

June 9, 1925.

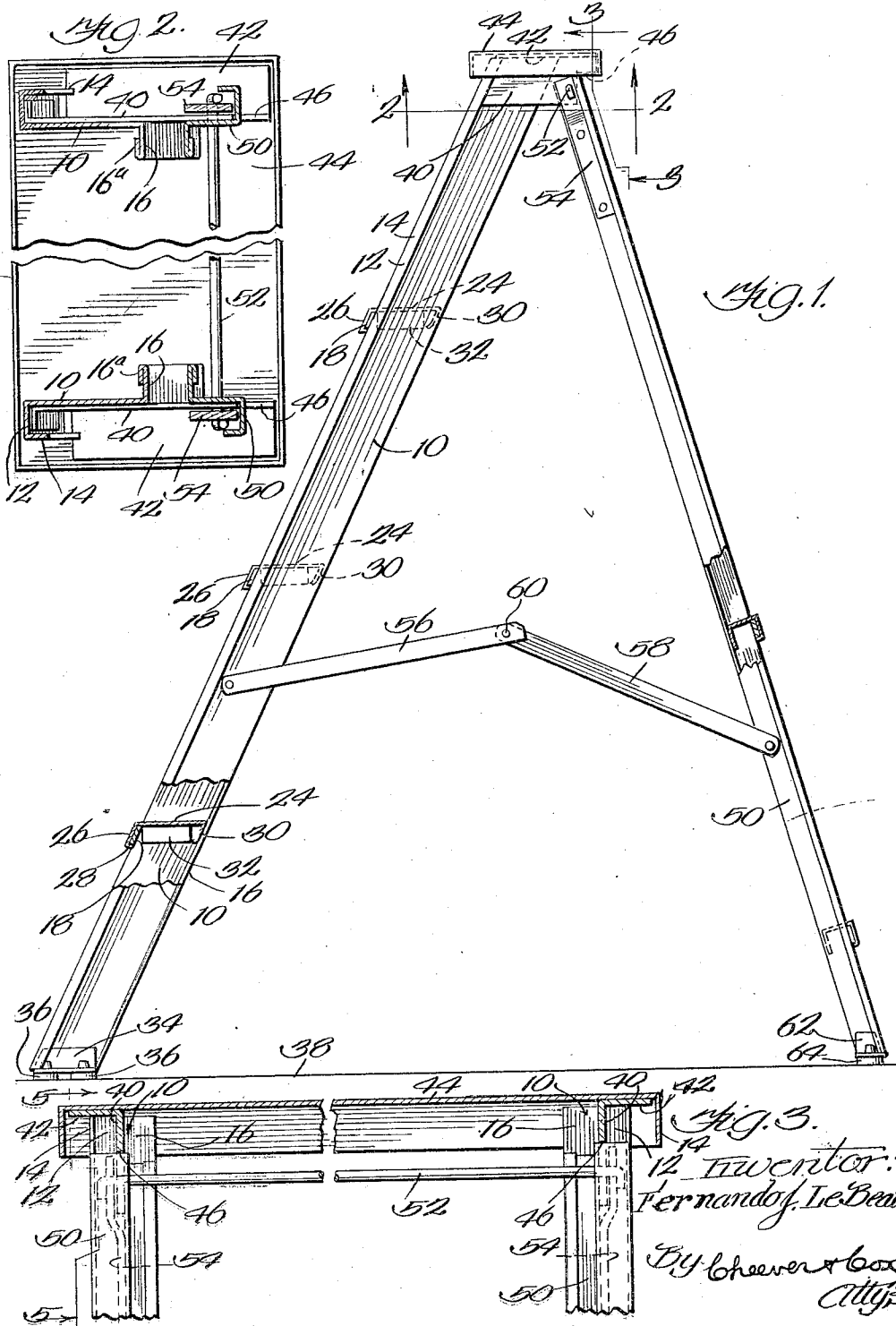
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F. J. LE BEAU

METAL STEPLADDER

Filed Jan. 17, 1924

2 Sheets-Sheet 1



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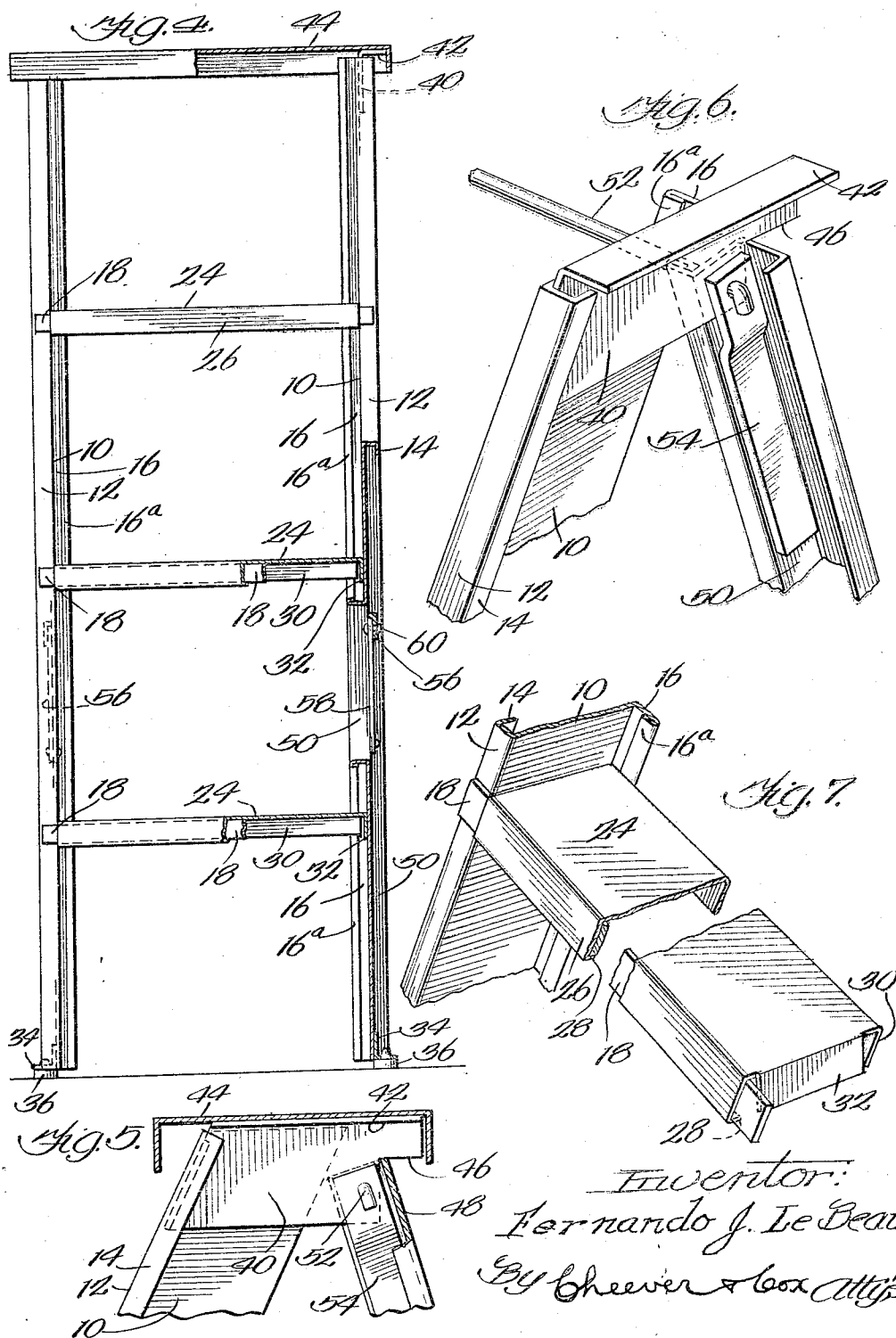
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2 Sheets-Sheet 2



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.

METAL STEPLADDER.

Application filed January 17, 1924. Serial No. 686,759.

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 Metal Stepladders, of which the following is a specification.

This invention relates to collapsible metal stepladders for use in offices, factories and the like where general fireproof construction is required.

The object of this invention is to provide a ladder wholly of metal, providing a maximum of strength for a minimum of weight; which can be easily and cheaply made; which is satisfactory in use and not readily liable to get out of order.

The invention consists in numerous features and details of construction which will be hereafter more fully set forth in the specification and claims. Among these features of prime importance is an automatic stop at the top of the device between the ladder and prop sections which prevents their spreading beyond a given point, said device dispensing with the conventional rope or link of ordinary devices of this kind.

Another important feature is the step construction and the method of attaching it to the uprights of the ladder to afford a thoroughly strong and efficient step with the consumption of an unusually small amount of metal.

A further feature consists in a novel cross-section for the ladder uprights which increases the strength while reducing the normal weight of the device.

Referring to the drawings in which like numerals designate the same parts throughout the several views:

Figure 1 is a side elevation of mechanism illustrating this invention in its preferred form.

Figure 2 is an inverted plan view taken on the line 2—2 of Figure 1.

Figure 3 is a side detail view, certain parts being taken in section on the line 3—3 of Figure 1.

Figure 4 is a front view of the ladder, certain parts being shown in section.

Figure 5 is a side view, partially in section, on the line 5—5 of Figure 3.

Figure 6 is a perspective view of the

hinge and stop construction with the top of the ladder removed.

Figure 7 is a perspective view of a step and its application to one ladder upright.

In order to make a ladder of unusually strong yet light construction, separated parallel Z-shaped members 10 of special construction are provided. Each one of these side members has a relatively wide upright web, to which the number 10 is applied in Figure 7, carrying a top, horizontal flange 12 terminating in a downwardly positioned flange 14 parallel to the main web of member 10. The opposite or lower edge of the web 10 carries a comparatively wide, base flange 16, rolled over upon itself in the reinforcing strip 16^a.

Extending across the side members 10 and preferably spot-welded direct to the upper flanges 12 of the side members are horizontally disposed, properly spaced cross-bars 18, supporting throughout the lengths of the bars between the uprights the channel shaped steps 24 of the ladder. These steps are, as clearly shown in Figure 7, of generally channel iron shape except that the front flange 26 of the step which embraces the adjacent bar 18 is made wider than the bar and has its lower edge turned in in the horizontally extending lap 28 (Figure 7). Each step is made of proper length to occupy the entire horizontal space between the webs of the uprights 10 and, as the bars are straight, the front flanges 26 of the steps wrap the bars throughout substantially their lengths thereby improving both the strength and appearance of the structure. The fact that the uprights are Z bars with front or top flanges turned in opposite directions permits this wrapping of the bars without cutting the steps except at their ends. Each step 24 is made of exactly the proper width so that the rear flange 30 of the step bears closely against and wedges against the bottom flanges 16—16^a of the side members 10. At the end of each step 24 is a downwardly turned flange 32 fitting against and spot-welded or otherwise suitably secured to the web portion of the adjacent upright 10. Attention is called to the fact that, as shown in Figure 1, the steps 24 are at an acute angle to the longitudinal axes of the uprights 10, and the flanges 30 of the steps 24 are parallel to the central

axes of said uprights, with the result that the more weight there is placed on a particular step 24, the harder the rear flange 30 of that step will bear against the bottom flanges 16 of the side members 10, thereby

securing efficient supporting of the step with reference to the ladder side members. By the use of Z shaped uprights 10, arranged as shown, and the steps carried upon the cross bars 18, specifically by being wrapped around these bars, it is possible to assemble the ladder by placing the two uprights in proper separated relation, then simply shoving each step from the front into place and spot-welding the bars 18 to the uprights. Conversely, if repairs are necessary, the only requirement is to break the spot welds, whereupon a given step can be slipped out for repair or replacement without disturbing the rest of the ladder. The necessary insertion or removal of a step from between the uprights is made by straight horizontal sliding action without any of the twisting and turning which would be necessary were channel irons or I-beams with inwardly turned flanges used as in prior construction.

The lower ends of the side members 10 terminate in suitable feet 34, spot welded or otherwise suitably secured thereto, carrying anti-friction devices, specifically rubber cushions 36 engaging the floor 38 to prevent slipping of the device.

Rigidly secured to the top of each side member 10, by any suitable means, such as spotwelding, and extending rearwardly therefrom is a horizontally disposed angle iron 40 having its upper flange 42 horizontal and supporting an adjacent end of the upper web or step 44 of the ladder. These plates 40 are cut away behind the uprights 10 in notches 46, adapted to receive and afford bearing for the top flanges 48 of downwardly inclined rear ladder supports 50. One of these rear supports 50 is provided immediately behind each ladder upright 10 and is pivoted near its upper end on a horizontal rod 52 connecting parallel plates 40 heretofore referred to. The pivot support for members 50 is reinforced by bearing plates 54, rigidly attached by spot-welding or otherwise to the members 50 and journaled on the outer ends of the rod 52, heretofore referred to. The whole construction of the upper end of each support 50 is such that when the ladder is opened, as shown in Figure 1, the upper end of each flange 48 of the adjacent member 50 takes bearing in the notch 46 of the adjacent plate 40, thereby preventing separation of the ladder mechanism 10 and the brace supports 50 beyond the position shown in Figure 1.

For convenience, the ladder and the brace support are shown in Figure 1 as connected together by conventional links 56 and 58,

pivoted together at 60; but, except as an insurance against spreading of the ladder should there be a break at the top of the ladder mechanism, these links may be dispensed with without departing from the invention.

The lower end of each brace member 50 is equipped with a foot 62, suitably attached by spot-welding or otherwise, the same carrying a cushion 64 engaging the floor 38.

The construction described produces a ladder which has all the advantages set forth in the opening statement.

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

1. In mechanism of the class described, a pair of parallel-separated upright normally inclined Z members with their lower flanges pointed inward toward each other, a straight bar across the upper flanges of said upright members, and an inverted U-shaped step filling the space between the uprights, having one flange over said bar from upright to upright and the other flange bearing on the rear flanges of the Z bar.

2. In mechanism of the class described, a pair of parallel-separated upright normally inclined Z members with their lower flanges pointed inward toward each other, a straight bar across said upright members, an inverted U-shaped step substantially filling the space between the uprights, having one flange over said bar from upright to upright and the other flange bearing on the rear flanges of the Z bars, and a lip on the flange of the step turned around the bar.

3. In mechanism of the class described, a pair of parallel-separated upright normally inclined Z members with their lower flanges pointed inward toward each other, a straight bar across said upright members, an inverted U-shaped step substantially filling the space between the uprights, having one flange over said bar from upright to upright and the other flange bearing on the rear flanges of the Z bars, and independent means at one end of the step securing it to the web of the adjacent upright.

4. In mechanism of the class described, a pair of parallel-separated upright normally inclined Z members with their lower flanges pointed inward toward each other, a straight bar across said upright members, an inverted U-shaped step substantially filling the space between the uprights, having one flange over said bar from upright to upright and the other flange bearing on the rear flanges of the Z bars, a lip on the flange of the channel turned around the bar, and independent means at one end of the step securing it to the web of the adjacent upright.

5. In mechanism of the class described, a ladder, a pair of parallel plates 40 extending rearwardly therefrom, a ladder

support pivoted to said plates and a notch 46 in each plate entered by the adjacent upper end portion of the support when the ladder and support are separated to a predetermined point, to thereby prevent separation of the ladder and support beyond a given predetermined angle.

6. In mechanism of the class described, a ladder upright 10, a ladder support 50, a reinforcing member 54 on the support, a plate 40 on the ladder upright fitting between the support and the re-inforcing member, and a pivot member through the members 40-50-54, all the parts being arranged and disposed as shown and described for the purposes set forth.

7. In a ladder, two separated, normally inclined uprights, having parallel webs with top flanges turned away from each other, a step fitting between the webs of the uprights, and a bar of greater length than the step, carrying the step by its front edge, applied across the uprights and rigidly secured to the top flanges thereof.

8. In a ladder, two separated, normally inclined uprights, having parallel webs with top flanges turned away from each other, a step fitting between the webs of the uprights, and a bar of greater length

than the step, carrying the step by its front edge, applied across the uprights and rigidly secured to the top flanges thereof, and a flange on the lower edge of each upright engaged by the rear portion of the step as described.

9. In a ladder, two separated, normally inclined uprights having parallel webs with top flanges turned away from each other, a step fitting between the webs of the uprights, and a bar of greater length than the step, wrapped by a flange on the step, applied across the uprights and rigidly secured to the top flanges thereof.

10. In a ladder, two separated, normally inclined uprights having parallel webs with top flanges turned away from each other, a step fitting between the webs of the uprights, a bar of greater length than the step, wrapped by a flange on the step, applied across the uprights and rigidly secured to the top flanges thereof, and a flange on the lower edge of each upright engaged by the rear portion of the step as described.

In witness whereof, I have hereunto subscribed my name.

FERNANDO J. LE BEAU.