

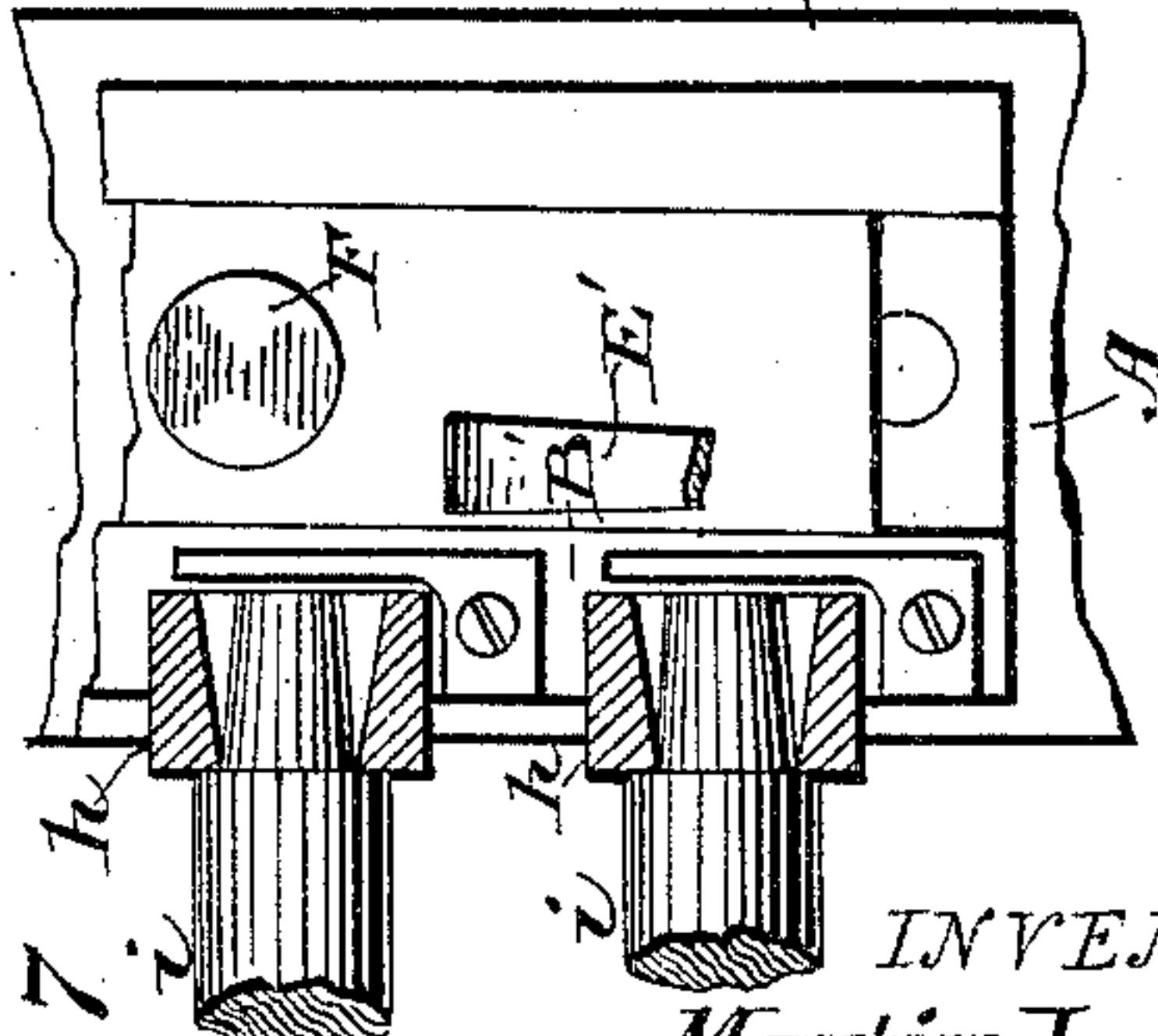
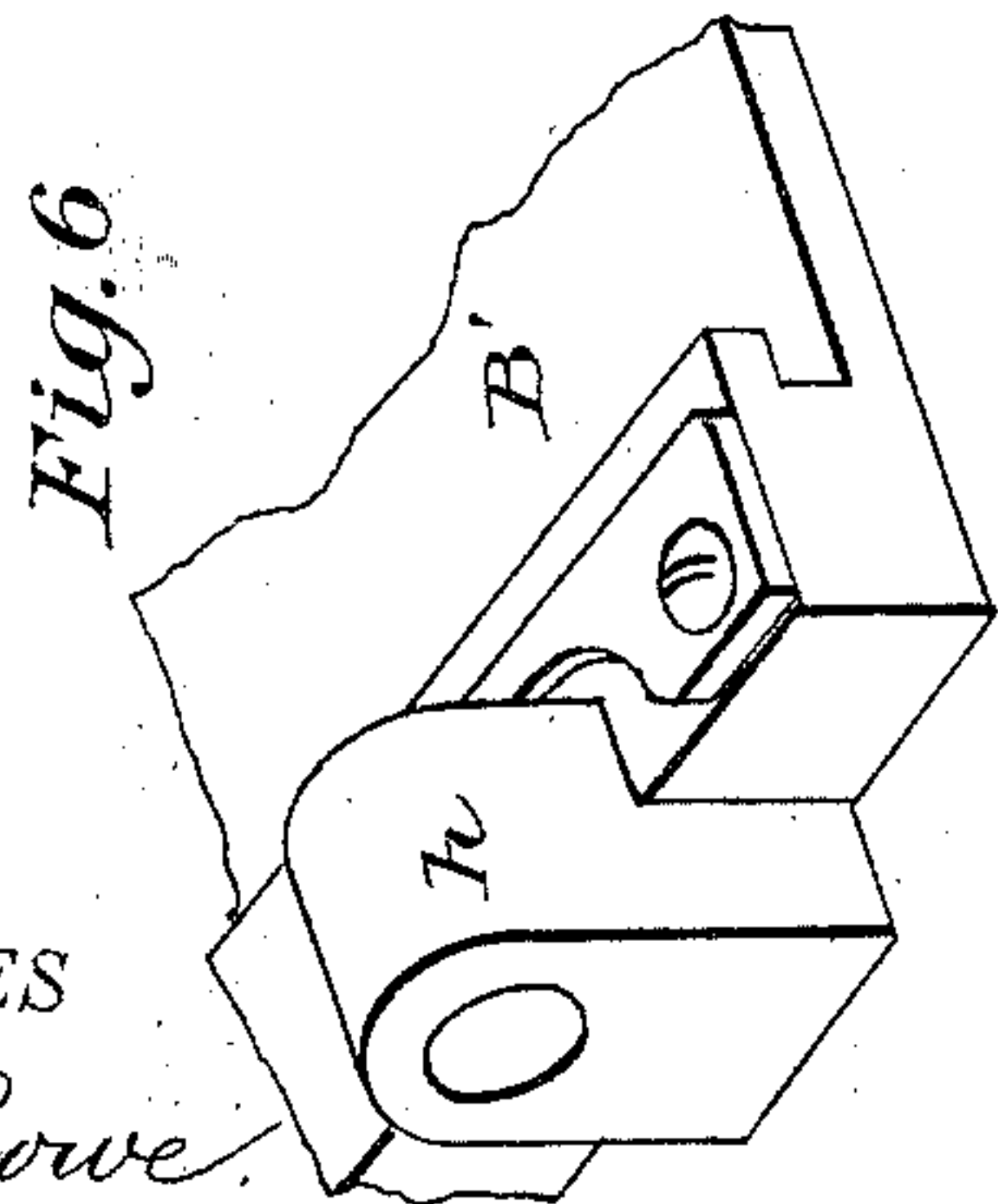
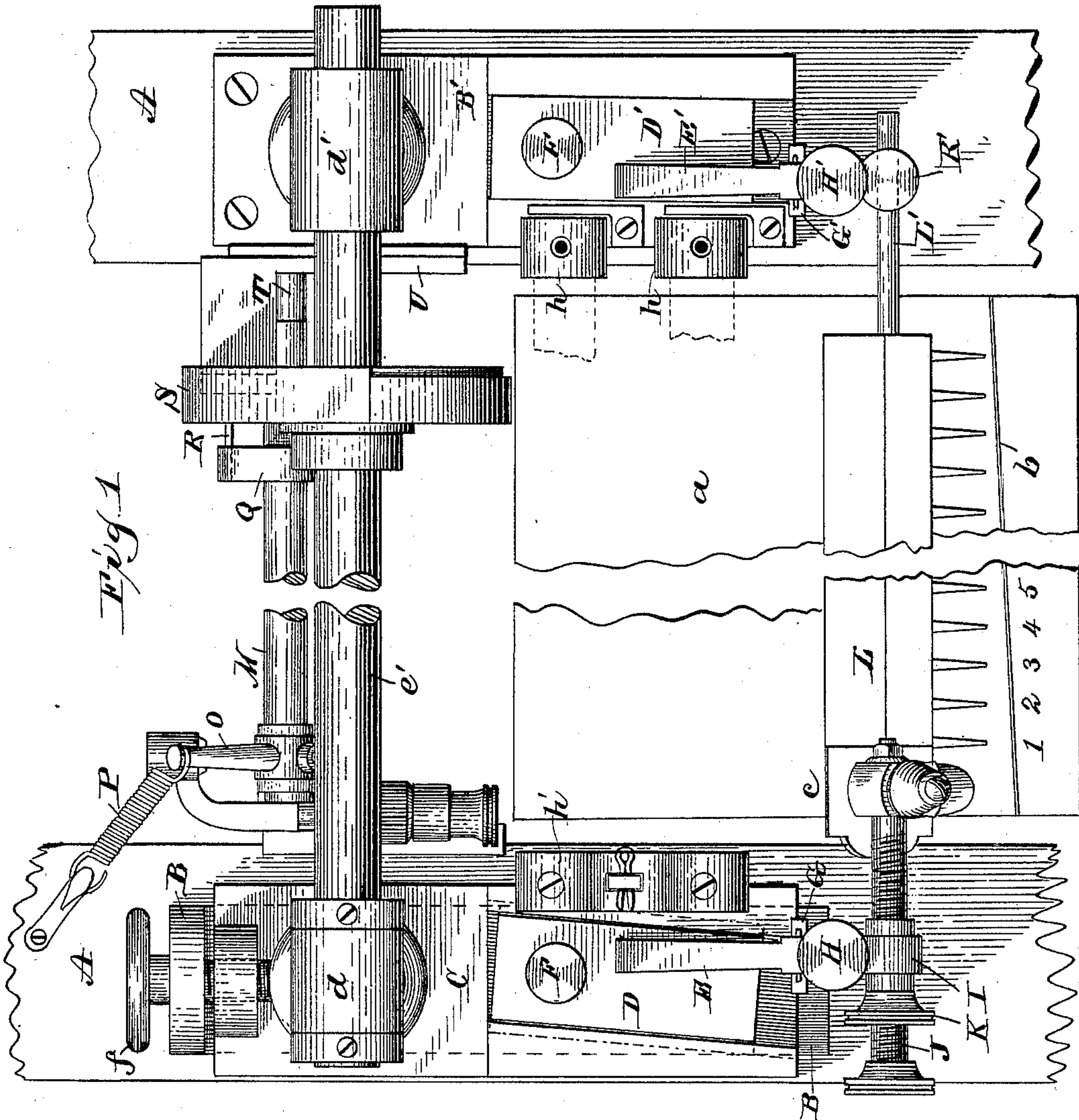
(No Model.)

2 Sheets—Sheet 1.

M. L. METZGER & A. COOPER.  
PAPER RULING MACHINE.

No. 432,633.

Patented July 22, 1890.



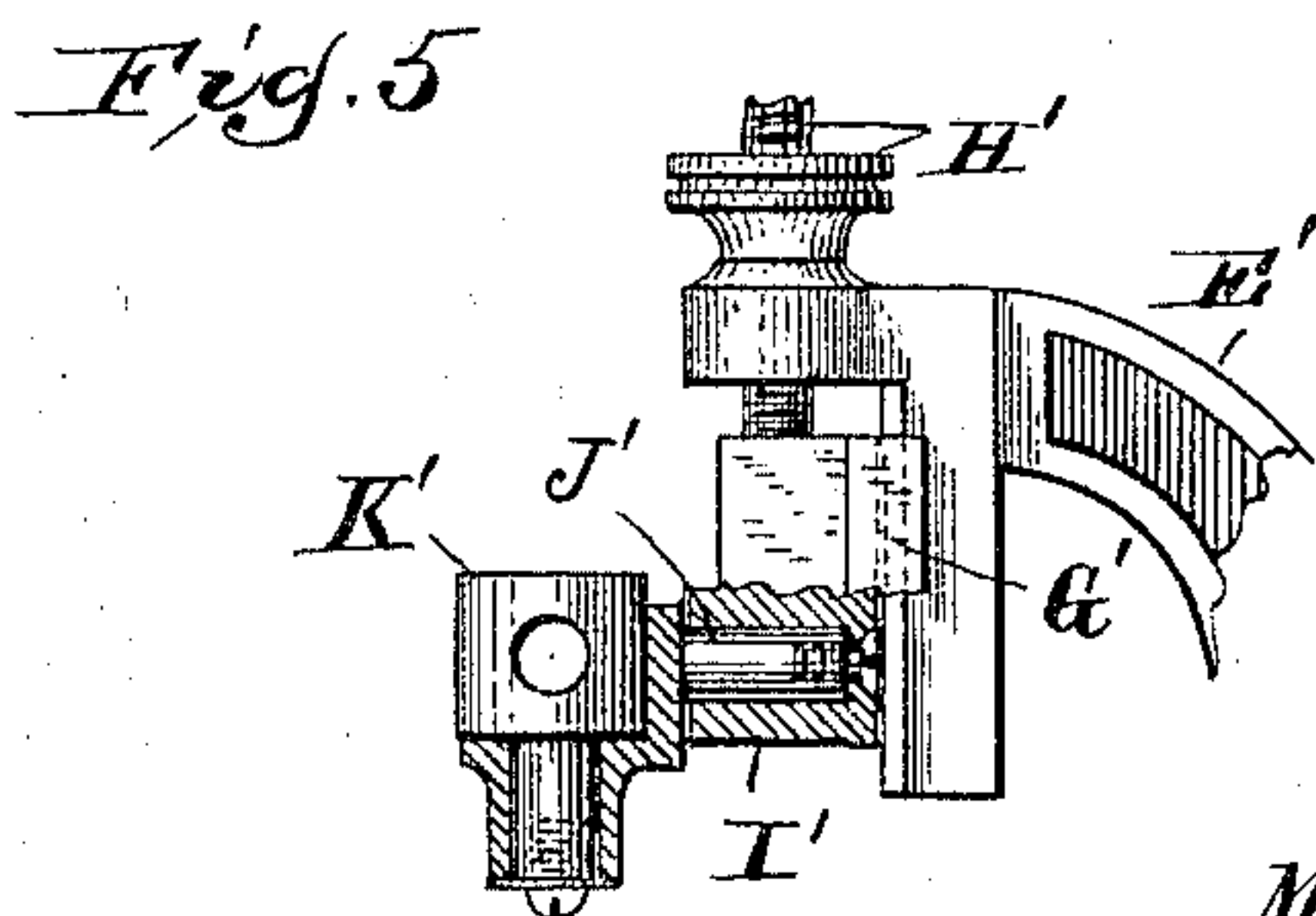
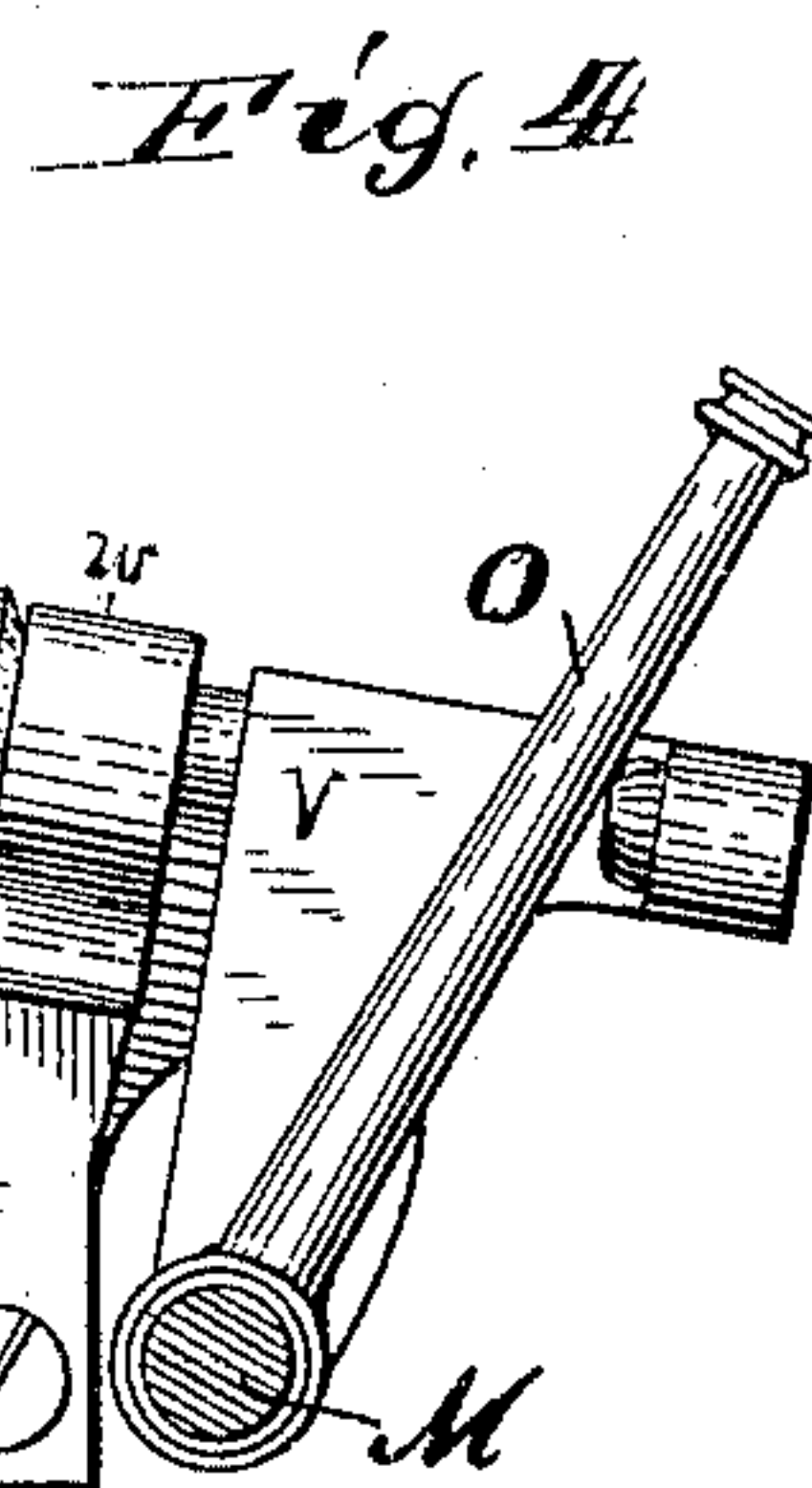
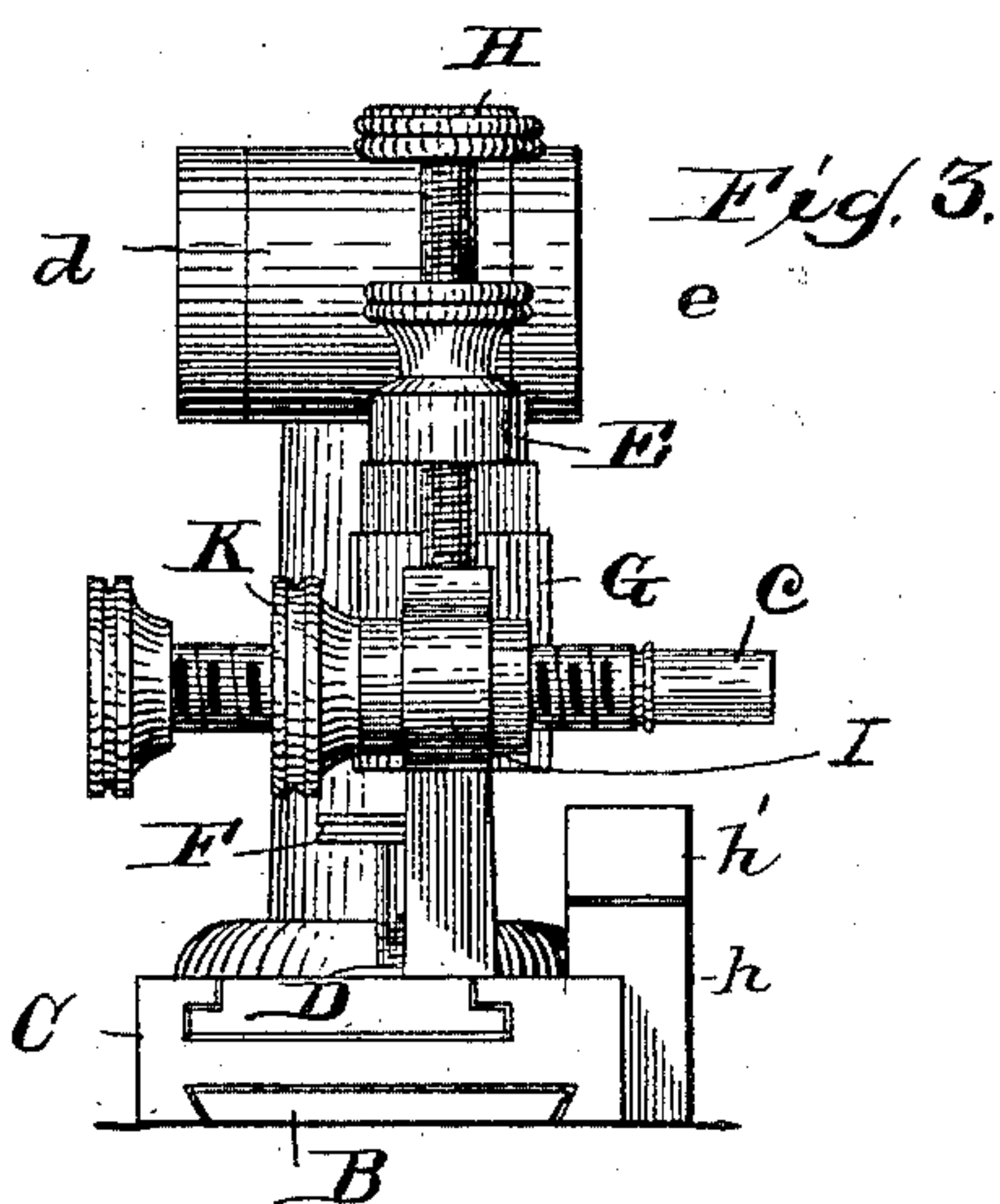
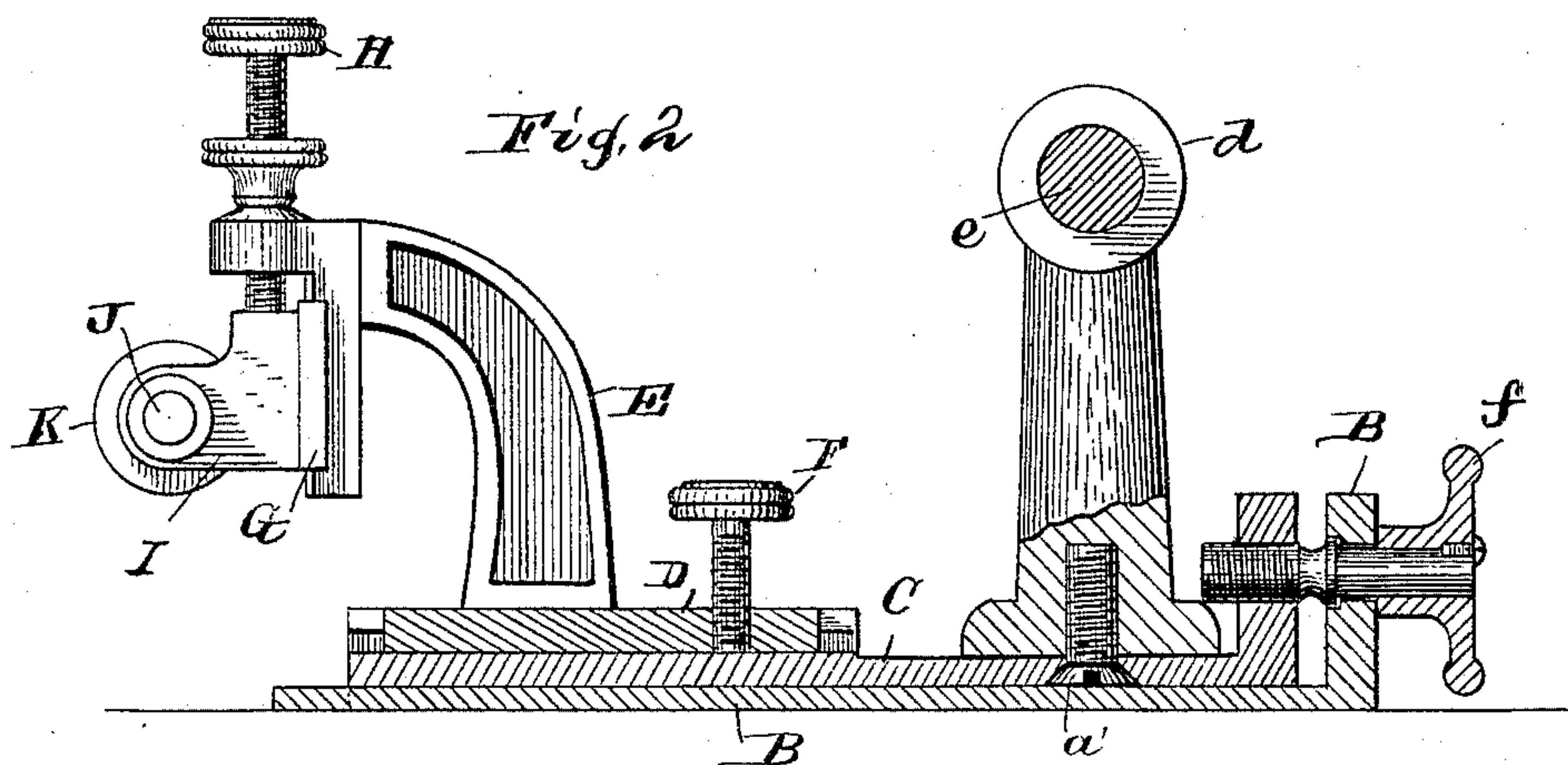
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*Martin L. Metzger,*  
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# UNITED STATES PATENT OFFICE.

MARTIN L. METZGER AND ALBERT COOPER, OF HARRISBURG, PENNSYLVANIA, ASSIGNORS TO THE W. O. HICKOK MANUFACTURING COMPANY, OF SAME PLACE.

## PAPER-RULING MACHINE.

SPECIFICATION forming part of Letters Patent No. 432,633, dated July 22, 1890.

Application filed October 1, 1888. Renewed June 20, 1890. Serial No. 356,049. (No model.)

*To all whom it may concern:*

Be it known that we, MARTIN L. METZGER and ALBERT COOPER, citizens of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Ruling Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in ruling-machines for ruling blank paper.

The improvements have reference to mechanism in which the pen-beam is mounted and by which it is adjusted in such manner that after the pens have been so placed in the beam as to draw the column-lines at the places desired one adjustment of the pen-beam will suffice to bring all the pens up to the head-lines and to the proper point on the said lines from which to start the column-lines, irrespective of a variance in the angle of the head-line with the sides of the sheet—that is to say, the one adjustment will suffice for these two purposes, whether the head-line happens to be at a right angle to the side of the sheet or to vary indefinitely from that angle.

The improvements also have reference to means for adjusting one end of the stop-gate so that it may arrest the sheets of paper and bring their sides parallel to the sides of the machine, even though the head of the sheet be not cut at a true right angle to its sides, and whereby the gate is held at such adjusted positions by the same devices as are manipulated to adjust it.

The improvements also have reference to the manner of securing the standards in which the cam-shaft is mounted, so that the bearings in the standards will accommodate themselves to the line occupied by the cam-shaft.

In the accompanying drawings, forming a part of this specification, and on which like reference-letters indicate corresponding parts, Figure 1 represents a plan view of so much of the paper-ruling machine as embodies the present improvements; Fig. 2, a partial

section and side elevation of one of the base-plates, the adjustable slide, one of the cam-shaft standards, and one of the pen-beam standards and its adjuncts; Fig. 3, an end elevation of the same parts; Fig. 4, a detail enlarged elevation of the stop-gate supporting and adjusting devices, showing the shaft in section; Fig. 5, a detail sectional view of the turret, its seat, the supporting-head, and a part of one of the pen-beam standards; Fig. 6, a detail perspective view of a portion of one of the base-plates, showing a box of one of the pen-lifter shafts; and Fig. 7, a plan view and partial section of a portion of the side rail of one of the base-plates, one of the foot-plates, its standard, the pen-lifter shafts and their boxes.

The letter A designates the side rails of a ruling-machine of the ordinary construction, upon which are secured base-plates B and B', the former constructed with outside dovetail ways to receive the reversely-dovetailed adjustable plate C, and the latter constructed with inside dovetail ways to receive the foot-plate of an adjustable standard, presently to be described. The adjustable plate C is constructed with similar inside dovetail ways for the reception of the foot-plate of a similar standard. These foot-plates are designated at D and D' and the standards at E and E', and are known as the "pen-beam" standards. It will be observed from Fig. 1 that the ways in the plates C and B' are at an angle to the sides of the beams A, the ways in the former plate being at a greater angle than those in the latter. The result of the angular direction of these ways is that in adjusting the foot-plates of standards E and E' back and forth they are at the same time given a transverse movement, such movement of the standard E being greater than that of the standard E', because the former standard supports that end of the pen-beam which is to undergo the more frequent adjustments, while the standard E' supports that end which is only to be adjusted in case there should ever happen to be an adjustment of the pen-beam desired, which cannot readily be obtained by the adjustment of the beam E alone and the



manipulation of its adjunct devices. Each foot-plate is provided with a set-screw F, which secures it in adjusted positions, and each standard with a vertical way, to which is fitted a head G and G', respectively, both being vertically adjustable and held by the screws H H'. The head G has an extension I, in which is fitted a stout screw J, having a jam-nut K, and connected at its inner end with the pen-beam L by any convenient form of joint that will admit of rotation of the screw without turning the beam, but which will move the beam longitudinally with the screw. The head G' is constructed with a sleeve I', in which the spindle of the seat J' is mounted, so that it may rotate therein. In this seat the turret K' is fitted to rotate and support the rod L' of the pen-beam. These two joints afford universal adjustability to the turret, and hence a perfect accommodation to the position of the pen-beam, whatever the latter may be.

At the beginning of this specification a statement was made as to the object of the construction just described. It may be added here, however, that *a* designates a sheet of paper to be ruled, *b* a head-line, and the points 1, 2, 3, 4, 5, &c., the places on the head-line at which it is desired to start the column-lines. It is noticeable, however, that the head-line is not at a right angle to the sides of the sheets, and it very frequently happens in the vast number of sheets being ruled that now and then a sheet or two will enter the machine which have not been accurately trimmed, throwing the head-line more or less out of a right angle from its sides. In such cases the pens have to be adjusted so that all of them will touch the head-line at the same time, and in doing this according to the common way one end of the beam is advanced toward the line, the other end turning on its support as a center. While this brings the pens up to the head-line, it throws them to one side of the points on that line where the column-lines are to commence, and to overcome this defect the beam has then to be adjusted sidewise or longitudinally, thus requiring two adjustments. With these improvements this is not the case, for to adjust the pens to the head-line *b* in the example shown in Fig. 1 it is simply necessary to move the standard E toward said line, which, as it moves laterally, on account of the direction of the ways in which its base-plate is mounted, will automatically shift the pen-beam laterally, and thus compensate for the tendency of the pens to arrive at the head-line to one side of the points at which the column-lines are to commence on account of the beam turning with the turret K' as the center. Thus it appears that but one adjustment is necessary and that the back and forward adjustment of the end *c* of the pen-beam does not vary the lateral position of the points of the pens on the sheet.

Referring now to the means for adjusting

the stop-gate, as already suggested, the letter M designates the gate-shaft, which is of the usual kind and has a lifting-arm and spring O and P and a collar Q, carrying a pin R, which is operated through the cam S, and a suitable intermediate trip-lever. (Not shown and not forming any part of the present invention.) The shaft M at one end is journaled in a bearing T, forming a part of a plate U, which is secured to one of the side rails, and at the other end in a bracket V, having a screw-threaded shank mounted to slide in the jaws W of a plate W', secured to the side rail of the machine. This shank carries a manipulating-nut X between the jaws, by turning which the bracket is moved back and forth and the stop-gate shaft adjusted to and from a right angle with the side rails, as the condition of the paper may require. The jam-nut X' is fitted upon the shank of the bracket to additionally hold it in adjusted positions, although it is so held by the nut X. A part of the bracket carries the rubber bumper, against which the arm O abuts.

As just suggested, it will be noticed that the means, the shank, and the nut X, by which the bracket is adjusted, form also means for holding it in adjusted positions, whereby the one operation of adjustment is all that is necessary, as the jam-nut may or may not be used, while in the old way the shaft had to be adjusted and then some other device manipulated to fasten it.

Referring now to the means for bringing the bearings of the cam-shaft automatically into line with each other, the letters *d* and *d'* designate two stout metallic standards, whose lower ends are fitted to turn upon the plates C and B' by means of screws *a'*, while their upper ends are fashioned to constitute bearings for the cam-shaft *e*. A hand-screw *f*, carried by the base-plate B, engages a lug on the plate C, so as to adjust that plate back and forth in setting up the machine, and as the standard *d* is carried by the plate C the advantage of having said standard and the standard *d'* turn on a vertical axis is apparent, as this construction brings the bearings in true alignment automatically and without the necessity of expensive workmanship to secure the same end during the making of the parts.

The letter *h* designates the journal-boxes of the pen-lifter-supporting shafts *i*, and in order to allow of the adjustment of the plate C, above referred to, and yet not bind these shafts in these boxes, they are of peculiar construction. From Fig. 7 it will be seen that the bore of the boxes is tapered in one direction, while the journals of the shafts are tapered in the other direction. They fit snugly to each other near the shoulders of the shafts, and this tapering construction of the bore and journal admits of adjusting the shafts to and fro by means of the plate C without binding the shafts in the boxes. Thus lost motion is prevented and the free-



dom of the shaft in the boxes obtained, and yet a simple construction is provided.

It will be seen from Figs. 1, 3, and 6 that the boxes *h* are secured, respectively, to the plates B' and C. The latter boxes have a removable cap *h'*; but the former boxes are each of one piece, and are preferably cast integral with a plate B'.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a ruling-machine, the combination, with two standards, their base-plates, ways in which said base-plates are mounted, one of said ways being at an angle to the sides of the machine, an adjustable head carried by each standard, a turret carried by one head, and an adjusting and supporting screw carried by the other head, of a pen-beam connected to said screw, and a rod connected to the other end of the beam and mounted in said turret.

2. In a ruling-machine, the combination, with two standards and their base-plates, ways in which said base-plates are mounted, both of said ways being at an angle to the sides of the machine and at an angle to each other, an adjustable head carried by each standard, a turret carried by one head, and an adjusting and supporting screw carried by the other head, of a pen-beam connected to said screw, and a rod connected to the other end of the beam and mounted in said turret.

3. In a ruling-machine, the combination, with two standards, their base-plates, ways in which they are adjustably fitted, one of said ways being at an angle to the side of the machine, a vertically-adjustable head carried by one of said standards and provided with an extension and a supporting and adjusting screw mounted in said extensions, a vertically-adjustable head carried by the other standard and having a sleeve, a seat mounted in the sleeve, and a turret mounted in the seat at right angles to the sleeve, of a pen-beam connected to said screw at one end and provided at the other end with a rod which is fitted to slide in said turret.

4. In a ruling-machine, the combination, with the stop-gate and a bracket forming a bearing for one end thereof and provided with a screw-threaded shank, of a plate having jaws in which said shank is fitted to slide,

and a manipulating-screw mounted upon the shank between said jaws. 55

5. In a ruling-machine, the combination, with a stop-gate shaft, its lifting-arm, and a bracket constituting a bearing for said shaft and provided with a yielding stop opposite said arm and a screw-threaded shank, of a plate provided with two jaws, in which said shank is mounted to slide, and a manipulating-nut mounted on the shank and between said jaws, whereby the same device that adjusts the bracket secures it in adjusted positions. 65

6. In a ruling-machine, the combination, with a cam-shaft, of two standards, the upper end of each of which constitutes a bearing for said shaft and the lower end of each of which is mounted upon a vertical axis. 70

7. In a ruling-machine, the combination, with two base-plates and an adjustable plate mounted upon one of said base-plates, of two standards, one of them fitted to one of the stationary base-plates and the other of said standards fitted to the said adjustable plate, and the cam-shaft mounted in bearings constituted by said standards. 75

8. In a ruling-machine, the combination, with two base-plates and an adjustable plate mounted upon one of said base-plates, of two boxes secured to one of the base-plates and two other boxes secured to the adjustable plate, all of said boxes having their bores tapered from the inner faces thereof toward the outer faces, and two pen-lifter-supporting shafts having journals at their ends fitted to said bores and tapered in the opposite direction to them. 80

9. In a ruling-machine, the combination, with a stationary journal-box and a movable journal-box, said boxes being mounted on opposite sides of the machine, of a pen-lifter-supporting shaft extended across the machine and mounted in said boxes, the journals of said boxes being tapered in one direction and the bores of the boxes in the opposite direction. 85

In testimony whereof we affix our signatures in presence of two witnesses. 90

MARTIN L. METZGER.  
ALBERT COOPER.

Witnesses:

D. C. MAURER,  
JOHN FAGAN.