No. 645,867. Patented Mar. 20, 1900.

J. G. MILHIME.

STEP LADDER.

(Application filed Apr. 21, 1899.)

(No Model.)

Fig. I.

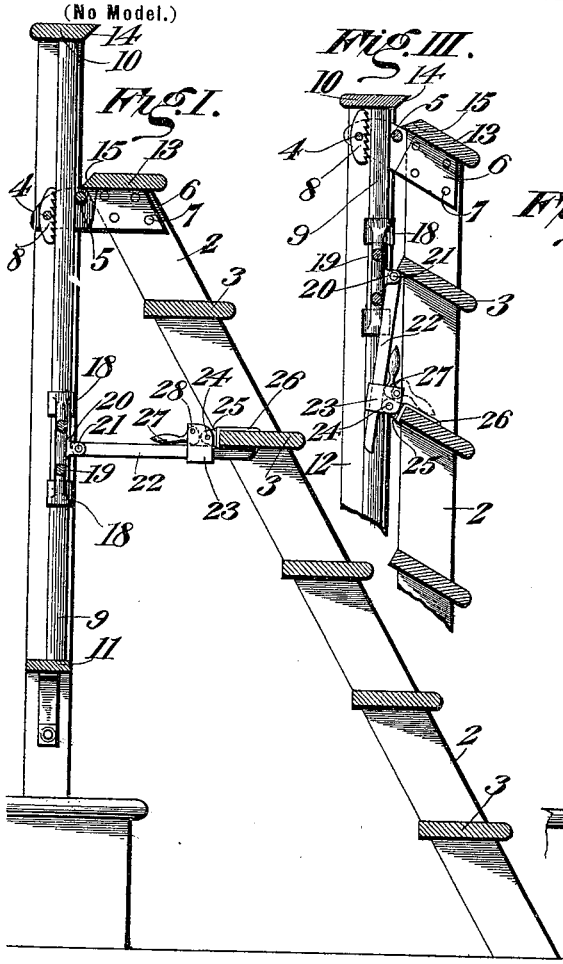


Fig. III.

Fig. II.

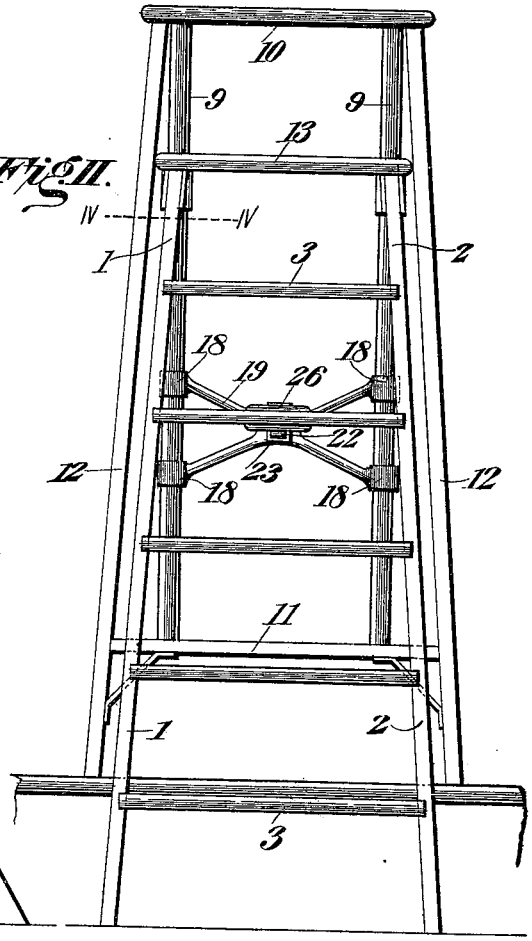


Fig. IV.

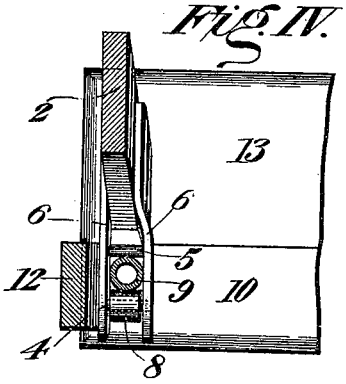
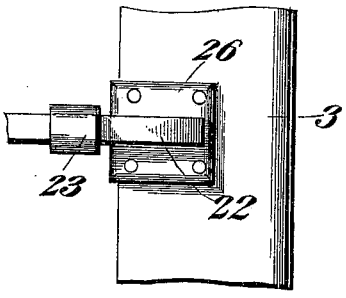


Fig. V.



Witnesses

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JOHN GOTTLIEB MILHIME, OF CHICAGO, ILLINOIS.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 645,867, dated March 20, 1900.

Application filed April 21, 1899. Serial No. 713,930. (No model.)

To all whom it may concern:

Be it known that I, JOHN GOTTLIEB MILHIME, of Chicago, in the county of Cook, State of Illinois, have invented certain new and useful Improvements in Step-Ladders, of which the following is a complete specification, reference being had to the accompanying drawings.

The object of my invention is to produce improvements in step-ladders of the type shown in my application, Serial No. 631,865, filed April 12, 1897, whereby the stability of the means of adjustment may be augmented, and, more especially, compensation for any wear may be made.

In the accompanying drawings, Figure I is a longitudinal vertical section of my ladder, showing it adjusted in use upon a floor and a stair-step. Fig. II is a front elevation of the same. Fig. III illustrates in section the upper part of the ladder folded. Fig. IV is a section on the line IV IV of Fig. II looking upwardly. Fig. V is a bottom plan view of a portion of the step to which the spreader-arm is secured and showing the collar by which said arm is adjustably secured to the step.

Referring to the figures on the drawings, 1 and 2 indicate the two side pieces, and 3 the intermediate steps, of a step-ladder, which may be of any ordinary or suitable construction.

Adjacent to the end of each of the side pieces 1 and 2 I provide a pair of engaging members 4 and 5, which preferably consist of a pair of pins extending between and secured to each member of a pair of plates 6, secured to opposite sides of the respective frame-pieces, (see Fig. IV,) as by bolts or rivets 7. Each pair of plates projects rearwardly from the side piece to which it is secured.

The pins 4 and 5 are of any suitable shape and size, and one is provided with a broad bearing-piece 8, which moves freely upon the pin 4 and is preferably provided with a roughened or serrated edge in contact with the leg 9, which works between the pin 5 and the bearing-piece 8, secured to the pin 4. There are two legs 9, that are parallel to each other, being constituted into a rectangular supporting-frame by union with a cross-head 10 and lower cross-piece 11. The opposite extremities of the cross-head 10 and cross-piece 11 are respectively, preferably, united to flaringly-disposed legs 12. By this arrangement the parallel legs 9, being adapted to be adjusted between the engaging members above specified, are supplemented by the presence of the legs 12, which afford a steadier lateral support to the ladder than that which would be afforded in a rectangular frame comprising only parallel legs. The cross-head 10 and top step 13 have opposite beveled faces 14 and 15, respectively, by which both of said members may be brought to the same plane and made to constitute, in effect, the top step or platform-head of an ordinary step-ladder.

When the legs 9 and the side pieces 1 and 2 are brought into parallel relation, as they are when the ladder is folded, as shown in Fig. III, the legs 9 slide freely between the bearing-pieces 8 and pins 5, and the legs 9 may then be adjusted to any desired height. Afterward by spreading the legs 9 from the side pieces 1 and 2, as shown in Fig. I, the bearing-pieces 8 and pins 5 are caused to engage and hold the legs 9, respectively, and secure the two parts of the ladder in rigid relation one to the other. For preserving this adjustment and engagement I provide a sliding frame upon the legs 9, consisting, preferably, of collars 18 and cross-braces 19, uniting the collars. Preferably at the juncture of the cross-braces 19 I provide a lug 20, to which is pivoted, as indicated at 21, a spreader-arm 22, the spreader-arm being pivoted to one of the steps 3, under which, beyond the pivotal point, it projects and is adapted to fix the adjustment of the sliding frame; but under wear or strain the adjustment may become loose, and for that reason I prefer to provide means for regulating the spread of the legs from the ladder, which in the simple form of embodiment which I prefer consists of a collar 23, through which the arm 22 may slide freely. The collar is pivoted, as indicated at 24, to a lug 25 upon a frame 26, secured to and preferably upon the opposite sides of the step 3, above referred to.

A cam 27, pivoted, as indicated at 28, to the collar and working therein, is adapted to secure the arm 22 to the collar or release it therefrom, as required.

By the aid of the regulating mechanism

above described or any suitable equivalent therefor all wear in the parts may be compensated for and a rigid and firm engagement of the engaging members with the legs 9 may be at all times insured.

What I claim is—

1. The combination with the side pieces of a ladder provided, respectively, with engaging members, of a supporting-frame comprising a pair of flaringly-disposed legs, and a pair of parallel legs working between the engaging members, respectively, the engaging members being so located as to receive and hold the legs only when they are set at an angle to the ladder, and means for fixing the legs at such an angle to the ladder as to compel the said engagement, substantially as set forth.

2. The combination with a ladder proper provided with engaging members, of a supporting-frame comprehending legs working between said engaging members, respectively, the engaging members being so located as to receive and hold the legs only when they are set at an angle to the ladder, a spreader-arm adapted to regulate said angle of the legs to the ladder, and spreader-regulating mechanism, substantially as set forth.

3. The combination with a ladder proper provided with engaging members, and a supporting-frame comprehending legs working between said engaging members, the engaging members being so located as to receive and hold the legs only when they are set at an angle to the ladder, of a sliding frame on the legs, a spreader-arm uniting said frame and the ladder proper, and spreader-regulating mechanism, substantially as set forth.

4. The combination with a ladder proper provided with engaging members, of a supporting-frame comprehending legs working between the engaging members, respectively, the engaging members being so located as to receive and hold the legs only when the supporting-frame is set at an angle to the ladder, a sliding frame on the legs, a collar pivotally united to the ladder, a spreader-arm uniting the sliding frame and collar, and means for adjustably connecting the collar and spreader-arm, substantially as set forth.

5. The combination with a ladder proper provided with engaging members, of a supporting-frame comprehending legs working between the engaging members, a sliding frame on the legs, a collar pivotally united to the ladder, a cam working in the collar, and a spreader-arm adjustably connecting the sliding frame and the collar through the aid of the cam, substantially as set forth.

In testimony of all which I have hereunto subscribed my name.

JOHN GOTTLIEB MILHIME.

Witnesses:
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