Jan. 7, 1941. W. K. FLAVIN 2,228,076

SOUND INSULATING FLUID CONDUCTOR

Filed Feb. 21, 1939

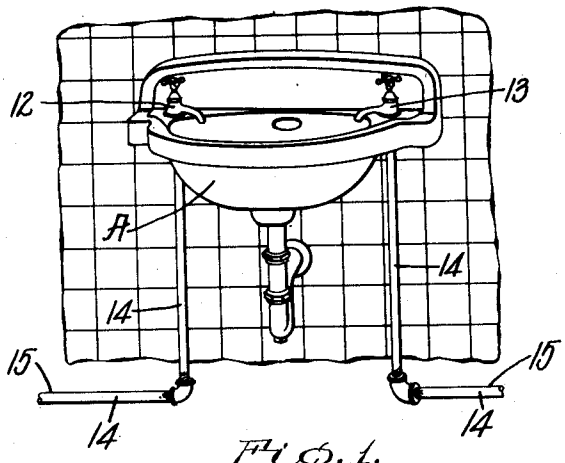


Fig. 1.

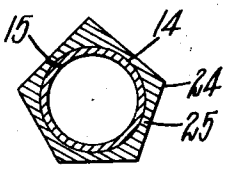


Fig. 8.

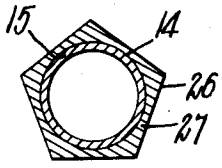


Fig. 9.

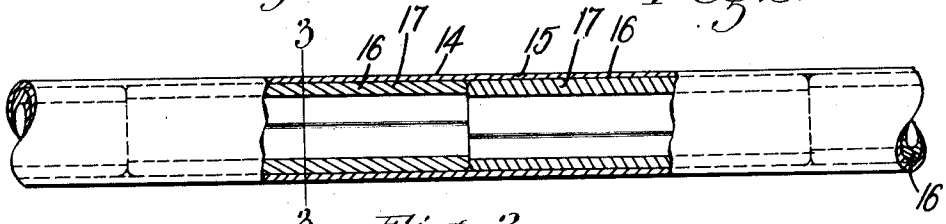


Fig. 2.

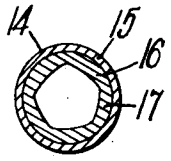


Fig. 3.

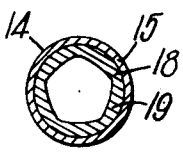


Fig. 4.

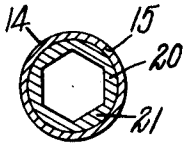


Fig. 5.

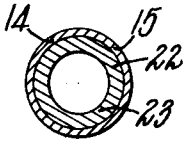


Fig. 6.

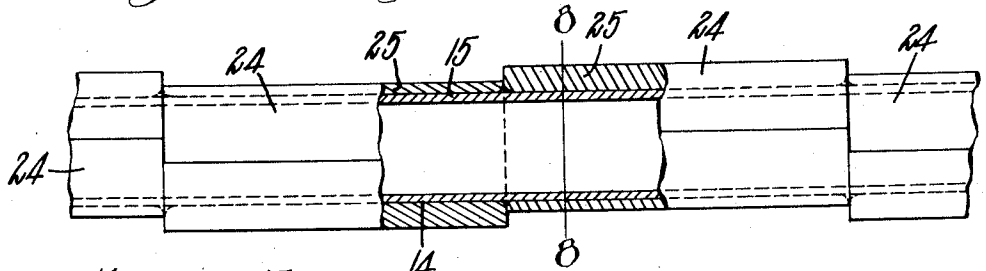


Fig. 7.

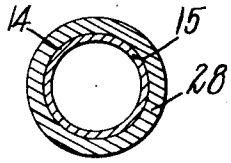


Fig. 10.

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SOUND INSULATING FLUID CONDUCTOR

Walter K. Flavin, Arlington, Mass.

Application February 21, 1939, Serial No. 257,625

3 Claims. (Cl. 181—33)

This invention relates to improvements in sound insulating fluid conductors.

In many private dwellings, hotels and public buildings objectionable noises emanate from the plumbing fixtures when the latter are operated, and these noises are often transmitted for a considerable distance along the pipes leading to or from the fixtures and are audible in rooms other than those in which the fixtures are located to the great annoyance of the occupants of these rooms.

The object of this invention is to provide an effective sound insulating fluid conductor for plumbing and like installations, said conductor forming a part of the fluid supply pipe leading to the various plumbing fixtures and being interposed in the system at strategic locations therein, preferably adjacent to said fixtures, said conductor having a plurality of sleeves of novel construction embodied therein which contact with the conductor wall in a manner to effectively reduce the vibratory quality of the metallic conductor and to absorb the sound waves passing along the conductor wall, thereby preventing the vibrations or waves from continuing along the conductor to points in the plumbing system where they may cause annoyance.

The invention consists of a sound insulating fluid conductor as set forth in the following specification and particularly as pointed out in the claims.

Referring to the drawing:

Fig. 1 represents a perspective view of a typical plumbing installation, including sound insulating fluid conductors embodying my invention interposed in the plumbing system adjacent to hot and cold water faucets.

Fig. 2 is a longitudinal sectional elevation illustrating a portion of a sound insulating fluid conductor and disclosing several sound absorbing sleeves mounted within a fluid conducting pipe in circumferential contact therewith.

Fig. 3 is a detail transverse section through the sound insulating fluid conductor as taken on the line 3—3 of Fig. 2.

Figs. 4, 5 and 6 are sectional views similar to Fig. 3, but illustrating modified embodiments of the invention.

Fig. 7 is a longitudinal sectional elevation illustrating another modified embodiment of my invention in which the sound absorbing sleeves are mounted upon the exterior of a fluid conducting pipe in circumferential contact therewith.

Fig. 8 is a detail transverse section taken on the line 8—8 of Fig. 7.

Figs. 9 and 10 are sectional views similar to Fig. 8 illustrating other modified embodiments of the invention.

Like numerals refer to like parts throughout the several views of the drawing.

In the drawing, referring particularly to Figs. 1, 2 and 3, A represents a plumbing fixture which, in this instance, is a wash bowl, although the fixture may be a bathtub, flush tank, reducing valve, water meter, pump, or any other apparatus from which water is discharged or through which water or any other fluids pass, and in which various forms of noises develop as a result of the discharge or flow of said fluids. The wash bowl A is provided with hot and cold water faucets 12 and 13 respectively, both of which have a sound insulating fluid conductor 14 constructed in accordance with the teachings of this invention communicating therewith and constituting a portion of the water supply pipe for each faucet. In the plumbing installation illustrated in Fig. 1 the fluid conductor is attached direcly to the faucets and extends therefrom for a suitable distance determined by the type and character of the fixtures. A length of the conductor may, however, be interposed at strategic locations in the plumbing system in a manner to absorb noises emanating from a group of fixtures.

The construction of the sound insulating fluid conductor 14 is as follows: Inserted in a length of metallic fluid conducting pipe or tubing 15 of any well known type, in co-axial relation therewith, are a plurality of relatively short sleeves 16, preferably formed of metal and having an easy slide or close running fit within said pipe as defined in Machinery's Handbook for machine shop and drafting room, 10th edition, 1939, Eric Oberg and F. D. Jones, editors, page 1132, together with tables for clearances for particular diameters as disclosed on page 1129. The sleeves 16 are rounded or bevelled at their ends as illustrated in Fig. 2, and said sleeves may or may not abut together end to end, but preferably they abut as illustrated in Fig. 2. The sleeves 16 are provided with walls of uneven area and thickness in cross-sectional contour, thereby providing an uneven weight distribution throughout the length of the sleeves. In Fig. 3, five intersecting walls 17 of unequal area and thickness are illustrated, but it will be clearly understood that the actual number of these walls is immaterial as long as an uneven distribution of weight is obtained. Furthermore, an important consideration in this invention is that the combined

weight per foot of the sleeves exceeds the weight per foot of the fluid conducting pipe carrying said sleeves.

The action of the sleeves 16 in easy sliding circumferential contact with the interior wall of the pipe 15 is to reduce the vibratory quality of the metallic pipe, and to absorb the sound waves passing along said pipe within themselves, thus preventing said waves from continuing along the pipe wall to points in the fluid conducting system where they may cause annoyance. Although the sleeves 16 abut one with another within the pipe 15, said sleeves do not necessarily align one with another, and preferably they are not positioned in alignment.

In Figs. 4, 5 and 6 other embodiments of my invention are illustrated wherein sound absorbing sleeves formed in accordance with the teachings of this invention, but which may vary somewhat in effectiveness, are mounted within fluid conducting pipes 15 to have an easy slide or close running fit therein.

In Fig. 4 a sleeve 18 is provided with an odd number of intersecting walls of equal area and uneven thickness in cross-sectional contour, thereby providing an uneven weight distribution throughout the sleeve.

In Fig. 5 a sleeve 20 having an easy slide or close running fit within a pipe 15 is provided with an even number of intersecting walls of equal area and uneven thickness in cross-sectional contour, thereby providing an uneven weight distribution throughout the sleeve.

In Fig. 6 a cylindrical sleeve 22 is mounted within the interior of a pipe 15 to have an easy slide or close running fit therein. In this embodiment of the invention the weight distribution is even, but the sleeves have the ability of absorbing the sound vibrations to a certain degree because of their easy slide fit within the pipe 15, and because of their superiority of weight.

In Figs. 7 and 8 another embodiment of my invention is illustrated wherein a plurality of relatively short metallic sleeves 24 are mounted end to end upon the periphery of a pipe or tube 15 in co-axial relation therewith and to have an easy slide or close running fit therewith. The sleeves 24 are provided with an irregular exterior surface preferably consisting of a plurality of intersecting longitudinally extending walls 25 of uneven area and thickness, thereby creating an uneven weight distribution throughout the sleeve.

In Fig. 8, five intersecting walls 25 of unequal width are illustrated, but it will be understood that the number of said walls may vary if desired. The important consideration is the easy slide or close running fit of the sleeves 24 upon the pipe 15, the uneven weight distribution of the sleeves, and the superiority of weight per foot of the sleeves over the weight per foot of the pipe.

In Fig. 9 a sleeve 26 has an easy slide or close running fit upon a pipe 15 and is provided with an odd number of intersecting walls 27 of equal area but uneven thickness, thereby providing an uneven weight distribution throughout the sleeve.

Fig. 10 illustrates a cylindrical sleeve 28 mounted to have an easy slide or close running fit within the exterior of a pipe 15.

The action of the various embodiments of the invention illustrated in Figs. 7, 8, 9 and 10 is substantially the same as that of the corresponding structures illustrated in Figs. 2, 3, 4 and 6 respectively.

In all of the embodiments of the invention the weight per foot of the sleeves exceeds the weight per foot of the fluid conducting pipe carrying said sleeves, and in each instance the sleeves have an easy slide or close running fit within the pipe carrying said sleeves as defined in the authority quoted.

I claim:

1. A sound insulating fluid conductor of the character described comprising, in combination, a metallic fluid conducting pipe, and a sleeve carried by said pipe in co-axial relation therewith and having an easy slide fit therewith, the weight per foot of said sleeve exceeding the weight per foot of the pipe carrying said sleeve.

2. A sound insulating fluid conductor of the character described comprising, in combination, a metallic fluid conducting pipe, and a sleeve of unsymmetrical cross-sectional area carried by said pipe in co-axial relation therewith and having a full circumferential contact and easy slide fit therewith, the weight per foot of said sleeve exceeding the weight per foot of the pipe carrying said sleeve.

3. A sound insulating fluid conductor of the character described comprising, in combination, a metallic fluid conducting pipe, and a sleeve mounted lengthwise within said pipe and having an easy slide fit therein, the weight per foot of said sleeve exceeding the weight per foot of the pipe carrying said sleeve.

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