

No. 874,150.

E. J. YOUNG.

PATENTED DEC. 17, 1907.

SHOCK ABSORBING MECHANISM.

APPLICATION FILED JAN. 22, 1906.

2 SHEETS—SHEET 1.

FIG. 1. SCALE 1/20 INCH.

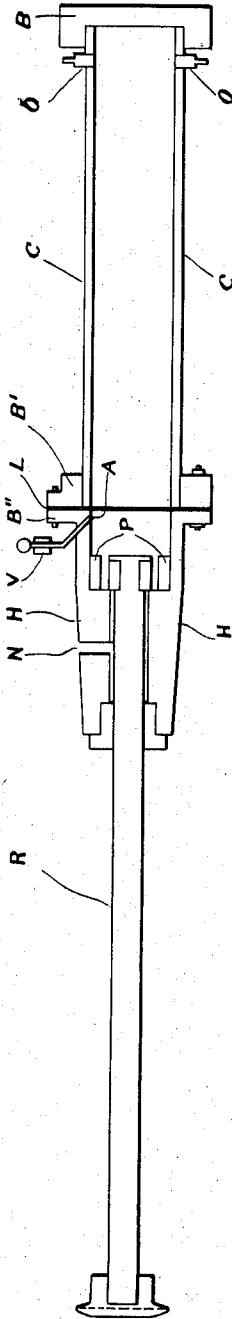
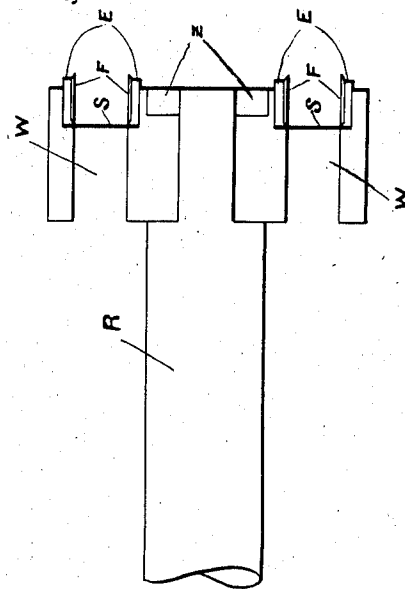
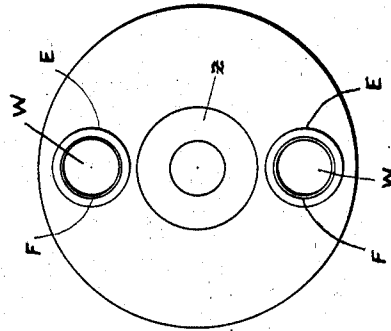


FIG. 2.



SCALE 1/5 INCH.

FIG. 3.



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2 SHEETS—SHEET 2.

FIG. 4. SCALE 1÷60 INCH.

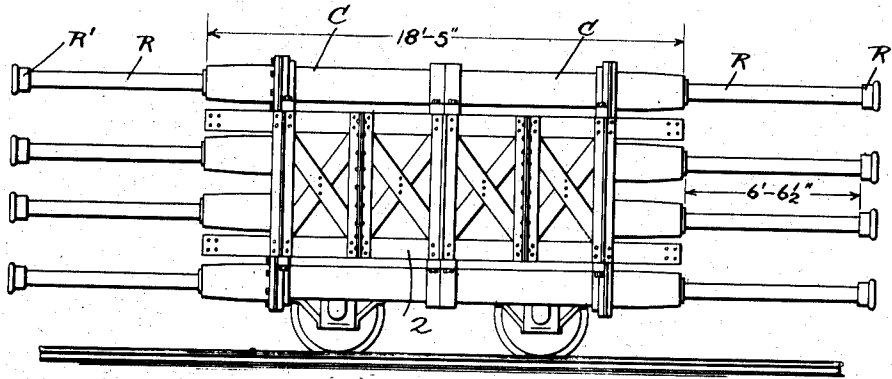


FIG. 5.

SCALE 1÷60 INCH.

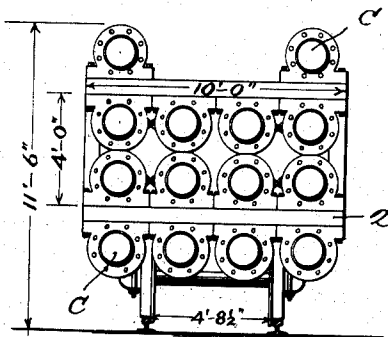
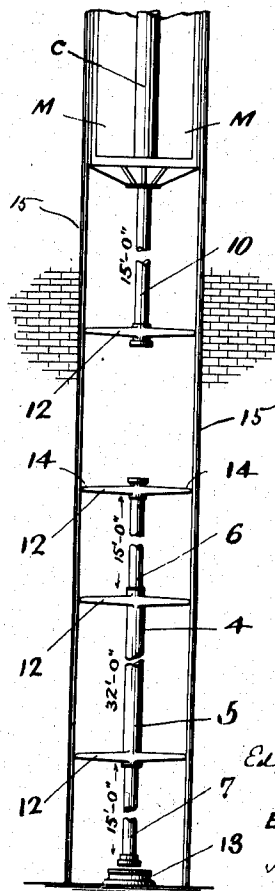


FIG. 6.



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SHOCK-ABSORBING MECHANISM.

No. 874,150.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed January 22, 1906. Serial No. 297,388.

To all whom it may concern:

Be it known that I, EDGAR JOHN YOUNG, a citizen of the United States, residing at Buenos Ayres, Argentina, have invented a new and Improved Shock - Absorbing Mechanism, of which the following is the specification.

My invention has for its object the production of a device which will act to destroy the effect either of impact or stopping of a moving mass, such as a train or elevator, and thus act as a safety device to prevent the, otherwise, result of the sudden stoppage of a train or of an elevator, such as a train collision, or where a train meets with an unexpected obstruction, or the falling through space of an elevator, etc.

I will first describe the embodiment of my invention as illustrated in the accompanying drawings and then point out the invention in the claims.

In the drawings: Figure 1 is a longitudinal section of a buffer cylinder. Fig. 2 is an enlarged section of the piston. Fig. 3 is an end view of same. Fig. 4 represents a buffer car containing a number of buffer cylinders. Fig. 5 is an end view of same. Fig. 6 is a vertical section of an elevator shaft containing buffer cylinders.

C is a cylinder, having the head B of cast steel or bronze, which is firmly screwed to the cylinder. B' is a flanged collar, screwed to the other end of the cylinder. This flanged collar is securely bolted to the flanged end B'' of the cylinder extension H.

Between the flange collar B' and flange B'' is a thin sheet L of soft metal, such as lead which forms an air tight barrier between the cylinder proper and the extension. o o are inlets to the cylinder C, which may be closed by threaded metal stoppers. Through these openings a liquid is entered so as to completely fill the space between the sheet or plate L and the head B.

P is the piston head, R the piston rod, at the end of which is the buffer plate R'. Through the piston head are the orifices W. In these orifices are screwed tubes E, preferably of bronze. The ends of these tubes are closed by sheets S of soft metal. Within the tubes E are tubes F, preferably of steel and having sharpened edges, so that when they are driven against the metal at S and L, the metal will be cut through.

A is an inlet pipe, through which compressed air is adapted to flow from a source

not shown. This pipe is provided with a check valve V, against back pressure.

N is an exhaust and outlet port.

Under normal conditions, the air entering at A is sufficient to hold the piston in the position shown in Fig. 1. If the buffer is struck with sufficient force to overcome this pressure, the piston is forced forward and the cutting edges of the tubes F cut through the plates S and L, allowing the liquid in the cylinder C to pass through plate L and openings W through the piston. The further movement of the piston ruptures the plate L and the piston moves forward in cylinder L as rapidly as the liquid can pass from one side of the piston to the other through the openings W.

In practice, where my device is used, with railway trains, I use the arrangement shown in Figs. 4 and 5, in which what I call, a buffer car 2 is used, upon which is mounted a plurality of these cylinders and pistons. As shown, there are fourteen. This car is interposed at any point of the train and the pressure entering the cylinders at A is sufficient to resist and prevent the movement of the piston under the impact of the ordinary stoppage or obstructions of the train. When a greater resistance is met, the pistons are moved against this pressure with the action before described. The length of piston and size of opening W are calculated to stop a train of a given weight traveling at a given velocity within a certain distance. The effect upon lighter trains and at different velocities will therefore be proportional to this.

In its application to a buffer car, Fig. 4, the cylinders are filled with water or any convenient liquid, the metallic sheets L hermetically closing the ends at B'.

The piston is held against the shoulder of H H by means of compressed air, forced from the engine through pipe A, at a convenient pressure to keep the piston from sheet L in all moderate pushes, such as when stopping or backing train. When, however, the impact exceeds the limit allowed, the cutters F of Fig. 2 are forced against the sheet metal, clipping at both ends the required sections for the free outrush of water through W, W. The conditions are then fulfilled by the piston cutting past sheet L and plunging through the liquid with a determined area of outlet at a given speed. The stoppage, as illustrated, would be brought about by em-

ploying two buffer cars, placed between baggage and mail cars, each having a corresponding set of cylinders to oppose the buffer.

5 In Fig. 6, I show my invention applied to an elevator. M is the elevator cage. In this cage I can place one of my cylinders and its appurtenant mechanism, the piston 10 of which cylinder may have, say, a movement
10 of fifteen feet. This cylinder can travel with the car. In the remaining distance of, say, 30 feet, the shaft is provided with a double cylinder 4, 5, of which 6, 7 are the piston rods. 12, 12, 12, 12 are strut arms, which
15 travel along the guiding rails 15 in the shaft. The cylinders and pistons are held in suspension, just in contact with the fixed stop 13, at the bottom of the shaft, by means of two wires (not shown) attached at 14, which
20 wires are of such strength that they will break when the buffer of piston 10 strikes the piston-rod 6, this occurs when the elevator falls freely or beyond the desired speed.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a device of the character described, in combination, a cylinder, or plurality of cylinders, having closed ends adapted to
30 contain liquid, the wall at one end of said cylinder being adapted to be ruptured, an extension of said cylinder beyond said last mentioned wall, a piston and piston rod in said extension, there being a liquid passage
35 or passages from one side to the other of the piston and means to normally hold said piston away from said wall.

2. In a device of the character described, in combination, a cylinder, or plurality of
40 cylinders, having closed ends adapted to contain liquid, the wall at one end of said cylinder being adapted to be ruptured, an extension of said cylinder beyond said last mentioned wall, a piston and piston rod in
45 said extension, means to normally hold said piston away from said wall, there being openings from one side to the other of said piston.

3. In a device of the character described, in combination, a cylinder, or plurality of
50 cylinders, having closed ends adapted to contain liquid, the wall at one end of said cylinder being adapted to be ruptured, an extension of said cylinder beyond said mentioned wall, a piston and piston rod in said
55 extension, means to normally hold said piston away from said wall, there being openings from one side to the other of said piston, rupturable material covering said openings, and means to rupture said material when the
60 force holding said piston away from the cylinder wall is overcome.

4. In a device of the character described, in combination, a cylinder, or plurality of
65 cylinders, having closed ends adapted to contain liquid, the wall at one end of said

cylinder being adapted to be ruptured, an extension of said cylinder beyond said wall, a piston and piston rod in said extension, means to normally hold said piston away
70 from said wall, there being openings from one side to the other of said piston, rupturable material covering said openings, and means to rupture said material and the rupturable wall of the cylinder when the force holding said piston away from the cylinder
75 wall is overcome.

5. In a device of the character described, in combination, a two compartment cylinder or plurality of cylinders, the two compartments being separated by a rupturable wall,
80 one of said compartments being adapted to contain liquid, a piston and piston rod in the other compartments, there being a liquid passage or passages from one side to the other of said piston, means to normally hold
85 said piston away from said rupturable wall.

6. In a device of the character described, in combination, a two compartment cylinder or plurality of cylinders, the two compartments being separated by a rupturable wall,
90 one of said compartments being adapted to contain water, a piston and piston rod in the other compartment, means to normally hold said piston away from said rupturable wall, there being openings from one side to the
95 other of said piston.

7. In a device of the character described, in combination, a two compartment cylinder, or plurality of cylinders, the two compartments being separated by a rupturable wall,
100 one of said compartments being adapted to contain water, a piston and piston rod in the other compartments, means to normally hold said piston away from said rupturable wall, there being openings from one side to
105 the other of said piston, rupturable material covering said openings, and means to rupture said material when the force holding said piston away from the cylinder division wall is overcome.
110

8. In a device of the character described, in combination, a two compartment cylinder, or plurality of cylinders, the two compartments being separated by a rupturable wall,
115 one of said compartments being adapted to contain water, a piston and piston rod in the other compartment, means to normally hold said piston away from said rupturable wall, there being openings from one side to the other of said piston, rupturable material covering
120 said openings, and means to rupture said material and the cylinder division wall when the force holding said piston away from the cylinder division wall is overcome.

9. In a device of the character described, in combination, a cylinder, or plurality of
125 cylinders, having closed ends adapted to contain liquid, the wall at one end of said cylinder being adapted to be ruptured, an extension of said cylinder beyond said last
130

mentioned wall, a piston and piston rod in said extension, means to normally hold said piston away from said wall, there being openings from one side to the other of said piston, and means to rupture said cylinder wall when the force holding said piston away from the cylinder wall is overcome.

10. In a device of the character described, in combination, a two compartment cylinder, or plurality of cylinders, the two compartments being separated by a rupturable wall, one of said compartments being adapted to contain water, a piston and piston rod in the other compartments, means to normally

hold said piston away from said rupturable wall, there being openings from one side to the other of said piston, and means to rupture said cylinder division wall when the force holding said piston away from said cylinder division wall is overcome.

In testimony whereof, I have hereunto signed my name to this specification in presence of two witnesses.

EDGAR JOHN YOUNG.

Witnesses:

I. E. MILLER,
G. C. COLE.