

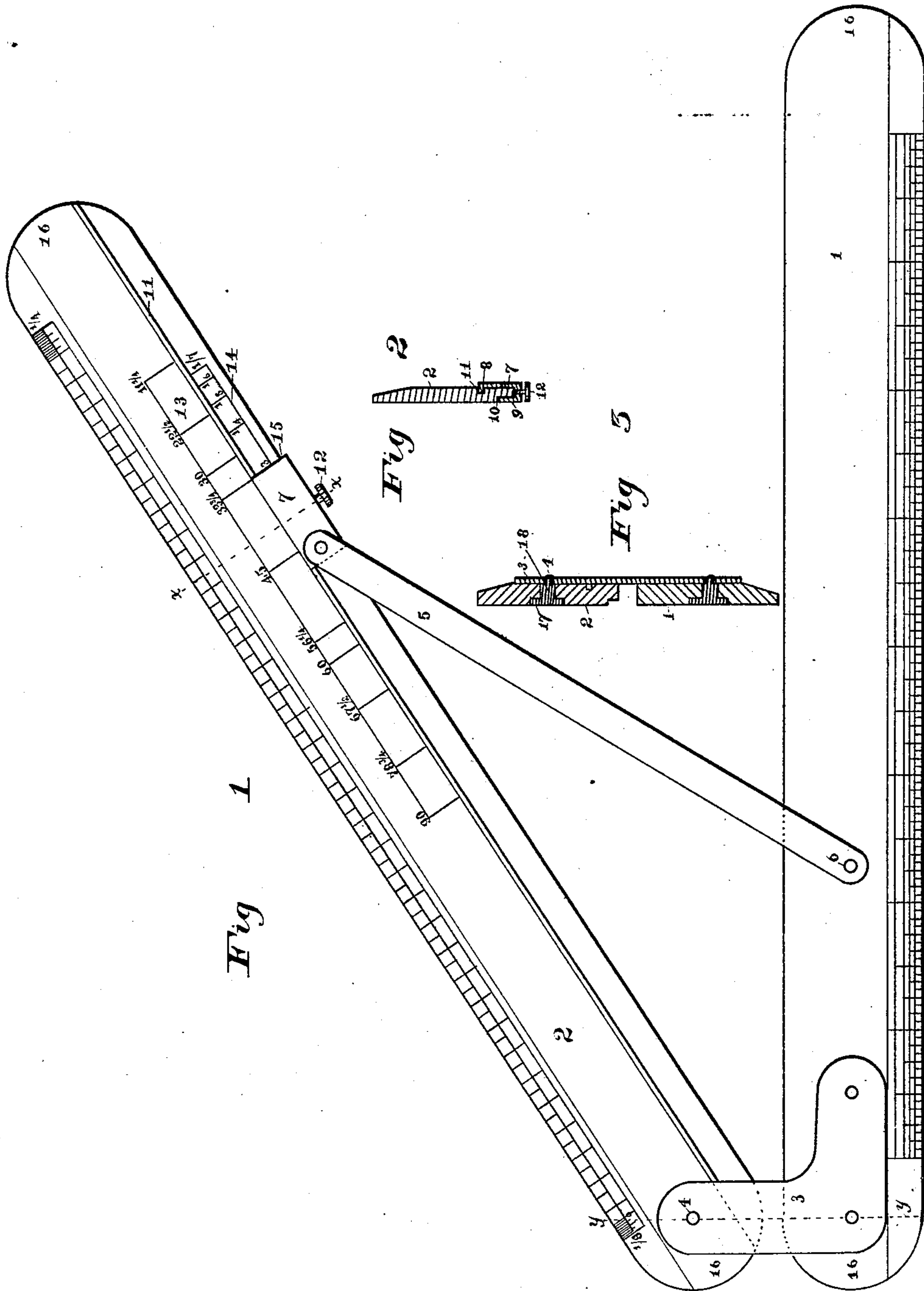
(No Model.)

W. QUAYLE.

ADJUSTABLE ANGLE MEASURE AND PROTRACTOR.

No. 390,705.

Patented Oct. 9, 1888.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

WILLIAM QUAYLE, OF DENVER, COLORADO.

## ADJUSTABLE ANGLE-MEASURE AND PROTRACTOR.

SPECIFICATION forming part of Letters Patent No. 390,705, dated October 9, 1888.

Application filed February 1, 1888. Serial No. 262,675. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM QUAYLE, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Adjustable Angle-Measures and Protractors, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to a new and improved drafting-instrument for the use of architects, engineers, draftsmen, artisans, and others having need of an instrument by which various angles and pitches may readily be measured and laid off. Its object is to furnish a simple, reliable, and easily adjusted and operated instrument, which may be set instantly and accurately to any desired angle, so that any angle in ordinary drawing, or the angle for any desired pitch of roof in architectural drawings, may be correctly laid off with a minimum of labor or trouble; to which end it consists in the features more particularly hereinafter described and claimed.

In practicing my invention two arms, both straight-edged on both edges, are taken and hinged together near one end by a hinge which permits them to be folded parallel and close to each other. Preferably for such purpose the hinge should be L-shaped, the base being rigidly secured to one arm, which, for convenience, may be termed herein the "lower" arm, while the standard of the L is pivotally secured to the other or upper arm. This L-hinge is not placed at the extreme end of the arms, as is the custom with ordinary rule-joints, but it is placed on the flat surfaces of the arms a short distance from their ends, so that the ends project beyond the hinge, such projection being rounded, to the end that it may not injure the edge of a T-square or other base with which it is used, or against which it is placed. Pivoted at one end to the lower arm is a connecting-arm, whose other end is pivoted to a stirrup adapted to slide upon and along the inner edge of the upper arm, the stirrup being provided with a set-screw, by which it may be locked and secured at any desired point on the arm. The stirrup is provided with a flange depending from the outer edge of its top and taking in a groove formed in the

upper surface of the upper arm, and also with an under flange taking in a rabbet on the under side of such arm, so that while it may slide upon the arm it is held securely thereon and cannot be removed therefrom excepting by sliding it off at the outer end.

The pivoted connecting-arm controls the distance apart the free ends of the upper and lower arms may be moved, and consequently the angle they form at their union. Upon the arms any desired scales may be placed, both of standard inches, fractions, angles or degrees of angles, pitches, &c. For instance, one very useful scale upon the upper arm is one indicating roof-pitches one-half, one third, one-fourth, &c., the division and index marks of such scale being placed at such points as the index end of the stirrup indicates when the arms are separated at the free ends to form the proper angle at their united and pivoted ends. A scale or index of angles is also useful thereon. The stirrup being moved to the index-mark of the desired angle or pitch and there secured by the set-screw, the limbs will be found to be at that angle to each other.

The construction and operation thus generally described may be better understood by reference to the drawings, in which is shown an embodiment of the invention, and in which—

Figure 1 is a plan view of my improved angle-measure and protractor; Fig. 2, a cross section thereof on line *x x*, Fig. 1; and Fig. 3, a cross-section thereof on line *y y*, Fig. 1.

In the figures the reference-numeral 1 indicates the lower arm of the instrument, and 2 the upper arm. They are pivotally united by the hinge 3 near one end, the hinge being rigidly secured at its base to the lower arm, 1, but pivotally secured at 4 to the upper arm, 2. This hinge being secured upon the sides of the arms, and at a slight distance from the ends thereof, the latter are extended and rounded, as seen at 16, so that the metal of the hinge cannot take against and injure the T-square or other straight-edge or base with which it is used, for which reason this peculiarly-shaped end and L-hinge has been devised and substituted for the ordinary rule-joint. At 6 a connecting-arm, 5, is pivoted to 1, the other end of 5 extending to and being pivoted



to a stirrup, 7, taking upon and adapted to slide along the inner edge of arm 2. As seen in Fig. 2, this stirrup has a small flange, 8, depending from its outer upper surface, which flange takes in the groove 11, formed for its reception in arm 2, while the under side, 9, of the stirrup takes in a rabbet, 10, on the under side of the arm. This arrangement permits the stirrup to slide longitudinally upon the arm, but prevents transverse movement thereof upon the arm or removal therefrom except by sliding it out at the end of groove 11. The stirrup is also provided with a set-screw, 12, by which it is secured and clamped at any desired point along the edge of the arm, to prevent injury to which a small bearing-piece may be inserted in the stirrup for the end of the screw to take against; or the end of the screw may be seated in such a bearing strip or head. Preferably the outer end of the stirrup should be squared, so as to form an index-line, as shown at 15. The arms 1 and 2 should be made of any suitable wood, and the hinge, connecting-arm, and stirrup of some suitable metal, as German silver, hard brass, &c. The screws securing the hinge to the arms preferably should have an enlarged head with periphery square to or at a right angle to the body and be sunk flush into the arms, so as not to interfere with their being placed flat and true upon the work. Adjoining the head and extending through the arms there should be a plain body, 18, at the end of which is the thread of the screw seated in the metal and somewhat slighter in diameter than the body 18.

13 indicates an index or scale of angles, and 14 an index or scale of pitches of roofs. Any additional scales may be marked upon the arms, as indicated in the drawings.

The instrument is used as follows: A straight-edge or a T-square being properly placed, the arm 1 is laid thereagainst. Supposing it to be desired to lay off the slope or angle of a roof having what is technically called a "one-third pitch," the set-screw is loosened and the stirrup is slid till the line 15 is at the point marked  $\frac{1}{3}$  on the index 14 for roof-pitches, and it is there tightened. The arms are then at the exact angle a roof of one-third pitch makes

with a perpendicular side, and one slope of the roof may be drawn. If a gable is to be shown, the instrument is turned around and the 2 placed against the base or on the base-line and the other slope marked by the arm 1. If some desired angle is to be laid off, the stirrup is moved to and secured at the index-mark of such angle on the angle-scale 13, when the two arms will be found to be at that angle to each other.

While for convenience of description the arms have been called herein "upper" and "lower" arms, in practice and in capacity for use there is no such distinction. Set at the angle desired, either may be placed upon the base used, or on a base-line and be for the time being a lower arm, while the other is for that time the upper arm, so that either may be used. From the ease with which it may be set as desired, it is especially useful in drawing parallel lines, as in delineating roof-plans, hatchings for sections, oblique or angled shading-lines, &c.

Having thus described my invention, what I claim is—

1. The combination of the two main arms, an L-shaped hinge pivotally uniting them near one end, a stirrup or slide having a flange taking in a longitudinal groove in one arm and adapted to slide thereon, means for locking the slide or stirrup in position, and a connecting-arm pivoted at one end to the slide or stirrup and at the other to one point in the other arm, substantially as set forth.

2. The combination of the main arms 1 and 2, having rounded ends 16, the hinge located near such rounded ends, an arm, 5, pivoted in one main arm and connected to a stirrup, 7, sliding upon the edge of the other main arm, the stirrup having flanges taking in grooves in such arm and provided with a set-screw, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM QUAYLE.

Witnesses:

Z. F. WILBER,  
B. L. POLLOCK.