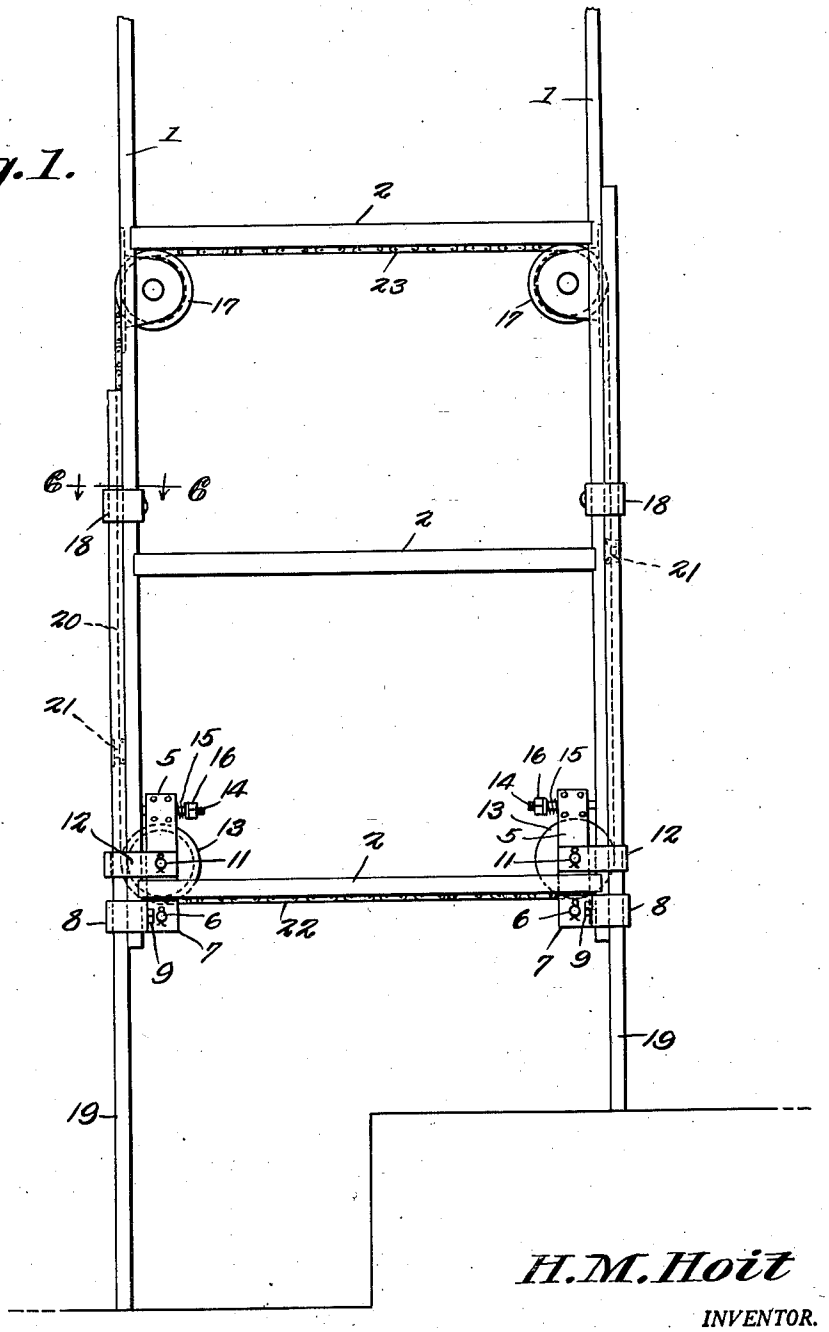
Oct. 5, 1943. H. M. HOIT 2,330,825

LADDER

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Fig. 1.



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LADDER

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Fig. 2.

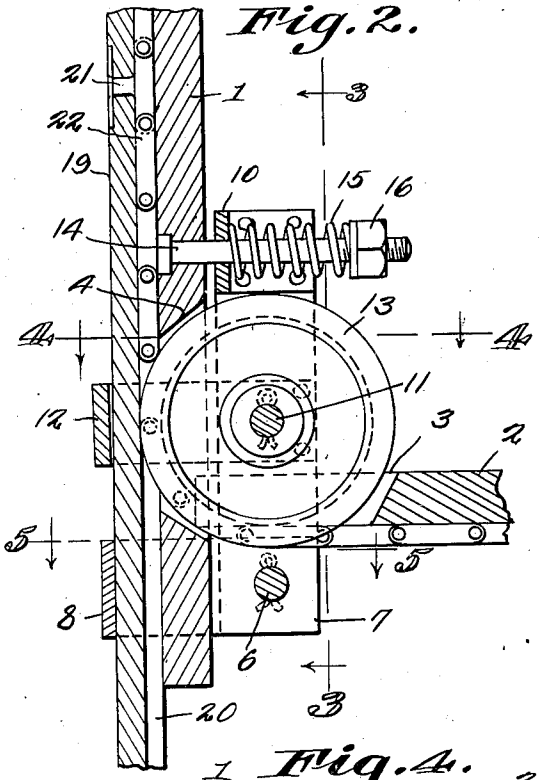


Fig. 3.

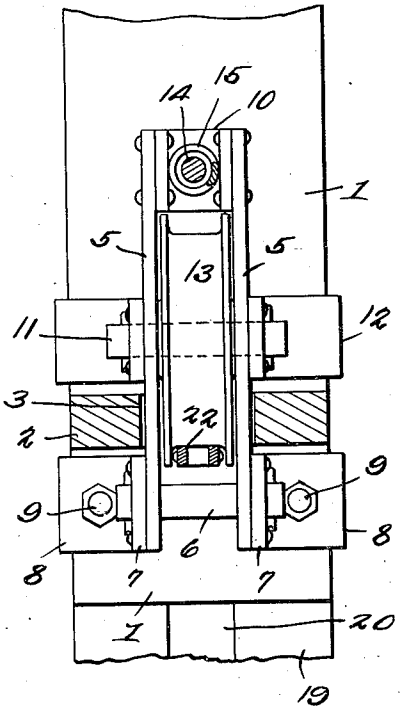


Fig. 4.

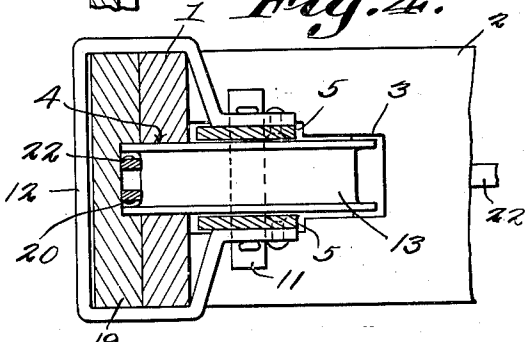


Fig. 6.

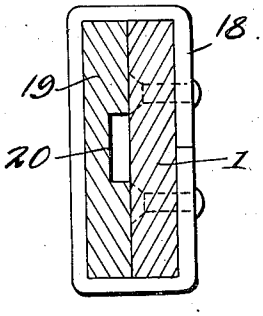
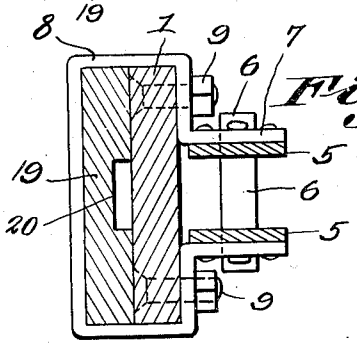


Fig. 5.



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UNITED STATES PATENT OFFICE

2,330,825

LADDER

Henry M. Hoit, Tacoma, Wash.

Application April 1, 1942, Serial No. 437,251

5 Claims. (Cl. 228—63)

This invention relates to ladders, one of the objects being to provide a ladder with legs mounted on the respective side rails and providing means whereby the ladder can be supported properly on inclined or stepped surfaces.

A further object is to provide adjustable legs so connected that when one leg is lowered, the other leg will be correspondingly raised.

A still further object is to provide simple but efficient means serving to clamp the legs tightly against movement when the ladder is subjected to a load, the clamping action increasing in proportion to the load applied, so that accidental shifting of the legs from their proper positions on the side rails of the ladder is prevented.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings

Figure 1 is a front elevation of a ladder equipped with the present improvements, the same being shown supported on a stepped surface.

Figure 2 is a vertical transverse section through a portion of one of the side rails and the clamping means cooperating therewith.

Figure 3 is a section on line 3—3, Figure 2.

Figure 4 is a sectoin on line 4—4, Figure 2.

Figure 5 is a section on line 5—5, Figure 2.

Figure 6 is an enlarged section on line 6—6, Figure 1.

Referring to the figures by characters of reference, 1 designates the side rails of a ladder which, in the present instance, are connected by steps 2 although it is to be understood that rungs could be used in lieu of the steps.

Openings 3 are provided in one of the steps, preferably the lowest one and these openings communicate with short slots 4 formed longitudinally in the adjacent side rails 1. Spaced straps 5 are extended through the openings 3 and are pivotally connected at their lower ends by a pin 6 to arms 7 extending from a guide strap 8 which is extended around rail 1 and fastened thereto by bolts 9 or other suitable means.

A connecting plate 10 joins the upper ends of the straps 5 and seated in these straps at a point above the adjacent step 2 is a bearing pin 11 on which are pivotally mounted the end portions of a stirrup 12 extending around the adjacent rail 1. A pulley 13 is journalled on the pin 11 and is positioned to work within the opening 3 and the slot 4.

Slidably mounted in the connecting member 10 is a bolt 14 secured to the adjacent rail 1. On this bolt is a coiled spring 15 which thrusts at one end against the connecting member 10 while its other end is engaged by a nut 16 adjustably mounted on the bolt. Obviously this spring acts to hold the straps 5 and pulley 13 normally pressed laterally toward rail 1 with the stirrup 12 thrust laterally well beyond said rail.

Sash pulleys 17 are secured in the side rails at points above the pulleys 13 and are located preferably beneath and close to a step 2 above the lowermost step, and secured to each of the side rails 1 below the pulley 17 is a guide strap 18 which extends around the rail.

Each side rail is provided, on its outer surface, with a leg or extension 19 proportioned to slide within the guides 8 and 18 and also within the stirrup 12. Each leg has a channel 20 in its inner side extended longitudinally thereof and secured in each channel at a point adjacent to the center of the leg is an anchoring bracket 21. Fastened to the lower ends of the brackets are the ends of a chain 22 or other suitable flexible connection which is extended downwardly within channels 20 and thence under the pulleys 13 and the step 2 adjacent thereto. The upper portions of the anchoring brackets 21 are connected to the ends of a chain or other flexible connection 23 extending upwardly within the channels 20 and over the pulleys 17 and under the adjacent step 2. Thus it will be apparent that as these flexible connections are taut, when one of the legs 19 is pulled downwardly motion will be transmitted therefrom through the flexible connection to the other leg so as to move that leg upwardly. Consequently the two legs can be quickly adjusted so as to properly support the ladder in an upstanding position on an inclined or stepped surface.

When a weight, such as that of a person using the ladder, is placed on one of the steps 2, the side rails 1 of the ladder will tend to move downwardly relative to the legs or extensions 19 with the result that the pulleys 13, in pressing downwardly on the chain 22, will becaused to swing toward each other about the pivot pins 6 and

against the action of the springs 15. This will cause the straps 5 to pull the stirrups 12 toward each other so that they will bind tightly against the adjacent portions of the legs 19. Thus the side rails 1 will be tightly clamped to the legs or extensions 19 and displacement of these parts will be prevented, the clamping action obviously increasing in proportion to any increase in weight added to the ladder. As soon as weight is removed from the ladder, the springs will restore the stirrups 12 to their initial positions so that it thus becomes possible to readily readjust the legs or extensions 19.

What is claimed is:

1. The combination with a ladder having a pair of side rails and steps connecting the rails, of legs extending longitudinally of and mounted to slide upon the side rails, means operated by the sliding movement of either leg in one direction for sliding the other leg in the opposite direction, said means including a flexible connection between the legs extended transversely of the ladder, leg-clamping members carried by one of the steps and embracing the respective legs and their rails, yielding means for holding each member normally disengaged from the adjacent leg, and means movable with said member, said means being positioned for actuation by the said flexible connection to shift the clamping member into leg-engaging position against the action of the yielding means when the ladder is subjected to a load.

2. The combination with a ladder having side rails, of legs slidably mounted on the respective rails, means operated by either leg when shifted in one direction for sliding the other leg in the opposite direction, said means including a transverse flexible element connected to the respective legs, a leg-clamping element at each side of and connected to the ladder, a pulley movable with each member and bearing on the flexible connection, thereby to transmit thrust from the ladder through the pulleys and connection to the legs to bind the clamping members on the legs when the ladder is subjected to a load, and yielding means for holding the clamping members normally out of leg-clamping positions.

3. The combination with a ladder having side rails, of legs slidably mounted on the respective side rails, means operated by the movement of either leg in one direction for sliding the other leg in the opposite direction, said means including a flexible connection between the legs and extended transversely of the ladder, pulleys at the sides of the ladder and pivotally connected thereto for swinging movement toward and from each other, said pulleys constituting means for transmitting downward thrust from the ladder to the flexible connection, and means actuated by the pulleys when moved toward each other, for gripping the legs to hold them against movement relative to the side rails.

4. The combination with a ladder having side rails, of legs slidably mounted on the respective side rails, means operated by the movement of either leg in one direction for sliding the other leg in the opposite direction, said means including a flexible connection between the legs and extended transversely of the ladder, pulleys at the sides of the ladder and pivotally connected thereto for swinging movement toward and from each other, said pulleys constituting means for transmitting downward thrust from the ladder to the flexible connection, means actuated by the pulleys when moved toward each other, for gripping the legs to hold them against movement relative to the side rails, and yielding means for holding the pulleys normally pressed away from each other.

5. The combination with a ladder having side rails, of legs slidably mounted upon the respective rails, means operated by the movement of either leg in one direction for sliding the other leg in the opposite direction, said means including upper and lower flexible connections movably mounted transversely of the ladder, the terminals of each connection being extended along the rails of the ladder toward the terminals of the other connection, guide pulleys carried by the ladder for the upper flexible connection, guide pulleys for the lower connection, means connecting the last named guide pulleys to the sides of the ladder for swinging movement toward or from each other, leg-clamping means movable with the latter pulleys, and yielding means for holding the leg-clamping means normally out of clamping position and the pulleys normally pressed away from each other.

HENRY M. HOIT.