

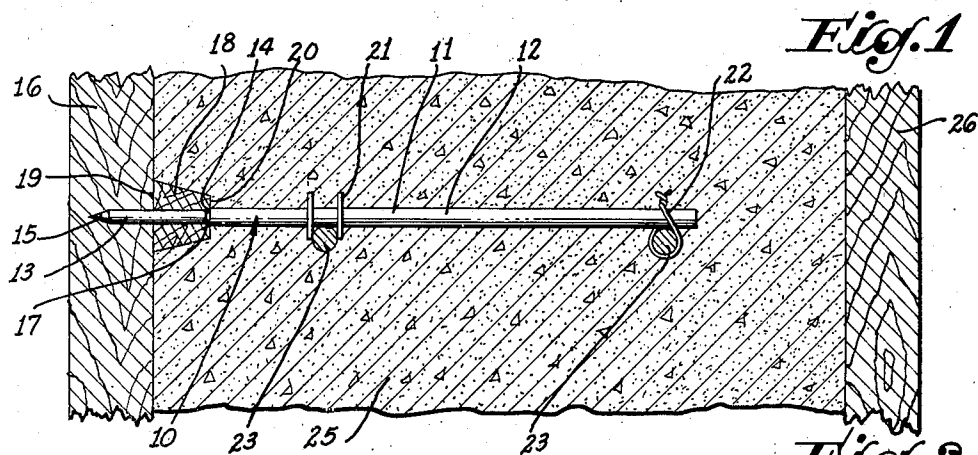
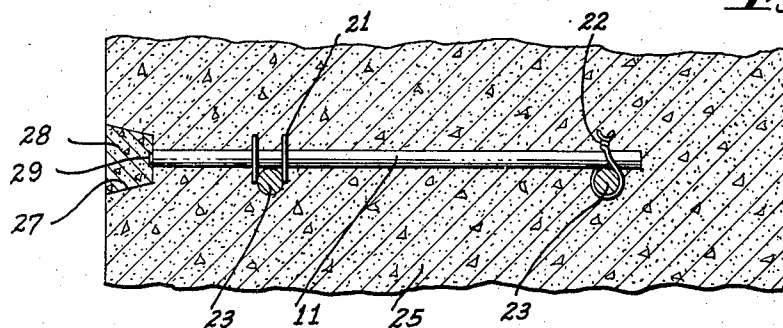
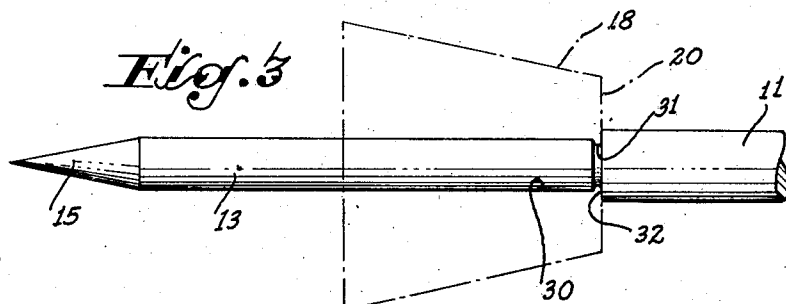
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REINFORCING SPACER

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REINFORCING SPACER

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1

My invention relates to a spacer for retaining a metallic member in place while concrete or the like is poured and permitted to set around it. Since it finds particular utility in forms adapted for spacing reinforcing steel in concrete from the face of the finished surfaces of the concrete, embodiments adapted for such use are hereinafter described, it being understood that my invention is not restricted to such use.

It is general practice, desirable for structural and appearance reasons and frequently required by specifications, that the reinforcing steel in concrete walls and the like be spaced a minimum distance from the concrete form and finished surface of the concrete wall. It is desirable for structural reasons that the reinforcing steel be accurately positioned and retained in position during the pouring and setting of the concrete therearound to provide the calculated strength to the structure.

It is an object of my invention to provide an improved spacer for maintaining during pouring and setting of the concrete the reinforcing steel at the desired position within the concrete and at the prescribed distance from the concrete form and the finished surface of the concrete wall. More specifically, it is an object of my invention to provide such a spacer which can be installed upon only one form side, thus permitting its use where only one form side is employed and eliminating the labor and time required for the connection of a spacer to two form sides.

A great deal of the expense involved in the present spacing of reinforcing steel in concrete is due to the time and effort required in the installation of spacers between the forms. It is an object of my invention to minimize this expense by providing a spacer which can be attached to one form side with only the time and effort required to drive a nail in the form side.

It is a further object of my invention to provide such a spacer having a portion which may with facility be removed from the finished concrete wall, so that there is no metal within the prescribed distance from the finished surface of the wall.

Still another object of my invention is the provision of such a spacer which may be installed in the form wall without the necessity of boring holes through the wall so that the parts of the form wall, when my invention is employed, are not rendered unfit for reuse.

Still another object of my invention includes the provision of such a spacer which can be in-

2

stalled with the use only of a hammer by workmen with no special skill and which is positive in its operation of maintaining the reinforcing steel in the desired position and which is inexpensive in its manufacture.

An embodiment of my invention is described in the following specification, which may be more readily understood by reference to the accompanying drawing. In the drawing.

Fig. 1 is a vertical sectional view illustrating the spacer of my invention as installed in a form side and supporting reinforcing steel in a concrete wall;

Fig. 2 is a vertical sectional view of the spacer of my invention after the form wall has been removed and after the removal of a portion of the spacer from the concrete wall; and

Fig. 3 is an enlarged fragmentary view of a portion of the spacer illustrated in Figs. 1 and 2.

Referring to the drawing, which is for illustrative purposes only, the numeral 10 indicates the spacer of my invention, which includes a rod 11, a supporting portion 12, and a portion 13, shown as a reduced portion, separated from the supporting portion 12 by contactor engaging means in the form of an annular shoulder 14. The free end of the reduced portion 13 is pointed, as indicated by the numeral 15, so that it is adapted for being driven into a form side 16, customarily made of wood, by impacts upon the free end of the supporting portion 12 by a suitable tool, for example, a hammer.

Adjacent the annular shoulder 14 there is provided a weakened break-back portion in the form of an annular groove 17 in the reduced portion 13. While illustrated as an annular groove, it is obvious that the weakened break-back portion may be formed in other manners, as, for example, by one or more indentations, or by forming it of metal different from and more easily breakable than the metals forming the remainder of the rod 11. The diameter of the annular groove 17 is so related to the material of which the rod 11 is formed that it resists fracture during those impacts upon the free end of the supporting portion 12 necessary to drive the pointed end 15 into the form side 16 to that extent necessary to enable the supporting portion 12 to project substantially normal to the form side 16.

Positioned upon the reduced portion 13 of the rod 11 is a sleeve 18 having its outer end 19 of larger cross-sectional area than its inner end 20. The sleeve 18 is preferably, though not necessarily, frusto-conical in form, and its inner end 20 abuts against the annular shoulder 14 when the

pointed end 15 is driven into form side 16, so that the outer end 19 of the sleeve 18 engages the inner surface of the form side 16. The rod 11 is thus supported substantially normal to the inner surface of the form side 16 not only by the penetration of the pointed end 15 and the reduced portion 13 into the form side 16, but also by the engagement of the sleeve 18 with the reduced portion 13, the inner surface of the form side 16, and the annular shoulder 14 of the rod 11.

The sleeve 18 is preferably formed of a material having a limited degree of deformability, such as cork, fibre, wood, or the like, and if desired, a metal washer may be interposed between the inner end 20 of the sleeve 18 and the annular shoulder 14 of the rod 11 to enhance the supporting effect of the sleeve 18 upon the rod 11.

Retaining means in the form of washers or fingers 21 may be fixedly or adjustably attached to the supporting portion 12 of the rod 11, or retaining means in the form of a tie 22 of wire or the like may be secured to the supporting portion 12 before or after the rod 11 is installed in the form side 16. The retaining means in the form of the washers or fingers 21 or the tie 22 engage opposite sides of a reinforcing steel 23 and prevent its horizontal movement relative to the form side 16 during the pouring and setting of the concrete, indicated by the numeral 25. The retaining means 21 or 22 may be positioned to engage reinforcing steel intermediate the ends of the supporting portion 12, or at the inner free end of the rod 11, or both.

While I have in Fig. 1 illustrated the concrete 25 as cast between the form side 16 and an opposite parallel form side 26, it will be understood that the spacer 10 may be employed where only one form side 16 is utilized, the concrete 25 during setting being supported by means other than the form side 26, as, for example, a precast wall of concrete, bank of earth, or the like.

It will be understood also that, while I have not illustrated or described wales or uprights against the outer surface of the form sides 16 or 26 or battens or horizontal beams engaging the outer sides of the wales or uprights, these or other means to maintain the form sides 16 and 26 in proper position during the pouring and setting of the concrete 25 may be employed.

The spacer 10, including the rod 11 with the sleeve 18 positioned thereon, may be installed in the form side 16 before its erection to the position illustrated, but preferably thereafter, by impacts of a hammer upon the free end of the supporting portion 12 until the pointed end 15 and the reduced portion 13 of the rod 11 are driven into the form side 16, so that the sleeve 18 is compressed between the form side 16 and the annular shoulder 14. The sleeve 18 serves to provide a uniform extent of the penetration of the reduced portions 13 of a plurality of the rods 11. A plurality of the spacers 10 are installed in the form side 16 to accommodate the desired number of reinforcing steels 23, which are prevented from moving horizontally during the pouring and setting of the concrete 25 by the washers or fingers 21 or the ties 22.

When the concrete 25 is hardened, the form sides 16 and 26 are removed, leaving that part of the reduced portions 13 of the rods 11 which had penetrated the form side 16 projecting from the surface of the hardened concrete. The reduced portions 13 of the rods 11 may be readily removed from the hardened concrete 25 by movement of such reduced portion relative to the con-

crete 25 and the remainder of the rods 11, this movement being permitted by the deformability of the sleeves 18. The sleeve 18 may be so formed that its cylindrical bore 30 includes a reduced portion 31 at its inner end 20 to provide an annular flange 32 of such diameter that it may be forced over the reduced portion 13 of the rod 11 and received in the annular groove 17. The dimensions of the flange 32 are so related to the deformability of the material of which the sleeve 18 is formed that, while the flange may be forced over the reduced portion 13 of the rod 11, when it is received in the annular groove 17, it retains the sleeve 18 upon the rod 11 so that the two may be handled as a unit.

If it is desired to form the sleeves 18 of a non-deformable material, the rods 11 may be formed of material of high resistance to compression but of small resistance to tension, so that the rods 11 will not fracture at the annular grooves 17 when the rods 11 are driven into the form side 16 but will fracture when the form side 16 is removed and tension is exerted upon the reduced portions 13. It is preferred, however, to form the sleeves 18 of deformable material and the rods 11 of material resistant to both compression and tension, as, for example, steel.

The reduced portions 13 of the rods 11 having been removed from the hardened concrete 25, the sleeves 18 are thereafter removed, or, if desired, the sleeves 18 are removed first. Thereafter, the recesses in the concrete 25 left by such removal of the sleeves 18, and indicated by the numeral 27, are filled with cement or concrete, as indicated by the numeral 28, and made flush with the remainder of the surface of the hardened concrete, so that the exposed surface of the concrete has a uniform appearance.

Obviously the dimensions of the reduced portion 13 and the sleeve 18 may be made such as to provide the space between the exposed surface of the hardened concrete 25 and the broken end of the rod 11, as indicated by the numeral 29, which is made necessary by specifications or the like. Likewise the dimensions of the rod 11 and the sleeve 18 may be of such value as to provide the stability necessary to prevent movement of the reinforcing steels 23 of any size. Thus, the portion 13 of the rod 11 may be formed with a diameter equal to, or greater than, the diameter of the supporting portion 12.

While I have described my invention as applied to the spacing of reinforcing steel in concrete, it will be understood that my invention may be utilized for other purposes, such as spacing railings, pipe conduit, or the like.

It will now be apparent that the embodiment of my invention hereinbefore described is fully capable of performing the objects and providing the advantages primarily stated. However, since various modifications and variations in the embodiment herein illustrated and described, likewise capable of performing these objects and providing these advantages will occur to those skilled in this art, my invention is to be understood as not restricted to such specific embodiment, but as including all modifications and variations thereof coming within the scope of the claims which follow.

I claim as my invention:

1. In a spacer for supporting a member spaced from a form during the placing of concrete therearound, the combination of: a rod having one end pointed and adapted for being driven into the form, and having a weakened break-back portion

5

spaced from said pointed end adapted for fracture within the hardened concrete whereby the pointed end may be withdrawn therefrom; a sleeve having an enlarged outer end and a reduced inner end mounted on said rod and surrounding said weakened portion and adapted for removal from the hardened concrete; contact means on said rod adapted for engaging the inner end of the sleeve with the outer end of the sleeve in contact with the inner side of the form; and retaining means attached to said rod and spaced from the inner end of said sleeve and adapted for preventing movement of the member relative to said rod.

2. In a spacer for supporting a member spaced from a form during the placing of concrete therearound, the combination of: a rod having one end pointed and adapted for being driven into the form, and having a weakened break-back portion of reduced cross-sectional area spaced from said pointed end adapted for fracture within the hardened concrete whereby the pointed end may be withdrawn therefrom; a sleeve having an enlarged outer end and a reduced inner end mounted on said rod and surrounding said weakened portion and adapted for removal from the hardened concrete; engaging means associated with said rod adapted for compressing said sleeve against the form when the pointed end of said rod is driven into the form, whereby said sleeve contributes to the support of said rod in a substantially horizontal position; and retaining means spaced from the inner end of said sleeve and adapted for preventing movement of the member relative to said rod.

3. In a spacer for supporting a member spaced from a form during the placing of concrete therearound, the combination of: a rod having a weakened break-back portion adapted for fracture within the hardened concrete whereby a portion of said rod may be withdrawn therefrom; a sleeve mounted on said rod and adapted for removal from the hardened concrete; and retaining means associated with said rod and spaced from the inner end of said sleeve and adapted for preventing movement of the member relative to said rod.

4. In a spacer for supporting a member at a desired distance from a form during the placing and setting of concrete therearound, the combination of: a rod having a pointed end adapted for being driven into the form and having engaging means associated therewith and a weakened portion between said means and said pointed end of such reduced cross-sectional area as to resist fracture while said pointed end is driven into the form and to fracture upon bending or twisting of said rod; and a sleeve shaped for withdrawal from the hardened concrete mounted on said rod and adapted for engagement with said means and the inner side of the form.

5. In a spacer for supporting a member at a desired distance from a form during the placing and setting of concrete therearound, the combination of: a rod having a pointed end adapted for being driven into the form and having engaging means associated therewith and a weakened portion between said means and said pointed end of such reduced cross-sectional area as to resist fracture while said pointed end is driven into the form and to fracture upon bending or

6

twisting of said rod; and a sleeve shaped for withdrawal from the hardened concrete mounted on said rod and adapted for engagement with said means and the inner side of the form whereby said rod is supported by the penetration of said pointed end in the form and contact of said sleeve with said form.

6. In a spacer for supporting a member at a desired distance from a form during the placing and setting of concrete therearound, the combination of: a rod having a pointed end adapted for being driven into the form and having associated therewith an engaging means and having an annular groove between said engaging means and said pointed end of such reduced cross-sectional area as to resist fracture while said pointed end is driven into the form and to fracture upon bending or twisting of said rod; a sleeve of deformable material shaped for withdrawal from the hardened concrete and having an opening therethrough whereby the sleeve may be mounted upon said rod; and a flange associated with said sleeve extending into said opening and adapted for reception in said annular groove to resist relative axial movement of said rod and said sleeve.

7. A spacer for supporting a member at a desired distance from a form during the placing and setting of concrete therearound, comprising: a rod of a length less than the thickness of the concrete, said rod having one end pointed to facilitate its being driven into the form to support said rod in the desired angular relation with said form; retaining means associated with said rod and projecting radially from said rod and adapted for restraining movement of the member relative to said rod; and a weakened portion in said rod of such reduced cross-sectional area as to resist fracture while said rod is driven into the form and to fracture when the form has been removed from the hardened concrete and the exposed portion of said rod is moved relative to the remainder of said rod, said weakened portion being at a greater distance from said pointed end than the depth of penetration of said rod into the form, whereby, when said pointed end is removed from the concrete after fracture of said rod, both ends of said rod are spaced a substantial distance inwardly from the opposed surfaces of the set concrete.

8. A spacer for supporting a member at a desired distance from a form during the placing and setting of concrete therearound, comprising: a rod of a length less than the thickness of the concrete, said rod having one end pointed to facilitate its being driven into the form to support said rod in the desired angular relation with said form; and a weakened portion in said rod of such reduced cross-sectional area as to resist fracture while said rod is driven into the form and to fracture when the form has been removed from the hardened concrete and the exposed portion of said rod is moved relative to the remainder of said rod, said weakened portion being at a greater distance from said pointed end than the depth of penetration of said rod into the form, whereby, when said pointed end is removed from the concrete after fracture of said rod, both ends of said rod are spaced a substantial distance inwardly from the opposed surfaces of the set concrete.

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