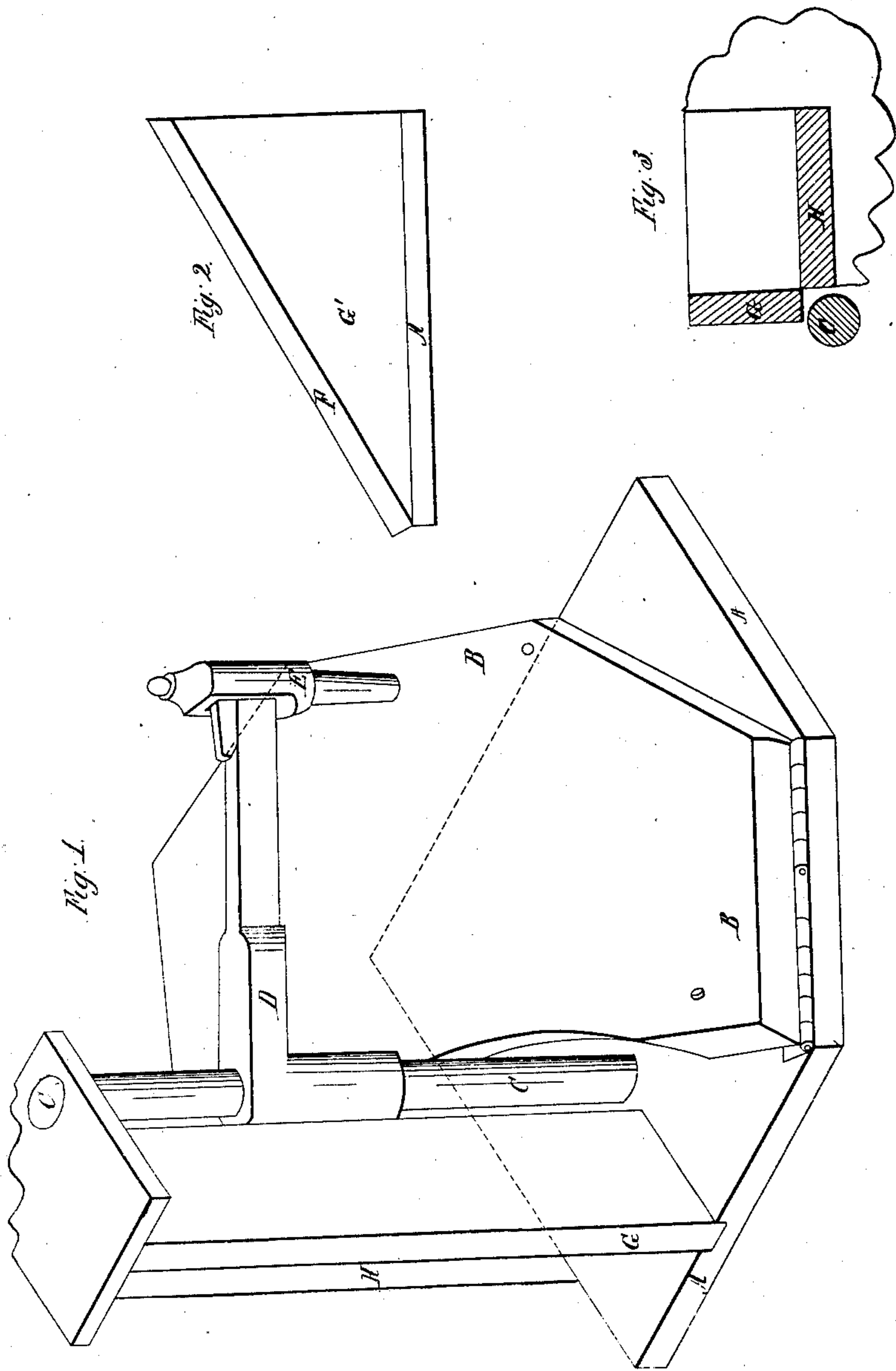


C. R. Shaeffer.

Stair-Rail Mach.

N^o 24,763.

Patented Jul. 12, 1859.



Witnesses;
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UNITED STATES PATENT OFFICE.

CORNELIUS R. SHAEFFER, OF GETTYSBURG, PENNSYLVANIA.

MACHINE FOR MAKING HAND-RAILS FOR STAIRS.

Specification of Letters Patent No. 24,763, dated July 12, 1859.

To all whom it may concern:

Be it known that I, CORNELIUS R. SHAEFFER, of Gettysburg, in the county of Adams and State of Pennsylvania, have invented
5 certain new and useful Improvements in Machines for Ascertaining the Twist and Curve of Hand-Rails for Stairs; and I do hereby declare that the following is a full,
10 clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in constructing and arranging a machine so
15 that the length, the twist, joint, and the curve of any piece of a stair rail may be obtained by a mechanical process, substantially as will be described.

In the drawings Figure 1 is a perspective.
20 Figs. 2 and 3, are detached views of portions of the machine.

In the figures, A, represents the base, on which the machine is erected. Upon this base is erected a perpendicular, square post,
25 two sides of said post being here represented and marked G, and H. A rod or round bar C, is also erected upon this base A, in such relation to the post just spoken of that its axis will be in the two planes of the outside
30 of the two portions of the post represented by G, and H.

The two sides G, and H, it will be understood, stand at right angles to each other. The lower end of the rod, or bar, C, rests in
35 a socket or hole in the base, while its upper end has its bearing in a cap, which is secured on top of the post.

D, represents an arm which has a hole through its rear end, through which passes
40 the rod or bar C.

E, represents a variable scribe with which the arm D, is provided and which slides backward and forward upon said arm and which can be stationed at, any desired point
45 upon it. The arm D, is so secured to the rod, C, that it can slide freely up and down upon it when desired.

B, represents a draft board, which is hinged to one edge of the base, as will be
50 seen.

G, represents a triangular pitch board which is placed under the draft board. The base of the triangle rests upon the base A, while the draft board rests upon the hypotenuse of said triangle. The acute angle
55 of the triangle, in ordinary cases, being the

angle at which the draft board stands to the base A. In stair cases which are almost perpendicular of course this angle will be changed.

The pitch board G, is for the purpose of giving the desired pitch to the draft board B, the said pitch board, always having the inclination of the stairs.

In operating this machine I first obtain
65 the pitch of the stairs and this is given to the pitch board. The pitch board is then placed under the draft board A as has been described. The draft board then stands of course, with the inclination of the stairs.
70 I then lay my board or timber for forming the rail upon the draft board. I then measure across from one rail to the other and obtain the distance the two are apart, and by taking one half of this distance just
75 measured, I have a radius with which to describe the curve which the rail is to make. This radius just obtained I give to the scribe E, placing the scribe just that distance from the center of the rod or bar
80 C. The scribe being secured to the arm, I proceed to describe the arc of an ellipse upon the timber lying upon the draftboard. After describing two arcs, the one representing the outer and the other the
85 inner curve of the rail, I remove the rod. I remove the rod, C, and the arm, D, and apply a straight edge to the piece of timber, resting one side of the
90 straight edge, first against one side of the post and then against the other and drawing a line across the timber each time. This gives me the length of the piece of rail, which is the quarter of an ellipse. I then
95 apply my square first to one of the lines obtained, and then to the other, drawing a line across the timber from one arc to the other first obtained. The lines thus drawn intersect the lines drawn with the straight
100 edge at the center of the timber. I then saw the timber square off on this line obtained by the square, and I have the joint necessary. I then place the rod, C, and the arm D, again in their former positions, and
105 by resting the arm D, upon the center of the timber I find that it stands on a level. I also find by sliding the arm up from the center that the outside edge of the timber is the highest and that by sliding the arm
110 over the timber below the center that the inside edge of the timber is the highest. I then take my instrument and work off the

outside edge above the center and the inside edge below the center, until by sliding the arm D, over the timber I find that it is all on a level as was the center. This gives
5 the necessary twist to the timber. In this manner two pieces of rail may be formed, and when joined together they form square butt joint and the proper curve for a platform stair case, the ends of the pieces thus
10 formed being in position to join to a straight rail, the butt joint being obtained by applying the square.

For a winding stair case the timber is laid upon the board and one part of the rail
15 is obtained as has been described, but the upper part of the rail is obtained in this manner. The timber being laid on the draft board the lower end of the timber is placed on a line drawn through the center of the
20 other piece, and then being cut off to a

quarter ellipse it will be found that by applying the arm D, the upper or outside edge is the highest so that I work off this outside edge to aline as has been described, and it is ready to join the piece first obtained
25 with a square butt joint and having the proper curve and twist.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent is—
30

The combination of the perpendicular square post, erected upon the base A, with the draft board B, pitch board G, rod C, and arm D, the several parts being arranged substantially as and for the purpose set forth.
35

C. R. SHAEFFER.

Witnesses:

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