PREFABRICATED STACKABLE STAIR UNIT

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ABSTRACT

A prefabricated stackable stair unit comprising a stair flight integrally attached to a half landing having a width approximating that of the stair flight. A second stair flight with a similar half landing, but attached to its opposite extremity, can be assembled in abutting relation to the first half landing to provide a full landing. The outer stringer and adjacent outer portion of the half landing are welded together, while the inner stringer and corresponding inner portion of the half landing are secured together by a member of substantial structural strength to thereby provide load transfer.

1 Claim, 6 Drawing Figures
PREFABRICATED STACKABLE STAIR UNIT

BACKGROUND OF THE INVENTION

1. Field of the Invention
The present invention relates to a prefabricated stackable stair unit, and particularly a stair unit of the type used in multistory buildings.

2. Description of the Prior Art
Some years ago it was common practice to erect the major portion of a multistory building, including the walls defining the stair wells, before installing the stair flights and landings in the stair wells. This on-the-job or in situ method of construction was expensive and time consuming because it required erection of temporary scaffolds, fitting of stair and landing components to the existing walls of the stair well, which were often not uniform in dimension or precise in orientation, and providing welding equipment for assembly.

Relatively recently this type of cut-and-ﬁt procedure was eliminated by using prefabricated stair units which were completely assembled in the shop and thereafter transported to the job site. These stair units were generally integral, self-supporting units, and included the stair flights, the landings, and also the vertical members necessary to support the stair flights and landings in proper position. The whole unit was shipped on a truck bed or on a railroad flat car and lifted into position at the job site by a large crane. The stair well and the remainder of the building were built up around the stair unit.

Although such a stair unit has certain advantages, it suffers the serious disadvantage that it is extremely expensive to ship to the job site. Moreover, its handling is cumbersome and requires heavy equipment.

Insofar as is known, the prior art lacks a prefabricated unit which can be easily shipped to the job site, and which is sufficiently completed that its assembly on the job site requires a minimum of time and effort.

SUMMARY

According to the present invention, a prefabricated stackable stair unit is provided which comprises a stair flight and a half landing having a width approximating that of the stair flight. These two units are rigidly attached to one another so that a similar stair flight, with a half landing attached to its opposite extremity, can be arranged adjacent the first stair flight with the half landings in abutting relation. Securement of the half landings in this abutting relation provides an "up" stair flight, a common, split landing, and a "down" stair flight. The number of such assemblies can be multiplied according to the height of the particular building. Each up stair flight or down stair flight and its associated landing is substantially identical in general configuration so that a plurality of up units or down units can be stacked upon one another for shipment in compact form to the job site.

The outer stringer of each stair flight is welded or otherwise rigidly secured to the complementary outer side member of the half landing for good load transfer characteristics. Since the inner stringer and corresponding inner member of the half landing are necessarily offset in order to enable the user to move from the "up" stair flight, for example, to the "down" stair flight, a member of substantial structural strength is attached to the adjacent terminal extremities of the inner stringer and inner platform member to provide good load transfer properties.

Assembly on the job site is relatively simple in that only the outermost side of each landing, and one extremity of each of the stair flights, needs to be attached to the stair well walls, and these attachments are made to accommodate normal dimensional discrepancies in the walls.

The shop assembly of the stair unit components, ease of transportation of the stackable stair units, and rapid and straightforward assembly procedure to integrate the stair units in the job site structure greatly reduce the cost of fabricating and installing stair units in multistory buildings.

Other objects and features of the invention will become apparent from consideration of the following description taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of "up" and "down" stair units as they would appear prior to assembly, a portion of the down stair unit being cut away to fit the drawing space;

FIG. 2 is a top plan view of the up and down stair units assembled in a stair well of a building;

FIG. 3 is a side elevational view of the assembled up and down stair units of FIG. 2, and also showing how the use of the stair unit can be multiplied in a multistory building;

FIG. 4 is an enlarged view taken along the line 4--4 of FIG. 3;

FIG. 5 is an enlarged view taken along the line 5--5 of FIG. 3; and

FIG. 6 is a view on a reduced scale, illustrating a stack of three up stair flights as they would be assembled for compact shipment.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, there is illustrated a pair of stair units which are identiﬁed as the "up" stair unit 10 and the "down" stair unit 12, although it will be appreciated that the stair units are used by people going either up or down.

The stair units 10 and 12 are generally similar, except that they complement one another for assembly so as to form a common split landing, as will be seen.

The up stair unit 10 comprises, generally, a stair flight 14 and a half landing 16, the half landing 16 having a width approximating that of the stair flight 14.

The stair flight 14 includes a pair of spaced apart channels constituting stringers 18 and 20 which are welded or otherwise rigidly attached to the opposite extremities of a plurality of spaced apart treads or steps 22. The steps 22 are oriented so as to be disposed horizontally for the particular diagonal inclination of the stair flight in its stair well, as will be apparent. Each step 22 preferably also includes a riser 24.

As best viewed in FIG. 3, the top step 22 projects outwardly of the vertically oriented outward terminus of the stringers 18 and 20. A transversely oriented support member 26 is located beneath the top step 22 and is welded at its ends to the stringers 18 and 20. As will
be seen, the support member 26 facilitates assembly of the stair unit to the adjacent wall of the stair well.

The half landing 16 includes a rectangular platform 28 which is welded at its outer side edge to an outer channel or side member 30 somewhat below the upper edge of the member 30. The side member 30 forms a horizontal continuation of the outer stringer 20 of the stair flight 14, with the abutting web and flange portions of the outer stringer 20 and the outer side member 30 being welded together, as best viewed in the showing in FIG. 1 of the down stair unit 12.

Referring again to the up stair unit 10, the inner extremity of the platform 28 rests upon the upper flange of a shallower inner channel or side member 32. The upper flange of the side member 32 is located below the upper flange of the inner stringer 18, and does not form a horizontal continuation thereof. This is because people using the stairs must be able to pass from one half landing 16 to the other half landing 34 without having to step over any structure. In the absence of structural continuity between the inner stringer 18 and the side member 32, a vertically oriented load transfer member 36 is welded to the lower extremity of the inner stringer 18 and is extended through a suitable slot cut in the platform 28. The lower extremity of the member 36 is welded to the adjacent extremity of the inner side member 32.

The member 36 is solid in cross section and therefore characterized by substantial structural strength whereby loads are satisfactorily transferred between the stair flight 14 and the half landing 16 without appreciable relative movement or bending therebetween.

The down stair unit 12 is substantially similar to the unit 10 just described, including a stair flight 38 having inner and outer stringers 40 and 42 supporting a plurality of steps 22 and their associated risers 24.

The down stair unit 12 also includes a half landing 34 comprising a platform 44 welded to inner and outer side members 46 and 48. The members 46 and 48 are secured to the stringers 42 and 40 in a manner similar to the connection of the outer and inner side members 30 and 32 to the stringers 20 and 18 of the up stair unit 10 previously described.

Although not shown, the platforms 44 and 28 may each be strengthened against bending under load by welding one or more angles or like supporting members beneath the platforms to the opposed side members.

The outer edge portion of each of the platforms 44 and 28 is provided with a boundary riser in the form of an angle 50 which is welded at one end to the side member 30 or 48, as the case may be. In addition, a second angle 52 underlies each angle 50 and is welded thereto, as best seen in FIGS. 1 and 2, with a rectangular bracket 54 welded to the angles 50 and 52 at the inner ends thereof.

As best seen in FIG. 4, when the platforms 28 and 44 are brought together in assembled, abutting relation, the angles 50 and 52 are also in endwise, abutting relation, with the brackets 54 adjacent one another. A bolt 56 is disposed through openings provided in the bracket 54, and a nut 58 is mounted to the bolt 56 to tighten the brackets 54 in assembled relation. Similarly, at the opposite extremities of the inner side members 32 and 46, openings are provided to accommodate a bolt 60, and a nut 62 is mounted to the bolt 60, as best seen in FIG. 5, to tightly hold the platforms 28 and 44 together.

The stair units 10 and 12 are mounted to the opposed walls 64 and 66 of a building stair well by any suitable means, resting upon ledges, or hanging from cables, as desired. Therefore, the showing in FIGS. 2 and 3 is merely exemplary.

More particularly, the transverse support members 26 welded to the stringers 18 and 20 of the up stair unit 10 and to the corresponding stringers 40 and 42 of the down stair unit 12 rest upon structure which forms an integral part of the associated building. This structure includes a horizontally oriented plate 26, one of which is shown in FIG. 3, which rests on a horizontal, transversely oriented angle 70 so that when the stair units 10 and 12 are located in position within the stair well, the transverse members 26 rest on the angles 70. Each angle 70 embodies threaded inserts (not shown) to receive bolts passing through a transverse bar 74. The bar 74 associated with the stair unit 10 is welded between the upper ends of the stringers 18 and 20, and the bar 74 associated with the stair unit 12 is welded to the lower ends of the stringers 40 and 42.

In similar fashion, the joined half landings 16 and 34 rest upon a horizontal, transversely oriented angle 72 which is rigidly affixed to the wall 66 and welded to the members 48, 46, 32 and 30 of the half landings 16 and 34.

From the foregoing, it will be apparent that assembly of the stair units 10 and 12 to one another and to the stair well walls 64 and 66 is relatively simple, and can be accomplished progressively, working either upwardly or downwardly from one stair unit to the next.

FIG. 6 illustrates a number of the up stair units 10 stacked upon one another to show the compact manner in which a plurality of the stair units can be arranged for placement upon a truck bed or railroad flat car and for transportation to the building site.

Various modifications and changes may be made with regard to the foregoing detailed description without departing from the spirit of the invention.

I claim:

1. In combination with a stair well including a front well having an opening onto a building floor, and a back wall opposite said front wall, an improved prefabricated stackable stair unit comprising:
   a stair flight having support means at one extremity for support thereof adjacent said opening in said front wall, said stair flight including a plurality of stairs and a pair of stringers attached to and supporting the ends of said stairs;
   a second stair flight having a width approximating that of said stair flight and including a platform and a pair of side members attached to and supporting said platform, the inward one of said side members including coupling means for attachment to complementary coupling means of a complemental half landing arranged in side-abutting relation to said first-mentioned half landing, said first-mentioned half landing further including support means at its outer end portion for the support thereof upon said back wall, the outward one of said side members and the outward one of said stringers having their adjacent terminal extremities connected together in continuous structural relation with the
upper edge of said outward one of said side members being located above said platform, said inward one of said side members and the inward one of said stringers having adjacent terminal extremities, the upper edge of said inward one of said side members being located below said platform and in discontinuous relation relative to the upper edge of said inward one of said stringers; and

a structural member of substantial strength extending between and rigidly connecting said terminal extremities for transferring loads between said inward ones of said side member and said stringer, said stair unit being supported solely by said front and back walls.

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