Dec. 9, 1958 E. E. NEIMAN 2,863,593

BUILT-IN LADDER

Filed Aug. 2, 1955 2 Sheets-Sheet 1

Fig. 3

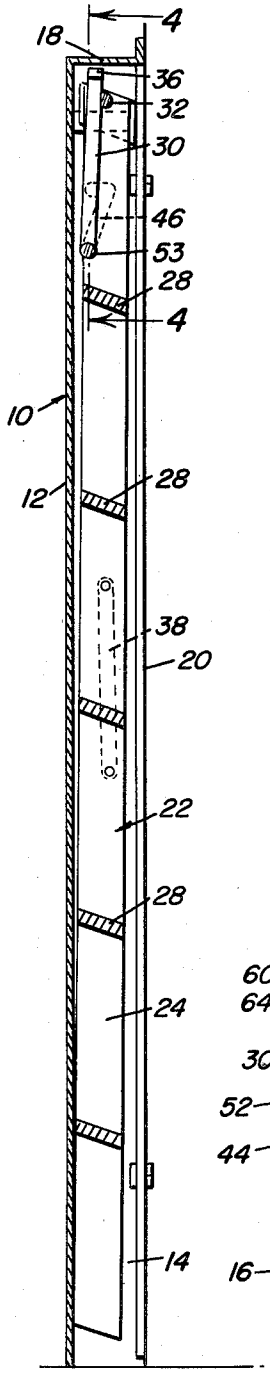


Fig. 1

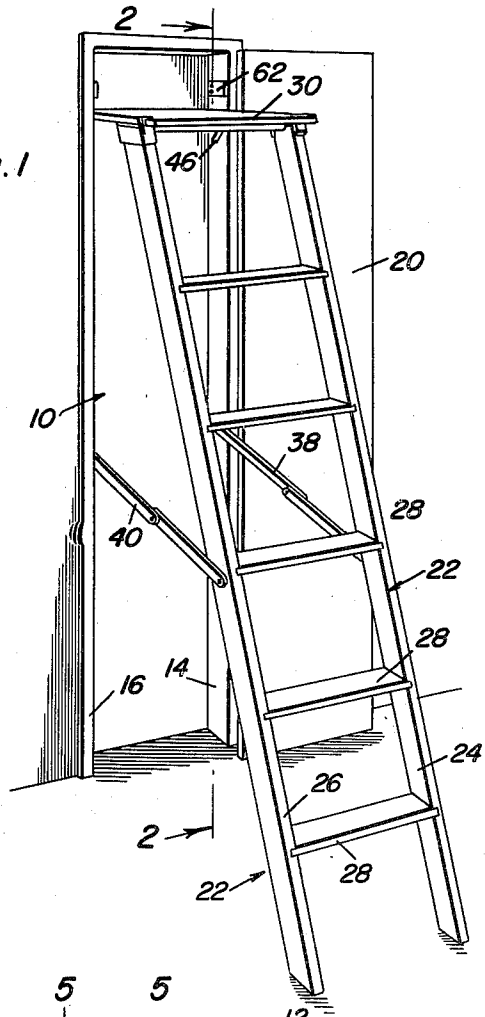
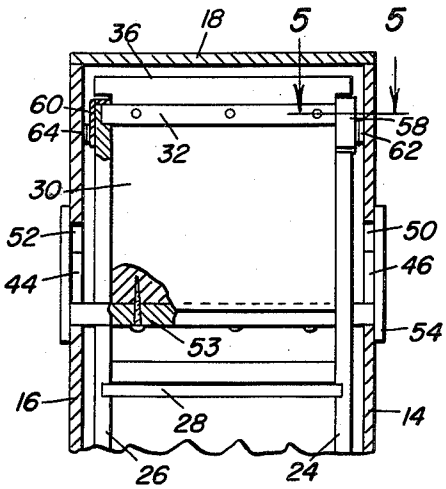


Fig. 4



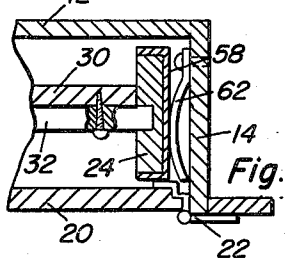


Fig. 5

Edward E. Neiman
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

Dec. 9, 1958 E. E. NEIMAN 2,863,593

BUILT-IN LADDER

Filed Aug. 2, 1955 2 Sheets-Sheet 2

Fig. 2

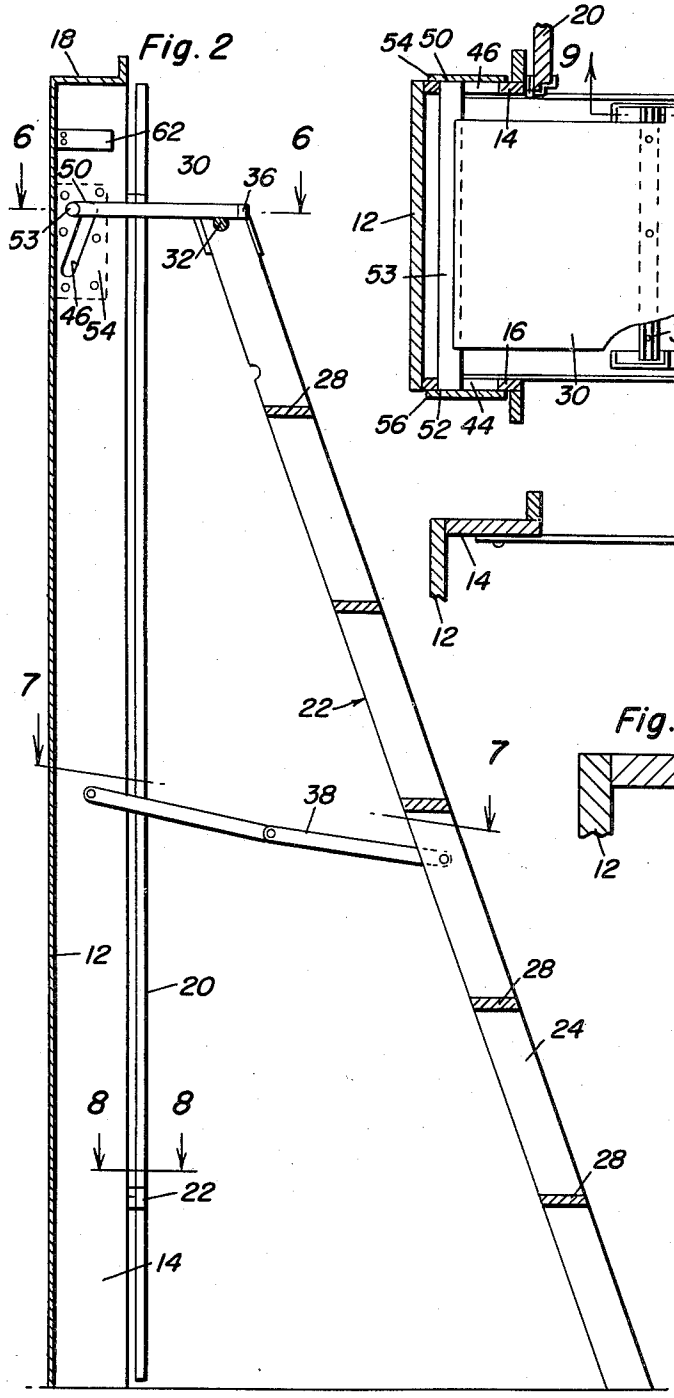


Fig. 6

Fig. 7

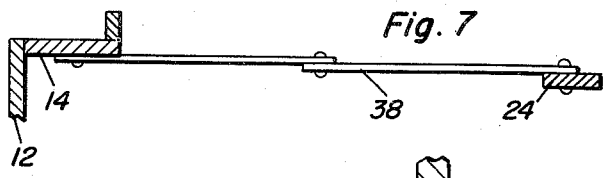


Fig. 8

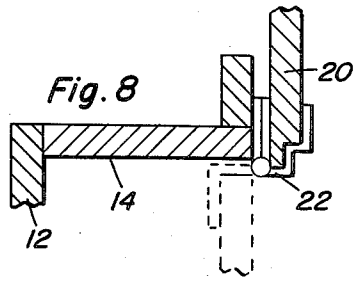
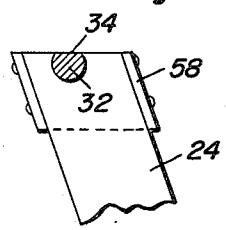


Fig. 9



Edward E. Neiman
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

United States Patent Office 2,863,593 Patented Dec. 9, 1958

2,863,593

BUILT-IN LADDER

Edward E. Neiman, Lompoc, Calif.

Application August 2, 1955, Serial No. 526,027

3 Claims. (Cl. 228—45)

This invention relates to improvements in ladder constructions.

An object of this invention is to provide a ladder concealed in a small casing especially designed to accommodate the ladder in such a way that when the door of the casing is opened, the ladder may be pulled therefrom a limited amount during the pulling of which, a platform which constitutes the top step of the ladder is moved to the substantially horizontal position and releasably locked in that position for the user.

A further object of this invention is to provide an inexpensive concealed ladder useful primarily in making attics accessible without providing a stationary stairway or more expensive folding and/or pull-down ladder.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the ladder in the operative position;

Figure 2 is a longitudinal sectional view taken generally on the line 2—2 of Figure 1 and in the direction of the arrows;

Figure 3 is a vertical sectional view of the ladder in the closed, inoperative condition;

Figure 4 is an enlarged sectional view taken substantially on the line 4—4 of Figure 3 and in the direction of the arrows;

Figure 5 is an enlarged sectional detail taken on the line 5—5 of Figure 4 and in the direction of the arrows;

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 2 and in the direction of the arrows;

Figure 7 is a transverse sectional view taken on the line 7—7 of Figure 2 and in the direction of the arrows;

Figure 8 is an enlarged sectional view taken on the line 8—8 of Figure 2 and in the direction of the arrows; and

Figure 9 is an enlarged sectional view taken substantially on the line 9—9 of Figure 6 and in the direction of the arrows.

The primary but not exclusive field of utility of the illustrated ladder is in connection with ceiling openings which lead to an attic. It is desired to provide a steady, firm and yet inexpensive ladder which leads to the attic through the celing opening. In this regard, a casing 10 is provided of such dimension as to fit between the studs in a partition or wall. This casing consists of a back panel 12, jambs 14 and 16, together with a header 18. Any trim may be used on the outside of the jambs and header which cooperate to form the door frame for door 20. This door is hinged, as at 22, to the jamb, and a suitable latch is provided for the door in order to hold it in the closed position.

Ladder 22 is made of side rails 24 and 26 between which are steps 28 which may be morticed in the rails and screwed to hold them firmly in place. Other standard techniques for attaching the steps to the side rails 24 and 26 may be resorted to.

The top step of the ladder 22 is formed by a platform 30 when the ladder is in the extended, operative position (Figures 1 and 2). This platform is of a transverse dimension smaller than the distance between the inside surfaces of the side rails 24 and 26 of the ladder in order that it may be swung between the side rails when the ladder is folded in the inoperative position (Figure 3). Means pivotally connecting the front part of the platform 30 to the side rails 24 and 26 are provided on the undersurface of the platform 30. The preferable means consists of a dowel 32 which has a flattened top surface 34 intermediate its ends, and the extreme ends thereof remain circular in cross-section so as to rotatably fit in apertures in the upper ends of the side rails 24 and 26, respectively. Nails or screws may be used for securing the platform 30 to the pivot 32, and the front portion 36 of platform 30 is wider than the distance between the inner surfaces of the side rails 24 and 26 in order to come to rest upon the upper ends of the side rails 24 and 26 when the platform is in the generally horizontal, operative position (Figure 2). This wider portion 36 of platform 30 functions, therefore, as a stop to limit the relative pivotal movement of the ladder 22 and its upper step or platform 30. Also limiting the movement of the ladder with respect to its casing 10 is a pair of spreader hinges 38 and 40, respectively, which are secured to the side rails 24 and 26 and to the jambs 14 and 16, respectively.

A pair of slots 44 and 46, respectively, are formed in the jambs 14 and 16 near the upper end thereof. These slots are angled a slight amount with respect to the vertical direction and have approximately horizontal offsets 50 and 52 at the upper ends thereof. For strength and ease of sliding motion of pivot pin 53, there are plates 54 and 56 backing the slots 46 and 44.

Pivot 53 is preferably a dowel wider than ladder 22 and having its ends disposed in the slots 44 and 46. This dowel is also fixed to the rear edge of platform 30 so that any movement of the dowel in the slots 44 and 46 is transmitted to motion of the platform 30.

When the ladder is in the closed condition (Figure 3), metal bearing plates 58 and 60 at the upper ends of rails 24 and 26 come into contact with leaf springs 62 and 64 which are fastened to the jambs 12 and 14 near the upper ends thereof. These leaf springs bear against plates 58 and 60, thereby holding the ladder 22 fixed within its casing 10 in the stored, concealed condition, when the door 20 is closed.

When it is desired to use the ladder, door 20 is opened and ladder 22 is pulled from within the frame of the casing 10. During this movement, the platform 30, because of its pivotal disposition with respect to the ladder 22 and the frame of casing 10, is required to pivot about pivot means 32 and the pivot 53 slides upwardly in slots 46 and 44. When the ladder is pulled the full way out, platform 30 is approximately horizontal with its front portion 36 resting upon the upper ends of rails 24 and 26, and the pivot 53 is approximately in alignment with the lateral offsets 50 and 52 of the slots 44 and 46. Then, the upper end of the ladder is pushed backwardly until pivot 53 comes to rest against the back ends of the offsets 50 and 52, at which time the spreader hinges 38 and 40 are fully extended. Now, the ladder may be used. In order to return the ladder to its concealed position, the upper end of the ladder is pulled outwardly until the pivot 53 is separated from the offsets 50 and 52. The platform 30 will then drop downwardly in the rear thereof to the bottom part of slots 44 and 46 and the ladder is pushed inwardly, actuating hinges 38 and

40. As the ladder is pushed all of the way into the casing 10, it becomes held by the spring steel or other spring material holding devices 62 and 64. Thereafter, the door 20 may be closed.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be restored to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. In combination with a door frame, a ladder having side rails, steps rigidly fixed to and extending between said side rails, a spreader hinge extending between said ladder and said frame and located intermediate the ends of said ladder, a platform pivoted to the upper ends of said rails and disposed therebetween, said platform being generally parallel to said rails when said ladder is disposed within said frame, said frame having slots in opposite sides thereof, a hinge pin secured to said platform and having ends captive in said slots to thereby constrain the movement of said platform, said slots having lateral offsets in which said hinge pin ends are disposed when said ladder is separated from said frame and said spreader hinge is extended and said platform is in the approximately horizontal position, said platform constituting the top step of said ladder and having a front portion on the front side of the pivot between the platform and said side rails wider than the inside dimension of the ladder in order to come to rest upon the upper ends of said side rails when the platform is in the generally horizontal position.

2. The combination of claim 1 wherein said platform has a dowel secured to the front part thereof and extending across the bottom surface thereof, the upper surface of said dowel being flat and the ends being circular in cross-section, and the upper ends of said side rails having apertures in which said circular ends are mounted for rotation.

3. The combination of claim 2 wherein there is at least one leaf spring located between one of said rails and said frame to releasably hold the ladder within the door frame by frictional contact but enabling the ladder to be pulled from said frame.

References Cited in the file of this patent

UNITED STATES PATENTS

1,227,640	Marguardt	May 29, 1917
1,765,168	Laursen	June 17, 1930
1,821,517	Hyatt	Sept. 1, 1931
2,469,559	Johns	May 10, 1949
2,622,783	Mahoney	Dec. 23, 1952

FOREIGN PATENTS

19,659	Great Britain	1889
449,560	Great Britain	June 30, 1936