April 24, 1962 H. HARRISON 3,031,028

PLATFORM LADDER

Filed Sept. 11, 1959 2 Sheets-Sheet 1

FIG. 2.

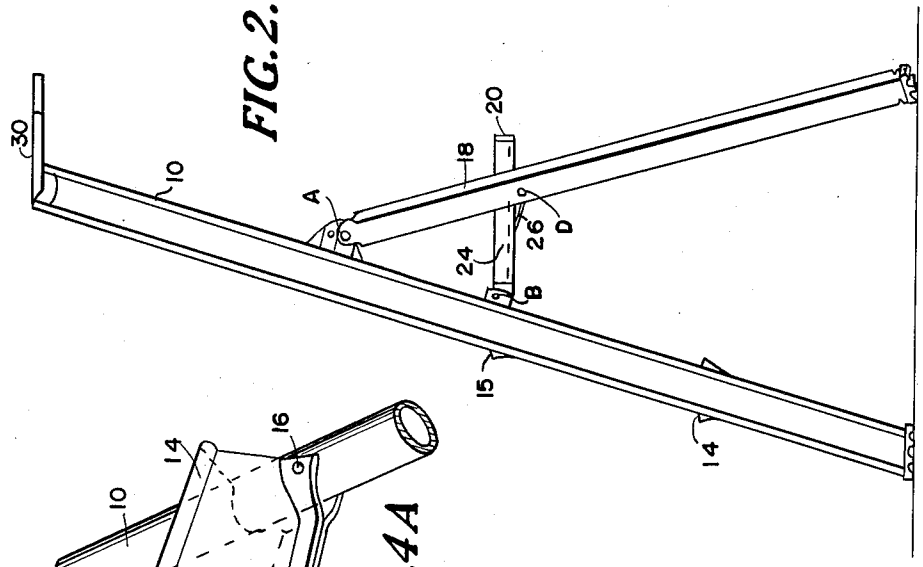


FIG. 4A

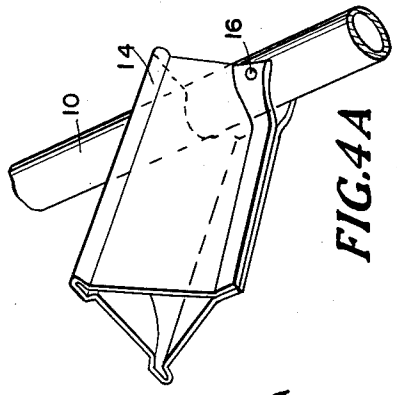
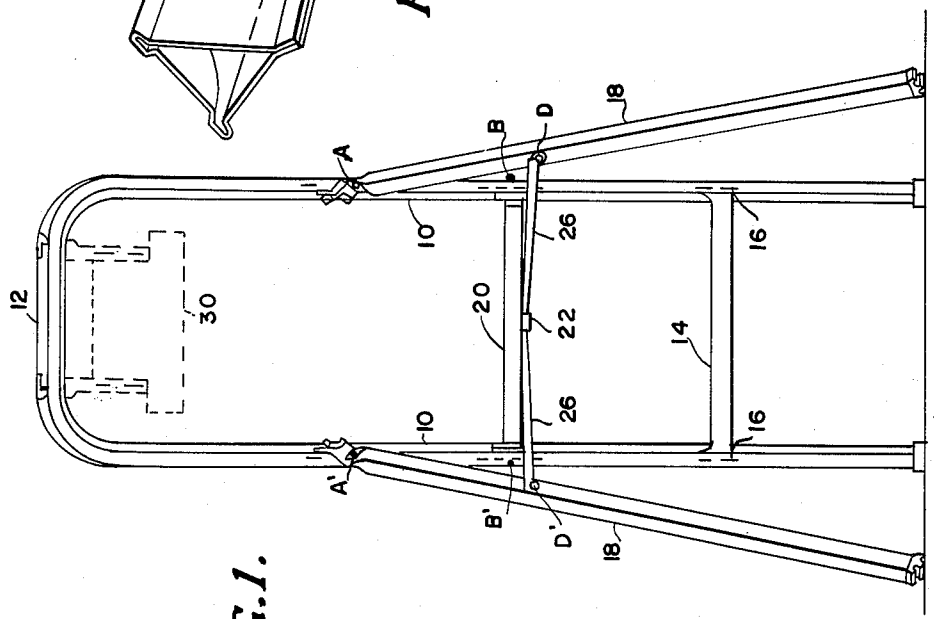


FIG. 1.



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Filed Sept. 11, 1959 2 Sheets-Sheet 2

FIG.4.

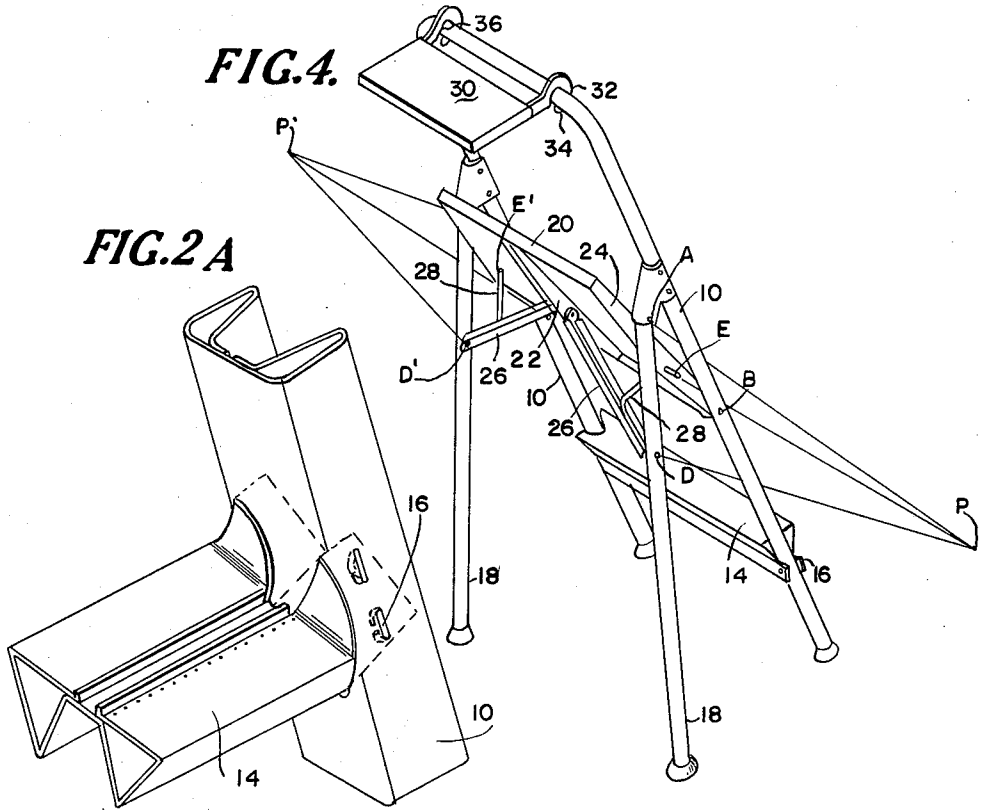
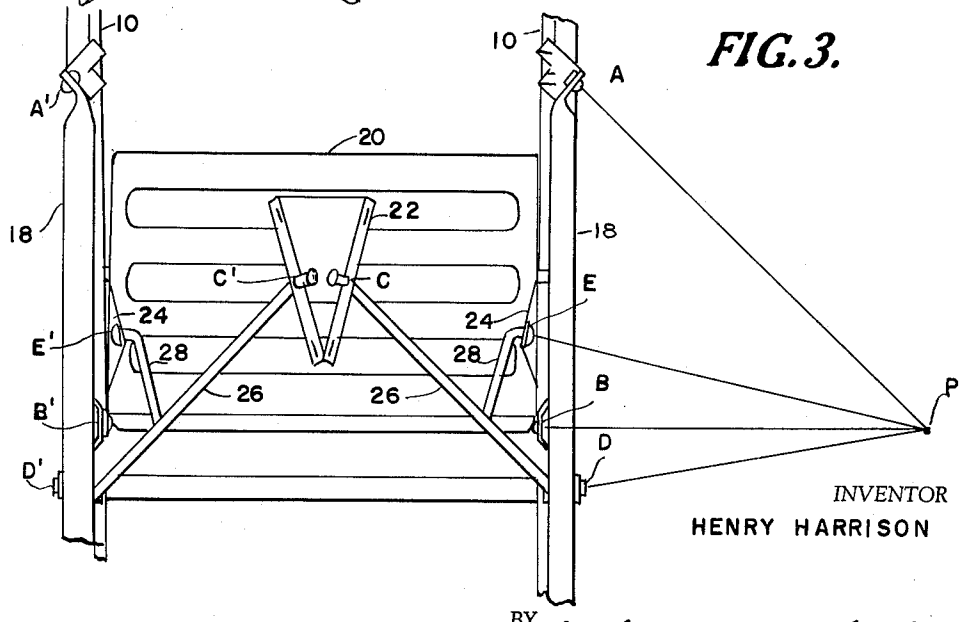


FIG.2A

FIG.3.



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PLATFORM LADDER

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3 Claims. (Cl. 182—125)

This invention relates to a folding platform ladder and more particularly to a lightweight metallic platform ladder, and is an improvement over my prior United States Patent No. 2,650,014.

This invention is primarily concerned with a folding platform ladder having a pair of spaced front legs, each of which has a rear leg pivotally secured to it at a position adjacent its upper end in such a manner that the rear legs pivot outwardly and rearwardly relative to their associated front legs in order to provide an extremely stable yet relatively uncomplicated lightweight ladder.

Another feature of this invention is to provide a load-bearing platform intermediate the extremities of the front legs, which platform is adapted to pivot downwardly and rearwardly relative to the front legs simultaneously with the aforementioned pivotal motion of the rear legs.

Still another feature of this invention is to provide an auxiliary tray which is pivotally connected to the upper end of the front legs and may be readily swung into an operative position to be readily accessible to the user of the ladder when standing upon the aforementioned platform.

It is an object, therefore, of this invention to provide a folding platform ladder having a minimum of parts, which parts are, however, operatively connected together to provide an extremely stable and lightweight support.

It is a further object of this invention to provide a folding ladder in which a supporting platform moves simultaneously with a pair of outwardly and rearwardly pivoting legs, thus providing an extremely stable lightweight working platform.

These and further objects and advantages will become readily apparent to those skilled in the art upon reading the following detailed description taken in conjunction with the appended drawings in which:

FIG. 1 is a rear elevational view of the ladder of the present invention in its open, or operative, position;

FIG. 2 is a side elevational view of the ladder in the position shown in FIG. 1, showing the auxiliary supporting tray in its operative position;

FIG. 2*a* is a fragmentary perspective view showing the method of joining the step to the front legs;

FIG. 3 is a partial rear elevational view of the ladder of the present invention in its closed position;

FIG. 4 is a perspective view of the ladder of the present invention made of tubular stock and shown in a partially open position; and

FIG. 4*a* is a fragmentary perspective view showing the connection of the step to a tubular front leg in the modification shown in FIG. 4.

One embodiment of the folding platform ladder of the present invention is shown in FIGS. 1 through 3 disclosing a metallic folding ladder in which the metal side rail, which may be lightweight steel or aluminum, has a double thickness channel, and in which the step has a double triangular tubular cross-section and employs a metal stitch construction. The embodiment illustrated in FIG. 4 shows an alternative type of construction wherein the metal stock comprises round tubular portions, and the metal step comprises a substantially triangular tubular section, which may also be of lightweight steel or aluminum.

Referring now to FIG. 1, the folding platform ladder comprises a pair of spaced front legs **10** which are preferably integrally joined at their upper ends, providing

a horizontal extension **12** therebetween such that the front legs and horizontal extension present the configuration of an inverted U. A horizontal step **14** extends between the lower ends of front legs **10** and is secured thereto in any suitable manner as by metal stitches or rivets **16**. A second horizontal step **15** is secured to the front legs **10** about twelve inches above step **14**. A pair of rear legs **18** is pivotally secured at their upper ends, as at A, to the front legs **10**, at a position about ten inches above step **15**. The axis of pivotal connection A is inclined with the horizontal so that each of the rear legs **18** may pivot outwardly and rearwardly relative to its respectively associated front leg **10**, to assume the open position shown in FIGS. 1 and 2. The particular pivotal construction is best shown and described in detail in my prior United States patent referred to above.

Disposed beneath the pivotal connection A is a platform **20** which is pivotally connected to the front legs **10**, as at B, and extends therebetween. The platform **20** is provided on its under surface with a transversely extending re-enforcing or stiffening rib **22** and also has transverse flanges **24** on its opposite sides. A pair of first links **26** are pivotally secured at one end thereof, as at C, to the middle of re-enforcing rib **22** and their opposite ends are respectively pivotally connected to rear legs **18**, as at D, at a position approximately two-thirds the length of the leg from its lower end. Each of the first links **26** includes an additional link portion **28** which is pivotallly connected, as at E, to the flange **24** of platform **20** and may be in the form of a stiff wire, as shown, which lies along link **26** and extends outwardly so as to be pivotally connected to the associated rear leg **18**, as at D. When the ladder is in an open position, first links **26** and their associated link portion **28** provide a support for platform **20** to maintain it in a horizontal position relative to the surface upon which the ladder is situated.

Referring now to FIGS. 3 and 4, it will be seen that by inclining the pivotal axes of the rear legs **18** relative to the front legs **10** and also by inclining the pivotal axes of the links **26** with the rear legs **18** in a manner to be described below, an extension of all of the aforementioned pivotal axes will pass through a common point P on the same side of the ladder as the associated front leg **10** and rear leg **18** to provide the rearward and outward pivotal motion of the rear leg **18** simultaneously with the downward and rearward pivotal motion of the platform **20**. For clarification, the pivot points on the right-hand side of the ladder are indicated as A, B, C, D and E; whereas, the pivot points on the left-hand side of the ladder have been designated as A′, B′, C′, D′ and E′.

Common point P for the right-hand side and common point P′ for the left-hand side lie along a line drawn through the pivotal axis B—B′ of the platform **20** relative to the front legs **10**. Pivotal axis A of the right-hand rear leg **18** and right-hand front leg **10** is inclined as previously described so that an extension thereof passes through point P and defines the line A—P. The pivotal axis D of the right-hand first link **26** and its associated link extension **28** relative to the right-hand rear leg **18** is also disposed at an angle so that an extension thereof will also pass through point P, thus defining a line D—P. Similarly, the pivotal axis E of the right-hand extension link **28** relative to flange **24** of top platform **20** is also inclined so that an extension thereof will pass through point P and the final line E—P. It will thus be seen that an extension of all the pivotal axes of the elements disposed on the right-hand side of the ladder pass through the common point P and, similarly, on the left-hand side of the ladder extensions of the various pivotal axes define lines A′—P′, B′—P′, D′—P′ and E′—P′, all of which converge at the

common point P' which is on the same line as the point P, which line passes through pivot points B and B'. It is this particular inclination of the pivotal axes which accounts for the simultaneous rearward and outward pivotal motion of the rear legs **18** relative to the front legs **10** and the downward and rearward pivotal motion of platform **20** relative to front legs **10**, thus providing an extremely stable lightweight metallic ladder which has a minimum of operating parts.

An auxiliary tray or support platform **30** is pivotally mounted upon the horizontal extension **12** of front legs **10**, as by the brackets **32**, which are pivotally supported by rivets **34** connected to extension **12**. In the construction shown in FIG. 4, the brackets **32** pivot on rivets **34** which are set transversely into the downward extension of vertical studs **36**, which make rigid connection to extension **12**, and may be retained in it by a stud head at their upper ends. When the ladder is to be folded or put in its closed position, tray **30** may be readily pivoted upwardly and forwardly about extension **12** and rivets **34** and then downwardly so that it depends from extension **12** between front legs **10** (as shown in phantom in FIG. 1).

It will thus be seen that there has been provided by this invention a structure in which the various objects hereinbefore set forth, together with many practical advantages, are successfully achieved. As various possible embodiments may be made of the mechanical features of the above invention, all without departing from the scope thereof, it is to be understood that all matter hereinbefore set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A folding platform ladder comprising a pair of spaced front legs joined together at their upper ends; at least one horizontal step joining said front legs adjacent to and spaced upwardly from their lower ends; a platform pivotally mounted to said front legs above said step; a pair of rear legs; single pivot means connecting each of said rear legs directly to said front legs above said platform; means to pivot said rear legs rearwardly outwardly relative to said front legs about a single pivot axis to an open position while at the same time pivoting said platform downwardly rearwardly relative to said front legs to a generally horizontal position, said means including a pair of first links each pivotally connected at one of its ends to one of said rear legs respectively, the other end of both of said links pivotally connected to the center underside of said platform and providing a support therefor when said ladder is in said open position; and means connecting said first links with at least one side of the platform.

2. The structure defined in claim 1 wherein said last-mentioned means includes opposed link portions, each of which are pivotally connected at one end to the underside of said platform and fixedly joined at the opposite end to said first link.

3. The structure defined in claim 1 in which the pivotal axis of one of said rear legs and its associated front leg, the pivotal axis of said platform with respect to said one front leg and the pivotal axes of the first link associated therewith all converge at a common point on the same side of said ladder as said one front and rear leg.

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