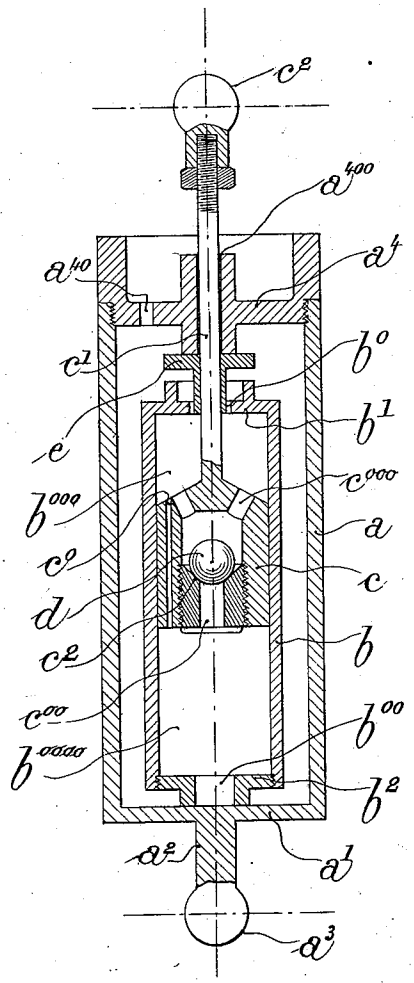
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L. BECHEREAU

SHOCK DEADENER

Original Filed June 13, 1922



Louis Béchereau Inventor

by Mock & Blum Attys.

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UNITED STATES PATENT OFFICE.

LOUIS BÉCHEREAU, OF PARIS, FRANCE.

SHOCK DEADENER.

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To all whom it may concern:

Be it known that I, LOUIS BÉCHEREAU, a citizen of the French Republic, residing at Paris, France, have invented certain new and useful Improvements in Shock Deadeners, of which the following is a specification.

My invention relates to a new and improved liquid shock absorber.

One of the objects of my invention is to produce an efficient device which can be cheaply manufactured and which will require little or no repairs or attention.

Another object of my invention is to provide a device of this character employing a piston which is movable within a cylinder, the said cylinder being movable to a limited extent within an outer vessel.

Other objects of my invention will be set forth in the following description and in the drawing which diagrammatically shows in cross section a preferred embodiment of my invention.

An outer cylinder a is provided at one end with a fixed cap a' having an external axial extension a^2 terminating in a ball a^3. The outer cylinder a is provided at the other end with a removable cup-shaped cap a^4, which has a lateral bore a^{40} for connecting the interior of the outer cylinder a with the atmosphere. The cap a^4 which may be called the upper cap for convenience, has a central bore a^{400}.

A light inner cylinder b is located within the outer cylinder a and the diameter of the inner cylinder b is slightly less than the diameter of the outer cylinder a. The inner cylinder b has a piston c and this cylinder b is provided with caps b' and b^2 which are provided with openings b^0 and b^{00}.

The piston c is of substantial length and its upper and lower faces are connected by a relatively narrow by-pass or duct c^0. The piston c has a movable valve such as a ball d which rests upon a suitable seat c^2 provided for this purpose. When the ball d is raised from its seat then the spaces adjacent the upper and lower faces of the piston c are connected by means of ducts c^{00} and c^{000}. The rod c' of the piston c is located upon the upper side of the piston and this is provided with a ball c^2.

A socket e can be connected with a slight relative play upon the rod c' so that this socket e can abut the inner end of the cap a^4.

The height of the cylinder b is slightly less than the distance between the top of the cap a' and the bottom of the lowest face of the cap a^4.

The device is turnably connected by the ball a^3 which serves as a socket member, to the axle of the automobile which is provided with a suitable socket for this purpose and the ball c^2 is similarly connected to the body of the automobile so that the axis of the device is normally vertical.

The device is then filled with a quantity of any suitable liquid, the volume of which is not less than the internal volume of the cylinder b minus the volume of the piston c.

The operation of my device is as follows:

If the automobile runs on uneven ground then the piston c is moved relatively to the outer cylinder a. The movement of the piston c positively carries along the piston b due to the resistance offered to the flow of the liquid through the apertures in the caps of the inner cylinder b which are made of suitable small size for this purpose. Hence the inner cylinder b alternately abuts against the socket e and the lower cap a'.

Hence the movement of the cylinder b, to follow the movement of the piston c, is not solely dependent upon the friction between the piston c and the inner cylinder b and this is important because the amount of such friction varies and the action of the device is not reliable if it is dependent upon this friction alone.

When the piston c rises and the smooth upper faces of the cap b' have contacted with the lateral surface of the cap e so as to restrain the flow of liquid upwardly out of the cylinder b, then the liquid is forced to pass through the duct c^0 because the valve d is forced against its seat when the piston c is moved upwardly. This restrains or brakes the upper movement of the body of the automobile. At the same time, the space b^{0000} becomes filled by the liquid which has passed through the braking-duct c^0 and by the liquid which has been pumped or sucked through the space between the cap a' and the bottom of the cap b^2.

During the greater part of the upward stroke of the piston c, the top cap of the cylinder b abuts against the flange e being forced into and retained in this position by the upward pressure exerted upon the cap b' by the liquid in the space b^{000} and also by the pressure exerted upon its cap b^2 by the liquid which is pumped into the space b^{0000}.

When the piston c descends this down-

wardly forces the cylinder b until the cap b^2 abuts against the cap a' and restrains any downward flow of the liquid below the piston c. This causes the ball d to be lifted so that the liquid passes freely above the said ball. The space b^{000} thereby becomes filled with liquid the excess of which corresponds to the volume of that portion of the rod c' which has entered the cylinder b being forced through the aperture b^0 into the cylinder a. The position of the opening b^0 at the upper part of the cylinder b permits the release of the air bubbles which might be created by the movement of the parts before described in the liquid. During the greater part of the downward movement of the cylinder c, the cylinder b thus remains firmly pressed against the cap a'.

It must be noted that the rod c' of the piston c is only guided by the bore a^{400} of the cap a^4 and that the piston serves as a guide for the cylinder b. It is therefore unnecessary to accurately manufacture and fit the parts together so as to make the axis of the piston c and of its rod, accurately coincide with the axis of the cylinder b.

The rod c' is caused to fit tightly within the bore a^{400} and the socket e is also caused to fit tightly upon the rod c' so that a liquid tight fit of the parts is secured during the greater part of the upward movement of the piston c.

I have described a preferred embodiment of my invention but it is clear that numerous changes and omissions could be made without departing from its spirit.

I claim:

1. A liquid shock absorber comprising an outer cylinder, an inner cylinder containing liquid and having a limited movement relative to said outer cylinder, a piston located within the said inner cylinder and adapted to act as a sole guide for said inner cylinder and having a rod projecting through one end of the said outer cylinder, the said inner cylinder being open at both ends thereof and the said piston being provided with a braking-duct, the said outer cylinder and the said rod having means adapted to relatively connect them to the chassis and to the body of an automobile.

2. A liquid shock absorber comprising an outer cylinder, an inner cylinder containing liquid and adapted to have a limited movement relative to said outer cylinder, a piston located within the said inner cylinder and adapted to act as the sole guide of the said inner cylinder, and having a rod projecting through one end of the said outer cylinder, the said piston having a one way valve and relatively large ducts therein, said piston also having a relatively narrow braking duct, the said inner cylinder having openings in the opposite ends thereof, the said openings being so narrow that the movement of the piston in the liquid contained in the said inner cylinder, actuates the said inner cylinder in the direction of movement of the said piston, the said outer cylinder and the said rod having means adapted to respectively connect them to the axle and to the chassis of an automobile.

In testimony whereof I hereunto affixed my signature.

LOUIS BÉCHEREAU.