April 29, 1969 L. BLUM ET AL 3,441,253

HANDRAIL

Filed March 31, 1967 Sheet 1 of 2

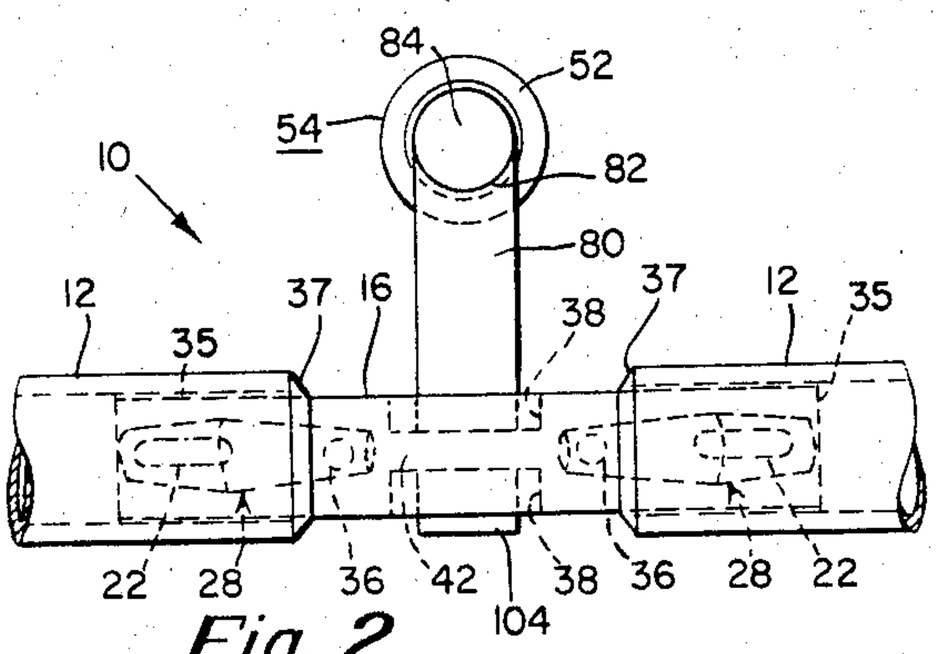

Fig. 2

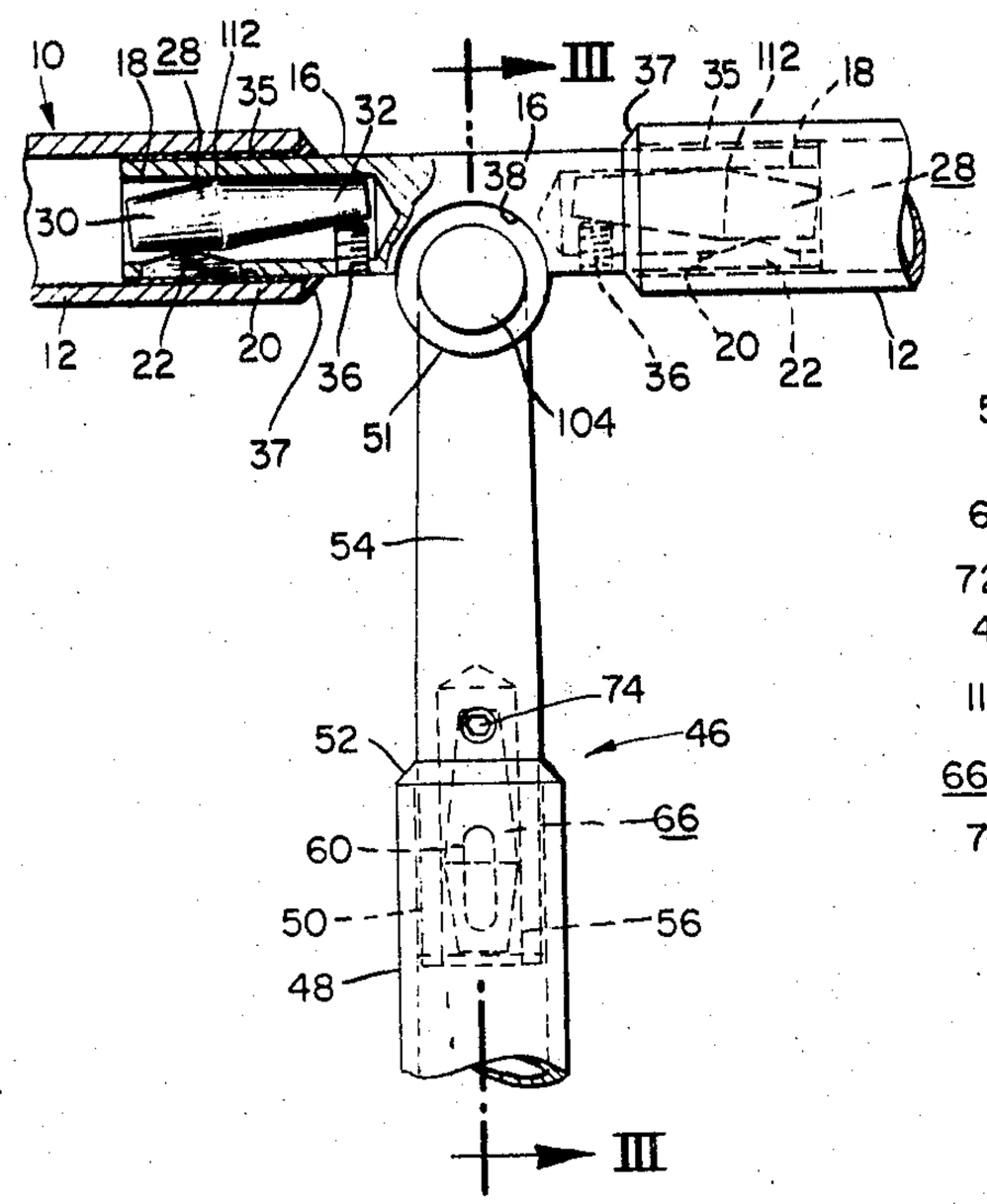

Fig. 1

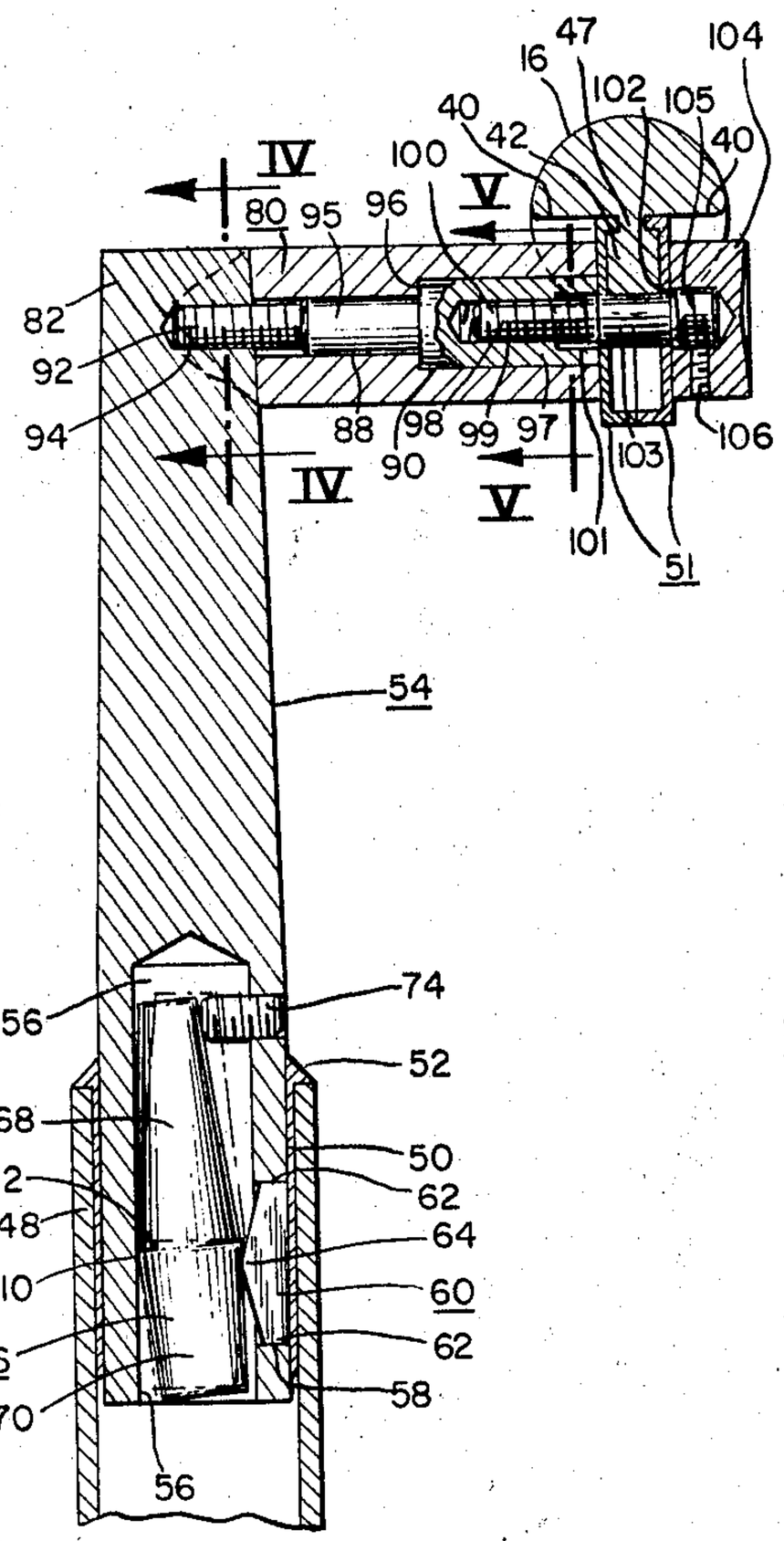

Fig. 3

Fig. 4

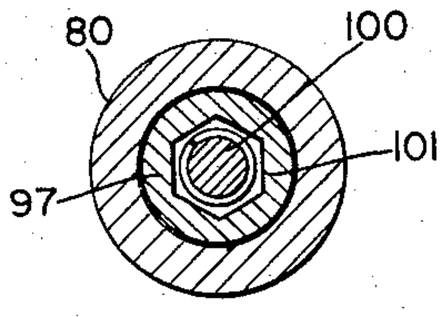

Fig. 5

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Sheet 2 of 2

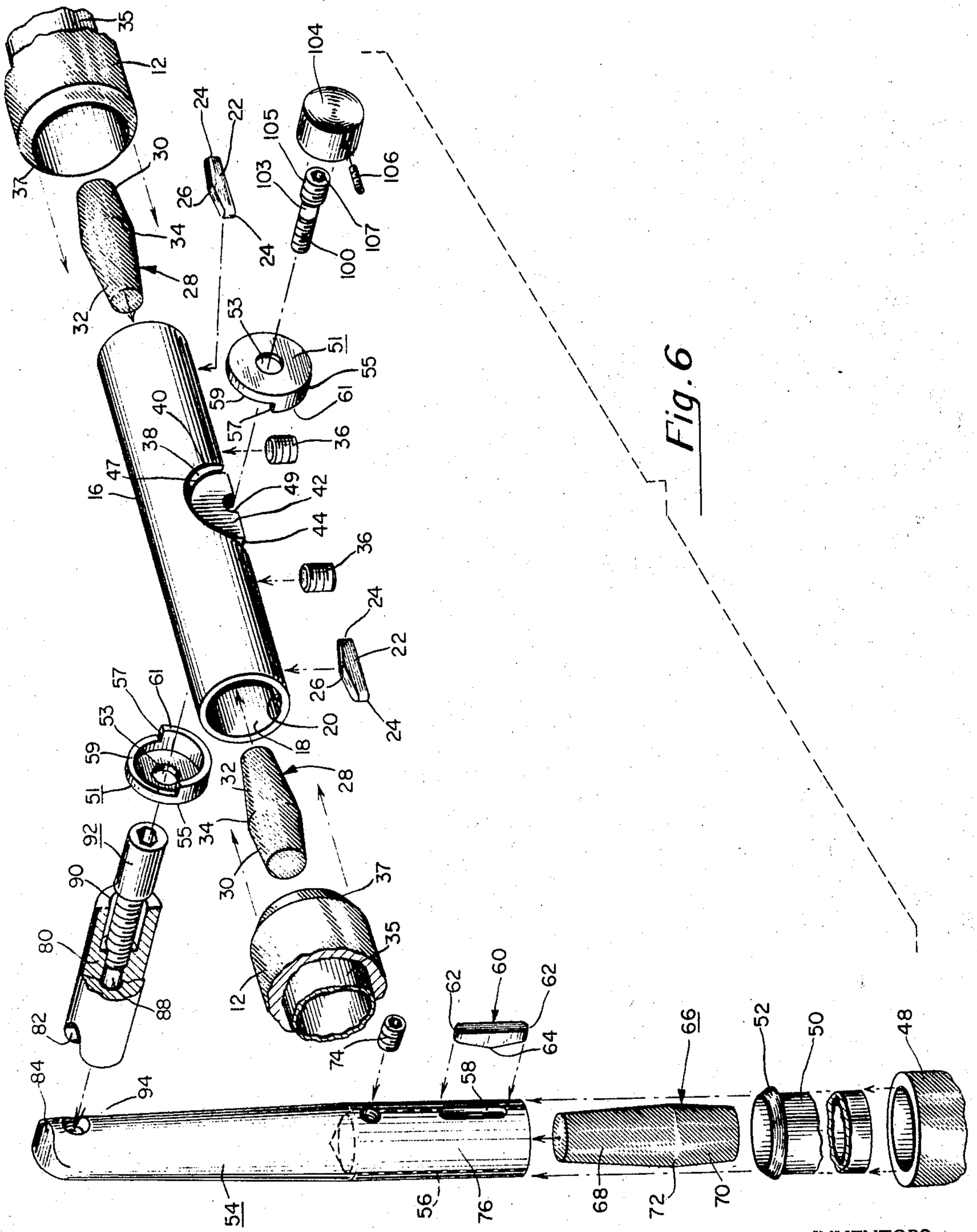

Fig. 6

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HANDRAIL

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13 Claims

ABSTRACT OF THE DISCLOSURE

A handrail post carries an elongated handrail splice member. Slidably fitted over the opposite end portions of the splice member respectively are a pair of thin walled sleeves, and slidably fitted over these sleeves respectively are the opposed end portions of a pair of handrail sections. Within the opposite end portions of the splice member are locking means operative for enlarging the effective diameters of the sleeves thereby to cause the sleeves to grip the handrail sections and frictionally secure them to the splice member.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to handrails, and particularly to improvements in sectional handrails.

Description of the prior art

Handrail arrangements of the prior art suffer the disadvantage that the handrail sections must be cut accurately to length, which takes time and is expensive. In addition, assembly of the component parts of prior art handrails normally is a comparatively complicated task.

SUMMARY

A hollow end portion of an elongated splice member, a thin-walled sleeve and an end portion of a tubular handrail section are slidably telescoped together. Housed within the hollow of the splice member is an elongated locking piece, one end of which is engaged by a set screw which is threaded through the wall of the hollow and exposed to facilitate application of a screwdriver. The opposite end portion of the locking piece is pressed against a friction shoe which extends through the wall of the hollow and presses against the thin wall of the sleeve, enlarging the effective diameter thereof and thereby causing it to frictionally grip the handrail section to secure it to the splice member.

An important object of the invention is to provide a handrail structure wherein a section of the handrail is disposed between each successive pair of posts, and the ends of the handrail sections at each post are joined by a splice member carried directly by the post.

Another object is to provide such a handrail wherein the opposite end portions of the splice member are adjustably telescoped into the ends of the handrail sections and frictionally secured thereto by locking means concealed within the splice member.

Another object is to provide such a handrail wherein the splice member is secured to the post for angular adjustment of the splice member and the handrail sections joined thereby about a horizontal axis.

Another object is to provide such a handrail wherein the posts are sectional, and one section of the post is adjustably telescoped into the other and frictionally secured thereto by concealed locking means.

Another object is to provide such a post wherein the means securing the post sections together is operable by means exposed to facilitate application of a tool.

Other objects of the invention will become apparent when the following description is read with reference to the accompanying drawings, in which:

FIGURE 1 is an elevation of the handrail constructed in accordance with the invention, part being shown in setcion;

FIGURE 2 is a plan view of the handrail shown in FIGURE 1;

FIGURE 3 is an enlarged section on line III—III in FIGURE 1;

FIGURE 4 is an enlarged section on line IV—IV in FIGURE 3;

FIGURE 5 is an enlarged section on line V—V in FIGURE 3; and

FIGURE 6 is an exploded view of the unit shown in the other figures.

It will be understood that the following description is directed to the specific form of the invention shown in the drawings. It is not directed to the scope of the invention, which may be practiced in a variety of forms.

Referring to the drawings, the handrail constructed in accordance with the invention, generally designated **10**, comprises a number of handrail sections **12** interconnected by splice members **16**. Each end portion of the splice member **16** is centrally bored, as at **18**, and the wall of the central bore is provided with an elongated slot **20** which slidably accommodates a friction shoe **22** having rounded opposite end portions **24** and a peaked edge **26**. Inserted into the bore **18** is a double tapered cone or cat-shaped locking piece **28** opposite end portions of which, designated **30** and **32**, are tapered down from an intermediate section **34**. Each end portion of the splice member **16** is slidably fitted into a thin walled sleeve **35** which in turn is fitted into one end of a handrail section **12**. The sleeve **35** is provided with a radially outwardly extending flange **37** which abuts the end of the handrail section. A set screw **36** extends through the wall of the bore **18** and engages the end **32** of the locking piece **28** whereby to tilt the locking piece and cause the other end **30** thereof to bear upon the peak of the edge **26** of the friction shoe **22**. A section of the splice member **16** intermediate the opposite end portions thereof, is undercut on both sides of the splice member, as at **38**, whereby to provide a pair of downwardly presenting semicircular shoulders **40** respectively on opposite sides of a semi-circular wall **42**. Each face of the wall is grooved, as at **44**, to provide a wall area **47** reduced in thickness. The base of the wall is provided with a semicircular recess **49**. Each side of the wall is fitted with a disc **51** which is centrally apertured, as at **53**, and flanged, as at **55**. The flange is recessed, as at **57**, to provide an upper half portion **59** which is received by the associated groove **44** and a lower half portion **61** which abuts the lower half portion **61** of the flange **55** of the other disc **51**. The central apertures **53** of the discs **51** are concentric with the recess **49** in the base of the wall **42**.

The post constructed in accordance with the invention, generally designated **46**, is provided with a lower section **48**. A thin walled sleeve **50** slidably fitted into the upper end portion of the section **48** is provided with a radially outwardly extending flange **52** seated on the upper terminal edge of the section **48**. The post is also provided with an upper section **54** having a lower end portion slidably fitted into the sleeve **50**. The lower end portion of the section **54** is centrally bored, as at **56**, and the wall of the bore is provided with an elongated slot **58** which accommodates a friction shoe **60** having rounded opposite end portions **62** and with a peaked edge **64**. Inserted into the bore **56** is a double tapered cone or cat-shaped locking piece **66** opposite end portions of which, designated **68** and **70**, are tapered down from an intermediate

section **72**. A set screw **74** extends through the wall of the bore **56** and engages the end **68** of the locking piece **66** whereby to tilt the locking piece and cause the other end **70** thereof to bear upon the peak of the edge **64** of the friction shoe **60**. The lower end portion of post section **54** fitted into the sleeve **50** is cylindrical. The upper end portion of post section **54** is tapered and has extending from the upper terminal portion thereof a lateral extension of the post, designated **80**. An end portion of the extension **80** is recessed, as at **82**, to fit about the opposed portion of the post section **54**, which is rounded off, as at **84**, to merge smoothly with the upper surface of the extension **80**. The free end of the lateral extension **80** is centrally bored, as at **88**, and counterbored, as at **90**. A screw, generally designated **92**, is provided with a threaded end portion **94** extending from an unthreaded portion **95** under the head **97** of the screw. Under the head is an annular shoulder **96**. The head is provided with a central bore **99** terminating in a socket **101** for an Allen wrench. The screw **92** is projected axially into the lateral extension **80**, and the end **94** thereof is threaded into the side of the post section **54**. A screw **98** is provided with a threaded end **100** extending from an unthreaded portion **103** under the head **105** of the screw. The head **105** is provided with a socket **107** for an Allen wrench. The screw **98** is projected through one of the discs **55**, then through the recess **49** in the base of the wall **47** and then through the other disc **55**. The end **100** thereof is threaded into the head **97** of the screw **92**. A nut **104** is threaded upon the head **105** and is secured by means of a set screw **106**.

The lower end portion (not shown) of the post section **48** may be plain, and it may be secured to a separate stem in the same way that the upper end portion thereof is secured to the post section **54**.

In assembling the post **46**, the locking piece **66** is inserted into the bore **56** with the tapered end **68** leading. Then the friction shoe **60** is inserted into the slot **58** with the peaked edge **64** presenting toward the locking piece **66**. Then the sleeve **50** is fitted over the lower end portion of the post section **54**. Thus the locking piece **66** is captured in the bore **56** because the clear distance between the friction shoe **60** and the diametrically opposite area of the wall of central bore **56** is less than the greatest diameter of the locking piece **66**. The post section **54**, locking piece **66**, friction shoe **60** and sleeve **50** are then inserted as a unit into the upper end portion of the post section **48**. Post section **54** is now adjusted as desired axially relative to post section **48**. Then the set screw **74** is threaded in to engage the end **68** of the locking piece **66** and to tilt the locking piece about a point on its greatest diameter and diametrically opposite the shoe **60**, as at **110**. The locking piece tilts counterclockwise from the broken line to the full line position thereof shown in FIGURE 3, whereupon the end **70** of the locking piece bears upon the peak of the edge **64** and presses the shoe **60** against the wall of the sleeve **50**. The wall of the sleeve in turn is pressed against the wall of the lower post section **48**. Thus the post sections **48** and **54** are frictionally secured against relative axial shifting movement.

Now the lateral extension **80** of the post is fitted to the upper terminal portion of the upper post section **54**, and screw **92** is projected through the bores **90** and **88** and threaded into the side of the post section **54**. The shoulder **96** of the screw engages the opposed shoulder at the juncture of the bores **90** and **88** and holds the lateral extension **80** to the upper terminal portion of the post section **54**.

In assembling the handrail, one of the locking pieces **28** is inserted in the central bore **18** at one end of the splice member **16**. The insertion is made with the end **32** of the locking piece leading. Then the friction shoe **22** is inserted in slot **20** with the peaked edge presenting toward the locking piece. Next the sleeve **35** is fitted over the end of the splice member **16**. Thus the locking piece **28** is captured in the bore **18** because the clear distance between the friction shoe **22** and the diametrically opposite

area of the wall of the bore **18** is less than the greatest diameter of the locking piece **28**. The end of the splice member **16**, locking piece **28**, friction shoe **22** and sleeve **35** are then inserted as a unit into the handrail section **12**, and the splice member **16** is adjusted as desired axially relative to the handrail section **12**. Then the set screw **36** is threaded in to engage the end **32** of the locking piece **28** and to tilt the locking piece about a point on its greatest diameter and diametrically opposite the shoe **22**, as at **112**. The locking piece **28** tilts, whereupon the end **30** of the locking piece bears upon and presses the shoe **22** against the wall of the sleeve **35**, which in turn is pressed against the wall of the handrail section **12**. Thus the splice member **16** and the handrail section **12** are frictionally secured against relative axial shifting movement.

The screw **98** is now projected through the discs **55** and threaded into the head **97** of the screw **92**. Then the nut **104** is threaded onto the head of the screw **98** and the set screw **106** is threaded in. The handrail section **12** and splice member **16** may be set at any angle relative to the post.

Now the other handrail section **12** is secured to the other end of the splice member **16** by following the procedure outlined above.

It will be noted that the handrail section **12** is tubular, both ends thereof being plain. There is no necessity for cutting the handrail section to accurate length. The posts are adjustable in length and the entire handrail structure is quickly assembled. In addition, the locking means for frictionally securing the handrail sections together and for securing the post sections together are concealed from view and operable by manipulation of exposed screws.

It will be understood that the friction shoes **22** and **60** may assume forms other than the form shown and described. For example, the shoes may be in the form of elongated pins round in transverse section and slidably received in round holes.

What is claimed is:

1. In a handrail structure, the combination comprising:
(a) a handrail; and
(b) a post comprising:
(1) an upper post section connected to said handrail, said section having a hollow formed in the lower end portion thereof,
(2) a lower post section having an upper end portion slidably fitted over said lower end portion, and
(3) means for frictionally locking together said upper and lower post sections, comprising: a friction shoe extending laterally through the wall forming said hollow in said lower end portion of said upper post section, and lever means within said hollow engaging said friction shoe between one end and the fulcrum thereof and holding said friction shoe firmly engaged with said lower post section.

2. The invention of claim **1** wherein the lever means engaging said friction shoe comprises a rockable locking piece, and a screw threaded into one side of the wall forming said hollow in said lower end portion of said upper post section and bearing on one end portion of said locking piece to rock the same and thereby bring the opposite end portion thereof to bear on said friction shoe.

3. The invention of claim **2** wherein said locking piece is circular in transverse section and tapered toward each end from a maximum diameter at a section intermediate the ends thereof.

4. In a handrail structure, the combination comprising:
(a) a post, and
(b) a sectional handrail including:
(1) an elongated splice member having a portion intermediate opposite end portions thereof connected to said post,
(2) a pair of handrail sections having opposed

end portions slidably fitted respectively over the opposite end portions of said splice member, and

(3) means for frictionally locking said splice member to said handrail sections including

(a) a pair of friction shoes respectively extending laterally through the walls of hollows formed in the opposite end portions of said splice member, and

(b) lever means within each of said hollows each engaging a friction shoe between one end and the fulcrum thereof and holding said shoe firmly engaged with said handrail section.

5. The combination according to claim **4** wherein a pair of sleeve members are slidably fitted respectively over the opposite end portions of the splice member, the opposed end portions of the handrail sections are slidably fitted respectively over said sleeve members, and the sleeve members are deformable in transverse section under the influence of pressure applied in opposite directions on diametrically opposite wall areas thereof respectively by said splice member and friction shoes.

6. The combination according to claim **5** wherein the lever mean holding each friction shoe in engagement with its associated sleeve member includes a rockable locking piece, and a screw threaded into one side of the splice member and bearing on one end of portion of said locking piece to rock the same and thereby bring the opposite end portion thereof to bear on said friction shoe.

7. The combination according to claim **6** wherein the locking piece is circular in transverse section and tapered toward each end from a maximum diameter at a section intermediate the ends thereof, and the end portion of the splice member is provided with a cylindrical bore for receiving said locking piece.

8. The combination according to claim **6** wherein the sections of the handrail are disposed in spaced relation thereby to expose a section of the splice member intermediate the opposite end portions thereof, and the screws that rock the locking pieces are threaded through the exposed portion of the splice member.

9. In a handrail structure, the combination comprising:

(a) a handrail, and

(b) a post including

(1) an upper post section connected to said handrail,

(2) a sleeve member slidably fitted over the lower end portion of said upper post section deformable in transverse section under the influence of pressure applied in opposite directions on diametrically opposite wall areas thereof,

(3) a lower post section having an upper end portion slidably fitted over said sleeve member, and

(4) means for frictionally locking together said upper and lower post sections including

(a) a friction shoe extending laterally through the wall of a hollow formed in the lower end portion of said upper post section, and

(b) means within said hollow holding said friction shoe firmly engaged with said sleeve member.

10. The combination according to claim **9** wherein the means holding the friction shoe in engagement with the sleeve member includes a rockable locking piece, and a screw threaded into one side of the upper post section and bearing on one end portion of said locking piece to rock the same and thereby bring the opposite end portion thereof to bear on said friction shoe.

11. The combination according to claim **10** wherein the locking piece is circular in transverse section and tapered toward each end from a maximum diameter at a section intermediate the ends thereof, and the lower end portion of the upper post section is provided with a cylindrical bore for receiving said locking piece.

12. The combination according to claim **10** wherein the screw threaded into the side of the upper post section is disposed above the sleeve member and the lower post section and thereby exposed for application of a tool thereto.

13. The invention of claim **4** wherein said lever means operatively holding each friction shoe engaged with its associated handrail section, comprises: a locking piece circular in transverse section and tapered toward each end from a maximum diameter at a section intermediate of the ends thereof; and a screw threaded into one side of the splice member and bearing on the tapered portion of one end of said locking piece to lock the same and thereby bring the tapered portion of the other end thereof to bear on said friction shoe.

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U.S. Cl. X.R.

256—70; 287—54