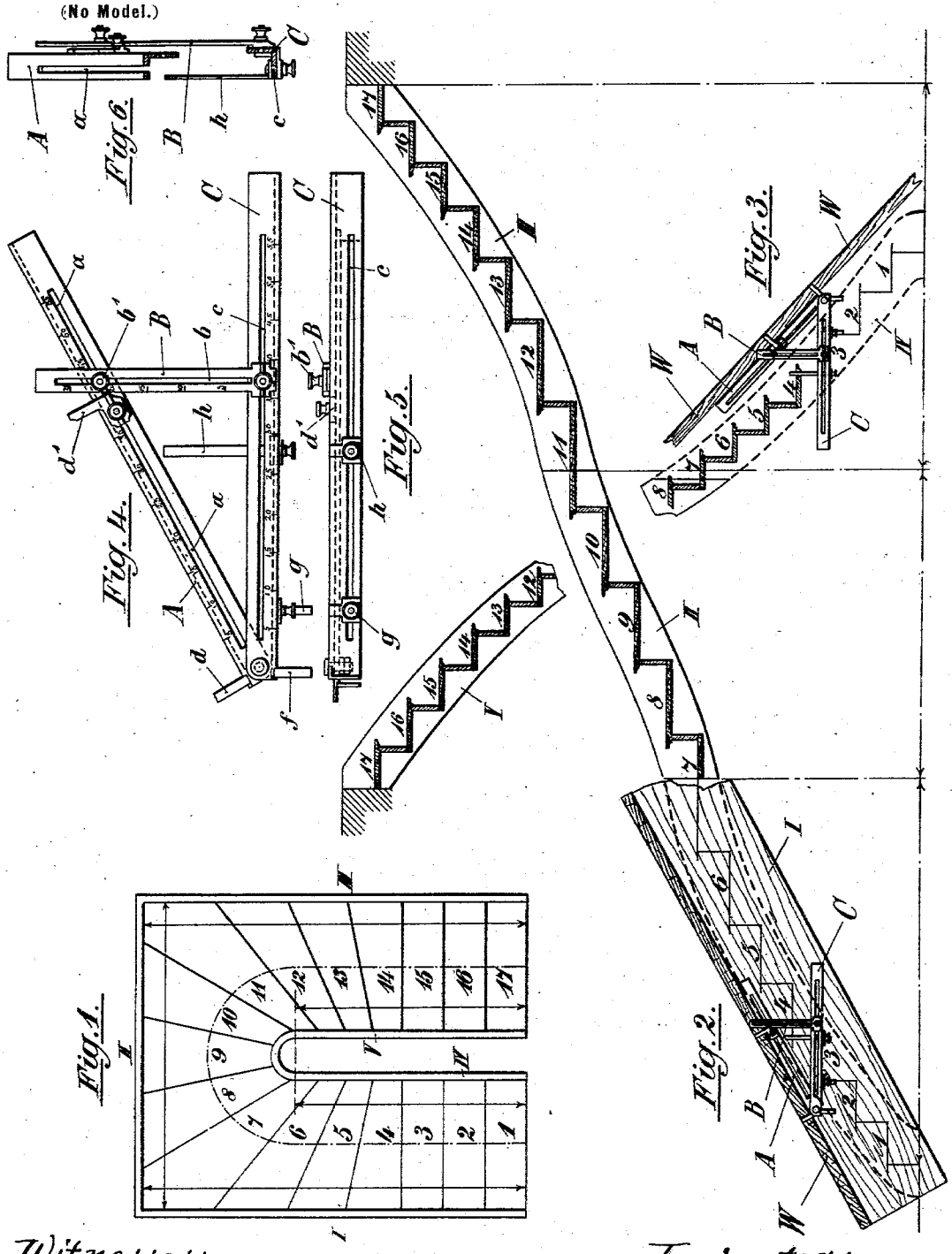
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E. WALTER.

STAIRCASE RULE.

(Application filed Feb. 25, 1899.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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STAIRCASE-RULE.

SPECIFICATION forming part of Letters Patent No. 634,782, dated October 10, 1899.

Application filed February 25, 1899. Serial No. 706,855. (No model.)

To all whom it may concern:

Be it known that I, EUGEN WALTER, a citizen of the German Empire, residing at Heilbronn-on-the-Neckar, Kingdom of Würtemberg, Germany, have invented a certain new and useful Stair-Rule or Pitch-Board Gage; 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.

This invention relates to pitch-board or stair rules or gages; and it consists substantially in such features of improvement as will hereinafter be more particularly described.

The marking out of staircase string-boards has hitherto always required a great consumption of time, because it was not founded on any systematic basis, as treads and risers were tentatively projected or sketched by striking angles until a suitable position of the same on the plank to be dealt with was found. Such work required clever and skilled workmen who, however, required a long time to do it in, so that this work was time-consuming and costly.

The object of the invention is to provide a rule or gage for enabling the marking out of string-boards of staircases to be easily and quickly effected without special experience or skill and with security and precision.

In the accompanying drawings, Figure 1 is a plan view of a turned staircase, eighteen risers being assumed for the height of the steps—that is to say, seventeen steps are necessary for this staircase. (The last riser forms the landing.) Figs. 2 and 3 are sectional views of staircases, showing the use or application of my improved device or rule thereto in marking or arranging the string-boards. Figs. 4, 5, and 6 are enlarged views in detail of my improved rule or gage.

The division of the stair-steps is usually made in such a way that the risers are all of equal height, and the average widths of the steps or treads are assumed to be similar. The tread-surfaces at the top and bottom of the staircase are usually of equal width on both cheeks or string-boards, while the intermediate treads gradually alter on both string-boards. In the present instance it is assumed that the treads 1 2 3 and 15 16 17 are of equal width at both string-boards, while the intermediate treads from 4 to 9 become gradually wider at the outside and narrower at the inside, and from 10 to 14 gradually again narrower at the outside and wider at the inside. It is evident from the plan of a staircase shown here as an example that in the left-hand string-board I six and two-thirds steps are contained. In string-board II there are three and two-thirds steps. In the present instance of a curved or turned staircase, as the width of the treads alters in the separate string-boards or cheeks, the average width of the treads in the string-boards I, II, and III is first ascertained. (The average width equals the length of the string-boards in plan divided by the number of treads lying therein.) The scale for the pitch or rise is obtained from the height of the floor or story and the number of risers. As soon as these two measures are ascertained the marking out of the staircase by means of the special implement, which will now be described, is uncommonly simple. This takes place by means of the angle-gage shown in Figs. 4, 5, and 6, the longer arms A and C of which are pivotally connected with one another and may be adjusted in position to one another by means of a third but vertical arm B, adjustable on both arms A and C and at any time adjustable thereon (according as right or left string-boards are to be marked out) and which may be fixed together by means of a screw b'. For this object all three arms A, B, and C have slots a, b, and c, through two of which the set-screw b' projects and in the slot c of which the arm B is adjustable. All three arms are provided with scale-markings, and two projections or contacts d and f are arranged at the point of rotation of the two arms A and C, vertically to these latter, in such a way that the inner contact edges pass through the center of the hinge, (point of rotation.) A further contact or stop d', capable of being adjusted in the slot a and fixed therein, serves for enabling a given measure (rise) to be adjusted with its corner or angle on the arm B. By means of this angle on the stop d' the position of the hypotenuse of the right-angled triangle (in the arm A) may be ascertained,

the said projection d' being arranged exactly in the center line of the slot a, which line passes through the center of the hinge, and the inner edge of the arm B passing through the angle, which hypotenuse forming the center of the slot a passes through the point of rotation (center of the hinge) and through the above angle of the stop d' and the exact length of which is given by the distance apart of the two stops d and d'. If a planed latch W be nailed on the side of the string-board I and the instrument be adjusted with its two arms B and C to the angle of rise (average width of tread and height of rise) and laid with its hypotenuse-arm A on this latch W, the horizontal lines for the steps 1 2 3 4, &c., may be easily marked out, as they have an equal vertical distance apart, by means of the divisions (scale) on the arm B, (heights of rise.) For laying out or marking the verticals of the steps (risers) lying at varying distances apart two contacts or stops g and h, arranged on the arm C, are employed, which are adjusted each time to this different treads or width of step on the string-board I in such a way that g rests on the front vertical, and by means of the stop h the vertical for the next step is projected. In this manner there is first obtained the design of steps shown on the left of Fig. 2. If in the same the actual thicknesses of the wood of the risers and treads and also the profile of the tread-nosing (see Fig. 2 to the right) be taken, and then the distance from the front nosing and from the rear end of the treads, to which the string-board is to project above and below the steps, be added, (so that the whole width of the string-board is obtained,) the points for the upper and under border-lines of the string-board are obtained. (In the present case these are regular curves.) In a similar manner for the other string-boards II and III and also the right-hand (inner) string-boards IV and V the divisions of the steps (form and position) are obtained in a very short time, while, as before, the horizontal distances are always ascertained, corresponding to the distances to be deducted from plane I by means of the stops g and h.

The marking out may be carried out by the method hereinbefore described with the use of the implement described in so simple a manner that even the most unskilled workman learns the same in a very short time. The advantage consists also not only in the short time required for marking out and the use of unskilled workmen, but also particularly in the security and accuracy of the work afforded by the mechanical execution.

The method when laying out straight staircases is of course simpler, because here the widths of the treads remain equal. With an exact handling of an implement an absolute security is afforded in the carrying out of the separate parts and errors are excluded. This method may also be employed for stone staircases of all kinds by using this implement.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. A staircase-rule comprising the two slotted arms, A, C, movably joined together at one end, and each provided with a right-angled projection at the joint, and a third slotted arm connecting the said arms, and adjustable with reference thereto, the said arm, A, being provided with an adjustable right-angled projection, substantially as described.

2. A staircase-rule comprising the two slotted arms, A, C, movably joined together at one end, and each provided with a right-angled projection at the joint, and a third slotted arm connecting the said arms, and adjustable with reference thereto, the said arm, A, being provided with an adjustable right-angled projection, and the said arm, C, being provided with oppositely-extending stops or contacts, substantially as described.

3. A staircase-rule comprising the two slotted arms hinged together at one end, the third slotted arm connecting said arms and adjustable thereon, and the projections, d, f, and d', as described.

4. A staircase-rule comprising the two slotted arms hinged together at one end, the third slotted arm connecting said arms and adjustable with respect thereto, the projections d, d' and f, and the contacts or stops g and h, substantially as described.

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

EUGEN WALTER.

Witnesses:
A. DRAUTZ,
WM. HAHN.