The driver h is provided with a recess h^6 (Figs. 3^a and 3^b) which receives the coupling h', so that the latter does not project above the carriage-supporting surface of the driver, the swinging end of the coupling being adapted to slide on the bottom of the recess, while the upper side of the coupling is flush with the upper surface of the driver, so that the coupling supports that part of the carriage which projects over the recess.

It will be seen that when the driver is rotated, the coupling h' acts not only to support a part of the knife-carriage, but also to communicate motion from the driver to the knife-carriage and draw the latter along in a path that is governed by the cam-groove. The variation in the distance between different parts of the cam-groove and the center of rotation of the driver causes the carriage to slide in and out on the flat surface of the driver, the coupling moving in and out with the carriage, as indicated by full and dotted lines in Fig. 3^a. It will also be seen that the coupling swinging freely in the recess h^6 and arranged to constantly exert a pulling force on the knife-carriage transmits power from the driver to the carriage with little or no loss by friction. The connection of the coupling to the stud that carries one of the cam-engaging rolls of the carriage still further reduces the loss of power by friction, since said connection causes all the power that moves the carriage to be exerted practically in line with the said cam-engaging rolls. Hence there is no tendency to press one roll against one edge of the cam-groove and the other roll against the other edge, as would be the case if the power were applied at a point considerably out of line with the cam-engaging rolls.

The trimming-knife g^6 is directly supported by a slide g^7, which is supported by the carriage g and is movable independently thereof toward and from the center of rotation of the driver h. Inward pressure is constantly exerted on the slide g^7 to hold the knife against the edge of the pattern, by a suitable spring or springs. In Figs. 9, 10, and 11, I show the preferred arrangement of springs, and means for multiplying the motion caused by the action of the springs. $i\ i$ represent the springs, which bear against supports affixed to the outer end of the carriage g and exert pressure in the direction indicated by the arrow x (Fig. 9) on ears i' formed on an independently movable frame i^2. In said frame is journaled a shaft i^3 to which are affixed a larger pinion i^4 and a smaller pinion i^5. The pinion i^4 meshes with a rack i^7 affixed to the slide g^7, while the pinion i^5 meshes with a rack i^6 affixed to the carriage g.

It will be seen that inward movement imparted by the springs to the frame i^2 is multiplied by the pinions and racks, so that a short spring having a comparatively limited range of movement may be employed.

To enable the slide g^7 to be locked in a retracted position, as when the work is being applied and removed, I provide it with a series of ratchet-teeth g^9 (Fig. 10^a) arranged to be engaged by a spring-pawl g^{10} affixed to the carriage g, said pawl engaging said teeth automatically and locking the slide in any position to which it may be moved by a lever g^{12} which is pivoted at g^{13} to the carriage, and is connected by a link g^{14} with the slide. A movement of the lever g^{12} in the direction indicated by the arrow in Fig. 8 moves the knife and slide back from the pattern, the pawl g^{10} holding the knife and slide at any point to which they may be thus moved. The pawl may be depressed to release the slide, by means of a cam-shaped stud g^{15} journaled in one side of the carriage and formed so that when turned to one position it will permit the pawl to rise and engage a tooth g^9, and and when turned to another position it will depress the pawl below said teeth.

To the driver h is affixed a bevel-gear j meshing with a bevel-gear k (see dotted lines in Fig. 1) on a shaft m, the latter being rotated by a connection with a shaft n, as hereinafter described, and imparting a rotary movement to the driver h and causing the latter, through the coupling h', to impel or draw the knife carriage around the cam-plate and pattern.

The shaft n is arranged out of alignment with the shaft m, and is driven by power communicated from a driving-shaft o through gears $n'\ o'$ affixed respectively to the shafts n and o. The shafts n and m are so connected that a variable speed is imparted to the shaft m (the speed of the shaft n being constant) in order that the knife may move more slowly when trimming the toe and heel portions than when trimming the side portions. To this end, I provide the gear n' with parallel wings or guides $n^2\ n^2$ between which projects a trundle-roll m' on a disk m^2 affixed to the shaft m. The relative arrangement of the shafts $m\ n$ causes the distance

between the said trundle-roll and the center of the shaft n to vary, as shown in Figs. 5 and 6, and therefore causes a corresponding variation in the speed of rotation of the shaft m and of the parts driven thereby, there being two periods in each complete rotation when the motion is considerably retarded. The mechanism is so timed that the said periods occur when the knife is trimming the toe and heel portions of the blank.

The shaft o is driven by a loose driving-pulley p thereon, said pulley having a clutch-member, and a clutch-member p' keyed to the shaft so as to rotate therewith and slide thereon toward and from the pulley p.

I provide automatic means for stopping the operation of the machine after each complete rotation of the driver h, said means being as follows: q represents a bell-crank lever pivoted at q' to the supporting frame. One arm of said lever has a fork q^2 engaging a grooved collar affixed to the clutch-member p'. The other arm of said lever has an inwardly projecting finger q^3, which normally extends under a pin q^4 adapted to slide in fixed guides q^5 on the supporting frame, said pin being raised by a spring q^6. The upper end of the pin q^4 projects into the path of a projection q^7 affixed to the under side of the driver h, said projection being formed to depress the pin q^4 when it is brought over said pin. The depression of the pin q^4 is imparted, through the finger q^3, to the horizontal arm of the lever q, and said lever is caused to move the clutch-member p' away from the corresponding member on the driving-pulley p and into contact with a fixed brake r attached to the supporting frame. The motion of the clutch-member p', shaft o, and the mechanism driven by the latter, is therefore stopped by the described depression of the pin q^4.

In case it is desired to continue the operation of the machine without automatically stopping it, the finger q^3 may be moved out of line with the pin q^4, this movement being permitted by the pivotal connection of the finger q^3 with the lever q shown at q^9 (Fig. 2). The finger q^3 is normally held in position under the pin q^2, by means of a spring q^{10} interposed between a handle q^{12} on the finger q^3 and a handle q^{13} affixed to the lever q.

The projection q^7 is adjustably secured to the driver h, so that it may be adjusted at any desired point, and therefore will stop the operation when the knife has reached any desired part of the edge of the sole or pattern. To permit the convenient adjustment of the projection q^7, I provide the under side of the driver h with a circular groove s (Fig. 4), with which the projection is adjustably engaged.

The clamp c is secured to a sliding rod or plunger c', which is movable in a socket c^2 formed on the supporting frame. A lever c^3 pivoted at c^4 to said frame bears at one end on the plunger c', and is connected at its other end by means of a rod c^5 with a treadle-lever c^6 at the base of the machine. The operator, by depressing said lever, forces the clamp down upon a blank interposed between it and the pattern b. A spring c^7 (Fig. 1) in the socket c^2 raises the clamp from the blank when the treadle is released. The clamp is secured to the plunger c' by means of a yoke c^8 affixed to the clamp, and held by a detent c^{10} against a rounded bearing c^9 in the lower portion of the plunger c', said bearing permitting the yoke to oscillate to a limited extent, thus enabling the clamp to be slightly inclined endwise to compensate for variations in the thickness of the blank.

The detent c^{10} is formed on an elastic metal shank c^{12} affixed at its upper end to the plunger, and made sufficiently flexible between its fixed end and the detent to permit any rocking motion of the clamp that may be required.

I do not limit myself to the particular devices and details of construction hereinbefore described, and may vary the same within the limits of mechanical skill, without departing from the spirit of my invention.

I claim—

1. In a sole-rounding machine, the combination of the supporting frame, a fixed tubular stud or support such as d^3 rigidly secured to the supporting frame, the cam-plate supported by and detachable from the tubular stud and provided with a central slot, said plate and stud having interlocking projections and recesses whereby exactness of position of the plate is insured, and a clamping bolt fitted to turn in the orifice of the tubular stud and provided at its upper end with a head adapted to be turned across the slot in the cam-plate and at its lower end with a clamping lever, as set forth.

2. A sole-rounding machine comprising in its construction a fixed pattern, a stud such as d^3 affixed to the supporting frame, a cam-plate attached to the upper end of said stud, a rotary driver mounted to rotate on said stud and provided on its under side with a bevel-gear, a knife-carriage engaged with said driver and with the cam-plate and having a knife co-operating with the pattern, a shaft m having at one end a bevel-gear meshing with the bevel-gear on the driver and at the other end an eccentrically arranged roll or projection such as m', a shaft n out of line with the shaft m and provided with parallel guides between which the roll m' projects, and means for rotating the shaft n, as set forth.

3. A sole-rounding machine comprising in its construction a fixed pattern, a fixed cam-plate, a rotary driver having a projection such as q^7 on its under side, a knife-carriage independently movable on said driver and impelled thereby, a driving-shaft and connections between said shaft and the driver whereby the latter may be rotated, said connections including, first, a loose pulley having a clutch-member, and secondly, a sliding clutch-member rotatively engaged with the driving-shaft, a bell-crank lever pivoted to

the supporting frame and engaged at one end with the sliding clutch-member, said lever being adapted to be moved by the operator to connect and disconnect the loose pulley and sliding clutch-member, and devices intermediate the said lever and the projection q^7 through which the lever may be moved by said projection to disconnect the loose pulley and clutch-member once during each rotation of the driver.

4. A sole-rounding machine comprising in its construction a fixed pattern, a fixed cam-plate, a rotary driver, having a projection such as q^7 on its under side, a knife-carriage independently movable on said driver and impelled thereby, a driving-shaft, and connections between said shaft and the driver whereby the latter may be rotated, said connections including, first, a loose pulley having a clutch-member, and secondly, a sliding clutch-member rotatively engaged with the driving-shaft, a bell-crank lever pivoted to the supporting frame and engaged at one end with the sliding clutch-member, said lever being adapted to be moved by the operator to connect and disconnect the loose pulley and sliding-clutch-member, a plunger or pin such as q^4 adapted to be depressed by the projection q^7, and a finger q^3 pivotally connected to the bell-crank lever and normally in position to be depressed by said plunger, said finger being movable so that it may be displaced to prevent the stoppage of the driver.

5. In a sole-rounding machine, the combination of the carriage, the knife-supporting slide movable on said carriage, springs supported by the carriage, and means for imparting a multiplied motion from the springs to the slide, as set forth.

6. In a sole-rounding machine, the combination of the carriage, the knife-supporting slide movable on said carriage, springs supported by the carriage, a frame movable independently on the carriage by said springs and provided with a larger and a smaller pinion, a rack affixed to the carriage and meshing with the smaller pinion, and a rack affixed to the slide and meshing with the larger pinion, as set forth.

7. In a sole-rounding machine, the combination of the carriage, the knife-supporting slide movable on said carriage, a spring or springs arranged to force the slide forward, a lever and link whereby the slide may be moved backward, ratchet-teeth and a pawl whereby the slide may be held in any position to which it may be retracted, and a pawl-displacing device whereby the slide may be released.

8. In a sole-rounding machine, the combination with the pattern, of the clamp, the yoke rigidly fixed to the clamp, the plunger having a bearing on which the yoke is adapted to rock, and a detent connected by a flexible spring with the plunger and adapted to detachably secure the yoke to the plunger, as set forth.

9. The cam having a fixed pattern-guiding or locating stud and two adjustable pattern-supporting studs at opposite sides of the said locating stud, as set forth.

10. The cam having a fixed pattern-guiding or locating stud and two adjustable pattern-supporting studs at opposite sides of the said locating stud, combined with a pattern having orifices for said studs.

11. The combination of the fixed cam-plate, the rotary driver having a flat upper surface and a recess in said surface, the knife-carriage having rolls entering the groove in the cam, and independently movable on the flat upper surface of the driver and the coupling connecting the driver and carriage and located in the recess of the driver.

12. The combination of the fixed cam-plate, the rotary driver having a flat upper surface and a recess in said surface, the knife-carriage having rolls entering the groove in the cam, and the coupling connecting the driver and carriage and located in the recess of the driver, said coupling being connected with the carriage at a point coinciding with one of the cam-engaging rolls on the carriage.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 25th day of July, A. D. 1894.

LEWIS E. ERICSON.

Witnesses:
C. F. BROWN,
A. D. HARRISON.