S. D. HALLEY.

Combined Square, Protractor, &c.

No. 223,727. Patented Jan. 20, 1880.

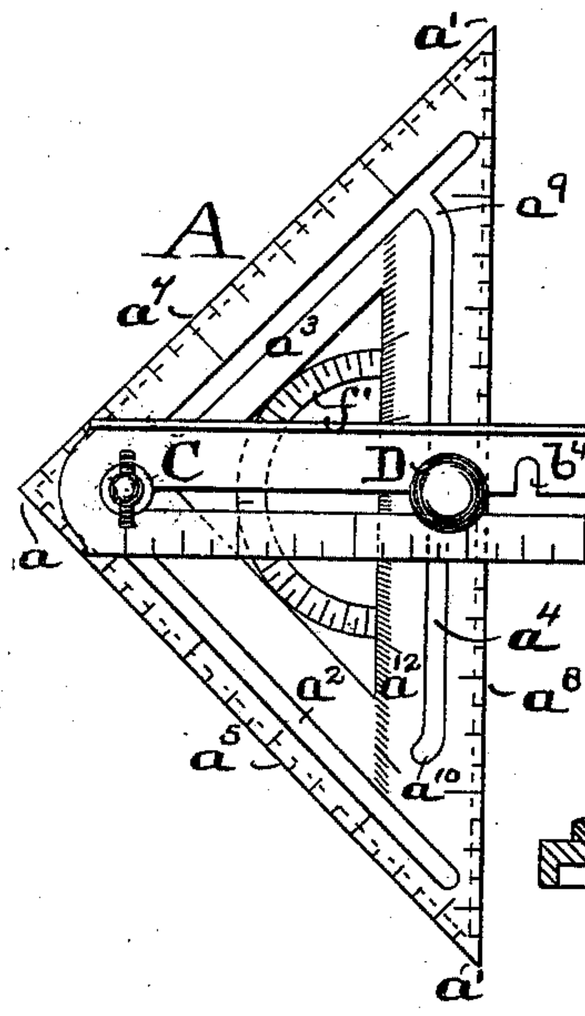

Fig. 1.

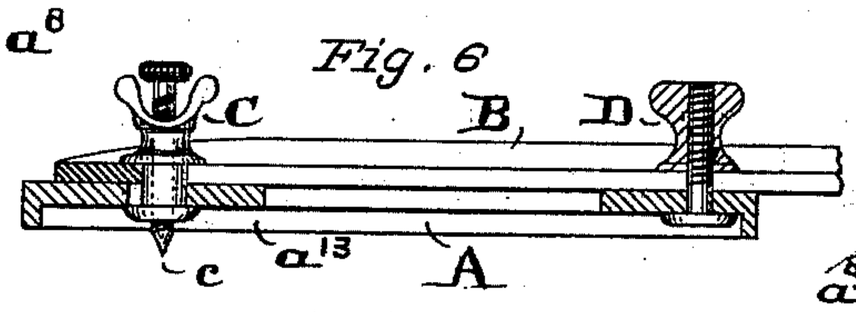

Fig. 6

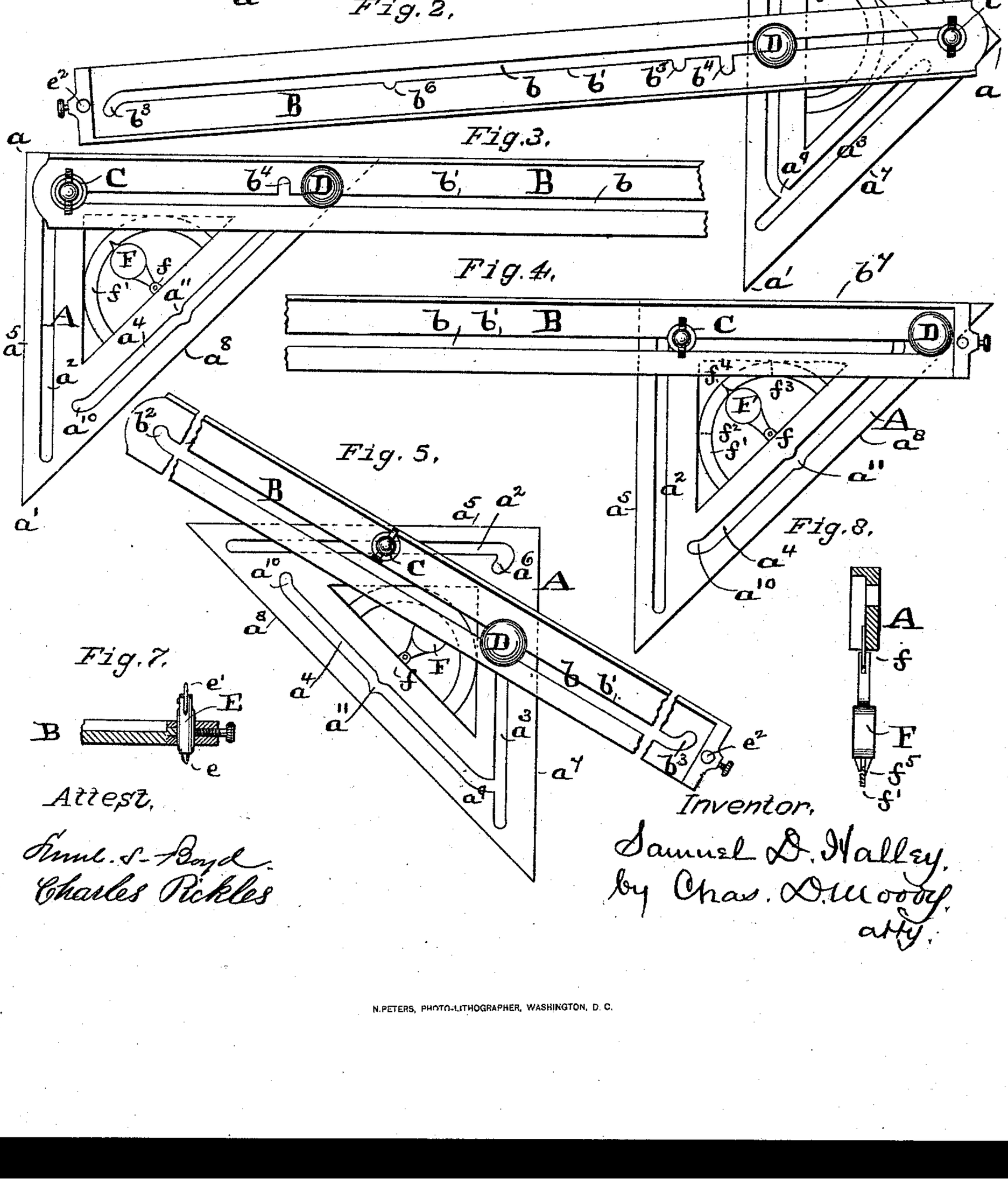

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 8.

Fig. 7.

Attest,

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Charles Pickles

Inventor,

Samuel D. Halley,
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atty.

UNITED STATES PATENT OFFICE.

SAMUEL D. HALLEY, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO WILLIAMS DAMAN, OF SAME PLACE.

COMBINED SQUARE, PROTRACTOR, &c.

SPECIFICATION forming part of Letters Patent No. 223,727, dated January 20, 1880.

Application filed December 6, 1879.

To all whom it may concern:

Be it known that I, SAMUEL D. HALLEY, of St. Louis, Missouri, have invented a new and useful Combined Square, Protractor, Pitch-Board, Trammel, Level, and Rule, of which the following is a full, clear, and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is a plan or face view of the instrument, the parts being arranged to form a T-square; Fig. 2, a similar view, but showing the parts as in a protractor. Fig. 3 shows the parts arranged to form a carpenter's square, Fig. 4 as a shoulder-square, Fig. 5 as a pitch-board; Fig. 6, a sectional view, showing the screws used in attaching the rule or straight-edge to the triangle and the parts immediately therewith connected; Fig. 7, a detail showing the pencil-holder in the outer end of the rule; and Fig. 8, an edge elevation of the plumb-bob.

The same letters denote the same parts.

The present invention can be used as a T-square, a shoulder-square, an ordinary square, a protractor, a pitch-board, a trammel, a level, and a rule, making it a convenient instrument for carpenters, architects, draftsmen, and others.

Referring to the drawings, A represents a triangle, having the angle *a* a right angle and the other two, *a' a'*, angles of forty-five degrees each. B represents an arm, straight-edge, or rule, connected with the triangle by means of the screws C and D.

The triangle is slotted at a^2, a^3, and a^4. The slot a^2 is parallel with the side a^5 of the triangle, and at the end toward the angle *a* is extended, as shown at a^6, Fig. 5. The slot a^3 is parallel with the side a^7 of the triangle, and near the angle *a'* it connects with the slot a^4. The latter is parallel with the side a^8 of the triangle, saving at its ends a^9 and a^{10}, and at its center a^{11} it is shaped as seen more distinctly in Fig. 5.

The arm B has a slot, *b*, extending longitudinally therein. The edge *b'* of the slot is taken as the longitudinal axis of the arm. At its ends the slot is extended, as shown at b^2 b^3, Fig. 5, and the edge *b'* is notched at b^4, b^5, and b^6.

Now, to form a T-square, the arm B is placed as in Fig. 1—that is, the extension b^2 of the slot *b* coincides with the extension a^6 of the slot a^2, and the arm is moved until the screw D enters the notch a^{11}. The screws C and D are then tightened. The side a^8 of the triangle then becomes the edge to apply to the work.

When used as a protractor, the points b^2 and a^6 are kept in coincidence and the arm is turned to the desired angle. For this purpose the triangle is provided with an angle-scale, a^{12}, and the position of the arm B is determined by bringing the edge *b'* over the proper line on the scale, the center of the latter being the center of the extension a^6. The screws C D can be used to clamp the arm, as before.

To form the ordinary square the arm B is swung around and fastened as in Fig. 3. In this the points b^2 and a^6 coincide, and the screw D passes through the notch b^5.

To form a shoulder-square the arm B is moved into the position shown in Fig. 4—that is, the arm B is placed so that its edge b^7 coincides with the edge a^7 of the triangle, and the screw D passes through the extension b^3 and slot a^3, and the screw C through b^6 and a^6, and the screws are then tightened. The side a^5 of the triangle then forms the shoulder of the square.

As a pitch-board, miter, or bevel, the arm B is moved as in Fig. 5, the rise and tread of the stairs, for instance, being laid off upon the edges a^5 and a^7 respectively.

As a trammel, the point *c*, with which the screw C is provided, is placed upon the center or initial point, and a pencil-point, pen, or cutter-wheel, *e* and *e'*, respectively, is, by means of the holder E, held in a perforation, e^2, in the outer end of the arm B. The arm B, having the screw C in the extension b^2, can then be used to lay off a circle from the point upon which the screw C rests.

To enable the instrument to be used as a level, the triangle A is provided with a plumb-bob, F, which is pivoted to the triangle at *f*. The triangle is also furnished with a scale, *f'*, having marks f^2 f^3. The point f^2 is in a line drawn from the pivot *f* perpendicularly to the side a^5 of the triangle, and the point f^3 is

in a line drawn from the pivot f perpendicularly to the side a^7 of the triangle; then, by placing the side a^5 or the side a^7, as the case may be, the level can be found in the usual way. The scale f' may be graduated to enable the triangle to be turned to bring the side a^5 or a^7 to any desired angle with the center line. The arm B is graduated at G to enable it to be used as a rule. The edges of the triangle are also graduated. The bob F is forked at its point f^5, to engage with and move upon the scale f', and thereby be kept from dropping away from the triangle as the latter is turned upon its side. The scale f' is marked at f^4, midway between the points f^2 f^3, to enable, in leveling, the side a^8 of the triangle to be applied to the under side of the surfaces to be leveled. The point c of the screw C is adjustable therein, and when needed for use can be screwed to project from the screw, as in Fig. 6.

The instrument can also be used as a gage, as follows: Let the parts be as in Fig. 1, and insert a pencil, e, or cutter e' in the perforation e^2 of the arm B. The side or shoulder a^8 of the triangle is then moved along the initial line or edge to be gaged from, and the pencil or cutter lays off the desired mark or groove. The triangle A is provided with a flange, a^{13}, Fig. 6, to raise the central portion of the triangle sufficiently for the projections upon the under side thereof to clear the surface upon which the triangle may be resting.

I claim—

1. The combination of the triangle A, having the slots a^2 a^3 a^4, extended and shaped as described, the arm B, having the slot b, extended as described, and having the notches b^4 b^5 b^6, and the screws C and D, substantially as described.

2. The combination of the triangle A, having the slot a^2, extended at a^6, and the slot a^4, notched or bent at a^{11}, the arm B, having the slot b, and the screws C and D, substantially as described.

3. The combination of the triangle A, having the slot a^6 and scale a^{12}, the arm B, having the slot b and edge b', arranged as described, and the screws C and D, substantially as described.

4. The combination of the triangle A, having the slots a^6 and a^4, the arm B, having the slot b, notched at b^5, and the screws C and D, substantially as described.

5. The combination of the triangle A, arm B, screws C and D, and point c, and holder E, having a pencil or wheel, substantially as described.

Witness my hand this 29th day of November, 1879.

SAMUEL D. HALLEY.

Witnesses:
CHAS. D. MOODY,
SAML. S. BOYD.