J. A. CALDWELL.

Instrument for Scribing Stair-Curves.

No. 211,132. Patented Jan. 7, 1879.

Fig. 1

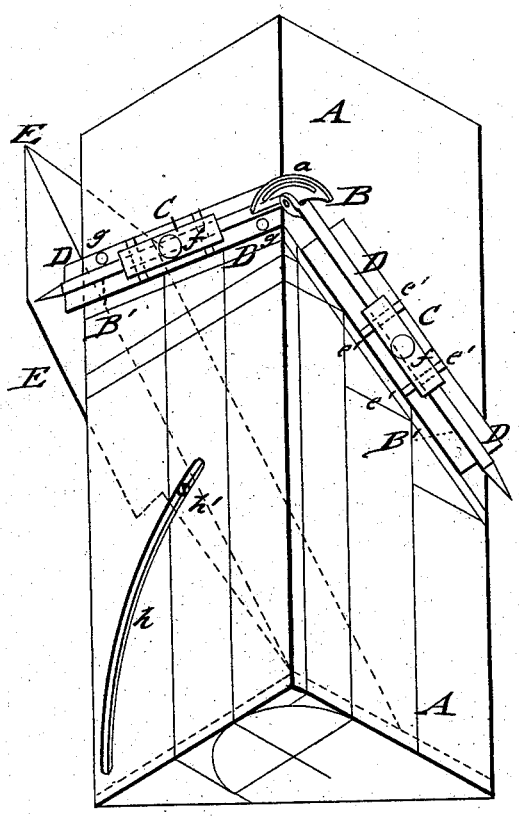


Fig. 3

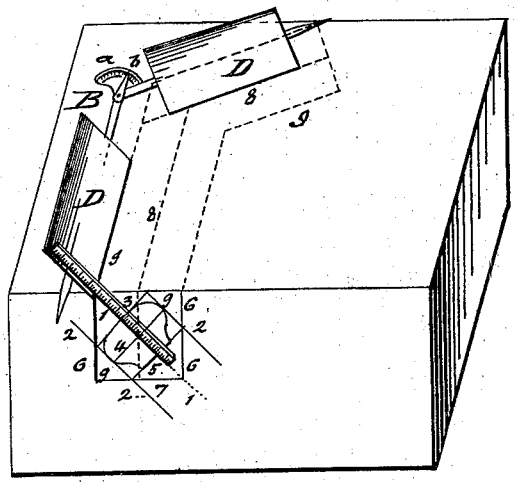


Fig. 4

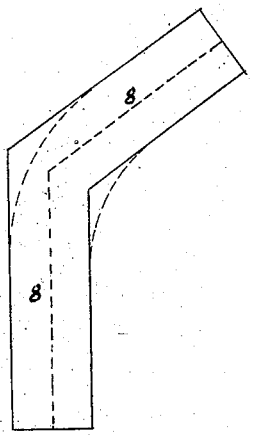


Fig. 2

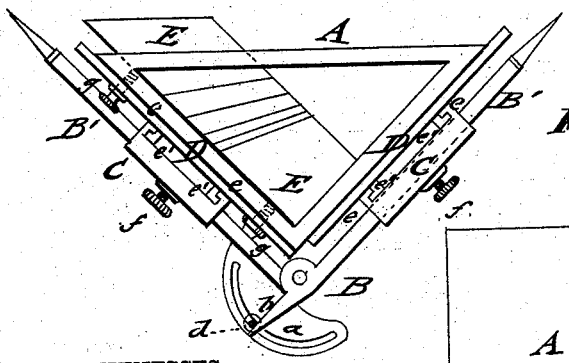
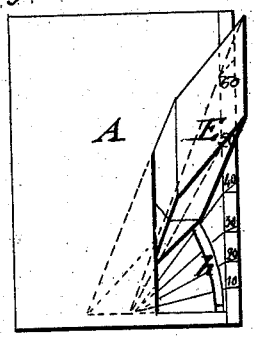


Fig. 5



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UNITED STATES PATENT OFFICE.

JOHN A. CALDWELL, OF BROWNSVILLE, TENNESSEE.

IMPROVEMENT IN INSTRUMENTS FOR SCRIBING STAIR-CURVES.

Specification forming part of Letters Patent No. **211,132**, dated January 7, 1879; application filed August 10, 1878.

To all whom it may concern:

Be it known that I, JOHN A. CALDWELL, of Brownsville, in the county of Haywood and State of Tennessee, have invented a new and Improved Compound Beveling Instrument for Stair-Builders, &c., of which the following is a specification:

In the accompanying drawings, Figure 1 represents a perspective view of my improved beveling instrument for stair-builders, carpenters, &c. Fig. 2 is a top view of the same; Fig. 3, a perspective view of the beveling instrument, shown as used for marking off the bevels on the plank. Fig. 4 is a top view of the face-mold of the plank; and Fig. 5, a rear view of the instrument, showing arm for taking bevels of jack-rafters.

Similar letters of reference indicate corresponding parts.

This invention has reference to an improved compound beveling instrument for the use of stair-builders, carpenters, millwrights, and others, by which, in simple manner, complicated cuts, such as the pitches of hand-rails and bevels of jack-rafters, are obtained, the instrument facilitating the work of the mechanic and dispensing with the complicated system of lines at present employed.

The invention consists of a prismatic box in connection with compass-legs having adjustable blades that swing and slide thereon by sleeves, being clamped to the box by screws, and set to the proper bevel-lines of the same. An arc-shaped guide-slot in one of the side walls of the box serves, in connection with a swinging arm and set-screw, to mark off the bevels of the jack-rafters for hip-roofs.

Referring to the drawings, A represents a box, which is made in the shape of a right-angle triangle, and which constitutes the base of operations on which the pitches or line of hand-rails are laid off. On the equilateral side walls of the box A is placed a compass-like instrument, B, whose hollow legs B′ are arranged with detachable points, and jointed by a graduated pivot-connection with slotted sector *a*, pointer *b*, and clamp-screw *d* for keeping the legs rigidly at any angle. On the hollow legs B′ are arranged sleeves C, that turn and slide readily thereon, and which support, by shoulders *e*, blades D, that slide by guide-rails *e′* on the shoulders of the sleeves C. The sleeves C are secured by clamp-screws *f* to the compass-legs and one of the blades D, attached to the side wall of the box A by means of thumb-screws *g*. These thumb-screws serve to fasten the blade D to the box or base A, and facilitate the setting of the instrument to the lines laid off on the same. The box A is partly open at the back, and a swinging arm, E, applied to the interior of the same, and seated by the edge of its tapering end in the angle formed by one side wall and of the bottom. The other side wall of the box is provided with an arc-shaped slot, *b*, that is concentric to the apex of the lower corner of the box, and which serves to guide and clamp the swinging arm by a countersunk screw, *h′*. (Shown in Fig. 1.) The slotted side wall is graduated at the inside and at the edge from ten to sixty degrees, as in Fig. 5, and the swinging arm set thereto, according to the angle at which the jack-rafters in hip-roofs are to be set, the instrument indicating then readily both bevels of jack-rafter by the position of the arm on the rear wall of the box, so as to cut the jack-rafters with great facility at the proper bevels.

The instrument is used as follows for the bevels of hand-rails: The ground-plan of the stair is laid off, together with well-hole and tangent lines, and the elevation of the stair then laid off on the lines of tangents in the usual manner, by which the pitch and length of rail are obtained. The lines obtained thereby form the center of rail and are transferred to the triangular box A by measurement, and the compass and blades set to those lines, as shown in Fig. 1. To do this the screws are all loosened and the upper blade set to line and fastened by set-screws to the side wall of the box A. The other blade is then moved and set to the line on the other side of the box, after which the blades and compass-legs are screwed tightly to each other. The compass and blades are then removed from the box and set to a rectangular box with smooth sides, as shown in Fig. 3, so that the edge of one blade touches a line drawn on top of box at right angles to the end thereof. The blade is made to project somewhat beyond the edge of box, and a rule placed against the face of blade and against

side of box, and then a line, 1, drawn along rule on side of box, all as shown in Fig. 3. Parallel thereto, at a distance equal to half the width of rail, are drawn the lines 2; then the line 3 is drawn square to line 1 until it intersects with line 2 at the edge of the box; then draw the central line, 4, for half the thickness of rail and parallel with line 3, the line 5 at the same distance therefrom as line 3 from center line, which gives a square section of the rail. By drawing plumb lines 6 through the corners of the section of the rail and a horizontal line, 7, to take in the lower corner, the thickness and width of plank from which to work a square rail are obtained. To get the face-mold, the instrument is placed on a thin board, (shown in Fig. 4,) and the tangents 8 drawn along the edges of the blades, as shown also at 8 8, Fig. 3. The dotted lines represent the mold, and the instrument is shown in position for marking the bevel or pitch on one end of plank, the bevel of the other end being marked the same way, always keeping the blades of instrument parallel with tangent lines on mold. When the surplus wood is worked off at Fig. 3, the line 3 at top of rail has, when the rail is brought level, the proper pitch. The instrument facilitates thus the drafting of the angles of the tangents and the laying off of the bevels, which impart the required pitch to the rail, all of which has heretofore constituted the main difficulty in hand-railing. The curves are parts of ellipses, and are drawn with string and pins in the well-known manner. The board, on being sawed out, forms the mold, which is tacked onto the face of the plank, to cut rail after the plank is marked, as described. The work of the carpenter and stair-builder is thus rendered easier, and some of the most difficult operations of their trade simplified and expedited.

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

1. A beveling instrument for stair-builders, consisting of a prismatic box and of jointed compass-legs with swinging and sliding blades, substantially as described, and for the purpose specified.

2. The combination of the jointed compass-legs with sliding and swinging sleeves having shoulders and set-screws and sliding blades guided by rails along sleeves, substantially as specified.

3. The combination, in a beveling instrument, of a prismatic box having graduated side wall and arc-shaped slot with a swinging arm and set-screw, for getting bevels of jack-rafters for hip-roofs, substantially as specified, and in the manner described.

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