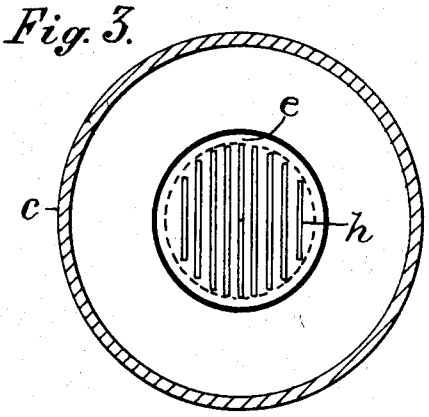
E. G. HEDGES.

ANTIFOULING MUFFLER FOR FLUSH PIPES.

APPLICATION FILED FEB. 14, 1920.

1,387,003. Patented Aug. 9, 1921.

Fig. 3.



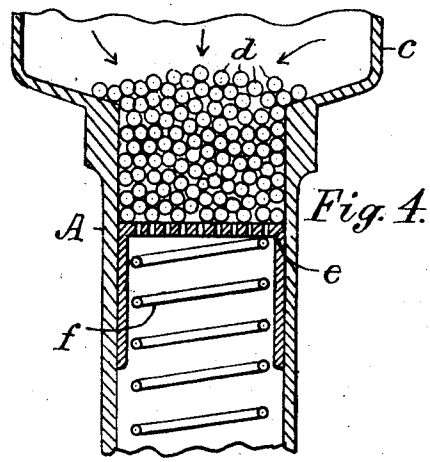


Fig. 4.

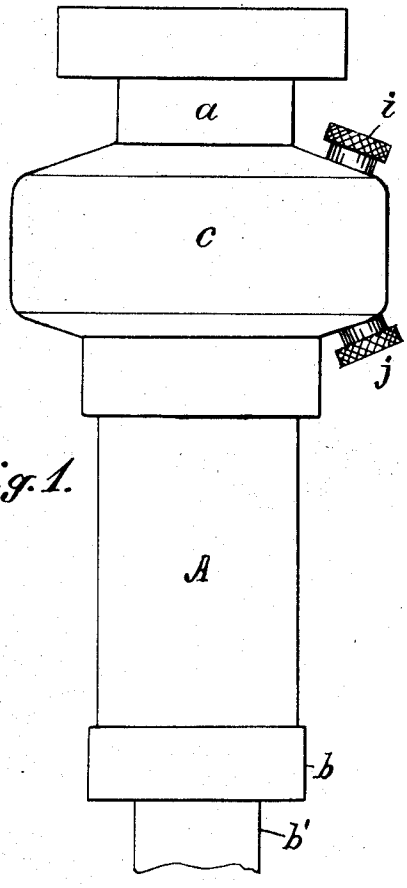


Fig. 1.

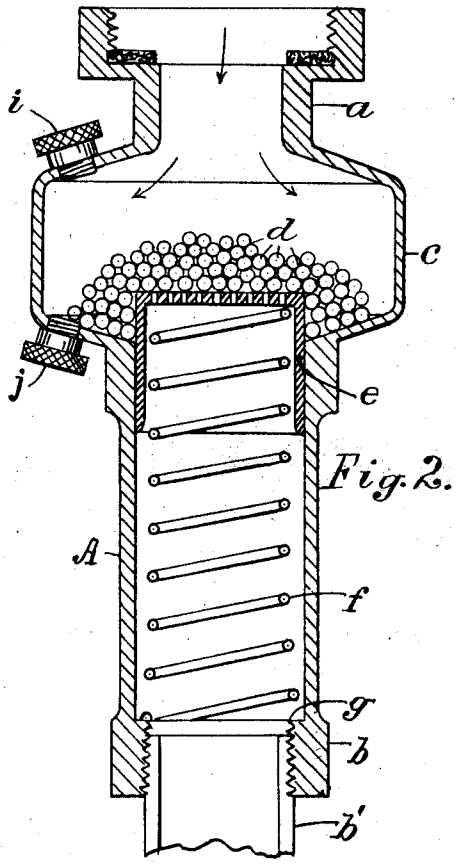


Fig. 2.

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per Thos. S. Crane, Atty.

UNITED STATES PATENT OFFICE.

EDWARD G. HEDGES, OF NEWARK, NEW JERSEY.

ANTIFOULING MUFFLER FOR FLUSH-PIPES.

1,387,003. Specification of Letters Patent. Patented Aug. 9, 1921.

Application filed February 14, 1920. Serial No. 358,740.

To all whom it may concern:

Be it known that I, EDWARD G. HEDGES, a citizen of the United States, residing at 271 Belleville avenue, Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Antifouling Mufflers for Flush-Pipes, fully described and represented in the following specification and the accompanying drawing, forming a part of the same.

The present invention relates to the muffler used by plumbers for insertion in flush-pipes to prevent the noise naturally caused by the flow of water therein.

The invention is particularly adapted for such mufflers as are operated with water of high pressure which generates a current of high velocity and necessarily produces a great vibration and noise in the pipe.

The present invention is therefore especially useful in cases where a flush-pipe is operated without a flush-tank, being connected directly to the high pressure service pipe.

The invention utilizes the property of granular material to diffuse vibrations and thus prevent noise which such vibrations would cause.

If a mass of such material be merely interposed in a current of water it operates to arrest and accumulate any matter suspended in the water-current, and ultimately becomes clogged by the accumulation of such matter, so as to materially retard the water-current and interfere with the flushing operation of the water.

The object of the present invention is to utilize such granular material to diffuse and correct the vibrations, and at the same time avoid the clogging of such granular material by any deposit of the suspended matter. The device may thus be used in connection with filters as well as with plumbers' flush-valves.

This object is attained by providing a tubular casing with a chamber in which the granular material can be inserted in the path of the water-current, and supporting such material upon a perforated plunger resting upon a yielding spring so as to move downward when the water-current is passing through the muffler, and rise again to its initial position when the current is shut off.

Such a movable support for the granular material operates to agitate and displace its particles after each actuation of the muffler, and thus loosen and dislodge any matter arrested by the material.

Such dislodgment of the matter permits the water-current to carry it out of the muffler at each actuation, and thus maintain the efficiency of the granular material as a muffling agent.

The nature and operation of the invention will be understood by reference to the annexed drawing, in which Figure 1 is a side elevation of a muffler provided with the improvement; Fig. 2 is a vertical section of the muffler with the feed and vent-plugs upon the right-hand side of the chamber; the view in Fig. 2 being taken from the rear side of Fig. 1 showing the feed and vent-plugs at the left-hand side of the chamber; Fig. 3 is a transverse section across the enlarged chamber; and Fig. 4 is a section like the middle portion of Fig. 2 with the plunger support forced downward by the water-current.

a designates the inlet-end of the tube which forms the casing A of the muffler and is connected to the flush-valve, and *b* is the outlet-end of the tube connected to the flush-pipe *b'*. The enlarged chamber *c* is formed adjacent to the inlet *a*, and affords increased space for the granular material, and thus displaces and shifts its particles as it spreads out in the chamber.

A perforated support for the granular material *d* is formed by a plunger *e* fitted movably within the casing *c*, below the chamber and is supported upon a spiral spring *f* which extends downward in the casing to a shoulder *g* and operates normally to project the plunger above the bottom of the chamber, as shown in Fig. 2.

The plunger is shown in Figs. 2 and 3 with numerous perforations *h* adapted to permit the passage of the water-current while supporting the granular material *d* in the bottom of the chamber.

The granular material is shown in the form of shot at *d* in Figs. 2 and 4, resting upon the top of the perforated plunger *e*, and when the water-current is admitted to the muffler it is impelled directly against the shot and its velocity presses the plunger downward in opposition to the spring *f*, thus entirely removing the support below the shot and causing the same to be displaced in following the plunger downward.

At the end of each actuation of the muffler the cessation of the water-current per-

mits the spring to push the plunger up into the chamber, as shown in Fig. 2, thus causing the shot to roll off of the top of the plunger which displaces all of the particles so as to rub them against one another, and break up and dislodge any matter which has been deposited thereon by the water.

A feed-plug *i* and a vent-plug *j* are screwed removably into the upper and lower sides of the chamber to introduce the charge of shot thereto, or to withdraw the shot therefrom, so as to proportion the volume of shot to the velocity of the water in any particular instance.

A sufficient charge of the shot serves to wholly diffuse the vibrations caused by the passage of the water-current, and if this maximum charge is exceeded it causes an unnecessary retardation of the water-current through the muffler and thus impairs its efficiency as a flushing agent.

The use of the plugs *i* and *j* enables an operator to insert and withdraw the granular material while the muffler is connected in a working position in a flush-pipe, and thus to proportion the quantity of granular material to the exact requirement of the water-current.

It is obvious that the essential feature of the invention is the provision of means for agitating and displacing the granular material by the normal operation of the muffler in which the current is intermittently operated, which causes a yielding support like the plunger *d* to be depressed by the water-current and restored to its initial position when the water-current is cut off.

It is therefore immaterial what means be employed to displace the particles of granular material, provided they are so supported after each displacement as to lie in the path of the water-current and thus arrest its vibration.

It is obvious that the only function of the perforated movable support in the chamber is to push the charge of granular material in the chamber above the level of its bottom, and any form of such perforated support may therefore be employed which performs this function.

It will be observed by reference to Figs. 2 and 4 that the plunger support normally projects into the bottom of the chamber and thus holds the granular material therein; but when the current of water flows through the chamber it encounters a resistance from the plunger and presses the plunger support downwardly into the bore of the casing, leaving above its upper end a cavity into which the granular material rolls, thus rubbing the particles against one another and cleansing them as desired.

During the flushing movement of the water-current the granular material is contained chiefly in the bore of the casing and the water is compelled to pass through the interstices between such material, and it is this subdivision of the current and the movement of the particles of material upon one another that prevents the vibrations which would be caused by a rapidly moving unobstructed current of water.

The shot *d* shown herein for the muffling material is only an example of any kind of granular material that may be convenient to use, as gravel, coarse sand, glass balls, or any other suitable substance which forms interstices through which the current of water can pass without material obstruction, and which can be displaced automatically (to cleanse the particles) by the intermittent passage of the water-current through the muffler.

Having thus set forth the nature of the invention what is claimed herein is:

1. An anti-fouling device having a casing and a perforated support movable in the casing with muffling material carried upon such support, and means to sustain the support yieldingly and to restore it to its initial position after yielding.

2. An anti-fouling muffler having a casing with inlet and outlet at opposite ends and an enlarged chamber near its inlet, a perforated yielding support movable in the casing below the chamber, and granular muffler material in the chamber resting upon such support.

3. An anti-fouling device having a casing with an enlarged chamber, a perforated support movable in the casing below the chamber, granular muffler material in the chamber resting upon the said support, and means to sustain the support yieldingly, said means operating to displace the material at each actuation of the muffler and to then restore it to its initial position after such yielding movement.

4. An anti-fouling device having a casing with an enlarged chamber, a perforated support movable in the casing below the chamber, granular muffler material in the chamber resting upon the said support, and a spring pressing the support normally into the chamber.

5. An anti-fouling muffler consisting of a tubular casing with enlarged chamber, a seat for a spiral spring in the casing below such chamber, a perforated plunger movable in the casing below the chamber, a spring between the seat and the plunger and holding the plunger normally in the chamber, a charge of granular material in the chamber supported upon the plunger, and water connections at the ends of the casing, whereby the water-current flows first into the chamber and thence through the granular material and the plunger support and compresses the spring in its passage through the muffler.

6. An anti-fouling muffler having a casing with inlet and outlet at opposite ends and an enlarged chamber near its inlet, a perforated yielding support movable in the casing below the chamber, granular muffler material in the chamber resting upon such support, and feed-plug and vent-plug screwed respectively into the upper and lower sides of the chamber to introduce and withdraw the granular material therefrom.

In testimony whereof I have hereunto set my hand.

EDWARD G. HEDGES.