

No. 696,046.

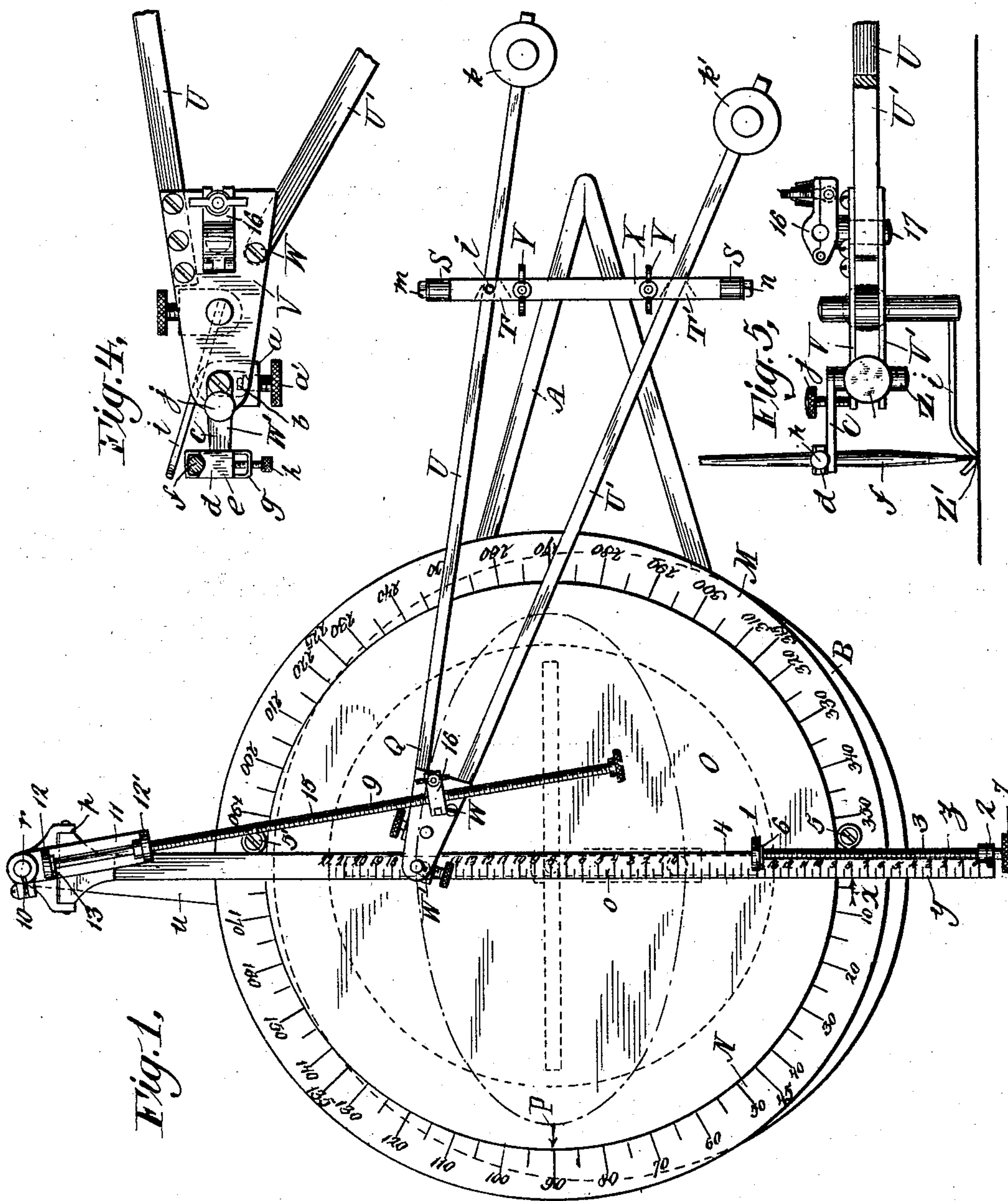
Patented Mar. 25, 1902.

**A. E. HOTCHKISS,
ELLIPSOGRAPH.**

(Application filed Nov. 21, 1899.)

(No Model.)

5 Sheets—Sheet 1.



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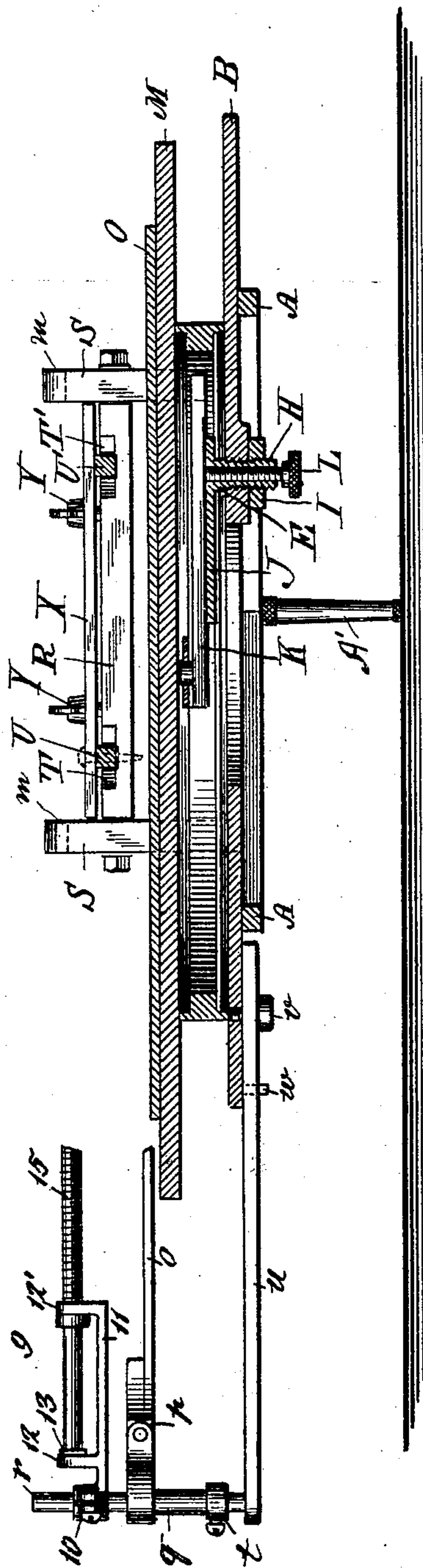
A. E. HOTCHKISS.
ELLIPSOGRAPH.

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Fig. 2,



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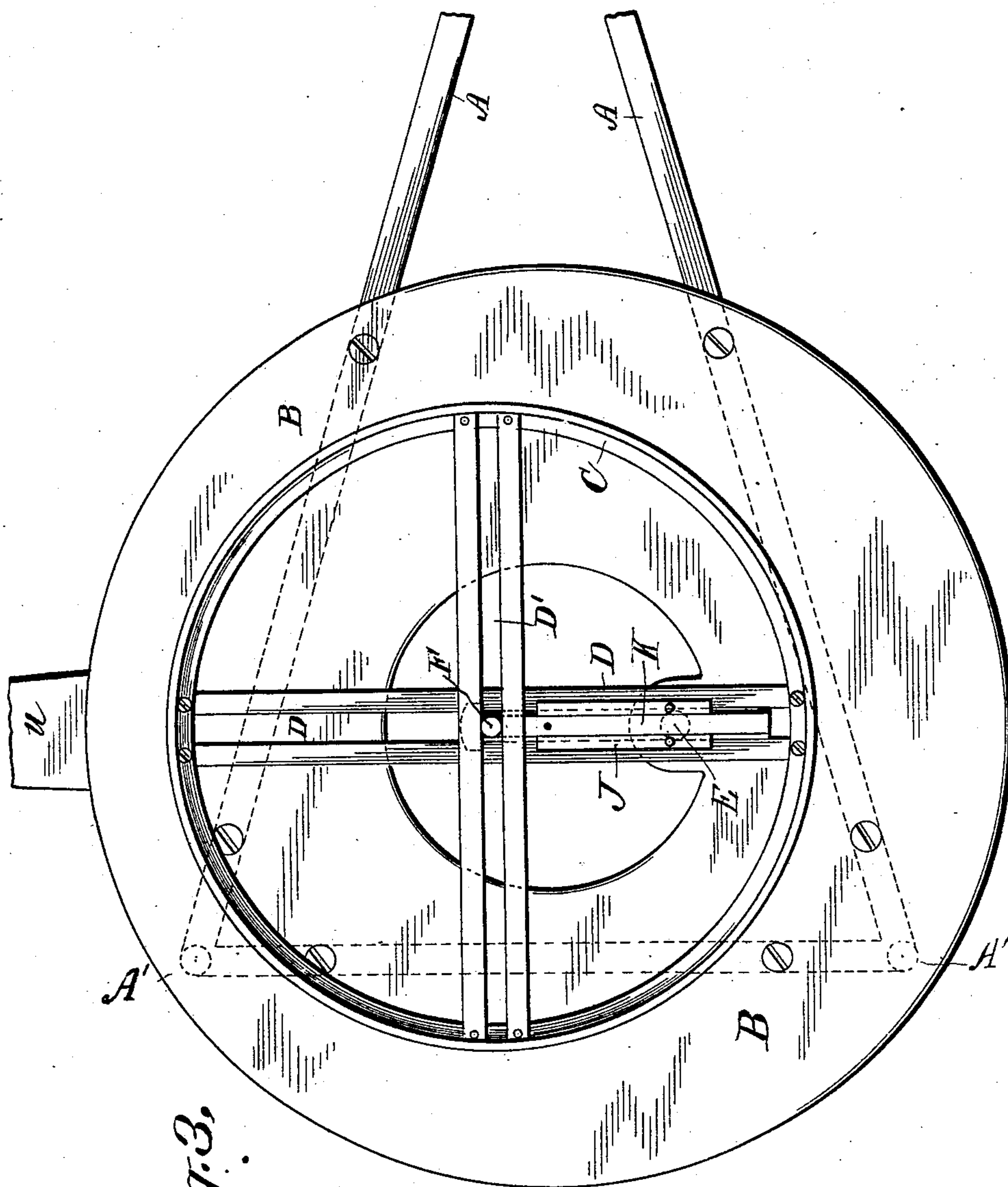


Fig. 3.

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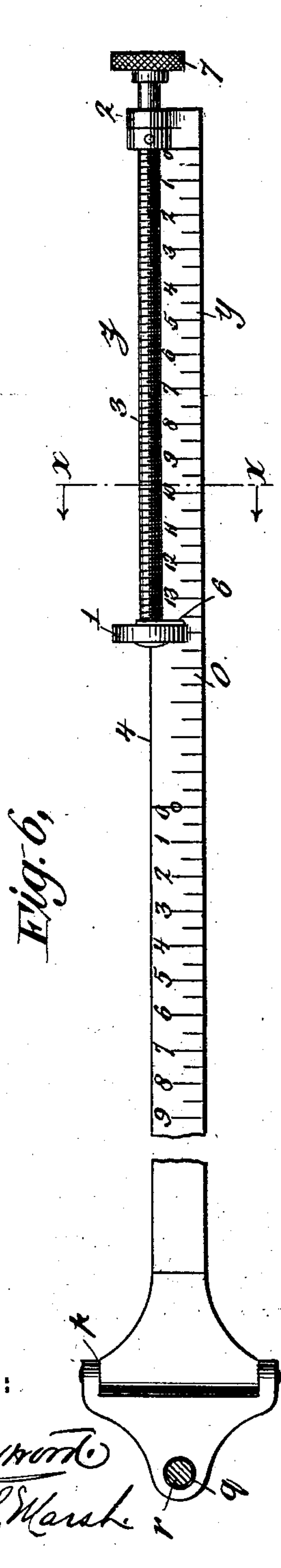
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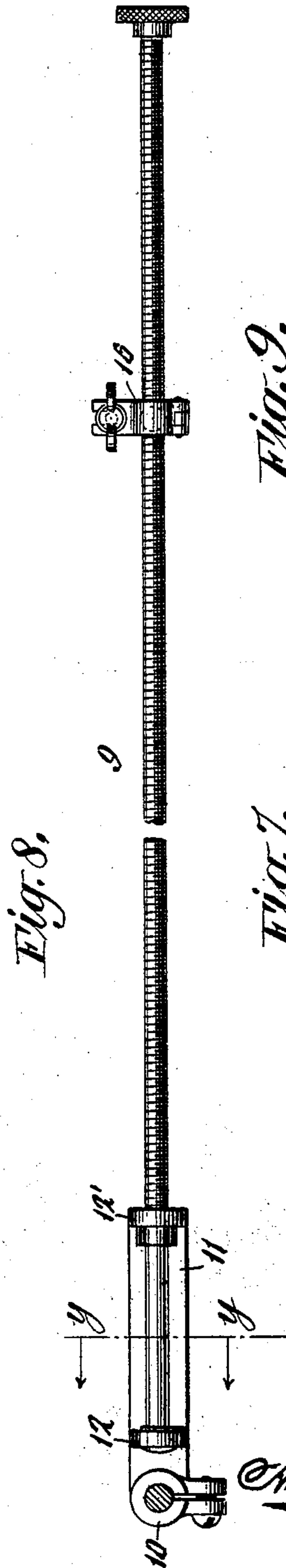
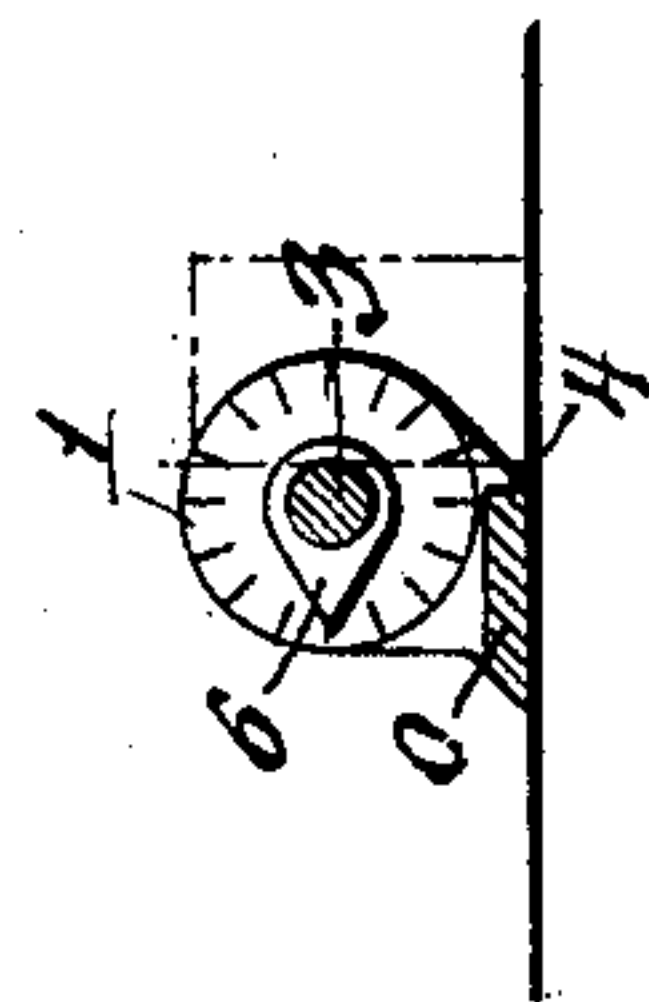
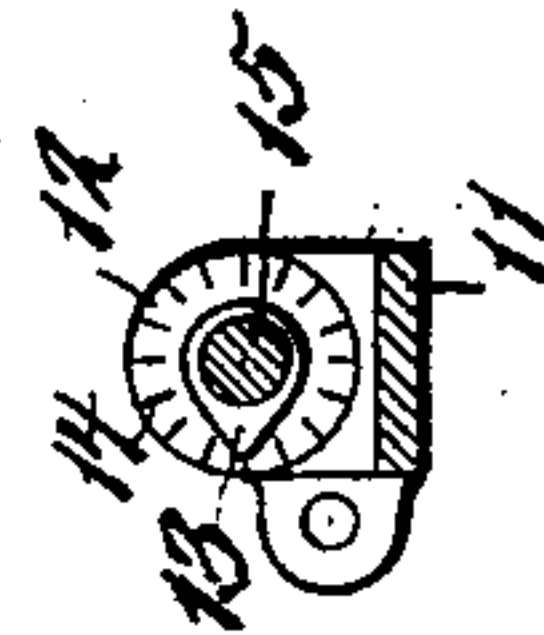


Fig. 9.



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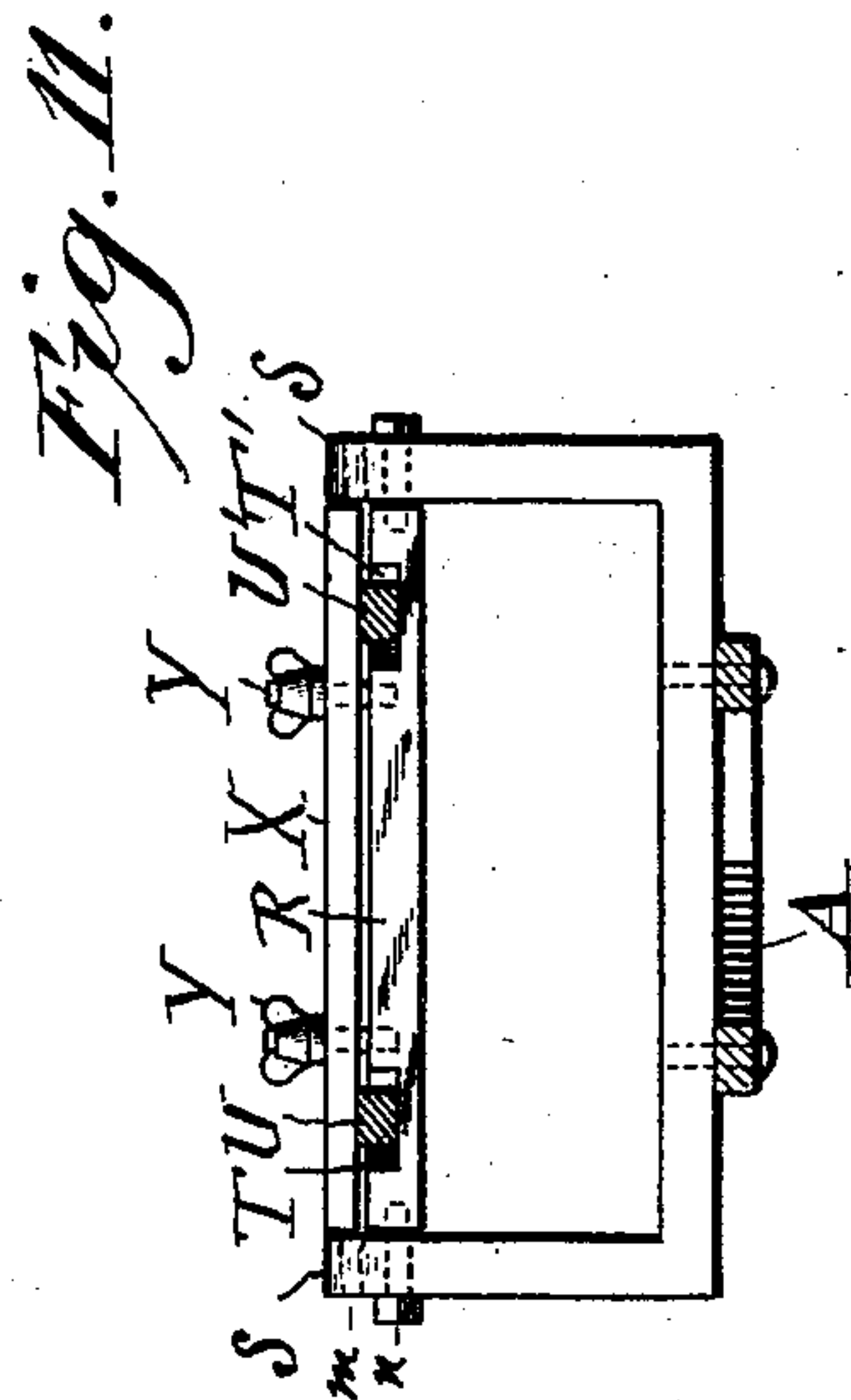
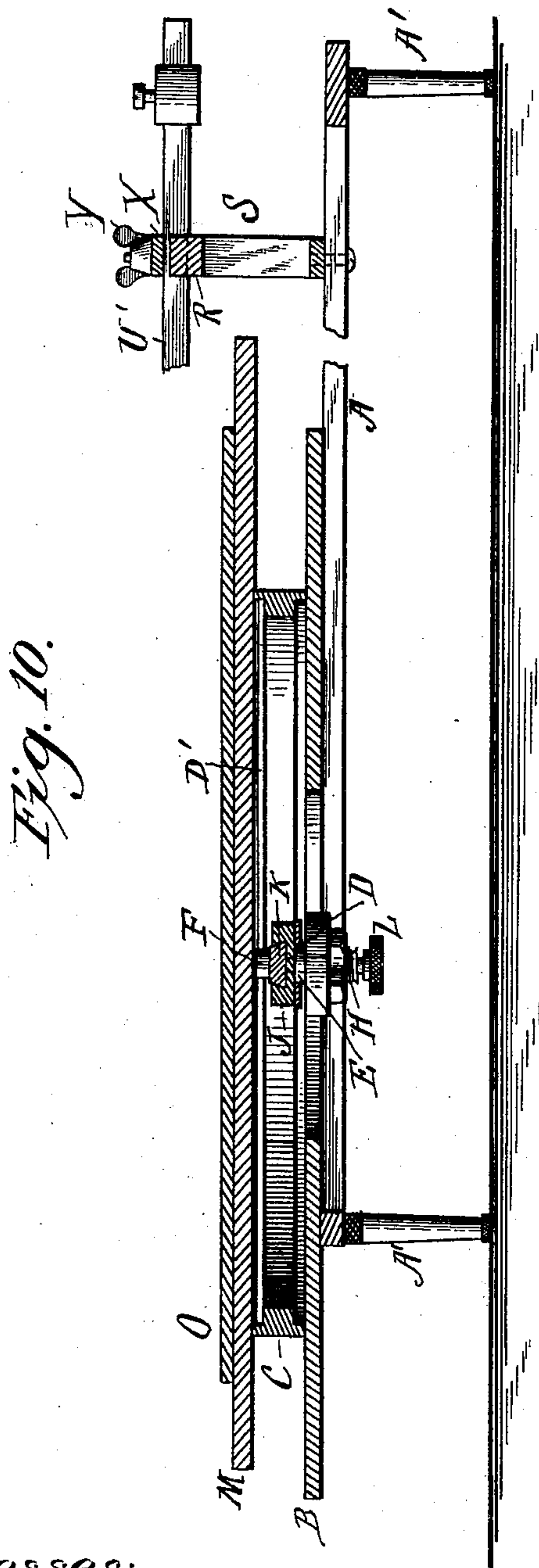
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5 Sheets—Sheet 5.



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UNITED STATES PATENT OFFICE.

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ELLIPSOGRAPH.

SPECIFICATION forming part of Letters Patent No. 696,046, dated March 25, 1902.

Application filed November 21, 1899. Serial No. 737,791. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. HOTCHKISS, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Ellipsographs, of which the following is a specification.

My invention relates to instruments for producing curved designs or oval work; and it consists in the construction and relative arrangement of the various parts, as hereinafter described, and pointed out in the claims, reference being had to the accompanying drawings, in which like letters and numerals of reference indicate like parts throughout the several figures.

Figure 1 is a top view showing complete device. Fig. 2 is a sectional view. Fig. 3 is a top view with the table removed. Fig. 4 is an enlarged detail view of head of describing-arm with the attachments. Fig. 5 is a side elevation of the same. Fig. 6 is an enlarged detail view of graduated arm with micrometer attachment for minor axis. Fig. 7 is a section of the same on line X X. Fig. 8 is an enlarged detail view of micrometer adjustment for major axis. Fig. 9 is a section of same on line Y Y. Fig. 10 is a section taken on a plane at right angles to the plane of the section of Fig. 2. Fig. 11 is a detailed sectional elevation showing the frame S.

A is a triangular frame with suitable legs A' A', and B preferably a flat plate secured thereon.

C is a circular frame arranged to revolve on this plate with either a circular or elliptical movement and is provided with slots D D' at right angles to each other arranged in different planes, so that the stationary stud E in one of the slots and an adjustable stud F in the other may be brought into vertical line with each other when the device is adjusted to describe a circle or into approximately close concentric relation to each other when describing or producing a small oval or an oval with a minimum minor axis. The arrangement and adjusting mechanism of these studs are as follows: The stud E is firmly secured or attached to the plate B by its threaded portion H being screwed with the same and when placed in its proper position

is made fast by a jam-nut I. On the upper end of this stud E is formed a dovetailed arm J, which is disposed between the planes of the slots D D', as shown, and arranged therein is the movable slide K, bearing the adjustable stud F. A tightening-screw L, passing through the stationary stud E, secures the slide K in its position when set to any desired point.

M is preferably a wood disk suitably secured to the frame C and adapted to revolve with it and may or may not be provided with graduations N, divided into degrees or other convenient divisions, and pivotally arranged thereon and concentric therewith is another disk O, which is provided with an index character P to facilitate setting it with relation to the degrees or divisions on the lower disk M. These two disks thus arranged properly constitute the table of my device, though the disk O may be omitted.

In operation, the work is arranged on the table and by turning it the inclination of the next oval figure to be executed thereon is changed in its angular relation to the former or to the work already done without changing the adjustment of the other parts of the device, the degree of inclination being predetermined by the arrow P on the disk O and the graduations N on the lower disk.

Another distinctive feature of this invention consists in the new construction and arrangement of the describing-arm Q, which is as follows: R is a rock-shaft pivotally supported at each end by bracket S, arranged on the triangular frame A, as shown, and having recesses T T' to receive the bars U U', which are connected at their inner ends by means of plates V V', between which one of the bars U is rigidly secured and the other bar U' pivotally connected, as by a single bolt W passing through the same. Means for holding the pencil or other tool or their holding-fixtures is provided in the extremity of these plates, as shown and described later on. The length of these bars is such that the pencil or tool used may be set forward of the center of the table when desired, as also back of it, and by means of the pivotal connection of one of the bars, as U or U', just described, and sufficient width of the recesses T T', in which they are held,

lateral movement also of the pencil or tool is provided for sufficiently to allow setting or adjusting the same to either right or left extremity of the table. Thus it will be seen, 5 that a great variety of adjustments and work can be accomplished by this describing-arm, since the setting of the tool is not limited to points in a straight line, and since changing the position of the tool or pencil from one 10 point to another outside of a straight line going through the center of the table changes the inclination or angle of the figures produced when the table is rotated. A clamping-piece X is arranged above the bars, and by 15 means of the thumb-nuts Y Y suitable friction is secured to hold the bars firmly in any desired position.

Referring now to the fixtures for holding the pencil or other instruments, Z is a shank 20 passing through the plates V V' and secured in any desired position by means of the slotted clamp *a* and its set-screw *a'*, bearing against the post *b*, as shown. An arm *c*, attached to the same, extends outward beyond 25 the plates V V' and has arranged thereon a clamping device *d*, formed, preferably, with a base-piece *e*, being V-shaped at one end, in which the tool *f* is placed and secured in its position by means of a suitable strap *g* 30 and its tightening-screw *h*, as shown. This V-shaped recess and the adjustable strap are adapted to hold tools of different sizes. In order to enable artists to use a brush in executing water-color designs, &c., and to secure 35 uniform engagement of the point or end of the brush upon the surface of the work, notwithstanding the weight of the describing-arm to which it is attached or the unevenness of the surface over which it may pass, I have disposed in close proximity to the point 40 Z' of the brush, and preferably at one side thereof, to avoid marring the lines made by it, a rigid foot or rest *i*, which is adapted to freely glide over the surface of the material 45 operated upon and is arranged to be disposed on either side of the brush by means of its swivel attachment and connection with the plates V V' in a manner similar to that of the pencil-fixture just described and as 50 shown. As the work passes under the brush by revolving the table, the close proximity of the foot *i* to the brush will cause substantially uniform contact of the brush with its engaging surface, since as the foot *i* passes over any 55 unevenness of the surface its rigid connection with the describing-arm will cause a corresponding rising-and-falling movement of the arm and the brush, and a uniformity in the width of the lines or stroke made by the 60 brush will thereby be insured.

It is obvious that in describing successive curves outwardly from the center of the table the foot *i* will in operation clear the fresh marks of the brush if it be disposed outside 65 of it or when proceeding vice versa if placed on the inside of it.

As a means of adjusting the brush accord-

ing to the lines or strokes desired I have provided the screw *j*, as shown, for raising or lowering the same, the clamping set-screw *a'* 70 being slackened during the adjustment and then again tightened.

Whenever the sliding foot is not used in operating my device, I provide for change of pressure of the describing-arm upon the pencil or tool by disposing one or more weights, 75 as *k k'*, on the opposite end of the bars U U', which may be shifted as required. This means of compensation is particularly well calculated to enable the operator to regulate 80 the pressure upon the pencil in a sensitive manner. Again, in executing fine-line work by moving either of these weights back and forth on its supporting-bar while the table is revolving corresponding variation in shad- 85 ing of the lines can be thereby effected.

Another improvement consists in rendering one or both of these bars U U' of the describing-arm pivoted in its recess and preferably 90 at a point that will cause the pencil or tool when moved laterally to describe radial curves passing through the center of the table. I effect this by passing a removable pin *i'* through the clamping-piece X and one of 95 the bars, as U, and rock-shaft R, as shown.

The bracket S has its upright arms also drilled and threaded at *m m*, into which the pivotal screws *n n* may be entered when it is desired to hold the rock-shaft R and the describing-arm in a higher position to accom- 100 modate work of unusual thickness or depth upon the table.

It will be observed that the peculiar arrangement of the bracket S referred to on the angular portion of the frame, as shown, renders it exceedingly rigid and that the triangular form of the describing-arm is expressly calculated to overcome any lateral bending or vibrations of the same when in operation. As a means of setting the pencil or 105 tool I have arranged a graduated bar *o*, which is hinged, preferably, at *p* to permit raising or lowering its outer end and provided it with a socket or sleeve *q*, which is adapted to turn on the stud *r* in swinging the graduated bar 115 laterally or out of its position over the table, and has also its socket or stationary end arranged to be raised or lowered on the stud *r* and to be kept at the proper height according to the work placed upon the table by 120 means of the collar and set-screw *t*. This stud *r* is supported, preferably, by the arm *u*, pivotally secured at *v* to the base-plate B, and in its normal position bears against a stop-pin *w*, with the center line of the graduated bar 125 directly over the center of the table, the table having been at the same time adjusted and secured in its normal position or starting-point of rotation by bringing the edge 4 of the graduated bar into contact with the vertical 130 stops 5 5', secured to the table. By this arrangement the setting of the pencil or tool can be effected with its point disposed immediately above the graduations or while rest-

ing upon the graduated bar and can so remain until the operation of setting is completed, which is of special advantage and convenience in an instrument of this character, where it is necessary in adjusting it for one of its axes to move the work along under the tool without marring the same. This latter operation is effected by moving the table laterally in either direction until the arrow x on the lower disk M of the table indicates the desired point in the graduations y on the bar, the lay-out and arrangement being such that with the arrow x at zero the two studs E and F will be in a vertical line and the table set to describe a circle.

Upon removal of the graduated bar from under the tool the tool assumes its corresponding position upon the paper or surface to be operated upon. By providing the arm u , bearing the stud r , with a pivotal or swivel movement, as above described, the machines may be rendered more compact for shipment. Again, this swivel movement of the arm, effecting change in the position of the stud, together with the swivel movement of the graduated bar and the rotary movement of the table, enables the operator while using the graduated bar o as a straight-edge to draw lines on any part of the table at any angle or in any direction, which constitutes another of the important features of my invention.

As a still further improvement in the setting mechanism I have combined with the graduated bar o a micrometer attachment z , which I preferably arrange directly opposite or adjacent to the graduations y made on the bar for setting of the table for the minor axis of the figure to be executed. The construction and operation of this attachment are as follows: Journaled in standards 1 and 2 on the bar is a screw-shaft 3, having its threaded portion disposed sufficiently beyond the edge 4 of the graduated bar to allow the V-shaped edge of the stop 5 to enter the threads of the screw. Whenever it is desired to make finer adjustments in setting of the table than is practicable with the arrow x and its graduations upon the bar, the operator may at once, regardless of the position at which the table is then set, press the graduated bar laterally toward the stop 5 until the V-shaped edge of the stop is forced to the bottom of one of threads of the screw-shaft 3, and then by first noting the position of the index-finger 6 on the graduated face of the standard 1 he may readily proceed to turn the screw-shaft by means of the button 7 on its end until the desired lateral movement of the table in either direction is indicated. I have further connected another micrometer attachment 9 with the describing-arm so that either of the axes of the oval figures produced may be varied in the minutest degree and with uniform precision, as when, for instance, my device is used for engraving circular or elliptical line work for bank-notes, bonds, &c., or for light shading on artistic designs. I prefer to

construct this latter micrometer attachment as follows: Frictionally arranged upon the stud r is a socket 10, to the flange of which is conveniently secured an extension-piece 11, provided with standards 12 12', corresponding substantially to the standards 1 and 2 above described, and journaled in these standards and provided with a similar index-finger 13 and its graduations 14 is a screw-shaft 15, with a threaded portion arranged to extend over the table and provided with an opening and closing nut 16, which is swivelly arranged on the describing-arm by its shank 17 passing through the plates V V', and by which means this micrometer is connected with the said arm. The swivel movement of the nut allows it to conform to the general line and direction of the screw-shaft. Turning of this screw-shaft when thus connected imparts lateral movement to the pencil or tool.

It will be seen that attaching the micrometer which I have thus adapted for close adjustment of the describing-arm and pencil or tool to the device wholly independent of the graduated bar obviates the necessity of bringing the bar into its position over the table each time the pencil or tool is set and that this construction and arrangement dispenses also with the necessity of disengaging the attachment from the describing-arm at each change in its adjustment.

Without the combination or use of the "micrometer set" which I have thus devised for an instrument of this character, setting of the table for the minor axis or the pencil or tool for the major axis is attended with constant variation.

It is obvious that many slight changes might be made in the construction and relative arrangement of the parts here shown and described without in any way departing from the spirit and scope of my invention.

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

1. In an instrument of the character described, a table B, a rotating frame C on said table, said rotating frame having a slot or way D across the same and also another slot or way D' across the same on a different plane than the slot or way D and at right angles to the latter, a fixed stud E projecting into the slot or way D, a keeper J attached to said stud and held thereby in the space between the said ways D and D', a movable plate K held to slide in said keeper J and a stud F attached to said movable plate and projecting into the slot or way D', substantially as described.

2. In an instrument of the character described, a table B, a rotating frame C on said table, said rotating frame having a slot or way D across the same and also another slot or way D' across the same on a different plane and at right angles to slot or way D, a fixed stud E projecting into the slot or way D, a keeper J attached to said stud and held there-

by in the space between the said ways D and D', a movable plate K held to slide in said keeper, a stud F attached to said movable plate and projecting into the slot or way D' and a set-screw L in said stationary stud E adapted to fasten the sliding plate K for holding the stud F in line with the stud E or any desired position at one side thereof, substantially as described.

10 3. In an instrument of the character described, a base-plate B, a stationary stud E secured therein and passing through the slot D and having a bearing in said slot, and having arranged on its upper end a dovetailed

15 arm J, a movable slide K adapted to move therein, said dovetailed arm and slide being disposed between the planes of the slots D D' and a stud F secured in said slide and having its bearing in the slot D', said latter slot

20 being disposed above the aforementioned parts substantially as and for the purposes described.

4. In an instrument of the character described, a bracket S having pivotally disposed therein a rock-shaft R, provided with 25 recesses T T', a clamping-bar X and tightening-screws Y Y, in combination with the bars U U' of the tool-carrying arm, substantially as described.

5. In an instrument of the character described, a main rotatable table, means for 30 imparting an elliptical movement to said table during its rotation, a tool-carrying arm adapted to be laid across said table, a graduated bar adapted to be laid across said table 35 and micrometer for adjusting the table, substantially as described.

Signed at New York, in the county of New York and State of New York, this 20th day of November, A. D. 1899.

ARTHUR E. HOTCHKISS.

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