W. WINTER.

SINE BAR.

APPLICATION FILED FEB. 17, 1915.

1,169,900.

Patented Feb. 1, 1916.

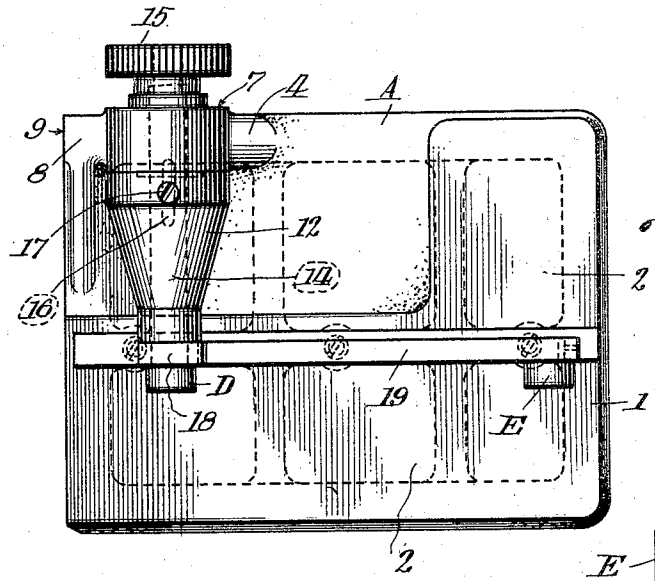


Fig. 1.

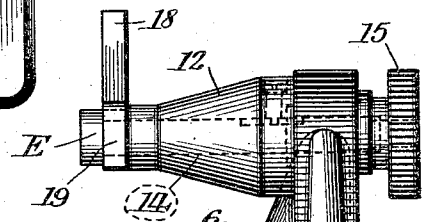
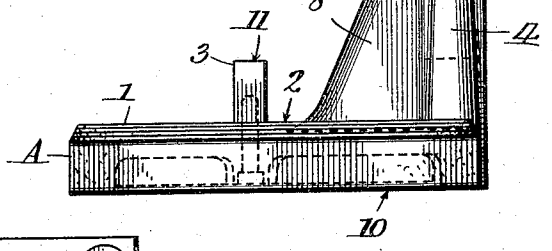


Fig. 2.



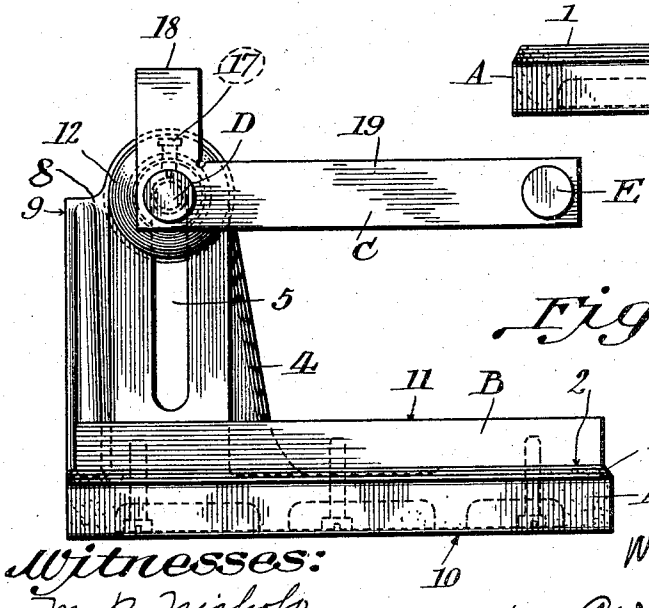


Fig. 3.

Witnesses:
M. B. Nichols
Frances McCann.

Inventor:
William Winter
By George W. Ramsey
Atty.

THE COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM WINTER, OF WOONSOCKET, RHODE ISLAND, ASSIGNOR TO THE TAFT-PEIRCE MANUFACTURING COMPANY, OF WOONSOCKET, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

SINE-BAR.

1,169,900. Specification of Letters Patent. Patented Feb. 1, 1916.

Application filed February 17, 1915. Serial No. 8,950.

To all whom it may concern:

Be it known that I, WILLIAM WINTER, a citizen of the United States, and a resident of the city of Woonsocket, in the county of Providence, State of Rhode Island, have invented new and useful Improvements in Sine-Bars, of which the following is a specification.

This invention relates broadly to tools and more specifically to improvements in sine bars for accurately determining the value of angles.

The principal object of this invention is to provide a sine bar mounted in a predetermined relation with a predetermined surface.

Another object of this invention is to adjustably mount a sine bar in a definite relation with a predetermined surface, which surface comprises one of the coöperating elements of the tool for measuring angles.

A still further and primary object of this invention is to mount a sine bar in such manner as to permit a vertical adjustment of the pivot of said bar relative to a predetermined plane.

Another important object of this invention is to mount a sine bar upon a base provided with a surface constituting a surface plate in such manner that the sine bar may be used by coöperation with the surface plate, or the sine bar may be positioned in such manner as not to extend over the surface plate enabling the measuring bar to be used in conjunction with the base to measure angles wherein both the work and the base rest upon a surface plate independent of the tool itself.

A still further object of this invention is to provide a sine bar in the nature of a universal tool wherein the base of the sine bar is provided on its upper surface with a surface plate and also with a surface bar directly beneath the sine bar, with the pivotal mounting of the sine bar constructed to be reversed to enable the sine bar to be used without coöperation of the specified surface plate or surface bar on the base block.

Still other and further objects of this invention will in part be obvious and will in part be pointed out hereinafter in the specification by reference to the accompanying drawings wherein like characters are used to represent like parts throughout the several figures thereof.

Figure 1 is a plan view showing the sine bar over the surface plate and surface bar. Fig. 2 is an end elevation of the device with the parts in the position shown in Fig. 1. Fig. 3 is a side elevation of the device with the parts in the position shown in Fig. 1.

Heretofore sine bars have been constructed with the axis of the sine bar fixedly mounted at a predetermined distance above the plane beneath the supporting block of the bar, and the pivot mounting was such as not to permit vertical adjustment thereof. Also as sine bars have heretofore been constructed it has been necessary to use the tool in connection with a surface plate separate and independent from the tool. Such sine bars are not well adapted to fast and accurate work in connection with relatively small articles. There is also a possibility of error in such devices in that small particles may accidentally be interposed between the base and the separate surface plate.

The sine bar which will hereinafter be more specifically described by reference to the drawings, obviates some of the previously specified difficulties by having its base provided on its upper surface with a certain portion thereof finished to constitute a surface plate, and to further facilitate rapidity of use and accuracy of measurement it is also provided with a longitudinal bar extending directly beneath the sine bar and having its upper surface formed to lie in a plane parallel to the plane of the surface plate upon which it rests. Furthermore, to facilitate more universal use of the device the pivot bolt is constructed to be vertically adjustable, thereby enabling the device to be used upon articles of small dimension as well as upon larger devices thus increasing the range of usefulness of the device. In order to further increase the range of utility of the tool the pivot bolt is constructed to pass through a removable boss which coöperates with parallel surfaces of the supporting bracket in such manner that the boss may be positioned to maintain the sine bar over the surface plate and surface bar, or the parts may be adjusted to retain the pivot boss in position extending away from the surface plate and surface bar, thereby permitting the instrument to be used after the manner of an ordinary sine bar.

Referring now to the drawings, the specific embodiment of my invention as herein

illustrated comprises a supporting block A which includes a base member 1 provided on its upper portion with a plane surface formed to constitute a surface plate 2 and preferably provided at one corner with a bracket 4 in which is formed a vertical slot 5. This surface plate 2 may comprise a predetermined measuring surface from which measurements to a movable measuring element, which will later be described, may be taken. The bracket 4 is provided with vertical sides 6 and 7 which respectively lie in parallel vertical plane surfaces. The side of the bracket adjacent the corner of the base member may be offset as at 8 to enable the supporting surface 9 to be formed to lie in the plane of the end of the base member and at right angles to the lower surface 10 of the base member. In the preferred form of my device a surface bar B is fixedly mounted on the surface plate 1 with the upper edge of said bar as at 11 lying in a plane parallel to the surface plate plane 2. The upper edge of the surface bar B forms an accurate surface extending directly beneath the measuring or sine bar C to facilitate the operation of measurements of angles by this said bar, which will now be described.

A pivot boss 12 is adapted to bear against the surface 6 of the bracket 4 and is provided with an opening to constitute a bearing for the through pivot bolt 14, which passes through the measuring or sine bar C. A thumb screw or clamp 15 coöperates with the outer end of the through bolt 14 to maintain the sine bar C in various adjusted positions and also permits the through bolt 14, the pivot boss 12, and the sine bar C, to be adjusted and clamped at various vertical positions through the length of the slot 5 in the bracket 4. As has previously been specified, it will be noted, that since the bracket 4 is provided with parallel vertical plane surfaces 6 and 7 and also with a vertical slot 5, the thumb clamp 15 may be removed from the end of the through bolt 14, and the through bolt may be withdrawn from the vertical slot 5 and replaced therein with the pivot boss 12 bearing against the surface 7 and extending outwardly away from over the surface plate 2 and supporting block A. When in this position the sine bar C may be used in connection with a separate surface plate (not shown) on which the lower surface 10 of the supporting block A is adapted to set. The through bolt 14 is preferably provided with a small longitudinal slot, for example, 16, with which a set screw 17 may coöperate to allow axial and longitudinal movement of the through bolt 14 relative to the boss 12 and to prevent relative rotative movement of these parts. While measuring buttons D and E may be conveniently located at various places relative to the measuring or sine bar C, in the preferred form of my invention one measuring button, for example D, comprises a cylindrical head formed on the end of the through bolt 14 and located in such manner that the center of this button is within the axis of the through bolt and also the intersection of the axes of the short arm 18 on the long arm 19. Preferably I also locate the measuring button E adjacent the outer end of the long arm with the space between the centers of the buttons D and E a fixed predetermined distance; the said distance being preferably a multiple or factor of ten units of linear measure. In order to provide rigidity and strength various forms and shapes of the webs may be utilized throughout the base construction. While the long arm and the short arm of the sine bar may have their respective axes intersect at various angles, I prefer that the said axes be arranged to intersect at right angles, and I also prefer that all of the edges of the said measuring arms shall be parallel to either the axis of one arm or the axis of the other arm. When constructed as specified, the sine bar comprises an L-shaped member wherein the edges of the longer arm are parallel to the plane joining the axes of the measuring buttons D and E, while the edges of the shorter arm are at right angles to the plane joining the axes of the said measuring buttons, and the ends of each arm are respectively parallel to the axis of the opposite arm.

By use of this tool it is obvious that upon measuring distances between the lower parts of the measuring buttons and predetermined plane surfaces, for example either an independent surface plate or the surface plate 2 on the supporting block, and subtracting the smaller dimension from the larger, the difference will numerically represent a factor of a natural sine of the angle adjacent the axis of the pivot bolt, thereby accurately measuring the said angle.

Since it is physically possible to vary the specific embodiment of my invention without departing from the spirit thereof, I desire that the specific construction herein disclosed shall be considered as illustrative and not in a limiting sense.

Having thus described my invention, what I desire to claim is:—

1. In a device of the character described in combination, a supporting block having the upper surface thereof formed to constitute a surface plate, a bracket constituting a part of said supporting block, said bracket being provided with a vertical slot, a pivot boss, a pivot bolt mounted in said pivot boss, a clamping nut carried by said pivot bolt, a movable sine bar pivotally mounted upon said pivot bolt between the head of said bolt and said pivot boss, and a surface bar extending above said surface plate and hav-

ing its upper edge lying in a plane parallel to said surface plate.

2. In a device of the character described in combination, a supporting block having its upper surface formed to constitute a surface plate, a vertically extending bracket at one corner of said supporting block, said bracket being provided with a slot and having sides lying in vertical parallel surfaces, a pivot boss having one end adapted to rest against one of said parallel surfaces, a pivot bolt extending through said pivot boss and said slot, means to prevent said pivot bolt from rotating in said pivot boss, a clamping nut carried on the outer end of said bolt and being adapted to bear against the other of said parallel surfaces, and a movable sine bar rotatably mounted on the opposite end of said pivot bolt.

3. A device of the character described comprising in combination, a base member, a surface bar carried by said base member, a bracket supported by said base member, said bracket being provided with a vertical slot, a sine bar, and means coöperating with said bracket for adjustably mounting said sine bar over said surface bar.

4. In a device of the character described in combination, a supporting block being provided on its upper portion with a predetermined measuring surface, a measuring bar being provided with a work surface, means for pivotally mounting said measuring bar over said predetermined surface, and a pair of cylindrical buttons mounted on said measuring bar in such manner that a plane including the axes of said buttons is always parallel to the work surface of said measuring bar.

5. In a device of the class described in combination, a supporting base, means mounted upon said supporting base and being provided on its upper edge with a substantially plane surface to constitute a measuring base, a rotatable measuring arm provided with a work face, and a pair of cylindrical buttons mounted on said arm in such relation to said arm that the plane including the axes of said buttons is parallel to the work face of said arm.

6. In a device of the class described in combination, a supporting base being provided on its upper surface with a plane surface, a bar adjacent said plane surface and having an upper surface parallel to said plane surface, a measuring arm mounted to rotate directly above the upper surface on said bar, a pair of cylindrical buttons both of which are fixedly mounted relative to said measuring arm and one of which rotates with said measuring arm, said cylindrical buttons being of exactly the same diameter and comprising means for determining a predetermined base line.

WILLIAM WINTER.

Witnesses:
ROY J. SOULER,
AUSTIN M. WILSON.

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