Oct. 17, 1961 J. C. GREEN 3,004,624

EXTENSIBLE LADDER

Filed May 9, 1960

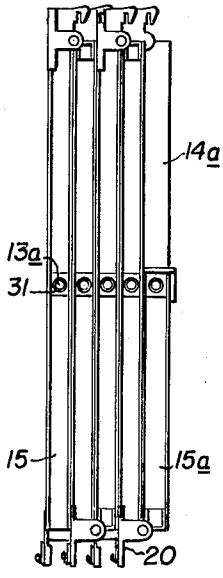


FIG. 1.

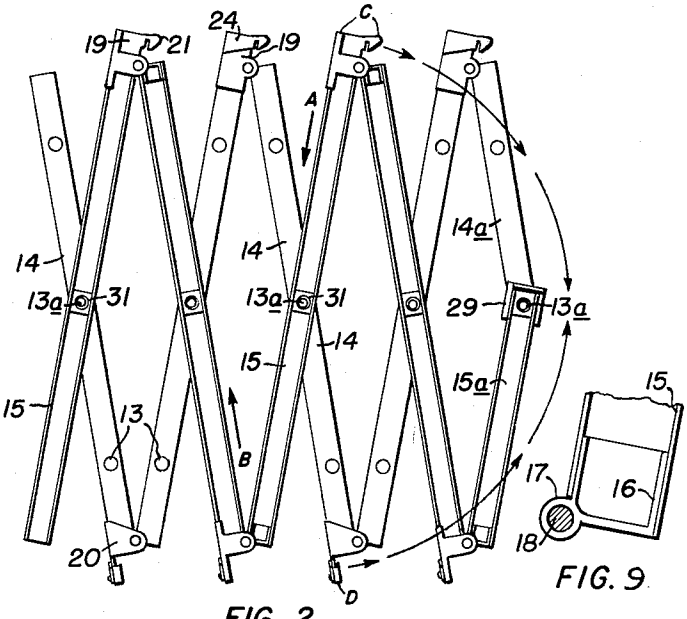


FIG. 2.

FIG. 9.

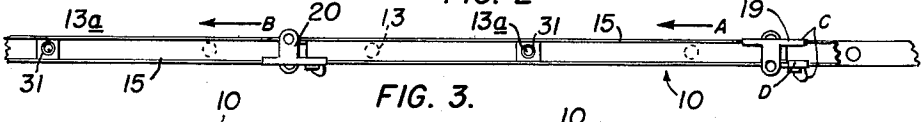


FIG. 3.

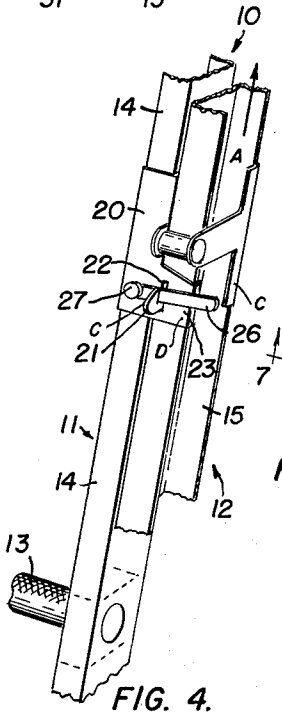


FIG. 4.

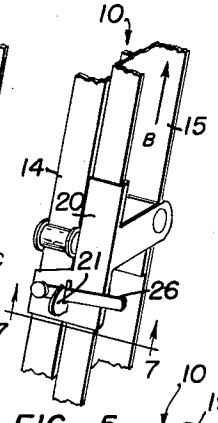


FIG. 5.

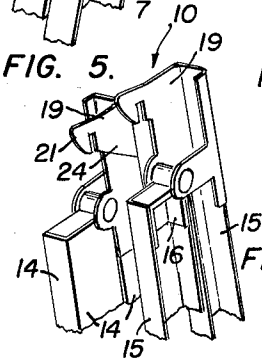


FIG. 6.

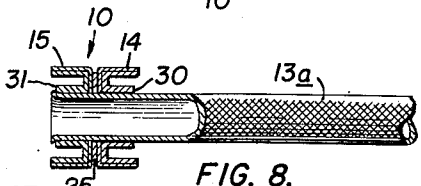


FIG. 8.

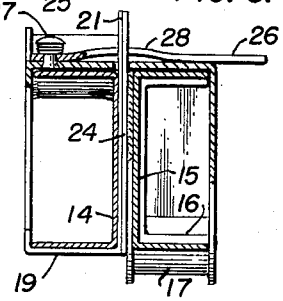


FIG. 7.

JOHN C. GREEN
INVENTOR.

BY Herbert J. Brown

ATTORNEY

United States Patent Office 3,004,624
Patented Oct. 17, 1961

3,004,624

EXTENSIBLE LADDER

John C. Green, 2404 Hanley Drive, Fort Worth, Tex.

Filed May 9, 1960, Ser. No. 27,686
3 Claims. (Cl. 182—157)

This invention relates to extensible ladders wherein the sides are comprised of hinged links pivoted in a manner whereby the links define continuously straight parallel stringers when the ladder is fully extended. Particularly, the invention is directed to an improved latch mechanism for detachably securing adjoining side by side links in parallel relation when the ladder is extended its full length.

An object of the invention is to provide a lightweight and sturdy ladder of the lazy tong type and one which is capable of fabrication by mass production methods.

A particular object of the invention is to provide a practical latch mechanism for use in conjunction with a hinged ladder wherein the links form parallel straight stringers when the ladder is fully extended.

Another object of the invention is to provide a ladder of the described class which may be extended vertically from its collapsed position to fully extended position by one man standing on the ground.

Another object of the invention is to provide a lazy tong ladder having straight stringers when extended and latch means therefor which may be operated by a climber as he ascends or descends the ladder.

Another object is to provide a hinged ladder wherein adjoining links are provided with stirrups at their joints for lending rigidity to the ladder when fully extended.

A further object of the invention is to provide a rung construction which has pivot means for side by side pairs of links, yet which rungs are not subject to turning when stepped on by a person climbing the ladder.

These and other objects will become apparent from the following description and the accompanying drawing, wherein:

FIGURE 1 is a side elevation of a lazy tong type ladder in accordance with the invention and showing the ladder in its retracted or collapsed position.

FIGURE 2 is a side elevation of the ladder illustrated in FIGURE 1 and showing the same partially extended.

FIGURE 3 is a broken side elevational view corresponding with FIGURES 1 and 2 but showing the ladder in its fully extended position.

FIGURE 4 is an enlarged broken perspective view showing inner and outer channels comprising parallel stringers along each side of the ladder and showing a hinge in an outer stringer.

FIGURE 5 is a view similar to FIGURE 4 but showing a hinge in the inner stringer.

FIGURE 6 is a broken perspective view showing hinges, such as illustrated in FIGURES 4 and 5, in side by side relation as occurs when the ladder is fully retracted.

FIGURE 7 is an enlarged sectional view taken on line 7—7 of FIGURE 5, and

FIGURE 8 is an enlarged broken elevation and sectional view showing one end of a rung pivotally connecting adjacent links of two stringers.

FIG. 9 is a view showing part of the hinge member illustrated in FIG. 6.

The form of the invention shown includes spaced parallel runners **10**, each comprised of inner and outer hinged stringers **11** and **12** and rungs **13** connected between the inner stringers. The rungs **13** are regularly spaced with reference to each other and special rungs **13*a*** hereinafter described. Each stringer **11** and **12** is comprised of inner and outer links **14** and **15** arranged in side by side pairs which are pivotally connected with each other intermediate their ends by the special rungs **13*a***. The links

14 and **15** of each stringer **11** and **12** are oppositely hinged at their ends, and the hinge arrangement of one stringer is the reverse of the other stringer so that each runner **10** comprises a lazy tong construction.

The individual links **14** and **15** are of channel stock and the pairs of links have their webs adjacent each other. Rectangular hollow brackets **16** are provided in corresponding ends of the links and have integral bearings **17** projecting from corners thereof for receiving hinge pins **18**. The axis of each pin **18** lies substantially within the plane defined by the outer surface of the adjacent channel link **14** or **15**.

A feature of the invention is directed to a special latch assembly shown in detail in FIGURES 4 through 7. Each latch assembly includes a hook portion **19** and a hook receiving portion **20**. Each hook portion **19** and hook receiving portion **20** is comprised of formed sheet metal substantially U-shaped in transverse section so as to provide ears, not numbered, which receive extending ends of the hinge pins **18**. Each hook portion **19** extends longitudinally beyond the link **14** or **15** to which it is secured where it is provided with a lateral hook **21** adapted to be positioned through a slot **22** in a laterally extending flange **23** on the hook receiving portion **20** and positioned to engage an adjacent stringer **11** or **12** when the latter is fully extended. The outer surfaces of the lateral flanges **23** may be reinforced by plates, not shown, if desired. Similarly, the hooks **19** may be reinforced by additional plates **24**, and which plates are of the same thickness as washers **25** around the special rungs **13*a*** between links **14** and **15** as shown in FIGURE 8. Latches **26** are mounted by means of pivot pins **27** on the hook receiving portions **20** and are arranged to receive the hooks **21** when the latter are extended. As shown in FIGURE 7, the latches **26** are outwardly bowed, as at **28**, to provide spring engagement with the hooks **21**. The links **14*a*** and **15*a*** at the foot of the ladder are of half length and their extending ends are joined by one of the special rungs **13*a***. Channel shaped feet **29** may be provided around the extending ends of the outer half links as shown in FIGURES 1 and 2.

Referring now to FIGURE 8, each special rung **13*a*** extends through the inner and outer links **14** and **15** which are provided with inner and outer bearings **30** and **31**. The outer ends of the special rungs **13*a***, which are of tubular material, are peened so as to be rigidly secured to the outer bearings **31**. The intermediate rungs **13** are reinforced by channel shaped brackets **32** in the inner links **14** and shown in FIGURE 4.

The retracted ladder, as shown in FIGURE 1, may be extended horizontally along the ground or may be raised vertically by the operator by placing his foot on the lowermost special rung **13*a*** and pulling upwardly on any rung **13*a*** thereabove.

For the purpose of describing the operation, the hook portions **19** and their integral hooks **21** are designated by the letter "C" and the hook receiving portions including the lateral flanges **23** and hook receiving slots **22** are designated by the letter "D."

Referring now to FIGURE 2, the joining of opposite hinged portions "C" and "D" is illustrated by means of arcuate arrows. The letters "A" and "B" and arrows thereby designate the ultimate alignment of outer links **15** when the ladder is extended as shown in FIGURE 3. In view of the foregoing description, it will be apparent that the latches **26** may be caused to engage the hooks **19** as a person ascends or descends the ladder.

The invention is not limited to the exemplary construction herein shown and described, but may be made in many ways within the scope of the appended claims.

What is claimed is:

1. An extensible ladder wherein the runners thereof

are comprised of inner and outer stringers and wherein each stringer is comprised of links oppositely hinged at the end corners thereof, the links of said inner and outer stringers being arranged in side by side relation and pivotally connected intermediate their ends, the hinged links of one said stringer being oppositely arranged with reference to the other said stringer so as to provide a lazy tong construction, and latch assemblies connecting said stringers opposite their respective hinges, said latch assemblies including stirrups extending from one said link so as to engage an adjacent said link of the same stringer and an adjacent stringer when the ladder is in its fully extended position, and rungs connected between the inner said stringers.

2. An extensible ladder as defined in claim 1 and wherein each said latch assembly is comprised of a hook portion including a rigidly projecting hook on an extending end thereof opposite its mounting, and a hook receiving portion mounted on the ends of adjoining links opposite the hinge thereof, said hook receiving portion including a slot adapted to receive the hook of said hook portion, and a latch pivotally mounted on said hook receiving portion adapted to engage said hook.

3. An extensible ladder as defined in claim 1, and wherein the pivotal connection between said side by side links are rungs extending therethrough, and wherein the ends of said rungs are secured against rotation to the outer said links.

References Cited in the file of this patent

UNITED STATES PATENTS

942,683	Vaghi	Dec. 7, 1909
1,120,702	Erdman	Dec. 15, 1914
2,749,009	Price	June 5, 1956