

July 28, 1964

A. L. DANIELSON
COLLAPSIBLE STEP BENCH

3,142,355

Filed June 26, 1962

2 Sheets-Sheet 1

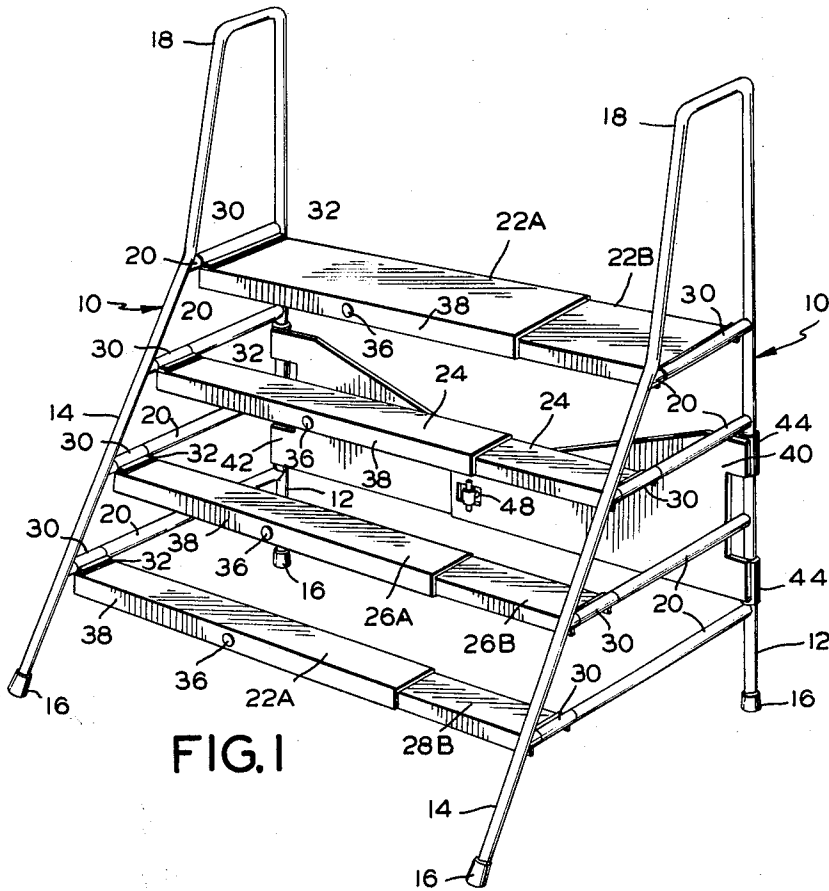


FIG. 1

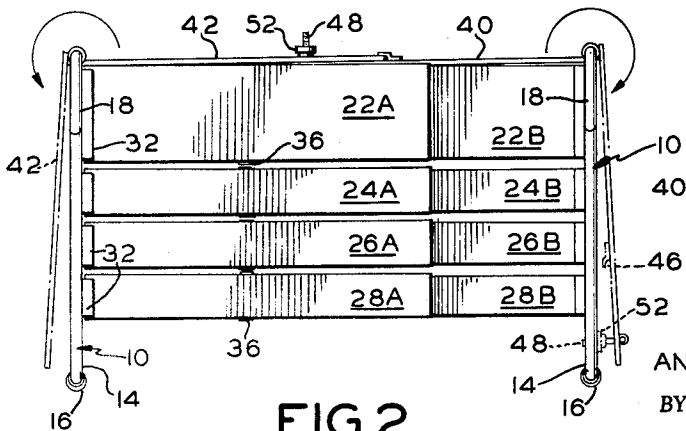


FIG. 2

INVENTOR
ANDREW L. DANIELSON

BY

Knox & Knox

July 28, 1964

A. L. DANIELSON

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2 Sheets-Sheet 2

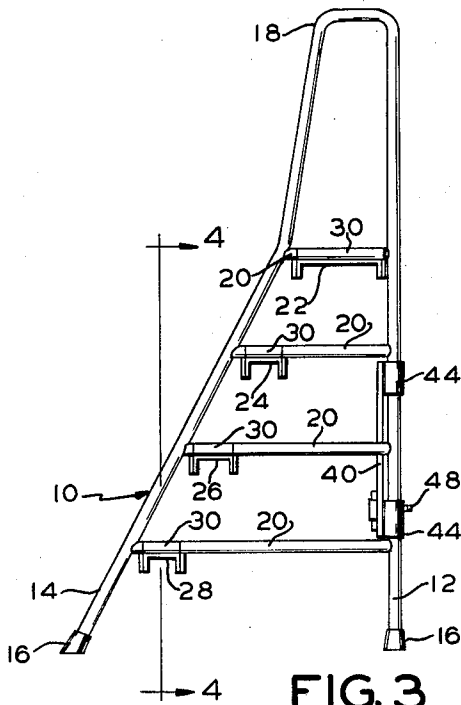


FIG. 3

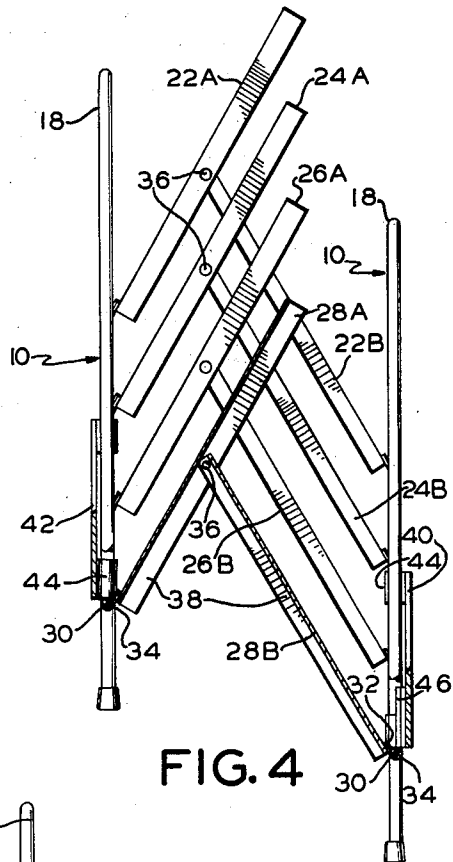


FIG. 4

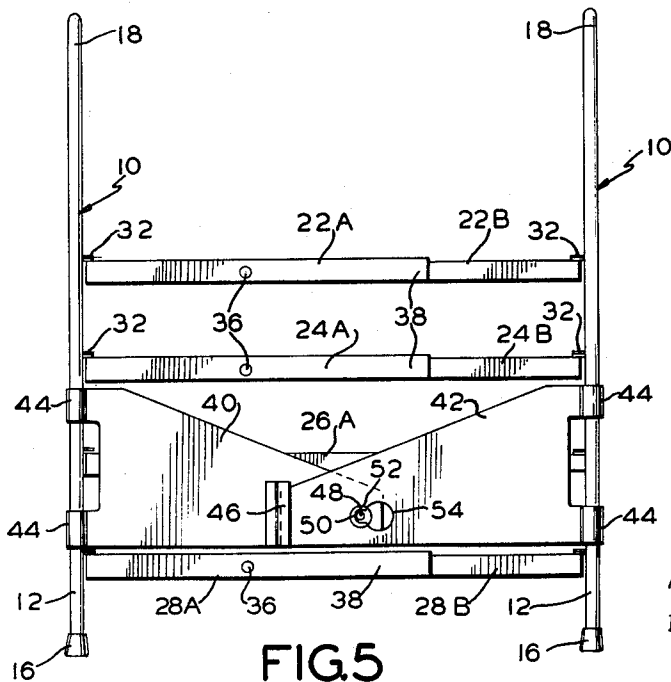


FIG. 5

INVENTOR
ANDREW L. DANIELSON
BY

Knott & Knott

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3,142,355

COLLAPSIBLE STEP BENCH

Andrew L. Danielson, 1140 20th St., San Diego, Calif.

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1 Claim. (Cl. 166—42)

The present invention relates generally to portable steps and more particularly to a collapsible step bench.

The primary object of this invention is to provide a step bench having several elongated steps and which serves as a ladder or a bench and can be folded into a compact unit for storage.

Another object of this invention is to provide a step bench in which the steps are horizontally staggered so that each clears the next adjacent steps in folding, which simplifies hinging, avoids the necessity for complex nesting of the steps and results in a more compact assembly.

Another object of this invention is to provide a step bench having a single fastener to lock the complete assembly in erected position, the individual steps having overlapping portions which are self-locking and self-supporting.

A further object of this invention is to provide a step bench having integral raised hand holds for convenience and safety.

Finally, it is an object to provide a collapsible step bench of the aforementioned character which is simple and convenient to manufacture and use and which will give generally efficient and durable service.

With these and other objects definitely in view, this invention consists in the novel construction, combination and arrangement of elements and portions, as will be hereinafter fully described in the specification, particularly pointed out in the claim, and illustrated in the drawings which form a material part of this disclosure, and in which:

FIGURE 1 is a perspective view of the step bench in erected position;

FIGURE 2 is a top plan view thereof;

FIGURE 3 is an end elevation view thereof;

FIGURE 4 is a partially sectional view as taken on line 4—4 of FIGURE 3, but showing the structure partially folded; and

FIGURE 5 is a rear elevation view of the erected structure.

The step bench has a pair of rigid end frames 10 having perpendicular legs 12 and outwardly inclined front legs 14 providing a wide supporting base, the lower ends of the legs being fitted with suitable protective and non-slip feet 16. The upper ends of frames 10 are extended to form integral hand holds 18 of substantially inverted U-shape, the complete frames preferably being of tubular material for strength, weight and ease of manufacture.

Fixed between the legs 12 and 14 of each frame 10 are vertically spaced, horizontal cross bars 20 of different lengths to conform to the incline of front legs 14. Extending between the frames 10 are steps 22, 24, 26 and 28, four steps being illustrated although any suitable number may be used according to requirements. The top step 22 is wide, substantially the full width between the legs 12 and 14 at their transition into hand holds 18, the other steps being narrower and being disposed adjacent the front legs 14. As illustrated in FIGURES 2 and 3, the incline of front legs 14 is such that each of steps 24, 26 and 28 is horizontally staggered to provide a horizontal space from the next highest step, so that the steps can fold without interfering with each other. Portions of the cross bars 20 are made separately and are axially rotatable to form hinge sleeves 30, said hinge sleeves having inwardly projecting flanges 32 which are fixed to the upper surfaces of the steps at their ends.

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The cross bars 20 may have each an inner rod 34, as in FIGURE 4, to support the sleeve portions, but other bearing or hinge arrangements may be equally suitable.

Each of the steps 22—28 is of inverted channel section and comprises an outer portion A and an inner portion B, which have a considerable overlap, the two portions being interconnected by a hinge pin 36 through the downwardly extending side flanges 38 at the end of inner portion B. The portion B of each step is thus slightly narrower and fits inside the portion A, the large overlap providing considerable rigidity when the step is open or flat, and each step can break or fold upwardly about its hinge pin 36, as indicated in FIGURE 4.

Mounted on the rear of frames 10 are plate-like back braces 40 and 42, each being pivotal about a vertical axis on sleeves 44 rotatable about the rear leg 12 of the respective frame. The back braces overlap, back brace 40 having a channel member 46 thereon into which the end of back brace 42 seats. Back brace 40 also carries a pivotally bolt 48 which passes through a slot 50 in the back brace 42, as in FIGURE 5, the bolt being provided with a large hand nut 52. Slot 50 has an enlarged portion 54 through which hand nut 52 can be passed as the two back braces are brought together, the end of back brace 42 being inserted into channel member 46 and the hand nut tightened to clamp said back braces together. It will be evident that the hand nut 52 is the single element which locks the entire step bench assembly in erected position.

To fold the unit, the hand nut 52 is loosened and the back braces 40 and 42 separated, said back braces then being swung outwardly and forwardly to lie flat against the outside of frames 10, as indicated by the directional arrows and broken line positions in FIGURE 2. The steps 22—28 are then broken upwardly and folded, each step folding in front of the next highest step, as in FIGURE 4. In the collapsed position the step portions B close completely into the portions A, the total thickness of the collapsed structure being the combined thicknesses of the frames 10, back braces 40 and 42 and a single step. The resultant folded unit is very compact and requires a minimum of storage space.

Erection of the unit is very simple, the frames 10 being pulled apart, and the steps opened to their flat, overlapped position. Back braces 40 and 42 are then swung around to the rear, the hand nut 52 is passed through the enlarged slot portion 54, the end of back brace 42 is engaged in the channel member 46 and said hand nut is tightened, locking the unit into a rigid structure.

The step bench can be fabricated entirely from stock material, no castings, elaborate machining, or special parts being necessary. The structure is light in weight and easily portable, yet is sturdy and suitable for heavy use. The wide top step provides ample standing room for safe work and can also be used as a bench surface or a seat.

It is understood that minor variation from the form of the invention disclosed herein may be made without departure from the spirit and scope of the invention, and that the specification and drawing are to be considered as merely illustrative rather than limiting.

I claim:

A collapsible step bench comprising:

a pair of rigid inverted U-shaped end frames each having forward and rear legs;

a plurality of steps secured between said end frames and each successive step being horizontally forwardly offset from the immediately preceding higher step;

each of said steps being pivotally attached to said end frames at opposite ends of said steps;

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each step comprising a pair of interfitting overlapping portions hinged intermediate the ends to fold upwardly, there being horizontal clearance between said steps when folded;
 said end frames having integral, upwardly extending 5 hand-hold portions above said steps;
 a plate-like brace member pivotally attached to each rear leg and having overlapping portions;
 and a manually operable locking element attached to 10 one of said brace members at the overlapping portion thereof and engageable with the other brace member and constituting the sole means for securing the step bench in erected position, said brace

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members adapted to fold against said end frames when the step bench is folded.

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