

(No Model.)

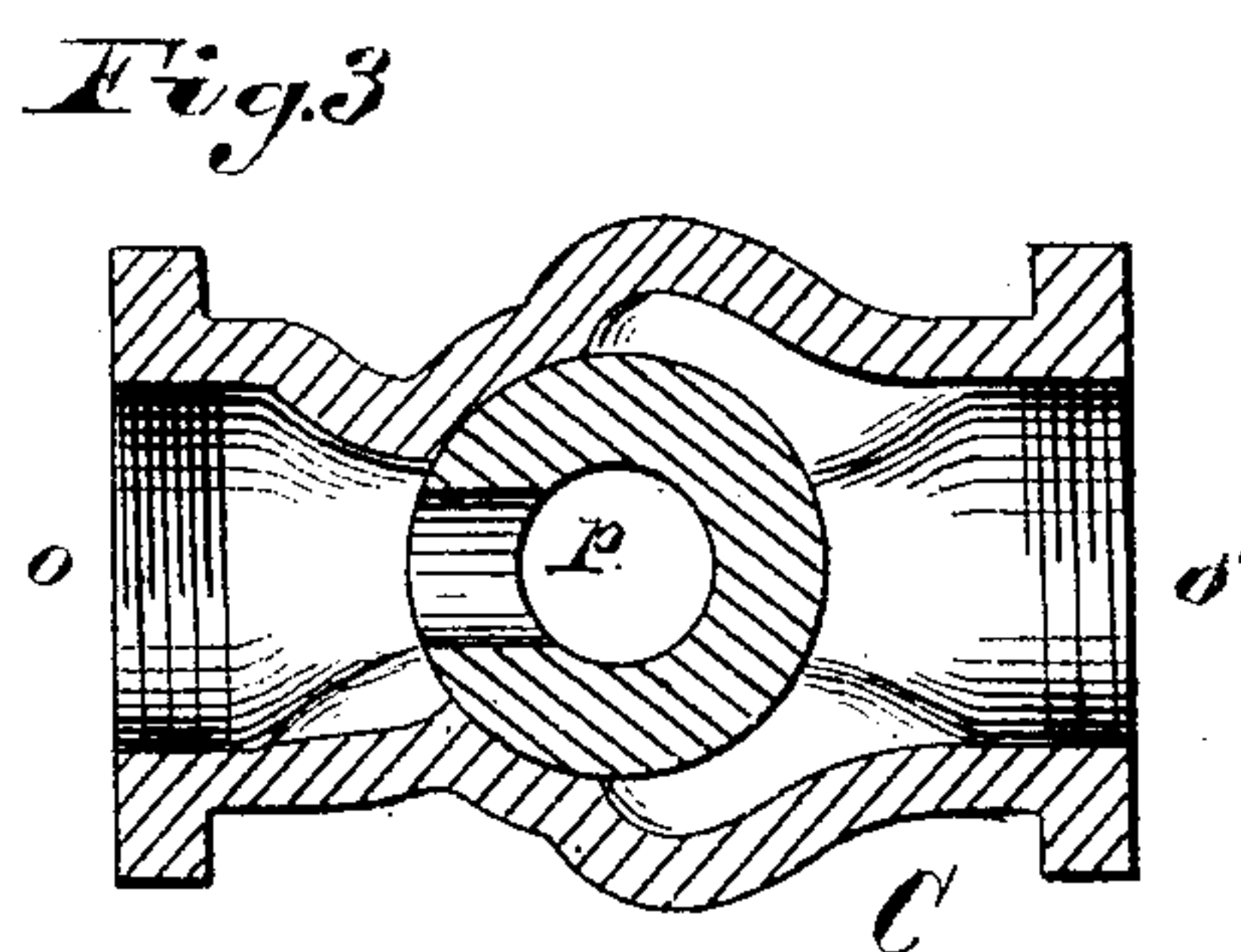
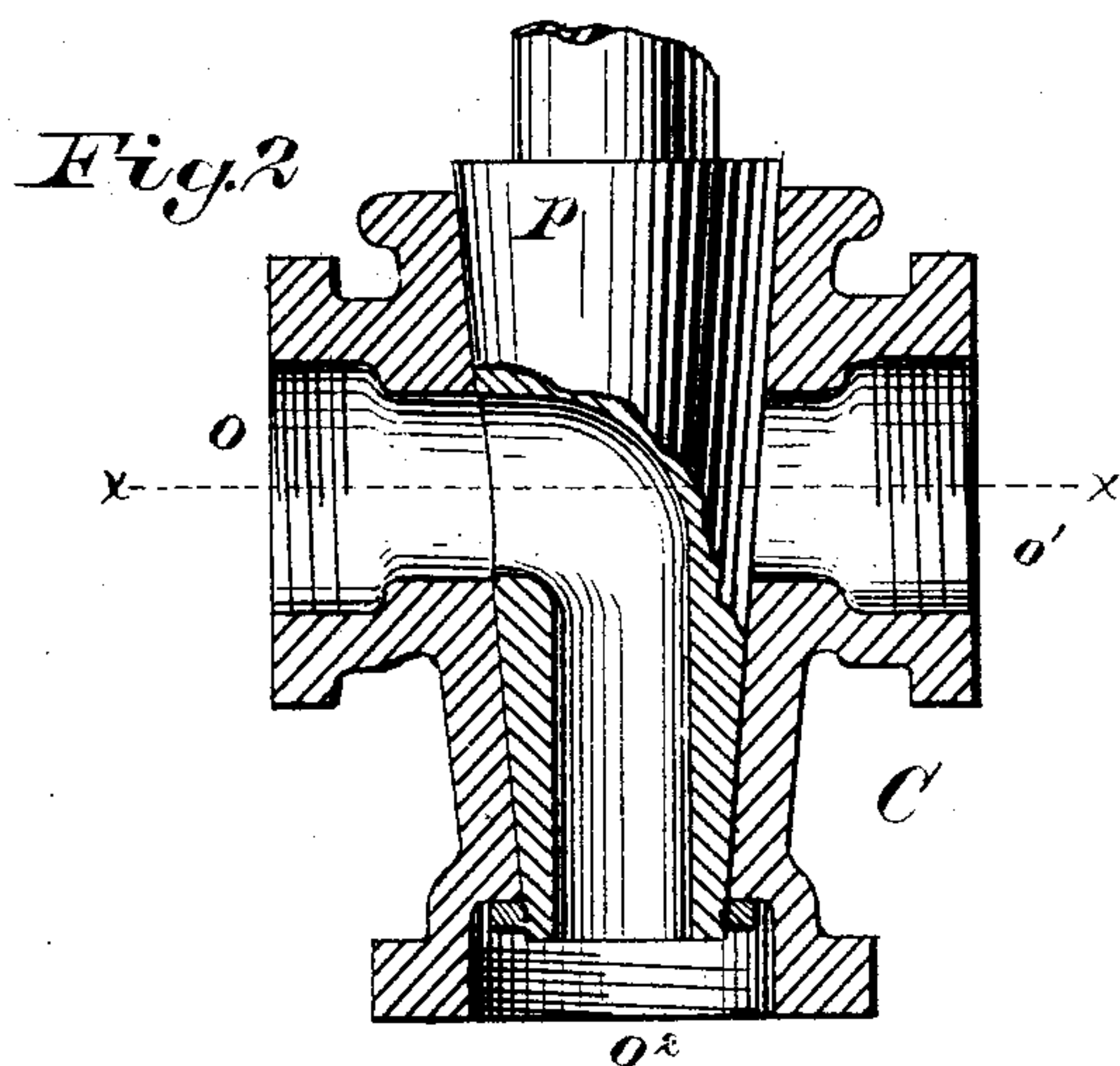
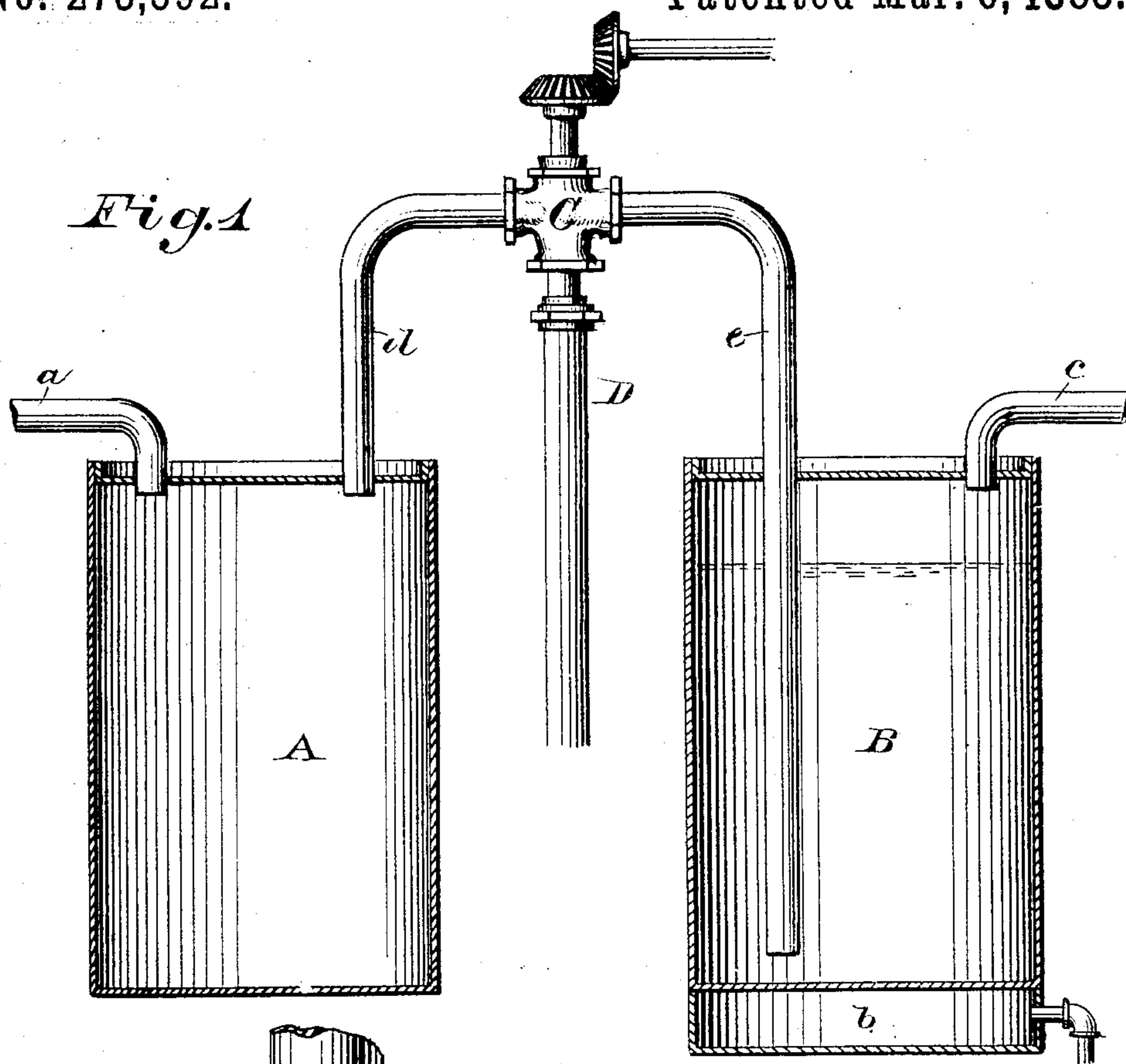
2 Sheets—Sheet 1.

W. R. PATTERSON.

METHOD OF FILLING TELEGRAPH CABLES WITH INSULATING SUBSTANCES.

No. 273,592.

Patented Mar. 6, 1883.



Attest  
*Paul A. Staley*  
*Walter Wilson*

Inventor  
*William R. Patterson*  
By *George P. Barton*  
Attorney

(No Model.)

2 Sheets—Sheet 2.

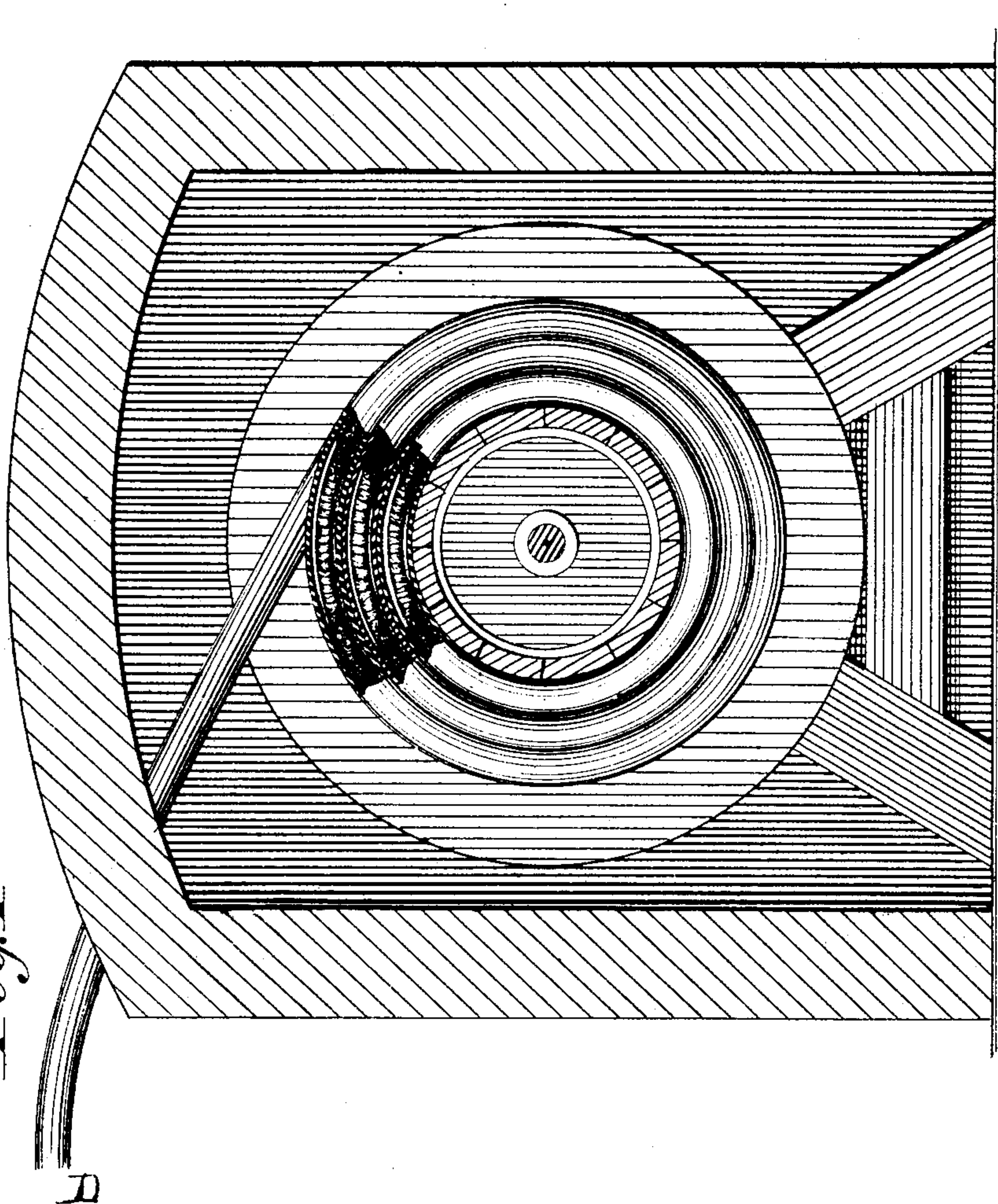
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*Fig. 4*



*Fig. 5*



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# UNITED STATES PATENT OFFICE.

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

METHOD OF FILLING TELEGRAPH-CABLES WITH INSULATING SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 273,592, dated March 6, 1883.

Application filed November 13, 1882. (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 the Method of Filling Telegraph-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 relates to telegraph-cables in which a core of conductors is inclosed within a flexible pipe and surrounded by an insulating substance, which is introduced into said pipe in a molten state and allowed to cool and become more or less solidified.

In Letters Patent of the United States No. 248,209, granted to me October 11, 1881, I have described a method of filling cables with an insulating substance, consisting of a suitable insulator charged with gas, which is introduced into the cable in a molten state, the expansion of the gas having the effect of counteracting the contraction of the insulator in cooling, and of thus avoiding the vacuums which would otherwise be formed by the cooling of the insulator. In this method, as will be seen by reference to the above-named patent, the insulator and gas fill the cable in a homogeneous mass.

The object of the invention herein described is to provide a method of filling telegraph-cables with paraffine or other insulator in a molten state and air or gas under pressure, the insulator and the air or gas being in alternate sections throughout the length of the cable, whereby the contraction of the insulator in cooling is counterbalanced by the expansion of the air or gas. The insulation of the conductors of the cable is thus increased.

Air or gas, when free from moisture, is, as is well understood, the best insulator known; but the conditions attending a telegraph-cable will not permit the exclusive use of air or gas as an insulator therein, from the fact that should a leakage, however small, occur in the pipe, the cable would be damaged throughout its entire length.

In my improved method the air or gas and the insulator being in alternate sections, the

contraction of the insulating substance in cooling is counteracted by the expansion of the air or gas and made to completely fill the space between the core and the pipe and the interstices between the conductors, thus effectually separating the air or gas sections. The air or gas is thus utilized as an insulator, and in the event of leakage the damage would be confined to a single section.

In the drawings I have shown apparatus adapted to carrying out my invention.

Figure 1 is a partial sectional view of the said apparatus; Fig. 2, a vertical sectional view of the valve; Fig. 3, a horizontal sectional view of the same, taken on the line *x x* in Fig. 2. Fig. 4 is a view showing the cable coiled on a reel for filling. Fig. 5 is a longitudinal sectional view of a portion of a cable complete.

In said drawings, A represents a tank or reservoir to contain the air or gas, which is supplied thereto under pressure by a force-pump, or in any other well-known manner, through a supply-pipe, *a*.

B is a tank or reservoir to contain the melted paraffine or other insulator, which is kept melted by a steam-chamber, *b*, at the bottom of the tank, or in any other suitable manner. The melted insulator is kept under pressure in tank B by air or gas entering through a supply-pipe, *c*, from a suitable generator or force-pump.

C is a cock or valve, of the type known as a "three-way" cock, to which are connected pipes *d* and *e*, leading, respectively, from the upper part of tank A and from near the bottom of tank B. The cable to be filled is coiled on a suitable reel, with the coils in vertical planes, and is connected to the bottom of the cock C by suitable connection, D.

The construction of the cock C is clearly shown in Figs. 2 and 3. *p* represents the plug; *o* and *o'*, the inlet-openings, and *o<sup>2</sup>* the outlet. It will be seen by reference to Fig. 3 that the inlets *o* and *o'* extend around the plug *p* in such a manner that as said plug is revolved as soon as one inlet is completely closed the other will begin to open, and, further, that the inlet *o'* has considerably more opening to the plug than inlet *o*. The pipe *d* from the air or gas tank is connected to the smaller inlet, *o*, and



the pipe *e* to the larger inlet, *o'*. The plug *p* is provided with suitable mechanism whereby it may be revolved.

The operation of filling a cable is as follows:

5 The cable properly coiled, as before described, is placed in an oven kept at a proper temperature during the process of filling and properly connected to outlet *o*<sup>2</sup> of cock *U*. The  
10 plug *p* is then revolved, and the air or gas from tank *A* and the melted paraffine or other insulator from tank *B* alternately introduced into the cable by the pressure of the air or gas in the said tanks, as the inlets *o* and *o'* are  
15 opened, respectively, by the revolution of the plug *p*. The cable being on a reel with its coils in vertical planes, as set forth above, the air or gas will find its way through the melted insulator to the top of the coils, and the air or gas sections will thus be evenly distributed  
20 throughout the length of the cable.

It is evident that if the cable were not coiled the same result would be accomplished, the length of the alternate sections of air and insulator being determined by the speed of the  
25 revolving plug *p*.

I prefer to use carbonic-acid gas for supplying the pressure to the tanks and for filling

the alternate sections of the cable, as it may be easily generated under pressure; but air or other gases may be used with equally good results. 30

Having thus described my invention; what I claim is—

1. A method of insulating or filling telegraph-cables, consisting of introducing into 35 the pipe around the conductors melted paraffine or other insulator, and air or gas under pressure, said air or gas and the insulator, respectively, filling alternate sections of the cable, whereby the contraction of the insulator in 40 cooling is counteracted by the expansion of the air or gas.

2. A telegraph-cable consisting of a core of conductors inclosed within a pipe, in combination with insulation consisting of air or gas and 45 an insulator in alternate sections, substantially as set forth.

In witness whereof I hereunto subscribe my name this 9th day of October, A. D. 1882.

WILLIAM R. PATTERSON.

Witnesses:

P. A. STALEY,  
GEORGE P. BARTON.