Nov. 13, 1923. 1,473,692

W. S. ATKINSON

ELEVATOR BUFFER

Filed April 29, 1921

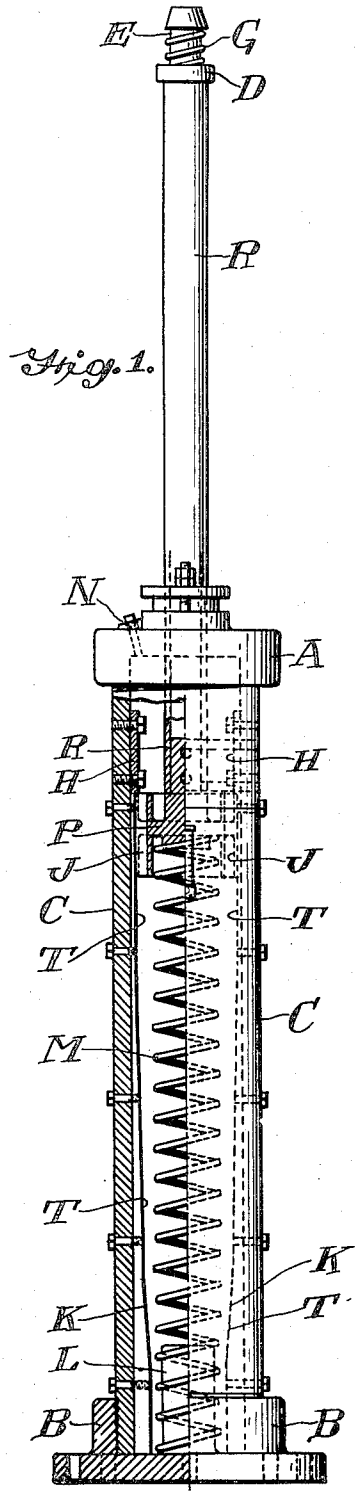

Fig. 1.

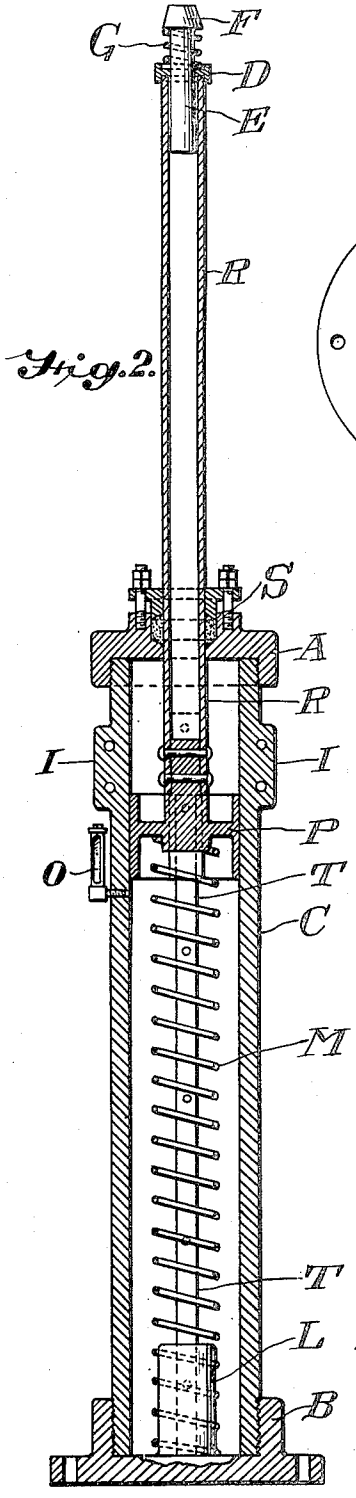

Fig. 2.

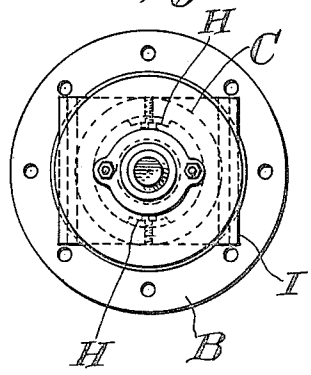

Fig. 3.

INVENTOR.
Willard S. Atkinson
by
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UNITED STATES PATENT OFFICE.

WILLARD S. ATKINSON, OF ASHLAND, NEW JERSEY, ASSIGNOR TO ATLANTIC ELEVATOR COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ELEVATOR BUFFER.

Application filed April 29, 1921. Serial No. 465,555.

To all whom it may concern:

Be it known that I, WILLARD S. ATKINSON, a citizen of the United States, residing in Ashland, county of Camden, State of New Jersey, have invented new and useful Improvements in Elevator Buffers, of which the following is a specification.

My invention relates to buffer structure for retarding an elevator car to bring it gradually to rest without undue shock.

In accordance with my invention, in a cylinder containing suitable liquid, as oil, is movable a plunger or piston to which is connected a member extending to the exterior of the cylinder and adapted to receive the elevator car upon its upper end, the piston being provided with an aperture affording a passage for transfer of liquid from one side to the other as it descends under the weight of blow of the car, and there is provided upon the inner wall of the cylinder a throttle bar disposed in the aperture or passage and having different cross sections at different positions longitudinally of the cylinder, whereby the cross section of the passage or aperture is varied as the piston moves longitudinally of the cylinder.

My invention resides in structure of the character hereinafter described and claimed.

For an illustration of one of various forms my invention may take, reference is to be had to the accompanying drawing, in which:

Fig. 1 is a vertical sectional view, partly in elevation, of apparatus embodying my invention.

Fig. 2 is a vertical sectional view, partly in elevation, at right angles to Fig. 1.

Fig. 3 is a top plan view of the structure shown in Figs. 1 and 2.

Referring to the drawing, C is a metal cylinder threaded into the base support B, which latter is secured, with the cylinder in vertical position, at the bottom of the elevator shaft or pit. Upon the cylinder is formed the pad structure I, to which may be attached means for bracing the cylinder C in the desired vertical position. The interior of the cylinder is bored true, and preferably lapped or polished to provide an accurate fit for the plunger or piston P, which is movable vertically in the cylinder. Secured to the piston P is the upwardly extending tube or piston rod R extending through the stuffing box S carried by the cap A secured, as by threading, upon the upper end of the cylinder C. At the upper end of the member R is provided a cap D, through which extends the plunger E having the head F, between which and the cap D is disposed the spring G opposing movement of the head F toward the member R.

Within the cylinder C above the piston P are secured blocks H forming stops limiting the upward travel of the piston.

Extending through the piston P is or are one or more passages or apertures J in which are received the throttle bars T secured by bolts to the inner wall of the cylinder. As indicated, these bars taper and become thicker toward the bottom of the cylinder, the taper increasing at the lower end, as indicated at K. The bars T may be of uniform width, though they may also, if desired, have different widths at different parts or ranges longitudinally thereof.

Within the cylinder C at its bottom is an upstanding boss L forming a stop for the piston P. Between the piston and the bottom of the cylinder is disposed the helical spring M for returning the piston to its normal position indicated.

Within the cylinder is contained oil or other liquid of suitable characteristics and viscosity, which may be introduced through the filler opening N. A glass gauge O communicates with the interior of the cylinder for indicating the height of liquid therein.

The operation is as follows:

A descending car first engages the head F, which is then forced downwardly in opposition to spring G until the rod or tube R is engaged, whereupon the latter is forced downwardly, forcing the piston P downwardly, the liquid on the lower side of the piston passing upwardly to the upper side of the piston through the passage or passages J, the resistance offered by the passage or passages to the passage of the liquid constituting the retarding force exerted upon the descending car.

During the first part of the downward movement of the piston the apertures have greatest cross section, which, however, diminishes as the piston descends because of the greater part of the area of the passage or passages occupied by the increasing thickness of the throttle bar or bars T. The further the piston descends the smaller is the cross section of the passage or passages J, with resultant increase of resistance to

the flow of liquid therethrough and with consequent increase in resistance to descent of the car.

The change in cross section of the bar or bars T may be made anything suitable or desirable, and is preferably such that as the piston nears the lower limit of its travel, the passages are more rapidly constricted, as when the piston has descended to the portions K of the throttle bars.

Finally, the piston comes to rest against the boss L and the car also has been brought to rest without undue shock.

When the car again ascends, it leaves the buffer structure described, and the spring M, previously compressed by descent of the piston P, expands, forcing the piston P and attached parts upwardly, the liquid which was above the piston P now flowing downwardly in reverse direction through the passage or passages J into the lower portion of the cylinder, and finally the parts take their normal position illustrated.

While I have hereinbefore described a structure embodying my invention, it will be understood that my invention is not strictly limited thereto, and that variations may be made by those skilled in the art without departing from the spirit of my invention.

What I claim is:

1. Elevator buffer structure comprising a cylinder, a piston movable therein, a rod secured to said piston and extending to the exterior of said cylinder in position to be engaged by an elevator car, said piston having a passage in its cylinder-engaging surface affording communication between opposite sides of the piston, a spring normally holding the piston in advanced position, a throttle bar secured upon the wall of said cylinder and extending through said passage for varying the cross section thereof with movement of said piston, and screws extending inwardly through said cylinder wall to hold the bar in position.

2. Elevator buffer structure comprising a cylinder, a piston movable therein, a rod secured to said piston and extending to the exterior of said cylinder in position to be engaged by an elevator car, said piston having a passage in its cylinder-engaging surface constituting the sole means for passage around said piston and affording direct communication between opposite sides of the piston, means for normally holding the piston in advanced position, and a throttle bar increasing in cross section toward the bottom of said cylinder secured upon the wall of said cylinder and extending through said passage for varying the cross section thereof with movement of said piston.

3. Elevator buffer structure comprising a cylinder adapted to contain a liquid, a piston snugly fitting the cylinder but provided with a passage at its periphery constituting the sole means for passage through which said liquid may flow from one side of the piston to the other side thereof, a rod secured to said piston and extending to the exterior of the cylinder in position to be engaged by an elevator car, and a throttle bar for said passage, increasing in cross section toward the bottom of said cylinder.

4. Elevator buffer structure comprising a cylinder, a piston movable therein, a rod secured to said piston and extending to the exterior of said cylinder, said piston having a passage in its cylinder-engaging surface affording communication between opposite sides of the piston, a cushioning member on the outer end of the rod for engagement by an elevator car, a throttle bar increasing in thickness toward the bottom of said cylinder secured upon the wall of said cylinder and extending through said passage for varying the cross section thereof with movement of said piston, and means operable from the exterior of the cylinder for releasing said bar.

5. Elevator buffer structure comprising a cylinder, a piston movable therein, a rod secured to said piston and extending to the exterior of said cylinder, in position to have abutting engagement with a movable member of an elevator, said piston having a passage in its cylinder-engaging surface affording communication between opposite sides of the piston, a throttle bar of constant width and increasing in radial thickness toward the bottom of said cylinder secured upon the wall of said cylinder and extending through said passage for varying the cross section thereof with movement of said piston, and means operable from the exterior of the cylinder for releasing said bar.

6. Elevator buffer structure comprising a cylinder, a piston movable therein, a rod secured to said piston and extending to the exterior of said cylinder, in position to be engaged by an elevator car, said piston having a plurality of apertures in its cylinder-engaging surface and disposed at different positions circumferentially of said piston, a throttle bar for each of said passages increasing in cross section toward the bottom of said cylinder and secured to the inner wall thereof, and means operable from the exterior of the cylinder for releasing said bars.

In testimony whereof I have hereunto affixed my signature this 26 day of April, 1921.

WILLARD S. ATKINSON.