July 9, 1940. R. R. KNUDSEN 2,207,544

STAIR ELEVATOR

Filed June 16, 1939

Fig. 1

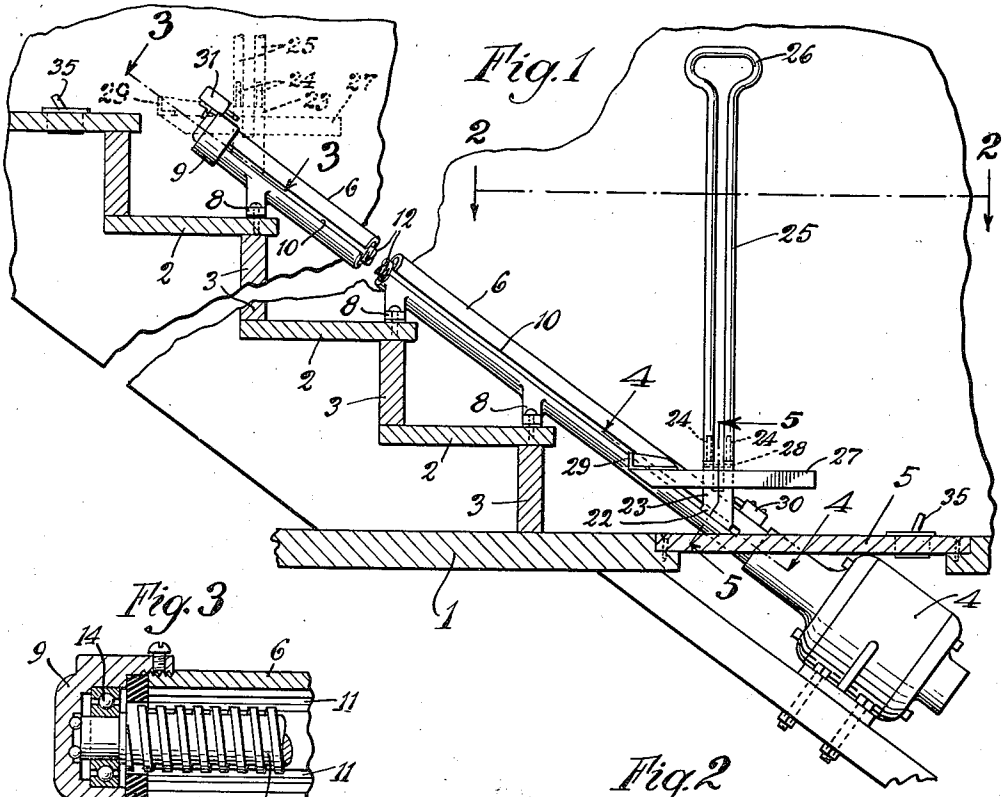


Fig. 3

Fig. 5

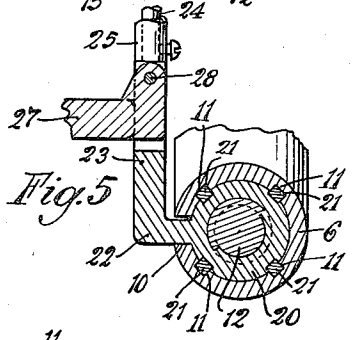


Fig. 2

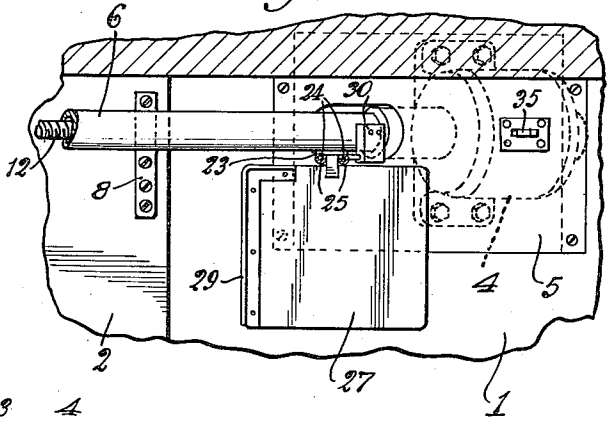
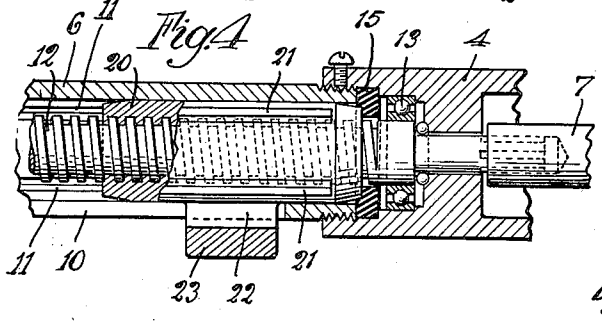


Fig. 4



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STAIR ELEVATOR

Richard R. Knudsen, Chicago, Ill.

Application June 16, 1939, Serial No. 279,480

6 Claims. (Cl. 187—12)

My invention relates to an improvement in stair elevators.

It has for one purpose the provision of a stair elevator which will be simple and easy to ship and assemble, easy to apply, and efficient in use.

Another purpose is the provision of a stair elevator which shall provide a minimum of interference with the normal use of the stair structure.

Another purpose is the provision of a stair elevator the platform of which may be folded into inoperative position at one side of the stair.

Other purposes will appear from time to time in the course of the specification and claims.

I illustrate my invention more or less diagrammatically in the accompanying drawing wherein:

Fig. 1 is a vertical section with parts in elevation;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 1;

Fig. 4 is a section on the line 4—4 of Fig. 1; and

Fig. 5 is a section on the line 5—5 of Fig. 1.

Like parts are indicated by like symbols throughout the specification and drawing.

Referring to the drawing, 1 generally indicates a floor, from which rises a stair, including the steps 2 and the risers 3. 4 is any suitable reversible motor which may be located beneath the floor level, which may be concealed, for example by a readily removable lid or cover member 5. 6 is a tube extending from the motor in line with the motor shaft 7. It is provided with any suitable brackets or supports 8, which may be screwed to or otherwise secured to the various steps 2. It terminates at its upper end in a cap 9 and is slotted along one side, as at 10. It is also provided with longitudinal parallel rectilinear grooves 11.

12 indicates a worm shaft, herein shown as extending from end to end of the tube 6. Any suitable bearing means may be provided, but I illustrate a roller bearing assembly 13 at the lower end, and a simple roller bearing assembly 14 at the upper end.

Suitable rings or pads 15 are located at each end of the tube 6, and may be of yielding compressible material. 20 is a carrier, in effect a nut, screw threaded to conform to the threads of the worm 12. It is provided with outwardly extending keys or projections 21, which seat in and generally conform to the slots 11, whereby relative rotation of the nut or carrier 20 and the tube 6 is prevented.

It will be understood that, in response to rotation of the motor and consequent rotation of the worm 12, the carrier 20 is moved longitudinally along the interior of the tube 6. The pads or washers 15 serve to cushion its movement at the ends.

The member 20 is also provided with an outward extension or bracket 22, passing through the slot 10. The slot is herein shown as being in one side of the tube 6, but it will be understood that it may be located elsewhere if desired. Since in the present form it is shown as in the side of the tube, I provide an upward extension 23 on the arm or bracket 22, to the upper end of which, as on the stubs 24, I may mount any suitable hand hold or support 25, herein shown as in the form of two rods with an upper handle or lip 26 joining them.

27 indicates a platform, upon which the user may stand. This platform is hinged, as at 28, with the upward extension 23 of the bracket 22, in such fashion that it will be swung up out of the way at one side of the stairway when the elevator is not in use. The platform may be provided with a toe guard 29 to prevent injury to the user's toes.

I may connect the motor 4 with any suitable source of electric current and employ any suitable circuit therefor. The circuit, however, I have not indicated in detail.

It will be understood that I may provide limit switches 30 and 31 at the upper and lower end of the stairway, in such fashion that, when the elevator reaches either limit of its movement, it engages a limit switch, which breaks the motor circuit.

I may provide any suitable means for initiating rotation of the rotor when the operator is on the platform 27. I illustrate for example any suitable foot- or hand-operated switches 35, located at the foot and top of the stairs.

It will be realized that whereas I have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of my invention. I therefore wish my description and drawing to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

I claim:

1. In a stair elevator, a generally rectilinear tube adapted to be mounted upon the stairway, a motor, a worm in said tube, an actuating connection between said worm and said motor, a carrier nut longitudinally movable in said tube

and threaded upon said worm, means for preventing relative rotation of said nut and tube, including longitudinal grooves in the interior surface of said tube and mating extensions on said nut, a support extending outwardly through said tube from said nut, and a platform means mounted on said support.

2. In a stair elevator and in combination with a flight of stairs, a generally rectilinearly extending tubular guide extending along such stairway, and inclined to conform to the general inclination of the stairway, a motor, a worm in said tube, an actuating connection between said worm and said motor, a carrier member located in and slideable within said tube, and including a portion in mesh with said worm, said carrier member including a portion extending outwardly through a slot in the side of said worm, a platform means mounted on said outward extension, and means for preventing undesired rotation of the carrier member in response to weights located on the platform, including a longitudinally extending wall portion of the interior of the tube, and a portion of the carrier member adapted to abut thereagainst.

3. In a stair elevator and in combination with a flight of stairs, a generally rectilinearly extending tubular guide extending along such stairway, and inclined to conform to the general inclination of the stairway, a motor, a worm in said tube, an actuating connection between said worm and said motor, a carrier member located in and slideable within said tube, and including a portion in mesh with said worm, said carrier member including a portion extending outwardly through a slot in the side of said worm, platform means mounted on said outward extension, and means for preventing relative rotation of said carrier member and said tube, including an element moving with said carrier member and opposed to a portion of the inner face of said tube.

4. In a stair elevator and in combination with a flight of stairs, a generally rectilinearly extending tubular guide extending along such stairway, and inclined to conform to the general inclination of the stairway, a motor, a worm in said tube, an actuating connection between said worm and said motor, a carrier member located in and slideable within said tube, and including a portion in mesh with said worm, said carrier member including a portion extending outwardly through a slot in the side of said tube, and platform means mounted on said outward extension, said carrier member being adapted to center said worm in said tube, and a longitudinal interlock between said carrier member and said tube, including opposed faces on carrier member and tube.

5. In a stair elevator and in combination with a flight of stairs, a generally rectilinearly extending tubular guide extending along such stairway, and inclined to conform to the general inclination of the stairway, a motor located beneath the level of the lowest step of said stairway, a removable cover therefor located flush with said step, a worm in said tube, an actuating connection between said worm and said motor, a carrier member located in and slideable within said tube, and including a portion in mesh with said worm, said carrier member including a portion extending outwardly through a slot in the side of said worm, and platform means mounted on said outward extension.

6. In a stair elevator, a generally rectilinear tube adapted to be mounted upon the stairway, a motor, a worm in said tube, an actuating connection between said worm and said motor, a carrier element longitudinally movable in said tube and in screw-threaded relation with said worm, means for preventing relative rotation of said carrier member and said tube, including a longitudinally extending offset in the interior surface of the tube, and a portion of said threaded member adapted for engagement with the walls of said offset, a support extending outwardly through said tube from said threaded member, and a platform means mounted on said support.

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