United States Patent [19]

Werner et al.

[11] **3,844,520**

[45] **Oct. 29, 1974**

[54] **DEPENDENT TOEBOARD CONSTRUCTION**

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[22] Filed: **July 23, 1973**

[21] Appl. No.: **381,994**

[52] **U.S. Cl.** **248/228,** 256/1, 256/59

[51] **Int. Cl.** **E04g 3/04**

[58] **Field of Search** ..... 256/1, 21, 24, 59, 65–70; 248/228, 227.1, 226 B, 200, 221, 223, 225, 241, 244, 245; 182/113

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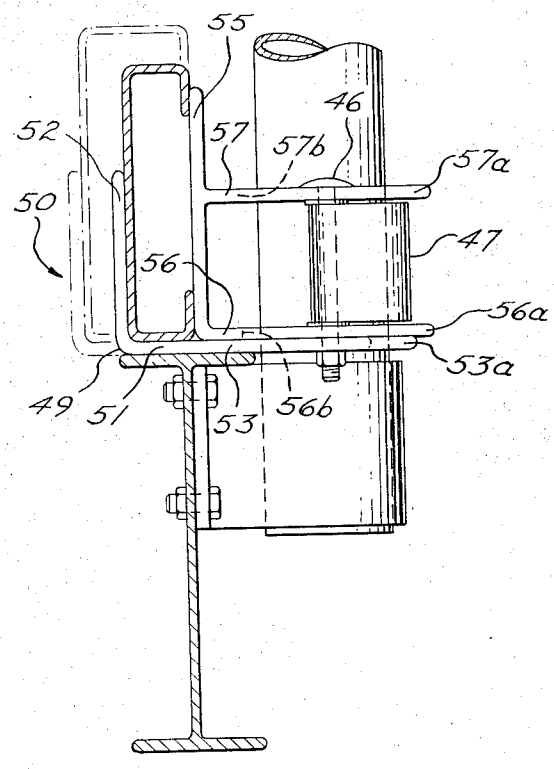
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Primary Examiner—Dennis L. Taylor

[57] **ABSTRACT**

There is disclosed herein a workmen and material supporting stage having a toeboard around the edge and an handrail assembly along one longer side. The handrail assembly includes vertical stanchions and a special toeboard bracket adapted to be secured to stanchions of different cross-sectional sizes and retain the toeboard in edgewise position. In one embodiment of the bracket, said bracket is adjustable to receive toeboards of various thicknesses.

18 Claims, 10 Drawing Figures



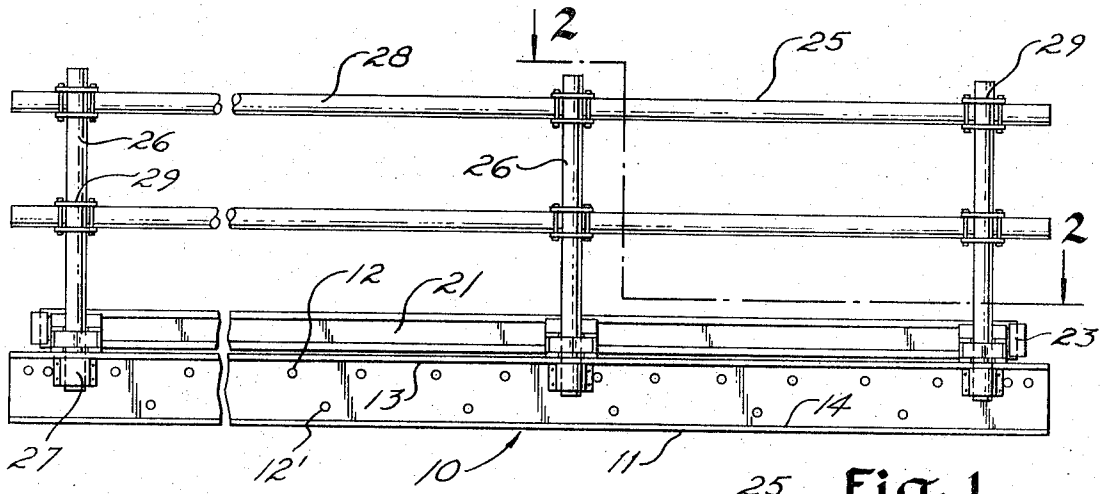


Fig. 1

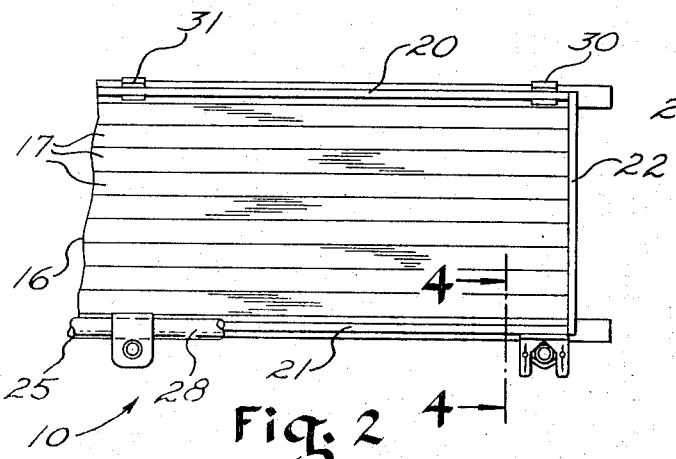


Fig. 2

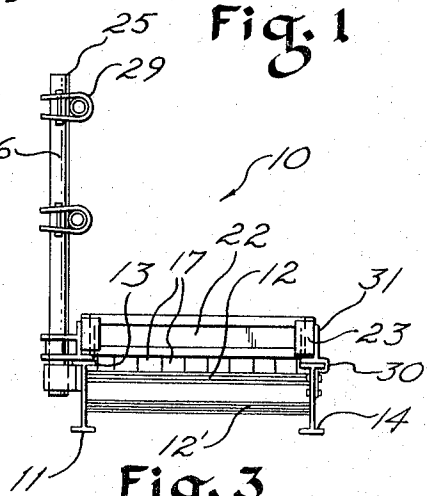


Fig. 3

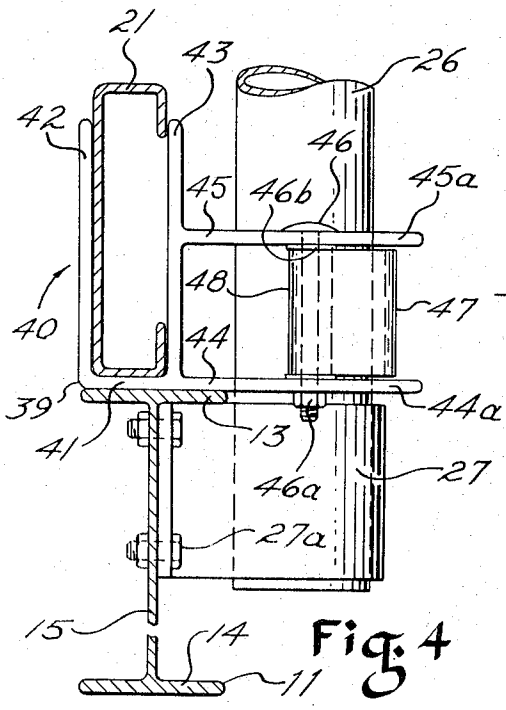


Fig. 4

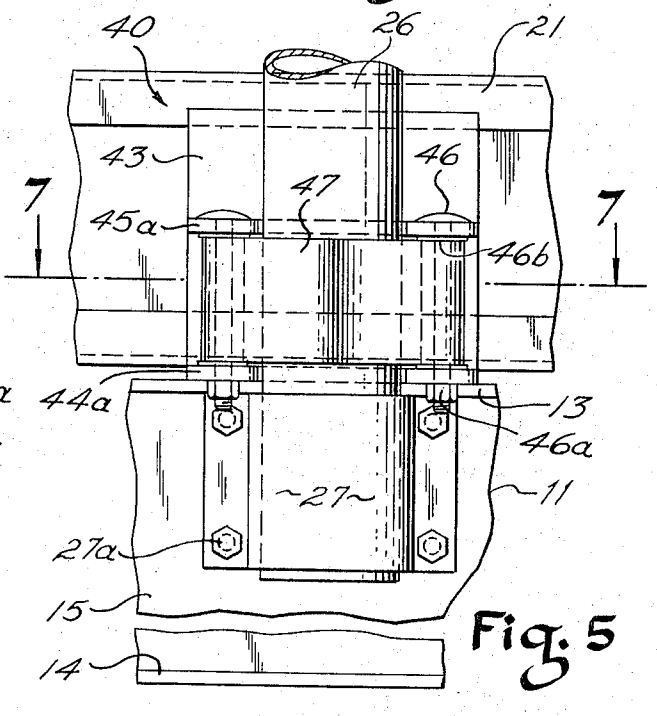


Fig. 5

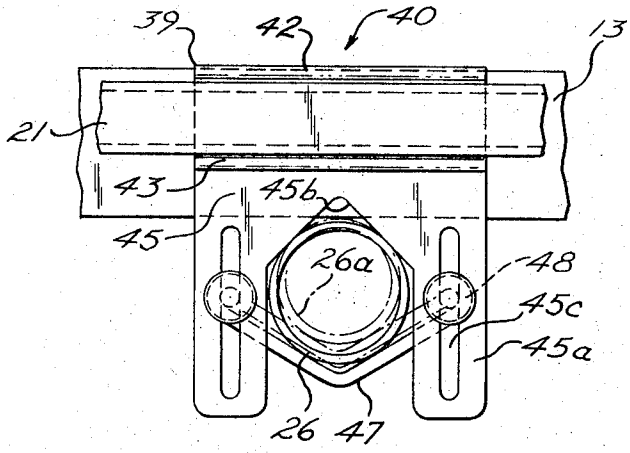


Fig. 6

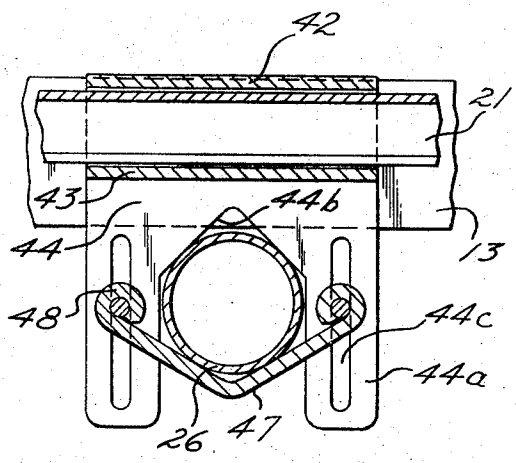


Fig. 7

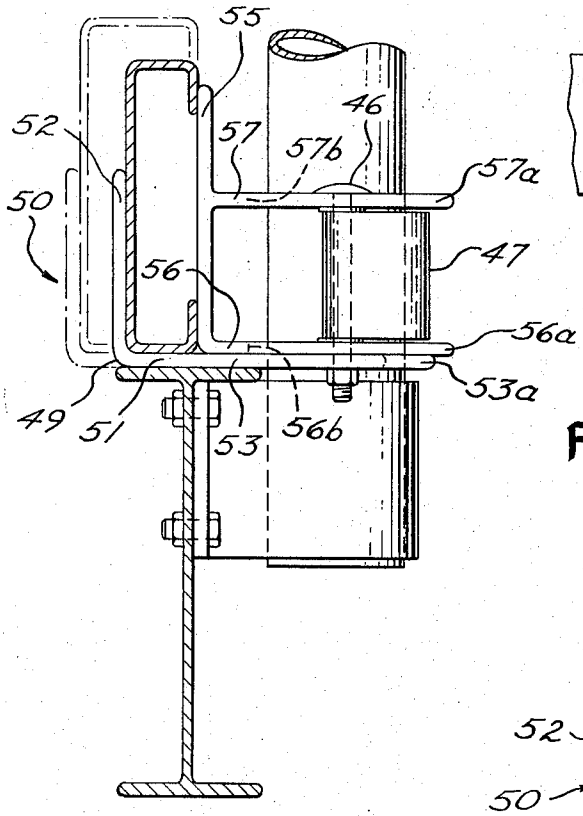


Fig. 8

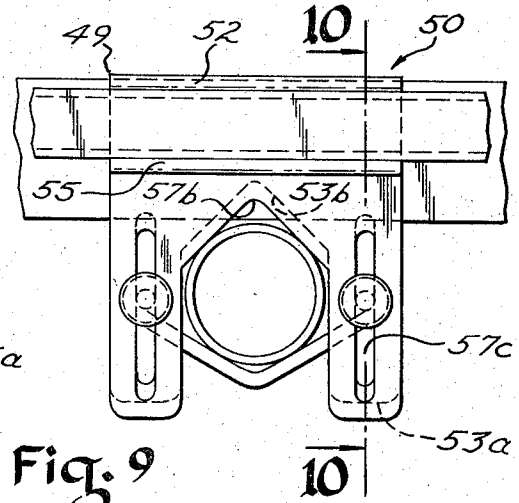


Fig. 9

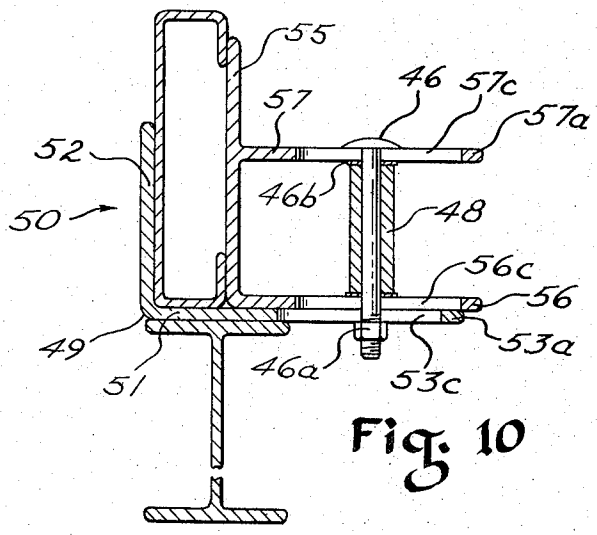


Fig. 10

DEPENDENT TOEBOARD CONSTRUCTION

This invention relates to scaffolds and staging for supporting workmen and materials during the erecting, repairing, painting, and the like of buildings, ships and other structures and particularly to a toeboard assembly and a bracket for supporting the toeboard in combination with vertical supports such as handrail stanchions.

As is well known in the art, a horizontal work platform or stage, whether suspended by cables or as part of a larger support structure or scaffold, is preferably provided with an upright toeboard at the edges thereof as a safety measure to prevent tools and materials from slipping off of the stage. Handrail systems with upright stanchions are variously provided on one or more sides and ends of the stage as needed, the toeboard commonly being retained by means attached to the upright stanchions on the sides having handrails. End toeboards are preferably connected across the ends of the longer side toeboards by means of suitable corner brackets or the like.

Known means for mounting toeboards with respect to upright stanchions or posts comprise bolting, nailing, and corner hinges with hinge pins secured to corner posts. In metal staging of the type herein disclosed, toeboards are commonly provided with a hat section type retainer through which the vertical stanchions can be projected. Thus the location of each toeboard retainer is critical with respect to the location of each stanchion.

The disadvantages of staging constructed as described above are obvious. Each toeboard has to be custom made for a particular stage at the time of manufacture. Toeboards are not interchangeable between staging having different spaces between stanchions. The time needed for fitting and assembling the parts is quite lengthy resulting in high costs. Also, such staging cannot be readily constructed and dismantled at the work site.

The present invention is directed to a toeboard assembly having a bracket for mounting the toeboard to stanchions of various cross-sectional sizes regardless of the locations thereof along the side of the stage. The bracket provides an upwardly open U-shaped retainer portion for receiving the toeboard at any position along the toeboard, and in one embodiment of the invention, the U-shaped retainer is laterally adjustable to receive toeboards of different thicknesses.

The general object of the invention is to provide an improved bracket for mounting a toeboard to the vertical stanchions of a stage having a safety handrail.

Another object of the invention is to provide an improved bracket of the above type which can be located at any position along the toeboard with equal facility.

Still another object of the invention is to provide a toeboard bracket as set forth above adapted to be attached to stanchions of different cross-sectional dimensions.

A further object of the invention is to provide such a bracket wherein both the bracket and the toeboard adapted to be used therewith are freely interchangeable with other staging.

Yet another object of the invention is to provide a bracket as characterized above which facilitates the construction and dismantling of a stage at the work site.

A still further object of the invention is to provide a bracket of the type referred to which substantially reduces the time taken to construct or dismantle a stage.

Another object of the invention is to provide a toeboard bracket which is adjustable to receive toeboards of different thicknesses.

Still another object of the invention is to provide a handrail and toeboard assembly for a stage incorporating a bracket of the above type.

Other objects of the invention and the invention itself will be readily understood from the following description of two embodiments thereof as disclosed in the accompanying drawings in which:

FIG. **1** is a side elevation of a stage having a safety handrail along one side thereof and a toeboard retained by brackets of this invention, a portion of the length of the stage being broken out;

FIG. **2** is a top plan view of an end portion of the stage;

FIG. **3** is an end view of the stage;

FIG. **4** is an enlarged section showing the bracket in side view taken along the line **4—4** of FIG. **2**;

FIG. **5** is a view of the bracket as seen from the right-hand side of FIG. **4**;

FIG. **6** is a top plan view of the bracket as shown in FIGS. **4** and **5**;

FIG. **7** is a horizontal section taken along the line **7—7** of FIG. **5**;

FIG. **8** is an enlarged section similar to FIG. **4** showing a modification of the toeboard bracket of this invention;

FIG. **9** is a top plan view of the modified bracket of FIG. **8**; and

FIG. **10** is a vertical section taken along the line **10—10** of FIG. **9**.

Referring now to the drawings in all of which like parts are designated by like reference numerals, FIGS. **1–3** show a stage **10** comprising a pair of parallel, laterally spaced side rails **11** rigidly connected together in the manner of a metallic ladder by tubular rungs **12** and **12'**. The side rails **11** are I-shaped metallic extrusions having upper horizontal T-flanges **13** and lower horizontal T-flanges **14** connected by a vertical web **15.** As herein disclosed the rungs **12** and **12'** are identical, the rungs **12** being disposed in an upper layer adjacent to the upper horizontal flanges **13** and the rungs **12'** being disposed in a lower layer adjacent to the lower horizontal flanges **14.** Suitable decking **16** is secured upon the upper layer of rungs **12** and disposed horizontally between the upper flanges **13,** such decking comprising a plurality of individual decking planks **17** which, in a metallic stage, may comprise channel shaped extrusions. It will be understood that the stage **10** is adapted to be swung by cables adjacent to the side of a building or be part of a larger, more elaborate scaffolding in a known manner (not herein illustrated), the details of which form no part of the present invention.

As best seen in FIG. **2,** the workmen supporting portion of the stage **10** defined by the decking **16** is surrounded at the edges by a front toeboard **20,** a rear toeboard **21,** and forwardly and rearwardly projecting end toeboards **22.** The toeboards **20–22** may be wooden boards or, as herein illustrated with respect to a metallic stage, may be rectangular, generally C-shaped extru-

sions of metal. Generally, the toeboards are 1 inch to 2 inches thick by 4 inches to 6 inches wide and are disposed on one side edge thereof whereby the width becomes the height. The front and rear toeboards **20** and **21** are disposed parallel with and upon the upper flanges **13** of the front and rear side rails **11**, respectively, and the end toeboards **22** are connected to the ends of the toeboards **20** and **21** by suitable corner brackets **23**.

A handrail assembly **25** is provided on the back of the stage **10** adjacent to the rear toeboard **21**, said handrail assembly comprising vertical stanchions **26** mounted at their lower ends in stanchion brackets **27** suitably secured to the rearwardly facing side of the web **15** of the rear side rail **11**. The stanchions **26** support parallel, horizontal railings **28** which are connected to the stanchions by cross-fittings **29**. For purposes of the present invention, the cross-fittings **29** may be of any suitable type adapted to secure intersecting vertical stanchions and horizontal railings. The specific cross-fittings **29** herein illustrated are more fully disclosed in co-pending application Ser. No. 382,046 filed July 23, 1973, the details of which form no part of the present invention.

The front toeboard **20** is mounted to the front edge of the stage **10** by means of independent toeboard brackets **30** which are secured to the outer surface of the web **15** of the front side rail **11** and afford upwardly open channel portions **31** adapted to receive said front toeboard. Said independent toeboard brackets **30** are more fully disclosed in co-pending application Ser. No. 382,047 filed July 23, 1973, the details of which form no part of the present invention.

At the rear of the stage **10**, the rear toeboard **21** is carried by dependent toeboard brackets **40** which are mounted to the vertical stanchions **26**. A dependent toeboard bracket **40** is shown in detail in FIGS. **4–7**. Referring particularly to FIGS. **4** and **5**, it will be noted that each stanchion bracket **27** is mounted upon the rearwardly directed face of a web **15** by nut and bolt assemblies **27***a* preferably just below the rearwardly projecting portion of the associated upper horizontal T-flange **13**. The lower end portion of the vertical stanchion **29** is secured in any suitable manner to the stanchion brackets **27** and projects upwardly therefrom rearwardly of and closely adjacent to the associated side rail **11**.

Each dependent toeboard bracket **40** is attached to a vertical stanchion **26** just above and preferably upon the upper horizontal T-flange **13**. The toeboard bracket **40** comprises a toeboard retainer portion **39** having a horizontal base **41**, an upwardly projecting outer wall **42** disposed outwardly of the stage **10**, and an upwardly projecting inner wall **43**. The outer and inner walls **42** and **43**, respectively, are spaced apart and parallel with each other, said inner wall **43** carrying a pair of horizontally disposed, forwardly projecting, vertically spaced yokes: a lower yoke **44** extending inwardly coplanar with the base **41** and an upper yoke **45** disposed parallel therewith and extending inwardly from a medial portion of the inner wall **43**. As herein illustrated, the base **41**, the walls **42** and **43**, and the yokes **44** and **45** are all integral and preferably comprise a single extrusion.

Referring now to FIGS. **6** and **7**, the lower yoke **44** comprises a pair of inwardly projecting, parallel, spaced arms **44***a* disposed on either side of a V-shaped throat **44***b*. Similarly, the upper yoke **45** is provided with parallel arms **45***a* disposed on either side of a V-shaped throat **45***b*. Each arm **44***a* has a longitudinal, forwardly and rearwardly directed slot **44***c* and, in like manner, each arm **45***a* has a longitudinal, forwardly and rearwardly directed slot **45***c*. Vertically disposed bolts **46** are disposed through vertically aligned slots **44***c* and **45***c*, said bolts being provided with thread-fitted nuts **46***a*. A clamp **47**, preferably formed from a piece of heavy gage sheet metal, is bent into a V-shape and has lateral enlarged edge portions in the form of edge rolls or beads **48** through which the bolts **46** project. As best seen in FIG. **5**, each clamp **47** is preferably of such vertical dimension as to substantially fill the vertical space between the yokes **44** and **45**. Washers **46***b* may be provided between the edge rolls **48** and the arms **44***a* and **45***a* if desired.

As best shown in FIGS. **6** and **7**, the vee of the adjustable clamp **47** is directed just opposite to the V-shaped throats **44***b* and **45***b* whereby the stanchion **26** can be clamped between the two vees by sliding the bolts **46** rearwardly outwardly toward the edge of the stage **10** and then tightening said nuts **46***a* to firmly hold the dependent toeboard bracket **40** in place. Thus the bracket is now ready to receive a standard toeboard which may comprise a wooden board or plank or, as herein illustrated, a C-shaped metallic extrusion.

A dependent toeboard bracket **40** is adapted to be attached to vertical stanchions of different diameters as shown in phantom line in FIG. **6**. Thus a diametrically smaller stanchion **26***a* can be placed in the V-shaped throats **44***b* and **45***b*, the bracket automatically centering itself with respect to the stanchion due to the V-shaped throat. The adjustable clamp **47** can then be moved outwardly with respect to the stage **10**, or rearwardly as herein described, to close upon the smaller stanchion and firmly grip the same. This is an advantageous feature of the invention in view of the fact that vertical stanchions will sometimes vary in diameter, generally between 1 and 2 inches, although said bracket may well afford an even greater range. The V-shape of the throat and the clamp makes the same idealy suited for attachment to posts of circular cross section but it is not intended to exclude the possibility of adaptation for other shapes.

The thickness of the toeboard; that is, the horizontal transverse dimension when in use, may also vary. A common standard dimension is, for example, 1 inch and where such standard is followed throughout the stage construction, the upwardly opened U-shaped retainer portion **39** formed by the base **41** and the walls **42** and **43** would be so dimensioned as to receive a toeboard of this thickness. However, the thickness of the toeboard may vary and to accommodate to such variation, there is provided a second embodiment of the invention which differs from the first embodiment primarily in that the spacing between the vertical walls of the upwardly open U-shaped retainer portion can be adjustably varied.

Referring now to FIGS. **8–10**, a modified dependent toeboard bracket **50** comprises a toeboard retainer portion **49** having a base **51** which is disposed upon the upper horizontal T-flange **13** in the same manner as hereinabove described with respect to the first embodiment of the invention. The base **51** has a vertical outer wall **52** disposed at its outer or rearward edge with respect to the stage **10**. Said base **51** also has an inward

and forwardly projecting yoke **53** substantially in the form of the yokes hereinabove described having inwardly and forwardly projecting arms **53***a*, a V-shaped throat **53***b*, and elongated slots **53***c* provided in said arms. As will be seen, the exact shape of the throat **53***b* is not critical since it is not adapted to engage a stanchion **26**, said throat being preferably cut or shaped in such manner as to completely clear said stanchion.

The retainer portion **49** of the modified toeboard bracket **50** also comprises an inner vertical wall **55** which is not integral with the base **51** and outer wall **52** and which has an inwardly projecting lower yoke **56** at its lower edge and an inwardly projecting, upwardly spaced, upper yoke **57**. As in the first embodiment, the yoke **56** is provided with arms **56***a*, a V-shaped throat **56***b*, and elongated slots **56***c* in said arms **56***a*. Similarly, the upper yoke **57** is provided with arms **57***a*, a V-shaped throat **57***b*, and elongated slots **57***c* in said arms **57***a*.

As in the first embodiment, bolts **46** carry an adjustable clamp **47** by projecting through edge rolls **48** and aligned slots **53***c*, **56***c*, and **57***c* whereby a vertical stanchion such as that shown at **26** can be firmly grasped and held within the V-shaped throats **56***b* and **57***b* in the manner hereinbefore described. Washers **46***b* may be provided above and below the edge rolls **48** if desired. At the same time, the three sets of yoke arms **53***a*, **56***a*, and **57***a* and the edge rolls **48** are vertically clamped together by tightening the nuts **46***a* on the bolts **46** whereby to maintain any selected adjusted spacing between the vertical walls **52** and **55**. Loosening of the nuts **46***a* allows for outward movement of the outer wall **52** to accommodate toeboards of greater thickness as illustrated in phantom line in FIG. **8**.

From the foregoing it will be seen that the dependent toeboard bracket **50** of the second embodiment is readily adaptable to be quickly attached to stanchions of various cross-sectional dimensions and at the same time and by the same means is readily adjustable to accommodate toeboards of different thicknesses.

It will be understood that many changes in the details of the invention as herein described and illustrated may be made without, however, departing from the spirit thereof or the scope of the appended claims.

We claim:

1. A toeboard bracket for mounting a toeboard to a stanchion, said bracket comprising a retainer portion for receiving and supporting a toeboard; yoke means projecting laterally from said retainer portion, said yoke means having a pair of spaced arm means adapted to receive a stanchion therebetween; a clamp bridged across said arm means and adjustable in a direction generally parallel with said arm means whereby to clamp a stanchion between said arm means; and means for releasably securing said clamp to said arm means in any adjusted position whereby said bracket can be firmly secured to a stanchion.

2. A toeboard bracket as set forth in claim **1** wherein said retainer portion comprises an upwardly open channel having a base and upwardly projecting, spaced, substantially parallel side walls adapted to receive a toeboard seated therein.

3. A toeboard bracket as set forth in claim **2** wherein means are provided for adjusting the spacing between said side walls whereby said bracket is adaptable to receive toeboards of various thicknesses.

4. A toeboard bracket for mounting a toeboard to a vertical stanchion, said bracket comprising a retainer portion for receiving and supporting a toeboard; yoke means projecting laterally from said retainer portion, said yoke means having a pair of horizontally spaced arm means and throat means between said arm means adapted to receive a stanchion; a clamp bridged across said arm means and adjustable toward said throat means whereby to engage a stanchion between said throat means and said clamp; and means for releasably securing said clamp to said arm means in any adjusted position whereby said bracket can be firmly secured to a stanchion.

5. A toeboard bracket as set forth in claim **4** wherein said throat means is substantially V-shaped in horizontal section whereby a stanchion is seated within a vee, said V-shape automatically centering said bracket with respect to stanchions of substantially circular cross section.

6. A toeboard bracket as set forth in claim **5** wherein said clamp is V-shaped in horizontal section in the opposite direction from said V-shaped throat.

7. A toeboard bracket as set forth in claim **6** wherein said retainer portion comprises an upwardly open channel having a base and upwardly projecting, spaced, substantially parallel side walls; and means for adjusting the spacing between said side walls whereby said bracket is adaptable to receive toeboards of various thicknesses.

8. A toeboard bracket for mounting a toeboard to a vertical stanchion of a handrail assembly, said bracket comprising a retainer portion for engaging and supporting a toeboard; two vertically spaced yokes projecting laterally from said retainer portion, each said yoke having a pair of parallel horizontally spaced arms vertically aligned with the pair of arms of the other yoke; said yokes having throat portions between said horizontally spaced pairs of arms for receiving a stanchion; a clamp disposed between said vertically spaced yokes and bridged across said horizontally spaced arms, said clamp being adjustable in a direction parallel with said arms whereby to engage a stanchion between said throat portions and said clamp; and means for releasably securing said clamp to said arms in any adjusted position whereby said bracket can be firmly secured to the stanchion.

9. A toeboard bracket as set forth in claim **8** wherein said retainer portion comprises an upwardly open channel having a base and upwardly projecting, spaced, substantially parallel side walls; said yokes projecting from one of said side walls.

10. A toeboard bracket as set forth in claim **9** wherein said throat means is substantially V-shaped in horizontal section whereby a stanchion is seated within a vee, said V-shape automatically centering said bracket with respect to stanchions of substantially circular cross section; said clamp being V-shaped in horizontal section in the opposite direction from said V-shaped throat.

11. A toeboard bracket as set forth in claim **10** including means for adjusting the spacing between said side walls whereby said bracket is adaptable to receive toeboards of various thicknesses.

12. A toeboard bracket for mounting a toeboard to vertical stanchions of a handrail assembly, said bracket comprising an upwardly open channel portion adapted to be disposed adjacent to a vertical stanchion and re-

ceive a toeboard therein; two vertically spaced yokes projecting laterally from said channel portion, each said yoke having a pair of parallel horizontally spaced arms vertically aligned with the pair of arms of the other yoke; said yokes having throat portions between said horizontally spaced pairs of arms for receiving a stanchion; each said arm having an opening therethrough aligned with the opening in the arm vertically aligned therewith; a clamp disposed between said vertically spaced yokes and bridged across said horizontally spaced arms, said clamp having edge portions extending substantially the entire distance between said vertically aligned arms and having openings therethrough aligned with said openings in said arms; bolt means projecting through said aligned arm and edge portion openings, said openings in said arms being larger than said bolt means and allowing adjustment of said clamp toward said throat portions to engage a stanchion between said throat portions and said clamp, said bolt means having tightening means cooperative therewith for tightening said clamps in the adjusted position.

13. A toeboard bracket as set forth in claim **12** wherein said throat portions are substantially V-shaped in horizontal section whereby a stanchion is seated within a vee; said clamp being V-shaped in horizontal section in the opposite direction from said V-shaped throat, said V-shapes automatically centering said bracket with respect to stanchions of substantially circular cross section.

14. A toeboard bracket as set forth in claim **13** wherein said openings in said arms comprise elongates slots disposed longitudinally of said arms whereby said clamp is adjustable to clamp posts of substantially different diameters.

15. A toeboard bracket as set forth in claim **14** wherein said clamp is formed from heavy gage sheet metal into a V-shape and is rolled at the lateral edges thereof to form openings for receiving said bolt means; and said tightening means comprising thread-fitted nuts on said bolts for tightening said arms securely against said rolled edge portions.

16. A toeboard bracket as set forth in claim **14** wherein said upwardly open channel portion comprises upwardly projecting, spaced, substantially parallel side walls; said two vertically spaced yokes projecting laterally from one of said walls, the lowermost of said yokes projecting from the lower edge of said one wall and the other of said yokes projecting at a level spaced upwardly therefrom; a third yoke projecting laterally from the lower edge of the other of said walls in the same direction as said two yokes, said third yoke having a pair of parallel, horizontally spaced arms having elongated longitudinal slots therein, said last mentioned pair of arms and slots being aligned with the pairs of arms and slots of said two yokes, said lowermost of said two yokes being superimposed on said third yoke, said bolt means projecting through all of said slots in said arms whereby said other wall is adjustable toward or away from said one wall to receive toeboards of various thicknesses and upon tightening said tightening means, is securely maintained in an adjusted position.

17. In a dependent toeboard assembly for a stage, the combination of a vertical handrail stanchion projecting upwardly at one side edge of said stage a toeboard bracket comprising a base and two upwardly projecting, spaced walls defining a channel; two vertically spaced yokes projecting laterally outwardly from one of said walls, each said yoke having a pair of parallel horizontally spaced arms vertically aligned with the pair of arms of the other yoke; said yokes having V-shaped throat portions between said horizontally spaced pairs of arms for receiving a stanchion and centering said bracket with respect thereto; each said arm having a longitudinal elongated slot therein aligned with the slot in the arm vertically aligned therewith; a V-shaped clamp of heavy sheet metal having enlarged portions at the lateral edges thereof disposed vertically between vertically aligned arms and bridged across horizontally spaced arms, said enlarged portions having vertical openings therethrough; bolts projecting through said aligned elongated slots in said arms and said vertical openings in said enlarged portions of said clamp, said bolts being slidable within said slots whereby said clamp is adjusted to engage said stanchion, said bolts having thread-fitted nuts for tightening said bolts to maintain said clamp in an adjusted position.

18. A dependent toeboard assembly as set forth in claim **17** wherein the lowermost of said yokes projects from the lower edge of said one wall and the other of said yokes projects at a level spaced upwardly therefrom; the other of said walls having a base projecting laterally from the lower edge thereof in the same direction as said two yokes; a third yoke projecting laterally in the same direction from said base and having a pair of parallel, horizontally spaced arms having elongated longitudinal slots therein, said last mentioned pair of arms and slots being aligned with the pairs of arms and slots of said two yokes, said lowermost of said two yokes being superimposed on said third yoke, said bolt means projecting through all of said slots in said arms whereby said other wall is adjustable toward or away from said one wall to receive toeboards of various thicknesses and upon tightening said nuts, is securely maintained in an adjusted position.

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