No. 686,871. Patented Nov. 19, 1901.

W. C. & F. H. WARREN.

LADDER.

(Application filed Jan. 14, 1901.)

(No Model.)

Fig. 1.

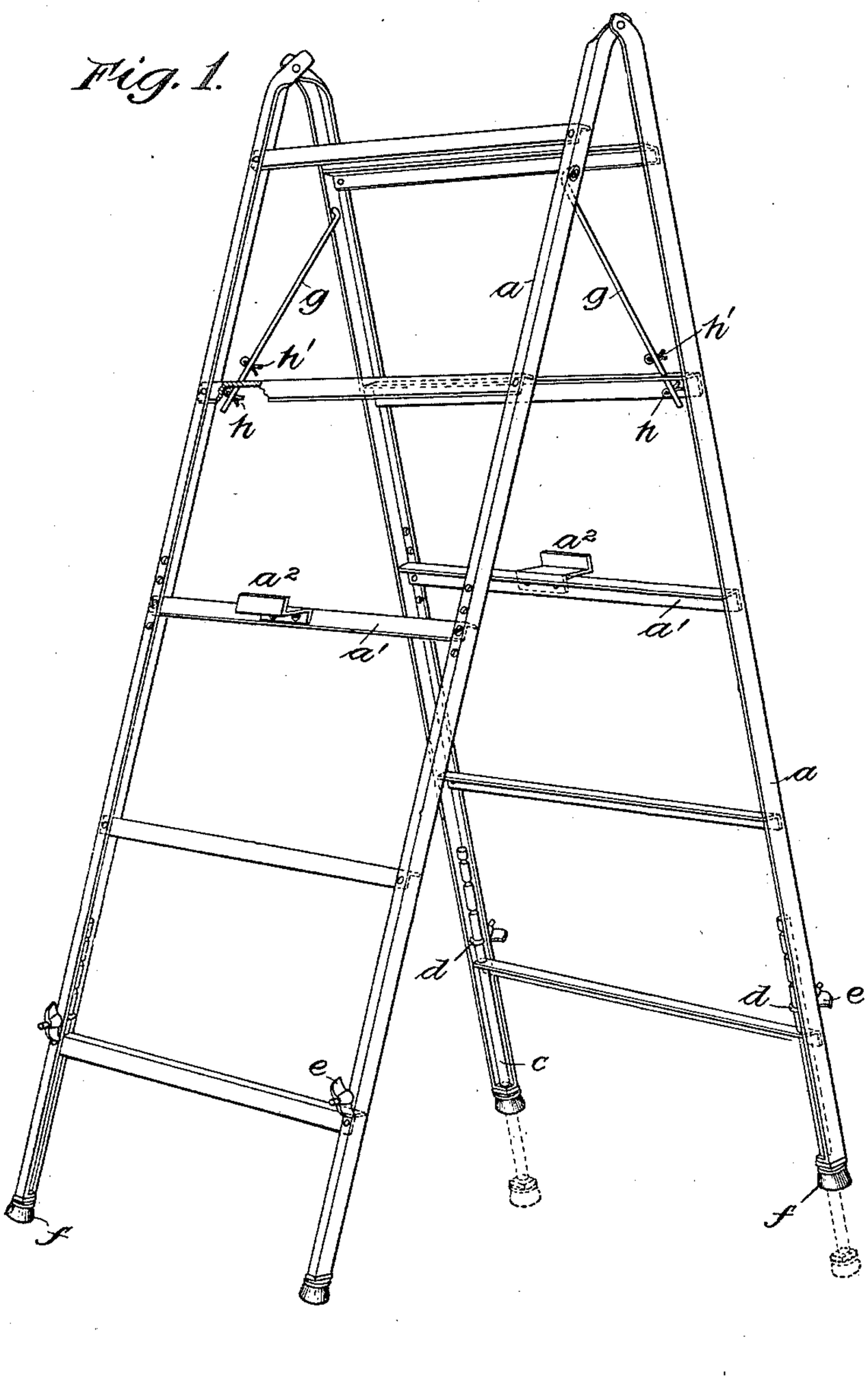
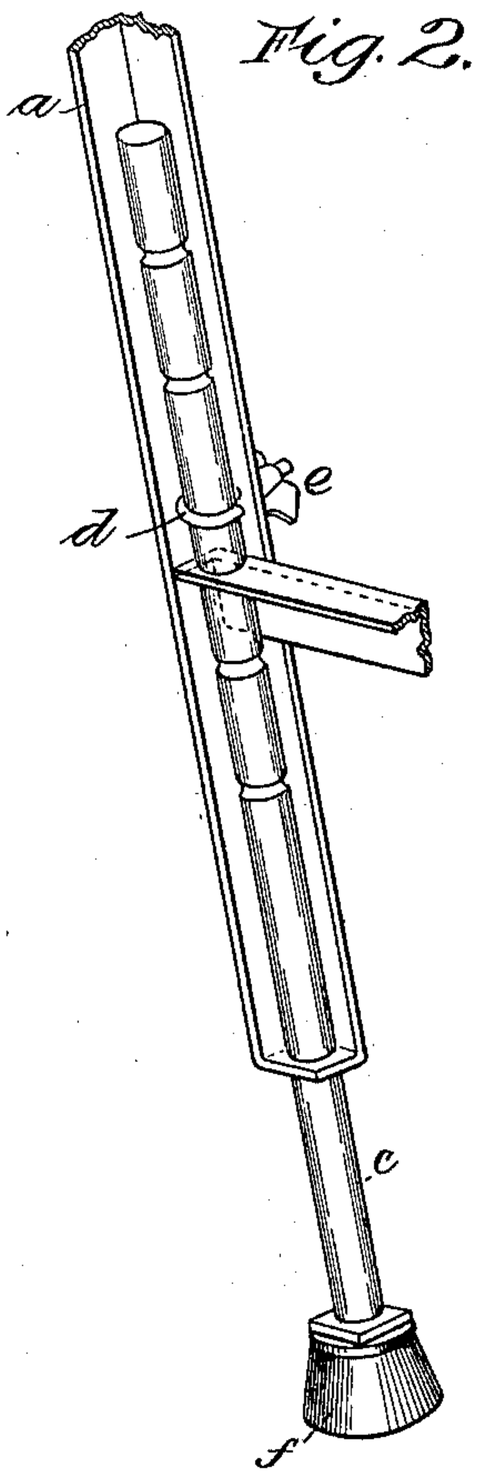


Fig. 2.



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LADDER.

SPECIFICATION forming part of Letters Patent No. 686,871, dated November 19, 1901.

Application filed January 14, 1901. Serial No. 43,261. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM C. WARREN and FRANK H. WARREN, citizens of the United States, residing at Streator, in the county of Lasalle and State of Illinois, have invented a certain new and useful Improvement in Ladders, of which the following is a full, clear, concise, and exact description.

Our invention relates to ladders, and is more particularly concerned with double ladders, such as are used by painters, paper-hangers, and decorators.

It has been our object to provide a ladder of strong and at the same time extremely simple construction which may be used as a "walking ladder," so that the user may move about from place to place upon it as though he were on stilts.

One feature of our invention consists in the manner of hinging the two single ladders together and bracing them. Another feature consists in an improved adjustable tread-bar and foot-rest therefor; and a third feature consists of an improved structure by which the legs of the ladder may be extended to vary its effective length.

We will describe our invention particularly by reference to the accompanying drawings, and the parts or combinations which we regard as new will be pointed out in the appended claims.

Figure 1 is a perspective view of the ladder, and Fig. 2 is a detail view showing more clearly one of the extension-legs.

The same letters of reference are used to designate the same parts in both figures.

As shown in the drawings, the ladder is made almost entirely from steel angle-bars having a substantially L-shaped cross-section, which makes a light but extremely strong and durable construction. Two single ladders are made, as shown, the side bars *a a* of each single ladder being extended at the top, flattened out, and pivotally secured by rivets to corresponding extensions of the mate ladder. The side rails, in other words, are formed at their upper ends to constitute hinges uniting the two single ladders. This is a very strong as well as a very simple construction, and we believe it to be novel with us. The extremities of the steel angle-bars are bent around into a plane at right angles with the line of the rail or leg and bored to receive round extension-rods *c c*, which pass up through these turned-up ends of the side rails and through holes in the lower tread-bar, which register therewith. The extension-rods, in other words, lie within the angle of the side bars at the bottom and telescope therewith. To secure the rods at their various positions of adjustment, we preferably groove them transversely at intervals, as shown most clearly in Fig. 2, and provide threaded hook-bolts *d d*, engaging the rods in these grooves. The hook-bolts pass through the front walls of the legs and are provided with thumb-nuts *e e*, by which they may be drawn up and caused to tightly engage the extension-rods. The lower ends of the legs or extension-rods are preferably furnished with rubber tips or shoes *f f*, whereby the ladder is made more firm and may be used on a carpeted or polished floor without injury to the latter.

The grooves in the extension-legs are cut at definite intervals, so that it is no trouble to adjust all the legs so they will project the same distance from the lower end of the angle-steel side rail. This is done by pulling out each leg one, two, or more notches, as desired, and then fastening it by tightening the thumb-nut *e*.

To brace the ladder securely and at the same time to permit the two members to be moved toward one another, if desired, we provide two reciprocating tie-rods or braces *g g*, as shown, pivoted in a side rail of each single ladder near the top and extending diagonally downward through a hole in the second tread-bar from the top. As the two members of the ladder are moved in and out the tie-rods *g g* slide to and fro in the holes in the tread-bars; but cross-pins *h h*, which are passed through the ends of the tie-rods underneath the tread-bars, prevent the legs from being spread apart more than a certain definite angle. When spread apart as far as they will go, the legs are thus securely braced and held by the tie-rods. If at any time it should be necessary to spread the two members of the ladder apart to a greater angle, as when used on a stairway, the pins *h h* may be pulled out, leaving the tie-rods loose. Other cross-pins or keys *h' h'* are also provided for the tie-rods or braces *g g*, passing through holes therein a short dis-

tance above the tread-bars, whereby the ladder is prevented from closing up more than a certain distance—say until the legs are fifteen inches apart at the bottom. By this means all danger of the ladder falling with the workman on it is avoided, since the legs of the ladder cannot open out or close together except within the limits set by the pins h h'.

One of the principal advantages of our improved ladder is that a person standing upon it may without getting down from the ladder move it to and fro as may be necessary. To do this, the workman straddles the ladder, standing upon the tread-bars a' a', and by shifting his weight from one foot to the other and jerking the ladder he may walk from place to place by the ladder much as though he were upon a pair of stilts.

The range of movement of the two members of the ladder is ample to permit walking with it, the two reciprocating tie-rods sliding to and fro in the tread-bars of the opposite legs within the limits set by the pins. The hinges at the top have play enough so that short steps forward or backward may be taken as well as from side to side.

To facilitate walking with the ladder, we have provided the foot-rests a^2 a^2 upon the tread-bars a' a', which will hold the feet of the workman firmly in place. The tread-bars a', upon which the toe-clips are mounted and upon which the workman stands, are preferably adjustable upon the side rails a a of the ladder. The other tread-bars are riveted to the angle-steel side rails; but in fastening the tread-bars a' screws are used instead of rivets, and a number of holes are provided in the side rails, in any set of which holes the tread-bars a' may be fastened. The workman who uses the ladder may thus adjust the bars a' to the height which suits him best, according to the length of his legs.

It is usual for paper-hangers and decorators to have two double ladders or horses, between which a running-board is stretched to form a scaffold upon which the workmen may walk to and fro. By means of our invention it is only necessary to have the one ladder, since the workman standing upon it may move about from place to place as he desires. It is evident, however, that two of my ladders may be used to support a running-board, the same as ladders heretofore known. The principal advantages of our ladder are its great strength, comparative lightness, simplicity of construction, and general convenience.

It is evident that many of the features or improvements herein set forth may be embodied in wooden ladders as well as those made of steel.

Having thus described our invention, we claim as new, and desire to secure by Letters Patent, the following:

1. A double walking ladder comprising two single ladders, with side rails made from angle-steel, as described, the upper ends of the side rails being extended, flattened and pivoted together to form hinges integral with the ladder, said hinges being loose to allow lateral play between the two ladders, whereby the ladder may be moved forward and backward and from side to side by the person standing upon it, substantially as set forth.

2. A double walking ladder comprising two single ladders hinged together at the top and provided with foot-rests a^2 a^2 upon a pair of tread-bars at the same height, whereby a person standing upon said tread-bars with his feet held by the foot-rests may move the ladder from place to place, as set forth.

3. A ladder comprising a pair of side bars made from angle-steel substantially L-shaped in cross-section, tread-bars uniting the side bars, extension-rods lying within the angle of the side bars at the bottom and telescoping therewith, said extension-rods having circumferential grooves at intervals, and threaded hook-bolts with nuts therefor, engaging said extension-rods in the grooves and adapted to hold them in their various positions of adjustment, substantially as described.

In witness whereof we hereunto subscribe our names this 10th day of January, A. D. 1901.

WILLIAM C. WARREN.
FRANK H. WARREN.

Witnesses:
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OTTO H. NATER.