United States Patent

[11] 3,556,248

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[21] Appl. No. **832,897**
[22] Filed **June 13, 1969**
[45] Patented **Jan. 19, 1971**

[54] **FOLDING LADDER FOR A WORKING CART**
4 Claims, 2 Drawing Figs.

[52] **U.S. Cl.** **182/15,** 182/96
[51] **Int. Cl.** **E06c 5/00**
[50] **Field of Search** 182/15, 95, 96, 129, 107

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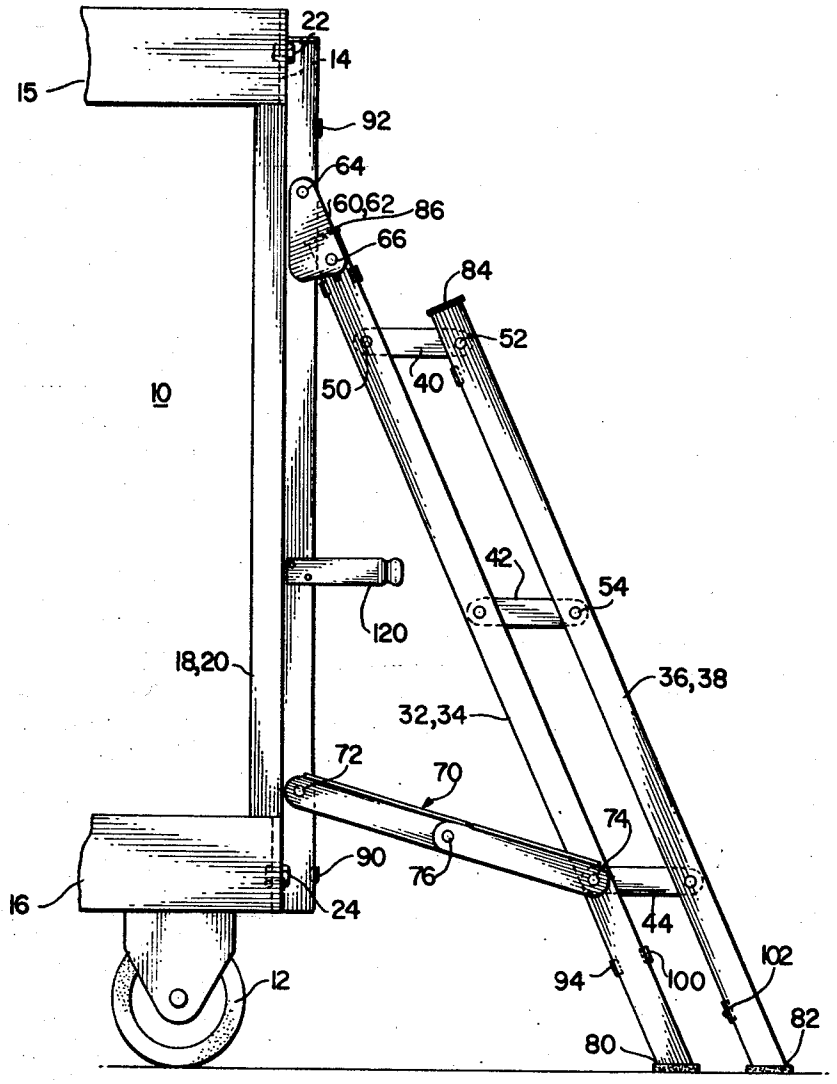
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ABSTRACT: A working cart having a frame structure formed of rectangular members to which a pair of vertical members in parallel relation are supported, a set of four ladder-forming members in which two members thereof adjacent to said pair of vertical members are connected at their upper end by a pivot arm, and in which an articulated pivot arm is mounted near the lower end of the pair of vertical members for connecting with said two of said four members, and in which a plurality of magnetic elements are disposed in the pair of vertical members for the mating with magnetic elements in said two of said four members for holding the ladder in collapsed position. Steps are disposed between the set of four ladder-forming members to complete the structure of the ladder, and plastic caps may be disposed over the lower ends as well as some of the upper ends of the four members.



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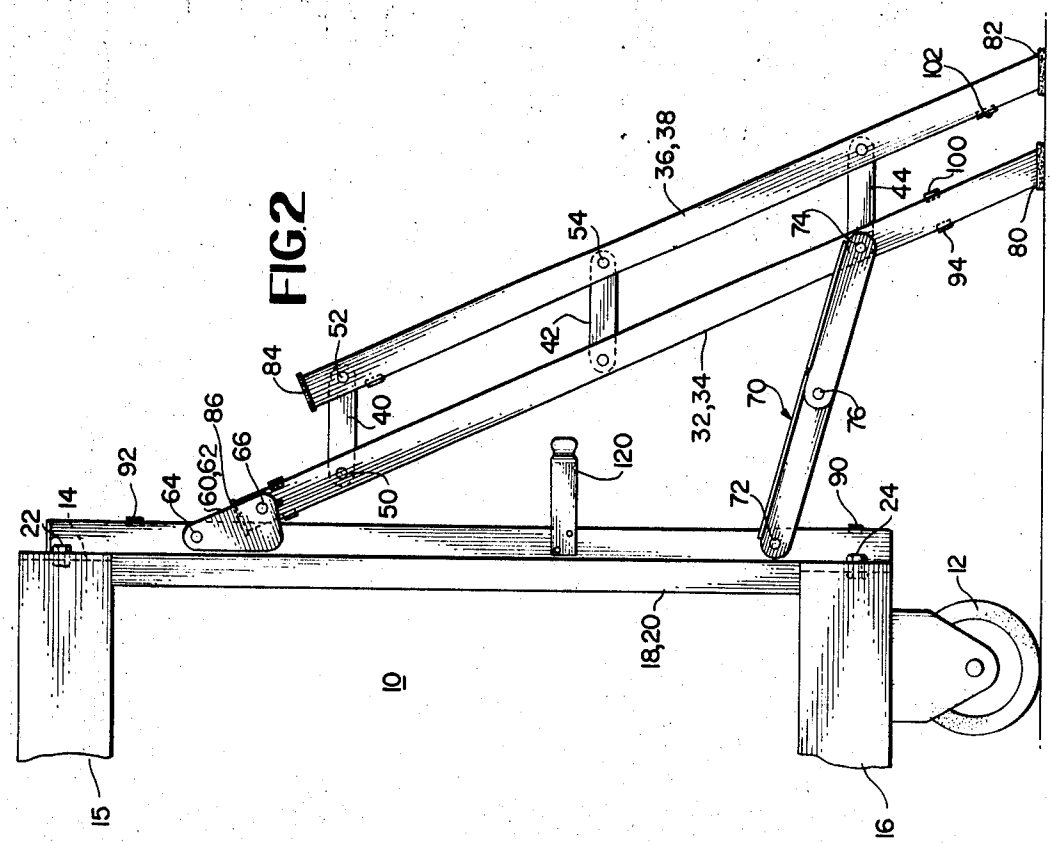


FIG. 2

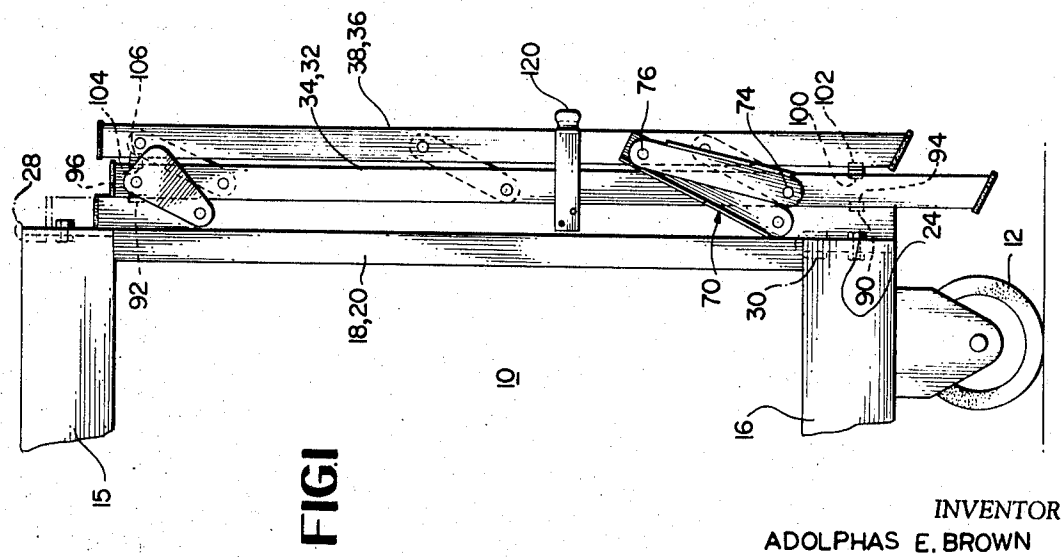


FIG. 1

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FOLDING LADDER FOR A WORKING CART

The present invention relates to a an improved folding ladder for a working cart, and more particularly relates to the construction of a collapsible ladder in which magnetic elements are arranged in mating relation so that opposite poles essentially contact each other when the ladder is in its collapsed position for holding it in place, and the ladder is used in conventional fashion when the ladder is opened to its operating or working position.

An object of the present invention is to provide a folding ladder for selectively mounting on a working cart or any other object, and in which the folding ladder may be held in its collapsed position by means of selectively disposed and positioned magnetic elements that are in the ladder-forming members as well as in the vertical members for supporting the ladder members.

A further object of the present invention is to provide a ladder arrangement that is adapted for selectively mounting on a cart, a bed bunk, and the like, and in which the ladder structure is readily moveable with the working cart or other device for use in stocking shelves or filling orders from shelves in a warehouse, and the like.

The above and other objects and advantages of the invention will become apparent upon full consideration of the following detailed description and accompanying drawings in which:

FIG. 1 is a side elevation view of the folding ladder according to the preferred embodiment of the present invention, showing the ladder in the collapsed position; and

FIG. 2 is a side elevation view of the ladder showing it in its open and operating position.

Referring now to the drawings, there is shown a working cart **10** having a pair of wheels or casters **12**. The cart is formed of a rectangular frame having upper member **15** and lower member **16**, from which there is supported a pair of parallel vertical members **18, 20**, the upper end being held in place by a bolt and nut arrangement **22**, and the lower end being held securely in place by a similar bolt and nut arrangement **24**. In lieu of using the bolt and nut arrangement, one may provide a construction in which a hook-in means **28** may be used to secure the upper end of the parallel members **18, 20** onto the ledge of the frame, or its extension, as shown, and similarly a hook-in means **30** is provided near the lower end of the parallel members **18** for securing them to a lower lip of the frame **16** of the cart **10**.

There are provided a set of four parallel ladder forming members **32, 34**, and **36, 38**, which the two members **32, 34** are positioned adjacent to the parallel members **18, 20**. It is seen that the set of four members **32—38** are essentially parallel to each other, and that an arrangement of steps **40, 42, 44**, are pivotally disposed within the set of four ladder-forming members **32, 38**, by pivots means **50, 52, 54**, and that the step elements operate and are disposed in conventional fashion to form the ladder.

The upper end of the two ladder members **32, 34** is pivotally connected to the vertical support members **18, 20** by a short or triangularly disposed pivot arm **60, 62**, in which pivot **64** engages one of the vertical support members, **18, 20**, and pivot **66** engages one of the pair of ladder-forming members **32, 34**, the pivot **66** engaging essentially the upper end thereof. Near the lower end of the vertical support members **18, 20** there is pivotally supported an articulated pivot arm **70**

mounted by a pivot means **72** connecting one of the vertical members **18, 20**; a pivot means **74** connects the other end of the articulated pivot arm **70** to one of the pairs of ladder members **32, 34** and it has an essentially disposed pivot **76** to provide articulation of the pivot arm **70**.

At the upper and lower extremities of the ladder-forming members **32—38**, there may be provided and secured thereon plastic cap members **80, 82, 84, 86**.

There are shown and disposed in the vertical support members **18, 20** certain magnets **90, 92** formed of pole pieces imbedded therein, as shown in the drawings, and which essentially mate with similarly disposed magnetic elements or magnet means **94, 96** respectively shown imbedded in two of the ladder-forming members **32, 34**, but in which the poles are in opposing relation, so that the magnets attract each other. The manner of providing magnets in opposing relations for purposes of attracting each other is conventional and well known. Also, there are provided essentially mating pairs of magnets **100, 102** and **104, 106** similarly imbedded in the ladder-forming members **32, 34** and **36, 38** respectively.

It is thus seen that the advantages of the invention are achieved and realized in the improved construction of the folding ladder having the imbedded magnets and the pivotal arrangement of the parts so that the ladder can be collapsed into its stored position by the attracting forces of magnets imbedded in the ladder, as shown and described. Also provided for securing purposes, as desired, is a resiliently mounted steel spring clip **120** for further securing the collapsible ladder in place.

Additional embodiments of the invention in this specification will occur to others and therefore it is intended that the scope of the invention be limited only by the appended claims and not by the embodiment described hereinabove. Accordingly, reference should be made to the following claims in determining the full scope of the invention.

I claim:

1. A folding ladder for a working cart comprising a frame structure forming rectangular members of said working cart, a pair of vertical members in parallel relation end-supported from the frame structure and having magnetic elements disposed thereon, a set of four ladder-forming members disposed always in parallel relation to each other in which two of said four members are adjacent to said pair of vertical members and connected thereto at the upper end by a pivot arm and near the lower end by an articulated pivot arm, said two members having magnetic elements disposed thereon formating with said magnetic elements disposed on said vertical members when in closed relation, a plurality of spatially disposed step members pivotally connected near their corners for support from adjacent portions of said four ladder-forming members, said other two members having magnetic elements disposed thereon, said two members having magnetic elements disposed thereon for mating with said magnetic elements disposed on said other two members when in closed relation.

2. The invention of claim **1** wherein plastic caps are disposed over the lower ends of said four members.

3. The invention of claim **1** wherein said pair of vertical members are end supported by hook-in means for quick engaging said frame structure.

4. The invention of claim **1** wherein a bolt-and-nut means are used for end supporting said pair of vertical members onto said frame structure.