Feb. 17, 1959 R. R. McCORMICK 2,873,904

COLLAPSIBLE HANDRAIL

Filed Feb. 25, 1958 3 Sheets-Sheet 1

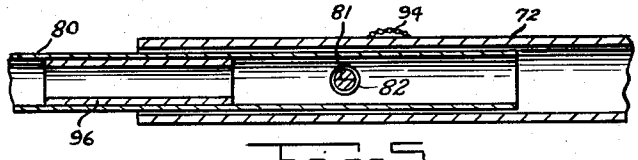


Fig-5

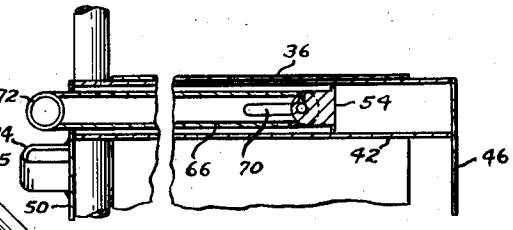


Fig-4

Fig-1

INVENTOR.
RONALD R. McCORMICK
BY
Wade Doouy
S. A. Strickland
ATTORNEYS

Feb. 17, 1959 R. R. McCORMICK 2,873,904

COLLAPSIBLE HANDRAIL

Filed Feb. 25, 1958 3 Sheets-Sheet 2

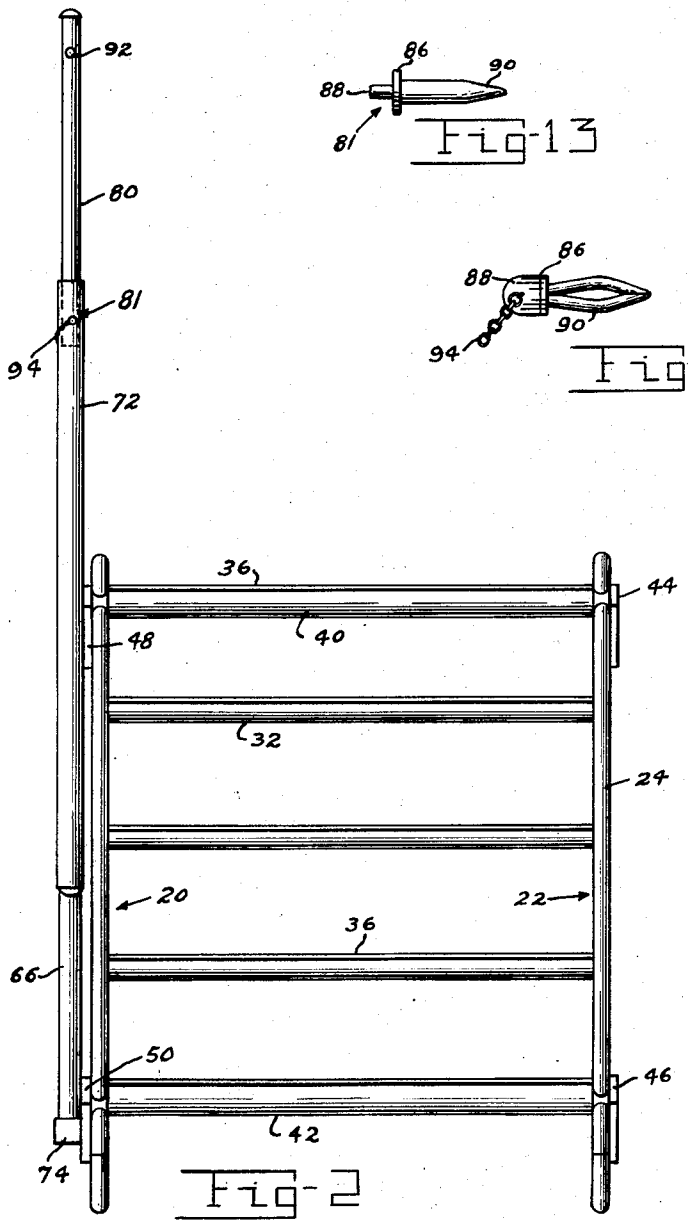


Fig-2

Fig-13

Fig-14

INVENTOR.
RONALD R. Mc CORMICK

BY Wade Kooney and S. A. Strickett
ATTORNEYS

Feb. 17, 1959 R. R. McCORMICK 2,873,904

COLLAPSIBLE HANDRAIL

Filed Feb. 25, 1958 3 Sheets-Sheet 3

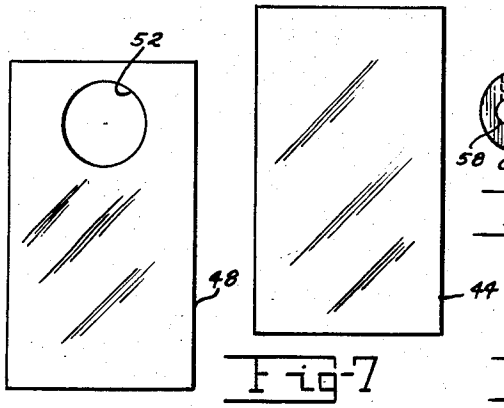


Fig-6

Fig-7

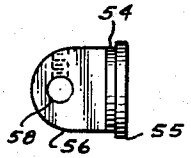


Fig-8

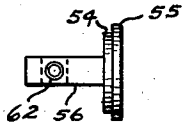


Fig-9



Fig-10

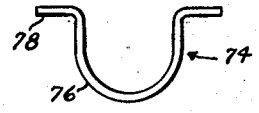


Fig-11

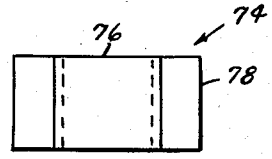


Fig-12

Fig-3

INVENTOR.
RONALD R. McCORMICK

BY Wade Kroontz
S. A. Strickler
ATTORNEYS

United States Patent Office 2,873,904
Patented Feb. 17, 1959

2,873,904

COLLAPSIBLE HANDRAIL

Ronald R. McCormick, Dallas, Tex.

Application February 25, 1958, Serial No. 717,535
7 Claims. (Cl. 228—67)
(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to a collapsible handrail and particularly to a collapsible self-storing handrail for use with portable stairs.

In the utilization of vehicles such as aircraft it is customary to provide portable stairs for the convenience of persons boarding the vehicle or introducing articles therein. Heretofore, it has been customary to provide such portable stairs with suitable handrails so that passengers may have the convenience of the same while entering the vehicles. However, when introducing bulky articles into the vehicles the handrails have proven to be of considerable annoyance so that it is customary to provide stairs both with and without handrails.

In the construction according to the present invention a handrail is mounted in and preferably constructed as part of the stairs and arranged to be extended into normal position for use as a handrail or stored within the stair structure to provide a clear space for the handling of articles on the stairs.

It is, accordingly, an object of the invention to provide an improved handrail.

It is still another object of the invention to provide a collapsible handrail substantially for storing in a stair structure.

It is a further object of the invention to provide a stairs having a handrail which may be collaped to decrease the storage space of the stairs.

It is a further object of the invention to provide an extensible handrail having reinforcement at the normally weaker points.

Other objects and advantages of the invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

Fig. 1 is a side elevation of a portable stair embodying the collapsible handrail according to the invention:

Fig. 2 is a front elevation of the stair with the handrail in extended position;

Fig. 3 is a cross sectional elevation taken substantially on the plane indicated by the section line 3—3 and showing the manner of anchoring the handrail in extended position;

Fig. 4 is a sectional elevation taken substantially on the plane indicated by the line 4—4 of Fig. 1 with parts broken away and in section showing the handrail in retracted stored position;

Fig. 5 is a longitudinal section through the extensible handrail taken substantially on the plane indicated by the line 5—5 of Fig. 1;

Fig. 6 is an enlarged plan view of an apertured stop member;

Fig. 7 is a similar view of an opposed stop member;

Fig. 8 is a side elevation of an anchor member;

Fig. 9 is a top plan view of the anchor member shown in Fig. 8;

Fig. 10 is a pivot pin for securing the rail standard to the anchor member;

Fig. 11 is an enlarged top plan view of a locking socket member;

Fig. 12 is a side elevation of the socket member;

Fig. 13 is an enlarged plan view of a friction fastening member; and

Fig. 14 is a side elevation of the fastening member.

In a construction according to the invention stair horses 20 and 22 are constructed of top and bottom tubular rails 24 and 26 spaced by tubular spacers 28. The side rails 24 and 26 are preferably angulated to provide ground engaging portions 30 and stop portions 32. The horses 20 and 22 are maintained in spaced relation by tubular spacers 32 and 34 on which are mounted suitable tread plates 36.

The handrail structure comprises enlarged tubular housing members 40 and 42 preferably placed adjacent the opposite ends of the stairs and replacing a pair of the tubular spacing members 32. The tubular housing members 40 and 42 extend through the top rails 24 of the horses 20 and 22 to provide oppositely exposed openings to the interior of the tubular members 40 and 42. Substantially solid stop plates 44 and 46 are placed on the ends of the tubular housing members 40 and 42 extending through the horse 22 and the plates 44 and 46 are preferably integrally connected to the horse 22. Stop members 48 and 50 are applied to the ends of the housing members 40 and 42 extending through the horse 20 and also are preferably rigidly secured to horse 20. The stop members 48 and 50 are provided with apertures 52 which provide communication with the interior of the housing members 40 and 42 with the apertures 52 being of smaller diameter than the internal diameter of the housing members 40 and 42. An anchor member 54 is slidably received in each of the housing members 40 and 42. The anchor member 54 has a flange 55 which will not pass through the aperture 52 but which is freely slidable within the housing member 40 or 42. Each of the anchors 54 is provided with an extending ear 56 which is of a dimension to pass through the aperture 52 so that it may extend outwardly past the stop plates 48 and 50. The ear 56 is provided with an aperture 58 for receiving a pivot pin 60 which may be secured in the aperture 58 by means of a suitable set screw 62. Rail standards 64 and 66 are each provided with a longitudinally extending slot 68 adjacent the lower end thereof and adapted to receive the ears 56. Also, the lower ends of the standards 64 and 66 are provided with longitudinally extending apertures 70 arranged substantially parallel to the slot 68 and positioned transversely of the standard with respect to the slot 68 and adapted to slidably and pivotally engage the pivot pin 60.

A tubular handrail 72 is rigidly secured on the top ends of the standards 64 and 66 and the handrail is rigidified by means of a socket 74 constructed as a substantially U-shaped member 76 having flanges 78 for rigid connection to the plates 48 and 50. These sockets 74 are mounted on the plates 48 and 50 immediately below the apertures 52 so that the standards 64 and 66 may be extended into the sockets because of the elongated apertures 70 engaging the pivot pins 60.

In order to extend the handrail 72 into the vicinity of the side of the vehicle an extension member 80, preferably tubular in construction, is telescopically received in the handrail 72 and may be extended therefrom to provide a substantial continuation thereof. In order to retain the extension 80 in extended relation a transverse fastening pin 81 is provided with a finger engaging portion 88 and a stop head 86 to which is connected the split body 90. Preferably the split body 90 is constructed of substantially resilient material so that it will remain in frictional engagement within the fastening aperture 82 to retain the extension 80 in fixed relation. The extension 80 is also preferably provided with an aperture 92 so that the extension 80 may be secured in retracted relation within the handrail 72. The chain 94 is preferably secured to

the pin 81 and to the handrail 72 to prevent loss of the fastening pin 81.

In order to prevent bending of the extension member adjacent to its point of emergence from the handrail 72 a reinforcing member 96 is secured within the extension 80 and extending a substantial distance each way from the point of emergence of the extension 80 from the rail 72 when the extension 80 is in the extended position.

In order to store the handrail 72 it is necessary to lift the standards 64 and 66 to disengage the lower ends from the sockets 74 so that the standards may be pivoted about the pivot pin 60 after which the standards 64 and 66 may be received in the housing 40 and 42.

For purposes of exemplification a preferred embodiment of the invention has been shown and described according to the best present understanding thereof. However, it will be apparent to those skilled in the art that various changes and modifications may be made in the construction and arrangements of the parts thereof without departing from the true spirit of the invention.

What is claimed is:

1. A boarding stairway comprising a pair of spaced apart tubular horses, tubular spacers secured between said horses, treads mounted on said spacers, anchor members slidably received in a pair of said spaced apart tubular spacers, stop plates secured to one of said horses and covering the ends of said tubular spacers receiving said anchor members, said stop plates having apertures communicating with the interior of said spacers, said apertures retaining said anchors in said tubular spacers, an ear on each of said anchors, said ears being of a size to extend through said apertures, a pivot pin in each of said ears, tubular standards, means on one end of each of said standards for slidably and pivotally connecting said standards to said pins, said standards being of a size capable of passing through said apertures, sockets on said stop plates adapted to receive the said ends of said standards, a handrail secured on said standards.

2. A boarding stairway comprising a pair of spaced apart tubular horses, tubular spacers secured between said horses, treads mounted on said spacers, anchor members slidably received in a pair of said spaced apart tubular spacers, stop plates secured to one of said horses and covering the ends of said tubular spacers receiving said anchor members, said stop plates having apertures communicating with the interior of said spacers, said apertures retaining said anchors in said tubular spacers, an ear on each of said anchors, said ears being of a size to extend through said apertures, a pivot pin in each of said ears, tubular standards, means on one end of each of said standards for slidably and pivotally connecting said standards to said pins, said standards being of a size capable of passing through said apertures, sockets on said top plates adapted to receive the said ends of said standards, a handrail secured on said standards, an extension member telescopingly received in said handrail and locking means for securing said extension member in fixed relation to said handrail.

3. In a portable stairs having longitudinally extending horses with spaced apart tubular spacers extending between the horses and tread members mounted on the tubular spacers, a collapsible handrail comprising a pair of anchor members slidably received in a pair of spaced apart tubular spacers, stop plates mounted on said horses and covering the ends of said pair of spaced apart tubular spacers, the stop plates on one of said horses having apertures communicating with the interior of said pair of tubular spacers, said stop plates retaining said anchor members in said tubular spacers, an ear on each of said anchors, said ears being of a size to extend through said apertures, a pair of standards, one end of each of said standards having a longitudinally extending slot at one end for receiving said ears, said standards having an elongated longitudinally extending aperture adjacent the end having said slots, said longitudinally extending apertures being positioned transversely relative to said slots, a pivot pin fixed in each of said ears and being slidably received in the respective longitudinally extending apertures, a socket on said stop plate adjacent to each of said apertures for receiving the said ends of said standards and a rail member fixed on the other ends of said standards.

4. For use with a stairs having longitudinally extending horses, a collapsible handrail assembly comprising a pair of tubular members adapted for mounting in parallel relation transversely of said stairs, an anchor slidably received in each of said tubular members, stop means retaining said anchors in said tubular members, said stop means having apertures communicating with the interior of said tubular members, an ear on each of said anchors, said ears being extensible through said apertures, a pair of standards, means pivotally and slidably mounting said standards on said ears, a socket mounted adjacent to each of said apertures and adapted to receive the pivoted ends of said standards and a rail member mounted on the other ends of said standards.

5. For use with a stairs having longitudinally extending horses, a collapsible handrail assembly comprising a pair of tubular members adapted for mounting in parallel relation transversely of said stairs, an anchor slidably received in each of said tubular members, stop means retaining said anchors in said tubular members, said stop means having apertures communicating with the interior of said tubular members, an ear on each of said members, said ears being extensible through said apertures, a pair of standards, means pivotally and slidably mounting said standards on said ears, a socket mounted adjacent to each of said apertures and adapted to receive the pivoted ends of said standards, a tubular rail member fixed on the other ends of said standards, a tubular extension member slidably received in said rail member, and a reinforcing member in said extension member encompassing the point of contact between said rail and said extension member when said extension member is in extended position.

6. For use with a stairs, a collapsible handrail assembly comprising a pair of tubular members adapted for mounting on said stairs transversely thereof, an anchor slidably received in each of said tubular members, stop means retaining said anchors in said tubular members, an extension member on each of said anchors, said extension members being extensible beyond the ends of said tubular members, a pair of standards, means pivotally and slidably mounting one end of each of said standards on said extension members, and a rail member mounted on the other ends of said standards.

7. For use with a stairs, a collapsible handrail assembly comprising a pair of tubular members adapted for mounting in spaced relation on said stairs, an anchor slidably received in each of said tubular members, stop means retaining said anchors in said tubular members, an extension member on each of said anchors, said extension members being extensible beyond the ends of said tubular members, a pair of standards, means pivotally and slidably mounting one end of each of said standards on said extension members and a rail member mounted on the other ends of said standards, said standards being of a size capable of being stored in said tubular members.

References Cited in the file of this patent

UNITED STATES PATENTS

396,886	Meisel	Jan. 29, 1889
961,357	Ketelsen	June 14, 1910
1,343,094	Sims	June 8, 1920
1,993,437	Ferguson	Mar. 5, 1935
2,010,588	Gooden	Aug. 6, 1935
2,594,926	Hoffman	Apr. 29, 1952
2,666,217	Stuart	Jan. 19, 1954
2,827,016	Jenkins	Mar. 18, 1958