Oct. 16, 1928. 1,687,879

T. E. MURRAY

FORMING WAYS OR DUCTS IN PLASTIC MATERIALS

Filed Aug. 19, 1925 2 Sheets-Sheet 1

Fig. 1.

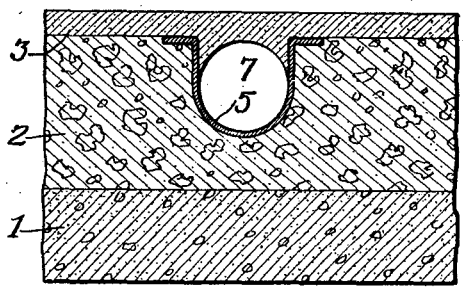


Fig. 2.

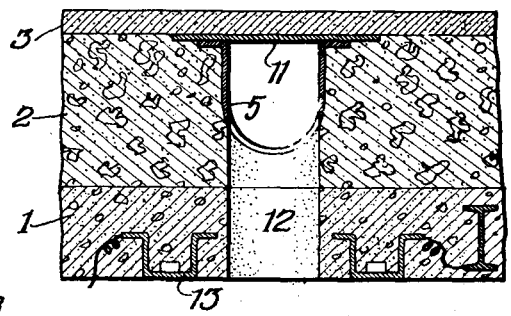


Fig. 3.

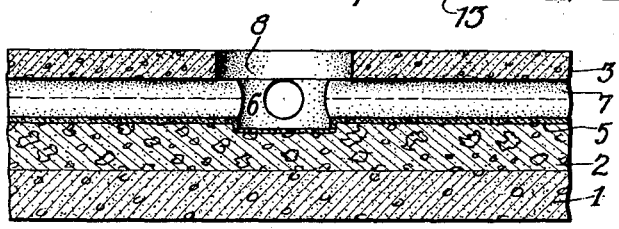


Fig. 4.

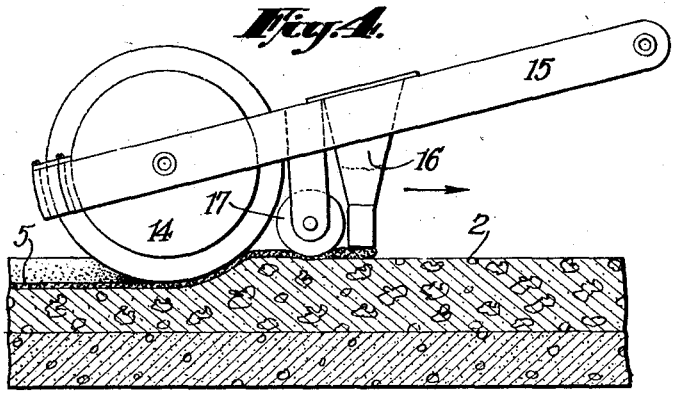


Fig. 6.

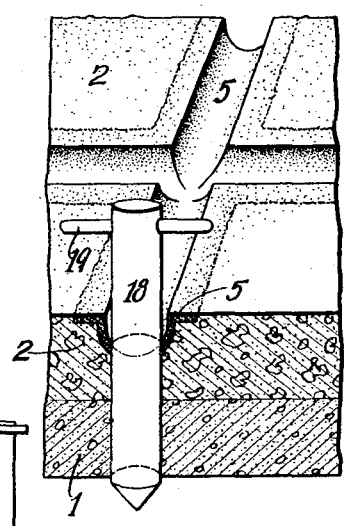
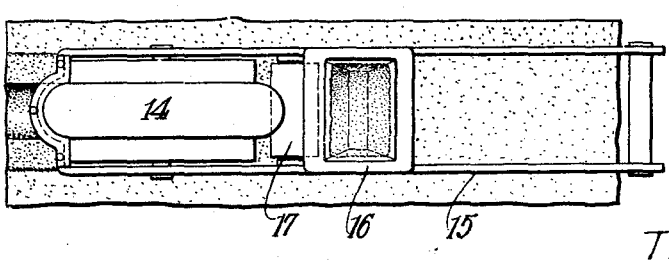


Fig. 5.



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FORMING WAYS OR DUCTS IN PLASTIC MATERIALS

Filed Aug. 19, 1925 2 Sheets-Sheet 2

Fig. 7.

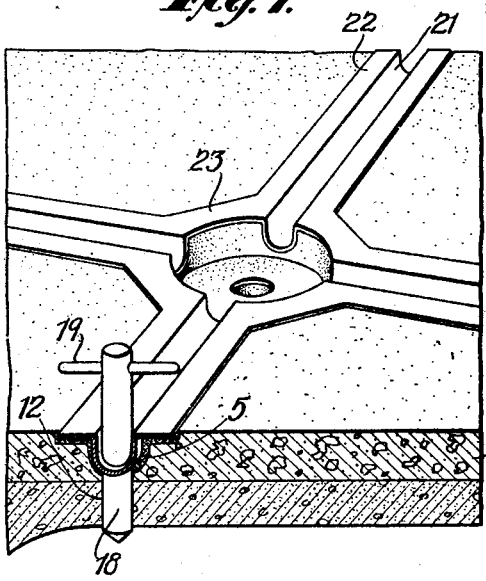


Fig. 8.

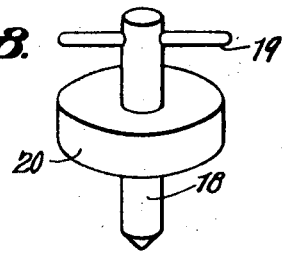


Fig. 9.

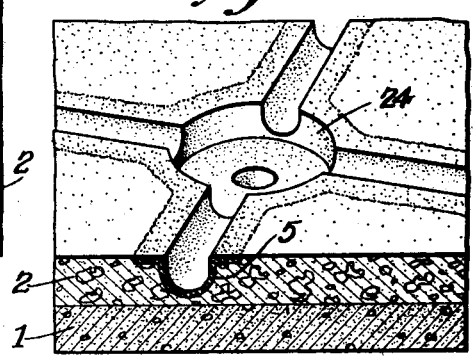


Fig. 11.

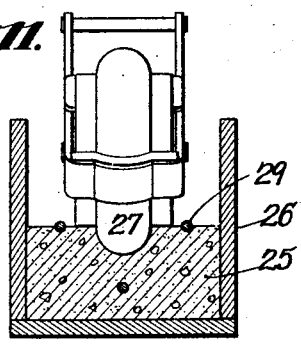


Fig. 10.

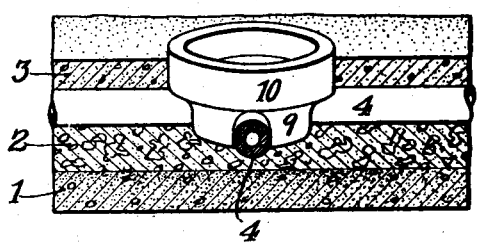
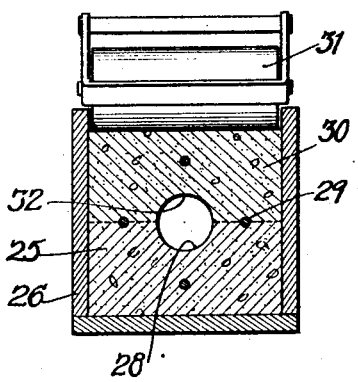


Fig. 12.



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UNITED STATES PATENT OFFICE.

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FORMING WAYS OR DUCTS IN PLASTIC MATERIAL.

Application filed August 19, 1925. Serial No. 51,249.

My invention aims to provide methods and apparatus for forming ducts or raceways in floors or other structures of concrete or other similar plastic material, such as are commonly used for laying wires or pipes in a building. The accompanying drawings illustrate embodiments of the invention.

Figs. 1, 2 and 3 are vertical sections through a floor illustrating differences in detail;

Figs. 4 and 5 are respectively a side elevation and plan of an apparatus for applying the process;

Fig. 6 illustrates in perspective a floor grooved by the process of Fig. 5 with a device for forming an outlet to the ceiling below;

Figs. 7 and 8 illustrate supplementary devices used in molding a crossing and an outlet;

Fig. 9 illustrates the work done by these devices;

Fig. 10 is a perspective view of a device for forming a junction box; and

Figs. 11 and 12 are cross-sections showing the invention applied to the making of ducts in blocks of concrete.

In building a floor, a slab 1 of strong concrete is first placed on the centering device. On this is a fill 2 of moist cinders or of comparatively weak cinder concrete; on the top of which is another slab 3 of strong concrete. I propose to make ducts in such a floor by forming grooves in the top of the cinder fill with a lining 5 of fine concrete or other durable material. The application of the layer 3 of concrete above closes the grooves to form a conduit. Where a circular conduit is desired I propose to lay in the groove a core 4, Fig. 10, of high grade rubber on which the layer of concrete 3 is poured. When the latter has hardened, the core will be pulled endwise, contracting it in cross-section so as to release it from the surrounding concrete and to permit its withdrawal. At crossings or other outlet points, an outlet box may be formed similar to that shown in Fig. 3 comprising a vertical cylindrical recess 6 communicating with the conduits which are indicated as a whole at 7 and with an enlarged cylindrical portion 8 at the upper end. Such an outlet box may be formed for example by means of a core (Fig. 10) having a reduced lower portion 9 and a larger upper portion 10. The ends of the duct cores 6 abut this box core. The concrete being hardened, the box core is withdrawn and the duct cores 6 can be pulled endwise through the opening.

Another way of completing the duct is shown in Fig. 2. A plate 11 is laid over the groove formed with the lining 5, and supports the upper slab 3 of concrete. In this connection I have shown an opening or outlet box down to the ceiling at 12. Metal anchors 13 are embedded in the ceiling adjacent to the opening 12 to support a lighting or similar fixture and are grounded to the beams as shown.

The groove can be rapidly and economically made in the cinder concrete by means of a roller 14 (Figs. 4 and 5) having a periphery of the desired shape in cross-section and a handle 15 by which it is pulled across the cinder in the desired line; the roller having weight enough to press the cinder into the desired grooved shape. Where a lining of concrete is desired to reinforce the wall of the groove, a hopper 16 is fastened to the handle in front of the roller, carrying dry or slightly moistened cement or mixture. A flat roller 17 travels just behind the opened lower end of the hopper and spreads cement in a thin layer on top of the cinder. Then when the heavy roller 14 advances, it presses out the cement layer and the cinder below to form a cement lined groove as in Fig. 1.

Fig. 6 shows the top of the bed of cinder concrete grooved with linings 5 of cement. To provide an outlet to the ceiling below, a pointed iron rod 18 is used with handles 19. By putting sufficient pressure on this and turning it back and forth, it may be forced through the cinder and drilled through the concrete slab 1.

Fig. 7 illustrates the making of an outlet box at a crossing with openings both above and below. At the intersection a tool (Fig. 8) is used having a shank 18 and handles 19, the same as in Fig. 6, and having at a proper height a cylindrical portion 20 of the desired diameter. First, a metal centering device or guide is used comprising troughs 21 (Fig. 7) with flanges 22 at the top connected across the corners by webs 23; with a circular opening at the center in which the part 20 of the tool fits. This serves to center the tool and at the same time to guard against injury to the corners of the concrete. The concreting form is laid in the grooves with linings 5, after which the tool of Fig. 8 is thrust down into the concrete in the manner previously described.

Fig. 7 shows also the use of a simple rod 18 for making an outlet in the ceiling below,

the sheet metal form having a hole through it to locate the tool 18 and to prevent breaking the edges of the concrete therewith. After these operations, the forming devices will be removed, leaving the top of the cinder bed as in Fig. 9. Thereupon the core 9—10 (Fig. 10) will be set in the central opening 24 and the cores A abutted against it and laid in the desired lines. The top layer of concrete 3 will then be applied and the rubber cores withdrawn as above described.

The invention may be applied in many other structures than floors and without the reinforcing lining 5. Figs. 11 and 12 for example illustrate the making of a hollow reinforced block of concrete. First, a slab 25 of concrete is laid in a mold 26. While the concrete is still soft, a heavy or weighted roller 27 is drawn along the top of it and forms a semi-circular groove 28 (Fig. 12). Reinforcing wires or rods 29 are also laid on the top of the slab. A rubber or similar removable core is laid in the groove 28 and a second slab 30 is cast thereon and preferably pressed down and smoothed by a flat roller 31 drawn over the top. The rubber core forms the semi-circular upper portion 32 of the duct. Or the groove 28 may be covered in various other ways to form a closed duct, using either a removable core or support for the upper concrete or a permanent support such as the plate 11 in Fig. 2, which may be of various shapes in cross section. The groove 28 may be lined with fine cement or concrete if desired. And in all the constructions described, other materials than cement or concrete may be used for the lining of the groove. Where dry cement is used, the water in the cinder fill unites with it and makes the lining practically integral with the material below.

The outlets into the floor above may be closed with a thin plug leveled off with the floor and made of plaster or other easily removable material.

The same scheme may be applied to the making of conduits in other locations. Street conduits, for example, may be made in this way, the soft earth, generally moist, being substantially the equivalent of the cinder fill and other plastic materials referred to. The apparatus of Fig. 4 will form a groove in the earth and line it, after which it may be covered by any of the methods above described.

In Figs. 1 and 2 I have shown the grooves formed for a depth equal to the entire diameter of the proposed duct. In the other figures I have shown the groove formed to a depth of only half the diameter. In the latter case the superposed layer will enclose the upper half of the duct as in Fig. 12, for example.

Various modifications of the described embodiments may be made without departing from the invention as defined in the following claims.

What I claim is:—

1. In the making of a floor containing a layer of comparatively poor plastic material, the method of forming grooves in said material which consists in applying a comparatively rich plastic material to the top of said layer and passing over the same a roller having a periphery of the desired cross-section of the groove and pressed down sufficiently to force the comparatively rich material down into the comparatively poor material and to form a groove lined with such comparatively rich material.

2. The method of making ducts in plastic material which consists in providing a bed of comparatively poor material laying a coating thereon of richer material, forming a groove in a coated portion of said bed with a lining of such richer material and applying a second bed of material above the first to close said groove and form a duct.

3. In the making of a floor or the like of plastic material, the method of forming ways therein which consists in applying permanent lining material thereon and pressing the lining material and the supporting plastic material at the same time to form them into a grooved shape.

4. In the forming of ways in plastic material, the method which comprises applying a plastic lining material to a plastic foundation material and pressing both such materials at the same time to form them into a grooved shape.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.