Dec. 31, 1968 T. R. ALLMAND 3,418,770

SPIRAL STAIRS

Filed July 12, 1966

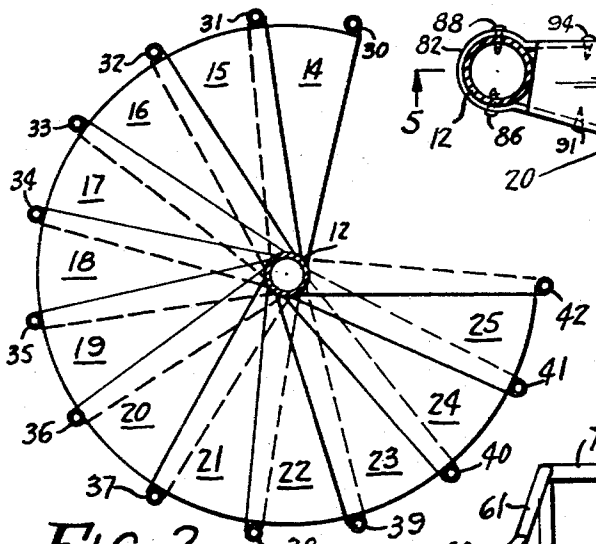


FIG. 2

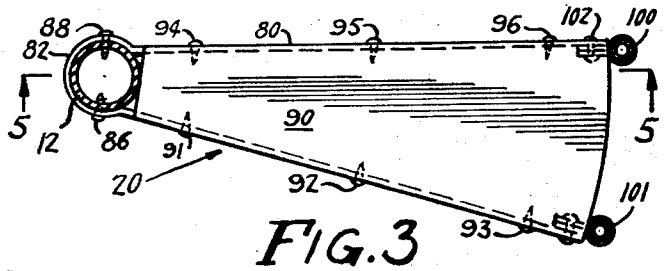


FIG. 3

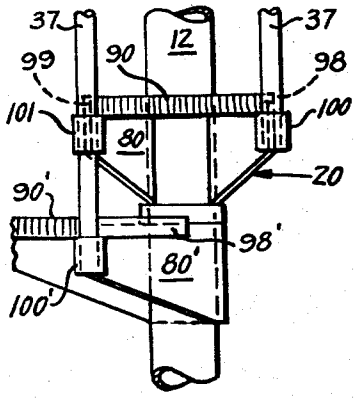


FIG. 4

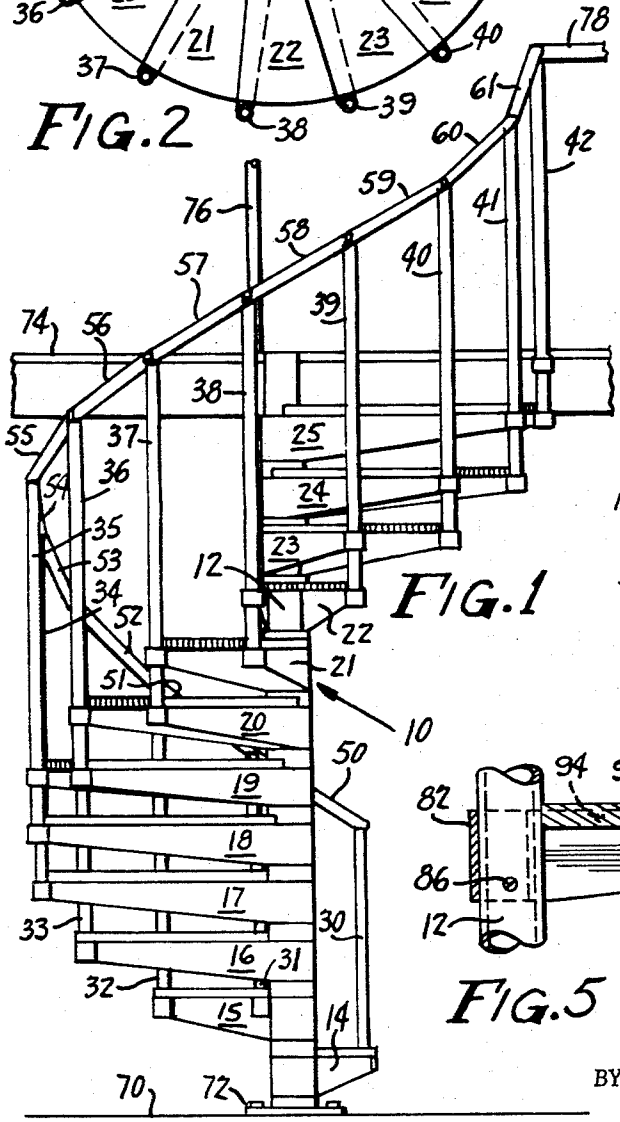


FIG. 1

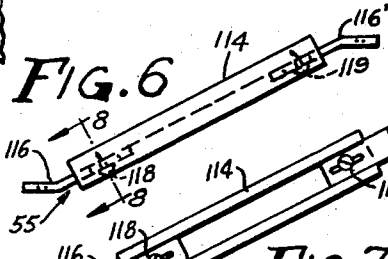


FIG. 6

FIG. 7



FIG. 8

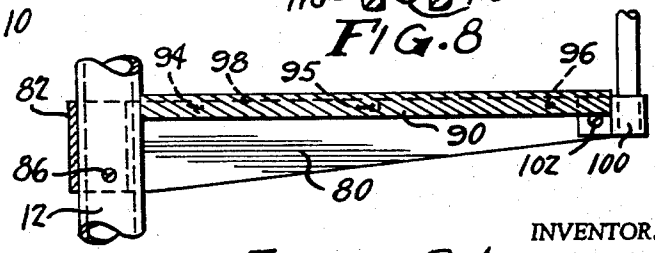


FIG. 5

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SPIRAL STAIRS

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2 Claims. (Cl. 52—187)

ABSTRACT OF THE DISCLOSURE

Support means for stair treads arranged in axially spaced relation about a vertical centrally positioned support post to form an open spiral staircase, and wherein each support means is formed of sheet metal and includes a substantially U-shaped support having an arcuate bight of less than 360° for engagement about and fixed connection on said post, and pair of legs diverging away from the ends of said bight; a stair tread fixedly connected between each pair of confronting sides of said legs; clamp means on the distal end of each leg to receive and support an upright ballister therein; a banister segment extending across and connected to each adjacent pair of ballisters; and means connecting together each pair of banister segments having adjacent ends.

This invention relates to a spiral staircase. More particularly, this invention relates to a spiral staircase having individual stairs comprised of sheet metal horizontal supports carrying wooden treads thereon attached to a vertical circular support carrying a handrail banister comprised of a plurality of individual segments each supported by a baluster connected to each of the individual stairs.

The object of this invention is to provide a spiral staircase which is of light weight construction, sturdy, and which may easily be constructed on the building site.

A further object of this invention is to provide a spiral staircase comprising individual stairs each of which carry a vertical baluster to support a banister segment of approximately the same length as the distal end of the stair.

A further object of this invention is to provide a spiral staircase comprised of easily assemblable, light weight, strong, economical stairs.

Other objects and advantages of this invention will become apparent from the following specification and from the drawing.

In the drawing:

FIGURE 1 is an elevation plan view of a completely assembled set of spiral stairs;

FIGURE 2 is a view of the vertical staircase from the top;

FIGURE 3 is a top view of an individual stair of which the staircase is comprised;

FIGURE 4 is an end view of an individual stair and a portion of an adjacent stair showing the stair construction and the connection of the balusters to the individual stairs;

FIGURE 5 is a side view of an individual stair shown in partial section taken substantially along line 5—5 of FIGURE 3;

FIGURE 6 is a side elevational view of one of the individual banister segments of balustrade;

FIGURE 7 is a bottom plan view of the banister segment shown in FIGURE 6; and

FIGURE 8 is a transverse detailed cross-sectional view, FIGURE 8 being taken substantially on the inclined plane of line 8—8 of FIGURE 6, looking in the direction of the arrows.

Referring now to FIGURE 1, the staircase **10** comprises a vertical center supporting post **12** of generally circular cross sectional configuration or a many sided polygon to provide proper angular displacement for the individual stairs as will be described, a plurality of individual stairs **14** through **25**, each of which stairs supports a baluster **30** through **42**, extending a predetermined distance upward from each individual stair and secured to the individual stair and to the next higher stair and a banister comprised of a plurality of individual segments **50** through **60**.

The staircase extends from a lower floor **70** upon which the vertical support **12** rests and is affixed by means of a base plate **72**. The vertical support **12** extends from the lower floor **70** to an upper floor **74**. Of course the staircase may extend for more than one floor. A support at the top of the staircase may be provided as shown generally at **76** and the banister of the staircase may be secured to a wall in any desired manner as shown generally at **78**.

As is clearly shown in FIGURE 2, each of the individual stairs is angularly displaced from each adjacent individual stair.

Important constructional features on the staircase of this invention are shown in FIGURE 3. Each individual stair, for example a stair **20**, comprises a horizontal support constructed of sheet metal **80** which is generally in the shape of a U. The center of the U **82** forms approximately 190° of a circle the inside diameter of which is approximately equal to the outside diameter of the circular cross section of the vertical support **12**. The additional 5° on each side of the diameter is provided to securely fix the stair to the vertical support **12**. Stair **20** may be secured to vertical post **12** by means of screws **86** and **88** or by glue, spacers, or other fastening means. The stair includes a wooden tread **90** the lower portions of which are snugly received between the identically constructed diverging planar legs of the sheet metal U-shaped horizontal support **80**. The wooden tread is secured within the support by means of a plurality of screws **91** through **96**. As best shown in FIGURE 4, the upper portion of the wooden tread extends substantially uniformly a predetermined distance over the top of the horizontal support **80** in the form of two extending ribs **98** and **99**.

The next lower step **19** includes a sheet metal U-shaped horizontal support **80'**, a step **90'** including a lip **98'**. Clamps **100** and **101** and frictional fastening means **102** are used to secure the balusters **36** and **37** to the stairs **19** and **20** in the manner shown in FIGURES 4 and 5.

As best shown in FIGURES 3 and 4, the sheet metal U-shaped horizontal support engages slightly more than one-half the diameter of the vertical support **12** thereby giving the stair more rigidity.

Stair **20** is shown in partial cross section in FIGURE 5 which shows one-half of the sheet metal U-shaped horizontal support **80** including one of the legs which, as shown best in FIGURE 3, forms a diverging angle, and a stair tread **90** which is secured by a plurality of frictional fastening means **94** through **96** to the horizontal support and the entire stair tread is secured by means of frictional fasteners **86** and **87** to the vertical support **12**.

As shown in FIGURES 6 and 7, the banister for the staircase comprises a plurality of balusters, for example **36** and **37**, and a plurality of banister segments, for example **54**, **55** and **56**, secured to the top of the balusters **36** and **37** by conventional means.

Each of the individual banister segments, for example **55**, comprises a wooden handrail portion **114** and a steel or other metal supporting portion **116**, the wooden portion being secured by means of frictional fasteners **118**

and **119**, the latter being shown in FIGURE 6. Each of the individual banister segments is bent downwardly at its upper end and upwardly at its lower end in order to form a horizontal joint with the top of each of the balusters **36** and **37**.

As will be seen, a spiral staircase has been described which comprises a vertical center supporting post having a circular cross section and a plurality of individual stairs supported by and angularly displaced about this vertical support. Each of the individual stairs comprises a generally U-shaped metal horizontal support which has a maximum vertical dimension at the center of the U and has a cross section at the center forming approximately 190° of a circle of a diameter approximately equal to the outside diameter of the post to which it is attached. Each of the stairs includes a tread which has a lower portion snugly secured between the lengths of the U-shaped horizontal support and an upper portion which extends over the top of the U-shaped horizontal support.

While circular staircases which may be assembled at the construction site are known in the prior art, they are most frequently constructed of a very heavy material, for example cast iron, and are consequently difficult to handle and exepnsive to manufacture.

Such expensive and heavy circular staircases may advantageously be used in industrial plants and as fire escapes; however, for ordinary household use, for example providing stairs by which one may conveniently descent to the basement of a house or ascend to the attic thereof, such stairs are inconvenient, aside from the expense involved. In addition, frequently, the construction of an ordinary dwelling house would not support the extreme weight of such heavy staircases. It is therefore apparent that the present staircase which is both light and sturdy includes many important advantages and advances over the circular staircases of the prior art.

There are other important advantages of this staircase as well; for example, the components of the staircase may be manufactured and packaged individually and shipped to the site. Thus, the sheet metal U-shaped horizontal supports may be manufactured and shipped to the site in one crate, the stair treads in another, the balusters in another, the banister segments in another, etc. so that the final assembly may be done easily, quickly and conveniently at the construction site.

An important feature of this invention is the provision of individual balusters attached to each stair with an individual banister segment attached thereto for providing an easily assemblable circular staircase.

While the invention has been described with reference to a specific example, many variations and alterations in the specific structural details may be made without departing from the spirit of this invention. The scope of this invention is limited only by the appended claims.

I claim:

1. A spiral stair case comprising:

a vertical center supporting post of generally circular cross sectional configuration,

a plurality of individual stairs vertically arranged about the center post angularly displaced from each other forming a helical stair path,

means for fastening the individual stairs to the center post in vertical and angularly displaced relation,

each individual step comprising:

a generally U-shaped sheet metal horizontal support having a maximum vertical dimension at the center of the U, a cross sectional configuration at the center forming more than one-half of a circle of diameter but less than 200° and approximately equal the outside diameter of the center post, said support further including upright identically configured substantially planar legs integral at their inner ends with the center and extending therefrom to form a diverging angle relative to each other, said legs having free distal ends, said legs further having a plurality of holes in the upper edge thereof and a vertical dimension at the distal end less than the vertical dimension at the center of the horizontal support,

a tread member having a lower portion snugly received between the confronting sides of the diverging legs of the sheet metal U-shaped horizontal support, the upper portion of the tread extending a predetermined distance over the top and beyond the outside of the horizontal support along each of the legs of the sheet metal U-shaped horizontal support,

a plurality of frictional fasteners extending through the holes in the upper edge of the sheet metal U-shaped horizontal support into the tread member for securing the tread member to the support,

clamp means at the distal end of each of said legs, said clamp means each being positioned beyond the adjacent end of each tread,

an elongated baluster for each clamp means, said balusters each having an end secured in one of said clamp means, respectively, with the other end thereof extending upwardly therefrom, and

an elongated banister segment extending between and being connected to the other ends of each pair of balusters of each step.

2. The staircase of claim **1** wherein:

each of said balusters extend substantially vertically and upwardly a predetermined distance from each individual stair,

a plurality of said banister segments of approximately equal length secured to the said other ends of said balusters to form a continuous banister along the outer edge of the staircase, the lower end of each segment being bent upward to form a substantially horizontal joint with the lower baluster and the upper end of each segment being bent downward to form a substantially horizontal joint with the upper baluster to which the segment is secured.

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PO-1050
(5/69)

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,418,770 Dated December 31, 1968

Inventor(s) THOMAS R. ALLMAND

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

On the first page of the printed specification, under the title "SPIRAL STAIRS", after "Thomas R. Allmand, Ann Arbor, Mich.", delete ", Assignor to Fabriques de Produits Chimques de Thann et de Mulhouse, Thann, France, a French body corporate".

SIGNED AND
SEALED

NOV 25 1969

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

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Commissioner of Patents