

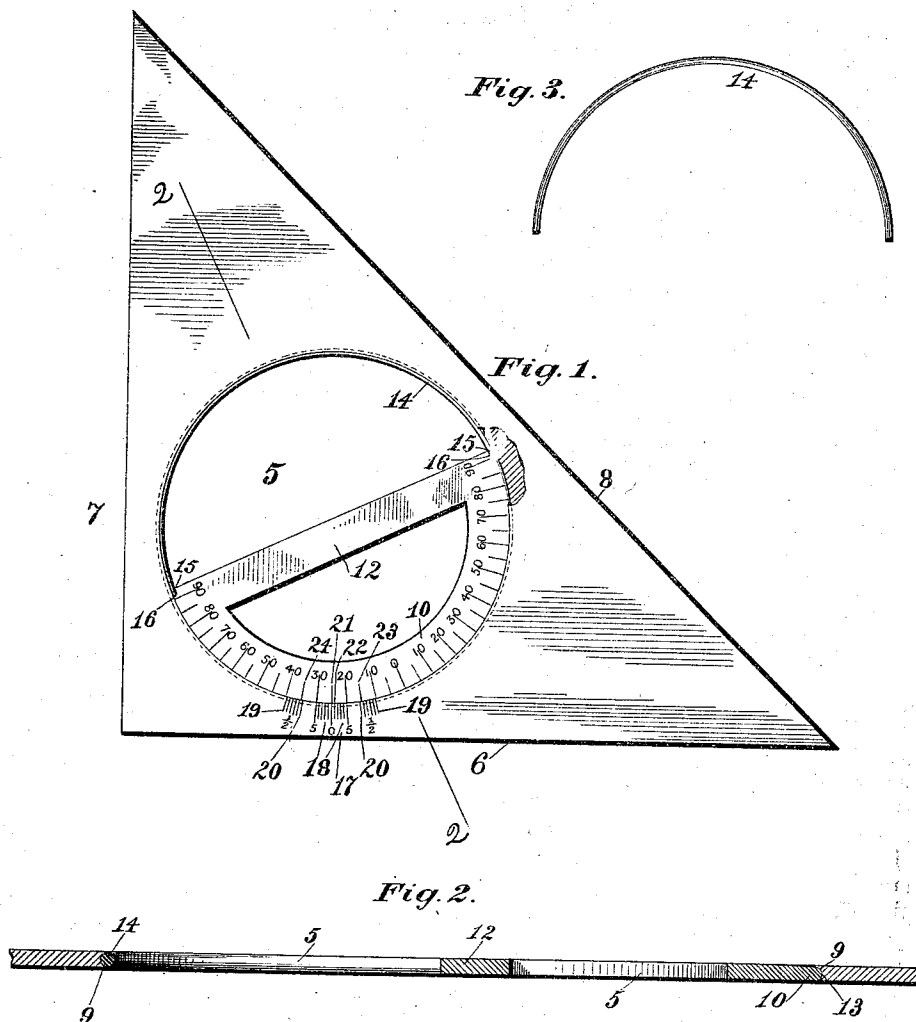
(No Model.)

W. J. BELCHER.

COMBINED TRIANGLE AND PROTRACTOR.

No. 570,977.

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COMBINED TRIANGLE AND PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 570,977, dated November 10, 1896.

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To all whom it may concern:

Be it known that I, WARREN J. BELCHER, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in a Combined Triangle and Protractor, of which the following is a specification.

This invention relates to combination-tools more particularly designated as a "combined triangle and protractor," the object being to provide the ordinary draftsman's triangle with a protractor, whereby the instrument can not only be used in the usual way, but can also be used as a protractor for obtaining different angles.

A further object of the invention is to provide a combined tool of this character which will be simple in its construction and manipulation and accurate in its measurements.

In the drawings accompanying and forming part of this specification, Figure 1 is an elevation of this improved combined tool, a part thereof being shown in section. Fig. 2 is a sectional view taken in line 2 2, Fig. 1; and Fig. 3 is a view of the member or spring for retaining the protractor in position.

Similar characters designate like parts in all the figures of the drawings.

As a preface to a description of this improved combined tool it will be understood that the triangle can be made of any suitable material and in any desired way. It is, however, preferably made of celluloid or some suitable transparent material, whereby the graduations need be placed only on one side thereof, and thus permit both sides of the tool to be utilized. It will also be further understood that while this particular construction of protractor, and the means for securing the same in position, is shown in connection with a triangle it may also be used in connection with other tools and placed in position relatively thereto in the same way.

This improved combined tool comprises, in a general way, a triangle, a protractor secured thereto for adjustment, and a spring for firmly holding the protractor in position and retaining the same throughout its adjustment.

In the preferred form thereof herein shown and described the triangle, which, as before stated, may be of any suitable construction

and material, has a circular opening 5, of a size adapted for the purpose, intermediate its three plane faces 6, 7, and 8, and which circular opening 5 has a groove 9 in the edge of the triangle-frame bounding said opening, and which groove may be of any suitable shape, but is herein shown preferably concaved. Disposed for adjustment within this opening and occupying substantially one-half of the same is a protractor comprising a semi-circular member or protractor-bar 10, connected at its ends by a cross member or bar 12, and which protractor-bar 10 has its outer edge 13 shaped to fit the groove 9 of the circular opening, and, as herein shown, is preferably convex or curved for this purpose. As a means for holding this protractor in position firmly and also for permitting the desired adjustment thereof a spring is used in connection therewith, and is herein shown in the nature of a bow-spring 14, preferably of wire and of a shape adapted to rest within the groove 9 and extend substantially around the other half of said opening 5, its ends fitting within recesses 16 of the cross-bar 12 of the protractor, and which recesses are contiguous to the holding-groove 9, whereby said protractor will be held at all times firmly against displacement, but will at the same time be capable of quick and perfect adjustment.

The protractor-bar 10 might be graduated in any desired way, but it is herein shown preferably graduated at both sides of its center or index-mark "0" up to "90," each main mark indicating ten degrees, and which ten-degree intervals are further divided intermediate thereof to indicate five degrees.

The triangle at one portion thereof, as 17, is marked with an index-mark "0" to correspond with the index-mark "0" of the protractor-bar, and is also marked at each side of such index-mark "0" with graduations 18, reading from "0" to "5," whereby the protractor can not only be adjusted to indicate angles as low as five or ten degrees, but can also be adjusted to indicate angles of one degree.

On the triangle at each side of the one-degree graduations 18 are disposed a second series of graduations, as 19, for the purpose of securing adjustments equal to a half-degree, these marks 19 being disposed at odd

distances from the graduations 18—that is to say, as herein shown, the first graduation-mark, as “20,” of each series 19 is disposed at a distance equal to four and one-half degrees from the graduations 18, whereby they will indicate adjustments of the protractor equal to a half-degree in the manner hereinafter set forth. It will be understood that other graduation-marks might be used to indicate adjustments of less than one-half degree by disposing them in substantially the same way.

In the use of this improved combined triangle and protractor, when it is desired to adjust the protractor to measure any desired angle, it is simply necessary to turn the same within the circular opening 5, to thereby bring the desired graduated mark of the protractor-bar 10 adjacent to the index-mark “0” of the triangle—that is to say, presuming it is desired to measure an angle of twenty-five degrees, as indicated in the drawings, it is simply necessary to bring the intermediate mark, as “21,” located between the graduated marks “20” and “30” of the protractor-bar into line with the index-mark “0” of the triangle. If it is desired, however, to secure an adjustment equal to an angle of twenty-six degrees, it is simply necessary to move the protractor to bring the mark “21” in line with the first graduation-mark, as “22,” at one side of the index-mark “0” on the triangle. If it is desired to secure an adjustment equal to an angle of twenty-six and one-half degrees, it is simply necessary to bring the mark “21” into line with the first graduated mark, as “22,” at one side of the index-mark “0” of the triangle, and then further move the protractor to either bring the mark “23” intermediate the graduated marks “10” and “20” or the mark “24” intermediate the graduated marks “30” and “40” into line with one of the graduated marks “19” of either series of half-degree marks, whereby the protractor will indicate an angle of twenty-six and one-half degrees.

From the foregoing it will be seen that comparatively few graduations are necessary on the protractor and triangle in order to secure an adjustment from one-half of a degree to one hundred and eighty degrees, or one-half of a circle, and that by this improved device the necessity of forming on protractors a large number of graduations, as has heretofore been found necessary, is obviated.

This combined tool, it will be seen, can be used as a triangle or as a protractor or as a combined triangle and protractor. It will also be understood that the cross-bar 12 of the protractor can be used for sectional lining at any desired angle by simply adjusting the protractor to any desired position and then moving the combined tool in the usual way to secure the sectional lines. Thus the instrument forms a combined tool which is extremely simple in its construction, effective in use, and inexpensive to manufacture, and which latter advantage is quite a material

one in this class of instruments. It will also be seen that the spring not only constitutes a means for holding the protractor in position against displacement when stationary, but also constitutes a means for permitting the adjustment thereof and securing it firmly in such adjusted position against movement. It will be further seen that such spring takes up the wear resultant from the adjustment of the protractor and always holds the same in proper position relatively to its holding-groove. It will, furthermore, be understood that the graduated marks 18 and 19 need not necessarily be placed directly on the triangle, as they might be placed on a supplemental member secured thereto either for or without adjustment.

Having described my invention, I claim—

1. The combination with a triangle having a circular opening the wall of which is grooved throughout its entire circumference, of a semicircular protractor having a cross-bar recessed at each end; and a loose bow-spring fitted into the unoccupied part of said opening and having its ends engaging the recesses of said cross-bar, said spring being movable with the protractor and serving to hold the same in its adjusted position.

2. A supporting-frame having a completely inclosed circular opening provided with a grooved wall; a protractor having a convex edge disposed in said opening and movable entirely around the same; and a spring loosely engaging the protractor and movable therewith, said spring serving to hold the protractor in position.

3. A supporting-frame having an inclosed circular opening provided with a groove in the edge thereof bounding said opening; a protractor having a part thereof shaped to fit said groove; and a spring fitting into the unoccupied portion of said groove and operable to hold the protractor in position.

4. A triangle having an inclosed circular opening having a groove in the edge thereof bounding said opening; a protractor having a semicircular protractor-bar with its outer edge shaped to fit within said groove; and a bow-spring also fitting in the unoccupied portion of said groove and having its ends engaging said protractor, said spring being adjustable simultaneously with the protractor entirely around the opening.

5. A triangle having a circular opening and provided with a groove in the edge thereof bounding said opening; a protractor having a semicircular member with its outer edge shaped to fit into a part of said groove; and a bow-spring fitting in the unoccupied part of said groove and having its ends engaging the ends of the protractor for holding the same in position.

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