No. 839,846. PATENTED JAN. 1, 1907.

G. HOLDEN.

SPIRAL STAIRWAY.

APPLICATION FILED MAY 7, 1906.

2 SHEETS—SHEET 1.

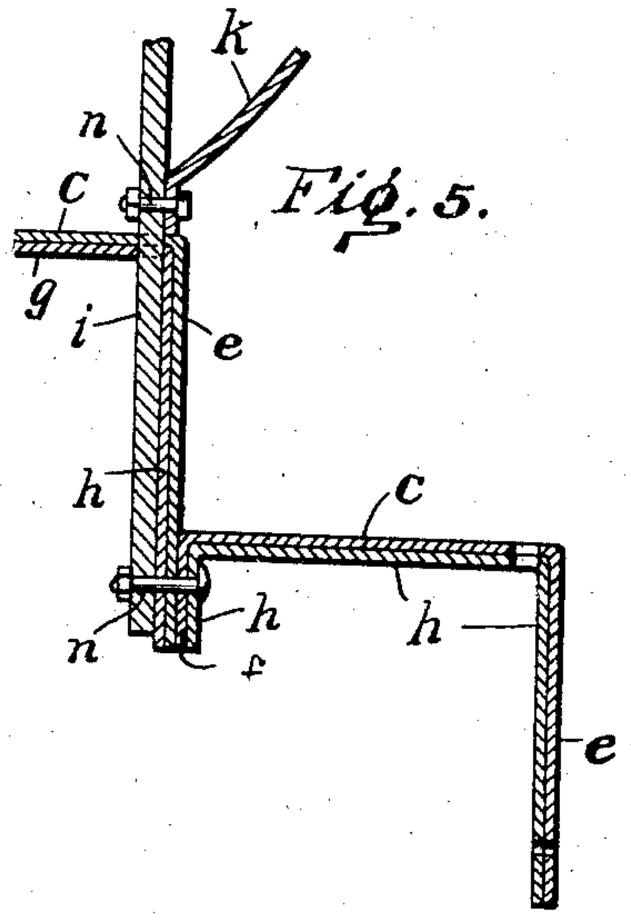

Fig. 5.

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

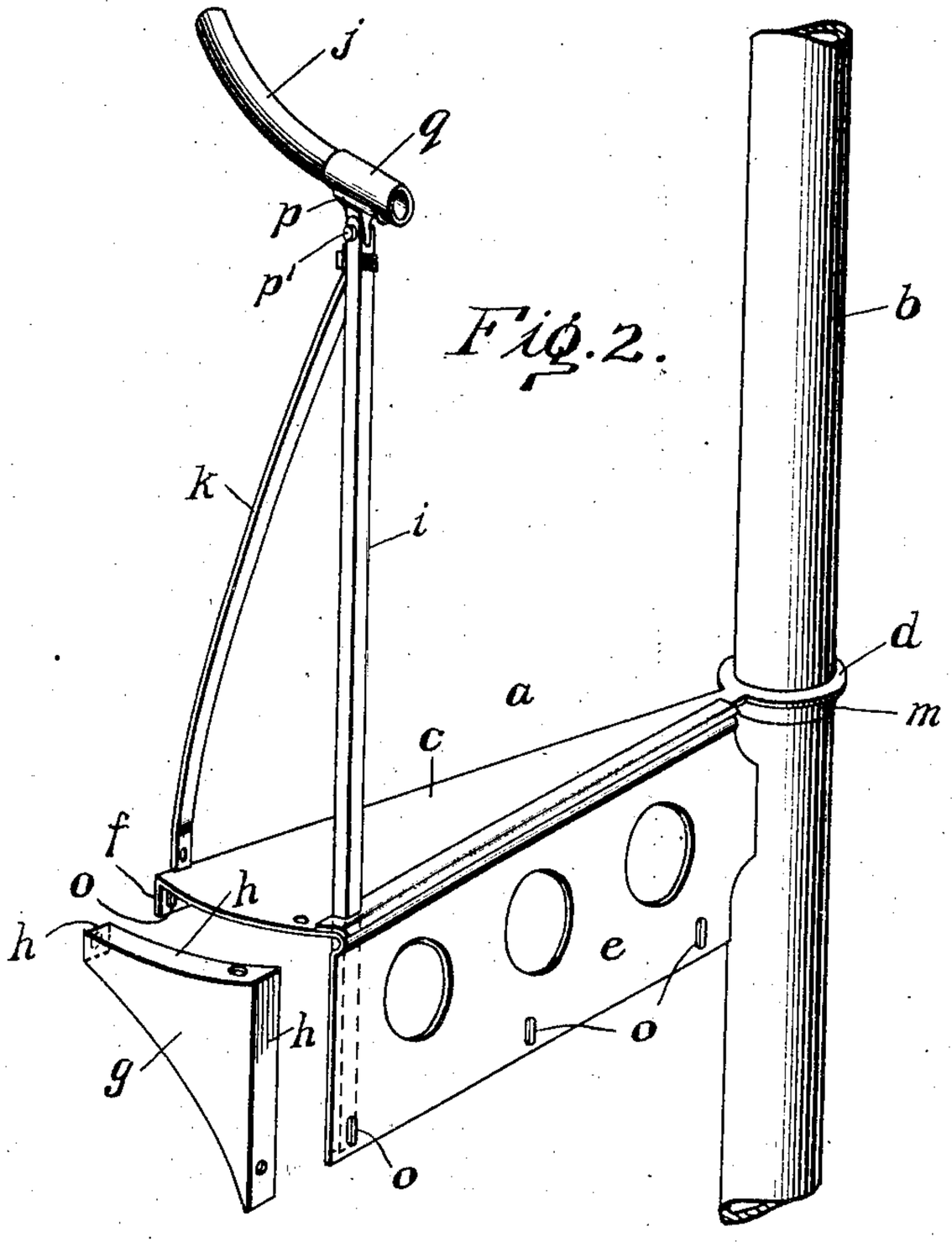


Fig. 3.

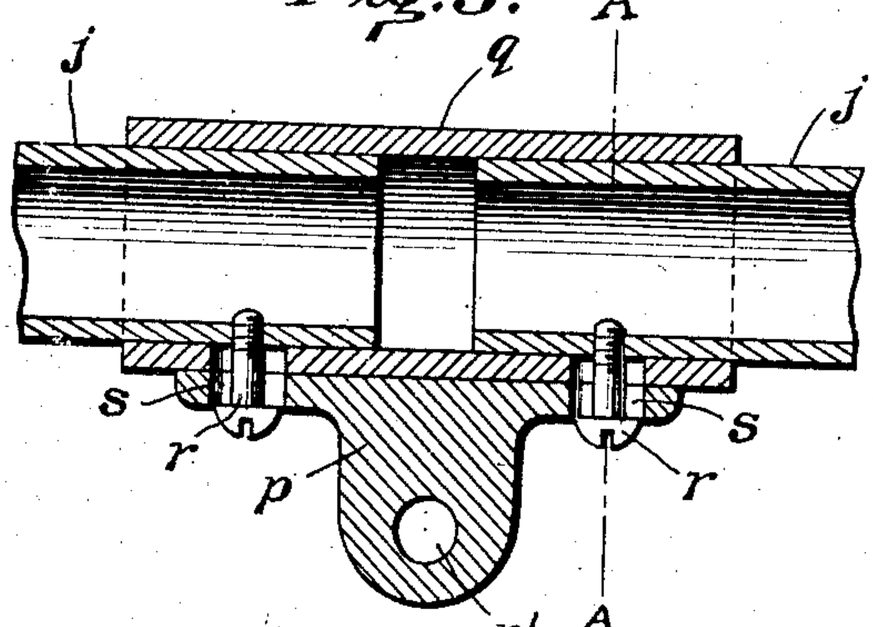
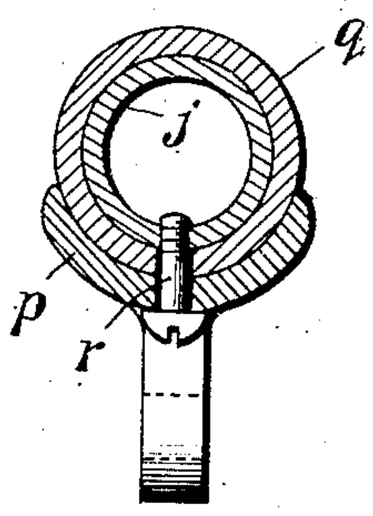


Fig. 4.



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GEORGE HOLDEN, OF MERCHANTVILLE, NEW JERSEY, ASSIGNOR TO MERRITT AND COMPANY, A CORPORATION OF PENNSYLVANIA.

SPIRAL STAIRWAY.

No. 839,846. Specification of Letters Patent. Patented Jan. 1, 1907.

Application filed May 7, 1906. Serial No. 315,626.

To all whom it may concern:

Be it known that I, GEORGE HOLDEN, of Merchantville, county of Camden, and State of New Jersey, have invented an Improvement in Spiral Stairways, of which the following is a specification.

It is one of the objects of my invention to provide a unit stair structure of simple and convenient form, which may be combined with other similar units to produce a spiral stairway of any height desired. The units are adapted to be supported at their inner ends by a central post about which they are arranged one above the other in spiral form, and when the successive units are united together a strong stairway is formed, with the steps supported wholly by the central post.

The invention also relates to the combination of a hand-rail with such a stairway, said rail being composed of sections or units carried by the steps and coupled together when the steps are in place to form a continuous hand-rail. These rail-sections are so supported that they may be adjusted both longitudinally and angularly to suit the requirements of erection. The units may be easily united together in the erection of the stairway and may be made to standard sizes.

In the drawings, Figure 1 is a perspective view of a spiral stairway embodying my invention. Fig. 2 is a perspective view of one of the "units" and the central post. Fig. 3 is a longitudinal vertical section of the hand-rail coupling on an enlarged scale. Fig. 4 is a vertical section of the same on the line A A of Fig. 3; and Fig. 5 is a vertical transverse section, enlarged, through the outer end of two connected units.

The stairway is made up of a series of units *a a a* and *c*, connected together in spiral form and supported at their inner ends by a central post *b*. The body of these units *a*, which is preferably stamped from sheet metal, consists of a horizontal triangular tread *c*, having an integral ring *d* at the end or apex, a deep horizontal flange *e* at the front, and a narrow horizontal flange *f* at the back.

g is an angular end piece having a flanged edge *h*, by which it is attached to the tread *c* and flanges *e* and *f* of the body at the outer end.

i is the upright post of the step or unit, which carries the hand-rail *j*.

k is a brace extending from the upper end of post *i* of one unit to the lower end of the post of the next unit or step.

m represents supporting-collars secured to the central post *b* to support the rings *d* of the steps.

In assembling the units and erecting the steps the rings *d* of successive units, each with its collar *m* below it, are placed on the central post *b*, the lowermost step is adjusted about the post *b* into the proper radial position, and the collar *m* is secured to the post. The next unit is adjusted on the post *b*, so that the lower edge of its front flange *e* fits against the outer face of the back flange *f* of the lower step, and these flanges are secured together by suitable rivets or bolts, and this operation is repeated with successive units until the staircase is completed.

The same rivets or bolts which secure the flanges *e* and *f* together at the outer ends may be used also to fasten the end pieces *g* and the end of the upright *i*, as shown in Fig. 5. In this case the bolts *n* pass through the flanges *h* and *f* of the lower unit and the flanges *e* and *h* and the upright *i* of the upper unit. The end pieces *g* and the upright *i* may of course be secured by separate fastenings, if desired. To provide for vertical adjustment in the connection of the units, and thus to permit variation in the height of the steps, the bolt-holes *o* in the flanges *f* and *e* may be slotted or elongated, as shown.

So far as the invention relates to the construction and combination of the steps it is immaterial whether any hand-rail be used, and if no hand-rail is necessary the uprights *i* and braces *k* may be omitted. My invention, however, embraces certain improvements in the construction of the hand-rail, whereby each unit carries its corresponding section of the rail, and these sections may be united to form a continuous spiral rail.

p is a shoe pivoted, as at *p'*, to the upper end of the upright *i* and supporting a tubular coupling *q*. The ends of the rail-sections *j* of successive units are fitted in the coupling *q* and secured by suitable screws *r*. These screws *r* pass through slots *s* in the shoe *p* and coupling *q* to permit of longitudinal adjust-

ment. Each unit carries its rail-section *j*, and the complete rail is formed by uniting these sections together through the couplings *q* in the manner described. The hinged shoes *p* permit such radial adjustment as may be required in the rail-sections. The horizontal angular size of the steps or units may be varied to suit the requirements. I have found an angle of thirty degrees for each unit most satisfactory. This enables a complete circle to be made with twelve steps.

What I claim as new, and desire to secure by Letters Patent, is as follows:

1. A spiral stairway, consisting of a central post, a series of independent metal steps having a horizontal triangular tread and a vertical front, said triangular tread terminating at its inner end or apex in a supporting-ring, collars adjustably secured to said post to support said rings with the steps arranged one above the other, and means to unite the back of the triangular tread of the lower steps with the lower edge of the vertical front of the next steps above.

2. A spiral stairway, consisting of a central post, a series of independent steps formed of stamped sheet metal having a horizontal triangular tread with a short depending flange at the back and a long depending front, means to secure said steps to the central post at the inner end or apex one above the other, and means connecting the short back flange of the lower steps with the lower edge of the depending front of the next steps above.

3. A spiral stairway, consisting of a central post, a series of independent steps formed of stamped sheet metal having a horizontal triangular tread terminating at the inner end or apex in an integral supporting-ring adapted to engage the post, and provided at the back of said tread with a short depending flange and at the front with a long depending front portion, means to support said steps by their supporting-rings one above the other on said central post, and means to unite the short back flange of the lower steps with the lower edge of the depending front of the next steps above.

4. A spiral stairway consisting of a central post, a series of independent triangular metal steps, each supported at its inner end or apex by said post, and arranged one above the other, means uniting the back of each lower step with the front of the next step above, uprights carried by the outer ends of said steps, braces between the uprights of successive steps, and a hand-rail carried by said uprights.

5. A unit for a spiral stairway, consisting of stamped sheet-metal frame having a horizontal triangular tread, a narrow depending flange *f* at the back of said tread and a deep depending front *e* and a separate end piece secured to the outer end of said stamped frame between the tread and the flange *f* and front *e*.

6. A unit for a spiral stairway, consisting of stamped sheet-metal frame having a horizontal triangular tread, a narrow depending flange *f* at the back of said tread and a deep depending front *e* and a separate end piece *q* having a flange *h* secured to the outer end of said sheet-metal frame.

7. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, and a hand-rail section carried by the end of said upright.

8. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, and a hand-rail section carried by the end of said upright with provision for angular adjustment.

9. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, a coupling-sleeve carried by said upright and a hand-rail section carried by said sleeve.

10. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, and a hand-rail section carried by the end of said upright with provision for longitudinal adjustment.

11. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, a shoe pivotally connected with the upper end of said upright with provision for angular adjustment in a vertical plane, and a hand-rail section carried by said shoe.

12. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, a shoe pivotally connected with the upper end of said upright with provision for angular adjustment in a vertical plane and a coupling-sleeve carried by said shoe.

13. A unit for a spiral stairway, consisting of a triangular metal step adapted to be supported at its inner end, an upright carried by the outer end of said step, a shoe pivotally connected with the upper end of said upright with provision for angular adjustment in a vertical plane and a coupling-sleeve carried by said shoe and adjustable longitudinally thereon.

14. A spiral stairway, composed of a series of units each consisting of a triangular step portion having an upright at its outer end and a rail-section carried by said upright, a central post supporting said units one above the other at their inner ends, means connecting the back of the lower steps with the fron

of the steps above, and couplings uniting the rail-sections of successive steps.

15. A spiral stairway, composed of a series of units each consisting of a triangular step portion having an upright at its outer end and a rail-section carried by said upright, a central post supporting said units one above the other at their inner ends, means connecting the back of the lower steps with the front of the steps above, couplings uniting the rail-section of successive steps, and braces connecting the uprights of adjacent sections.

In testimony of which invention I hereunto set my hand.

GEO. HOLDEN.

Witnesses:
H. S. BARNES,
W. B. PLACE.