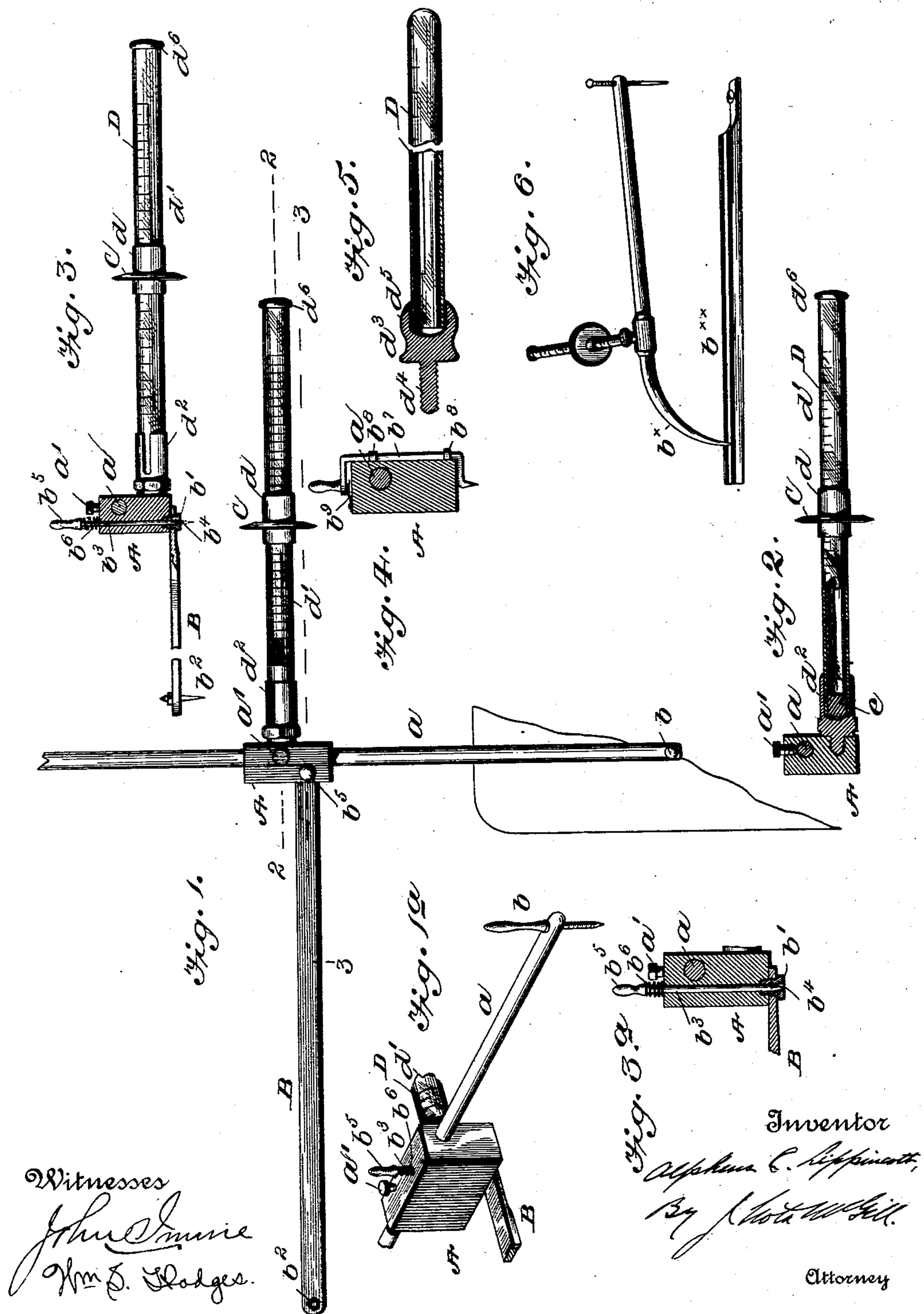


(No Model.)

A. C. LIPPINCOTT.
PLANIMETER.

No. 569,107.

Patented Oct. 6, 1896.



UNITED STATES PATENT OFFICE.

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PLANIMETER.

SPECIFICATION forming part of Letters Patent No. 569,107, dated October 6, 1896.

Application filed December 24, 1895. Serial No. 573,215. (No model.)

To all whom it may concern:

Be it known that I, ALPHEUS C. LIPPINCOTT, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Planimeters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention contemplates certain new and useful improvements in planimeters.

In ascertaining the areas of steam-indicator diagrams and other figures it is essential that great accuracy be observed and the reading of the marks or scales be capable of easy accomplishment. It is well known that scale-bars for indicating the areas, in connection with measuring-wheels, are affected by atmospheric influences, which seriously impair their accuracy. By my invention I seek to avoid this difficulty. This I accomplish by providing a hollow shaft for the measuring-wheel, said shaft being of glass or other translucent material, and inclosing therein scales of graduation, preferably printed on paper. The ends of the shaft are closed, and said shaft being removably held to the frame of the planimeter a series of such shafts may be used interchangeably. In planimeters the length of the diagram controls the distance between the pivot of the frame and the tracing-point of the tracer-bar. It has been customary to mount pointed lugs over these two points, and they are brought into coincidence with the length of the diagram to be measured by turning the entire instrument over, or partly so, in making the necessary measurements. A source of inaccuracy is introduced from the fact that these two points may not be exactly the same distance apart as the two measuring-points above which they are located. To overcome this, I provide the frame of the planimeter with a depressible pin the point of which is preferably directly beneath or in alinement with the pivot of the frame. This pin is normally held out of the way when not in use by means of a spring, but can be forced down while the instrument is being adjusted for length, the point of this pin and the tracer-point corresponding with the pointed lugs heretofore

used. In this way it is not necessary to turn the instrument over to ascertain the length of the card.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan view. Fig. 1^a is a detail perspective view. Fig. 2 is a sectional view on line 2 2, Fig. 1. Fig. 3 is a similar view on line 3 3, Fig. 1. Fig. 3^a is a detail sectional view. Fig. 4 is a view like Fig. 3, showing a slight modification. Fig. 5 is a view of a modified form of the shaft-holder. Fig. 6 is a view of a modified form of tracer-bar and guide.

Referring to the drawings, A designates the frame, which consists of an oblong block, and *a* the tracer-bar, which is extended through a longitudinal opening in the block and held at any desired point by a set-screw *a'*. Through a threaded opening in one end of this tracer-bar is passed a screw *b*, which serves as a tracer-point. A fulcrum-bar B is pivotally connected at one end to the under side of frame A by a screw *b'*, its free end having a pointed pin *b²* for holding that end of said bar. This acts as the guide for the instrument. This screw *b'* is made hollow, and through it and a vertical opening in frame-block A is passed a pin *b³*, having a lower pointed end *b⁴* and an upper head *b⁵*. A coil-spring *b⁶*, encircling this pin, serves to hold the latter elevated, so as not to contact with the card while the planimeter is being used, but when the length of the card is to be ascertained, or the tracer-bar adjusted according to such length, the pin is depressed. In this way the lower point of the pin *b³* and the pin *b²* serve as the measuring-points, avoiding turning over the instrument. In lieu of this form of depressible pin the latter may be formed with angular end portions *b⁷* and held to the side of the frame-block A by keepers *b⁸*, and a plate-spring *b⁹* can serve to normally hold the pin elevated. (See Fig. 4.) The forward end of the tracer-bar may be extended and slightly curved to one side and bent downwardly, as at *b^x*, Fig. 6, so that its extreme end will fit in and be movable along a grooved guide-bar *b^{xx}*.

C designates the measuring-wheel, having an elongated hub *d*, and *d'* is the shaft there-

for, which is removably held to frame A by a split sleeve d^2 , extending from one side of said frame; or in lieu of this sleeve a separate socket d^3 for each shaft may be employed. (See Fig. 5.) This socket has a threaded shank d^4 and a hollow ball end d^5 , in which the end of the shaft may be securely held by melted shellac. When this form is employed, the removal of the shaft necessitates the removal of its socket, but in using the split sleeve the shaft is separable therefrom. This shaft is made of translucent material, preferably glass, and is formed at its outer closed end with a peripheral flange d^6 . Within this shaft is a graduated scale D, preferably composed of a narrow strip of paper, on which the scales are printed. The scales of different shafts vary according to the different scales of measurement. After the scale is inserted in the translucent shaft the inner end of the latter is sealed, as by a wax-held stopper e , so as to preclude atmospheric influences on the scale.

The advantages of my invention are apparent to those skilled in the art. It will be observed that the shaft can be easily removed for effecting the interchangeability of scales of different measurement, and that the reading of the scales is readily accomplished, one of the edges of the wheel-hub being the point of indication. The scales are protected from the atmosphere, and hence their accuracy is insured. The adjustment of the tracer-bar is easily accomplished and the length of the card readily ascertainable without necessitating the reversal of the planimeter. The depressible pin is held out of the way while the instrument is being used, and can be quickly depressed for bringing the tracer-bar pin into coincidence therewith.

I claim as my invention—

1. A planimeter provided with a measuring-wheel having rotary and longitudinal movements, a removable shaft therefor of translucent material, a graduated scale inclosed in said shaft, and a tracer-bar, as set forth.

2. A planimeter provided with a measuring-wheel having rotary and longitudinal movements, a frame, a shaft for said wheel removably held at one end to said frame and formed

of translucent material, a graduated scale inclosed in said shaft, a tracer-bar, and a guide therefor, as set forth.

3. A planimeter provided with a measuring-wheel having rotary and longitudinal movements, a frame, a tracer-bar, a guide B therefor, a holder a' extending from one side of said frame, a hollow shaft for said wheel secured in said holder and formed of translucent material, and a graduated scale within said shaft, as set forth.

4. In a planimeter having a frame and an adjustable tracer-bar, a depressible pin carried by said frame, and a spring engaging said pin for normally holding the same elevated, as and for the purpose set forth.

5. A planimeter having a frame, an adjustable tracer-bar, a guide-bar pivoted to said frame, and a depressible pin having its lower point in perpendicular alinement with the pivot of said guide-bar, as set forth.

6. A planimeter having a frame, and an adjustable tracer-bar, a guide-bar pivoted to said frame, a depressible pin having its ends in perpendicular alinement with the pivot of said guide-bar, and the spring acting on said pin, substantially as set forth.

7. A planimeter having a frame-block, a tracer-bar adjustable in said frame-block having a tracer-pin at one end, a guide-bar, a hollow screw pivoting the latter to said frame-block, and the depressible spring-held pin extended through said hollow screw and a coincident opening in said frame-block, substantially as set forth.

8. The herein-described planimeter, comprising the frame-block, the longitudinally adjustable tracer-bar, the removable shaft having a graduated scale, the wheel thereon, the guide-bar pivoted to said frame-block, and the depressible pin having its ends in the same vertical line with the pivot of said guide-bar, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALPHEUS C. LIPPINCOTT.

Witnesses:

FRED S. SCOTT,

FRANK ROBERTSON.