March 1, 1938. W. A. WARREN ET AL. 2,109,787

AUTOMATIC LEVELING LADDER

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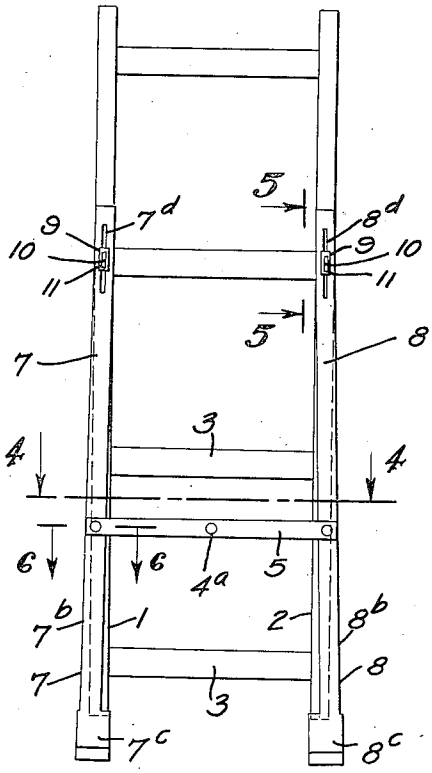


FIG. 1

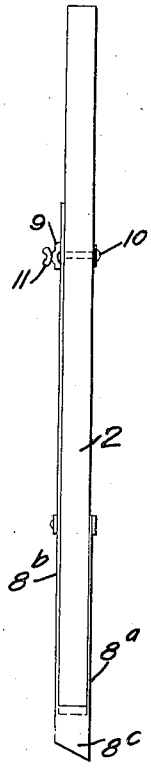


FIG. 2

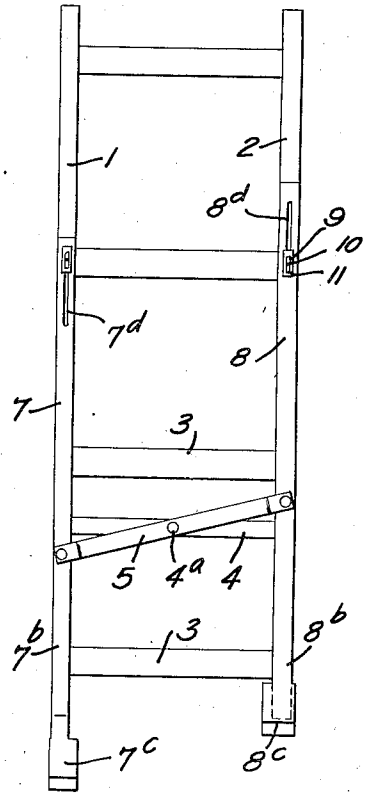


FIG. 3

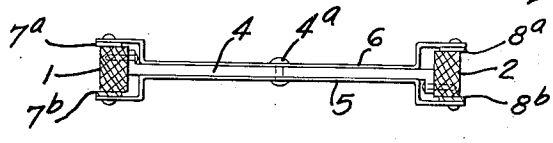


FIG. 4

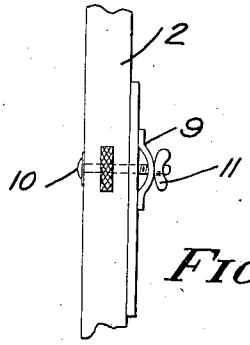


FIG. 5

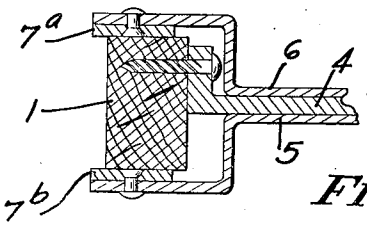


FIG. 6

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AUTOMATIC LEVELING LADDER

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4 Claims. (Cl. 228—63)

Our invention relates to ladders, more particularly to a ladder in which the legs will automatically shift to conform to uneven surfaces upon which the ladder may be positioned while the steps of the ladder remain substantially horizontal or level, and the objects of our invention are:

First, to provide a ladder of this class which is strong and durable and in which the legs of the ladder will automatically shift to accommodate the ladder to uneven surfaces upon which it may be positioned;

Second, to provide a ladder of this class in which the weight of the person stepping on the ladder will automatically shift the legs of the ladder while the main portion of the ladder will remain substantially stationary;

Third, to provide a ladder of this class with means for rigidly securing the legs in varying relation to each other;

Fourth, to provide a ladder of this class with means for providing frictional relation between the shiftable legs and the main legs of the ladder so that the legs shift only when weight is brought to bear on the steps of the ladder;

Fifth, to provide reinforcing means for the lower end of the ladder;

Sixth, to provide an automatic shifting means for the legs of a ladder of this class which is applicable to the ordinary standard two-leg ladder, to the step-ladder, and also to the tripod ladder; and

Seventh, to provide a ladder of this class which is very simple and economical of construction, automatic in its action, durable and efficient.

With these and other objects in view as will appear hereinafter, our invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawing and to the characters of reference thereon which form a part of this application, in which:

Figure 1 is a rear elevational view of our ladder with the legs substantially positioned on a level surface; Fig. 2 a side edge view thereof; Fig. 3 a view similar to Fig. 1 showing one of the legs elevated and the adjusted relation of the other parts of the ladder substantially level with the steps substantially horizontal; Fig. 4 is an enlarged sectional view from the line 4—4 of Fig. 1; Fig. 5 a fragmentary sectional view on an enlarged scale from the line 5—5 of Fig. 1, and Fig. 6 a further enlarged fragmentary sectional view from the line 6—6 of Fig. 1.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawing.

The leg members 1 and 2, steps 3, equalizing stationary bar 4, equalizing shiftable bars 5 and 6, shiftable leg members 7 and 8, spring clamps 9, clamp bolts 10, and wing nuts 11, constitute the principal parts and portions of our ladder.

The legs 1 and 2 and steps 3 are of the conventional form and secured in rigid relation to each other in conventional manner. Shiftably mounted longitudinally with the leg member 1 is a metallic shiftable leg member 7, and shiftably mounted longitudinally with the leg member 2 is a metallic shiftable leg member 8. These leg members 7 and 8 consist of front strip portions 7*a* and 8*a* and rear strip portions 7*b* and 8*b* which are substantially the same width as the leg members 1 and 2, and the front and rear strip members are integrally connected at their lower ends with pocket members 7*c* and 8*c* which are adapted to receive the lower ends of the ladder legs 1 and 2 and in which these lower ends reciprocate with the automatic shifting of the shiftable leg members with the stationary leg members. These pockets are provided on the lower ends of the strips 7*a* and 7*b* and 8*a* and 8*b* to prevent dirt and other matter gathering or getting into the lower end preventing the longitudinal shifting of these leg members 7 and 8 relative to the members 1 and 2.

Secured between the legs 1 and 2 and extending across intermediate the front and rear sides of these leg members 1 and 2 is an equalizing stationary bar 4 which is secured to the inner side of the leg members 1 and 2, as shown best in Figs. 4 and 5, and pivotally mounted on opposite sides of this member 4 are shiftable bars 5 and 6 by means of a rivet member 4*a*, and these members 5 and 6 are pivotally connected at their opposite ends with the shiftable leg members 7 and 8, as shown best in Figs. 4 and 6 of the drawing, preferably by rivet connections. Thus the members 7 and 8 may be shifted, the one upwardly, the other downwardly, upon the pivotal mounting 4*a*, it being noted that these members shift outwardly and inwardly because of the radial movement of the members 5 and 6.

The upper ends of the members 7*b* and 8*b* are provided with slots 7*d* and 8*d* at their upper ends to permit the longitudinal shifting, and through these slots are provided bolts 10 which extend through the legs 1 and 2 of the ladder and there is provided a spring clamp member 9 which is adapted to rest against the upper ends of these

strips 7b and 8b and form a friction clamp for clamping the upper ends of these members against the leg members 1 and 2 and this friction is adjusted by means of wing nuts 11 on the bolts 10.

The operation of the ladder is as follows: The ladder is positioned on the ground with the shiftable leg portions 7c and 8c positioned on uneven surfaces. Then with a person stepping on the steps 3 of the ladder the rigid portion of the ladder consisting of the leg members 1 and 2 and steps 3, will move downwardly and the shiftable leg members 7 and 8 will automatically assume relative positions, as shown in Fig. 3 of the drawing, while the step members 3 remain substantially horizontal, and if desired these leg members 7 and 8 may be clamped by use of the wing nuts 11 on the bolts 10, thus holding them in that certain relative position.

It will be noted that the equalizing shiftable bars shift with the members 7 and 8.

Though we have shown and described a particular construction, combination and arrangement of parts and portions, we do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the scope of our invention the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. In a ladder, a pair of leg members, a plurality of steps rigidly secured thereto spacing said leg members in rigid relation, other shiftable leg members including spaced strip portions extending longitudinally on the front and back side of each of said leg members and shiftable longitudinally thereof and including a main pocket portion extending below the lower ends thereof, means for equalizing the shifting of said shiftable leg members, said means for equalizing including a single stationary bar rigidly supported at its ends on said first mentioned leg members, and a pair of shiftable bars pivotally supported intermediate said first mentioned leg members on said stationary bar and pivotally connected with said last mentioned leg members at the front and back sides of said first mentioned leg members.

2. In a ladder, a pair of leg members, a plurality of steps rigidly secured thereto spacing said leg members in rigid relation, other shiftable leg members including spaced strip portions extending longitudinally on the front and back side of each of said leg members and shiftable longitudinally thereof and including a main pocket portion extending below the lower ends thereof, means for equalizing the shifting of said shiftable leg members, said means for equalizing including a single stationary bar rigidly supported at its ends on said first mentioned leg members, and a pair of shiftable bars pivotally supported intermediate said first mentioned leg members on said stationary bar and pivotally connected with said last mentioned leg members at the front and back sides of said first mentioned leg members, and means for frictionally supporting said shiftable leg members relative to the first mentioned leg members.

3. In a ladder, a pair of leg members, a plurality of steps rigidly secured thereto spacing said leg members in rigid relation, other shiftable leg members including spaced strip portions extending longitudinally on the front and back side of each of said leg members and shiftable longitudinally thereof and including a main pocket portion extending below the lower ends thereof, means for equalizing the shifting of said shiftable leg members, said means for equalizing including a single stationary bar rigidly supported at its ends on said first mentioned leg members, and a pair of shiftable bars pivotally supported intermediate said first mentioned leg members on said stationary bar and pivotally connected with said last mentioned leg members at the front and back sides of said first mentioned leg members, means for frictionally supporting said shiftable leg members relative to the first mentioned leg members, said means including clamp means adapted to provide rigid connection between said shiftable leg members and said first mentioned leg members.

4. In a ladder, a pair of leg members, a plurality of steps rigidly secured thereto spacing said leg members in rigid relation, other shiftable leg members including spaced strip portions extending longitudinally on the front and back side of each of said leg members and shiftable longitudinally thereof and including a main pocket portion extending below the lower ends thereof, means for equalizing the shifting of said shiftable leg members, said means for equalizing including a single stationary bar rigidly supported at its ends on said first mentioned leg members, and a pair of shiftable bars pivotally supported intermediate said first mentioned leg members on said stationary bar and pivotally connected with said last mentioned leg members at the front and back sides of said first mentioned leg members, means for frictionally supporting said shiftable leg members relative to the first mentioned leg members, whereby when one shiftable leg member moves in one direction, the other moves in the opposite direction and the pocket means at the extended ends of each of said shiftable leg members in which the lower ends of said first mentioned leg members are shiftably mounted.

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