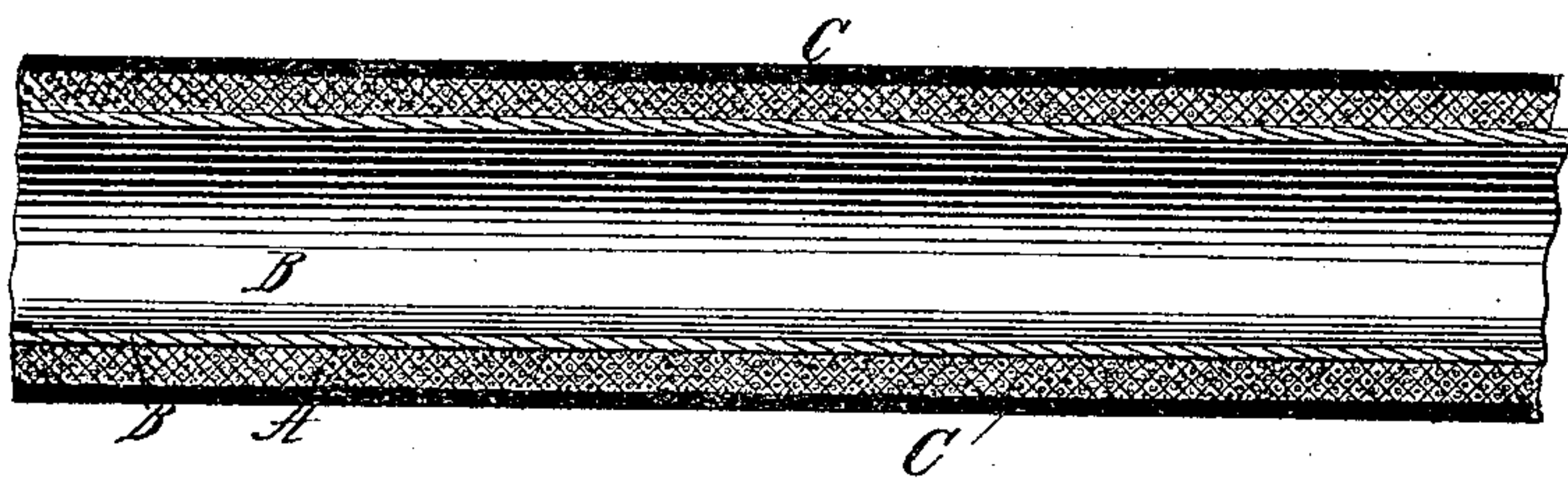


(No Model.)

H. W. JOHNS.
CONDUIT FOR ELECTRIC WIRES.

No. 459,509.

Patented Sept. 15, 1891.



WITNESSES:

Edward C. Rowland.
C. H. Ryder.

Henry W. Johns INVENTOR
BY *Phillips Abbott*
his ATTORNEY

UNITED STATES PATENT OFFICE.

HENRY W. JOHNS, OF NEW YORK, N. Y.

CONDUIT FOR ELECTRIC WIRES.

SPECIFICATION forming part of Letters Patent No. 459,509, dated September 15, 1891.

Application filed April 27, 1891. Serial No. 390,554. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. JOHNS, a citizen of the United States, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Insulating-Conduits for Electric Wires, of which the following is a specification.

My invention relates to a new and useful insulating tube or conduit for electric wires intended especially for interior work; and it consists in making a seamless flexible braided, knitted, or woven tube of a fire-proof material, and so treating it that it shall be water-proof, and preferably lining and covering it on the inside and outside, one or both, so that the wires may be easily introduced, and also so that the exterior may be hard and firm, presenting a surface which may be readily painted or otherwise decorated. The flexibility of my conduit is of great advantage because corners and angles may be turned without disjoining it, and also because it can be made in long pieces and rolled up for transportation.

The figure of the drawing illustrates a longitudinal section of a piece of my conduit.

To make my improved article I take asbestos yarns or strands and saturate them with a water-proof material during the process of weaving or braiding or prior thereto, or I may first braid the tube and afterward waterproof it. The waterproofing material may be paraffine-wax or a solution of the same, properly-prepared tar, or a drying-oil of any kind, or it may be in the nature of a cement, which should preferably be elastic, or it may be india-rubber, or its equivalent, treated more or less with sulphur, so as to become vulcanizable, and the tube or conduit may thereafter be partially or wholly vulcanized according to the degree of flexibility required. The conduit thus formed should have its pores filled so that it will be air-tight, and it may be additionally coated so as to present a smooth or measurably smooth interior, so that the wires will not catch in its inner wall while they are being introduced. I sometimes also coat the tube on the interior with plumbago. I may also coat the exterior with any of the materials before mentioned or with asphalt, pitch, gum-shellac, or a suitable

heavy varnish. For special purposes the conduit may be coated inside and outside, one or both, and either in conjunction with the coating above mentioned or not with a plastic material, such as plaster-of-paris, oxide of zinc, powdered asbestos, or like materials combined with oil or other substance which will stiffen it to a desired extent.

In the drawing, A represents the seamless woven asbestos tube proper, which is treated with the waterproofing material.

B represents an asphalt coating on the inside and outside, and C represents an exterior plastic lining or coating. I show the last coat C on the exterior of the tube only. It may be on the interior also, if desired.

For certain purposes my woven asbestos conduit will be improved by an interior or exterior coating, one or both, of suitable sheet metal—as, for instance, lead. This may be applied to the conduit in the form of a thin sheet with a suitable cementing material, or it may be wound or pressed thereon, or, the conduit being made of asbestos, it may be immersed in molten metal without injury, and may thus be made to receive a thin film or coating of metal, or the metal may be applied by an electrical process or otherwise.

It is obvious that my invention may be practically employed by making the tube of material which, although not fire-proof of itself, has been made fire-proof by special treatment. For instance, hemp and certain other fibrous materials may be subjected to a fire-proofing treatment—as, for instance, by saturation with silicate of soda or other fireproofing material—and may be substituted for the asbestos, which, however, I prefer, and when I use the words “fire-proof strands or yarns” in the claims hereof I mean such as are either fire-proof in themselves, as asbestos, or which have been rendered fire-proof by treatment, and such treatment may be either before or after they are woven into the tube or conduit. I may also braid, knit, or weave the fire-proof strands upon a tube of paper, preferably asbestos paper, which may be made into tubular form, as set forth in my pending application, Serial No. 387,316, filed April 1, 1891, or otherwise. The construction gives additional strength against indentation, and also furnishes a smooth hard interior.

It will be seen that my invention possesses the desirable characteristics of incombustibility and flexibility, and that it is waterproof; also, that it may be made in long lengths and rolled into coils for transportation.

I claim—

1. A seamless woven, knitted, or braided tube or conduit made from asbestos strands or yarns, the same being waterproofed, substantially as set forth.

2. A seamless woven, knitted, or braided tube or conduit made from fire-proof strands or yarns of fibrous material, the same being waterproofed and made in continuous lengths and having a coating of surfacing material, substantially as set forth.

3. A seamless woven, knitted, or braided tube or conduit made from fire-proof strands or yarns of fibrous material, the same being

saturated or coated with a vulcanizable material, substantially as set forth.

4. A seamless woven, knitted, or braided tube or conduit made from fire-proof strands or yarns of fibrous material and having an exterior coating of protecting and strengthening material, such as metal, plastic material, and the like, substantially as set forth.

5. A seamless woven, knitted, or braided tube or conduit made from fire-proof strands or yarns of fibrous material, the same being waterproofed, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 21st day of April, A. D. 1891.

HENRY W. JOHNS.

Witnesses:

PHILLIPS ABBOTT,
J. E. HOFFMAN.