

April 10, 1951

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FIRE ESCAPE LADDER  
Filed May 24, 1946

2,548,843

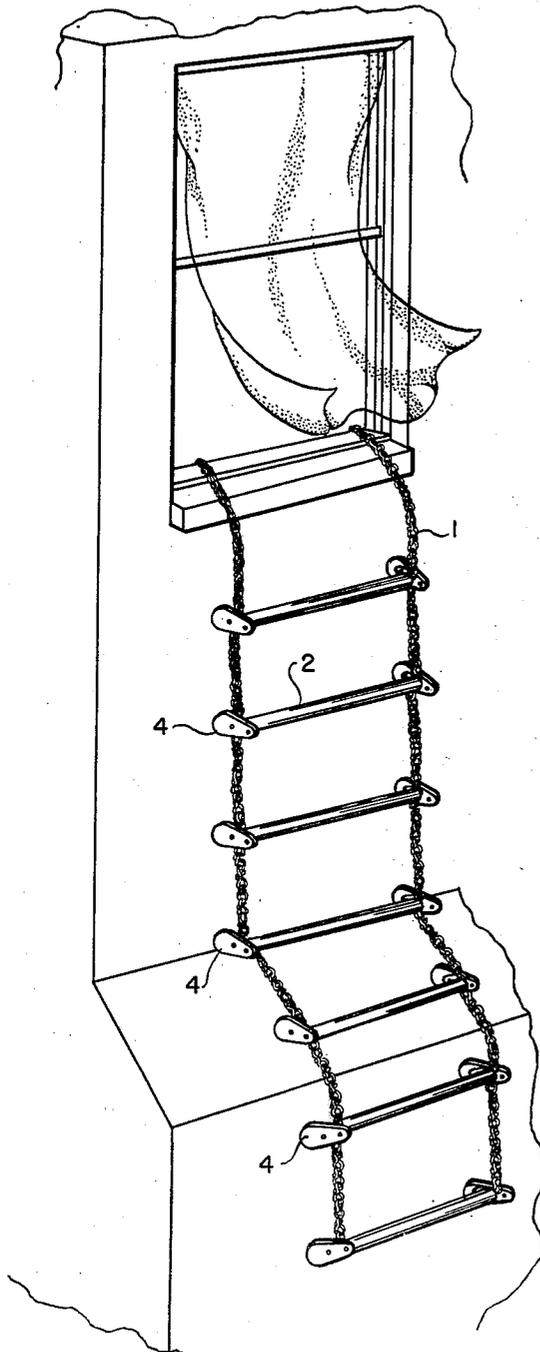


FIG. 1

FIG. 2

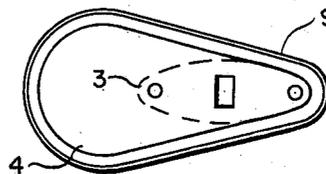


FIG. 3

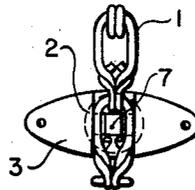
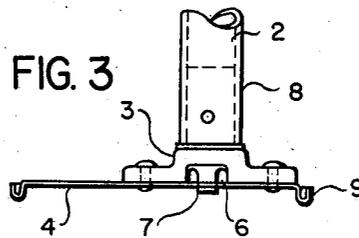


FIG. 4

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# UNITED STATES PATENT OFFICE

2,548,843

## FIRE ESCAPE LADDER

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Application May 24, 1946, Serial No. 671,931

4 Claims. (Cl. 228-40)

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My invention relates to fire escape ladders and especially such ladders as will provide the minimum danger of accident or loss of life in the use thereof, it being understood that the ladder must furnish means of descending from a point some distance from the ground to the ground or a similar point of safety and it is to be remembered that persons using such means of escape from a fire or similar emergency are necessarily under considerable excitement or strain.

One of the main objects of the invention is to insure that the user of the ladder will have the most desirable foot and hand hold in all situations that are commonly met with. To that end the design presents sufficient clearance between a vertical wall and the rungs to give the proper foot hold on the rungs and likewise furnishes the proper hold, if there is an obstructing flat or inclined surface.

Another object is to make the construction of parts suitable for storing in a room or similar place, and yet sufficiently and inexpensive to meet the requirements of the user. It must also be capable of being suspended from one fixed point with the maximum of speed and minimum of danger of disarrangement.

Other objects and advantages will be in part indicated in the following description and in part rendered apparent therefrom in connection with the annexed drawing.

To enable others skilled in the art so fully to apprehend the underlying features hereof that they may embody the same in the various ways contemplated by this invention, drawings depicting a preferred typical construction have been annexed as a part of this disclosure and, in such drawings, like characters of reference denote corresponding parts throughout all the views, of which:

Figure 1 is an elevation of the fire escape ladder supported from a window; Figure 2 is a detail view of a spacer showing an end of a connector in dotted lines; Figure 3 is a detail showing a rung broken away, the rung, connector and spacer being assembled together; Figure 4 is a detail view showing a link having its body portion retain the socket of a connector of metal.

Referring to Figure 1 there is shown said ladder, extending from a window. The chains for supporting the rungs are marked 1, the rungs being indicated by 2 and the ladder is shown extending downwardly adjacent to a vertical wall and its lower part contacting an obstructing sloping flat surface such as a roof.

In Figures 1, 2 and 3 the spacers are marked 4.

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In Figure 3 and in dotted line in Figure 2 the connector is indicated by 3. In Figure 3 the connector 3 is shown having one end formed with a socket 6 for a link of chain 1 and a lug 7 which projects through an opening in the spacer 4 and the spacer is rigidly secured to said connector by rivets thereby clamping the body portions of the link to the connector. The square shaped lug (Figs. 3 and 4) projecting from the connector at a point intermediate the grooves 6 extends through the square shaped opening in spacer 4 shown in Fig. 2 fitting closely therein as indicated in Fig. 4. When the spacer is secured to the connector by bolts or rivets, (Fig. 3) the link is trapped entirely within the connector 3 and the spacer 4 is anchored against turning and twisting at that point and is secured at two other points to the connector, the central point of application being intermediate the two arms of the link and in line with the axis of the connector, thereby insuring that no rocking of the spacer can occur. The other end of said connector is formed with a tubular bearing 8 and the rung 2 is shown rigidly secured on said tubular bearing.

Figure 4 discloses clearly the body position of a link secured to said connector with its free ends projecting beyond said connector and having adjacent links plially secured thereto.

The spacers are preferably shaped and mounted in a way to give them a dual function i. e. that of spacing the rungs from any vertical walls and also spacing them above the roof or flat sloping surface of any obstructing building or structure to enable persons to secure the proper hold by foot or hand. To that end the spacers are somewhat elongated and ovate shaped and by that is meant that they project some distance and increase in width or breadth from the point of attachment. Having the body portion of the link clamped to a connector with the free ends of the link projecting beyond the connector, insures that there will be flexibility of the chain at that point which together with the proper shaping of the spacer insures that the rung will be slightly raised from any obstructing horizontal or flat surface. For that purpose the dimensions of said spacer are preferably about  $\frac{3}{4}$  inch wide at point of attachment and  $2\frac{3}{8}$ " at widest part of the opposite end and  $4\frac{1}{2}$ " in length. The outer periphery of the spacer is rolled as shown in Figure 3.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt it for various utilizations by retaining one

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or more of the features that, from the standpoint of the prior art, fairly constitute essential characteristics of either the generic or specific aspects of this invention and, therefore, such adaptations should be, and are intended to be, comprehended within the meaning and range of equivalency in the following claims.

I claim:

1. In a fire escape ladder comprising flexible metal chains having elongated links, metal rungs and flat, substantially ovate spacers having reduced ends, a single detachable connector having a body portion with a cylindrical bearing for the rung projecting from said body portion, seats formed integrally with said body portion for enclosing the shanks of a link, the ends of the links being flexibly secured to other links, a solid lug projecting outwardly from said connector for anchoring a spacer at its reduced end transversely to said rung and wings or arms furnishing bearing surfaces for a spacer projecting from said connector and capable of supporting fastening means for securing the connector to the spacers whereby the spacers are held against undesirable rocking.

2. In a fire escape ladder comprising flexible metal chains having elongated links, metal rungs and flat, substantially ovate spacers having reduced ends, a single detachable connector having a body portion with a cylindrical bearing projecting from said body portion for fastening a rung to said connector, seats formed integrally with said body portion for enclosing and rigidly securing the shanks of a link, a solid square-shaped lug projecting outwardly of said connector for anchoring the reduced ends of said spacer to said attachment transversely to said rungs, and wings or arms projecting from said body portion furnishing bearing surfaces for said spacers and supporting fastening means for securing said connector and spacer, the projecting wings assisting in giving stability to the spacers.

3. A fire escape ladder comprising metal chains with elongated links, rungs and substantially flat and ovate metal spacers in combination with a unitary, one piece attachment or connector for distributing the strains caused by forces exerted on the rungs, the rungs being rigidly secured to said attachment, seats formed in the body portion

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of said attachment beyond the ends of the rungs for enclosing and anchoring the links within same, a square-shaped lug integral with said attachment capable of fitting within a square hole in said spacer near its reduced end for anchoring the spacer to said attachment, wings or arms integrally formed as part of said attachment forming bearing surfaces for said spacer, the projecting wings assisting in resisting any sudden movements of the rung or link, thereby distributing the strains exerted upon said spacer over a sufficient area to prevent undesired rocking of said spacers.

4. In a fire escape ladder comprising a pair of flexible metal chains with elongated links, metal rungs, and substantially oval-shaped spacers having the figure of the longitudinal section of an egg eccentrically mounted on said chains in combination with a one piece attachment or connection having a plurality of bearing surfaces for said links, rungs and spacers, including seats for enclosing the shanks of a link and including a square-shaped lug integrally formed from said connector capable of fitting within a square-shaped opening in said spacer for rigidly holding said spacer in axial alignment with said rung, said connector having wings projecting from its periphery for furnishing an additional bearing for said spacers and fastening means securing said spacers to said wings, the wings assisting in resisting any sudden movements of the rung or links, thereby preventing undesirable rocking of said spacers, the spacers having a minimum of contact with a wall.

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