

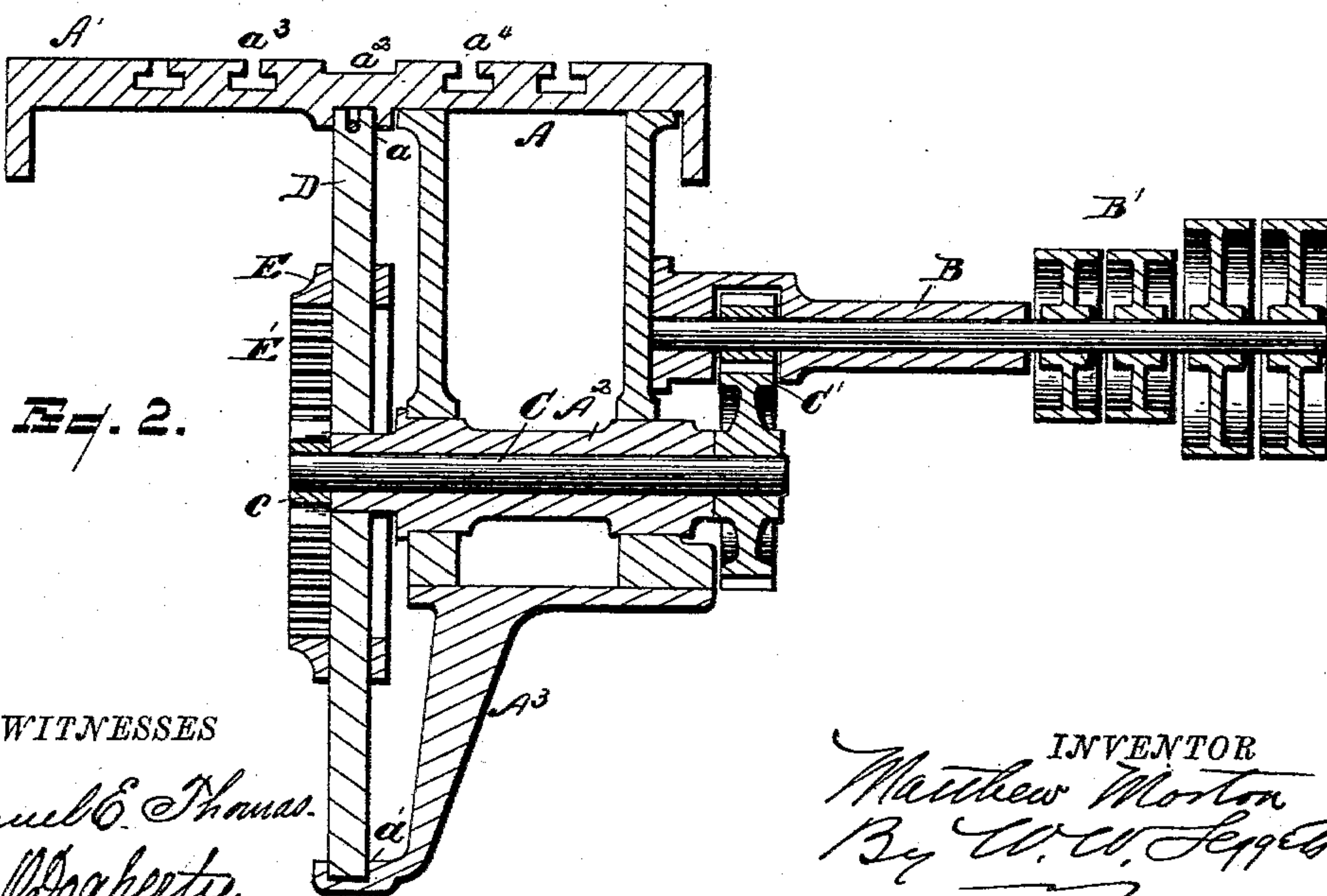
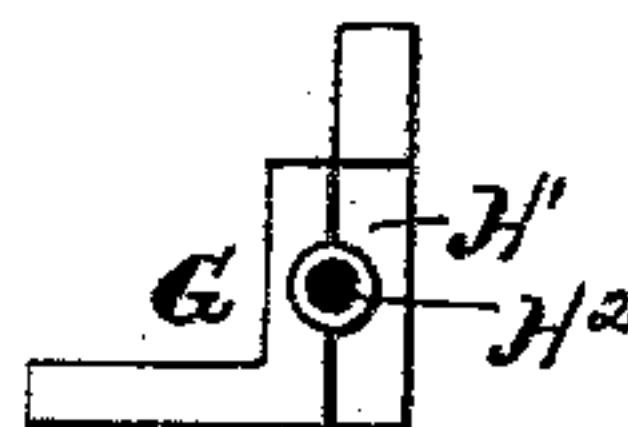
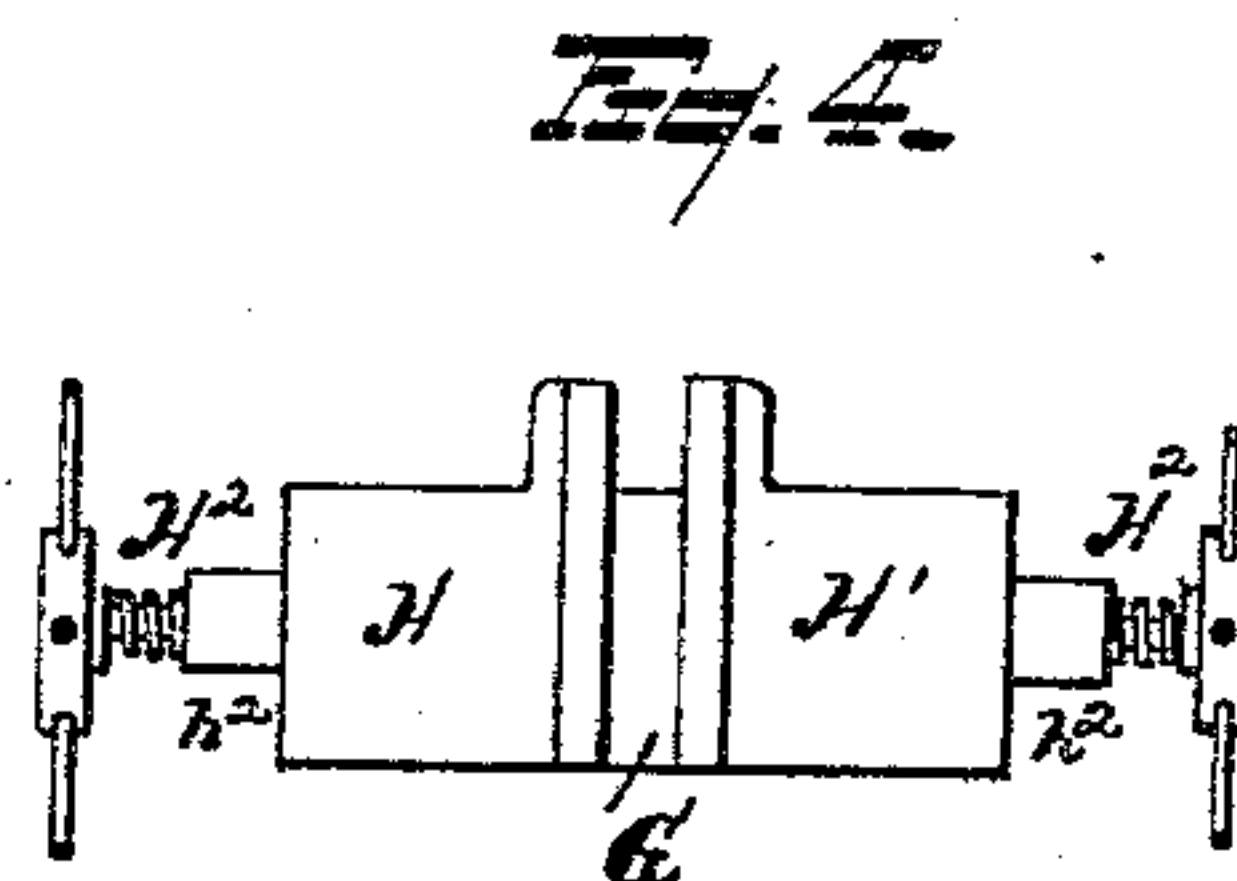
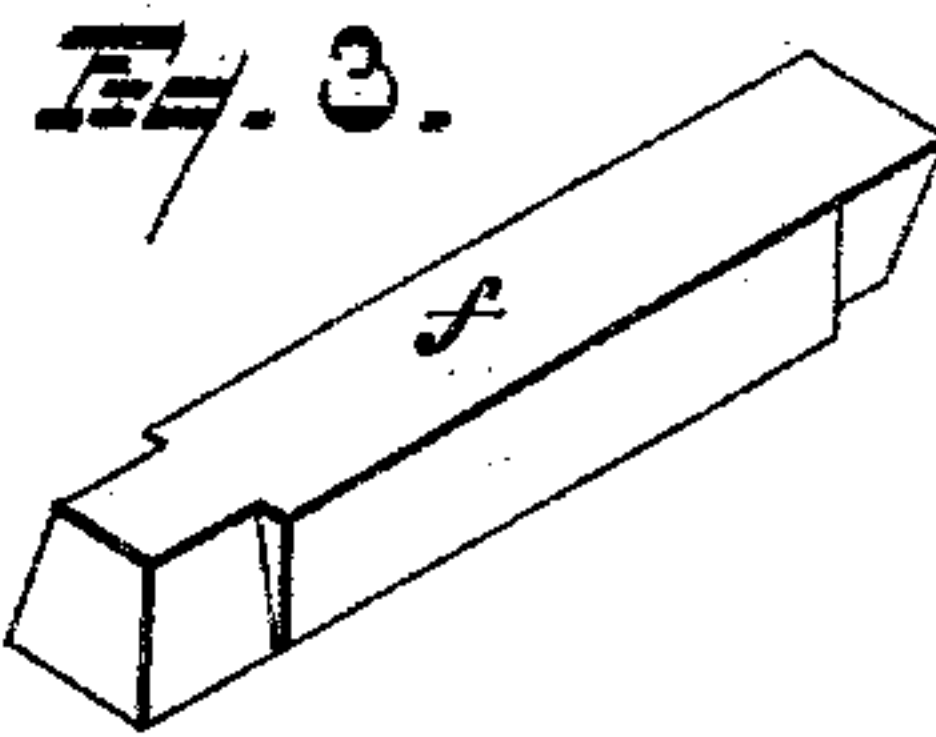
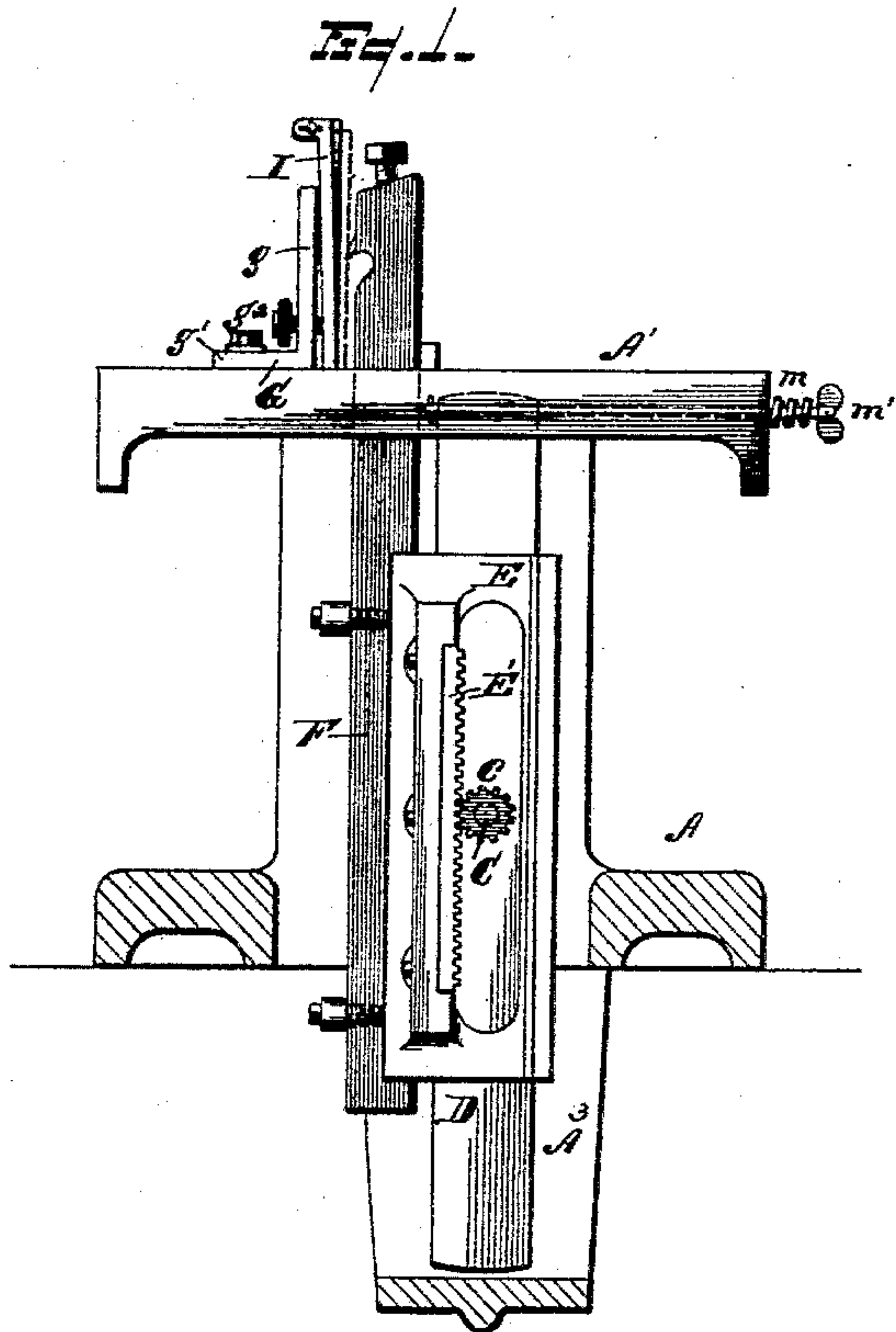
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4 Sheets—Sheet 1.

M. MORTON.
KEY AND KEY SEAT CUTTER.

No. 373,680.

Patented Nov. 22, 1887.



WITNESSES
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(No Model.)

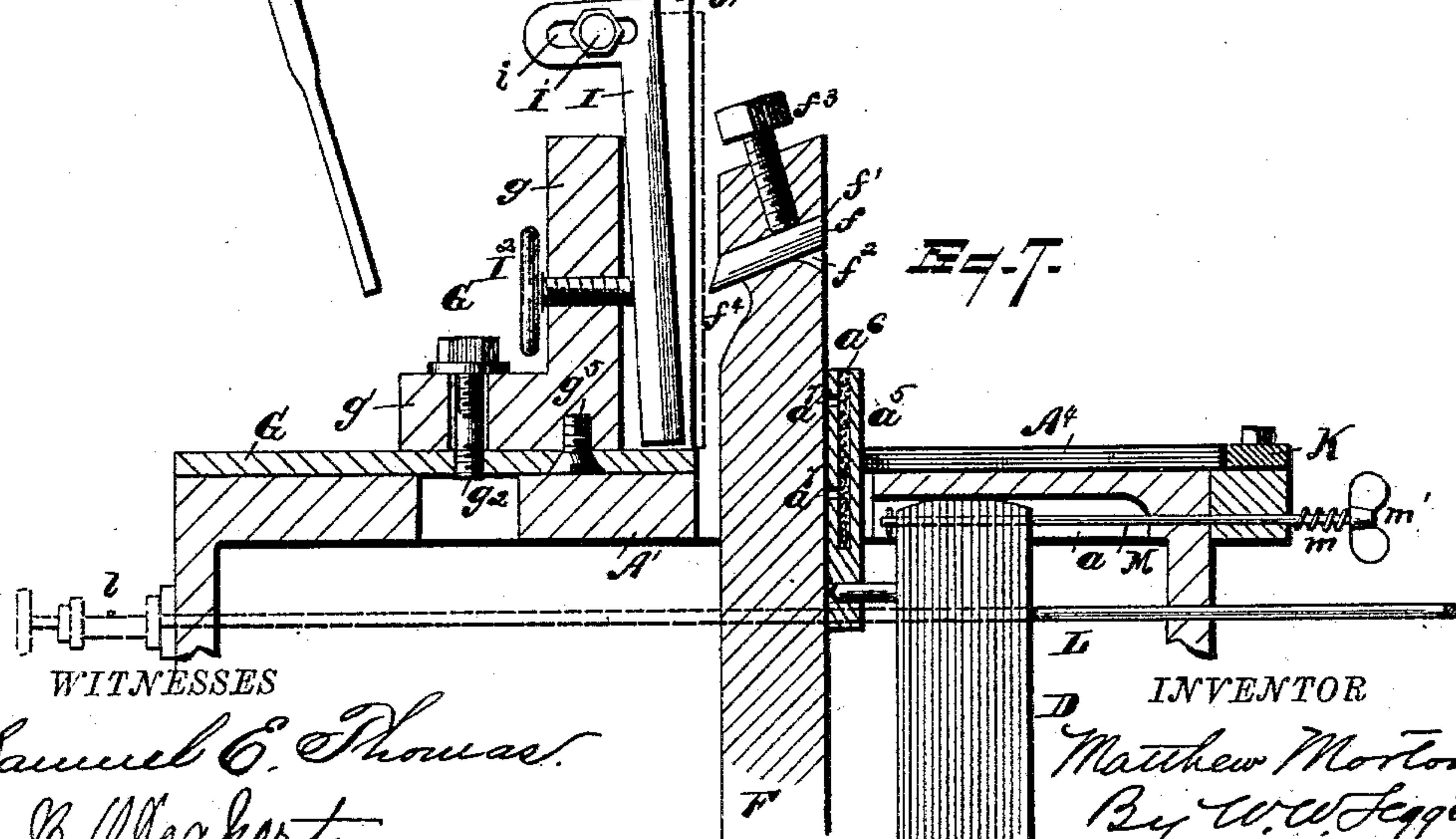
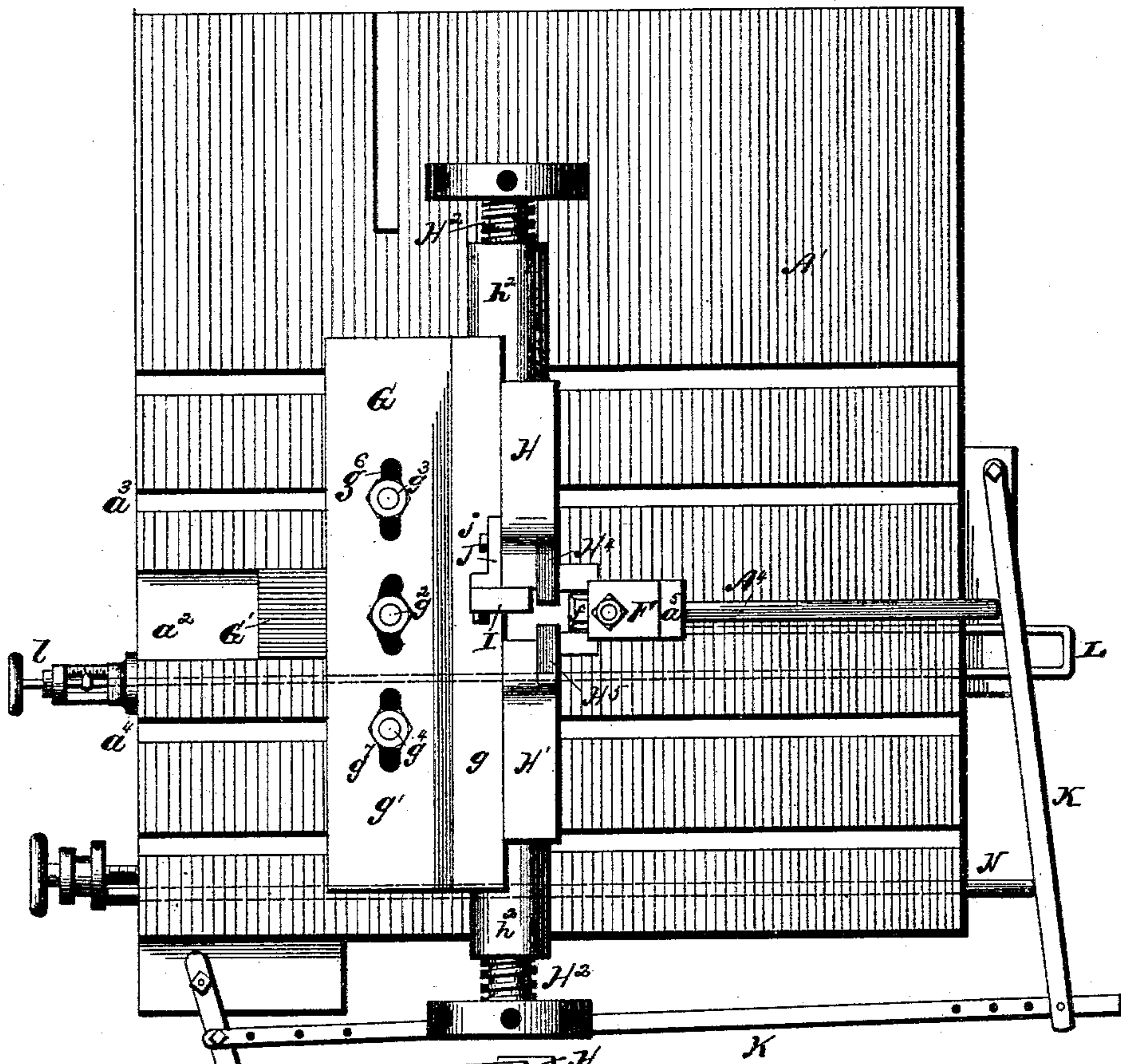
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Fig. 6.



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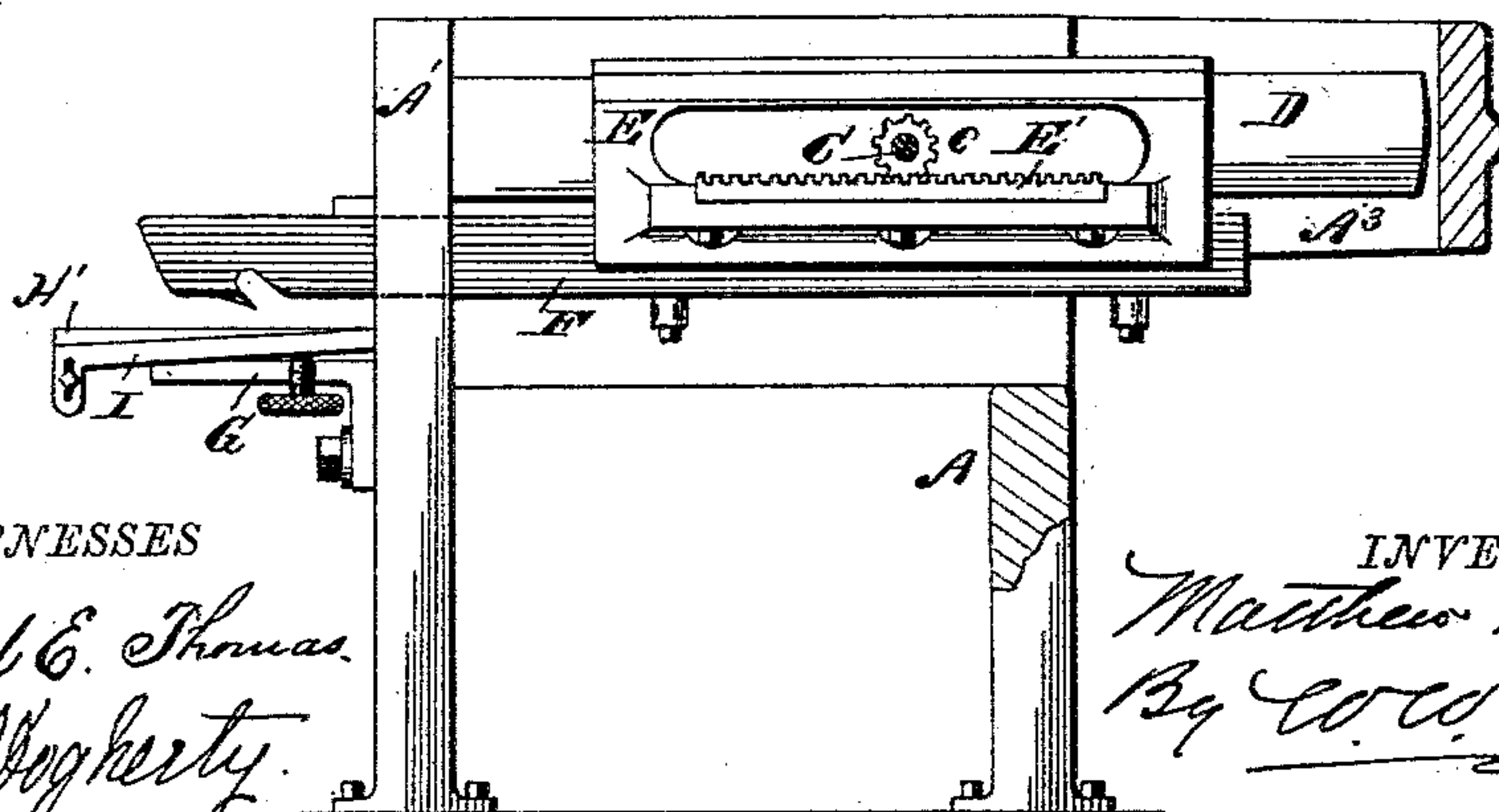
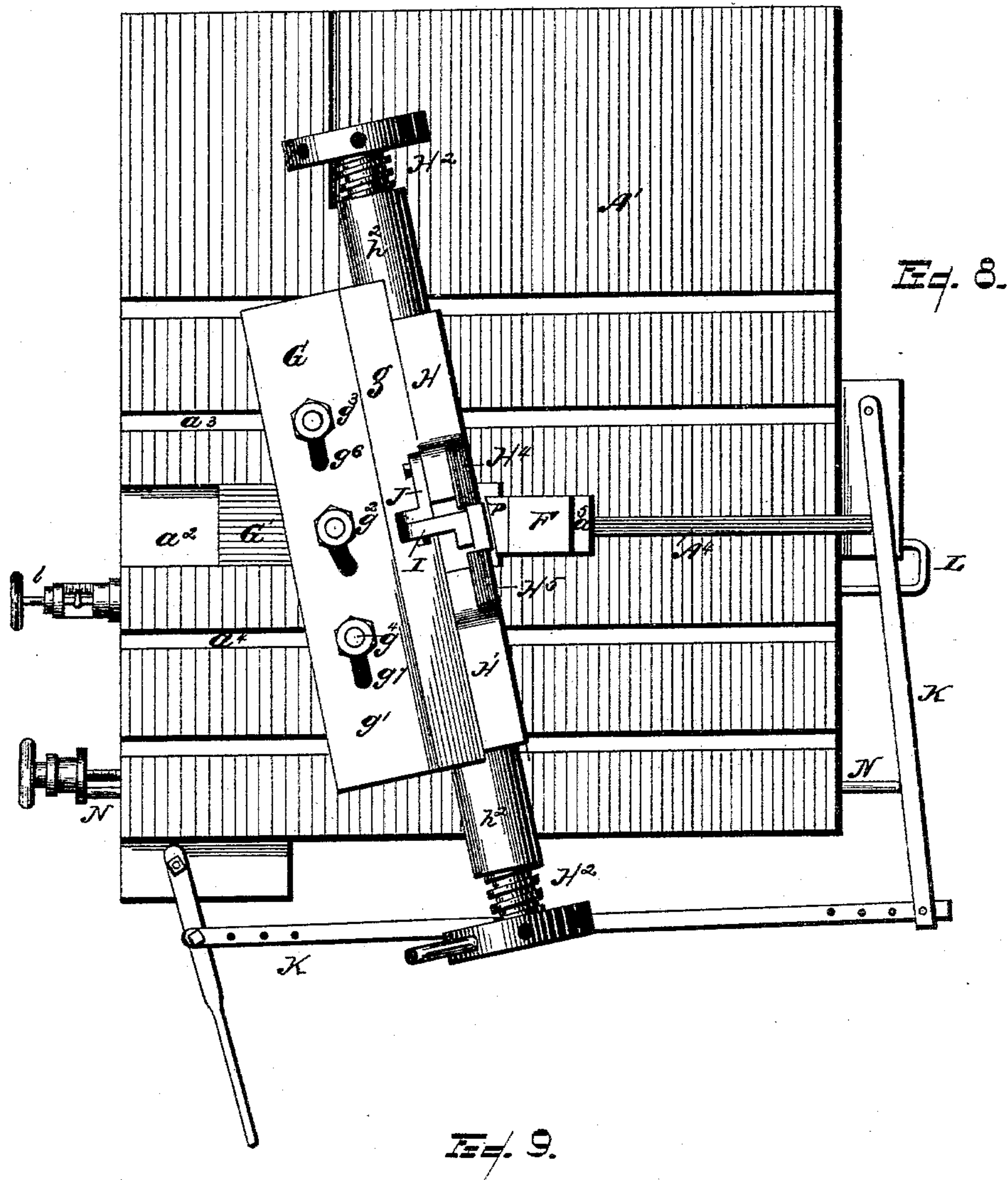
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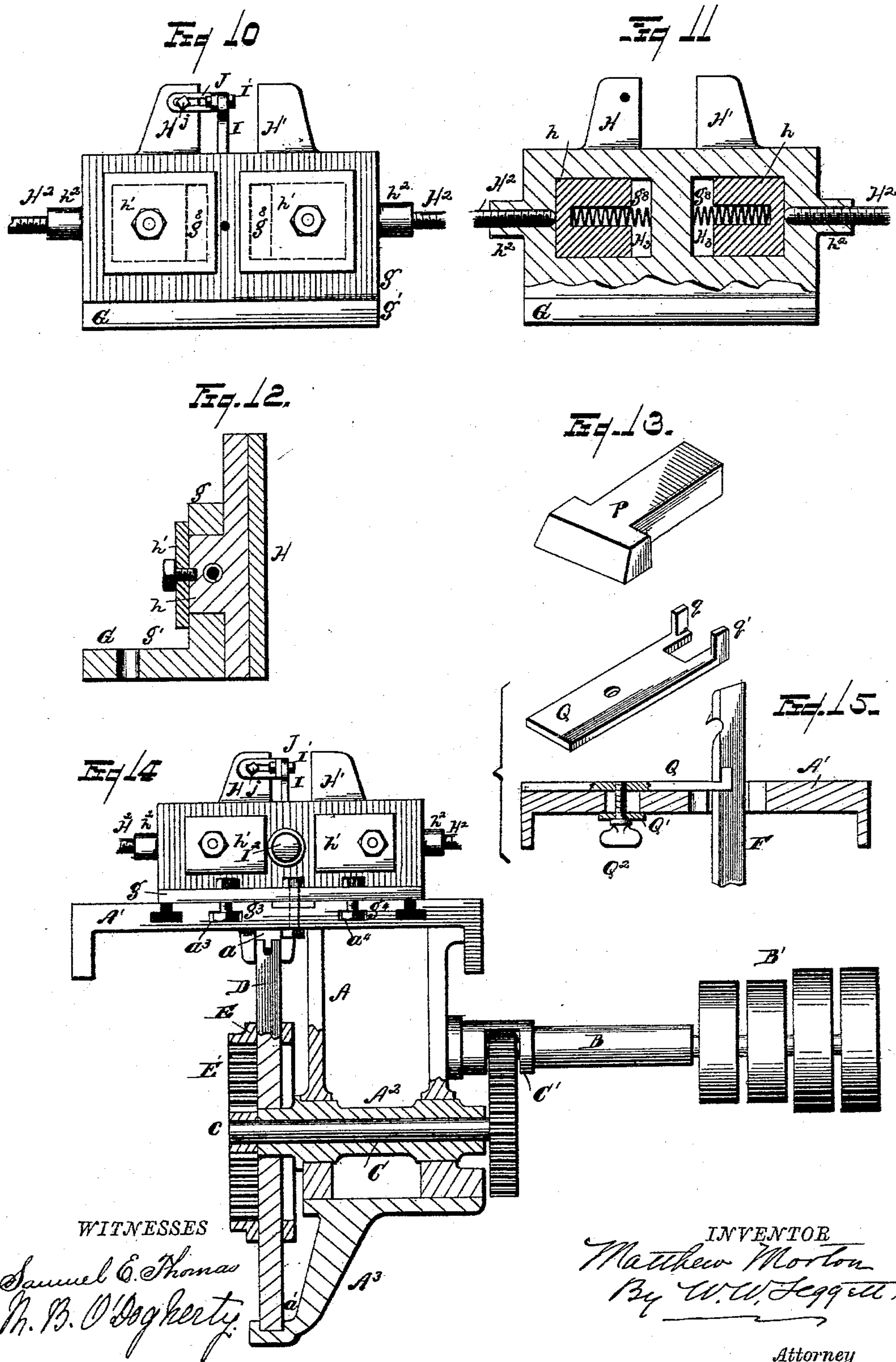
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UNITED STATES PATENT OFFICE.

MATTHEW MORTON, OF ROMEO, MICHIGAN.

KEY AND KEY-SEAT CUTTER.

SPECIFICATION forming part of Letters Patent No. 373,680, dated November 22, 1887.

Application filed February 9, 1887. Serial No. 227,051. (No model.)

To all whom it may concern:

Be it known that I, MATTHEW MORTON, of Romeo, county of Macomb, State of Michigan, have invented a new and useful Improvement in Key and Key-Seat Cutters; and I declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to an improved key and key-seat cutting-machine, and is more particularly designed as an improvement upon similar analogous devices, for which United States Letters Patent were granted to me August 5, 1884, No. 303,178, and the United States Letters Patent granted to me December 29, 1885, No. 333,324.

The present invention has for its objects, first, a novel construction and arrangement of the adjustable guide; second, improved means for operating the sliding head with its cutter attached; third, a novel construction of the frame and its bed; fourth, an improved vise for holding the work to the cutter; fifth, an improved construction of the cutter; and, sixth, the general construction and arrangement of the devices and their combinations, as hereinafter more fully described, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a side elevation, partly in section, illustrating features of my invention. Fig. 2 is a vertical section through the adjustable guide and longitudinally with the driving-shaft. Fig. 3 is a detail view of a cutter-blade; Fig. 4, a side elevation of the vise; Fig. 5, an end elevation of the same. Fig. 6 is a plan view; Fig. 7, a vertical section through the cutter-head. Fig. 8 is another plan view showing the vise turned into position for the operation of cutting keys; Fig. 9, a side elevation showing the bed turned in a perpendicular direction. Figs. 10, 11, and 12 are additional views of the vise; Fig. 13, an additional view of the cutter-blade. Fig. 14 is a front elevation of the bed and vise. Fig. 15 is a section on the same line as Fig. 7, showing a modification.

I carry out my invention as follows:

A represents a supporting-frame, A' being its bed or working-surface.

B is a driving-shaft; B', the driving-pulleys. The driving-shaft is geared with a counter-shaft, C, as shown at C', said counter-shaft being provided upon its opposite end with the pinion c. The counter-shaft is located in a sleeve or bearing, A².

D is an adjustable guide pivoted upon the sleeve A², the upper end of said guide being movably engaged in a guiding-groove, as shown at a, on the under side of the bed, the lower end of said guide having a movable engagement, also, in a guiding-arm, A³, of the frame, as shown at a', the construction being such that said guide may be turned to the desired extent about its center, the guide projecting above and below its center preferably to an equal distance. The extremities of the guide should be constructed on the arc of a circle to permit its free adjustment.

E is a sliding head located upon the adjustable guide, on which head is a rack-bar, E', meshing with the pinions c. The sliding head carries the cutter-bar F, attached thereto in any suitable manner.

By centering the pivoted guide upon the sleeve A² midway of its extremities the machine may be built more compactly, as the sliding head may reciprocate both ways from the center of said guide. The lower portion of said guide may project below the floor.

The cutter-bar F is provided toward its upper end with a removable cutter-blade, f, which may be engaged therein in any proper manner. I prefer, however, to recess said bar, as shown at f', for the insertion of the cutter-bar, and to cut away the rear of the orifice, as shown at f².

f³ is a screw having a binding engagement upon said cutter-blade. As thus constructed, it will be seen that when the screw is forced upon the blade the rear of the cutter-blade may tilt slightly, and thereby bind toward its forward end against the upper and lower edges of said recess. This enables a firm engagement of the blade to be made in said bar. I do not limit myself to the manner of its engagement therein.

G is a movable body-plate of a vise, constructed with an upwardly-extended arm, g, and flanged base g'. Said body-plate is located upon the bed and engaged thereon by means of an intervening slide, G', movably engaged

in a groove at a^2 , upon the face of the bed, the engagement of said plate with said slide being effected by a screw, g^2 . The body-plate is also engaged by T-headed bolts $g^3 g^4$ with dovetail grooves $a^3 a^4$ upon the face of the bed. This body-plate is thus engaged upon the bed opposite the cutter, and serves to form a firm backing for the work, while it is also made readily removable whenever desired.

In cutting keys it is desirable to swing this body-plate horizontally, so as to present the work properly to the cutter and permit a shear cut by the cutter being made thereon. The flanged base is therefore pivoted about a suitable post or stud, g^5 , engaged with the slide G' , and it is also provided with slots $g^6 g^7$ to receive the screws $g^3 g^4$, said base being similarly slotted, also, to receive the screw g^2 , as shown, and permit the plate to be turned.

H and H' represent jaws of a vise placed laterally across the bed to assist in holding the work. These jaws are engaged with the body-plate of the vise, so as to be removable with said plate in any proper manner—as, for instance, the jaws are provided with a projection, h , engaged in elongated slots g^8 in the body-plate, and are held in such engagement by a shield or plate, h' , bolted thereto and located upon the opposite side of the body-plate, the jaws being removable from said latter plate upon the disengagement of said shields.

To operate the jaws laterally to and from the cutter the body-plate is provided with an operating-screw, H^2 , screw-tapped into the end of the body-plate, and bearing against the end of the projection h , so as to crowd the jaw toward the key to be cut. A spring, H^3 , is located between the opposite face of said projection and the edge of the slot in the body-plate adjacent thereto, so as to retract the jaw whenever the pressure of the screw H^2 is released. The body-plate is preferably constructed with a hub, h^2 , to receive the adjusting-screw, and the adjacent jaws may be recessed to fit over a portion of said hub h^2 .

H^4 and H^5 represent steel surface-plates located in said jaws, having roughened faces to grip the work.

In case a key is to be cut it will be desirable to incline the lower end toward the cutter to give the required angle upon said key. This I accomplish by engaging upon one of the jaws a bar, I, having a pivotal engagement upon said jaw at its upper end. To accomplish this pivotal engagement I prefer to provide the jaw with an arm, J, united thereto in any particular manner, as by a screw, j , said arm constructed with an elongated slot to receive said screw and permit the adjustment of said arm longitudinally upon said jaw, so as to carry the oscillatory arm to and from the adjacent edge of the jaw. The arm J is constructed with an elongated slot, i , to receive the pivotal bolt I' . It is designed to employ arms of various sizes with different kinds of work. In order to tilt the lower end of said

arm toward the cutter the body-plate is provided with a thumb-screw, I^2 , by which said arm may be adjusted to the desired angle, and when so adjusted any number of keys of a particular taper for which such adjustment is made may be cut. The bed of the table is provided with a sliding bar, A^4 , located in a groove in said bed, the forward end of said bar engaged against the cutter-bar, said bar preferably provided with an upright brace, a^5 , to communicate the pressure along its length.

K represents lever mechanism engaged with the table and constructed to bear against the rear end of said sliding bar and force the cutter to its work, as shown in my patents above referred to.

To adjust the guide so as to throw the upper part of the cutter either forward or backward of the center or to a perpendicular, so as to give the proper inclination to the cutter-blade, the bed of the table is provided with a bar, L, preferably curved at its rear extremity and engaging against the guide, and having its forward end provided with an adjusting-screw, l , whereby the upper end of the guide with its cutter-bar may be adjusted to a desired position. To retract the guide it is provided with any suitable spring mechanism—as, for instance, the guide is provided with a rod, M, passed through the supporting-frame and provided with a spring, m , at its rear end, by which the upper end of said guide will be forced backward when free to move in that direction.

m' is a thumb-screw for giving the desired tension to the spring.

N is an adjustable bar engaged upon the bed to limit the stroke of the lever, and so limit the cut of the blade upon the work.

When the device is used for cutting key-seats in pulleys, &c., the body-plate and the jaws of the vise are all removed from the bed of the table, when the pulley may be located about the cutter-bar and held in place upon the bed by any suitable binder.

In cutting keys a cutter is used which will give a shear cut, and the body-plate is made oscillatory about its pivoted center, so as to present the key to the blade to receive the cut in this manner.

P represents a cutter constructed with an angular edge adapted to make a shear cut. The cutter should be of sufficient width to cut the entire width of the key at one stroke.

For some kinds of work it is desirable to locate the bed of the machine so as to present a perpendicular surface, the frame-work being provided with a base at right angles to said bed. Such a device is shown in Fig. 9, and the cutter in this case operates horizontally instead of vertically. The cutter-bar is cut away on its front surface beneath the cutting-edge of the blade to give room for the shavings, as shown at f^4 . When the cutter-blades are of the same width with that of the recesses in which they are located, they may be constructed with cut-

ting-edges on both ends. In Fig. 3 I have illustrated such a cutter-blade, the lower longitudinal edges thereof being parallel to each other along a portion thereof, which is engaged in the orifice of the cutter-head.

As illustrated in Fig. 15, in cutting key-seats the vise mounted upon the slide G is removed from the bed of the table, and a guide, Q, provided with upwardly-extended shoulders q q' at one end, is located in the groove a^2 , and engaged therein by a washer, Q' , and thumb-screw Q^2 , said upwardly-extended shoulders located, respectively, on either side of the cutter-bar. In cutting a key-seat the hub is brought up against these shoulders, and in this manner the pulley is properly centered for cutting, the centering always being gaged from the inside of the bore of the hub, instead of from the outside, and thus perfect accuracy is obtained.

The brace a^5 for the cutter-bar I prefer to construct as shown in Fig. 7, in which the same is provided with an orifice, as shown at a^6 , the side of the brace adjacent to the cutter-bar being perforated, as shown at a^7 , to communicate with said orifice. This orifice is filled with cotton waste or any proper substance, and which is penetrated with oil, thereby forming a perfect lubrication between said brace and said cutter-bar.

What I claim is—

1. The combination, with a supporting-frame, of a guide centered intermediate of its extremities upon said frame, said guide adjustable to and fro from the work and made rigid laterally, substantially as described.

2. The combination, with a supporting-frame, of an adjustable guide centered intermediate of its extremities upon said frame, a reciprocatory sliding head located upon said guide, the construction being such that said head may reciprocate in both directions from the point about which said guide is centered, substantially as described.

3. The combination, with a supporting-frame provided with a sleeve, A^2 , of an adjustable guide centered intermediate of its ends about said sleeve, and a reciprocatory sliding head located upon said guide, the construction being such that said head may reciprocate in both directions from said sleeve, substantially as described.

4. The combination, with a supporting-frame provided with a shaft, C, of an adjustable guide centered intermediate of its ends about said shaft, and a sliding head located upon said guide, said head reciprocated by said shaft, the construction being such that said head may be reciprocated upon the guide in both directions from said shaft, substantially as described.

5. The combination, with a supporting-frame, of a shaft, C, provided with a pinion, an adjustable guide centered intermediate of its ends about said shaft, and a sliding head located upon said guide, provided with a rack-bar meshing with said pinion, the construc-

tion being such that said head may be reciprocated in both directions from said shaft, substantially as described.

6. The combination, with a supporting-frame, of a guide centered intermediate of its extremities upon said frame, the extremities of said guide movably engaged in guiding-grooves in the frame, the construction being such that said guide will be held rigid laterally and be adjustable to and from the work, substantially as described.

7. The combination, with a supporting-frame and drive-shaft, of a counter-shaft, C, engaged therewith, said counter-shaft provided with a pinion engaging a rack in the movable head which carries the cutter, and an adjustable guide for said movable head centered intermediate of its ends about said shaft C, the construction being such that said head may be reciprocated in both directions along said guide, substantially as described.

8. The combination, with a bed provided with a reciprocatory cutter, of a vise for holding the work, said vise having an oscillatory engagement upon said bed, the construction being such that said vise may be oscillated on an arc of a circle, substantially as and for the purpose described.

9. The combination, with a bed, of a vise for holding the work, said vise constructed with a body-plate having an oscillatory and a reciprocatory engagement upon the bed, said body-plate provided with laterally-reciprocating jaws, substantially as described.

10. The combination, with a bed, of a vise for holding the work, said vise constructed with a body-plate pivotally engaged upon a sliding plate having a reciprocatory engagement upon said bed, and in connection therewith laterally-adjustable jaws engaged upon said body-plate, the construction being such that said jaws may be oscillated upon an arc of a circle and reciprocated to and from the cutter, substantially as and for the purposes described.

11. The combination, with a body-plate, of lateral independent adjustable jaws engaged therewith, each said jaws provided with adjusting-screws screw-tapped into the end of the body-plate, substantially as described.

12. The combination, with a body-plate, of laterally-adjustable jaws, one of said jaws provided with an adjustable bar, substantially as described.

13. The combination, with a body-plate, of laterally-adjustable jaws, one of said jaws provided with an adjustable arm having engaged therewith an adjustable bar, substantially as described.

14. The combination, with the cutter-bar, of a removable cutter-blade, said bar constructed with a recess to receive said blade, and a binding-screw to hold said blade in said bar, said recess cut away on the lower edge to permit the tilting of the blade and its consequent binding against the upper and lower edges of said recess when the binding-screw is engaged therewith, substantially as described.

15. The combination, with a cutter-bar, of a removable cutter-blade, said bar provided with a recess cut away on its rear lower edges to receive said blade, and a binding-screw to hold
5 the blade in said recess, said bar cut away beneath the edge of the cutter, substantially as described.

16. The combination, with a key-cutting machine provided with a reciprocatory cutter, of
10 an oscillatory vise to hold the key to be cut, said vise adapted by its oscillatory movement to be adjusted into the plane of the cutting-edge of the tool, whereby the key may be properly cut regardless of the plane occupied by
15 the edge of the tool after the same has been ground, substantially as described.

17. The combination, with a supporting bed,

of an adjustable guide provided with a reciprocatory head, a cutter-bar engaged with said head, and a vise located on said bed to hold a
20 key before said cutter-bar, substantially as described.

18. The combination, with a supporting bed, of an adjustable guide provided with a reciprocatory head, a cutter-bar engaged with said
25 head, and a vise to hold a key at an angle to the cutter, substantially as described.

In testimony whereof I sign this specification in the presence of two witnesses.

MATTHEW MORTON.

Witnesses:

N. S. WRIGHT,

M. B. O'DOHERTY.