

# UNITED STATES PATENT OFFICE

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## LADDER

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This invention relates to ladders which are employed in mercantile and other establishments to facilitate access to goods upon shelves in a store or salesroom. The object of the invention is to provide simple means whereby the ladder will be normally in position to travel along its defined path but will be automatically held stationary when an attendant mounts thereon. A further object of the invention is to provide means whereby a person standing on the ladder may dispose the same for travel without alighting therefrom. These stated objects and other objects which will appear incidentally in the course of the following description are attained in such a mechanism as is illustrated in the accompanying drawings, and the invention resides in certain novel features which will be particularly defined in the appended claims.

In the drawings,

Figure 1 is a front elevation, partly broken away and in section, of one form of the invention,

Fig. 2 is a side elevation of the device illustrated in Fig. 2,

Fig. 3 is an enlarged detail sectional elevation more particularly showing the mounting of the roller,

Fig. 4 is an elevation, partly broken away and in section, showing another form of the invention, and

Fig. 5 is an edge view of the device shown in Fig. 4.

The ladder comprises side bars 1 and steps or rungs 2 mounted between and secured to the side bars in the usual manner. At its upper end the ladder is provided with devices whereby it may be suspended from a guide rail or similar member and retained in convenient relation to the shelves of goods.

At its lower end the ladder is equipped with rollers adapted to rest on the floor of the sales or storeroom and effect travel of the ladder from point to point along the shelves. The lower ends of the side bars 1

are also equipped with pads or feet 3 of some material which will effect frictional engagement with the floor and thereby hold the ladder against travel. In the arrangement shown in Figs. 1, 2 and 3, a housing 4 is secured on the outer side of each side bar 1 at the lower extremity thereof, the housing being open at its bottom, as clearly shown in Figs. 1 and 3. Disposed within each housing is a roller 5, the sides of which are parallel with the sides of the housing and at a right angle to the respective side bar of the ladder. The axle 6 of each roller is disposed eccentrically in journals 7 which are mounted in bearings or openings provided therefor in the sides of the housing, as shown in Fig. 3, and from each rear journal 7 extends a fulcrum pin or shaft 8. Secured upon the fulcrum pin or shaft 8 is a hub or sleeve 9 from which rises a crank arm 10 which is offset or tilted sufficiently to pass to a point at the rear of the side bars 1, the crank arms 10 at the two sides of the ladder being connected by a rod or link 11 which is pivoted at its ends to the respective crank arms, as shown in Fig. 3 and as will be readily understood. A retractile spring 12 is attached at one end to one of the side bars 1 and, at its opposite end, to the connecting rod or bar 11, and tends constantly to hold the ladder raised with the crank arms 10 in such position that the axle 6 will be below the centers of the journals 7 and the fulcrum pin 8 and, consequently, the rollers 5 will support the ladder. The sleeve 9 at one side of the ladder is provided with a second downwardly extending crank arm 13 to which is pivoted the lower end of an operating bar 14 which extends upwardly and is slidably fitted in guides 15 mounted on the adjacent side bar of the ladder.

The spring 12 is adjusted so that when no weight is imposed on the ladder the crank arms 10 will be swung to the position shown by dotted lines in Fig. 1, the axles of the

rollers being below the centers of the journals, and the ladder will be held raised. In this position of the parts, the ladder may obviously be moved from point to point.

5 When a person mounts the ladder, his weight will overcome the force of the spring 12 and cause the ladder to move relatively downward so that the feet 3 will be brought into contact with the floor and travel of the ladder

10 will be thereby prevented. When the ladder is thus moved relatively downward, the crank arms are rocked so that the axles 6 of the several rollers will be carried relatively upwardly to points in the horizontal plane of the fulcrum pin or shaft 8 or above such

15 plane, as will be understood. If the person upon the ladder desires to have the same shifted to a different point along the shelves, he depresses the rod or handle 14, thereby

20 rocking the crank arms and the fulcrum pin or shaft to their former positions, so that the rollers will be relatively lowered and the ladder will be raised from the floor. The person on the ladder may then easily shift

25 the position of the same by pushing against the shelves in a well-understood manner.

In the embodiment of the invention shown in Figs. 1, 2 and 3, and just described, the ladder sets parallel with the shelves and

30 rollers are also parallel therewith, and both rollers are at the same distance from the shelves. In the arrangement shown in Figs. 4 and 5, the ladder is disposed at a right angle to the shelves, and one roller is between

35 the ladder and the shelves, while the other roller is at the outer side of the ladder. Each roller 16 is mounted in a housing 17 and is provided with an axle 18 carried eccentrically

40 by journals 19 in the same manner as the first-described rollers are mounted. The housings 17 differ from the housings 4, previously described, in being attached to the sides of the ladder at their own sides instead

45 of at their edges, and the fulcrum pins or shafts 20 extend through the side bars of the ladder and are engaged in the ends of a rock shaft 21, so that any movement imparted to the rock shaft or to the fulcrum pins or shafts will be transmitted to the other.

50 The rock shaft 21 is provided with a crank arm 22 which normally extends downwardly and rearwardly, as indicated in Fig. 5, and to this crank arm is attached the lower end of a spring 23 which has its upper end attached to a step or other fixed part of the

55 ladder. An operating rod 24 is pivoted at its lower end to the crank 22 and extends upwardly therefrom at the rear of the ladder, as will be understood. The operation of this

60 form of the invention is the same in all essential respects as the operation of the first-described form. The spring 23 yieldably holds the ladder raised, the bearings 19 being turned to such position that the axle 18 is

65 below the centers of said bearings and the

rollers are in contact with the floor, with the ladder out of contact therewith, as shown. When a person mounts the ladder, his weight overcomes the tension of the spring 23 and effects relative movement of the parts so that

70 the ladder is lowered onto the floor and held against movement. If, while on the ladder, the person desires to effect travel thereof, he pulls down upon the rod 24 so that the several parts are returned to the illustrated

75 positions and the ladder raised from the floor in the manner previously described.

The apparatus is exceedingly simple in the construction and arrangement of its parts and may be readily applied to ladders now

80 in use, as well as ladders in course of construction, and it is highly efficient in operation for the purposes for which it is designed.

Having thus described the invention, I claim:

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1. The combination with a ladder having feet at its lower end whereby it may be supported in stationary position, of rollers mounted eccentrically at the lower end of the ladder, means for yieldably holding the rollers normally in relatively lowered position whereby to support the ladder out of contact with the floor, said means yielding when a weight is placed upon the ladder to permit the ladder to be relatively lowered, and means on the ladder including rocking connections with the rollers to be operated by a person on the ladder whereby to raise the ladder.

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2. The combination with a ladder, of housings secured to the lower end thereof on the opposite sides of the same, rollers journaled eccentrically in the housings, yieldable means for normally holding the ladder raised relative to the rollers, said means yielding to the weight of a person on the ladder, an operating rod slidably mounted on the ladder, and connections between said rod and the journals of the rollers whereby said journals may be rocked by a person on the ladder.

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3. The combination with a ladder, of housings secured on the sides thereof at the lower end of the same, journals mounted in the sides of the housings, axles extending between and carried eccentrically by the journals, fulcrum pins extending rearwardly from the centers of the rear journals, upper crank arms on said fulcrum pins, a rod connecting said crank arms, a spring connected with the ladder and with said rod whereby to hold the ladder yieldably in a relatively raised position, a second crank arm on one of the fulcrum pins, and an operating rod pivoted to and rising from said second crank arm and slidably mounted on the ladder whereby the journals may be rocked by a person on the

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4. The combination with a ladder, of housings secured on the sides of the same at the lower end thereof, journals mounted in the sides of the housings, an axle carried by and

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between said journals and eccentric thereto,  
a rock shaft connected with the journals,  
yieldable means acting on the rock shaft to  
hold the ladder normally in relatively raised  
5 position, the ladder descending under the  
weight of a person thereon, and an operating  
rod connected with the rock shaft and slid-  
ably mounted on the ladder whereby the  
journals may be rocked by a person on the  
10 ladder to effect raising of the ladder.

In testimony whereof I affix my signature,  
HARRY E. BALLARD. [L. s.]

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2 Sheets-Sheet 1

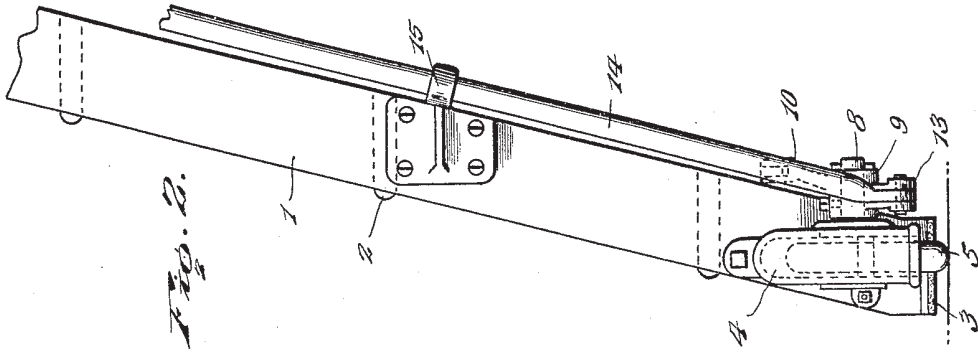


Fig. 2.

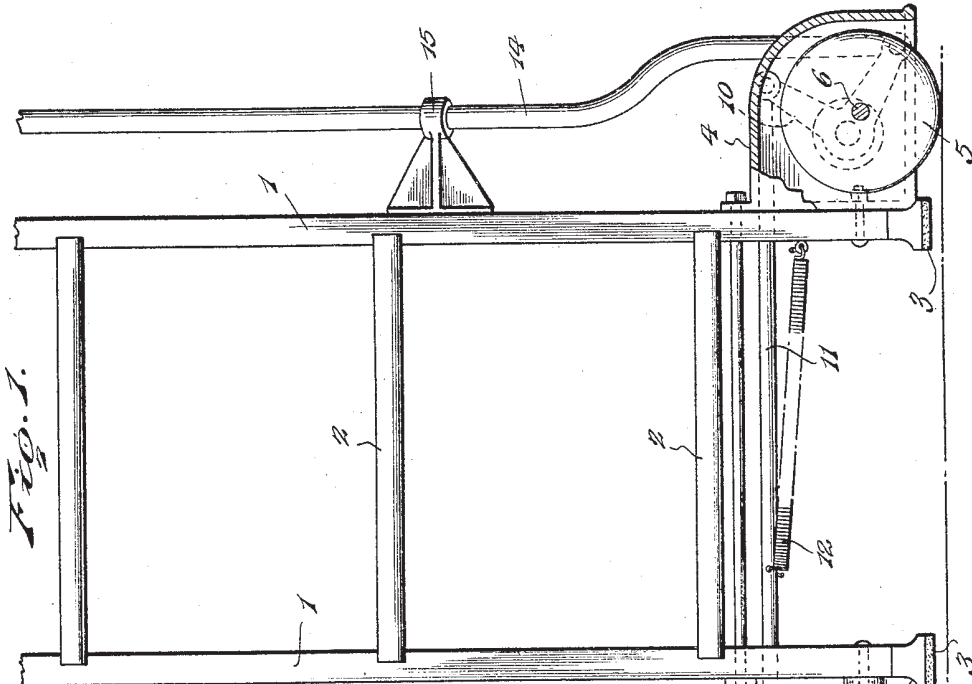


Fig. 1.

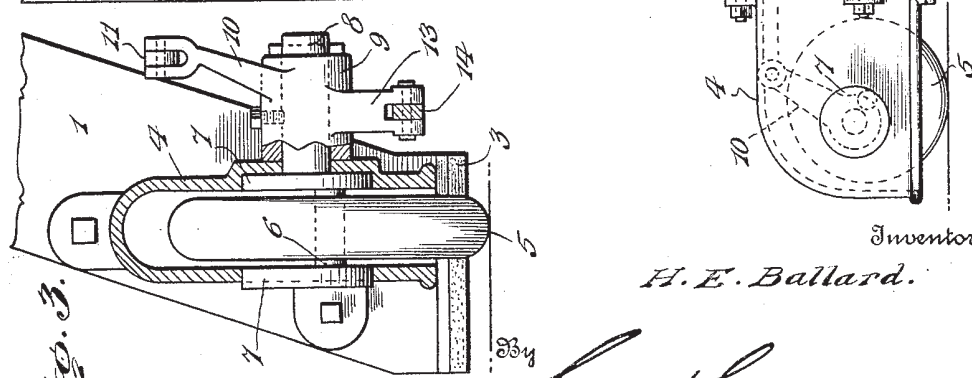


Fig. 3.

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2 Sheets-Sheet 2

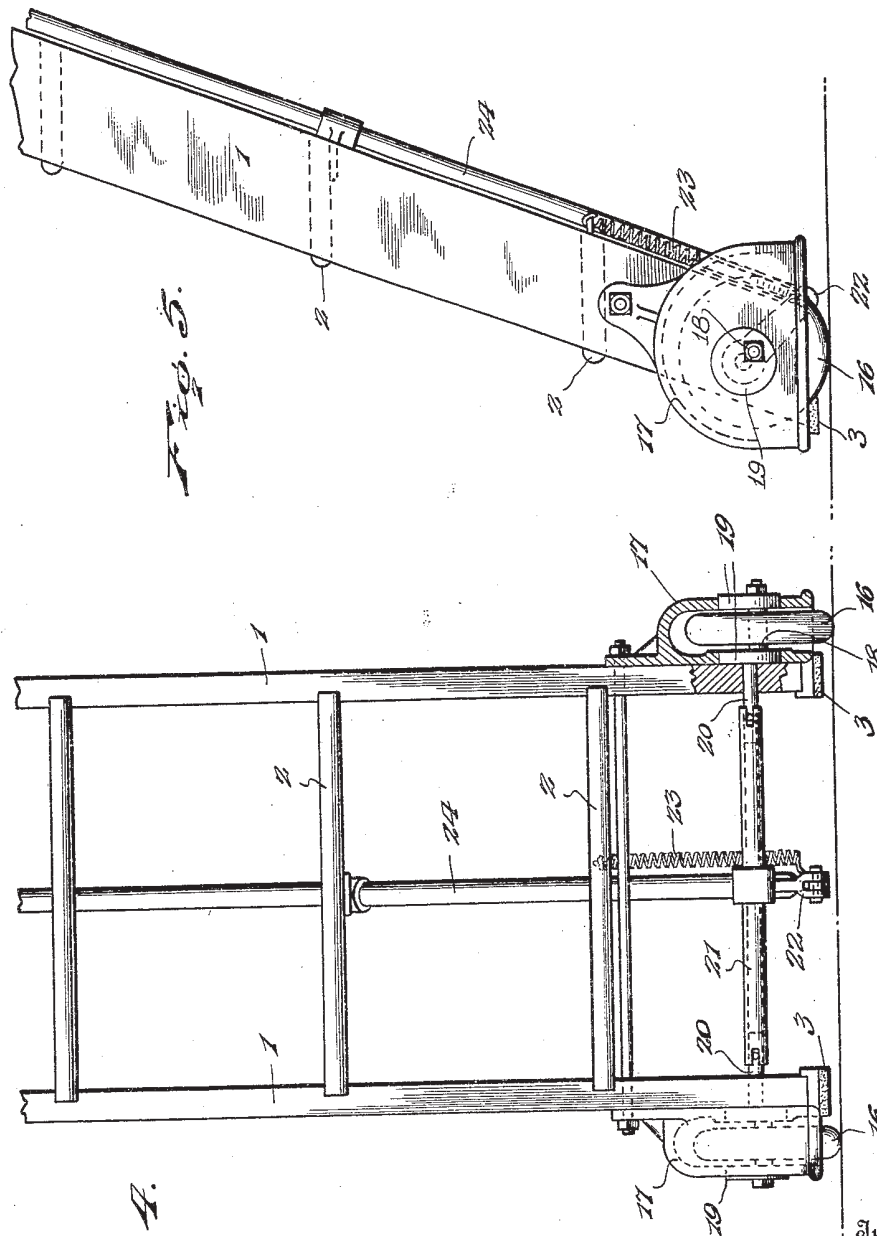


Fig. 4.

Fig. 5.

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