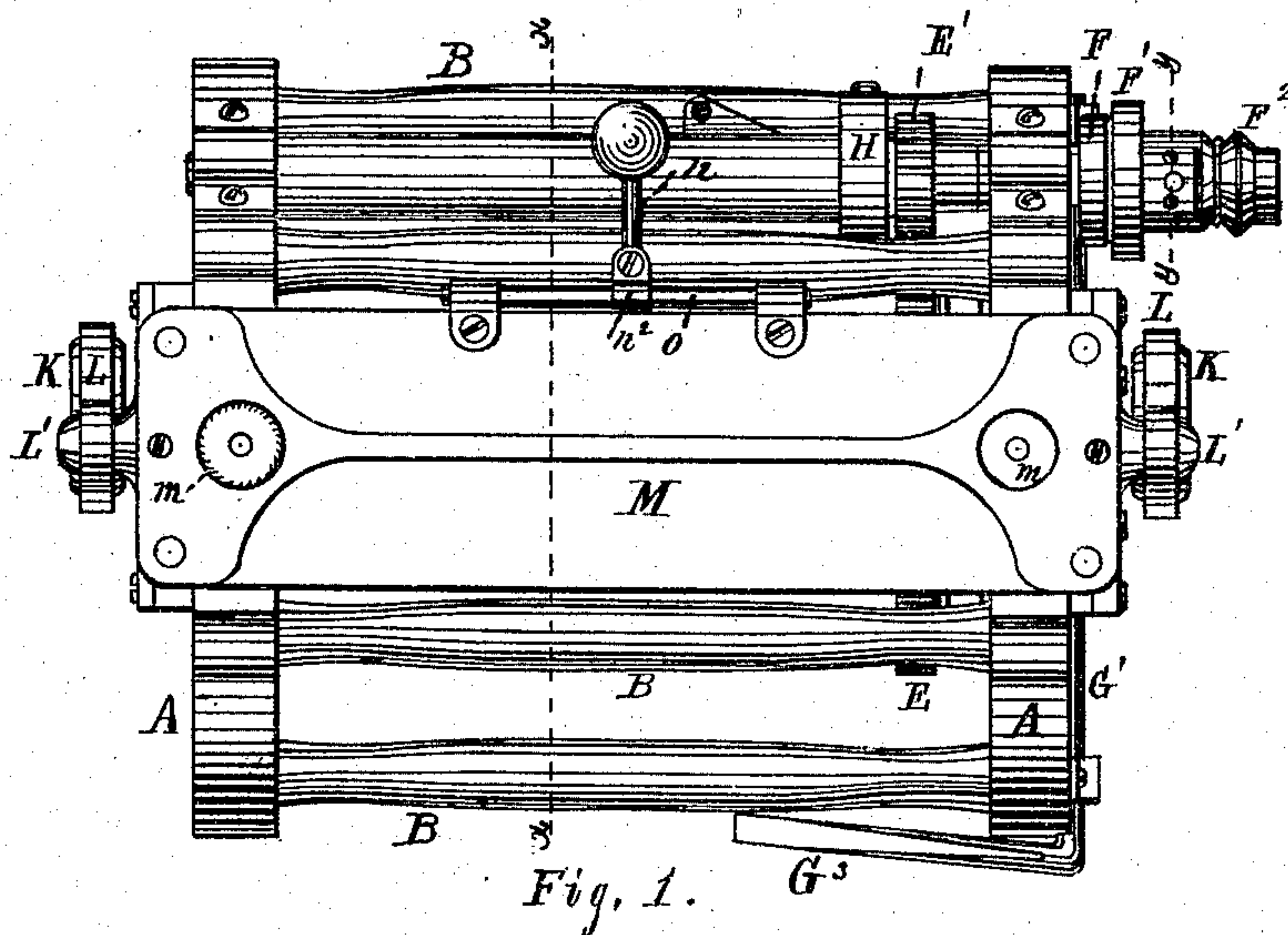
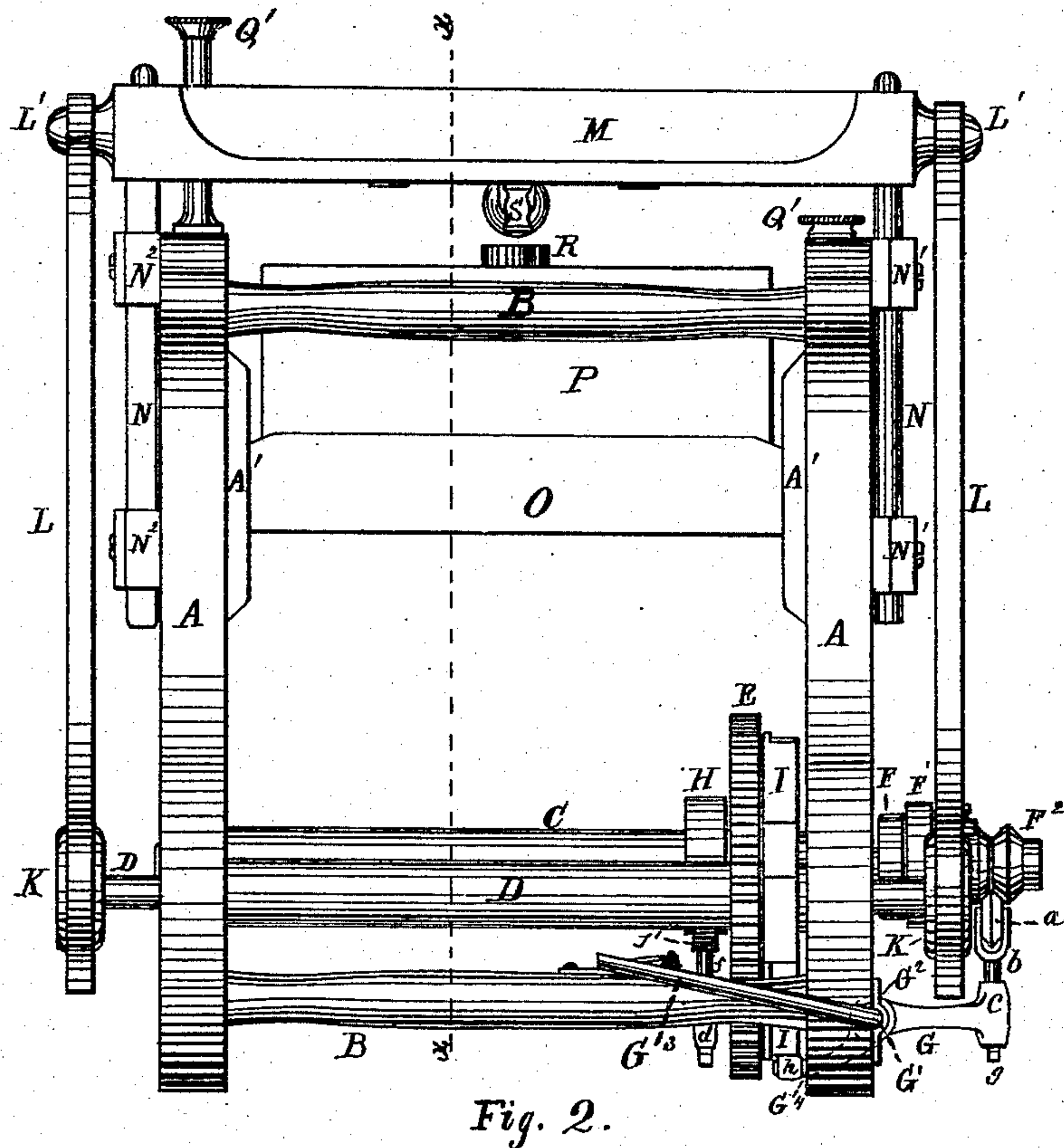


J. A. SAFFORD.
Sole-Cutting Machines.

No. 156,650.

Patented Nov. 10, 1874.



Witnesses.

Witnesses,
N. C. Lombard
B. Andrews.

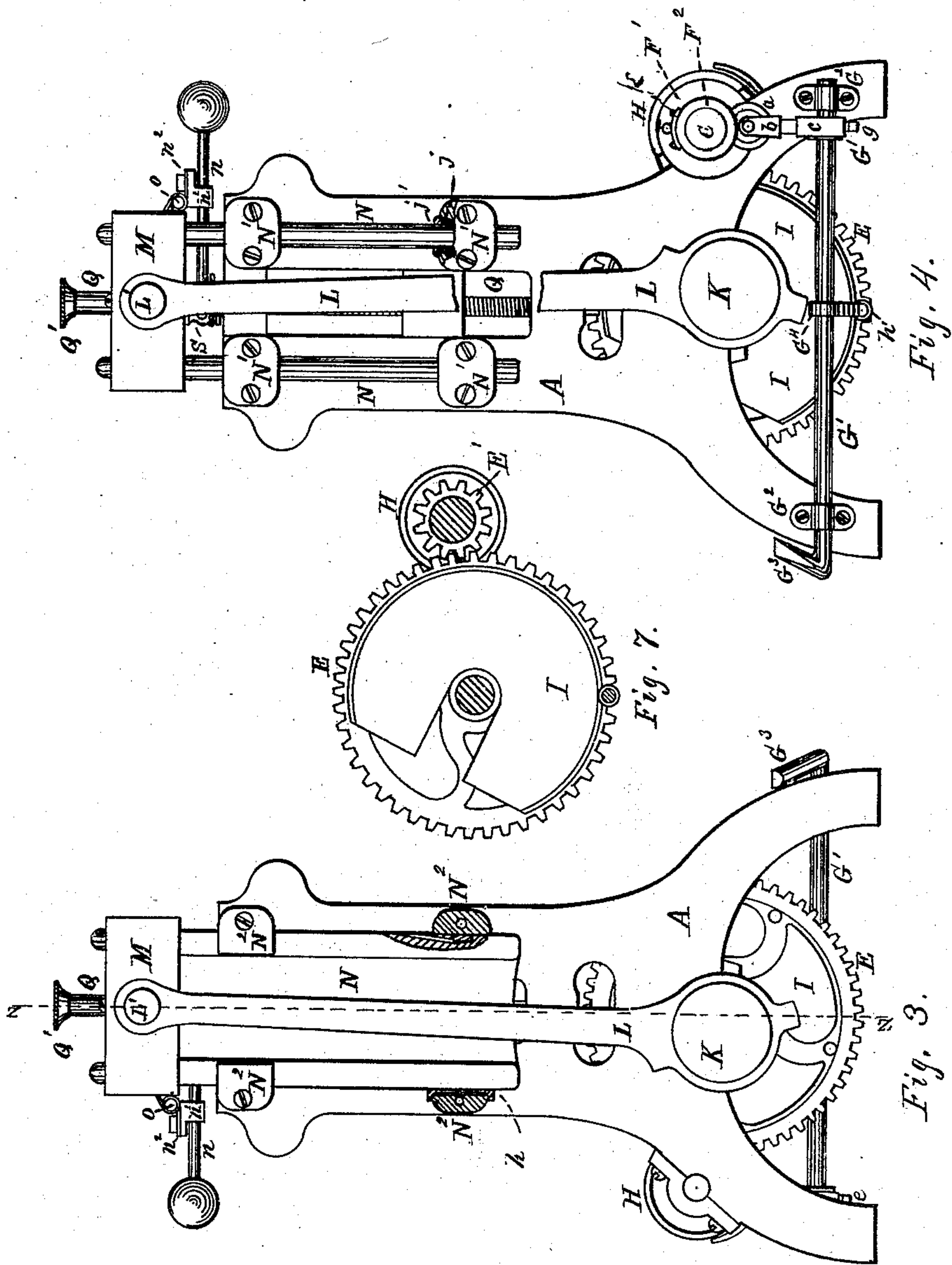
Inventor,

Joseph A. Caffarel

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Witnesses,
N. C. Lombard
B. Andrews, Jr.

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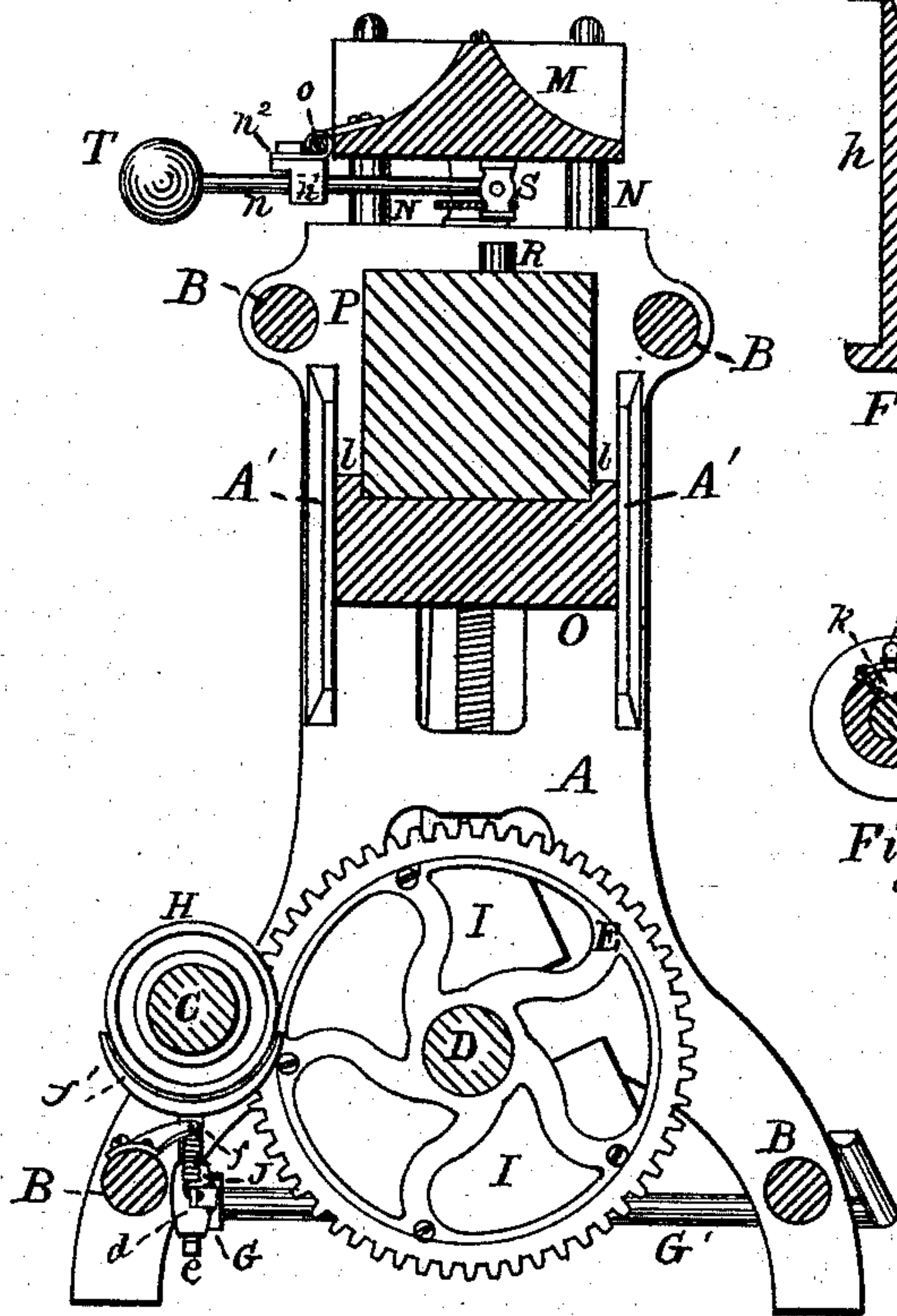


Fig. 5.

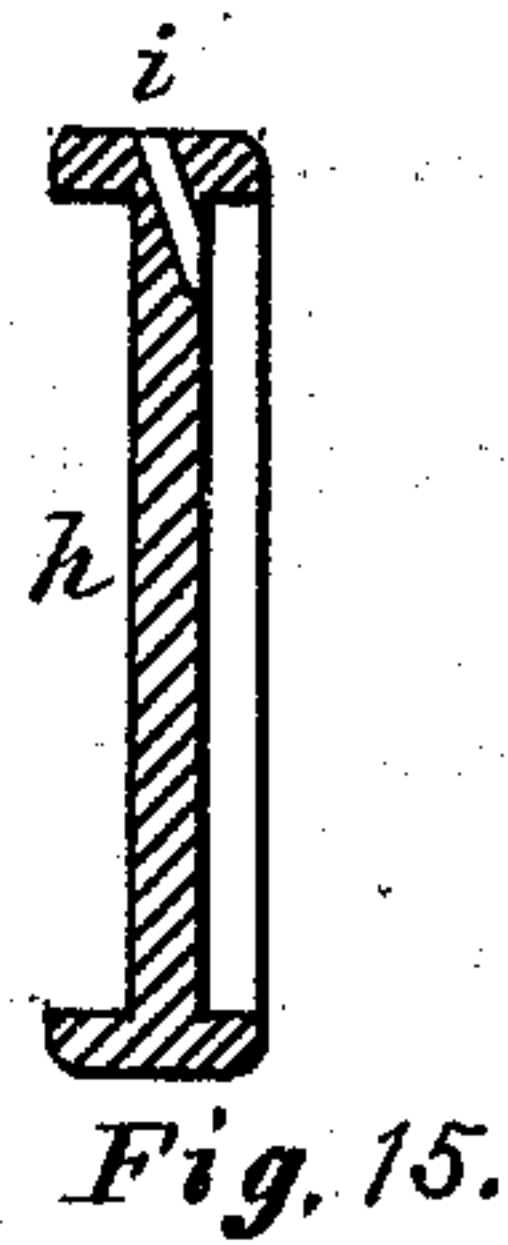


Fig. 15.

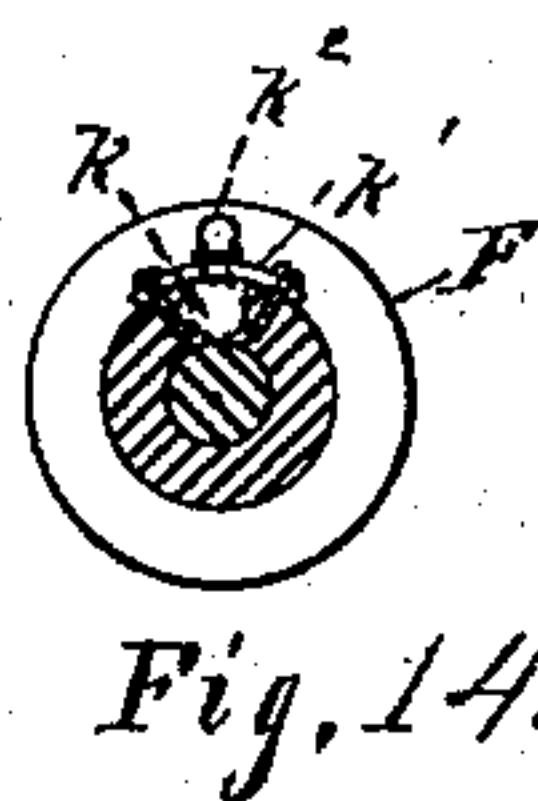


Fig. 14.

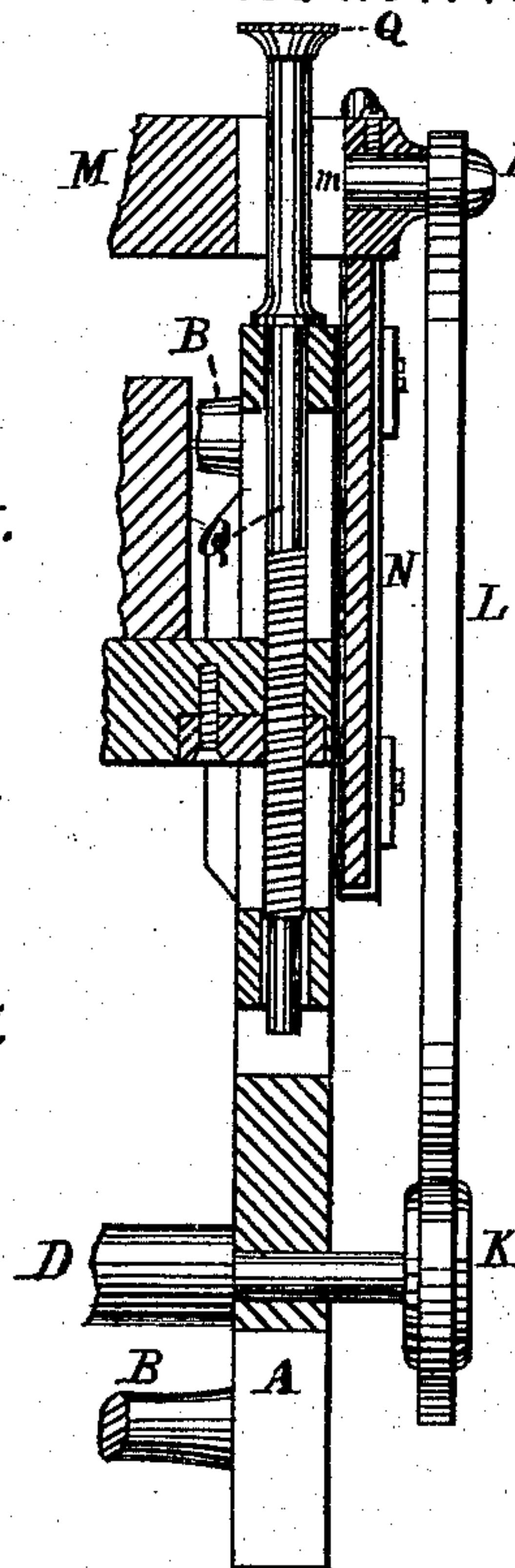


Fig. 6.

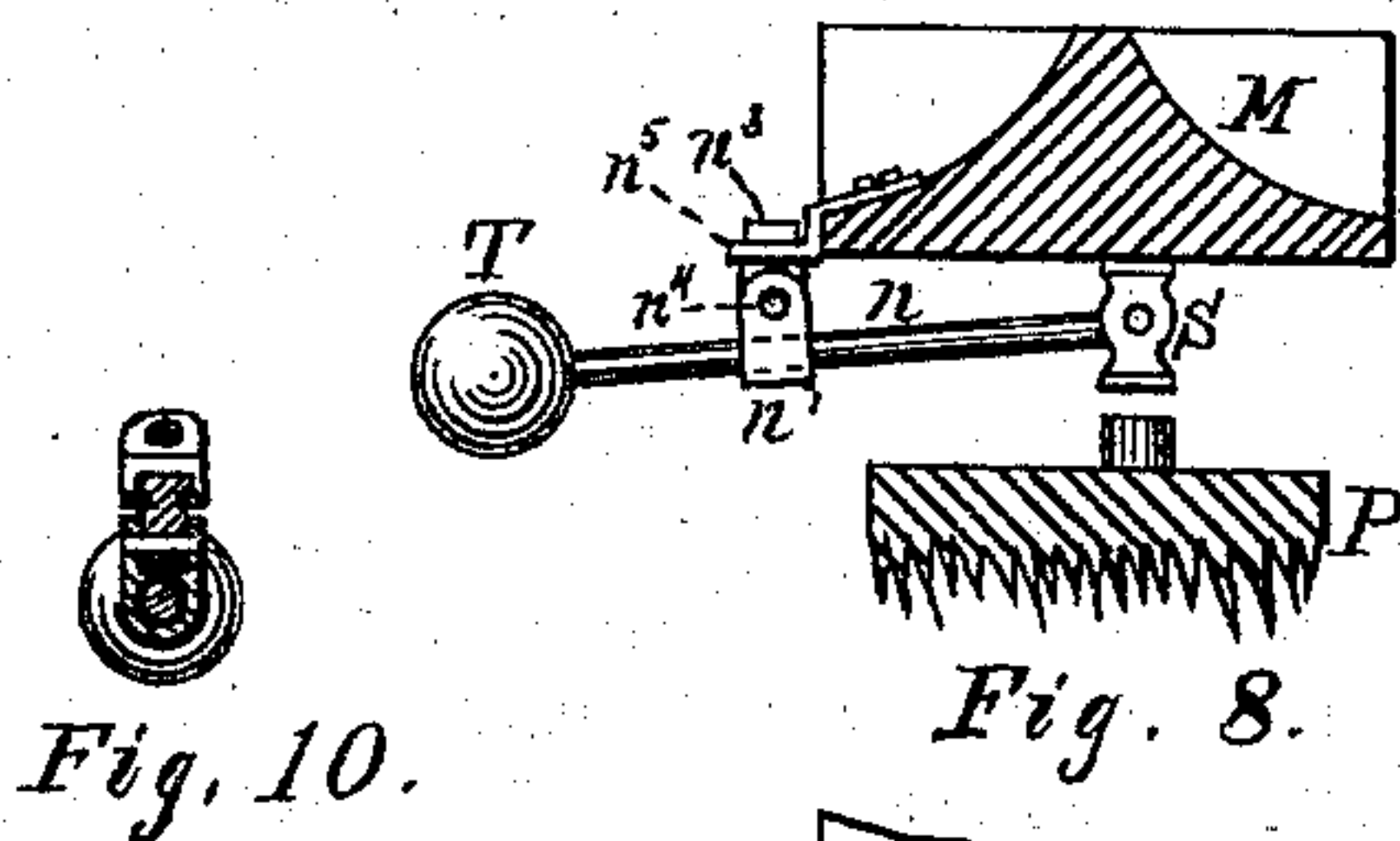


Fig. 8.



Fig. 10.

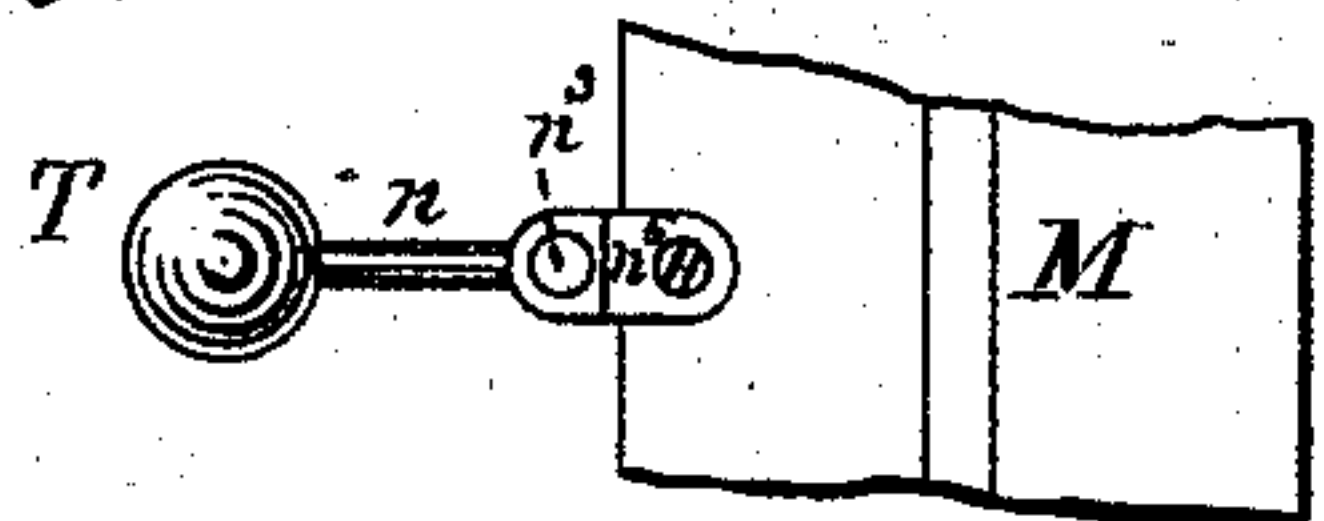


Fig. 9.

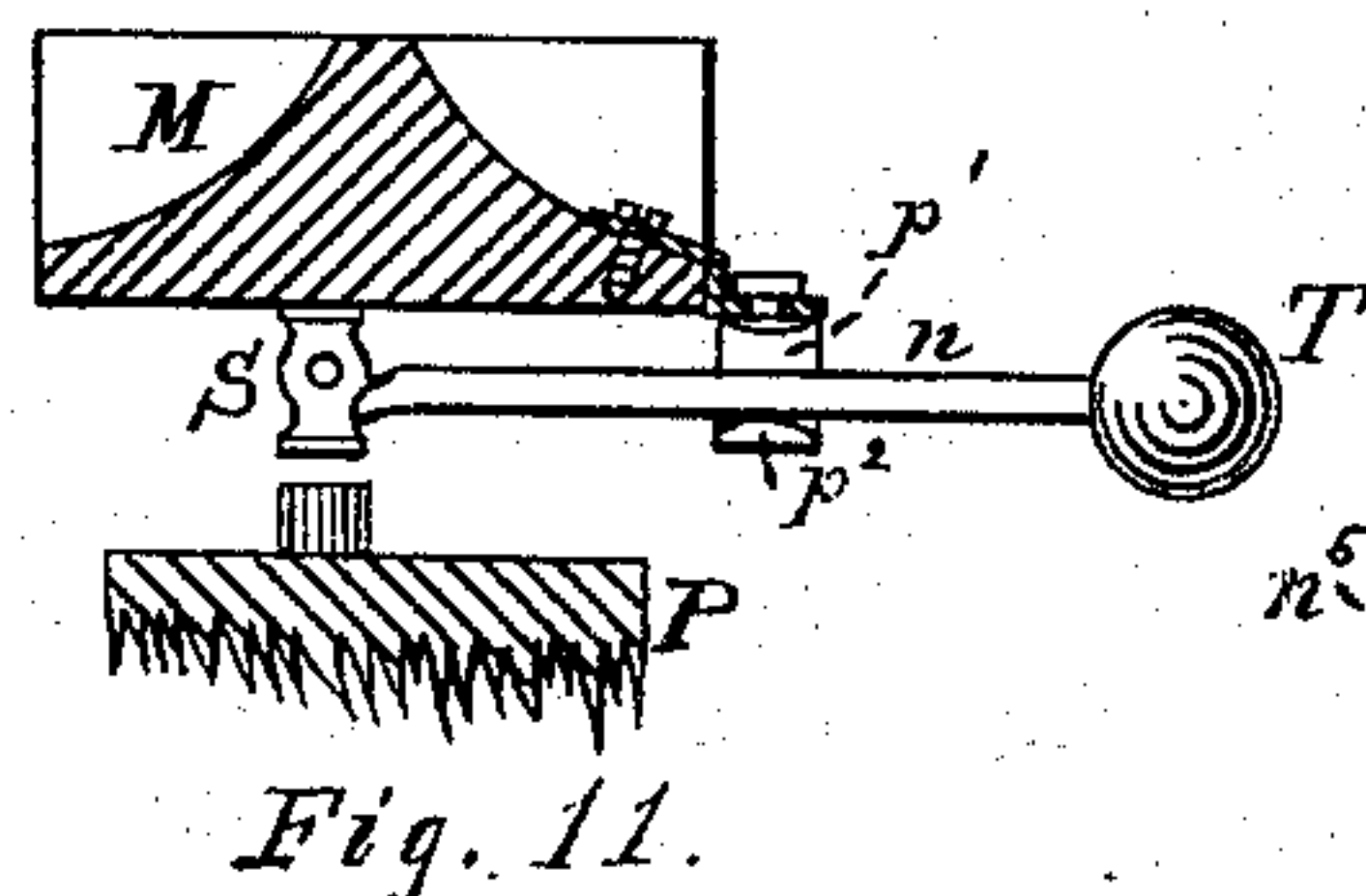


Fig. 11.

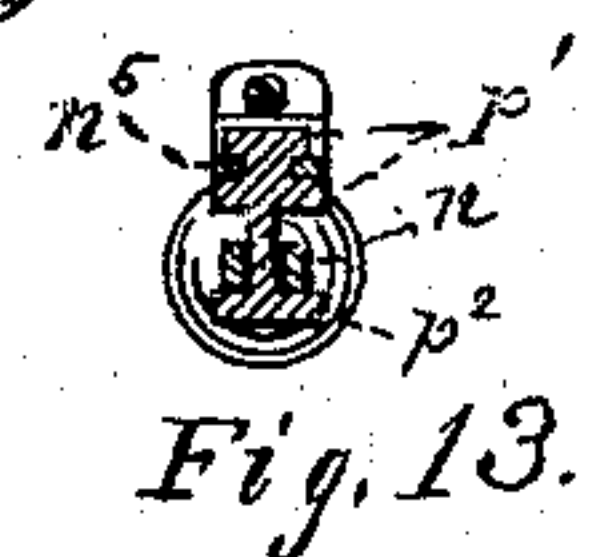


Fig. 13.

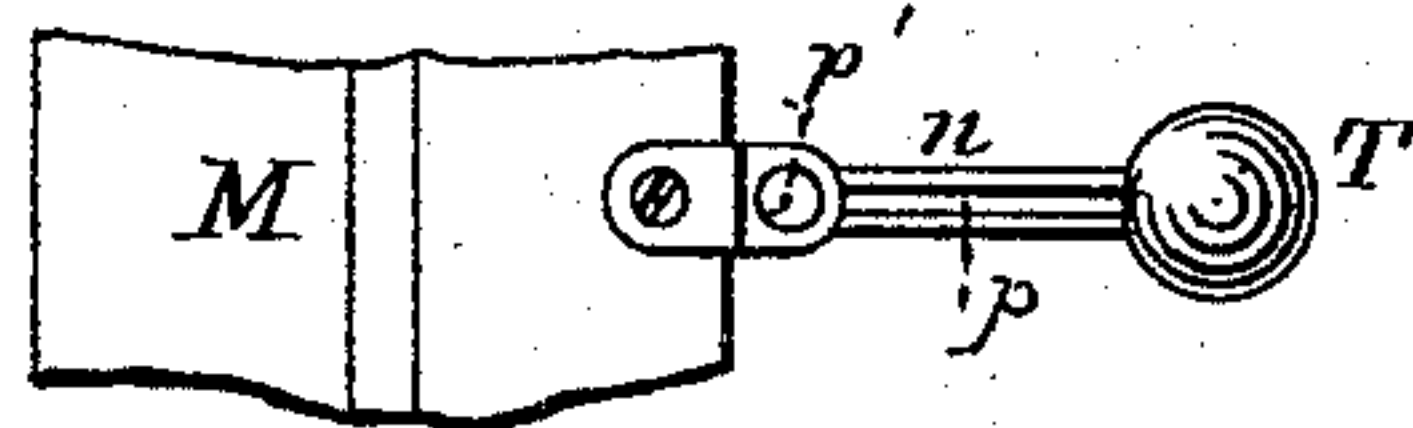


Fig. 12.

Witnesses;
N. C. Lombard
B. Andrews.

Inventor;
Joseph A. Safford

UNITED STATES PATENT OFFICE.

JOSEPH A. SAFFORD, OF WINCHESTER, MASSACHUSETTS.

IMPROVEMENT IN SOLE-CUTTING MACHINES.

Specification forming part of Letters Patent No. **156,650**, dated November 10, 1874; application filed July 13, 1874.

To all whom it may concern:

Be it known that I, JOSEPH A. SAFFORD, of Winchester, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Sole-Cutting Machines, of which the following, taken in connection with the accompanying drawings, is a specification:

The first part of my invention relates to the manner of hanging the "step" to be interposed between the detached die or knife and the reciprocating cross-head; and it consists in pivoting said step to the end of a rod or arm fitted to move endwise through or upon a block pivoted by a vertical axis to another block mounted upon a horizontal rod or pin, about which it may vibrate within certain limits, and along which it may or may not slide, as may be desired; or, in other words, it consists in the use of said sliding rod carrying the step at one end and mounted in a bearing provided with any suitable universal joints which will admit of the step end of said rod moving in any direction, as will be more fully described.

The second part of my invention relates to the manner of hanging the bed and adjusting the same; and it consists in suspending the bed by means of two threaded screws (one at either end) mounted in fixed bearings in the frame of the machine, and working in nuts formed in or secured to the ends of said bed, or upon which the ends of said bed may rest, in combination with suitable slides projecting from, or formed in, the inner faces of the end frames, and to which the ends of the bed are fitted so as to serve as a guide for the bed in its up-and-down movement, and hold it firmly in position. It further consists in extending the adjusting and suspending screw up through an opening formed for the purpose in the cross-head, so as to render said screws more conveniently accessible for adjustment.

The third part of my invention relates to the manner of hanging and operating the cross-head; and it consists in securing to either end of the cross-head one or more rods, bars, or plates, projecting downward therefrom at right angles to the under surface of the cross-head, and fitted to suitable bearings formed in, or secured to, the end frames of the machine in such a manner that they may be moved endwise therein, in combination

with cranks or eccentrics on a shaft mounted in bearings below the bed, and connecting-rods leading therefrom to the ends of the cross-head, to which they are connected by suitable journals.

The fourth part of my invention relates to the driving mechanism and the means employed to control the motion of the cross-head; and it consists in the combination of a friction-pulley, a shipper, and a treadle or lever for operating the same to throw into action the friction-pulley and a cam upon the crank-shaft arranged to act upon said shipper and hold the pulley in contact with its friction-surface during a specified or determined portion of the revolution of the crank-shaft, and release it at the proper time. This part of my invention further consists in the use of a two-armed lever mounted upon a rocker-shaft, and carrying at one end a shipper-fork or conical wheel, and at the other end a brake-shoe arranged to partially embrace, and to act upon the periphery of, a pulley secured to the driving-shaft, in combination with a cam upon the crank-shaft, for controlling the action of the friction-pulley. It further consists in mounting the fork, which carries the conical roll for shipping the friction-pulley and the brake-shoe, in sockets, with their lower ends stepped upon set-screw, by means of which they may readily be adjusted.

In the drawing, Figure 1 is a plan of a machine embodying my improvements. Fig. 2 is a front elevation. Figs. 3 and 4 are elevations of the opposite ends of the machine, with small portions shown in section to illustrate the lubricating devices. Fig. 5 is a vertical transverse section on line *x x* on Figs. 1 and 2. Fig. 6 is a vertical longitudinal section through one of the frames, on line *z z* on Fig. 3. Fig. 7 is a transverse section through driving and crank shafts, and showing the gears, brake-pulley, and shipper-cam in elevation. Figs. 8, 9, and 10 represent, in detail, a modification of the mode of hanging the "steps;" and Figures 11, 12, and 13 represent another modification of the same devices; and Fig. 14 is a transverse section through hub of loose pulley, on line *y y*.

A A are the end frames of the machine, connected together by the tie-rods B B, and having mounted thereon, in suitable bearings, the driving-shaft C and crank or eccentric

shaft D, geared together by the spur-gear E and pinion E'. The driving-shaft C has firmly secured thereon the disk or hub F, the outer end face of which is conical to fit a corresponding face formed upon the contiguous end of the loose pulley F¹, mounted upon said shaft in such a manner that it may revolve freely thereon when not in contact with the hub F. F² is a collar or hub, also firmly secured to the outer end of the shaft C, contiguous to the hub of the loose pulley F¹, with sufficient space between to allow of a slight reciprocating motion of said pulley along its shaft, to engage it with or disengage it from the fixed collar F, and compel the shaft C to revolve with the pulley in a well-known manner. The contiguous end faces of the hub of the pulley F¹ and the collar F² are made conical in opposite directions, so as to form a V-shaped groove between them, into which fits the double-coned truck *a*, which is mounted upon a suitable axial pin in a forked rod or standard, *b*, stepped in a socket, *c*, formed in one end of the double-armed lever G, mounted upon and secured to the rocker-shaft G¹, mounted in suitable bearings G² upon one of the frames A, and provided at its front end with the treadle G³, as shown. The double-armed lever G has a socket, *d*, formed in the end opposite the conical truck *a*, in which is stepped the upright rod or standard *f*, with its lower end resting on the point of the set-screw *e*, and carrying at its upper end the brake-shoe *f'*, arranged to partially embrace, and at times to press against, the pulley H, secured to the driving-shaft C for the purpose of stopping the machine. The lower end of the standard *b*, in which is mounted the conical roll *a*, rests upon the adjusting set-screw *g*, by means of which said roll may be adjusted to the V-shaped groove formed between the loose pulley F¹ and the collar F². The rocker-shaft G¹ also has secured thereto, directly under the crank-shaft D, the cam-lever G⁴, provided with the anti-friction truck *h* upon its outer end, upon which the edge of the cam I mounted upon the crank-shaft D acts during a portion of the revolution to hold the loose pulley in contact with the disk F, and, at the proper time, to allow said pulley to be disengaged by the force of the spring J acting upon the inner end of the lever G, which, at the same time, throws into action the brake-shoe *f'* to stop the motion of the driving-shaft. The shaft D has formed upon or secured to each end thereof a crank or eccentric, K, to which is connected one end of a rod, L, the upper end of which is secured to the end of the cross-head M by the journal L'. The cross-head M is guided in its up and down movements, and held in a proper parallel position, by the guide rods, bars, or plates N, firmly secured to said cross-head at either end, and projecting downward therefrom at right angles to its planed under face, and parallel to each other, and fitted to slide in the bearings N¹ or N². One or more round or square rods or bars at each end of the cross-

head may be used, fitted to boxes N¹, provided with caps, as seen in Fig. 4; or a single broad plate, fitted to slides N², as shown in Fig. 3, may be used, in which case the slides would preferably be provided with gibs *h* for adjusting the bearing. The gib *h* has a recess formed in its face contiguous to the edge of the sliding plate, against which it bears, which recess is packed with felt or other suitable absorbent material saturated with oil, which may be supplied through the oil-hole *i'*, said packing of saturated material coming in direct contact with the surface of the sliding plate or bar, as seen in Figs. 3 and 15.

Instead of the recess in the gib a similar recess may be formed in the edge of the sliding plate or bar N, and packed in the same manner, as shown upon the right of Fig. 3. If the round or square guide-rods are used in full boxes N¹ a recess, *j*, is formed in the upper end of the box, completely surrounding the rod or bar, and packed in the same manner as before described, a ring-stopple, *j'*, being provided to keep out dirt and dust.

The hub of the loose pulley F has formed therein a chamber, *k*, extending through the same to the shaft on which it revolves and filled with a packing of felt or other suitable absorbent material, saturated with oil, said recess being covered by the plate *k'*, having an oil-hole closed by a screw-plug, *k''*, as seen in Fig. 14. O is a metallic bed fitted to be moved up and down between the guide-ribs A', formed upon or secured to the inner faces of the frames A A and provided with the ribs *l l* upon its upper side, between which is secured the wooden cutting-block P. The bed O is suspended in the desired position by means of the threaded rods Q, mounted in suitable bearings in the frames A A, one above and the other below the bed, in a vertical position and fitted to work in correspondingly-threaded nuts formed in or secured to the ends of said bed, or upon which the ends of said bed rest, so that said bed may be readily adjusted to position as the wooden block is reduced in thickness by constant use and repeated truing of its surface. The adjusting-screws Q may be extended up through the cross-head, in which is formed an opening, *m*, for the purpose, so as to bring the hand-wheel Q' upon its upper end in a position more conveniently accessible to the hand of the operator. R is a ring or endless knife, to be made of the form of the article to be cut, entirely disconnected from the machine, to be placed in any desired position on the material to be cut, all in a well-known manner. S is a step, so called, or a block of metal, to be placed upon the upper side of the knife in a vertical position, so that its upper end will be struck by the cross-head in its descent and thereby force the knife through the leather or other material to be cut, in a manner well known in the art. The step S is pivoted to the end of a rod, *n*, fitted to slide endwise through the block *n'*, which is attached by a swiveled

joint, the axis of which is at right angles to the axis of the rod n , to the stand n^2 , fitted to vibrate about and slide upon the horizontal rod o , mounted in a fixed position upon the back side of the cross-head M , as shown in Fig. 1, the whole so constructed that the step S may be moved to any position on the cutting-block P by swinging the rod n to the right or left, combined with the sliding of its fulcrum-blocks n^2 along the rod o and the endwise motion of rod n , while at the same time the inner or front end of the rod n , with the step S attached thereto, may be moved up or down by the vibration of its fulcrum-block about the rod o , the step S always being held up against the under side of the cross-head by the counter-balance weight T attached to the rear end of the rod n , which weight may be made adjustable on said rod, if desired.

In machines for cutting soles or other articles from strips of leather of less width than a side of leather, the sliding motion upon the rod o will not be needed, and on such machines I propose to use one of the modifications illustrated in Figs. 8, 9, 10, 11, 12, and 13, where the same principles are applied and the same motions obtained (except the sliding motion in the direction of the length of the machine) by a slightly-modified construction of some of the parts.

In the modification shown in Figs. 8, 9, and 10, the step S , rod n , and weight T are the same as before described, and the rod n is arranged to slide through its fulcrum-block n^1 , as before, but the block n^1 is hinged to a vertical pivot, n^3 , by means of a horizontal axial pin, n^4 , the vertical pivot n^3 being mounted in the stand n^5 , attached in a fixed position to the back edge of the cross-head M .

In the modification shown in Figs. 11, 12, and 13, instead of the plain round rod n , I use two flat bars of metal placed parallel to each other, and a short distance apart, with their ends secured together, so as to form one bar or radius arm, with a slot, p , extending nearly the whole length thereof, the two bars of said rod embracing the flat portion of the stud p^1 , and resting upon the lips p^2 formed on its lower end, as seen in Fig. 13. The stud p^1 is mounted in the stand n^5 , so as to revolve therein with its axis in a vertical position.

The operation of my improved machine will be readily understood from the foregoing description without further explanation.

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

1. In combination with a bed and cross-head, arranged to be moved, one toward the other, and a detached endless or ring knife, the step S attached to one end of a radius arm or rod fitted to slide endwise upon or through a bearing mounted upon the cross-head, the bearing and radius arm constructed and arranged to admit of universal motion being imparted to the step, substantially as described.

2. In combination with a bed and cross-

head, arranged to be moved, one toward the other, and a detached endless or ring knife, the step S attached to the end of a radius arm or rod, fitted to slide endwise upon or through a fulcrum-block made in two parts, hinged or pivoted together by a vertical axis, and arranged to vibrate about and slide horizontally upon a rod attached to the cross-head, substantially as described.

3. In combination with the step S , attached to one end of a radius arm fitted to slide endwise through or upon a fulcrum-block, arranged to vibrate vertically and horizontally, the counterpoise-weight T applied and arranged to operate substantially as described.

4. The bed O , fitted to move up and down between the ribs A' , in combination with the supporting and adjusting screws Q , working in threaded nuts formed in or secured to the ends of said bed, or upon which the ends of the bed rest as a support, substantially as described.

5. In combination with the bed O and cross-head M , the supporting and adjusting screws Q , mounted in fixed bearings in the frame above and below the bed, as set forth, and extending upward through an opening in the cross-head M , and provided with the hand-wheel Q or other suitable means of revolving said screw, located above said cross-head, substantially as described.

6. The cross-head M , provided with one or more rods, bars, or plates, N , extending downward from each end thereof, and fitted to slide in bearings N^1 or N^2 , as set forth, in combination with cranks or eccentrics K , and the connecting-rods L attached by their upper ends to the cross-head, substantially as described.

7. In combination with a friction-pulley, a shipper-lever, and a treadle or lever for operating the same, the cam I , arranged to hold the friction-pulley in gear during a determined portion of the revolution, and release it at the proper time, without the aid of the operator, substantially as described.

8. In combination with a friction-pulley, provided with suitable devices for engaging the pulley by foot or hand, and a cam for holding the pulley in gear, and automatically disengaging it, the brake-shoe f' , and brake-wheel H , arranged to operate substantially as described.

9. The brake-shoe f' and standard f , mounted in the socket d , in combination with the set-screw e , arranged substantially as described, for the purpose specified.

10. In combination with the friction-pulley F^1 , the conical roll a and its standards b , the set-screw g , arranged to adjust the same substantially as described.

Executed at Boston, Massachusetts, this 9th day of July, 1874.

JOSEPH A. SAFFORD.

Witnesses:

N. C. LOMBARD,
B. ANDREWS, Jr.