(No Model.)

# H. BORMANN.

## ELLIPSOGRAPH.

No. 383,697. Patented May 29, 1888.

Fig. 1.

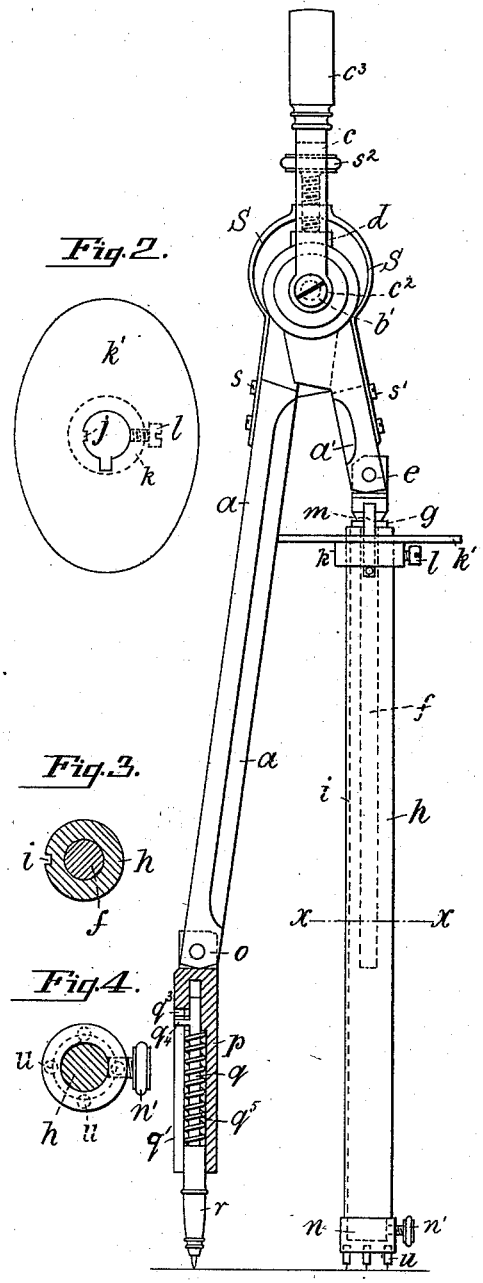



Fig. 2.




Fig. 3.




Fig. 4.




Fig. 5.

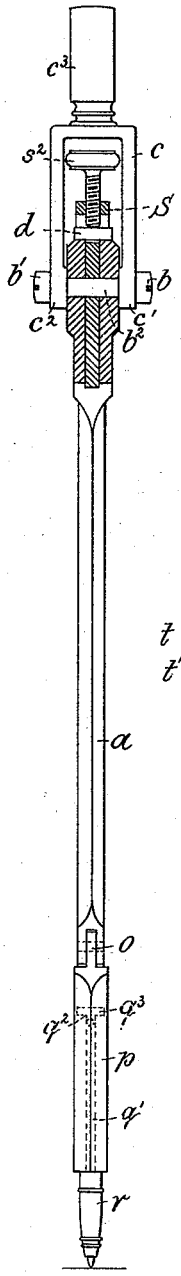



Fig. 6.

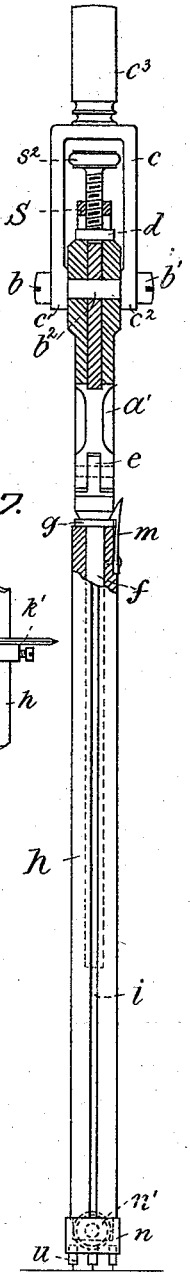
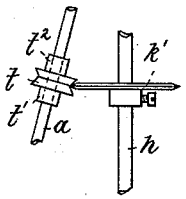



Fig. 7.

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atty.

# 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. 383,697, dated May 29, 1888.

Application filed July 28, 1887. Serial No. 245,482. (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 of compasses or mathematical instruments for drawing geometrical figures; and the principal object of the invention is to provide a device of simple construction that may be readily manipulated for drawing elliptical or other figures.

The nature of this invention will be more fully understood taken in connection with the accompanying drawings, wherein I have illustrated the improved device in forms found practically efficient for the accomplishment of the object, and in which—

Figure 1 is an elevation of an ellipsograph embodying the essential features of my invention. Fig. 2 is a top or plan view of the elliptical-shaped plate. Fig. 3 is a cross section of one of the legs and sleeve thereon on the line *x x* of Fig. 1. Fig. 4 is a similar view of a collar to which the needle-points are fitted, and showing also the screw for clamping the collar firmly to the sleeve encircling one of the legs. Figs. 5 and 6 are respectively vertical central sections through a device of my improved construction; and Fig. 7 is an elevation, partly in broken section, of a portion of a device, showing a plate or disk with a beveled-edge periphery rigidly mounted on a sleeve encircling one of the legs of the device, and with a grooved wheel loosely mounted on the opposite leg of the device.

Similar letters of reference indicate like parts throughout the several views.

Referring to the drawings for a further description of my invention, *a* and *a'* are the two legs of the device, made of steel, German silver, or other suitable metal. The leg *a* is constructed with a tongue, of preferably circular form, which is fitted between the bifurcated leg *a'*, and the two legs forming, when fitted together, a hinge-joint, and these legs held to place and to each other by a headed bolt with a smooth surface for a portion of its length from the head, having a transverse slot, *b*, therein, and the extremity of this bolt screw-threaded for the reception of a nut, *b'*. A bail or stirrup, *c*, having eyes *c'* and *c²* on its extremities, is fitted snugly up against the sides of the bifurcated leg *a'*, and the bolt *b²* is inserted through the eyes of the bail *c* and legs *a* and *a'*, and a nut, *b'*, is secured to the threaded extremity of the bolt *b²*. The bail *c* has secured centrally to the upper portion a handle, *c³*, with preferably a milled surface, so that the device when being manipulated may not slip in the fingers.

To the top surface of the bifurcated arm *a'* is secured rigidly, in any suitable manner, a curved cap-plate, *d*, for a purpose to be presently more particularly described. By a knee-joint, *e*, is attached a shank, *f*, which has rigidly secured thereto below the joint *e* a collar, *g*, and to the shank *f* is fitted a sleeve, *h*, made of brass or other suitable metal. This sleeve *h* has a narrow groove, *i*, in the surface thereof, which extends its entire length, for the reception of the feather *j*, projecting from the interior surface of the hub *k*, and elliptical plate or disk *k'*, rigidly attached thereto, thereby preventing the hub and plate from turning while on the sleeve *h*. The hub *k* is provided with a set-screw, *l*, for holding the plate *k'* onto the sleeve *h* for making the desired size ellipse, oval, or other geometrical figure. A latch, *m*, is soldered or otherwise secured to the sleeve *h*, for holding the same firmly up against the stationary collar *g* of the shank *f*.

To a cup, *n*, the shouldered needle-points *u* are suitably held to place therein, and this cup is fitted onto the lower extremity of the sleeve *h* and held thereto by means of a tightening-screw, *n'*. The leg *a* is preferably constructed with a flat surface on the outside and with the sides thereof beveled off, as shown in Figs. 1 and 5, and to which leg, by a knee-joint, *o*, is attached a short leg, *p*, having the sides beveled off and the interior bored out, forming a socket, *p'*, for the reception of the stem *q* of the pencil or other attachment, *r*, of any ordinary well-known construction. A slit, *q'*, extends from the bottom of the leg *p* to the point *q²*, where it terminates in a transverse slit, *q³*,

formed in the surface of this leg *p*. The stem *q* is provided with a pin, $q^4$, and around this stem is coiled a helical retracting-spring, $q^5$.

The advantage derived from providing the vertical slit *q'* and the transverse slit $q^3$ in the surface of the short leg *p* is, that the drawing attachment may be readily and quickly raised out of contact with the paper and held in the elevated position by means of the pin $q^4$ while the axis of the figure to be drawn on the paper is being ascertained by the operator with the opposite leg of the device, or for any other purpose that may arise for elevating the attachment, whence by moving the pin by hand in the direction of and to the vertical slit *q'* the helical spring $q^5$ will cause the drawing attachment to assume an operative position in the short leg *p* for immediate use or manipulation.

To the sides of the upper portion of the legs *a* and *a'* is attached, by means of screws *s* and *s'*, a curved spring, S, which is re-enforced in the center for additional strength and for enhancing the springing action thereof, and through the center of which is inserted an adjusting-screw, $s^2$, with its lower extremity normally resting upon the top of the curved cap-plate *d*, secured to the upper extremity of the bifurcated leg *a'*, whence by turning slightly this adjusting-screw by hand the tension of the spring may be increased or decreased *ad libitum*, thereby causing the two legs *a* and *a'* to be spread apart or drawn together to accommodate whatever size plate *k'* may be fitted to the sleeve *h*.

In Fig. 7 is shown a modified form of plate *k'*, secured to the sleeve *h*, consisting of an elliptical plate or disk having a beveled-off periphery. To the leg *a*, made cylindrical in form, is loosely mounted a V-shaped grooved wheel, *t*, having two hubs, *t'* and $t^2$, secured thereto, and this wheel *t*, loosely mounted on the leg *a*, serves to guide this leg around the stationary elliptical plate *k'*, secured to the sleeve *h*, while seated in the grooved wheel, thereby reducing, as thus arranged, the friction between the leg *a* and plate *k'* while the device is being manipulated by the draftsman for drawing the desired-shaped figure upon the paper.

The manner of operating my improved ellipsograph may be explained in the following manner: The instrument being in the position shown in Fig. 1, the thumb and first finger are placed upon the handle $c^3$, secured to the bail *c*, and the elliptical plate or disk *k'* being in the position shown in Fig. 1, with four needle-points impinging in the paper on the axis of the figure to be drawn, and if the leg *a* be then revolved, carrying the pencil or pen attachment, the desired figure may be recorded upon the paper in a well-understood manner.

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 provided with two main legs suitably hinged together, a shank carried by one of said legs, a sleeve mounted thereon carrying on its lower extremity one or more needle-points, a plate fitted to said sleeve, a short leg with a socket therein hinged to the opposite main leg, and a drawing attachment supported in said socket, substantially as and for the purposes set forth.

2. An improved ellipsograph provided with two legs of unequal length hinged together, a shank attached to the shorter leg and provided with a stationary collar upon its upper extremity, a sleeve secured to said shank, a latch for holding said sleeve to said shank, a plate or disk fitted to said sleeve, a collar carrying two or more points, and means for holding said collar to said sleeve, a short leg hinged to the longer leg with a bored-out interior and a pencil attachment suitably held in said leg, substantially as and for the purposes set forth.

3. An improved ellipsograph having two legs suitably hinged together, a bail with a handle located centrally thereon, in combination with a shank hinged to one of said legs, a sleeve mounted thereon, means for holding the same thereto, one or more shouldered points secured to the lower extremity of said sleeve, a plate or disk with a hub integral therewith mounted on said sleeve, and means for holding the same thereto, a socketed leg hinged to one of the main legs, and a drawing attachment suitably supported in said socket, substantially as and for the purposes set forth.

4. The combination, with a device provided with two legs hinged to each other, of a spring encircling the upper extremity of and secured to the sides of said legs, an adjusting-screw passing through said spring, and a cap-plate mounted on one of said legs, substantially as and for the purposes described.

5. The combination, with a device having two main legs suitably attached to each other and carrying a bail with a handle, of a shank secured to one of said legs and having a sleeve mounted thereon, a narrow groove extending through the surface thereof, a plate or disk provided with a feather fitting into said groove, and means for holding said plate or disk in position thereon, a collar provided with one or more points attached to said sleeve, a leg provided with a socket hinged to the other main leg, and a pencil attachment suitably supported therein, substantially as and for the purposes set forth.

6. An improved device consisting of two legs hinged to each other, a shank attached to one of said legs, a sleeve mounted thereon with one or more needle-points fitted to the lower extremity thereof, a plate or disk with a beveled-edge periphery, and a hub formed integral with said sleeve, a grooved wheel loosely mounted on the opposite leg, and a drawing attachment suitably supported by said leg, substantially as and for the purposes set forth.

7. An improved device for forming geometrical figures, consisting of two main legs suitably hinged together and carrying a bail having a handle, a shank jointed to one of said

main legs with a fixed collar thereon, a sleeve mounted upon said shank, and a latch for holding said sleeve to said shank and permitting of the removal of the plate or disk held thereon, a narrow longitudinal groove in said sleeve, an elliptical plate or disk secured to a hub having a feather upon the interior surface thereof and fitting into said groove, a collar having one or more shouldered points, and means for securing said collar to said sleeve, and a drawing attachment supported by the opposite leg, substantially as and for the purposes set forth.

8. An improved device provided with two legs, a shank connected with one of said legs by means of a knuckle-joint, a sleeve mounted thereon carrying a plate having a beveled off periphery, a grooved wheel with double hubs secured thereto and loosely mounted upon the opposite leg, a spring secured to the upper extremity of both of said legs, having an adjusting-screw, and a cap-plate, *d*, formed integral with one of said legs, substantially as and for the purposes set forth.

9. An improved device provided with two main legs, a short leg hinged to one of said legs and having the interior bored out, a narrow vertical slit in the surface of said short leg uniting with a transverse slit therein, a drawing attachment having a stem with a pin projecting therefrom, and a helical spring coiled around said stem, whereby said attachment may be elevated and supported by means of the pin in said transverse slit out of its operative position.

10. An improved device, substantially such as described, having a sleeve held by means of a latch to a fixed collar formed integral with a shank hinged to one of the legs thereof, and a narrow longitudinal groove formed in said sleeve, in combination with a plate or disk and a hub formed integral therewith, and with a feather upon the interior surface thereof, and means for adjusting said plate or disk to said sleeve, substantially as and for the purposes set forth.

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

HERMANN BORMANN.

Witnesses:

ANDREW ZANE, Jr.,

THOS. M. SMITH.