

[54] **MANUALLY OPERABLE ELEVATOR**

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[57] **ABSTRACT**

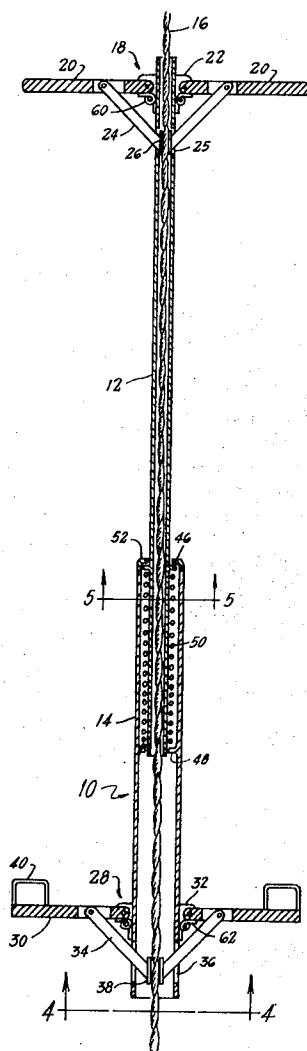
A manually operable elevator consisting of a pair of tubular members telescopically interconnected, each tubular member having a manually operable brake cooperable with a rope passing through the tubular members. One of said tubular members includes a seat for the operator. To lower one's self, the operator occupies the seat and controls the rate of descent by applying one or both brakes, one brake operable by the hands, and the other operable by the feet. In ascending, the elevator is raised by alternately locking one tubular member to the rope by applying a brake while raising the other tubular member.

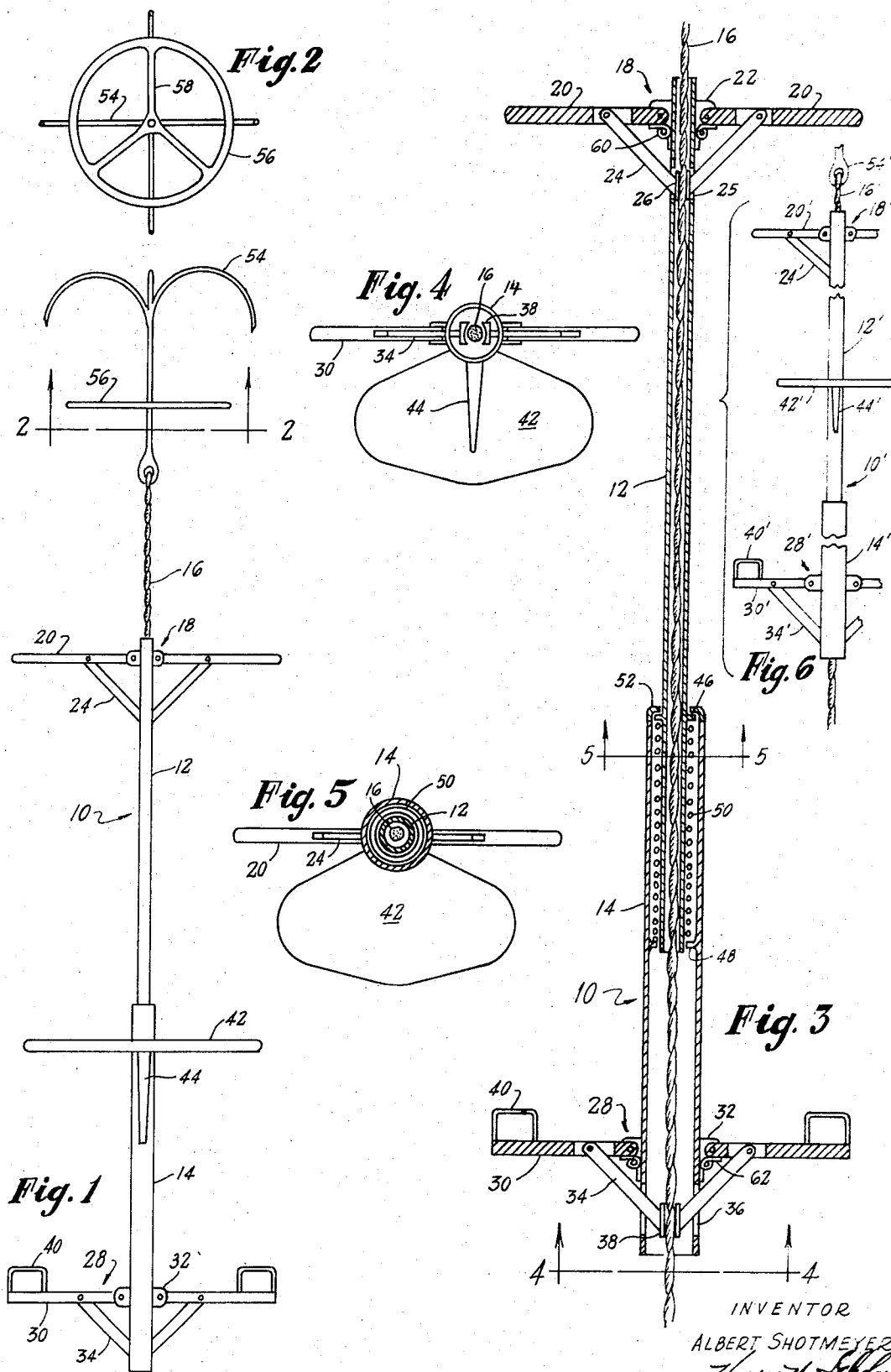
10 Claims, 6 Drawing Figures

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MANUALLY OPERABLE ELEVATOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to manually operable elevators, and more particularly to a light-weight, compact, elevator which can be readily stored for emergency use in escaping from a building by way of a balcony or window thereof. The invention can also be employed for scaling mountains, buildings or other tall structures.

2. Description of the Prior Art

Efforts have been made in the past to provide emergency escape devices to permit a person to lower himself from a burning building. Most of these devices consist of ropes which can be suspended from a window of a building, and a suspender or the like to attach to a person, including a means to brake the descent of the suspender down the rope.

All of these suffer from various shortcomings which detract from their usefulness. Many persons, especially older persons, tend to become extremely excited when faced with an emergency situation and will panic, finding themselves unable to go through the necessary motions of attaching the end of the rope to some fixed object and to harness themselves in the more or less complicated suspender. Others will have extreme fear in lowering themselves in a suspended manner with no support for the feet.

SUMMARY OF THE INVENTION

It is an object of this invention to overcome the above shortcomings by providing a manually operable elevator which includes a pair of levers which can be grasped by the hands, a pair of pedals which can support the feet, and a seat or saddle on which the operator or rider may sit and control his descent.

It is a further object to provide a novel manually operable elevator which is simple and compact in construction, is light in weight, and can be easily stored until needed.

It is a still further object to provide a novel manually operable elevator which can be readily attached to a window sill, balcony, eaves, or overhanging ledge.

It is a still further object to provide a novel manually operable elevator which is simple to operate, requiring no special training or instruction.

It is a still further object to provide a novel manually operable elevator which can be employing for ascending, as well as descending.

It is a still further object to provide a novel manually operable elevator which can be used for ascending by a relatively weak person going through easy and simple motions.

The attainment of the above and other objects and advantages is accomplished by a construction consisting of a pair of elongated tubular members of different internal and external diameters arranged in telescopic relation. Means are provided to permit and to limit relative axial movement between the two tubular members, which may include a helical spring engaging both tubular members to maintain them in a predetermined relationship until a force is applied by the rider to overcome the spring force. Each tubular member includes brake means adapted to cooperate with a rope or the like passing through the two tubular members, each brake means being independently operable, one by the hands of the rider, and the other by the feet of the rider. One of the tubular members carries a seat on which the rider may sit.

In descending, the rider may comfortably occupy the seat, employing a safety belt, if desired, to keep him from falling. Under the force of gravity, the rider can control the rate of descent merely by varying the force applied by his hands and/or feet to the two independent brake means.

In ascending, the rider alternately raises one of the two tubular members while applying the brakes of the other, thereby climbing up the rope step by step.

One end of the rope includes a grappling hook and a ring. The grappling hook can be attached to a balcony, a window sill, roof eaves or overhanging ledge to suspend the rope, and

the ring will maintain the suspended rope in spaced relation from the walls of the building or from other balconies during the descent of the elevator.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to gain a clearer understanding of the invention and its operation, reference is made to the annexed drawings illustrating two preferred embodiments, in which:

FIG. 1 is an elevation view of a first embodiment of the invention in which the seat is mounted on the lower or second tubular member;

FIG. 2 is a top end view of the embodiment of FIG. 1 as seen along the line 2—2 of FIG. 1 looking in the direction of the arrows;

FIG. 3 is a longitudinal sectional view through the first embodiment of FIG. 1;

FIG. 4 is a bottom end view as seen along the line 4—4 of FIG. 3 looking in the direction of the arrows;

FIG. 5 is a transverse sectional view taken along the line 5—5 of FIG. 3 looking in the direction of the arrows; and

FIG. 6 is an elevation view of a second embodiment of the invention, in which the seat is mounted on the upper or first tubular member.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As used in the specification and claims, the term "manually operable" connotes, in its broader sense, the operation by the hands and/or the feet of the operator.

Referring to the annexed drawings, and particularly to FIGS. 1 to 5, inclusive, illustrating the details of a first embodiment of the invention, the manually operable elevator is designated in its entirety by the numeral 10, and comprises a first tubular member 12 and a second tubular member 14 through which a rope 16 or the like extends. The rope 16 can be made of any conventional material, for example, Nylon. It is evident that a metal cable or any other flexible material could be used, or a rigid pole.

The first tubular member 12 has an external diameter less than the internal diameter of the second tubular member 14, allowing the two members to be disposed in telescopic relation as clearly shown in FIG. 3. In fact, the internal diameter of the second tubular member 14 is considerably larger than the external diameter of the first tubular member 12 to accommodate a spring and a pair of stops as will be described in detail later in this specification.

The tubular members 12 and 14 may be made of any suitable light-weight metal such as aluminum or magnesium, or an aluminum-magnesium alloy having the desired weight and strength for the intended purpose.

The first tubular member 12 is equipped with a first brake means 18 comprising a pair of levers 20 pivoted on a pair of pivotal supports 22. One end of a link 24 is pivotally connected intermediate the ends of the lever 20, the other end passing through a slot 25 in the wall of the tubular member 12 and carrying a friction member in the form of a brake shoe 26 to frictionally engage the rope 16.

The second tubular member 14 is equipped with a second brake means 28 comprising a pair of levers 30 pivotally supported on the supports 32. A pair of links 34 are pivotally attached, at one end, intermediate the ends of the levers 30, the other ends passing through slots 36 in the wall of the tubular member 14 and carrying a pair of friction members in the form of brake shoes 38 adapted to frictionally engage the rope 16. The upper, outer, ends of the levers 30 carry stirrups 40 to receive the feet of the operator.

While the drawings illustrate tubular members having a circular cross section, it is evident that the tubular members may have angular cross sections, such as square, pentagonal, or hexagonal.

A seat 42 is attached to the upper end of the second tubular member 14, having a prop 44 to support the outer end. This seat may be pivoted at its connection with the tubular member

14 in an obvious manner, if desired, to permit it to swing downward when not in use to occupy less storage space.

The tubular member 12 includes a stop ring 46 spaced from the lower end thereof, and the second tubular member 14 includes a stop ring 48 spaced from the upper end thereof. A helical compression spring 50 operates within the chamber formed by the stop rings 46 and 48, the exterior of the first tubular member 12 and the interior of the second tubular member 14. A removable cap 52 covers the upper end of the second tubular member 14 and serves as a stop to limit the upward movement of the first tubular member by engaging the stop ring 46. Downward movement of the first tubular member 12 relative to the second tubular member 14 is limited by the compression of the spring 50.

The spring 50 is designed to exert only a light force between the tubular members 12 and 14, only sufficient to support the weight of the first tubular member 12, so that only a small force will be required to compress the spring. In fact, the spring 50 and its function could be omitted, if desired.

A pair of springs 60 cooperate with the first tubular member 12 and the levers 20 to maintain the brake shoe 26 in their released portion, and similarly, a pair of springs 62 cooperate with the second tubular member 14 to maintain the brake shoes 38 in their released position.

The upper end of the rope 16 is attached to the lower end of a grappling hook 54 having the usual angularly spaced hooks. A spacing ring 56 is disposed intermediate the ends of the grappling hook 54 by means of a plurality of spokes 58, for the purpose of suspending the rope and the manually operated elevator 10 clear of the walls of a building, or clear of lower balconies if the device is suspended from an upper balcony.

The manually operated elevator 10 is usually stored in a convenient place with the rope 16 passing through the two tubular members 12 and 14, and with the grappling hook 54 tightly attached to the upper end of the rope. The rope obviously should be sufficiently long to reach the ground or some other safe landing area.

Assume the mode of operation for emergency escape from the balcony of a building: if the device has a folding seat 42 and has been stored with the seat in its folded position, the first step would call for moving the seat to its open or operative position. The grappling hook 54 can be secured to a balcony above the one used for escape, or to the roof eaves or to an overhanging ledge or a window sill. The slack between the grappling hook 54 and the elevator 10 should be taken up by drawing on the rope 16 through the lower end of the second tubular member 14, and then dropping the lower end of the rope over the side of the balcony, with the elevator in its upright position. The operator can then occupy the seat 42 and strap himself to the elevator 10 if desired. The operator grasps the levers 20 with his hands, and passes his feet through the stirrups 40 on the levers 30. By standing on the levers 30, taking his weight off the seat 42, the operator can then shift his weight to the levers 20 and lift his feet upwardly. This motion will apply pressure to the first brake means 18 and release the second brake means 28, moving the second tubular member 14 upwardly relative to the first tubular member 12 and compressing the spring 50 until the spring is fully compressed to limit the upward movement. The operator's weight is then quickly shifted from his hands to his feet, which applies the second brake means 28 to prevent downward movement of the second tubular member 14 by the compressed spring 50. The operator can then sit on the seat 42 while maintaining pressure on the levers 30, release the downward force on the levers 20, which permits the compressed spring 50 to raise the first tubular member 12 until the stop ring 46 engages the cap 52. If the spring 50 were omitted, the same results could be accomplished by lifting upwardly on the ends of the levers 20. These two steps will raise the elevator one step upward, and should be alternately repeated until the bottom end of the elevator 10 or lower end of the second tubular member 14 can swing clear of the top of the balcony rail. The elevator can then be lowered, under the force of gravity, the rate of descent

being controlled by applying pressure to the first and/or second brake means 18 and 28 in an obvious manner.

FIG. 6 illustrates a second embodiment which is similar in all respects to the first embodiment, except that the seat 42' is attached to the first tubular member 12' instead of to the second tubular member 14'. Corresponding parts in FIG. 6 are identified by the same reference numerals with the addition of a "prime" (') to distinguish between the two embodiments.

The attachment of the seat 42' intermediate the ends of the first tubular member 12' results in a slight difference in operation. When put into use with the grappling hook 54' secured to some part of the building as described above and with the elevator 10' in a vertical position and the slack between the elevator and the grappling hook eliminated, the operator occupies the seat 42' and straps himself to the elevator 10' if desired. Grasping the ends of the levers 20' with the hands and forcing them downwardly to apply the brake means 18', the operator passes his feet through the stirrups 40', pulling upwardly by bending the knees while still occupying the seat. This will compress the helical spring until the limiting means prevent further movement, whereupon the operator can quickly reverse his foot movement to force the levers 30' downwardly to apply the brake means 28', transfer his weight from the seat 42' to the levers 30', and release the downward force on the levers 20', whereupon the compressed helical spring will move the first tubular member 12' upwardly along the rope 16'. If no helical spring were provided, the same result could be accomplished by lifting upwardly on the levers 20'. These two steps are alternately repeated until the lower end of the second tubular member 14' clears the upper part of the balcony railing and the elevator can swing clear, whereupon descent under the force of gravity can be controlled by applying a braking force with the hands and/or the feet in an obvious manner.

The second embodiment illustrated in FIG. 6 has a slight advantage over the first embodiment in that the operator can perform the motions of raising and lowering himself requiring only sufficient effort in his knee muscles to raise the lightweight second tubular member 14', instead of supporting his body weight by grasping the levers 20 and pulling upwardly on the stirrups 40 as in the case of the first embodiment.

While, in the above detailed description, the operation of the elevator was described in connection with the escape from the balcony of a building, it is evident that the elevator could be used for scaling buildings or other tall structures, or for scaling mountains. By mounting the elevator on a rigid upright pole instead of from a suspended rope and the like, the elevator would be safe for use as an amusement device.

I claim:

1. A manually operable elevator, comprising: a first tubular member adapted to surround a suspended rope and the like having a first brake means adapted to engage the rope and the like; a second tubular member adapted to surround said suspended rope and the like having a second brake means adapted to engage the rope and the like; and means interconnecting said tubular members and permitting limited relative axial movement therebetween.

2. A manually operable elevator as defined in claim 1, in which said interconnecting means includes a telescopic connection.

3. A manually operable elevator as defined in claim 2, in which said interconnecting means includes a spring.

4. A manually operable elevator as defined in claim 3, in which said spring is helical and surrounds the rope and the like.

5. A manually operable elevator as defined in claim 1, including a seat attached to said first tubular member.

6. A manually operable elevator as defined in claim 1, including a seat attached to said second tubular member.

7. A manually operable elevator as defined in claim 1, including a seat attached to one of said tubular members; each of said brake means including a pivoted lever having a friction surface adapted to engage the rope or the like and a lever, one

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of said levers engageable by a hand and the other of said levers engageable by a foot of the rider.

8. A manually operable elevator as defined in claim 7, in which said foot operable lever includes a stirrup.

9. A manually operable elevator as defined in claim 1, including a rope extending through said tubular members, and a

grappling hook secured to one end of said rope.

10. A manually operable elevator as defined in claim 9, in which said grappling hook includes ring means to space said rope from the walls of a building to which said grappling hook is attached.

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