

Oct. 28, 1924.

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DASHPOT

Filed Jan. 19, 1924

1,513,016

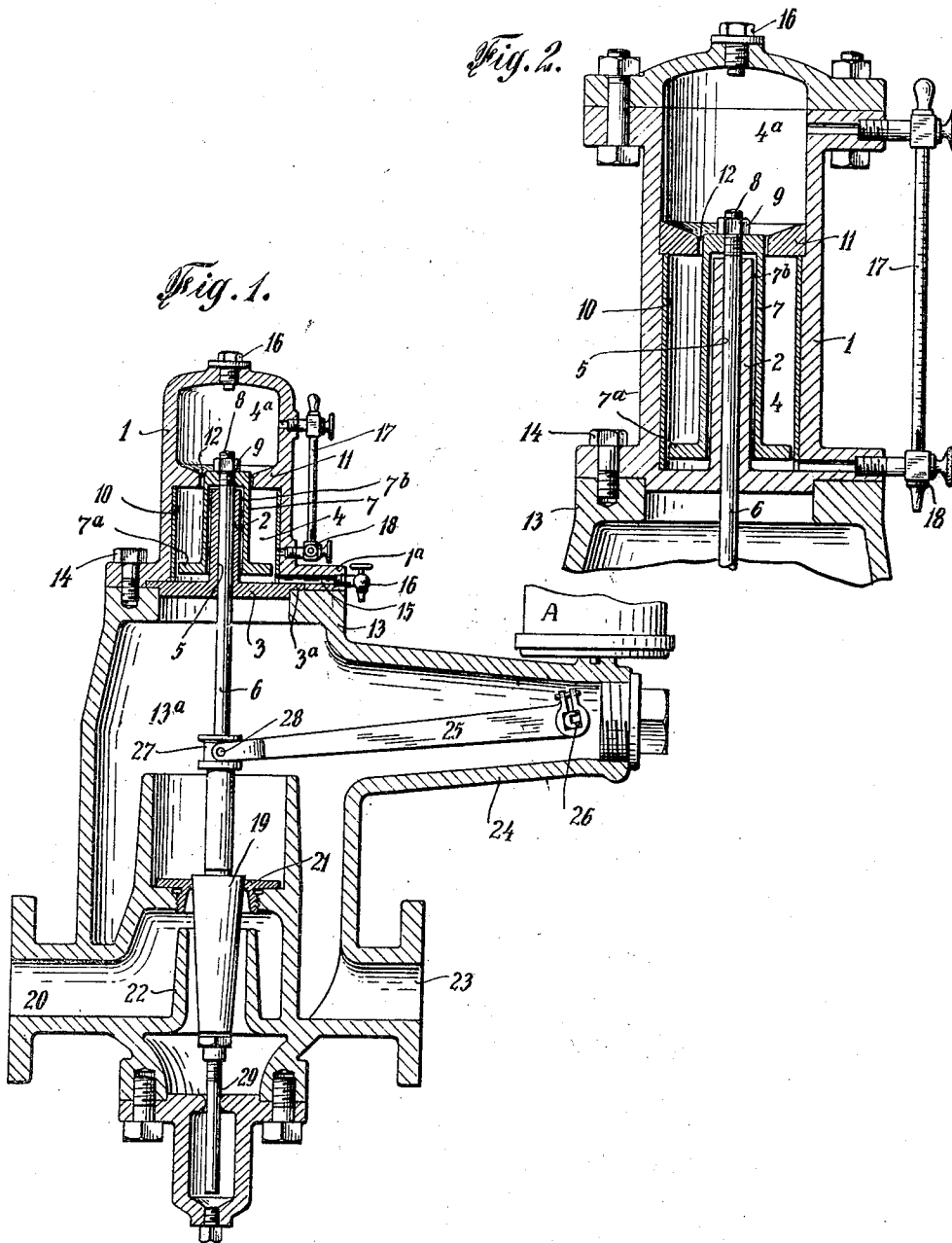


Fig. 2.

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DASHPOT.

Application filed January 19, 1924. Serial No. 687,233.

To all whom it may concern:

Be it known that I, GAMALIEL C. ST. JOHN, a citizen of the United States, and resident of Greenwich, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Dashpots, of which the following is a specification.

My invention relates to improvements in dash-pots and has for its object to provide a dash-pot in which substantially uniform resistance to the movement of the movable member or piston of the dash-pot will be encountered, whereby to resist vibration of a valve or other element connected with said member or piston of the dash-pot and yet to permit such valve or element to have the required extent of movement in due course.

I have illustrated my improvement in connection with a fluid meter valve and particularly in the class of steam meters set forth in Letters Patent No. 567,054, granted to me September 1, 1896, and No. 599,746, granted to me March 1, 1898.

My invention comprises novel details of improvement that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part hereof, wherein—

Fig. 1 is a vertical section illustrating my improvement in connection with a steam meter of the class before stated, and

Fig. 2 is a detail section of a modification. Similar numerals of reference indicate corresponding parts in the several views.

A dash-pot hollow shell or housing 1 is provided with an inner wall 2 shown projecting upwardly from the bottom 3 of said shell and spaced from the inner surface of the latter, providing a chamber or space 4 therebetween. The wall 2 is in tubular form having a bore 5 opening through opposite ends of the wall to receive and guide a reciprocative rod 6. The movable member or piston 7 is shown in inverted cup-like form receiving the wall 2 to reciprocate along the same and extending over the open upper end of its bore 5, the member or piston 7 being located between wall 2 and the inner wall of shell 1 within chamber 4 and spaced therefrom for the accumulation of water or other fluid in said chamber. The upper closed end

of the cup-like member or piston may be secured to rod 6 in any suitable way, as by threads 8 on said rod screwed into the end of the piston, a nut 9 on said rod securing the latter to the piston. The upper closed end of the piston opposes the adjacent upper end of wall 2. The lower laterally extended portion 7^a of member of piston 7 is spaced with suitable clearance from the inner surface of shell 1 within chamber 4 to serve in the nature of a piston to freely reciprocate and to permit the flow of fluid between the edge of extension 7^a and the inner surface of shell 1 in chamber 4. A lining 10, of brass or other suitable metal, may be provided in chamber 4. The diameter of the inner bore 7^b of piston 7 is such that the latter may reciprocate freely along a wall 2 and fluid may flow therebetween to a limited extent, and whereby when steam flows along rod 6 within the bore 5 water of condensation may accumulate within chamber 4.

The shell 1 between its ends is provided with an inner transverse partition 11 having an axial bore or opening 12 in which the upper portion of member or piston 7 is adapted to reciprocate freely, there being sufficient clearance between the wall of bore 12 and member or piston 7 to permit flow of water to a limited extent. The wall 2 is in axial alignment with opening 12. The partition 11 divides shell 1 into chamber 4 and chamber 4^a, which communicate through opening 12, the chamber 4^a being shown above chamber 4 so that when member or piston 7 rises its upper portion may enter chamber 4^a and water or other fluid that may be lifted by the extension 7^a of the piston may flow through the space between bore 12 and the reduced upper portion of member or piston 7 from chamber 4 into chamber 4^a, the partition 11 retarding the flow of the fluid.

In the form shown in Fig. 1 the wall 2 extends from the bottom 3 which is separate from the material of shell 1 and has a flange 3^a clamped securely in place between casing 13 and flange 1^a of shell 1, the parts being secured together by means of screws 14. In the form shown in Fig. 2 the shell 1, its bottom 3 and the wall 2 are integral, the shell being secured upon casing 13 by screws 14. A passage 15 communicates with chamber 4 and is shown provided with a pet cock 16 to permit drainage of the shell. A sight

gage at 17 may be provided to indicate the height of water in the dash-pot, which may be controlled by a pet cock 18.

Although rod 6 may be actuated by any member whose movements are to be controlled I have illustrated said rod as connected with valve 19, which is the metering valve of a steam meter whose casing 13 is provided with a steam inlet at 20, a seat for valve 19 being indicated at 21. A pressure equalizing shield is indicated at 22 and an outlet for the casing is indicated at 23. The casing 13 is shown provided with a hollow projection 24 in which a lever 25 is pivoted, the opening of which projection may be closed by a plug. A recording or integrating machine A upon projection 24 may have a stylus or other indicating element which may be operated by shaft 26 on lever 25 in any well known manner used in fluid meters, which parts form no part of my present invention but may be like those used in my aforesaid Letters Patent, or of any other desired construction. The valve 19 is shown provided with a groove 27 receiving a pin 28 on lever 25, as usual. The lower end of rod 6 is shown guided at 29.

In the example illustrated the dash-pot is placed above the metering valve and above the main steam chamber 13^a of casing 13 so that substances that may be carried along with the steam will not accumulate in the dash-pot and may fall below. Steam that leaks past rod 6 through bore 5 into the dash-pot will condense in the latter, and such water of condensation will charge the dash-pot, and particularly the chamber 4, thereof, to a sufficient extent for controlling the operation of the dash-pot member or piston 7, whereby as rod 6 rises and descends with valve 19, (as, for instance, in the usual manner of steam meters of the class described), the member or piston 7 will control operation of said rod and valve, such as vibrations thereof. Sediment, loose particles, grit, oxide, scales and rust, oil, vegetable concentrates and emulsions, etc., that may pass into the casing 13 with the steam through seat 21, past valve 19, will be prevented from accumulating in the dash-pot by reason of the elevation of the latter above the current of steam in casing 13, hence the dash-pot is kept free from interfering material and may perform its operation without obstruction from extraneous substances, thereby decreasing friction, avoiding breakage, providing steadiness of action, facilitating the operation of the meter, and reducing annoyance. When the steam entering casing 13 raises valve 19, rod 6 and member or piston 7 of the dash-pot the water upon the extension 7^a of said member or piston will be raised and forced against the partition 11, to prevent undue or too rapid rising of valve 19. Due to the effort of the

valve to rise such water will flow downwardly in the clearance space between extension 7^a and the inner surface of chamber 4 until the position of the water is settled, above and below extension 7^a, whereby the piston may come to rest at the required position. Such resistance of the water against partition 11 has the effect to steady the action of the piston. Likewise, when the valve 19 seeks to descend the part 7^a of member or piston 7 will press upon the water beneath it in chamber 4 and such water will gradually rise within said chamber through the clearance space aforesaid, thereby steadying such action of the piston. In other words, the presence of the partition 11 in shell 1 spaced from the bottom 3 and in opposition to the extension 7^a of member or piston 7 serves to retard quick action or vibration of the latter, and yet permits the required movement for positioning of valve 19 according to the work required, it being understood, also, that when extension 7^a of member or piston 7 rises water may flow slowly into chamber 4^a and will descend from that chamber into chamber 4 for equalization with respect to member or piston 7. In either movement of member or piston 7 the effect of vacuum behind the extension 7^a also serves to steady the action of the piston and to induce the flow of water behind the extension 7^a.

I am aware that dash-pots have been provided with springs or air resistance against the movement of their pistons but the increasing tension of the springs and the compression of the air creates an increasing resistance against the strokes of the piston, which resistance continues to oppose the piston, when at rest, and so on, whereas in accordance with my invention when liquid is used the piston is not opposed by varying pressure in its movements, since the liquid within chamber 4 of the dash-pot may flow and settle or equalize its position on opposite sides of the extension 7^a of the member or piston 7, the latter then not being pressed reversely against its initial movement, although movement of the piston in either direction is initially resisted either by the liquid pressing against the partition 11, or against the bottom 3 of the dash-pot when the piston moves in conjunction with the vacuum referred to. In other words, my improvements permit smooth operation of the member or piston 7 in all of its positions with substantially equal resistance at all points of its movements.

Having now described my invention what I claim is:—

1. A dash-pot comprising a shell having a plurality of chambers, a partition provided with an opening between said chambers, and a movable member in one of said chambers and operative to force fluid against said

partition, said shell and member being spaced to permit fluid to flow between said shell and member.

2. A dash-pot comprising a hollow shell provided with an inner wall spaced from the shell, a partition within the shell between its ends providing chambers on opposite sides of the partition, said partition having an opening providing communication between said chambers, a movable member operable in one of said chambers, and means to actuate said member.

3. A dash-pot as set forth in claim 2, in which there is a space between the movable member and the opening in the partition to permit fluid to flow therebetween from one of said chambers to the other.

4. A dash-pot comprising a hollow shell provided with a transverse partition having an opening dividing the shell into a plurality of communicating chambers, a wall within one of said chambers spaced from the inner surface thereof and axially disposed respecting the opening of the partition, a movable member within one of said chambers operatively disposed respecting said wall and opening, a clearance space being provided between said member and said partition at said opening and a clearance space being provided between said movable member and the inner surface of its chamber to permit the flow of fluid through said clearance spaces, and means to actuate said member.

5. A dash-pot comprising a hollow shell provided with a transverse partition having

an opening dividing the shell into a plurality of communicating chambers, a wall within one of said chambers spaced from the inner surface thereof and axially disposed respecting the opening of the partition, a movable member receiving said wall and reciprocative in the opening of said partition, said movable member being spaced from the inner surface of one of said chambers and provided with an extension at its lower part opposing said partition, the upper portion of said member being freely operative in the opening of said partition and said extension being spaced from the inner surface of its chamber to provide a clearance space therebetween, and means to actuate said member.

6. A dash-pot comprising a hollow shell provided with a transverse partition having an opening dividing the shell into a plurality of communicating chambers, a wall within one of said chambers spaced from the inner surface thereof and axially disposed respecting the opening of the partition, a cup-like piston operative along said wall and provided with a lower laterally disposed extension opposing said partition, the upper portion of the piston being freely operative in the opening of the partition and the extension of the piston being spaced from the inner surface of its chamber to provide a clearance space for the flow of fluid between said surface and said extension, and a rod operative in said wall and connected with the piston to actuate the same.

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