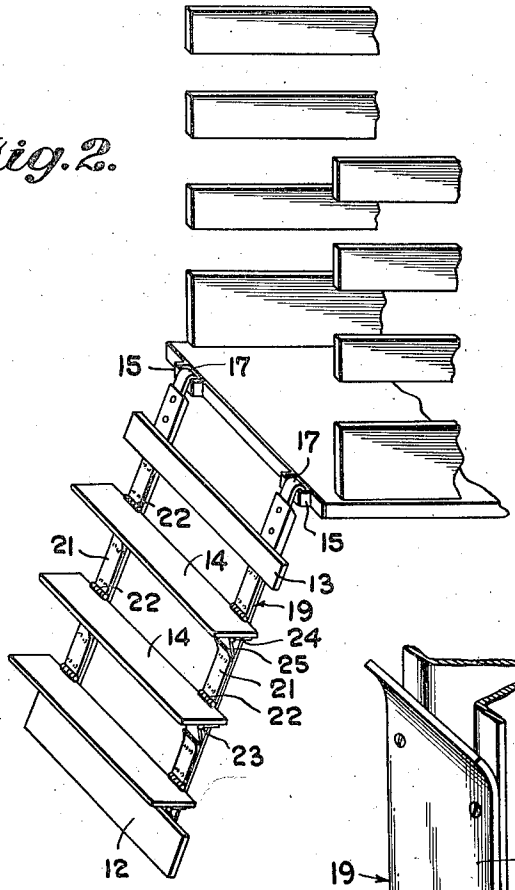
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LADDER CONSTRUCTION

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Fig. 2.



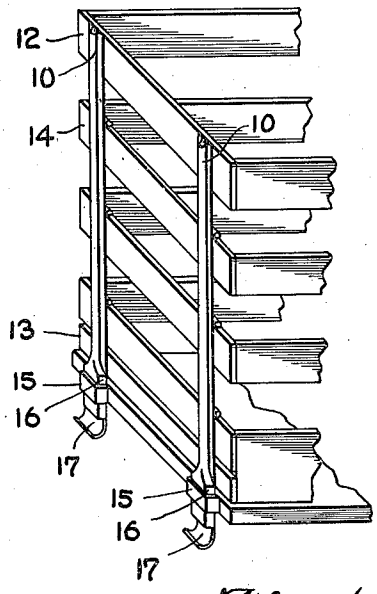


Fig. 1.

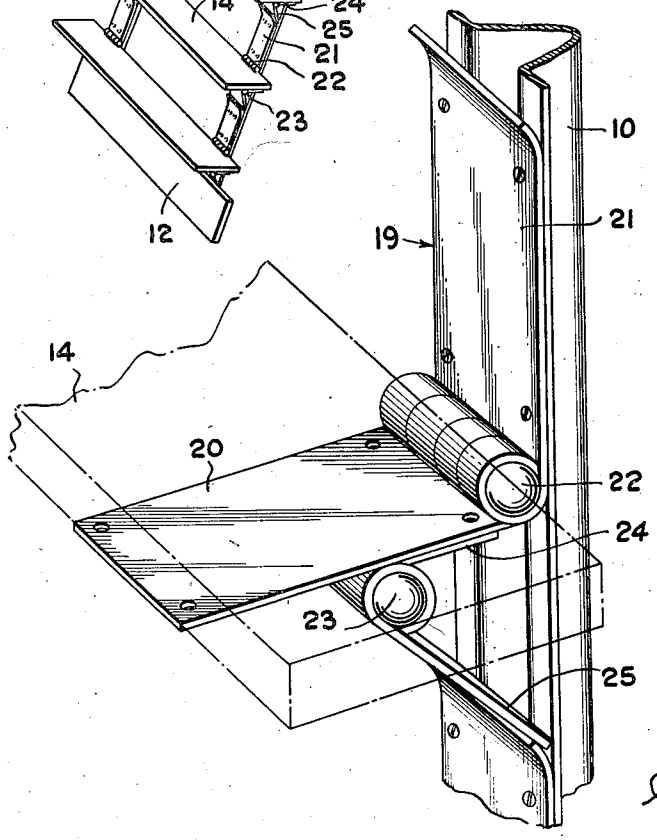


Fig. 5.

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Fig. 3.

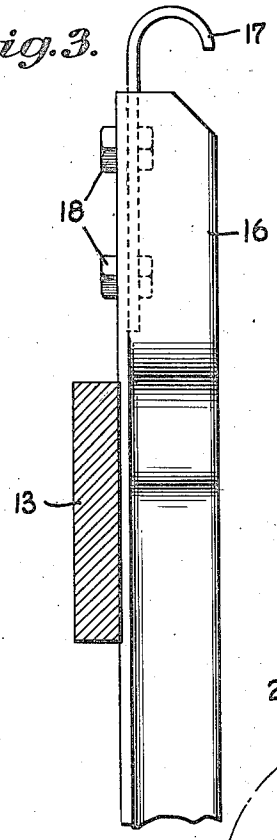
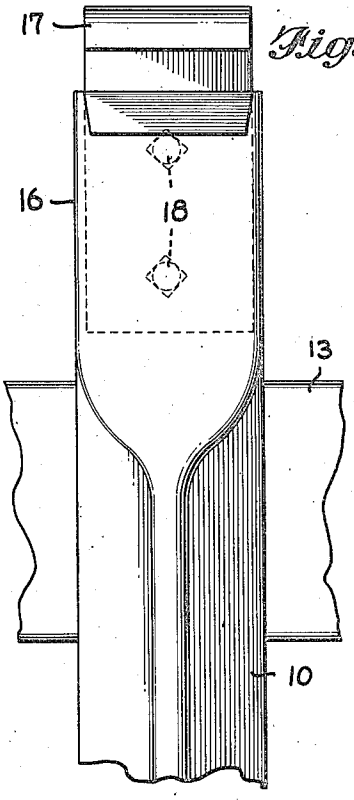


Fig. 4.



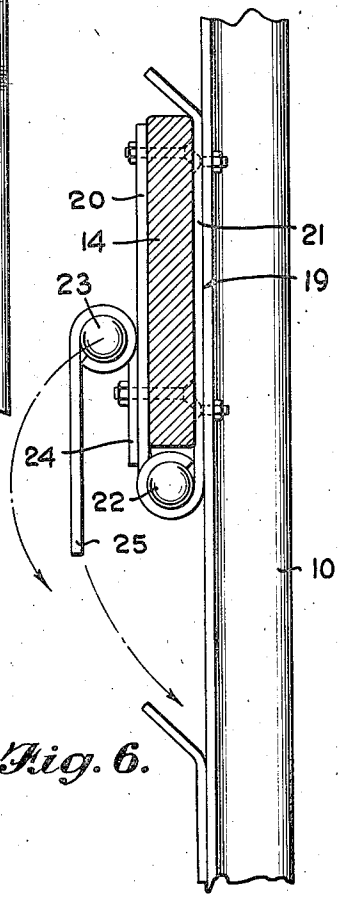


Fig. 6.

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UNITED STATES PATENT OFFICE

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LADDER CONSTRUCTION

Sayrs E. Driscoll, Ypsilanti, Mich.

Application June 13, 1941, Serial No. 397,981

2 Claims. (Cl. 228—36)

This invention relates to ladders, and is more particularly concerned with a ladder, the structure of which is so modified as to render it adaptable to secondary uses.

In the manufacture of ladders which are to serve additionally as barriers, bridges, skids or the like, it is customary to vary conventional structure in a manner to insure a broadened field of utility. Of course, such modifications of structure inherently involve a compromise, the goal of which is to maintain unimpaired the best features of each of the structures which the combination device is to replace. As the art now stands, this goal has never been attained, known ladder constructions of plural utility being defective in the performance of either one or both of the intended functions. In other words, the utility and strength of a ladder are usually, at least in part, sacrificed in order to render the structure more versatile.

A ladder which may have an additional function has been found particularly desirable for employment in conjunction with trucks, freight cars and the like in which there is provided a load carrying bed or floor which is disposed in a plane lying a substantial distance above the plane of the road surface. In such vehicles it is common to provide a barrier surrounding the load carrying floor and it is highly desirable to have some means to bridge the gap between the floor and the road surface during loading. As a consequence, it has been proposed to so modify a portion of the barrier that it may be used as a ladder during loading operations. Such constructions are now known but the full advantage of the combination construction is not attainable because those constructions characterized by simplicity have been found to be lacking in essential strength, while those of sufficient strength are of such complexity as to render their use undesirable from a cost standpoint.

It is, therefore, an object of this invention to provide a ladder of novel construction characterized by great rigidity and strength without loss of adaptability to secondary functions.

According to this invention, it is contemplated that a barrier structure of wide adaptability be provided, the said barrier structure serving additionally as a ladder to permit access to the floor level of the enclosure. By the employment of this invention, the provision of a combination truck tail gate and ladder of superior construction is contemplated, the construction being of unimpaired utility in each of its functions.

It is a further object of this invention to provide a ladder, the steps of which may be folded into a plane parallel the plane of the uprights, while, at the same time, the steps may be rigidly reinforced when in operative position.

Other objects and advantages of this invention will be apparent upon consideration of the following detailed description thereof in conjunction with the annexed drawings wherein:

Figure 1 is a perspective view of a portion of a truck body showing a preferred type of tail gate constructed in accordance with this invention, the tail gate being in position to act as a barrier;

Figure 2 is a perspective view similar to Figure 1 but showing the tail gate in position to function as a ladder, the steps being let down to operative position;

Figure 3 is a detail view in side elevation of the lower end of a tail gate stave showing the hook construction of the present invention by which the tail gate is fastened to the truck bed when the former is functioning as a ladder;

Figure 4 is a plan view of the detail illustrated in Figure 3;

Figure 5 is a detail view in perspective to an enlarged scale illustrating the manner of hinging the ladder steps to the uprights and the manner of supporting the steps in operative position; and

Figure 6 is a view in side elevation showing a portion of a single step in retracted position.

Referring now in greater detail to the drawings, it will be seen that the illustrated form of the invention consists primarily of two uprights or staves 10 connected by upper and lower rigidly attached slats 12 and 13, respectively. Intermediate slats 12 and 13 further slats 14 are provided, each of these being hinged to uprights 10 in a manner to be hereinafter described. As shown in Figure 1, the uprights 10 are adapted for coaction with the bed or floor of a truck of conventional construction. As illustrated, and as is customary, the end of a truck bed is normally provided with straps 15 for the reception of staves which normally maintain the tail gate in position. The ends of uprights 10 are, therefore, provided with integral portions of increased cross-section 16 for close reception within straps 15. Each enlarged portion 16 is hollow and generally rectangular in form, while the remainder of each upright 10 is arranged in channel form as illustrated in the various figures of the drawings. By this arrangement, the maximum rigidity of the upright is attainable together with a close fit between the socket defined by strap 15 and the thickened portion 16 of each upright. In the position shown in Figure 1, the tail gate construction is held against lateral movement by the straps 15 and against downward movement by slat 13 which is rigidly attached to both uprights 10 and which consequently acts as a stop to prevent their passage through strap 15, the bottom edge of the slat resting on the flooring of the truck. In order to facilitate insertion of portions 16 of uprights 10 within straps

15, one face of the enlarged portion is beveled as shown in Figures 3 and 4.

Having now discussed in conjunction with Figure 1 the position and function of the present invention as a tail gate, reference is now made to Figure 2 in which the operation of the device as a ladder is illustrated. It should be noted that each upright 10 is provided with a rounded hook 17, the shank of which is bolted, riveted, or otherwise attached thereto. As illustrated in Figure 3, bolts 18 may be conveniently used for this purpose, the shank of the hook being inserted within the hollow rectangular portion 16. These hooks function to attach the uprights 10 to the straps 15 when the tail gate construction is disposed in the manner indicated in Figure 2. As before, slats 12 and 13 serve in part to maintain the rigidity of the construction. It will be noted, however, that the various step members 14, which, in Figure 1 were disposed in a plane parallel the plane of the uprights, in Figure 2 are disposed in a plane substantially transverse the plane of the uprights. This movement is accomplished by gravity and is made possible by the construction best illustrated in Figure 5.

It will be seen that each step member 14 is provided with a hinge 19 consisting of leaves 20 and 21 pivoted together for movement about a pin 22. Leaf 20 of each hinge underlies and is connected to the lower surface of a step member 14, the step member extending inwardly toward the upright 10 to a point just short of the barrel formed by portions of leaves 20 and 21 where they surround pivot pin 22. On the other hand, the leaf 21 is permanently attached to a portion of the upright. This may be done by the use of bolts or by welding or any other suitable manner. In operative position the leaf 21 of each hinge extends above the step which is attached to the other leaf 20 of hinge 19. The upper end of each leaf 21 is bent outwardly from the face of upright 10 and with that face forms a groove. This groove is clearly seen in Figures 5 and 6. The length of leaf 21 between the axis of rotation and the bent out portion is conveniently equal to the width of the step to permit nesting as shown in Figure 6. It can now be seen that each step member 14, being hinged to both uprights 10 by a construction such as that shown in Figure 5, is movable from the position of Figure 2 to the position of Figure 6 at which time it lies in a plane parallel the plane of upright 10.

In order that each step member 14 may be supported in its operative position, hinge 23 is provided this hinge having a leaf 24 resting against a portion of leaf 20 and being attached therethrough to step member 14. The other leaf 25 of hinge 23 is normally free, but when step member 14 is moved to operative position it will follow the path indicated in Figure 6 and will be received in the groove formed between the upright 10 and the bent out portion of the leaf 21 of the hinge on the step directly therebelow. Leaf 25, when received in this groove as shown in Figure 5, serves to support step member 14 rigidly in position.

From the foregoing description, the operation of the described form of this invention is apparent. If it is desired to use the tail gate of Figure 1 as a ladder as shown in Figure 2 for the purpose of facilitating loading of the truck, it is only necessary to raise manually uprights 10 to unseat portions 16 from within straps 15. Thereafter, the gate is swung downwardly in an arc about straps 15 as a pivot point, hooks 17 gripping the edges of straps 15. Upon arcuate movement, in excess of ninety degrees from the vertical, each step member 14 will be caused by gravity to pivot about its hinge 19 to a position at right angles to the uprights 10. It is then only necessary to insert the leaves 25 of the various hinges 23 in the appropriate notches to insure maintenance of the steps in position to resist any strains to which they may be subjected.

The lowermost of the step members 14 is, of course, provided with a hinge 23, the notch for leaf 25 of this hinge being merely the upper edge of slat 12 and the appropriate portion of uprights 10.

If the device of the present invention is not to be subjected to great strains, the hinges 19 may be used without support, it being necessary only to employ a hinge of conventional type which will open only ninety degrees. It will be realized that but one preferred embodiment of this invention has been described and that many modifications of the structure shown may be made within the scope of the appended claims.

What is claimed is:

1. A ladder construction comprising, a pair of spaced uprights, step members extending therebetween, hinges connecting each of said members to each of said uprights to render the members movable to and from a position parallel to the plane of the uprights and an extended step forming position substantially transverse thereof, the hinge on each upright having its upper end bent outwardly to form with the respective upright a notch above the step member, and a pair of means each pivotally attached to a step member in a position to register with the notch directly therebelow, said means each being adapted, when the step member is in extended position, to engage a notch therebelow, each of said means being of a width not greater than that of the corresponding upright, whereby each step member may be supported in suspended position at two spaced points so that the foot of the user will not tend to engage and so displace said means.

2. A ladder construction comprising, a pair of generally parallel uprights spaced apart a distance at least equal to the width of a human foot, step members extending therebetween, hinges adjacent opposite ends of each of said members marginally connecting them to each of said uprights to render the step members movable to and from a position parallel to the plane of the uprights and an extended step forming position substantially transverse thereof, each hinge having its upper end bent outwardly to form with the respective upright a notch above the step member and a pair of plates pivotally attached at one end to the underside of each step member forward of the marginal connection to an upright, said plates being spaced apart a distance equal to the spacing between the notches therebelow so that the free end of each plate may fit in a notch when the step member is in extended position, the plates so held serving to support the step members to which they are attached, while being readily disengageable when the step members are folded to lie in a plane parallel to the plane of the uprights.

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