Feb. 3. 1925. 1,525,087

T. E. MURRAY

MAKING MOLDED CONDUITS

Filed June 28, 1924 4 Sheets-Sheet 1

Fig. 1.

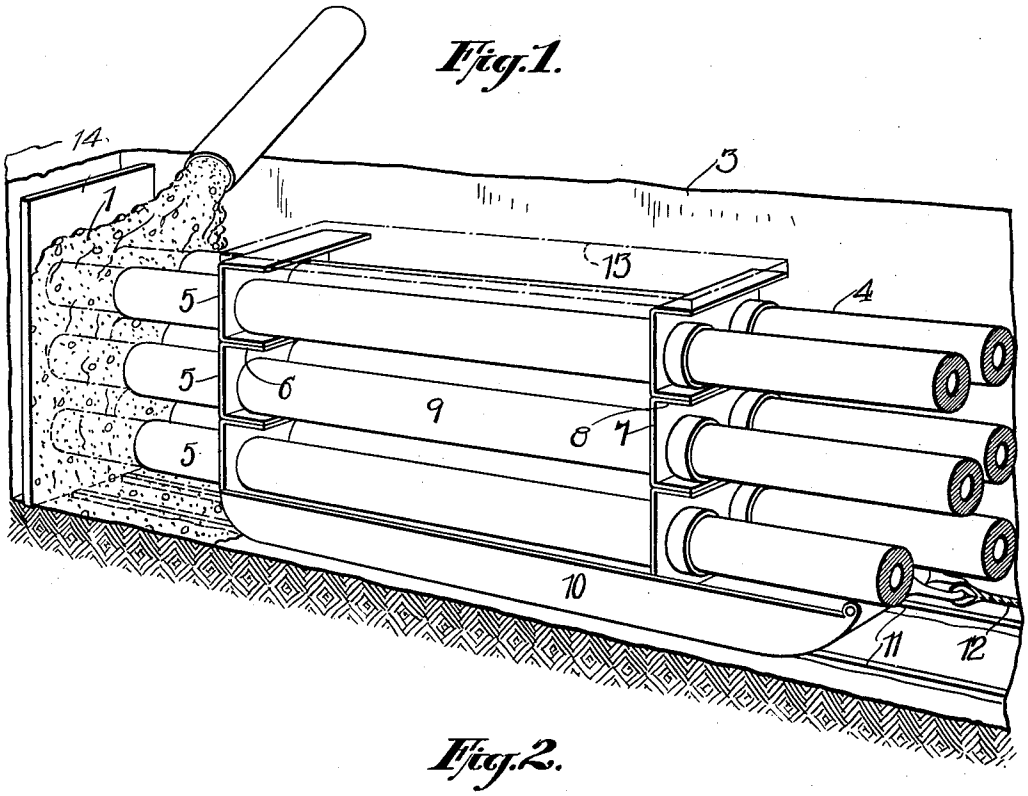
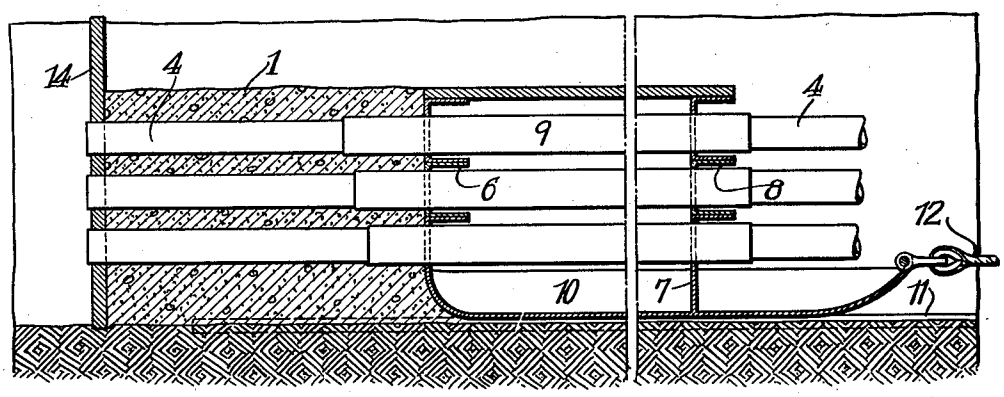


Fig. 2.



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Fig. 3.

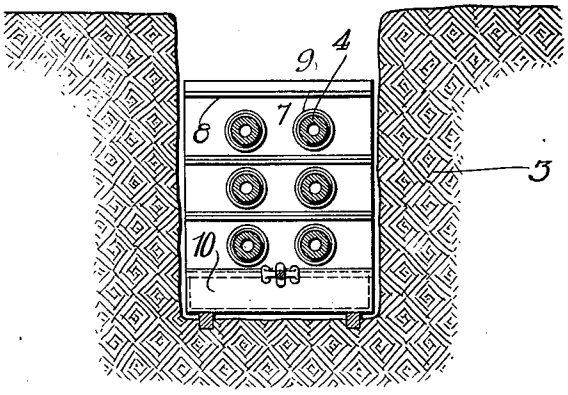


Fig. 4.

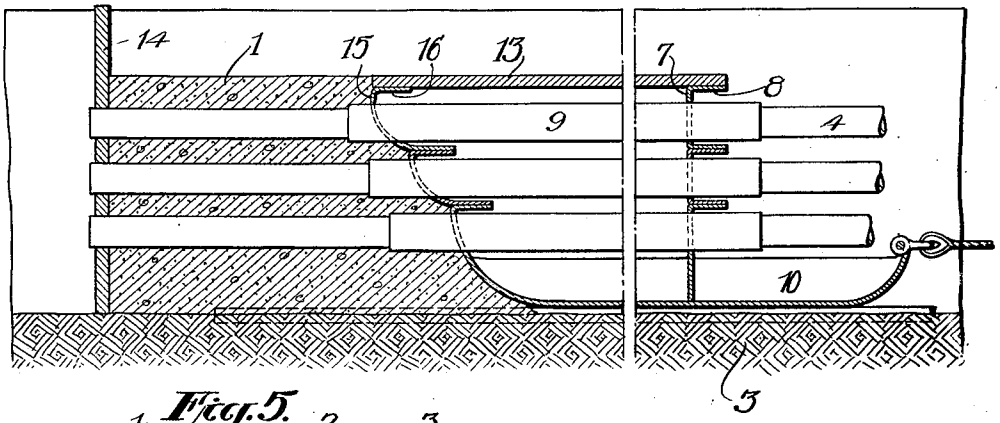
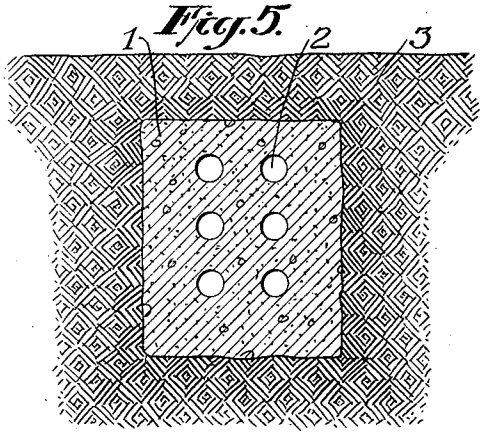


Fig. 5.



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MAKING MOLDED CONDUITS

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Fig. 6.

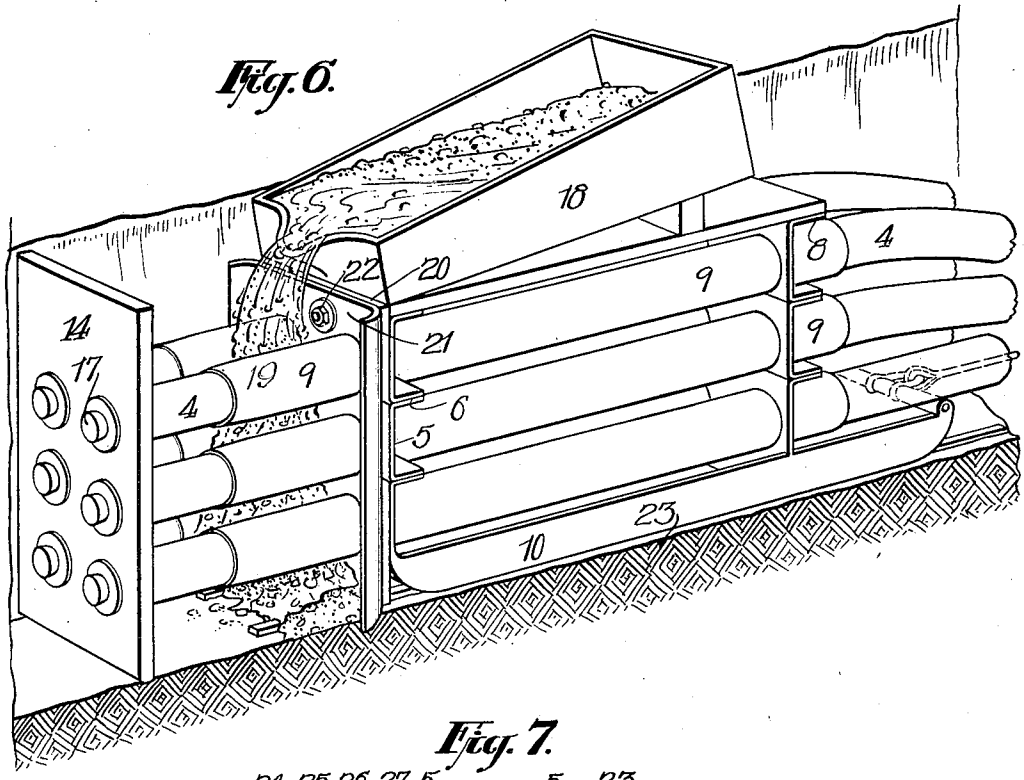


Fig. 7.

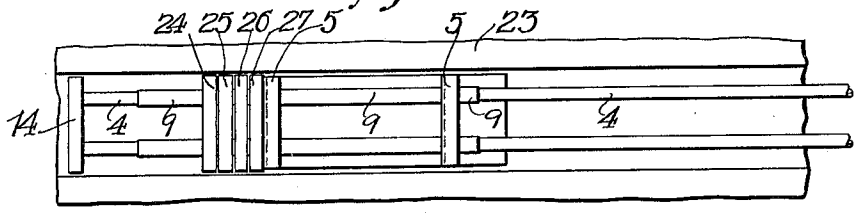
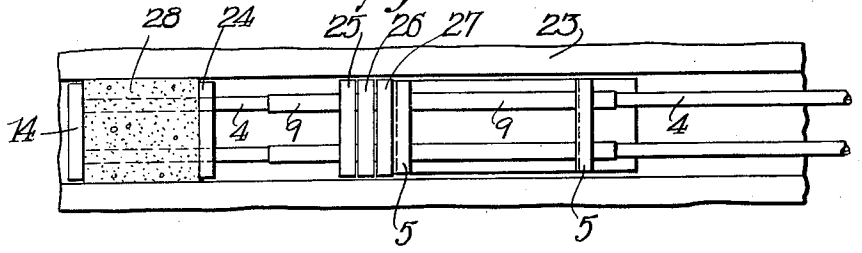


Fig. 8.



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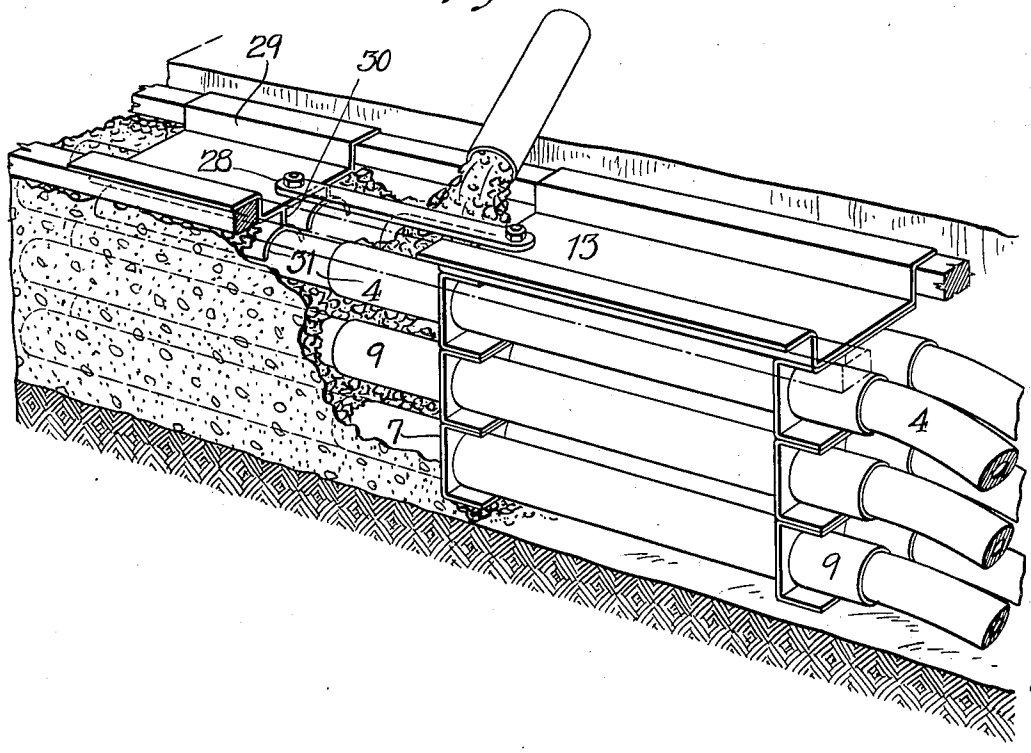
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Fig. 9.



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Patented Feb. 3, 1925. 1,525,087

UNITED STATES PATENT OFFICE.

THOMAS E. MURRAY, OF BROOKLYN, NEW YORK.

MAKING MOLDED CONDUITS.

Application filed June 28, 1924. Serial No. 722,913.

To all whom it may concern:

Be it known that I, THOMAS E. MURRAY, a citizen of the United States, and resident of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Making Molded Conduits, of which the following is a specification.

In certain previous applications for patent, Serial Numbers 670,423, filed October 24, 1923, and 679,521, filed December 10, 1923, respectively, I have described methods and apparatus for molding ducts in concrete or similar plastic material, such for example, as are used in the streets for carrying electric cables.

My present invention relates to the same art and provides means by which a conduit can be built rapidly and efficiently.

The accompanying drawings illustrate embodiments of the invention.

Fig. 1 is a perspective view of the apparatus in place;

Fig. 2 is a longitudinal section of the same;

Fig. 3 is a cross-section of a trench showing the apparatus in place;

Fig. 4 is a section, similar to Fig. 2, of a modification;

Fig. 5 is a cross-section of a finished conduit;

Fig. 6 is a perspective view of a modification;

Figs. 7 and 8 are plan views illustrating another use of the apparatus.

Fig. 9 is a perspective view of another form of apparatus.

Referring to the example illustrated, the conduit to be built is as illustrated in Fig. 5 formed of concrete 1 with a multiplicity of ducts 2 extending lengthwise therethrough parallel to each other and spaced a certain distance apart calculated according to the strength of the concrete, the electric load on the cables and similar considerations. The conduit when completed is to be buried at a certain depth in the earth indicated at 3.

For the molding of such ducts in the concrete, I use cores 4 of resilient material, such for example as thick walled rubber tubes which, notwithstanding their resilient character, are of sufficient dimensions to support the weight of the plastic concrete without substantial distortion and which, after the concrete has set, can by pulling their ends be contracted in cross-section sufficiently to relieve them from the concrete and permit them to be pulled out of the latter.

The problem of spacing a number of such cores and holding them properly spaced during the casting of the concrete and the setting of the latter presents some difficulties, and the present invention aims to secure such spacing by holding means which is moved progressively forward as the concrete is cast behind it, in the manner of a sort of shield.

This shield or spacing device comprises a back plate made up of sections 5 with flanges 6 by which they are fastened together; and a front plate made up of similar sections 7 united by means of flanges 8; and steel tubes 9 passing at their ends through said plates and supported by the latter; the structure thus described being carried on a sled 10 which can be dragged along the trench on skids 11 by means of a cable 12 running to a winch. To hold it down firmly a platform 13 may be laid on the top and weighted. The tubes 9 are fitted loosely to the cores 4, the latter extending through the tubes at both ends.

In beginning the molding of a conduit the ends of the cores 4 are fastened in a bulkhead 14 set across the trench, and the cores are passed through the tubes 9 of the movable shield. The latter is set at such a distance from the bulkhead 14 as will preserve the alignment and relative spacing of the several cores in the intervening space. The concrete is then cast in this space as indicated in Fig. 2. The sled is then dragged forward leaving a further space which is filled with concrete, and so on progressively to the full length of the cores 4. In this operation the shield is never so far in advance of the concrete filling as to allow excessive sagging or displacement of the cores behind it. Thus, by means which are outside of the conduit during its construction, the cores are held in their proper location and spacing with regard to each other. When the shield has reached the end of the cores 4, and the concrete has set and hardened sufficiently, the cores are withdrawn by pulling their projecting ends as described in my previous applications, above referred to. Withdrawal is continued until the rear ends of the cores are near the end of the completed section of the conduit.

The pull on the cores is then released so that their rear ends remain in this position and are held there as they were in the bulkhead 14 in the beginning; and the next section of the conduit is proceeded with. Of course, the cores must be released from the bulkhead 14 before they can be pulled forward.

After a considerable length of conduit has been molded and hardened, it is not essential to slide the shield along the cores while holding the latter fixed in the concrete. The cores and the shield mounted on their forward ends may be advanced together by steps sufficiently short to prevent undue sagging of the cores, the concrete casting following the shield, while the rear ends of the cores are in concrete which has set and hardened sufficiently to preserve its own shape. Thus the means for spacing the cores may be moved relatively to the latter or may be moved along with the latter according to circumstances.

The shield or spacing device is shown built up in sections in order to accommodate it to the building of conduits of different heights. Where the cross-section of the conduit to be built is fixed, the shield may be in the form of a single plate. Instead of a sled any usual or suitable style of support may be provided which permits movement along the trench. A single plate in some instances will be suficient as a spacing device. But for conduits of substantial size, it is preferable to employ a pair of plates as shown with tubes between them so as to preserve a long straight bearing and facilitate the movement of the spacing device along the cores. Any usual or suitable means may be provided for fastening together the several sections of the plates, the supporting sled, and the supporting tubes.

Fig. 4 shows a modification in which the front wall of the spacing device is the same as in Fig. 1, but the rear wall is spaced so as to approximately conform to the angle of repose of the plastic concrete 1 so that the latter may be filled up to the desired level and tamped without shoving the spacing device forward before such movement is desired. The undercut shape of the rear plate is obtained by means of sections 15 built up with the aid of connecting flanges 16.

I have illustrated the invention and described the same in connection with the special cores of my earlier applications which are made of rubber. The invention can be used with advantage, however, with various other styles of core; such, for example, as the common fibre ducts or linings which are made in comparatively short sections, but which sections can be united end to end to give a suitable length for use with this invention.

Fig. 6 shows certain modifications in detail. Plugs 17 are illustrated for fastening the rubber tubes 4 in the fixed bulkhead 14. A trough 18 is laid on the top of the sliding structure and tilted so as to pour the concrete immediately in the rear of the shield. The rearwardly projecting ends of the guide tubes 9 are contracted as at 19 to make a closer fit on the cores 4.

In this figure also I show a movable bulkhead 20 with a facing strip 21 of rubber or similar flexible material bent backward on the edges to make a close fit against the sides of the trench. The bulkhead is fastened to the back of the shield by means of bolts 22. When the space between the fixed bulkhead 14 and the movable bulkhead 21 has been filled with concrete, the bolts fastening the movable bulkhead in place are withdrawn and the latter is held in place while the shield with its tubes 9 and connected parts is carried forward as far as may be desired; the movable bulkhead 20 remaining in place until the concrete which it holds up has hardened sufficiently to stand alone.

Where it is desirable to use a number of such movable bulkheads before getting to the ends of the cores, they may be all set in position at the back of the shield before the operation is started. A similar method of operation is illustrated in Figs. 7 and 8 in connection with the molding of concrete in sections adapted to be separately transported; that is, not built in situ.

In these figures mold-boards 23 are set up with the fixed bulkhead 14 at one end. The sled or movable guide is set up with a succession of movable bulkheads 24, 25, 26 and 27 behind it, the tubular guides 9 passing through said bulkheads. In the position of Fig. 7, concrete will be cast between the fixed bulkhead 14 and the movable bulkhead 24. While the latter is held in place, the shield with the bulkheads 25, 26 and 27 will be shifted forward to the position of Fig. 8. The ends of the cores 4 will remain in the body of concrete 28, until the latter has set and hardened, or until a number of sections of similar design have been cast. The second section will be cast between the bulkheads 24 and 25 arranged as in Fig. 8, the next between the bulkheads 25 and 26, and so on to any desired extent. This furnishes a very convenient apparatus for and method of producing concrete multiple-duct conduits in short transportable sections which can be laid in a trench end to end for any desired length. The improvement explained in connection with these two Figures, 7 and 8, is also covered separately in a co-pending application No. 737,472.

The cores being hollow are more or less buoyant in the concrete, particularly near the top where the water tends to accumulate. For preventing the lifting of the cores out

of line by such buoyancy I may use a weight resting on the cores. Such a device is illustrated in Fig. 9. The top 13 has loosely connected to it a link 28 extending to the rear and loosely connected at its rear end to a plate 29 adapted to support loose weights, said plate bearing on the uppermost cores 4 preferably through ribs 30 with concave bases 31 fitting the cores. The weight of the parts described may be sufficient, or may be reinforced by piling additional weights on the plate 29. The bearing on the cores 4 is comparatively short and is at a point intermediate between the fixed ends of the cores. The concrete is poured to the level required. When the exposed portions of the cores are held firmly by the concrete, the weight is lifted out of place and more concrete introduced to fill the gap left. The span of the weight is so short that there will be no substantial distortion of the cores in the last operation.

By the use of such a weighting device the length of the space provided between the fixed and the movable bulkheads for the casting of the concrete can be made greater in proportion to the size and flexibilty of the cores than where no such weighting device is used. Consequently a more rapid rate of progress can be maintained in the work, casting the concrete in longer sections.

Though I have described with great particularity of detail certain embodiments of my invention, yet it is not to be understood therefrom that the invention is restricted to the particular embodiments disclosed. Various modifications thereof in detail and in the arrangement of the parts may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is:

1. An apparatus for molding conduits comprising a comparatively stiff tubular rubber core of sufficient strength to support the external pressures of the molded material and a longitudinally movable supporting device for said core comprising a back plate and a front plate with a rigid tube extending between them for carrying said hollow rubber core in the desired alignment.

2. An apparatus for molding conduits comprising a comparatively stiff tubular rubber core of sufficient strength to support the external pressures of the molded material and a longitudinally movable supporting device for said core adapted to embrace a considerable length thereof so as, by the stiffness of the core, to hold it in proper position and alignment within the mold.

3. An apparatus for holding one end of a core in alignment between said apparatus and a fixed point to permit the casting of plastic material around it, and a weighting device adapted to rest on such core to prevent its being lifted by the plastic material.

4. An apparatus for holding a plurality of cores properly spaced and in alignment between said apparatus and a fixed point during the casting of plastic material around them, and a weighting device adapted to rest on the uppermost of such cores to prevent lifting by the plastic material.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.