Jan. 26, 1926. 1,570,915

T. NOSE

DEVICE FOR CONSTRUCTING CULVERTS OF CONCRETE

Filed March 2, 1925

Fig. 1.

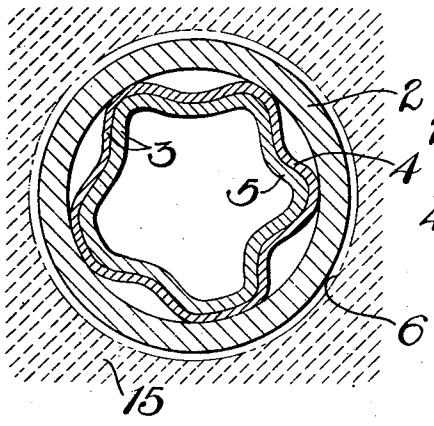


Fig. 2.

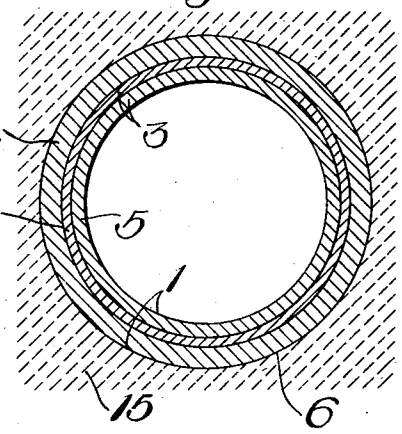


Fig. 3.

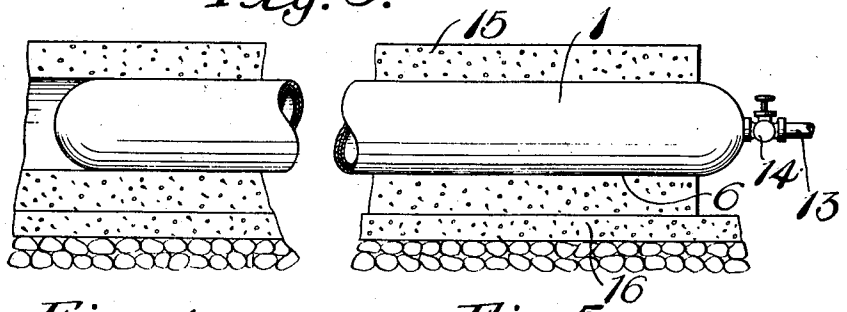


Fig. 4.

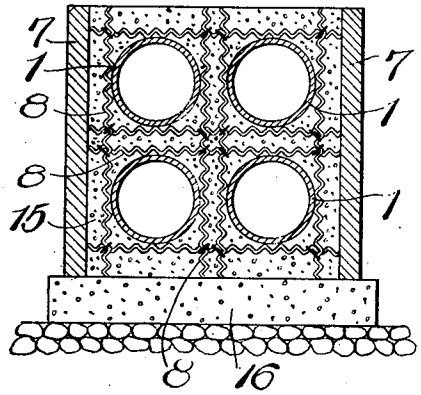
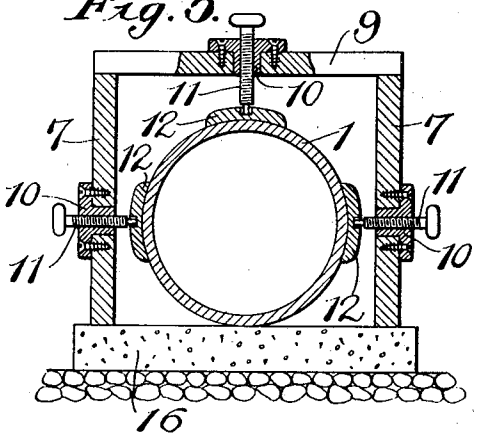


Fig. 5.



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DEVICE FOR CONSTRUCTING CULVERTS OF CONCRETE.

Application filed March 2, 1925. Serial No. 12,629.

To all whom it may concern:

Be it known that I, TOICHI NOSE, a subject of the Emperor of Japan, residing at No. 86, Nikaido, Kamakura Machi, Kamakura Gun, Kanagawa Ken, Japan, have invented new and useful Improvements in a Device for Constructing Culverts of Concrete, of which the following is a specification.

This invention relates to a device for constructing culverts, especially long, continuous tubes of concrete, for sewer, cable ducts and so on.

The method of constructing culverts, using, to form internal bore, a flexible bag-like core filled with a fluid, such as the steam, air, water, or the like, and when the concrete filled around the core, has set, withdrawing it from the molded work by loosening it, is already known. But in such method, the core when tightened by the pressure of the fluid, should not become larger than a definite diameter. Consequently it has hitherto been made of non-extensible material, such as cotton fabric lined with india rubber, and when the pressure of the fluid is withdrawn, the core becomes loosened, but does not become smaller. Thus when to withdraw it from the formed product, on account of the friction and the collection of the remaining fluid in an end making that part inflated and tightened, a great difficulty is felt in withdrawing it, the difficulty being greater when the formed product is curved.

Now, the chief object of this invention is by improving the construction of the core to make it expand to a required size when inflated with a fluid, and when it is exhausted, it becomes smaller, along the whole length, leaving a space between it and the molded product and making it very easy to pull out. Another object is to obtain a product having a smooth bore without damaging the film. Still another object is to obtain a simple device for supporting the core at a proper position within the outer frame.

The accompanying drawing shows a convenient form of my invention, of which,

Fig. 1 is a cross sectional view of the core when it is not inflated with inner pressure;

Fig. 2 is also a cross sectional view when the core is inflated;

Fig. 3 is a view showing a side elevation of the core and a longitudinal section of the culvert;

Fig. 4 is a sectional view of cable ducts showing a means for supporting the cores in proper position in the outer frame; and

Fig. 5 is a sectional view showing another means for supporting the core.

In Fig. 3, (1) is a flexible bag-like core; (13) is a pipe for supplying a fluid under pressure; (14) is a stop valve or cock; (16) is ground work of a concrete culvert; and (15) is a concrete culvert formed. The core (1), consists of an outer tube (2) and inner tube (3), as shown in Figs. 1 and 2, the latter being made with a substantially unextensible and flexible material such as cotton or flax fabric, leather or the like. In the figure, it is shown as made with such fabric (4) lined with india rubber (5). The outer tube (2) is formed with elastic and extensible material such as india rubber, so as its outside diameter is a little smaller than the diameter of the bore to be formed, but it can be expanded to diameter of the bore (6). The inner tube is inserted in the outer tube, so that if not pressed, it will remain folded within the india rubber tube as shown in Fig. 1. But if it is inflated with a fluid, the outer india rubber tube is also expanded, and the whole is enlarged to a size equal to the bore to be formed.

If the molded product to be formed is straight, strips of stiff material such as bamboo, or the like, may be longitudinally placed between the outer and inner layers (4) (5) of the inner tube, to give a strength and rigidity to the core.

If the core of this invention be placed in the proper position within the outer frame, and filled with a fluid it will expand to its fullest size, as shown in Fig. 2. Then the outer frame is filled with concrete, and if the fluid be taken out after the concrete has set, the outer tube of the core, which is made of india rubber, rebounds to its original size, thus leaving a space between the bore formed and the core itself; and it is very easy to withdraw it, even if it is very long or the bore is curved. Moreover the outer tube being made of india rubber, the bore formed is made very smooth without damaging the film.

The core (1), in the work above described, must be supported at a proper position. One device for this purpose chiefly to be used in molding ducts of cable, is shown in Fig. 4. In the same figure, (8) are re-enforcing bars, which are put together vertically and

horizontally, thus forming square holes one for each core and placed within the outer frame (7). Then the outer frame is filled with concrete with one core in each square. These re-enforcing bars are preferably bent zigzag, or corrugated as shown in the figure, and they will appear very little in the surface of the bores.

Fig. 5 shows another device for supporting cores, which is adapted to be used for culverts having a large bore. In this device, screwed bushes (10) are fixed to two sides of the outer frame and to the beams (9) which connect the sides, and screwed spindles (11) are driven in them with supporting pieces (12) revolvably mounted at their ends. If these spindles are properly adjusted, the core can be steadily supported at its proper position. The screwed spindles (11) are arranged in circumferential and longitudinal rows at suitable distances apart, these spindles being removed successively from one end of the core to the other as the concrete is applied in like manner from end to end, each circumferential series of spindles being removed before the concrete is applied to the adjacent portion of the core.

In Fig. 4 and also Fig. 5, the supporting members are connected with outer frame, and consequently the core can be upheld at a proper position within the outer frame. Moreover, as the core is supported not only from both sides, but also from the top, when concrete is poured into the outer frame, there is no fear of the core floating.

Claims—

1. A core for molding culverts of concrete consisting in the outer tube made of elastic substance smaller in diameter than the diameter of the bore to be formed, and thrusted therein an inner tube of flexible but substantially unextensible material, larger in diameter than that of the outer tube.

2. A core for molding concrete culverts, consisting of an outer tube of india rubber, and inner tube of a flexible material such as cotton or hemp fabric, leather or the like lined with india rubber.

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

TOICHI NOSE.