Nov. 25, 1969 G. ASCH 3,479,785

INSTALLATION OF FASTENERS IN CONCRETE

Filed Oct. 19, 1966 2 Sheets-Sheet 1

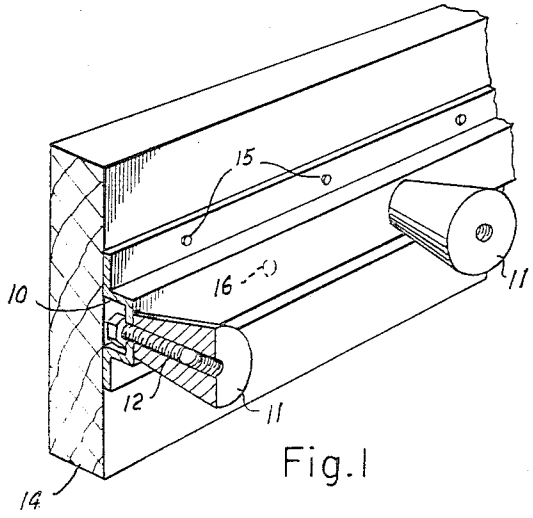


Fig.1

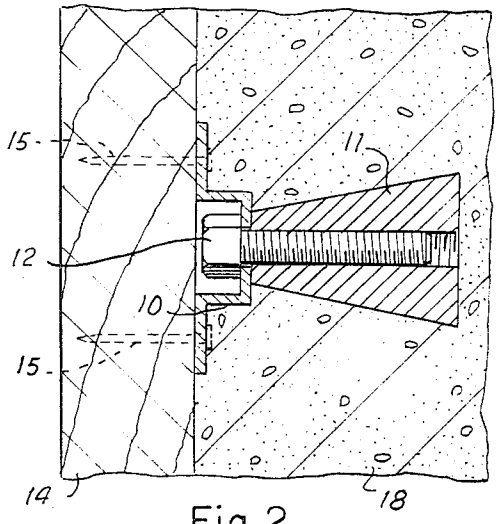


Fig.2

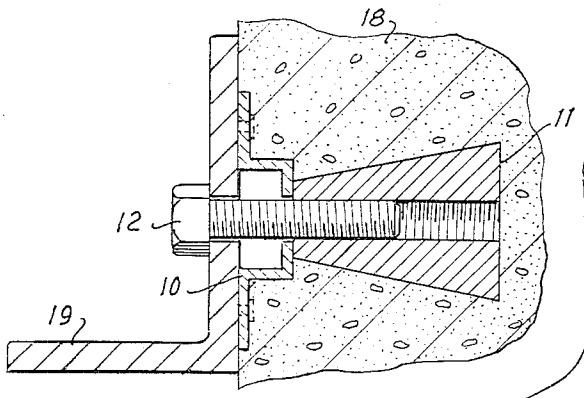


Fig.3

Fig. 4

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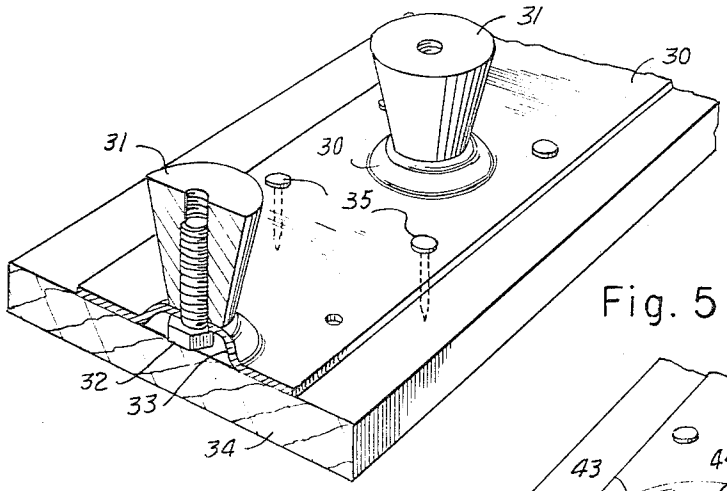


Fig. 5

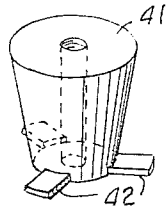


Fig. 7

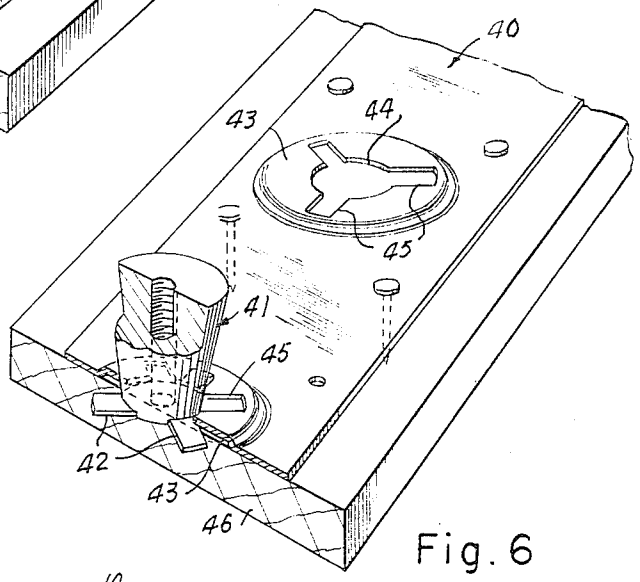


Fig. 6

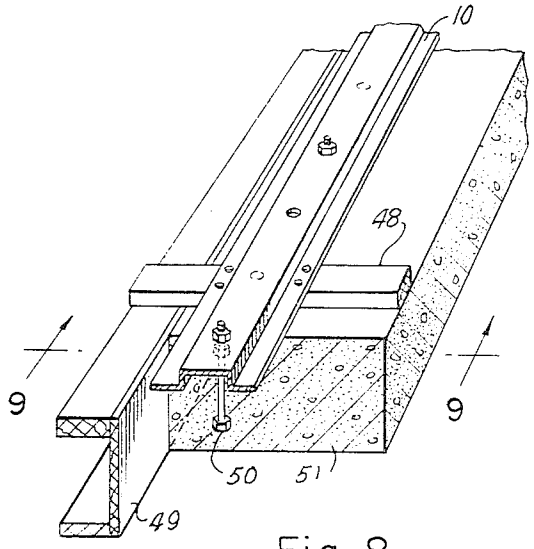


Fig. 8

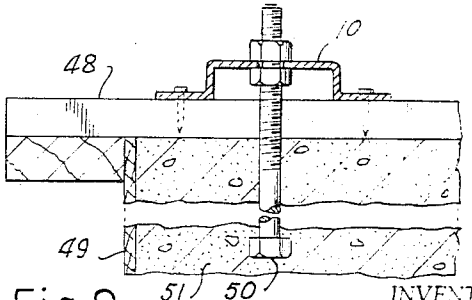


Fig. 9

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3,479,785

INSTALLATION OF FASTENERS IN CONCRETE

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Int. Cl. E04g 17/02; E04c 5/18
U.S. Cl. 52—701 4 Claims

ABSTRACT OF THE DISCLOSURE

This invention relates to a technique for accurately spacing and aligning fasteners for securing members to concrete or the like, and more particularly to the use of a template to attach to form work for concrete for holding in position fasteners or inserts at accurately spaced and aligned locations.

When it is desired to fasten a member to a concrete beam, column or slab, it is often the practice to embed male or female fasteners or inserts in the concrete as it is placed. While such a technique provides an anchor for the member, considerable difficulty is encountered in providing accurate spacing and alignment of the male or female fastener inserts. These items are ordinarily individual units which must be separately mounted on the face of the concrete form against which the concrete is to be placed, or which are mounted by drilling holes through the form through which the fasteners can be held, placed or inserted, or which are pushed into the surface of the concrete after it is placed but while it is still soft and plastic. Since these operations are done in the field, usually after the concrete form has been constructed, it is not unusual for substantial error in the positioning of the fastening means to occur, resulting in either incorrect spacing or misalignment, or both, of the fasteners when it is attempted to secure the member to the concrete. Another method widely used for installing fasteners in concrete is by drilling holes in the hardened concrete surface and inserting expandable threaded inserts or the like. This technique usually requires accurate field measurements for correct spacing and alignment of the fastening means also, and is subject to interference from items embedded in the concrete such as reinforcements and the like and from the difficulties inherent in drilling in concrete. Either of these techniques results in considerable expenditure of time by skilled craftsmen in placing the fasteners and also in securing the members due to inaccuracies in the spacing and alignment of the fasteners once placed.

It is therefore a principal object of this invention to provide a technique for installation of fasteners in concrete such that the spacing and alignment of the fasteners in the completed concrete structure will be precise whereby the parts to be secured to the concrete may be readily aligned with the fasteners, the fasteners in addition to being installed without relying upon precise measurement in the field of the position of each fastener. Another object is to provide apparatus for installing fasteners in concrete precisely spaced and aligned using means adapted to shop fabrication by mass production techniques rather than the existing slow and inprecise field techniques.

In accordance with the invention a prefabricated template is used for holding a number of fastening devices in the desired positions in the concrete. The template may be a generally flat elongated strip adapted for attaching to a concrete form. The fasteners may be internally threaded to accommodate bolts which provide the function for holding the fasteners to the template until the concrete is set up and then the bolts are removed and can be reused for securing the member to the concrete. The

template may be constructed with a recess at the position of each of the fasteners or it may be constructed with a continuous recess along its entire length, so that bolt-heads will not interfere with installing the template flat against a concrete form. The apertures or positions for the fasteners may be provided in the template spaced at a basic interval so that the template can be used for installing fasteners for any member which has provision for fastening at any spacing which is a multiple of an integer and the basic interval at which the apertures or positions of the template are spaced.

The novel features which are believed characteristic of this invention are set forth in the appended claims. The invention itself, however, as well as further objects and advantages thereof, will best be understood by reference to the following detailed description of particular embodiments, read in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a pictorial view partly in section of one embodiment of the template and one of the types of associated fasteners of this invention, in place on a concrete form;

FIGURE 2 is an elevation view in section taken through one of the fasteners of FIGURE 1 after the concrete has been poured;

FIGURE 3 is an elevation view in section, corresponding to FIGURE 2, of one of the fasteners after the form has been removed and a member bolted to the fastener;

FIGURE 4 is a pictorial view of a template and fastener arrangement in accordance with another embodiment of the invention;

FIGURE 5 is a pictorial view partly in section of a template and fastener arrangement in accordance with another embodiment of the invention;

FIGURE 6 is a pictorial view in section of a template and fastener arrangement according to still another embodiment of the invention;

FIGURE 7 is a pictorial view of one of the fasteners used in the embodiment of the invention which is illustrated in FIGURE 6;

FIGURE 8 is a pictorial view partly in section of one of the templates of FIGURE 1 used for locating bolts in concrete; and

FIGURE 9 is an elevation view in section taken along the line 9—9 of FIGURE 8.

With reference to FIGURE 1, a template **10** is shown which functions to hold a number of fasteners in a fixed position in accordance with this invention. The template **10** in this embodiment is in the form of an elongated strip of metal or the like having a channel running the length thereof. The channel provides the function of accommodating bolt heads of bolts used to secure to the template a plurality of concrete inserts or anchors **11**. The inserts **11** are internally threaded for engagement by threaded bolts **12** which hold the inserts in place against the inside face of template **10** while the concrete is being poured and set. These bolts can be subsequently used to attach the desired member to the concrete surface. The channel shaped template **10** is temporarily secured to the surface, against which the concrete is placed, of a form **14** type ordinarily used in pouring concrete. Small nails **15** or other suitable fasteners may be used for this purpose. The template **10** would be ordinarily positioned along an interior flat surface of a concrete form in the location where a member, such as a continuous structural element, for example a steel angle, is later to be applied. The inserts **11** would be therefore positioned by the template in a manner such as to align with bolt holes in the member which is to be installed. Accordingly, holes must be provided in the bottom of the channel of the template

10 to accommodate bolts in the proper positions. To this end, the proper holes may be located to fit each particular member to be installed, or preferably positions may be provided spaced at a basic interval to provide for attaching the inserts 11 at a wide variety of spacings by prepunching, drilling, or slugging the template, leaving a large number of completed holes or punchouts 16 which may be removed by a center punch or the like at each place that an insert 11 is to be attached.

Referring now to FIGURE 2, it will be noted that the template 10, held securely to the concrete form 14 by the nails 15, holds the fastener 11 accurately in position while concrete 18 is being poured and set. If desired, means may be provided at the ends of the channels to prevent the concrete 18 from entering the channel around the bolt heads. It is noted that the inserts 11 are shown for illustration as truncated cones, although it will be understood that other shapes would also be suitable.

After the concrete 18 has set up, the form 14 is stripped away leaving the template and inserts in place in the concrete structure. At this time the ends of the nails 15 could be flattened against the template with a hammer or removed by means of a chisel, wire cutter or the like, leaving the template in place. Alternatively, the bolts 12 could be removed and the template together with the nails removed from the concrete by pulling on the exposed points of the nails with pliers or the like. With reference to FIGURE 3, the bolts 12 must be removed from the threaded inserts, so member 19 can be installed by inserting bolts through holes in the member 19 and into the threaded inserts 11 which of course will be accurately spaced and aligned to match with the bolt holes in this member. Although a simple angle shape is illustrated for the member 19, it will of course be understood that the element to be installed on the face of the concrete may be of any type and any material desired.

Instead of using bolts to hold the inserts to the template as illustrated in FIGURES 1–3, other means may be used for this purpose such as illustrated in the embodiment of the invention shown in FIGURE 4. A template 20 is used which is in the form of an elongated metal member having a pair of channels running the length thereof. Fasteners 21 for use with this template are in the form of internally threaded members as before with a flat plate 22 added having four square holes 23 formed therein. These holes 23 align with four upstanding segments 24 which are formed in the template by cutting away portions of the channels. The inserts 21 are held firmly in place against the template 20 by means of a pair of pins 25 inserted through the loops formed by the upstanding segments 24 which pass through the holes 23 in the base plates 22. As before holes are provided in the template 20 to accommodate nails or the like for securing the template to a concrete form. In this embodiment holes are provided in the template at the locations for the fasteners to permit passage of a bolt through the template to the insert. Should the fastener be drilled entirely through its length, a paper plug or other suitable means may be used for preventing concrete from entering the threaded hole.

As may be seen by reference to FIGURE 5, in place of using a channel running the length of the template, other means may be used for recessing the bolt heads. A template 30 in the form of an elongated metal strip has a plurality of fasteners 31 secured thereto by bolts 32, while the bolt heads being recessed by a plurality of dimpled or depressed portions 33 formed in the template 30. As before, the template 30 is secured to a concrete form 34, by a plurality of nails 35 or the like. The embodiment of FIGURE 5 is similar in all respects to that of FIGURES 1–3 and functions in the same way, the only difference being in the arrangement used to prevent the bolt heads of the bolt 32 from interfering with the form 34.

In another embodiment of the invention as will be seen by reference to FIGURES 6 and 7, a bayonet or twist-lock type fastening arrangement may be used to secure the anchors or inserts to a template 40. In this embodiment the inserts or anchors 41 are internally threaded as illustrated above. However, these inserts have formed at the base thereof a plurality of outwardly projecting lugs 42. To accommodate this type of insert, the template 40 has formed therein a plurality of shallow dimpled portions 43, each of which has a hole 44 in the center with a plurality of radial slots 45 arranged to mate with the lugs 42. After the template 40 is secured to a form 46 by nails or the like, the inserts 41 are secured in place by inserting the lugs 42 in the slots 45 and twisting the anchor 41 about its axis. The edges of the holes 44 may be slightly bent or canted to hold the inserts 41 more securely in place as is conventional in a fastener of this type. The template 40 may of course contain many unused depressions 43 so that the template may be used for a wide variety of different bolt spacings for various members to be bolted to the concrete.

While various arrangements have been shown for securing the fasteners to the templates it will be of course understood that these fasteners could be formed integrally with the template and the same function would be provided. However, such an arrangement would be more difficult to fabricate and would be more difficult to adapt to a wide variety of bolt spacings for members to be bolted to the concrete. Also, internally threaded fasteners may be externally threaded at one end, with holes in the template being internally threaded so that the fasteners may be screwed into the template at the appropriate places. Various other techniques for attaching the fasteners to the template will be apparent.

The template shown in FIGURE 1 may be used for anchoring bolts at spaced and aligned positions in a concrete slab or the like. With reference to FIGURES 8 and 9, a template 10 is shown attached to a cross-bar 48 on a concrete form 49. A number of bolts 50 are positioned in holes in the template spaced a preselected distance apart. Each of the bolts is held to the template by a nut or a pair of nuts, the lower one if it is used of course being placed on the bolt before it is inserted into the template. The bolts are thus supported securely in an upright position and so when the concrete 51 is thereafter poured and allowed to set up the bolts heads will be firmly anchored deep in the concrete. Then the top nuts can be removed, the forms stripped away, and the bolts will be in position for securing a member to the concrete.

When installing window or door frames in concrete structures, it is often necessary to apply caulking material at the interface between the frame and the concrete. The templates of this invention provide an improved technique for accomplishing this in an embodiment similar to that of FIGURE 1. The channel may be V-shaped instead of rectangular shaped, with the threaded inserts extending from the sides of the channel at an angle with the face of the concrete. A sub-buck member, as 19, which is then bolted to the inserts would have a lip extending into the channel, and the channel could be then filled with caulking material. The window or door frame could then be attached to the member.

While the technique for anchoring fasteners for members in concrete according to this invention has been described with reference to particular embodiments, it is of course understood that this description is not to be construed in a limiting sense. Other embodiments of the invention, as well as modifications of the disclosed embodiments, will be apparent to persons skilled in the art upon reference to this application. It is therefore contemplated that the appended claims will cover any such modifications or embodiments as fall within the true scope of this invention.

What is claimed is:

1. A template for accurate spacing and aligning of fastening means in concrete or the like and being adapted for being secured to a form which contains the concrete until setting thereof and releasable from said form after setting of the concrete comprising a generally flat, rigid, elon-

gated member having a pair of parallel channels running along the length thereof with the channels being broken away at spaced locations to provide sets of outwardly projecting loops, the fastening means including plates having holes corresponding to the sets of loops whereby the fastening means are secured to the templates by pins extending through said loops with the plates held between the pins and the flat member.

2. A template as defined in claim 1 wherein said locations are spaced apart at a basic interval to correspond to a spacing which is an integral multiple of the basic interval of fastening means of a member to be secured to the concrete.

3. A template as defined in claim 1 including aperture at each location extending through said member.

4. A template as defined in claim 2 further including holes formed in said member for receiving devices for fastening said template to said form.

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U.S. Cl. X.R.

25—131; 52—704