

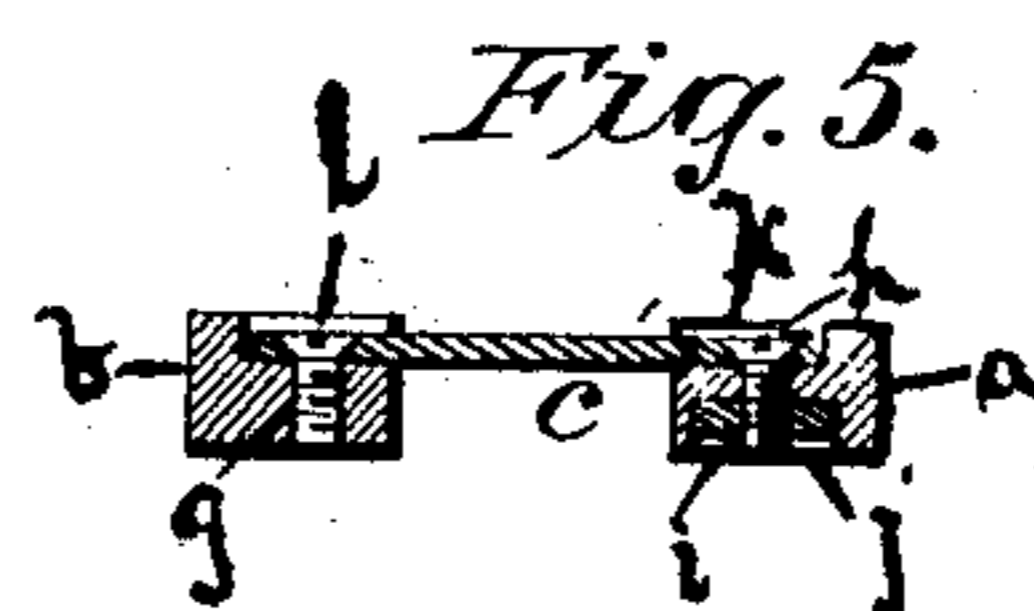
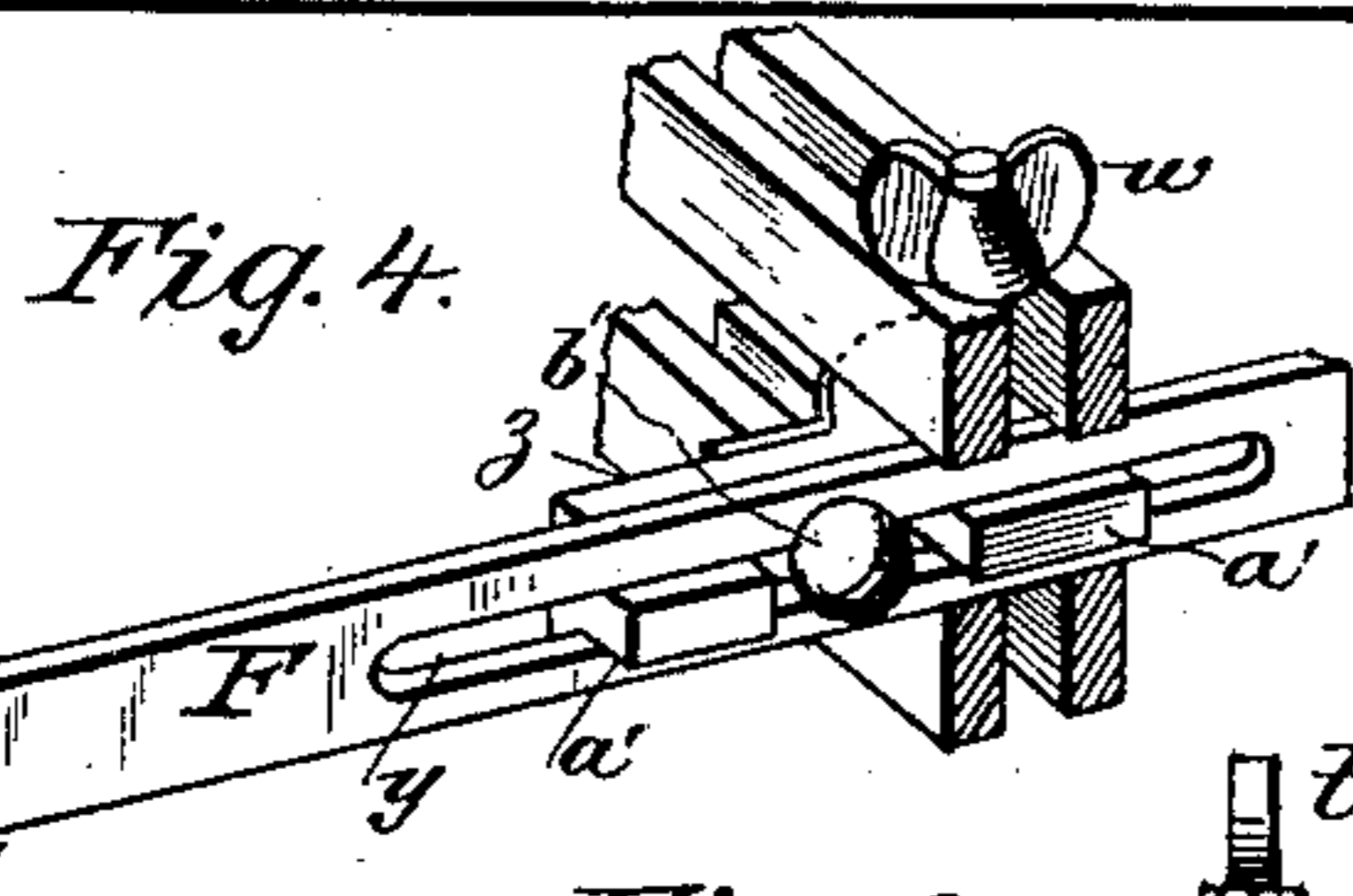
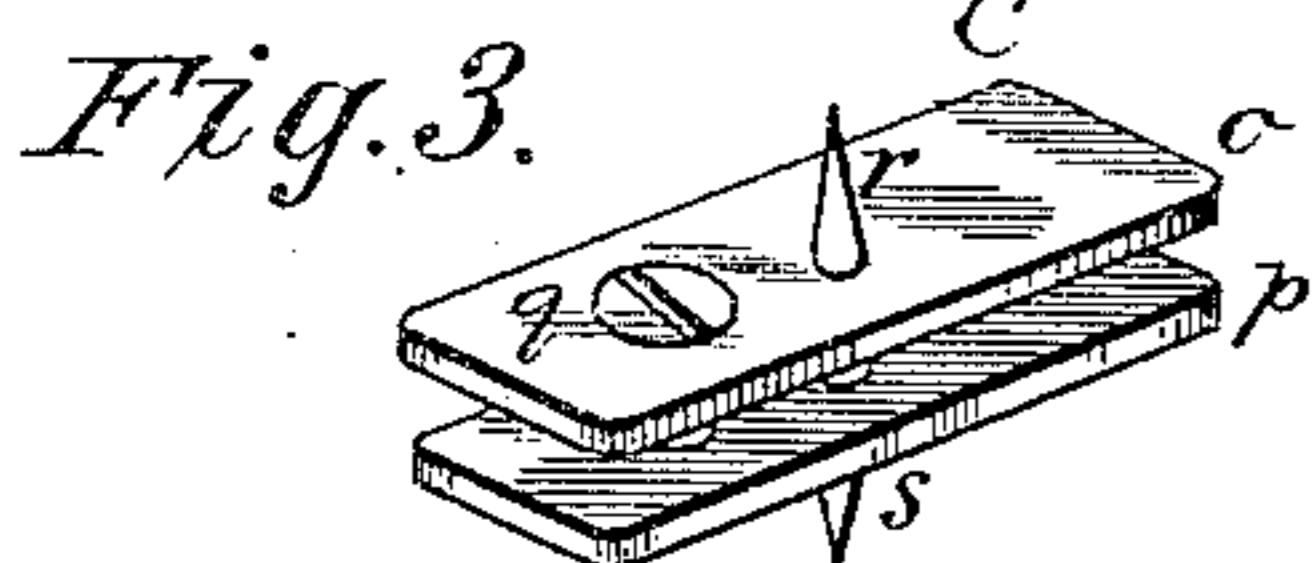
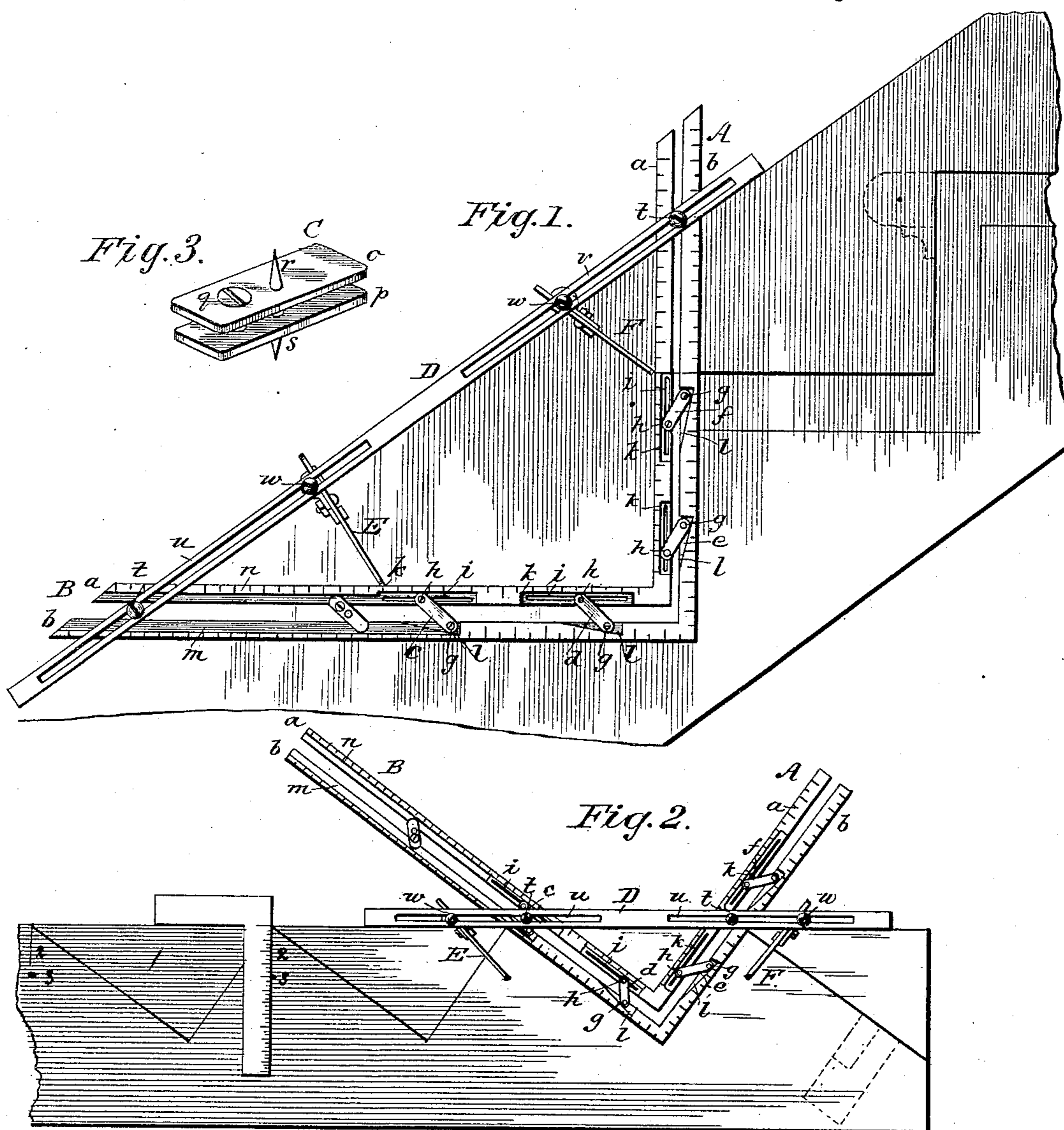
(No Model.)

W. H. BOYER.

ADJUSTABLE SQUARE AND GAGE.

No. 341,126.

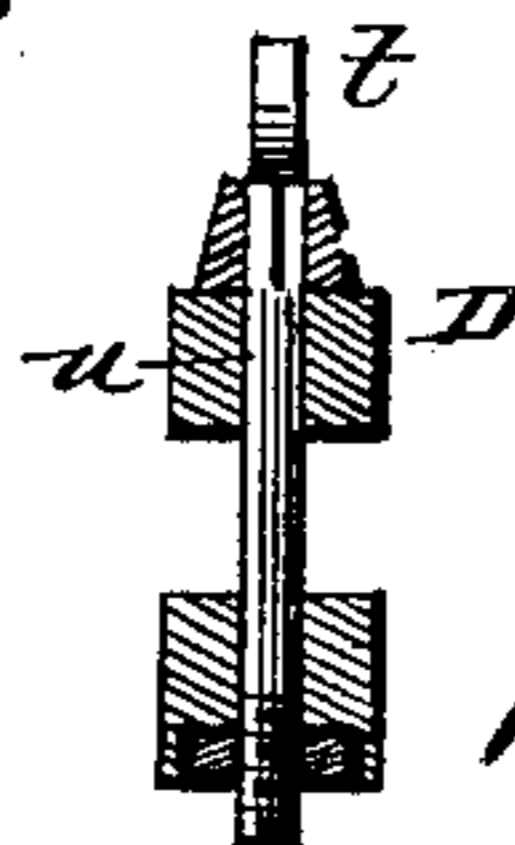
Patented May 4, 1886.



WITNESSES.

Fred. G. Dieterich  
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Fig. 6.



INVENTOR

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# UNITED STATES PATENT OFFICE.

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## ADJUSTABLE SQUARE AND GAGE.

SPECIFICATION forming part of Letters Patent No. 341,126, dated May 4, 1886.

Application filed February 17, 1886. Serial No. 192,233. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM H. BOYER, a citizen of the United States, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in an Adjustable Square, Gage, or Pitch-Board; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to an adjustable square, gage, or pitch-board adapted for general use, but is designed with special reference for use in laying off strings or carriages for stairs, and has for its object the construction of an instrument which will take the place of the dividers, pitch-board, square, rule, and parallel straight-edge now used for laying off strings or carriages to be grooved out for the insertion of the riser and step, and enable the carpenter to effect at one operation, or by going over the string once and marking it, all that is now accomplished by going over it six separate and distinct times.

The invention consists in the constructions hereinafter described, and particularly pointed out in the claims.

It is a fact well known to carpenters and stair-builders that under the present prevailing systems of laying off the strings or carriages to support the steps of a stairway much time is expended in marking the timber preparatory to cutting out the grooves and angles to receive the risers and steps, and that unless great care is exercised in making them the workmanship will prove itself to be of a very inferior order, and much more time will be consumed in fitting the risers and steps to the irregular grooves or angles cut in the strings.

To lay off or mark the strings for a stairway as ordinarily practiced, the workman is required to handle the timber or work over its entire length six (6) times, as follows: After having determined upon the height of the riser and the width of the step or tread, which gives him the base and the altitude of his triangle, he then proceeds to find the hypotenuse with a pair of dividers. This having been done he applies the dividers to the string or carriage, and steps off the number required to reach the height of the stairway; second, he then goes over the string and marks the

fine holes made by the dividers with a lead-pencil, so that they may readily be seen; third, he then applies a pitch-board and marks the rise and step; fourth, he then applies a parallel rule or straight-edge of a width equal to the thickness of the step and marks the outer boundary or wall of the groove to receive the end of the step and the riser, if they are both of the same thickness (which is very unusual); if not, fifth, he applies another parallel rule of less width, but equal to the thickness of the riser, and marks the outer wall for the groove to receive it; sixth, he then steps off the points in the parts to be cut out to form the "housing" where the hole is to be bored to receive the rounded front edge of the step.

By my invention the workman can make all of the marks required for the strings or carriages of a stairway by one application of the instrument, and lay off all of the steps exactly alike without a shadow of variation.

In the accompanying drawings, which form a part of this specification, Figure 1 is a plan view showing the instrument applied to a string or carriage to be grooved to receive the ends of the risers and steps. Fig. 2 is a similar view showing the instrument applied to a string in which the angles are to be cut out for the riser and steps to bear upon. Figs. 3, 4, 5, and 6 are details.

Reference being had to the drawings and the letters of reference marked thereon, A B represent the two sides of a graduated square formed in two parts, *a b*, arranged parallel to each other and adjustably secured together by links *c, d, e*, and *f*, one end of each of which is pivoted on a pin, *g*, in the part *b*, and the other end is secured to the part *a* by a screw, *h*, which works in a slot, *i*, and has a nut on the under side of the part *a* working in a groove, *j*, as shown in Fig. 5. The upper surface of the part *a* is recessed at *k*, and the part *b* at *l*, to accommodate the movement of and the different angles which the links assume in manipulating the instrument. In the side B and in the upper surface of each of the parts *a b*, are formed long recesses *m n*, which form a seat for a movable head, C, made in two parts, *o p*, secured together by a screw-bolt, *q*, and provided with a stud projecting on both sides of the head, and formed into conical pins *r s*, as shown in Fig. 3.

D represents a gage-bar secured to both

sides A B of the square by bolts *t*, which work in slots *u v*, and sustains the same relation to the two sides of the square that the hypotenuse does to the base and altitude of a triangle. The gage-bar D is adjustable on the arms or sides A B, and the square may be adjusted to different angles with relation to the plane of the gage to serve as a bevel.

E F represent gage-arms adjustably secured to the gage-bar D by bolts *w*, and are provided with a slot, *y*. A block, *z*, held by the bolt *w*, has tongues *a'* formed thereon, which project through the slot *y*, and the arms E F are adjustably secured to said block *z* by a screw, *b'*. On the outer end of the arms E F are prongs or points *c' d'* projecting above and below the edges of said arms.

The several parts being constructed substantially as described, the operation of laying off a string or carriage for a stairway is as follows: After the width of the step and the height of the riser have been determined upon, and the thickness of the said parts ascertained, the screws *h* are slackened. The parallel parts *a b* of the side A of the square are adjusted to the thickness of the risers, and the parts *a b* of the side B are adjusted to the thickness of the steps. The screws *h* are again tightened, when said parts will be firmly held against lateral movement, and the width across each of said parts *a b* will be equal to the width of the groove to be cut in the string. The gage-bar D is then adjusted upon the arms A B with reference to the position the grooves are to occupy in the string, and the gage-arms E F set upon the gage-bar D, with their inner ends bearing against the part *a*, E indicating the width of the step and F the height of the riser. The head C is then adjusted so that the pins *r s* are fixed at a point to constitute the center of the circle to be bored out to accommodate the front edge of the step, all of which is shown in Fig. 1. The several parts having been adjusted as described, the instrument is laid upon the string or carriage, commencing at one end, the pin *r* or *s* of the head C, and *c'* or *d'* of the arms E F (according to the string being marked, whether the right or left hand one) pressed into the wood. Lines are then drawn on each side of the parts A B, which will indicate the width of the grooves to be cut for the riser and the step. The instrument is then raised off the timber, and the point on the arm F inserted in the hole made by the point on the arm E when set to mark the former step and riser, and the pin on the head C is again embedded in the wood, and this operation continued throughout the length of the string, and all of the lines required made by working over the timber once.

To lay off or mark a string in which the angles are to be sawed out, the instrument is adjusted, as shown in Fig. 2, with the gage-arms E F outside of the sides A B of the square. After the height of riser and width of step have been determined upon the workman

lays off one triangle, as 1, applies an ordinary try-square, and draws lines, as 2. He then indicates a point or mark, as 3. The instrument is then applied to the triangle, and the points *c'* of the gage-arms E F set to the point or mark 3, when the bolts *t* are tightened and the points *c* pressed into the timber. The instrument is then removed, and the point of one gage-arm inserted where the other one was when applied to the triangle. The riser and step are then marked and the instrument again moved, the distance being regulated by the holes made by the points on the end of the gage-arms E F. The instrument may then be applied for marking the ends of the string for the floor and the joist at the upper end, and the floor and the wash-board at the lower end.

It is obvious that the instrument is well adapted for laying off rafters and other timbers for constructing roofs of buildings, and for general application as a square or bevel, and that the graduations on both sides of the blades of the square dispense with the use of the ordinary carpenter's rule.

Having thus fully described my invention, what I claim is—

1. A square composed of two parallel parts adjustably secured together by links, substantially as described.

2. A square composed of two parallel parts secured together by links pivoted to one part and movably attached to the other, substantially as described.

3. A square composed of two parallel parts adjustably secured together, a gage-bar, and gage-arms, substantially as described.

4. A square composed of two parallel parts adjustably secured together, an adjustable gage-bar, and gage-arms adjustably secured thereto, substantially as described.

5. A square composed of two parallel parts adjustably secured together, an adjustable gage-bar, and gage-arms adjustable longitudinally and laterally, substantially as described.

6. A square composed of two parallel parts adjustably secured together, a gage-bar, and gage-arms having points on the end thereof, substantially as described.

7. A square composed of two parallel parts, a gage-bar, gage-arms, and a movable head having a point or points, substantially as described.

8. A square graduated upon both edges, in combination with a gage-bar and gage-arms adjustably secured thereto, substantially as described.

9. A square, in combination with a gage-bar detachably secured thereto and provided with gage-arms, substantially as described.

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

WILLIAM H. BOYER.

Witnesses:

HENRY M. BOYER,  
FRANK S. BECKER.