No. 825,589. PATENTED JULY 10, 1906.

A. S. DIXON.

PROCESS OF MAKING HERMETICALLY SEALED CONDUITS.

APPLICATION FILED APR. 11, 1904.

Fig. 1.

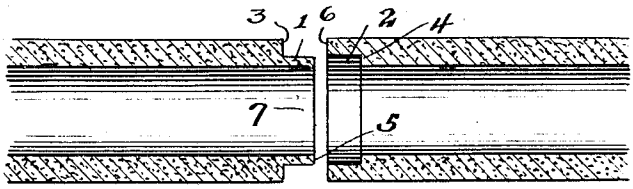


Fig. 2.

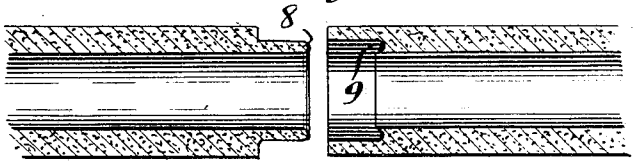


Fig. 3.

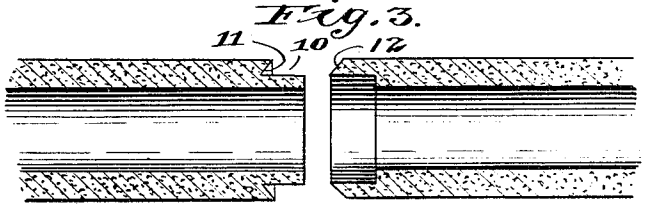
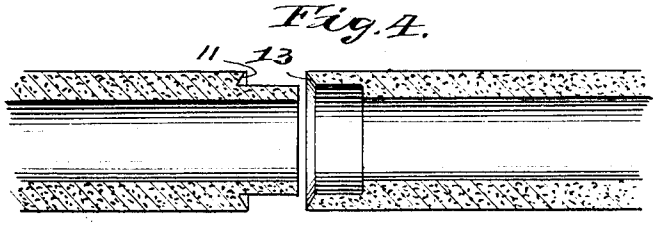


Fig. 4.



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UNITED STATES PATENT OFFICE.

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PROCESS OF MAKING HERMETICALLY-SEALED CONDUITS.

No. 825,589. Specification of Letters Patent. Patented July 10, 1906.

Application filed April 11, 1904. Serial No. 202,654.

To all whom it may concern:

Be it known that I, ALBERT S. DIXON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Processes of Making Hermetically-Sealed Conduits, of which the following is a specification.

This invention relates to an improved process or method of forming hermetically-sealed continuous conduits, and refers more specifically to an improved method of laying and hermetically joining sections of bituminized-fiber conduits.

The salient object of the present invention is to provide a method whereby sections of conduit may be united in such manner as to form a continuous conduit integral and of homogeneous construction throughout to all practical intents and purposes.

Other objects are to provide a method or process which results in producing a hermetically-sealed conduit durable and impervious to both gas and liquids and at the same time possessing insulating qualities of high and permanent character and electrolysis-proof throughout, including the points of union or joints.

To the above ends the invention consists in the improved process hereinafter described, and more particularly pointed out in the appended claims.

I have discovered that bituminized-fiber conduit may be hermetically sealed and joined by providing the meeting sections with interfitted male and female joints and then immersing in or applying to one or both members of the joint a hot bath of bitumen until the material of the conduit is softened and unites homogeneously with the melted bitumen, and while it is thus softened and coated with bitumen bringing the joint members together into intimate union. In practically carrying out my process it is essential that the meeting ends of the conduit-sections be so constructed that they telescope together for a substantial distance, the tenon or male member being constructed to fit accurately and tightly within the other member, so that the meeting surfaces will be joined by a comparatively thin film of material united homogeneously with the joined members.

In practically carrying out the process sections of the bituminized-fiber conduit are made in suitable lengths and their ends shaped in a suitable lathe, so that the meeting sections will interfit accurately together and form a joint the principal meeting surfaces of which extend substantially parallel with the axis of the sections. These bituminized-conduit sections, it may be explained, are formed by saturating a sheet of tough and highly-porous fiber board or paper in a bath of melted asphalt or analogous bitumen product and then while hot and the saturating solution still in liquid form rolling the sheet of material upon a cylindric mandrel until the walls of the conduit-section reach the required thickness, whereupon the conduit-section is removed from the mandrel and allowed to cool and harden. When thus formed and hardened, the conduit-section is practically homogeneous throughout, and the ends may be turned off in a suitable lathe to produce the male and female joints referred to.

In the following drawings I have shown a variety of joints suitable for carrying out my process forming the subject of the present invention.

In Figure 1 an ordinary rabbet-joint is shown, rabbets 1 and 2 of the respective sections having end walls 3 and 4, respectively, formed at right angles to the axis of the sections, and the abutting ends 5 and 6 of the sections being similarly formed at right angles to the axis of the conduit. The male or tenon member 7 is of suitable external diameter to fit tightly and accurately within the rabbets 2 of the other member.

In Fig. 2 a similar joint is shown, except that the abutting end or edge 8 of the tenon member is rounded and the coöperating or opposed wall 9 of the receiving-rabbet is correspondingly hollowed, the parts being, as in the first construction, made to fit accurately throughout.

In Fig. 3 the tenoned member is provided with an undercut external rabbet 10, having an inclined abutting wall or shoulder 11, and the coöperating end of the female section is beveled, as indicated at 12, to fit accurately the rabbet 10.

In Fig. 4 the tenoned member is substantially as that shown in Fig. 3, while the coöp-

erating female member has the end wall or edge 13 of the telescoping section reversely inclined, so that when the parts are assembled a triangular space is left between the opposed surfaces 11 and 13, which space is occupied by the sealing material.

When laying the conduit, I provide a suitable vessel containing melted asphalt or bitumen and means for heating the vessel to maintain the asphalt at a high temperature. Preferably I employ the same kind of bitumen that is used in originally forming the sections of conduit. As each section is laid that one of its ends which is to be united to the previously-laid section is dipped into the vessel containing the melted bitumen and held there long enough to become thoroughly heated, slightly softened as to its immersed surface, and thoroughly and evenly coated with the liquid. The treated end of the section is then quickly adjusted into telescoped engagement with the end of the previously-laid section and forced into intimate interfitting union with the latter, usually by a slight twisting movement, and after being accurately forced "home" allowed to cool. The hot pitch upon the treated end of the conduit-section, together with the heat which has been imparted to the end of the section itself while immersed in the hot bath, act to soften the end of the previously-laid section sufficiently to cause the pitch to unite the parts homogeneously, and a perfect hermetically-sealed joint is thus formed. In other words, the end of the section is so softened that it will either expand or contract to conform to the size and shape of the other member end, whether it be inserted into or forced over it, whereupon the engaging surfaces of the telescoped ends become welded and in cooling are formed into an integral or continuous pipe for all practical purposes and capable of resisting internal pressure at this point as well as at any other.

The product of my improved process is adapted for a great variety of uses, but more especially for those uses wherein a line of pipe is used as a conduit for electrical conductors. Such conductors are usually insulated by being wrapped or covered and are commonly [illegible]he form of cables and are inclosed in a line of pipe or conduit. Such conduits have been composed of iron pipe, earthen tile, vitrified tile, wooden pipe, and more recently so-called "paper" pipe composed of bituminized fiber. The latter forms a good non-conductor. Owing to the fact that all such conduits require to be made in short sections presenting numerous joints, unless such joints can be made perfectly tight the use of such conduits will not attain complete success. The chief difficulty encountered has been that the joints, no matter how perfectly formed mechanically, could not be made sufficiently tight to prevent the entrance of liquids and gases or the escape of current when such electrical conduits are laid, as is frequently the case, in proximity to gas-pipes. The leakage of gas impregnates the earth surrounding the conduit, and the gas finds ingress to the interior of the conduit at the joints and passes through the same to the manholes, where the electrical conductors are joined. It is impossible to prevent sparking at these joints, and this sparking results in the ignition of the accumulated gas and frequently in violent explosions, resulting in damage to property and loss of life.

My improvement not only insures liquid and gas tight joints, but it also provides a perfectly-insulated joint which will prevent the passage of current and affords a practically-continuous line of pipe which maintains perfect alinement, thus making it possible to draw the cable more easily and to use a larger cable.

I claim as my invention—

The herein-described method of forming a continuous line of piping out of separate sections composed of bituminized fiber which consists in providing said sections with male and female joint members constructed to have a substantial telescopic engagement with each other, submerging one of the joint members in a bath of hot melted bitumen or bitumen compound, applying the heated and coated end of the section to the end of the corresponding previously-laid section and forcing the parts tightly together, whereby said sections become hermetically joined and to all intents integral.

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