

DASHPOT.

1,407,320.

A technical cross-sectional drawing of a mechanical assembly. The drawing shows a central vertical shaft (11) passing through a housing (1). At the top, a cap screw (7) is used to clamp a cover plate (6) against a flange (8). A gasket (3) is positioned between the cover plate and the flange. A seal (4) is located where the shaft enters the housing. Below the seal, a sleeve (2) is mounted on the shaft. The sleeve has a lower section (12) that fits into a housing bore. A shoulder (9) on the shaft is positioned above the sleeve's lower section. A ring (10) is located at the bottom of the sleeve's lower section, likely to secure it in place.

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DASHPOT.

1,407,320.

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To all whom it may concern:

Be it known that I, WILLIAM F. BOUCHÉ, a citizen of the United States, residing at Buffalo, county of Erie and State of New York, have invented certain new and useful Improvements in Dashpots, of which the following is a description.

My invention relates to improvements in that class of devices known as dash-pots and is directed particularly to dash-pots to be used in connection with delicately responsive mechanism wherein it is desired that the action of the dashpot shall remain constant under various conditions and temperature changes and be accompanied by as little friction as possible.

More specifically, my invention is directed toward providing a dash-pot which may be readily made with great accuracy so that quantities may readily be made which are all alike and may have their parts interchanged without materially affecting the operation thereof.

A further object of my invention is to produce an extremely smoothly operating dash-pot, in addition to the above characteristics.

The drawing is a partial section and partial elevation of a dashpot comprehending my invention.

In the drawing, 1 represents the body portion or cylinder of the dash-pot, made of a hard phenolic condensation product, such as molded bakelite or a bakelite molding composition, such as are now articles of commerce well known by these terms and requiring no further description relative to their chemical construction. This material may be molded with great accuracy, but is not as readily machined nor with as great accuracy as some of the metals, for example, brass or bronze. For these reasons, I mold the pot or cylinder 1, with its cylindrical bore defined by the wall 2, accurately to the diameter desired,—as I find by using this material I can produce cylinders of extremely accurate bore in quantities, which when finished will have their bores alike in dimensions within the limits of great accuracy.

As it is desired that these cylinders shall be held in perfect alinement with respect to a portion of the apparatus in connection with which it is desired they shall be em-

ployed, I cast the cylinders 1 with a metallic insert, preferably made of brass or bronze, as indicated at 3. This insert may be firmly held in and practically united with the phenolic condensation product composition by knurling the sleeve portion of the insert, as indicated at 4, and also, if desired, by providing the insert with a circumferential groove, as indicated at 5, or other equivalent means. And, in practice, I accurately center the cylinder 1 with respect to the central axis of the bore and then accurately turn the face 6 of the metal insert 3 so that it is substantially in a truly normal plane to the axis of the said bore, and more positively and accurately than could the phenolic condensation product material be cast or machined. The exterior of the cylinder 1 is preferably knurled at its upper portion, as indicated at 7, so that it may be readily grasped by the hand when being made up into operative position, by means of the thread 8 which may engage any suitable threaded member, not shown, which will serve to draw the surface 6 accurately against a plane surface with respect to which it is desired to hold the central axis of the bore of the dash-pot perpendicularly. 9 is a piston which may be provided with grooves, as indicated at 10, if desired, and is very accurately turned to allow a slight clearance with respect to the pot or cylinder, which clearance will be uniform at any working position of the piston and is determined in a manner which will hereinafter be explained. 11 is a portion of the apparatus or device the motion of which it is desired to modify by the use of the dash-pot.

I fill the cylinder 1 to a suitable level, as for example that indicated at 12, with a light liquid possessing the characteristics of a lubricant and of such composition that its viscosity changes little under the influence of reasonable temperature changes such as to be met with in the use of my dash-pot in connection with such machinery or devices as it is applicable to. By using a light fluid, the clearance between the piston and the cylinder may be made reasonably small without the dash-pot operating too stiffly for practical purposes. And by using a piston of proper material having a higher

co-efficient of expansion for changes in temperature than the phenolic condensation product cylinder, I cause the small expansion of the piston, in excess of the expansion of the cylinder for like temperature changes, to so vary the clearance under the influence of temperature changes as to compensate for the change in viscosity of the dashing fluid, and in this manner maintain the operation of my dash-pot constant throughout the temperature variations to be met in practice.

One material which I find quite satisfactory for the manufacture of the pistons is aluminum, which may be attached to the member 11 in any suitable manner obvious to one skilled in the art. And one fluid which I find useful is a light weight mineral oil changing its viscosity very slightly throughout wide ranges of temperature, and having a specific gravity at 15.5° C. of .860 with an approximate viscosity by the Saybolt method at 100° F. of 250 seconds.

From the foregoing it will be noted that I have produced a dash-pot possessing many valuable attributes set forth under the statement of invention and which, while possessing the smoothness of operation obtainable only by means of a wet dash-pot, avoids the usual and great objection to this type of dash-pot of having its operation varied quite deleteriously by changes in temperature.

What I claim is:

1. A dash-pot comprising a receptacle, a fluid in the receptacle and a piston operating in the fluid in the receptacle, the fluid being such that its viscosity is affected but little by temperature changes in the dash-pot and the piston and receptacle being of materials such that they are differently affected by temperature changes in such manner as to vary the clearance of the piston, under temperature changes, so as to compensate for the change in viscosity of said fluid, so as to cause the fluid to offer a substantially constant retarding effect to the movement of the piston in the receptacle under various changes in temperature.

2. A dash-pot comprehending a receptacle and a piston therein differently affected by temperature changes, a fluid in said receptacle, the resulting effect of temperature changes upon said receptacle, piston and fluid resulting in a constant retarding effect due to varying characteristics influenced by said temperature changes.

3. A dash-pot comprehending a receptacle, a piston and a fluid in the receptacle, said three elements being differently affected by temperature changes, and co-operating to produce a substantially constant retarding effect to the movement of the piston in the receptacle during variations in temperature.

4. A dash-pot comprehending a receptacle,

a fluid contained therein, a member immersed in said fluid and movable within said receptacle, the characteristics of said receptacle and movable member being such that the clearance therebetween varies upon temperature changes in such ratio with respect to the viscosity of the fluid under like changes that the retarding effect offered to relative motion between said movable member and said receptacle remains substantially constant under changes in temperature.

5. The combination with a cylinder and a piston operating therein of a material having a greater coefficient of expansion for temperature changes than the cylinder, of a fluid cooperating therewith to perform a retarding effect, the relationship between the cylinder and piston and fluid being such that, under changes in temperature, the difference in expansion between the piston and the cylinder varies in such relationship to the variation caused by said differences in temperature upon the viscosity of the fluid that the retarding effect remains substantially constant throughout operating temperature changes.

6. In a dash-pot, a cylinder, a member movable therein with a small clearance space therebetween, and a fluid contained in said cylinder and filling said clearance space, the relative expansion for like temperature changes taking place in the piston and in the cylinder being such as to compensate for the changes in viscosity of the fluid upon such changes and thereby produce a dash-pot of substantially constant operation under varying temperatures.

7. In a dash-pot, the combination with a cylinder portion composed of a phenolic condensation product, a metallic piston operating therein, and a fluid cooperating therewith to produce a substantially constant retarding effect under temperature changes.

8. In a dash-pot, a cylinder of a phenolic condensation product composition, a piston and a fluid cooperating therewith, said piston having a relatively slight clearance with respect to said cylinder and composed of material having a greater coefficient of expansion than said phenolic condensation product composition.

9. In a dash-pot, a cylinder portion of a phenolic condensation product composition, a fluid contained therein and a movable member immersed in said fluid and having a greater coefficient of expansion than said phenolic condensation product composition.

10. In a dash-pot, a cylinder of a phenolic condensation product composition, a fluid contained therein, and a metallic piston immersed in said fluid.

11. In a dash-pot, a cylinder of a phenolic condensation product composition, a fluid contained therein, and an aluminum piston immersed in said fluid.

12. In a dash-pot requiring precise alinement, the combination with a cylinder composed of a moldable composition with an accurately molded bore, of a metallic member
5 intimately united with the cylinder and machined into precise relationship with respect to said bore.
13. In a dash-pot having a molded cylinder of a phenolic condensation product composition with an accurate bore, a member
10 movable within said bore and having a small clearance with respect thereto, of means for insuring correct alinement of said bore and said member comprehending a metallic member
15 intimately united with a phenolic condensation product composition of the cylinder and accurately dimensioned with respect to said bore.
14. In a dash-pot, a cylinder of a phenolic
20 condensation product composition, a fluid maintaining an approximately constant viscosity throughout wide range of temperature changes contained therein, and a metallic piston immersed in said fluid.
- 25 15. In a dash-pot, a cylinder molded of a phenolic condensation product composition, a fluid contained therein having very small changes in its viscosity in response to changes in temperature, and a metallic piston cooperating therewith.
16. In a dash-pot, a cylinder of a material of a given coefficient of expansion in response to temperature changes, a fluid contained in the receptacle having a viscosity
35 very slightly decreasing with increase of temperature and a piston in said cylinder having a coefficient of expansion exceeding that of the cylinder by an amount equivalent to the difference between the coefficient of
40 expansion of the cylinder and the change of viscosity of the fluid, the resulting effect of the co-operation of said three elements producing a substantially constant retarding effect to the movement of the piston and the
45 cylinder.
17. In a dash-pot, a phenolic condensation product composition cylinder, a light mineral oil contained therein, and a metallic piston cooperating therewith.
18. The combination with a cylinder of a
50 phenolic condensation product composition, a light mineral oil contained in said cylinder, and a metallic piston cooperating therewith.

WILLIAM F. BOUCHÉ.