No. 689,825. Patented Dec. 24, 1901.

S. M. D. MILLER.

SCREW CUTTER'S BEVEL AND PITCH GAGE.

(Application filed Oct. 13, 1900.)

(No Model.)

Fig. 1.

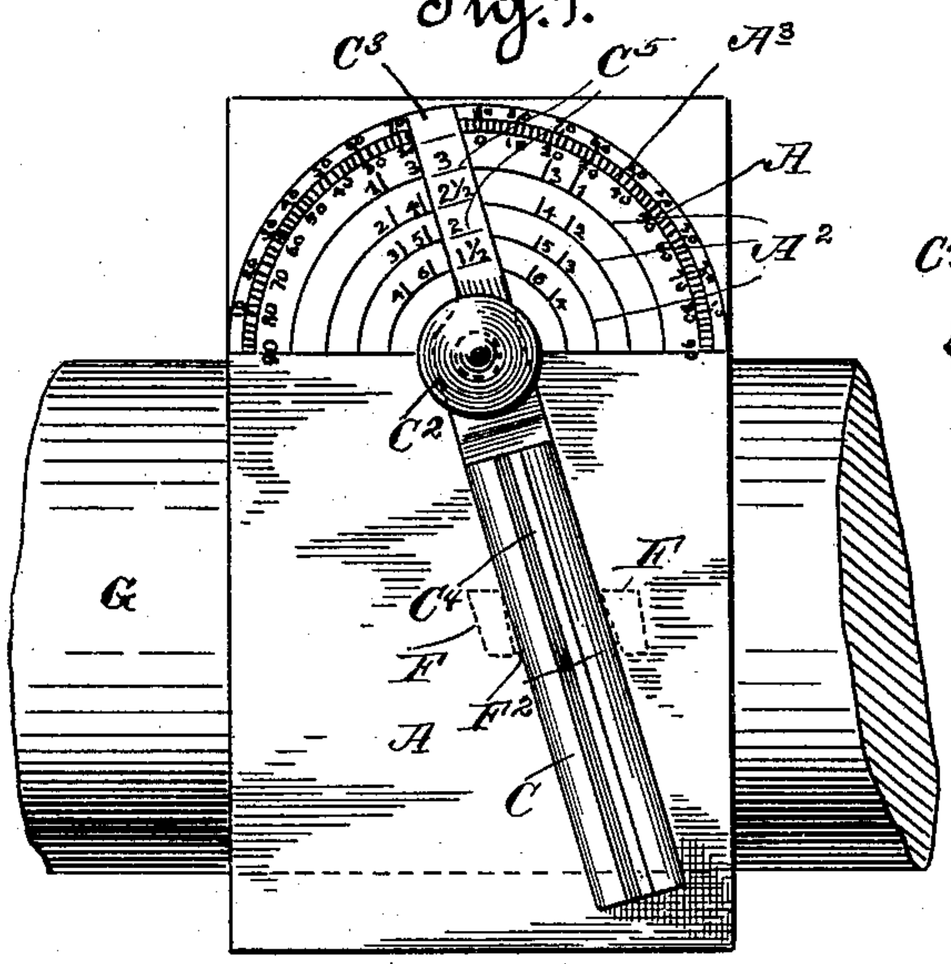


Fig. 2.

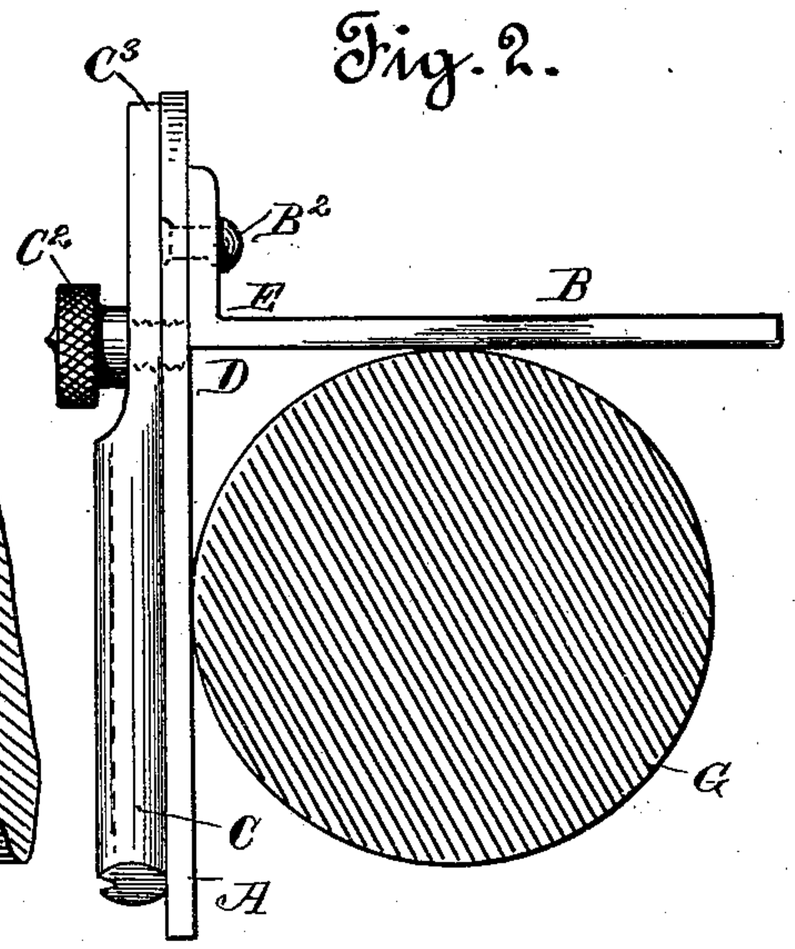


Fig. 3.

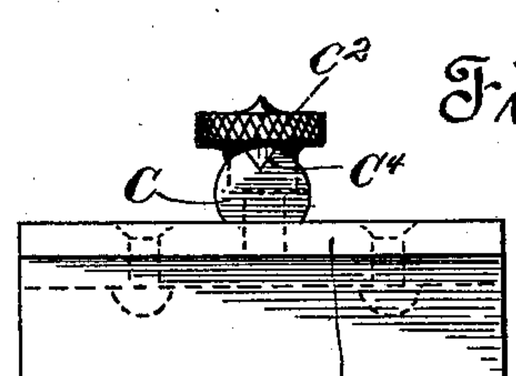
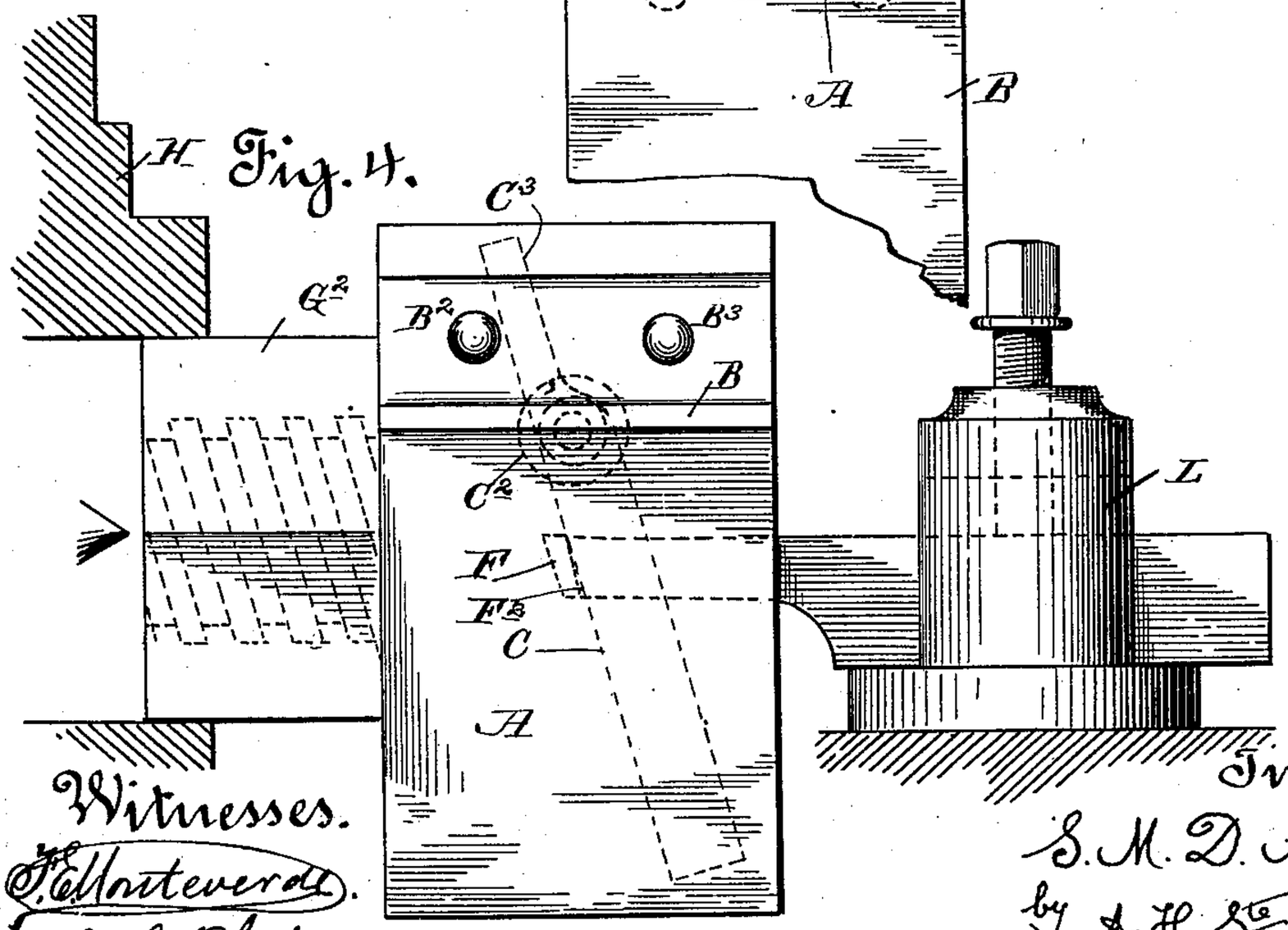


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SCREW-CUTTER'S BEVEL AND PITCH GAGE.

SPECIFICATION forming part of Letters Patent No. 689,825, dated December 24, 1901.

Application filed October 13, 1900. Serial No. 32,987. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL M. D. MILLER, a citizen of the United States of America, and a resident of Stockton, in the county of San Joaquin and State of California, have invented a new and useful Screw-Cutter's Bevel and Pitch Gage, of which the following is a specification.

This invention is an instrument for correctly and mechanically determining the correct inclination, bevel, and clearance of the cutting end of tools for cutting screw-threads.

It is well known to those familiar with metal-working that the cutting-tool for lathe-work, such as thread-cutting and the like, should have more or less depth at the cutting-point to give strength to the tool. Such being the case, it has been found difficult to cut threads of different pitch and insure sufficient clearance between the sides of the cutting end of the tool and the sides of the thread when the tool is making and has entered the channel, it being found that in many instances the bottom or non-cutting portions of the tool engage the side of the thread and bind on the same. Heretofore the process of obtaining the inclination, bevel, and clearance of such tools has been a haphazard or tedious "grind-and-try" operation; but with the aid of this instrument screw-tools can be shaped to cut threads of any desired pitch positively and expeditiously.

The device consists of several parts, each capable of performing various functions, all as hereinafter described and claimed.

To better explain my invention, I will refer to the accompanying drawings, which form part of this specification, and in which like characters indicate like parts in the several figures.

Figure 1 is a front elevation of my invention, or, in other words, it presents that face of my gage which is functionally disposed vertically in front of the user. This view shows the gage applied to a shaft upon which an external screw-thread is to be cut, and it also indicates in dotted lines how the gage is placed on both sides of the thread-cutting tool to determine its bevel and clearance. Fig. 2 represents the said shaft in cross-section and the instrument applied thereto in side or edge elevation. Fig. 3 is a plan of the instrument inverted and partly broken away. Fig. 4 is a rear elevation of the instrument applied to a nut held in a lathe, illustrating its function for determining the slant and clearance of a tool for cutting an internal thread.

My gage, as herein shown, consists substantially of two plates of thin steel, preferably rectangular in form and respectively marked A and B in the drawings, and a bar C, pivoted to a face of the plate A. For small and medium-sized work—say up to three inches in diameter—the said plates A and B are about four inches long and one inch and a half to two inches wide. The plate B is secured square across and perpendicular to that face of the plate A which is opposite to the pivoted bar C by means of a flange B^2 and rivets B^3, so as to form with it a somewhat T-square-like tool when looking at these joined plates edgewise. B is preferably disposed to A nearer to one end than the other, so that the sides of one angle D of the two adjacent right angles D E, formed by said plates, shall represent two adjacent sides of a square box whose length and width are three inches and whose depth is (the before-mentioned) one and a half or two inches. The disposition of the parts forming the angle D is herein designated the "box-square," and the edgewise relation of the plates A and B to each other, comprising the two angles D and E, I herein term the "T-square." The flange B^2 is within the angle E, so as to be without the box-square.

As above stated, the bar C is pivoted to the face of the plate A which is opposite the perpendicular plate B and preferably to the box-square by means of a thumb-screw C^2. The position of this pivot C^2 is central transversely with the plate A and at a distance below its upper end equal to half its width. The bar C is of or about the length of the plate A and is free to revolve over the face thereof for the purpose of indicating by its direction any desired angle to either the sides or top or bottom of said plate A or showing by its angular relation with the box-square (applied to the work) the desired slant to give the thread-cutting tool. Above the pivot C^2 this bar C is made so that one of its longitudinal edges is exactly on a line with the center of said

pivot in order that when the bar lies parallel with the longitudinal sides of the plate A this edge will be on or coincide with a central line parallel with said sides of the plate A. This upper end of the bar is herein called the "index" and is designated by C^3. The longer or lower end of the bar is preferably (in end or cross-section) a segment of a circle greater than a semicircle, with its chord in contact or contiguous with the face of the plate A. Longitudinally on the cylindrical face of this end of the bar C and centrally as to the arc of the segment and its chord aforesaid is a V-shaped groove C^4 to be employed as a screw-cutter's center-gage and which will therefore be an angle of sixty degrees for the United States standard thread or as the case may require.

My object for making the gaging-bar C cylindrical is to afford facilities for applying thereto thread-cutting tools for square, bevel, or other shaped threads. I am thereby enabled to determine the inclination-clearance as well with one form of cutting-tool as with another, the receding sides of the bar accommodating the slant of any tool. This clearance-determining function is illustrated at F F^2, Figs. 1 and 4, in which F is the thread-cutting tool and F^2 its clearance. The upper or index end of the gaging-bar is flattened below the pivot C^2 upward to the end of the index, so as to be flat under the head of the pivot and to afford a suitable surface on which to impress a table of shaft-diameters C^5, which table is to be used in connection with underlying and corresponding screw-pitch graduations A^2 on the contiguous face of the plate A. These graduations A^2 are placed between lines concentric with reference to the pivot C^2, so that the shaft-diameter graduations C^5 on the index C^3 will pass each over its respective scale of the graduations A^2. Each of the scales A^2 is for a shaft of the diameter indicated by the adjacent mark on the upper end of the gaging-bar, and each scale is provided with characters indicating the number of threads to the inch for a shaft of that diameter. Besides the graduations A^2, I employ a circular measure or protractor-scale A^3, which is to be used in connection with a table of screw-pitches in degrees or fractions. (Not shown.) Such table I would prefer to place on the face of the plate A below the pivot C^2, or I may otherwise furnish the same. I may also provide other tables for sundry uses, which may be impressed on this same space of the plate A or elsewhere on the gage to be used more or less in connection with it. When the sides of the gaging-bar are parallel to the longitudinal edges of the graduated plate A, the index registers blank or zero on the underlying scales of said plate A. When the bar is inclined to any degree, screw-pitch, or other graduation, its sides show the indicated bevel, slant, or incline with reference to the sides of the plate A and the corresponding complements in relation to the ends of the same plate. By the guiding arrangement of the plate B, disposed at right angles to and square across the opposite face of the plate A, the sides of the gaging-bar will show positively the correct bevel or slant to give the cutting-tool in order to obtain the pitch or number of threads per inch indicated on the scale over which the index is moved when read in connection with the corresponding shaft-diameter on said index.

To illustrate the use of my instrument in obtaining the inclination and clearance of tools for cutting screw-threads of any desired number per inch, whether external or internal, we will refer to Figs. 1 and 2 for external and to Fig. 4 for internal threads.

In Figs. 1 and 2 the instrument is seen applied to a shaft G to be threaded externally. Fig. 1 illustrates this shaft in longitudinal aspect and the instrument functionally disposed thereon—that is to say, with the graduated plate A standing vertically and flat against the side of the shaft and the perpendicular plate B therefrom lying horizontally and squarely across the top of the shaft. In Fig. 2 we see the shaft G in transverse section and the instrument, properly applied thereto, in side or edge elevation. In Fig. 1 the bar C is represented as if disposed at the desired thread pitch or bevel, and on either side thereof is seen in dotted lines the cutting end of the thread-cutting tool F, between which and the bar is shown the clearance F^2 for said cutting-tool. This suggests the method of applying the gage to the cutting-tool so as to equalize its clearance on each side, it being understood that the bar C is brought to first one side and then the other side of the cutting end of the tool to test the inclination from the vertical of the sides of the tool to insure that there will be sufficient clearance between the lower portion or non-cutting portion of the tool and the threads when the tool is cutting the channel. In this figure we notice that the reading on the upper scale A^2 in relation to its corresponding shaft-diameter on the index C^3 illustrates the gaging-bar inclined so as to indicate the pitch of three threads to the inch for a three-inch shaft, and on the outer scale A^3 it shows the incline in degrees or circular measure. Of course these screw-pitch markings on the drawings are not correct and are only intended for illustration. The circular-measure scale A^3 will give the screw-thread pitches when read in connection with a table showing the same in degrees, as before stated, and it further illustrates the utility of this instrument as a protractor-bevel or for any similar use.

In Fig. 4 we see the instrument applied edgewise, as a T-square, to the end of a nut G^2. This nut is grasped in the chuck H of a lathe and shows internal threads dotted in. In this view the gage is in rear elevation or in reverse position to that seen in Fig. 1, showing the perpendicular plate B pointing edgewise toward the observer and presenting its flange B^2 and rivets B^3. On account of

this being the reverse position to that of Fig. 1 the gaging-bar and cutting end of the tool are dotted in. The gage-bar is seen in this view at the same incline as the internal threads of the nut G^2, which of course is its functional position and agrees with the position for external threads of the same pitch, as shown in Fig. 1. In Fig. 4 the shank of the cutting-tool is seen held by the lathe tool-post L. The clearance of this tool for cutting internal threads is obtained in the same manner as in the previous case for external threads. The importance and utility of the center-gage provision C^4 for determining both slant and clearance of external and corresponding internal threads of the standard V variety (by the simple application of the cutting-tool to and within the center gage) are quite apparent.

This instrument can be put to numerous other uses, such as squaring or determining the square of straight bars or shafts of any kind, or for beveling or mitering such shafts at any desired angle, or for determining such angle or miter, or for setting a cutting-off tool, &c.

Having described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A gage for screw-cutting tools comprising a square applicable to the work comprising oppositely-disposed plates secured together at their meeting ends, graduations on the outer surface near the end of one of said members, a gaging-bar pivotally secured to and movable across the same surface having an upper extension adapted to be brought into registration with said graduations, and a lower extension, substantially as described.

2. A gage for screw-cutting tools, comprising a square applicable to the work comprising oppositely-disposed plates secured together at their meeting ends, a swinging bar movable across the outer surface of one of said members pivoted intermediate of its ends having a relatively flat upper extension adapted to be brought into registration with suitable graduations on the same member, and a lower substantially cylindrical extension C provided with the longitudinally-arranged groove C^4, substantially as described.

3. A gage for screw-cutting tools, consisting of a square applicable to the work, a gaging-bar thereon to which the tool can be applied as it is held in position to thread the work, and a screw-pitch-indicating scale coöperating with said gaging-bar, substantially as described.

4. A gage for screw-cutting tools composed of plates secured squarely across and perpendicularly one to the other, and a bar pivoted to one of said plates and adapted to be set at various angles on the face thereof, substantially as described.

5. A gage for screw-cutting tools consisting of a square applicable to the work, said square comprising a plate with screw-pitch-indicating graduations on its face, and a bar pivoted to said plate and bearing marks that can be read in connection with its graduations, substantially as described.

6. A gage for screw-cutting tools composed of a squaring device consisting of two plates secured square across and perpendicular one to the other so as to form the angle of a box-square and present the edgewise aspect of a T-square, one of said plates having graduations on its front face, and a gaging-bar movable across the same face of the last-named plate and adjustable thereon with relation to its graduations, substantially as described.

Signed at Stockton, California, this 19th day of September, 1900.

SAMUEL M. D. MILLER. [L. S.]

Witnesses:
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