

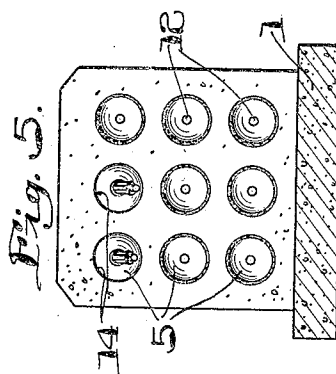
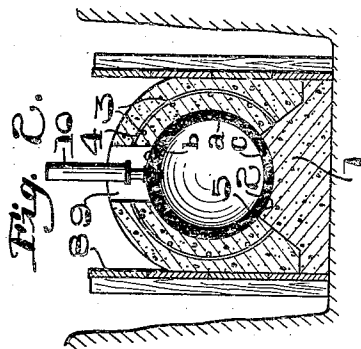
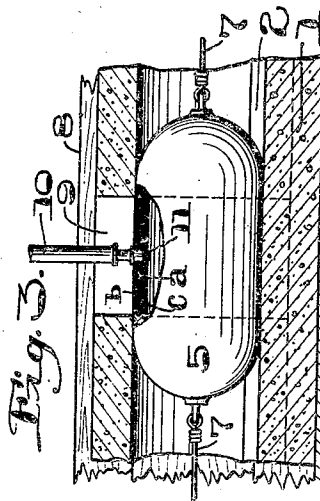
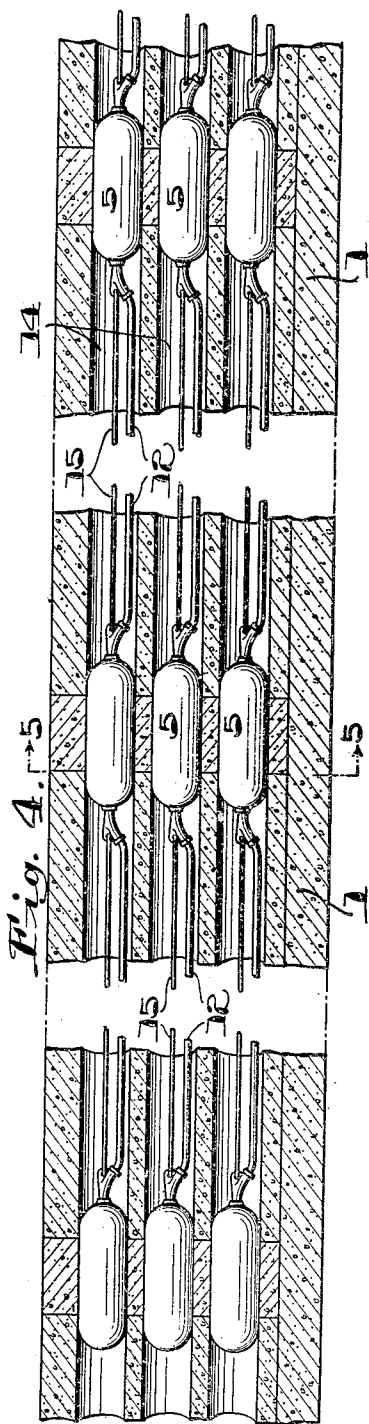
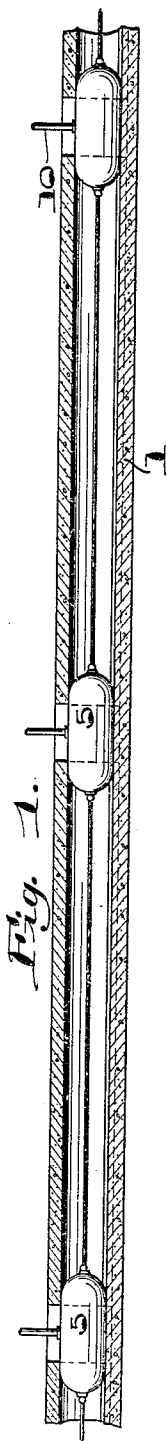
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DEVICE FOR CONSTRUCTING LONG CULVERTS OR CONTINUOUS CONCRETE TUBES

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DEVICE FOR CONSTRUCTING LONG CULVERTS OR CONTINUOUS CONCRETE TUBES

Application filed October 26, 1928. Serial No. 315,297.

This invention relates to an improvement in a device for constructing long culverts or continuous concrete tubes for sewers and cable ducts and the like.

The method of constructing culverts by using a core for moulding concrete culverts consisting of an outer tube made of elastic substance smaller in diameter than the bore to be formed, and an inner tube of flexible but substantially non-expansible material, stuffed in said outer tube and larger in diameter than said outer tube is known in Nose's U. S. Patent No. 1,570,915. That method, however, is accompanied by many disadvantages in constructing a long culvert. For example, the lack of support for a moulding core causes it to float up on account of the upward pressure due to the weight of liquid concrete and consequently a straight bore cannot be obtained. That method has no means for facilitating the manufacture of long tubes. Therefore, it involves considerable time and expense. Besides, the cores used have such drawbacks that they are heavy and apt to be damaged. Moreover, they are too weak to resist pressure.

A primary object of this invention is to provide means for supporting the core in its position so as to prevent the cores from becoming uneven on account of the upward pressure due to the weight of liquid concrete.

Another object is to provide means for laying a long culvert, which consists of several sections made at the same time, each connected with the adjacent one by using the bag-like cores connected in series. Thus, the time and cost for manufacturing long culverts are considerably economized. Another object is to obtain novel cores suitable for manufacturing long light culverts of concrete or the like such as resist the pressure of fluid.

In the accompanying drawings,

Fig. 1 is a longitudinal sectional view of a general arrangement for manufacturing a long culvert,

Fig. 2, a cross sectional view of a part of the long culvert manufactured according to this invention,

Fig. 3, is a longitudinal sectional view showing the method of connecting the parts

moulded separately by a core according to this invention,

Fig. 4, a front sectional view showing the process of manufacturing a cable duct.

Fig. 5, a cross sectional view of the same.

In Figs. 1 to 3, 1 is a concrete stand laid longitudinally along the bottom of a concrete duct having its upper surface 2 curved to coincide with the curvature of the bore. 3 and 4 are longitudinal and circular bars of iron-reinforcement respectively. 5 is a core made of an inner and an outer flexible tube *a* and *b* respectively, and an intermediate member *c* of canvas or fabric interwoven with metallic wire. Core 5 is of closed-bag shape with a small inlet opening at one side and two connecting means 7 at both ends.

In the moulding operation, the concrete stand 1 is first laid out to the full length to be moulded. Then, the moulding cores are placed in series, and the iron reinforcement placed in its position. The concrete is then poured between the plate 8 and the inflated cores. Thus, many sections of a continuous culvert may be moulded at the same time, leaving a short space designated 9 between the adjacent sections.

According to this invention, after drawing out the moulding cores (not shown in the drawings), short bag-shaped cores are introduced into the bore in the space to be connected. Air supply pipes 10 are inserted through the inlet mouth 11, and air or other fluid is supplied to the bag to inflate it to its full diameter. Then, concrete is supplied to the space to form a connection for two adjacent sections. After the air supply pipe is removed, the core is exhausted and can be drawn out easily from one end of the culverts. The small openings left by drawing out the supply pipe 10 may be closed without any trouble. Thus, long culverts are made with least possible time and expense.

Figs. 4 and 5 show the process of moulding cable ducts according to this invention. The cable ducts include many long holes 14 arranged vertically and horizontally. In this case, the ducts are divided into many sections which are moulded in a similar way as explained before, but the air-supply pipes

such as shown in Figs. 1 to 3 cannot be used because it is impossible to draw them out. Thus, the cores used to form a connection for the sections of a duct are connected by a flexible air pipe 12 end to end and may be connected by strings or ropes 15. After the sections are moulded leaving open spaces between them, the above-mentioned cores are inserted in their positions and supplied with suitable fluid from one end of supply pipes to inflate the core to its full diameter and the concrete is supplied to mould connections around the cores. The fluid in the cores is discharged and the cores are drawn out from one end of the duct. Thus, the continuous cable duct is completed.

The core 5 consists of an outer tube *b*, an inner tube *a* and an intermediate layer *c*. The outer tube *b* is formed of elastic and expansible material such as india rubber and its outside diameter is a little smaller than the diameter of the bore to be formed, but it can be expanded to the diameter of the bore. The inner tube *a* may also be formed of india rubber; and the intermediate layer *c*, of canvas, fabric or the like interwoven with metallic gauze wire or otherwise.

The core may also be formed of canvas or fabric interwoven with metallic wire or otherwise, the inner and outer surfaces being both lined with thin layers of india rubber.

Claims:

1. The method of forming continuous tubes which consists in laying a continuous base, moulding on said base a plurality of short tube-forming sections in separated end-to-end relation, inserting inflatable cores in the spaces between adjacent sections with the ends of said cores extending into the opposing ends of the sections, inflating said cores, filling the spaces around the inflated cores with tube-forming material, deflating said cores and withdrawing them through one end of the tube.

2. The method of forming continuous tubes which consists in laying a continuous base, moulding on said base a plurality of short tube-forming sections in separated end-to-end relation, inserting inflatable cores in the spaces between adjacent sections with the ends of said cores extending into the opposing ends of the sections, connecting said cores in series for inflation from a single source of fluid supply, inflating said cores, filling the spaces around the inflated cores with tube-forming material, deflating said cores and withdrawing them through one end of the tube.

3. A core for forming continuous tubes, comprising a plurality of short inflatable members connected together in spaced end-to-end relation, means for inflating said members when in tube-forming position, and means for withdrawing said members as a unit from one end of a completed tube.

4. A core for forming continuous tubes, comprising a plurality of short inflatable members, tubes connecting said members together in spaced end-to-end relation for inflation from a single source of fluid supply, and means for withdrawing said members as a unit from one end of a complete tube.

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