METHOD AND APPARATUS FOR FORMING CONSTRUCTION ELEMENT LOCATING AND MOUNTING voids IN A Poured CONCRETE STRUCTURE

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ABSTRACT

An assembly is provided which is comprised of a plurality of desirably spaced sleeves rigidly interconnected to a framework which may be oriented and suspended in a desired attitude within a concrete form by means of noncorrosive studs protruding from the base of each sleeve. When the concrete is then poured into the form, the framework and sleeves become an integral part thereof with the sleeves subsequently providing voids for mounting guardrails and the like.

3 Claims, 4 Drawing Figures
METHOD AND APPARATUS FOR FORMING CONSTRUCTION ELEMENT LOCATING AND MOUNTING Voids IN A Poured CONCRETE STRUCTURE

This invention pertains to the art of building construction elements and more particularly to the location and mounting of construction elements in a poured concrete pad.

The invention is particularly applicable to the method and apparatus for establishing mounting holes or voids in a concrete balcony pad and will be described with particular reference thereto; however, it will be understood that the invention has broader applications and may be employed in other instances wherein it is desired to provide structural element locating and mounting holes or voids in a concrete pad.

Heretofore, several approaches have been used in installing balcony railings in concrete pads. One such approach is commonly referred to as "top mounting" wherein the railings were affixed to the top surface of the concrete pad by means of expansion bolts. However, such installations are deemed to be expensive when the labor and material costs therein involved are taken into consideration. Also, the railing design itself must be somewhat special in order to accommodate the mounting. Substantial installation problems have been encountered with this approach when the concrete surface on which the railing was to be mounted was not truly flat so that undesired shimming was oftentimes required.

A second, improved mounting method was to simply drill cored holes into the concrete, sink railing posts therein and grout the opening left between the railing posts and cored holes. This too required the expenditure of a substantial amount of labor time.

It has been found that a superior mounting method resides in using individual sleeves to form voids for receiving the balcony railing posts. In this method, each sleeve is individually suspended in the concrete form by means of brackets or rods prior to pouring. However, several disadvantages are inherent in using this arrangement. Because the sleeves are individually set within the form, their spacing and alignment often varies from one concrete pad to the other so that the holes must be measured after the concrete has hardened and the railing especially fabricated for that particular installation. Another drawback has been that the means employed to suspend the sleeves prevent the concrete from flowing and hardening beneath the bottom of each sleeve and thus does not provide a solid base for the railing posts. Another disadvantage has arisen when concrete or other foreign matter partially filled the voids to be formed by the sleeves as often occurred during concrete pouring. Still a further disadvantage has been the corrosive condition generally known as "rust bleeding" caused by corrosion of the sleeves and suspension means. This last disadvantage, of course, detracted from the overall aesthetic value of the balcony installation.

The present invention contemplates a new and improved method and apparatus which overcomes all of the above referred to problems and others and provides means for establishing locating and mounting voids in poured concrete structures which is simple, economical and readily adaptable to a variety of different applications.

In accordance with the present invention, there is provided a new and improved apparatus for forming mounting and locating voids at desired spaced intervals in a poured concrete pad having a predetermined thickness wherein the apparatus is designed to be positioned relative to a concrete pouring form. The apparatus comprises a plurality of elongated hollow sleeves disposed in a parallel spaced apart patterned relationship identical to the desired spaced intervals. At least some of said sleeves include elongated locating studs extending longitudinally outward from one end thereof for positioning the apparatus in a desired relationship relative to the form.

In accordance with another aspect of the present invention, the length of the sleeves or studs may be varied to facilitate the inclusion of a pitch angle in the concrete pad.

In accordance with still another aspect of the present invention, means are provided to selectively cover the ends of the sleeves exposed at the top of the form in order to prevent undesirable foreign matter from entering thereinto during concrete pouring.

In accordance with still a further aspect of the present invention, there is provided a method of forming construction element forming and locating voids at predetermined spaced intervals in a poured concrete pad having a predetermined thickness. The method comprises the steps of: (a) rigidly interconnecting a plurality of elongated sleeves in a generally spaced apart patterned relationship to each other substantially identical to the spaced intervals; (b) providing at least some of the sleeves with elongated studs extending generally longitudinally outward from one end thereof; (c) locating the interconnecting sleeves relative to the form so as to extend generally transversely thereof with the studs supporting the sleeves relative thereto; and, (d) pouring concrete into the form and around the sleeves.

The principal object of the present invention is the provision of a new method and apparatus for forming voids in a concrete pad which are simple and inexpensive to use.

Another object of the present invention is the provision of a new method and apparatus for forming voids in a concrete pad which prevent undesirable corrosion or rust bleeding.

Still another object of the present invention is the provision of a new method and apparatus for forming voids in a concrete pad which prevent foreign matter from entering the voids during pouring and hardening of the concrete.

Still a further object of the present invention is the provision of a method and apparatus for forming voids in a concrete pad which can be readily employed with a sloping concrete pad.

Yet another object of the present invention is the provision of a method and apparatus for forming voids in a concrete pad which may serve as a guide for finish leveling of the concrete.

This invention may take physical form in certain parts and arrangements of parts, a preferred embodiment of which will be described in detail in the specification and illustrated in the accompanying drawings which for a part hereof and wherein:
FIG. 1 shows the general environment in which the subject application finds particular use; FIG. 2 is a perspective view of an apparatus formed in accordance with the present invention; FIG. 3 is a vertical cross-sectional view showing one of the sleeve arrangements of the invention; and FIG. 4 is a front elevation of another sleeve arrangement formed in accordance with the present invention.

Referring now to the drawings wherein the showings are for purposes of illustrating a preferred embodiment of the invention only and not for purposes of limiting same, FIGS. 1 and 2 show an apparatus or sleeve assembly A used for forming construction element locating and mounting voids in accordance with the subject invention, a concrete pad B defining a balcony extending outwardly of a building wall and a balcony railing C having railing posts which are received in the locating and mounting voids created in the pad during pouring thereof.

More particularly, assembly A is comprised of a plurality of elongated sleeves 10 rigidly interconnected in a desired spaced relationship with each other by a framework 12. The sleeves are disposed in a generally parallel relationship with each other so as to conveniently receive the posts 14 of railing C as will hereinafter become described. An elongated stud 16 protrudes longitudinally outwardly of each sleeve, the use of which will also hereinafter be more fully described.

Sleeves 10 are desirably constructed from any non-corrosive material and may assume a variety of shapes and designs, although in the preferred embodiment, cylindrical sleeves are preferred. Each sleeve includes an open top end 20, a continuous closed side wall 22 and a bottom end 24 which may either be open or closed and may be constructed of standard sized tubing. In both embodiments of FIGS. 3 and 4, the length of side wall 22 may be varied according to the thickness of pad B for reasons which will hereafter become apparent.

Stud 16 is desirably constructed from a non-corrosive material and protrudes outwardly from the bottom end of each sleeve. The stud is preferably formed of stainless steel and affixed to the bottom end by resistance welding to thus prevent the undesirable characteristic of "rust bleeding," although other materials such as a fairly rigid plastic material could be advantageously employed. As shown in FIG. 3, stud 16 forms an integral part of sleeve 10 whereas in FIG. 4, stud 16 is affixed to a cup-shaped base 40 which, in turn, is affixed to the sleeve. Base 40 is dimensioned to receive the sleeve in a press fit, thus closing bottom end 24 of the sleeve. The length of stud 16 may be conveniently varied to accommodate various concrete pad thicknesses as will be appreciated hereinafter.

FIGS. 3 and 4 each show a removable plastic cap 30 dimensioned to be closely received in open top end 20 for concrete pouring and hardening periods. Cap 30 has a peripheral outline dimensioned substantially to the interior of closed side wall 22 and further includes an upwardly extending flange 32 disposed around the periphery thereof. The close fitting relationship between the sleeve and cap acts to retain the cap in the desired position within the sleeve. Flange 32 also provides a convenient gripping surface for removing the cap once the concrete has hardened.

Framework 12 may comprise any fabricated structure adapted to rigidly maintain a plurality of sleeves 10 in a desired spaced relationship relative to each other.

With reference to FIG. 2, this framework comprises a welded reinforcing rod structure including a pair of parallel rods 50,52 spaced apart from each other and welded to opposite sides of the sleeves. End rods 54,56 are welded to the terminal ends of rods 50,52 at an angle therefrom to form the sides of the framework and cross rods 58,60 affixed to rods 50,52 and rods 54,56 provide rigidity for the total framework. Although the end rods are shown as being at generally right angles to rods 50,52 in FIG. 2, it will be appreciated that other angles are equally suitable as any particular balcony or other construction element design so dictates. It will also be appreciated that framework 12 may be constructed and sleeves 10 applied thereto by means of a jig which accurately positions all the component parts in their proper positions.

In use, sleeve assembly A is secured within a conventional form 60 for concrete pad B by means of studs 16 by any convenient means commensurate with the particular form structure. Although use of the invention is not limited to any particular type of form, common present usage is to precast the balcony pads off the construction site in reusable steel forms so that the sleeve assembly or apparatus A is merely precisely located in the form prior to concrete pouring. The subject invention, however, is equally applicable to use with other form arrangements for on or off site pouring. The use of the type of balcony shown in the FIGURES has found particular value in high-rise apartment buildings and the like where the balconies are generally designed to extend outwardly of the vertical building wall 70. The specific manner in which the balconies or concrete pads are affixed to the building wall is deemed to be conventional and beyond the scope of the present invention so that further elaboration therein is not required.

In any event, each stud 16 is of sufficient length to provide a space between the bottom wall of form 60 and bottom ends 22 of the sleeves when sleeve assembly or apparatus A is properly positioned in the form. Thus, when the concrete is poured, it will flow around and under the bottom ends 22 to form a solid bottom area for each void once the concrete hardens. Caps 30 prevent the concrete or other foreign materials from entering the sleeves during fabrication of the pad.

It should be further noted that the sleeve assembly provides an excellent guide to effect levelling for the top surface of the concrete when finishing the pad. If, for example, it is desired that the concrete pad top surface be level, the sleeve assembly would simply be constructed to have a constant height and the concrete poured and leveled to that height. Similarly, if it is desired to have the top surface of the concrete pitched at some angle, then different length sleeves 10 or different length studs 16 could be employed in the sleeve assembly with the height of the assembly sleeves again determining the height or thickness of the pad. In this second example, any denied "drop" in the pad for drainage purposes may be easily established. If the concrete pouring form used is constructed from wood, the studs may be driven into the wooden bottom wall to retain the assembly in position. Also if desired, the bottom of the studs could be marked, for example, by painting in order to indicate their proper driven depth into the form to assure accurate location of assembly A relative thereto.
Once the concrete has been poured into a form of the type described above and hardened, the pad may be removed from the form and transported to the construction site for installation. Caps are retained in the sleeves until the pad or balcony is installed on the building and then removed so as to expose the railing mounting holes or voids. Thereafter, a prefabricated railing, portions of which are shown in FIGS. 1 and 2, having mounting posts spaced identically to the mounting holes or voids is simply dropped into place and grouted. It should be apparent that the above described arrangement may be varied as desired to accommodate any particular railing structure, as well as other construction elements, without departing from the scope and intent of the subject invention.

The invention has been described with reference to a preferred embodiment. Obviously, modifications and alterations will occur to others upon a reading and understanding of the specification. It is my intention to include all such modifications and alterations insofar as they come within the scope of the appended claims or the equivalents thereof.

Having thus described my invention, I now claim:

1. A device for providing a plurality of members embedded in a poured concrete slab of a predetermined thickness for coacting with a plurality of horizontally-spaced vertical posts on a preassembled railing to permanently locate the posts and hold the posts in a vertical position, said posts having predetermined spacing and pattern relationship, said device including a plurality of vertically-extending sleeves, one for each post, and of an internal transverse dimension to slidingly receive said posts, said sleeves being closed at the lower end and of a vertical height less than the thickness of said slab the number of members being equal to the number of posts; rigid means extending horizontally between adjacent members and rigidly fastened to said members at a point spaced from the upper end a distance such as to be between the upper and bottom surfaces of the concrete slab after the concrete is placed in position, said means holding said members in a rigid spacing and pattern substantially the same as the predetermined spacing and pattern of said posts and a rigid member extending below the lower end of said sleeves for spacing same above the bottom of said concrete slab as the concrete is being poured, said last mentioned means and said sleeve having combined vertical dimension generally equal to the predetermined thickness of said slab.

2. The device of claim 1 wherein said rigid members are in the form of a stud on the lower end of at least some of said sleeve members.

3. The device of claim 2 wherein said studs are of a corrosive resistant material.

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