Sept. 29, 1959 C. P. BRUMBY 2,906,374

WEIGHT CONTROLLED SELF LIFT ELEVATOR

Filed Sept. 30, 1957

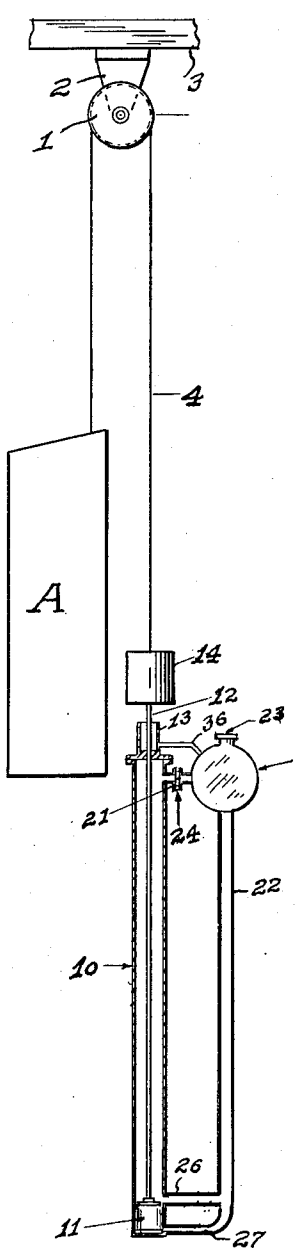


FIG. 1.

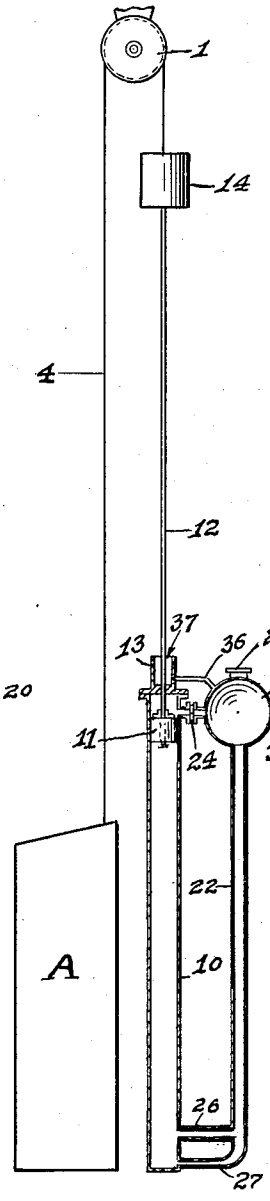


FIG. 2.

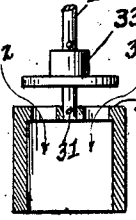


FIG. 5.

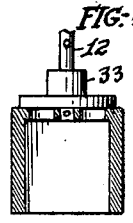


FIG. 4.

FIG. 3.

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WEIGHT CONTROLLED SELF LIFT ELEVATOR

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Application September 30, 1957, Serial No. 687,253

1 Claim. (Cl. 187—17)

This invention relates to elevators for buildings and has particular reference to an automatically functioning elevator.

Most elevators used at the present time are electrically or hydraulically operated and while such power operation may be necessary in ordinary installations, there are times when an automatically operated elevator is sorely needed. In warehouses, for example, where refilling of the storage space from time to time is performed by such conventional elevators, it may be found most convenient and economical to perform the many minor daily dispensing operations by means of a device requiring no such power operation.

In homes and in apartment buildings where stairways constitute the sole means of exit it is in cases of emergencies, such as fires, often found that casualties occur because such stairways are inadequate to provide means for safe escape, particularly where infants, elderly people and physically handicapped persons seek escape.

It is in view of the foregoing the object of the present invention to provide escape means which is at all times ready for service and which will perform its service automatically, thereby entirely eliminating the power devices of conventional elevators.

These and other objects of the invention will be apparent from the following detailed description and by referring to the accompanying drawings in which preferred forms of the invention are illustrated.

In the drawings:

Fig. 1 is a schematic elevational view of a device embodying the invention;

Fig. 2 is a similar view showing the device in a different position of adjustment;

Fig. 3 shows a somewhat modified form of the invention; and

Figs. 4 and 5 illustrate parts of this modified structure.

The device of the invention includes a pulley 1 which is mounted for rotation in a suitable bracket 2 which is held suspended from a beam or ceiling 3 of a building. A cable 4 of any required length is placed on the pulley to support the elevator cage A.

At the base of the building is placed a cylinder 10 in axial alinement with the free end of the cable 4 and a piston 11 is seated for vertical sliding movement in this cylinder. A piston rod 12 extends from the piston through a cap 13 at the upper end of the cylinder to the free end of the cable 4. A counterweight 14 is in any suitable manner fastened to the adjoining ends of the rod and cable. It is important to note that this counterweight is so much heavier than the empty cage it normally will maintain the cage in the elevated position indicated in Fig. 1 of the drawings.

A tank 20 is placed near the upper end of the cylinder to which it is connected by means of conduit 21 and a tubular channel 22 extends from the tank to the lower end of the cylinder. A suitable fluid is poured into the tank completely to fill the cylinder and the conduits therefrom whereupon a cap 23 is mounted on the tank to close the tank opening.

When a load is placed in the cage or a passenger enters the cage, and if the load is heavy enough to over-balance the counterweight, it is found that the cage will descend, in descending to cause the piston 11 to rise within the cylinder and in rising to cause the fluid to circulate through the conduits and the tank. Once the cage again has been evacuated, it is found that the counterweight is capable of returning the cage to its normal, elevated position.

Means must be provided for controlling the speed of descent and since the device, as above pointed out, may be installed in places none of which require the same load capacity, it is important to provide additional speed control in each installation. This may be done by placing in the conduit 21 an element 24 having a passage therethrough of the required diameter in each case.

As above pointed out, it is one of the main objects of the invention to provide a device for use as a fire escape. In such cases it is important to provide means for controlling the speed of the starting and stopping movements of the cage to the end that these movements may be effected smoothly, without danger of sudden starting jerks and stopping bumps discomforting the occupant or damaging the load in the cage.

The lower end of the conduit 22 is for this purpose shown divided into two horizontally directed branches 26, 27 the distance between which is about equal to the height of the piston 11. The lower branch is smaller in diameter than the upper branch. At the start of the downward cage movement it is found that the fluid only can reach below the piston through the smaller lower branch thereby to counteract a sudden starting movement. Full speed of the cage descending movement is not attained until the piston rises above the upper branch 26.

It is now noticed that a second conduit 28 is in Fig. 3 placed a short distance below the upper conduit 21. The fluid is free to pass through both of these conduits until the piston reaches and gradually closes this second conduit gently to slow down the cage movement to bring the cage to a gentle stop. This combination assures safe and comfortable descent of the person or persons occupying the cage even in the case of physically handicapped occupants. An element 29, similar to the element 24, should be placed in this second conduit to assure proper slowing-down speed.

Once the occupant has left the cage, it is found that the counterweight will return to its elevated position. In cases where the device serves as a fire escape, it is essential to expedite the return movement of the cage for use by other persons endeavoring to escape from the fire. This may be done in the manner best shown in Figs. 4 and 5 of the drawings.

The piston is for this purpose made thimble-shaped and the rod 4 is in any suitable manner, as by a pin 31, rigidly mounted in the top plate 30 of the piston. In addition, it is important to note that a number of passages 32 extend through this top plate. A cover 33 is mounted above the piston for sliding movement on the piston rod 4. This cover will during the upward movement of the piston by fluid pressure within the cylinder above the piston be held tightly against the upper plate thereof to maintain these passages closed and so to insure safe descending movement of the passenger supporting cage. But the moment the cage is evacuated and the heft of the counterweight commences to lower the piston it is found that the cover 33, by the fluid pressure within the lower portion of the cylinder is held against downward movement with the piston. The fluid is now free to escape

through the passages 32 and rapid, unrestricted return movement of the cage to its upper position is assured.

It was above stated that the cable may be of any required length and an additional pulley may be placed above the counterweight, as shown in Fig. 3, to provide room for such longer cable within a limited space.

This application is a continuation in part of my copending application, Ser. No. 422,905, filed April 13, 1954, which hereby is abandoned.

I claim:

A self-lift elevator comprising, a cage, a pulley mounted for rotation in a stationary bracket, a cable extending from the cage over the pulley and vertically downward therefrom, a stationary cylinder below the pulley in axial alinement with the dependent end of the cable, a piston in the cylinder, a rod extending from the piston to the cable, a tank, a conduit from the tank to the upper end of the cylinder, a similar second conduit a distance below the first conduit substantially equal to

the height of the piston, flow controlling elements in the two conduits, two conduits from the tank to the lower end of the cylinder, one above the other a distance substantially equal to the height of the piston, the lower conduit being smaller in diameter than the conduit directly above it.

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