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M. GALEN

2,718,346

LADDERS

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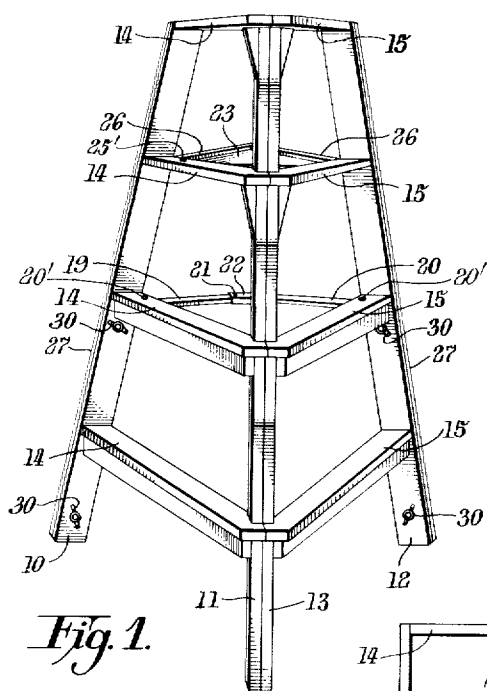


Fig. 1.

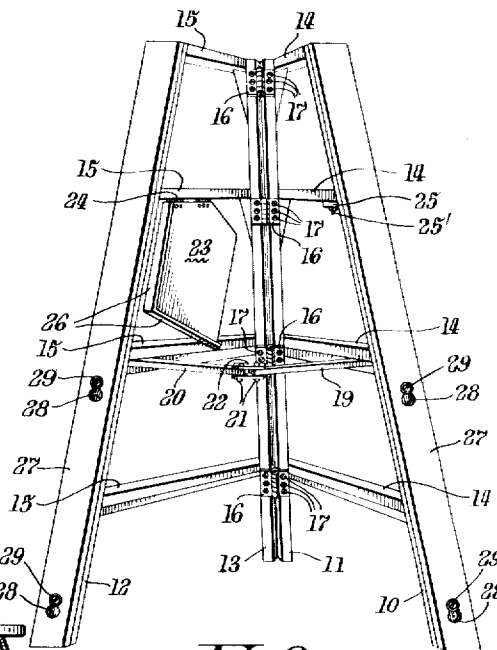


Fig. 2.

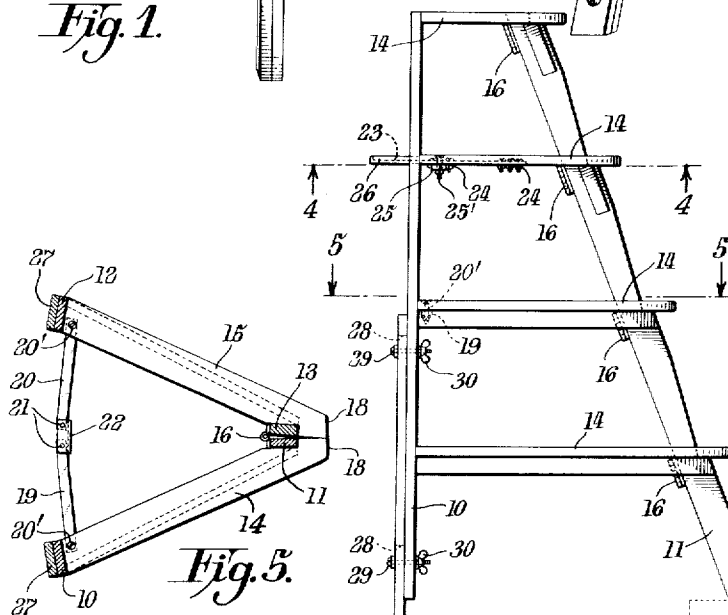


Fig. 3.

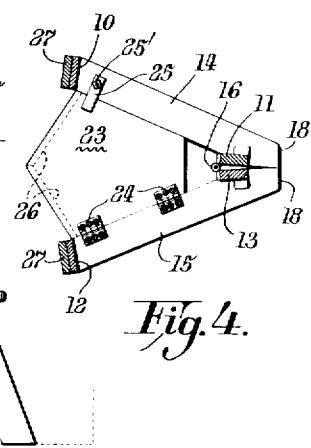


Fig. 4.

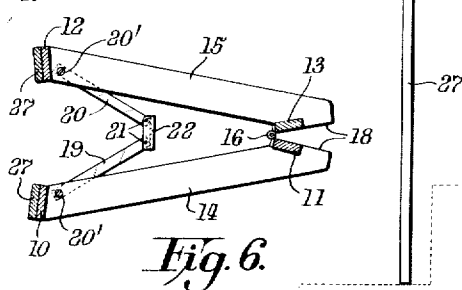


Fig. 5.

Fig. 6.

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LADDERS

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This invention relates to ladders and, more particularly, to foldable stepladders.

The primary object of the present invention is to provide a stepladder which will afford an extremely stable and safe working platform for the artisan, and at the same time a ladder which can readily be manufactured at a reasonable cost.

A further object of the present invention is to provide a stepladder constructed in a manner which will enable the artisan to stand close to and face a vertical wall while standing on any steps of the ladder.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations, and arrangements of parts hereinafter set forth and illustrated in the accompanying drawings of a preferred embodiment of the invention from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the accompanying drawings:

Fig. 1 represents a front perspective view of the present ladder in its open or operable position.

Fig. 2 represents a rear perspective view of the unit disclosed in Fig. 1.

Fig. 3 represents a side elevation view of the present ladder illustrating the same with its auxiliary stiles or legs in their extended position so as to permit the ladder to be used, for example, on stairs.

Fig. 4 is a sectional view taken substantially along the line 4—4 of Fig. 3.

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 3, and illustrating the ladder in its open or operable position.

Fig. 6 represents a sectional view of the same type as disclosed in Fig. 5, but illustrating the ladder in its partially closed position.

Like reference characters refer to like parts in the different figures.

Referring particularly to the drawings, the present ladder comprises essentially a pair of sections of which each includes a pair of upright laterally spaced stiles tapering upwardly to define substantially a trapezoidal figure having a wide base and a narrow top. More specifically, and referring particularly to Figs. 1 and 3, a first section includes a pair of stiles 10 and 11, while the other section includes a pair of stiles 12 and 13. Referring particularly to Fig. 3, it is to be noted that, as above noted, each section is defined by its laterally spaced stiles which form substantially a trapezoidal figure and this figure might be termed a right trapezoid as the stile 10 forms substantially a right angle with the base line of such figure, while the stile 11 forms an acute angle with the base line of this figure. By the same token, the other section defined by the stiles 12 and 13 is shaped as a mirror image of the first section.

The stiles 10 and 11 are secured together by means of a plurality of vertically spaced steps 14, 14 disposed in parallel relation with each other and in parallel relation

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with the base line of the trapezoidal figure formed by the stiles 10 and 11. The other section of the stepladder has its stiles 12 and 13 similarly secured together by a plurality of vertically stacked steps 15, 15.

Referring particularly to Figs. 2 and 5, it will be observed that the two sections of the stepladder are hinged together lengthwise of and along a pair of juxtaposed corresponding upright sides of such two sections thereby to form substantially a three-legged foldable ladder unit. More specifically, the corresponding stiles 11 and 13 are secured together by a plurality of hinges 16, 16, which are suitably secured to the stiles as by means of screws 17. Referring particularly to Figs. 5 and 6, it will be observed that the steps 14 and 15 are secured between their respective laterally spaced stiles 10 and 11 or 12 and 13 in a manner such that one end portion of each of these steps extends beyond the outside edge of its stile 11 or 13 so as to form an abutment member 18. Since the steps 14, 14 and 15, 15 are disposed between their associated stiles in a manner such that together they define vertically stacked planes whenever the two sections are in their open position, the abutment members 18, 18 will engage each other so as to limit the opening of the two sections of the ladder to a predetermined angle.

As may be best observed from Figs. 2, 5 and 6, the ladder is provided with a locking means in the form of a conventional toggle joint including two toggle arms 19 and 20, of which each has its one end portion pivotally secured to a ladder step by means of a bolt 20'. The other end portion of each of the toggle elements 19 and 20 is pivotally secured by means of a bolt or rivet 21 to a substantially U-shaped sheet metal hinge element 22. From this, it will be appreciated that whenever the two ladder sections are opened, as disclosed in Fig. 5, the abutment elements of the steps will engage each other so as to limit the angle between the sections. In order to so open the ladder, the toggle joint is moved from the position disclosed in Fig. 6 to the position as disclosed in Fig. 5, thereby to lock the two sections in their open position. Since the steps 14 and 15 have a certain amount of spring in them, the toggle elements, when shifted to their locked position, will slightly compress the abutment elements 18 and 18 so that they will maintain the toggle elements in the position illustrated in Fig. 5 and the ladder will have no tendency to shift to its closed position until the toggle elements are manually shifted back past their dead-center position.

Referring particularly to Figs. 2 and 4, the present ladder is provided with a substantially flat shelf member 23 having one edge portion thereof pivotally secured to a step 15 by means of conventional hinges 24, 24. These hinges permit the shelf 23 to hang in a substantially vertical plane, as disclosed in Fig. 2, when the shelf is not in use, but at the same time, they permit the shelf to be swung to a horizontal plane between a pair of steps 14 and 15 whenever it is desired to use the shelf for supporting tools, paint cans and the like elements. A latch finger 25 may be pivotally secured to the under side of a step 14 by means of a bolt 25' for the purpose of supporting the shelf 23 in its operable horizontal position. If desired, the exposed edge portions of the shelf 23 may be provided with ledge elements 26.

Each of the stiles 10 and 12 carries an auxiliary stile or leg 27 which is provided with a plurality of inverted keyhole-shaped apertures 28, 28 for receiving a bolt 29. Each of the bolts 29 is provided with a conventional type of wing-nut 30 and, as may be best seen from Fig. 2, the bolts and wing-nuts maintain the auxiliary legs 27, 27 in juxtaposed positions against their associated stiles 10 and 12. In the event that the artisan wishes to use the ladder unit on, for example, a stairway, the forward stiles 11 and 13 may be placed upon a stairway illustrated by

the dotted line 31 and the auxiliary legs 27, 27 may be removed from their associated stiles by first backing off the wing-bolts 30 and then raising the auxiliary leg so that the large portion of the keyhole-shaped holes will pass over the bolt heads. Thereafter each of the auxiliary legs 27 may be turned through 180° and be reapplied over the bolts so as to extend downwardly from their associated stiles 10 and 12 in a manner as illustrated in Fig. 3. In this condition, each of the bolts 29 may be tightened by its wing nut 30 so as to form a rigid extension of the rear stiles 10 and 12.

From the above, it will be appreciated that the present invention provides a novel ladder which in its open position, illustrated in Figs. 1, 2 and 3, forms a figure which might well be called a trihedron. It will be observed that the steps 14 and 15 are placed between their associated stiles in opposing pairs so that each pair forms substantially a continuous V-shaped stair which permits the artisan to place his left foot upon a step 14 and his right foot upon a step 15 so as to straddle the center or composite leg made up of the stiles 11 and 13. Thus, the weight of the artisan will be disposed over the center of the ladder so as to provide a most stable working platform. In this connection, it will be appreciated that by straddling the center legs 11 and 13, each of the feet of the artisan will be placed lengthwise along a step so that the step will support the entire foot as opposed to the usual stepladder which supports only the arch or toe portion of the foot.

Referring to Fig. 3, it will be appreciated that the present ladder may be placed squarely against a vertical wall for the rear stiles 11 and 12 form substantially a right angle with the horizontal, thereby permitting the artisan to work facing the wall which he may approach by shifting his position toward the rear stiles 11 and 12, as opposed to the usual stepladder which must be placed sideways against the wall to permit the artisan to work close to the wall.

From the above, it will be appreciated that the present invention provides a novel ladder unit which may be economically manufactured and which will form a most useful tool for the average artisan.

Having thus set forth the nature of the invention, what I claim herein is:

1. A stepladder comprising, a pair of sections of which each includes a pair of laterally spaced stiles tapering upwardly to form a wide base and a narrow top and connected by a series of steps extending therebetween, and hinges connecting said two sections together at points spaced lengthwise along a pair of juxtaposed corresponding upright sides of such sections so as to form substantially a three-legged ladder.

2. A stepladder comprising, a pair of sections of which each includes a pair of upright laterally spaced stiles tapering upwardly to define substantially a trapezoidal figure having a wide base and a narrow top with one of the two stiles of each section forming an acute angle with the base line of such figure, a plurality of steps extending between the stiles of each section with each step being disposed in parallel relation with its associated section base line, and hinges connecting said two sections together lengthwise of and along the juxtaposed corresponding acute angle sides of said two sections so as to form substantially a three-legged foldable ladder.

3. A stepladder comprising, a pair of sections of which each includes a pair of upright laterally spaced stiles defining substantially a trapezoidal figure having a wide base and a narrow top with one of the two stiles forming an acute angle with the base line of such figure and with the second of the two stiles forming substantially a right angle with such base line, a plurality of steps extending between the stiles of each section with each step being disposed in parallel relation with its associated section

base line, and hinges connecting said two sections together lengthwise of and along the juxtaposed corresponding acute angle sides of said two sections to form substantially a three-legged foldable ladder.

4. A stepladder comprising, a pair of sections of which each includes a pair of upright laterally spaced stiles defining substantially a trapezoidal figure having a wide base and a narrow top with one of the two stiles forming an acute angle with the base line of such figure and with the second of the two stiles forming substantially a right angle with such base line, a plurality of steps extending between the stiles of each section with each step being disposed in parallel relation with its associated section base line, hinges connecting said two sections together lengthwise of and along the juxtaposed corresponding acute angle sides of said two sections to form substantially a three-legged foldable ladder, and toggle joint spreader extending between the right angle sides of said two sections for releasably locking said two sections substantially in the shape of a trihedron.

5. A stepladder comprising, a pair of sections of which each includes a pair of upright laterally spaced stiles with steps extending therebetween, hinges connecting said two sections together at points spaced lengthwise along one pair of juxtaposed corresponding stiles thereby to form substantially a three-legged ladder, a toggle-joint spreader extending between the second pair of corresponding stiles for releasably locking said two sections substantially in the shape of a trihedron, the steps of the two sections being arranged in phase so that an end portion of each step of one section substantially joins an end portion of one step of the other section whenever the two sections are locked in their open positions, a flat shelf hinged along one of its sides to one of said steps of a first of said sections, and latching means for releasably locking an opposite side of said shelf to a step of the second section when said sections are locked in their open positions.

6. A stepladder comprising, a pair of sections of which each includes a pair of laterally spaced stiles with steps extending therebetween, hinges connecting said two sections together at points spaced lengthwise along one pair of juxtaposed corresponding stiles thereby to form substantially a three-legged ladder, locking means extending between the second pair of corresponding stiles for releasably locking said two sections substantially in the shape of a trihedron, two auxiliary legs each carried by and juxtaposed against a respective one of the two unhinged stiles, and means carried by each of said unhinged stiles for securing its associated auxiliary leg in various selective positions of adjustment lengthwise thereof.

7. A stepladder comprising, a pair of sections of which each includes a pair of laterally spaced upright stiles with steps extending laterally therebetween, hinges connecting said two sections together lengthwise of and along a pair of juxtaposed corresponding upright stiles of such two sections thereby to form substantially a three-legged foldable ladder, each step of each of said two sections extending beyond the outside edge of its associated hinged stile so as to butt against an extended end portion of a corresponding step carried upon the opposite section thereby to restrict the pivotal movement of said sections through a predetermined angle, and a toggle-joint spreader extending between the other two upright unhinged stiles of said two sections for releasably locking said two sections open at said predetermined angle.

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