Oct. 13, 1925.

F. J. LE BEAU

1,556,853

STEPLADDER HINGE

Filed Feb. 18, 1924

Fig. 2.

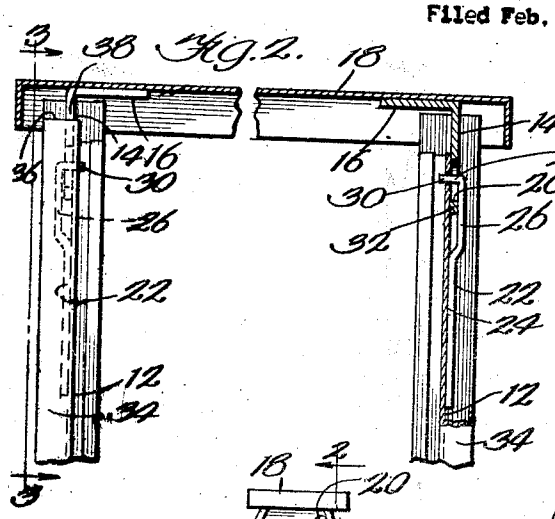


Fig. 4

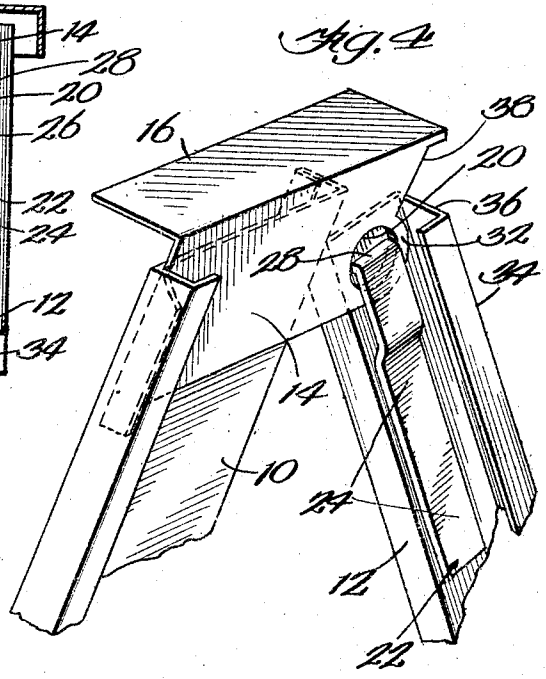


Fig. 1.

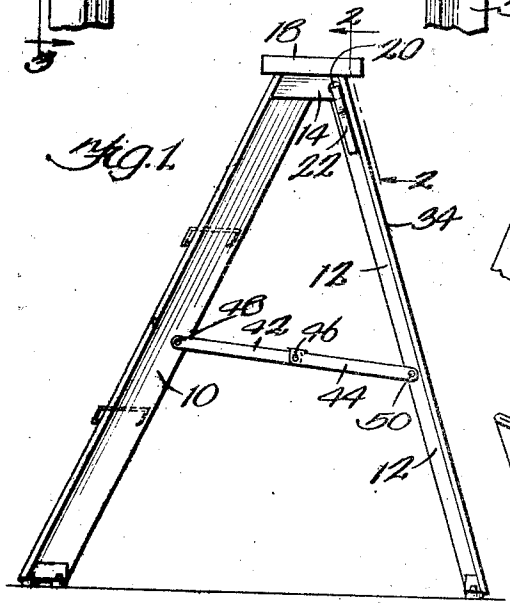


Fig. 5.

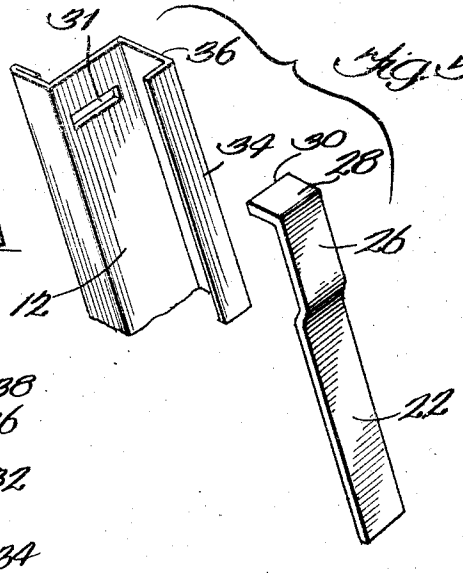
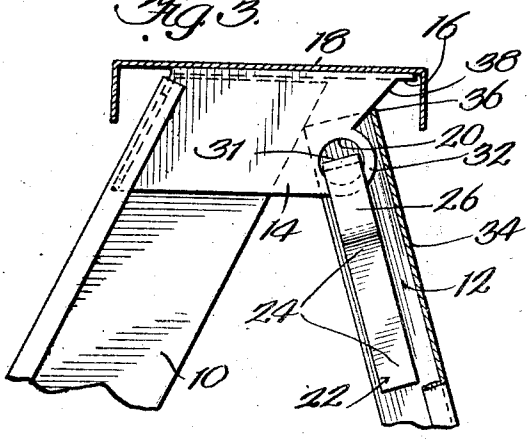


Fig. 3.



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Patented Oct. 13, 1925. 1,556,853

UNITED STATES PATENT OFFICE.

FERNANDO J. LE BEAU, OF NILES CENTER, ILLINOIS, ASSIGNOR OF ONE-THIRD TO ERICK BLAINE THELIN AND ONE-THIRD TO TITUS L. THELIN, BOTH OF CHICAGO, ILLINOIS.

STEPLADDER HINGE.

Application filed February 18, 1924. Serial No. 693,464.

To all whom it may concern:

Be it known that I, FERNANDO J. LE BEAU, a citizen of the United States, residing at Niles Center, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Stepladder Hinges, of which the following is a specification.

Generically, this invention relates to hinges for use between two angularly disposed members to be pivoted together. More particularly, it relates to the hinge connection between the two upright supports of a step-ladder, more specifically such a step-ladder made wholly of metal. The object of the invention is to provide a hinge construction of the utility outlined, such as can be formed by simple punching and welding operations by the use of a minimum number of parts in addition to the necessary uprights of the ladder which are to be pivotally secured together. The invention consists in mechanism for attaining the foregoing and other objects which can be very easily and cheaply made; which is satisfactory in use and is not readily liable to get out of order. More particularly the invention consists in numerous features and details of construction which will be hereafter more fully set forth in the specification and claims.

Referring to the drawings in which similar numerals indicate the same parts throughout the several views:

Figure 1 is a side elevation of a metal step-ladder equipped with the device of this invention.

Figure 2 is a side detail elevation taken on the irregular line 2—2 of Figure 1.

Figure 3 is a side detail view taken on the line 3—3 of Figure 2.

Figure 4 is a perspective view of the parts entering into the hinge construction of this invention.

Figure 5 is a perspective view showing what will hereafter be described as the movable upright of the ladder removed from the remaining parts of Figure 4.

Every step-ladder comprises in the first instance two upright parts 10 and 12, the former the ladder proper, the latter the diagonal brace therefor, both of which are in fact in ordinary operation movable with reference either one to the other but for convenience of description hereafter, the ladder 10 will be referred to as "the stationary upright" and the brace 12 as "the movable upright." The problem solved by this invention is to conveniently and economically hinge this movable upright to the stationary upright.

As clearly shown in Figure 2 and in accordance with conventional practice, a separate hinge is provided at each side of the ladder 10 but as these hinges are identical in construction, except that they are reversals, one of the other, the single hinge shown in Figures 3, 4 and 5 will be described.

In carrying out this invention, a horizontally disposed cross-plate 14 is rigidly secured to the top of the adjacent portion of the stationary upright 10 by any suitable means—such as welding. In the particular form here shown, this cross-plate is in the form of an angle iron having an upper flange 16 on which rests the top step 18 of the completed ladder. This plate 14 is made substantially longer than the width of the stationary upright 10 so as to overlap as shown in Figures 3 and 4 the web of the metal upright 12 and a suitable perforation 20 is formed in this cross-plate 14 at the point where it overlaps and contacts the movable upright 12. This perforation 20 is made preferably circular in form so as to form a pivotal bearing in connection with a bar 22 rigidly, preferably by welding, secured to the inside of the upright 12 along the location 24 to one side of the perforation 20. The upper portion of the bar 22, which is not thus welded to the upright 12, is in initial construction so shaped that as shown it first bends outward from the web of member 12 in the portion 26 parallel thereto and then at the perforation 20 turns sharply into and through said perforation in the right angle part 28, the extreme end 30 of this right angled portion being preferably but not necessarily entered in the slot 31 especially provided for it in the web of movable support member 12, thus getting the more or less rough end out of the way and bracing the pivot support for member 14. The parts are so shaped that when assembled as just described, the part 28 of the bar 22 forms a hinge pivot journaled in perforation 20; and, when the parts are thus assembled, the upright 12 carried by

such a particular hinge rocks freely within proper limits about this hinge with reference to stationary upright 10.

In the actual construction shown in the drawings, the cross-plate 14 is rounded off in the curve 32 concentric with perforation 20 so that no part of the plate interferes with the flange 34 of movable upright 12 except as the end 36 strikes and stops against an angular cut 38 formed at the extreme edge of the plate as is more fully shown, described and claimed in my previous application, Ser. No. 686,759, filed January 17, 1924.

Bearing in mind that the uprights 10 and 12 and some sort of a cross plate corresponding to plate 14 have to be provided in any step-ladder of this class, it will be seen that a hinge is provided by simply perforating the cross-plate 14 at 20 and, if desired, perforating the upright 12 at 31 and then providing and welding in place the single bar 22, thereby reducing to a minimum the number of parts required and the consequent expense of construction.

The ladder uprights 10 and 12 are conventionally connected together at a point midway of their height and a substantial distance remote from the hinge by a collapsible connecting device of some sort, specifically two links 42 and 44 pivoted together at 46, link 42 being pivotally connected to upright 10 at 48 and link 44 being pivotally connected to upright 12 at 50. This collapsible connection is made exactly the right length to come into action, restraining a further spreading of the members 10 and 12 at exactly the instant the upper end 36 of member 12 contacts surface 38 of plate 14, as heretofore described, to prevent further opening of the hinge mechanism at the top of the ladder. In other words, the stop device just referred to on the hinge operates at exactly the instant link connection 42 and 44 becomes taut, and each anti-spreading mechanism thus simultaneously cooperates with and reinforces the other.

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

1. In a metal step-ladder, two upright support members angularly disposed with reference to each other, for pivotal connection, a cross-member projecting from one of said members overlapping the second member, there being a perforation in the cross member and a part welded at one end to said second member overlapping at its other end the cross member, thence passing through and journaled in said perforation in the cross member, and again engaging said second member.

2. In a metal step-ladder, two angularly disposed upright support members, a flat cross-plate rigid with one upright, overlapping the second upright and carrying a circular perforation where it overlaps the second upright, and a flat bar rigidly secured at one end to the second upright adjacent to the perforation in the plate, bent through said perforation in the plate to form a pivotal connection therein and thence into a perforation provided for it in said second upright.

3. In a metal step ladder, two overlapping members to be pivoted together, there being a perforation in one of the members where it overlaps the second and a third member welded to the second member extending from a point at one side of the perforated member, over the edge of said perforated member and thence into said perforation to form a pivot therein, the free end of the third member entering an opening provided for it in the member to which it is welded.

4. In a step-ladder, two angularly disposed upright members, a hinge connection between said upright members, means at the hinge preventing the upright spreading beyond a given angle and a collapsible connection, between the uprights, remote from the hinge, of such length that it becomes tight and effective when the uprights are spread to exactly the point where the preventing means at the hinge operates.

5. A hinge construction comprising two adjoining plates provided with registering openings; and a strip secured at one end to one of said plates, the other end of said strip being bent to pass through both of said openings, substantially as described.

6. A hinge construction comprising two adjoining plates one of which is provided with a circular opening and the other a rectangular slot registering centrally with said circular opening; and a strip secured to one of said plates at one end, the other end of said strip being bent to extend through said openings, substantially as described.

In witness whereof, I have hereunto subscribed my name.

FERNANDO J. LE BEAU.