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FASTENER AND DISTANCE MEANS FOR TUBES AND CONDUCTORS

Filed May 11, 1961

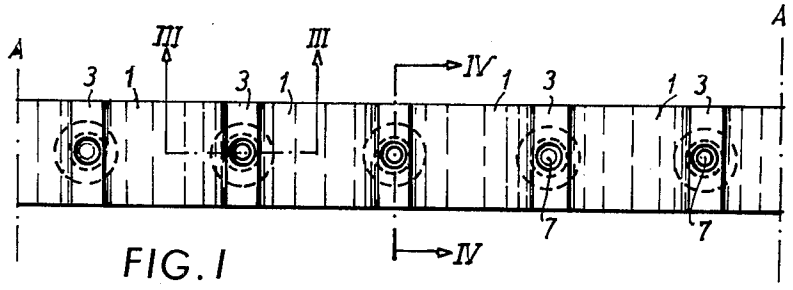


FIG. 1

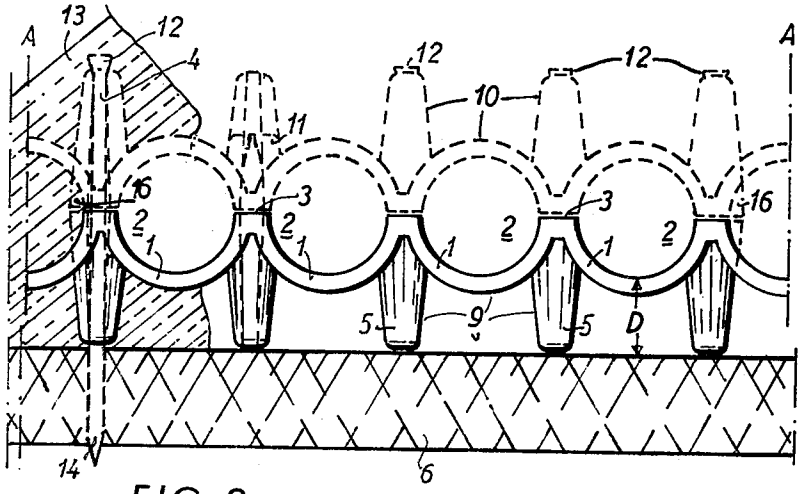


FIG. 2

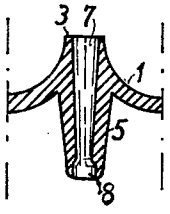


FIG. 3

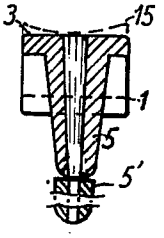


FIG. 4

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FASTENER AND DISTANCE MEANS FOR TUBES AND CONDUCTORS

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3 Claims. (Cl. 52—701)

The present invention relates to fastening means and, more particularly, to a means for fastening elongated objects, such as electrical conductors and tubes, for instance protecting tubes for such conductors, to be cast into concrete structures, to forms against which the concrete structure is cast.

When arranging electric conductors within concrete structures it has heretofore been prevalent to attach an insulated conductor or a protecting tube therefor as well as circuiting and switch boxes onto a concrete form part on the side thereof against which the concrete is to be cast, whereafter, in case of a wall, a further concrete form is raised and the concrete finally cast, the tubes and boxes with the means for securing them onto the form thus being cast into and enclosed by the concrete mass. Due to the fact that the tubes or conductors are to be located at a distance from the surface of the ready cast concrete, it is necessary to arrange for distance pieces between the tubes and the form wall when mounting the tubes.

One purpose of the present invention is to create a fastening and distance means by which the concrete surface obtained after casting is essentially undamaged and that the final work for obtaining a satisfactory concrete surface is facilitated. For similar purpose it is, at present, usual to use concrete block pieces as supports for the conductors or tubes when mounting them on the form, the conductors or tubes then being secured by means of wires to nails into the form. If, as is most often the case, a plurality of tubes are to be mounted parallel to each other, the mounting work for the tubes takes much time and is thus expensive, other disadvantages following this manner of mounting as regards the ready-made concrete also still being essential. After removal of the forms, the points of the nails used for securing the tubes to the form protrude out from the concrete and it is not possible to remove the nails for reason that they are seized by the wires used for securing the tubes and cast into the concrete. Therefore the protruding points have to be cut off near the concrete surface, the remaining parts of the nails being apt later on to cause considerable damage to coatings or the concrete surface in case common iron nails are used. For this reason it is common practice to prescribe use of copper nails or nails of stainless steel for the nailing, which is, however, connected with considerable additional cost, especially as this method necessitates the use of comparatively heavy nails in order to obtain the necessary stability for casting the concrete.

The present invention relates to a distance means by which the disadvantages of mounting of tubes or conductors to be cast into concrete are entirely eliminated as regards the necessary work when mounting as well as in respect of the final result as such, the use of which making it possible in a simple manner after the casting of the concrete and the removal of the form to remove also the nails used for the mounting.

A fastener and distance means for securing electrical conductors or tubes to a concrete form against which the concrete enclosing the conductors or tubes, respectively, shall be cast, consists, according to the invention, of a member of resilient material, preferably soft artificial resin, as for instance polyethylene, said member having at least one recess adapted for receiving a tube or a conductor, said recess preferably having the shape of a semi-circular cylindrical surface, at least two legs protruding perpendicularly to a plane through edges of said recess in the opposite direction to the direction in which the recess is facing, centre lines of said legs being located outside said edges of the recess and in said direction protruding so far ahead of the bottom of the recess as corresponding to a desired distance between a tube or a conductor, respectively, inserted into said recess, and the concrete form, said legs further being provided with bores extending in the longitudinal direction of the legs and perpendicular to said plane.

In a preferred embodiment said member constitutes a bar, having a plurality of recesses, preferably each defined by a semi-circular, cylinder-shaped concave surface, which recesses are located side by side in the longitudinal direction of the bar at a distance from each other and constituting grooves perpendicular to said direction, the concave part of the recesses facing the same direction, a leg protruding from the bar in the opposite direction of the recesses and perpendicular to the bar surface between adjacent recesses. Such a bar may comprise an arbitrary number of recesses and the shape thereof is preferably so chosen that it may easily be cut off into pieces adapted for receiving a number of tubes as desired in a particular case.

The invention is further illustrated in the accompanying drawing, in which like characters of reference indicate like parts throughout the several figures, of which:

FIG. 1 is a top view of a fastener and distance piece bar of arbitrary length as seen in the direction of the legs, protruding from one side of the bar.

FIG. 2 is a side view of the same fastener and distance piece bar, this figure also illustrating with dashed lines the arrangement of a similar bar piece adapted to secure tubes or conductors between semi-cylindrical surfaces constituting the recesses in the bar.

FIG. 3 is a fragmentary vertical sectional view of part of the rod in section III—III of FIG. 1.

FIG. 4 is a sectional view of the rod as viewed in section IV—IV of FIG. 1.

It will be understood that a fastening means according to the invention may, as an extreme, consist of a body having only one recess and two legs located aside the edges of said recess and up to an indefinite number of recesses with a leg located between each two recesses. The fastening means as illustrated in the drawing consists essentially of a bar of resilient artificial resin, preferably a polyethylene, with such properties as to allow for the withdrawal of nails used for securing tubes or conductors with the distance pieces, said bar as illustrated in the drawing consisting of semi-circular cylindrical arcs 1, the concave part of which constitutes semi-circular recesses 2 for tubes or conductors. Between each two recesses 2 an essentially plane part 3 is present, having at least such width as to allow for the insertion of a nail 4 between tubes or conductors located in the recesses and having a dimension for which the fastener is intended. Between two adjacent semi-circular recesses 2 a leg 5 protrudes in the direction from the intermediary part 3 a distance giving the desired distance D between a tube resting against the surface of the recess 2 and a concrete form 6 to which the tube or conductor is to be secured by means of the fastener and distance piece.

If desired, a fastener and distance piece having legs 5 giving as such a certain distance D may be used in connection with additional leg pieces 5' as illustrated in FIG. 4 in order to adapt one and the same fastener and distance means for different desired distances between the bottom of the recess and a concrete mould.

Each leg **5** is provided with a bore **7** extending from the surface between adjacent recesses and to the end of the leg, said bore being perpendicular to a plane through the axis of the semi-circular cylindrical recesses **2**. Although it is not essential that this bore **7** extends unbroken all through the entire length of the legs, as it may serve as a guide for nails even if not doing so, this is preferred. Preferably the bores **7** taper towards the end of the leg and are given a dimension adapted for a suitable nail to fit tightly to the wall of said bore at least over part of the bore.

A bar as illustrated in the drawing may be manufactured with an arbitrary number of recesses **2** and legs **5** in the longitudinal direction and be cut off to be used for a desired number of tubes or conductors as mentioned before. It will be appreciated, however, that the rod may also be manufactured in determined lengths for different numbers of conductors to be installed parallel to each other. An embodiment of a unit having recesses for four tubes is illustrated in FIG. 2 by the dashed and dotted lines **16**.

If, for instance, four parallel tubes or conductors are to be secured to a concrete form, using a fastener and distance piece bar as illustrated in the drawing of arbitrary length, two pieces of the bar, each comprising four complete recesses, are cut off, the pieces for instance then each having a shape as illustrated between the two section lines A in FIGS. 1 and 2. One part is then placed with its legs **5** against the concrete form **6** and the other part arranged on top the tubes or conductors placed in the recesses **2**, whereafter the tubes are secured to the concrete form by means of nails inserted through the bores **7** of the legs **5** in the manner as illustrated in FIG. 2. Obviously, it is not essential that the bar **10** is provided with distance determining legs **5** of any particular length, it being possible to arrange corresponding parts as illustrated at **11** in FIG. 2, although, for the sake of simplicity, the pieces are taken from the same bar.

The bore **7** may, if desired, be somewhat widened at the point of the leg as illustrated at **8** in FIG. 3 in order to receive the head of a nail and prevent seizing of head by the hardened concrete. Such a widening of the bore is however not essential, as a nail, when hit into the form, may, if of suitable shape such as a headless type nail, easily intrude into the resilient material of the leg.

As the concrete has been cast and has thus enclosed the tubes or conductors and the fastening means as illustrated by **13** in FIG. 2 and after the concrete has hardened and the form been removed, the points of **14** of all nails, of which only one is shown in FIG. 2, will protrude out from the surface of the concrete. Thanks to the resilient material of the fastening means it is thereafter an easy matter to remove the nails by withdrawing them from the fastening and distance piece. No undesired material is then present between the tubes or conductors cast into the concrete construction and thus inconveniences, which in some cases appear when using for instance copper nails and are caused by galvanic currents generated between the nails and for instance protective steel tubes, entirely obviated while simultaneously attaining the advantage of having the possibility to use cheap nails of rusting material. It will be appreciated, that a fastener and distance means of the type described may, in principle, be provided with two or more legs located side by side in a direction perpendicular to the bar between each adjacent couple of recesses. In most cases it is, however, fully sufficient with only one leg between each pair of adjacent recesses, the fastening means after the nailing being kept in a correct position partly due to the stiffness of the nail, partly due to the adaption of the tubes to the surface of the recesses.

The surfaces **3** between each two adjacent recesses may not be entirely plane but shaped as illustrated at **15** in FIG. 4 in order to provide for a sealing between

the two parts of the complete fastener arrangement as illustrated in FIG. 2 to prevent concrete to enter to the nail and render the removal of the nail more difficult.

What I claim is:

1. A spacer device for securing electric conduit or the like to the wooden form in concrete work, comprising a pair of like elements formed from a deformable synthetic resin, each element comprising an elongate body portion having legs at each end thereof, said body portion having at least one transverse recess of semicylindrical shape, said elements being arranged in opposed relationship with said recesses cooperating to provide a substantially cylindrical opening adapted to receive an electric conduit or the like, the oppositely disposed legs at either end of said pair of elements having aligned bores constructed and arranged to receive a finishing nail for securing said pair of elements to each other in opposed relationship and to said wooden form, the outer end of each bore of each element being deformable and restricted for engaging the enlarged head portion of a finishing nail received therein, the engagement between said deformable and restricted bore portion and said nail permitting said finishing nail to be pulled, point first, through said aligned bores after said form has been removed.

2. A spacer device for securing electric conduit or the like to the wooden form in concrete work, comprising a pair of like elements formed from a deformable synthetic resin, each element comprising an elongate body portion having legs at each end thereof, said body portion having at least one transverse recess of semicylindrical shape, said elements being arranged in opposed relationship with said recesses cooperating to provide a substantially cylindrical opening adapted to receive an electric conduit or the like, the oppositely disposed legs at either end of said pair of elements having aligned bores constructed and arranged to receive a finishing nail for securing said pair of elements to each other in opposed relationship and to said wooden form, each bore of each element converging outwardly so as to provide a deformable tapered bore portion whereby a finishing nail received therein will be gripped at two spaced points, one point being adjacent the enlarged head end of said nail, and the other point being at the shank of the nail adjacent to the point where it passes into said wooden form, the engagement between said deformable tapered bore portion and said nail permitting said finishing nail to be pulled, point first, through said aligned bores after said form has been removed.

3. A spacer device for securing electric conduit or the like to the wooden form in concrete work, comprising first and second elements formed from a deformable synthetic resin, each element comprising an elongate body portion having legs at each end thereof, said body portion having at least one transverse recess of semicylindrical shape, said elements being arranged in opposed relationship with said recesses cooperating to provide a substantially cylindrical opening adapted to receive an electric conduit or the like, the oppositely disposed legs at either end of said pair of elements having aligned bores, a finishing nail disposed in each set of aligned bores with the enlarged head end of said nail engaging the outer end of the leg of said first element and with the pointed end thereof extending beyond the outer end of the leg of said second element, the outer end of the leg of said first element being of tubular configuration with a comparatively thin wall portion, and at least the major portion of the length of the bore of each leg being of a diameter greater than the diameter of said enlarged head end portion, said outer end of the bore of the leg of said first element being of a diameter less than the diameter of said enlarged head end portion and, being deformable, providing yielding engagement between said leg and said nail, said yielding engagement permitting said nail to be pulled point first through said aligned bores.

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