Jan. 26, 1960 J. REITKNECHT 2,922,487

STEPLADDER

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Fig.1

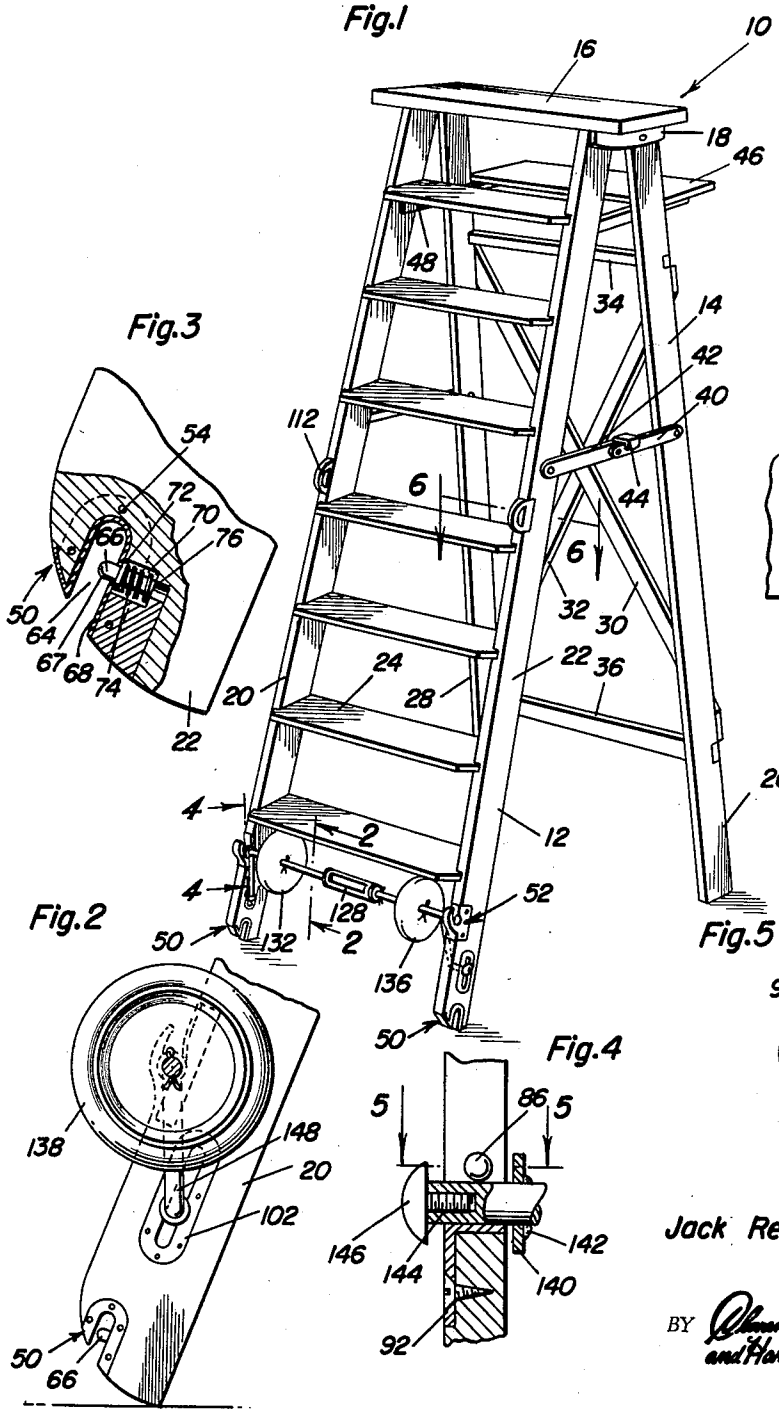


Fig.3

Fig.6

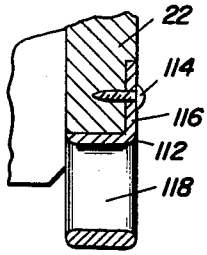


Fig.2

Fig.5

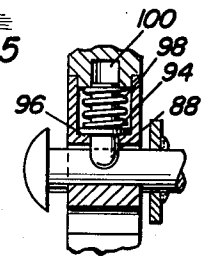


Fig.4

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STEPLADDER

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Fig.7

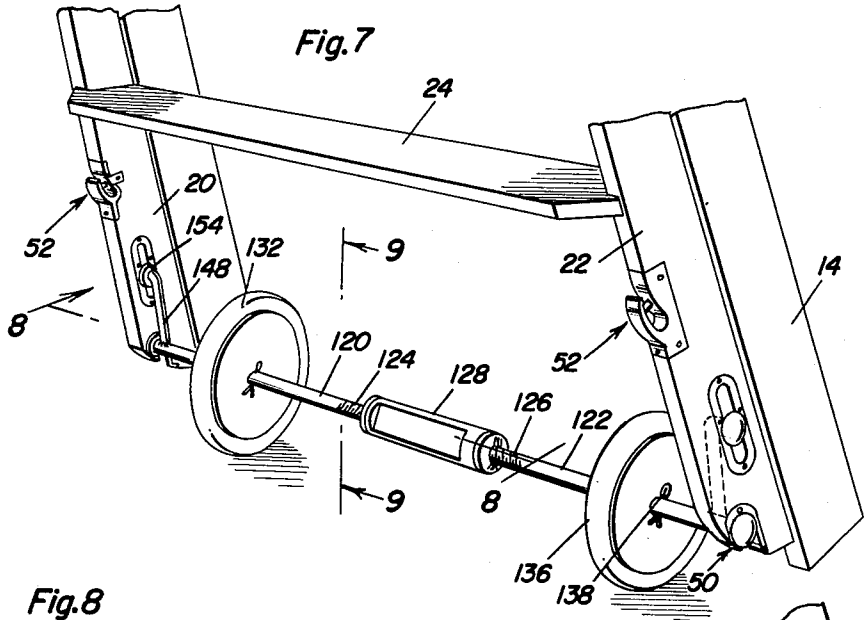


Fig.8

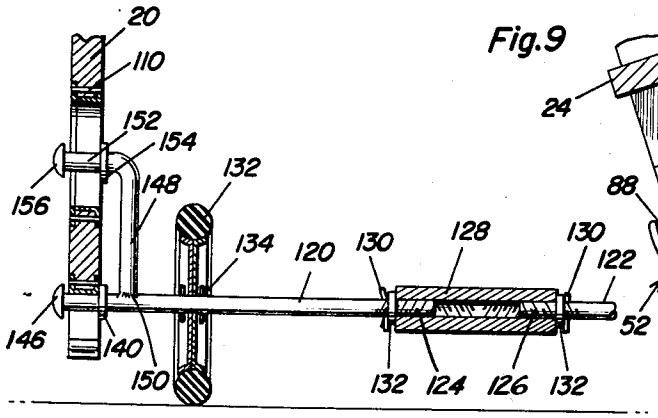


Fig.9

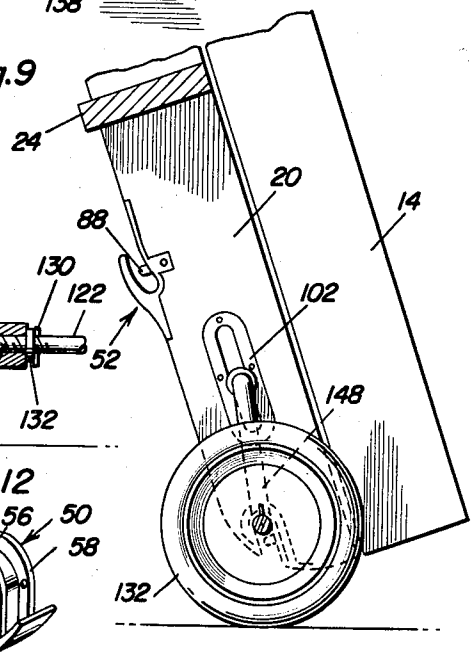


Fig.10

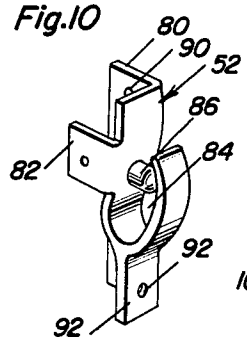


Fig.11

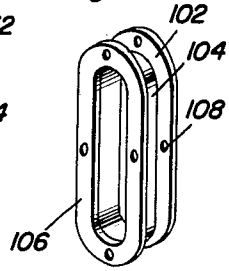
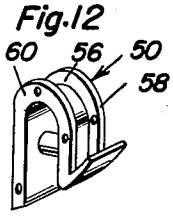


Fig.12



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STEPLADDER

Jack Reitknecht, New York, N.Y.

Application May 7, 1958, Serial No. 733,687

7 Claims. (Cl. 182—16)

This invention relates generally to ladders and more particularly to a novel and improved construction in step ladders which enables the user to roll rather than carry the stepladder when moving it from one location to another.

The painter, paperhanger, and general tradesman will agree that a significant problem is involved in carrying a stepladder along with other required supplies. More particularly, the painter, for instance, must carry a stepladder along with cans of paint and tarpaulins a significant distance from his utility truck to a house. Clearly, the cumbersome nature of the articles could necessitate a plurality of individual excursions between the truck and house. Likewise, the paperhanger must of necessity carry several rolls of paper along with the other tools of his trade. Clearly, the development of a means for more easily and efficiently transporting a stepladder and supplies would be very welcome to these people. Accordingly, it is the principal object of this invention to provide a novel and improved construction in stepladders which incorporates rolling means whereby the stepladder may be rolled, rather than carried.

It is a further object of this invention to provide a novel and improved stepladder construction which incorporates rolling means in a manner such that they are selectively movable to an operative or inoperative position.

It is a further object of this invention to provide a novel and improved stepladder construction which while incorporating rolling means thereon for facilitating transportation, does not detract from the normal functioning of the stepladder.

It is a still further object of this invention to provide teachings which may be incorporated in conventional stepladders for making them more easily transportable.

It is a still further object of this invention to provide novel teachings for adapting a conventional stepladder to be more easily transportable which are efficient and relatively inexpensive to manufacture and install.

In accordance with the above stated objects, below is particularly described the construction of the novel and improved stepladder which includes a pair of longitudinal parallel stiles supporting a plurality of spaced rungs therebetween. Hingedly connected to the stiles at their uppermost portion is a rear frame member including a pair of frame sides and supporting braces therebetween. The invention particularly lies in the rolling means provided between the stiles including an axle carrying a pair of rolling elements adapted to rotatably engage the ground. The axle has connected thereto a pair of arms which are slidably and pivotally connected to the stiles. Longitudinal recesses above and below the slidable and pivotal connection between the arms and stiles are adapted to accommodate end portions of the axle for esablishing inoperative and operative positions of the rolling means. Spring urged detents are carried within the recesses and are adapted to overlie the axle end portions for retaining the axle in the recess. The spring urged detents are adapted to withdraw against the spring urging into the stiles as the axle is forced into the recess. As the axle passes the detent, the detent is spring urged outwardly from its withdrawn position to overlie the axle and to retain the axle in the recesses. Further, rigidifying means are provided on the axle end portions and the offset portions for properly structurally relating the axles to the stiles. Still further, the axle is constructed of two portions which are terminally threaded and attached by a turnbuckle whereby they may be easily detached and disassembled from the remaining portions of the ladder construction. Still further, a pair of handles are installed on the stiles for facilitating the rolling movement of the stepladder when the axle is placed in the operative position.

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 a ladder construction utilizing the teaching of this invention;

Figure 2 is a fragmentary sectional view taken substantially along the plane 2—2 of Figure 1;

Figure 3 is an elevational view partly broken away of one of the retaining means;

Figure 4 is a fragmentary sectional view taken substantially along the plane 4—4 of Figure 1;

Figure 5 is a fragmentary sectional view taken substantially along the plane 5—5 of Figure 4;

Figure 6 is a fragmentary sectional view taken substantially along the plane 6—6 of Figure 1;

Figure 7 is an enlarged perspective view of a portion of the ladder construction illustrating the rolling means in operative position;

Figure 8 is a sectional view taken substantially along the plane 8—8 of Figure 7;

Figure 9 is a sectional view taken substantially along the plane 9—9 of Figure 7;

Figure 10 is a perspective view illustrating a plate portion adapted to form the recess in one of the stiles;

Figure 11 is a perspective view of a pair of elements adapted to form a slot in the stiles; and

Figure 12 is a perspective view of an element adapted to form another recess in the stiles.

With continuing reference to the drawings, the numeral **10** generally represents a stepladder having a front ladder portion **12** and rear supporting frame portion **14**. A top step **16** has a depending flange **18** to which the ladder portion **12** and frame portion **14** are hinged. The ladder portion **12** includes a pair of longitudinal parallel stiles **20** and **22** with a plurality of spaced rungs **24** being supported therebetween. The rear frame portion **14** includes side frame members **26** and **28** with cross braces **30** and **32** and braces **36** and **26** providing rigidity for the frame **14**. Further, conventionally included in this type of construction is a pair of links **40** and **42** which are pivoted respectively to the rear frame member **14** and the front ladder portion **12** and to each other at their free ends. A stop **44** carried by the link **42** limits the downward pivotal movement of the links relative to each other. The links coact to limit the hinge movement between the rear frame portion and the ladder portion **12**. It is to be noted that identical links are utilized connected between each of the side portions of the frame member and each of the stiles. Still further, conventionally included with similar type of ladder construction is a support **46** which is pivoted to both side members **26** and **28** of frame **14**. The support member **46** carries therewith a pivotal limiting member **48** which is adapted to abut one of the steps **24** of the ladder portion **12** to

substantially establish the support member 46 in a horizontal position.

In accordance with the particular teachings of this invention, each of the stiles 20 and 22 have recessed portions which are adapted to accommodate elements 50 and 52 illustrated in Figures 12 and 10. The element 50 is adapted to be fixed in the bottom of the stiles 20 and 22 by screws 54 which pass through apertures 56 into the stiles. Flange portions 58 and 60 fall on each side of a depressed stile portion so that the apertures 54 through the flange portion may securely grip the stiles. A recess 64 is defined in the element 50 and a detent 66 projects into the recess 64. The detent 66 projects through a wall 68 of the element 50 and into an opening 70 in the stile 22. A flange 72 is formed integral with the detent 66 while a spring 74 concentrically fits about the detent 66 between the flange 72 and the wall as at 76 of the aperture 70. The spring 74 therefore continually urges the flange 72 and integrally formed detent 66 outwardly into the recess 64. It is of course apparent that a force may be exerted on the detent 66 which would oppose the urging of the spring 74 to substantially force the detent 66 from the recess 64. It is to be further noted that the detent 66 terminates in a rounded portion 67 in the recess 64.

The element 52 having an outer wall 80 and an inner wall 82 is adapted to be accommodated on the stiles 20 and 22 a predetermined distance above the accommodated position of element 50 The element 52 has a substantially U-shaped recess 84 with a spring urged detent 86 have a rounded terminal portion 88 projecting into the recess 84. Apertures 90 are positioned in wall 80 and wall 92 for securing the element 52 as by screws to the stiles 20 and 22. The detent 88 has a flange 94 formed integral therewith with the flange being positioned adjacent the wall portion 96 and between the walls 80 and 82. A spring 98 concentrically fits about the detent 88 and resiliently urges the flange 94 forwardly into the recess 84. It should be apparent that a force may be exerted on the detent 88 which would cause the flange 94 to bear against the spring 98 to substantially force the detent 88 into a recess portion 100 formed in the stiles 20 and 22.

A slotted portion in the stiles 20 and 22 between the recessed portions 64 and 84 accommodate the plate 102 and integrally formed slot 104 and accompanying open plate 106. The plates 102 and 106 have apertures 108 therein for passing screws 110 for maintaining the members 102, 104 and 106 on the stile 20.

Further, a pair of handles as at 112 are affixed to the stiles 20 and 22 approximately adjacent the vertical midpoint of the latter portion 12. A screw 114 passes through a side plate 116 and threadedly engages stile 22. The handle 112 has a recessed portion 118 for accommodating the user's fingers while the user is rolling the latter in accordance with the teachings of the invention.

A pair of axle portions 120 and 122 are terminally threaded as at 124 and 126 and are attached by the utilization of a turnbuckle 128. Cotter pins 130 pass through the axle sections 120 and 122 to limit the movement of washers 132 which bear against the turnbuckle 128 and in turn limit the movement of the turnbuckle so as to in effect prevent the axle sections 120 and 122 from drawing too close to each other. A wheel 132 is rotatably fixed as by cotter pins 134 on the axle section 120 while a wheel 136 is rotatably fixed by cotter pin 138 on the axle section 122. The axle end portions include flange means 140 which are welded at 142 to the axle sections. A threaded aperture 144 is concentrically and terminally formed in the axle sections and accommodate a screw as 146.

An arm 148 is welded to the axle section 120 at 150. The arm 148 has an offset portion 152 which has a flange 154 similar to the flange 140. The offset portion 152 has a threaded aperture concentrically and terminally formed therein which threadedly accommodates screw 156.

In the utilization of this device, the offset portion 152 is pivotally and slidably carried within the slot in the stiles 20 and 22 defined by the members 102, 104 and 106. The axle sections 120 and 122 carrying the wheels 134 and 136 may thereby pivot about the offset portions 152 and may slide in the stile slot. As illustrated in Figures 1 and 2, when it is desired that the rolling means be in inoperative position, that is when it is desired that the ladder be utilized strictly for that purpose, the axle sections 120 and 122 carrying the wheels 132 and 136 are pivoted upwardly about the offset portions 152 which may slide upwardly in the stile slots so that the axle end portion falls into recess 84. A depression on the axle sections 20 and 22 while in the recessed portion 84 will force the detent 86 out of the recess portion 84 as the axle end portion bears against the rounded end portion of the detent 86. Therefore, the axle may fall to the bottom of the recess 84 so that the detent 86 may again be urged outwardly by spring 98 to retain the axle in the recess 84. Clearly, with the axle end portion fitting in the recess 84 below the detent 86, the rolling means defined by the wheels 132 and 136 will be inoperative and the latter may be conventionally utilized. When it is desired to transport the latter, it is merely necessary to force the axle sections upwardly out of the recess 84 as the axle end portions apply a force against the rounded portion of the detent 86 to force the detent into the stiles. The axle portions may be forced upwardly by merely kicking them upwardly with the foot or raising them with the hand. The axle sections and the wheels 132 and 136 may then be pivoted about the offset portions 152 and move downwardly in the stile slots so that the axle end portions may enter the recess 64 and be forced upwardly over the spring urged detent 66 for retaining the axle sections in the recess 64. Clearly, as this occurrence takes place the device will appear as in Figures 7 through 9 so that the ladder may be rolled on the wheels 132 and 136.

It is thought that the operation and utilization of this invention will now be apparent to one skilled in the art. It is to be noted that these teaechings may be utilized to convert a conventional ladder or may be utilized in the construction of new ladders. An auxiliary function of this invention is for using the ladder as somewhat of a wheelbarrow for carrying such as a tool box, tarpaulin, or paper rolls.

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 resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A ladder construction comprising a pair of longitudinal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements, said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to said axle, said arms pivotally connected to said stiles, said retaining means including recesses in said stiles spaced above and below said pivotal connection between said arms and stiles for accommodating end portions of said axle in inoperative and operative positions of said rolling means.

2. A ladder construction comprising a pair of longitudi-

nal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements, said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to said axle, said arms pivotally connected to said stiles, said retaining means including recesses in said stiles spaced above and below said pivotal connection between said arms and stiles for accommodating end portions of said axle in operative and inoperative positions of said rolling means, spring urged detents carried in said recesses for retaining said axle therein.

3. A ladder construction comprising a pair of longitudinal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements, said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to said axle, an offset portion formed integral with each of said arms, a slot in said stiles extending in the direction of said stiles, said offset portion slidably and pivotally retained in said slot, said retaining means including open longitudinal recesses in said stiles spaced above and below said slot for accommodating end portions of said axle in inoperative and operative positions of said rolling means.

4. A ladder construction comprising a pair of longitudinal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements, said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to said axle, an offset portion formed integral with each of said arms, a slot in said stiles extending in the direction of said stiles, said offset portion slidably and pivotally retained in said slot, said retaining means including open longitudinal recesses in said stiles spaced above and below said slot for accommodating end portions of said axle in inoperative and operative positions of said rolling means, spring urged detents carried in said recesses, said detents positioned to overlie said axle end portions in said recesses for retaining said axle in said desired selective position.

5. A ladder construction comprising a pair of longitudinal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements, said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to

said axle, an offset portion formed integral with each of said arms, a slot in said stiles extending in the direction of said stiles, said offset portion slidably and pivotally retained in said slot, said retaining means including open longitudinal recesses in said stiles spaced above and below said slot for accommodating end portions of said axle in inoperative and operative positions of said rolling means, spring urged detents carried in said recesses, said detents positioned to overlie said axle end portions in said recesses for retaining said axle in said desired selective position, said axle being constructed of a pair of sections with each of said sections being terminally threaded, and a turnbuckle attaching said sections whereby said sections may be detached from each other and from the stiles.

6. A ladder construction comprising a pair of longitudinal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements, said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to said axle, an offset portion formed integral with each of said arms, a slot in said stiles extending in the direction of said stiles, said offset portion slidably and pivotally retained in said slot, said axle being constructed of a pair of sections with each of said sections being terminally threaded, and a turnbuckle attaching said sections whereby said sections may be detached from each other and from the stiles, said retaining means including open longitudinal recesses in said stiles spaced above and below said slot for accommodating end portions of said axle in inoperative and operative positions of said rolling means.

7. A ladder construction comprising a pair of longitudinal parallel stiles, a plurality of spaced rungs supported therebetween, rolling means carried by said stiles for rolling engagement with the ground, retaining means on said stiles for selectively retaining said rolling means in either an operative or an inoperative position, said rolling means including an axle, a plurality of rolling elements said rolling elements rotatably carried by said axle, means connected to said axle for allowing a pivotal movement of said axle about a line parallel to but spaced from said axle, said last named means including a pair of arms fixed to said axle, said arms pivotally connected to said stiles, said retaining means including recesses in said stiles spaced above and below said pivotal connection between said arms and stiles for accommodating end portions of said axle in inoperative and operative positions of said rolling means, said axle being constructed of a pair of sections with each of said sections being terminally threaded, and a turnbuckle attaching said sections whereby said sections may be detached from each other and from the stiles.

References Cited in the file of this patent

UNITED STATES PATENTS

78,988	McKendree	July 16, 1868
1,665,991	Stramaglia	Apr. 10, 1928
2,597,902	Roketa	May 27, 1952
2,788,930	Pals	Apr. 6, 1957

FOREIGN PATENTS

522,207	Germany	Apr. 7, 1931