United States Patent [19]

Liptak et al.

[11] **3,826,337**

[45] **July 30, 1974**

[54] **RETRACTABLE LADDER**

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[22] Filed: **June 28, 1973**

[21] Appl. No.: **374,474**

[52] **U.S. Cl.** **182/91**, 182/88, 182/92, 280/166

[51] **Int. Cl.** **B60r 3/02**

[58] **Field of Search** 182/90, 91, 92, 88, 228, 182/86, 127; 280/166; 248/DIG. 3

[56] **References Cited**

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[57] **ABSTRACT**

A retractable ladder is in the form of a generally U-shaped member adapted for operative use in a vertical position and which may be stored in an inoperative position within the supporting body by lifting the bottom rung or step and pushing the ladder into the body. Optional stops are provided on the ladder for limiting its travel. Optional hand grip means are also provided.

6 Claims, 2 Drawing Figures

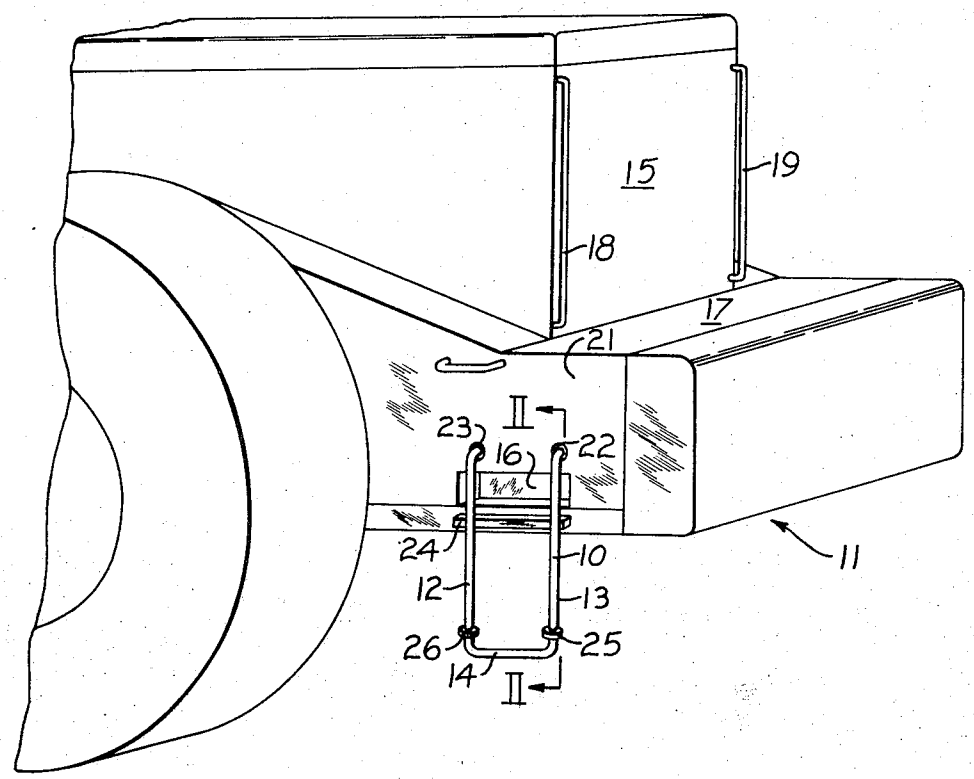


Fig. 1

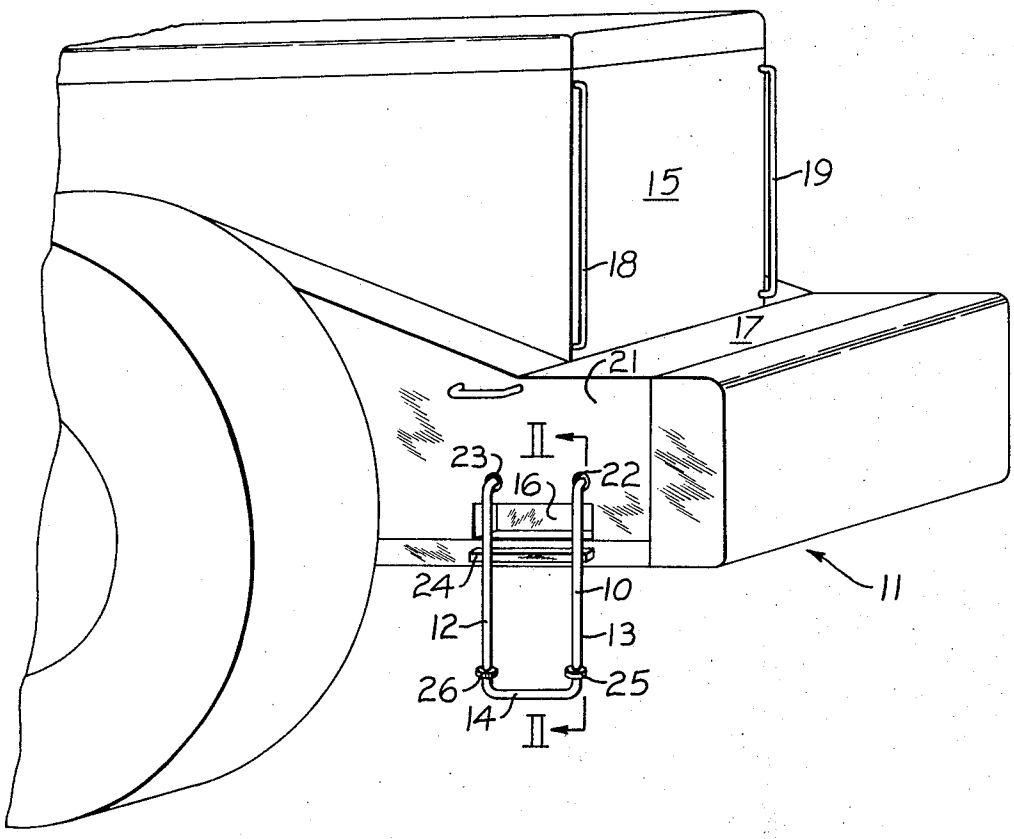
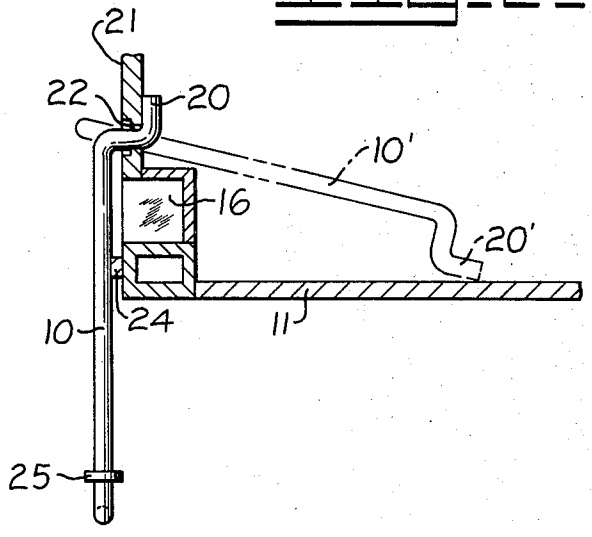

15
19
18
17
21
II
23
16
22
24
10
12
13
26
25
14
II
11

Fig. 2


21
22
20
10'
16
20'
10
24
11
25

RETRACTABLE LADDER

BACKGROUND OF THE INVENTION

This invention relates to a ladder assembly for disposition on the side of a structure having a provision for retraction of the ladder assembly from its operative to a stowed position within the structure. More particularly, this invention is directed to a retractable ladder for use on vehicles such as large earth-moving vehicles.

While the following discussion concerns use on earth-moving vehicles, it is to be understood that such is merely for the sake of convenience. The invention has wider application to other uses where similar requirements are present.

As the size and complexity of large earth-moving machines increase, one problem that is encountered is that of providing easy access to various portions thereof including the driver's station and numerous service areas. In the past, use of permanently fixed ladders on vehicles necessarily within easy reach of the ground support surface has not been satisfactory. This is the case since the bottom portions thereof are usually placed below the normal ground clearance of the vehicle and therefore in a position to be damaged when the machine is in motion. In attempts to solve this problem, various types of retractable steps have been devised which can be pivoted or lifted out of the way. An example is shown in U.S. Pat. No. 3,603,429, to Shepherd. Nevertheless, most of these prior art ladders are still subject to being damaged and in some cases can be shaken or jarred loose during vehicle operation.

SUMMARY AND OBJECTS OF THE INVENTION

It is therefore the primary object of this invention to provide a ladder assembly that overcomes the above-noted disadvantages.

It is particularly an object of this invention to provide a ladder which is retractable from its operative position to a stowed position.

It is also an object to provide such a ladder which is simple and inexpensive and is quickly and easily extended and retracted.

It is a still further object of this invention to provide such a ladder which can be secured to a vehicle with a minimum of alterations.

The invention takes the form of a ladder for disposition on the side of a supporting structure comprising a generally U-shaped member defining a pair of legs and having a hook member formed on each end thereof. The ladder is secured to the side supporting structure such as a vehicle frame by inserting the hook members into a pair of spaced holes therein. The ladder may be stowed or stored by lifting the bottom or stop portion thereof and pushing it into the frame.

Other objects and advantages will become readily apparent to one skilled in the art from having reference to the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an over-all isometric view of the invention shown mounted on the rear portion of earth-moving scraper vehicle; and

FIG. **2** is a fragmentary, cross-sectional view of the same taken along lines II–II in FIG. **1**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** of the drawing illustrates the subject ladder at **10** shown mounted on a side support surface in the form of a scraper, a rear frame portion of which is shown at **11.** The ladder is a generally U-shaped member having a pair of parallel, vertical arms **12, 13** joined by a horizontal step portion **14.** The ladder provides access to a horizontal platform **17** on the rear of the vehicle which is used by an operator when servicing various parts of the vehicle including the engine shown generally at **15.**

The ladder is located so as to be directly below a cut-out or indented step **16** integral with the vehicle. A three-step operation is thus provided in mounting the vehicle from step **14** to step **16** and thence to platform **17.** Optional hand rails or holding bars **18, 19** may be provided to assist the operator when climbing onto the platform.

Additional details of the structure and operation of the ladder are found by having reference to FIG. **2.** The ladder **10** may be conveniently formed from metal bar stock. A hook, one of which is shown at **20** is formed at the end of each of the legs of the ladder opposite the horizontal step. The ladder, in turn, is secured to the side support surface such as vehicle frame exterior wall surface **21** by inserting the hook members into a pair of spaced holes **22, 23** as best seen in FIG. **1.** When the ladder is lowered into operative position as best seen in FIG. **2,** the extremities of the hook members which are parallel to the vertical arms contact the inner wall of the side supporting surface to hold the step in place. Optionally, a horizontal spacer block **24** for spacing the arms from the supporting surface can be secured to the frame exterior wall surface **21.** Also optionally, and as best seen in FIG. **1,** a pair of stops in the form of washers may be fixed to the vertical arms at their juncture with the horizontal step. These stops **25, 26** will contact wall surface **21** when the ladder is in the stored condition, as shown in phantom at **10'** in FIG. **2.** These stops function both to prevent the ladder from being positioned too far within the frame but also to prevent twisting when in the stored position.

In operation, the operator merely lifts the ladder and pushes it into the frame. The weight of the ladder and particularly the arms being at a lower level than the horizontal step, facilitated by having sufficiently large holes, causes it to remain in its stowed position even during rough operation. To remove the stored ladder, the operator merely grasps the horizontal step **14** and pulls it out of the storage position until the hook contacts the inner frame surface and releases the step whereupon the ladder will pivot downward to its operative position.

It is to be understood that the foregoing description is merely illustrative of preferred embodiment of the invention and that the scope of the invention is not to be limited thereto, but is to be determined by the scope of the appended claims.

What is claimed is:

1. In combination a ladder and means defining a side support surface comprising a vehicle frame, said ladder comprising a generally U-shaped member defining a pair of arms joined by a bottom step member, hook members formed on the ends of the arms opposite to the bottom step member, a pair of spaced holes in said

vehicle frame and whereby said arms extend through and spaced from said holes, such that the ladder may be moved to a generally vertical operative position parallel to the vehicle frame as well as to an inoperative position by raising the bottom step and moving the ladder into said vehicle frame and further including a step means in said vehicle frame located between said arms and spaced from said bottom support member when in the operative position.

2. The invention of claim **1** further including stop members on said arms adjacent the bottom step member.

3. The invention of claim **1** wherein said holes are dimensioned with respect to said arms received therein

so as to allow the arms to position themselves at a lower level than that of the horizontal step when in the inoperative position.

4. The invention of claim **1** further including a spacer means on said vehicle frame for spacing said arms from said vehicle frame.

5. The invention of claim **4** wherein said spacer means is a spacer block mounted on said vehicle frame in a location to contact said arms when in the operative position.

6. The invention of claim **1** further including hand grip means on said frame for use when mounting said ladder.

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