No. 656,192. Patented Aug. 21, 1900.

A. H. HOWARD.

MANUFACTURE OF PIPES OR CONDUITS FOR ELECTRICAL CONDUCTORS.

(Application filed May 18, 1900.)

(No Model.) 2 Sheets—Sheet 1.

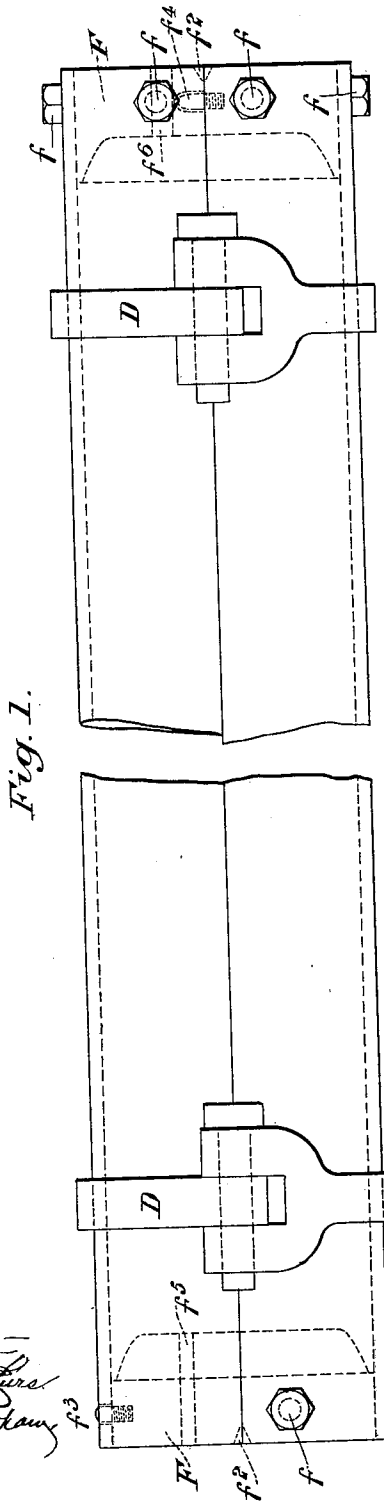


Fig. 1.

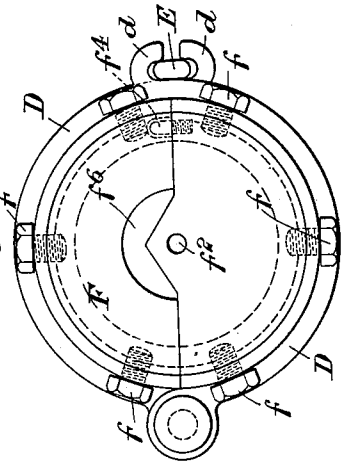


Fig. 2.

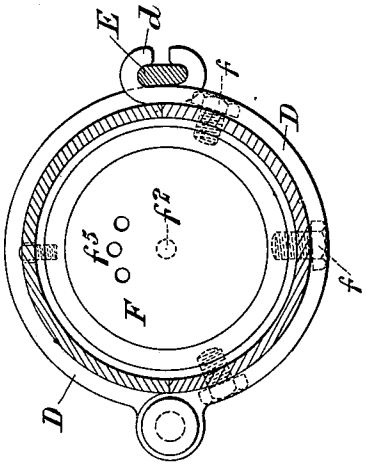


Fig. 2A.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 3.

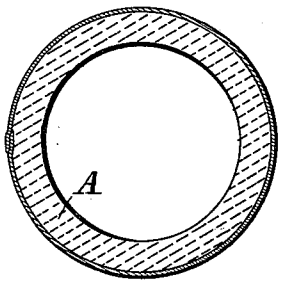


Fig. 4.

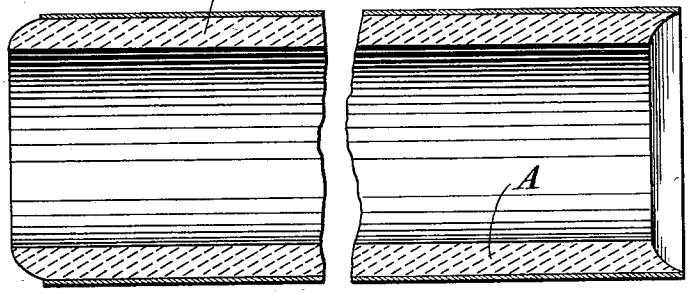


Fig. 5.

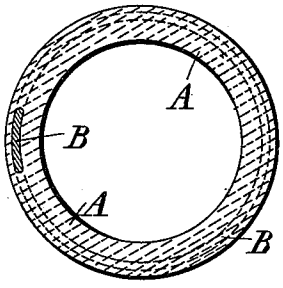


Fig. 6.

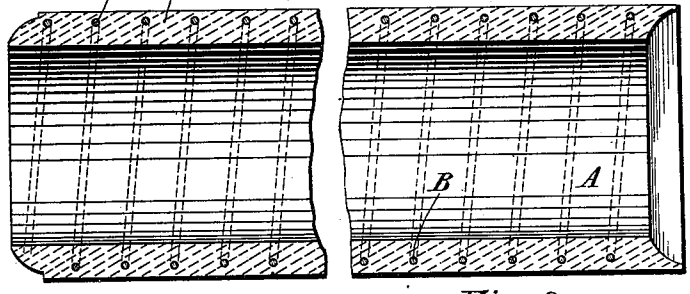


Fig. 7.

Fig. 8.

Fig. 9.

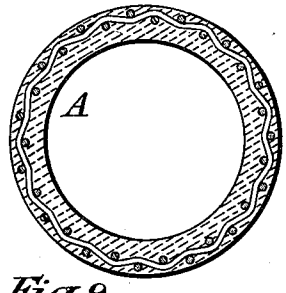
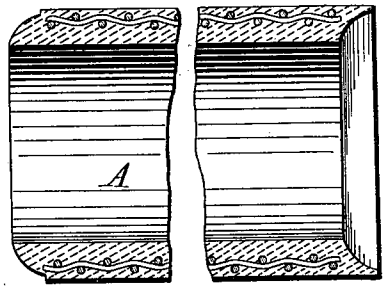
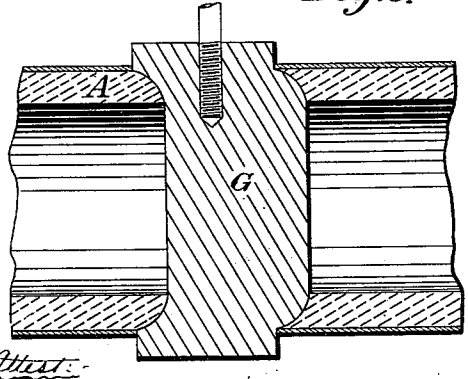
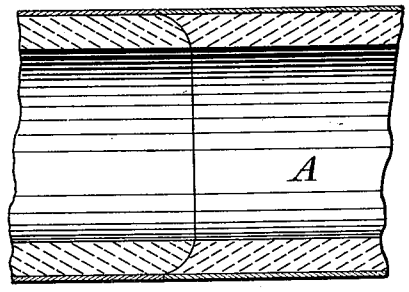


Fig. 10.







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UNITED STATES PATENT OFFICE.

ALBERT HARRIS HOWARD, OF LONDON, ENGLAND.

MANUFACTURE OF PIPES OR CONDUITS FOR ELECTRICAL CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 656,192, dated August 21, 1900.

Application filed May 18, 1900. Serial No. 17,166. (No model.)

To all whom it may concern:

Be it known that I, ALBERT HARRIS HOWARD, a citizen of the United States of America, and a resident of Queen Anne's Mansions, Westminster, London, England, have invented certain new and useful Improvements in the Manufacture of Pipes or Conduits for Electrical Conductors or for Conveying Liquids or Gases or for Analogous Purposes, (for which I have applied for a patent in Great Britain, No. 2,964, dated February 14, 1900,) which invention is fully set forth in the following specification.

The object of my invention is to provide means whereby bituminous matter, such as asphalt, (I will refer to the bituminous matter used as "asphalt,") which is not of a nature to enable it to be dealt with in the ordinary way of making pipes or conduits can be conveniently employed in making pipes or conduits suitable for electrical conductors or for conveying liquids or gases or for analogous purposes, whereby I provide a perfectly water-tight and gas-tight pipe or conduit which is light and easily manipulated and very economical in cost.

In the accompanying drawings I have illustrated apparatus by means of which I can carry my invention into effect and also portions of pipes or conduits produced in accordance with my invention, and I will refer to these drawings in describing my invention.

Figures 1 and 2 represent in elevations at right angles to one another, and Fig. 2^A in transverse section, a mold for use in making pipes or conduits in accordance with my invention. Figs. 3 and 4 are transverse and longitudinal sections of a pipe or conduit made in accordance with my invention. Figs. 5 and 6 and Figs. 7 and 8 are corresponding sections illustrating modifications of the pipes or conduits, and Figs. 9 and 10 illustrate the method of joining lengths of the pipes or conduits together.

According to my invention after rendering the asphalt, if necessary, sufficiently fluid or plastic—for example, by heat and admixture with ordinary bitumen—I place in a mold or in a tube in a mold (which tube will in that case form the outer skin of the pipe or conduit, while the asphalt forms the lining or main body of the pipe or conduit) sufficient asphalt to form the length and thickness of pipe or conduit required, and I rotate this mold (or mold and tube) by placing it in a lathe or otherwise at such a rapid rate as to cause the asphalt to fly outward under the action of centrifugal force and spread itself evenly and as a compact mass over the interior of the mold or tube. Although asphalt is a material possessing many desirable qualities for use in the manufacture of pipes or conduits, it should in order to render it capable of withstanding the pressures and strains to which such pipes or conduits are subjected be combined with a strengthening material, such as iron or other metal, and this may be so arranged that when necessary it will follow the deflections or movements of the pipe or conduit and at the same time act as a support thereto. By this construction the pipes or conduits can be bent as desired by heating them slightly and bending them slowly, and as asphalt even when cold is slightly plastic the said pipes or conduits will follow any moderate subsidence of the ground without fracture or injury to the joints. I therefore combine metal with the asphalt, which may be effected by placing a coil of wire or a tube of large-mesh interlaced wire in the mold and supporting it by distance-pieces or otherwise concentrically in the mold, the said coil or tube of wire being of such a diameter that it will be embedded in the asphalt and form a strengthening medium for the asphalt, while the asphalt will protect the metal from oxidation.

Figs. 1 and 2 illustrate a mold suitable for the purposes of this invention. The said mold is made in two longitudinal parts held together by jointed metal straps D and wedges E, driven in between the engaging claws *d* at the ends of the said straps. The end pieces F are fixed in place by screws *f* and are formed with recesses f^2 at the center of their outer sides, so that the mold may be placed in the lathe or apparatus, by which the necessary rotation at a high speed can be given to the mold to cause the asphalt to spread over the interior of the mold and be molded by the end pieces, the inner sides of the said end pieces being formed the one with a recess and the other with a projection to respectively form the projecting and recessed ends on the

pipe or conduit. In the arrangement shown one of the end pieces is fixed to the lower part of the mold and provided with a pin f^3 to enter a hole in the upper part of the mold and the other end piece is made in two parts, one fixed to the upper part of the mold and the other to the lower part of the mold, a pin f^4, secured to one half of the end piece, entering a hole in the other half. Thus the molded pipe or conduit can be removed without detaching the end pieces. f^5 are openings at one end, and an aperture f^6 is arranged between the two parts at the other end for the circulation of air. The upper half of the mold is removed and the asphalt poured into the lower half as evenly as possible. The mold is then closed and clamped and rotated rapidly, as described.

End pieces can, if desired, be applied to the iron tube which is to form the outer skin of the pipe or conduit, so that when the tube and end pieces are rapidly rotated, as explained with regard to the mold, the asphalt forms a lining to the said iron tube. A pipe or conduit thus formed is illustrated in Figs. 3 and 4. Figs. 5 and 6 represent a pipe or conduit with a wire coil B embedded in the asphalt A, and Figs. 7 and 8 represent a pipe or conduit with a tube of interlaced wires embedded in the asphalt. If desired, a number of molds (or of tubes with end pieces) can be combined in one rotating apparatus and be connected by gearing, so as to be driven from one motor. The interior of the mold should be lined with paper or coated with chalk or other material to prevent the adherence of the asphalt to the mold.

The rotation of the mold or tube should be continued until the asphalt is sufficiently cool to retain its shape. The cooling may be expedited by any suitable means for that purpose.

In order to join the lengths of pipe, I prefer to use a heating-iron shaped at its opposite sides to correspond with the projecting and recessed ends of the pipes or conduits. This heating-iron after being sufficiently heated is applied to the ends to be joined, as shown in Fig. 9, (where the heating-iron is marked G,) and then the heating-iron is removed and a thin coating of melted bitumen is applied to the said ends, which are pressed together and joined, as shown in Fig. 10.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I declare that what I claim is—

1. The process for the manufacture of pipes, or conduits, consisting in placing asphalt, or like bituminous matter, in a mold, or in a tube closed at the ends, and imparting rapid rotation to the mold, or tube, so as to cause the asphalt, or the like, under the action of centrifugal force, to spread out over the interior of the mold, or form a lining to the tube, as hereinbefore described.

2. The process for the manufacture of pipes, or conduits, consisting in placing a suitable metallic strengthening material in a mold together with asphalt, or like bituminous matter, and imparting rapid rotation to the mold so as to cause the asphalt, or the like, under the action of centrifugal force, to spread out over the interior of the mold, and surround the metallic strengthening material so that the said material becomes embedded in the asphalt.

3. The process for the manufacture of pipes, or conduits, consisting in placing asphalt, or like bituminous matter, in a mold, or tube, provided with end pieces to form the projecting and recessed ends of the pipes, or conduits, and then rapidly rotating the mold, or tube, so that the asphalt, or the like, under the action of centrifugal force, spreads itself over the interior of the mold, or of the tube, and the projecting and recessed ends of the pipes, or conduits, are formed by the end pieces substantially as hereinbefore described.

4. As a new article of manufacture, a pipe or conduit made of asphalt or like bituminous matter and a metallic strengthening matter embedded in said asphalt.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALBERT HARRIS HOWARD.

Witnesses:

WILLIAM GERALD REYNOLDS,

WILLIAM FREDERICK UPTON.