O. COLBORNE.

LADDER.

APPLICATION FILED FEB. 6, 1909.

927,491. Patented July 13, 1909.

Fig. 1.

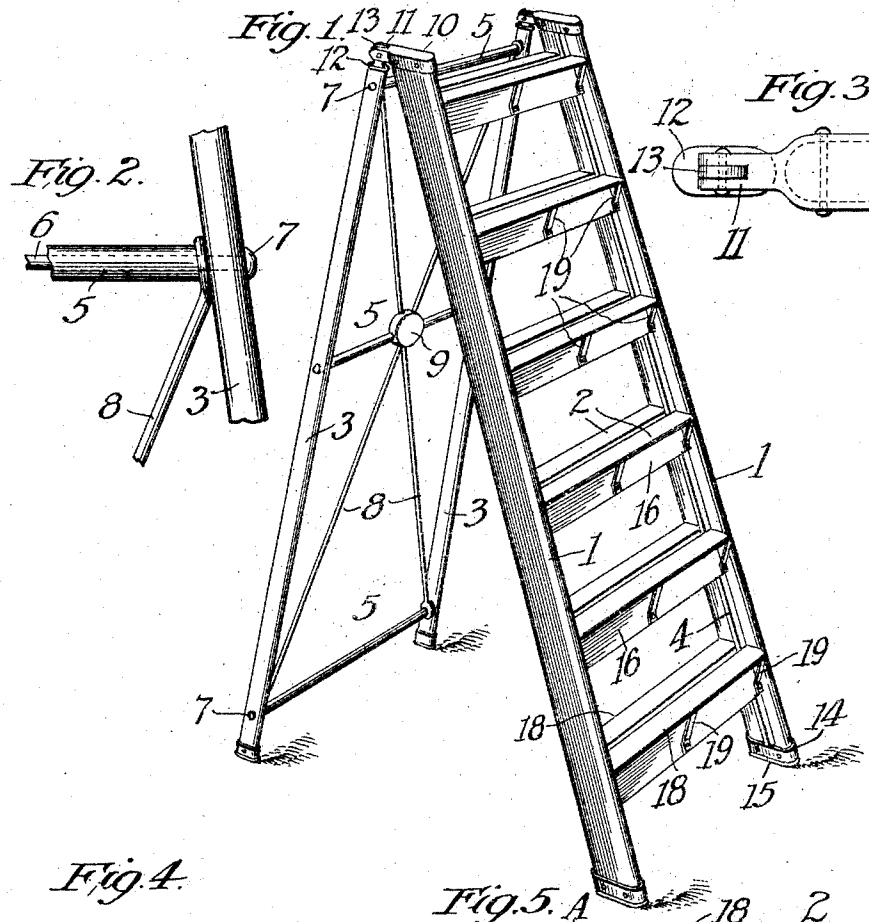


Fig. 2.

Fig. 3.

Fig. 4.

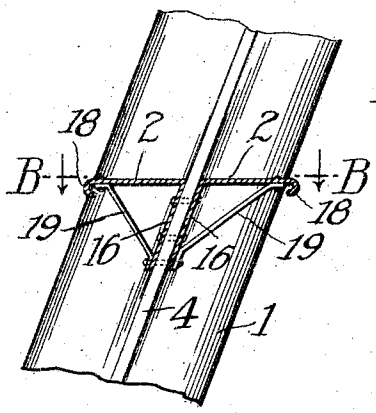


Fig. 5.

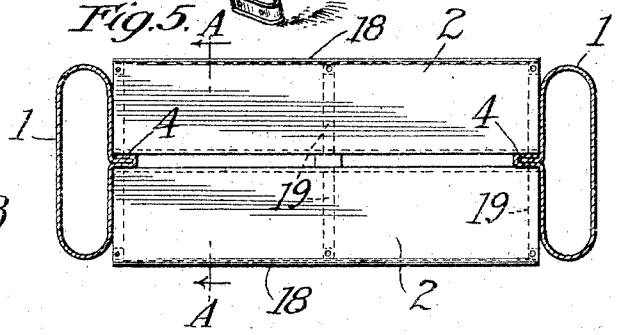


Fig. 6.

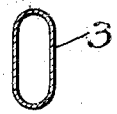


Fig. 7.



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LADDER.

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To all whom it may concern:

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

The main objects of this invention are to provide an improved form of ladder which may be formed entirely of metal and which will at the same time be inexpensive, strong, durable, and light in weight; to provide an improved form of side bars for ladders of this character; to provide an improved form of step construction; and to provide an improved and inexpensive form of footing for preventing the side bars from marring or scratching the surfaces upon which the ladder rests.

A specific construction for accomplishing these objects is shown in the accompanying drawings, in which:

Figure 1 is a perspective view of a step-ladder constructed according to this invention. Fig. 2 is a detail of the connection between one of the rear standards and the braces. Fig. 3 is a top plan of the hinge joint between adjacent front and rear standards. Fig. 4 is a sectional detail, showing the construction of the steps of the ladder and the method of attaching them to the flanges of the front standards, the section being taken on the line A—A of Fig. 5. Fig. 5 is a horizontal section on the line B—B of Fig. 4. Fig. 6 is a sectional detail, showing the shape of the rear standards. Fig. 7 is a sectional detail, showing the construction of the lower ends of the standards.

In the construction shown in the drawings, the ladder comprises a pair of main standards or side-bars 1 rigidly connected together by steps 2 and a pair of rear standards or side-bars 3 hinged to the upper ends of the front standards for supporting them in an inclined position, in the same general manner as in step-ladders of usual construction. The standards 1 are of tubular form and preferably formed of sheet metal bent to the form shown in Fig. 5, the longitudinal side edges of the sheet metal strips being closed upon each other to form the longitudinally extending flanges 4. The tubular standard 1 is preferably of flattened or oblong cross-section, and each of the flanges 4 is preferably located in the middle of one of the broad sides of the respective tube. The flanges 4 on the two standards 1 face each other and lie in substantially the same plane. The rear standards 3 are also preferably of flattened or oblong tubular form, their greatest width being from front to back.

In the form shown, the transverse braces of the rear support consist of tubes 5 which space the standards 3 apart and rods 6 extending longitudinally through the tubes 5 and which are headed at 7 after passing through the standards 3, so as to prevent spreading of said standards. The standards 3 are also braced by diagonal tension braces 8 which have flattened perforated ends interposed between the bars 3 and the ends of the tubes 5, the rods 6 passing through said flattened ends. The braces 8 and the middle brace 5 may be secured together by a fitting 9 at the point where they cross.

The corresponding front and rear standards are connected together by hinge fittings, each comprising a part 10 preferably in the form of a cap closing the upper end of the front standard and having rearwardly extending hinge lugs 11, and a part 12 preferably in the form of a plug fitting into the upper end of the respective rear standard 3 and provided with a hinge lug 13 pivoted to the lugs 11. The lower ends of the standards 1 and 3 are reinforced by means of caps or collars 14 which are open at the bottom so as to permit the insertion of the headed wooden plugs 15 which protect floors and other surfaces upon which the ladder is placed from being scratched by the metal parts.

The steps 2 of the ladder are also formed of sheet metal, and each step is preferably formed of two pieces each bent along a line about midway between its longitudinal edges to an angle-shaped cross-section. The depending parts or flanges 16 of the steps are secured back to back against opposite sides of the flanges 4 of the standards 1, as in Figs. 4 and 5, and the angle between the upper or tread parts of the steps and their depending parts 16 is such that they will lie in the same plane with each other and be substantially horizontal when the ladder is set up for use, as in Fig. 1. The outer edges 18 of the tread parts of the steps are flanged downward so as to stiffen said edges, and the flanges are preferably of rounded form, as shown in Fig. 4. The depending flanges 16 are preferably made of sufficient width to permit them to be connected by a plurality of spaced rivets to each of the flanges 4, so that said depending part

16 will serve to rigidly brace the ladder against racking in the plane of the bars 1. The outer edges 18 of the steps are also supported by means of braces 19 extending at an angle between said edges and the lower edges of the depending parts 16.

The oblong sectional shape of the bars 1 and 3 gives them great strength for sustaining weight upon the steps, and similarly the step construction gives great strength with a minimum weight of material. The steps brace the bars against bending toward or away from each other, and the bracing between the rear side-bars 3 serves a similar function. The material of the bars 1 and 3 is so disposed as to give the greatest strength against bending in a forward or backward direction.

Although but one specific embodiment of this invention is herein shown and described, it will be understood that numerous details of the construction shown may be altered or omitted without departing from the spirit of this invention.

I claim:—

1. A metal ladder, comprising a pair of standards, an integral flange on each of said standards extending along the same intermediate between the front and back edges thereof, the flange on one standard lying in substantially the same plane with that on the other, and a series of steps each comprising two parts lying in substantially the same plane, integral depending flanges on the adjacent edges of said parts and secured back to back against respectively opposite sides of the flanges on said standards, each of said parts being bent over at its outer edge to stiffen said edge.

2. A metal ladder, comprising a pair of standards, an integral flange on each of said standards extending along the same intermediate between the front and back edges thereof, the flange on one standard lying in substantially the same plane with that on the other, a series of steps each comprising two parts lying in substantially the same plane, integral depending flanges on the adjacent edges of said parts and secured back to back against respectively opposite sides of the flanges on said standards, each of said parts being bent over at its outer edge to stiffen said edge, and braces extending between the outer edges of said steps and their depending flanges for supporting said outer edges.

3. A metal ladder, comprising a pair of standards, an integral flange on each of said standards extending along the same intermediate between the front and back edges thereof, the flange on one standard lying in substantially the same plane with that on the other, a series of steps each comprising two parts lying in substantially the same plane, integral depending flanges on the adjacent sides of said parts and secured back to back against respectively opposite sides of the flanges on said standards, each of said parts being bent over at its outer edge to stiffen said edge, and braces adapted to support the outer edges of the steps.

4. In a ladder, the combination of a pair of tubular standards, integral flanges formed on the adjacent sides of said standards and lying in substantially the same plane with each other, and a series of steps each comprising a piece of sheet metal bent to form a tread part disposed transversely to the flanges on said standard and a depending part secured to said flanges, and braces for supporting the outer edge of said tread part.

Signed at New York this 3rd day of February 1909.

OLIVER COLBORNE.

Witnesses:

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