(No Model.) 4 Sheets—Sheet 1.

JOHN, PAUL, AMOS, FREDERICK & ARTHUR CAVE.

LEATHER CUTTING MACHINE.

No. 379,857. Patented Mar. 20, 1888.

Fig 6

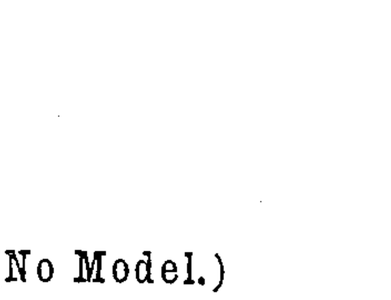

Fig 1.

Fig. 5.

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Fig. 7.

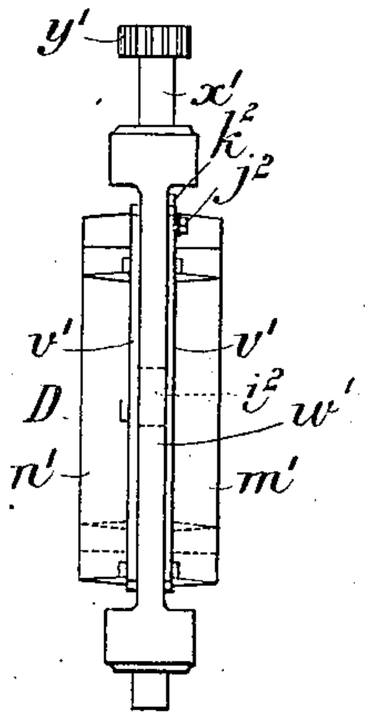

Fig. 8.

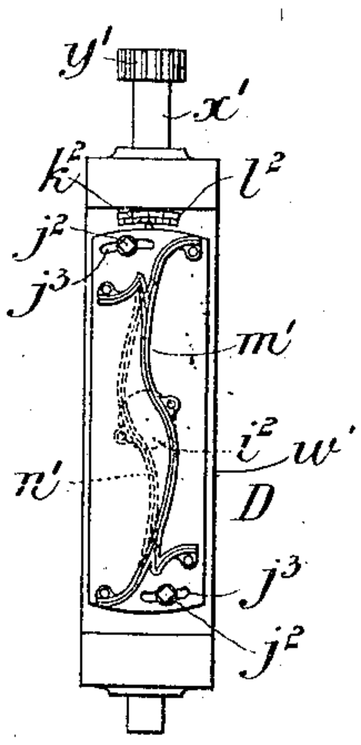

Fig. 9.

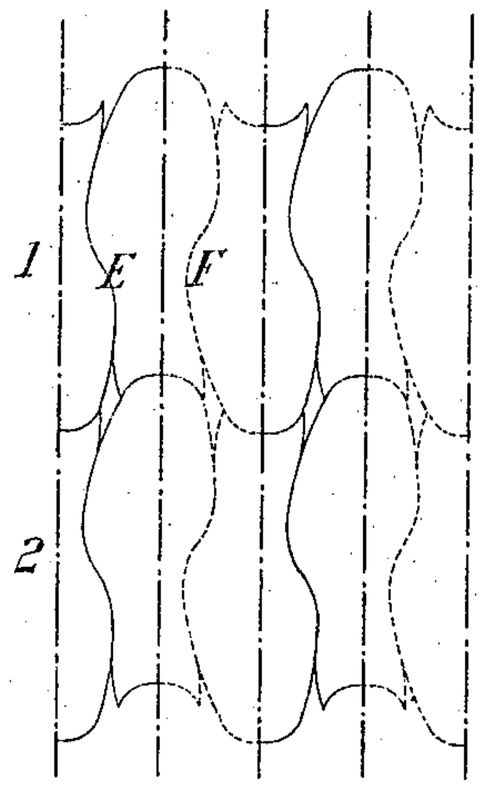

Fig. 10.

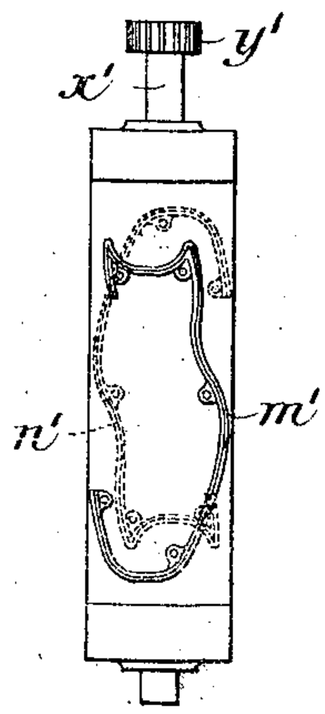

Fig. 11.

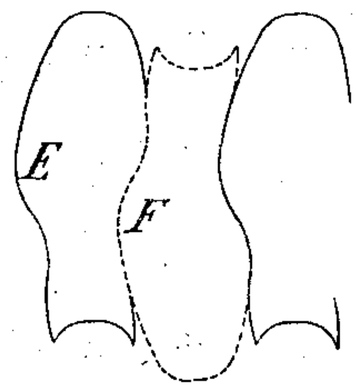

Fig. 2

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No. 379,857. Patented Mar. 20, 1888.

Fig. 3.

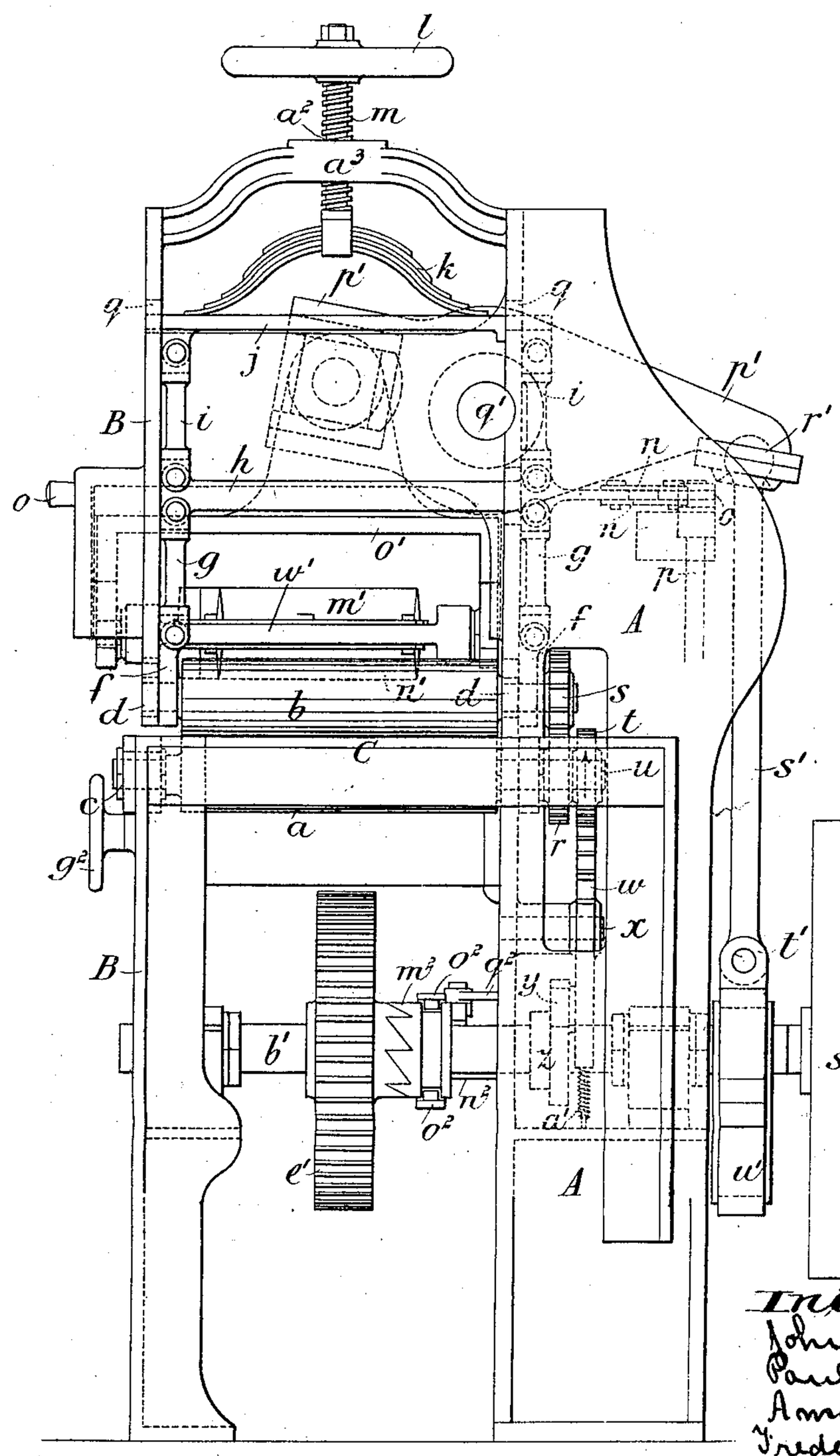

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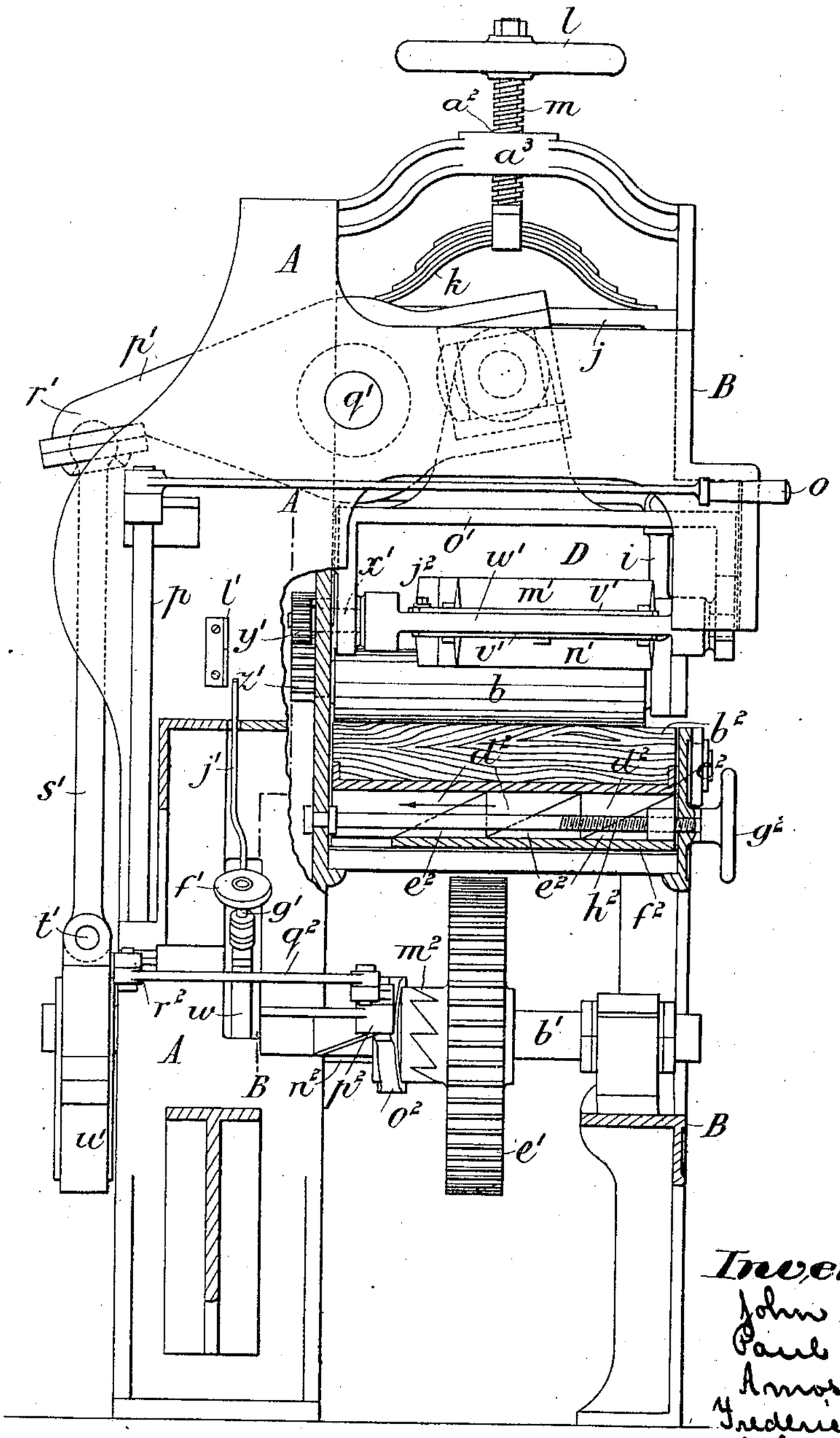
Fig. 4.



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UNITED STATES PATENT OFFICE.

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LEATHER-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,857, dated March 20, 1888.

Application filed November 11, 1887. Serial No. 254,886. (No model.)

To all whom it may concern:

Be it known that we, JOHN CAVE, PAUL CAVE, AMOS CAVE, FREDERICK CAVE, and ARTHUR CAVE, subjects of the Queen of Great Britain, residing at Higham Ferrers, in the county of Northampton, England, have invented a new and useful Improved Machine for Cutting Leather into Soles for Boots or Shoes, applicable, also, for cutting leather and other materials for other purposes, of which the following is a specification.

This invention relates to the construction of a machine whereby leather is rolled, ranged, and cut into soles for boots or shoes in a simple and expeditious manner, the usual waste of leather being considerably diminished.

The improved machine comprises a suitable framing, in which is mounted a pair of rollers to which motion is communicated in any suitable manner. The leather is fed through these rollers, and on one side of the said rollers is arranged a double-edged cutting-knife of the proper size and shape for the purpose required. This knife is so arranged that as the leather is fed forward through the rollers one edge of the knife is brought down on the leather by any suitable arrangement, and, having cut through the leather, the knife is raised a certain distance and at the same time is turned through half a revolution and then moved downward, so as to bring the other cutting-edge of the knife onto the leather and divide it, by which arrangement it will be obvious that after the first cut each downward motion of the knife separates one sole.

It will be understood that the feeding forward of the leather is regulated according to the width of the sole to be cut, the leather remaining stationary while the cutting operation takes place. The knives are also adjustable to allow of slightly varying the width of the toes and heels.

In order to enable our invention to be fully understood, we will describe how it can be carried into practice by reference to the accompanying drawings, in which—

Figures 1 and 2 represent a front elevation and a plan, respectively, of a machine, constructed according to our invention, for cutting leather into soles for boots or shoes, applicable, also, for cutting leather and other materials for other purposes. Fig. 3 represents an elevation of the right-hand side of the machine. Fig. 4 represents an elevation, partly in section, of the left-hand side of the same. Fig. 5 represents a section taken on the line A B of Fig. 4. Fig. 6 represents a vertical section, drawn to a larger scale, of the wheel for driving the feed-rollers. Figs. 7 and 8 represent a side elevation and a plan, respectively, of one form of our double-edged cutting-knife. Fig. 9 is a diagrammatic view illustrating a portion of a butt or hide of leather which has been cut by the knife shown in Figs. 7 and 8 into a series of boot or shoe soles. Fig. 10 represents a plan of another form of our double-edged cutting-knife; and Fig. 11 is a similar view to Fig. 9, but illustrating the manner in which a series of boot or shoe soles is cut by the knife shown in Fig. 10.

Similar reference-letters indicate similar or corresponding parts throughout the drawings.

Referring to Figs. 1 to 8, the framing of the machine consists of a standard, A, frame B, and tables C and C'. The part of the frame B above the tables is detached from the lower part, so as to allow of any required width of leather-butt being placed between the feed-rollers.

a and *b* are the pair of feed-rollers for feeding the leather to be cut into boot or shoe soles. The lower roller, *a*, revolves in fixed bearings *c c*, while the upper roller, *b*, revolves in bearings *d d*, which have a slight vertical movement, so that by lifting the said roller *b* the feed of the leather will be stopped. The bearings *d d* at each end of the roller *b* are provided with upward extensions *f f*, connected by links *g g* to a bar, *h*, which is connected by links *i i* to a bar, *j*, on which presses a spring, *k*, the pressure of which can be regulated by means of a hand-wheel, *l*, and a screw, *m*, working through a screw-threaded opening, a^2, in the cross-bar a^3. The bar *h* is also connected by links *n n* to a bell-cranked lever-handle, *o*, attached to a vertical pivot-shaft, *p*. By moving the lever-handle *o* into the position shown by the dotted lines in Fig. 2 the bar *h*, which, together with the links *g g* and *i i*, forms a toggle-joint, will be moved so as to raise the roller *b*. The bar *j* normally rests on the bot-

tom parts of slots *q q*, which receive its ends; but when a butt of leather to be operated upon is placed between the rollers the thickness of the leather will cause the bar *j* to be lifted up a corresponding distance, thereby allowing the pressure from the spring *k* to be imparted to the leather. The rollers *a* and *b* are geared together by toothed wheels *r* and *s*, the teeth of the said wheels being sufficiently deep to allow of the upward movement of the roller *b* without taking the wheel *s* out of gear with the wheel *r*.

t is the pinion (of which a detached section is shown at Fig. 6) for imparting movement to the rollers *a* and *b*, and which is mounted on the pivot *u* at one end of the roller *a*.

In order to allow the leather to remain stationary while the cutting operation takes place, the motion imparted to the rollers *a* and *b* is intermittent. For this purpose the pinion *t* is loose upon the pivot *u*, and the latter is provided with a spring-key, *v*, (or spring-keys,) beveled on its upper edge, and which engages with a correspondingly-shaped key way or notch (or key ways or notches) in the pinion *t*, as shown clearly in Fig. 6. By this arrangement, if the pinion *t* be operated in the direction of the arrows, Figs. 3 and 6, the pivot *u*, and consequently the roller *a*, will be caused to turn with it; but if the pinion be turned in the opposite direction it will press the key *v* into the pivot *u* and slide round on the same without turning it. For imparting these movements in opposite directions to the pinion *t*, we employ a toothed oscillating quadrant, *w*, pivoted at *x*, and actuated by means of a roller, *y*, which is caused to bear against a cam, *z*, by means of a spring, *a'*, as clearly shown in Fig. 5. The cam *z* is mounted on a shaft, *b'*, to which movement is imparted from the main shaft *c'*, by means of spur-wheels *d' e'* and a clutch, m^2, hereinafter described.

In order to vary the feeding movement of the rollers *a* and *b*, for the purpose of altering the width of the soles to be cut, we make the roller *y* adjustable by means of a hand-wheel, *f'*, and screw *g'*, working through a nut, u^2, and form the leg *w** of the quadrant *w*, as shown at *i'*, so that it can bear or stop against the shaft *b'* when the roller is upon or over that part of the periphery of the cam *z* which is nearest the shaft *b'*. By this arrangement the position of the roller can be adjusted so that more or less of the periphery of the cam *z* will act upon it, thereby varying the movement imparted to the quadrant *w*, and consequently to the rollers *a* and *b*.

j' is an index or pointer working in a guide, *k'*, and attached to the screw *g'*, the said index serving to indicate on a scale, *l'*, attached to the standard A, the width of sole to be cut.

D is the double-edged cutting-knife, pivoted to a sliding cross-head, *o'*, to which a reciprocating movement is imparted by one end of a lever, *p'*, pivoted at *q'* to the standard A, the other end of the said lever being attached, by means of a ball-and-socket (or other) joint, *r'*, to a rod, *s'*, to which movement is imparted by and which is attached by a knuckle-joint, *t'*, to an eccentric, *u'*, on the shaft *b'*. The double-edged cutting-knife D is formed of two blades, *m' n'*, of the shape shown in Fig. 8, fixed to plates *v' v'* on each side of a plate, *w'*, which is pivoted to the cross-head *o'*. The plates *v' v'* are attached to one another by a circular block, i^2, passing through the plate *w'*. This block also acts as a pivot, as it allows the plates to be adjusted sidewise so as to slightly vary the width of the toes and heels of the soles cut by the knives. The plates when so adjusted are clamped by studs j^2 passing through slots j^3 in the same.

k^2 is a pointer or index on one of the plates *v'*, which pointer, when the said plates are being moved on their pivot i^2, works over a scale, l^2, to allow of indicating when the knives have been accurately adjusted. One of the pivots *x'* of the plate *w'* is extended through into the standard A, and carries a pinion, *y'*, which gears with a fixed rack, *z'*, Fig. 4, so that as the knife D is moved upward by the lever *p'* it is caused to turn half round.

In order to prevent the knife D from turning when moving downward to cut the leather, the pinion *y'* and pivot *x'* are provided with a spring-key similarly to the pinion *t* and pivot *u* of the feed-roller *a*.

Underneath the knife D, and level with the top of the table C, is arranged a wooden block, b^2, on which the cutting operation takes place. The surface of this block gradually becomes worn away by the action of the knife; and in order to compensate for this wear we mount the said block in a frame, c^2, provided with inclined planes d^2 d^2 on its under side, as shown clearly in Fig. 4. These inclined planes d^2 d^2 rest on other inclined planes, e^2 e^2, attached to a frame, f^2, to which a sliding movement in the direction of the arrow, Fig. 4, can be imparted by a hand-wheel, g^2, and screw h^2, thereby raising the block b^2, as required.

In order to stop the reciprocating action of the knife D, (for the purpose of preventing the leather from being cut when the feeding movement of the latter is stopped by the feed-roller *b* being raised by the lever-handle *o*,) we provide the clutch m^2, hereinbefore referred to, which slides on a spline, n^2, on the shaft *b'*, and is caused to engage with the clutch-teeth on the boss of the spur-wheel *e'* (which runs loose on the shaft) by means of the forked end of a lever, o^2, pivoted at p^2, the other end of the said lever being connected by a link, q^2, to a lever, r^2, attached to the lower end of the pivot-shaft *p*, as shown clearly in Figs. 2 and 4. By this arrangement the two operations just mentioned can be effected by the one movement of the lever-handle *o*.

s^2 is a fly-wheel for insuring a uniform motion of the machine, and t^2 t^2 are fast and loose pulleys for enabling the machine to be started and stopped, as required.

To operate the machine, the lever-handle *o* must first be placed in the position shown by

the dotted lines in Fig. 2, the knife D being then in the raised position shown in Figs. 1, 3, and 4, with the blade *m'* uppermost. The leather to be operated upon is then placed on the table C, and between the feed-rollers *a* and *b*, so that one end of it rests on the block b^2 under the knife D. The machine being now started and the lever-handle *o* placed in the position shown by the full lines in Fig. 2, the feed-roller *b* will be caused to move down onto the leather, which will remain stationary while the knife D moves down and causes its blade *n'* to cut into the leather, thereby producing a cut like that shown by the full lines at E in the range of soles marked 1 in Fig. 9. The knife will then move upward, at the same time making a half-revolution, as hereinbefore described, so as to bring the blade *m'* underneath. The feed-rollers will also at the same time be caused to feed the leather, so that when the knife D moves down onto the leather again its blade *m'* will make a cut like that represented by the dotted lines at F in Fig. 9. By this arrangement it will be seen that after the first cut each downward movement of the knife D separates one sole, which is pushed forward onto the table C' by the remaining leather. The cutting action is continued to the end of the butt of leather, thereby completing the range of soles marked 1. The lever-handle *o* is then again moved into the dotted position, so as to lift the top feed-roller, *b*, and stop the knife D, and the butt of leather is again placed in position, so as to cut the range of soles marked 2, the toes and heels of the soles at the juncture of the two ranges being cut so as to fit one another, as shown, thereby reducing the waste of leather to a minimum.

In Fig. 10 we have shown a modified form of cutting-knife, a series of soles cut thereby being illustrated at Fig. 11. The cut represented by the full lines at E is made by the blade *n'*, and the cut represented by the dotted lines at F is made by the blade *m'* when the knife is turned over.

We have described our invention as applicable for cutting out boot or shoe soles; but it will be obvious that by modifying the shape of the knives the machine may be used for cutting out other parts of soles, such as toes, middles, and heels; also for cutting out boot or shoe uppers, and for cutting other articles from leather or other materials.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is—

1. In a machine for cutting leather, the combination, with the plate *w'*, of the sole-cutting knife having a single central blade-body provided at each end with diverging portions, substantially as described.

2. In a machine for cutting leather, a sole-cutter consisting of a pivoted plate having on one side a cutting-knife consisting of a central body-blade with diverging portions at each end for cutting the edges of different soles, and on another face of the said plate a cutter-blade of like character reversely disposed, substantially as described.

3. In a machine for cutting leather, the combination, with the plate *w'*, of a sole-cutting knife pivoted to said plate, and clamps for holding the knife in the desired position, substantially as described.

4. In a leather-cutting machine, the combination, with the plate *w'*, of a plate, *v'*, having curved slots at its end, mounted thereon, and clamp-bolts connecting said plate *v'* to plate *w'* through said slots, and a sole-cutting knife mounted on said plate *v'*, substantially as described.

5. In a machine for cutting leather, the combination, with a pair of feed-rolls in gear with each other, a pinion mounted on the shaft of one of said feed-rolls, and an automatic clutch connecting the pinion and shaft, of an oscillating segment engaging said pinion, whereby the movement of the segment in one direction feeds the material to the cutters, and its reverse movement permits the feeding-rolls to remain stationary, substantially as described.

6. In a machine for cutting leather, the combination, with a pair of feed-rolls in gear with each other, a pinion mounted on the shaft of one of said feed-rolls, an automatic clutch connecting the pinion and its shaft, and a lever provided with a segment engaging said pinion, of an index-plate mounted on said machine, and a pointer-arm connected with the segment-lever, whereby the amount of movement given the feeding mechanism is indicated upon the index-plate, substantially as described.

7. In a machine for cutting leather, the combination, with a pair of feed-rolls in gear with each other, a pinion mounted on the shaft of one of said feed-rolls, an automatic clutch connecting the pinion and its shaft, and a lever provided with a segment engaging said pinion, of a cam bearing against said lever, and a spring holding said lever in contact with said cam, substantially as described.

8. In a machine for cutting leather, the combination, with a pair of feed rolls in gear with each other, a pinion mounted on the shaft of one of said feed-rolls, and an automatic clutch connecting the pinion and its shaft, of a lever having a slot therein and provided with a segment engaging said pinion, a block provided with a friction-roll adjustably mounted in said slot, a cam engaging the friction-roll, and a spring holding the friction-roll in engagement with the cam, substantially as described.

9. In a machine for cutting leather, the combination, with a pair of feed-rolls, one of said rolls being mounted in stationary bearings and the other in movable bearings, and toggle-levers supporting said movable bearings, of a lever, and connections with the central joints of the toggle-lever, whereby the said movable feed-roll is moved into and out of operative position, substantially as described.

10. In a machine for cutting leather, the com-

bination, with a pair of feed-rolls, one of said rolls being mounted in stationary bearings and the other in movable bearings, and toggle-levers supporting said movable bearings, of a driving-shaft, a driving gear-wheel loosely mounted on said shaft, a clutch connecting said shaft and driving-gear, a rock-shaft mounted on the main frame, an arm on said rock-shaft connected with said clutch, a hand-lever rigidly mounted on said rock shaft, and connections connecting said lever with the central joints of said toggle-levers, whereby the movement of said hand-lever operates said clutch and at the same time raises said movable feed-roll from its operative position, substantially as described.

11. In a machine for cutting leather, the combination, with a pair of feed-rolls, one of said rolls being mounted in stationary bearings and the other in movable bearings, of toggle-levers supporting said movable bearings, a movable support for said toggle-levers mounted in slots provided in the main frame, a pressure device for said movable support, a hand-lever pivoted on the main frame of the machine, and connections connecting the said lever with the central joints of the toggle-levers, whereby a movement of the hand-lever moves the movable roll into and out of position to receive the force of the pressure device, substantially as described.

12. In a machine for cutting leather, the combination, with a pair of feed-rolls, one of said rolls being mounted in stationary bearings and the other in movable bearings, of toggle-levers supporting said movable bearings, a movable support for said toggle-levers mounted in slots provided in the main frame, a spring bearing upon said movable support, the slots in said frame limiting the movement of the movable support, so that the pressure of the spring is not upon the rolls unless there is material between them, substantially as described.

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