March 7, 1967 W. C. LYONS 3,307,308

PRECAST SUB-GRADE REINFORCED CONCRETE STAIRWAY

Filed June 9, 1964 2 Sheets-Sheet 1

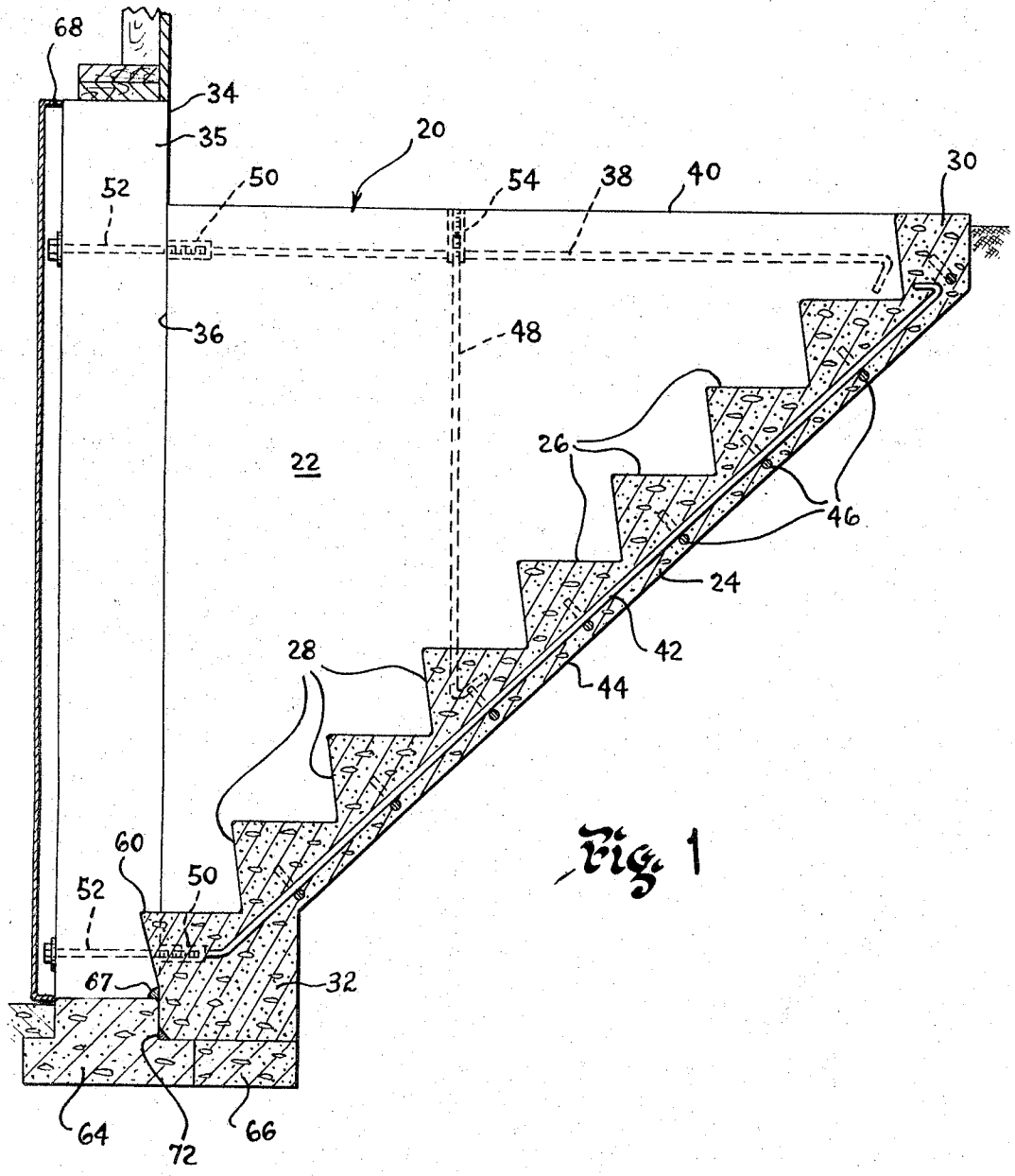

Fig. 1

INVENTOR.
WILLIAM C. LYONS
BY Steward & Steward
his ATTORNEYS

March 7, 1967 W. C. LYONS 3,307,308

PRECAST SUB-GRADE REINFORCED CONCRETE STAIRWAY

Filed June 9, 1964 2 Sheets-Sheet 2

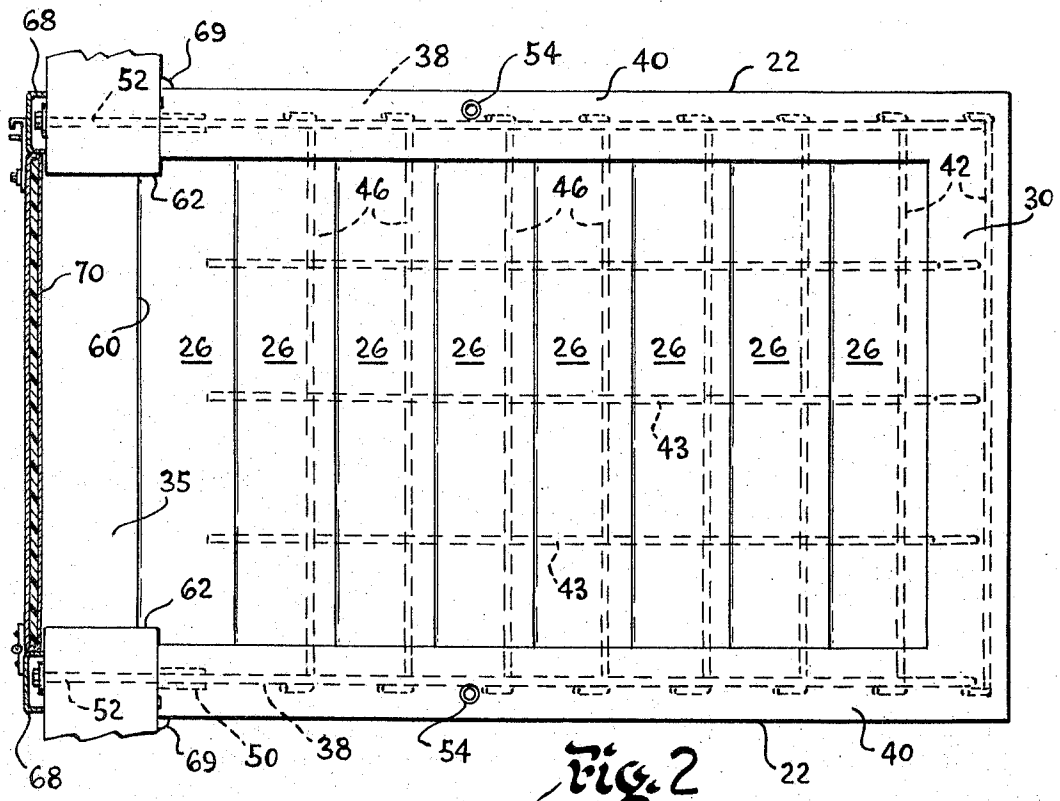

Fig. 2

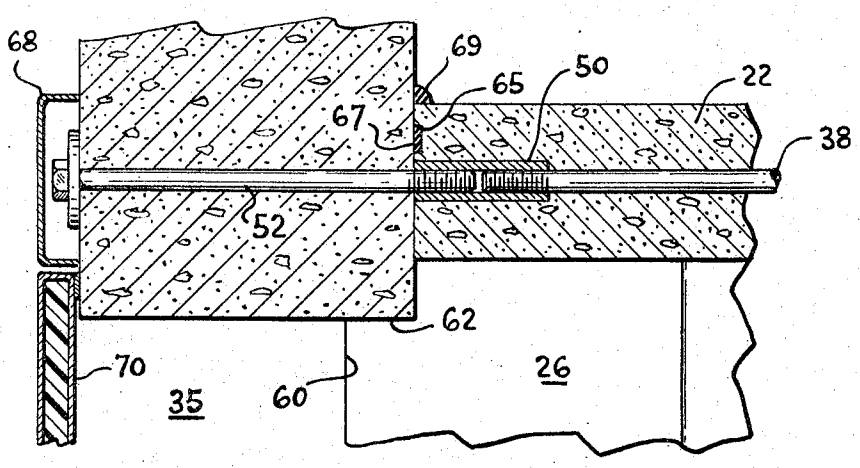

Fig. 3

INVENTOR.
WILLIAM C. LYONS
BY Steward & Steward
his ATTORNEYS

United States Patent Office 3,307,308
Patented Mar. 7, 1967

3,307,308

PRECAST SUB-GRADE REINFORCED CONCRETE STAIRWAY

William C. Lyons, 186 Damascus Road, Branford, Conn. 06405

Filed June 9, 1964, Ser. No. 373,802
2 Claims. (Cl. 52—184)

This invention relates generally to a precast concrete stairway, and more particularly to a precast recessed concrete stairway of unitary construction intended to provide outside access to interior building areas wholly or partly below grade.

For a long time, it has been a general practice to construct a stairway for below-grade entrances to houses or buildings by excavating adjacent the wall of the building, constructing a form, pouring concrete into the form to produce the stairway in place against the wall, and finally dismantling the form when the concrete has set. In some instances the stair treads and risers are cast simultaneously with or subsequently to the casting of the sidewalls and back of the stairwell, while in other instances a stairwell is cast without a stair flight, and thereafter treads and risers of wood or metal are then secured in place to complete the stairway. All of these practices involve substantial construction at the building site and the expense, particularly in terms of labor, is large.

The present invention has for its general object the provision of a novel concrete stairway of unitary construction that may be precast by mass production methods at a location remote from the point of ultimate installation and, as needed, transported to the construction site and rapidly secured to the foundation wall at the desired entrance location. Thereafter it is supported from and by said foundation wall, thus eliminating the need for elaborate footings and foundations, and the excavation and construction normally involved under the former practice. The stairway thus becomes securely fixed to the structure wall and any subsequent settling of the ground around the wall has no effect upon the bond or joint between the wall and the stairway unit.

Briefly, and in general, the invention comprises a precast unitary reinforced concrete stairway having a pair of inverted generally right triangular side panel sections of which the horizontal legs project substantially perpendicularly to the foundation wall, when the stairway unit is assembled thereto, adjacent the top of the entrance in the wall which the stairway is designed to service. A web section intermediate and integrally connecting the side panels along the hypotenuse edges thereof completes the stairway unit. This web section is formed on its interior face with stair flight consisting of treads and risers molded directly into the web. Each of the side panels has embedded therein adjacent its hypotenuse and horizontal edges, respectively, reinforcing rod means. These reinforcing rods at one end extend to and terminate adjacent the edge faces of the panels along the respective vertical edges, near the top and bottom of the side panels. The rods serve not only to reinforce the stairway but also provide coupling means whereby the stairway is clamped to the foundation wall at either side of the entranceway therein. To this end, the aforesaid terminal portion of each reinforcing rod has provision for fastening the stairway to the foundation wall in cantilever manner.

For purposes of illustrating one manner in which the invention may be practiced, reference is made to the accompanying drawings and the following detailed description of the illustrated embodiment. The foregoing general description of the invention, and the detailed description to follow of the illustrated embodiment will of course be understood to be by way of example only and

not intended to define the scope of the invention, the claims appended hereto being relied upon for that purpose.

In the drawings:

FIG. 1 is a sectional view in side elevation of a portion of a foundation wall and entrance therethrough to which is secured a precast unitary concrete stairway structure of the invention;

FIG. 2 is a plan view, looking from above in FIG. 1; and

FIG. 3 is a fragmentary view in section, on an enlarged scale, showing the fastening of the stairway to the foundation wall.

As seen in the drawings, stairway unit **20** is of precast reinforced concrete providing a generally right triangular structure comprising two side panel sections **22** and an intermediate, web section **24** extending along and integrally joined at the hypotenuse edges of side panels **22**. The interior face of web section **24** is formed with treads **26** and risers **28**, the topmost riser and tread forming a lip **30** which is flush along its upper surface with the top edge of side panels **22**, while the lowermost tread and riser form a foot **32** for the stairway.

Stairway **20** is secured to foundation wall **34** so that side panels **22** are astride the entranceway or opening **35** in the wall which the stairway is designed to serve. Stairway **20** is supported in cantilever fashion from the wall by means, presently to be described, which hold the vertical edge faces **36** of side panels **22** clamped into abutment with the face of wall **34**.

Embedded within the several panels of the stairway are sets of reinforcing rods. A first set of rods **38** extends horizontally of side panels **22** adjacent the upper edge faces **40** thereof, with one end of rod **38** in each panel terminating adjacent the respective vertical edge face **36**. A second set of rods **42** is similarly embedded in panels **22** but is located adjacent and generally parallel to the hypotenuse or inclined edge face **44** of the respective panel section. Rods **42** likewise terminate at one end adjacent the vertical edge face **36** of each panel, adjacent foot **32** of the unit. As will appear presently, the foregoing two sets of reinforcing rods serve also as part of the means for securing the stairway to the wall.

Additional reinforcing rods **46** are located in the web section **24** generally in the location of each step, extending transversely of the web section and intersecting reinforcing rods **42**. These serve only as strengthening members of the stair unit.

When desired, a further set of reinforcing rods **48** may be employed to provide convenient means for attaching a hoist to the stairway unit. In this case, rods **48** are located in the respective side panels **22** and disposed generally vertically therein in the plane passing through the center of gravity transversely of the stair flight, terminating adjacent horizontal edge faces **40** in the respective panels.

Rods **38**, **42** and **48** in each instance are provided with coupling or fastening means, such means being here illustrated as internally threaded sleeves or unions joined to the respective rods and embedded within the concrete of the side panels. Rods **38** and **42** terminate in threaded sleeves **50** which form sockets for threaded engagement therein of retaining pins or bolts **52**. The latter pass through holes bored in the foundation wall at appropriate locations on either side of the entrance. Rods **48** are similarly provided adjacent horizontal edge faces **40** with threaded sleeves **54** for eye bolts or the like to which a hoist sling can be attached. The stairway can thus be hoisted onto a truck for transportation to the construction site and there again hoisted and maneuvered into position at entranceway **35** while the stairway is being clamped to the foundation wall.

In order that stairway unit **20** fit flush against wall **34**, the nose **60** of the lowermost step **26**, which projects slightly forward of the vertical edge faces **36**, is notched at **62** to accept the exterior corners of the entranceway **35**. Foot **32** of the stairway may simply rest its toe portion upon footing **64** of the foundation wall, or if desired, a further small footing **66** adjacent the wall may be laid across the width of the entranceway to support the balance of foot **32**.

As seen more particularly in FIG. 3, the vertical edge faces **36** of panels **22** are each provided with one or more longitudinal grooves **64** for the reception of a gasket **66** which extends down along each edge face. Additional gasket means **72** may be provided along the toe portion of foot **32** where it abuts footing **64** of the foundation wall. This may be further supplemented by molding strips **69** along the part-line between the wall and the stairway, as shown. Thus a complete seal around the periphery of the entranceway below-grade prevents water seepage into the basement.

Various modifications of the specifically illustrated unit are of course possible. For example, reinforcing rods **38** and **42** may simply be extended beyond vertical edge faces **36** a distance sufficient to pass through the foundation wall, and such extended ends of the rods threaded and provided with retaining nuts by which the unit can then be clamped to the foundation wall. To provide a more attractive appearance at the interior surface of wall **34**, the retaining bolts **52** may be hidden behind wood or metal door facing members **68** which frame door **70** and entranceway **35**.

The stairway may conveniently be cast in a reusable form of the type disclosed in my copending application Serial No. 304,281, filed August 23, 1963, now Patent No. 3,147,531. The units may be produced in quantity in various standard sizes at a central location, using a number of such forms and mass production techniques, thus economizing on labor and materials. The units produced can then be stored until needed and quickly attached to the house or building to be serviced by a subgrade entranceway.

What is claimed is:

1. A precast reinforced concrete stairway of unitary construction for attachment to a below-grade entrance in a foundation wall of a building, comprising a pair of inverted generally right triangular side panel sections, and a web section intermediate and integrally connecting said side panels along the hypotenuse edges thereof, said web section being formed on its interior face with stair treads and risers; fastening means embedded in said side panels which extend to and terminate adjacent the vertical edge faces of the respective side panels for fastening said stairway to the foundation wall to support said stairway in cantilever relation thereto, and reinforcing rod means embedded in said side panels along and adjacent the hypotenuse and horizontal edges thereof, respectively, which rod means form an extension of said fastening means embedded therein adjacent the vertical edge faces of the respective side panels.

2. A precast concrete stairway as defined in claim **1**, wherein said fastening means consist of sleeve members, one end of each of which opens onto the vertical edge face of the respective side panel to provide a socket thereat, the other end of which is engaged by an end of one of said reinforcing rods, the socket formed by each such fastening means having locking provision for detachable engagement by a mating member to clamp said stairway to said foundation wall.

References Cited by the Examiner

UNITED STATES PATENTS

1,533,166	4/1925	Daly	52—190
2,239,428	4/1941	Michaud	52—190
2,331,701	10/1943	Kogel	249—14
2,652,614	9/1953	Como	52—190 X
2,695,689	11/1954	Peterson	52—107 X
2,936,504	5/1960	Harris	249—14
3,236,012	2/1966	Laven	52—184

FRANK L. ABBOTT, *Primary Examiner.*

JOHN E. MURTAGH, *Examiner.*