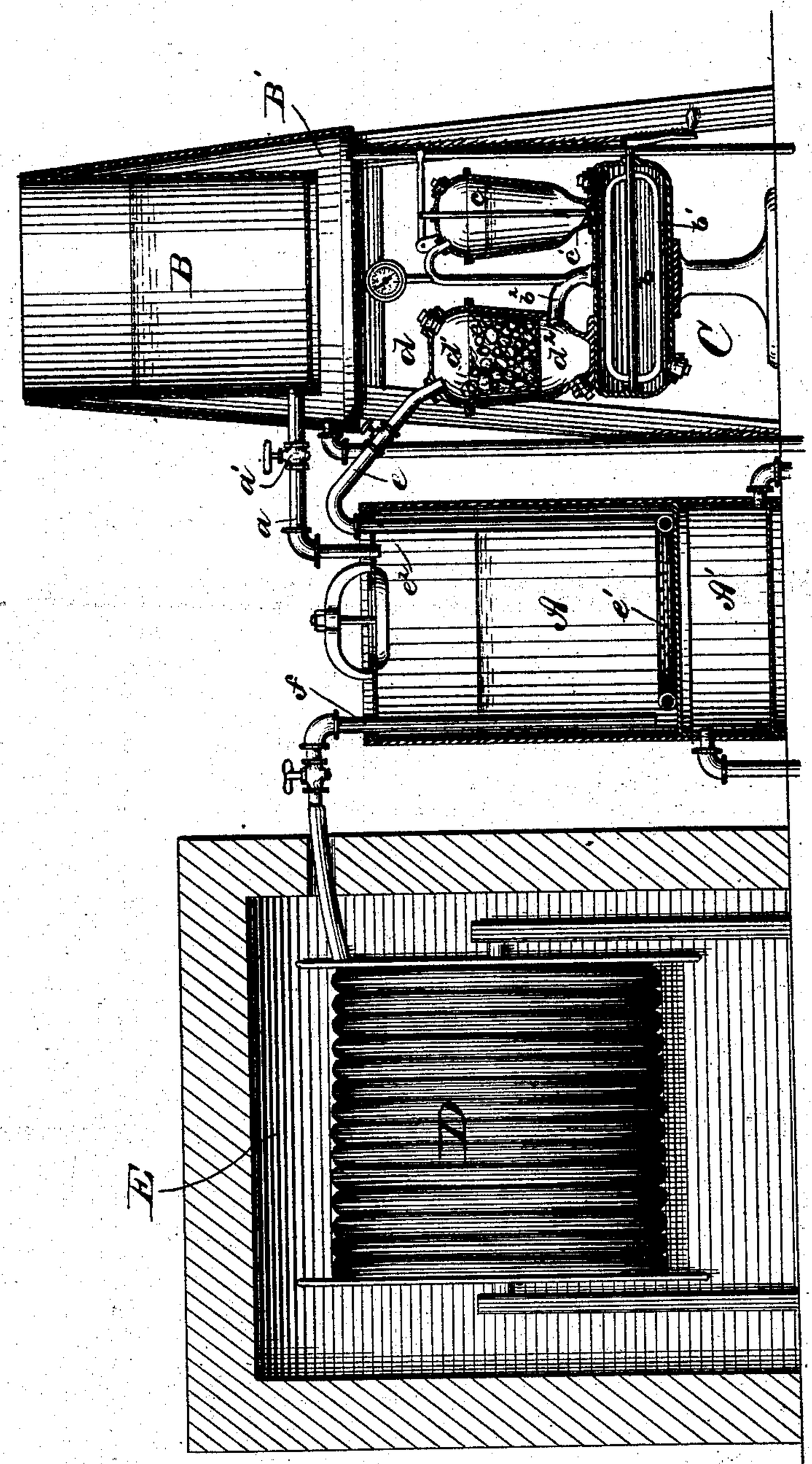
(No Model.)

W. R. PATTERSON.

APPARATUS FOR FILLING CABLES WITH INSULATING SUBSTANCES.

No. 284,226. Patented Sept. 4, 1883.



Attest

Paul A. Staley

Chas. A. Warren.

Inventor

William R. Patterson

By George R. Barton

Attorney

UNITED STATES PATENT OFFICE.

WILLIAM R. PATTERSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN ELECTRIC COMPANY, OF SAME PLACE.

APPARATUS FOR FILLING CABLES WITH INSULATING SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 284,226, dated September 4, 1883.

Application filed February 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. PATTERSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Filling Cables with Insulating Substances, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention herein set forth is designed particularly for filling cables such as described in my Letters Patent No. 248,209, dated October 11, 1881, in which the insulating substance—which consists of an insulator intimately mixed with gas—is introduced into the cable in a molten state under pressure. The insulating substance which I have preferably used in these cables is paraffine mixed with carbonic dioxide. Paraffine and other insulators of this class, as generally manufactured and sold, contain more or less moisture. This is also true of air or gas under ordinary conditions. In order to obtain a high degree of insulation in a cable in which these insulating substances are used, it is essential that this moisture be removed before the insulating substance is introduced into the cable. By my present invention I have sought to provide an apparatus adapted to remove the moisture from insulating substances used for filling cables, said apparatus being also adapted to force the said insulating substance into a cable in a molten state and under pressure.

My invention consists in the construction and combinations of parts, as hereinafter described and claimed.

The accompanying drawing, which forms part of this specification, is a longitudinal sectional elevation view of an apparatus embodying my invention.

In the said drawing, A represents a tightly-closed reservoir, which I term the "charging-chamber," provided at the bottom with a steam chamber or jacket, A'. Connected with the charging-chamber A by a pipe, *a*, provided with a valve, *a'*, is an open reservoir, B, which I term the "evaporating-kettle." This evaporating-kettle B is provided with a steam-jacket, B', which extends to the top of the said kettle, so that when steam is admitted into said steam-jacket the evaporating-kettle is kept evenly heated throughout.

C represents a carbonic-dioxide generator, which consists of a mixing-chamber, *b*, and an acid-chamber, *c*, arranged in the ordinary manner, the mixing-chamber *b* being provided with the customary agitator, *b'*, and the acid-chamber being supplied with a valve, *c'*, adapted to open and close the aperture leading to the mixing-chamber, in the usual way.

From the top of the mixing-chamber *b* a pipe, b^2, leads into a drying-chamber, *d*. This drying-chamber *d* is divided by a perforated false bottom into two compartments, *d'* d^2, the upper one, *d'*, of which contains chloride of calcium or other suitable absorbent. The pipe b^2 from the mixing-chamber *b* enters the lower compartment, d^2. A connection is made from this pipe b^2 to the upper part of the acid-chamber *c*, to equalize the pressure therein, and also to a pressure-gage in the ordinary manner.

From the top of the upper compartment, *d'*, of the drying-chamber *d* a pipe, *e*, leads to the charging-chamber A. This pipe *e*, entering at the top, extends to the bottom of said charging-chamber A, and there connects with a coil of perforated pipe, *e'*.

The cable to be filled is attached at one end to a discharge-pipe, *f*, which leads from near the bottom of the charging-chamber A. This cable is preferably coiled on a reel, D, and placed in an oven, E, during the filling process, the said oven being kept at a temperature above the melting-point of the insulator used.

The operation of filling a cable with this apparatus is as follows: The paraffine or other insulator is placed in the evaporating-kettle B and heated to a temperature above the boiling-point of water. The moisture contained therein will thus be evaporated. The steam-jacket B', extending to the top of the kettle B, keeps the said kettle evenly heated and prevents moisture from collecting on the sides of the kettle and running back into the insulator. When the moisture has thus been all evaporated, the insulator in the evaporating-kettle is drawn off through pipe *a* into the

charging-chamber A. Here, by means of the steam-jacket A′, it is retained at a temperature above the melting-point of the insulator, preferably at 150° to 200°. Gas is now generated in the generator C by allowing the acid contained in the acid-chamber *c* to enter the mixing-chamber *b*, which contains a suitable carbonate, a uniform production of the gas being secured by the agitator *b′*. The gas thus generated passes from the mixing-chamber *b* into the drying-chamber *d*, where it parts with any moisture it contains, and then passes through pipe *e* to the charging-chamber A, entering said charging-chamber through the coil of perforated pipe *e′* in the bottom thereof. The gas is thus forced into the charging-chamber in a thoroughly dry condition, and, rising through the melted insulator, becomes intimately mixed therewith. When sufficient pressure is obtained in the charging-chamber, the discharge-pipe *f* is opened and the insulator, charged with gas, is forced into the cable. The free end of the cable is left open until all the air is expelled, and the insulator issues therefrom. Both ends of the cable are then closed in any suitable manner, and the cable is disconnected and removed from the oven and allowed to cool.

It will be seen that if the insulator were placed directly in the charging-chamber without being first heated, the moisture would be vaporized in said chamber, and, having no means of exit except through the discharge-pipe *f*, would finally be discharged into the cable, with damaging results. Besides, if the insulator in the charging-chamber were heated to a sufficient temperature to vaporize the moisture contained therein, the said insulator would be so expanded that it would not take up the quantity of gas which is desired. The temperature in the charging-chamber is therefore kept just above the melting-point of the insulator therein.

In addition to the perforation in the coil *e′* at the bottom of the charging-chamber, I provide the pipe *e* with one or more small perforations, e^2, above the insulator contained in said chamber. This is for the purpose of equalizing the pressure of the gas in the said pipe *e*; otherwise, if for any reason the pressure should be lowered in the generator, the insulator from the charging-chamber would be forced back into the pipe *e* and the drying-chamber *d*, where it would solidify, causing very serious inconvenience.

I have shown the evaporating-kettle B placed above the charging-chamber A and connected thereto by a pipe, so that the molten insulator will run from the kettle to said chamber. This is the most convenient arrangement; but it is obvious that it may be arranged in any other suitable manner.

All the pipes and connections are provided with suitable cocks or valves, so that the entire apparatus may be kept under perfect control and regulated to suit varying conditions.

The various chambers of the generator are provided with suitable openings for the admission and removal of the material used therein, and all of its parts may be readily cleansed. By reason of the lower compartment, d^2, in the drying-chamber *d*, in case the lower portion of the absorbent becomes saturated, the moisture will trickle down into said lower compartment, and may be readily removed therefrom by an opening provided for the purpose.

I have omitted the ordinary washing-chamber in the generator; but this may be used with beneficial results. If used, it should be placed between the mixing-chamber *b* and the drying-chamber *d*.

I claim as my invention—

1. The combination, with a charging-chamber adapted to retain an insulating substance at a temperature above the melting-point of said insulator, of a generator adapted to supply gas under pressure to said charging-chamber, substantially as specified.

2. The combination, with a charging-chamber provided with a discharge-pipe leading from near the bottom thereof, said charging-chamber being adapted to retain an insulator under pressure at a temperature above the melting-point of said insulator, of an evaporating-kettle, substantially as and for the purpose specified.

3. The combination, with a charging-chamber adapted to retain an insulator in a molten state under pressure, said charging-chamber being provided with a discharge-pipe leading from near the bottom thereof, of a generator adapted to supply gas under pressure to said charging-chamber, said generator being provided with a drying-chamber for removing the moisture from the gas, substantially as and for the purpose set forth.

4. A steam-jacketed charging-chamber provided with a discharge-pipe leading from near the bottom thereof, in combination with a generator adapted to supply gas under pressure to said charging-chamber, substantially as and for the purpose specified.

5. The combination, with a steam-jacketed charging-chamber provided with a discharge-pipe leading from near the bottom thereof, of a steam-jacketed evaporating-kettle, substantially as and for the purpose set forth.

6. In an apparatus for filling cables, the combination of a charging-chamber, an evaporating-kettle, and a gas-generator, substantially as and for the purpose set forth.

7. The combination, with a charging-chamber adapted to retain an insulator in a molten state, of a generator adapted to supply gas under pressure, said charging-chamber and generator being connected by a pipe which extends to the bottom of said charging-chamber, whereby the gas from said generator is caused to pass through the melted insulator in the charging-chamber, substantially as and for the purpose set forth.

8. The combination, with a charging-cham-

ber provided with a discharge-pipe leading from near the bottom thereof, of an evaporating-kettle and a generator, said generator being provided with a drying-chamber, substantially as and for the purpose set forth.

9. The combination of a steam-jacketed charging-chamber provided with a discharge-pipe leading from near the bottom thereof, a steam-jacketed evaporating-kettle placed above said charging-chamber and connected to said chamber by a pipe, *a*, and a generator for generating gas under pressure, said generator being provided with a drying-chamber adapted to remove the moisture from the gas, substantially as specified.

10. The combination of the charging-chamber A, evaporating-kettle B, generator C, and oven E, substantially as and for the purpose specified.

11. The combination, with a charging-chamber adapted to contain insulating substance in a molten state, and a generator for supplying gas under pressure, of a pipe for conveying the gas from the generator to the charging-chamber, said pipe being adapted to discharge the gas under the surface of the insulating substance in the charging-chamber, and being also provided with one or more perforations which open into said charging-chamber above the surface of the insulating substance therein, whereby the pressure of the gas is equalized in said pipe, substantially as and for the purpose set forth.

In witness whereof I hereunto subscribe my name this 8th day of February, A. D. 1883.

WILLIAM R. PATTERSON.

Witnesses:
PAUL A. STALEY,
A. D. COE.