

(No Model.)

W. R. PATTERSON.
INSULATING TELEGRAPH CABLES.

No. 356,156.

Patented Jan. 18, 1887.

Fig. 1.

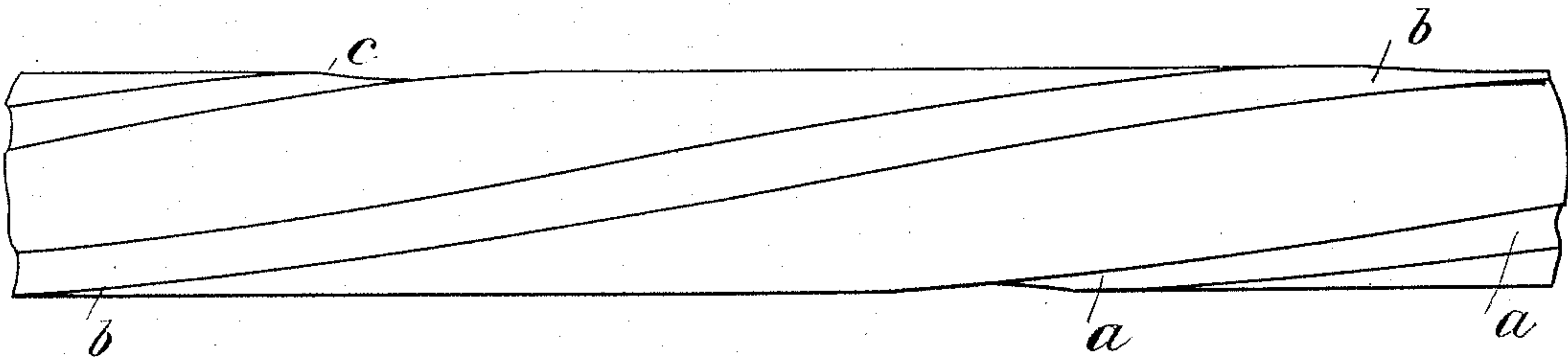


Fig. 2.

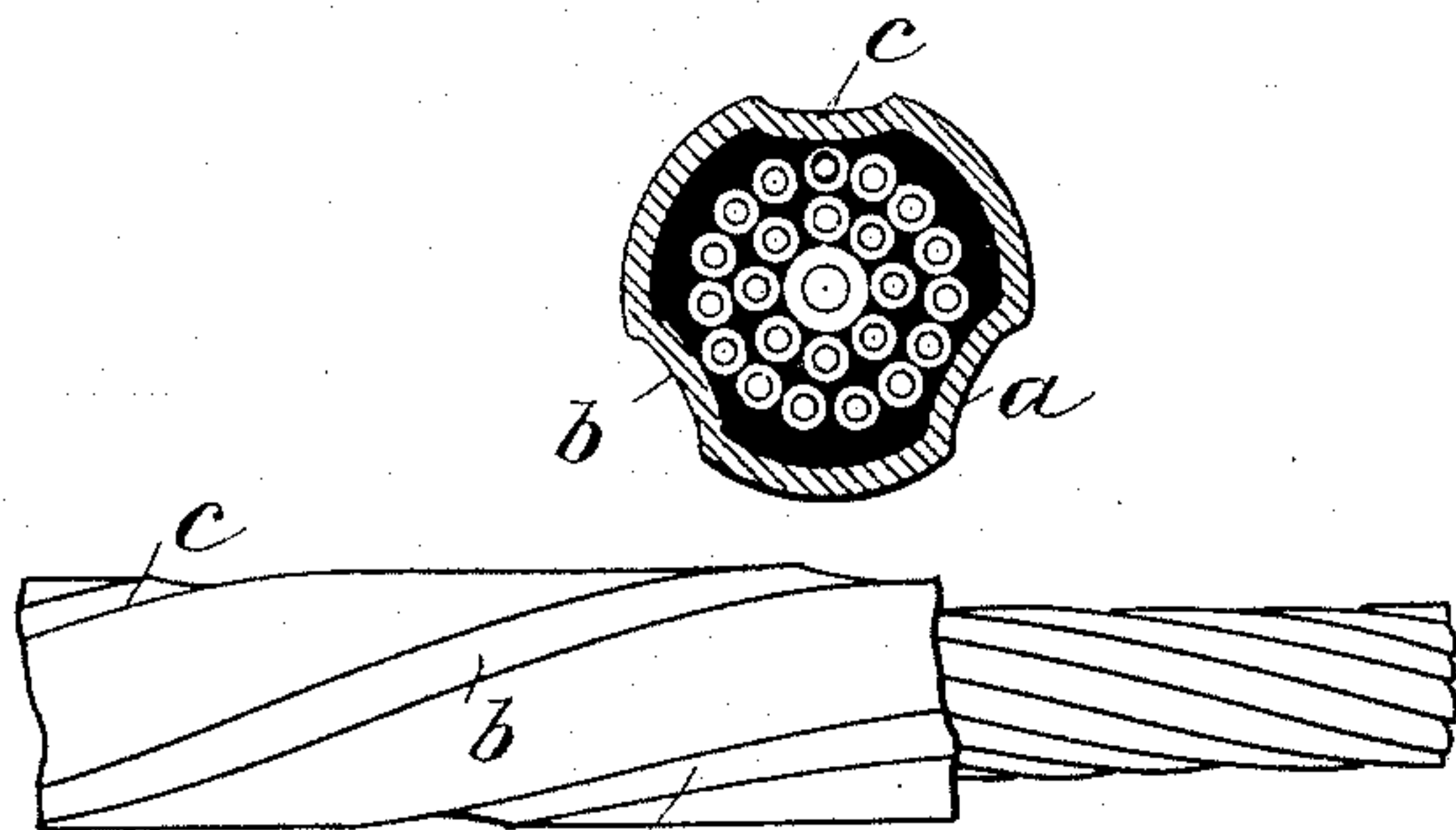


Fig. 3.

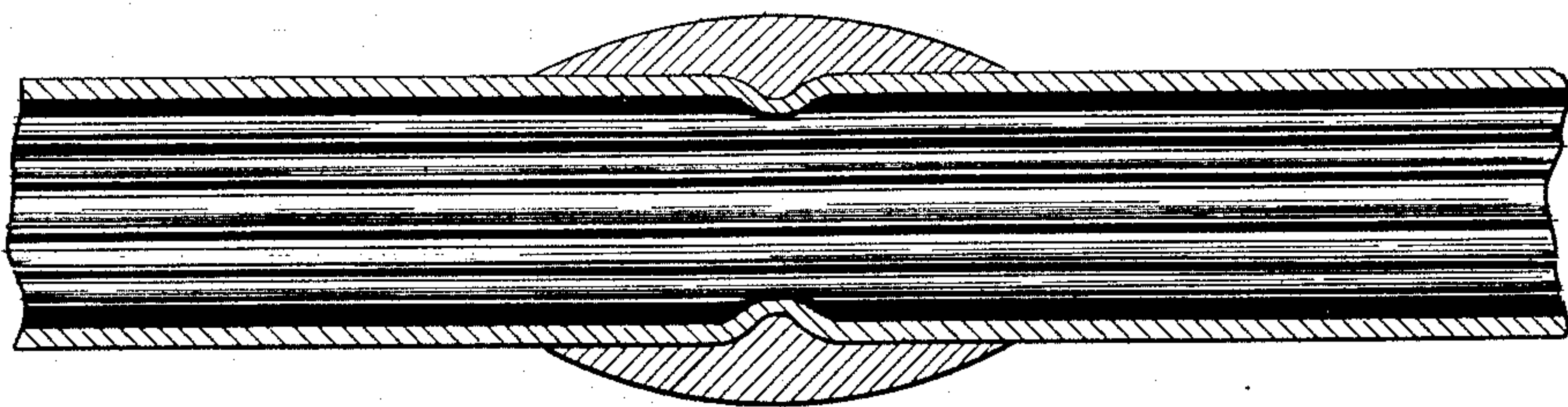


Fig. 4.

Witnesses
Sam^l. B. Dover.
J. H. Mculloch,

Inventor:
William R. Patterson.
By George P. Burton
Attorney.

UNITED STATES PATENT OFFICE.

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

INSULATING TELEGRAPH-CABLES.

SPECIFICATION forming part of Letters Patent No. 356,156, dated January 18, 1887.

Application filed February 2, 1886. Serial No. 190,653. (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 Insulating Telegraph-Cables, (Case 53,) 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 the core of separately-insulated conductors is inclosed in a lead pipe, and the space within the pipe about the core filled with melted insulating material which shrinks in cooling. When the material is paraffine of good quality, which becomes hard when cold, I prefer to charge the melted paraffine with gas as it is forced into the pipe, so that the gas may expand as the paraffine shrinks, thus preventing any openings being formed by the shrinkage of the paraffine. The gas thus distributed through the paraffine serves also to decrease the static capacity of the cable. When, however, grades of paraffine are used which melt at a low temperature, my inflating process will not work satisfactorily, as the gas will not be held distributed in minute particles, as is required. The same may be said of mixtures of rosin and oil and other insulating compounds which become liquid at a low degree of temperature. On account of the fact that viscid or soft plastic material will not retain the gas with which it may be charged, I know of no way by which such material can be prevented from shrinking in cooling, it being necessary to heat such material in order that it may be run into the pipe. Heretofore it has been common to roll the pipe after filling so as to reduce its diameter, the pipe being thus brought in close proximity to the conductors. This greatly increases the inductive capacity of the cable.

My invention consists in changing the form of the lead pipe after the filling has cooled, and thereby reducing the area of the interior opening by such change in its shape from the circular, thus compensating for the shrinkage of the filling material.

I preferably form three spiral grooves in

the pipe, the grooves being preferably of a different trend from that of the conductors. In addition to these spiral grooves I compress the pipe at intervals against the serving of the core, so as to prevent the plastic or viscid material from flowing longitudinally. Then, in order to prevent the pipe from bending or breaking at such places, I wipe over each of these grooves thus compressed about the circumference of the pipe a strengthening of solder.

My invention is illustrated in the accompanying drawings, in which Figure 1 is an elevation showing the outside of the lead pipe of the cable. Fig. 2 is a transverse section thereof. Fig. 3 is a detail of the core and lead pipe. Fig. 4 is a detailed longitudinal section of the solder wiped about one of the circumferential grooves.

Like parts are indicated by similar letters of reference in the different figures.

In Figs. 1 and 2 I have shown the pipe compressed in three spiral grooves, *a b c*. These grooves change the form of the opening from the usual cylindrical, which form has the greatest capacity, to irregular form. Any spaces caused by the shrinking of the filling material *d* are thus got rid of.

In order to compress the spiral grooves in the pipe, I run the cable through a machine, which gives the cable a longitudinal motion through a revolving chuck. The chuck may consist of a plate and any desired number of adjustable rollers, preferably three. By securing the rollers to the revolving plate of my armoring-machine (shown in Patent No. 330,047, of November 10, 1885,) and making such modifications as will readily suggest themselves to a mechanic I am enabled to do this work.

In order to make the circumferential grooves, I use a tool like a pipe-cutter, except that I use a blunt wheel to press against the pipe in place of the sharp wheel or knife. These circumferential grooves should always be made at the ends of the pipe immediately after the filling is introduced and before the spiral or longitudinal grooves are made.

In the manufacture of aerial cables, to which my improvements herein are especially adapted

ed, these circular grooves may be made after the spiral or longitudinal grooves are formed and after the cable is suspended. A groove at each pole and at each street-crossing in house-top lines I have found sufficient to prevent the filling from running out in case the cable is cut, broken, or burned off. These circumferential grooves may be advantageously used in the manufacture of aerial cables filled with inflated insulating material where such cables are to be used in a warm country.

By giving the longitudinal grooves a spiral trend the cable is allowed to retain its general cylindrical outline, so that it may be wound upon reels and unwound without injury, and in suspending the cable the same hangers may be used as if the cable were truly cylindrical.

As before stated, I prefer to give the longitudinal grooves a pitch in the opposite direction to the pitch of the conductors as twisted together in the core, in order that the same conductor may not follow close to the lead of the pipe for any great distance. I may, however, make the pitch of the grooves in the same direction as that of the wires, provided the pitch is greater or less than that of the wires.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the core of conductors, of a viscid or plastic filling shrunk in cooling and a lead pipe compressed in grooves to change the interior opening from its cylindrical form, whereby the area and capacity of said opening are reduced to correspond to the shrinkage of the filling.

2. The combination, with the core of conductors, of a viscid or plastic filling shrunk in cooling and a lead pipe compressed to change the interior opening from its cylindrical form, whereby the area and capacity of said opening are reduced to correspond to the shrinkage of the filling.

3. The telegraph-cable consisting of the combination, with the core of separately-insulated conductors, of the lead pipe inclosing

the same and the soft plastic filling, said lead pipe being compressed in spiral grooves to compensate for the shrinkage of the filling in cooling.

4. The combination, with the core of conductors, of the soft plastic filling, the lead pipe compressed in spiral grooves to compensate for the shrinkage of the filling in cooling, the trend of said grooves being different from that of the conductors of the core.

5. The combination, with the core of insulated conductors, of the soft plastic insulating-filling, the lead pipe inclosing the same, said pipe being compressed at intervals in circumferential grooves, said grooves being filled with solder, whereby the plastic material is held in place while the strength of the cable is maintained, substantially as and for the purpose specified.

6. The combination, with the soft plastic insulating material, of the core of separately-insulated conductors and the lead pipe compressed in one or more corrugations to change the form of the interior opening and thereby diminish its capacity to compensate for the shrinkage of the filling material, said filling material being held in place by circumferential grooves, substantially as and for the purpose specified.

7. The method of filling telegraph-cables with soft plastic insulating material, which consists in placing the core within the lead pipe, forcing the insulating material while hot into the remaining space about the core, allowing the filling to cool, and then compressing the pipe to change the form of the interior opening, whereby compensation is made for the shrinkage in cooling, substantially as and for the purpose specified.

In witness whereof I hereunto subscribe my name this 30th day of January, A. D. 1886.

WILLIAM R. PATTERSON.

Witnesses:

GEORGE P. BARTON,
F. H. McCULLOCH.