Aug. 27, 1929. A. O. WILSON 1,726,133

STAIR

Filed Oct. 14, 1926

Fig. 1.

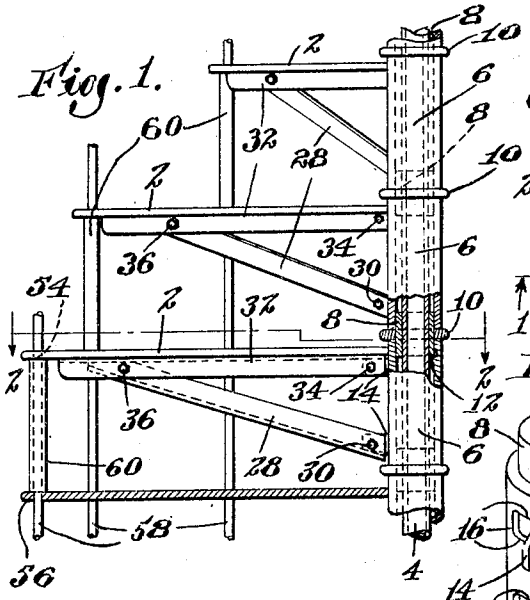


Fig. 2.

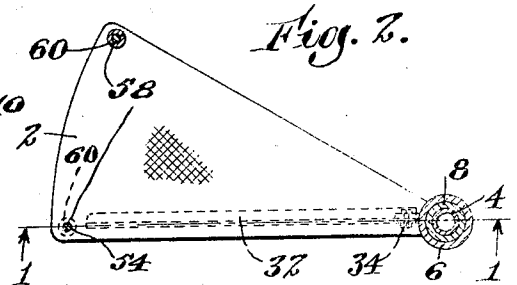


Fig. 3.

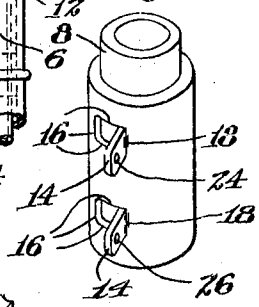


Fig. 4.

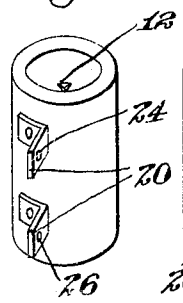


Fig. 5.

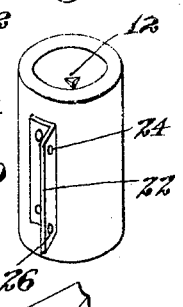


Fig. 6.

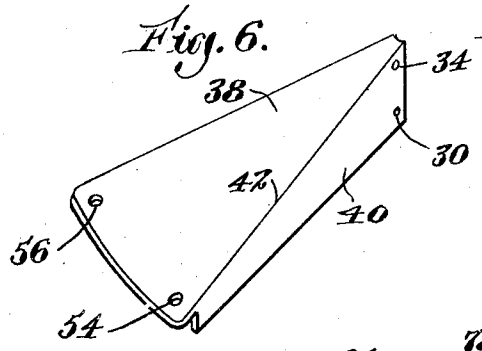


Fig. 7.

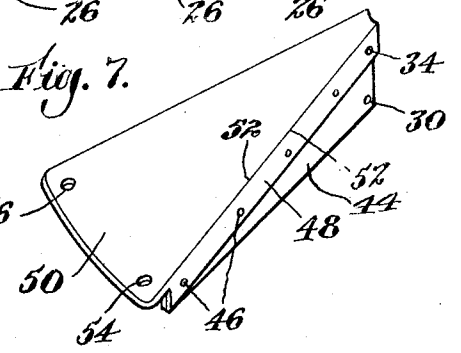


Fig. 8.

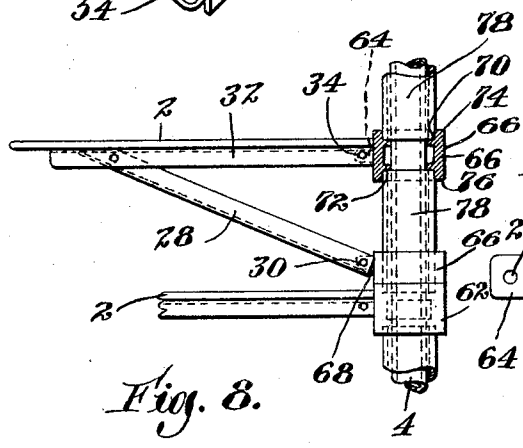


Fig. 9.

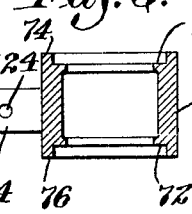
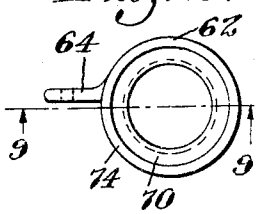


Fig. 10.



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UNITED STATES PATENT OFFICE.

ALBERT O. WILSON, OF WINCHESTER, MASSACHUSETTS.

STAIR.

Application filed October 14, 1926. Serial No. 141,478.

The present invention relates to stairs and other building structures of similar nature, and more particularly to circular stairs.

The chief object of the invention is to simplify and improve upon present-day stair constructions, to the end that a superior product shall be provided, at a minimum cost, and that shall be able to withstand greater loads than has heretofore been possible. Other and further objects will be explained hereinafter and will be particularly pointed out in the appended claims.

The invention will be explained more fully in connection with the accompanying drawings, in which Fig. 1 is an elevation of circular stairs constructed according to a preferred embodiment of the present invention, shown partly in section upon the line 1—1 of Fig. 2, looking in the direction of the arrows; Fig. 2 is a section taken upon the line 2—2 of Fig. 1, looking in the direction of the arrows; Fig. 3 is a perspective of a preferred sleeve; Figs. 4 and 5 are similar perspectives of modified sleeves; Figs. 6 and 7 are perspectives of two modified forms of stair treads; Fig. 8 is an elevation, partly in section, similar to Fig. 1, of a modification; Fig. 9 is a section, taken upon the line 9—9 of Fig. 10, and Fig. 10 is a plan of a collar such as is used in the modification of Fig. 8.

Three horizontal treads 2 of a circular stairway are illustrated in Fig. 1, angularly spaced horizontally about a central support 4, shown as a vertically disposed, continuous pipe shaft, each tread being secured to a separate sleeve 6 that is fitted about the shaft 4. The sleeves 6 may be constituted of steel, wrought iron or the like, cut from standard piping to the desired size, thus simplifying the construction, reducing the cost of manufacture and increasing the strength over castings. As the pipe shaft 4 is also of standard size, the interior diameter of the sleeves 6 is somewhat greater than the external diameter of the pipe 4, leaving a space 7 between the pipe 4 and the sleeves 6. In order, therefore, to aline the sleeves 6, one above the other, and to keep them uniformly spaced at 7 from the pipe shaft 4, connecting sleeves 8 are inserted between the sleeves 6 and the pipe 4. Each connecting sleeve 8 extends into, and overlaps, adjacent ends of adjacently disposed sleeves 6, as shown more particularly in Fig. 1. The sleeves 8 are prevented from falling by small projections 12 that extend inward from the interior wall of each sleeve 6. These projections may be formed by means of a chisel, or in any other desired way. If the sleeves 6 were to rest upon one another, they might become slightly misalined, and such misalinement would prevent a sleeve from being supported throughout its full area by the sleeve below. The sleeves therefore bear throughout their full area upon collars 10 that are fitted loosely about the sleeves 8 between each two adjacently disposed sleeves. The collars 10 serve the further purpose of maintaining the sleeves in vertically spaced relation.

Each sleeve 6 is provided with one or more projecting lugs. According to the preferred embodiment of the invention, two lugs 14 are employed, cut out of the body of the sleeve along three sides 16, and bent out from the wall of the sleeve along a fourth side 18, as illustrated more particularly in Fig. 3. Lugs 20 may, however, be employed, as shown in Fig. 4, constituted of angle-iron clips, riveted, bolted or tapped in place, or secured in any other desired manner. Instead of using two small lugs 14 or 20, as shown in Figs. 3 and 4, a single lug 22 of larger dimension may be employed, as illustrated in Fig. 5.

Each of the upper lugs 14 or 20 is provided with an opening 24, and each of the lower lugs with an opening 26. If a single lug 22 is employed, it will naturally be provided with both openings 24 and 26. A bracket 28 is secured to the sleeve 6 by means of a rivet, bolt, or the like extending through an opening 30 in one of its ends and through the opening 26. A support 32 is similarly secured to the sleeve 6 by means of a rivet, bolt or the like extending through an opening 34 in one of its ends and through the opening 24. The other end of the member is provided with an opening 36 through which, and through a corresponding opening in the member 28, extends a rivet, bolt or the like to secure the members 28 and 30 together at their other ends. Preferably, the members 28 and 30 are angle irons.

The tread 2 is carried by the support 32. It may be a separate part therefrom, welded, bolted, riveted or otherwise secured thereto, as shown in Figs. 1 and 2, or it may be integral therewith. The bracket 28 may also be separate from or integral with the tread. As shown in Fig. 6, the bracket 28, the support 32 and the tread 2 may be replaced by a single, integral member, having a tread 38 and a bracket or riser 40 bent away therefrom at 42; or the riser may be a separate element 44,

Fig. 7, riveted, bolted, or otherwise secured at 46 to a marginal flange 48 that is bent away from the tread 50 at 52.

The treads are in the form of a sector of a circle, and along the outer circumference, each tread is provided with two openings 54 and 56 through each of which extends a paling 58. It will be understood that the circular shape, though preferred, is not essential and that, for example, the tread may be in the form of a triangle. All such shapes will be included herein in the term "sector". Each paling extends vertically through the opening 54 of one tread and the opening 56 of the next lower tread, and an iron pipe 60 is fitted about the paling to space the successive steps from one another. One of the edges of each tread is thus disposed just above the opposite edge of the next lower tread.

According to the modification shown in Figs. 8 to 10, the lugs are carried upon separate sleeves. Thus, sleeves 62 are provided with lugs 64 corresponding to the upper lugs 14 or 20 and sleeves 66 are provided with lugs 68 corresponding to the lower lugs. One advantage of this structure is that the lugs 64 and the sleeves 62, for example, may each be cast in one piece. Owing to the weakness of castings, it is preferred to use the structure already described in connection with Figs. 1 to 5. In fact, an important advantage of the present invention is the elimination of unreliable cast iron from stair constructions. But a further disadvantage of using cast iron is that where the treads 2 are required to be spaced at different heights, it is necessary either to make special castings or cut down castings of large size. The use of the castings shown in Figs. 8 to 10 is attended with neither of these difficulties, because the casting sleeves may be of one size, and they may be spaced from each other by collars 78 cut from standard pipe to the desired length.

The castings 62 may have internally disposed, annular lugs 70 and 72 cast integral therewith, together with flanges 74 and 76. These lugs 70 and 72 serve as seats for the spacing collars 78. Each collar 78 will engage the upper seat 70 of one casting 62 and the lower seat 72 of the next higher casting. But the lugs 70 and 72 serve also to space the castings 62 from the pipe 4, and they should be so designed as to fit somewhat snugly about the pipe 4. The flanges 74 and 76 will, of course, hold the spacing collars 78 properly positioned. The angle iron 32 and the tread 2 may be secured to the lug 64, and the angle iron 28 may similarly be secured to the lug 68 of the sleeve 66 by rivets or bolts, as before described. The sleeve 66 is shown of different construction from the sleeve 62, fitted entirely about the collar 78, and resting on the sleeve 62. Being of this construction, it may be cut from pipe instead of cast.

Many other modifications will occur to persons skilled in the art, and all such are considered to fall within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. In stairs comprising a support, means fitted about the support, a separate bracket secured to the said means, a separate tread secured to the bracket and the said means, and means spacing the first-named means from the support.

2. In stairs comprising a support, means fitted about the support having one or more lugs, a bracket secured to a lug, a tread secured to a lug and the bracket, and means spacing the first-named means from the support.

3. In stairs comprising a support, a plurality of sleeves fitted about the support, a bracket secured to each sleeve, a tread secured to each bracket and the corresponding sleeve, and collars between adjacent sleeves.

4. An article of the class described comprising a steel or wrought iron sleeve having an interior projection, and a sleeve extending into the first-named sleeve and resting on the projection and having a portion extending beyond the first-named sleeve and adapted to extend into another sleeve.

5. An article of the class described comprising two steel or wrought iron vertically disposed sleeves, one of the sleeves having a portion extending into the other sleeve and a portion extending beyond the said other sleeve and adapted to extend into another sleeve, one of the sleeves having means for preventing one of the sleeves falling with respect to the other sleeve.

6. In stairs comprising a support, a plurality of sleeves fitted about the support, a tread carried by each sleeve, collars between adjacent sleeves of larger diameter than the diameter of the sleeves, and sleeves within the collars having portions extending between adjacent first-named sleeves and the support.

7. In stairs comprising a support, a plurality of sleeves fitted about the support, a tread secured to each sleeve, and sleeves each having portions extending into adjacent first-named sleeves between the first-named sleeves and the support.

8. In stairs comprising a vertically disposed support, a plurality of sleeves fitted about the support each having an interior projection, a tread secured to each sleeve, and sleeves between the first-named sleeves and the support, each resting on a projection.

9. An article of the class described comprising a sleeve, a second sleeve, the first-named sleeve having means for attaching a weight-supporting structure thereto, and the second-named sleeve having a portion extending beyond the first-named sleeve and adapted to extend into another sleeve.

10. An article of the class described com-

prising two sleeves, one of the sleeves having a lug projecting externally therefrom to which a weight-supporting structure may be attached and an interior projection, and the other sleeve extending into the said one sleeve as far as the projection.

11. In stairs comprising a support, a sleeve fitted about the support, the sleeve having a lug cut therefrom and projecting outward thereof, and a tread secured to the lug.

12. In stairs comprising a support, a plurality of tubular elements fitted about the support, a spacer between each two tubular elements, and a tread secured to each tubular element.

13. In stairs comprising a support, a plurality of sleeves fitted about the support, a spacer between each two adjacent sleeves, each sleeve resting against an adjacently disposed spacer and each spacer resting against an adjacently disposed sleeve, and a tread secured to each sleeve.

14. In stairs comprising a support, a plurality of sleeves fitted about the support each having a lug, a collar between each two sleeves to space the sleeves, and a tread secured to each lug.

15. In stairs comprising a support, a plurality of sleeves fitted about the support, and a plurality of sleeves fitted about the support between the support and the first-named sleeves and positioned to overlap adjacently disposed first-named sleeves.

16. In stairs comprising a support, a plurality of sleeves fitted about the support, a plurality of sleeves fitted about the support between the support and the first-named sleeves and positioned to overlap successive first-named sleeves, and collars interposed about the second-named sleeves between successive first-named sleeves.

17. An article of the class described comprising a sleeve, a second sleeve, the first-named sleeve having means for attaching a weight-supporting structure thereto, and the second-named sleeve having a portion extending beyond the first-named sleeve adapted to extend into another sleeve, and a collar about the second sleeve.

18. An article of the class described comprising two sleeves, one of the sleeves having a lug projecting externally therefrom to which a weight-supporting structure may be attached, and the other sleeve extending into the said one sleeve.

In testimony whereof, I have hereunto subscribed my name.

ALBERT O. WILSON.