(No Model.)

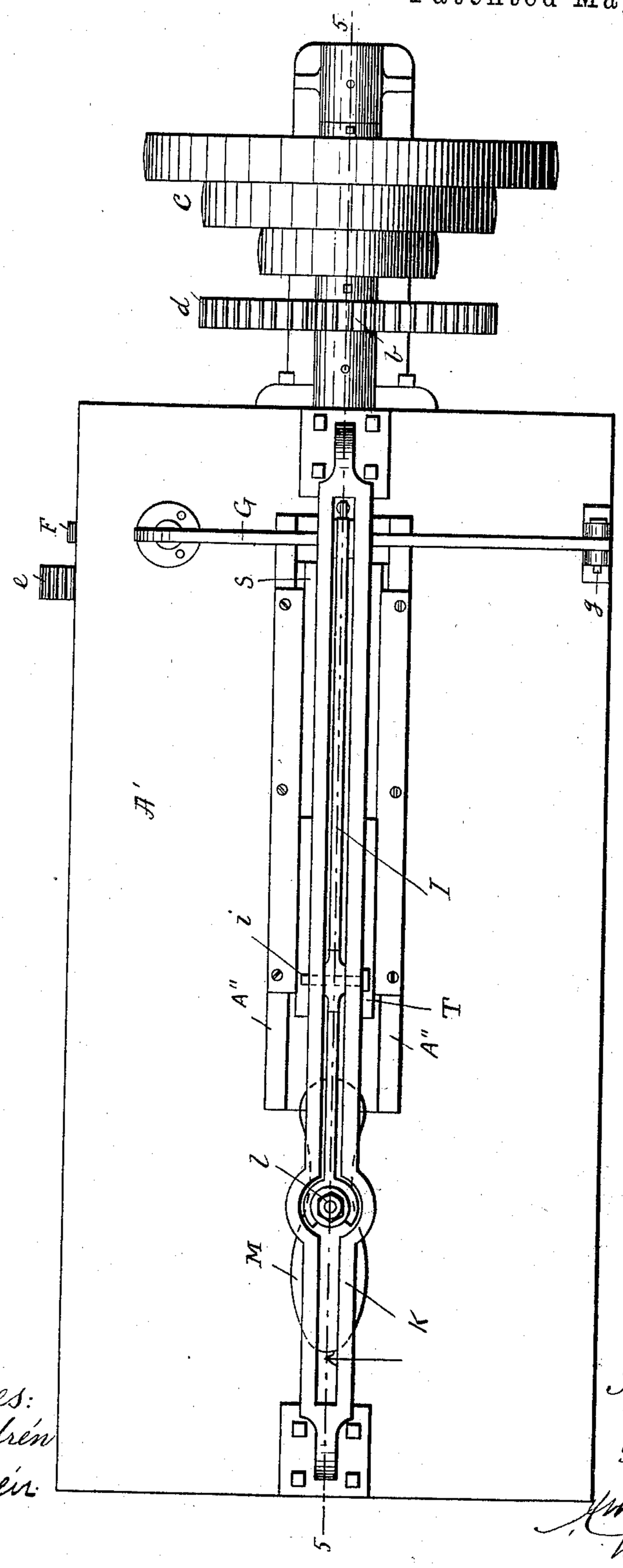
8 Sheets—Sheet 1.

R. REID.

MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

Fig. 1.



Witnesses:
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Thekla Andrén.

Inventor:
Robert Reid.
by
Hiram Andrén
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(No Model.) 8 Sheets—Sheet 2.

R. REID.

MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

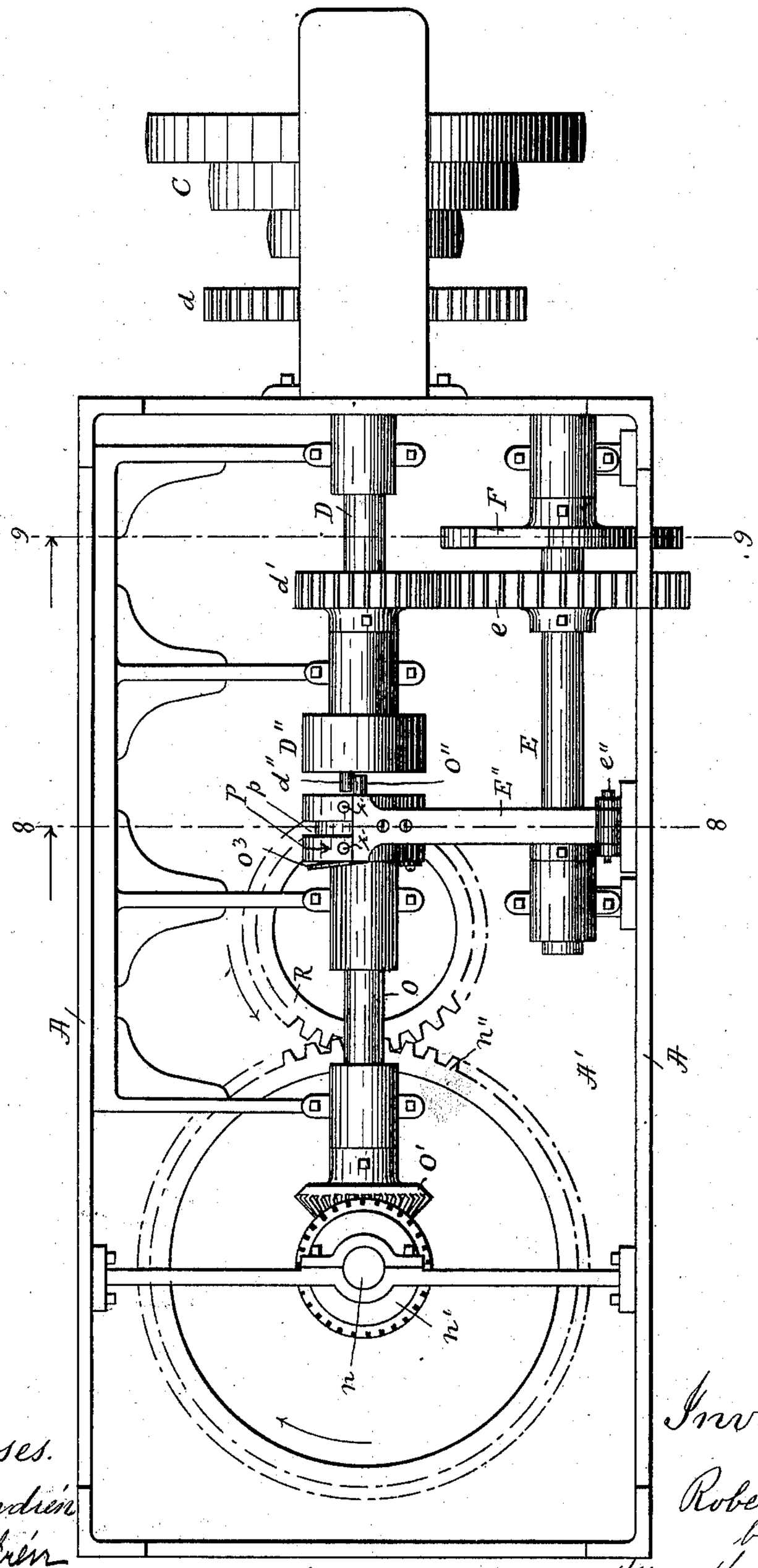

Fig. 2.

Witnesses.
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R. REID.

MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

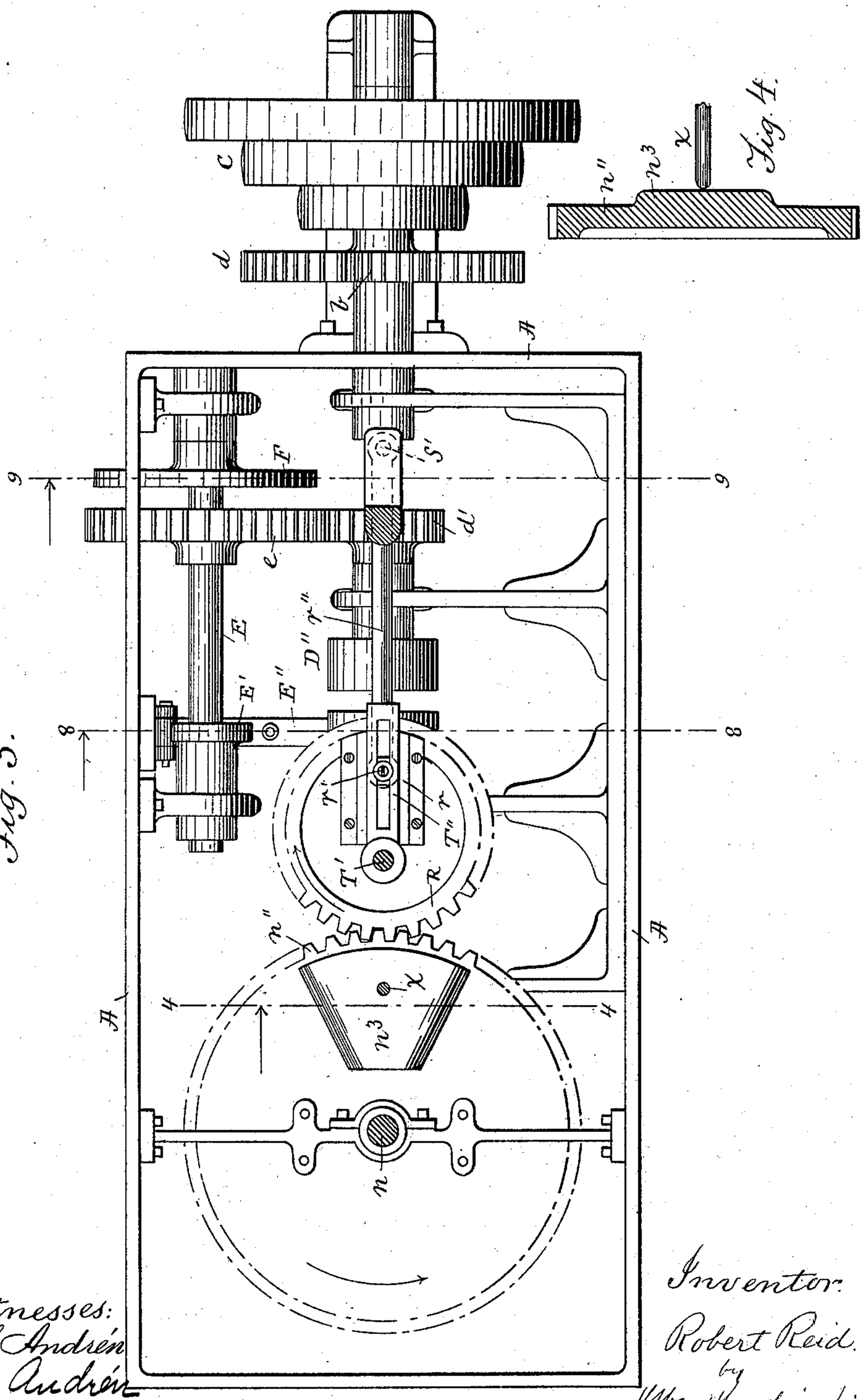

Fig. 3.

Fig. 4.

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(No Model.) 8 Sheets—Sheet 4.

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MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

Fig. 7.

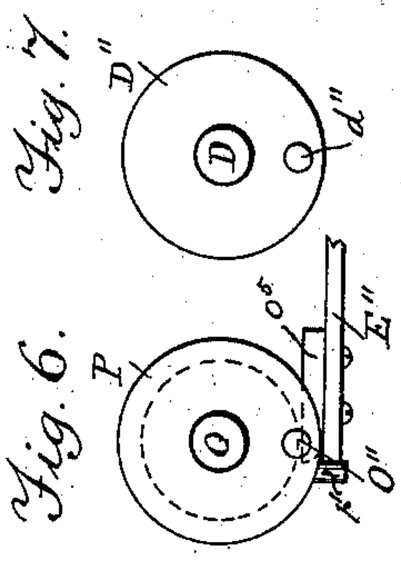

Fig. 6.

Fig. 5.

Witnesses.
Karl Andrén
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(No Model.) 8 Sheets—Sheet 5.

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MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

Fig. 9.

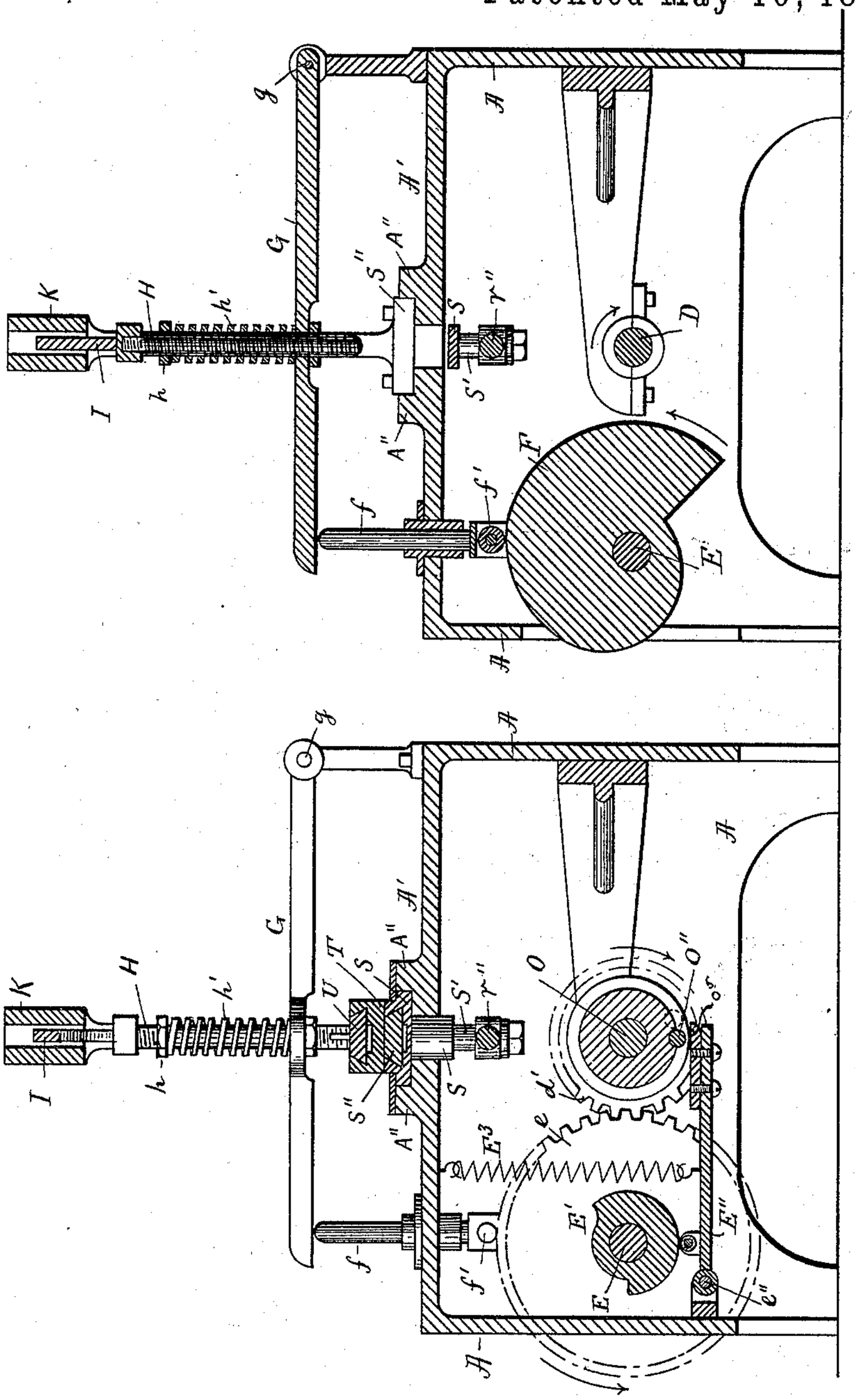

Fig. 8.

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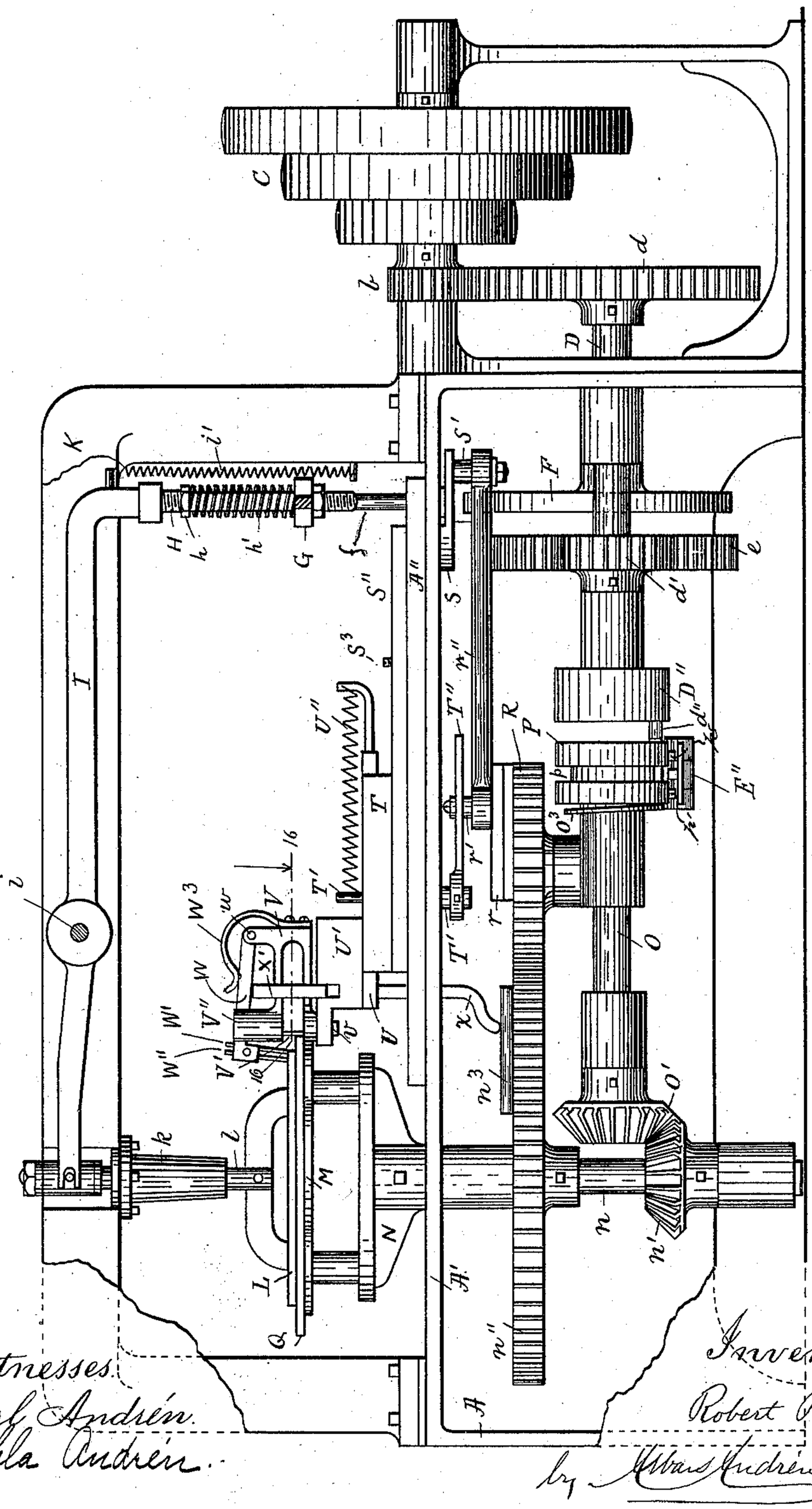
(No Model.) 8 Sheets—Sheet 6.

R. REID.

MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

Fig. 10.



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(No Model.) 8 Sheets—Sheet 7.

R. REID.

MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

Fig. 11.

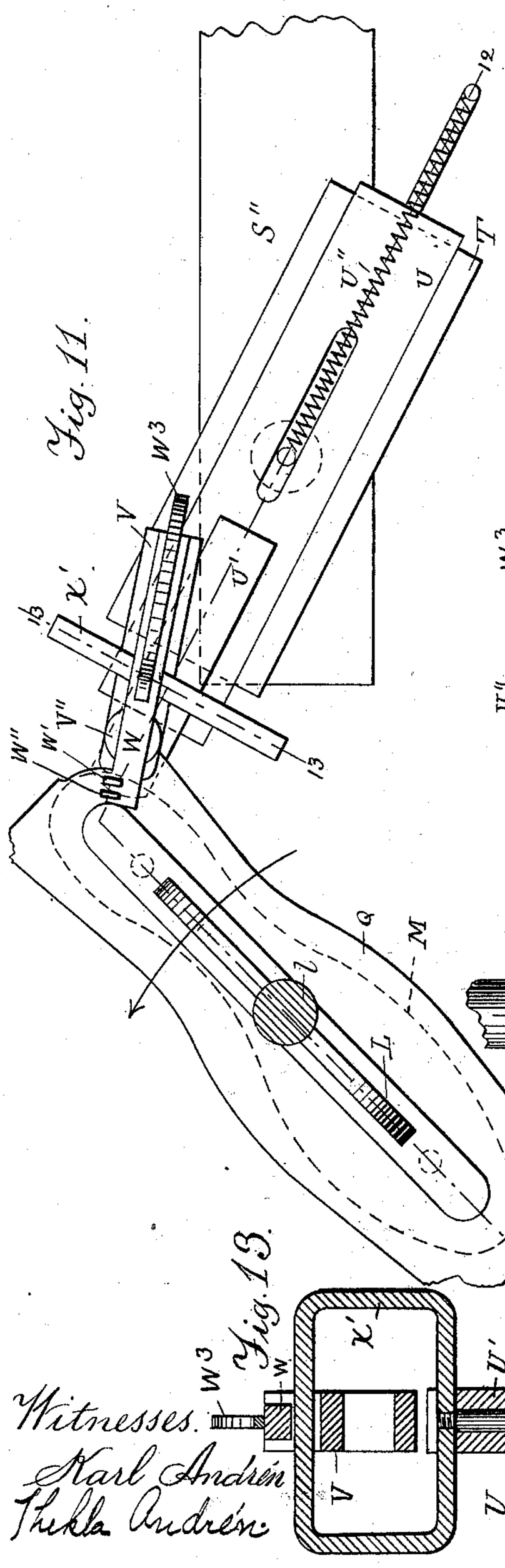

Fig. 12.

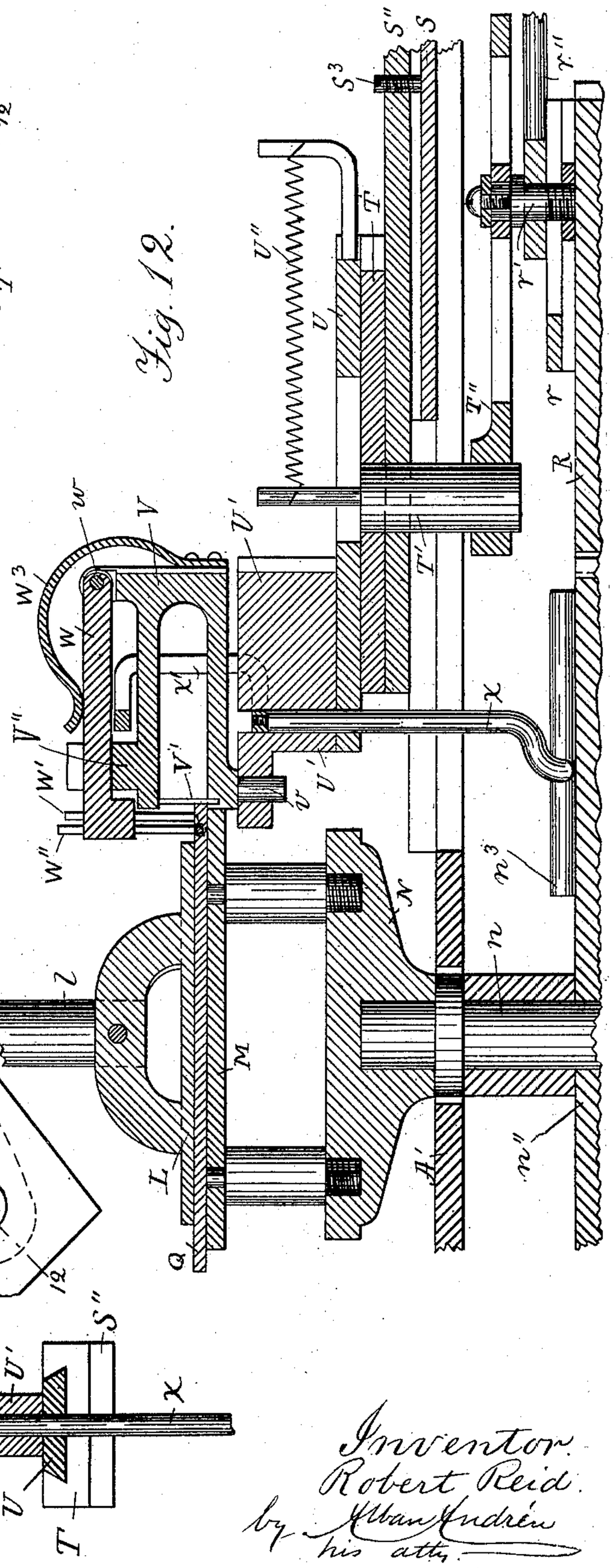

Fig. 13.

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(No Model.) 8 Sheets—Sheet 8.

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MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

No. 603,968. Patented May 10, 1898.

Fig 14.

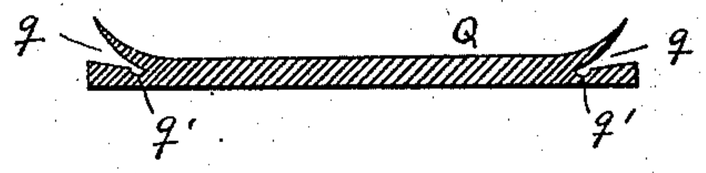
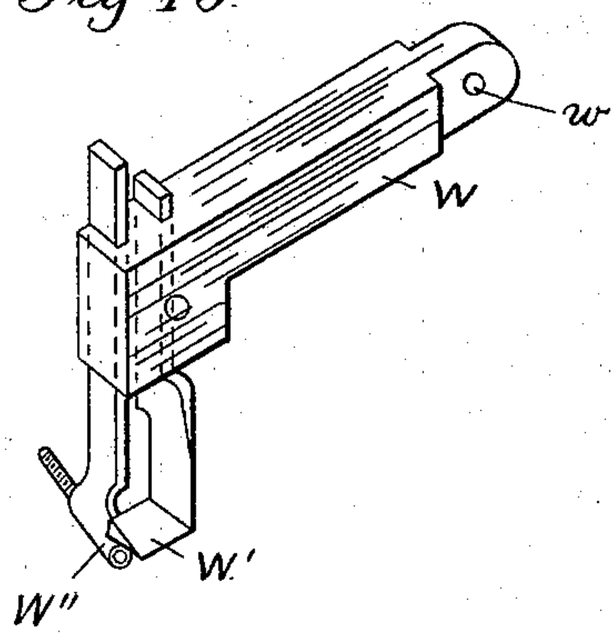


Fig 15.



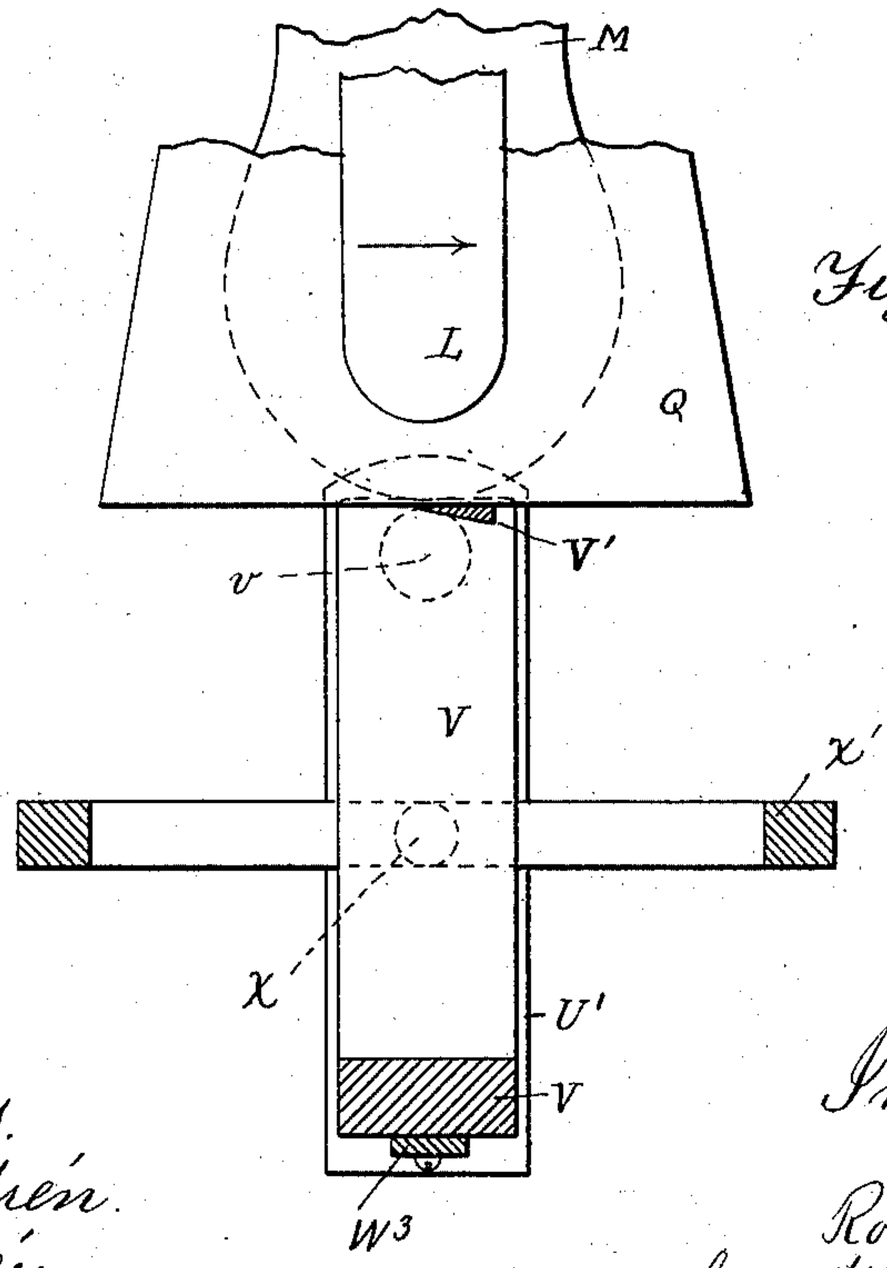


Fig 16.

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UNITED STATES PATENT OFFICE.

ROBERT REID, OF BEVERLY, MASSACHUSETTS, ASSIGNOR OF ONE-FOURTH TO SVEN M. HALLSTROM, OF SAME PLACE, AND JOHN F. HENDRICKSON, OF BOSTON, MASSACHUSETTS.

MACHINE FOR CUTTING OUT AND CHANNELING SOLES.

SPECIFICATION forming part of Letters Patent No. 603,968, dated May 10, 1898.

Application filed July 24, 1897. Serial No. 645,853. (No model.)

To all whom it may concern:

Be it known that I, ROBERT REID, a citizen of Great Britain, and a resident of Beverly, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Sole Cutting and Channeling Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to improvements in machines for cutting, channeling, and grooving the soles of boots and shoes; and it consists generally in improvements in the mechanism and operation of parts of a machine in which automatically-operated means are employed for cutting, channeling, and grooving the sole-blanks.

An object of the invention relates to improvements in the mechanism for clamping the sole-blank against a templet during the cutting, channeling, and grooving operation.

A further object of the invention relates to improved means for rotating at intervals the templet and sole-clamping devices.

A further object of the invention relates to improved mechanism operating automatically to release the clamping device from engagement with the sole after the same has been cut, channeled, and grooved.

A further object of the invention relates to improved means operating automatically to stop the rotation of the templet at the completion of each revolution to permit the cut sole to be removed and a sole-blank placed on the templet.

A further object of the invention relates to improved mechanism for imparting a forward and rocking motion to the tool-carrier.

A further object of the invention relates to mechanism operating automatically to raise and lower the channeling and grooving knives during the cutting operation.

Still further objects of the invention relate to certain details of construction and operation of parts which will hereinafter be more clearly set forth.

In the accompanying drawings, illustrating the invention, Figure 1 represents a top plan view of the improved machine. Fig. 2 represents a bottom plan view of the same. Fig. 3 represents a top plan view of the machanism below the table-top or frame of the machine. Fig. 4 represents a detail sectional view on the line 4 4, shown in Fig. 3. Fig. 5 represents a vertical longitudinal section on the line 5 5, shown in Fig. 1. Fig. 6 represents a cross-section on the line 6 6, shown in Fig. 5. Fig. 7 represents a similar cross-section on the line 6 6 in Fig. 5, shown from the opposite direction. Fig. 8 represents a vertical cross-section on the line 8 8, shown in Figs. 2 and 3. Fig. 9 represents a vertical cross-section on the line 9 9, shown in Fig. 3. Fig. 10 represents a side elevation of the machine, showing a portion of the frame removed. Fig. 11 represents an enlarged detail plan view of the sole clamping and cutting device. Fig. 12 represents a sectional view on the line 12 12, shown in Fig. 11. Fig. 13 represents a vertical cross-section on the line 13 13, shown in Fig. 11. Fig. 14 represents a cross-section of the cut, channeled, and grooved sole. Fig. 15 represents a detail perspective view of the channeling and grooving tools and their holder; and Fig. 16 represents an enlarged horizontal section on the line 16 16, shown in Fig. 10.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

In the drawings, A represents the frame of the machine, and A′ represents the upper portion or table-top thereof. In bearings in said frame is journaled the driving-shaft B, which is set in a rotary motion by means of belt-power applied to its cone-pulley C, as shown. To said driving-shaft B is secured a pinion *b*, the teeth of which mesh in the spur-gear *d*, secured to the shaft D, which is journaled in bearings in the frame of the machine, as shown.

On the shaft D is secured a pinion *d′*, the teeth of which mesh in a spur-gear *e*, secured to the rotary shaft E, which I term the "cam-shaft," said shaft being journaled in suitable bearings in the machine, and it is set in a constant rotary motion from the driving-shaft B by the gearing hereinabove described. To

said rotary shaft E is secured a cam F, that serves to impart a vertical motion to a pin *f*, Fig. 9, guided in a bushing secured to the table A′. Said pin *f* is preferably provided at its lower end with an antifriction-roller *f′*, which rolls against the periphery of the cam F during the rotation of the latter. At *g* is pivoted a lever G, the free end of which rests on the upper end of the spindle *f*, as shown in Fig. 9, and through a perforation in said lever passes loosely a vertical rod H, provided with an adjusting-nut *h*, between which and the lever G is interposed a coiled spring *h′*. The upper end of the rod H bears against the rear end of the lever I, which is pivoted at *i* to the standard K, which is secured to the upper side of the table A′, as shown in Figs. 5 and 10.

In the forward end of the lever I is pivotally supported a journal-bearing *i″*, in which is revolubly secured the upper end of a vertically-movable spindle *l*, which is guided up and down in a sleeve *k*, secured to the frame K, and to the lower end of said spindle *l* is suitably secured or connected the sole-clamping plate L, as shown in Figs. 5, 10, 11, and 12.

It will be seen that the spindle *l* and its clamping-plate L, during its vertical adjustment, may be freely rotated around the axis of said spindle *l* for a purpose as will hereinafter be fully shown and described.

M represents the metal templet, which is of a shape like the sole to be cut. Said templet is suitably secured to the intermittently rotary templet-holder N, which is secured to a vertical spindle *n*, journaled in suitable bearings. An intermittent rotary motion is imparted to said spindle *n* and its connections during the sole-cutting operation by mechanism as follows: To the spindle *n* is secured a bevel-gear *n′*, the teeth of which mesh in the teeth of a similar bevel-gear O′, secured to the horizontal shaft O, journaled in bearings attached to the frame of the machine.

To the shaft O is secured a preferably-grooved clutch P, having an annular groove *p* (shown in Figs. 2, 5, 8, and 10) and provided on its periphery with two projecting studs *p′ p′*. (Shown in Figs. 2, 6, and 10.)

The shaft O is arranged axially in a line with the continuously-rotating shaft D, and to the latter is secured a clutch-block D″, provided with an end pin or projection *d″*. (Shown in Figs. 2, 5, 7, and 10.)

Any suitable automatic clutch mechanism may be used for imparting an intermittent rotary motion to the shaft O and its connection from the constantly-rotating shaft D without departing from the essence of my invention. In the drawings I have shown for this purpose a longitudinally-movable and spring-pressed engagement-pin O″, arranged in the clutch part P, which during the cutting operation is held in engagement with the projection *d″* on the clutch part D″ by means of a suitable spring O^3. (Shown in Fig. 10.)

To the shaft E is secured a cam E′, adapted to engage a pin and roll on the lever E″, pivoted at *e″* and actuated in one direction by said cam E′ and in an opposite direction by the influence of the spring E^3. (Shown in Fig. 8.)

In the spring-pressed pin O″ there is a groove O^4, provided at one end with an incline, (shown in Fig. 5,) into which groove a feather O^5 on the end of lever E″ enters when said lever is released from the cam E′, and by engagement with the incline of said groove causes the pin O″ to be drawn backward from engagement with the pin *d″* on the continuously-rotating clutch D″, by which means the clutch D″ ceases for the time being to impart a rotary motion to the shaft O. At the same time the motion of the clutch P is arrested by the projecting studs *p′ p′* contacting with the end of lever E″, as shown in Fig. 6, thus holding the shaft *n*, its templet-holder N, and templet M stationary after the sole has been cut, released from the clamping device, and replaced with another to be cut, when the cam E′ depresses the lever E″ out of contact with the studs *p′ p′*, causing the pin O″ on the clutch P to be released and forced by its spring O^3 in contact with the pin *d″* on the continuously-rotating clutch D″, thereby causing the shaft O to rotate with the shaft D, by which the shaft *n* and its templet-holder is rotated one complete revolution, during which time the cutting of the sole takes place, and so on during the operation of the machine.

Q is the sole, which is placed upon the templet M while the latter is stationary and is automatically clamped between said templet and the vertically-adjustable clamping-plate L with a yielding pressure by means of the rotary cam F, pin *f*, lever G, spring-pressed spindle H, and lever I, as hereinabove described.

By the arrangement of the spring *h′*, which is interposed between the lever G and an adjustable nut *h* on the screw-threaded spindle H, the sole to be cut is clamped with a proper yielding pressure between the clamping-plate and templet independent of slight variations in the thickness of the leather. More or less pressure may be given to the clamping device by adjusting the position of the nut *h* on the screw-threaded spindle H, if so desired.

During the rotation of the templet-holder N and while the sole is clamped between it and the clamping device L the latter is caused to rotate with the sole, templet, and templet-holder by the frictional pressure between said parts caused by the cam F and its intermediate connection to the pivoted lever I.

After the sole has been cut at the completion of one revolution of the templet-holder and its frictionally-held clamping device the cam F ceases to act on the pin *f*, and the clamping device L is automatically raised to the position shown in Fig. 5 by the influence of a spring *i′*, one end of which is attached to the

against the sole-blank and the templet by means of the cam F and its connecting mechanism to the lever I, and by such means the sole-blank is firmly clamped between the templet and clamping device, as shown in Fig. 10, and will be so held during a complete revolution of the templet-holder and clamping device, which latter is caused to rotate with the templet-holder by frictional contact between said parts and the sole-blank firmly held between them. During the rotation of the sole-blank the knife-holder V is held with a yielding pressure against the edge of the templet, and the knife V′ is caused to follow the curvature of the templet by reason of its knife-holder V being pivotally connected to the spring-pressed plate U, moving on the oscillating slide T, which is oscillated by the crank-pin r' on the intermittently-rotating gear R, as described, and by the reciprocating slides S S″, which are automatically moved twice to and from the templet during a complete revolution of the latter by the intermediate connecting mechanism from the intermittently-rotating gear R, as hereinabove fully described. When the templet-holder has completed a full revolution, it is automatically stopped by the release of the clutches between the shafts D and O, and so soon as said templet-holder comes to rest the clamping device L is automatically raised and the now finished sole liberated by the influence of the spring i', which causes the lever I and the clamping device to assume the released positions shown in Fig. 5, allowing the finished sole to be removed and another sole-blank to be placed on the templet, automatically clamped thereon, and so on during the operation of the machine.

The machine may be used for the purpose of cutting the soles only; but if it is desired to channel and groove the sole simultaneously with the cutting operation I prefer to use, in combination with the cutting device, an automatic channeling and grooving mechanism constructed and operated as hereinabove fully shown and described.

The machine, as before stated, is readily adjusted for the purpose of cutting soles of various forms and sizes by means of the adjusting mechanism described and shown.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a sole-cutting machine, in combination, a rotary drive-shaft, a rotary shaft in line therewith, clutch mechanism interposed between said shaft, a templet adapted to be rotated by said rotary shaft, a cutting-tool operating automatically to follow the contour of the templet during the rotation of the latter, a clamping device for holding the sole-blank on said templet, a pivoted lever supporting said clamping device at one end and at its opposite end carrying a depending rod provided with an adjusting-nut, a lever G pivoted at one end on the frame and intermediate its ends having an opening through which said rod extends, a coiled spring surrounding said rod and interposed between said adjusting-nut and lever G, a vertically-movable pin supporting the free end of said lever G, a cam operating to raise said pin, and thereby, through the mechanism described, operating to depress said clamp into yielding engagement with the sole-blank, means for releasing the clamp from such engagement when the cam has ceased to operate, and means operating automatically to throw said clutch mechanism into and out of engagement and to stop the rotation of the templet at the completion of each of its revolutions, substantially as described.

2. In a sole-cutting machine, in combination, a templet, means for rotating the same and for stopping the same at the completion of each of its revolutions, a clamping device operating automatically to clamp the sole-blank to the templet during the revolution of the latter and to release the sole at the completion of a revolution of the templet, a slide-plate mounted in guides in the frame, means for reciprocating said plate, a plate S″ adjustably supported on said slide-plate, a plate T, pivotally supported on said plate S″, means for oscillating said plate T, a tool-carrying slide U slidably supported in said plate T, a tool-carrier pivotally supported on said tool-carrying slide, and means for holding said tool-carrier normally in contact with the edge of the templet, substantially as described.

3. In a sole-cutting machine, in combination, a rotary drive-shaft, a rotary shaft in line therewith, clutch mechanism interposed between said shafts, means operating automatically to throw said clutch mechanism into and out of engagement and to stop the rotation of said rotary shaft when the clutch mechanism is out of engagement, a rotary templet-holder intermittently actuated by said rotary shaft, a clamping device operating automatically to clamp the sole-blank to the templet during the revolution of the latter and to release the sole at the completion of a revolution of the templet, and an oscillating tool-carrier normally held in contact with the edge of the templet and operating automatically to follow the contour of the same during the rotation of the templet, substantially as described.

4. In a sole cutting, channeling and grooving machine a templet, means for rotating the same and for stopping the same at the completion of each of its revolutions, a clamping device operating automatically to clamp the sole-blank to the templet during the revolution of the latter and to release the sole at the completion of a revolution of the templet, an oscillating tool-carrier normally held in contact with the edge of the templet and operating automatically to follow the contour of the same during the rotation of the templet, a lever pivotally supported on the tool-carrier at one end and at its other end carry-

lever I and the other end to the frame K or other stationary part of the machine, as represented in said Fig. 5.

On the shaft n is secured a spur-gear n'', the teeth of which mesh in the teeth of a smaller spur-gear R, as shown, and on the latter is a slotted guide r, in which is adjustably secured a crank-pin r', on which is pivoted one end of the link r'', the other end of which is pivotally connected to a pin S′ on the sliding plate S, which is thereby caused to slide forward and back in guides A″ A″ in the table A′, as shown in Figs. 1, 5, 8, 9, 10, and 12.

On the slide S is longitudinally adjustable a secondary slide S″, which after being adjusted in proper position relative to the main slide S is secured thereto, preferably by means of a set-screw S^3. (Shown in Figs. 5 and 10.)

By adjusting the position of the crank r' on the gear R and by adjusting the position of the slide S″ relative to the slide S the cutting device carried by said slides may readily be adjusted for cutting soles of varying sizes, large or small, as may be desired.

On top of the slide S″ is arranged the oscillating plate T, to which is secured a downwardly-projecting spindle T′, which is journaled in the slide S″, as shown in Figs. 5, 11, and 12, and in guides in said oscillating plate T is slidably supported the tool-carrying slide U, preferably provided with a vertically-projecting block U′, on which is pivoted at v the oscillating knife or cutter carrier V, provided with the sole-cutting knife V′. (Shown in Figs. 5, 10, 12, and 16.)

During the operation of the machine the tool-carrier V is held in contact with the edge of the templet M, preferably by means of a spring U″, one end of which is attached to the spindle T′ and the other end to a rear extension on the oscillating plate T, as shown in Figs. 5, 10, 11, and 12. Instead of the spring U″ a weight and suitable connections may be used to equal advantage without departing from the essence of my invention. An oscillating motion is imparted to the plate T and its connections, preferably as follows: To the lower end of the spindle T′ is secured a slotted arm T″, which is pivotally connected in an adjustable manner to the crank-pin r' on the gear-wheel R, as shown in Figs. 3, 5, and 12.

If it is desired to channel and groove the sole simultaneously with the operation of cutting it, so as to make the channel q and groove q', as represented in Fig. 14, I provide the knife-holder V with an automatic channeling and grooving device, which is constructed as follows: To the knife-holder V is pivoted at w the upwardly-yielding channel-knife and grooving-tool holder W, to the free end of which are adjustably secured the channel-knife W′ and grooving-tool W″, as shown in detail in Fig. 15.

W^3 is a spring secured to the knife-holder V and having its free end pressing on top of the tool-holder W for the purpose of normally holding the latter against the slotted guide V″ on the upper side of the knife-holder V, as shown in Fig. 12, during the channeling and grooving operation.

In devices of this kind it is essential that the channeling and grooving tools should automatically be raised out of contact with the sole when passing around the rear or heel portion of the sole, and for this purpose I make use of automatic mechanism, as follows: On top of the intermittently rotary gear n'' is made a raised segmental cam-surface n^3, which at the proper time comes in contact with an up-and-down movable pin or rod X, which is guided in the block U′, to which the knife-carrier V is pivoted. To the upper end of the pin X is secured a yoke X′, which encompasses the oscillating knife-carrier V and has its upper end bearing against the under side of the channeling and grooving tool carrying arm or lever W, as shown in Figs. 5, 10, 11, and 13. This yoke X′ and its pin X is automatically raised by the influence of the projection n^3 on the gear n'' and is depressed when released from said projection n^3 by the influence of the spring W^3.

When the templet-holder N is at rest, the spring-pressed pin X is located centrally on the cam-surface n^3 on the gear n'', as shown in Figs. 3 and 4, and it is held raised at such time, causing the channeling and grooving tools to be raised above the sole. As soon as the gear n'' rotates sufficiently to liberate the pin X from the projection n^3 the lever W is forced downward by the spring W^3 sufficiently to cause the channeling and grooving tools to enter the sole edge to channel and groove the latter, and as the sole reaches nearly the end of its complete rotation the channeling and grooving tools are automatically raised above the sole by the projection n^3 acting on the pin X, its yoke X′, and lever W, thus leaving a portion of the heel part of the sole unchanneled and ungrooved, as is necessary and desirable for the subsequent securing of the soles to the uppers of boots and shoes.

The operation of the machine is as follows: The driving-shaft B is kept continuously rotated by belt-power applied to its pulley, as described, causing a continuous rotary motion to be imparted to the shaft D and cam-shaft E. By means of suitable automatic clutch mechanism between the shafts D and O an intermittent rotary motion is imparted to the said shaft O and to the shaft n and the templet-holder N and templet M, secured to said shaft. When the templet-holder is at rest, the sole-clamping device is automatically raised for the removal of a previously-cut sole and the insertion of a sole-blank to be cut, as shown in Fig. 5, such automatic raising of the clamping device being accomplished by the spring i' acting on the lever I, which is pivotally and revolubly connected to the spindle l of the clamping device L. After the sole-blank has been placed in position on the templet M the clamping device L is automatically forced with a yielding pressure

ing the channeling and grooving tools, a spring holding said lever normally in a depressed position, and means operating automatically to lift said lever at a stated interval in the revolution of the templet whereby to raise the channeling and grooving tools out of contact with the sole-blank, substantially as described.

5. In a sole cutting, channeling and grooving machine, in combination, a templet, means for rotating the same and for stopping the same at the completion of each of its revolutions, a clamping device operating automatically to clamp the sole-blank to the templet during the revolution of the latter and to release the sole at the completion of a revolution of the templet, an oscillating tool-carrier normally held in contact with the edge of the templet and operating automatically to follow the contour of the same during the rotation of the templet, a lever pivotally supported on the tool-carrier at one end and at its other end carrying the channeling and grooving tools, a spring holding said lever normally in a depressed position, a vertically-movable rod journaled in the tool-carrier and having at its upper end a yoke located beneath said lever, and a gear rotating in unison with said templet and having on its upper surface a cam-surface adapted to engage the lower end of said rod at a stated interval in the revolution of the templet whereby to lift said lever and to raise the channeling and grooving tools out of contact with the sole-blank, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 20th day of July, A. D. 1897.

ROBERT REID.

Witnesses:
ALBAN ANDRÉN,
KARL A. ANDRÉN.