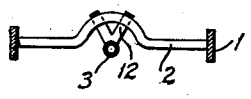
Jan. 23, 1945. G. M. MARSH 2,368,081

SAFETY LADDER

Filed Aug. 30, 1943

Fig.2



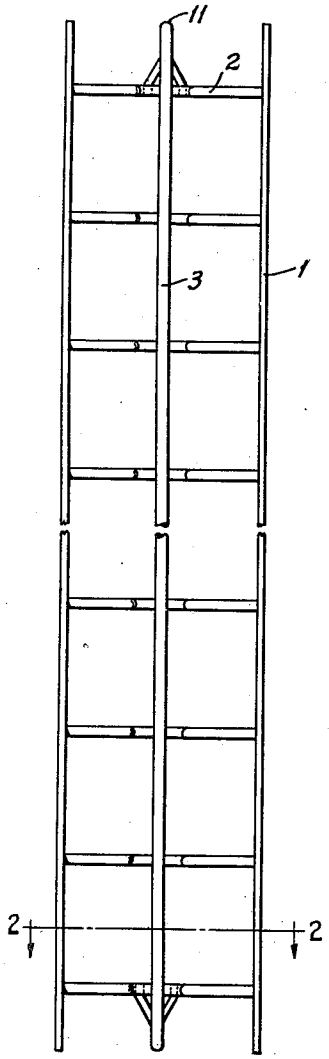


Fig.1

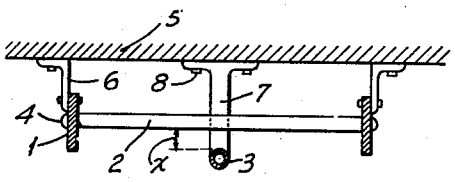


Fig.3

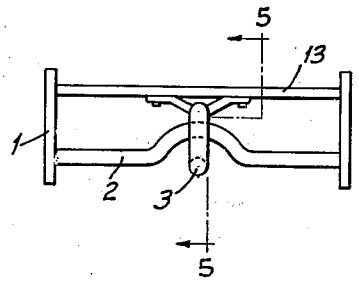


Fig.4

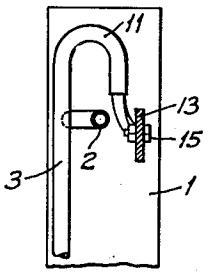


Fig.5

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SAFETY LADDER

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Application August 30, 1943, Serial No. 500,516

4 Claims. (Cl. 228—67)

This invention relates to ladders, particularly to vertical ladders such as ladders on ships which are secured to bulkheads or the sides of hatches, also to fire escape ladders, and others where persons carrying materials or through lack of experience are in danger of falling; and the invention has for its object the provision of a special hand rail to make the use of such ladders safer.

Particular features and advantages of the invention will appear in the following description and accompanying drawing.

In the drawing,

Fig. 1 is a front view of a ladder equipped with my safety rail improvement.

Fig. 2 is a cross sectional view, the plane of section being indicated by the line 2—2 of Fig. 1.

Fig. 3 is a cross section of a modified form of my safety rail and ladder combination.

Fig. 4 is a plan view of the upper end of a ladder equipped with my safety rail showing an optional way of securing it by use of a special supporting rung.

Figure 5 is a vertical sectional view, the plane of section being indicated by the line 5—5 of Figure 4.

Before describing the invention I may state that I am well aware of the use of hand rails on stairways and on angularly positioned semi-ladders, i. e., with broad treads like those used from the bridge on shipboard, also angularly disposed fire-escape ladders, but on vertically disposed ladders such as those fastened to the walls of vertical shafts in ships' hatches, or vertical fire-escape ladders or painter's ladders hand rails are not used as the user of such ladders is supposed to grasp the rungs above or grasp the ladder side rails to keep from falling.

However, with the present rapid construction of ships and the general use of the vertical hatch ladders for thousands of workmen climbing these ladders in three shifts daily, many accidents occur, especially since the side rails of such ladders are of sharp cornered angular steel with supporting brackets riveted or roughly welded to them at many points. The rungs are generally of square steel set at an angle to bring a sharp corner uppermost, and are soon covered with grease and dirt from the mass of workers' shoes so that a good grip on them is almost impossible.

Besides the above dangers, the fact that in a large ship the hatch ladders extend vertically for about seventy feet adds to the danger that a slippery grip on a dirty and greasy rung will cause a plunge to the bottom. These hatch ladders are generally in individually sealed vertical chutes or hatches each about 2' 6" wide by 3' 0" long and with a water-tight door from each deck, tho some only have one entrance at the bottom.

It was due to the constant danger in the daily use of these ladders by the shipworkers that I devised a special hand-rail which greatly minimizes the dangers pointed out. This special hand-rail can be grasped by at least one hand of the climber, who need not let go of it for at least the height of one or two, or perhaps three decks, or for as long a distance as the stiffness of the rail permits the absence of intermediate hand-rail supports. Preferably this special hand-rail is located in the middle of the ladder between its regular side rails so that the feet of the climber are disposed on opposite sides of the special hand-rail. The hand-rail should be as close to the rungs as will still provide liberal clearance for a person's hand when sliding it along the rail without having to let go at any time, except when the end of the ladder or a support for the rail is reached. Such a safety rail permits a worker to loop his belt under it, and then use both hands to carry a load without danger of falling. Preferably such a safety rail is kept within the total thickness of the ladder; and this is easily done by having the ladder rungs bodily offset rearwardly under the safety rail as shown in Figs. 1 and 4 of the drawing.

In all figures of the drawing the ladder sides or side-rails are designated 1, the rungs 2, and the safety hand-rail 3. The side rails are generally of flat steel or steel angle bars; and the rungs of square or round steel are generally welded to the side rails or immovably headed over as at 4, Fig. 3. The side rails of vertical ladders are generally spaced outwardly from the wall or bulkhead 5 by angle iron brackets 6, or by any other means to provide sufficient toe clearance.

If the ladder has straight rungs 2 as shown in Fig. 3, the safety rail 3 may be centrally located between the side rails 1 and spaced outwardly a distance X of about two or three inches so that a hand grasping the safety rail can slide along it past the rungs. The safety rail is supported at its extreme ends by a bracket or integral foot connection 7, secured to the bulkhead 5 by bolts 8. It is desirable that the safety rail be as stiff as possible to prevent too much deflection in long unsupported runs, and while it may be solid metal or any other suitable material, and of any cross section, I prefer it to be made of pipe with a rust-proof metal exterior or enameled, and that it be filled with any suitable cement, plaster or other rigid mixture to make it as rigid as pos-

sible. A wooden rod forced into the pipe will greatly aid in contributing rigidity.

In the showing of Figs. 1 and 2 each rung 2 is formed with a rearwardly bent offset 10 in its center to give hand clearance under the safety rail 3 yet permit it to be placed close to the plane of the ladder rungs, and thus keep the safety rail within the total thickness of the ladder. This is an important point in shipping and storing such ladders before installing.

In Figs. 1 and 2 the safety rail 3 is about the same length overall as the ladder side rails 1 so that the ladder can be used as a separate ladder for any purpose. Each end of the safety rail is preferably curved backward in a goose neck 11 and bifurcated in terminals 12 secured to the adjacent rung on or near its offset portion 10.

Instead of securing the upper and lower goose neck of the safety rail to the upper and lower rungs of the ladder as shown in Figs. 1 and 2, a separate and larger or flat rung 13 may be provided, as shown in Figs. 4 and 5 back of the first and last ladder rung with its upper edge in line therewith so as not to interfere with the climber's toes. The rear end of the goose neck 11 is provided with bifurcated arms 14, secured by bolts 15 or by rivets or welding to the special rungs 13 as indicated.

I claim:

1. A ladder provided with a longitudinally extending substantially rigid hand rail positioned between the side rails of the ladder relatively close to the outer surface of the rungs of the ladder while preserving sufficient clearance for a climber's hand to clear the rungs while grasping the underside of the rail.

2. A ladder comprising side rails, rungs connecting the side rails and having rearwardly offset portions intermediate their ends, and a safety rail fixed with reference to the ladder and extending longitudinally thereof between the side rails and adjacent the offset portions, whereby a climber's hand grasping the safety rail clears the rungs.

3. A ladder comprising side rails, a safety rail extending longitudinally of the ladder and fixed between the side rails and substantially in their plane, and rungs connecting the side rails and having portions offset rearwardly to clear the safety rail.

4. A ladder comprising side rails, a safety rail extending longitudinally of the ladder between the side rails, rungs connecting the side rails and having portions offset rearwardly to clear the safety rail, and means including end rungs of the ladder for fixing the position of the safety rail relative to the side rails.

GERALD M. MARSH.