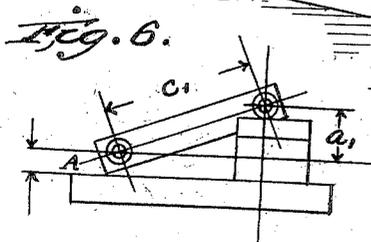
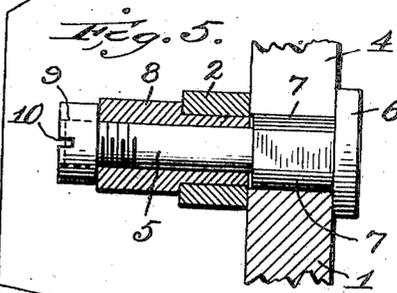
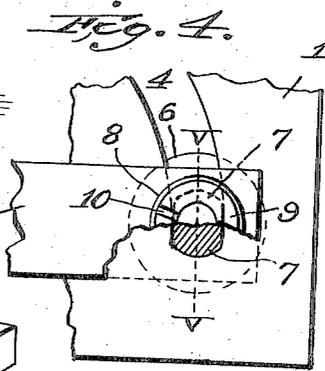
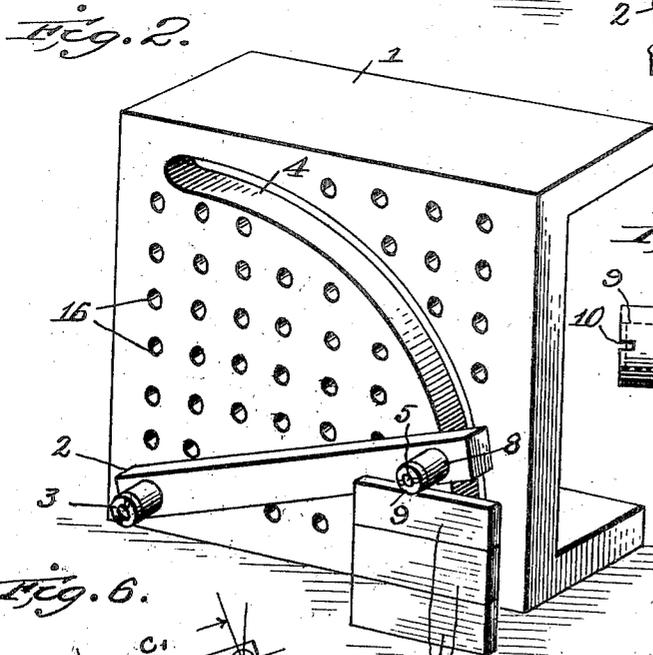
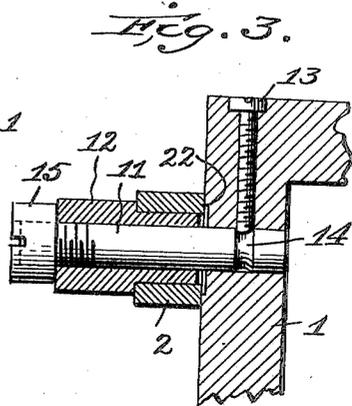
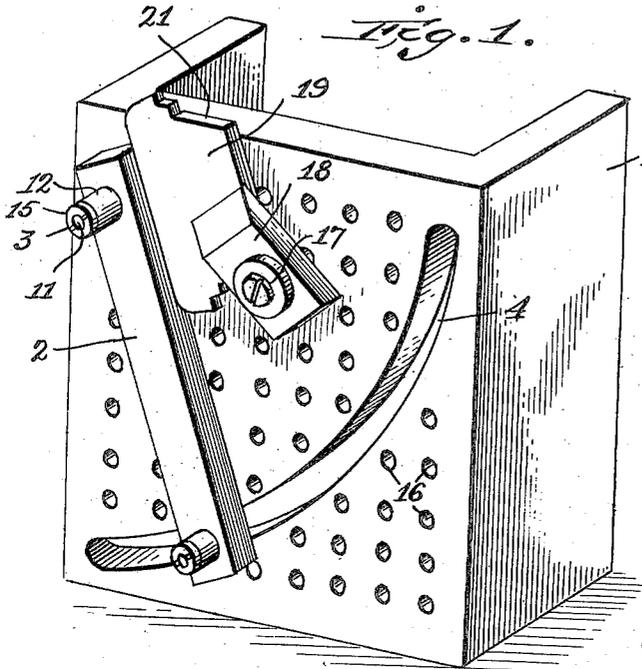


A. SCHACHAT.
SINE BAR.
APPLICATION FILED JUNE 8, 1917.

1,308,451.

Patented July 1, 1919.



Inventor
Abraham Schachat
By Percy B. Hills
Atty

UNITED STATES PATENT OFFICE.

ABRAHAM SCHACHAT, OF BROOKLYN, NEW YORK, ASSIGNOR TO SLOCUM, AVRAM & SLOCUM LABORATORIES, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SINE-BAR.

1,308,451.

Specification of Letters Patent.

Patented July 1, 1919.

Application filed June 8, 1917. Serial No. 173,511.

To all whom it may concern.

Be it known that I, ABRAHAM SCHACHAT, a citizen of the United States, residing at Brooklyn, borough of Brooklyn, city of Greater New York, and State of New York, have invented certain new and useful Improvements in Sine-Bars, of which the following is a specification.

My invention relates to precise instruments adapted for determining angles or the inclination of angular surfaces more accurately, by means of a sine bar of predetermined length pivoted upon a block or support, and having the axis of the pivot thereof located a predetermined distance above a definite horizontal plane, and has for its primary object to provide an improved construction of the same, whereby said bar may be adjusted and clamped to said block at a plurality of points.

A further object of my invention is to provide said bar and its block or support with means whereby work to be operated on may be clamped thereto in definite relation to said bar when the latter is adjusted to a predetermined angle, whereby said work may be ground or machined with absolute accuracy at any desired angle.

My invention embodies certain minor details of construction in respect to the sine bar and its method of adjustment and of retention in any adjusted position, as hereinafter will be pointed out and claimed more definitely, reference being had to the accompanying drawing, in which:—

Figure 1 is a perspective view of my improved block and attached sine bar, the latter being shown in an adjusted position, and a piece of work being shown fixed to said block in proper relation to said sine bar.

Fig. 2 is a view similar to Fig. 1, the block being shifted a quarter turn on its supporting base, and the sine bar being shown adjusted by means of suitable gage blocks placed under the movable end of the same.

Fig. 3 is a sectional view taken through the pivotal point of the sine bar and its block, showing the means of attaching the sine bar pivot to said block.

Fig. 4 is a face view of one corner of the block showing the slot therein at that portion, and the movable end of the sine bar in register with said slot, said sine bar being partly broken away.

Fig. 5 is a sectional view taken on the line 55 V—V of Fig. 4.

Fig. 6 is a diagrammatic view, illustrating the method of calculating the angle of the sine bar.

Similar numerals of reference denote corresponding parts in the several views.

In the said drawing, the reference numeral 1 denotes the metal block to which the sine bar is pivoted, and 2 said sine bar, the latter being pivoted to said block at 3. Formed in said block on the arc of a circle struck from the pivot 3 is a through slot 4, the same being disposed at a distance from said pivot 3 slightly shorter than the length of said sine bar 2, and with which is engaged a bolt 5, passing through said sine bar and slot, said bolt being headed at its inner end at 6 to engage the inner face of the block 1, as best seen in Fig. 5. That portion of the bolt 5, which lies in the slot 4, is enlarged upon opposite sides of its center at 7 to engage the sides of said slot to prevent rotation of said bolt therein. The outer threaded end of said bolt 5 passes through a sleeve 8, which also projects through the aperture in the sine bar and contacts with the block 1, and these parts are adapted to be clamped in any adjusted position by means of a nut 9, threaded onto the outer end of the bolt 5 and slotted at 10 to receive a suitable manipulating tool.

The end of the sine bar 2 pivoted at 3 is connected thereto by means of a bolt 11, which passes through a sleeve 12 similar to the sleeve 8 into the block 1, where it is retained in position by any suitable means, such as a screw bolt 13, passing through the side of the block 1 and engaging a groove 14 in said bolt 10. The outer end of said bolt 10 is screw-threaded to receive a clamping nut 15, similar in construction to the clamping nut 9.

The length of the slot 4 is such that when the sine bar is shifted on its pivot to one extreme of movement, its side face will lie exactly parallel with the adjacent side face of the block 1, whereas when moved to its opposite extreme of movement in said slot, its opposite side face will lie parallel with the adjacent side face of the block 1.

The face of the block 1 is provided with a plurality of through apertures 16 adapted to receive one or more bolts 17 for adjustably

attaching thereto clamps 18, between which clamp or clamps and the block 1 is to be fastened the work 19 to be operated on.

In adjusting the sine bar to the desired angle, I prefer to employ any suitable gage blocks 20, or a suitable height gage of conventional construction, and it being understood that the distance from the pivotal center 3 of the sine bar to the lower edge of the block 1, as well as the distance from said center 3 to the center of the bolt 5, which moves in the slot 4, being constant, the required height of sleeve 8 from the edge of block 1 may be determined by the following formula:

$$a_1 = c_1 \times \sin A,$$

said formula being read on Fig. 6.

In actual operation, when it is desired to grind one face of a piece of work along a line at a desired angle, the block 1 is placed upon its support in the position shown in Fig. 2, and the desired angle of adjustment of the sine bar 2 is obtained by means of gage blocks 20, or by means of a suitable height gage, whereupon said bar is clamped in said position by means of clamp nuts 9 and 15. The block 1 then is turned at a right angle to its former position, or to the position shown in Fig. 1, and the work 19 to be ground is positioned against the sine bar and is clamped in said position by means of block 18 and bolts 17, as shown. In this position the face of the work 19 may be ground or machined in a manner readily understood.

In order that the surface of the block around the aperture through which the bolt 11 passes may not present any bur or raised portion, I form in said surface around said aperture a slight annular depression 22.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A device of the class described, comprising a supporting block having a slot therein struck on the arc of a circle, a sine bar pivoted near one end to said block at

the center of the circle from which said slot is struck, means carried by said sine bar and engaging through said slot for clamping the free end of said bar in any adjusted position and means for clamping said bar in any adjusted position at its pivotal point.

2. A device of the class described, comprising a supporting block, a sine bar, a pivot bolt provided with an annular groove and passing through said sine bar and into said block, and a screw bolt passing into said block and engaging the annular groove in said pivot bolt to retain the latter against withdrawal.

3. A device of the class described, comprising a supporting block, a sine bar having a pivot aperture therein, a sleeve disposed in said pivot aperture, a pivot bolt passing through said sleeve and into said block, a screw bolt passing into said block and engaging said pivot bolt to retain the latter against withdrawal, and a clamping nut on said pivot bolt for retaining said bar in any adjusted position.

4. A device of the class described, comprising a supporting block having a through slot therein struck on the arc of a circle, a sine bar pivoted near one end to said block at the center of said circle, a sleeve in said bar at the point where it registers with said slot, a bolt passing through said sleeve and slot and headed on its inner end, said bolt at the point where it engages said slot being enlarged on opposite sides of its center to prevent rotation therein, and a clamping nut engaging the outer end of said bolt to retain said parts in any adjusted position.

5. A device of the class described, comprising a supporting block provided with a plurality of apertures, a sine bar pivoted thereon near one end, and means adapted detachably to engage through any of said apertures for clamping work in relation to said sine bar.

In testimony whereof, I hereunto set my hand this 31st day of May, 1917.

ABRAHAM SCHACHAT.