Nov. 7, 1961 A. E. BUEHLER 3,007,678

HANDRAIL AND SUPPORT

Filed Dec. 1, 1958

Fig. 1

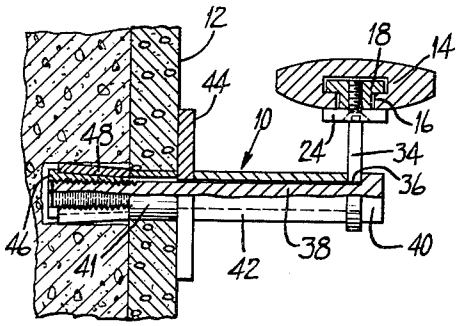


Fig. 2

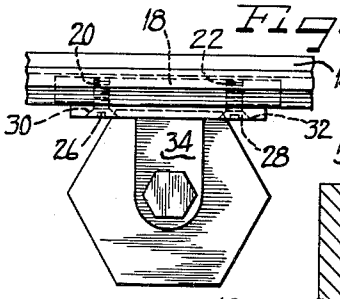
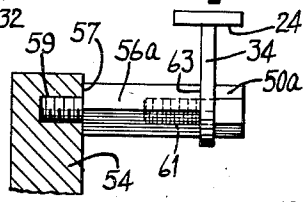


Fig. 8



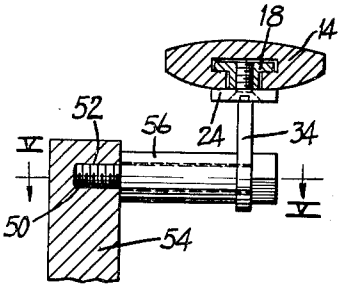


Fig. 3

Fig. 6

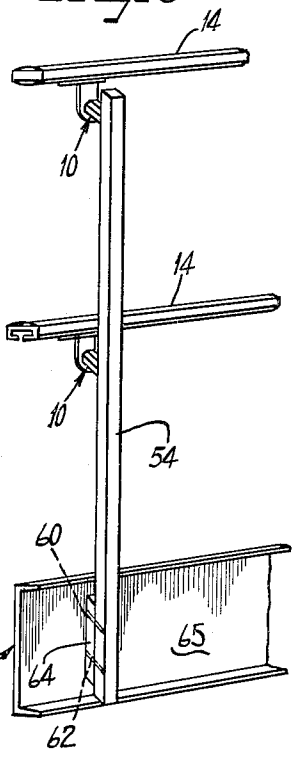


Fig. 7

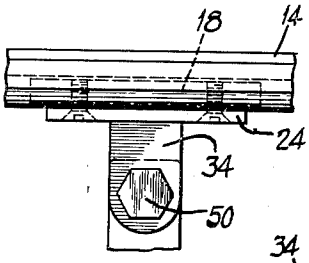


Fig. 4

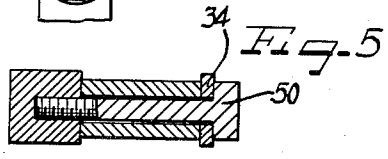
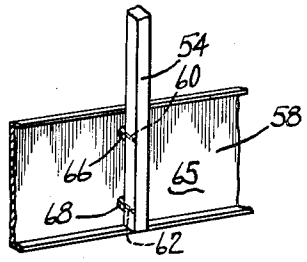


Fig. 5



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HANDRAIL AND SUPPORT

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1 Claim. (Cl. 256—65)

This invention relates to a handrail and support therefor, and more particularly to means for securing a handrail to a wall or stairposts which include a pair of T-shaped members, which cooperate to afford slidable adjustment and secure fastening between the rail and the support therefor.

Although a number of adjustable connections for handrails and handrail support structures have been available heretofore, they have generally been difficult to assemble and to adjust after assembly. The present invention provides a handrail which may be of an extruded aluminum type, and which defines a T-slot along the length thereof opening through the bottom face. A T-shaped section is slidably received in this slot so that precise calculations as to the location of support connections for the rail are rendered unnecessary. This strip or section has two tapped holes near the ends thereof, and a T-shaped bracket or connector is provided having two tapped holes for registration with the holes in the T-strip in the rail so that screws may be received therethrough and threadedly engage within the holes of the T-section received in the rail. Thereby the T-connection is clamped to the bottom face of the T-section in the rail and the rail is clamped between the respective T-members. A depending lug of the T-connector is apertured to receive a bolt, which is engaged by suitable means in horizontal relationship to a railpost or the wall, the lug being disposed between a head for the bolt and a spacer sleeve on the bolt between the vertical support structure and the lug. In one form of the invention the bolt is of a sufficient length to extend through a wall such as a cement or plaster wall or the like to provide an exposed threaded end. An escutcheon plate is positioned against the wall in surrounding relation to the bolt and in abutting relation to the sleeve. A second sleeve is secured in the wall in surrounding relation to the bolt and a tapered cam nut is threaded onto the end of the bolt so as to cause an expansion shell to engage the other side of the wall.

In another form of the invention the rail is supported by posts, which in turn are held in position by a channel-shaped stringer. In this construction the sleeve engaging the depending ear of the connector is disposed in abutting engagement with the post, and the bolt is threadedly received in the post. The stringer defines suitable apertures for receiving bolt means which extend therethrough into threaded engagement with the post, and in order to maintain the post in supported relation across the transverse dimension of the stringer, spacer means are provided in surrounding relation to the bolts, which may include a rectangular block adapted to receive a plurality of the bolts and engaging the inner surface of the stringer and the post. In another form each of the bolts may be provided with a separate spacer sleeve.

Accordingly it is an object of the present invention to provide means for adjustably connecting a handrail to support means therefor, which is characterized by a high degree of simplicity in construction and which is easily assembled without complicated techniques or skills.

Another object of the invention is to provide a handrail construction as described, in which the handrail defines a T-shaped slot slidably receiving a T-shaped section to which is releasably secured a connector also having a T-shaped form and threadedly engaging with the

bottom surface of the T-shaped element in the handrail so that the rail may be securely held between the T-shaped members.

Another object of the invention is to provide a handrail construction as described, in which means for holding the rail in spaced relation to support means therefor are engaged with a depending lug of one of the T-shaped members and include a bolt threadedly received in a post or otherwise secured in a support wall at one end and extending through the depending lug at the other end, the lug being positioned axially of the bolt by a spacer sleeve surrounding the bolt, and the head of the bolt.

Yet another object of the invention is to provide a handrail construction as described, wherein a channel-shaped stringer is provided with fastening means engaging vertical support posts for the handrail, and spacer elements are secured within the stringer channel by bolts for the posts.

Other objects and advantages of the invention will become apparent as the description proceeds in accordance with the drawings, in which:

FIG. 1 is a partial vertical sectional view of a handrail construction according to the invention in association with a support wall therefor;

FIG. 2 is a front view of the support structure shown in FIG. 1;

FIG. 3 is a partial vertical sectional view of another embodiment of the invention wherein the rail is supported by post means;

FIG. 4 is a front view of the structure shown in FIG. 3;

FIG. 5 is a top plan and horizontal sectional view taken along the line 5—5 of FIG. 3;

FIG. 6 is a perspective view showing the post support means for the rail together with a channel-shaped stringer and spacer means therefor;

FIG. 7 is a fragmentary view corresponding to the view of FIG. 6 but showing an alternative embodiment of the spacer means for the post; and

FIG. 8 is a partial vertical sectional view of another embodiment of the invention similar to that of FIGS. 3 to 5.

Referring now to the drawings, FIGS. 1 and 2 show a handrail construction **10** adapted to be supported in spaced relation to a wall **12**, which may be of cement, plaster or the like. The handrail construction **10** includes a rail **14**, which may be of extruded aluminum or the like and which defines a T-shaped slot **16** extending along the length thereof. A complementarily configured T-shaped strip or section **18** is slidably received within the slot **16** and may, for example, have an axial dimension of 3 inches, approximately, although this dimension is not critical. As seen in FIG. 2, the strip **18** is tapped adjacent its ends at **20** and **22** and a T-shaped connector element **24** is releasably secured to the bottom of the section **18** by means of screws **26** and **28** which engage within tapped holes **30** and **32** which are spaced to register with the holes **20** and **22** so that the screws **26** and **28** may be received in the complementary holes of the strip **18**. The connector has a depending ear or lug **34** which is apertured at **36** to receive an elongated threaded bolt **38** having a head **40** which may be of a hexagonal type. The bolt **38** extends through a sleeve **41** positioned in a facing for the wall **12**, and a spacer sleeve **42** surrounds the bolt **38**, engaging an escutcheon plate **44** which in turn abuts the wall **12**. The entire assembly is held in secure axial relationship by means of a tapered sleeve **46**, which is treaded onto the end of the bolt **38** and has an inwardly converging outer surface, so that as the sleeve is advanced along the screw, it provides a secure connection between an expansion shell **48** and the wall **12**.

Referring now to FIGS. 3 to 5, a second embodiment

of the invention is shown, wherein similar parts are referred to by similar numerals. In this construction a bolt **50** is provided, which may be somewhat shorter than the bolt **38** of the preceding embodiment and is threaded for engagement within a complementary hole **52** in the upper end of a rail support post **54** to effect a firm engagement between the sleeve **56** and the post.

As shown in FIG. 8, an exceptionally firm relationship between the post **54** and the rail **18** may be provided by forming the spacer element **56***a* as an integral bolt having a shoulder **57** and a reduced end **59** threadedly engaged in the hole **52** of the post, so as to bring the shoulder **57** into flush abutting engagement with the post. The spacer element **56***a* will thereby resist any tendency to wobble and will afford a solid support for a relatively short bolt **50***a*, which is threadedly received in a complementary axial bore **61** in the spacer element **56***a*, so as to bring the lug **34** into snug abutting relationship with the front surface or shoulder **63** of the spacer element when the head of the bolt is drawn against the lug **34**.

The lower end of the post is held firmly in position by a stringer **58**, which has a channel-shaped configuration and is secured in position along the threads of a stairway (not shown) in accordance with the understanding of those skilled in the art. In the form shown in FIG. 6 the stringer **58** defines apertures to receive bolts **60** and **62**, which in turn are threadedly engaged in the lower end of the post **54**. In order to give a firm support surface to the said lower end of the post, a rectangular spacer block **64** is interposed between the inner surface **65** of the stringer and the post **54**, the block or spacer defining suitable apertures for receiving the bolts **60** and **62**.

Referring now to FIG. 7, another form of the invention is shown, wherein spacer sleeves **66** and **68** are provided for the bolts **60** and **62**, in surrounding relationship thereto, and which also serve effectively to maintain a relatively rigid engagement of the post with the stringer, as in the case of the spacer block **64**.

As indicated in FIG. 6, the post **54** may be utilized to support a plurality of rails **14** in the manner heretofore described, and the assembly thus formed will be maintained in solid upright alignment by the stringer and spacer means, and will afford a sturdy and attractive construction, adapted for use in a wide variety of applications. The double-T elements of the invention permit manufacturing costs to be reduced to a minimum, while the costs of assembly are also reduced because of the simplicity of the structure and the relatively few parts required.

Although I have herein set forth and described my invention with respect to certain specific principles and details thereof, it will be understood by those skilled in the art that these may be varied without departing from the spirit and scope of the invention as set forth in the hereunto appended claim.

I claim as my invention:

A handrail construction comprising a solid metal rail having an axial T-shaped slot along the bottom thereof with a head portion extending transversely in said rail and a leg portion opening through the bottom face of the rail, said T-shaped slot providing flat transverse shoulders on opposite sides of the leg of said slot, a short complimentary T-shaped metal strip completely within and slidably seated in said slot on said shoulders, said strip having a size and cross sectional shape to substantially fill the portion of the slot in which it is seated, said strip having tapped holes opening through the bottom thereof, a connector having a head portion adapted to seat against the bottom of said rail with apertures therethrough adapted to register with the tapped holes of said T strip, said connector having a lug depending from said head, screws seated in said apertures of the head of the connector and threaded into said tapped holes of the T strip for drawing the head and T strip together to thereby clamp the rail between the head of the T strip and the head of the connector with said head of the T strip engaging said shoulders and said head of the connector engaging the bottom of the handrail, and means clampingly engaging opposite faces of said lug for mounting the connector on a fixed support.

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