June 19, 1928. 1,674,445

T. E. MURRAY

MOLDING CONDUITS

Filed July 11, 1925

Fig. 1.

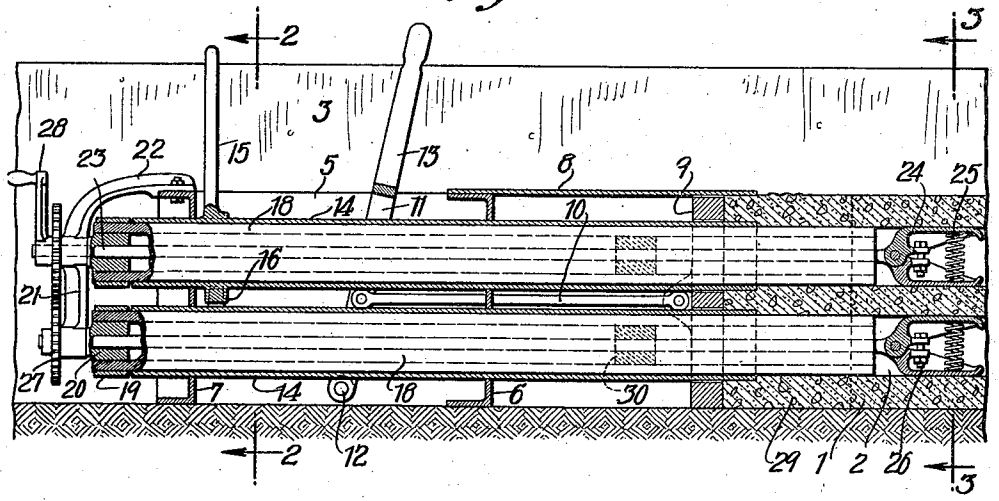


Fig. 2.

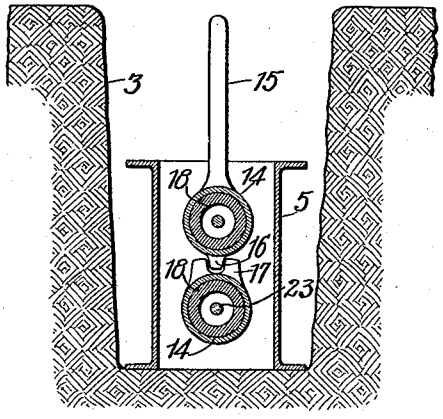


Fig. 3.

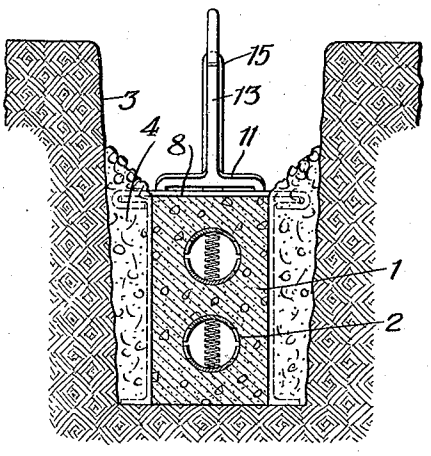
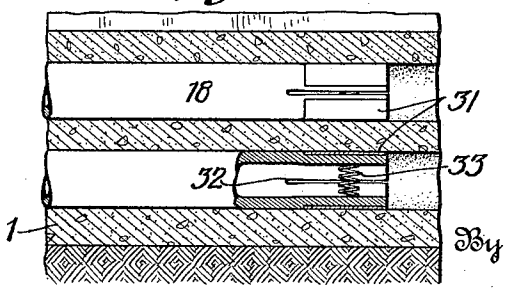


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MOLDING CONDUITS.

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In certain previous applications I have described the molding of conduits, especially of underground conduits, with the aid of cores of rubber. The present invention provides improvements in apparatus of this class and applicable generally to the molding of conduits of concrete and similar plastic material.

The accompanying drawings illustrate an embodiment of the invention.

Fig. 1 is a longitudinal sectional view of the apparatus in use;

Figs. 2 and 3 are cross-sections of the same on the correspondingly numbered lines.

Fig. 4 is a sectional view of a modification.

The purpose of the invention is to lay a conduit 1 of concrete having longitudinal ducts 2 therein. Two such ducts are illustrated, but the invention may be applied to the making of a single duct or a greater number of ducts. A trench is dug with side walls 3 far enough apart for the easy introduction of the apparatus, and as the conduit is completed and the apparatus withdrawn, the sides of the trench are filled in with earth 4 or other filling material embracing the conduit. Afterwards, of course, the trench is filled up to the street level.

The apparatus comprises a pair of side members 5 of channel shape resting on the bottom of the trench and connected at intervals by cross-braces 6 and 7. A portion of the space between the side members is covered by a top plate 8, which may be hooked over the flanges of the side members as illustrated in Fig. 3. Fitting loosely between the side plates is a ram 9 connected by links 10 to the sides of a yoke 11 which are pivoted at their lower ends 12 to the side members 5, the yoke having an upwardly projecting handle 13. By operating the handle the ram can be reciprocated.

Passing freely through openings in the cross plates 6 and 7 and the ram 9 are metal tubes 14. The upper one has an upwardly projecting handle 15 and has on its lower side a tooth 16 located between teeth 17 of the lower tube 14. When the handle 15 is rocked, therefore, both tubes 14 will be rocked.

Located within the tubes 14 are tubes 18 of rubber with thick walls and of such high grade composition that they can by a relative lengthwise movement in the concrete be given such a tensile strain as to contract them sufficiently to separate them from the surrounding concrete wall and to pull them out and leave the completely formed ducts. The forward ends of the rubber tubes are clamped by rings 19 on to hubs 20 carried by the vertical portion 21 of a bracket 22 fastened on the rear plate 7 of the apparatus.

Passing through each of the rubber tubes 18 is a rod 23 which extends to the rear to a point beyond the end of the rubber tube and carries there a smoothing or trowelling device. This consists of a pair of segments 24 pivoted to the end of the rod 23, held apart at their free ends by a spring 25 and limited in their outward movement by a bolt 26 passing freely through ears on the segments. The forward ends of the rods 23 pass through bosses in the part 21 of the bracket and carry pinions 27 which are in engagement with each other and one of which has a handle 28 by which it can be rocked or rotated.

The apparatus is operated in the following way. The completed conduit is shown at 1. The trowelling apparatus and the ends of the rubber tubes lie in the forward end thereof. A quantity of fresh concrete 29 has been poured in the space between the completed conduit 1 and the ram 9 while the latter was in the forward position. The handle 13 of the yoke has been pushed to the rear and the ram moved back, compacting the concrete 29 and causing it to perfectly fill the space between the sides of the apparatus, and at the same time forcing the apparatus forward. This operation is repeated at brief intervals and at a rate which is limited only by the rapidity of pouring of the concrete. Even when comparatively soft, it will hold its shape because of the lateral support of the filling 4, Fig. 3. Thus a practically continuous concrete structure is produced. The bore of the ducts is formed about the rubber cores 18; the tube 14 being drawn out of the concrete while it is still soft enough to settle itself about the rubber cores. The rods 23 may have additional bearings in the rubber tubes as indicated in dotted lines at 30. As the apparatus is withdrawn the crank handle 28 is turned or rocked so as to produce a rotary smoothing or trowelling effect in addition to the longitudinal smoothing motion. The

tubes 18 leave a very smooth bore in the ducts when they are withdrawn if the concrete is sufficiently hard to hold its shape. But where the apparatus is to be advanced rapidly, the concrete may be so soft beyond the ends of the tubes as to require a further smoothing by the segmental trowels. The steel tubes 14 may be loosened before each advance of the machine by rocking the handle 15 or this may be done during an advancing movement.

The apparatus may be used in a similar way for molding conduits above ground and in various locations where they are to be used and also for molding conduits in lengths or sections which are to be transported to the place of use.

Various other styles of troweling devices may be used for engaging the walls of the ducts at the rear end of the core. Fig. 4 shows a modification in this respect. The rubber tubes 18 are provided with trowels mounted directly on their rear ends. Such trowels are composed of two approximately semi-circular segments 31 of thin steel cemented on to the end of each tube, the latter being slitted as at 32 between the edges of the segments. As the cores are withdrawn from the freshly made concrete the resiliency of the rubber will spread the troweling segments 31 against the surface of the surrounding concrete so as to smooth it. The resiliency of the rubber may be supplemented by coil springs 33, or the springs may be relied on solely to press the troweling segments outward.

Various modifications of the apparatus illustrated and described may be made by those skilled in the art without departure from the invention as defined in the following claims.

What I claim is:

1. An apparatus for molding a duct in plastic material comprising a core which is removable in a straight longitudinal direction and a troweling device adapted to exert a yielding pressure against the face of the duct.

2. An apparatus for molding a duct in plastic material comprising a core which is removable in a straight longitudinal direction and a troweling device adapted to exert a yielding pressure against the face of the duct and means for giving a rotary movement to said troweling device.

3. An apparatus for molding a duct in plastic material comprising a core which is removable in a straight longitudinal direction and a troweling device adapted to exert a yielding pressure against the face of the duct, an operating rod for said troweling device extending through said core and means for giving a rotary movement to said rod.

4. An apparatus for molding a duct in plastic material comprising a core of rubber, means for exerting a lengthwise pull on the core to contract it and free it and to withdraw it from the surrounding material and a troweling device adapted to smooth the face of the duct at the end of the core.

5. An apparatus for molding a duct in plastic material comprising a core of rubber, means for exerting a lengthwise pull on the core to contract it and free it and to withdraw it from the surrounding material and a troweling device at the end of the core exerting a yielding pressure against the face of the duct.

6. An apparatus for molding a duct in plastic material comprising a core of rubber, means for exerting a lengthwise pull on the core to contract it and free it and to withdraw it from the surrounding material and a troweling device adapted to smooth the face of the duct at the end of the core and means for giving a rotary movement to said troweling device.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.