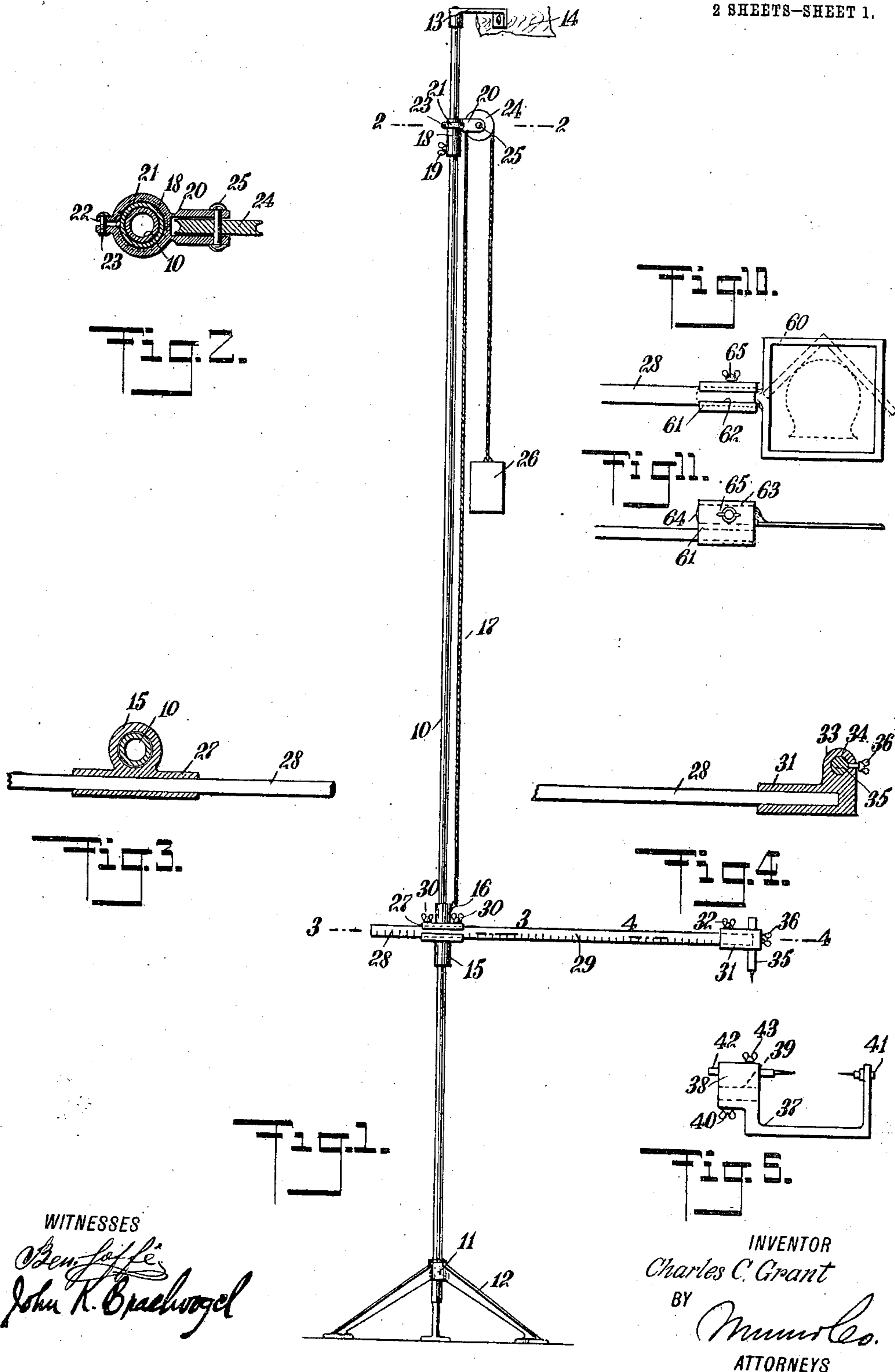


C. C. GRANT.  
SYSTEM OF LAYING OUT STAIR RAILS.  
APPLICATION FILED DEC. 1, 1909.

995,863.

Patented June 20, 1911.

2 SHEETS—SHEET 1.



WITNESSES  
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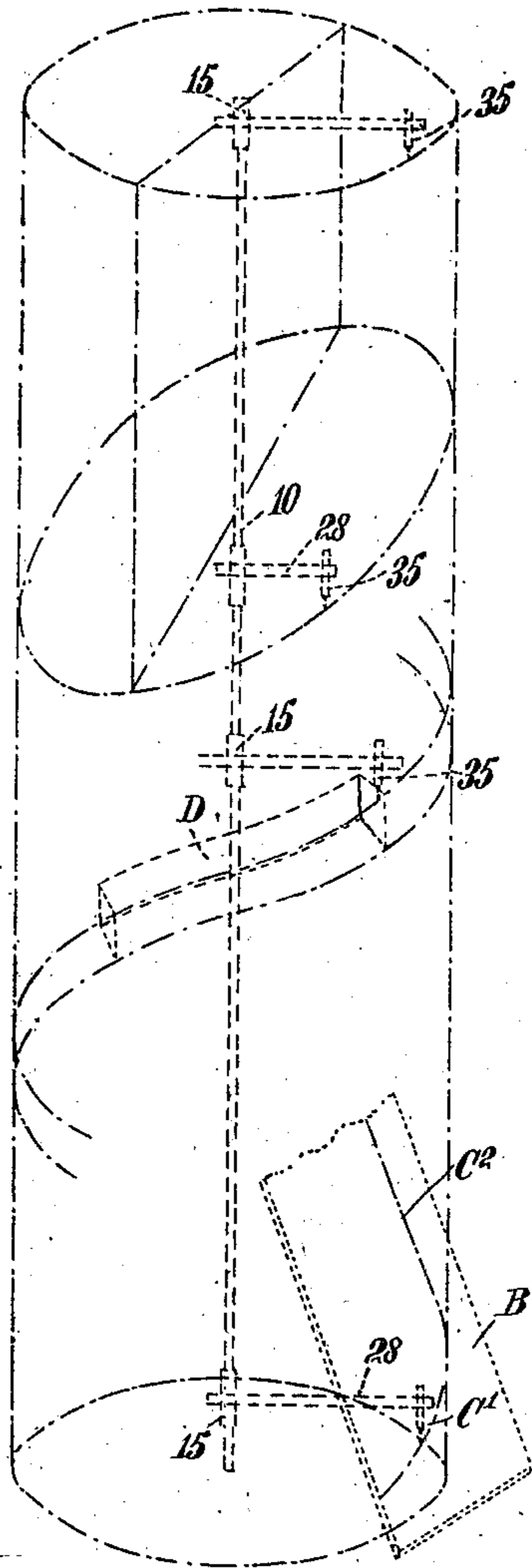


Fig. 8.

Fig. 7.

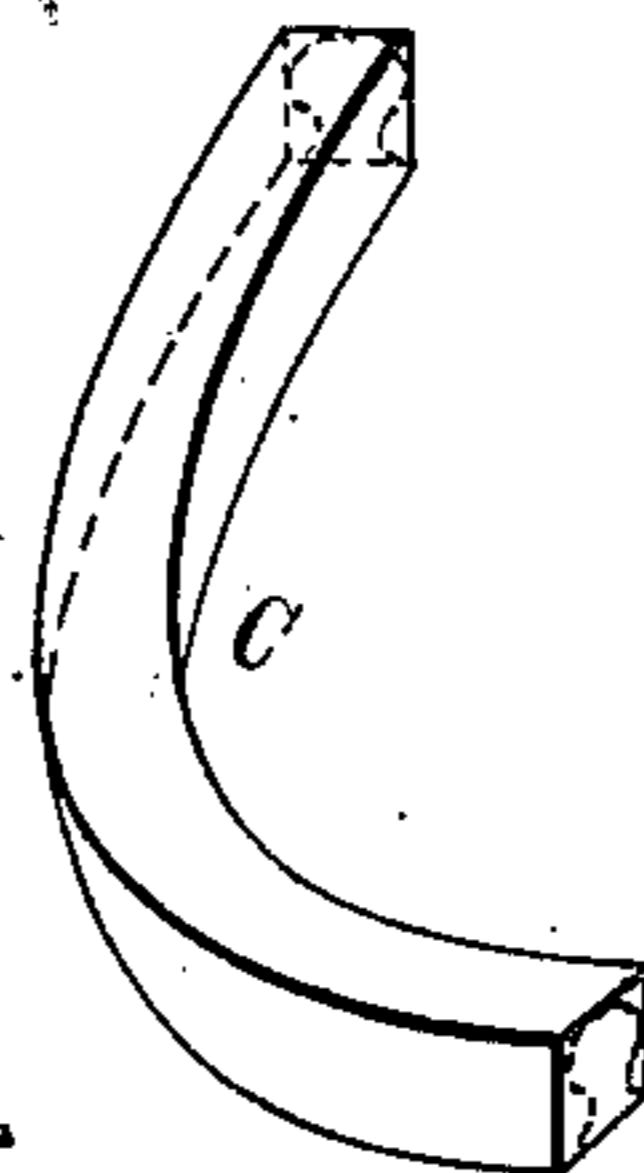
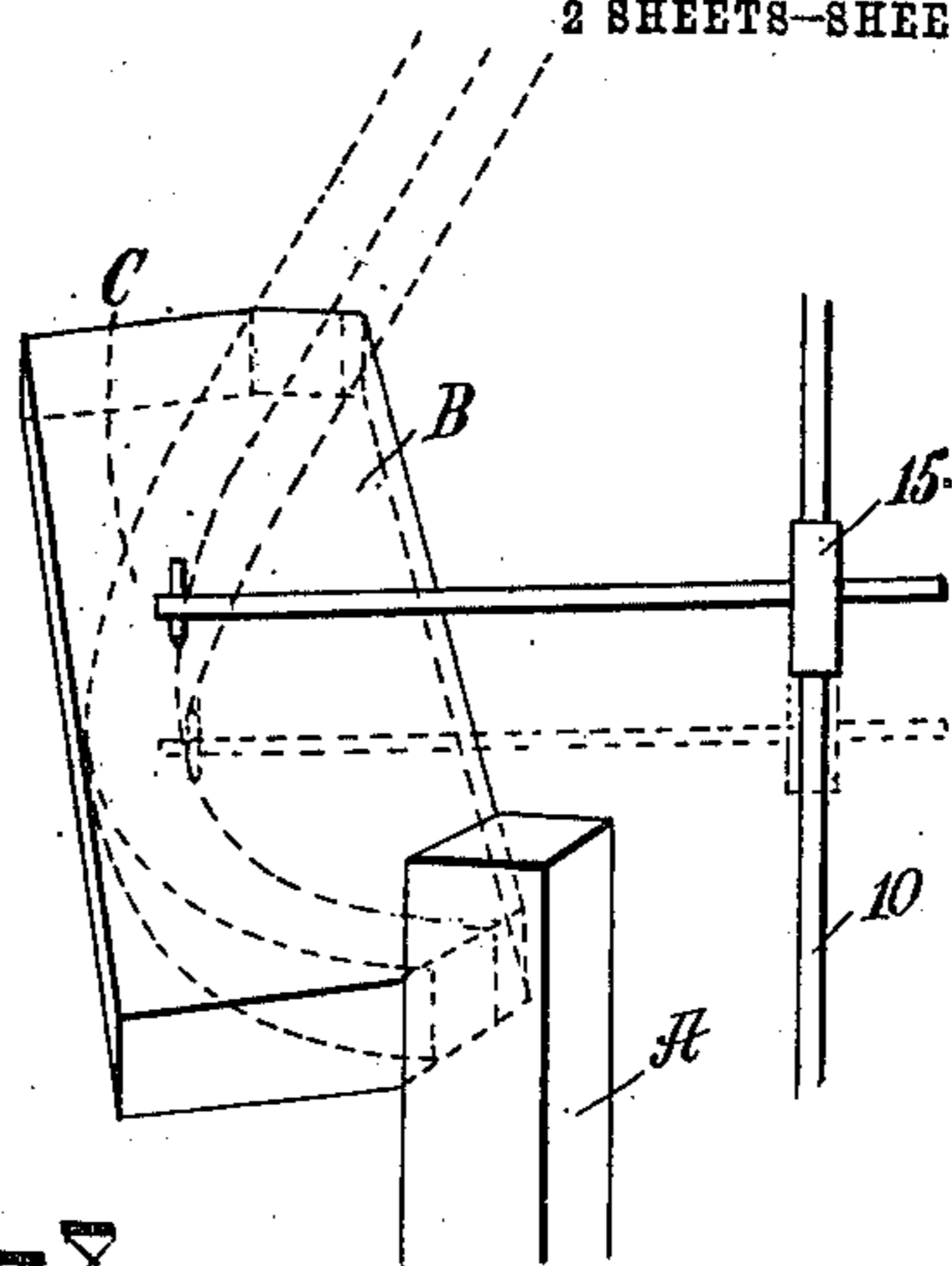
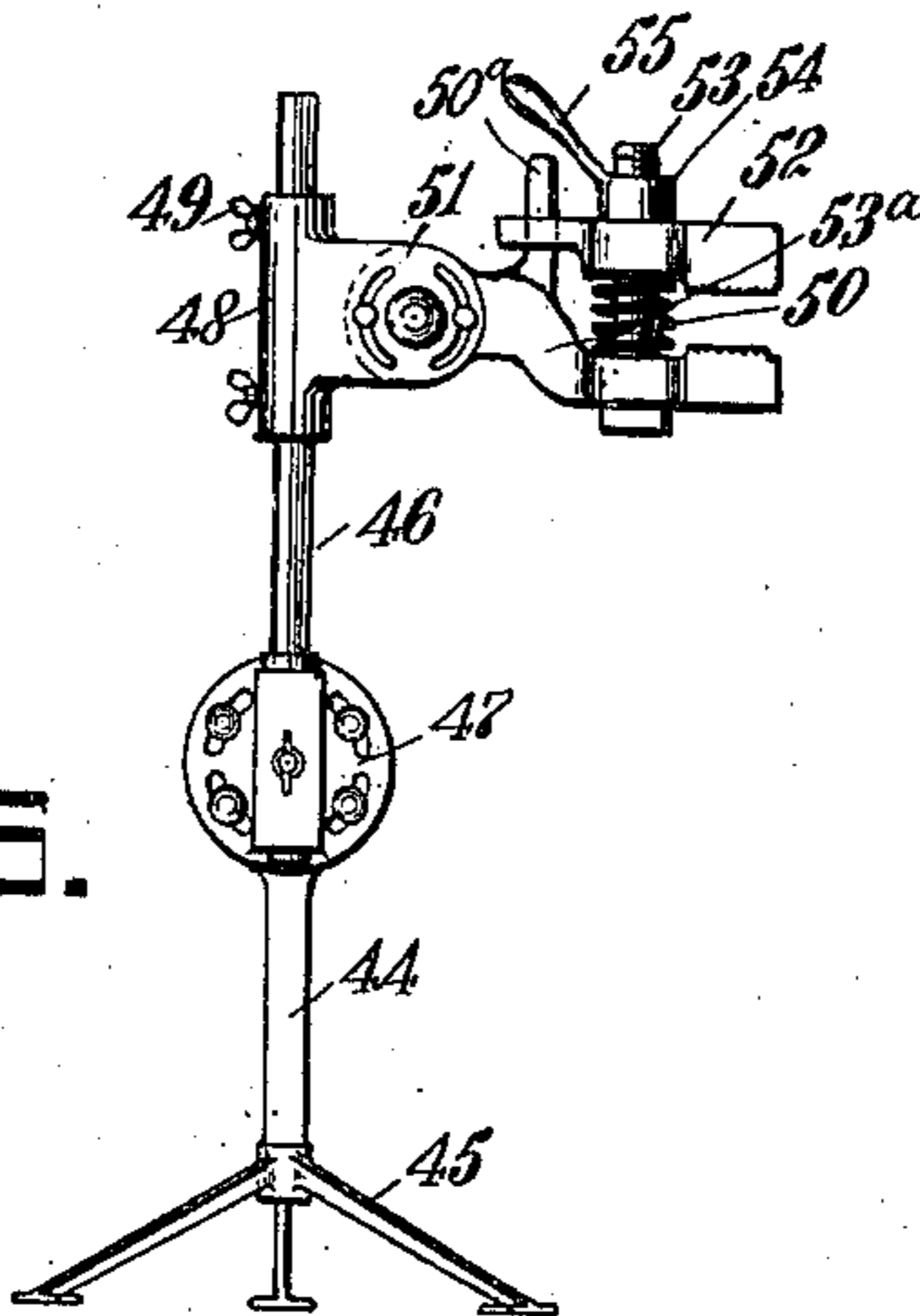


Fig. 9.

Fig. 6.



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# UNITED STATES PATENT OFFICE.

CHARLES CYRUS GRANT, OF RED DEER, ALBERTA, CANADA.

SYSTEM OF LAYING OUT STAIR-RAILS.

995,863.

Specification of Letters Patent. Patented June 20, 1911.

Application filed December 1, 1909. Serial No. 530,807.

*To all whom it may concern:*

Be it known that I, CHARLES CYRUS GRANT, a subject of the King of Great Britain, and a resident of Red Deer, in the Province of Alberta and Dominion of Canada, have invented a new and Improved System of Laying Out Stair-Rails, of which the following is a full, clear, and exact description.

This invention relates to systems for laying out stair rails and the like, for use by carpenters, builders and others, and relates more particularly to a system of the class described including in combination, means for holding the work, and a marker adapted to engage the work, and movable in a plurality of directions to permit the laying out upon the work of the outlines of the stair rail.

The object of the invention is to provide a simple and efficient system of laying out rails of stairs and like structures, which can be easily and expeditiously manipulated, which requires no special training or skill on the part of the operator, by means of which stair rails can be laid out accurately and in accordance with geometrical principles, and in which the apparatus employed can be easily moved from place to place and can be set up and taken down without loss of time and labor.

The invention consists in the construction and combination of parts to be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a side elevation of a part of my invention showing the marker and the means for guiding the same; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a similar view on the line 3—3 of Fig. 1; Fig. 4 is a similar view on the line 4—4 of Fig. 1; Fig. 5 is a side elevation of a detail of modified form for use in connection with the marker; Fig. 6 is a side elevation of an embodiment of the device for holding the work; Fig. 7 is a perspective view of a section of rail laid out by means of my system; Fig. 8 is a perspective view showing a newel, the work associated therewith, and a part of the apparatus, including the marker; Fig. 9 is a perspective view showing in diagrammatic outline, parts of

the apparatus, the work and the geometric form given the rail; Fig. 10 is a side elevation of an attachment for a special purpose; and Fig. 11 is a plan view of the attachment shown in Fig. 10.

Before proceeding to a more detailed explanation of my invention, it should be clearly understood that while the system is particularly useful for laying out the rails of curved stairs, it can also be advantageously employed for other like purposes in which it is necessary to lay out rails or similar structures in accordance with geometrical principles, for example, in which it is necessary to provide rails of helical form. Needless to say, the laying out of rails of circular stairs and similar structures is often a matter of considerable difficulty, especially if the operator is not well versed in the underlying geometrical principles and in the methods of their use. For example, the marking of lines upon the work so that a rail section of correct helical form can be cut therefrom is difficult of accomplishment, and my system provides means for executing this and like operations with ease.

While I have shown for example in the accompanying drawings, the system used for fashioning rails of helical form for use in connection with circular stairways, it can also be used for designing the rails of stairs which are only partly circular and which have for example, substantially straight sections.

Referring more particularly to the drawings, I provide a guide upright 10, consisting of a suitably elongated member mounted upon a base or support 11, which may be of any convenient form and is preferably provided with three supporting legs 12, which permit the upright to be centered with respect to a mark previously made upon the floor, and indicating the vertical axis or center line of the stairway. At the upper end, the upright has a bracket 13, adapted to be secured to a joist or any other suitable support, to assist in holding the upright in position within the stair well.

A sleeve 15, is slidably mounted upon the guide upright and is arranged to swing upon the same, having an extension 16, to which is secured the end of a line 17, consisting of a cord or any other suitable flexible member. The upright carries a second sleeve 18, adapted to be clamped in position by means

of a suitable set screw 19, and having a bifurcated bracket 20, clamped thereon by means of a split ring 21, provided with ears 22, adapted to be drawn together by means of a set screw 23. A grooved guide wheel or pulley 24, is pivotally mounted by means of a pivot pin 25, between the sides of the bracket, and has the line 17 passing thereover. At the free end, the line has secured to the same a counterpoise 26, consisting of a weight of any form adapted for the purpose.

The sleeve 15 has a transverse guide clip 27, in which is slidably arranged a marker arm 28, provided with suitable graduations 29, and adapted to be secured with respect to the guide clip, by means of set screws 30. At one end the marker arm carries a socket member 31, recessed to receive the end of the arm and secured upon the same by means of a set screw 32. The socket member has an extension 33 provided with a transverse, that is, a substantially vertical, bore 34, in which is positioned a marker 35, adapted to be held in place by means of a set screw 36. The marker may be of any suitable form, and consists for example, of a pencil or a pen. I also provide for use in connection with the arm, as will appear more clearly hereinafter, an attachment comprising a yoke member 37, having at one end an extension 38, provided with a hole 39, adapted to receive the marker arm, and having a set screw 40 by means of which it can be clamped in position upon the marker arm. The yoke bracket has, at the other arm, a fixed marker 41, and in a suitable opening of the extension 38 an adjustable pointer 42, adapted to be held in place by a set screw 43. The distance between these parts it will be understood, can be adjusted, and this device can be used for marking at opposite sides of a blank or work of suitable thickness.

I can use in connection with my system, any suitable device for holding the work, provided its adjustability is such that the work can be arranged at any desired angle with the horizontal. I have shown for example, in Fig. 6, a form of the work-holding means which can be used. This form consists of a post 44, supported upon a tripod or other base 45, and carrying an extension 46, mounted thereon by means of a suitably adjustable joint 47, which permits the parts 44 and 46 to be arranged at a plurality of angles with respect to one another. The post extension has mounted thereupon an adjustable sleeve 48, adapted to be held in a plurality of positions by set screws 49, and having adjustably secured thereto a jaw 50, by means of a suitable joint 51. The jaw 50 has adjustably mounted on a stud 50<sup>a</sup>, the movable jaw 52. The jaws have the adjacent faces suitably formed to grip the

work and are connected by a threaded pin 53, and are controlled by a spring 53<sup>a</sup> and an adjusting collar 54, operable by means of a handle 55. The parts 44 and 46 are relatively adjustable, as the sleeve 48 can be moved up and down upon the part 46 and can be swung around the same, and as the fixed jaw can be held in a plurality of angular positions with respect to the sleeve, the work can be held at any angle required by the operation of laying out the stair rail.

In Fig. 8 is shown a newel A, which has associated therewith a blank B, which represents the work and which is arranged at the proper angle required by the inclination of the stair rail C, which is indicated in dotted outline. Of course, the work will be held at this angle by the device shown in Fig. 6, while the marker is being used to describe the outlines of the stair rail upon the work. It will be understood that by swinging the marker arm about the guide upright, and by moving it up and down at the same time, with respect to the guide upright, a proper elliptical curve can be drawn upon the work, for use in connection with circular stairways. If the stairway has a straight section, the rail for this section of the stair can be drawn upon the work by extending lines tangent to the helical lines, as is shown, for example, at C<sup>2</sup> in Fig. 9, this being tangent to and an extension of the helical line C'. The angularity of the stair rail must of course be previously determined in any suitable manner, either graphically or otherwise.

In Fig. 9, at D, is included diagrammatically, a section of a suitably curved stair rail coinciding partly with the horizontal curves described by the marker. After a pair of curves has been described upon the upper surface of the work, the marker is reversed and the corresponding curves are described on the under side, and this section of the rail can then be cut out of the work by means of a saw or in any other suitable manner. The double marker shown in Fig. 5 can then be employed to mark at both sides of the piece resulting from the previous operation, a line indicating the thickness to which it is further to be cut away. The graduations on the marker arm are used for setting the marker, after its radius has been determined. The provision of the counterweight 26 facilitates the movement of the marker longitudinally of the guide upright.

In Figs. 10 and 11 I have shown an attachment comprising a frame 60 of any suitable form, mounted upon the marker arm 28 by means of a bracket 61 having a groove 62 adapted to receive the marker, and further having an opening 63. The frame has an offset extension 64 adapted to be received by the opening 63 and secured therein by a set-screw 65. This device is intended to

assist in cutting the end surfaces of the rail sections so that the sections fit exactly together. By suitably positioning the frame and placing therein the extremities of the rail sections, as is indicated in dotted outline, a straight edge 66 can be used in marking the ends of the sections so that these can be cut to fit exactly.

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

1. In a system of the class described, in combination, a guide upright, means for holding said upright in position, a sleeve mounted upon said upright and slidable longitudinally thereof and rotatable with respect thereto, a marker adjustably carried by said sleeve, a pulley adjustably carried by said upright and adapted to be secured thereto at a plurality of points, a line secured to said sleeve and passing over said pulley, and a counterweight secured to said line.

2. In a system of the class described, in combination, a guide upright, means for holding said upright in position, a sleeve slidable upon said upright and rotatable upon the same, said sleeve having a clip, a graduated marker arm adjustably mounted in said clip, a marker adjustably carried by said marker arm, a second sleeve adapted to be secured upon said upright at a plurality of points of the same, said sleeve having a bracket, a pulley journaled in said bracket, a line secured to said first sleeve and passing over said pulley, and a counterweight se-

cured to said line, said upright having at the lower end a supporting base permitting said upright to be positioned exactly over a predetermined point.

3. In a system of the class described, a guide upright, a member slidably and rotatably mounted upon said upright, and having a clip, a marker arm slidably arranged in said clip and having at the end a socket, said socket being provided with an extension, and a marker adjustably carried by said extension.

4. In a system of the class described, in combination, a guide upright, means for holding said upright in position, a sleeve slidable upon said upright and rotatable upon the same, a marker arm adjustably mounted on said sleeve, a marker adjustably carried by said marker arm, a second sleeve adapted to be secured upon said upright at any one of a plurality of points of the same, a pulley journaled on said second sleeve, a line secured to said first sleeve and passing over said pulley, and a counterweight secured to said line, said upright having at the lower end a supporting base, permitting said upright to be positioned exactly over a predetermined point.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES CYRUS GRANT.

Witnesses:

JNO. CRAWFORD,  
MARY SPENLIN.