(No Model.)

T. T. LA POINT, J. H. FLANAGAN, & C. A. THOMPSON.

CONDUIT FOR ELECTRIC WIRES.

No. 451,941. Patented May 12, 1891.

Fig. 1.

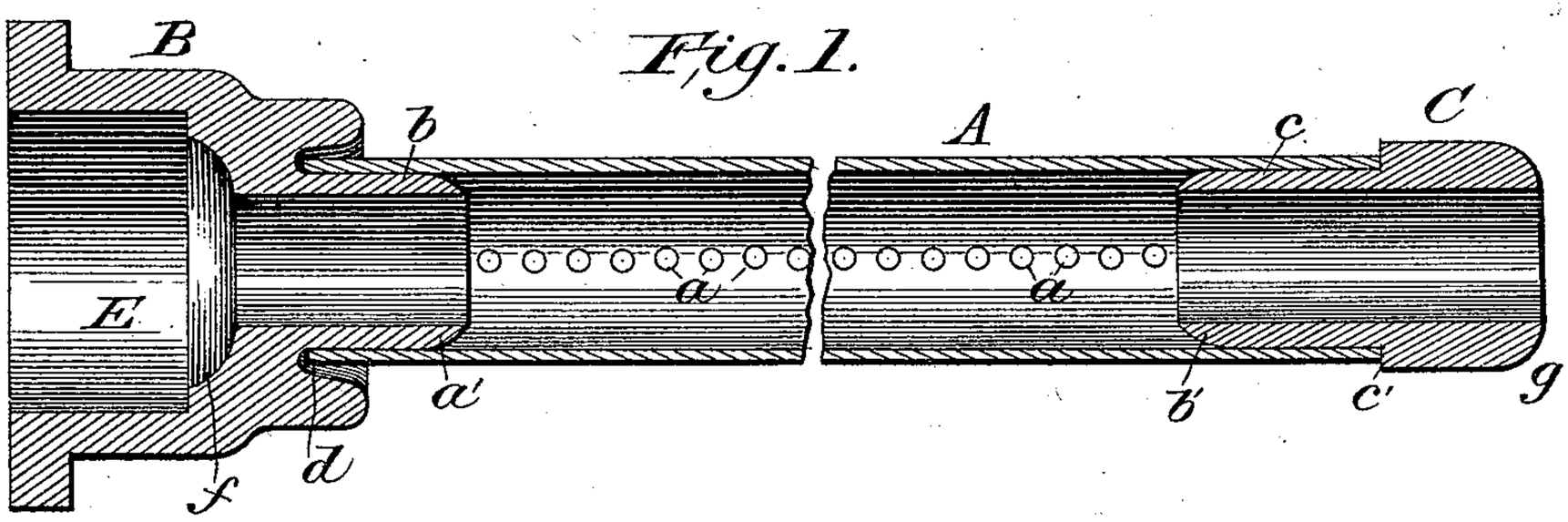


Fig 2

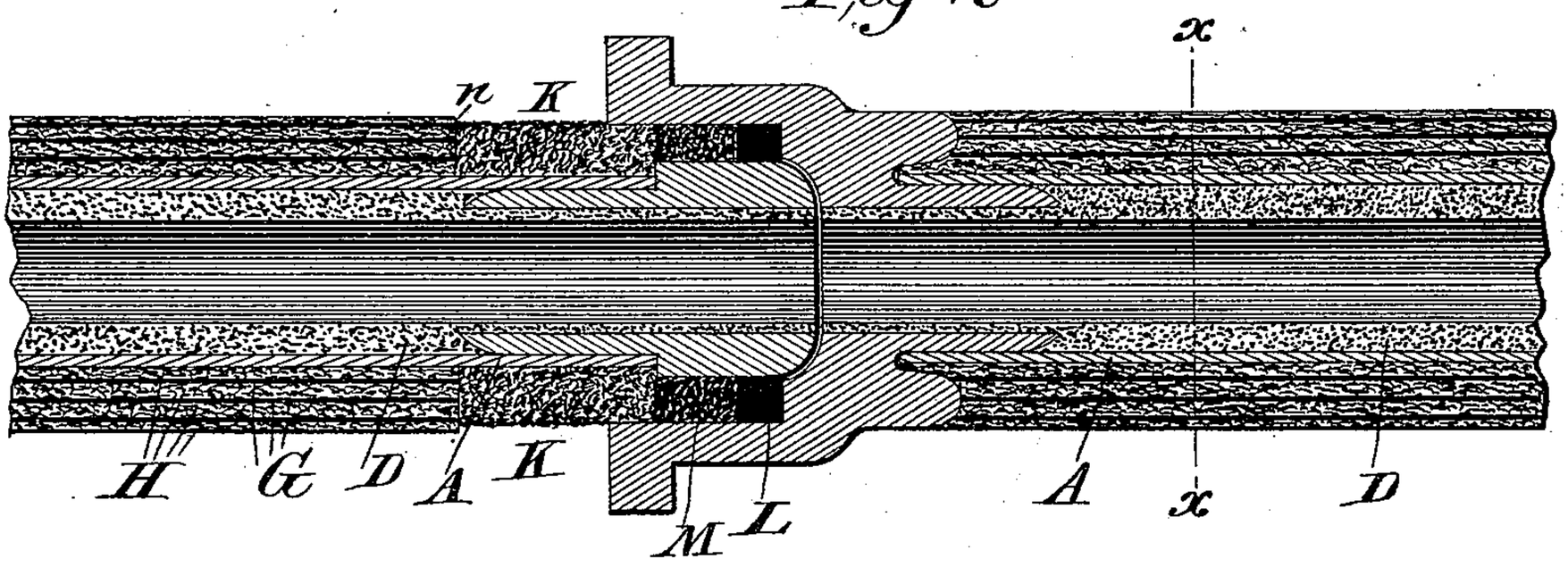


Fig. 3.

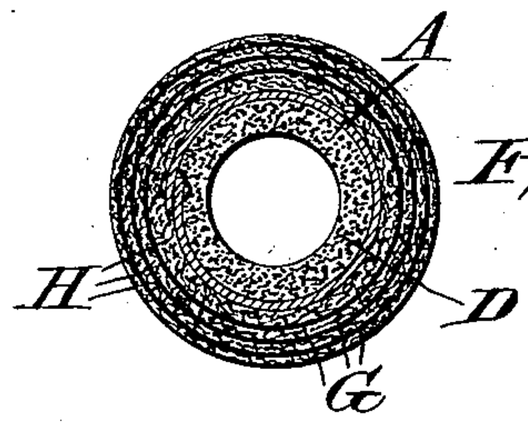
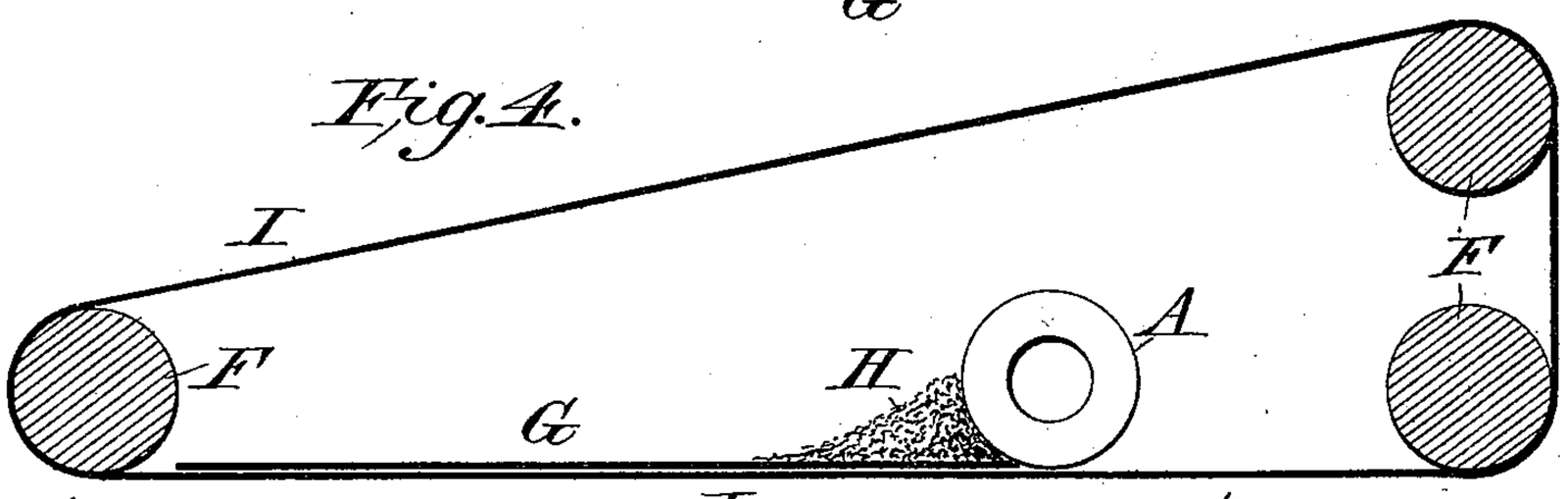


Fig. 4.



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CONDUIT FOR ELECTRIC WIRES.

SPECIFICATION forming part of Letters Patent No. 451,941, dated May 12, 1891.

Application filed December 30, 1889. Serial No. 335,450. (No model.)

To all whom it may concern:

Be it known that we, THOMAS T. LA POINT, JAMES H. FLANAGAN, and CHARLES A. THOMPSON, all being citizens of the United States, and residents of the city of New Haven, in the county of New Haven, and State of Connecticut, have invented a certain new and useful Improvement in Conduits for Electric Wires and for Conveying Liquids, of which the following is a specification.

Our improvement relates to conduits of sheet metal, and the object of the improvement is, first, to make a practically indestructible conduit by lining the sheet-metal cylinder internally with hydraulic cement and covering the cylinder externally with layers of paper and a composition of asphalt, resin, and fatty matters.

The object of our invention is, secondly, to permit the making of calked lead joints on sheet-metal cylinders by combining with the cylinder cast-iron hubs and spigots of such construction that they are readily and securely fastened to the cylinder and allow the lead joint to be calked around the spigot in the usual manner. The conduit is also so constructed at the spigot end as to prevent the lead from working or being forced back out of the hub after the joint is made.

The making of water-pipe and other conduits of asphalt is practiced, but they lack the necessary strength to resist pressure and are injuriously affected by warm weather, for they are either made of asphalt compositions alone, which have little strength, or they are formed by inserting coils of sheet metal or various veneers in the asphalt; but when the asphalt softens in warm weather it looses its hold on the coils or veneers, the pipe stretches, and is burst or rendered useless. We however make a rigid pipe of great strength by firmly riveting a sheet-metal cylinder to proper size and then coating this cylinder internally with hydraulic cement, which forms a hard, strong interior. Then the cylinder is wrapped externally with layers of paper and a composition of asphalt, resin, and fatty matter. Thus a very strong and practically indestructible conduit is produced, which is not affected by agencies in the soil in which it lies or in the water which flows through it. The cast-iron hubs and spigots are secured to the sheet-metal cylinder before the same is lined with cement, and their use has the great advantage, when the conduits are used for a water-supply system, that as soon as the lead-calked joints are made water may be turned on to the pipe system, whereas if the joints are made in the ordinary manner with sheet-metal sleeves and hydraulic cement some weeks must elapse for the joints to harden before water can be turned on.

Referring to the drawings which accompany the specification to aid in describing the same, Figure 1 is a longitudinal section of a length of the conduit, showing the sheet-metal cylinder united to the cast-iron hub and spigot before lining and wrapping. Fig. 2 is a longitudinal section showing two broken lengths of finished conduit. The spigot of one length is inserted in the hub of the next and the construction of the joint is shown. Fig. 3 is a view of a cross-section of the finished conduit, taken on X X of Fig. 2. Fig. 4 is a representation of the manner of wrapping the layers of paper and asphalt on the cylinder.

A cylinder of sheet metal A, preferably of wrought-iron, is first shaped to a tube of proper size, and then firmly riveted, as at *a a*, along either edge of the seam. The tube A is formed of any length according to the desired length of the section, and is dipped into a bath composed of melted asphaltum, resin, and fatty matters, preferably tallow, of the following composition: twelve parts of asphalt, two parts of tallow, and one part of resin; but these proportions may be somewhat varied, according to the weather, and oil may be substituted for the tallow. After being taken from the bath and while the asphalt composition is still melted, the cast-iron hub B and spigot C are secured to the cylinder A by driving their corresponding sleeves *b* and *c* into the opposite ends of the said cylinder. The said sleeves *b* and *c* fit very tightly into the cylinder A, and the asphalt composition cooling and hardening acts as a cement to bind the hub and spigot to the cylinder. The ends of the sleeves *b* and *c* of the hub and spigot are respectively beveled at *a'* and *b'* to facilitate inserting the sleeves

into the cylinder A, and also to form annular spaces, in which the asphalt composition collects and hardens, thereby strengthening the bond between the cylinder and the hub and spigot. The spigot C is formed with a shoulder *c'* around the sleeve *c*, against which the tube A abuts when the spigot is driven home to place, and the hub B is formed with an annular groove *d*, external to the sleeve *b*, to receive the end of the cylinder A when the hub is driven home. This groove *d* has a width somewhat greater than the thickness of the sheet metal of the tube A, so that a space is formed around the sheet metal, in which the asphalt composition collects, and also tends to solidly unite the hub to the cylinder. The interior of the hub B is chambered, as at E, to form a space for the gasket and lead joint, and concentric with the bore of the pipe there is a concave hemispherical surface *f*, which accurately fits the convex end *g* of the spigot C, the two surfaces forming a ball-and-socket joint. This construction insures an accurate fitting of the spigot into the hub, producing one practically continuous conduit when the pipe is laid, prevents the gasket from being tamped or driven past the spigot into the bore of the pipe, and also insures the accurate centering of the spigot in the hub, with an annular space all around the spigot for the lead joint.

The cylinder A, having been joined to the hub B and spigot C, as said, and the asphalt composition having hardened, the cylinder A is lined in the ordinary manner with a lining of hydraulic cement D of suitable thickness. This lining D is made continuous through both the cylinder A and the hub B and spigots C. When the cement has hardened sufficiently, the cylinder is wrapped with the external layers of paper and asphalt composition in the following manner: The cylinder A set up horizontally in a frame, so as to be rotated by hand or machinery, and immediately in contact with it is a belt of canvas I, which is stretched over three or more rollers F. These rollers are capable of lateral adjustment, so as to vary the tension of the belt I, and are set in motion by suitable machinery. The rollers F are sufficiently long to carry a belt I of a width equal to the length of the cylinder A. Strips of tarred paper G are laid on the belt I with one end squarely abutting the cylinder A, and then the belt and cylinder A have motion imparted to them, the linear velocity of both the surface of the cylinder and the belt being the same. At the same time a quantity of the melted composition of asphalt, resin, and tallow, hereinbefore mentioned, is spread across the width of the strips of paper G, as indicated by H, either by a ladle or in any other suitable way. The paper G being carried by the belt I under the cylinder A, the asphalt composition causes the end of the paper to adhere to the cylinder, and the revolution of the latter winds on the paper and asphalt compositions in alternate layers, as seen in Fig. 3, the length of the strips of paper G being sufficient to produce the required thickness of wrapper. In practice we ordinarily use two layers. Finally the conduit is finished by a coating of the aforesaid composition of asphalt, resin, and tallow.

In wrapping the cylinder the layers of paper G terminate some distance from the end of the spigot C, as seen in Fig. 2, whereby a shoulder *n* is formed, and a space *k* is left for introducing the gasket L, lead M, and calking-tool into the hub B.

The spigot C is centered in the hub B, and the joint is made and calked in the usual manner, the solid cast-iron hubs and spigots forming the necessary backing to the lead joint, which cannot be made with ordinary sheet-metal pipe. When the joint is completed, the asphalt composition is spread around the pipe A, filling the space between the shoulder *n* and the lead joint M. When this composition hardens, it will be seen the lead joint abuts against the solid outer layer of the conduit and cannot work back out of the hub B.

The conduit is tapped for service-pipes in the manner usual with sheet-metal cement-lined pipe.

We claim—

1. A conduit composed of the following parts: an internal lining of hydraulic cement, a cylinder of sheet metal firmly riveted at the seam to form a tube inclosing the lining of hydraulic cement, and strips of tarred paper coated with a composition of asphalt, resin, and fatty matters wrapped externally around the tube, as described.

2. A conduit composed of the following parts: a cylinder of sheet metal firmly riveted at the seam and dipped in a composition of asphalt, resin, and fatty matters, an internal lining of the cylinder composed of hydraulic cement, an external wrapping composed of layers of tarred paper coiled around the cylinder alternately with layers of a composition of asphalt, resin, and fatty matters, and over all a layer of the aforesaid asphalt composition, as described.

3. A conduit-section composed of a riveted sheet-metal cylinder united at its opposite ends to a hub and a spigot, the hub and spigot each forming a member of a ball-and-socket joint, as described.

4. A conduit-section composed of the following parts: a sheet-metal cylinder riveted at the seam to form a tube capable of resisting pressure and united at its opposite ends to a hub and a spigot, each of which forms a member of a ball-and-socket joint, a lining of hydraulic cement within the tube, and an external wrapping composed of strips of tarred paper coated with a composition of asphalt, resin, and fatty matters wound upon the tube, as described.

5. A conduit-section composed of the following parts: a sheet-metal cylinder riveted

at the seam to form a tube capable of resisting pressure, a hub secured to the tube by means of a sleeve which enters the tube, and a groove which surrounds the sleeve and receives the end of the tube, a spigot secured to the other end of the tube, and the hub and spigot each forming one member of a ball-and-socket joint, a lining of hydraulic cement within the tube, and an external wrapping of strips of tarred paper coated with a composition of asphalt, resin, and fatty matters wound upon the tube, as described.

6. A cast-iron hub for connection with a sheet-metal pipe and the hub, having a sleeve which tightly fits the pipe, and an annular groove external to the sleeve to receive and secure the end of the sheet-metal pipe, as described.

7. A cast-iron hub and a cast-iron spigot for connection with the opposite ends of a sheet-metal pipe, and the hub and spigot, each having a sleeve which tightly fits the pipe, and the hub having an annular groove external to its sleeve for receiving the end of the pipe, and an internal concave surface concentric to the bore of the pipe, conforming in shape to the convex surface of the end of the corresponding spigot, whereby when the spigot is inserted in the hub the aforesaid surfaces make a ball-and-socket joint, as described.

In witness whereof we have set our hands this 3d day of December, 1889.

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JAMES H. FLANAGAN.
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