

Sept. 12, 1950

N. E. ANDERSON

2,522,336

STEPLADDER

Filed Oct. 5, 1946

2 Sheets-Sheet 1

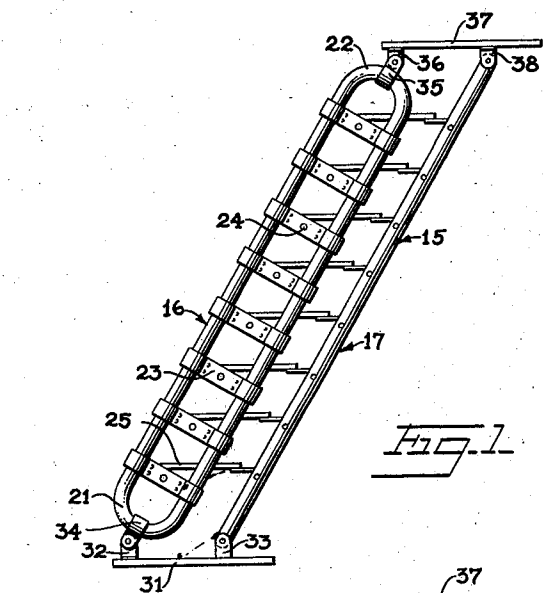


Fig. 1

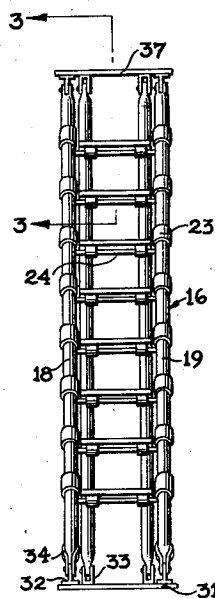


Fig. 2

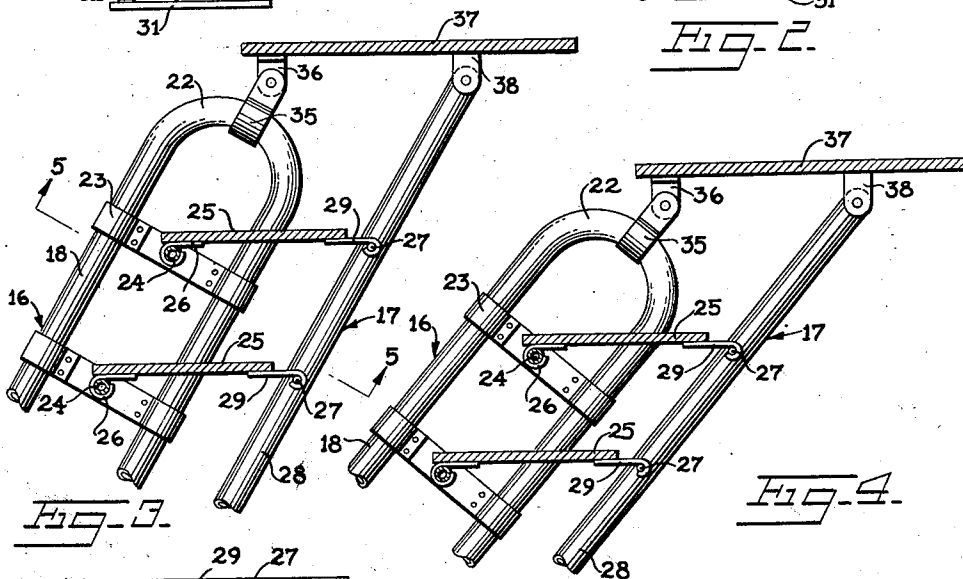


Fig. 3

Fig. 4

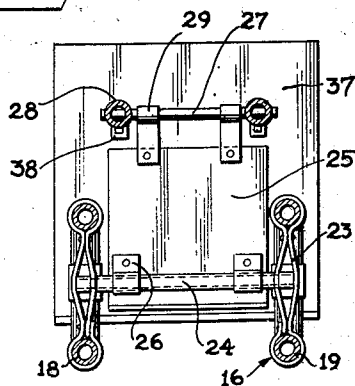


Fig. 5

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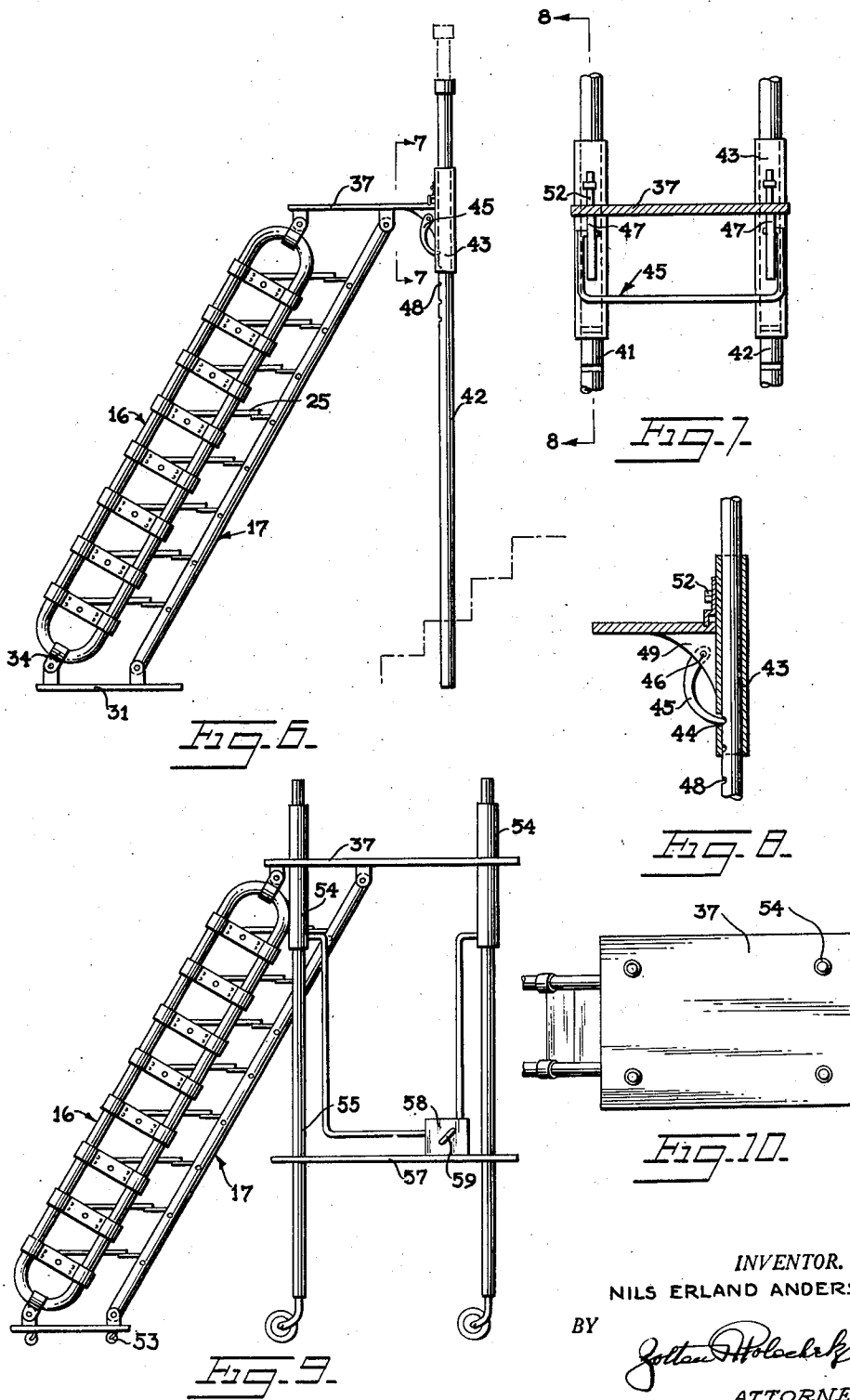
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2 Sheets-Sheet 2



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STEPLADDER

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1 Claim. (Cl. 228—54)

1

This invention relates to step ladders particularly adaptable for use in loading and unloading airplanes with passengers and for use by firemen in taking people from buildings.

It is an object of the present invention to provide a step ladder for airplanes and the like wherein the steps will be automatically adjusted to a horizontal position as the ladder is pivoted from its base to different door entrance heights of the airplane or window openings of a building.

It is another object of the present invention to provide an adjustable step ladder having all the conveniences of the regular steps now in use for airplanes including the usual side rail which the passengers may grasp upon boarding or leaving the airplane and the large top platform.

It is another object of the invention to provide a step ladder for airplanes which can be readily adapted for connection with vertical upright members which will retain the ladder always in its vertically extended position while permitting the same to be adjusted to different vertical heights.

According to the invention, each of the forms of the ladder include two parallel frames one of which forming the handle portion may be grasped by the people using the ladder, and between which there is extended a plurality of vertically spaced steps pivoted at each end to the frames to permit a parallelogram adjustment of the parallel frames and the steps. At the bottom end of the parallel there is pivoted a base portion adapted to rest on the ground, and at the top of the parallel structure there is pivoted the top step or platform which is adapted to be arranged level with the door opening of the airplane.

In another form of the invention, the ladder is retained in its upright position by posts made secure in the ground and having an adjustable sleeve thereon to which is connected or rested the top step or platform. The sleeve can be locked in any one of several vertically adjusted positions. In another form of the invention, the vertical upright supports include casters on the bottom ends so that the step ladder can be dragged about the air field. The vertical adjustment is effected by hydraulic lift devices on the upper end of the vertical supports. There are four vertical supports, two at each side, and the top platform is elongated to extend between these supports.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

2

In the accompanying drawing forming a material part of this disclosure:

Fig. 1 is a side elevational view of the more simple form of the invention.

Fig. 2 is an elevational view looking upon the front of the ladder.

Fig. 3 is an enlarged cross sectional view of the upper end of the ladder taken along the line 3—3 of Fig. 2 and looking in the direction of the arrows thereof.

Fig. 4 is a cross sectional view similar to Fig. 3 but with the ladder adjusted to a different vertical height to illustrate how the steps are retained in the horizontal position regardless of the degree of inclination of the ladder.

Fig. 5 is a transverse cross sectional view taken through the parallel structures looking upwardly on the bottom face of one of the steps and the bottom face of the upper step or top platform, the view being taken along line 5—5 of Fig. 3 and looking in the direction of the arrows thereof.

Fig. 6 is a side elevational view of a modified form of the invention wherein there is provided rigid vertical supports having vertically adjustable elements thereon connected to the top platform at the forward edge thereof.

Fig. 7 is a fragmentary elevational view with the platform being taken in section, looking upon the sides of the vertically adjustable elements on the upright supports and upon the locking device associated therewith, the view being taken generally along the line 7—7 of Fig. 6 and looking in the direction of the arrows thereof.

Fig. 8 is a detail cross sectional view taken through one of the adjustable elements on one of the supports, as along line 8—8 of Fig. 7 and looking in the direction of the arrows thereof.

Fig. 9 is a side elevational view of still another form of the invention including vertical supports with casters thereon and with hydraulic lifts at their upper ends connected with the top platform.

Fig. 10 is a plan view looking down upon the top platform of the form of Fig. 9 and showing arrangement of the hydraulic posts.

Referring now particularly to Figs. 1 to 5, 15 indicates the ladder structure in its entirety. This structure includes two vertically extending front and rear parallel ladder frames 16 and 17. The ladder frame 16 constitutes the portion of the ladder which serves to provide a hand grip for a person climbing the same. The frame 16 comprises two laterally spaced side elements 18 and 19. Each of the side elements 18 or 19 is made of bent pipe formed to have the shape of an elongated ellipse, with rounded top and bot-

3

tom end portions 21 and 22. Vertically spaced on these elements 18 and 19, are strap brackets 23. Between the elements 18 and 19 and connected respectively with the brackets thereof, are ladder rounds 24 to which are connected the wide steps 25 as by means of metal straps 26 adapted to encircle the round.

The frame 17 is of the usual ladder shape, having rounds 27 vertically spaced on side pieces 28 laterally spaced from one another. The steps 25 at the rearward ends have straps 29 adapted to curl about the rounds 27 of the frame 17 whereby to pivotally support the forward ends of the steps.

Between the frames 16 and 17 and at the foot thereof, there is pivotally connected a base support 31 as by means of upstanding brackets 32 and 33. The bracket 32 is connected to the rounded end 21 of the hand gripping elements 18 and 19 by means of clamping bands 34. On the top rounded end 22 of the elements 18 and 19, are other clamping bands 35 to which depending brackets 36 of a top platform 37 are pivoted. The platform 37 also has depending brackets 38 for connecting the platform with the upper ends of the ladder frame 17. The forward edge of the platform 37 will rest in the airplane opening.

In the position shown in Fig. 3, it will be noted that the steps lie in a parallel or horizontal direction along with the top platform 37. If the ladder is adjusted to have a different vertical inclination as for a lower height opening of an airplane, the steps and top platform will still assume and be retained in the same horizontal position so that the traverse of the person over the ladder is not impeded by any tilting of the ladder steps. The ladder steps will only be different in that they will be set back from one another at a different distance.

Referring now to the form of the invention shown in Figs. 6, 7 and 8, there is provided vertically extending posts 41 and 42, each of which has a vertically adjustable sleeve 43 thereon adapted to support the forward edge of the top platform 37. This sleeve 43 has holes 44 therein adapted to receive the free ends of a locking bar 45 pivoted at 46 to the sides of bracket portions 47 with which the platform 37 registers. The posts 41 and 42 also receive the free end of the locking bar within any one of several vertically spaced notches 48. With the bar 45 in place and in engagement with the notches 48 of the posts, the sleeves 43 will be retained in their vertically adjusted position. The lock bar 45 is of U-shape having a transverse portion 51 which can be grasped to engage and disengage it with and from the notches. As the ladder is pulled at its base from the posts, the sleeves 43 can be adjusted to level the steps and the platform. The base 31 will be pulled out or moved in to finally correct the adjustment of the ladder. A locking device 52 registers with the top edge of the platform to retain the same on the brackets 47 of the sleeve.

Referring now to Fig. 9, the ladder structure

4

is supported at its bottom end upon casters 53. The platform 37 is of extra long length and is supported on hydraulic lift struts 54, on the upper end of four vertically extending posts 55 having casters 56 on their bottom ends. On the posts 54, below the platform 37, is a tie structure 57 on which may be supported any appropriate hydraulic pressure generating device 58 for serving the hydraulic struts 54. An adjustment 59 of a control lever to one position or another will affect the raising and lowering of the hydraulic lifts. Since both the ladder and the posts 55 are on casters the entire arrangement may be easily transported over the air field.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claim.

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

A ladder structure comprising a flat plate-like base, a flat plate-like platform above and offset from said base, two parallel rods disposed side by side and pivotally connected at their bottoms to said base and at their tops to said platform, two elliptical members disposed parallel to said rods, each of said elliptical members including two parallel bars connected at their ends by a loop, said bars being in a plane normal to the plane in which said rods are disposed, a series of cross-pieces connecting the bars of each elliptical member, said cross-pieces being normal to said bars, rounds connecting opposite correlated cross-pieces and disposed centrally thereof, and flat plate-like steps pivotally supported at their fronts on said rounds and at their rears to said rods, said plate-like steps being horizontal and remaining horizontal regardless of the angular disposition of said rods and members, one bar of each of said members being disposed forwardly of the forward edges of said steps and forming hand rails.

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