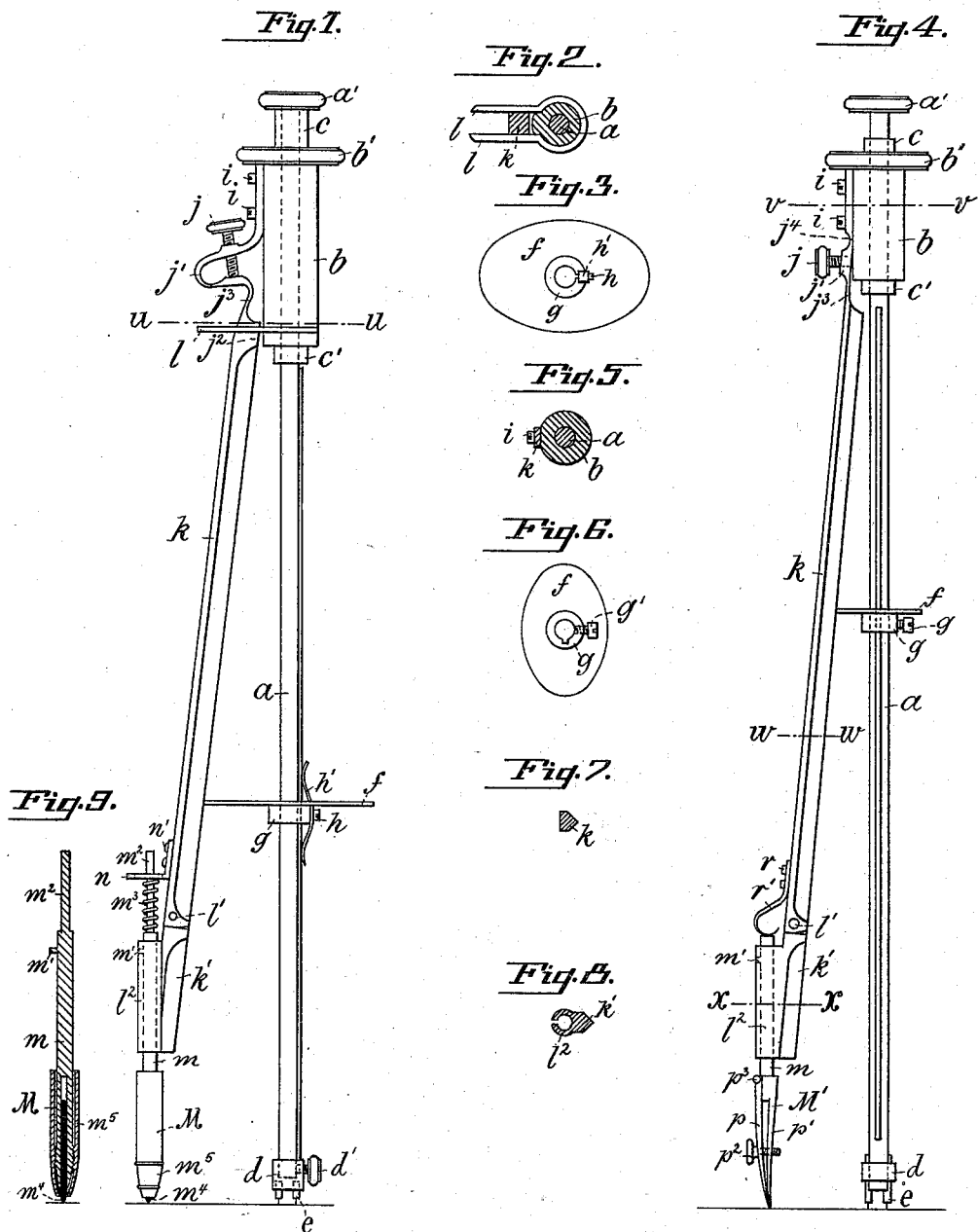


(No Model.)

H. BORMANN.
ELLIPSOGRAPH.

No. 383,696.

Patented May 29, 1888.



WITNESSES:

Thomas M. Smith.

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UNITED STATES PATENT OFFICE.

HERMANN BORMANN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO J. WALTER DOUGLASS, OF SAME PLACE.

ELLIPSOGRAPH.

SPECIFICATION forming part of Letters Patent No. 383,696, dated May 29, 1888.

Application filed July 28, 1887. Serial No. 245,481. (No model.)

To all whom it may concern:

Be it known that I, HERMANN BORMANN, a subject of the Emperor of Germany, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Ellipsographs, of which the following is a specification.

My invention relates to certain novel features in the construction and operation of ellipsographs or mathematical instruments for drafting purposes.

The principal object of my invention is to provide a device for drawing ellipses, ovals, and other figures; and to which ends my invention consists of an instrument or instruments arranged and operating substantially in the manner illustrated in the accompanying drawings, which represent forms thereof found in practice efficient, and in which—

Figure 1 is an elevation of a device of my improved construction for drawing elliptical figures. Fig. 2 is a transverse section on the line *u u* of Fig. 1. Fig. 3 is a plan view of the elliptical plate, looking from the under side thereof, and showing the means for attaching said plate to the feathered rod of the device. Fig. 4 is an elevation of an ellipsograph of my improved construction embracing certain modifications in the parts thereof. Fig. 5 is a cross-section on the line *v v* of Fig. 4. Fig. 6 is a top view of the elliptical-shaped plate for attachment to the feathered rod of the device. Fig. 7 is a cross-section of the spring-leg of the device on the line *w w* of Fig. 4. Fig. 8 is a similar view on the line *x x* of Fig. 4, and Fig. 9 is a longitudinal vertical section through the pencil attachment.

Similar letters of reference indicate like parts in the several views of the drawings.

Referring to the drawings for a further description of my invention, *a* represents a vertical rod of suitable form, made of steel, brass, or other material, and having a feather extending either the entire or only a portion of the length of the rod, and carrying on its upper extremity a milled thumb-nut, *a'*, made of brass, German silver, or other material.

Loosely carried on the rod *a* is a sleeve, *b*, and integral therewith on the upper extremity thereof is a milled-edge button or cap, *b'*.

This sleeve *b* is held to place on the rod *a* by means of upper and lower hubs, *c* and *c'*, suitably attached to the rod *a*, whereby the free rotary movement of the sleeve *b* by hand may be permitted in any well-understood manner.

To the lower extremity of the rod *a* is fitted a collar, *d*, by means of a set-screw, *d'*, into which collar is fitted one or more needle-points, *e*. The elliptical or other form of plate *f* carries a hub, *g*, which is rigidly secured thereto, and passing through this plate *f* and fastened to the hub *g* by means of a screw, *h*, is a flat-surfaced spring, *h'*, made of steel or other suitable metal, curved slightly on both sides from the center, with the ends thereof slightly bent upward, as shown in Fig. 1; or this spring may be of any other form for holding the plate *f*, with its hub *g*, in any desired location on the feathered rod *a*, and which may be readily moved up and down thereon by hand for varying the dimensions of the figure to be drawn upon the paper or other material.

To the sleeve *b* is attached, by means of screws *i* or otherwise, a springing leg, *k*, made of steel or other metal, the upper portion of which is constructed preferably in the form of an inverted *U*, through which a screw, *j*, is inserted for adjusting the lower portion of the leg *k* to any desired angle of inclination for accommodating whatever size plate or disk may be fitted onto the feathered rod *a*. The inverted *U* portion *j'* of the leg *k* is preferably constructed so that the upper arm of the *U* portion of the leg will contain a greater thickness of metal than the lower one—that is to say, will taper off slightly from the curve of the *U* in the direction of the sleeve *b*—and by turning the screw *j* the leg can be readily set to the desired angle of inclination for accommodating different sizes of plates or disks *f* that may be fitted onto the feathered rod *a*. From the extremity of the lower arm of the *U* to the projection *j''* the metal is tapered in any suitable manner, forming a secondary spring, *j''*, for holding the leg *k* at all times snugly up against the periphery of the elliptical plate or disk *f*. The projection *j''*, formed in the leg *k*, is held to place and against lateral movement in a double guideway, *l*, secured rigidly to the sleeve *b*, thereby insuring the proper amount of rigidity to the spring-

ing leg k while the instrument is being manipulated by the draftsman.

The spring-leg k is preferably constructed V-shaped, and to this leg by a knuckle-joint at l' is attached a short leg, k' , the sides of which are also beveled off, and integral with this leg k' is a tube, l , having a narrow slit extending through the surface thereof. Through the tube l is inserted the shank m of the pencil attachment M, which carries a pin, m' , in its surface. The upper portion of the shank m is preferably constructed of less diameter than the lower portion, and around the upper portion, m^2 , is coiled a spiral spring, m^3 , the upper extremity of which rests snugly up against a bracket, n , secured by means of screws n' to the flat surface of the spring-leg k , and this bracket n has a slot in its free extremity, through which the upper portion of the shank has a free up-and-down movement, which permits the pin m' in the shank m to be readily moved to place.

The lower portion of the shank m of the pencil attachment M has a threaded surface, and this shank is bored out to receive the pencil m^4 , and to which is attached a cap, m^5 , of any ordinary well-known construction, with a threaded surface barrel which meshes with the threaded surface of the shank, for holding the pencil m^4 when it is secured to place firmly in the barrel of the shank m ; or, instead of the pencil attachment shown in Fig. 1, a pen attachment of any well-known construction or any other form of pencil attachment may likewise be used with but slight modifications.

In Fig. 4 is shown a modified form of my improved device, in which a is a feathered rod carrying a thumb-nut, a' , on its upper extremity, and to which rod is similarly attached a sleeve, b , having a milled-edge button, b' , on its upper extremity, and this sleeve is held to place by means of upper and lower hubs, c and c' . The lower extremity of the rod a is grooved out slightly, forming recesses for the reception of the shouldered needle-points e , which are held firmly in position therein by means of a collar, d , slipped around them. The elliptical or other desired form of plate f , carrying a hub, g , rigidly secured thereto, is fitted to the feathered rod a and held to place thereon by means of the set-screw g' .

By means of screws i is secured to the sleeve b the spring-leg k , made of steel or other suitable metal. This leg in order to insure the proper springing action is filed out in a suitable manner to form a spring at j^4 , and a projection, j' , formed beyond this spring, as shown in Fig. 4, through which an adjusting-screw, j , is inserted to permit the springing leg k to be set by hand, through the action of the screw j , to the proper angle of inclination to accommodate any desired size of plate f , which may be readily and quickly fitted onto the feathered rod a by simply removing the collar d , holding the needle-points in position. On the opposite side of the projection j' is formed a secondary spring, j^3 , for holding the spring-

leg k up snugly against the periphery of the plate or disk f while the instrument is being manipulated by the draftsman.

The lower portion of the spring-leg k is preferably beveled off on the sides, and by a knuckle-joint at l' is attached a short leg, k' , which has integral therewith a tube, l , having a narrow slit extending through the surface thereof. Through this tube l is inserted the shank m of the drawing-pen attachment M', provided with a pin, m' , for holding the pen attachment in proper position for use; or, when the pen is filled with ink and it is desired to raise the pen out of contact with the paper for any purpose whatsoever, the pen attachment may be readily raised by hand and the shank m , carrying the pin m' , moved upward sufficiently to allow the pin to rest snugly against the upper extremity of the tube l by a slight turn by hand of the pen attachment in the tube to the right or left of the slot. This pen attachment M' consists of two steel blades, p and p' , bent so that when the points nearly touch each other there will be a space above the points for holding the ink, and these two blades p and p' are drawn together or released from each other by means of a regulating-screw, p^2 , extending through the middle thereof. One of the steel blades works upon a joint, p^3 , at its upper end, so that the ink can be thoroughly cleaned off the inner surface of the respective blades when it is desired to put them away, and to obviate their becoming injured by rust; or, instead of the pen attachment, any suitable construction of pencil attachment may be used.

To the outside of the spring-leg k is secured by means of screws r a flat spring, r' , formed into any desired shape, and this spring rests against the upper extremity of the shank m of the pen attachment M', for firmly holding this shank in proper position in the tube l for immediate use.

The manner of manipulating my improved drafting device for making geometrical figures may be briefly explained in the following manner: The device being in the positions indicated in either Fig. 1 or 4, by simply placing the first finger of one hand upon the milled nut a' of the feathered rod a , with the needle-points e impinging against the paper to insure its true vertical position, by placing the thumb and first finger of the other hand against the milled edge of the button b' of the sleeve b , the spring-leg k , secured to the sleeve, may be readily revolved around the periphery of the elliptical or other shaped plate f , suitably secured to the feathered rod a , thereby causing the desired form of geometrical figure in pencil or ink to be made upon the paper, and by the mere movement of the plate or disk f on the feathered rod a the dimensions of the figure may be readily increased or diminished by the draftsman.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An improved ellipsograph having a feath-

ered rod with an adjustable collar on its lower extremity, to which are fitted two or more shouldered needle-points, a plate with a hub mounted on said rod, a spring secured to said hub and extending through said plate for holding the same in any position vertically on said rod, a sleeve mounted on the upper portion of said rod, a spring-leg suitably secured to said sleeve, a leg hinged to said spring-leg, and a drawing attachment supported by said hinged leg and guided by said spring-leg, substantially as and for the purposes set forth.

2. An improved ellipsograph having a feathered rod with a thumb-nut on its upper extremity and two or more shouldered needle-points fitted to a collar adjustably attached to the lower extremity of said rod, a disk having a hub formed integral therewith and mounted on said feathered rod, a spring for holding the same in a vertical position thereon, a sleeve provided with upper and lower hubs suitably mounted on the upper portion of said rod, whereby a rotary movement thereof is obtained, a spring-leg secured to said sleeve, a short leg hinged to said spring-leg, and a pen or pencil attachment held in position by said short leg and supported by said spring-leg, substantially as and for the purposes set forth.

3. An ellipsograph having a feathered rod with a sleeve mounted upon the upper portion thereof, one or more shouldered needle-points suitably attached to the lower extremity of said rod, a plate fitted to said feathered rod, and means for retaining it in position thereon, in combination with a spring-leg attached to said sleeve provided with an adjusting-screw, a short leg which has integral therewith a tube hinged to said spring-leg, and a pen or pencil attachment supported in position by said legs, substantially as and for the purposes set forth.

4. An improved ellipsograph having a feathered rod with a nut on its upper extremity formed integral with said rod, and two or more shouldered needle-points secured to a collar adjustably attached to the lower extremity of said feathered rod, a disk with a narrow groove formed in the interior surface thereof, a spring for retaining said device in a vertical position on said rod, a sleeve mounted on the upper portion of said rod, a spring-leg attached to said sleeve and hinged to a second leg, a drawing attachment supported and guided by said legs, and means for adjusting said legs to any angle of inclination to said feathered rod, substantially as and for the purposes set forth.

5. An improved ellipsograph provided with a feathered rod, a plate or disk adjustably mounted on said rod, whereby the size of the

figure to be drawn may be readily increased or diminished, and a sleeve journaled to said rod, in combination with a spring-leg with its adjusting-screw, a short leg hinged to said spring-leg, a drawing attachment supported by said legs, and a double guideway rigidly secured to said sleeve, whereby the lateral movement of the legs while the instrument is being manipulated is prevented, substantially as described.

6. An ellipsograph having a rod with a thumb nut on its upper extremity and recesses formed in its lower extremity for the reception of shouldered needle-points held therein by a collar with a clamping screw, an elliptical plate or disk combined with a hub fitting onto said rod, and a spring for holding it in position thereon, in combination with a sleeve suitably supported upon said rod, a spring-leg attached to said sleeve, with a screw for adjusting said spring-leg to the desired angle of inclination to said rod, a short leg hinged to said spring-leg and having formed therewith a tube with a slit running through the surface thereof, a pen or pencil attachment, the stem of which carries a pin, a helical spring coiled around said stem, and a bracket secured to said spring-leg, all arranged substantially as and for the purposes set forth.

7. An improved device for forming geometrical figures, having a feathered rod, a plate or disk with a hub mounted on said rod, a spring for holding said plate or disk and hub in position thereon, a sleeve mounted on the upper portion of said feathered rod, a spring-leg attached thereto and to a short leg having a tube with a vertical slit in the surface thereof, a drawing attachment with a stem having a pin secured thereto, and means, as described, for supporting said attachment in proper position while the instrument is being manipulated, substantially as described.

8. An improved device for forming geometrical figures, having a feathered rod and a sleeve supported in position thereon, a button attached to said sleeve, a guideway secured to said sleeve, a spring-leg secured to said sleeve and provided with an adjusting-screw, a tube formed integral with a short leg hinged to said spring-leg, and a drawing attachment supported in said short leg and guided by said spring-leg, substantially in the manner and for the purposes described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HERMANN BORMANN.

Witnesses:

ANDREW ZANE, Jr.,
THOMAS M. SMITH.