HOLE-PATTERN MEMBER FOR USE IN CONNECTION WITH A CONCRETE FLOOR SLAB FORM


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4 Claims

ABSTRACT OF THE DISCLOSURE

A slab form pattern member adapted to be positioned on the foundation surface of a concrete slab form prior to concrete-pouring operations and to be subsequently extracted from the hardened concrete so as to leave a circular hole in the floor slab through which pipes, conduits, and the like may be passed during building erection. The hole-pattern member is formed of elastomeric material and is so formed that, by means of a suitable extraction tool, a purchase may be had on the central region thereof for inducing a shrink effect on the insert and thus breaking its bond with the surrounding concrete for removal purposes.

The present invention relates generally to a concrete floor slab form and has particular reference to a novel hole-forming pattern member which is adapted to be positioned on and secured to the foundation surface and is capable of ease of extraction from the hardened concrete a hole or void is created in the concrete floor slab.

In connection with the erection of a building, it is frequently necessary to provide holes in the various concrete floor slabs which cooperate to make up the building, the purpose of the holes being to accommodate or receive water or steam pipes, electrical conduits, and the like. The passage of steam pipes from a basement-installed boiler upwardly to the various rooms and other heated building enclosures is one example of the need for pre-formed floor slab openings. The passage of electrical conduits from roof-installed elevator and other electrically-operated machinery downwardly to a control panel and ultimately to the source of electrical current is another example of the need for pre-formed holes in the various underlying floor slabs.

Heretofore, various expedients have been resorted to in the creation of floor slab holes, a common practice being to nail an inverted previously opened beer or soft drink can directly to the floor slab foundation prior to pouring of the concrete. After the concrete has been poured, the circular wall at the top of the can is punctured and effort is made to pull the can from its surrounding hole by means of a hook. However, due to the strong bond which frequently obtains between the metal can and the surrounding concrete, difficulty is encountered in extracting the can. To obviate this difficulty, the can is sometimes left in position within the concrete and the circular wall at the top of the can is merely slitted to allow for the passage of pipes or conduits through the metal-lined hole which is formed in the floor slab by the can. Such expedients obviously are not altogether satisfactory, especially if the supply of available beverage cans is limited.

The present invention is designed to overcome the above suggested limitations by providing a reusable hole-pattern member which is so designed that it may be easily and securely installed in position on the slab form foundation surface and is capable of ease of extraction from the hardened concrete.

In carrying out the invention, there is contemplated the provision of a novel hole-pattern member which is of open-ended cylindrical design and is constructed of a resilient elastomeric material such as rubber. The member is of one-piece construction and embodies a central tubular hub and an outer concentric tubular casing which is connected to the hub by an annular series of radially extending vanes. The hole-pattern member is installed on the slab form foundation surface by positioning the same so that either end thereof rests upon such surface and then placing a washer on the upper end of the member. Thereafter, a lag screw or the like is passed downwardly through the washer and hub of the pattern member and threaded into the foundation surface which usually is of wooden construction. The washer and head of the lag screw serve to close the upper end of the member so that concrete may not enter into the voids which are formed or defined by the aforementioned vanes. The concrete is then poured to approximately the level of the upper end portion of the member so that, after hardening of the concrete, the member becomes embedded but the head of the lag screw is accessible for removal purposes. With the lag screw and washer removed, the elastomeric hole-pattern member may be easily removed by the simple expedient of twisting the hub portion thereof in one direction or the other and thus stretching the various radially disposed vanes so that they assume a somewhat curved position thereby deform the cylindrical outer casing in such a manner as to decrease its over-all transverse extent and resolutely to break the interfacial bond between the elastomeric material of which the member is formed and the hardened concrete to enable the hole-pattern member to be easily withdrawn endwise from its surrounding concrete. Removal or extraction of the hole-pattern member in this manner leaves the desired hole in the hardened floor slab. Since concrete has been excluded from entering the confines of the hole-pattern member because of the washer and lag screw, the member is available for immediate reuse, if desired, without necessitating special cleaning operations. The hole-pattern being of a resilient nature, becomes automatically restored to its original cylindrical shape as soon as torsional forces tending to twist it in the manner previously outlined is discontinued.

The provision of a concrete floor slab pattern member such as has been briefly outlined above constitutes the principal object of the present invention. Other objects and advantages of the invention, not at this time enumerated, will readily suggest themselves from a consideration of the following detailed description.

The invention consists in the several novel features hereinafter set forth and more particularly defined by the claims at the conclusion hereof.

In the accompanying single sheet of drawings forming a part of this description or specification, one illustrative embodiment of the invention is shown.

In these drawings:

FIG. 1 is a view partly in section and partly in side elevation and taken vertically and transversely through a concrete floor slab form in the vicinity of a hole-pattern member embodying the invention;

FIG. 2 is an enlarged horizontal sectional view on the line 2—2 of FIG. 1;

FIG. 3 is a perspective view of the pattern member of FIGS. 1 and 2;

FIG. 4 is a fragmentary plan view of a portion of a hardened concrete floor slab and illustrating schemati-
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cally the manner in which the improved hole-pattern member may be removed from its embedded position within the concrete; and FIG. 5 is a fragmentary perspective view further illustrating removal of the hole-pattern member from the slab.

Referring now to the drawings in detail, a hole-pattern member embodying the principles of the present invention is designated in its entirety by the reference numeral 10 and is shown as being operatively positioned on the upwardly facing surface 12 of the foundation member 14 of a concrete slab form, the member being maintained in position by means of a lag screw 16 and an associated washer. However, in the final embodiment shown, the member may be provided with form sides (not shown) to enable concrete to be poured to approximately the level indicated by the broken line x-x in FIG. 1. The hole-pattern member is of cylindrical configuration and its purpose is to establish a cylindrical hole 20 (see FIGS. 4 and 5) in the floor slab 5 resulting from the embedment of concrete on the upwardly facing surface 12 of the foundation member 14 and around the member 10 and the subsequent hardening of such poured concrete. After the hole-pattern member 10 has been extracted from its embedded position in the concrete, the hole 20 remains unobstructed so that should more water or steam pipes, electrical conduits, or the like be passed through the hole in connection with the erection of a building.

As best seen in FIGS. 2 and 3, the hole-pattern member is formed of a suitable elastomeric material such as rubber, either natural or synthetic, or a rubber substitute possessing an appreciable degree of resiliency. As will become apparent presently, the hole-pattern member 10 is capable of being formed by either a molding operation or by extruding an appropriate shape and then cutting the same to the desired length. The member 10 installed in its general organization an inner central hollow hub 22 of cylindrical configuration, an outer concentric hollow cylindrical casing 24, and an annular series of interconnected radially extending flat vanes 26. Although eight such vanes are illustrated in the drawings hereof for exemplary purposes, a greater or lesser number of such vanes may be employed if desired. The various vanes are equally spaced throughout the circumferential extent of the member 10 so that an annular series of identical generally trapezoidal openings or voids 28 extends longitudinally along the entire length of the member. The central hub 22 is formed with a cylindrical bore 30 therethrough.

The installation which is illustrated in FIG. 1 is made by placing the washer 18 on the upper end face of the member 10 so that it covers or closes the upper ends of all BORES 28, then introducing the hub screw 16 through the inner and outer curved wall surfaces, the inner surfaces, in combination with said central bore, establishing a tubular hub with a cellular arrangement of voids between the hub and outer casing, the various cells having walls which are placed under tension so as to shrink the outer casing when the hub is twisted. Therefore, only insofar as the invention is particularly pointed out in the accompanying claims is the same to be limited.

Having thus described the invention what we claim as new and desire to secure by Letters Patent is:

1. A pattern member for producing a cylindrical hole in a concrete floor slab which has been formed by the pouring of wet concrete onto the foundation surface of a concrete slab form to which the pattern member has been attached, said pattern member being in the form of a one-piece integral elastomeric cylinder having planar end faces and possessing an appreciable degree of resiliency so that it will become restored to its original shape after external forces tending to deform it have been relieved, said cylinder being provided with a central axial bore therethrough designed for reception therethrough of a threaded fastening member, said cylinder also being provided with an annular series of internal voids in which are distributed in circumferential fashion the said central bore and establish a central hub portion which is capable of being twisted in either circumferential direction and, upon such twisting thereof, effects stretching of the walls surrounding said bore and consequent diminishing of the over-all cross sectional area of the member as a whole to the end that the interfacing bond between the member and the concrete within which it is embedded may be readily broken and the member thus freed from the concrete for endwise removal therefrom.

2. A pattern member as set forth in claim 1 and wherein said circumferentially distributed voids are in the form of passages which project in a longitudinal direction completely through the member from one end face thereof to the other and open onto such end faces.

3. A pattern member as set forth in claim 1 and wherein the voids are in the form of a series of identical, generally trapezoidal sector-like passages which project in a longitudinal direction completely through the member from one end face thereof to the other and open onto such end faces, adjacent sectors establishing therebetween a dividing partition wall in the form of a flat radial vane which extends between said hub portion and the peripheral region of the member.

4. A pattern member as set forth in claim 3 and wherein in the sector-like passages present concentric inner and outer curved wall surfaces, the inner surfaces, in combination with said central bore, establishing a tubular
cylindrical hub portion, and the outer faces, in combination with the outside surface of the member, establishing an outer hollow cylindrical casing.

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