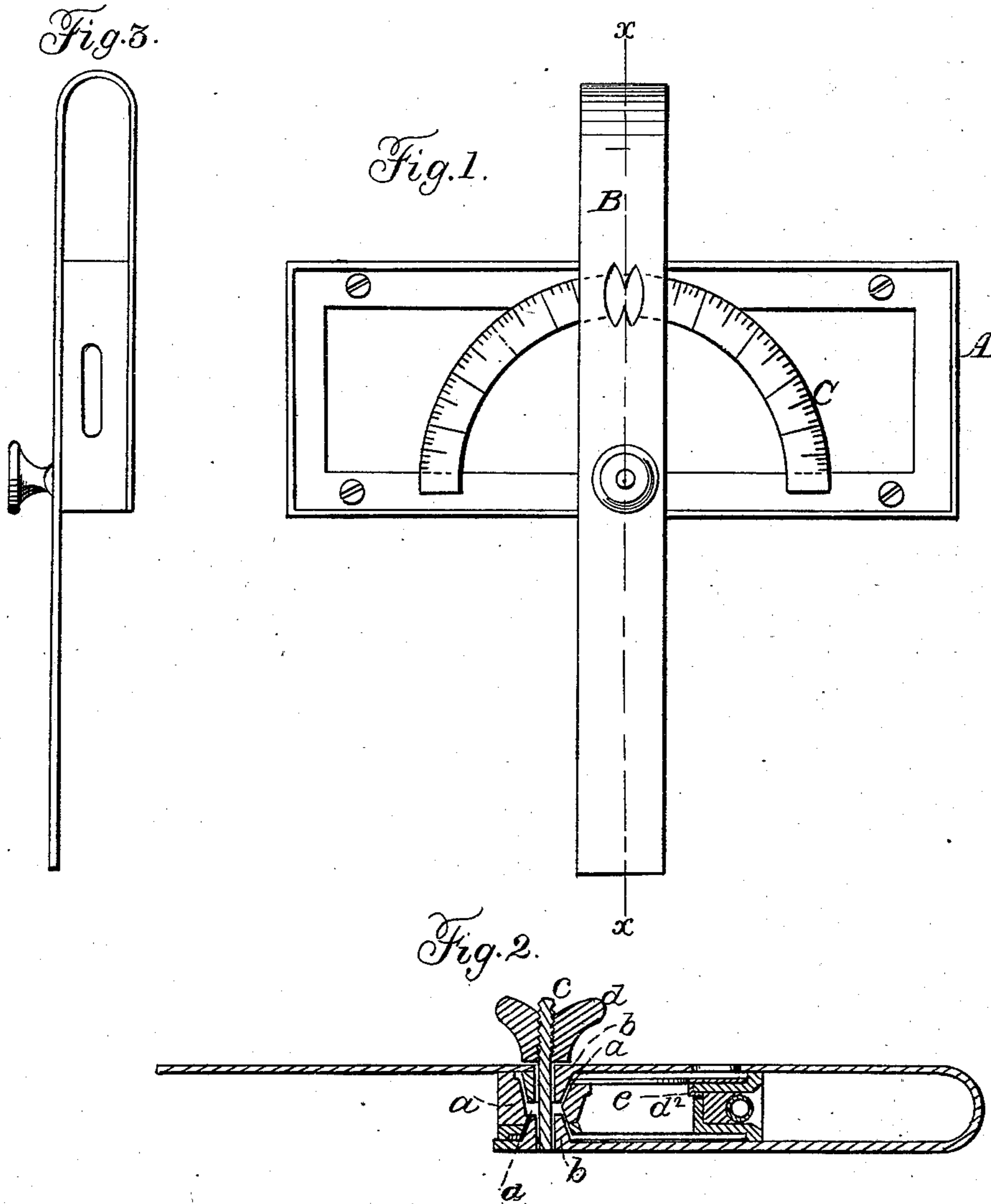


A. F. WARD.
Combined Square and Level.

No. 80,252.

Patented July 21, 1868.



Witnesses:

Wm. A. Morgan
H. C. Cotton

Inventor:

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United States Patent Office.

A. F. WARD, OF MARIETTA, OHIO, ASSIGNOR TO W. S. BATCHELDER AND COMPANY, OF PITTSBURG, PENNSYLVANIA.

Letters Patent No. 80,252, dated July 21, 1868.

IMPROVEMENT IN COMBINED PLUMB, SQUARE, AND LEVEL.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, A. F. WARD, of Marietta, in the county of Washington, and State of Ohio, have invented a new and useful Improvement in the Construction of Combined Square, Plumb, and Level; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a side elevation of the improved square, plumb, and level.

Figure 2 represents a central section on the lines $x x$ of fig. 1.

Figure 3, a face view of the same, when used as a level.

Similar letters of reference indicate like parts.

The nature of my invention relates to improvements in the construction of the combined square, plumb, and level invented by Chamberlain, and for which a patent was granted to him about January 1, 1867.

It consists—

First, in providing in the main portion of the body of the frame conical sockets, and providing the swinging frame with corresponding conical projections, fitted to the said sockets, and a bolt and thumb-nut; whereby a more durable and reliable axial-joint is formed for the same.

Second, in forming the metal frame in two parts, and providing them with projections to form the recesses for the glasses, one on each part.

Third, in the manner of fastening the protractor, as will be more fully described on reference to the accompanying drawings.

Fourth, in the improved construction of the swinging frame or blade.

A represents the frame,

B a swinging frame or tongue, and

C a protractor.

In the construction of these instruments, as heretofore manufactured, the joint of the swinging frame with the main frame was very liable to wear in a short time, so as to become loose and unsatisfactory in its operation, and the manner of constructing the blade attaching the glasses and the protractor was expensive.

The object of my invention is to simplify and improve it in these respects.

The frame A is provided on each side with the conical sockets $a a$ at the central point for pivoting the swinging frame, and the swinging frame is provided with the conical projections $b b$ and with the bolt c and nut d , whereby a very durable and reliable joint is formed, which may be adjusted to any degree of friction, and which will not wear untrue, or so that it cannot always be properly tightened.

The frame A is made in two parts, d and d^1 . The part d^1 is provided with the flange d^2 , and the part d with lugs, which, when the two parts are fastened together by the screws, as shown in fig. 2, bear such relation to the flange d^2 as to constitute the end walls of a recess, of which d^2 forms the bottom wall, and the main body of the parts d and d^2 the side walls, all of which parts are formed by casting, and which provide a recess for the glasses when put together, in which the latter may be readily packed by cement with very little labor.

The protractor is stamped out of sheet metal, and formed with a lip, e , which is bent into the proper form to hook under the edge of the part d of the frame, as shown in fig. 2, by reason of which it may be readily adjusted from side to side on the frame A, before it is pinned to it at its ends in the process of centring it on the said frame.

Instead of constructing the swinging frame or blade of several pieces, and joining them together at the ends, as has heretofore been done, I construct it of one strip of metal, and bend it up, as shown in figs. 2 and 3, by which a material saving in expense is effected.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent—

1. The swinging frame B, provided with the conical projections *b b*, and jointed to the frame A, provided with the conical sockets *a a*, substantially as and for the purpose described.
2. The part *d*¹, provided with the flange *d*², and the part *d*, provided with lugs, as described, and both parts otherwise constructed as and for the purpose described.
3. The protractor *e*, provided with the lip *e*, and connected to the frame A, substantially as and for the purpose described.

The above specification of my invention signed by me, this day of , 1868.

A. F. WARD.

Witnesses:

P. TIBBETTS,

D. C. SHEPARD.