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HAND TRUCK AND LADDER

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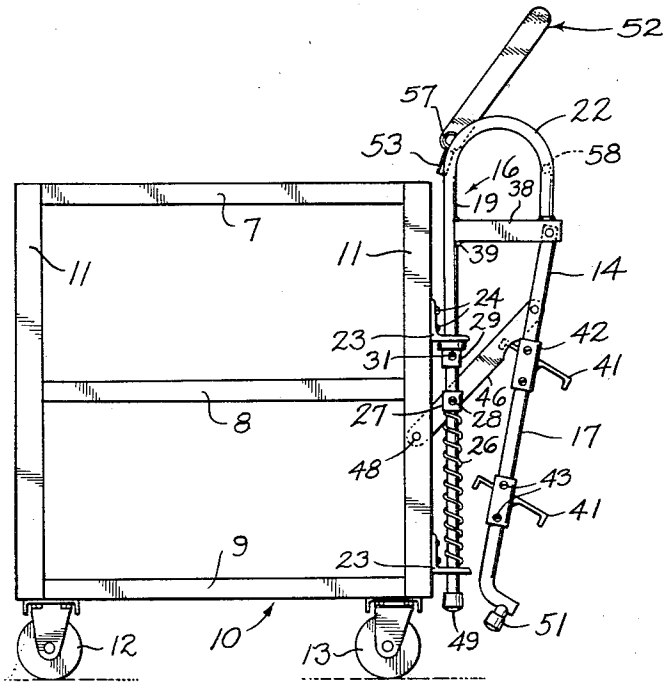


Fig. 1.

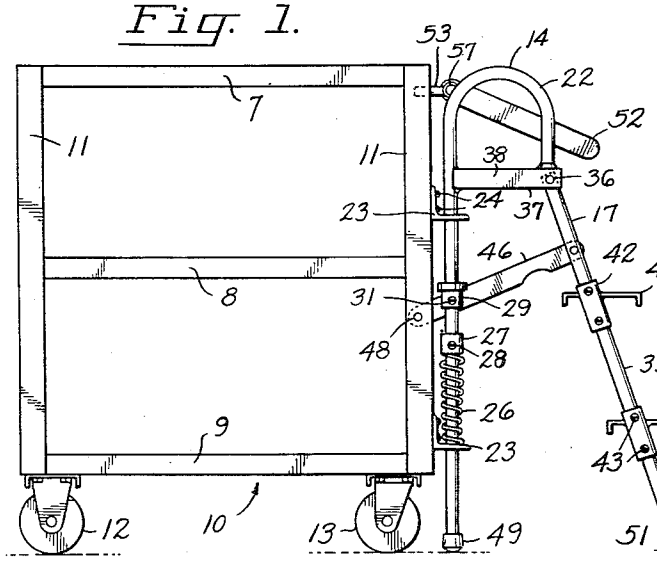


Fig. 2.

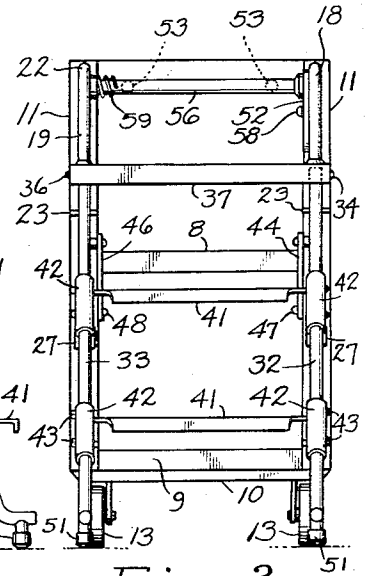


Fig. 3.

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HAND TRUCK AND LADDER

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9 Claims. (Cl. 228—6)

This invention relates to a novel stepladder assembly and more particularly to a stock transfer truck having a collapsible stepladder retractably carried thereby to assist in the loading and unloading of the stock transfer truck.

Stock transfer trucks presently find wide acceptance by concerns which handle, store, and transfer large volumes of such items as packaged goods, foods, replacement parts, and the like. Items of this nature are quite generally stored in a stockroom which has high, ceiling to floor shelves distributed throughout the stockroom along the walls of the room and frequently along isles laid out along the area bounded by the walls. Conventionally, the stock transfer truck is employed to assist in the transfer of goods to and from the various shelves, the transfer truck enabling the more expeditious transport of goods from one point to another.

Stock transfer trucks, by reason of the high shelves found in a stockroom of the type described, are sometimes equipped with built-in ladder devices which are transported with the stock transfer truck so as to be ready for use when the occasion demands. By the inclusion of a ladder with the transfer truck, it becomes no longer necessary to distribute many ladders throughout the stockroom or separately transport a ladder whenever it is needed.

In view of the conditions which are normally found in a stockroom, a well designed stock transfer truck and ladder assembly should be constructed so as to meet a number of requirements. For instance, to permit easy set up of the ladder without the need of manual aid to maintain proper balance, the ladder's step elements should lie on a plane sufficiently inclined from the vertical to permit a person using the ladder properly to balance himself using his feet only. In addition to this requirement, structure should be provided which will serve to anchor the truck and ladder from inadvertent movement while the ladder is in use. Also because of the crowded conditions normally found in storerooms, it is mandatory that the ladder assembly consume as little space as possible so as to permit maximum maneuverability of the truck.

Transfer truck and ladder assemblies have been proposed; however, to our knowledge the constructions heretofore suggested have not been wholly satisfactory. The majority of transfer trucks which have been proposed have been equipped with ladders of substantially rigid construction, with the step elements of the ladder arranged on an inclined plane either with the upper portion of the ladder extending inwardly over a portion of the cart itself, or with the entire assembly protruding outwardly from one end of the cart. The former design has resulted in decreased available space on the cart and increased difficulties in loading and unloading the truck, whereas the latter has been cumbersome and hard to manipulate.

To obviate the aforementioned difficulties, this invention contemplates the incorporation with a stock transfer truck of a collapsible stepladder assembly which has incorporated therein a novel arrangement which unfolds the stepladder to permit easy use of the ladder when the stepladder is positioned on the ground, and which collapses the ladder and positively holds the ladder in this state whenever the ladder is not in use and positioned to ride clear of the ground. Further, additional means are provided so that the ladder will unfold and assume an operative position under the weight of an ordinary person, and immediately return to a riding and collapsed condition wherein the ladder is folded and held against the side of a cart when subsequently released.

Generally, therefore, it is an object of this invention to provide in combination with a stock transfer truck, a collapsible stepladder mounted for reciprocation between a riding position wherein the ladder is clear of the ground, and an anchored position wherein the ladder contacts the ground, and which is collapsed and positively held in a folded position by means disposed between the truck and the ladder whenever the ladder is raised from the anchored to the riding position.

Another object of this invention is to provide a stock transfer truck and collapsible ladder assembly which includes a biasing arrangement normally urging the stepladder to a riding position where the ladder clears the ground, movement to this riding position automatically folding the ladder so that it will lie compactly against the stock transfer truck.

Another object of this invention is to provide a collapsible stepladder for use with an adjoining structure such as a stock transfer truck which will support itself independently when opened for use, and which will automatically fold together and be carried by the adjoining structure when the ladder is released and not in use. Still another object of this invention is to provide a fastening means for such a collapsible ladder disposed between the support structure and the ladder for locking the ladder in its extended and opened position.

These and other objects and advantages are attained by the present invention, various novel features of which are more fully disclosed in the following description and illustrated in the accompanying drawings, wherein:

Fig. 1 is a side view of one form of the transfer truck and ladder of this invention, showing the ladder folded against the transfer truck in a raised riding position;

Fig. 2 is a side view of the transfer truck and ladder shown in Fig. 1, showing the ladder unfolded and in an opened, extended position; and

Fig. 3 is an end view of the transfer truck and ladder with the ladder in the position it occupies in Fig. 2.

Referring to the drawings, generally indicated at **10** is the body of a conventional stock transfer truck comprised of four upstanding frame or chassis members **11** disposed at the corners of body **10** and forming the peripheral outline of body **10**. Lying horizontally between the frame members **11** are shelves **7**, **8** and **9**, which are suitably secured as by welding to frame members **11**. The body **10** of the transfer truck is mounted upon a pair of front wheels **12** and a pair of rear wheels **13** so as to provide wheel support for body **10**. Wheels **12** and **13** are preferably caster wheels mounted to swivel beneath body **10** so that the transfer truck has a maximum degree of maneuverability.

At one end of body **10** and mounted on the upright portion presented by frame members **11** is a ladder assembly generally indicated at **14**. This ladder assembly comprises an inner ladder support **16** mounted as described hereinbelow for reciprocation between an anchored position wherein the inner ladder support contacts the ground, and a riding position wherein the support is raised upwardly clear of the ground. Pivoted to this inner ladder support at an upper part thereof, is an outer ladder support generally indicated at **17**. Outer

ladder support is pivoted to the inner ladder support so that the free end of the outer ladder support is free to move toward and away from the body portion of the truck to the positions generally shown in Figs. 1 and 2.

More specifically, the inner ladder support generally includes a pair of ladder uprights **18** and **19** having U-shaped upper end portions **21** and **22**. Each ladder upright is slidably mounted in spaced guide members **23** secured to the side of the transfer truck by suitable means, as by screws **24**.

Encircling the lower portion of each ladder upright is a compression spring **26**. The lower end of each compression spring **26** is seated on the upper surface of the lower guide member **23**, and the upper end of each spring is seated on the lower surface of a retainer sleeve **27**, suitably fastened to the ladder upright as by screw **28**. Mounted on each ladder upright above retainer sleeve **27** is an abutment sleeve **29** secured to the upright by screw **31**. Each ladder upright therefore is free to reciprocate within guide members **23** between a lower or anchored position where the base of the upright contacts the ground, and an upper or riding position where abutment sleeve **29** strikes the lower surface of the upper guide member **23**. The combined force of the two compression springs **26** encircling ladder uprights **18** and **19** is sufficient to lift the ladder assembly **14** to its riding position when no force other than that exerted by the weight of the ladder is being exerted downwardly on the ladder assembly. When an additional force is exerted downwardly on the ladder assembly, compression springs **26** will yield and the assembly will be lowered to the ground. Thus, compression springs **26** form a bias means interposed between body **10** and the inner ladder support **16** normally urging the latter to a raised or riding position.

The outer ladder support **17** includes a pair of ladder legs **32** and **33** pivotally mounted to ladder uprights **18** and **19** at pivot connections **34** and **36**. To strengthen the upper end of the ladder assembly **14**, a channel shaped bracket **37** is included in the assembly, legs **38** of the bracket being welded to the ladder uprights as at **39** and pivot connections **34** and **36** extending through the legs of the bracket near the elbow portion thereof.

Fixed between and connecting each ladder leg is a pair of horizontal step elements **41**. The horizontal step elements preferably are selected so as to possess a substantial support area so that a person using the ladder may readily balance himself. As can best be seen in Fig. 3, these step elements are secured to the ladder legs by welding each end of the step element to a suitable coupling sleeve **42**, which in turn may be fastened to each ladder leg by suitable means such as screws **43**. From the foregoing, it will be apparent that ladder legs **32** and **33**, together with the horizontal step elements **41**, will pivot as a unit about pivot connections **34** and **36**.

Pivotally connected at one of their ends to each ladder leg **32** and **33** is a link **44** and **46**, respectively. The other ends of links **44** and **46** extend inwardly and are pivotally connected to body **10**, as by pins **47** and **48**. Pivot pins **47** and **48** are placed at a slightly lower elevation than the pivot connection between links **44** and **46** with ladder legs **32** and **33**, so that when inner ladder support **16** is raised from anchored position to riding position, links **44** and **46** will rotate in a counterclockwise direction, as viewed in Fig. 2, so that the free end of outer ladder support **17** will be pulled inwardly toward inner ladder support **16**. The pivot connections are so placed that when inner ladder support **16** is fully raised, outer ladder support **17** will be completely retracted with its lower end lying adjacent inner ladder support **16**.

Thus, means have been provided, comprising links **44** and **46**, wherein the free or unpivoted end of the outer ladder support is swung positively inwardly toward the inner ladder support in response to movement of the inner ladder support upwardly to a riding or free position. Conversely, when the inner ladder support is moved downwardly to its anchored position, the free end of the outer ladder support will swing outwardly to its extended position. Links **44** and **46** are selected so that when the inner ladder support, comprising ladder uprights **18** and **19**, are in contact with the ground, the outer ladder support, comprising legs **32** and **33**, will also simultaneously contact the ground. Thus, when the ladder assembly **14** is unfolded and in use, the ladder is independently sustained by reason of the four-point support provided by the ladder legs and ladder uprights, so that a maximum degree of stability is attained.

Rubber tips **49** and **51** are carried by the bottom portions of each ladder leg and ladder upright to insure that the ladder will not move inadvertently when the ladder is in use and in its anchored position.

At times it is desirable that ladder assembly **14** be kept in its lowered or anchored position regardless of whether the ladder is supporting the weight of a person. Therefore, it has been found advisable to provide a fastening means for selectively locking the ladder assembly in its anchored position.

Referring to the drawings, a lever **52** is mounted between ladder uprights **18** and **19** fixed to a tubular member **56**, tubular member **56** encircling a shaft **57** secured at its ends to the ladder uprights. Said tubular member carries a pair of spaced latch pins **53**. Fixed to ladder upright **18** is a latch member **58**. Lever **52** can be pivoted from a release position, shown in Fig. 1, to a locking position, as shown in Fig. 2, wherein latch pins **53** abut the underside of shelf **7** and arm **52** engages latch member **58**. A suitable coil spring, such as spring **59**, with one of its ends fastened to tubular member **56** and the other of its ends fastened to ladder upright **19**, is provided to urge lever **52** to the position shown in Fig. 1.

From the foregoing, it will be apparent that there has been provided a stock transfer truck and ladder assembly having a number of desirable features. Through the use of a collapsible type stepladder, a ladder has been included which affords maximum ease in ascending and descending but which takes up a minimum amount of space when the ladder is not in use. The ladder is carried at one end of the stock transfer truck, so that a maximum amount of space is provided in the stock transfer truck for carrying different articles. Furthermore, a novel means has been provided between the stock transfer truck body and ladder assembly, wherein movement of the inner ladder support of the assembly to a riding position is accompanied automatically by movement of the outer ladder support member of the assembly inwardly, so that the ladder assembly is in a collapsed state. By including a bias means, as represented by compression spring **26**, a means has been provided which serves automatically to collapse the ladder when the ladder is not in use. Still further, there has been provided a novel fastening means for locking the ladder in its lower extended position when it is convenient to do so.

It is claimed and desired to secure by Letters Patent:

1. A stock transfer truck comprising a body having an upright portion at one end thereof, wheel support for said body, an inner ladder support member extending upwardly along said upright portion and slidably mounted thereon for reciprocation between an anchor position wherein the member contacts the ground and a riding position wherein the member is raised clear of the ground, an outer ladder support member including a ladder step element pivoted to said inner ladder support member at an upper extremity thereof for movement of the free end of said outer ladder support member toward and away from said inner ladder support member, and means interposed between said body and outer ladder support member positively swinging said outer ladder support member toward and away from said inner ladder support member in response to movement of said inner ladder support member to said riding and anchor positions, respectively.

2. A stock transfer truck comprising a body having an upright portion at one end thereof, wheel support for said body, an inner ladder support member extending upwardly along said upright portion and slidably mounted thereon for reciprocation between an anchor position wherein the member contacts the ground and a riding position wherein the member is raised clear of the ground, an outer ladder support member including at least one ladder step element and pivoted to said inner ladder support member at an upper extremity thereof for movement of the free end of said outer ladder support member toward and away from said inner ladder support member, means interposed between said body and outer ladder support member positively swinging said outer ladder support member toward and away from said inner ladder support member in response to movement of said inner ladder support member to said riding and anchored positions, respectively, and bias means between said body and inner ladder support member normally urging said inner ladder support member to said riding position.

3. A stock transfer truck comprising a body having an upright portion at one end thereof, wheel support for said body, an inner ladder support member extending upwardly along said upright portion and slidably mounted thereon for reciprocation between an anchor position wherein the member contacts the ground and a riding position wherein the member is raised clear of the ground, an outer ladder support member including at least one ladder step element and pivoted to said inner ladder support member at an upper extremity thereof for movement of the free end of said outer ladder support member toward and away from said inner ladder support member, and a link pivotally connected to said body and said outer ladder support member at a point intermediate its ends operable to swing said outer ladder support member toward and away from said inner ladder support member in response to movement of said inner ladder support member to said riding and anchor positions, respectively.

4. A stock transfer truck comprising a body having an upright portion at one end thereof, wheel support for said body, an inner ladder support member extending upwardly along said upright portion and slidably mounted thereon for reciprocation between an anchor position wherein the member contacts the ground and a riding position wherein the member is raised clear of the ground, an outer ladder support member including at least one ladder step element and pivoted to said inner ladder support member at an upper extremity thereof for movement of the free end of said outer ladder support member toward and away from said inner ladder support member, a link pivotally connected to said body and said outer ladder support member at a point intermediate its ends operable to swing said outer ladder support member toward and away from said inner ladder support member in response to movement of said inner ladder support member to said riding and anchor positions, respectively, and bias means between said body and inner ladder support member normally urging said inner ladder support member to said riding position.

5. The stock transfer truck of claim 4 which further comprises fastening means for selectively locking said inner ladder support member in said anchor position.

6. A stock transfer truck comprising a body having an upright portion at one end thereof, wheel support for said body, a pair of ladder uprights extending upwardly along said upright portion and each slidably mounted thereon for reciprocation between an anchor position wherein the uprights both contact the ground and a riding position wherein the uprights are both raised clear of the ground, a ladder leg pivotally mounted to each ladder upright for movement of its free end toward and away from said ladder upright, at least one horizontal step element fixed between and connecting the ladder legs, said ladder uprights and ladder legs simultaneously engaging the ground when said uprights are moved to said anchor position so as to provide a four-point support for said step element, and means interposed between said body and at least one of said ladder legs positively swinging said ladder legs toward and away from said ladder uprights in response to movement of said ladder uprights to said riding and anchor positions, respectively.

7. A ladder assembly for a ground supported structure comprising an inner ladder support member extending upwardly along an upright portion of said ground supported structure and slidably mounted thereon for reciprocation between an anchor position wherein the member contacts the ground and a riding position wherein the member is raised clear of the ground, an outer ladder support member including at least one ladder step element and pivoted to said inner ladder support member at an upper extremity thereof for movement of the free end of said outer ladder support member toward and away from said inner ladder support member, and means interposed between said ground supported structure and outer ladder support member positively swinging said outer ladder support member toward and away from said inner ladder support member in response to movement of said inner ladder support member to said riding and anchor positions, respectively.

8. A ladder assembly for a ground supported structure comprising an inner ladder support member extending upwardly along an upright portion of said ground supported structure and slidably mounted thereon for reciprocation between an anchor position wherein the member is raised clear of the ground, an outer ladder support member including at least one ladder step element and pivoted to said inner ladder support member at an upper extremity thereof for movement of the free end of said outer ladder support member toward and away from said inner ladder support member, means interposed between said ground supported structure and outer ladder support member positively swinging said outer ladder support member toward and away from said inner ladder support member in response to movement of said inner ladder support member to said riding and anchor position, respectively, and bias means between said ground supported structure and inner ladder support member normally urging said inner ladder support member to said riding position.

9. A ladder assembly for a ground supported structure comprising a pair of ladder uprights extending upwardly along an upright portion of said ground supported structure each slidably mounted thereon for reciprocation between an anchor position wherein the uprights both contact the ground and a riding position wherein the uprights are both raised clear of the ground, a ladder leg pivotally mounted to each ladder upright for movement of its free end toward and away from said ladder upright, at least one horizontal step element fixed between and connecting the ladder legs, said ladder uprights and ladder legs simultaneously engaging the ground when said uprights are moved to said anchor position so as to provide a four-point support for said step element, and means interposed between said ground supported structure and at least one of said ladder legs positively swinging said ladder legs toward and away from said ladder uprights in response to movement of said ladder uprights to said riding and anchor positions, respectively.

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