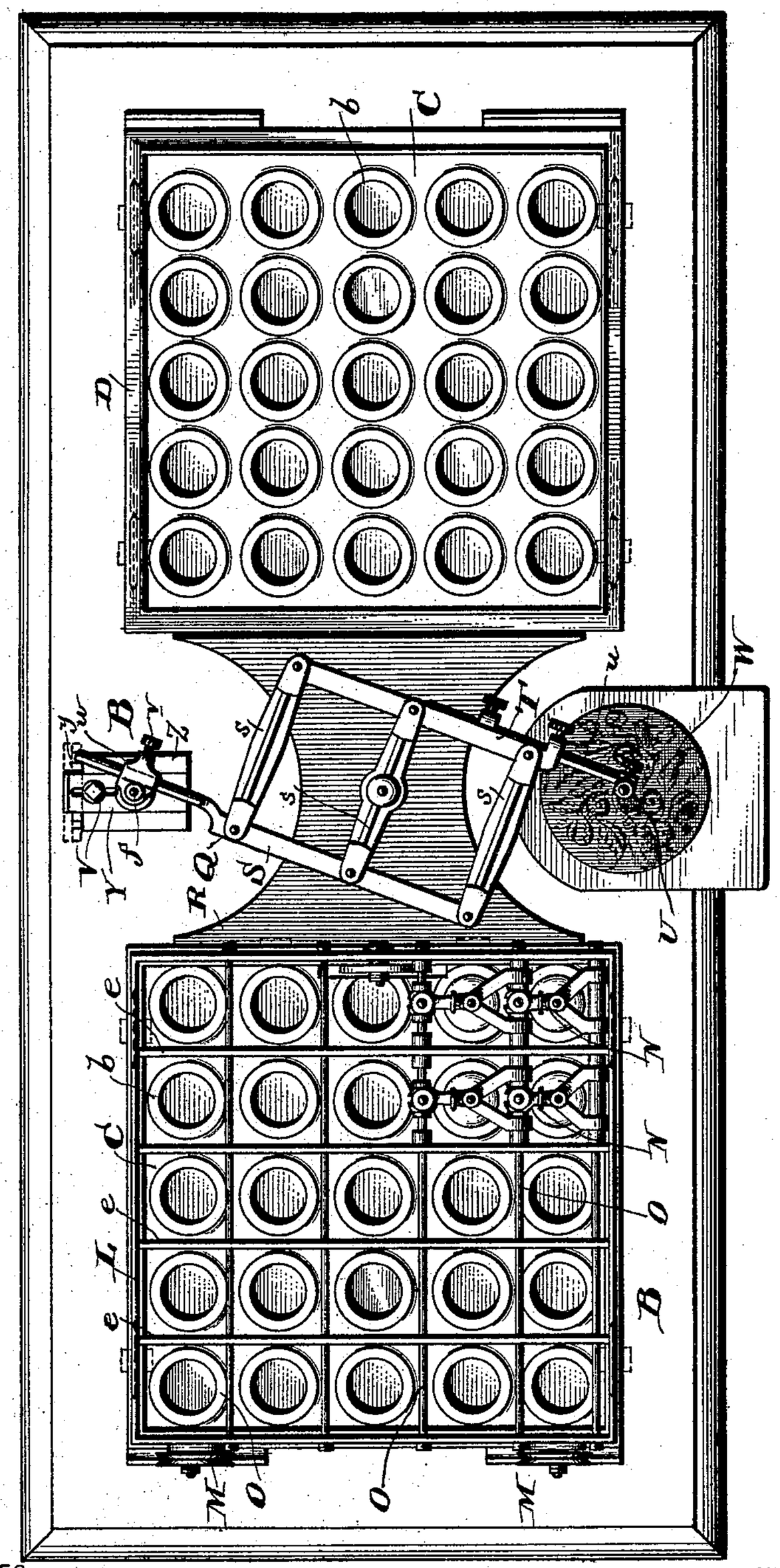
(No Model.) 3 Sheets—Sheet 1.

A. ZWAHLEN.

PANTOGRAPH FOR ENGRAVING AND ORNAMENTING WATCHCASES.

No. 513,962. Patented Jan. 30, 1894.



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3 Sheets—Sheet 2.

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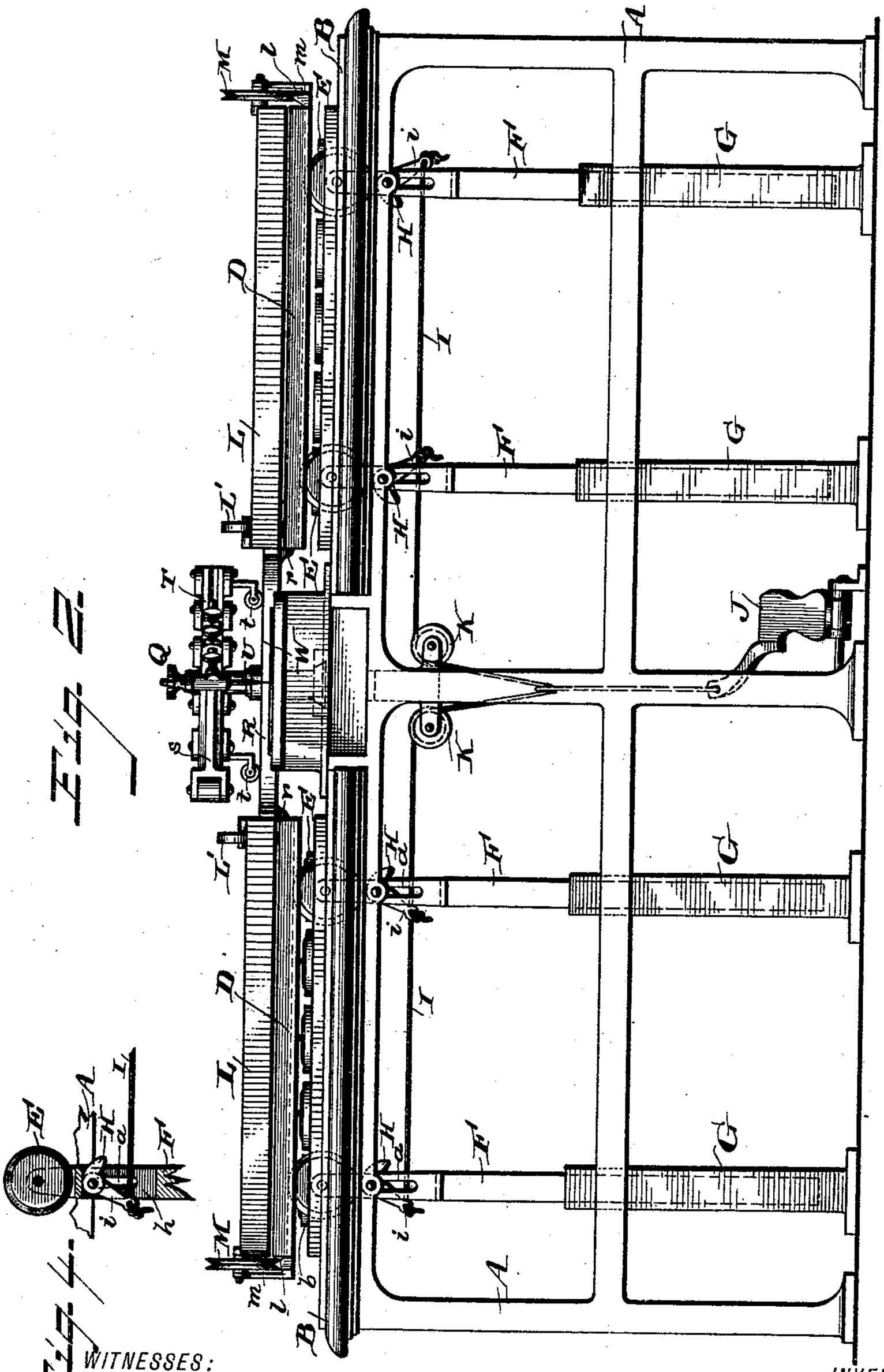

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 3.

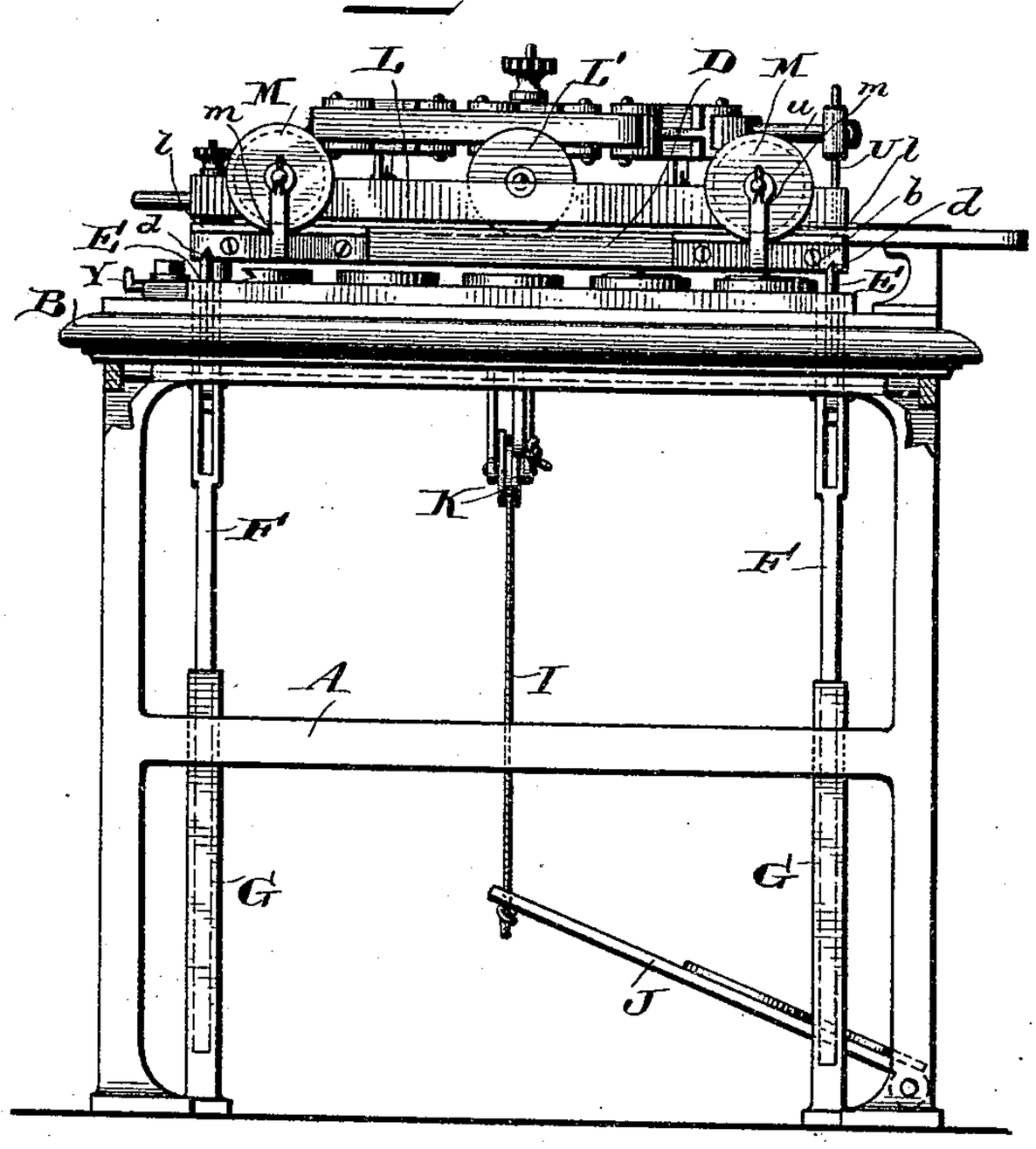


Fig. 5.

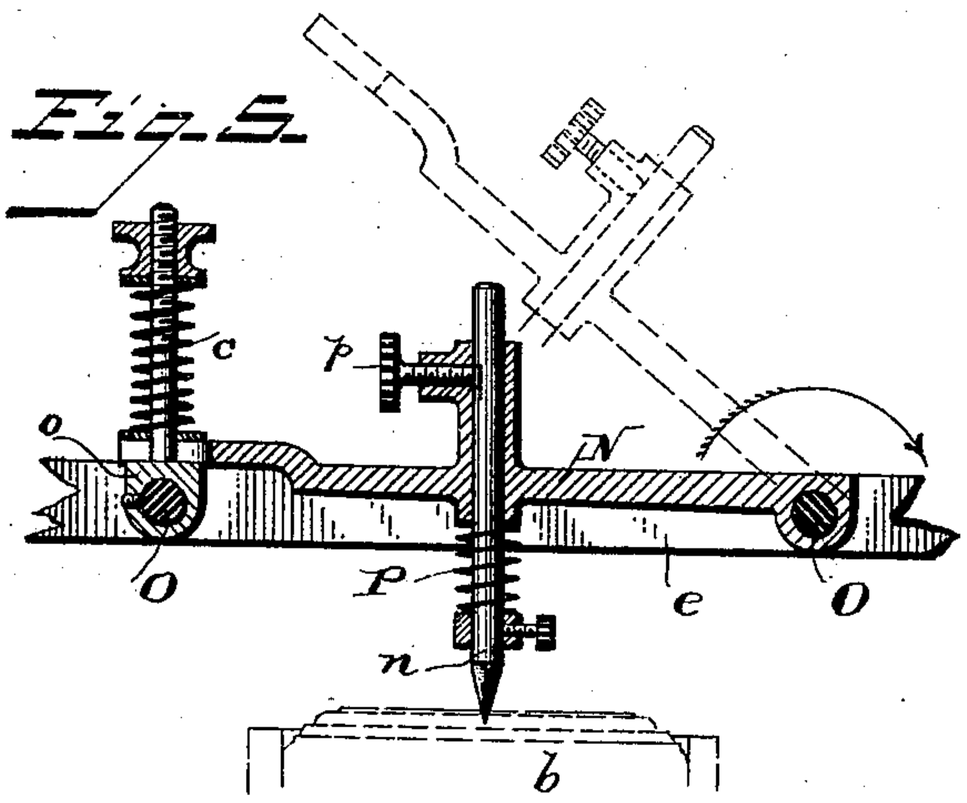
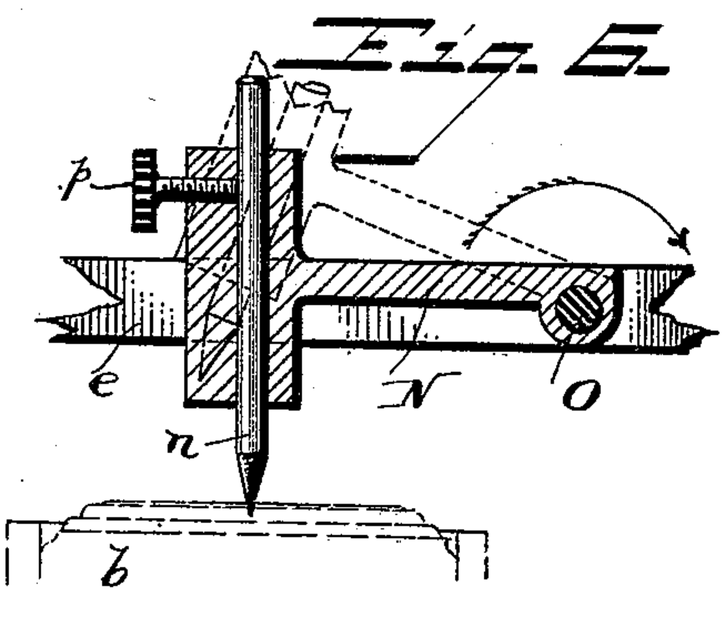


Fig. 6.



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UNITED STATES PATENT OFFICE.

AMI ZWAHLEN, OF PHILADELPHIA, PENNSYLVANIA.

PANTOGRAPH FOR ENGRAVING AND ORNAMENTING WATCHCASES.

SPECIFICATION forming part of Letters Patent No. 513,962, dated January 30, 1894.

Application filed May 15, 1891. Serial No. 392,810. (No model.)

To all whom it may concern:

Be it known that I, AMI ZWAHLEN, of the city and county of Philadelphia and State of Pennsylvania, have invented an Improvement in Pantographs for Engraving and Ornamenting Watchcases, of which the following is a specification.

My invention relates to pantographs for engraving and ornamenting watch cases and other objects, and consists of certain improvements which are fully set forth in the following specification and are shown in the accompanying drawings which form a part thereof.

The object of my invention is to accomplish the rapid engraving or ornamentation of a large number of watch case covers, bezels or other objects by means of a pantograph or reproducing apparatus, whereby upon the passage of one needle over the outlines of ornamentation or engraving upon a die the same outlines of ornamentation will be automatically produced upon a number of objects by the action of engraving or outline needles which move in a manner corresponding with the movement of the tracing or guiding needle.

Ordinarily the outlines of engraving are transferred from one watch case to another by means of patterns which are placed upon the cover and traced by hand with an engraving tool. This is a slow and expensive process, and it is the object of my invention to accomplish this outlining by means of a pantograph, by means of which a large number of watch case covers or other objects may be simultaneously provided with the outline tracing. This outline tracing is subsequently finished by the engraver.

In carrying out my invention I employ a pantograph of familiar construction having a needle which is adapted to be guided over the face of a die provided with the outline of ornamentation which is to be reproduced, and connected with needle carrying and operating frames, which are moved by the pantograph in a manner corresponding with every movement of the guided needle. These moving frames cause the needles which they carry and operate to reproduce upon the surface of a series of objects arranged under them, the outline of tracing upon the outline die. I employ two frames, one free to be reciprocated in one direction, and the other free to be reciprocated upon that frame in a direction at right angles to its movement. The tracing or engraving needles are carried by one of these movable frames and the combined movements of the two through the action of the pantograph frame will impart movement to the needles in any direction that may be desired.

My invention relates to various novelties of construction and combination of parts which are hereinafter more fully set forth and claimed.

In the drawings: Figure 1 is a plan view of my improved pantograph engraving machine for ornamenting watch cases, &c. Fig. 2 is a front elevation of the same. Fig. 3 is an end or side elevation of the same. Fig. 4 is a detail view of one of the guiding rollers for the movable needle operating frames with its support and the cam for raising and lowering it. Fig. 5 is a sectional side elevation on an enlarged scale of one of the needle holders, with the engraving needle carried by it; and Fig. 6 is a similar view illustrating a modification of the needle carrier or support.

A is the main frame of the machine which may be of any convenient construction.

B is the support or table of the main frame A.

Located upon the support or table B are a series of chucks or supports *b* which are shaped to receive the watch case covers, bezels or other objects which are to be engraved or ornamented. These chucks or supports *b* may be formed directly upon the surface of the table B, or they may be made in trays or removable frames C adapted to be carried by the table. The latter construction permits the removal at one time of an entire tray or frame containing a number of the objects to be treated.

In the particular machine shown in the drawings, I have shown two trays C with two sets of chucks *b* arranged upon opposite sides of the machine with movable needle carrying and operating frames, needles, &c., for each set of chucks. It will be understood, however, that one or any number of trays or sets of chucks may be employed and that they may be arranged in any convenient manner. In describing the particular construction of the parts, however, I shall confine myself to

a single needle carrying and operating frame, &c., as the two frames and their mechanisms shown in the drawings are identical.

Arranged above the table B and chucks *b* is a movable frame D supported upon rollers E which work in guides *d* of the frame. These rollers E are carried by movable supports F working in suitable guides G. By means of cams H located in recesses *h* in the supports F and pivoted to the main frame A through lateral slots *a* in the supports E, the said supports may be raised and lowered. The cam H acts upon the support F within the recess *h* and tends to lift it, the slots *a* permitting the movement. (See Fig. 4.) The cams H are operated together in any convenient manner, as by means of cords I connected with arms *i* of the cams H and with a foot treadle or lever J.

K are guides for guiding the cords I to the treadle or lever J.

When two or more frames and sets of engraving needles are employed as shown in the drawings, the several cords I are all connected with the same lever or treadle J, so that any operation of the treadle or lever will lift or lower together all of the supports F with their rollers E, correspondingly raising or lowering the frames D which they support. Arranged above the frame D is a frame L movable thereon in the opposite direction to the movement of the frame D.

M are antifriction rollers carried by the frame L and movable upon guides *l* of the frame D.

L′ is a second antifriction roller upon the side of the frame L opposite to the rollers M. The frame L is supported above the frame D by these rollers M, L′.

Q is a pantograph frame of any convenient and well known construction for operating the frames L and D.

Carried by the frame L are a series of needle holders or clamps N carrying the needles *n* and corresponding in number with the chucks *b* or objects which are to be treated. The needles *n* may be carried by the frame L in many ways. They may be fixed in the frame L, but I prefer to arrange them in hinged holders or carriers N.

In the particular construction shown in Figs. 1 and 5 of the drawings, O are a series of transverse rods carried by the frame L. The holders or carriers N are pivoted or hinged at one end to these rods O and their outer or free ends are adapted to rest upon supports or collars *o* upon the adjacent rod O. The needles *n* are carried by the holders or carriers N and may be adjusted therein by the adjusting screw *p*. (See Fig. 5.) The needle *n* is forced downward with a slight pressure by a spring P.

The free end of the holder N may be adjustably supported upon the collar *o* by means of an adjustable spring *c*. By pivoting the holder to the rod O in the manner shown it may be raised as indicated by the arrow and dotted lines in Figs. 5 and 6 whenever desired, to expose the surface of the watch case cover or other object under treatment and to permit an examination or adjustment of the needle *n*.

In the construction shown in Fig. 6, the needle *n* is carried by the free end of the carrier N which is weighted and the action of gravity alone is relied upon to press the needle upon the surface of the object under treatment.

The frame L may be strengthened by transverse brace pieces *e*, which also act as supports for the rods O.

R is a frame connected with the movable frames L, and having a projection *r* adapted to act upon the movable frame D. In the construction shown in the drawings this frame R connects the two frames L, L, and has a projection *r* to act upon each of the frames D, D, so that the respective frames L and D will move together.

The pantograph frame Q is pivoted to the frame R and may be of any convenient construction. In the drawings I have shown it formed of the side bar S pivoted to the table B at *f*, the side bar T carrying the needle U, and the links *s*, *s*, *s*, with the middle link pivoted to the frame R.

W is the die having upon it the outline or figure of ornamentation which is to be imparted to the surface of the objects under treatment.

The needle U is preferably carried in a rod *u* adjustable in the bar T and the needle may be vertically adjusted in this rod *u*.

The bar S is carried by a collar *w* pivoted at *f* to an adjustable plate Y. This plate Y may slide in suitable guides Z upon the frame B for purposes of adjustment. The bar S may be adjusted in the collar *w* by means of an adjusting screw *v*.

If desired the guide frame Z which carries the slide plate Y may be hinged to the frame B as indicated at *y* in dotted lines in Fig. 1. By this means the pantograph frame and the needle carrying frames with their needles may be swung upon the hinge away from the chucks *b*.

It will be seen that any movement of the needle U and its bar T will produce a corresponding movement in the plate R and thence in the frames L and D and in the needles *n* carried thereby which will produce upon the surface of the objects in the chucks *b* a tracing or engraving corresponding to that of the die W, each needle *n* moving over the surface of the object in the chuck in a manner corresponding to the movement of the needle U over the face of the die W and reproducing upon each of the objects the same figures of ornamentation.

The longitudinal movement of the frame R moves the frame L and D together, the projection *r* acting upon the frame D and pushing it longitudinally over the rollers E, and the transverse movement moves the frame L

upon the frame D. The backward longitudinal movement of the frame D is accomplished by the engagement of the wheels M with the guide *l*, but arms *m* projecting from the frame L and adapted to act upon the frame D may be employed for this purpose if desired. (See Fig. 2.) When the frame L is moved backward these arms *m* press upon the frame D and move it also.

By operating the lever or treadle J the frames D and L are raised in the manner heretofore described, lifting the needles *n* from the surface of the objects in the dies *b* and permitting them to be removed. Antifriction rollers *t* carried by the pantograph frame Q may be employed to support the pantograph frame and permit it to move freely above the frame R. (See Fig. 2.)

While I prefer the minor details of construction which are here shown, I do not limit my invention to them as they may be varied in many ways without departing from the principles of it.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a pantograph for ornamenting watch case covers and other objects the combination of a supporting chuck, a pantograph frame carrying a needle or pointer adapted to be guided over the figure upon the chuck, a movable frame operated by said pantograph frame, and a series of tracing or engraving needles carried by said movable frame.

2. In a pantograph for ornamenting watch case covers and other objects the combination with a pantograph frame carrying a needle or pointer, a frame free to be reciprocated in one direction, a second frame free to be reciprocated upon said frame in a direction at right angles to the movement of the first frame, said movable frame being connected with the pantograph frame and operated thereby, and one or more tracing or engraving needles carried by one of said frames.

3. In a pantograph for ornamenting watch case covers and other objects the combination with a pantograph frame carrying a needle or pointer, of the reciprocating frames D and L operated by said pantograph frame, and a series of needles carried by one of said reciprocating frames.

4. The combination with a pantograph frame carrying a needle or pointer, of a movable frame connected therewith and adapted to be reciprocated thereby, a series of tracing or engraving needles carried by said reciprocating frame, and a second movable frame carrying the first movable frame and arranged to be actuated by the pantograph in a direction at right angles to the movement of the first movable frame.

5. The combination of a reciprocating frame, guides therefor, a second reciprocating frame guided upon the first frame in a direction at right angles to its movement, a series of tracing or engraving needles carried by one of said frames, and a pantograph frame carrying a needle or pointer and arranged to actuate said reciprocating frames.

6. The combination of the reciprocating frame D, having guides *l* arranged at right angles to its line of movement, a frame L carried by said frame D and adapted to be reciprocated on the guides *l* of said frame, a series of tracing or engraving needles carried by one of said reciprocating frames, a pantograph positively connected with one of said frames and having a projection adapted to act upon the other.

7. The combination of a pantograph frame carrying a needle or pointer, a series of chucks to support objects to be ornamented, a movable frame connected with said pantograph frame and actuated thereby, a series of needles carried by said movable frame, and vertically movable supports for said needle carrying frame whereby it may be lifted to raise the needles from the objects in the chucks.

8. The combination with a pantograph frame and its needle or pointer, of a movable frame actuated thereby and carrying a series of tracing or engraving needles, guide rollers E for said movable frame, supports F carrying said rollers and cams H to actuate said supports.

9. The combination with a pantograph frame and its needle or pointer, of a movable frame actuated thereby and carrying a series of tracing or engraving needles, guide rollers E for said movable frame, supports F carrying said rollers and cams H to actuate said supports, the lever or treadle J, and a connection between all of said cams and the lever or treadle.

10. The combination with a pantograph frame and its needle or pointer, of a series of movable frames carrying tracing or engraving needles, and a common frame connecting all of said movable frames with the pantograph.

11. The combination with a pantograph frame and its needle or pointer, of a movable frame carried thereby, a series of needle holders or carriers pivoted to said movable frame, and a series of needles carried thereby.

12. In a pantograph the pivoted carrier N carrying the tracing or engraving needle *n* and pivoted to the movable frame.

13. In a pantograph the carrier N, a movable frame to which said carrier is pivoted, and a spring pressed engraving or tracing needle *n* carried by said carrier N.

14. A pantograph frame having its rear end pivotally connected to a sliding support, in combination with means to adjust said sliding support, and a needle carrying frame operated by said pantograph frame.

15. A pantograph frame having its rear end pivotally connected with a hinged support, in combination with a needle carrying frame connected with said pantograph frame, whereby said pantograph frame and needle frame may be swung upon said hinge.

16. The combination with a needle carry-

ing frame, of the connecting frame R, the pantograph frame Q pivoted thereto and anti-friction rollers *t* between said pantograph frame and frame R.

17. The combination of a supporting frame for a series of objects, a movable frame mounted over said supporting frame, a second movable frame carried by the first frame and movable transversely thereon, a series of engraving tools carried by the second movable frame, and a pantograph directly connected with the second movable frame and indirectly connected with the first movable frame, whereby movements imparted to the pantograph are transmitted to the two movable frames and thence to the tools controlled by them.

In testimony of which invention I have hereunto set my hand.

AMI ZWAHLEN.

Witnesses:

EDWARD C. CHAPPATT,

THEO. CANFIELD, Jr.