Dec. 26, 1950 W. D. McKINLEY 2,535,544

SAFETY LADDER

Filed Jan. 9, 1948 2 Sheets-Sheet 1

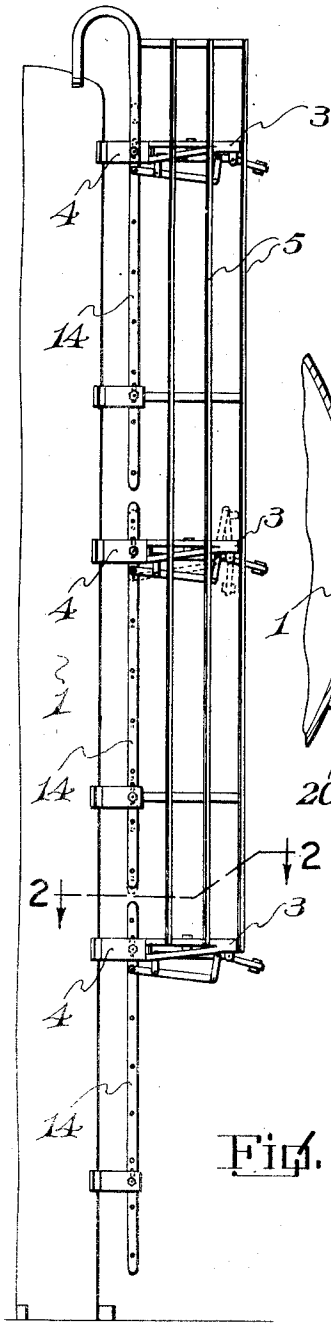


Fig. 1

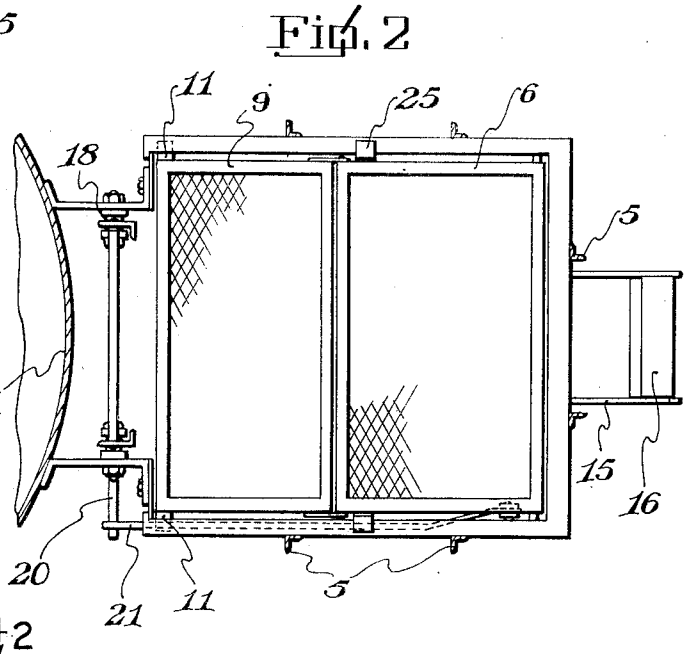


Fig. 2

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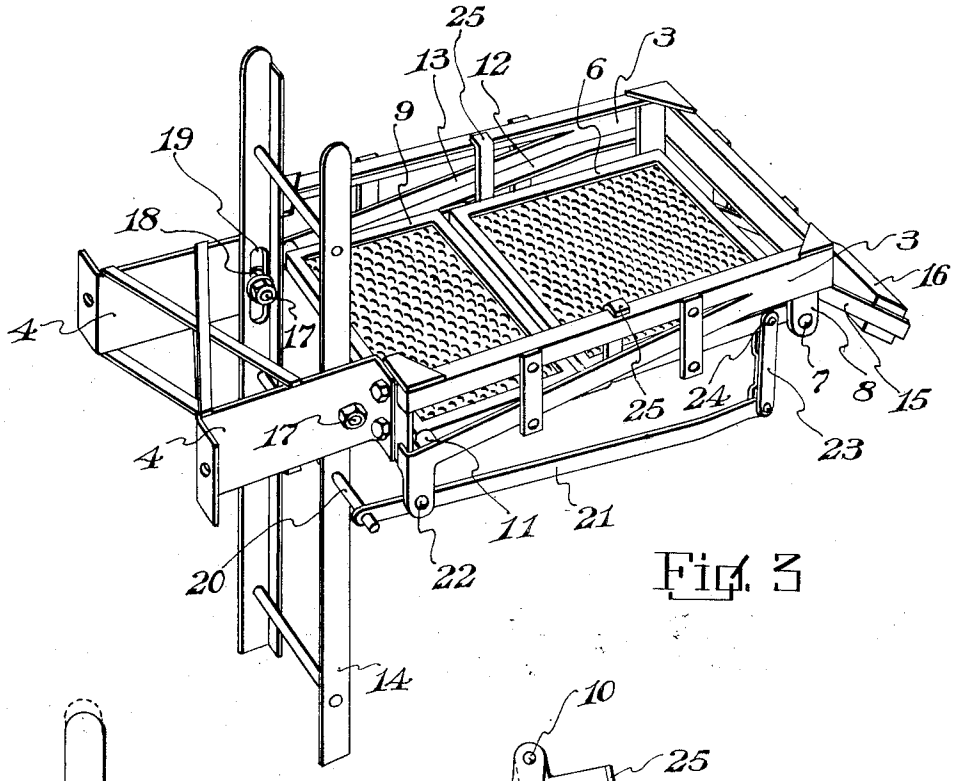


Fig. 3

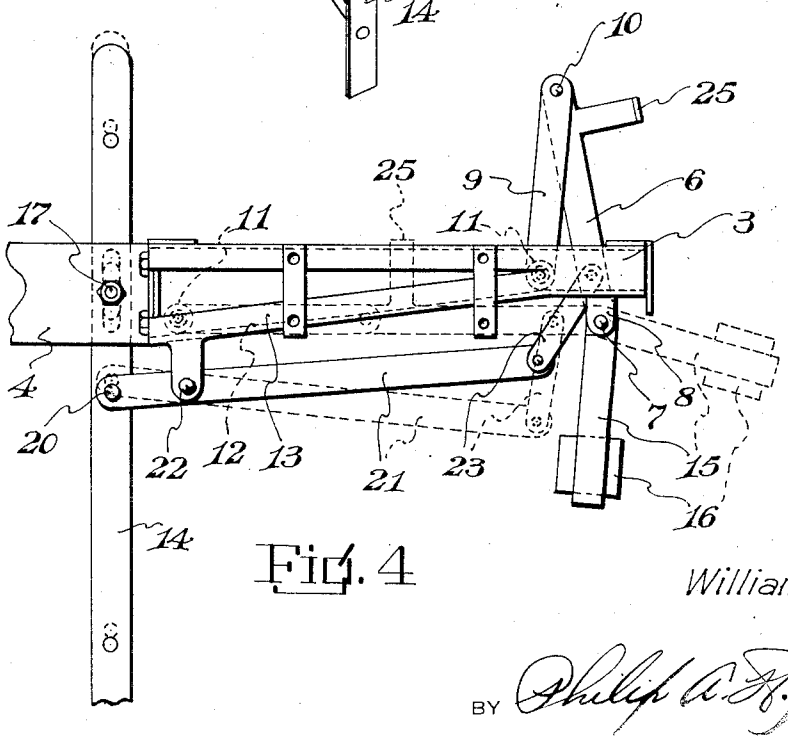


Fig. 4

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SAFETY LADDER

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7 Claims. (Cl. 228—45)

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The invention relates to safety ladders, particularly adapted for use in connection with bubble towers, derricks, cooling towers, and tall refinery vessels, which often require top inspection, and during which inspection, the inspector is subjected to gas and chemical fumes, which frequently cause fainting spells.

A further object is to provide a safety ladder having a platform intermediate its ends, and which platform is automatically opened by the weight of the operator on the ladder, and automatically closed when the operator's weight is relieved from the ladder, after the operator passed through the open platform.

A further object is to provide a safety ladder comprising a plurality of ladder sections, upwardly and downwardly slidable in stationary platform frames, the ladder sections being connected to movable platforms, which platforms are successively operated to open position as the operator ascends the ladder sections or descends the ladder sections.

A further object is to provide the platform sections with counterweight means, balanced against the weight of the ladder sections, so the ladders will be maintained raised until the weight of the climber is added thereto, and the additional weight of the climber added to the ladder weight and counterweight opening the platform.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawings, described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:

Figure 1 is a side elevation of the safety ladder, showing the same applied to one side of the bubble tower,

Figure 2 is a horizontal sectional view taken on line 2—2 of Figure 1.

Figure 3 is a perspective view of one of the platforms, showing the same in closed position.

Figure 4 is a side elevation of one of the platforms, showing the same in open position in full line.

Referring to the drawings, the numeral 1 designates the side of a conventional form of bubble tower, and secured to said tower at spaced positions are horizontally disposed platform frames 3 which are stationary at all times. The rear ends of the platforms are secured to the bubble tower by brackets 4, and the frames are substantially oblong in shape and formed from structural shapes. Each frame is preferably connected together by vertical structural bars 5 to form a cage arrangement, in case the climber falls. If the climber falls between either platform, the one immediately below will prevent his further falling, and as the platforms are preferably placed from ten to sixteen feet apart, in most cases series injury is obviated, however the inventor would not be limited in this respect.

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Disposed within the platform frames are foldable platforms formed from outer hinged sections 6, hingedly connected at 7 to downwardly extending lugs 8 carried by the opposite sides of the frames 3, and inner hinged sections 9, which are hingedly connected at 10 to the free ends of the outer sections 6. The free ends of the inner platform sections 9 are provided with rollers 11 which move over the trackways 12 on the inner sides of the side members 13 of each frame. Trackways 12, preferably, incline downwardly and inwardly towards the ladder sections 14. Extending outwardly and downwardly from the hinged ends of the platform frames 6 are counterweight supporting arms 15 having a counterweight 16 therebetween. The counterweight 16 is not sufficient to raise the platform sections 6 and 9 from their horizontal or near horizontal position until the weight of the climber is added to the weight of the ladder section 14, hence it will be seen that the platforms are normally in closed position as shown in Figure 3.

When the weight of the operator is added to the weight of the ladder sections the platform sections 6 and 9 are raised to the full line position as shown in Figure 4.

Each ladder section 14 has a movement upwardly and downwardly between the platform frame supporting brackets 4. Brackets 4 are provided with inwardly extending shafts 17, provided with anti-frictional spool rollers 18, which rollers extend through vertically elongated apertures 19 in opposite sides of the ladder sections 14. It will be noted, referring to Figure 3, that the weight of the platform sections 6 and 9, when in closed position, will maintain the ladder section 14 elevated, as well as the counterweight 16. When the weight of the climber is added to the ladder section 14, the outwardly extending rod 20, carried by the ladder section, will rock the operating lever 21 on its pivotal point 22, and the outer end of the lever 21 will force the link 23 upwardly, and as the link 23 is pivoted at 24 to one side of the platform section 6, said section will be moved to the full line position, shown in

Figure 4, and the section 9 moved outwardly, thereby opening the platform so the operator can continue his upward course. As soon as the weight of the operator is relieved from the particular ladder section, on which he has been climbing, the platform immediately closes, and the same is true when the operator descends from one ladder section to the other. It will be noted that opposite sides of the platform sections 6 are provided with angularly shaped stop arms 25, which overlie opposite sides of the platform frames and prevent the platform sections from passing downwardly beyond a horizontal position.

By providing the counterweights, it will be seen that the ladder sections can be easily adjusted as to the necessary weight of operation.

From the above it will be seen that a safety ladder is provided, which is simple in construction, and one wherein the platforms may be automatically operated as the operator ascends or descends the ladder, and the platforms will automatically close as the operator's weight is relieved from the ladder sections.

The invention having been set forth what is claimed as new and useful is:

1. A safety ladder comprising a plurality of ladder sections, said ladder sections being supported for limited upward and downward movement in stationary platform frames, hinged platform sections in said frames, lever connections between said platform sections and the ladder sections, counterweight means carried by the platform sections, said platform sections being opened by the downward movement of the ladder sections when additional weight is added to the ladder sections.

2. A device as set forth in claim 1 wherein all of the ladder sections are in aligned positions and all of the platform sections are disposed at angles to the ladder sections.

3. A safety ladder, said ladder being supported in a stationary platform frame, said ladder having limited upward and downward movement in the platform frame, hingedly connected outer and inner platform sections disposed within the frame, the outer platform section being hinged to the platform frame adjacent its outer end, the inner free end of the inner platform section having roller guides in trackways at opposite sides of the platform frame, and lever connections between the ladder and the outer platform section whereby the sections will be hinged upwardly and outwardly when additional weight is applied to the ladder.

4. A device as set forth in claim 3 wherein the lever means comprises a rock lever hinged to the platform frame near the inner end of the platform frame, the inner end of the lever being hinged to the ladder, the outer end of the rock lever having a link connection with the outer platform section adjacent its hinging point.

5. A device as set forth in claim 3 including members carried by one of the platform sections and cooperating with the frame for limiting the same to a near horizontal position when the platform sections move to closed position.

6. A device as set forth in claim 3 including a counterweight carried by the outer hinged end of the outer platform section.

7. A device as set forth in claim 3 wherein the slidable connection between the ladder section and the platform frame comprises anti-frictional bearings in elongated slots in opposite sides of the ladder section.

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No references cited.