

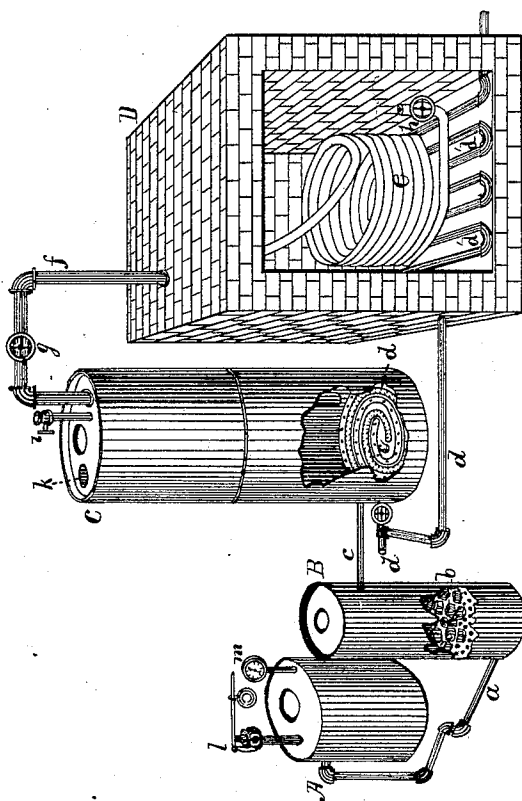
(No Model.)

W. R. PATTERSON.

METHOD OF FILLING TELEGRAPH CABLES WITH INSULATING SUBSTANCES.

No. 248,209.

Patented Oct. 11, 1881.



Witnesses.

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METHOD OF FILLING TELEGRAPH-CABLES WITH INSULATING SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 248,209, dated October 11, 1881.

Application filed May 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, WM. R. PATTERSON, of Chicago, Illinois, have discovered a certain new and useful Method of Filling Telegraph Cables with Insulating Substances, of which the following is the specification.

My invention relates to telegraph-cables which consist of a core of conductors inclosed within a pipe and insulated by some substance which is turned in in the liquid state and allowed to cool and become more or less solidified.

Paraffine, resin, beeswax, and other similar substances, alone and in combination, have been used as an insulating substance. These substances, as is well known, shrink on becoming cold. Thus cavities have been left within the pipe which have caused great trouble. Among the difficulties experienced on account of this shrinkage may be mentioned the increased liability of moisture to penetrate through flaws or joints in the pipe on account of the vacuums thus formed, and also the liability of water to penetrate the cavities to a considerable distance in case a cable should be broken under water. In order to compensate for this shrinkage I charge the melted paraffine or other insulating substance with carbonic-acid gas, or other suitable gas or mixture of gases, and force the liquid thus prepared into the heated pipe around the core, allowing the air to escape from the other end of the pipe through a small orifice, so that the pressure will not be removed from the charged paraffine and allow the gas and paraffine to separate. When filled, the pipe is closed and allowed to cool. The gas is held in very minute bubbles, hardly visible to the naked eye. As the substance cools and contracts these bubbles expand, and the pipe is thus kept entirely full. These bubbles are isolated from each other and uniformly diffused throughout the mass of solid substance. The insulating substance is thus formed into a light, porous, homogeneous mass.

The gas may be generated and forced into the insulating substance in any well-known way, but should be dried, so as not to injure the insulating qualities of the paraffine.

In the drawing I have shown apparatus adapted to carry out my invention.

A is a gas-generator. B is the filter for

drying the gas. C is the tank for holding the melted paraffine, and D is the oven for heating the cable.

The gas is conducted from the generator by pipe *a* to the filter, which contains chloride of calcium *b*, which absorbs any moisture that may be in the gas. The gas thus dried is conducted by pipe *c* into the tank of melted paraffine. The pipe *c* terminates in a coil in the bottom of the tank and is punctured with small holes, so as to allow the gas to escape and diffuse itself throughout the melted wax. The wax is melted by means of the steam-pipe *d*.

The drying-oven is also heated by means of the steam-pipe, which may be arranged in coils *d'*.

The coil of cable *e* is placed in the oven. One end of the cable is connected with pipe *f*, which extends toward the bottom of the tank of paraffine.

I provide a stop-cock, *g*, for opening and closing the pipe *f*, and a stop-cock, *h*, for regulating the vent at the end of the cable. The blow-off cock *i* and tube *k*, for letting in a thermometer, may be arranged as shown on the tank.

The safety-valve *l* and gage *m* may be provided for the generator.

The operation of the apparatus is too simple to require further description. When the cable is filled with the melted insulating substance charged with gas it is closed and allowed to cool. The interstices between the pipe and the conductors of the core being thus filled with a homogeneous mass of insulating substance, the cable may be transported to any distance and uncoiled in the place where it is wanted.

The higher the degree of heat to which the substance is raised the more will the substance shrink in cooling, and the greater will be the pressure required to keep it charged with gas. I therefore prefer to charge the substance and force it into the cable at a temperature but little above the melting-point.

If the core of conductors consists of insulated wires they should be dried and soaked in an insulating substance, like paraffine, after which the covering should be compressed in any well-known way, so that the insulating substance may thoroughly fill the pores of the fibrous

covering; otherwise air would be left in the cable, and in case of injury to the cable water might penetrate to a considerable distance.

I claim—

- 5 1. The method of filling telegraph-cables with an insulating substance, consisting of pouring into the pipe around the conductors melted paraffine, or its equivalent, charged with gas, whereby the shrinkage of the insu-
10 lating substance resulting from cooling is dis-

tributed throughout its mass, substantially as and for the purpose specified.

2. The telegraph-cable consisting of a pipe and core of conductors, in combination with an insulating substance charged with gas, sub- 15
stantially as and for the purpose specified.

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Witnesses:

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