Jan. 27, 1959 H. M. HELT 2,870,996

KNOCKDOWN ADJUSTABLE RAILING

Filed June 6, 1957 2 Sheets-Sheet 1

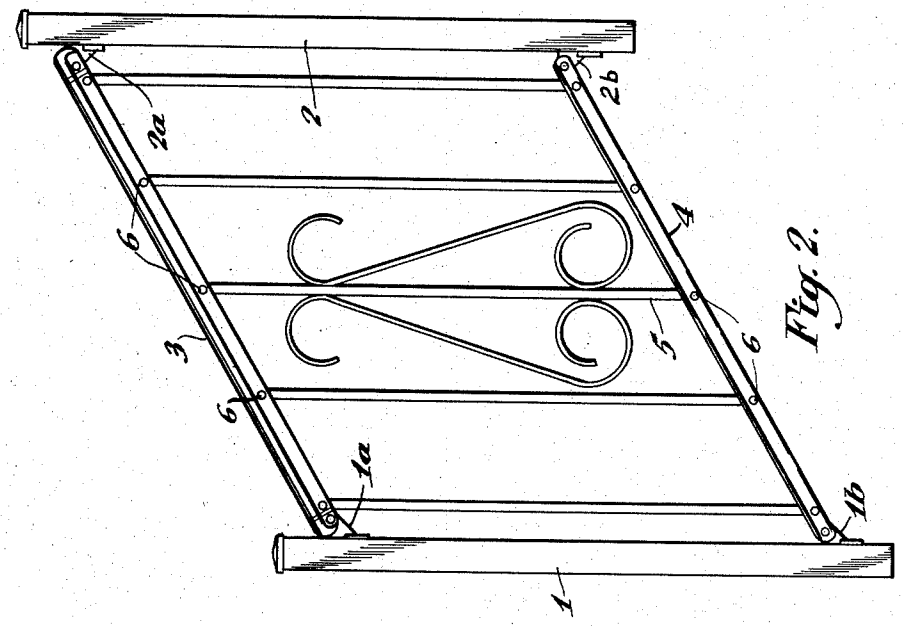


Fig. 2.

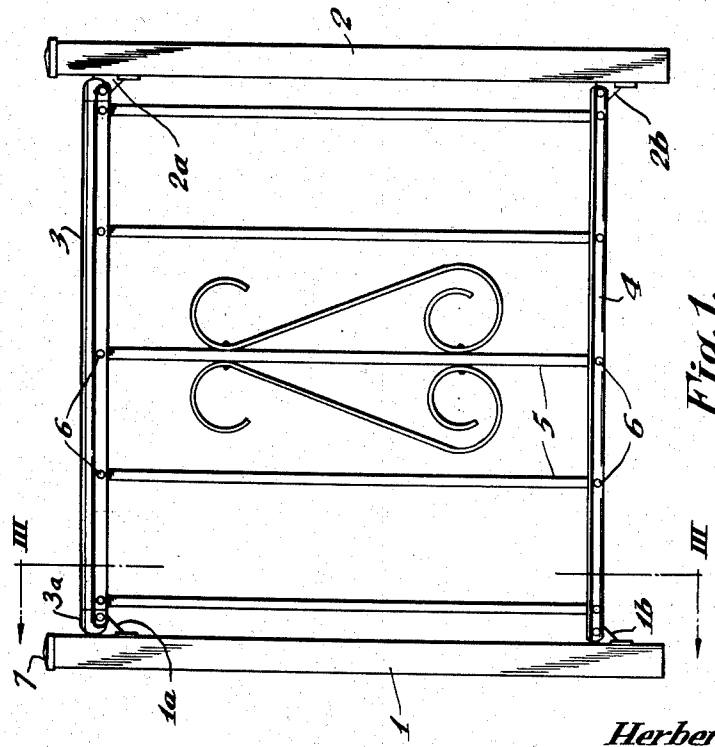


Fig. 1.

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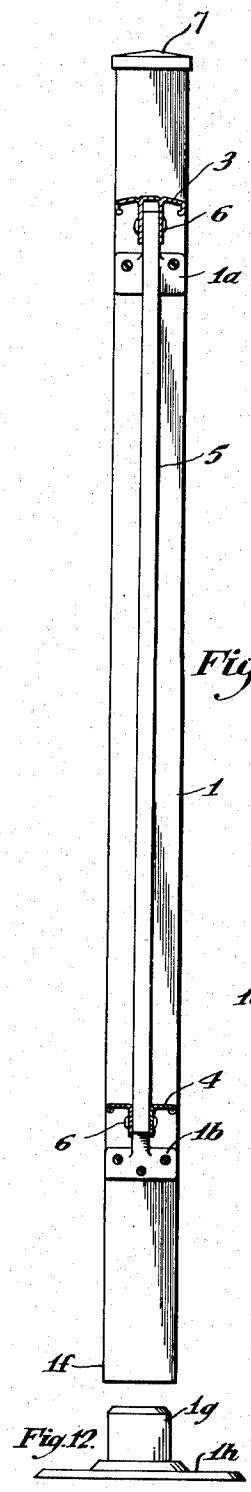


Fig. 3.

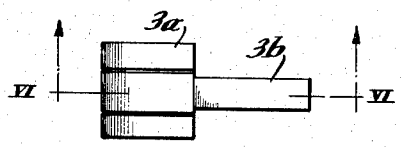


Fig. 4.

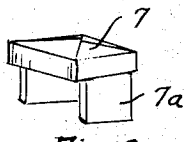


Fig 13

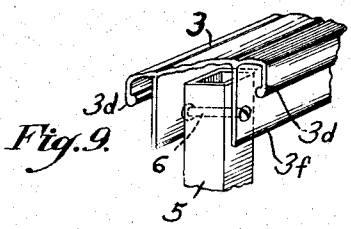


Fig. 9.

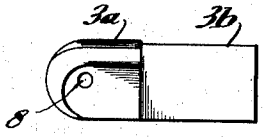


Fig. 5.

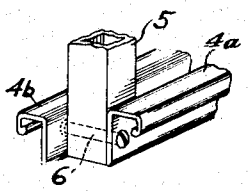


Fig. 10.

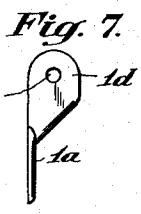


Fig. 7.

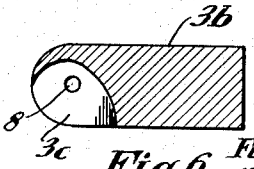


Fig. 6.

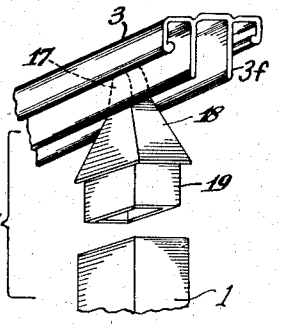


Fig. 11

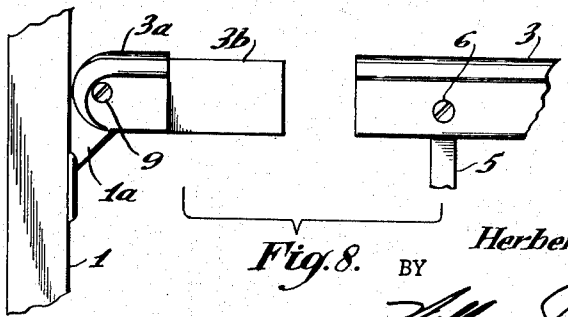


Fig. 8.

Fig. 12.

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KNOCKDOWN ADJUSTABLE RAILING

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3 Claims. (Cl. 256—22)

This invention relates to a railing and, more particularly, to an extruded, knockdown, metal railing which may be readily built up in selective lengths and automatically adjusted for any slope of steps.

An outstanding disadvantage of conventional metal railings is that units of substantial size must be built or welded together at the factory and they must be made to order for particular jobs, thereby necessitating stocking of numerous lengths of railing and railing of various slopes or angularities to suit different installations. This not only requires a considerable inventory or stock of widely different railing units but poses a shipping and transportation problem because of the large sizes of these units, thus results in high manufacturing cost.

An object of the present invention is to provide a novel metal railing which is devoid of the above named disadvantages and which may be built from simple and inexpensive, knockdown elements of relatively small size and weight, and which may be very easily and quickly assembled by an unskilled person at the building site, such as a home owner.

Another object of the invention is to provide an extruded aluminum railing having pivotally connected parts of inexpensive construction which allow adjustability in the angle of inclination of the railing so as to adapt the railing for use alongside steps of different slopes.

A further object of the invention is to provide a railing which may be built up from a minimum number of standard parts, some of which are interchangeable, and including modular sections, whereby a railing of variable length and slope may be easily and quickly put together at the home site.

Other objects and advantages of the invention will become more apparent from a study of the following specification taken with the accompanying drawings wherein;

Figure 1 is a side elevational view of a railing embodying the present invention, such as used on horizontal surfaces including sidewalks, patios etc.

Figure 2 is a view similar to Fig. 1 showing the railing of Fig. 1 after it has been pivotally moved to the inclined position for use as a stair railing.

Figure 3 is an enlarged, cross-sectional view taken along line III—III of Fig. 1

Figure 4 is a top view of the end knob shown at the upper left hand corner of Fig. 1

Figure 5 is an enlarged, elevational view of the end knob shown in Fig. 4

Figure 6 is a vertical, cross-sectional view taken along line VI—VI of Fig. 4

Figure 7 is an enlarged, elevational view of the rail end bracket 1*a* shown in Fig. 1

Figure 8 is an enlarged, fragmentary, exploded view, in elevation, showing the telescoping parts at the upper left hand corner of Figs. 1 and 2

Figure 9 is an enlarged, fragmentary, perspective view of the top rail, showing its pivotal connection to the top end of a spindle 5.

Figure 10 is a similar view of the bottom rail, showing its pivotal connection to the bottom end of a spindle 5.

Figure 11 is an enlarged, fragmentary perspective view of a cross-over cap interfitting the top rail.

Figure 12 is an elevational view of the detachable post base or floor flange, and

Figure 13 is an enlarged, perspective view showing the detachable post cap 7.

Referring more particularly to Figs. 1 and 2 of the drawings, numerals 1 and 2 denote vertically extending posts, preferably of hollow tubular construction and extruded metal, such as aluminum. Adjacent the top and bottom portions of posts 1 and 2 are mounted, by means of machine screws or other suitable fastening means, rail end brackets 1*a*, 1*b*, 2*a* and 2*b*. As shown more clearly in Fig. 7, rail end bracket 1*a* is provided with a flange 1*d*, at right angles to its bottom portion, which has a hole 1*e* to provide a pivotal connection with end knob 3*a*, shown more clearly in Figs. 4, 5 and 6. Flange 1*d* is fitted into a central, vertical groove 3*c* (see Fig. 6) in the end knob. A binding bolt 6 is inserted through holes 1*e* and 8 to provide a pivotal connection, whereby the end knob may be adjustably pivoted relative to the end bracket to enable adjustment of the slope or inclination of the railing to match different slopes of steps.

End knob 3*a*, which is of gracefully curved formation, is provided with a flange or extension 3*b* which is telescopically fitted between the vertically downwardly extending flanges 3*b* of top rail 3 and is lower in height than the top portion of the knob by the thickness of the top rail, whereby the top surfaces of knob 3*a* and rail 3 will be flush when the parts are telescoped together so as to provide an apparently continuous element. A similar end knob is provided at the opposite end of the top rail 3.

Figure 8 shows the telescoping parts of the top rail in the separated position.

A plurality of vertically extending tubular spindles 5 are provided in spaced, parallel relationship, the top ends of which are pivotally connected to the top rail 3 as shown in Fig. 9 and the bottom ends of which are pivotally connected to the bottom rail 4, the latter comprising rail sections 4*a* and 4*b*, as shown more clearly in Fig. 10. Thus there is provided a parallelogram linkage which enables the rail to be adjustably inclined from the horizontal position shown in Fig. 1, to that shown in Fig. 2, or to positions of lesser or greater angularity than that shown in Fig. 2. This enables the same railing shown in Fig. 1 to be used on steps of any slope or inclination. It also permits further collapsing of the railing to facilitate packing and shipping in relatively small cartons. Of course, the parts can be completely disassembled so as to fit into an even smaller carton, thus further facilitating packing and shipping.

For horizontal railing sections, end knobs 3*a* etc. may be omitted and the ends of the top and bottom rails may be bolted to the brackets 1*a*, 1*b* etc.

As shown more clearly in Figs. 9 and 10, the top rail 3 comprises an extruded aluminum section having downwardly extending end flanges which conceal the pivotal joints, when viewed from above, and add ornamentation as well as strength and which terminate in inward extending beads 3*d*. A binding bolt 6 is extended through registering holes formed in the central, downwardly extending flanges 3*f* of the top rail and through opposite sides of spindle 5, so as to pivotally connect, in an adjustable manner, the top rail and the various spindles 5. Similar pivotal connections are provided at the tops of the remaining spindles 5.

As shown more clearly in Fig. 10, the bottom rail 4

is made up of two horizontally spaced sections *4a* and *4b* of angular cross-section, having outwardly extending and flanges which conceal bolts **6**, and having downwardly extending inner flanges provided with registering holes through which a pivotal binding bolt **6** extends, also through registering holes in opposite sides of the bottom portion of spindle **5**. Thus the bottom rail **4** may be adjustably pivoted to any desired angle with respect to spindles **5**, the latter always remaining vertical.

Fig. 11 shows a modified connection between the top rail **3** and the top end of post **1**, which is devoid of a pivotal connection. Between the top rail **3** and the top end of post **1**, there is provided a cross over cap **18** fitted to post **1** by sleeve **19** and which has a top extension **17** of reduced width fitted closely between the central flanges *3f* of rail **3**, and having rounded shoulders on which said central flanges *3f* rest for rocking movement of the top rail **3** through a wide range of angular positions relative to spindle **5**.

Figure 12 shows a post base or floor flange *1h* having a vertical extension *1g* of tubular construction which telescopically fits into the bottom portion of the tubular post **1**.

Figure 13 shows a detachable post cap **7** having opposite, downwardly extending flanges *7a* which telescope into the open top portion of post **1**. Thus post caps or bases of other designs or ornamentation may be interchangeably fitted into the top and bottom openings of the posts **1** and **2**.

It will be noted that the length of the railing may be varied by providing different lengths of top and bottom rails, or by adding a number of modular units, end to end. Also the railing, when used alongside steps, may be automatically adjusted or pivotally moved to correspond to any slope of steps. The only variable will be the length. On porches, patios and the like, certain railing sections such as shown in Fig. 1 may be used around the perimeter while others may be inclined, as shown in Fig. 2, and used as stair railings, thus providing an amazing degree of flexibility of use.

Thus it will be seen that I have provided an efficient, knockdown railing of any suitable material, preferably of extruded aluminum, which may be easily and quickly assembled by an unskilled person, such as the average home owner, and built up into selective lengths and inclined to selective angles for use around porches, patios and the like and as a stair rail; furthermore I have provided a railing comprising a minimum number of relatively simple and inexpensive parts which are extremely light, yet which provide an exceedingly strong railing having relatively long life, also which is extremely attractive and pleasing to the eye; furthermore I have provided a metal railing having end pivotal connections for the top and bottom rails which avoid the necessity of cutting the ends at an angle, and which provides a finished and graceful appearance.

While I have illustrated and described a single specific embodiment of my invention, it will be understood that this is by way of illustration only, and that various changes and modifications may be made within the contemplation of my invention and within the scope of the following claims.

I claim:

1. An adjustable pitch railing structure comprising a pair of vertical end posts, longitudinally extending top and bottom rails of extruded metal extending between said posts, a plurality of parallel, vertical spindles extending between said rails, the top ends of said spindles being spaced from the bottom surface of said top rail adapted for relative tilting movement, said top rail having downwardly extending, longitudinal flanges abutting opposite sides of the top end portions of said spindles, said top rail having downwardly turned edge portions, said longitudinal flanges and abutting opposite sides of said top end portions having registering holes, a plurality of bolts extending through said registering holes and providing pivots for relative pivotal movement of said top rail and spindles, said bottom rail comprising two separate, spaced, extruded rail sections of angular cross section abutting opposite sides of the bottom portions of said spindles and being pivotally connected thereto, end brackets secured to top and bottom portions of said end posts, and pivotal means for pivotally connecting the ends of said top and bottom rails to said brackets, whereby said top and bottom rails, end posts and spindles provide a pivotally movable parallelogram linkage so as to enable selective adjustment of the pitch of said railing structure.

2. A railing structure as recited in claim 1 wherein said pivotal means includes end portions telescopically fitted into the end openings of said top and bottom rails.

3. A railing structure as recited in claim 1 wherein said vertical end posts are tubular and of rectangular cross section and include removable caps having parallel, downwardly extending flanges slip-fitted inside the top portion of said end posts.

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