

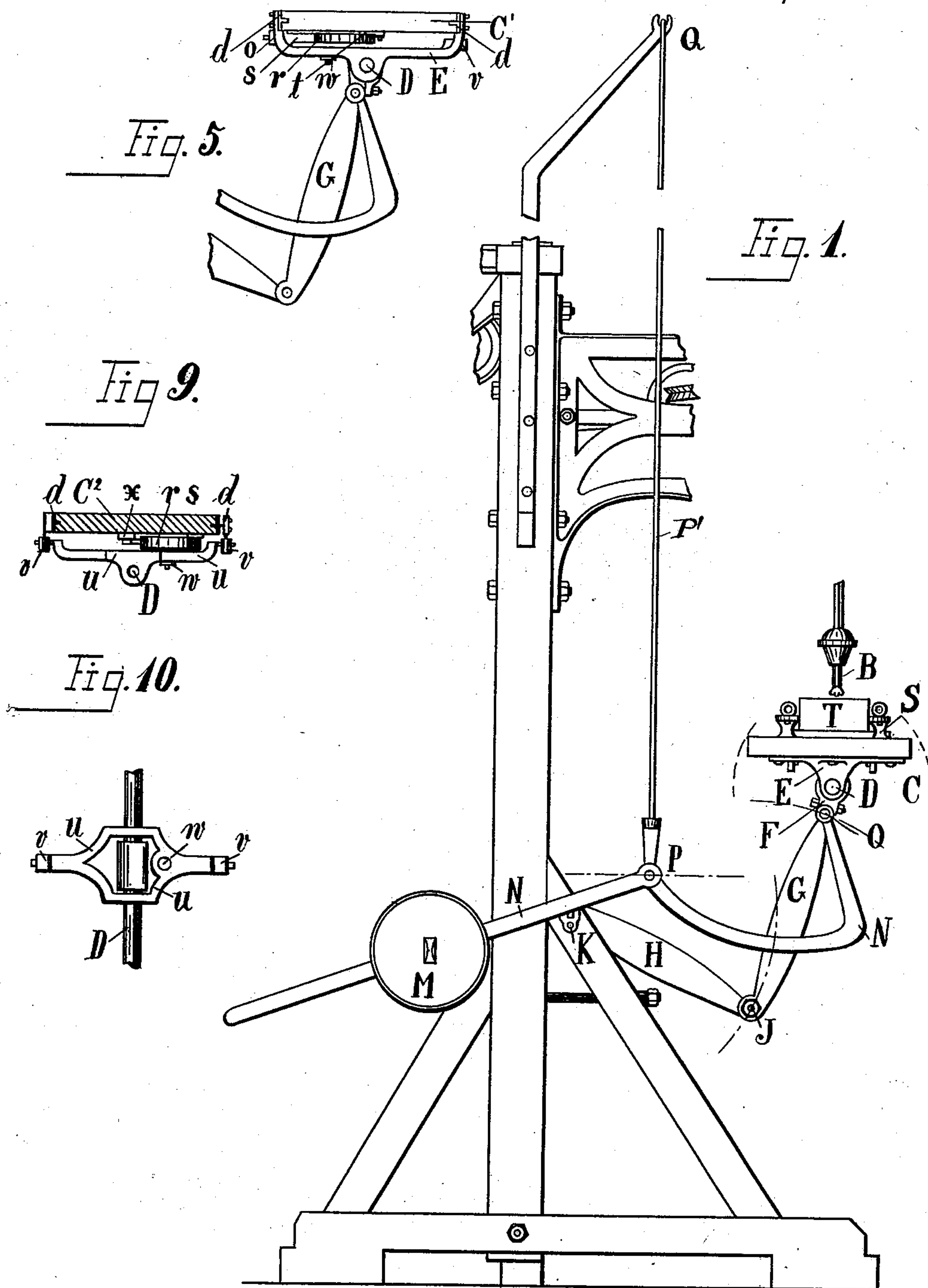
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4 Sheets—Sheet 1.

F. HIRSCH & C. THIEDE.  
ENGRAVING MACHINE.

No. 508,942.

Patented Nov. 21, 1893.



Witnesses.  
Walter E. Allen.  
Geo. E. Brown.

Inventors.  
Friedrich Hirsch  
Carl Thiede.  
by Knight Bros  
Attys

(No Model.)

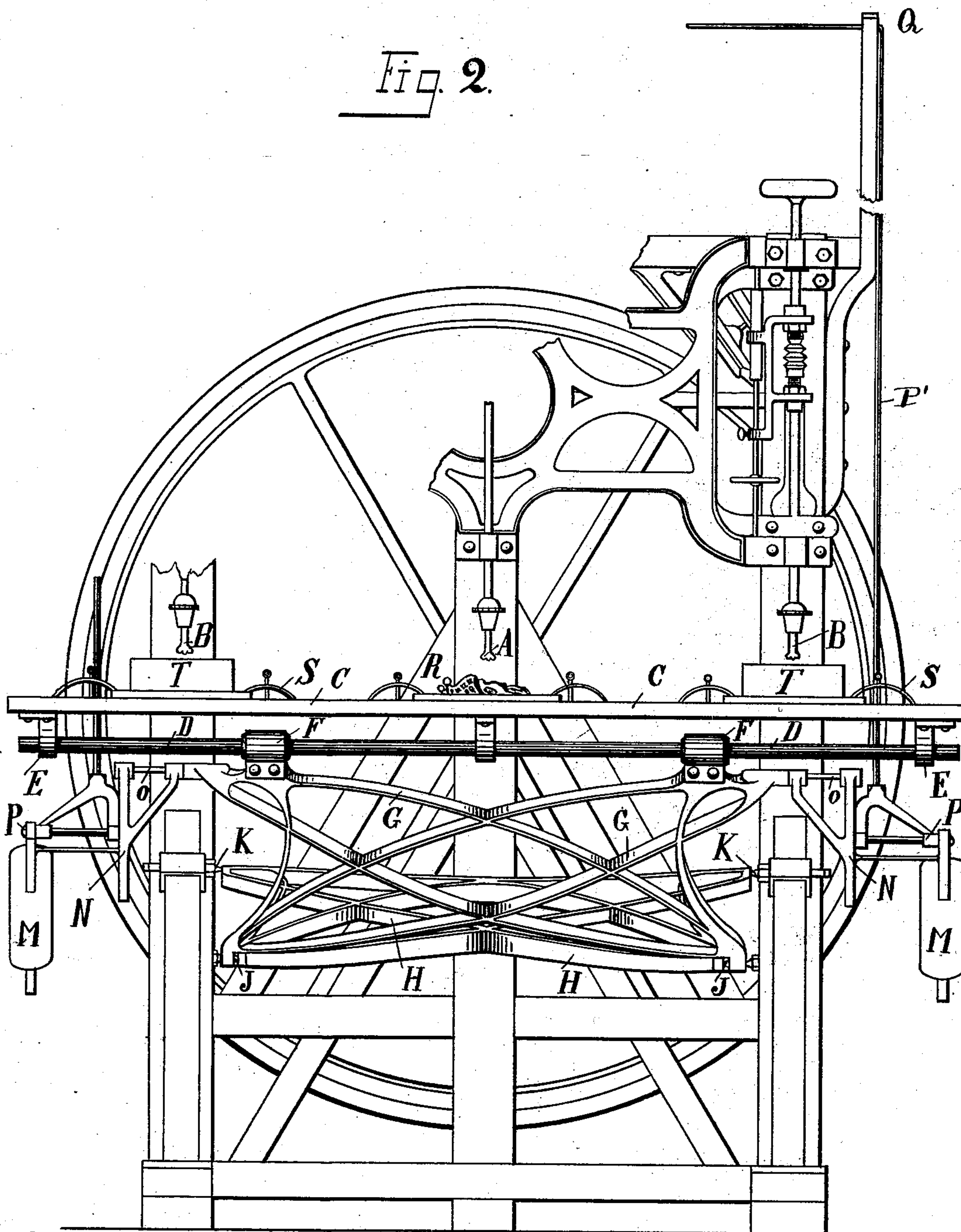
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Fig. 2.



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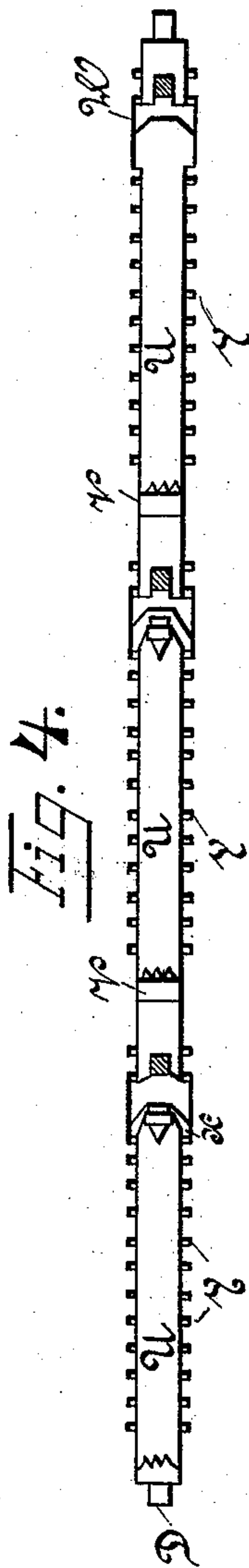
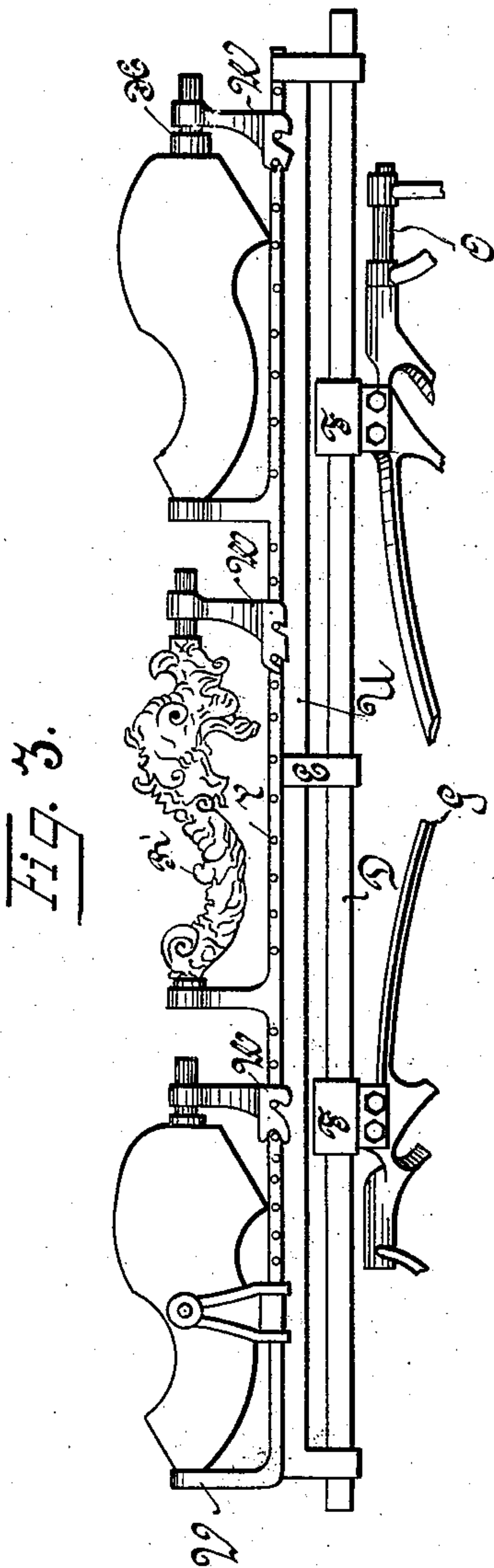
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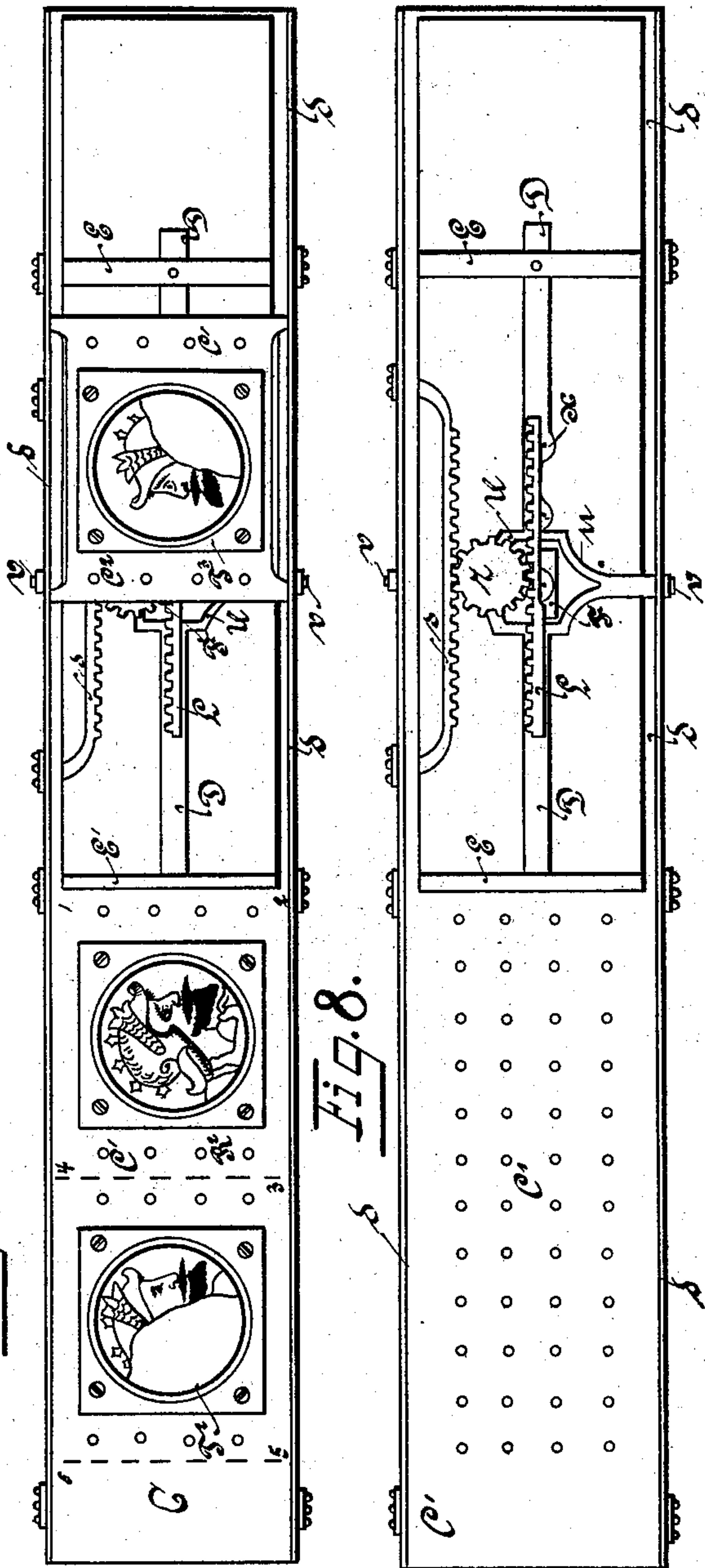
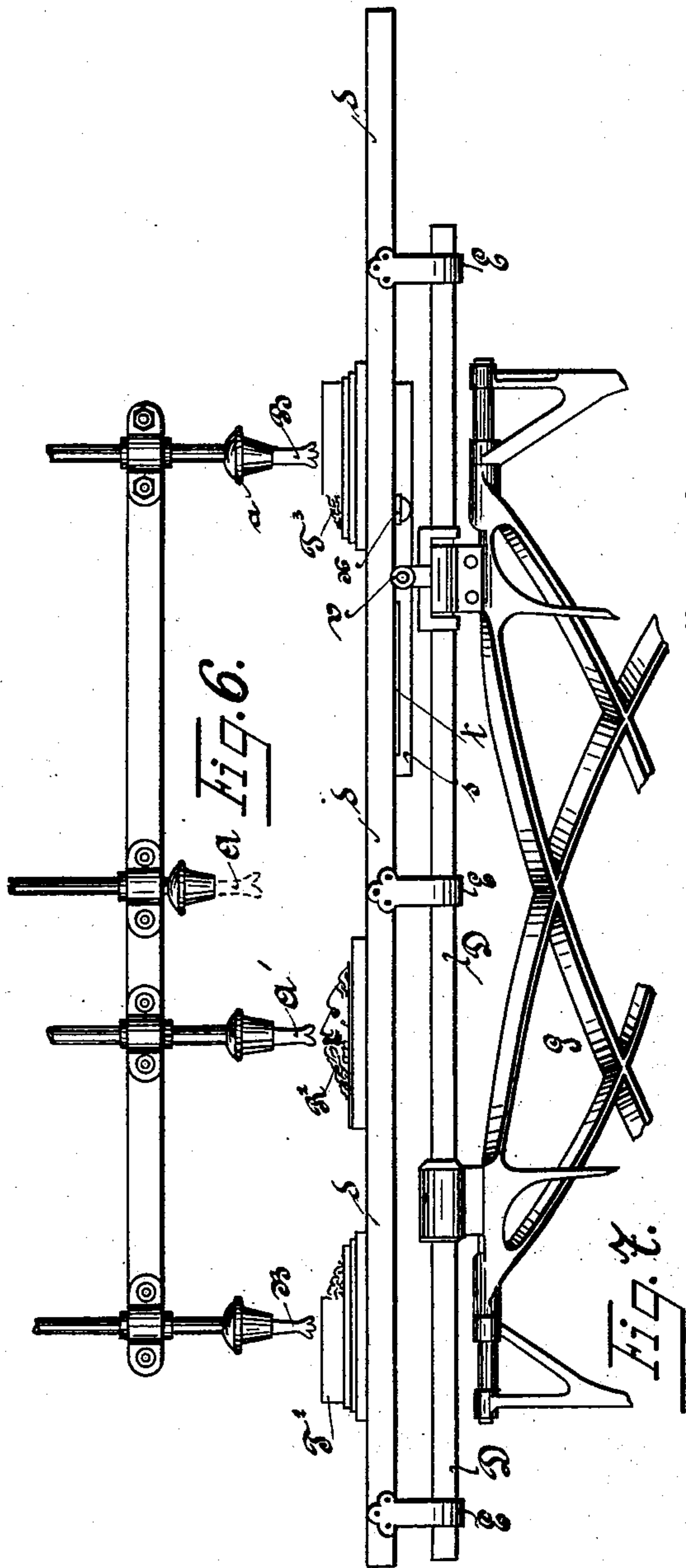
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# UNITED STATES PATENT OFFICE.

FRIEDRICH HIRSCH AND CARL THIEDE, OF BERLIN, GERMANY.

## ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 508,942, dated November 21, 1893.

Application filed August 6, 1892. Serial No. 442,382. (No model.)

*To all whom it may concern:*

Be it known that we, FRIEDRICH HIRSCH and CARL THIEDE, subjects of the King of Prussia, and residents of Berlin, in the Kingdom of Prussia and German Empire, have invented certain new and useful Improvements in Carving-Machines, of which the following specification, taken in connection with the accompanying drawings, which form a part thereof, is a full, clear, and exact description, such as will enable those skilled in the art to make and use the same.

Our invention, which relates to improvements on machines for reproducing articles, has for its object to simplify their structure and thereby render them more economical of manufacture and more efficient and durable in operation.

Our invention embodies essentially a suitable frame-work for supporting the operative parts, a movable work-supporting-frame supporting the pattern and work-blanks, and a tool-carrying-frame supported above the work-supporting-frame and carrying a guiding or shaping point and shaping tools which always assume a certain relation to each other.

Our improvements will first be described with particular reference to the accompanying drawings, and then the novel features pointed out in the annexed claims.

The drawings illustrate several embodiments of our ideas. However, the elements of machinery employed may be substantiated by many equivalents without deviating from the scope of the invention.

In said drawings:—Figure 1 is an end elevation of our improved machine. Fig. 2 is a front elevation thereof. Fig. 3 is an enlarged side elevation of the work-supporting-frame and the clamping mechanism for engaging the work-pattern and blanks. Fig. 4 is a top view of the same. Fig. 5 is an enlarged detail view of the operating mechanism for controlling the pattern and blank supporting-frame. Fig. 6 is an enlarged detail side elevation representing the operation of the guiding and shaping tools upon the pattern and blanks. Figs. 7 and 8 represent a special mode of application of the new machine. Figs. 9 and 10 are detail views.

With the guiding tool A, Fig. 2, any number of shaping-tools B (in the present case two are shown) may be rigidly connected in

such a way, that the guiding tool is not movable in its socket, while the shaping tools are arranged to revolve around their longitudinal axes. This motion can be imparted to them by any suitable transmitting gear from any convenient source of power, (crank for hand-power, or pulley for mechanical-power.) The guiding-tool as well as the shaping-tools can however, be adjusted lengthwise in their sockets, when this becomes necessary for any suitable reason. The work-supporting-plate C is connected with a rod D (Figs. 1 and 2) by means of brackets E, which rod may be placed in line with the center of the work-plate, in line with its rear-edge. In the latter case the plate would be in suitable equilibrium and would have to be balanced by corresponding weights. The rod D is passed through eyes F, so that the work-plates C are capable of a laterally sliding motion on the frame. The eyes F are fixed on a frame G (Figs. 2 and 6) which is pivotally connected to a second frame H at points J (Fig. 1). The frame H is hinged to the supporting frame at points K. The dotted lines in Fig. 1 indicate in what manner the above described parts can be oscillated and in what direction. Thus the work-plate C can be moved laterally and vertically, while at the same time it may be turned with the rod D which is loose in the eyes E.

The above device is balanced by weights M (Figs. 1 and 2) which can be adjusted on levers N. The ends of the levers N are hinged at O to the frame G and at their centers are pivotally hung on bolts P, supported from the lower ends of rods P' which are of the greatest possible length, and which are suspended in forks Q (Fig. 1).

The pattern R (Fig. 2) is clamped fast in the middle of the work-plate C, and also the work-blanks T are securely fastened upon said plate by clamps S at a distance from R, corresponding to the distance of the shaping tools from the guiding-tool or point. The shaping and guiding-tools are arranged in one line, which is parallel to the rod D. The position of pattern and work pieces should of course also be corresponding to this line. The fastening of the work-pieces and the pattern upon the plate C produces a certain increase in the weight of the frame, which has to be balanced by adjusting the weights M on the levers N.



The process of operation when making use of the device above described is substantially the same as follows: The pattern R is made to travel along the guiding tool in such a manner that every spot of the surface of the pattern has been in contact with the guiding tool. The work-blanks, being at the same time utilized to perform the same motions as the pattern, necessarily present to the shaping tools B, (which are revolving) corresponding parts. The tools B consequently cut away the corresponding parts of the material and have shaped the work-blank similar to the pattern, thus producing a copy, which is extremely correct and neat. In order to clamp a work piece more securely and so as to enable it to be acted upon on all sides, that it may be better shaped, as this is impossible on the smooth work-plate, the latter is substituted by a bar U (Fig. 3) which is fixed to the rod D in the same manner as the work plate C. This bar U is provided with the stationary dogs V each provided with the center bits or teeth and the distance between them is made to correspond with the distance between the shaping tools and the guiding tool. Corresponding adjustable dogs W are also provided each of which is formed with a suitable base fitting the bar U, and a vertical portion extending up from the base and having journaled in its upper end a set screw H. The bases of the adjustable dogs are formed with sockets in the side flanges as shown. Studs *y* are provided on the edges of the bar U for the sockets of the adjustable dogs to engage and allow the dogs to be adjusted to correspond to the length of the work-blank to be operated upon. The operation on the work-blanks is effected exactly in the same manner as if they were attached flat upon the plate.

The devices so far illustrated allow us to obtain by the new duplicating apparatus a true reproduction of the model. But we shall hereinafter describe a device by means of which a reversed copy of the pattern may be obtained.

The pattern R<sup>2</sup> (Figs. 6 and 7) would be exactly duplicated in T<sup>2</sup>. In T<sup>3</sup>, however, a reversed reproduction would be obtained being similar in all other respects. If the figure R<sup>2</sup> is the pattern of a face looking to the right, the copy obtained in T<sup>2</sup> would be the same, but the copy at T<sup>3</sup> would be a face looking to the left. Two work-plates C' and C<sup>2</sup> are provided in this case (Fig. 7). A loop *u* surrounds the eye F, sliding on the rod D in such a way, that it can freely swing on it. The device in Figs. 6 and 7 is fastened on the rod D by means of the brackets E' in the same manner as the work-plate C in Fig. 1. Two bars *d* (Fig. 8) are fixed to the bracket E' between which the work-plate C' is attached rigidly, while the work-plate C<sup>2</sup> may be shifted laterally. The rear bar *d* carries a rack S, and a similar rack L is fastened to the work-plate C<sup>2</sup> by means of straps *x*. Both racks gear into a pinion *r* pivoted on the

loop *u*. This latter ends in two arms, carrying rolls *v*, intended to run on the bars *d*. By these means the gearing together of racks and pinion is made certain. If the plate C' is moved laterally, the rack S is pushed forward in the same direction. By means of the pinion *r*, however, the rack L will be moved in the opposite direction. Thus the work-piece T<sup>3</sup> on plate C<sup>2</sup> will move in the opposite direction, while the pattern R<sup>2</sup> being fixed on plate C' within the surface 1, 2, 3, 4 is guided for instance from left to right, and the work-piece T<sup>2</sup> being on the same plate C' within the surface 3, 4, 5, 6 will perform the same motion from left to right. Besides the guiding tool A, being in the middle between B and B', a second guiding tool A' would be employed in this case placed outside the middle between the tools B and B'. The lateral displacement of both plates toward each other may of course be effected by any other similar mechanical elements, instead of the gears.

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

1. In a carving machine the combination of a main frame, a frame secured to said main frame and supporting the stationary guiding points and cutters carried thereby and a movable table carried by a suitable frame adjustably secured to said main frame, substantially as described.

2. In a carving machine, the combination of the supporting frame, the guiding and shaping tools carried by said frame, and the movable counter-balanced frame carrying the pattern and blanks, adapted to swing in all directions to keep the pattern and blanks in working relation with the tools; substantially as and for the purpose set forth.

3. In a carving machine, the combination of a main supporting frame, vertically movable guide and cutting points mounted on said frame, and a sectional pivoted frame traveling under said guide and cutting points to carry the pattern and work blanks; substantially as described.

4. In a carving machine, the combination of the supporting frame, the guiding and shaping tools supported on said frame, the sectional pattern and work-carrying-frame, one of said sections carrying the pattern and blank or blanks to be operated upon, and the other of said sections carrying a blank or blanks, and means of moving the sections in opposite directions, whereby a true and reversed copy of the pattern is obtained; substantially as and for the purpose set forth.

In witness whereof we have hereunto set our hands in presence of two witnesses.

FRIEDRICH HIRSCH.  
CARL THIEDE.

Witnesses:

PAUL FISCHER,  
PAUL BRINKMANN.