No. 833,892. PATENTED OCT. 23, 1906.

J. L. PERKINS.

ELLIPSOGRAPH.

APPLICATION FILED MAR. 1, 1905.

4 SHEETS—SHEET 1.

Fig. 1.

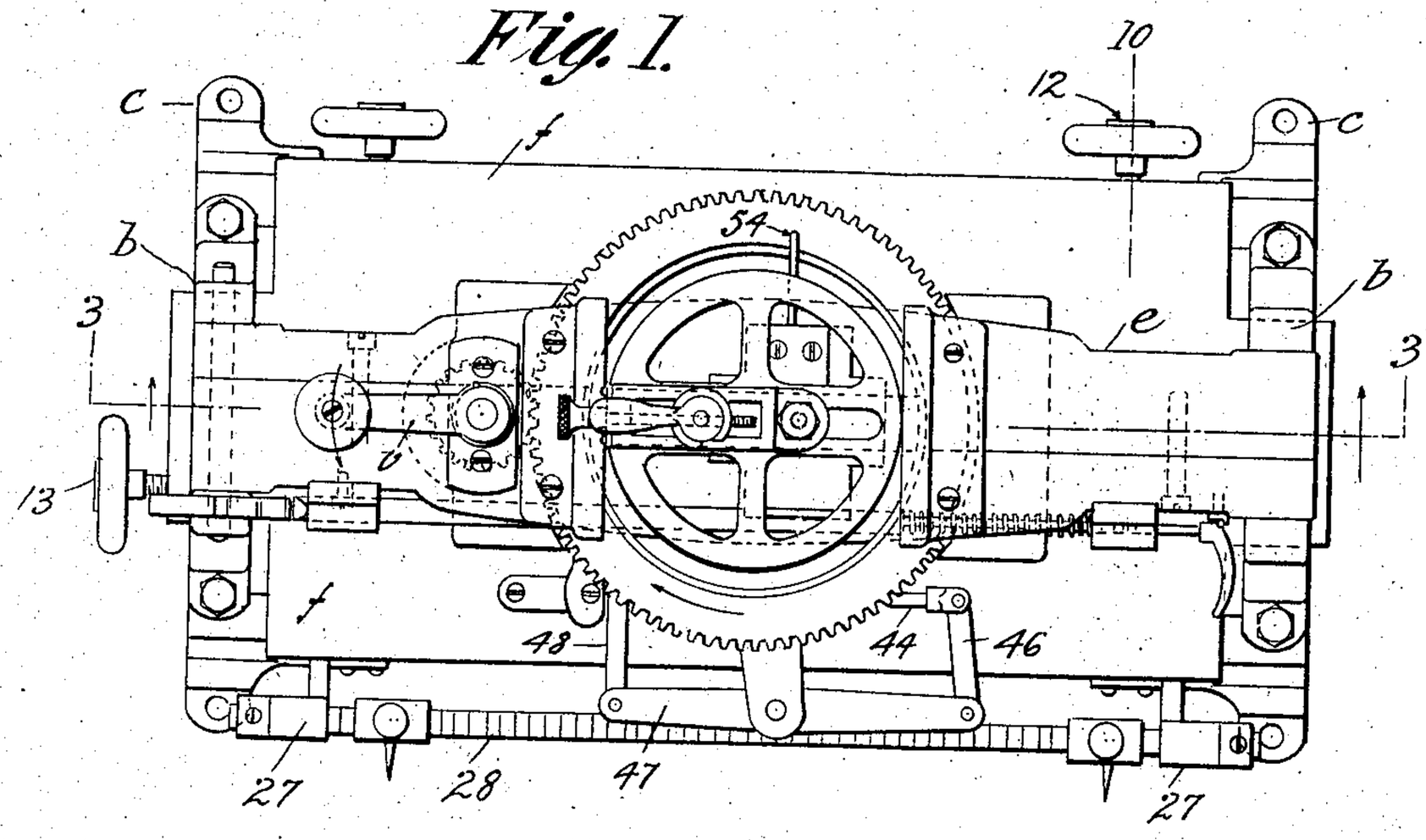
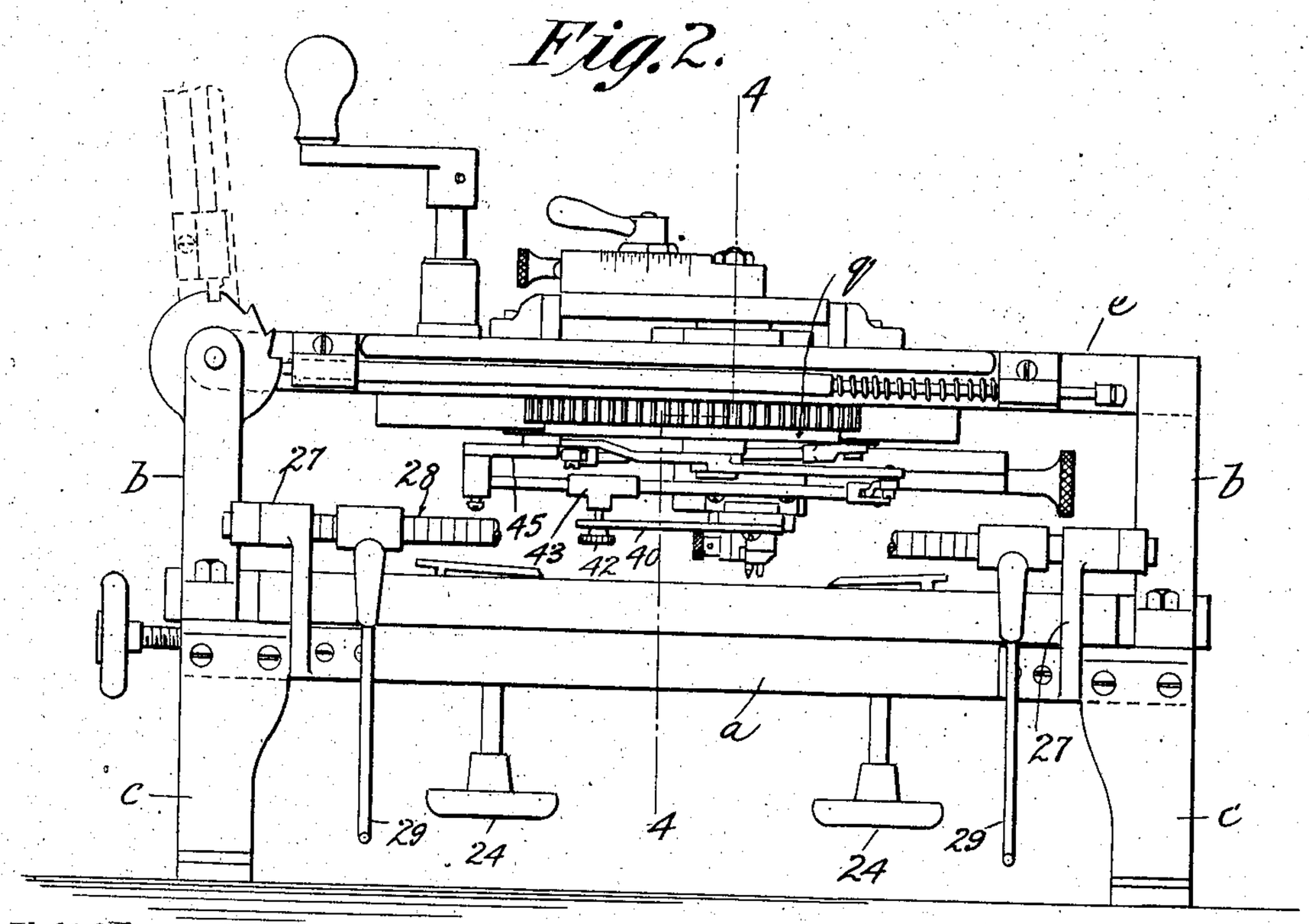


Fig. 2.



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4 SHEETS—SHEET 2.

Fig. 3.

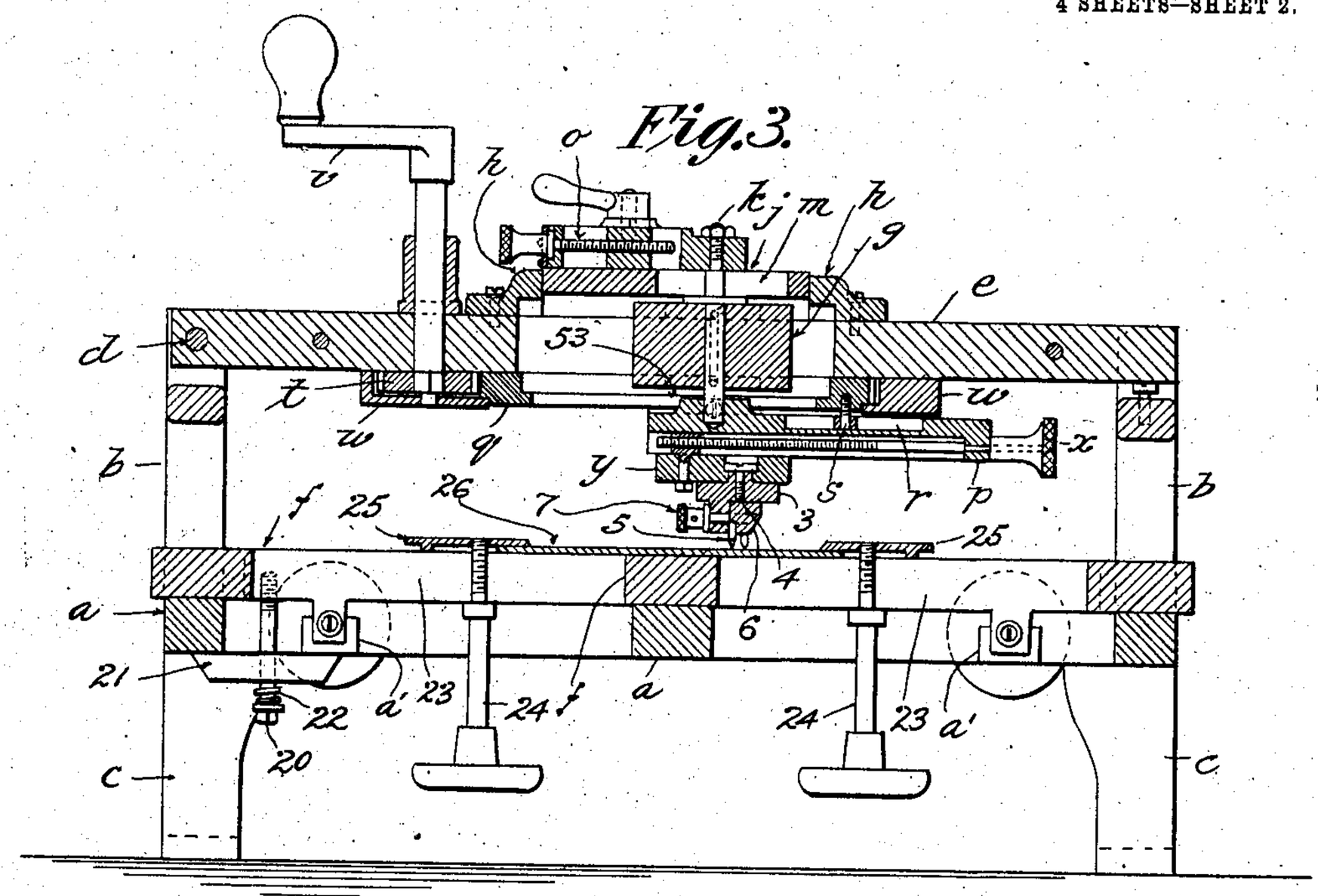
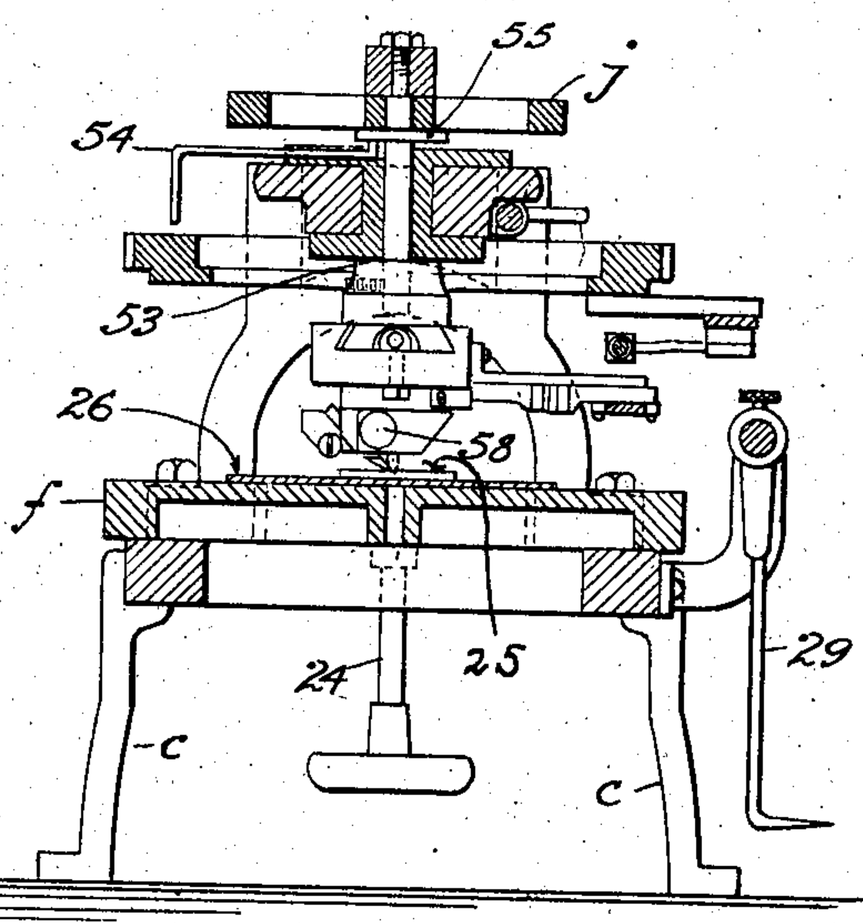


Fig. 4.



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4 SHEETS—SHEET 3.

Fig. 5.

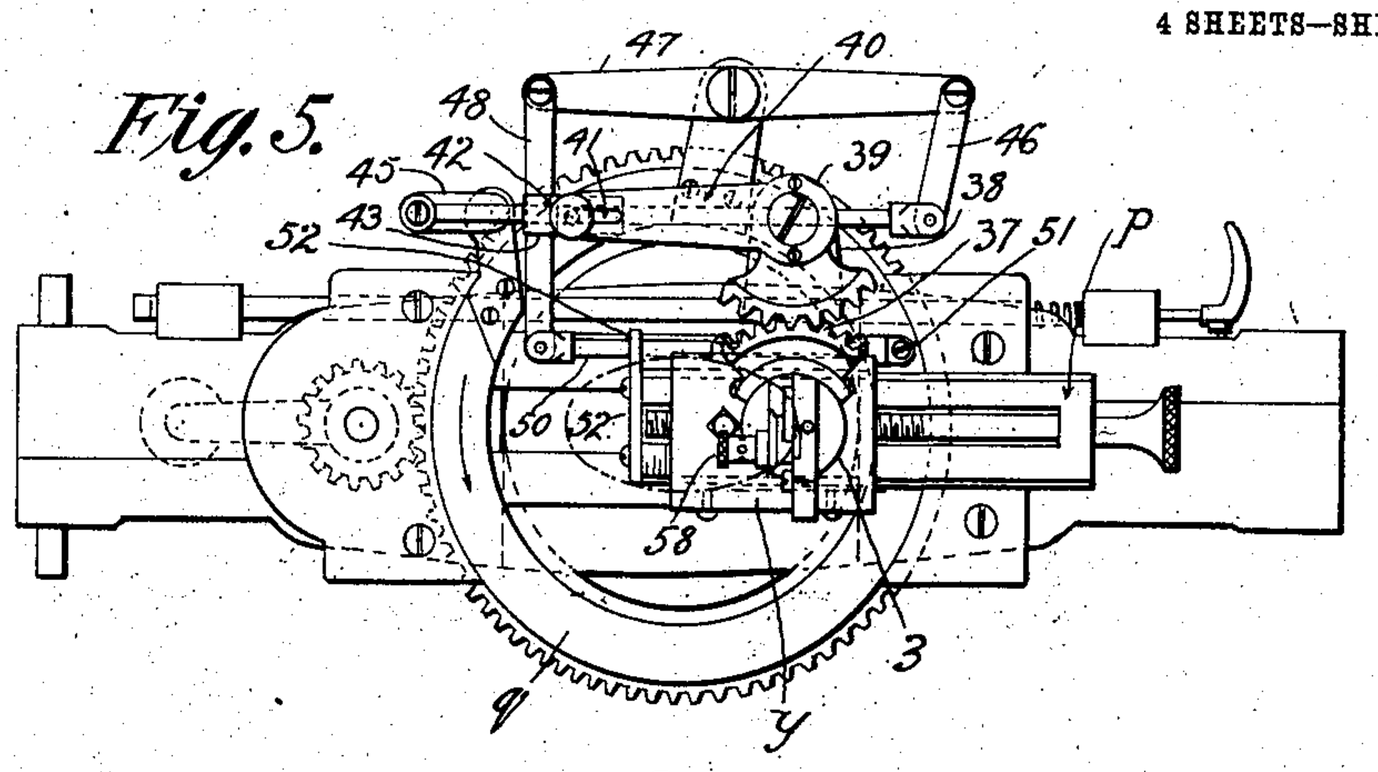


Fig. 6.

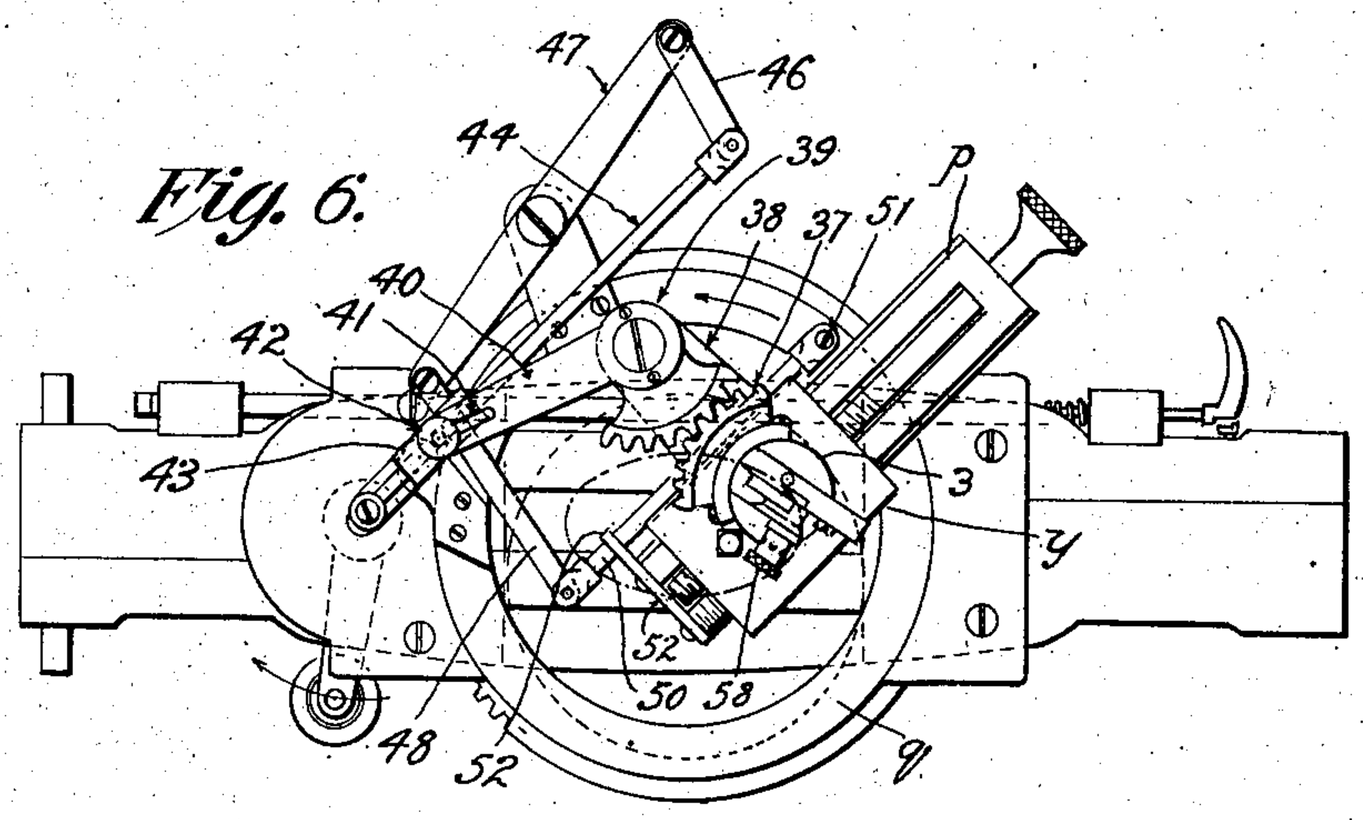
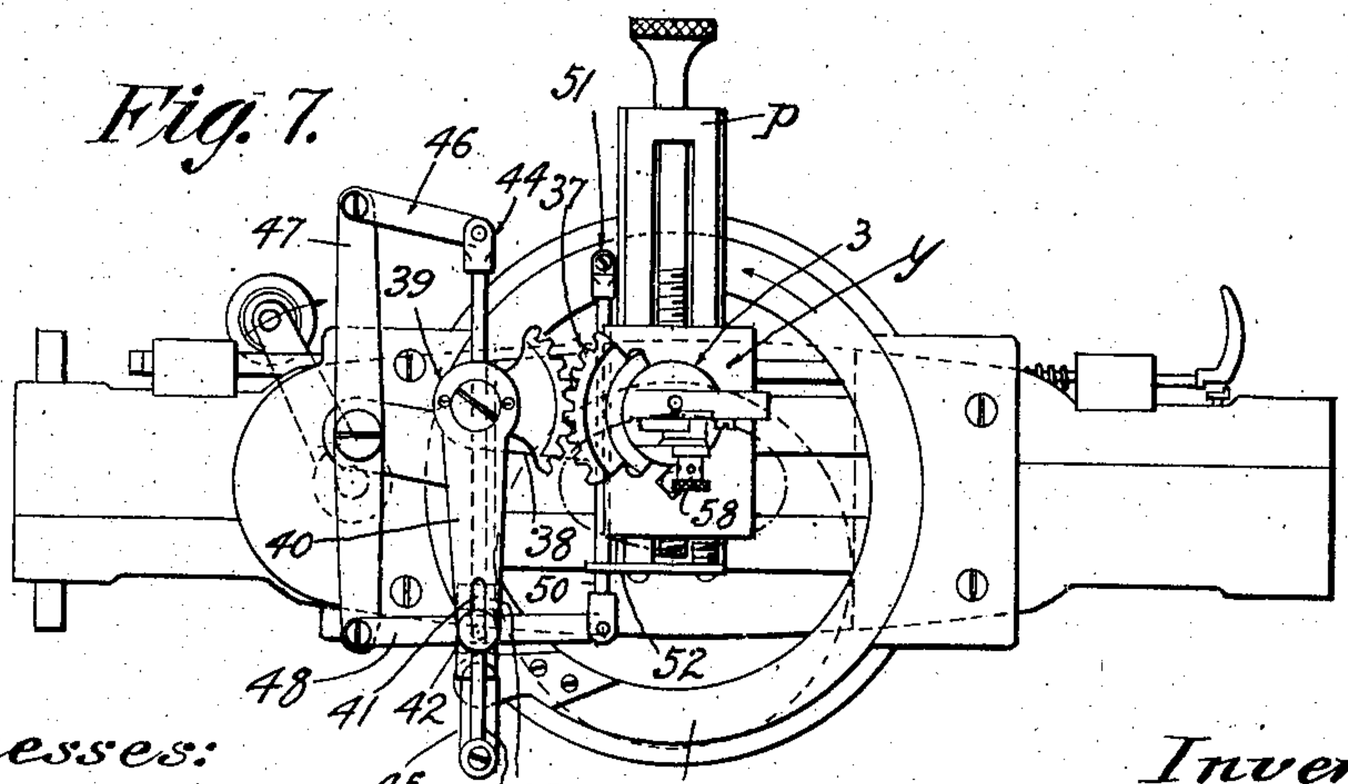


Fig. 7.



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ELLIPSOGRAPH.

APPLICATION FILED MAR. 1, 1905.

4 SHEETS—SHEET 4.

Fig. 8.

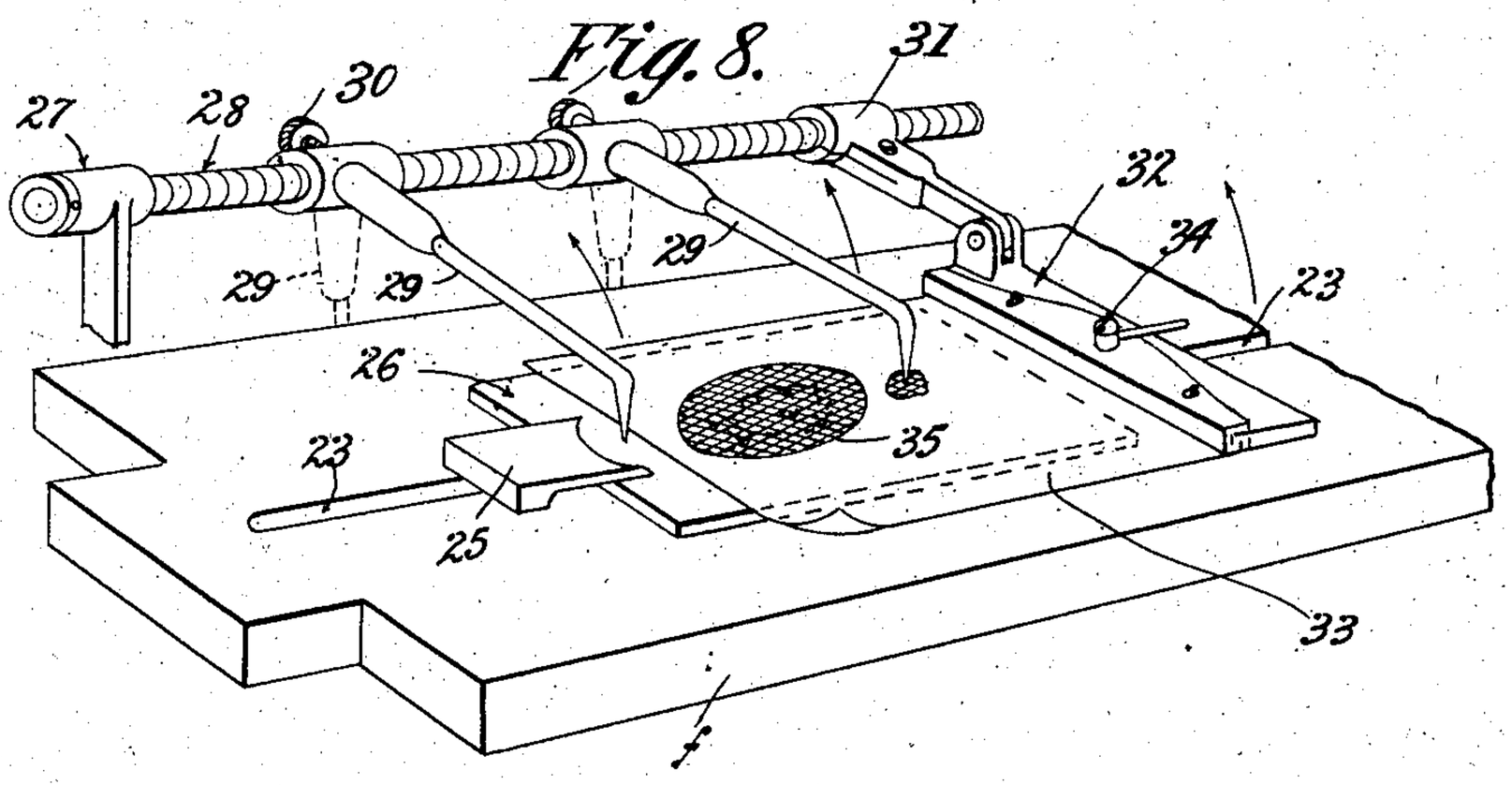


Fig. 9.

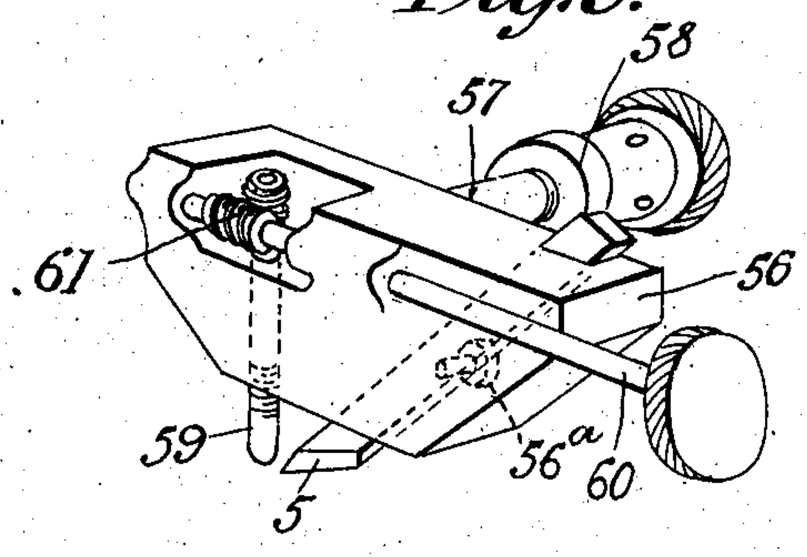


Fig. 10.

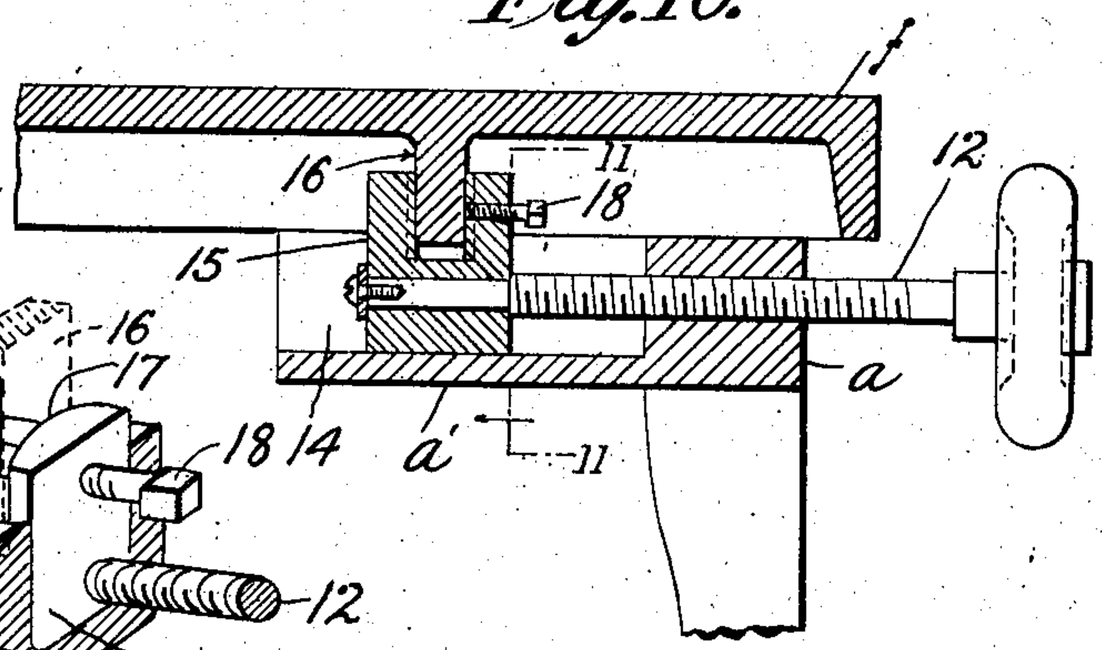
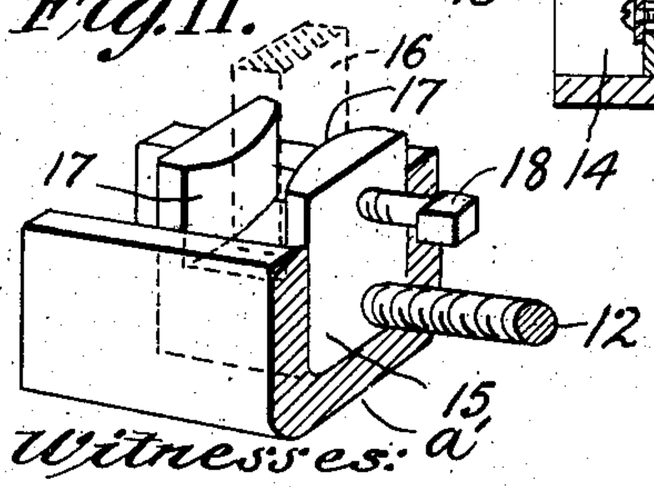


Fig. 11.



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UNITED STATES PATENT OFFICE.

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ELLIPSOGRAPH.

No. 833,892. Specification of Letters Patent. Patented Oct. 23, 1906.

Application filed March 1, 1905. Serial No. 247,964.

To all whom it may concern:

Be it known that I, JULIAN L. PERKINS, a citizen of the United States of America, residing at West Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Ellipsographs, of which the following is a specification.

This invention relates to ellipsographs, and is in the nature of an improvement on the machine for which I filed an application for Letters Patent of the United States on January 7, 1904, under Serial No. 188,024; and in its general features the present machine is identical with the former, the objects of the present invention being to provide improved mechanism whereby the cutting-tool may be rotated more or less on its vertical axis as said tool is carried around in its prescribed path by the operation of the machine.

A further object of the invention is to provide an improved bed construction whereby after a plate has been clamped thereon the bed may be adjusted in any direction to bring either axis of the ellipse to be cut by the machine into proper position.

Another object of the invention is to provide an improvement in a tool-clamp and in the provision of a depth-gage, in the provision of other gages for marking a plate prior to its removal from the bed-plate whereby it may be removed and then replaced with absolute accuracy in its former position.

A still further object of the invention lies in the provision of means whereby the cutting-tool and certain parts of the actuating mechanism thereof may be movably supported relative to the bed-plate whereby after the cutting-tool has been adjusted it may be elevated away from the plate and returned again to operative position in contact with the plate, the weight of said vertically-movable actuating parts serving to hold the tool in contact with the block during the operation of the machine.

Certain other novel features are embodied in this construction, as will clearly appear in the following specification and be pointed out in the claims.

The improved construction is clearly illustrated in the following drawings, in which—

Figure 1 is a top plan view of the machine embodying the invention in its preferred form. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal section taken on line 3 3, Fig. 1. Fig. 4 is a transverse section taken on line 4 4, Fig. 2. Figs. 5, 6, and 7 are plan views of a part of the mechanism for moving the cutting-tool through its prescribed path and also the mechanism for imparting rotary movement to the cutting-tool on an axis vertical to the bed-plate, the mechanism in these three figures being shown in different successive positions. This mechanism is located on the under side of a cross head or bar parallel with the bed-plate. Fig. 8 is a perspective view of the bed-plate removed from the machine, showing certain gages and clamps thereon. Fig. 9 is a perspective view of the tool clamp or holder, showing the construction of the depth-gage thereon. Fig. 10 is a vertical section on line 10 10, Fig. 1, through a portion of the bed-plate and frame in the plane of one of the adjusting-screws for the bed. Fig. 11 is a perspective view of a portion of the slideway on the frame and a shoe therein to receive one of the supporting-legs.

Referring now to the drawings, the machine consists in a frame consisting of the horizontal frame part *a* and the end frame parts *b*, extending above the part *a*, and suitable legs *c*. Pivotally supported at *d*, near the top of one of the frame members, is a cross head or bar *e*, on which is mounted all of the actuating mechanism of the machine. This head extends from one end of the frame *b* to the other in parallelism with the horizontal frame part *a* and may be swung upwardly, as shown in dotted lines in Fig. 2, to give easy access to the bed-plate *f*, which is adjustably supported on the horizontal frame part *a*, means being provided to lock said head or bar *e* in its elevated position, all as described in my said prior application. As in my said prior application, the bar *e* is provided with a sliding head *g*, movable in a slot in said bar, and on the upper surface of the latter are two transversely-arranged ribs *h*, between the edges of which a guide-wheel *j* rotates on a post *k*, mounted in said sliding head, said post extending through a slot *m*, located diametrically of said guide-wheel, means being provided, as the screw *o*, to adjust the sliding head *g* to a position of more or less eccentricity relative to the axis of the guide-wheel.

Secured to the lower end of the post *k* is the arm *p*, at right angles thereto, which extends transversely of the face of a ring *q*, said arm being slotted, as at *r*, and a guide-pin *s* being inserted in the ring and extending into said slot, whereby the arm *p* and the ring *q*

may move together. The latter is provided with gear-teeth, with which a pinion *t* is in mesh, and by means of a crank-arm *v* on the pinion this ring may be rotated, it being supported for that purpose at its periphery in the plates *w*, secured to the under side of the bar *e*. In the arm *p* is a long screw *x*, which engages a sliding carriage *y*, mounted to slide on the under side of said arm, and to this carriage is secured a rotatable member 3, whose axis (represented by the screw 4) passes through the point of the tool 5, supported in the tool holder or clamp 6, secured fixedly to the rotatable member 3 by a screw 7. This mechanism is thus practically the same as that described in my said prior application with the exception of the tool-carriage and tool-holder.

On the frame part *a* of the machine the bed-plate *f* is supported, as stated, and, as shown in Fig. 1, there are three adjusting-screws connected with legs on the under side of this plate, whereby it may be shifted in any direction in the plane of the frame part *a*. The adjusting-screws to move the plate transversely of its length are indicated by 10 and 12 and that to move the plate endwise by 13.

Figs. 10 and 11 show the mode of connecting the screws to the bed-plate, the end of the screw, as 12, being threaded into the horizontal frame part *a* of the machine. On the frame part *a* a boss *a'* is cast, in a recess 14 of which a sliding block 15 is located, there being a transversely-located slot in said block in which a short leg 16, cast on the under side of the plate *f*, extends, the opposite borders of this slot in the block being convex, as at 17, whereby when the plate is being adjusted these legs 16 may have a slight movement on a vertical axis to prevent any binding action between them and the sliding block 15. To take up any lost motion between the leg 16 and the borders of the slot in the block 15, an adjusting-screw 18 is provided, which may be turned up into contact with one side of the leg. To provide a certain yielding resistance against which the bed-plate *f* may move when adjusted as described, a bolt (see Fig. 3, indicated by 20) passes through a plate 21, which bears on the frame part *a* and on one of the bosses *a'* and is screwed into the bed-plate *f*, and between said plate 21 and the head of the bolt a spring 22 is located, which holds the plate 21 yieldingly against the bottom of the frame part *a*, and thus yieldingly holds the bed-plate *f* against the upper surface of said frame part. The bed-plate is longitudinally slotted through the center thereof, as at 23, through which slot the screws 24 extend into plate-clamps 25 on the bed-plate, these clamps being shown in operative engagement with a plate 26 in Fig. 3.

As shown in Figs. 1 and 2, there is secured to the frame part *a* of the machine two arms 27, which support a rod 28 in parallelism with the edge of the bed-plate at a short distance therefrom and a little above it. Preferably this rod has graduating marks thereon. This rod is also shown in Fig. 8, and there is supported thereon two fingers 29, having pointed ends, whereby when these fingers are thrown over to the position shown in Fig. 8 in contact with the plate or negative 26 indentations may be pricked therein which will serve as guide-marks whereby said plate 26 may be accurately relocated on the bed-plate if it becomes necessary to remove the same before all of the operations thereon have been completed. These fingers are provided with means to secure them on the rod 28—as, for example, the set-screws 30. Near one end of the rod 28 there is mounted thereon an arm 31, the extremity of which extends over the bed-plate, more or less, and there is pivoted thereto a paper-clamp 32, under which one end of a piece of paper 33 may be secured by means of the fastening device 34. This strip of paper is used for the same purpose as described in my said prior application—that is to say, an opening 35, oval-shaped or otherwise, is cut by the machine in the paper having the dimensions representing the boundary of the cut to be made on the plate 26, and the latter is then slipped under the paper, the fingers 29 being thrown over to the position shown in dotted lines in said Fig. 8 and then adjusted beneath the paper strip to bring such parts of the cut on the plate within said opening 35 as desired, and the plate is then secured by the clamps 25, whereupon the paper-clamp may be swung over against the arm 31, or the latter may be loosened on the rod and the arm and the clamp be swung over to vertical position like the dotted position of the fingers 29.

The improved means to rotate the cutting-tool on its vertical axis to maintain it in proper tangential position relative to the path it describes are constructed and arranged as follows: On the rotatable member 3 on the tool-carriage *y* is a segmental gear 37, and extending from the side of the tool-carriage is a rigid support 38 for another segmental gear 39, rotatably mounted thereon and provided with a rectangularly-extending arm 40, in the end of which is a slot 41, through which a screw 42 extends into a sleeve 43, slidable on a rod 44, one end of which is pivotally supported on the end of a crank-arm 45, which in turn has a pivotal support on the ring *q*, this construction being clearly shown in Figs. 5, 6, and 7 in plan and Fig. 2 in side elevation. The free end of the rod 44 is pivotally united to a link 46, which by its opposite end is connected to a lever 47, pivotally supported between its end on the ring *q* in substantial parallelism with the rod 44 when the parts of the machine are in certain positions—as, for example, those shown

in Figs. 5 and 7. To the opposite end of the lever 47 to that with which the link 46 is connected a longer link 48, in substantial parallelism to the link 46, extends inwardly toward and across the ring, and its inner end is pivotally connected to a rod 50, which extends alongside and parallel with the arm *p*, and that end thereof opposite to the link 48 is pivotally secured at 51 to the ring *q*, while near the inner end of the arm *p* is a bearing 52 for the rod 50, whereby the latter is made to follow the movements of the arm *p* on its axis. Hence during the operation of the machine the arm *p*, which, as usual in this class of machines, has a certain swinging movement on its axis as it rotates with the ring *q*, causes the rod 50 to swing on its pivoted end 51, and thereby through the medium of the link 48, the lever 47, the link 46 to impart a swinging movement to the rod 44 toward and from the axis of the segmental gear 39, said rod 44 swinging on the end thereof pivoted to the crank-arm 45. Therefore by means of the connection through the sleeve 43 with the arm 40 of said segmental gear 39 the latter will be rotated on its axis and impart like rotatory movements through the other gear 37 to the rotatable member 3, on which the tool-holder is secured, thus rotating the tool on its vertical axis to maintain it in tangential relation to the path through which it is moved by the movements of the machine. Means to adjust the degree of rotatory movement imparted to the tool on its vertical axis are provided by the slot 41 in the arm 40, whereby by moving the pivotal connection between the sleeve 43 and the arm 40 in said slot the throw of the arm 40 may be varied and the rotatory movement of the tool adjusted to a nicety.

Referring now to Figs. 3 and 4, it will be seen that a certain amount of vertical play is provided for and indicated by the space 53, between the sliding head *g* and the arm *p*, and the latter (and consequently the cutting-tool) may be raised to take the tool out of contact with the plate on which it is operated. When the arm is so raised, the post *k* slides endwise in the head *g*, and the guide-wheel *j* is also raised, (this elevated position of the parts being shown in Fig. 4,) and the movement is effected by the axially-rotatable rod 54, the inner end of which is turned up, as shown, at right angles to the lengthwise dimension thereof, so that the rotation of the rod will serve to cam the post upward, the end of said rod having a bearing on a flange 55 on the post, as shown in said Fig. 4.

Referring now to Fig. 9 particularly, it is seen that the tool-holder consists of a block 56, in which the cutting-tool 5 may be supported adjustably in any suitable way, as by a screw 56[a], in the proper cutting position. In this tool-holder means are provided to secure it to the rotatable member 3 on the tool-carriage, the means shown in this case being the screw-threaded post 57 and nut 58, said post 57 passing through a depending portion of said member 3, as shown in Fig. 3. In Fig. 9 is shown also an adjustable depth-gage 59, which consists of a screw-threaded pin vertically disposed relative to the bed-plate in the tool-holder and outside of the latter—that is to say, so disposed that it will bear on the plate outside of the line cut by the tool. The upper end of this pin is connected with a rectangularly-disposed rotatable rod 60 by means of the spiral gears 61. The depth-gage may thus be adjusted when the tool-holder is in position on the machine. By providing for the vertical play of the post *k* through the sliding head *g* it is seen that the weight of the parts carried on said post provides the requisite and a definite pressure for holding the tool in contact with the work, and when the desired depth of cut has been made in the plate the depth-gage comes to a bearing on the surface of the plate and determines the depth of the cut.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an ellipsograph, a suitable frame, a work-holding bed, a sliding head mounted in the frame to move reciprocally in a fixed plane, a tool-carrying arm rotatably supported by said head, and a tool on the arm, the latter being movable toward and from the work-holding bed whereby its weight may be supported by the tool when said tool is in contact with the work.

2. In an ellipsograph, a suitable frame, a work-holding bed, a sliding head mounted in the frame to move reciprocally in a fixed plane, a tool-carrying arm rotatably supported by said head, and a tool on the arm, the latter being movable toward and from the work-holding bed whereby its weight may be supported by the tool when said tool is in contact with the work, and a depth-gage to receive the weight of the arm when the tool has made a cut of the desired depth.

3. In an ellipsograph, a suitable frame, a work-holding bed, a sliding head mounted in the frame to move reciprocally in a fixed plane, a tool-carrying arm rotatably supported by said head, and a tool on the arm; means to adjust said work-holding bed and said arm one relative to the other, whereby the weight of the latter may be supported by the tool when said tool is in contact with the work on the bed.

4. In an ellipsograph, a suitable frame, a work-holding bed supported on the frame, and means to adjust said bed in the plane of its support; a sliding head mounted in the frame to move reciprocally in a fixed plane parallel with that of said bed, a tool-carrying arm rotatably supported by said head, a tool on the arm, and means to adjust said bed and

said arm one relative to the other, whereby the weight of the latter may be supported by the tool when said tool is in contact with the work.

5. In an ellipsograph, a suitable frame, a sliding head mounted in the frame to move reciprocally in a fixed plane, a ring rotatably supported at its periphery, said head being adjustable radially of said ring, a tool-carrying arm rotatably supported in said head and having a sliding engagement with said ring, a tool on said arm rotatably supported on the latter on an axis vertical to the plane of rotation of the arm, and means to rotate said tool consisting of a segmental gear thereon, a second segmental gear supported on the arm and in engagement with the first, a rod or bar pivotally connected with the ring at one end and having a bearing near its other end on said arm, whereby the swinging movement of the latter in the plane of said ring may impart like movements to said bar or rod; an arm on said second segmental gear and suitably-disposed lever connections between said arm and said bar or rod whereby the swinging movements of the latter may rotate said segmental gears to rotate the tool.

6. In an ellipsograph, a suitable frame, a work-holding bed supported on the frame, and means to adjust said bed in the plane of its support consisting of a plurality of rectangularly - disposed screws, whereby endwise or transverse adjustments of the bed may be effected independently or together, and means to apply frictional resistance to the movement of the brake-holding bed.

7. In an ellipsograph, a suitable frame, a work-holding bed supported on the frame, and a rod supported on the frame near one side of the bed and above it, gage-fingers on said rod movable toward and from the work-bed to serve as guides whereby a piece of work may be replaced on the bed in the position it occupied before removal.

8. In an ellipsograph, a suitable frame, a work-holding bed supported on the frame, and a graduated rod supported on the frame near one side of the bed, a paper-clamping device secured to the rod and arranged to swing toward and from the bed whereby a piece of paper having a guide-opening therein may be removed from the work-bed and applied thereto again in the same position.

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