T. N. RUSSELL.

LADDER.

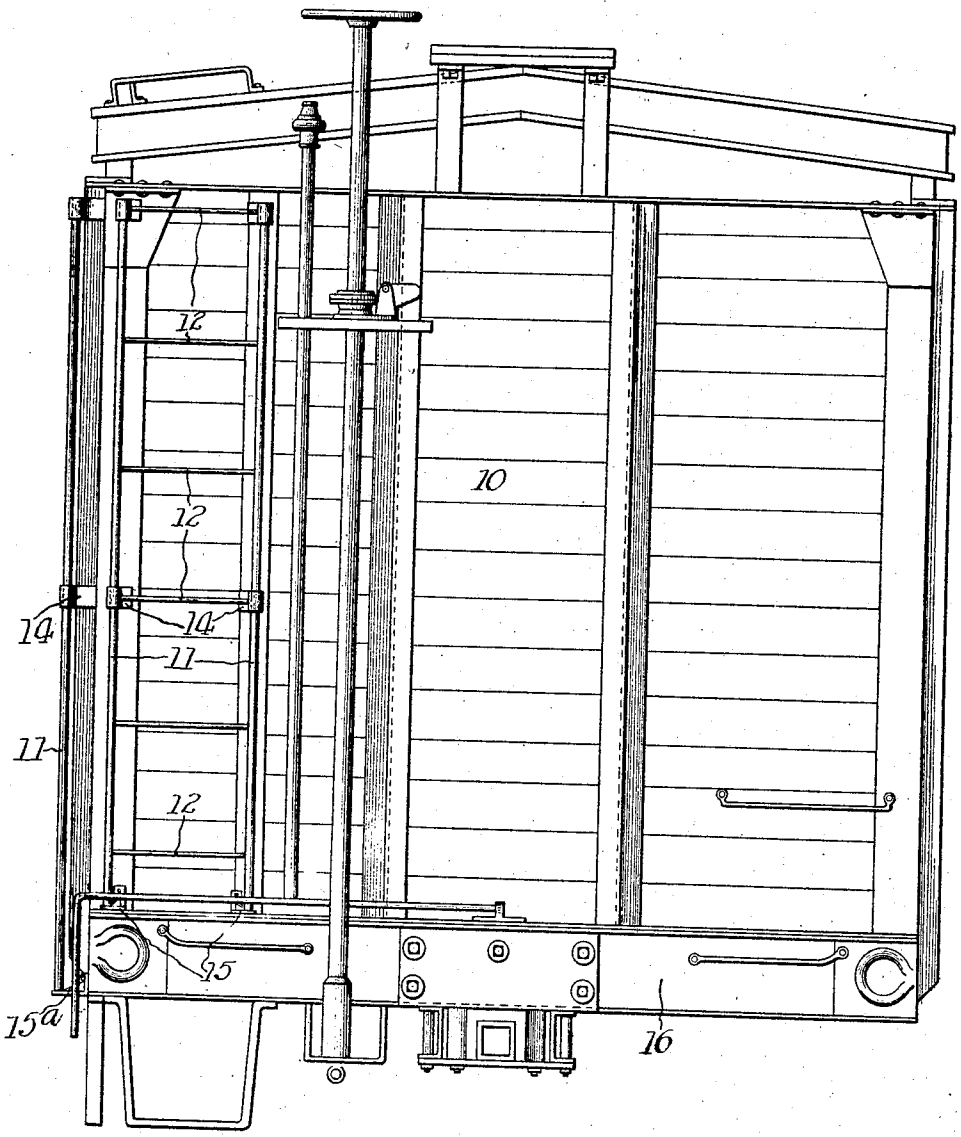
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1,304,809.

Patented May 27, 1919.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2

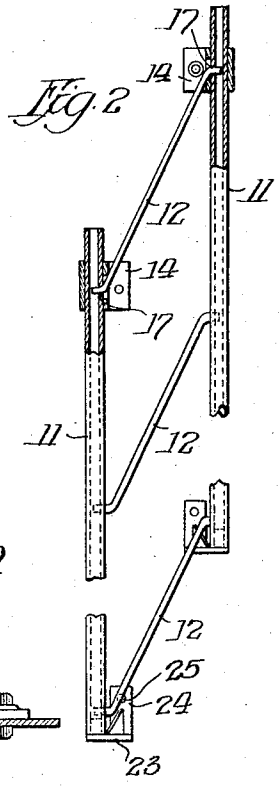


Fig. 3

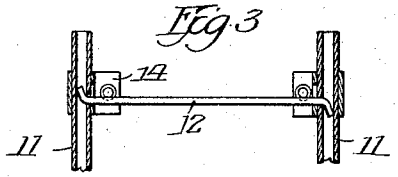


Fig. 4

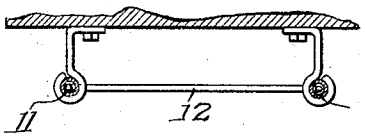


Fig. 5

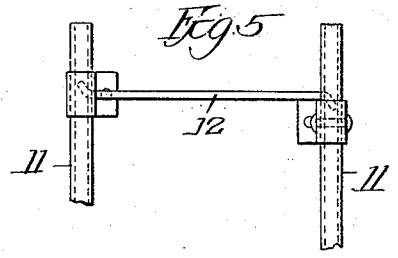


Fig. 10

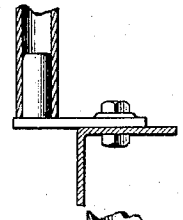


Fig. 8.

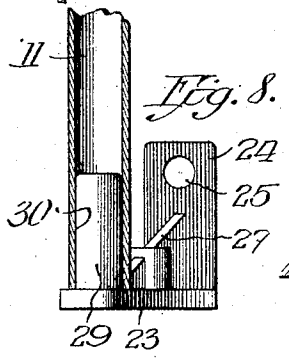


Fig. 6.

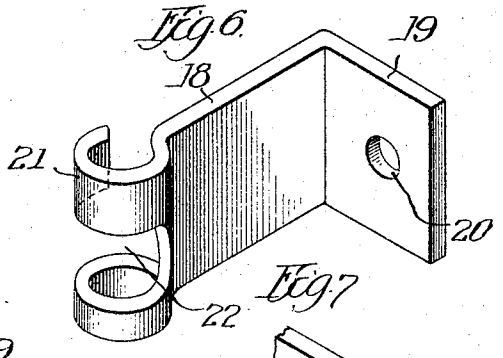


Fig. 7

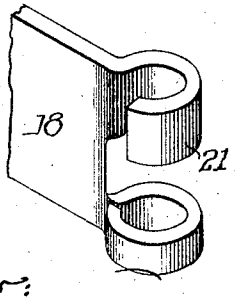
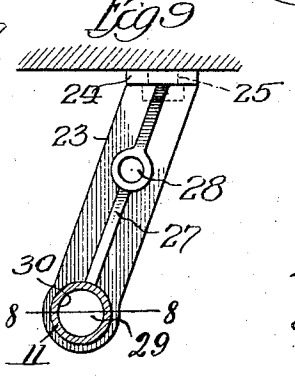


Fig. 9



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LADDER.

APPLICATION FILED JUNE 1, 1914.

1,304,809.

Patented May 27, 1919.

3 SHEETS—SHEET 3.

Fig. 11

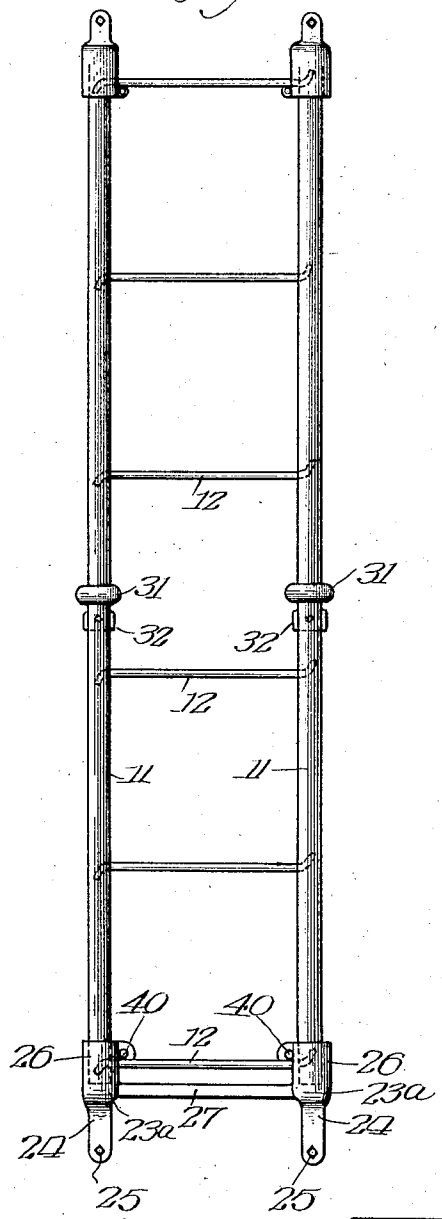


Fig. 12

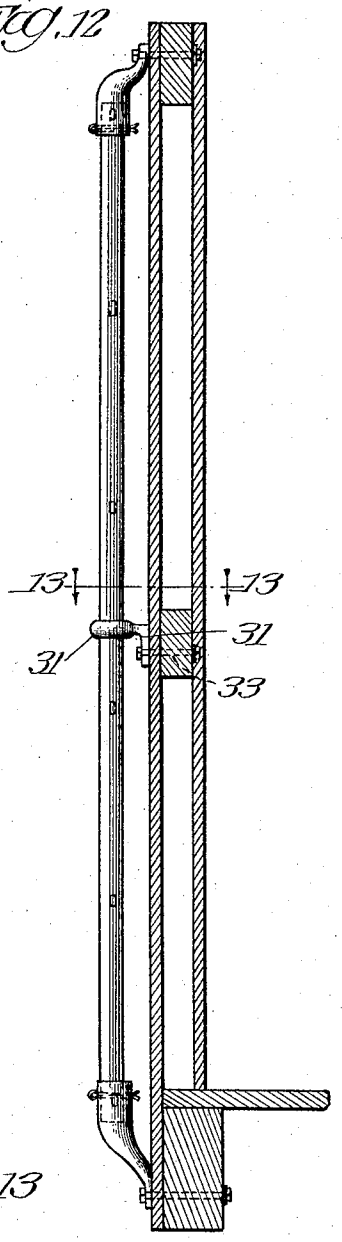
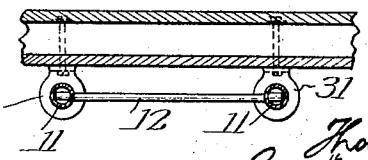


Fig. 13



Witnesses:

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UNITED STATES PATENT OFFICE.

THOMAS NATHAN RUSSELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO HARRY VISSERING & COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

LADDER.

1,304,809. Specification of Letters Patent. Patented May 27, 1919.

Application filed June 1, 1914. Serial No. 842,218.

To all whom it may concern:

Be it known that I, THOMAS NATHAN RUSSELL, a citizen of the United States, and a resident of Chicago, in the county of Cook, in the State of Illinois, have invented certain new and useful Improvements in Ladders, of which the following is a specification.

My present invention relates in general to ladders and more particularly to scaling ladders, and has special reference to improvements in railway car ladders.

The principal objects of my present invention are the provision of a ladder which may be made of a minimum amount and weight of material, and of material which is readily obtainable at a low cost; the provision of a ladder construction wherein easily available commercial forms of material may be employed with a minimum amount of machining or other manipulation, and wherein the employment of expensive castings and more particularly complex castings is avoided; the provision of a form of ladder which is readily manufactured in quantities, the parts of which are substantially identical and which may therefore be shipped "knock down" in quantities, and thereafter readily assembled for use; the provision of an improved form of ladder construction employing stiles provided with openings, and rungs having portions entering and coöperating with said openings, whereby the ladder may be readily assembled, but any breaking out of the rungs from said openings after such assembly prevented; the provision of an improved form of supporting brackets for ladders engaging one of the stiles and rungs thereof, whereby the ladder may be fixed to a wall; the provision of an improved form of brackets for ladders engaging one of the ends of the stiles thereof for fixing the ladder to a wall or floor, or both, and thereby preventing lateral movement of the ladder; and generally to improve, cheapen and simplify ladder construction; together with such other objects as may hereinafter appear.

In attaining the objects above mentioned and gaining certain further benefits and advantages to be hereinafter pointed out, I have here provided a construction, one embodiment whereof is illustrated in the accompanying drawings, wherein—

Figure 1 is an elevational view of the end of a railway box car having a preferred form of my ladder applied thereto;

Fig. 2 is an elevational view, partly in section, of the ladder shown in Fig. 1, illustrative of the method of assembling the same;

Fig. 3 is an enlarged central longitudinal sectional view of the ladder of Fig. 1 showing the relations of the ends of the rungs to the stiles and supporting brackets, when the assembly of the ladder is completed;

Figs. 4 and 5 are respectively a transverse sectional view and an elevational view of such construction;

Figs. 6 and 7 are perspective views of a form of supporting bracket adapted to engage the ladder stiles and rungs, employed by me for attaching the ladder to the end wall of the car;

Figs. 8 and 9 are respectively a plan and an elevational view of the form of bracket employed by me for fixing the ends of the ladder stiles; Fig. 8 being partly in vertical section, taken along the line 8—8 of Fig. 9;

Fig. 10 is a view of a modified form of supporting bracket, and

Figs. 11, 12 and 13 are respectively front elevational, side elevational, and horizontal sectional views of a modified form of structure, the view of Fig. 13 being taken on the line 13—13 of Fig. 12;

Referring first more particularly to Fig. 1 of the drawing it will be observed that I have here indicated the end, 10, of a box car to which I have applied side and end ladders wherein I employ substantially parallel stiles, 11—11, between which are interposed rungs, 12—12, which may be of any desired number. The ladders are supported by and attached to the car framing by means of intermediate brackets, 14—14, (see Figs. 6 and 7), each of which preferably engages one of the stiles, 11, and rungs, 12, and the lower end of the end ladder is here shown as supported from the end sill, 16, of the car by means of fixing brackets, 15—15, (see Figs. 8 and 9), and the lower end of the side ladder is here shown as supported from the side of the car by a similar bracket 15^a.

Referring more particularly to Figs. 2 and 3 it will be observed that in the manufacture of ladders embodying my present improvements I employ as stiles, 11—11, material wherein apertures are formed for the reception of the ends of the rungs, 12—12, the most convenient form of material for this

purpose being such tubular material as commercial wrought iron pipe, as is clearly shown in Figs. 2, 3, 4, and 8, such pipe being suitably apertured as indicated at 17—17 for the reception of the ends of the rungs, 12.

For the purpose of securing the rungs, 12—12, in position in the stiles, 11—11, when they have been passed through the openings, 17—17, the ends of the rungs are turned or bent over to an angle of nearly but not quite 90°, this structure permitting, for example, the use of $\frac{3}{4}$ inch pipe for the stiles, rungs formed of commercial $\frac{5}{8}$ inch wrought iron rods and $\frac{21}{32}$ inch openings into the pipe for the reception of rungs.

When the rungs, 12—12, are introduced into the stiles, 11—11, as indicated in Fig. 2, and then the stiles moved longitudinally relatively to each other to bring them into the position indicated in Fig. 1, the rungs are held firmly in position parallel to each other, and at right angles to the stiles, the parts assuming the relative position shown in Fig. 3.

For supporting the ladder thus formed in this final position, I preferably employ a form of intermediate supporting bracket indicated in Figs. 6 and 7, wherein the body, 18, is formed at one end with a flange, 19, apertured at 20, for the passage of a bolt employed for fixing it to the car framing, the opposite end of the body being provided with a tubular extension, 21, having an opening, 22, which is preferably of the L form shown.

The tubular portion, 21, shown, is employed for encircling the stile, 11, and the opening, 22, for engaging the rung, 12. By virtue of the L shaped cut out, the form of bracket here shown may be used either as a "right" or a "left" on either side of the ladder.

For fixing the ends of the ladder relatively to the car body, and, where desirable, supporting the same from the end sill, I preferably employ a form of bracket such as illustrated in Figs. 8 and 9, wherein a body portion, 23, has at one end a flange, 24, apertured at 25, for attaching it to the end or side wall of the car, and at the other end a boss 29 entering the open end 30 of the stile 11, a web, 27, being extended between said body, 23, and flange, 24, and apertured intermediate the parts, 23, and 24, as indicated at, 28, for attachment to the end sill, the boss 29 serving to restrain the stile 11 from any horizontal movement.

Obviously the bracket just described may be inverted for fixing the upper end of the stile against horizontal movement relatively to the car body, and lag screws or bolts may be passed through the openings, 25 and 28, or either thereof, as occasion may require.

The form of ladder structure illustrated in Figs. 11 to 13 differs from that of the preceding figures in the forms of supporting brackets employed. The lower end of the ladder is supported in a bracket comprising oppositely disposed body portions 23^a—23^a, connected by an intermediate member 27 and having extensions 24—24, respectively apertured at 25—25 for attachment to one of the sills of the body, each of said portions 23^a—23^a having a tubular portion 26 arranged to receive one of the stiles 11 and slotted for the reception of the lowermost of the rungs 12, ears 40—40 apertured for the passage of cotter pins being provided on said portions 23^a for holding the ladder structure in predetermined position. For supporting the upper end of the ladder structure similar devices may be used but as here shown they are not necessarily connected by a bar 27. For attaching the stiles intermediate their ends to the car body tubular members 31 flanged as indicated at 32 and apertured for the reception of bolts 33 may conveniently be employed.

Having thus described my invention and illustrated its use what I claim as new and desire to secure by Letters Patent is—

1. In a ladder, in combination with a pair of stiles, and a rung interposed between said stiles and supported thereby, a supporting bracket for said ladder including a body portion having at one end a flange whereby it may be attached to a wall and at the opposite end an apertured tubular extension whereby it may embrace one of said stiles and one of said rungs.

2. In a ladder, in combination with a pair of stiles, and a rung interposed between said stiles and supported thereby, a supporting bracket for said ladder including a body portion having at one end a flange whereby it may be attached to a wall and at the opposite end a tubular extension having a substantially L formed opening, whereby it may embrace one of said stiles and one of said rungs.

3. A ladder comprising, in combination, a pair of stiles apertured for the reception of rungs, and rungs connecting said stiles and inserted thereinto, said rungs being provided with ends bent toward opposite sides of said rungs, whereby the rungs may be engaged with or disengaged from said stiles by dropping one stile relative to the other.

4. A ladder comprising, in combination, a pair of substantially parallel stiles formed of tubular material apertured for the reception of rungs, and a plurality of rungs connecting said stiles and inserted therein, said rungs being provided with bent ends adapted in their engaged position to extend along the bore of the stiles, one end projecting upwardly and the other downwardly, whereby the rungs may be engaged with or disengaged from the stiles by a longitudinal movement of one stile relative to the other.

5. A ladder comprising stiles and a plurality of detachable rungs, each stile having divergent bearing portions and formed with holes in one of its portions, said rungs having hole engaging portions and oppositely bent end portions each inclining away from said hole engaging portions and toward opposite sides of said rungs substantially in a vertical direction to abut the other of the portions of said stiles at points respectively above and below said holes substantially as and for the purpose set forth.

6. A ladder comprising, in combination, a pair of stiles apertured for the reception of rungs, and rungs connecting said stiles and inserted through said apertures, said rungs having ends bent toward opposite sides of said rungs whereby accidental disengagement of the rungs and the stiles is prevented.

In testimony whereof I have hereunto signed my name in the presence of the two subscribing witnesses.

THOMAS NATHAN RUSSELL.

Witnesses:
PAUL CARPENTER,
DONALD C. WILLIAMS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."