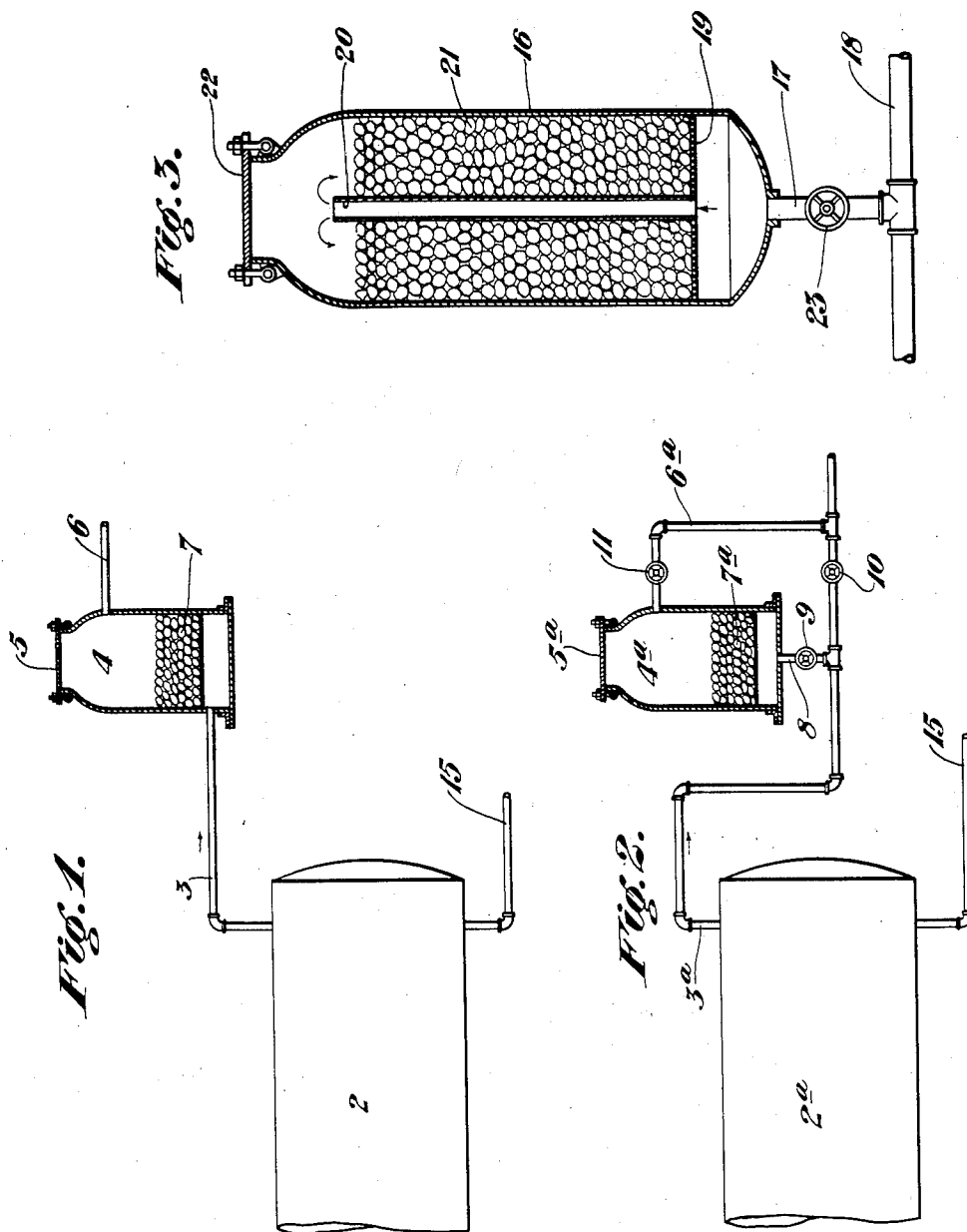


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PROTECTIVE COATING FOR WATER DISTRIBUTING
SYSTEMS AND METHOD OF FORMING SAME
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PROTECTIVE COATING FOR WATER-DISTRIBUTING SYSTEMS AND METHOD OF FORMING SAME.

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To all whom it may concern:

Be it known that I, FRANK N. SPELLER, a citizen of the United States, and resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Protective Coatings for Water-Distributing Systems and Methods of Forming Same, of which the following is a specification.

This invention relates to protective coatings for water distributing systems and the method of forming such coatings, and has for one of its objects the provision of a coating of this class that will decrease and prevent corrosion of the metal parts of water distributing systems.

Another object of the invention is the provision of a coating of this class that may readily be applied to existing systems without dismantling such systems or the addition of costly equipment.

A further object of this invention is the provision of a coating of this class that will have the advantages of low initial cost and low upkeep cost.

It is well known in the art to which this invention belongs that water distributing systems become corroded or rusted in use, and after a comparatively short time such corrosion becomes so extensive as to be objectionable in that it discolors the water passing through the system and makes it undesirable for use, especially for domestic purposes. Extensive corrosion also destroys the piping and other metal parts of the system.

The present invention provides for coating the surfaces of the piping and other metal parts of the water distributing system with a layer or film of protective matter. This coating or deposit while not permanent is adapted to be constantly forming in the system and to be continually deposited on any exposed metal surfaces with which the water comes in contact. The coating or deposit is substantially impervious to water and will decrease or prevent corrosion of the metal parts of the systems in which it is used.

In the drawings, Figure 1 shows one form of apparatus for carrying out this invention.

Figure 2 is a slightly modified form of apparatus.

Figure 3 is a still further modified form or apparatus.

In Figure 1 the numeral 2 designates a hot water tank having an outlet pipe 3 leading to the lower end of a container 4. The container 4 has a detachable cover 5 and is provided with an outlet pipe 6 adjacent its upper end. A quantity of slightly soluble material 7 in solid form is placed in the container 4, through which the water passes when flowing through the container. It will be understood, of course, that the outlet pipe 6 leads to any suitable distributing system, which may have a return line 15 to tank 2, thus causing circulation of water and deposit on all parts of the tank and piping in contact with the water.

In Figure 2 a hot water tank 2^a is shown having an outlet pipe 3^a leading to a distributing system or the like (not shown). The pipe 3^a is provided with a branch 8 having a valve 9 intermediate its ends and entering the bottom of a container 4^a. A valve 10 is provided in the pipe 3^a at a point beyond the branch 8 for a purpose to be described. The container 4^a has a detachable cover 5^a and is provided with an outlet pipe 6^a adjacent its upper end, which connects with the pipe 3^a at a point beyond the branch 8, and has a valve 11 intermediate its ends. The container 4^a like the container of Figure 1 has a quantity of soluble material 7^a therein in solid form. When it is desired to form a coating in the system using the apparatus of Figure 2, the valve 10 in the pipe 3^a is closed and the valves 9 in branch 8 in pipe 6^a are opened, thus causing the water to flow through the material in the container 4^a, and if it is desired to use water without applying the coating the valves 9 and 11 are closed and valve 10 opened so that the water will flow direct from the tank 2^a to the distributing system.

It will be understood that if desired valves 9, 10 and 11 may all be open at the same time and adjusted so as to get a regulated flow through the tank 4^a, or the valves 9 and 10 may be open and the valve 11 closed, still allowing a small amount of dissolved material to be carried into the distributing system.

In Figure 3 a modified container or tank 16 for holding the material to be dissolved in the water is shown. The tank or con-

tainer 16 is adapted to have its pipe leg 17 connected to a pipe 18 leading from any suitable source of supply (not shown) such as a water heater, and leading to suitable service lines or other sources (not shown). The container 16 has a perforated horizontal wall or partition 19 adjacent its lower end, and a tubular member or stand pipe 20 opens centrally through the wall 19 and extends upwardly within the tank an appreciable distance. The container 16 has a quantity of soluble material 21 for forming the pipe coating therein, which is held above the bottom of the container by the wall 19. The container 16 has a detachable cover 22 and a valve 23 is provided in the pipe 17 to regulate the flow of water into and out of the container. In operation the water will flow upward through the pipe 17 into the space below the wall 19, thence upward through the pipe 20 where it will be discharged onto the material 21 and flow through the same. As the water flows through the material 21 it will dissolve and take up a certain amount of such material. This water or solution with its load of dissolved material is heavier than the water in the system and will therefore settle or flow downward through the tank or container 16 and pipe 17 into the pipe 18 where it will mix with the water flowing directly through the distributing system where it will react with other matter in the system to form a protective coating as will be hereinafter more fully described.

The above apparatus is only illustrative of how my invention may be carried out and it will be understood that various other combinations of apparatus may be employed in carrying out the following method.

The method of applying the coating to water distributing systems consists in passing the water, either hot or cold, through a body of soluble material which is preferably in the solid form and then passing the water, which carries a quantity of the material through which it passed in solution, through the distributing system where the material combines with the compounds of iron or zinc, formed by corrosion of the metal parts of the system, to form a deposit or film like coating on the metal parts of the system.

For example, colloidal ferric hydrate (rust) is formed by the indirect oxidation of the metal parts of the system by the free oxygen dissolved in the water and is present in all water which has been in contact with iron for some time. Colloidal ferric hydrate and silicic acid react in water forming a deposit of precipitated ferric hydrate mixed with silica which will adhere to the metal parts of a water system. Therefore, anhydrous sodium silicate may be used to form a coating. The coating thus formed is sub-

stantially impervious to water and protects the metal parts of the system on which it is deposited. Calcium carbonate may also be precipitated with ferric hydrate to form a coating on the metal parts similar to silicic acid.

As stated before, this coating is not permanent and, therefore, water containing the material in solution must be either at intervals or continually passed through the system to renew the coating which has been worn off the metal by the constant flow of water through the system.

The soluble material used may be either anhydrous sodium silicate, calcium silicate, magnesium oxide, or any other suitable material that will react with the ferric hydrate and other compounds present in the water to form a coating on the metal parts. However, it will be understood that such material should be of a character and solubility as not to render the water objectionable in any way for domestic use.

I claim:—

1. The method of forming a protective coating on the metal parts of a water distributing system which comprises passing at least a portion of the water of the system through a bed of a soluble solid compound of a character that will react with other compounds usually present in water after having contacted with metal to form a film like coating on the metal parts of said system.

2. The method of forming a protective coating on the metal parts of a water distributing system which comprises passing the water through a body of soluble silicate and then passing said water through the system, so that the silicate taken into solution by said water may react with other compounds usually present in water after having contacted with metal in forming the coating on said metal parts.

3. The method of forming a protective coating on the metal parts of a water distributing system which comprises passing the water through a body of anhydrous sodium silicate in solid form to cause said water to take up a quantity of said silicate, then passing the impregnated water through the system so that the silicate taken up by said water may react with the hydrates and other compounds in said system in forming the coating on the metal parts of said system.

4. The combination with the metal surfaces of a water distributing system, of a protective coating comprising the reaction products of a metal hydrate and a siliceous material.

5. The method of forming a protective coating on the metal parts of a water distributing system which comprises passing at least a portion of the water to be passed

through the system through a bed of siliceous material of a character that will react with the products of corrosion usually present in the water of such systems, to
5 form a film-like coating on the metal parts of said system, and then passing said water through the system so that the siliceous material taken into solution by said water may react with the products of corrosion
10 in the water and form a film-like coating on the metal parts of the system.

6. The method of forming a protective coating on metal having contact with water, which consists in passing at least a portion
15 of the water to come into contact with the metal through a bed of soluble solid compound of a character that will react with the products of corrosion usually present in water having contact with metal, to form
20 a film-like coating on the metal, and then

passing said water into contact with the metal to be protected so that the compound taken into solution by the water may react with the products of corrosion in the water to form a film-like coating on the metal. 25

7. The method of forming a protective coating on metal having contact with water, which comprises passing at least a portion of the water to be contacted with said metal through a body of soluble silicate and then
30 passing said water into contact with said metal, so that the silicate taken into solution by said water may react with other compounds usually present in water after having contacted with metal, in forming the
35 coating on said metal.

In testimony whereof I have hereunto signed my name.

FRANK N. SPELLER.