A segmented spiral staircase and kit for its construction has a plurality of laterally extending step segments. Each step segment has a step surface with an inboard, donut-shaped end section and lower downwardly extending support members. Each step segment also has an upstanding baluster rail member connected by screws to the outboard end of the step surface. The step segments are each rotatably mounted, at their respective inboard end sections, in offset fashion through a vertically standing support post. The baluster rail members of the step segments are configured to be aligned adjacent to each other and are connected one to the other by screws. Spacer sleeves separate each of the step segments, whose lower support members are positioned against the vertical surfaces of the sleeves. Alternate stacking of the sleeves and step segments and connection of the baluster rail members produces a sturdy staircase structure which also includes an upper landing member. The relatively lightweight nature of the components of the kit make assembly easy and, by simply removing the screw connections between baluster rail members, a step segment or entire section of the staircase made up of several step segments can be rotated around the vertical support post to alter the configuration of the staircase.
SEGMENTED SPIRAL STAIRCASE AND KIT FOR ITS CONSTRUCTION

RELATED APPLICATION

[0001] This application is a continuation-in-part of application Ser. No. 11/169,548, filed on Jun. 29, 2005.

BACKGROUND OF THE INVENTION

[0002] Spiral staircases are both functional and decorative structures which allow for access between floors of residential and commercial spaces. Spiral staircases also are favored because of the smaller amount of space they require, as opposed to straight staircases. There are many occasions in which there simply is insufficient room in a building space for a straight stairway, and no other means to interconnect two levels, except by using a spiral staircase.

[0003] However, although a spiral staircase occupies a relatively small area, it presents difficulties in construction. For instance, there are logistical problems with the use of prefabricated spiral staircase units, both in safely packing and protecting them for shipment. The carriage and delivery of prefabricated staircases also may be cumbersome and difficult, especially in getting the staircases into the rooms where they are to be installed. In fact, most standard spiral staircases will not fit into many smaller rooms, resulting in the need to order customized units, with the resulting increase in price. In addition, there are usually installation problems in properly fitting spiral staircases between floors.

[0004] To overcome these problems, there have been attempts to provide spiral staircase installations with components which can be assembled on the job. Some examples of these are found in U.S. Pat. Nos. 1,361,918; 3,740,906; 3,964,222; 4,128,976; 4,850,164 and 5,557,893.

[0005] However, these and similar spiral staircase installations result in structures which are often not very sturdy. They may be unstable and wobbly, and even unsafe. In addition, most prior assembled spiral staircases are complicated and difficult to put together. They have many different component parts, requiring connection by bolts, screws, nails, rivets, or even welding or brazing.

[0006] Another handicap of existing spiral staircases is that they are designed to be permanent installations. If there is a need to temporarily change the configuration of the staircase, for instance to transport large pieces of furniture up the staircase, the permanently installed curved nature of the staircase makes this most difficult.

SUMMARY OF THE INVENTION

[0007] It is thus the object of the present invention to overcome the limitations and disadvantages of prior spiral staircases and spiral staircase assemblies and kits.

[0008] It is an object of the present invention to provide a spiral staircase kit which, when its components are assembled, results in a spiral staircase which is steady, sturdy, and safe for use.

[0009] It is another object of the present invention to provide a spiral staircase and spiral staircase kit which comprises relatively few different components.

[0010] It is still another object of the present invention to provide a spiral staircase and spiral staircase kit with components which are inexpensive and easy to manufacture, lightweight, and simple to assemble.

[0011] It is a further object of the present invention to provide a spiral staircase and spiral staircase kit in which all components are easily handled for assembly and installation of the complete spiral staircase unit.

[0012] It is still a further object of the present invention to provide a spiral staircase which, in its disassembled state, is easily transportable to the installation site.

[0013] It is another object of the present invention to provide a spiral staircase kit which requires minimal use of screws, nails, bolts, rivets or other connecting elements.

[0014] It is a further object of the present invention to provide a spiral staircase and spiral staircase kit whose components can be configured and manufactured with a plurality of attractive design options.

[0015] It is another object of the present invention to provide a spiral staircase which allows installation of the staircase between floors where space is limited.

[0016] It is still another object of the present invention to provide a spiral staircase kit which results in the assembly of a spiral staircase which can be configured and customized for any space.

[0017] It is a further object of the present invention to provide a spiral staircase kit which results in a spiral staircase which has a plurality of step segments which are readily disconnected to conveniently alter the configuration of the staircase.

[0018] These and other objects are accomplished by the present invention, a segmented spiral staircase and kit for its construction having a plurality of laterally extending step segments. Each step segment has a step surface with an inboard, donut-shaped end section and lower downwardly extending support members. Each step segment also has an upstanding baluster rail member connected by screws to the outboard end of the step surface. The step segments are each rotatably mounted, at their respective inboard end sections, in offset fashion through a vertically standing support post. The baluster rail members of the step segments are configured to be aligned adjacent to each other and are connected one to the other by screws. Spacer sleeves separate each of the step segments, whose lower support members are positioned against the vertical surfaces of the sleeves. Alternate stacking of the sleeves and step segments and connection of the baluster rail members produces a sturdy staircase structure which also includes an upper landing member. The relatively lightweight nature of the components of the kit make assembly easy and, by simply removing the screw connections between baluster rail members, a step segment or entire section of the staircase made up of several step segments can be rotated around the vertical support post to alter the configuration of the staircase.

[0019] Novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The invention itself, however, both as to its design, construction and use, together with the additional features and advantages thereof, are best understood upon review of the following detailed description with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. 1 is a front view of a completed spiral staircase assembled with the spiral staircase kit of the present invention.

[0021] FIG. 2 shows the beginning stages of assembly of the spiral staircase kit of the present invention.
FIG. 3 shows the continuing process of assembly of the spiral staircase kit of the present invention. FIG. 4 is a top view of a step of the spiral stairway kit of the present invention. FIG. 5 is an elevation view of a step of the spiral staircase kit of the present invention. FIG. 6 is a bottom view of a step of the spiral stairway kit of the present invention. FIG. 7 is an end view of a spacer sleeve of the spiral staircase kit of the present invention. FIG. 8 is an elevation view of a spacer sleeve of the spiral staircase kit of the present invention. FIG. 9 is a top view of the landing member of the spiral staircase of the present invention. FIG. 10 is an elevation view of the foot member of the spiral staircase of the present invention. FIG. 11 is a top view of the foot member of the spiral staircase of the present invention. FIG. 12 is a partial top view of a section of the assembled spiral staircase of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 shows spiral staircase 1 assembled from the spiral staircase kit of the present invention. The spiral staircase kit itself comprises elongated support post 2 configured to be vertically standing between floor spaces to be connected. Support post 2 is configured to be mounted within a plurality of uniquely designed staircase step segments. Each step segment, using step segment 4 as a representative example shown in FIGS. 2 and 10, comprises a step section having an upper step surface 12 and a donut-shaped inboard end section 13 formed with opening 14. (See FIGS. 4-6). End section 13 is shown completely enclosing opening 14. An alternate design could have a part of end section 13 open, substantially enclosing opening 14. Two lateral support members 15 and 16 extend down from step surface 12. Vertical rear surfaces 17 and 18 of support members 15 and 16 extend perpendicularly to step surface 12. Step segment 4 also comprises upstanding baluster rail member 40, connected by two or more screws 52 to step surface 12, as shown in FIG. 2. Step segment 4, as a single unit, is slid onto support post 2 via opening 14, or only the step section of the segment, shown in FIGS. 4-6, can be slid over the support post and baluster rail member 40 can be secured to step surface 12 thereafter.

As seen in FIGS. 7 and 8, representative spacer sleeve 20 is cylindrical in configuration and comprises through opening 21. FIG. 9 shows horizontal staircase landing member 32, which comprises a flat landing 33 and donut-shaped end section 34 with opening 35. Staircase foot member 36, shown in FIG. 11, has a center through opening 38 and a horizontal lower surface for placement on the floor on which staircase 1 is to be placed.

The spiral staircase kit of the present invention is assembled by initially positioning the lowest end of support post 2 within opening 38 of foot member 36. Opening 21 of sleeve 20 is positioned over post 2 and then sleeve 20, as shown in FIG. 2, is slid down along support post 2. Opening 14 of end section 13 of step segment 4 is then positioned over support post 2 and the step segment, optimally with baluster rail member 40 attached, is slid down onto sleeve 20. The diameters of opening 38 of foot member 36, opening 14 of end section 13, and opening 21 of sleeve 20 are larger than the outside diameter of support post 2, thus allowing foot member 36, step segment 4 and sleeve 20 to be positioned over and easily slid down support post 2. The diameter of opening 14 is smaller than the diameter of opening 21 to allow end section 13 of step segment 4 to rest on sleeve 20. The openings of sleeves 22-28 and step segments 5-11 are similarly configured.

Once step segment 4 is placed in the proper position on sleeve 20, the force of gravity compels the step segment against the sleeve, resulting in end section 13 resting flush on top of sleeve 20 and vertical surfaces 17 and 18 of lateral support members 15 and 16 resting flush against and in adjacent contact with a lateral surface of sleeve 20. Step surface 12 thus becomes fixedly positioned in a transverse plane in relation to support post 2.

As previously described, since the diameters of the openings of all the sleeves and steps used in the present invention are the same, once the initial sleeve 20 and step segment 4 are in place, as seen in FIG. 2, sleeve 22 is positioned over support post 2 and slid down the post and positioned in offset fashion to rest on end section 13 of step segment 4. See FIG. 3. End section of step segment 5, with its baluster rail member 42 and corresponding opening, is then positioned over support post 2 and slid down the post such that it rests on sleeve 22. Once again, the vertical surfaces of the lateral support members of step segment 5 rest against a lateral surface of sleeve 22 to maintain it in place in its offset position. The weight of sleeve 22 and newly added step segment 5 assists in maintaining step segment 4 in its originally assembled position.

As can be readily appreciated, sleeves 23-28 and the remaining sleeves to be used for the staircase system and the end sections of step segments 5-11 and the remaining step segments to be used, each with their respective baluster members (all sleeves and step segments are seen in FIG. 1, showing fully assembled staircase 1), are then positioned, in sequence, over support post 2 and slid, alternately, down the post, each step segment being appropriately offset to form the spiral stairway around the support post. The weight and positioning of step segment upon sleeve upon step segment assists in ensuring that the step segments of the present invention are maintained around and against support post 2. However, since none of the step segments are fastened to support post 2 or to any of the space sleeves, each step segment is free to rotate, at its inboard end section, around the support post, absent other connection. Secure connection of step segment is accomplished by baluster rail members as described hereinafter. After all step segments have been placed, sleeve 30 is positioned over and slid onto support post 2. Opening 35 of end section 34 of landing member 32, with upstanding baluster rail 48, is then centered over support post 2 and the landing member is slid down onto and positioned on the post, its side surface resting against sleeve 30, to maintain the landing in place.

Placing step segments 4-11, the remaining step segments (not shown in FIG. 3, but shown in FIG. 1), and landing member 32 in the appropriate spiraled, offset positions will cause baluster rail members 40, 42, and 44 and the other baluster rail members on the remaining step segments to be aligned to form a continuous rail, as seen in FIG. 1. For instance, as best seen in FIG. 12, baluster rail member 40 of step segment 4 will be adjacent aligned with baluster rail member 42 of step segment 5; baluster rail member 42 of step segment 5 will be adjacent aligned with baluster rail member 44 of step segment 6; baluster rail member 44 of step segment 6 will be adjacent aligned with baluster rail mem-
ber 46 of step segment 7, etc. Adjacent baluster rail members are then connected by two or more screws 54, to rigidly secure the step segments together. This ties all components together and rigidly secures staircase 1 in place. Lower step support 29 piece is added to provide additional support and stability between lowest step segment 4 and the floor surface.

[0039] Should the configuration of spiral staircase 1 need to be altered, for instance if large furniture is to be transported up the staircase, screws 54 between the effected, adjacent aligned step segments can easily be removed, thus separating step segments or entire sections of the staircase made up of several step segments from each other, allowing the step segments to be rotated around support post 2 to alter the configuration of the staircase.

[0040] It is contemplated that the steps of the present invention, as well as the handrail and balusters, can be configured and fabricated to a design of choice. While the components of the spiral staircase kit can be made of metal or any other sturdy material, it has been found that the use of lightweight wood has several advantages. It is easy to work with and can be fashioned into many different design configurations. The support post and spacer sleeves can be made of plastic or similar PVC type material. Use of such material as components guarantees the lightweight nature of the individual components and the ease of transportability and ultimate assembly and of separability and rotation of the step segments.

[0041] It is thus seen that the spiral staircase kit of the present invention results in a spiral staircase which can be assembled to connect adjacent floors in virtually any building space. It is lightweight for assembly purposes and results in a rugged and sturdy staircase unit, whose very weight assists in the stability and rigidity of the staircase. The staircase components are relatively inexpensive and simple to manufacture and are easily assembled and presents an attractive, as well as functional spiral staircase system. The staircase also has the significant added advantage of flexibility in permitting easy altering of its configuration to accommodate space limitations.

[0042] Certain novel features and components of this invention are disclosed in detail in order to make the invention clear in at least one form thereof. However, it is to be clearly understood that the invention as disclosed is not necessarily limited to the exact form and details as disclosed, since it is apparent that various modifications and changes may be made without departing from the spirit of the invention.

1. A spiral staircase kit comprising:
   an elongated support post;
   a plurality of step segments, each step segment comprising:
   (a) a step surface having a transversely extending length;
   (b) means for rotatably mounting the step segment substantially around the support post;
   (c) support means extending downward from and the full transverse length of the step surface to maintain the step segment in a substantially transverse plane in relation to the support post when the step segment is mounted on the support post; and
   (d) a baluster rail member to be connected to the step surface, said member having attachment means for connecting the baluster rail member to the step surface;

   a plurality of spacer means to be positioned around the support post, one of the plurality of spacer means being located between each of the step segments for supporting the step segments when the step segments are mounted around the support post, each of the step segment support means being in adjacent contact with one of the spacer means when the step segments are mounted around the support post; and

   second attachment means for connecting a baluster rail member of one of the step segments to an adjacent aligned baluster rail member of another step segment, whereby when the second attachment means connects all the adjacent aligned baluster rail members of each step segment to each other, the step segments are rigidly secured around the support post to form a spiral staircase.

2. The spiral staircase kit as in claim 1 wherein the means for rotatably mounting comprises an inboard end section with opening means to receive the support post.

3. The spiral staircase kit as in claim 1 wherein the support means comprises at least one support member extending below the step surface.

4. The spiral staircase kit as in claim 3 wherein the means for rotatably mounting comprises an inboard end section with opening means for receiving the support post.

5. The spiral staircase kit as in claim 1 wherein the plurality of spacer means comprises a plurality of cylindrical sleeves which substantially circumscribe the support post.

6. The spiral staircase kit as in claim 1 further comprising a landing member with means for mounting the landing member substantially around the post.

7. The spiral staircase kit as in claim 1 wherein the second attachment means comprises removable screw members.

8. A spiral staircase kit comprising:
   an elongated support post;
   a plurality of unitary steps, each unitary step comprising a step surface having a transversely extending length, means for rotatably mounting the step substantially around the support post, and support means extending downward from and the full transverse length of the step surface to maintain the step surface in a substantially transverse plane in relation to the support post when the step is mounted on the post;

   a plurality of spacer means to be positioned around the support post, one of the plurality of spacer means to be located between each of the steps for supporting the steps when they are mounted around the support post, each of the support means being in adjacent contact with one of the spacer means when the steps are mounted around the support post; and

   a baluster rail member to be secured to the step surface of each of the plurality of steps, each baluster rail member having first attachment means for connecting the baluster rail member to a step surface and second attachment means for connecting a baluster rail member to an adjacent aligned baluster rail member, whereby when the first and second attachment means are connected, the steps are rigidly secured around the support post and when the first attachment means are connected and the second attachment means are not connected, each step, with its attached baluster rail member, is free to rotate about the support post.

9. The spiral staircase kit as in claim 8 wherein the means for rotatably mounting comprises an inboard end section with opening means to receive the support post.

10. The spiral staircase kit as in claim 8 wherein the support means comprises at least one support member extending below the step surface.
11. The spiral staircase kit as in claim 10 wherein the means for rotatably mounting comprises an inboard end section with opening means for receiving the support post.

12. The spiral staircase kit as in claim 8 wherein the plurality of spacer means comprises a plurality of cylindrical sleeves which substantially circumscribe the support post.

13. The spiral staircase kit as in claim 8 further comprising a landing member with means for mounting the landing member substantially around the post.

14. The spiral staircase kit as in claim 1 wherein the second attachment means comprises removable screw members.

15. The spiral staircase comprising:
   an elongated support post;
   a plurality of step segments, each step segment comprising:
      (a) a step surface having a transversely extending length;
      (b) means for rotatably mounting the step segment substantially around the support post;
      (c) support means extending downwardly from and the full transverse length of the step surface to maintain the step segment in a substantially transverse plane in relation to the support post when the step segment is mounted on the support post; and
      (d) a baluster rail member connected to the step surface, said member having attachment means for connecting the member to the step surface;
   a plurality of spacer means positioned around the support post, one of the plurality of spacer means located between each of the step segments for supporting the step segments when the step segments are mounted around the support post, each of the step segment support means being in adjacent contact with one of the spacer means when the step segments are mounted around the support post; and
   second attachment means for connecting a baluster rail member of one of the step segments to an adjacent aligned baluster rail member of another step segment, whereby when the second attachment means connects all the adjacent aligned baluster rail members of each step segment to each other, the step segments are rigidly secured around the support post and when the second attachment means are not connected between baluster rail members, step segments are free to rotate about the support post.

16. The spiral staircase kit as in claim 15 wherein the means for rotatably mounting comprises an inboard end section with opening means to receive the support post.

17. The spiral staircase kit as in claim 15 wherein the support means comprises at least one support member extending below the step surface.

18. The spiral staircase kit as in claim 15 wherein the plurality of spacer means comprises a plurality of cylindrical sleeves which substantially circumscribe the support post.

19. The spiral staircase kit as in claim 15 further comprising a landing member with means for mounting the landing member substantially around the post.

20. The spiral staircase kit as in claim 15 wherein the second attachment means comprises removable screw members.

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