

United States Patent Office.

ROBERT W. RUSSELL, OF NEW YORK, N. Y.

Letters Patent No. 88,518, dated March 30, 1869.

IMPROVED FIBROUS-COMPOSITION TUBE.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern :

Be it known that I, ROBERT W. RUSSELL, of New York, in the county and State of New York, have invented certain new and useful Improvements in Tubes of Fibrous Composition, for the conveyance of gas and water, and for enclosing electric-telegraph wires, and for other purposes; and I hereby declare the following to be a full, clear, and exact description of the same.

The fibrous-composition casings, or tubes, to which my invention principally relates, are formed of cane and other vegetable fibre, disintegrated by the explosive force of steam, in combination with bituminous and other compositions, as hereinafter specified.

While the constituent elements which enter into the composition of the tubes, or casings remain in all cases substantially the same, yet the particular mode of constructing such tubes, or casings may vary, to accord with the varying purposes for which they are designed. I will therefore describe the manner in which I prefer to proceed to construct tubes, or casings for gas or water, and telegraph-wires, which will illustrate the manner in which they can be manufactured for the various other purposes for which such articles are usually employed.

One of the objects I have in view, is to produce good and cheap fibrous-composition casings, or tubes, for the protection of the wires of lines of electric telegraph, so that the same may be laid upon or under the ground.

To effect this object, I take a wire, of iron, copper, or other suitable metal, and cover it with several successive layers, or thicknesses of cane, or other vegetable fibre, the product of the disintegrating-process by the explosive force of steam, as described in A. S. Lyman's patent of August 3, 1858, which several layers, or sheets are fastened together with pitch, bitumen, or gum, or other suitable materials, so as to be anhydrous and insulating.

This casing, with the metallic conductor therein, is made in suitable lengths convenient for transportation, and the telegraph-line is composed of a series of these casings, put together and protected as hereinafter mentioned.

The said casings may be covered by the steam-blown cane-fibre protected, by concrete; or enclosed in a metallic tube or sheathing; or in a tube of earthenware, cement, or slate; or in a tube of fibrous composition, coated as hereinafter specified.

The tube, when ready to be laid down, is about ten feet long, having within it the wire, nine feet three inches long, covered with the insulating casing. A portion of the wire, to the length of three inches, is cut in the shape of an elongated cone, so as to fit into the wire of the adjoining tube, which has been prepared to receive it; or the wires may be connected by other means, as, for example, with hooks and eyes, or screwed together.

When sheets of paper or felt, made from the aforesaid fibre, are used, they may be wound round the wire, the adhesive matter being applied to such sheet

before or whilst they are being rolled or wound, in the same way as heretofore adopted by the manufacturers of fibrous-composition pipes; or, the casing may be made first, and the wire inserted afterwards. And the casings may be formed so that the end of one section may be inserted and fitted in the end of the other, and there fastened, with pitch, bitumen, or gum, or other composition, as aforesaid, so as to form a continuous and solid casing; and, in addition to the pitch or other cementing-matter, the two ends may be further held together and pressed, if circumstances should require it, by a band of twine, cord, wire, or metal, drawn tight.

The casings may be united as above described, by either of the following methods:

The casing being, for example, two inches thick, is cut away, or reduced in size at one end of it, for the length of one foot, to the thickness of an inch, so as to be inserted telescopically into the adjoining casing, which is cored out, or thinned from the inside, for the same length, also to the thickness of an inch, in such a way as to receive the end of the other casing, so that when brought together, the one being inserted in the end of the other, and fastened with pitch, bitumen, or other composition, as aforesaid, they will form a continuous and solid casing, the net length of each being nine feet.

In lieu of the above method, one end of the casing may be made larger than the other end, to the extent of one or two feet, so as to receive a casing of the full thickness, the two being fastened together, as aforesaid.

When the connection is to be made, heat is applied to the outer casing, so as to soften the pitch or other cementing-matter, and the two ends are pressed and held together, as above specified.

Or, when the casing is composed of fibrous-composition slabs, made by mixing and consolidating a composition with the fibre, as described in an application for Letters Patent in my name, now pending in the United States Patent Office, the casing may be pressed or moulded with a collar, to receive the end of the next section.

When the casing is composed of sheets, as aforesaid, it can be covered with said cane-fibre, which may be spun or twisted into a coarse rope, to be wound round the casing as it is being laid down, such rope-covering being impregnated or not with tar, or other preservative matter, and then covered with concrete.

Or, in lieu of the rope-covering and concrete, the casing may be enclosed in a tube of metal, or cement, or in a fibrous tube, made like the casing, and joined together in the same way, but having an outer covering of bitumen and sand, or other material, which will preserve the tube in the earth.

The casing, or tube thus protected, may be laid in a trench dug out for the purpose of receiving it, and there embedded in a casing of ordinary building-concrete.

I prefer having the wire half an inch thick, and the casing of the same at least two inches thick, making

the tube two and one-half inches in diameter, but other proportions may be substituted for these.

Instead of being buried in a trench, the casing, or tube may be laid upon the ground.

Another mode of making the tubes for the purpose aforesaid, and also for conveying gas and water, is as follows:

I take fibrous-composition slabs, made from the said fibre, mixed with bituminous or other composition, as aforesaid, and then pressed or moulded into slabs.

These slabs, with bitumen or other composition, aforesaid, interposed between the layers, are wound around a mandrel, or core, and pressed hard. A sufficient space is left for the insertion of the metallic conductor, or the passage of water or gas.

The exterior of the casing thus made, is coated with a suitable composition, as, for instance, coal-tar, rosin, and sand, or ordinary bituminous mastic, so that the tube may be laid in the ground without any further protection than that afforded by such outer casing.

In pressing the fibrous slabs together to form the tube, one end of the tube may, as before mentioned, be pressed into the form of a collar, to receive the end of the next tube; and the joined tubes are pressed and held together at the joints, as aforesaid.

Heretofore, various kinds of casings have been devised for enclosing telegraph-wires, but the great cost of suitable fibre has prevented its use, in the manner and for the purposes aforesaid.

The principal material to be used, viz, the steam-blown cane-fibre, can be used freely, so as to have a casing and protection of the same, of considerable thickness and strength, the cost of such fibre being very small, and the use of fibrous casings and tubes, in the way proposed, being thus rendered practicable.

By this method, a metallic conductor, much larger than the wires commonly suspended in the air, can be conveniently used.

The advantage of a large, heavy wire over a light one is well known and recognized in the telegraphic art.

The tubes, or casings being complete, the line can be easily and speedily constructed.

The tubes can be laid upon the permanent roadway of a railroad, in a trench cut along the spare ground of the road, or between the tracks, where there is a double track, and then covered, as aforesaid.

The above-described fibrous tubes, or casings, whether made from sheets of the said fibre, or from the fibrous slabs, will serve as pipes to convey water or gas, or to

cover and give strength to a pipe of metal, wood, cement, earthenware, or slate, to convey water or gas.

The said fibrous material, charged with bituminous mastic, or other suitable composition, as aforesaid, is wound or rolled around the interior tube, and pressed hard, or the interior tube may be inserted in the previously-formed casing.

The casings or outer tubes are made so as to fit each other, and are fastened together as aforesaid, or in any other suitable manner.

The main pipe can be tapped for service-pipes, in the usual way adopted when composition-tubes are employed for conveying water. For this purpose, I prefer to apply an iron band in two sections, drawn tight around the tube, this band to receive an iron service-pipe, to be screwed into the band, and to be carried through the same, and through the fibrous-composition tube, into the main pipe.

The tubes, or casings should be of considerable thickness; being composed of several layers of fibre, securely held together by strongly-adhesive matter, they have great strength, and will resist pressure better than ordinary iron pipes. They are, moreover, cheaper than iron pipes, and are bad conductors of heat or cold.

Having now described my invention, and the manner in which the same is, or may be, carried into effect.

What I claim, and desire to secure by Letters Patent, is—

1. The above-described manufacture of fibrous-composition casings, or tubes, for receiving or enclosing wires of telegraph-lines, such tubes, or casings being composed of webs or sheets of fibre, disintegrated by the explosive force of steam, in combination with bituminous or other composition, as aforesaid.

2. The method of making the said fibrous-composition tubes, for the conveyance of gas and water, and laying down and protecting the same, substantially as hereinbefore described.

3. As new articles of manufacture, the fibrous-composition casings, pipes, and tubes made by the processes aforesaid, and for the purposes described.

In testimony whereof, I have signed my name to this specification, before two subscribing witnesses.

R. W. RUSSELL.

Witnesses:

M. BAILEY,
H. E. BAILLIÈRE.