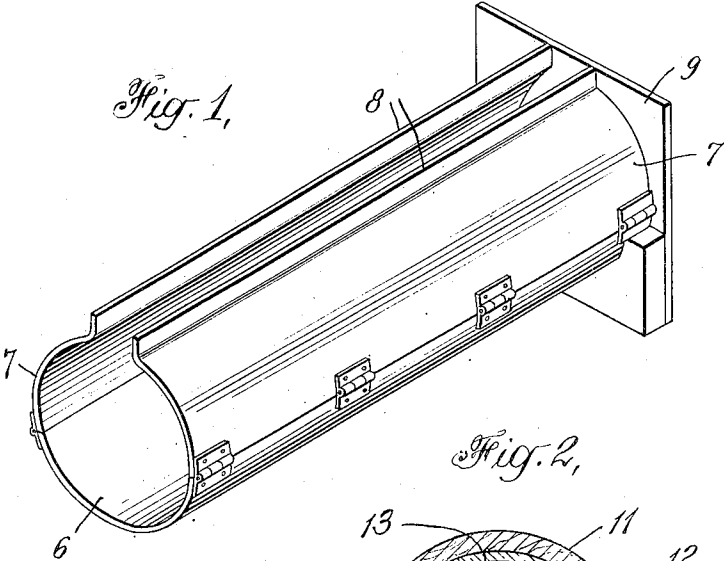
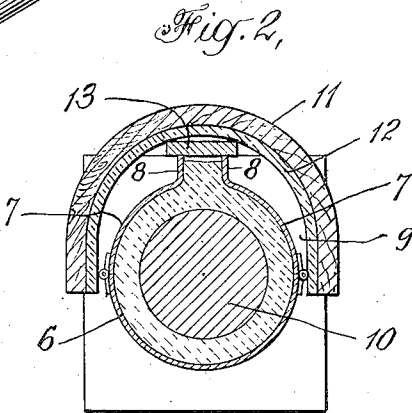
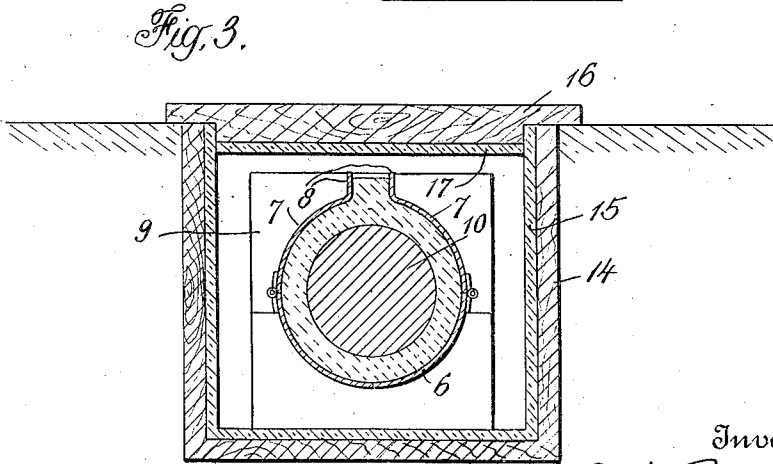


Dec. 11, 1923.

1,476,828

G. MONRATH  
ANNEALING MASTIC PIPE  
Filed July 22, 1919



Inventor  
Gustav Monrath  
By his Attorneys  
Pennie, Davis, Martin & Edwards

## UNITED STATES PATENT OFFICE.

GUSTAV MONRATH, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE BARBER ASPHALT PAVING COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF WEST VIRGINIA.

## ANNEALING MASTIC PIPE

Application filed July 22, 1919. Serial No. 312,476.

*To all whom it may concern:*

Be it known that I, GUSTAV MONRATH, residing at New York city, in the county of New York, State of New York, have invented certain new and useful Improvements in Annealing Mastic Pipes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the manufacture of asphalt mastic pipes, conduits, retainers, and the like, and has for its object the provision of certain improvements in the method of manufacturing such articles.

Asphalt mastic pipes, conduits, retainers, and the like are commonly made by pouring the mastic composition, heated to a sufficiently high temperature to secure the desired fluidity for casting, into an appropriate mold, and allowing the mastic composition to harden or set in the mold, whereupon the cast article is removed or separated from the mold in any convenient manner. Hollow cylindrical articles may be satisfactorily cast in a three-part mold having a semi-cylindrical base or bottom member to which are hinged, or otherwise suitably attached, covers or top members in the form of sector-shaped quadrants. The covers are spaced apart at their upper edges and are provided with vertical flanges or walls forming a trough along the entire length of the mold into which the fluid material is poured. The cast article thus has an integral longitudinal rib or foot formed by the mastic material in the trough of the mold.

In the manufacture of asphalt mastic pipes, conduits, and the like, in molds of the foregoing type, I have found it to be of importance to control the contraction and cooling of the asphalt mastic material after it has been poured into the mold, so as to prevent an uneven cooling off of the rib or foot of the pipe exposed to the air. The cooling off of the exposed rib of the casting causes the cooled portion to become hard and inflexible and thereby prevents the natural contraction of the mastic material with the attendant formation of a compact mass, thus causing the finished casting to be spongy or permeated with minute blisters and consequently liable to leak.

The present invention aims to overcome these difficulties and contemplates a slow cooling or annealing of cast asphalt mastic articles whereby the casting is permitted to contract into a compact mass, thus securing a homogeneous product. In carrying out the invention I have secured satisfactory results by covering the trough of the hereinbefore described type of mold with an inverted wooden trough lined with heavy asbestos and extending well down over the sides of the mold, and thereby slowly and gradually cooling the article as a whole while also specially retarding the cooling and solidification or hardening of the upper portion of the casting. This allows the material in the bottom of the mold to cool first and, during the contraction of the material, enables the still fluid material in the upper part of the mold to replenish the material in the lower portions thereof. In this manner the casting cools slowly or gradually from the bottom up, and the natural contraction of the casting as it cools is offset or compensated for by the overlying body of still fluid material in the upper part of the mold.

The cooling of the rib or foot of the casting may, if desired, be further impeded or delayed by appropriate means. Thus, I have found it of advantage, in certain cases, to cover the open trough of the mold with a bar of iron heated to a temperature of from 300° F. to 400° F. This heated bar of iron is large enough to cover the open trough of the mold, and is placed in position after the mold has been filled with the fluid mastic material, whereupon the mold is covered with the inverted asbestos lined trough hereinbefore described.

In the manufacture of cast asphalt mastic articles in general, I have found that a uniform slow cooling or annealing of the casting is of especial advantage in the production of a compact and homogeneous product. To this end, I have found it satisfactory to provide annealing boxes of insulating material, such, for example, as wood with an asbestos lining. I have also used with advantage plain wood boxes buried in the ground flush with their tops and covered with a tight fitting lid. The filled molds are placed in these annealing boxes or vaults immediately after the pouring of the fluid mastic material, and are allowed to

remain therein until the castings have completely cooled off.

The invention is further illustrated in the accompanying drawings, in which Fig. 1 is a perspective view of a molding apparatus of the type hereinbefore referred to for producing hollow cylindrical articles; Fig. 2 is a sectional view illustrating the mold filled with the asphalt mastic composition and provided with an inverted trough for controlling the cooling of the casting in accordance with the principles of the invention; and Fig. 3 is a sectional view of a mold filled with asphalt mastic composition cooling in an annealing vault in the ground.

The mold represented in the accompanying drawings may be made of rolled iron or other appropriate material. The lower half of the mold is a semi-cylindrical member 6 to which are hinged the quadrant-shaped upper members 7. The members 7 terminate at their tops in flanges 8 spaced apart and extending upwardly to provide therebetween an opening of, for example, three to five inches in width, depending upon the size of the pipe to be cast. This opening between the flanges 8 provides an open trough at the top of the mold into which the hot fluid material may be poured, and at the same time enables a rib or foot to be formed integrally as a part of the pipe.

The mold is provided with end plates 9 which permit the core 10 to be inserted and removed and accurately centered and supported thereby and which will also permit ready removal of the finished casting. The core 10 is preferably of the collapsible type so as to facilitate its removal from the hardened casting.

The asphalt mastic composition, heated to a sufficiently high temperature to secure the desired fluidity for casting, is poured into the substantially horizontal mold through the open trough at the top thereof. The mold is then covered with an inverted heat insulating trough, as indicated in Fig. 2 of the drawings. This trough, as shown in the drawings, comprises a wooden member 11 lined with a heavy layer of asbestos 12. The trough 11-12 extends well down over the sides of the mold and maintains the mastic material in the upper part of the mold in a fluid condition until the mastic material in the lower part of the mold has set or hardened. As previously explained, a source of heat may be applied above the open trough of the mold for assisting in maintaining the mastic material in the upper part of the mold in a fluid condition until after the setting of the material in the lower portion of the mold. Thus, in Fig. 2 of the drawings, I have illustrated a bar of iron 13 which is heated to a temperature of from 300° F. to 400° F. and placed over the open trough of the mold, whereupon the mold is covered

with the inverted insulating trough 11-12.

In Fig. 3 of the drawings, there is represented an annealing vault buried in the ground with its top flush with the surface of the ground. The vault, as shown in this figure, is composed of an outer wooden box 14 provided with an asbestos lining 15. As previously mentioned, the asbestos lining 15 may be omitted when the annealing box is buried in the ground, and where the annealing box is provided with a thick asbestos lining, it will generally be unnecessary to bury it in the ground, in order to secure satisfactory cooling of the casting. The mold is filled with the fluid mastic material in the usual manner and immediately placed in the annealing vault, and the vault is then closed with a tight fitting cover 16 which may also have an asbestos lining 17. The mold is kept in the annealing box until the casting has completely cooled off, and is then removed from the box and the casting taken out of the mold.

From the foregoing description, it will be observed that the invention contemplates a slow and gradual cooling of the asphalt mastic casting, under thermal conditions, permitting natural contraction of the casting and the formation of a compact homogeneous product. Furthermore, the casting is cooled under such conditions as to prevent the premature setting of a portion thereof and the consequent formation of imperfections as a result of the contraction of subsequently setting portions of the casting. An annealing of the casting is thus produced as a result of the slow and gradual cooling thereof, and a more compact and homogeneous product can be thereby obtained than by any heretofore customary method of casting asphalt mastic articles with which I am acquainted.

In the modification of the invention illustrated in Fig. 2 of the drawings, the inverted trough 11-12 acts as a heat retaining member, and may be of any desired shape and size. Preferably, it conforms more or less closely in configuration to the contour of the mold, so as to prevent the entrance of cold air into the space between the mold and the shield or trough, with the attendant objectionable chilling effect upon the material in the mold.

I claim:

1. The improvement in the casing of articles from molten asphalt mastic which comprises slowly cooling the casting, under thermal conditions permitting natural contraction thereof, so as to assure the formation of a compact homogeneous product; substantially as described.

2. The improvement in the casting in molds of articles from molten asphalt mastic which comprises gradually cooling the casting, while in the mold, under conditions pre-

venting the premature setting of a portion of the casting, so as to obviate formation of imperfections as the result thereof; substantially as described.

5 3. The improvement in the casting in molds of asphalt mastic pipe which comprises slowly and gradually cooling the casting as a whole in the mold, so as to permit gradual contraction and hardening of the  
10 cast pipe into a compact, homogeneous solid mass.

4. The improvement in the casting in molds of articles from molten asphalt mastic which comprises slowly and gradually cooling the casting as a whole while specially  
15 retarding the cooling of its upper portion, so as to permit contraction of the casting into a compact, homogeneous mass.

20 5. The improvement in the horizontal casting in molds of asphalt mastic pipe which comprises slowly and gradually cooling the casting as a whole in the substantially horizontal mold while specially retarding the cooling of its upper portion.

25 6. The improvement in the casting of articles from molten asphalt mastic in a mold having an open trough at the top thereof which comprises slowly cooling the casting while in the mold from the bottom up and  
30 thereby maintaining the material in the upper portion of the mold in a fluid condition until the material in the bottom of the mold has set; substantially as described.

35 7. The improvement in the casting of articles from molten asphalt mastic in a mold having an open trough at the top thereof

which comprises causing the casting to set in the mold from the bottom up and replenishing the material in the lower portion of the mold during its contraction by the  
40 overlying body of the still fluid material in the upper portion of the mold; substantially as described.

8. The improvement in the casting in molds of articles from molten asphalt mastic  
45 which comprises insulating the upper portion of the mold to cause the casting to set in the mold from the bottom up; substantially as described.

9. The improvement in the casting of articles from molten asphalt mastic in a mold having an open trough at the top thereof which comprises applying a source of heat above the open trough of the mold for maintaining the material in the upper portion of  
50 the mold in a fluid condition until the material in the bottom of the mold has set; substantially as described.

10. The improvement in the casting of articles from molten asphalt mastic in a  
60 mold having an upper trough at the top thereof, which comprises applying a source of heat above the open trough of the mold and insulating the upper portion of the mold to cause the casting to set in the mold from  
65 the bottom up and to maintain the material in the upper portion of the mold in a fluid condition until the material in the bottom of the mold has set; substantially as described.

70 In testimony whereof I affix my signature.  
GUSTAV MONRATH.