

1,049,186.

Patented Dec. 31, 1912.

2 SHEETS—SHEET 1.

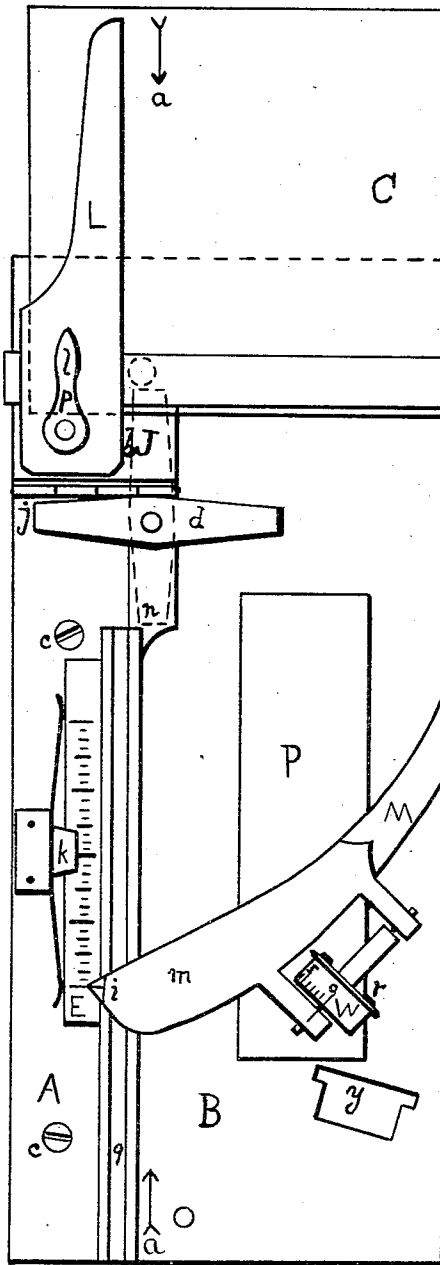


Fig. 1.

WITNESSES
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d. B. Heston.

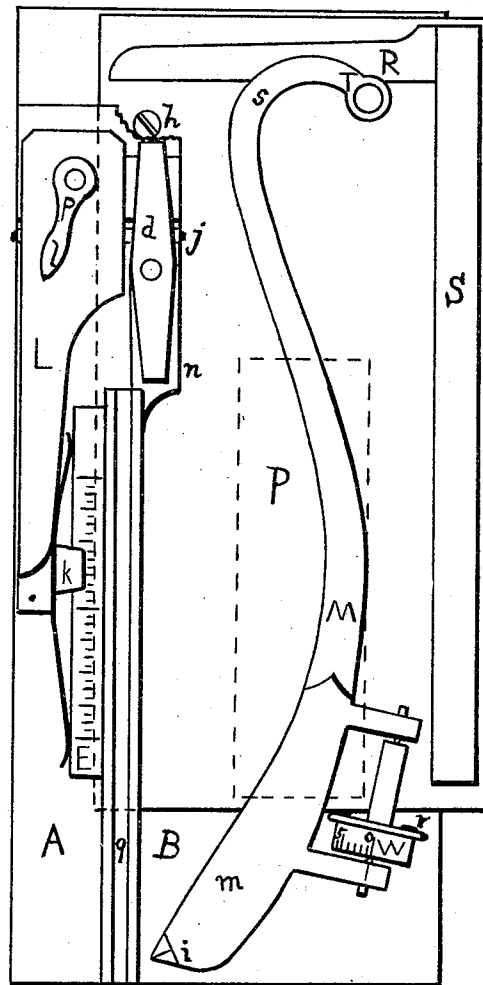


Fig. 5. INVENTOR
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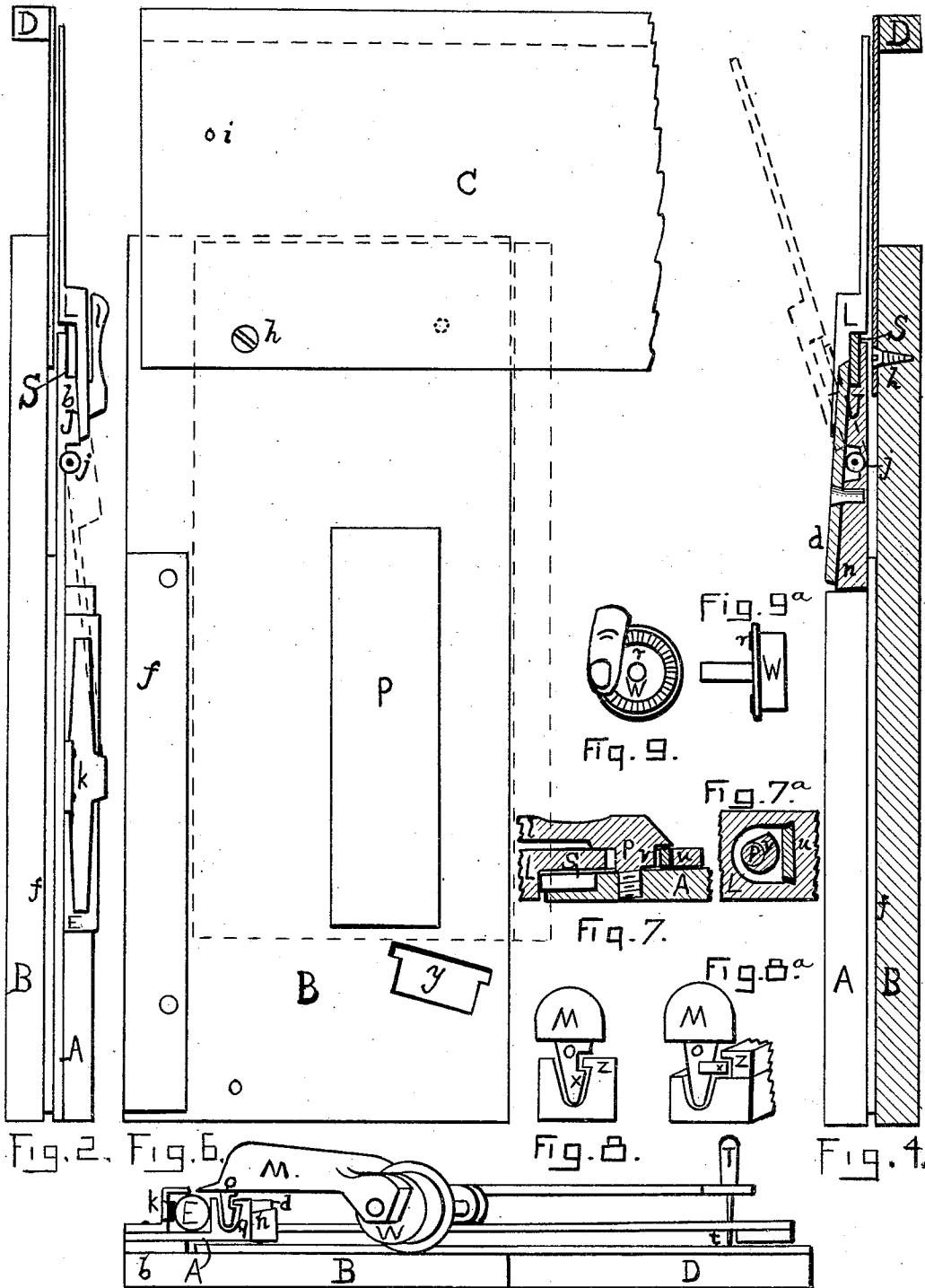
PLANIMETER.

APPLICATION FILED DEC. 31, 1906.

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2 SHEETS—SHEET 2.

1,049,186.



WITNESSES

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Fig 3

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PLANIMETER.

1,049,186.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed December 31, 1906. Serial No. 350,217.

To all whom it may concern:

Be it known that I, FRANK R. WILLIAMS, a citizen of the United States, and a resident of Syracuse, New York, have invented new and useful Improvements in Planimeters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in planimeters, and especially of a portable form, designed for general use upon engine diagrams, drafting and engineering sections, architects' and surveyors' plans, maps et cetera, and various other uses.

With this and other objects in view this invention consists of certain novel features of construction, combination and arrangement of parts as hereinafter described.

The general arrangement and construction of my improved planimeter will be readily understood from an inspection of Figure 1 of the drawings.

The main operating features of this planimeter are similar to that of my Patent No. 746,427, Dec. 8, 1903. The operative parts are, however, for useful reasons, detachably mounted upon a base or table, which base may be constructed in portions arranged so that the entire instrument may be operated self contained, and also may fold and lie together for convenience or for packing.

In the accompanying drawings, Fig. 1, is a plan view of my improved planimeter ready for use. Figs. 2 and 3, show a side and end view respectively. Fig. 4, is a view through the arrow line *a, a*, Fig. 1. Fig. 5, is a plan view as folded. Fig. 6, is a plan view of the table parts, with the operating parts removed. Figs. 7, and 7^a, show enlarged the pin *p*, and jaw *L*. Figs. 8, and 8^a, show enlarged the pin *o*, and ledge *z*. Figs. 9, and 9^a, show enlarged the wheel *w*, and knurling thereon.

In the figures, the letter *A*, represents the main body, upon or within which is the guideway *g*. Projecting above is the jaw *L*, which is attached and secured by the pivot *p*, hereinafter more particularly described. Sliding within the rectangle formed of the body *A*, and jaw *L*, is the sliding jaw *S*, upon which is mounted the perpendicular

jaw *R*. The pivot *p*, is threaded into the body *A*, and provided with a handle *l*, as shown, by which means the jaw *L*, is clamped down. It is also provided with a cam shaped portion *v*, see Figs. 4 and 7, which simultaneously draws the jaw *L*, longitudinally against the edge of the jaw *S*, thus holding it firmly and in perfectly correct position. A piece of hardened steel *u*, may be inserted in the jaw *L*, to receive the pressure and wear of the cam *v*. By means of the pivot *P*, the jaws may be loosened and released from pressure, or slightly raised, to facilitate sliding diagrams thereunder.

In order to raise the jaws, if necessary, there is near the upper end of the body *A*, a hinge *j*, or other construction which allows that portion of the body *J*, together with the jaws to be raised, see dotted lines Fig. 4, to facilitate placing diagrams, or for other purposes; portion *J*, being held down in use by a cam button *d*, or other equivalent manner; said cam button preferably being on its underside of a bevel or cam form *n*, and bearing upon a suitably formed portion of the frame *A*.

Alongside of the guideway *g*, is a scale *E*, retained in position by the holding clip *k*. The clip *k*, is constructed of a central portion rigidly attached to the body *A*, a stationary tongue projecting above the scale *E*, and has flexible ends that bear against the scale *E*, to provide an accurate but yielding retention of said scale tightly alongside to the guideway *g*, but at all times easily adjustable or removable, and which is suitable to hold scales of both round or rectangular form, and which scales may easily be removed or inserted.

The tracing arm *M*, is provided at one end with a tracer point *t*, and handle thereof *T*, and at the other end with a guide pin *o*, moving on the guideway *g*, and also carries a measuring wheel *W*, and weighted sufficiently by the integral portion *m*, to obtain proper pressure upon the pin *o*, and the wheel *W*.

To restrain the pin *o*, from accidentally jumping or lifting from its necessary position at the bottom of the groove, there is upon pin *o*, a shoulder *x*, over which pro-

jects a ledge *z*, shown enlarged in Fig. 8. Said ledge and shoulder may be formed integral, or may be attached as seen in Fig. 8^a.

5 The wheel *W*, is provided with graduations *o*, upon its face, and with a knurled or otherwise roughened ring or portion *r*, upon it, to facilitate adhesion of the finger when rotating it in setting, as shown by
10 Fig. 9. Said wheel is preferably smooth upon its paper contact edge.

The arm *M*, is formed in the single piece Venetian return curve form *S*, and the weight portion in a lobe integral thereof,
15 to facilitate convenience, and obtain the form least in the way of the sight when using, to facilitate exact adjustment by slight bending of the curves, and to obviate the nuisance of having a loose separate part
20 which must be handled at every operation.

The planimeter operating parts may be detachably mounted upon the bed by screws *c*, *c*, or other suitable manner to facilitate removal for flat use, as in my previous
25 patent. When compactness is not desired, the bed may be any table or board suitable for that purpose, or it may be permanently mounted upon a drawing board.

In order to fold into the smallest compactness the bed is constructed in parts, with a main portion *B*, (herein shown as a wooden base) to which the body *A*, is attached, and there is hinged or pivoted thereto as by hinge or pivot *h*, another portion *C*, (shown herein as a metal plate),
30 which swings or folds into position suitable to support and receive the diagram, as in Figs. 1, and 6, where it is held by a retaining catch or pin *i*, while it may swing or fold into position shown in Fig. 2. Also the
35 jaw *L*, the jaw *S* *R*, and the arm *M*, may be placed as in that figure.

The portion of the frame comprising the bearing of the jaw *L*, is formed on an incline *b*, so that when folding, the jaw will rise above the bed as shown in dotted lines Fig. 2. The body *A*, is raised to a level of the hinged portion *C*, by a strip *b*, which may be separate, or formed integral with
40 the bed *B*, or body *A*, and which also allows the portion *C*, to swing partly under the body *A*, and thus reduce the folded dimension. The plate *C*, may be partly supported by leg *D*. The surface *P*, upon which the
45 measuring wheel *W*, operates, which may be recessed below the level of the bed *B*, is covered by the plate *C*, when folded, and thus protected from injury.

The operation is well known and does not
50 need any specific description.

Claims.

1. The combination in a planimeter, of a main frame *A*, provided with projecting

jaws *L*, *R*, the jaw *R*, of which is adjustable to the dimension of the diagram; and
65 the jaw *L*, non-adjustably attached to frame *A*; of a pivot *p*, constructed to pass through and bear upon jaw *L*, and thereby clamp and securely hold said jaws in accurate
70 adjusted position, substantially as and for the purpose described.

2. The combination in a planimeter of a main frame *A*, provided with projecting jaws *L*, *R*, one of which is adjustable to the dimension of the diagram, and the other
75 jaw mounted upon frame *A*; of a pivot *j*, provided with a screw thread passing through jaw *L*, whereby it may screw down upon *L* and clamp said jaws rigidly and accurately hold same in position, substan-
80 tially as described.

3. The combination in a planimeter of a main frame *A*, provided with projecting jaws *L*, *R*, one of which is adjustable to the dimension of the diagram, and the other
85 non-adjustably attached to the frame; of a pivot passing through jaw *L*, provided with a cam thereon whereby it may draw said jaws into exact position and rigid security, as set forth.
90

4. The combination in a planimeter of a main frame provided with projecting jaws, one of which is adjustable to the dimension of the diagram; of a pivot, provided with a screw thread cooperating with the body,
95 and with a cam cooperating with the jaw, whereby said jaw may be drawn into exact position and clamped rigidly and securely, substantially as, and for the purpose described.
100

5. The combination in a planimeter of a main frame provided with separately constructed jaws *L*, *S*, *R*, of the pivot *p*, so constructed as to clamp and secure said jaws when in use, and which pivot may be loos-
105 ened to freely raise said jaws slightly to facilitate placing a diagram thereunder, as described.

6. In a planimeter, the bed *A*, provided with an incline *b*, and the jaw *L*, bearing
110 and rotating upon the incline *b*, of the frame for convenient folding, substantially as and for the purpose described.

7. The combination in a planimeter of a main frame *A*, a supplementary portion *J*,
115 jaws *L*, *S*, *R*, there-attached, and a hinged connection *j*, between said frame and supplementary portion, substantially as and for the purpose set forth.

8. The combination in a planimeter of a
120 main frame, a supplementary portion hinged thereto, projecting jaws there-attached, and the cam button *d*, as and for the purpose set forth.

9. The combination in a planimeter of a
125 main frame, projecting jaws there-attached,

and a hinged connection between said frame and jaws, and a cam button provided with a cam or bevel portion cooperating with a corresponding portion of the frame, as described.

10. A planimeter having frame A, hinge *j*, supplementary portion J, jaws L, R, arm M, tracer *t*, wheel W, and guide pin *o*, substantially and for the purpose set forth.

11. A planimeter having bed B, frame A, guideway *g*, supplementary portion J, cam button *d*, jaws L, S, R, and an arm provided with a point *t*, and measuring wheel W, as set forth.

12. A planimeter having frame A, guideway *g*, a scale E, a clip *k* constructed with fixed center and flexible ends, jaws L, R, and an arm N, carrying tracing point *t*, and measuring wheel W, substantially as shown and described.

13. In a planimeter, the combination of a frame A, and a tracing arm carrying therewith a tracing point, a measuring wheel, and a pointer, a scale E, and clip *k*, said clip being constructed with its center rigidly affixed to the frame, and with stationary tongue projecting above the scale, and with spring ends to provide a yielding retention of scale E, in accurate position tightly alongside to the guideway *g*, substantially as set forth.

14. A planimeter tracing arm M, constructed of a single piece of Venetian return curve, having a weight lobe integral, and carrying a measuring wheel, one end being provided with a tracing point, and the other end having means for positively controlling, substantially as described.

15. The combination with the operating parts of a planimeter, of a tracing arm constructed of a single piece Venetian return curve, having a weight lobe integral, and carrying a measurement indicating device, being provided at one end with a tracing point, and the other end having means for positively controlling, substantially as set forth.

16. In a planimeter, the combination with the operating parts, of a tracing arm, a tracing point at one end, and the other having means for positively controlling, and a measuring wheel provided with graduations upon its face and a knurled portion upon its flange side, as set forth.

17. The combination with the operating parts of a planimeter, of a tracing arm, of a single piece Venetian return curve, having a weight lobe integral therewith, and carrying a measuring wheel with a knurled portion upon its flange side, and also provided with a tracing point at one end, and the other having means for positively controlling, as set forth.

18. The combination with a tracer arm, and other operating parts of a planimeter, of a measuring wheel Z, provided with graduations upon its face, and a knurled ring *r*, upon its flange side, substantially as and for the purpose set forth.

19. In a planimeter, a base or table, diagram jaws thereupon, one of said jaws being of fixed position relative to the base, and the other adjustable so as to move toward and from the fixed jaw, and laterally beyond a side of said base, said base having a pivot *h*, and a movable extension attached thereto and swinging upon the pivot *h*, and adapted to project over the side of the base to form an extension over which the adjustable jaw projects when adjusted beyond the base, as and for the purpose set forth.

20. In a planimeter, the combination of a bed A, supporting the operating parts thereof, said base having a pivot *h*, and also thereupon a diagram leaf attached thereto by the pivot *h*, upon which said leaf swings horizontally to open working position, and to fold superimposedly upon the base, substantially as shown and described.

21. In combination with the operating parts of a planimeter, mounted thereon, a base A, of less width than the length of the diagram, said base having a pivot *h*, and a supplementary diagram leaf C, fixedly pivoted thereto, swinging upon pivot *h*, and retained in operating position by the catch *i*, as set forth.

22. In a planimeter, a base B, said base having a pivot *h*, and a catch *c*, a frame A, attached thereto and carrying diagram jaws L, R, which project over the base, and a diagram leaf thereunder to support diagrams, said diagram leaf being attached to the base, and swinging upon the pivot *h*, to fold superimposedly upon the base, and retained in working position by the catch *c*, substantially as shown and described.

23. A planimeter having a main base, and a supplementary hinged or pivoted portion adapted when open to support a diagram, and which when folded covers and protects the friction surface upon which the measuring wheel operates, substantially as shown and described.

24. A planimeter having a frame, a guideway thereon, diagram jaws attached, and an arm carrying the tracing point *t*, and the measuring wheel W, and the guiding pin *o*, said guide pin *o* being provided with a shoulder and the guideway with a removably attached ledge *z*, substantially as and for the purpose shown and described.

25. A planimeter having a frame A, a guideway G, thereon, diagram jaws L, R, attached, an arm carrying the tracing point

t, and the measuring wheel *W*, and the guiding pin *o*, said guide pin provided with a shoulder and the guideway furnished with a removably attached ledge *z*, substantially
5 as set forth.

26. A planimeter having a frame, a guideway thereon, diagram jaws attached, an arm carrying the tracing point *t*, and the measuring wheel *W*, and the guiding pin
10 thereof furnished with a shoulder, and the

guideway furnished with a ledge, substantially as described.

27. A planimeter having frame *A*, jaws *L*, *R*, guideway *o*, arm *M*, tracer *t*, wheel *W*, guide pin *o*, shoulder *x*, and ledge *z*, substantially as and for the purpose set forth. 15

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents
Washington, D. C."
