March 28, 1950 G. L. MILLER 2,502,228

LADDER FOR RAILROAD CARS

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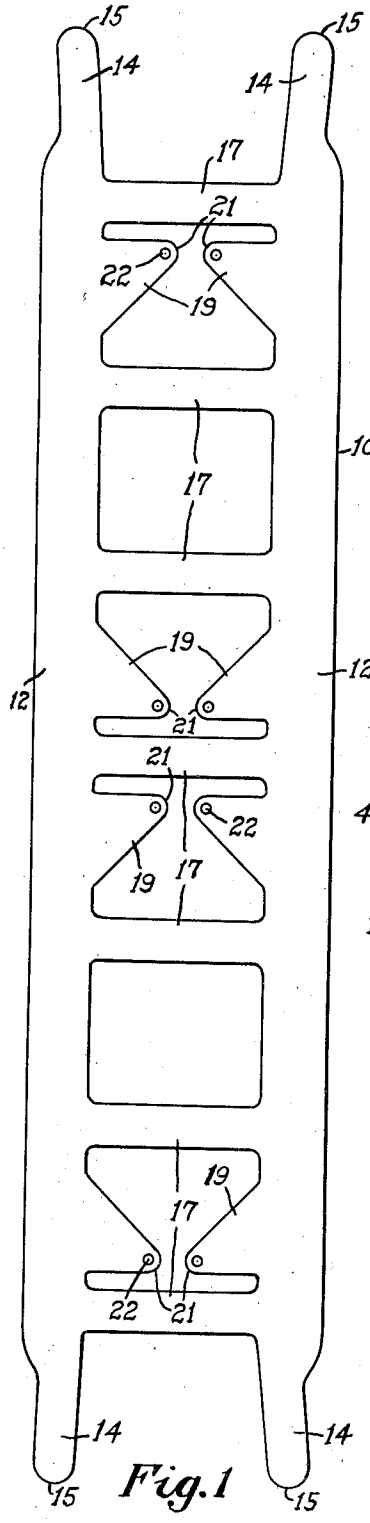


Fig. 1

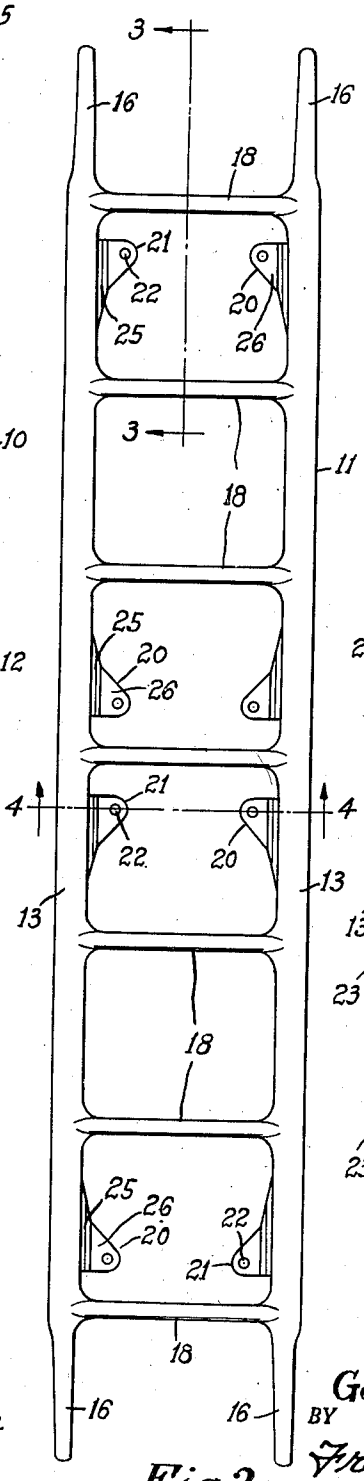


Fig. 2

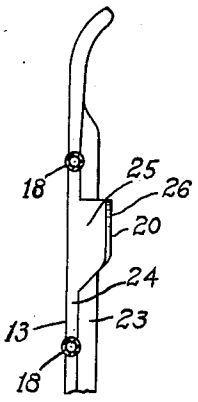


Fig. 3

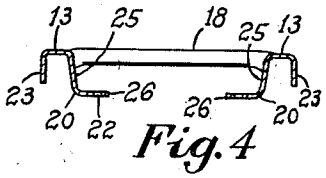


Fig. 4

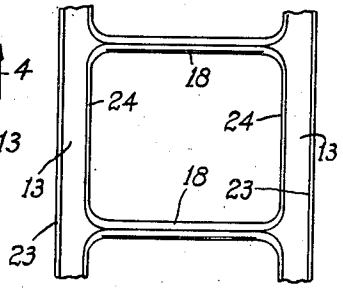


Fig. 5

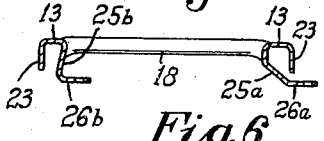


Fig. 6

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LADDER FOR RAILROAD CARS

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4 Claims. (Cl. 228—49)

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The invention relates to ladders and more particularly to a one-piece, pressed steel ladder for use upon railroad cars.

It is general practice to locate ladders upon the sides and ends of all box cars, gondolas, hopper cars and other railroad cars, in order to provide easy access to trainmen to climb onto or descend from a car from either side or either end thereof.

Under present practice these ladders are each made of a great number of pieces which require a considerable number of operations to form and assemble, adding greatly to the labor cost of producing such ladders.

As an example, the ladder commonly used upon box cars is generally provided with seven rungs and is attached to the car by six or more lugs. This requires the forming of the two stiles, the separate forming of seven rungs, and attaching of each end of each rung to the stiles as by rivets, the separate forming of six lugs, and the attaching of each lug to one of the stiles of the ladder.

Not only does this involve considerable labor cost for all of these separate operations in the construction of a single ladder, but the stiles and rungs are formed of steel bars, producing a heavy structure, and since four of these ladders are required for each car, this adds materially to the weight of the car.

Under the modern trend to increase the speed of railroad trains it is necessary that the weight of cars be reduced wherever this can be safely done.

The present invention therefore contemplates the provision of a one-piece ladder for railroad cars which may be formed in a minimum of operations, materially reducing the labor cost by production, and which weighs only about one-half the weight of the conventional railroad car ladder, this considerably reducing the weight of each car.

Another object is to provide a one-piece, pressed or stamped sheet steel ladder which may be formed in a single operation.

A further object is to provide a ladder of this character in which the stiles, rungs and attaching lugs are all made from an integral sheet of metal formed so as to give the maximum strength.

A still further object is to provide such a ladder formed from a sheet blank of such shape as to provide for channel shape stiles and integral, tubular rungs and integral lugs for attaching the ladder to a car.

It is another object of the invention to provide a ladder of the type referred to in which the attaching lugs are so formed as to increase the strength of the structure.

A further object is to provide such a ladder which is so formed that it has no protruding or

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projecting portions to interfere with the safe and convenient use thereof.

The above objects, together with others which will be apparent from the drawing and following description, or which may be later referred to, may be attained by constructing the improved ladder in the manner hereinafter described in detail and illustrated in the accompanying drawing, in which:

Figure 1 is a plan view of the sheet blank from which the one-piece ladder is formed;

Fig. 2 a front elevation of a one-piece, pressed sheet metal ladder constructed in accordance with the invention;

Fig. 3 a fragmentary, longitudinal section through one end portion of the ladder, taken on the line 3—3, Fig. 2;

Fig. 4 a transverse section through the ladder taken on the line 4—4, Fig. 2;

Fig. 5 a fragmentary rear elevation of a portion of the ladder, and;

Fig. 6 a transverse sectional view through a slightly modified form of the improved ladder showing one attaching lug bent inward and the opposite lug bent outward to further strengthen the structure.

The entire ladder comprising the stiles, rungs and attaching lugs is formed in one piece from a single sheet of steel of suitable gauge, by stamping a sheet blank of proper configuration, as indicated generally at 10 in Fig. 1, and forming said blank into the ladder, as indicated generally at 11 in Fig. 2.

Both the stamping and forming operations may be carried out in a suitably constructed die for preforming the same in a single, continuous operation, or the blank 10 may be first stamped in a stamping die and then removed to a forming die in which the ladder, as indicated at 11, may be formed.

The blank 10, shown in Fig. 1, comprises the two spaced, longitudinal side portions 12, for forming the stiles 13 of the ladder, terminating at opposite ends in the reduced portions 14 having rounded ends 15, for forming the reduced, curved upper and lower terminal ends 16 of the stiles 13 of the ladder; the uniformly spaced, straight, horizontal portions 17 extending between the vertical side portions 12, for forming the rungs 18 of the ladder; and the substantially triangular lugs 19 extending inwardly from the vertical side portions 12, at points near the center and each end of the blank, for forming the attaching lugs 20 of the ladder.

The ladder ends 16 are curved as shown in Fig. 5 and terminate substantially in the plane of the rear sides of the attaching lugs 20, so as to fit flush with the car roof at the top end and at the bottom to fit flush with the side or end sill of

the car body to reduce the possibility of accidents.

Rounded ends 21 are preferably formed upon the ears 19, and apertures 22 are punched therein to provide means for attaching the ladder to the side or end wall of a freight car by inserting screws, bolts or the like therethrough.

In the drawing a seven rung ladder is shown, this being the length ordinarily used upon box cars. A pair of attaching lugs is shown below the upper rung and a pair above the lower rung, while a pair of lugs is shown on each side of the central rung of the ladder. This arrangement of attaching lugs may be varied as desired. For instance, instead of locating two lugs on each side of the central rung, one lug may be provided above this rung as an integral part of the inside flange of one stile and another lug below the central rung as an integral part of the inside flange of the other stile.

The sheet metal blank shaped as illustrated and above described is pressed in the dies into the completed ladder as shown in Fig. 2. In this forming of the blank the vertical side portions 12 of the blank are pressed into channel shape to form the stiles 13 of the ladder having the relatively wide inturned flanges 23 at their outer edges and the relatively narrow inturned flanges 24 at their inner edges.

The ears 19 of the blank which form extensions upon the inner flanges 24 of the side rails are bent downwardly as at 25 and inwardly as at 26, being so positioned that when attached to the side or end wall of a car by bolts or the like located through the apertures 22, they will support the ladder in vertical position correctly spaced from the wall of the car.

At the same time the horizontal straight portions 17 of the blank are pressed into tubular shape forming the tubular rungs 18 integrally a part of the stiles 13.

Instead of bending the lugs on both sides of the ladder inward as shown in Figs. 2 and 4, the lugs on one side may be bent inward and those on the other side bent outward as indicated in Fig. 6, wherein the lug at the right hand side is bent downward and outward at an angle as indicated at 25*a*, the lower perforated end thereof being then bent outward in a plane parallel to the lower plane of the ladder as indicated at 26*a*.

To further strengthen the structure, the attaching lug shown at the left hand side of Fig. 6 may be bent downward and slightly outward as indicated at 25*b*, the terminal end thereof being bent inward as at 26*b* in a plane parallel to the normal plane of the ladder.

Ladders made in this manner from a single sheet of metal in a single stamping and forming operation eliminates the many operations required for the making of conventional ladders for this purpose, thus greatly reducing the labor cost of producing a freight car ladder.

Furthermore the sheet metal required for producing a ladder of this type having sufficient strength for the purpose for which it is intended weighs only about 50% of the weight of the conventional ladder, thus also reducing the cost as well as the weight of the material.

It will be noted that the ladder as described and shown presents a structure that offers much from the standpoint of safety. It is smooth and clean throughout its entire structure, there being no projections or obstructions such as irregular

shapes, rivet heads, sharp corners and the like to interfere and since it is an integral structure there are no joints to come loose or get out of alignment when in service.

I claim:

1. A one-piece sheet metal ladder of the character described comprising two spaced, straight, longitudinal side portions terminating at opposide ends in reduced extensions, uniformly spaced, straight transversely disposed portions extending between the longitudinal side portions and substantially triangular lugs extending inwardly from the longitudinal side portions between certain of the transverse portions, the longitudinal side portions forming channel stiles, the reduced extensions forming rearwardly curved terminal ends of the stiles terminating substantially in the plane of the rear side of the ladder, the transversely disposed portions forming hollow rungs and the triangular lugs forming integral, angular attaching lugs extending rearwardly from the inner flanges of the stiles and being an integral part thereof.

2. A sheet metal ladder of the character described comprising two straight, longitudinal stiles each having rearwardly disposed flanges at its outer and inner sides, rearwardly disposed triangular extensions formed integrally with the inner side flanges and having angularly disposed terminal ends forming integral attaching lugs, integral hollow rungs connecting the stiles, and rearwardly curved integral extensions upon the upper and lower ends of the stiles terminating substantially in the plane of said attaching lugs.

3. A metal ladder of the character described comprising two straight, longitudinal stiles each having rearwardly disposed flanges at its outer and inner sides, rearwardly disposed triangular extensions formed integrally with the inner side flanges and having angularly disposed inturned terminal ends forming integral attaching lugs, integral hollow rungs connecting the stiles, and rearwardly curved integral extensions upon the upper and lower ends of the stiles terminating substantially in the plane of said attaching lugs.

4. A metal ladder of the character described comprising two straight, longitudinal stiles each having rearwardly disposed flanges at its outer and inner sides, rearwardly disposed triangular extensions formed integrally with the inner side flanges and having angularly disposed outturned terminal ends disposed in the rear of the outer side flanges of the stiles forming integral attaching lugs, integral hollow rungs connecting the stiles, and rearwardly curved integral extensions upon the upper and lower ends of the stiles terminating substantially in the plane of said attaching lugs.

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