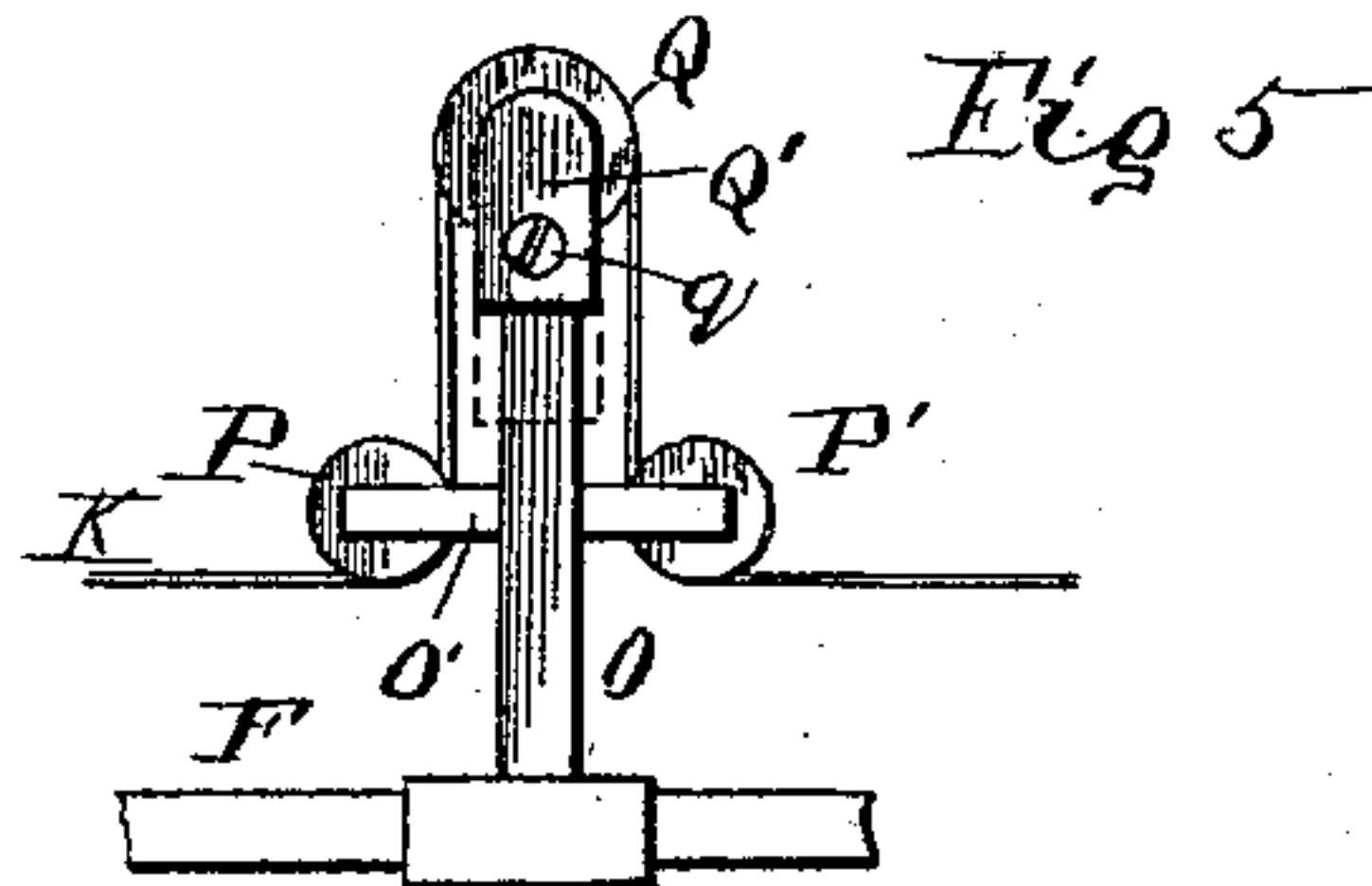
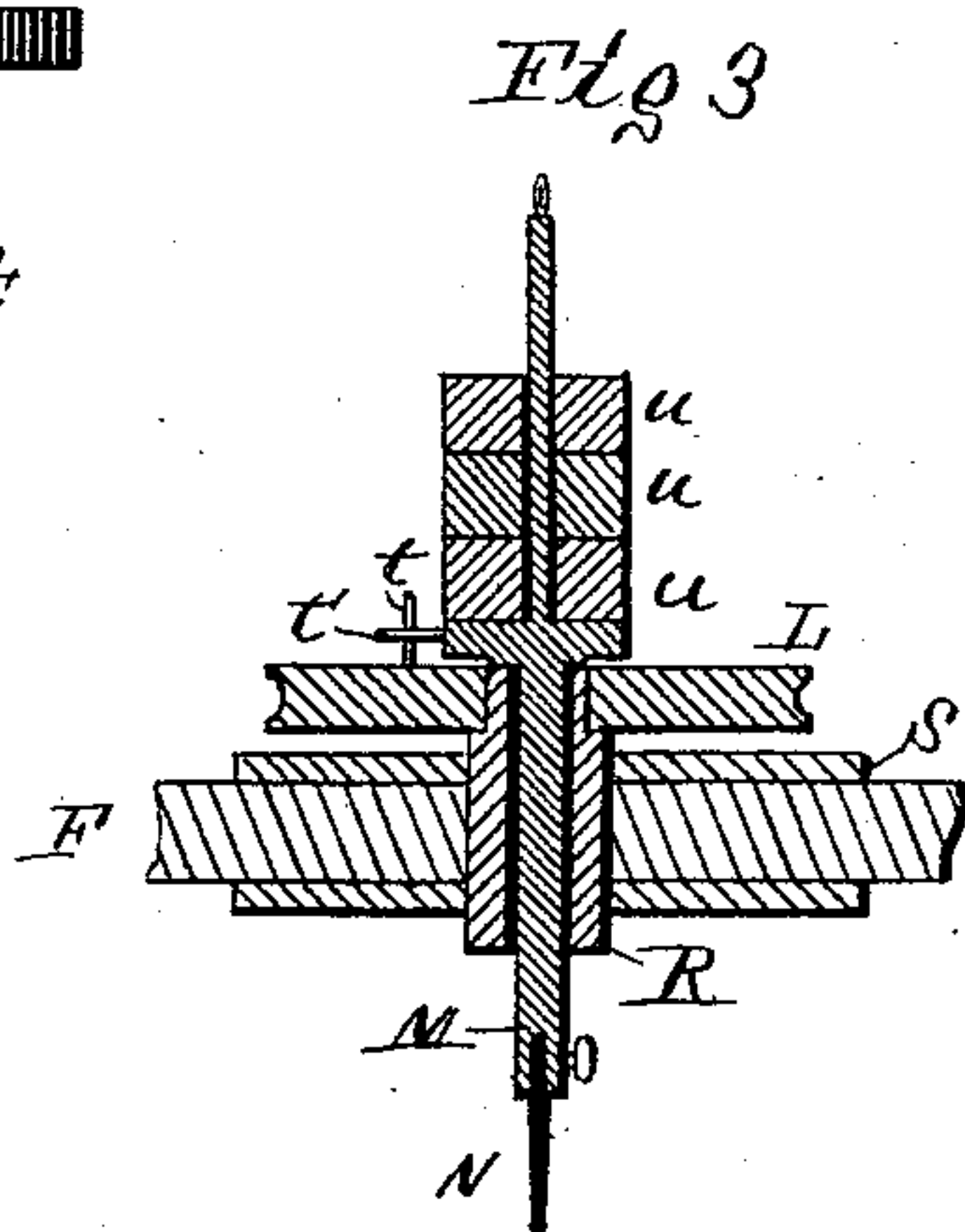
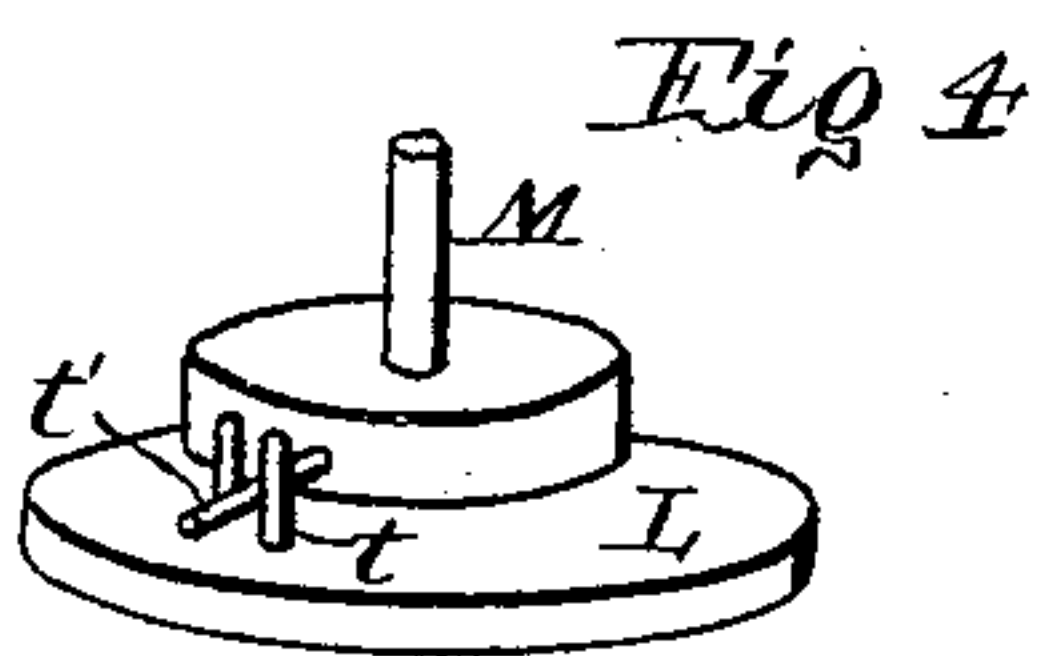
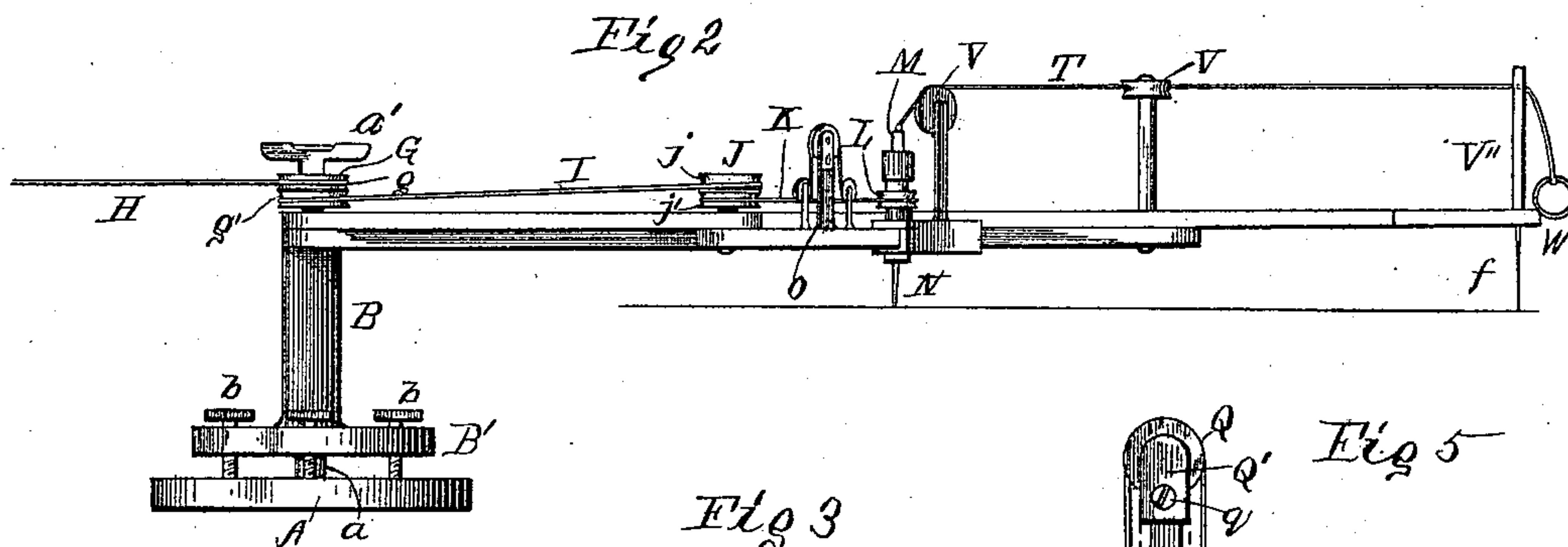
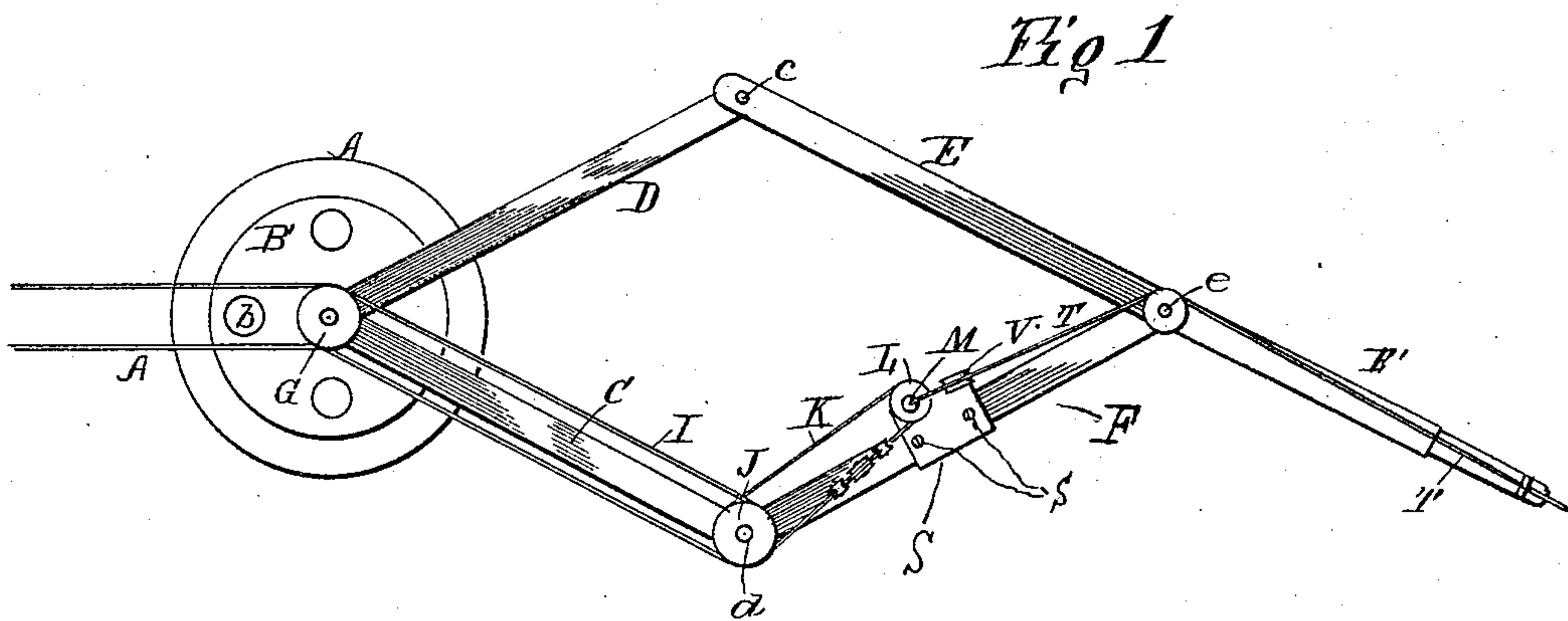


(No Model.)

G. R. ELLIOTT.  
PANTOGRAPH.

No. 455,185.

Patented June 30, 1891.



Witness  
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# UNITED STATES PATENT OFFICE.

GILBERT R. ELLIOTT, OF NEW YORK, N. Y.

## PANTOGRAPH.

SPECIFICATION forming part of Letters Patent No. 455,185, dated June 30, 1891.

Application filed August 28, 1890. Serial No. 363,294. (No model.)

*To all whom it may concern:*

Be it known that I, GILBERT R. ELLIOTT, of New York, in the county and State of New York, have invented certain new and useful Improvements in Pantographs; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to an instrument in the nature of a pantograph intended to engrave a copy of a drawing, picture, photograph, or other engraving upon any desired material upon any desired scale with relation to the original.

The object of my invention is to improve, simplify, and cheapen such instruments, and to render them more certain and easy of operation.

With this object in view my invention consists in the improved construction, arrangement, and combination of parts, hereinafter fully described, and afterward specifically pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a top plan view of an instrument embodying my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a detail showing the drill-stock and its connected parts in vertical section. Fig. 4 is a detail perspective view on an enlarged scale, showing the means for connecting the drill-stock with its pulleys. Fig. 5 is an enlarged detail view of the belt-tightener.

Like letters mark the same parts wherever they occur in the various figures of the drawings.

Referring to the drawings by letter, A is the base upon which the instrument rests, and it has projecting centrally upward from it a post *a*, upon the upper end of which is mounted a spirit-level *a'*. (See Fig. 2.)

Around the post *a* is a sleeve B, having at its lower end a horizontal flange B', in shape to correspond with that of the base A. This sleeve is mounted loosely on post *a*, and may be raised and lowered thereon by means of

set-screws *b*, passing through flange B' and bearing upon the top of the base A.

The pantograph consists of arms C D E F, connected by pivots at their points of junction at the four corners of the parallelogram, of which they form the sides. These pivots are, first, the post *a*; second, the pivot-pin *c*; third, the pin *d*, and, fourth, the pin *e*. The arms C and D, pivoted on the post *a*, rest on top of the sleeve B, and by means of the set-screws before mentioned may be raised or lowered at will to bring the pantograph into a true horizontal position. From an extension E' of the arm E the tracing-point *f* depends.

On the post *a* is a pulley G, having two grooves *g g'*, the groove *g* receiving the belt H from any suitable power (not shown) and the groove *g'* carrying a belt I, which engages in a groove *j* of a pulley J, mounted on the pin *d*, which forms the pivot of the arms C and F. Another groove *j'* of the pulley J carries a belt K, which engages a pulley L for driving the drill-stock M of the engraving drill or tool N, as hereinafter explained. This belt K passes through a belt-tightener, (see Fig. 5,) which consists of an upright O, mounted to slide on arm F, and provided with a cross-bar O', pulleys P P' being mounted at the ends of the cross-bar, and a pulley Q being mounted on a slide Q', adapted to be adjusted up and down on the upright O and to be secured at any desired height by a screw *q*. The drill-stock M (see Fig. 3) is mounted loosely in a sleeve R, carrying the pulley L, and mounted in a frame S, which is adapted to slide on arm F and to be fixed in any adjustment by set-screws *s*. Pins *t t'*, (see Fig. 4,) projecting from pulley L and drill-stock M, cause the drill-stock to rotate with its pulley.

Weights *u u u* hold the drill in contact with the work, and the drill may be raised when desired by means of a cord T, secured to the top of it, passing over pulley V, around pulley V', and through upright V<sup>2</sup>, terminating in a ring *w* in easy reach of the operator.

The pantograph operates as is well known, the tracing of the pattern by the tracing-point causing the drill to pass over corresponding lines on the object to be engraved.

To adjust the scale of copy, the drill and its



slide are moved on the arm F and the drill-driving belt tightened by the belt-tightener, so that the drill will always be properly rotated.

5 Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a pantograph, the arms pivoted together to form a parallelogram, one arm having the tracer on its extended end, in combination with a driving-shaft on which the pantograph is mounted at one of its points to freely swing around and independent of said shaft, a drill or engraving-tool carried by an arm of the pantograph, and connections from  
15 said shaft to the tool to rotate the same.

2. In a pantograph, the combination of the usual arms pivoted together to form the parallelogram, one arm having the tracer, a driving-shaft from which said arms swing the cutting or engraving tool carried by a slide adjustable on one of said arms, and driving connections from said shaft to said tool.  
20

3. In combination with the pantograph carrying the tracing-point, the adjustable base or support carrying pulley G, the belt I, the pulley J on pivot-pin *d*, the adjustable belt K, and the drill-stock and its pulley mounted in slide S, as set forth.  
25

4. In combination, the base A, having post *a* and spirit-level *a'*, the flanged sleeve B on said post *a*, the adjusting-screws *b*, and the pantograph mounted on post *a*, which forms one of its corner-pivots and resting on top of sleeve B, as set forth.  
30

5. In combination, in a pantograph, the pul-

leys G and J, mounted on two adjacent corner-pivots, the belt connecting them, the drill-stock mounted to slide on arm F and carrying pulley L, the belt-connecting pulleys J and L, and the belt-tightener, as set forth.  
40

6. In combination, the arm F, slide S, sleeve R, mounted in slide S and carrying pulley L, the drill-stock, and the pins *t* and *t'*, connecting the pulley and drill-stock, as set forth.  
45

7. In combination, the arm F, slide S thereon, sleeve R, mounted in slide S and carrying pulley L, the drill-stock mounted in sleeve R, clutch-pins *t t'*, weights *u*, and cord T, as and for the purpose set forth.  
50

8. In combination with pulley J, pulley L, mounted to slide toward or from pulley J, arm F, on which it slides, the belt K, connecting these pulleys, and the belt-tightener consisting of upright O, cross-bar O', pulleys P P' on said cross-bar, slide Q' on upright O, and pulley Q, mounted in said slide, as set forth.  
55

9. In a pantograph consisting of pivoted arms C D E F and extension E', a tracer at end of extension E', a drill or engraving-tool mounted to slide on arm F and movable up and down, and a cord for raising the drill-stock extending within easy reach of the operator, as set forth.  
60

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.  
65

GILBERT R. ELLIOTT.

Witnesses:

O. E. DUFFY,

EDWIN FROTHINGHAM,