

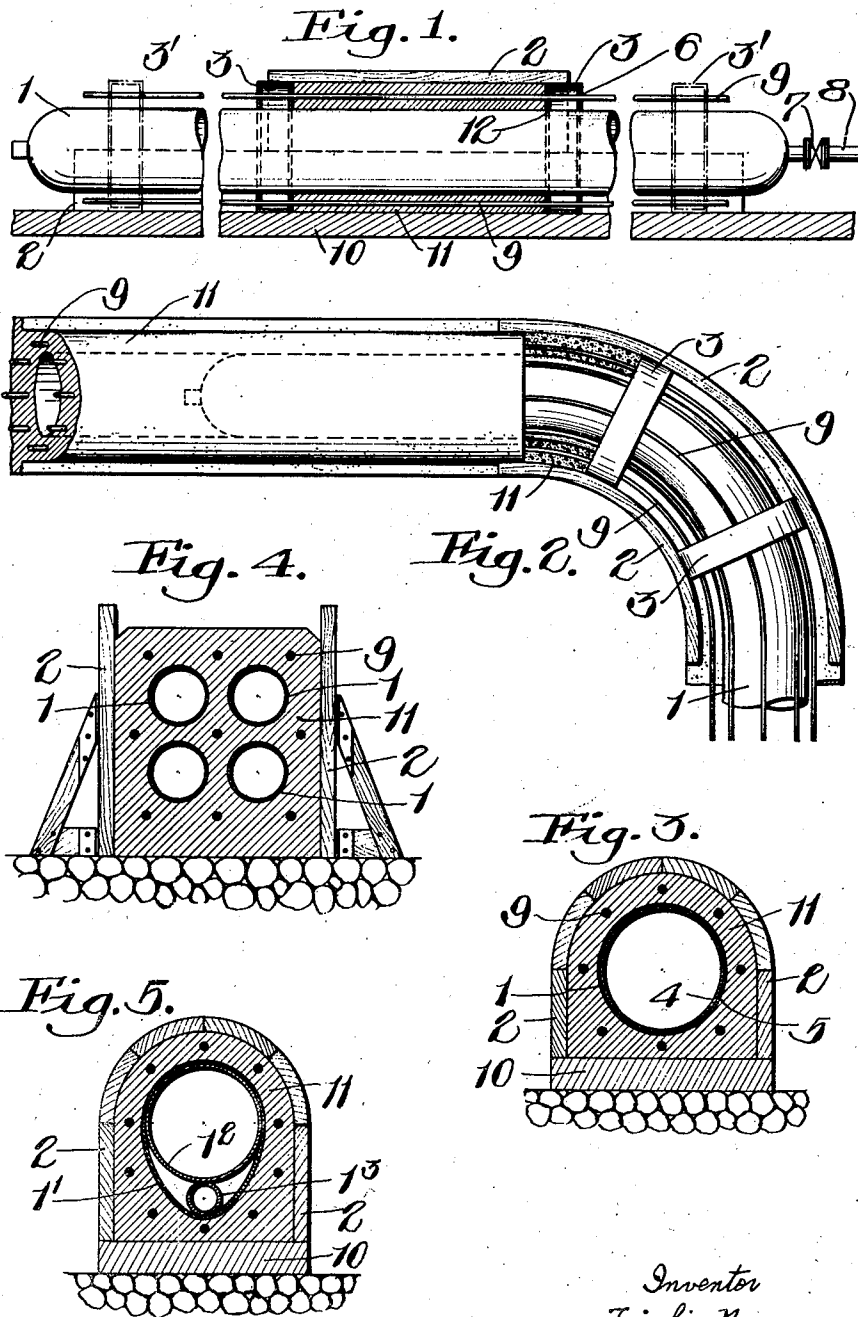
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PROCESS OF CONSTRUCTING CULVERTS OR PILES OF CONCRETE

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PROCESS OF CONSTRUCTING CULVERTS OR PIPES OF CONCRETE.

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This invention relates to a process of constructing culvert or pipes of concrete of any desired length, consisting in a long flexible hollow core to be placed within outer frames, forcing into the core a fluid, filling in the space between the outer frames and the core with concrete, when the concrete has set, withdrawing the core from the culvert or tube thus formed by exhausting the fluid of the core, constructing outer frames continuous to the former, supporting the withdrawn core at its position, filling in the space between the outer frames and the core, with concrete so as to form culverts or tube continuous to one already formed, and by repeating the same process, forming culvert or tube of any desired length. The object of this invention is to construct by simple means a culvert or tube of any desired length, either straight or curved, without any joint.

The accompanying drawing shows an example of carrying this invention into practice, of which—

Fig. 1 is a longitudinal vertical section;

Fig. 2 shows in sectional plan method of forming a curve continuous to a straight culvert already formed;

Fig. 3 is a cross sectional view of another example; and

Fig. 4 is also a cross sectional view of another example, and

Fig. 5 is a cross section of a culvert with oval core, which can also be constructed by this invention.

My invention is a process of constructing culverts or any tubular body of concrete to be used as aqueducts or sewers, for laying electric cables or other purposes, to be laid down either under or above ground, to be constructed at the place where they are to be laid down, or anywhere else, of any desired length without a joint and of any shape, either straight or curved; and to carry my invention into practice I use a core (1), outer frames (2), core supporters (3), and an air compressor or water pump to force air, or water, into the core.

The core (1) is a long bag, the inner layer (4) of which is india-rubber and outer layer (5), a strong duck, or may be made of any suitable materials of flexible and air, or water, tight nature. At its one end the core has a hole to admit or discharge a fluid, and is provided with a valve, or cock (7). A pipe (8) connects this hole

with the compressor or pump, by which a fluid is to be forced into the core. The outer frames (2) consist of two side boards, with or without upper boards hinged or latched together so that they can be opened or closed at will. The core supporters (3) are of the same breadth as the outer breadth of the culvert to be constructed and has a hole or holes (12) to receive the core (1) and around the hole or holes (12), there are smaller holes (6) to insert iron bars for reinforcing the concrete.

The accompanying drawing shows an example of constructing a culvert at the place where it is to be placed, and the process as shown in Figs. 1, 2 and 3, is as follows.

At the place where a culvert is to be constructed, either under or above ground, piles are first driven, and ground work (10) of concrete is formed thereon. Then side boards (2) are erected on the ground work with a space between them equal to the outer breadth of the culvert to be constructed. Between these side boards are placed two or more core supporters (3), and the core besmeared with fat or the like substance is inserted in the hole (12). Iron bars (9) are also inserted in the smaller holes (6). The air or water is forced into the core until it is perfectly filled, and the space between the core and the outer frames is filled with concrete (11). In filling the space with concrete it is preferable to commence at the middle part, or an end, and continue the work of filling with concrete towards ends, or end, removing the core supporters or supporter, as required. As is shown in Fig. 1, the filling work is commenced at the middle part. Two core supporters are placed near the middle of the core with such a space between them that the core does not bend at that part, and concrete is filled in. Then remove the core supporters to places as at (3'), and fill the spaces at the places between the concrete already filled in and the core supporters at their new positions. Repeat the work until the whole length of the core is covered. Then cover the soft tube thus constructed with upper side board, secure it with latches or the like and give further pressure to the core, in order to press the tube from inside and make the concrete more compact.

After some time when the concrete thus filled is set, drain off the fluid from the

core, and thus reducing its size, withdraw it out, and construct the outer frames and secure the core as before adjacent the tube already constructed, and repeat the work of filling in concrete until the required length is reached.

Fig. 2 shows an example to construct a curve continuous to a straight tube already constructed. To do this, the foundation work and the outer frame are constructed in the required curve, the core supporters are placed at a suitable distance between the outer frames, the core is inserted in the holes (12) and the core of the tube already formed, and iron bars (9) are passed through the smaller holes (6) of the core supporters. Then the core and bars will take a curved shape, and even if the former is filled with the fluid, it will remain in that shape. Then fill in concrete as before described, removing the core supporters as soon as the space between the formed tube and the next core supporter is filled up with concrete. In this way, a desired curve of the tube can be formed.

Fig. 4 shows another example of forming a concrete culvert pipe with several cores for laying down electric cables or for other purposes. In this case the core supporters having as many bores (12) as required, and as many cores are used. In other details of the work, it is the same as before. But as shown in Fig. 4, the upper side of the outer frame is not formed, and the process of giving the last pressure to the cores in order to make the concrete body more compact, is entirely dispensed with.

This invention may also be used to construct a culvert having a bore of a shape other than round.

Fig. 5 shows an example of forming a bore of oval shape. In this case a core (1¹) with two inner cores, one larger (1²) and the other smaller (1³), is used. If all the outer and inner cores are filled with a fluid the outer core will assume an oval shape, as shown in Fig. 5.

To sum up, a continuous culvert of any length without any joint can be constructed by a simple means at the place where it is to be laid down. A curve of any desired shape may also be formed, with a smooth bore. It goes without saying that this invention may be applied in constructing tubes of concrete of any form.

Claims:—

1. The process of constructing concrete culverts having passageways of a form other than circular in cross section, which consists in preparing an outer form, supporting within said form in spaced relation thereto a collapsible fluid-tight envelope, enclosing in said envelope a plurality of fluid-tight envelopes of different sizes and adapted when all of the envelopes are filled, to impart the desired form to said first collapsible envelope, forcing a fluid into said envelope thereby to inflate the same and form a core, pouring concrete into the space between the core and outer form and leaving said concrete to set, discharging the fluid from said core thereby to cause the envelope to collapse, withdrawing said envelope less than its full length from the set material, reconstructing an outer form around the withdrawn envelope in spaced relation thereto, supporting the free end of the envelope, and repeating the operations of inflating the envelope and pouring concrete into the space between said envelope and the form thereby to produce a culvert of any desired length.

2. The process of constructing concrete culverts having passageways of oval form in cross section, which consists in preparing an outer form, supporting within said form in spaced relation thereto a collapsible fluid-tight envelope, enclosing in said envelope two fluid-tight envelopes one larger than the other and adapted when all of the envelopes are filled to impart an oval form to said first collapsible envelope, forcing a fluid into said envelope thereby to inflate the same and form a core, pouring concrete into the space between the core and outer form and leaving said concrete to set, discharging the fluid from said core thereby to cause the envelope to collapse, withdrawing said envelope less than its full length from the set material, reconstructing an outer form around the withdrawn envelope in spaced relation thereto, supporting the free end of the envelope, and repeating the operations of inflating the envelope and pouring concrete into the space between said envelope and the form thereby to produce a culvert of any desired length.

In testimony whereof I have signed my name to this specification.

TOICHI NOSE.