

June 1, 1943.

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2,320,407

RETRACTILE WHEEL ASSEMBLY

Filed Feb. 28, 1942

3 Sheets-Sheet 1

FIG. 2

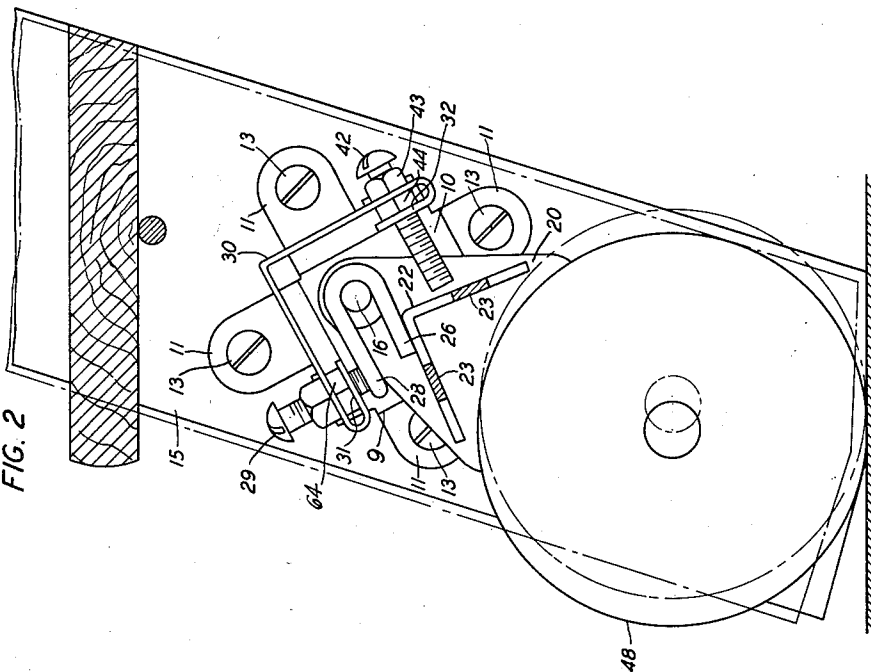
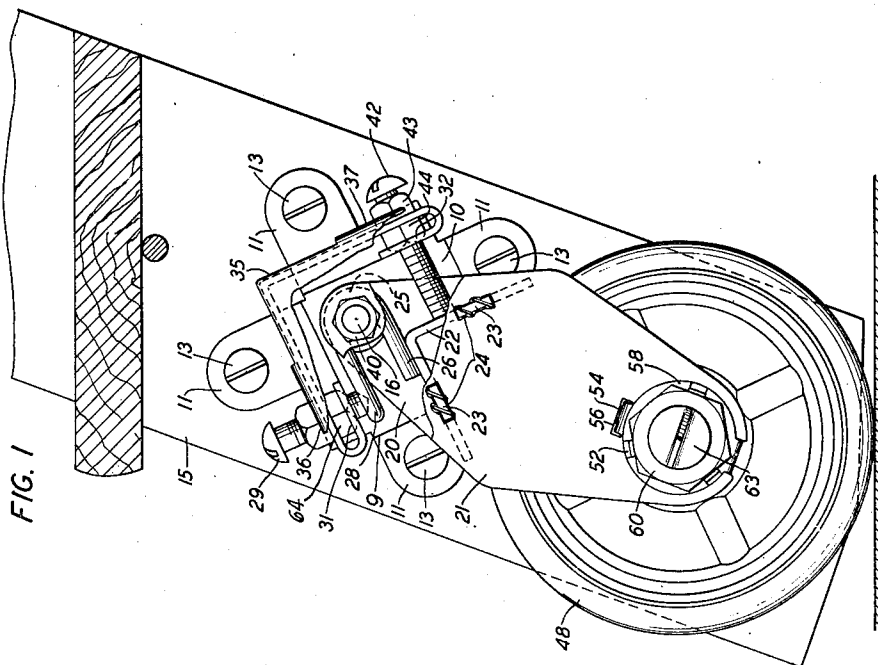


FIG. 1



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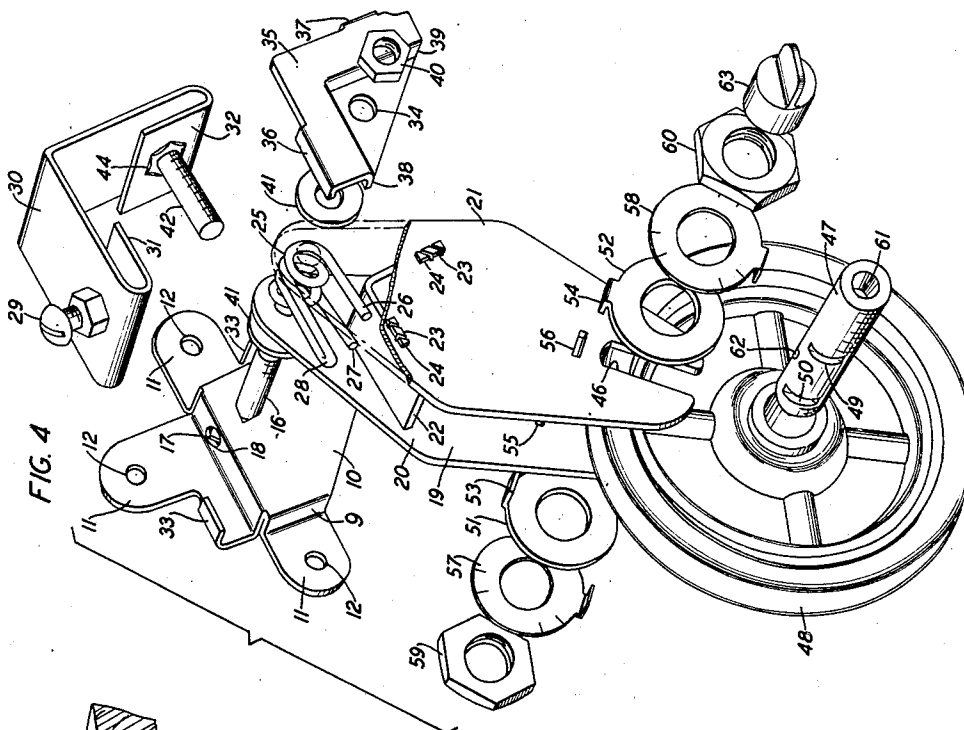


FIG. 4

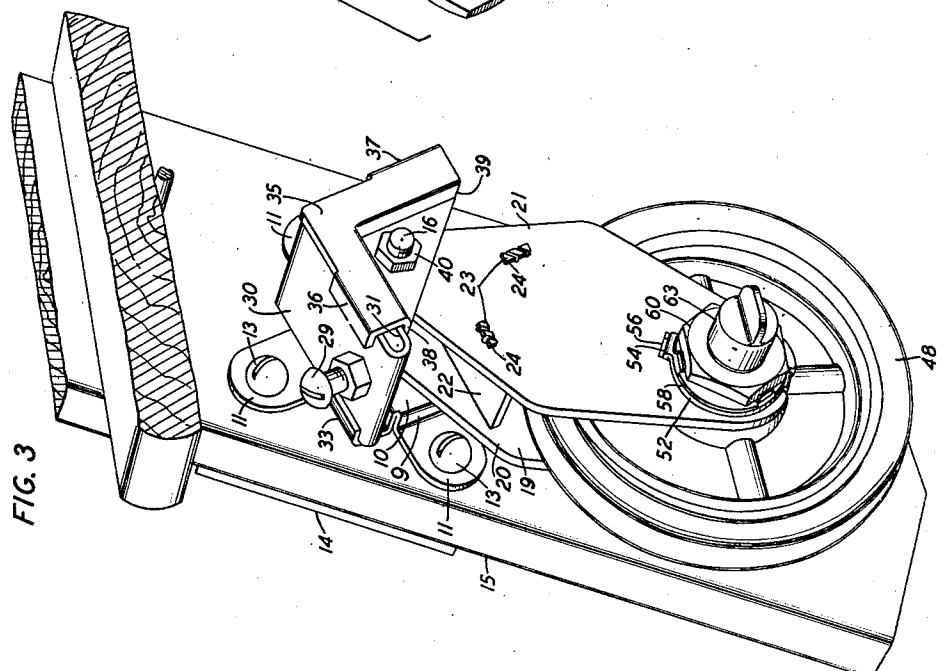


FIG. 3

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FIG. 5

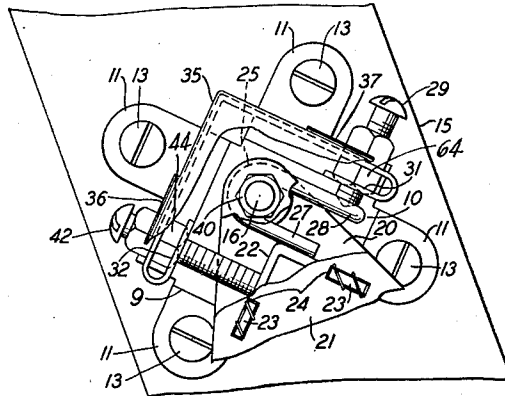
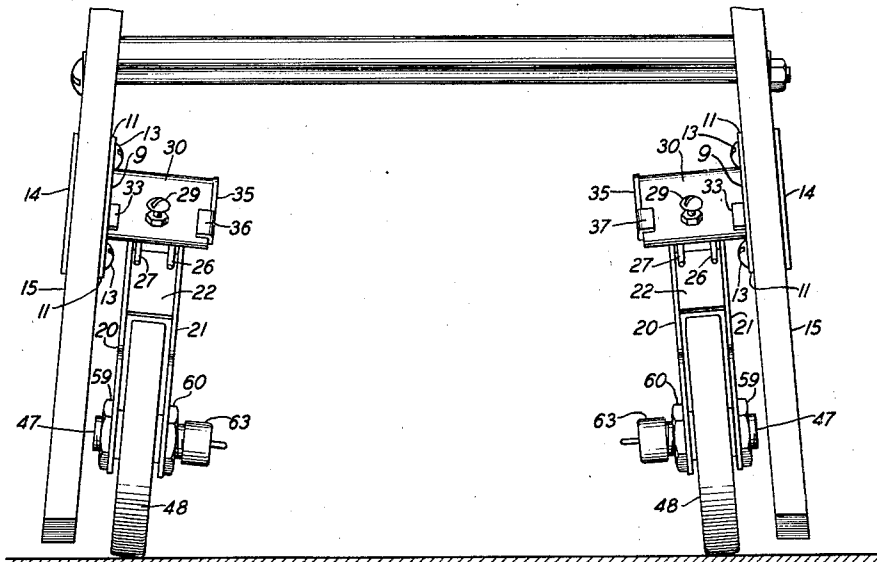


FIG. 6



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RETRACTILE WHEEL ASSEMBLY

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4 Claims. (Cl. 16—44)

This invention relates to wheels for rolling ladders and the like and more particularly to a retractile wheel assembly for use in portable rolling ladders wherein the weight of the user effectually holds the ladder against movement and the removal of the weight permits the ladder to be moved.

An object of this invention is the provision of an improved light-weight retractile wheel assembly for rolling ladders which when the ladder is unoccupied will maintain the bottom of the ladder out of contact with the floor so that it can be readily moved and will permit, when the ladder is occupied, the bottom of the ladder to contact the floor to prevent movement of the ladder.

Another object of the invention is the provision of a retractile wheel assembly for rolling ladders and the like which may, by a reversal of certain parts, be used on either the right or left-hand rail of the ladder.

A further object of this invention is the provision of a retractile wheel assembly which may be readily adjusted to accommodate various weights of ladders.

A still further object of this invention is the provision of a retractile wheel assembly which is light in weight and so constructed that a maximum amount of strength is obtained with a minimum amount of material.

A still further object of this invention is the provision of a retractile wheel assembly which may be readily disassembled without special tools for repair and replacement of worn parts.

The retractile wheel assemblies in use today on rolling ladders are for the most part heavy and cumbersome due to the fact that they are constructed from heavy castings. Not only is this construction costly, due to the amount of material used, but the finishing and assembling is also expensive inasmuch as the casting must be smoothed and the necessary holes accurately drilled therein. Furthermore, in the present type of retractile wheel assembly, both right-hand and left-hand parts must be made, which results in additional expense since the parts are not interchangeable.

In the retractile wheel assembly of this invention, the component parts are made from metal stampings which are readily interchangeable to provide a right or left-hand wheel assembly and may be readily disassembled for repair of worn parts. Due to the novel construction of this retractile wheel assembly manufacturing costs are considerably reduced since the various holes, slots, etc. may be put therein when the parts are

blanked out and formed up. The structure of the retractile wheel assembly of this invention results in a strong, simple and light-weight structure which may be readily adjusted to take care of various weights of ladders and to limit the movement of the wheel.

The features of my invention will be more readily understood from the following detailed description made with reference to the accompanying drawings, in which:

Fig. 1 is a side elevation, with parts broken away, of the wheel assembly of my invention attached to a fragmentary left-hand rail portion of a ladder with the wheel in contact with the floor and the ladder lifted out of contact therewith;

Fig. 2 is a view similar to Fig. 1 except that the rail of the ladder is now in contact with the floor and the wheel is shown in both its normal and actuated positions;

Fig. 3 is a perspective view of the wheel assembly shown in Figs. 1 and 2;

Fig. 4 is an exploded view in perspective of Fig. 3;

Fig. 5 is a fragmentary portion of the wheel assembly with parts broken away, similar to Figs. 1 and 2, except that the assembly in this illustration is secured to a fragment of the right-hand ladder rail; and

Fig. 6 is a fragmentary view of a ladder with the wheel assembly of this invention secured to the bottom thereof with the side rails of the ladder out of contact with the floor.

As shown in the drawings, the wheel assembly of this invention comprises a base plate 9 having a raised central portion 10 and extending lugs 11. The lugs 11 are provided with suitable apertures 12 through which the bolts 13 pass to threadedly engage the plate 14 on the outside of the ladder rail 15 for securing the base plate 9 to the ladder rail 15. Passing through the raised portion 10, and extending at right angles thereto, as shown in Fig. 4, is the bolt 16. This bolt is held in position and prevented from turning by means of the square washer 17 located under the head of the bolt which has its two upper corners located in apertures 18—18 located in the top side portions of the raised portion 10 of the plate 9, while a hexagonal-shaped aperture in the square washer 17 embraces the head of the bolt in the recess on the back of the plate 9. Rotatably mounted on the bolt 16 by means of having said bolt pass through suitable apertures in its upper end, is the yoke member 19. This yoke member comprises two spaced apart elon-

gated plates 20 and 21 secured together by means of an angular-shaped member 22 interposed between the two plates and having ears 23 which protrude through corresponding slots 24 in the plates 20 and 21. The ears 23 are riveted over to firmly secure the respective parts together.

As shown in Figs. 1, 2, 4, and 5, a double-ended coil spring 25 is mounted on the bolt 16 between the plates 20 and 21 with its free ends 26 and 27 bearing against the top of the angular member 22. The loop portion 28 of the spring 25 bears against the bottom of a set screw 29 which is threadedly mounted in the angular member 30. The angular member 30, which is provided with return bend portions 31 and 32 to strengthen said member, and to provide a means of holding nuts 44 and 64 from turning, is positioned on the base plate 9 between the top sides of the raised portion 10 and the bent-over ears or lugs 33 as shown in Figs. 3 and 4.

Positioned on the extending end of the bolt 16, by means of the aperture 34, and in engagement with the side of the angular member 30, is the embossed plate 35. This plate 35 is provided on its top edge with the bent-over ears 36 and 37 which with the side walls 38 and 39 of the embossed portion of the plate 35 serve to confine the return bent portions 31 and 32 of the angular member 30 therebetween when the nut 40 is screwed home with the washers 41 interposed between the base plate 9 and the side plate 20 and the embossed plate 35 and the side plate 21. In order to limit the amount of movement of the yoke 19 under the influence of the spring 25, a set screw 42 is threadedly mounted in the angular member 30 by means of the nuts 43 and 44. The end of the screw 42 bears against the top of the angular member 22 when the yoke 19 is in its normal or extended position as shown in Fig. 1 and is out of contact therewith when the yoke is rotated and the spring 25 is compressed as shown in Fig. 2.

As shown in Figs. 1 and 3 and more in detail in Fig. 4, the bottom portion of the plates 20 and 21 of the yoke 19, is provided with longitudinally extending slots 45 and 46 for the reception of the fixed axle 47 upon which the pressed steel rubber-tired wheel 48 is rotatably mounted. Located on the axle 47 are the diametrically opposed transverse slots 49—49 and 50—50 which are in alignment with the longitudinal slots 45 and 46 and so dimensioned that the plates 20 and 21 will slidably fit therein and will permit the ready removal of the axle 47 and its assembly but will not allow it to rotate.

In order to permit the axle 47 to be readily removed and yet firmly secure it in position in the yoke member 19, suitable washers 51 and 52 having ears or lugs 53 and 54 extending at right angles therefrom, are positioned over the axle 47 with the lugs 53 and 54 in engagement with the slots 55 and 56 in the plate members 20 and 21 as shown in Fig. 4 and more in detail in Figs. 1 and 3.

As shown in Fig. 4, lock washers 57 and 58 are interposed between the washers 51 and 52 and the nuts 59 and 60 and serve to prevent these nuts, which hold the wheel assembly together, from loosening.

In order to lubricate the bearing of the wheel 48, the axle 47 is provided with a longitudinal bore 61 which extends approximately two-thirds the length of the axle and terminates in a transverse bore 62 which communicates with the outer surface of the axle 47 at the wheel bearing. 75

Thus, grease introduced into the bore 61 by means of the grease cup 63 will be forced into the wheel bearing through the transverse bore 62.

Under normal conditions, that is, when no weight is on the ladder, the spring 25 bearing against the angular member 22 at the top of the yoke 19 and against the bottom of the set screw 29 in the bracket secured to the ladder rail, will cause the bottom of the ladder to be raised off the floor thus permitting the ladder, as shown in Figs. 1 and 6, to be readily rolled from place to place. However, when a person mounts the ladder the additional weight will overcome the force of the spring 25 and the bottom of the ladder will rest on the floor as shown in Fig. 2.

The tension of the spring 25 may be readily adjusted to take care of various sizes and weights of ladders by means of the set screw 29 and the set screw 42 limits the movement of the wheel assembly under the influence of the spring 25.

This retractile wheel assembly is intended to be used both on the left-hand rail and right-hand rail of the ladder as shown in Fig. 6, and while the foregoing description has been made with reference to the wheel assembly secured to the left-hand rail, the mere reversal of the angular member 30 and the spring 25, as shown in Fig. 5, permits the use of this hanger on the right-hand rail.

While I have shown and described the preferred form of my invention, it is to be understood that various modifications and changes may be made therein without departing from the spirit of the invention and I am only limited by the scope of the appended claims.

What is claimed is:

1. A retractile wheel assembly for rolling ladders and the like, comprising a base plate, a bolt extending from said plate, a yoke member pivotally supported on said bolt, an angular member on said plate extending outwardly therefrom, a set screw in said angular member, a clamping member positioned on said bolt and bearing against said angular member, means on said bolt for holding said clamping member firmly against said angular member, a coil spring having a loop portion and free end portions positioned around said bolt, the free ends of said spring bearing against said yoke and the loop portion bearing against said set screw to bias the position of said yoke, and a rotatable member axially supported on the free end of said yoke.

2. A retractile wheel assembly for rolling ladders and the like, comprising a base plate, a bolt extending from said base plate, a yoke member pivotally supported on said bolt, an angular member on said plate and extending outwardly therefrom, a set screw in said angular member, a clamping member positioned on said bolt and bearing against said angular member, means on said bolt for holding said clamping member firmly against said angular member, a coil spring having a loop portion and free end portions positioned around said bolt, the free ends of said spring bearing against said yoke and the loop portion bearing against said set screw to bias the position of said yoke, means on said angular member for limiting the amount of movement of said yoke and a rotatable member axially supported on the free end of said yoke.

3. A retractile wheel assembly for rolling ladders and the like, comprising a base plate, an angular member positioned on said base plate, a clamping member positioned against the outer side of said angular member, a bolt positioned

on said base plate, said bolt passing through said clamping member and having a nut thereon in engagement therewith, a yoke pivotally supported on said bolt between said base and said clamping member, a spring on said bolt, one end of which bears against said yoke and the other end bearing against a tension adjusting means located in said angular member and a wheel rotatably mounted between the side portions of said yoke on the bottom thereof.

4. A retractile wheel for rolling ladders and the like, comprising a base plate, an angular member positioned on said base plate, a clamping member positioned against the outer side of said

angular member, a bolt positioned on said base plate, said bolt passing through said clamping members and having a nut thereon in engagement therewith, a yoke pivotally supported on said bolt between said base and said clamping member, a spring on said bolt, one end of said spring bearing against said yoke and the other end bearing against a tension adjusting means located in said angular member, means on said angular member for limiting the amount of movement of said yoke, and a wheel rotatably mounted between the side portions of said yoke on the bottom portion thereof.

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