Oct. 31, 1961 H. B. RICH 3,006,434

LADDER CONSTRUCTION

Filed March 9, 1960

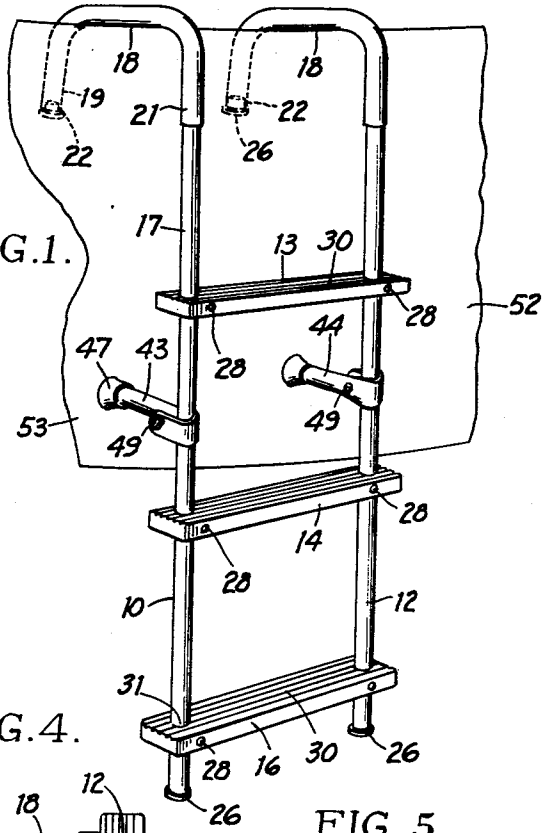


FIG. 1.

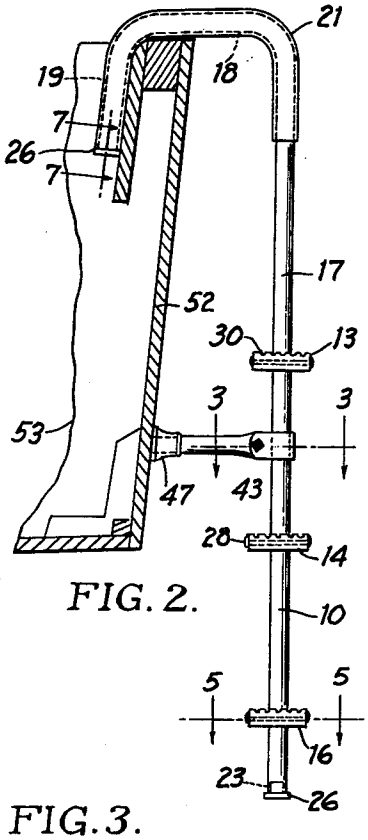


FIG. 2.

FIG. 4.

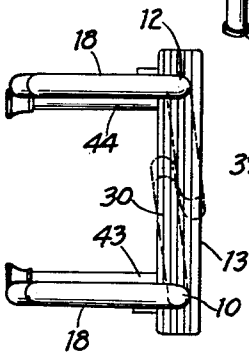


FIG. 7.

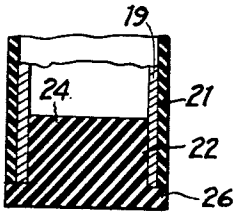
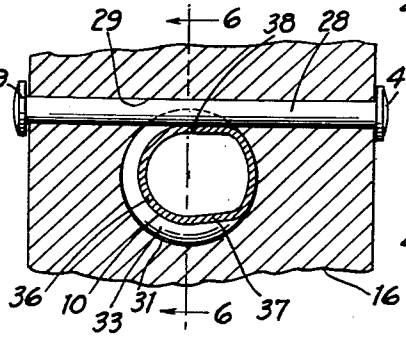


FIG. 5.



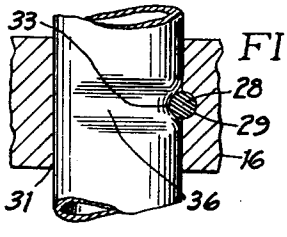
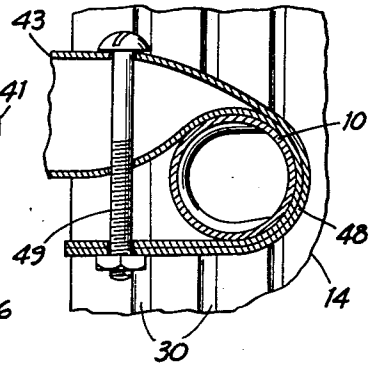


FIG. 6.

FIG. 3.



INVENTOR.
HOWARD B. RICH
BY Pearce & Schaeperklaus

ATTORNEYS

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LADDER CONSTRUCTION

Howard B. Rich, Carrollton, Ky., assignor to Howard B. Rich, Inc., Carrollton, Ky., a corporation of Kentucky

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This invention relates to a ladder construction. More particularly this invention relates to an improved ladder construction in which rails of the ladder can pivot inside rungs thereof.

An object of this invention is to provide a ladder construction in which hook-shaped supports on the side rails thereof are provided for supporting the ladder from the upper end thereof and in which the side rails pivot to swing the hook-supports between an operative position extending outwardly from rungs thereof and a folded position aligned with the rungs.

A further object of this invention is to provide a ladder of this type in which the rails of the ladder are formed of tubular material in which there are circumferentially extending grooves in the rails at the rungs thereof and in which retaining rods mounted in the rungs extend along the grooves to support the rungs on the rails.

A further object of this invention is to provide a ladder of this type suitable for hanging or mounting on the side of a boat for use in boarding the boat and in which struts are mounted on the rails to swing with the rails between the operative position in which the struts are adapted to engage a side of the boat and a folded position aligned with the rungs.

The above and other objects and features of this invention will be apparent to those skilled in the art to which this invention pertains from the following detailed description and the drawing, in which:

FIG. 1 is a perspective view of a ladder constructed in accordance with an embodiment of this invention, the ladder being shown in conjunction with a fragmentary portion of a boat;

FIG. 2 is a view taken in transverse section through the side of the boat showing the ladder in side elevation;

FIG. 3 is an enlarged view in section taken on the line 3—3 in FIG. 2;

FIG. 4 is a plan view of the ladder removed from the boat, the rails thereof being shown in operative position in full lines and being shown in folded position in dot-dash lines;

FIG. 5 is an enlarged view in section taken on the line 5—5 in FIG. 2, showing one rail in operative position;

FIG. 6 is a view in section taken on line 6—6 in FIG. 5, showing the rail in folded position; and,

FIG. 7 is an enlarged view in section taken on the line 7—7 in FIG. 2.

In the following detailed description and the drawing, like reference characters indicate like parts.

In FIGS. 1 and 2 is shown a ladder which includes side rails **10** and **12**. The side rails **10** and **12** are spanned by steps or rungs **13**, **14** and **16**. The side rails **10** and **12** are of similar construction, and only the side rail **10** will be described in detail. The side rail **10** is formed from tubular metal and includes an elongated upright main portion **17**, a cross-portion **18** (see FIG. 2) which extends substantially perpendicularly to the main portion **17** and a return bend portion **19**. The main portion **17**, cross-portion **18** and return bend portion **19**, are integrally formed from a single piece of hollow metal tube bent to the shape indicated. A sleeve **21** of resilient plastic material or the like, covers the return bend portion **19**, the cross-portion **18**, and an upper section of the main portion **17**. Ends of the side rail **10** are closed by upper and lower plugs **22** and **23**. As shown in FIG. 7, the

upper plug **22** includes a main portion **24** received inside the rail. A flange **26** on the plug **22** engages one end of the rail. The lower plug **23** can be of similar construction.

The rungs are held in position on the rails by rod members or pins **28**. The rungs can be made of wood treated to be water resistant. The rungs can be provided with grooves **30** to prevent slipping. Details of construction of one of the pins **28** are shown in FIGS. 5 and 6. The pin **28** is received in a transverse bore **29** in the rung **16**. The rail extends through an upright bore **31** in the rung **16**. As shown, the bores **29** and **31** intersect adjacent an edge of the bore **31**. The rail **10** is provided with a groove **33** extending generally circumferentially thereof in which the rod member **28** is received, so that the pin **28** locks the rung in position upon the rail but permits the rail to swing or pivot inside the rung from the operative position shown in full lines in FIG. 4, to the folded position shown in dot-dash lines shown in FIG. 4. As shown in FIG. 5, the groove **33** has a main portion **36** having an axis which follows the curvature of the rail and end portions **37** and **38**, which have axes which are straight, and tangent to the axis of the main portion **26**. The straight portion **38** engages the pin **28** when the rail **10** is in the position shown in FIG. 4 in full lines to limit outward swinging of the rails. The pin **28** can be formed as shown in FIG. 5 as a rivet with heads **39** and **41** engaging opposite side edges of the rung **16** to hold the pin **28** in position therein.

Struts **43** and **44** are mounted on the rails **10** and **12** respectively, and can swing therewith. The strut **43** has a tubular metal body. At one end of the body of the strut **46** is mounted a cap **47** of rubber or the like. The other end of the body is flattened and is turned around the rail **10**, as indicated at **48** in FIG. 3, to form a clamping section embracing the rail. A bolt **49** spans the ends of the clamping section and clamps the strut **43** tightly on the rail **10**. As shown in FIGS. 1, 2, and 4, the struts are mounted in alignment with the cross-portions of the rails so that, when the cross-portions of the rails are swung into alignment with the rungs, the struts also are aligned with the rungs.

When the ladder is in the operative position shown in FIGS. 1 and 2, and in full lines in FIG. 3, the ladder can be mounted on a side **52** of a boat **53** with the cross-portions of the rails resting on the gunwale or upper edge of the side of the boat and the return bent portions inside the body. The struts **43** and **44** engage the side **52** of the boat to hold the ladder in upright position. The sleeves on the upper portions of the rails and the tips of the struts, being of resilient material, do not mar the surface of the boat.

The struts can be supplied to purchasers of ladders in lengths sufficiently great to fit various types of boats and can be cut or trimmed to appropriate length to fit a desired boat.

The rails are continuous and unbroken from end to end. The caps at the ends of the rails fit tightly inside the ends of the rails and keep water out of the rails to trap air inside the rails so that, if the ladder falls into the water, the ladder can float.

When the ladder is removed from the boat, the rails can readily be folded to the position shown in dot-dash lines in FIG. 4, to bring the upper portions thereof and the struts into alignment with the rungs, as indicated in dot-dash lines in FIG. 4, so that the ladder can readily be stored in a small space.

The ladder construction illustrated in the drawing and described above is subject to structural modification without departing from the spirit and scope of the appended claims.

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

1. A ladder which comprises a pair of spaced rails, hooks mounted on upper ends of said rails for supporting the ladder, a plurality of rungs mounted on said rails, there being a circumferentially extending groove in each rail opposite each rung and a pair of pins mounted in each rung, each groove having an arc portion concentric to the face of the rail, each pin extending transversely of and being received in one of the grooves of one of the rails to support the rung, the rails being swingable between an operative position in which the hooks extend transversely of the rungs and a folded position aligned with the rungs, each groove having a straight portion extending tangentially from one end of the arc portion, the pins engaging the straight portions when said rails are in operative position.

2. A boarding ladder for a boat which comprises a pair of spaced rails, hooks mounted on upper ends of said rails for supporting the ladder, a plurality of rungs mounted on said rails, there being a circumferentially extending groove in each rail opposite each rung and a pair of pins mounted in each rung, each groove having a semi-circular portion concentric to the face of the rail and substantially parallel straight portions extending tangentially from ends of the said semi-circular portion, each pin extending transversely of and being received in one of the grooves of one of the rails to support the rung, the rails being swingable between an operative position in which the hooks extend transversely of the rungs and a folded position aligned with the rungs, the pins engaging said straight portions when said rails are in operative position, and a strut mounted on each rail in alignment with the hook thereof and engageable with a side of the boat when the rails are in operative position and the hooks are mounted over an upper edge of the side, the struts being in alignment with the rungs when the rails are in folded position.

3. A ladder which comprises a pair of spaced tubular rails, hooks mounted on upper ends of said rails for supporting the ladder, a plurality of rungs mounted on said rails, there being a circumferentially extending groove in each rail opposite each rung and a pair of pins mounted in each rung, each rung having a semi-circular portion concentric to the face of the tubular rail and substantially parallel straight portions extending tangentially from ends of the said semi-circular portion, each pin extending transversely of and being received in one of the grooves of one of the rails to support the rung, the rails being swingable between an operative position in which the hooks extend transversely of the rungs and a folded position aligned with the rungs, the pins engaging said straight portions when said rails are in operative position, and a strut mounted on each rail in alignment with the hook thereof and engageable with a side of the boat when the rails are in operative position and the hooks are mounted over an upper edge of the side, the struts being in alignment with the rungs when the rails are in folded position, and plugs mounted on ends of the rails to close the ends of the rails whereby the ladder is adapted to float in water.

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