United States Patent [19]

Theisen

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[54] **PREFABRICATED STACKABLE STAIR UNIT**

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[51] **Int. Cl.** **E04f 11/02**

[58] **Field of Search** ..52/182, 185, 184, 191; 182/83, 182/115

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[57] **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

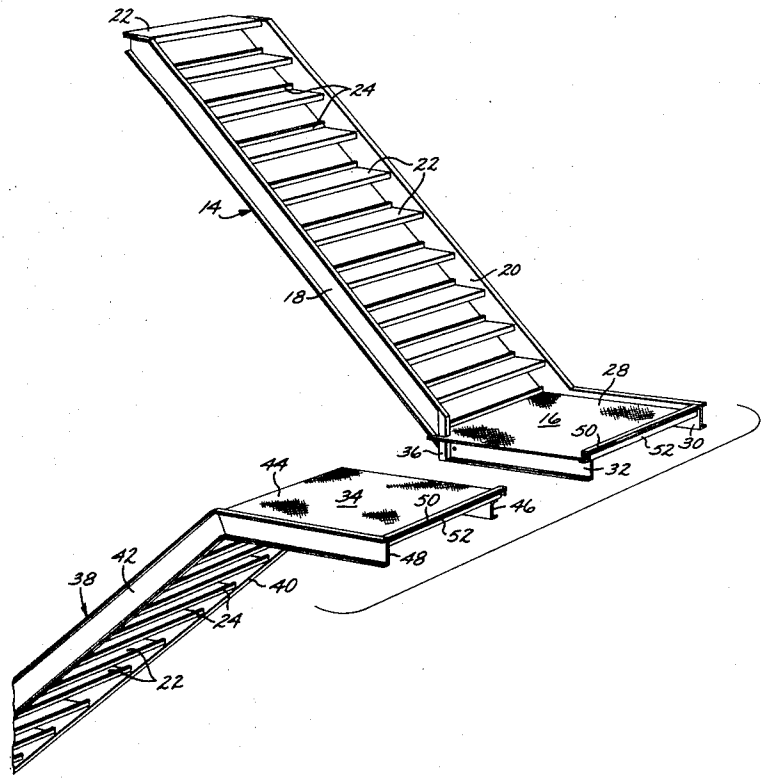


FIG. 1

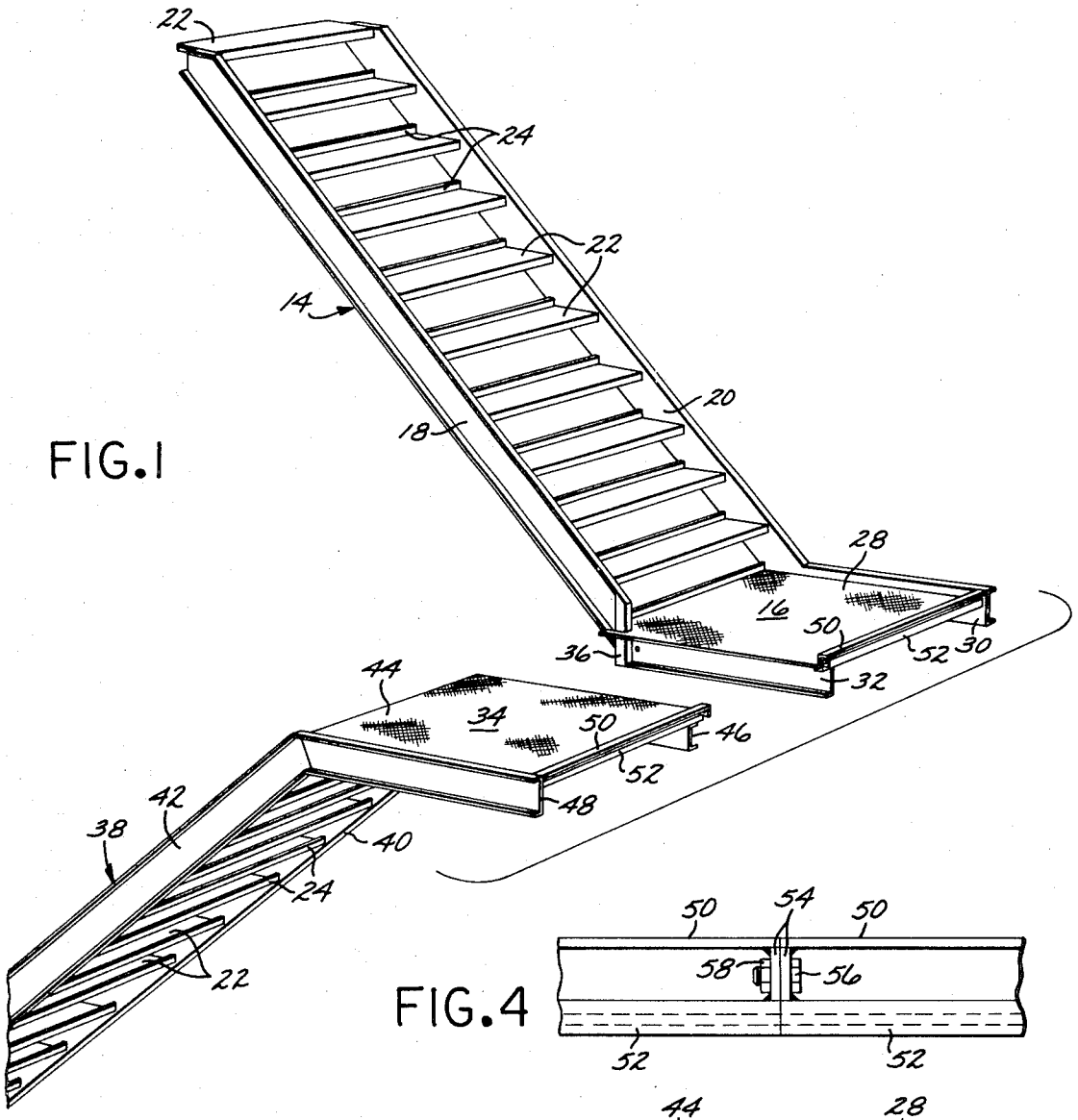


FIG. 4

FIG. 5

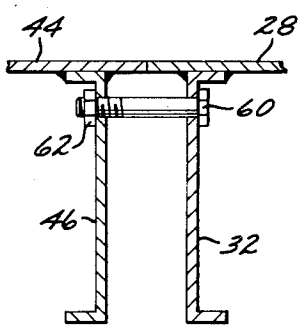
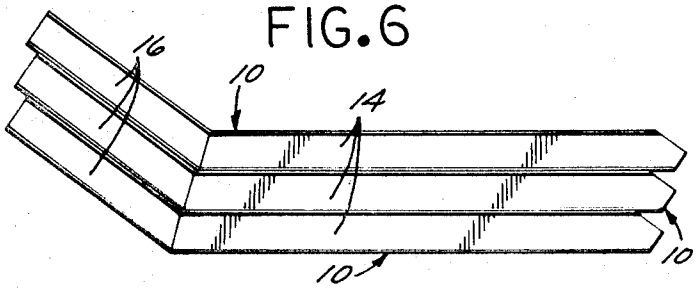


FIG. 6



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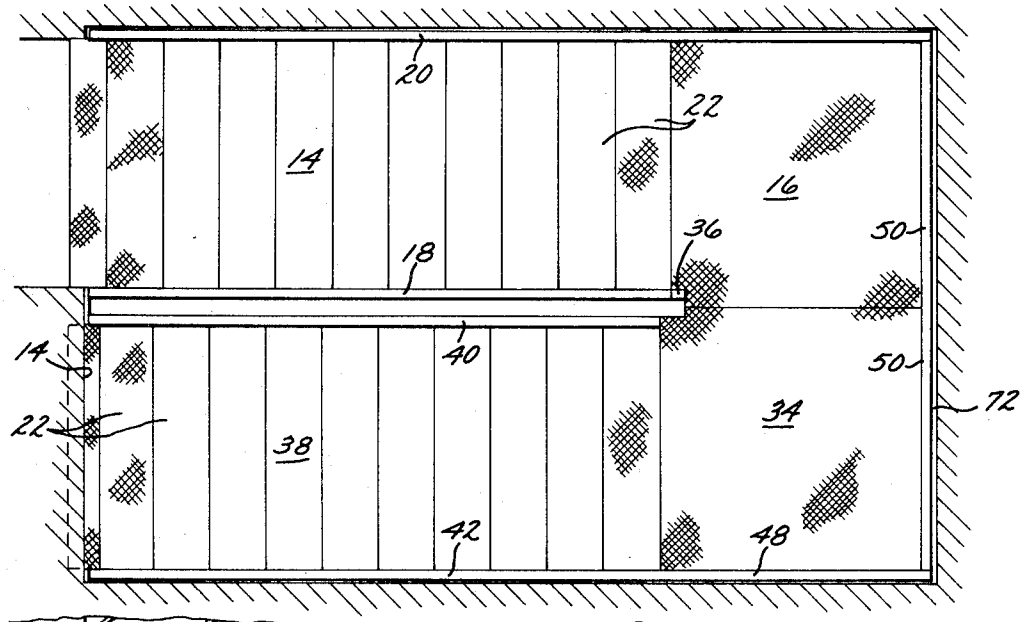


FIG. 2

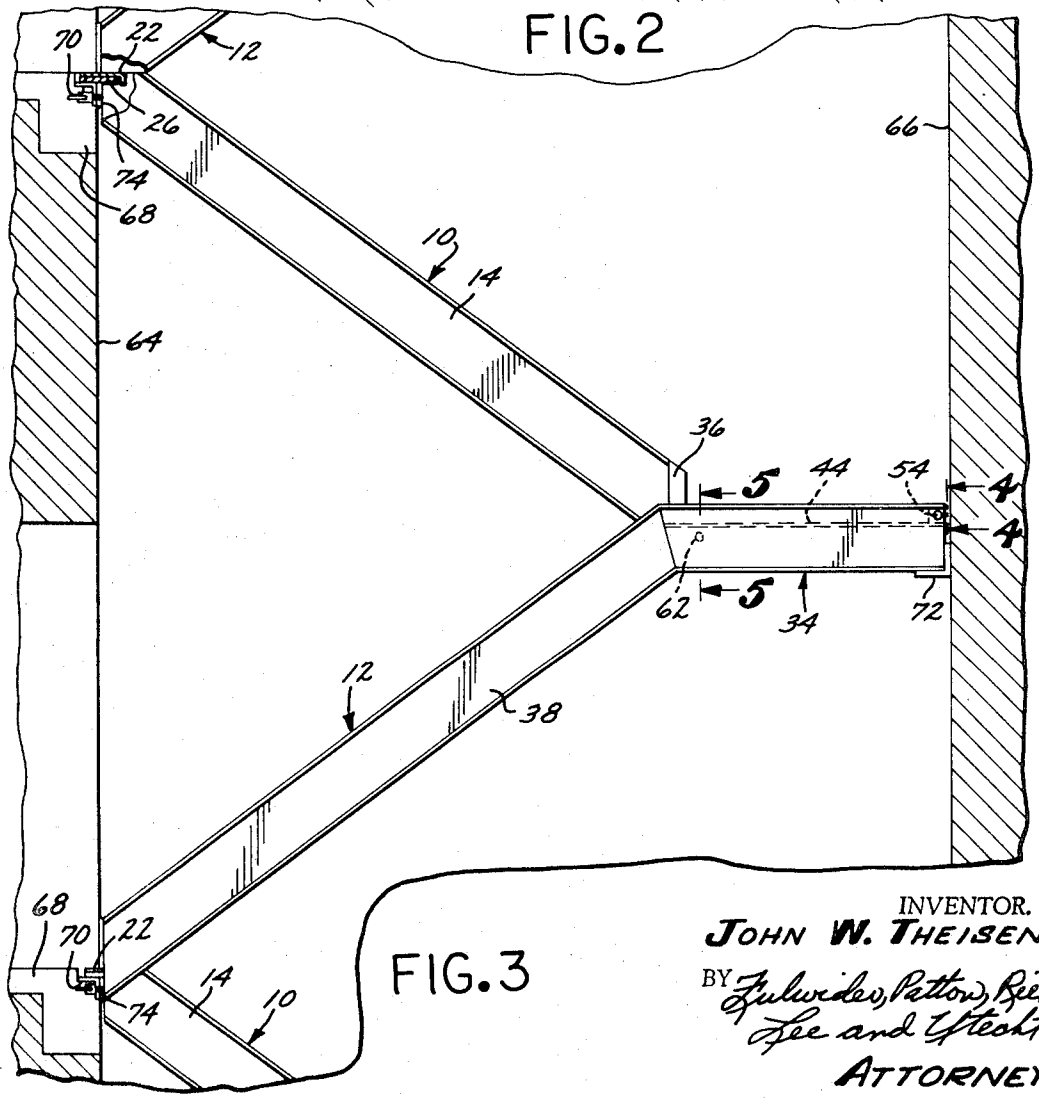


FIG. 3

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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 complemental 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 examplary.

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 half landing 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 complemental 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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