

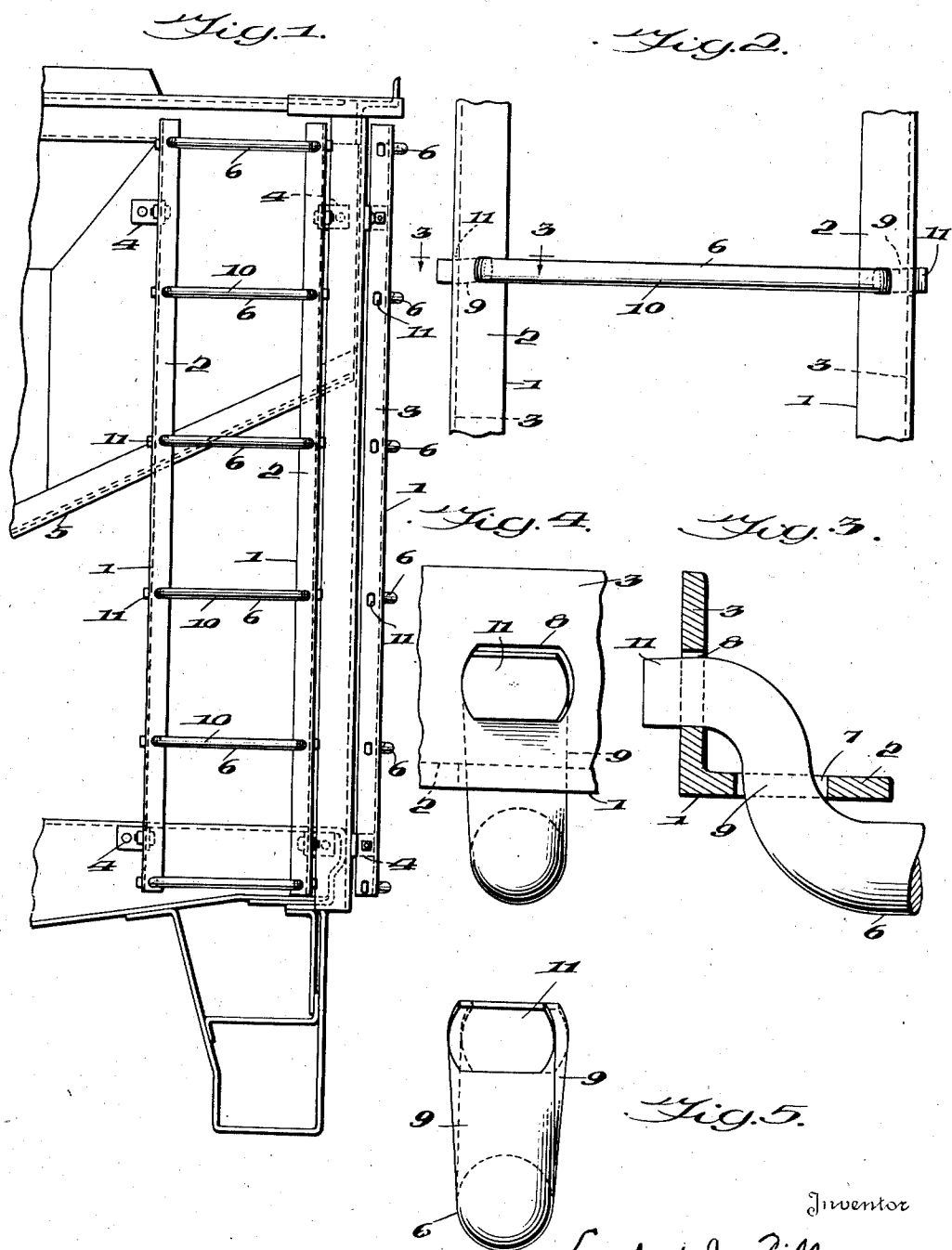
Jan. 16, 1940.

L. J. TILLMAN

2,187,286

LADDER

Filed Aug. 10, 1938



Inventor

Lambert J. Tillman

By Ritter, Neeklin & Miner
His Attorneys

UNITED STATES PATENT OFFICE

2,187,286

LADDER

Lambert J. Tillman, Toledo, Ohio, assignor to
Unitcast Corporation, Toledo, Ohio, a corporation of Ohio

Application August 10, 1938, Serial No. 224,172

5 Claims. (Cl. 228—56)

My invention relates to ladders and more particularly to improvements in ladders of the type whose rungs have offset ends for extending through a plurality of openings formed in angularly disposed portions of the stiles of the ladder. Such ladders are singularly applicable to railway freight cars but they are obviously capable of use in other environments.

The principal object of the invention is to so form the offset ends of the rungs of ladders of the type mentioned that they will be firmly held by the stiles of the ladder and accordingly will not vibrate and rattle.

A primary feature of the invention consists in providing the offset ends of the ladder rung with rearwardly extending portions which terminate in lateral projections, the lateral projection at one end of the rung being offset vertically from the lateral projection at the other end of the rung so that one of the projections will engage the bottom portion of the opening through which it is adapted to extend in one of the stiles and the other of the projections will engage the top portion of the opening through which it is intended to extend in the other stile.

Another feature of the invention consists in so forming the lateral projections of the offset ends of the rung that their axes will be disposed on opposite side of a plane normal to the stiles passing through the axis of the main body portion of the rung.

Other features of the invention residing in advantageous forms, combinations and relations of parts will hereinafter appear and be pointed out in the claims.

In the drawing,

Figure 1 is a side elevational view of one end of a railway car showing two ladders embodying the invention applied thereto, one of the ladders being shown in side elevation and the other in end elevation.

Figure 2 is an enlarged side elevational view of a portion of the ladder.

Figure 3 is an enlarged detail sectional view taken on line 3—3 of Figure 2.

Figure 4 is a detail side elevational view of the construction shown in Figure 3 as viewed from the left hand side of that figure.

Figure 5 is an end elevational view of one of the ladder rungs.

Referring more particularly to the drawing, 1 indicates the stiles of the ladder, each of which is preferably of angle shape so as to provide angularly disposed portions or legs 2 and 3, respectively. The stiles are oppositely arranged so that

their outer legs 2 project toward each other, while their other legs 3 project rearwardly and afford convenient means by which the stiles may be secured by brackets or the like 4 to a suitable support, such, for example, as the sides or ends of a railway freight car, which is designated generally in the drawing by the reference numeral 5.

The rungs 6 of the ladder are each provided with offset ends which are adapted to extend through apertures 7 and 8 formed in the legs 2 and 3, respectively, of each of the stiles. Each offset end of each rung consists of a portion 9 which extends rearwardly from the main body portion 10 of the rung through the opening 7 of the leg 2 of the adjacent stile and a lateral projection 11 which extends through the aperture 8 in the leg 3 of the adjacent stile.

As is known, ladders of the type herein described are assembled by first inserting one end of all the rungs in the openings provided therefor in one of the stiles and then by applying the other stile to the other offset ends of the rungs. When thus assembled and the stiles are rigidly connected to a suitable support by any suitable means, such as the brackets 4 previously referred to, the rungs are effectively secured in place and cannot be removed. However, unless more precision is employed in manufacturing the ladder than is justified in making articles of this character, difficulty has been encountered in preventing the rungs from rattling and vibrating with respect to the stiles. While this does not detract from the strength of the ladder since the rungs, even though they be capable of being vibrated to an apparently excessive degree, cannot be disconnected from the stiles unless the rungs or the stiles be deformed or bent to such an extent as would obviously render them unfit for use, such looseness of the rungs as may occur is objectionable in that one examining or using the ladder and being unacquainted with the construction thereof may gain the impression that the ladder is unsafe. Moreover, the noise which may be occasioned by the vibrations of one or more loose rungs in the ladder has proved objectionable to some users of ladders of this type.

To overcome these objects, I have found that by vertically offsetting the lateral projections 11 of each of the rungs with respect to each other, the rungs may be firmly held and engaged by the stiles and thus be prevented from vibrating and rattling. This offsetting of the lateral projections 11 is preferably accomplished by oppositely inclining the rearwardly extending portions 9 of

each rung with respect to a plane passing through the axis of the major portion of the rung and normal to the stiles. In this manner, the axes of the lateral projections of each rung, which are preferably parallel, will be vertically spaced with respect to each other and be disposed on opposite sides of the plane passing through the main body portion of the rung and normal to the stiles.

By having the lateral projections of each rung offset with respect to each other in this manner, the lateral projection at one end of the rung will engage the bottom portion of the opening in the stile through which it extends, while the lateral projection at the other end of the rung will engage the upper portion of the opening in the stile through which it extends. This engagement of the lateral projections of each rung with alternate faces of the openings in the stiles is assured because the amount the projections are offset with respect to each other is such that, when the rungs have been assembled with the stiles in the manner heretofore described, the stiles will be displaced axially with respect to each other and the rungs will be inclined slightly with respect to the horizontal position they are intended to occupy. In bringing the stiles into horizontal alignment with each other and the rungs into horizontal position, the lateral projections of each rung will, therefore, be forced into engagement with alternate faces of the openings in the stiles and torsional stresses will be set up in the main body portion of the rungs which will serve to maintain the desired engagement of the rungs with the stiles for so long as the stiles are rigidly held in place.

Due to the torsional stresses which are set up in the main body portions of the rungs, it will be found advantageous in mounting the latter on a support, such as a railway car, to first secure one of the stiles to the support and then force the other stile upwardly into its proper position and maintain it in such position while it is being secured to the support. When the stiles are thus secured in place, it is evident that the rungs will be effectively prevented from vibrating.

The desired configuration may be imparted to the ends of the rung by subjecting the bar of metal from which the rung is to be formed to two simple swaging or upsetting operations without the necessity of twisting one end of the bar with respect to the other. This may be easily accomplished by first subjecting one end of the bar to a swaging operation which will provide it with a rearwardly extending portion 9 and a lateral projection 11. The other end of the bar may be then operated upon in a similar manner but, during this operation, the bar is so held that the axis of the rearwardly extending portion 9 first formed is disposed at an angle to the direction of movement of the pressure applying element of the swage; that is to say, after the first swaging operation, the bar is rotated slightly on its axis from the position it occupied during that operation so that, upon completion of the second swaging operation, the axes of the two rearwardly extending portions thus formed will lie in angularly disposed planes whose line of intersection is coincident with the axis of the main body portion of the rung.

From the foregoing, it will be perceived that simple and efficient means has been devised for holding rungs of ladders of the type herein disclosed rigidly in place so as to prevent them from vibrating and rattling.

What I claim is:

1. A ladder rung having offset ends respectively adapted to extend through a plurality of openings formed in angularly disposed portions of the stiles of the ladder, said offset ends of the rung respectively having rearwardly extending portions terminating in lateral projections, the lateral projection at one end of the rung being offset vertically from the lateral projection at the other end of the rung whereby one of said projections is adapted to engage the bottom portion of the opening through which it is intended to extend in one of the stiles and the other of said projections is adapted to engage the top portion of the opening through which it is intended to extend in the other stile.

2. The improvement in ladder rungs of the character having offset ends respectively adapted to extend through a plurality of openings formed in angularly disposed portions of the stiles of the ladder, said improvement consisting in providing each offset end of the rung with a portion which extends inwardly from the main body portion of the rung and which terminates beyond the adjacent end of the latter in a lateral projection whose axis is spaced in the direction of length of the stiles from the axis of the lateral projection at the other end of the rung.

3. A ladder rung having offset ends respectively adapted to extend through a plurality of openings formed in angularly disposed portions of the stiles of the ladder, said offset ends of the rung respectively having rearwardly extending portions terminating in lateral projections, the axes of said projections being disposed on opposite sides of a plane normal to the stiles passing through the axis of the main body portion of the rung.

4. A ladder rung having offset ends respectively adapted to extend through a plurality of openings formed in angularly disposed portions of the stiles of the ladder, said offset ends of the rung respectively having rearwardly extending portions terminating in lateral projections, the rearwardly extending portions being inclined in opposite directions with respect to a plane normal to the stiles passing through the axis of the main body portion of the rung and said lateral projections being offset vertically with respect to each other.

5. A ladder including stiles having angularly disposed portions, and rungs having offset ends respectively provided with rearwardly extending portions terminating in lateral projections, the rearwardly extending portions and the lateral projections of each rung respectively extending through apertures in the angularly disposed portions of the stiles and said lateral projections being vertically offset with respect to each other so that one of them engages the bottom portion of the opening through which it extends in one of the stiles and the other one of them engages the top portion of the opening through which it extends in the other stile.

LAMBERT J. TILLMAN.