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PROCESS OF PROTECTING PIPE FROM CORROSION.

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Our invention relates to a process of treating pipe and other fluid conducting apparatus from the attack of corrosive liquids or gases. It has particular application to sulphur mining and contemplates the forming of a protective coating on the conducting pipes.

In subterranean sulphur mining the producing formation is usually found in so-called sulphur "domes." Hot water, steam or other fusing agent raised to a temperature above that of the fusion of sulphur is pumped through pipes into the mine, where it comes into contact with and loses a part of its heat in fusing the sulphur, which may then be raised to the surface in its liquid state. The sulphur occurs in an area originally flooded with cold water and when the sulphur fusion fluid is introduced, a large amount of the heat contained therein is used up in overcoming the effects of the cold water. This adjacent cold water gradually becomes warmed but it is colder than the fusion liquid, and deflects the hot water away from the sulphur, so that the effectiveness of the agent is greatly decreased. It is, therefore, customary to provide mine openings from the surface leading to points adjacent the producing mine, which allow the escape to the surface of water of a temperature below the fusion temperature of the sulphur. These wells are called "bleed" wells and the water escaping at the surface is called "bleed water" or "formation" water. This water is usually hot, but not hot enough to fuse the sulphur. A large amount of heat is wasted by present methods which allow this formation water to flow to waste.

The said waste formation water contains large amounts of corrosive constituents in solution, such as the sulphides and chlorides of sodium, calcium and magnesium, and the sulphates of calcium and magnesium. The sulphides and chlorides are particularly injurious to ordinary iron or steel pipes such as are employed in mining the sulphur. The bleed water cannot therefore be saved and again further heated, because its corrosive action upon the pipes and other surface equipment soon destroys them.

It is an object of our invention to provide a process of treating the fluid conducting pipes employed in sulphur mining, so that the corrosive agents found in the bleed water cannot reach and act upon the metal of the said pipes.

We contemplate the forming of a scale of corrosion-resisting compounds on the surface of the pipes, preferably after the said pipes have been placed in position within the well, although it will be obvious that said pipe can be treated when in any position by our process.

The drawing is a diagrammatic view partly in section illustrating an installation for mining sulphur and with which our process may be carried out.

The drawing illustrates at A the upper end of the pipes employed in conducting fluid into and from the sulphur mine. The outer pipe 1 is a surface casing which is ordinarily extended down into the mine to the upper surface of the cap rock. Within this is set a concentric pipe or casing 2 which has, at its upper end, a branch connection 3, through which any fusion liquid may be pumped into the well for the purpose of communicating heat to the upper sulphur stratum. The fusion liquid pumped in through this pipe passes downwardly through the channel 4 between the said pipe 2 and an inner concentric pipe 5.

The pipe 5 is the pipe for the hot fusion fluid for discharge into the lower sulphur formation and commonly known as bottom water. This water is pumped into said pipe through the branch pipe 6 leading to a source of supply of the heated liquid. Within the pipe 5 is a smaller concentric pipe 7 which also has a connecting pipe 8 at its upper end, and this pipe is the sulphur outlet pipe through which the melted sulphur is discharged at the surface.

A still smaller pipe 9 which comprises an air line extends downwardly through the pipe 7 and serves to discharge air under pressure into the lower end of the sulphur conveying pipe, thus forming an air lift to assist in the raising and discharging of the melted sulphur. Stuffing boxes are employed at the upper ends of the pipes 2, 5 and 7 to form a fluid-tight connection between the adjacent pipes, the stuffing box 10 shutting off the upper end of the pipe 2 and fitting tightly about the next inner concentric pipe 5. A stuffing box 11 packs the space between