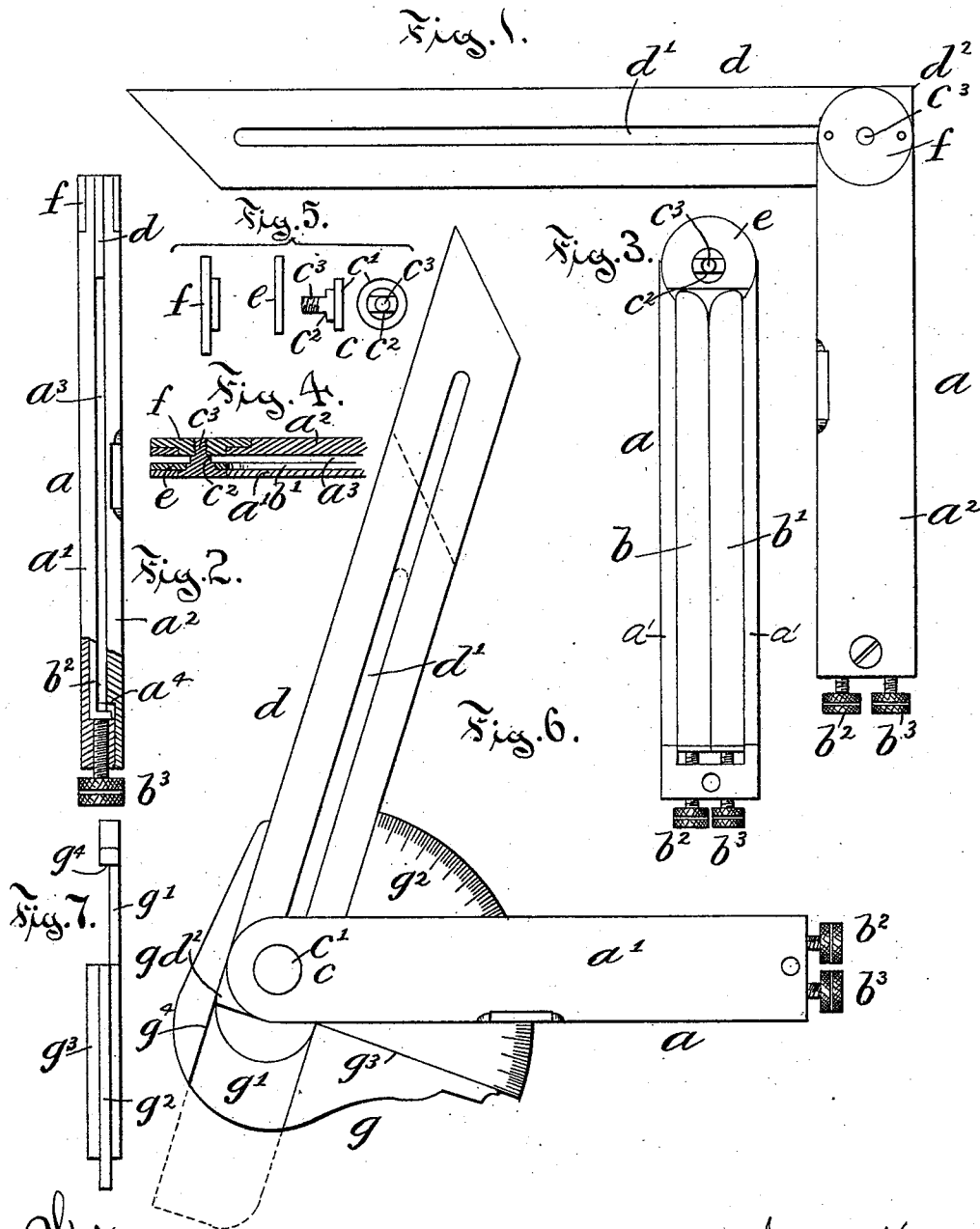


T. J. LUMIS.
PROTRACTOR AND BEVEL.

No. 528,729.

Patented Nov. 6, 1894.



Witnesses:
J. A. Cantin.
Arthur P. Jenkins

Inventor:
Thomas J. Lumis.
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Attorneys.

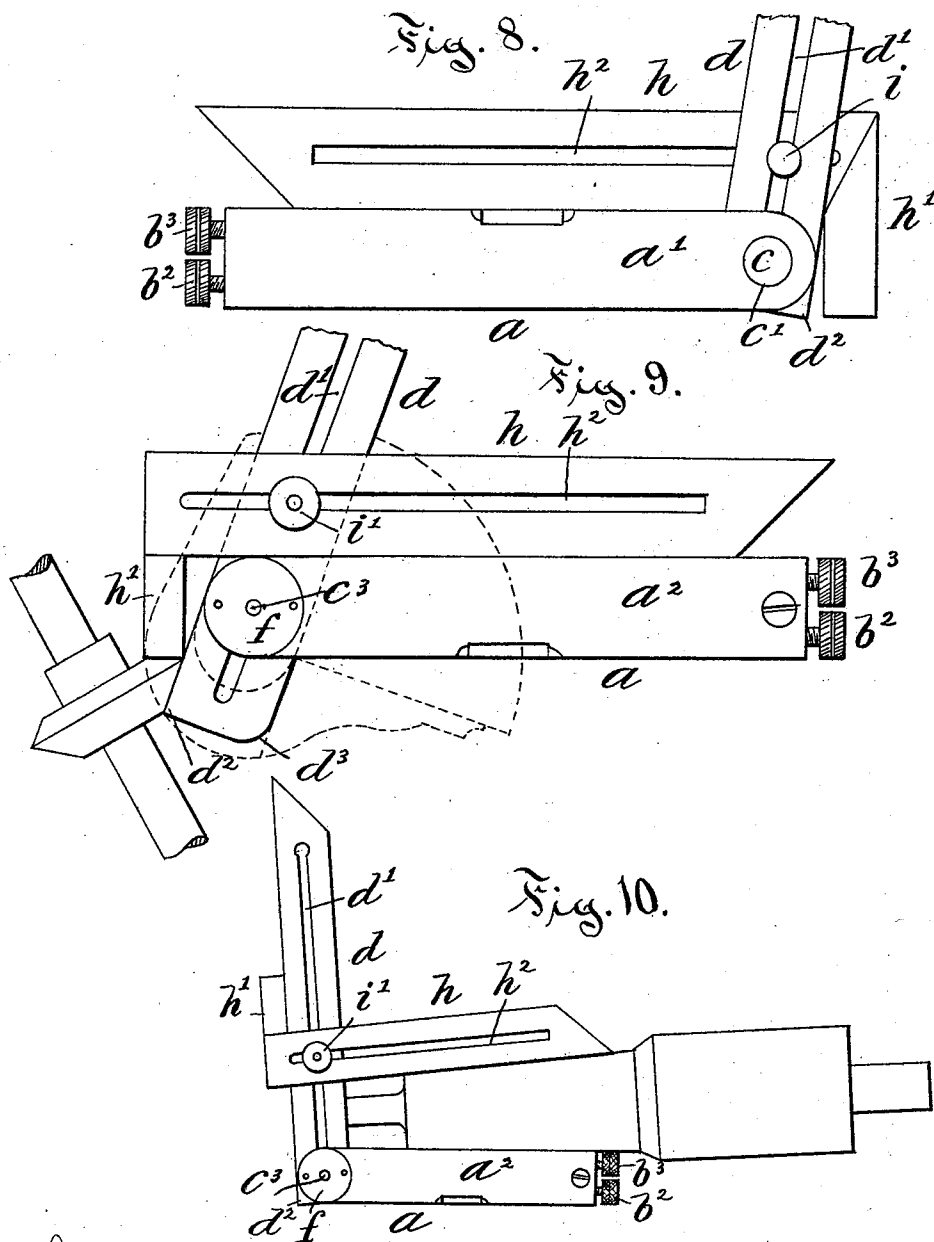
(No Model.)

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UNITED STATES PATENT OFFICE.

THOMAS J. LUMIS, OF HARTFORD, CONNECTICUT.

PROTRACTOR AND BEVEL.

SPECIFICATION forming part of Letters Patent No. 528,729, dated November 6, 1894.

Application filed February 7, 1894. Serial No. 499,324. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. LUMIS, a citizen of the United States, and a resident of Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Protractors and Bevels, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a try-square which shall be capable of use in laying out work and measuring the angular relation of lines and surfaces in comparatively confined spaces as well as free, and to also provide an implement in which the stock and blade are capable of a close degree of adjustment without loosening the clamping screw.

To this end my invention consists in the details of the several parts making up the device as a whole and in the combination of such parts as more particularly hereinafter described and pointed out in the claims.

Referring to the drawings: Figure 1 is a detail side view of the implement. Fig. 2 is a detail edge view of the same with a part broken away to show construction. Fig. 3 is a detail view of the stock with the cover plate removed to show the adjusting slides. Fig. 4 is a detail view in lengthwise section through the joint and parts appurtenant. Fig. 5 is a detail view of the several parts making up the joint separated. Fig. 6 is a detail side view of the bevel showing the removable protractor and illustrating the manner of its use. Fig. 7 is a detail edge view of the protractor. Fig. 8 is a detail side view of the bevel fitted with the auxiliary blade and illustrating one position. Fig. 9 is a detail side view of the protractor showing the auxiliary blade in use for measuring the angle of a piece of work in a close space. Fig. 10 is a view illustrating the method of using the bevel for testing the taper of a spindle.

In the accompanying drawings the letter *a* denotes a stock made preferably of steel or like metal and in two parts lengthwise, the one forming a base piece *a'*, and the other a cover plate *a''*, a lengthwise slot or space *a'''* extending the greater part of the length of the stock. In a lengthwise socket in the base piece *a'* adjusting slides *b*, *b'* are located, the slides filling the socket width-

wise and having a limited lengthwise movement in the socket. A pivot stud *c* forms the joint by means of which a blade *d* is pivotally supported at one end of the stock *a*, the blade being of a thickness substantially equal to the width of the slot *a'''*. The pivot stud *c* comprises a broad head *c'*, a squared portion *c''* smaller in diameter than the head, and a threaded shank *c'''*, the head *c'* being located in a pivot bearing in the base piece *a'* of the stock. The squared portion *c''* projects through the slot *d'* in the blade *d* in which it fits snugly permitting the blade to have a sliding motion, however, lengthwise along the stud. A rocker-block *e* consisting of a thin disk of metal is located in the end of the socket in the base piece *a*, as shown in Fig. 3 of the drawings, one side of the block being slabbled off and presenting a surface with which the ends of the adjusting slides *b*, *b'* may be held in contact by means of the adjusting screws *b''*, *b'''*. This rocker-block is clamped between the shoulder above the squared portion of the pivot stud and the under surface of the nut *f* which is made preferably with a broad head fitting a recessed socket in the cover plate *a''*, the narrow portion projecting through a socket substantially equal in diameter to the head of the stud and forming the pivot bearing of the stud in this portion of the stock. The nut may be turned by any convenient means, as a spanner fitting holes in the surface of the nut. By tightening the nut the stud, the rocker-block and the blade are firmly clamped together but are capable of a limited rocking movement on the pivot stud, depending upon the extent of lengthwise movement of the slides *b*, *b'*.

The function of the rocker block and the adjusting slide is to enable the angular position of the blade to be adjusted as by turning one of the feeding screws and moving the slide *b* forward, the other slide *b'* being free to move back at the same time by a reverse movement of the adjusting screw appurtenant to that slide.

When the blade has been set in the desired position, as by means of a protractor *g*, the screws *b''*, *b'''*, are used to tighten the hold of the slides upon the rocker-block and the blade will then be firmly held at the desired angle.

The protractor g is detachable and separate from the stock, being made with a socket g' in one surface and a thin segment or web g^2 located on one side of the socket, the segment 5 being provided with a graduated scale and extending from one arm of the protractor, a flange g^3 along one side of the segment having a surface located at right angles to the surface g^4 on the inner edge of the other arm 10 forming one wall of the socket g' .

To set the blade d by means of the protractor the segment g^2 is thrust into the slot a^3 until the corner of the flange g^3 strikes the edge of the stock, the blade d fitting snugly 15 into the socket g' . The blade is then swung to approximately the desired position and the nut then tightened to clamp the blade, the pivot stud, and the rocker block together. By means of the adjusting screws b^2 , b^3 , fine 20 adjustment of the blade to the desired angle is secured, reading from the back of the stock where a part of the edge is preferably cut away to facilitate its use for this purpose. The adjusting screws are turned up tight 25 and the protractor slipped out of engagement with the stock, leaving the bevel or square set at the desired angle for use.

The blade d has a square corner d^2 and a rounded corner d^3 , the latter being adapted 30 for use when the blade is to be set at an angle where a square corner would interfere with its proper use. The socket g' in the protractor extends completely across one arm so as to enable the blade d to be projected 35 from both sides of the stock, as illustrated in dotted outline in Fig. 6, without interfering with the use of the protractor in setting the blade at an angle with the stock.

The rear ends of the slides b , b' , are up- 40 turned to afford a suitable contact surface for the adjusting screws and also to engage the shoulder a^4 on the cover piece so as to limit the extent of forward movement of the slide, the purpose of which is simply to provide for but a comparatively small swinging 45 movement of the blade on the pivot stud.

In order to adapt a bevel or like tool to a greater diversity of uses there is combined 50 with it an auxiliary blade h having an arm h' with its edges at right angles to the edges of the main portion of the blade. This auxiliary blade h is preferably clamped to the blade d by a clamp screw i which extends through the central slot in the blade d and 55 through a central slot h^2 in the blade h , the broad head of the screw overlying one of the blades and a nut i fitting the threaded end of the screw stud serving as the clamping means. This removably secures the two 60 blades together and permits a lengthwise sliding movement of the two blades on each other as well as a swinging movement in the plane of the blades.

When it is desired to measure the angle of 65 taper of an article the blade h is set with one edge closely in contact with the inner edge of the stock a , the short arm h' overhanging

the end of the stock, the clamp of the pivot stud being loosened to permit the blade d to turn so that the two adjacent edges of the 70 blade d and arm h' can be placed in contact with the tapering surfaces. The blades are then firmly clamped in this position and the protractor applied to measure the angle of divergence. 75

In Fig. 8 the implement is shown with the blades set to measure an acute angle on a piece of work. The blades may be set to measure a greater taper as illustrated in Fig. 10 of the drawings. 80

If it is desired to set the two blades d and h to the proper angle to test the back of the teeth on a bevel gear, the blade d is extended beyond the end of the stock, the blade h 85 clamped in place and a corner of the arm h' set in contact with the outer edge of the blade d , as shown in Fig. 9, and the parts then applied to a gear. The angle can be measured by the protractor applied as indicated in dotted outline in the figure. 90

The implement can be used as a caliper by setting the blade d at right angles to the stock (in the position as illustrated in Fig. 1 105 of the drawings) the auxiliary blade being attached as shown in Fig. 8 of the drawings. The supplemental blade h may then be slid along the stock a the inner edge of the blade in contact with the surface of the stock, these edges being held in contact with the 100 hand and as soon as the inner edge of the arm h' is set at the proper distance from the outer edge of the blade d the auxiliary blade is clamped as by means of the clamp screw i , the inner edge of the arm h' of the auxiliary blade h and the outer edge of the blade d 105 serving as the measuring surfaces in caliper an article. The implement as a whole is adapted to a wide range of uses and by the combination of the auxiliary blade with the other parts is made particularly useful. 110

I claim as my invention—

1. In combination with a stock a , an adjustable blade pivoted to said stock and having a lengthwise movement along the pivot, and an auxiliary blade having an edge co- 115 operating with one edge of the stock in a permissible adjustment of said blade, and an arm with its inner edge at right angles to the edge of the main portion of the blade, said auxiliary blade being secured to the main 120 blade and adjustable lengthwise along the same, all substantially as described.

2. In combination with a stock having an adjustable blade, a separable protractor having arms at right angles to each other, a 125 socket, and a graduated segment projecting from one of the arms, all substantially as described.

3. In combination with a stock and an adjustable blade pivotally secured thereto in- 130 dependently of the protractor, a detachable protractor having a bearing surface g^4 at right angles to the surface of the protractor, and the thin graduated segment with a shoul-

der g^3 along one side of the segment located at right-angles to the said bearing surface g^4 , all substantially as described.

4. In combination, a stock, a slotted blade 5 pivoted to the stock, a pivot joint having a squared portion extending through a slot in the blade, a rocker block fitted on the pivot, a nut adapted to clamp the blade and rocker block together, and an adjusting device comprising a slide and a screw mounted in the 10 stock and adapted to thrust against the side of the rocker block, all substantially as described.

5. In combination, a stock, a slotted blade 15 pivoted to the stock, and a pivot stud journaled in the stock and supporting between a shoulder on the stud and a nut a rocker block, adjusting slides located in sockets in the stock and on opposite sides of the central 20 line of the stock, and adjusting screws ap-

purtenant to each slide and adapted to thrust the latter against the rocker block, all substantially as described.

6. In combination, a stock comprising a base piece and a cover plate with a length- 25 wise socket between the parts, a pivot stud having journal bearings in one end of the stock, the slotted blade supported on the pivot, and means for clamping it thereto, a rocker block adapted to be clamped to the 30 pivot and blade, means for adjusting the rocker block and blade, and an auxiliary blade having an arm at right angles therewith and means for removably securing it to the slotted blade, all substantially as de- 35 scribed.

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Witnesses:

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