Oct. 8, 1929. T. E. MURRAY 1,730,472

BUILDING FLOORS WITH DUCTS

Filed July 14, 1925

Fig. 1.

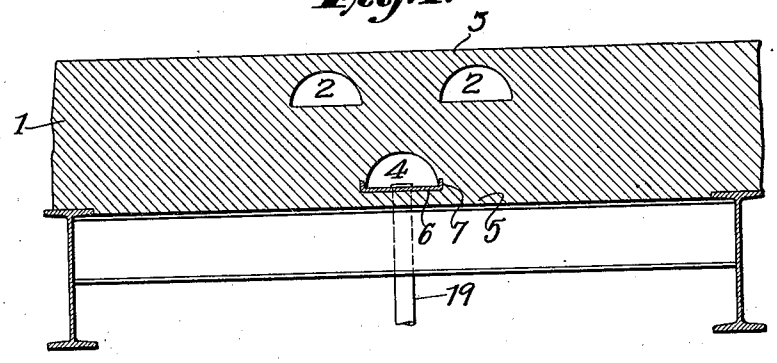


Fig. 2.

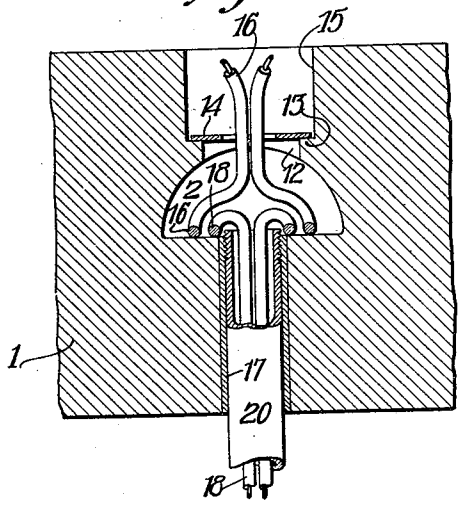


Fig. 3.

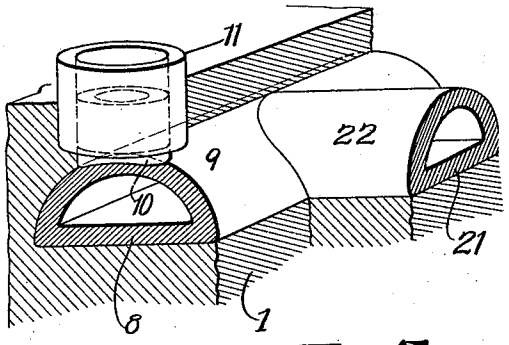


Fig. 5.

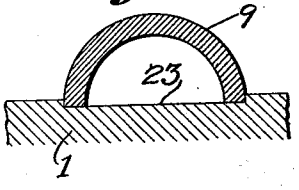
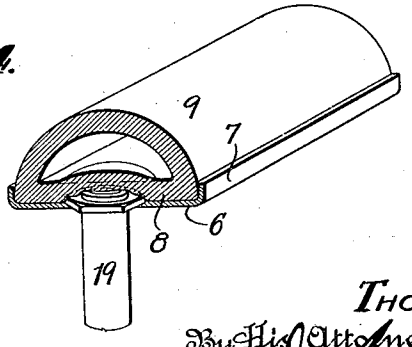


Fig. 4.



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UNITED STATES PATENT OFFICE

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BUILDING FLOORS WITH DUCTS

Application filed July 14, 1925. Serial No. 43,442.

In order to fulfill the requirements of wiring some large buildings, the floors are built with ducts arranged to take care with reasonable convenience of the wiring needs of various classes of tenants who may occupy the buildings, the ducts being such that wires may be inserted as required for telephone or buzzer or similar connections. The ducts are placed so close together that a desk or table on the floor at any point will be within a few inches of one of the ducts. These are called incomplete ducts because generally no floor plates or outlets for the surface are provided except when needed. Such ducts have a flat bottom surface to permit the introduction of several wires without interference and are sometimes arched over the top to make a half round cross-section, and are sometimes rectangular in cross-section. The half round shape is generally preferred because of the strength of the arch.

Such half round shapes have generally been formed by use of a permanent lining of manufactured "fiber" for the arch. A concrete waterproof pad is provided for the edges of the arched fiber to rest on, and concrete is carefully poured along the edge of the fiber before the finished floor is made up in the usual way. Rectangular ducts have generally been formed about a rectangular pipe or permanent lining.

My invention aims to provide an apparatus and process by which conduits of half round and similar flat bottomed shapes can be formed with economy of both material and labor.

The accompanying drawings illustrate embodiments of the invention.

Fig. 1 is a cross-section of a floor showing conduits at upper and lower levels for outlets above and below respectively;

Fig. 2 is a cross-section of a single conduit used for outlets in both directions;

Fig. 3 is a perspective view showing the method of forming the ducts and an outlet to the top surface;

Fig. 4 is a perspective view of the parts used in forming the lower duct in Fig. 1;

Fig. 5 is a cross-section of a modification.

Referring to Fig. 1, the floor 1 is of concrete with ducts 2 adjacent to the top surface 3 and a duct 4 adjacent to the undersurface 5. The lower duct has a permanent bottom lining consisting of a plate 6 with side flanges 7 and supporting a tube 19 through which the wires pass downward for connection to ceiling fixtures. The upper ducts 2 may be built without outlets. Their location being known, it is a simple matter to cut an outlet into a duct from the top surface of the floor at any desired point in its length and to install a plate or outlet box. Or outlet openings and boxes or plates can be installed when the floor is built, for use at points where it is certain such outlets will be needed.

According to my invention, the ducts are formed by means of a core which, notwithstanding their small cross-section, can be withdrawn endwise so as to leave an unlined duct of desired shape and size. As a core, I propose to use a rubber tube of a closed perimeter, that is, extending around the entire contour of the duct, and made of rubber of a high degree of purity so that after the concrete has been cast around it and has hardened it can be pulled endwise and will contract sufficiently in cross-section to free it from the concrete and to permit its withdrawal. With such comparatively soft rubber, the wall of the core has to be of substantial thickness to withstand the blows and the pressure involved in casting the concrete around it. The tube illustrated has a flat base 8 and an arched top 9. The concrete is built up to the level of the bottom of the duct. The cores are then laid in the proper locations. It is only necessary thereafter to pour the concrete in the usual rapid way. The withdrawal of the core leaves a duct, the walls of which are constituted directly by the surrounding concrete, giving a floor of greater compression strength than where part of the concrete is displaced by a lining, or giving a larger duct for the same strength of concrete. The rubber core described leaves a very smooth hard finish on the surrounding concrete, the smoothness being increased as the concrete is allowed to harden longer before the withdrawal of the core.

Where an outlet is to be provided to the top

of the floor during the building thereof, a special rubber form, like that in Fig. 3, may be used. An inner vertical tube 10 has its lower end fitting the arched top 9 of the core and an outer vertical tube 11 fits the inner tube with a shoulder at a point above the arch 9. When the concrete is cast, the shape shown in Fig. 2 is produced with a tubular opening 12 at the upper end of which is a shoulder 13 supporting an apertured plate 14 set in the larger opening 15. Two of the cables 16 from the duct 2 are led up through the opening in the plate 14 to the top of the floor, additional cover plates being provided as may be required. To provide an outlet to the ceiling beneath a hole is cut through slightly larger than the pipe 20 which is inserted therein embedded in fine cement, gypsum or similar material 17 to hold it in place; the threaded upper end furnishing a better hold for the imbedding material. Through this pipe wires 18 may be led downward from the duct 2.

Where a bottom outlet is desired, an alternative method is illustrated in Figs. 1 and 4. The ceiling duct 4 is formed about a rubber core which rests on the plate 6. The latter is provided with holes at intervals from which pipes 19 are suspended passing to a point below the ceiling level. After the floor is cast and set, the rubber core is withdrawn leaving the lining 6 at the bottom of the duct permanently in place.

Fig. 3 shows how two cores are brought together to make a branch connection. The core 21, 22 is cut off at its end to fit the outside of the core 8, 9. In making ducts of other shapes in cross-section, the core will be correspondingly shaped.

The flat bottom of the duct is formed in the laying of the concrete before the use of the core, either with or without the bottom lining 6. The essential feature of the core therefore is the shape corresponding with the desired shape of the duct above the bottom of the latter. For example, assuming an arched shape, we may use a core as in Fig. 5 consisting only of a rubber strip of arched form 9, lying with its edges on the bottom 23 and held by shoulders in the concrete or otherwise. The remaining concrete is cast on this and allowed to harden and the core then pulled out.

Various modifications of the invention 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. The method of building floors of plastic material with a flat bottomed duct therein which consists in laying the plastic material to the shape of the flat bottom of the duct, placing a plate on such bottom, placing on such plate a core shaped to correspond with the desired shape of the duct above the plate, casting the plastic material around the core, allowing the material to harden and removing the core so as to leave the duct with smooth faces above said plate formed directly by the plastic material.

2. A core for forming flat bottomed ducts in floors of plastic material, said core having a flat base adapted to rest on a flat face of the plastic material and having side portions with lower edges which are held by said base against spreading, said core being made of rubber of sufficient thickness to withstand (without internal support) the blows and pressure involved in casting plastic material around it without substantial deformation and being of rubber of so high a degree of purity that when pulled endwise it will contract sufficiently in cross section to free it from the surrounding plastic material and to permit its withdrawal.

3. A core for forming flat bottomed ducts in floors of plastic material, said core having a flat base adapted to rest on a flat face of the plastic material and an arched top the lower edges of which are held by said base against spreading, said core being made of rubber and sufficient thickness to withstand (without internal support) the blows and pressure involved in casting plastic material around it without substantial deformation and being of rubber of so high a degre of purity that when pulled endwise it will contract sufficiently in cross section to free it from the surrounding plastic material and to permit its withdrawal.

In witness whereof, I have hereunto signed my name.

THOMAS E. MURRAY.