June 11, 1929. C. I. WILLIAMS 1,716,872

SECURING MEANS FOR CONCRETE FORMS, OR THE LIKE

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Fig. 1.

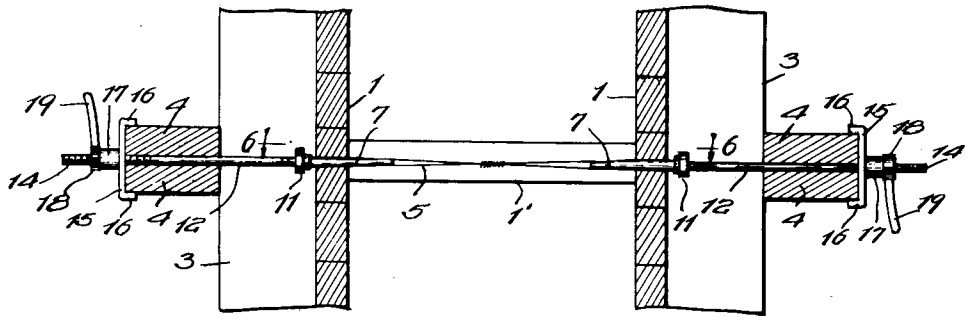


Fig. 2.

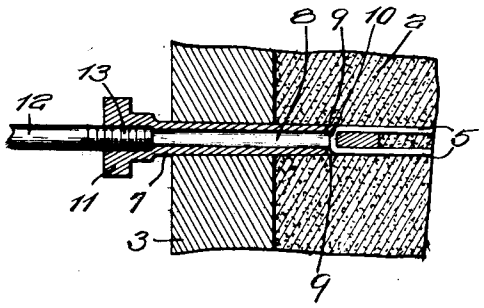


Fig. 3.

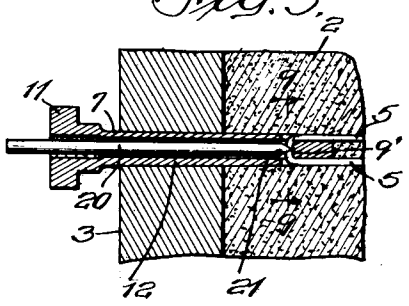


Fig. 4.

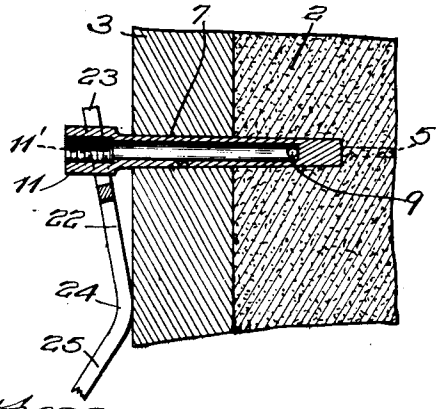
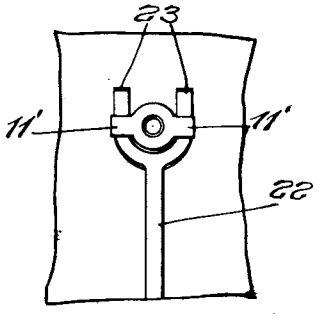


Fig. 5.



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Fig. 6.

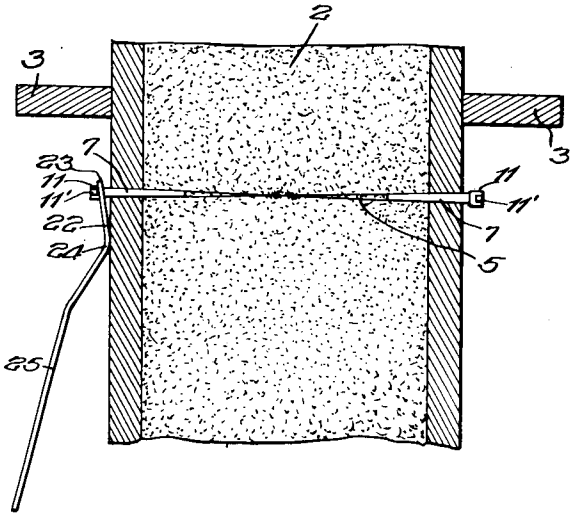


Fig. 7.

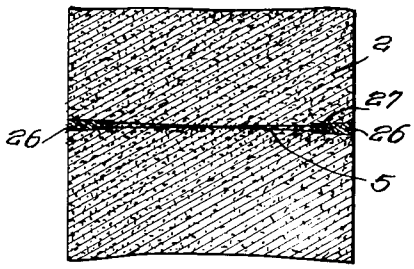


Fig. 8.

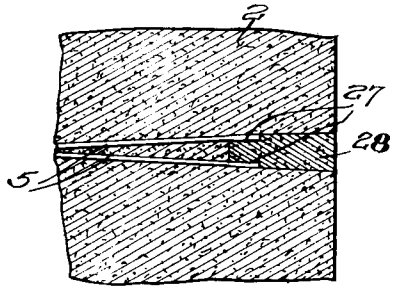


Fig. 9.

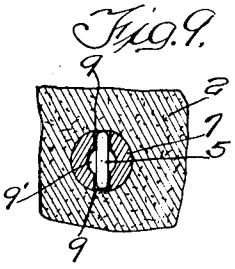
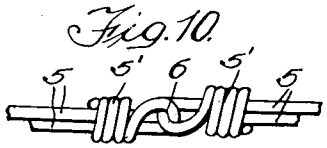


Fig. 10.



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Patented June 11, 1929. 1,716,872

UNITED STATES PATENT OFFICE.

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SECURING MEANS FOR CONCRETE FORMS OR THE LIKE.

Application filed February 26, 1925. Serial No. 11,755.

My invention relates particularly to an improved means and method of securing concrete forms or the like by wiring, and has among its objects the making possible of the production of an improved product in a more satisfactory manner. The invention has among its further objects the production of an improved wiring means for forms of the kind described which is simple, durable, reliable, convenient, efficient and satisfactory for use wherever found applicable. More particularly it has among its further objects the production of a wiring means in which breaking of the wires or elongation of the same in tension and resulting deformation of the mold or form is prevented. Many other objects and advantages of the construction herein shown and described will be obvious to those skilled in the art from the disclosure herein given.

To this end, my invention consists in the novel construction, arrangement and combination of parts herein shown and described, and more particularly pointed out in the claims.

In the drawings, wherein like reference characters indicate like or corresponding parts,

Fig. 1 is a sectional view through a form, illustrating the same set up;

Fig. 2 is an enlarged sectional view of a portion of the same;

Fig. 3 is a similar view, illustrating the method of cutting the wires after the concrete is set;

Fig. 4 is a similar view, illustrating the method of withdrawing the retaining members 7;

Fig. 5 is a view in elevation of the same;

Fig. 6 is a sectional plan (or top) view of the form, also illustrating the removal of the members 7 prior to the removal of the form boards;

Fig. 7 is a sectional view through the structure showing the form boards removed and only the wires remaining;

Fig. 8 is an enlarged view of a portion of the same, illustrating the filling up of the hole in which member 7 was seated;

Fig. 9 is a sectional view taken substantially on line 9—9 of Fig. 3; and

Fig. 10 is an enlarged view showing one method of securing the wire ends together.

Referring to the drawings, in which only the preferred embodiment of the invention is shown, I have illustrated a simple construction of concrete form or mold, it being understood that the design and size of the same, as well as the materials employed, may be as desired. Referring particularly to Fig. 1, 1 represents the form boards which are separated by spacers or spreaders 1′ of the desired size, while 3 represents studding or the like arranged at the exterior of the form boards, and 4 whalers extending along the outside of the members 3. I have illustrated in Figs. 2 to 6 the concrete 2 which is poured or otherwise applied between the form boards and allowed to set. The forms are set up substantially as shown in Fig. 1, in which 5 represents wire connecting the members 7 which extend through the form boards. As shown, the members 7 are tubular, as indicated at 8, for a portion of their length and provided with transverse openings 9 through which the wire 5 is looped, as indicated at 10, the wire extending over the face 9′ which substantially constitutes an anvil, as will be hereafter referred to.

In connecting up the wire, I prefer to loop the same through the members 7 and then bring the ends together at substantially the center of the mold and wrap them together and thence back, as indicated in Fig. 10 in which the ends 5′ are looped over as indicated at 6 and thence back and twisted around the wires, as shown. Any equivalent construction may be employed, such as the wrapping of the ends together as is common in wrapping the ends of telegraph or telephone wire, but whatever the arrangement, the wires 5—5 are preferably not twisted together in the ordinary sense. The members 7 are each provided with a head, as indicated at 11, the same being preferably formed with extending portions, as indicated at 11′ in Fig. 5, for engagement with a suitable removing tool hereinafter described. As shown, member 7 is internally threaded at the outer end for engagement with the bolt 12 which is threaded at one end, as indicated at 13, and at the opposite end as indicated at 14. This bolt extends between the two whalers 4—4, or through a single whaler as the case may be, and through a clamp 15 which is provided with the flanged portion 16 arranged to engage at the faces of the whalers. By using a clamp of this type and whalers 4—4,

it is not necessary to use heavy timber and bore holes through the same, thereby depreciating the value of the timber, as well as incurring increased expense in boring the holes. The clamping member is shown provided with a tubular extending part 17, the member 12 extending loosely therethrough and engaging with the wing nut 18, having the handle portion 19 for convenience in operating. I have illustrated in Fig. 3 a chisel 20 having the sharpened end 21 and inserted in the member 7 after the removal of the bolt 12 therefrom, as will be later described.

Referring to Figs. 4 and 5, 22 represents a tool, preferably provided with forked ends 23 arranged to engage with extensions 11′ on head 11 and operable to remove member 7 after the wires have been severed. Tool 22 (see Figs. 4 and 6) is preferably bent as indicated at 24 and formed with an extended handle 25. In Fig. 7 I have illustrated the forms and members 7 removed with the severed looped wires extending into the recesses 26, as indicated at 27. In Figure 8 I have illustrated the recess filled up by the plug 28 which is cast therein and which binds on the extended ends of the wire 5.

In use the forms and securing means are set up as shown in Fig. 1, in which the spreaders 1′ maintain the forms spaced apart, while the wires, members 7, bolts 12, etc., prevent spreading of the forms. The spreaders 1′ are removed as the concrete is added, as the pressure of the material tends in itself to spread the forms and maintain them separated. After the material is set, the bolts 12 may be removed. After they have been removed, the chisel 20 is employed by inserting the same in the members 7 and severing the wires at the loop 10, as indicated in Fig. 3, the face 9′ forming an anvil towards which the chisel is directed. After the wires have been severed, the tool 22 is applied to the several members 7 substantially as shown in Figs. 4, 5 and 6, and the members 7 withdrawn. Obviously, a block or the equivalent of the desired height may be used as a fulcrum for the tool 22. The form boards may then be removed and the structure is substantially as shown in Fig. 7. The holes or recesses 26 are then filled up or patched by applying the material as indicated at 28. This material covers the exposed ends of the wires 5 and binds therewith, as well as with the sides of the recesses, so the exterior of the structure is smooth and of finished appearance.

The advantages of this method of wiring forms over the ordinary method are numerous, the following few are those most worthy of consideration.

In the first place, there is no twisting of wires in the form. Every contractor knows that when a wire is twisted, for instance, if the ends of a wire are twisted together around the studding of a form, the wire is weakened, the amount it is weakened depending to a certain extent on the way it is twisted, but unskilled laborers will sometimes twist a wire to the breaking point and then the moment the wire is stressed due to the force of the concrete it will break at this point. It is sometimes practically impossible to repair or overcome the effect of a broken wire in the form. This danger is entirely eliminated by the method of using wires in connection with the wire form clamps. The wires are simply threaded through the holes in the wire casting, then the ends caught together at the middle of the form and wrapped back in opposite directions a distance of seven or eight inches; this leaves the wire loose, but it is then tightened to the proper tension by screwing up the wing nuts, the form being held to the proper spacing by the use of wooden spreaders. It is practically impossible in the ordinary use of wires to bring all the wires to the same tension, those of a lesser tension will allow the form to give more than those of a greater tension, as the forms are being filled with concrete. This allows the form as a whole to warp and the finished surface of the concrete will have a warped effect, which will be very noticeable by sighting over the surface of the concrete after the forms are removed. Even when wooden wedges are used with wires the wires are seldom brought to the same tension and held at that tension. There is always the danger of the wedges slipping or working loose and allowing the wire to give.

Another thing, when wires are used in the latter method, there is twice the length of wire, ordinarily due to the wires extending through the forms and around the studding; the amount a wire will elongate when it is in tension varies as the length of the wire over the diameter; thus, with the same tension on the wire, due to the pressure of the concrete, the latter method in which the wire is say twice as long, will elongate twice as much as in the method of using the wire with the wire form clamps. This latter method will require, at the most, a third the number of wires, by using whalers, as where the wires are twisted around every studding; the former method requires four holes drilled in the form for each wire, whereas, the latter method requires two holes drilled in the form for each wire to admit the wire casting; there would be at least three times the number of wires in the former case or six times as many holes drilled and approximately six times the length of wire; thus the cost of wire will be approximately six times as much and the depreciation of the form lumber due to drilling six times as great, and naturally the time of installing would be much more. When wires are so much thicker in the forms it is difficult to get around in the forms to clean out same or

to puddle the concrete as it is being poured into the form, and it is especially hard to spade the concrete around the wires out next to the forms; climbing around in the forms, stepping on the wires has a tendency to loosen them or break them, but with the wire form clamps one may step on the wire castings next to the form and eliminate the above danger.

When wires are left projecting through the forms it is difficult to remove the forms without damaging either the forms or the concrete in prying them off, but when the wire form clamps are used this leaves nothing projecting beyond the surface of the concrete to hinder in removing the forms.

In concrete work that requires a finished surface, this method of using the wire form clamps is very desirable, inasmuch as it leaves the ends of the wire severed back from the surface of the concrete about an inch or so, depending on the construction. The hole left when the casing is removed has a good square shoulder, does not run out to a thin flange, and has the projecting ends of the wires to bind a patch to. There is no danger of the patch ever coming out and leaving an unsightly place on the surface of the concrete. If a method is used wherein the wires project beyond the surface of the concrete, when the wires are cut off flush with the concrete, they will afterwards rust, due to exposure, and rust streaks will form on the surface of the concrete, or if they are chiseled off back in the concrete and the hole patched, you have nothing to bind the patch to except the sides of the hole which flare out to a thin flange, and as a result, due to exposure to the weather, this patch will loosen and fall out, leaving a bad place in the surface of the concrete. This method of using wire form clamps is not only advantageous from a stand-point of economy but from the stand-point of having a well finished surface.

The advantages may be summed up as follows:

Wires are not twisted in the forms.

No breaking point in the wire.

Wires are easily adjusted by use of wing nuts.

Less elongation of wire in tension.

Approximately one-sixth the length of wire is used.

Approximately one-sixth the number of holes to be drilled.

Forms are not damaged in being removed.

Time of installing, removing; cost of wire; depreciation of form lumber; and damage to concrete are less than in the ordinary method of wiring forms.

Less difficult to climb around inside form.

Easier to clean out form.

Easier to puddle concrete, especially around wires next to the form.

Eliminates danger of breaking or loosening of wires climbing around inside the form.

No wires projecting through forms to hinder in removal of same.

No wires exposed to the surface of the concrete.

A patch job that cannot come out.

A unique finished concrete surface.

Having thus described my invention, it is obvious that various immaterial modifications may be made in the same without departing from the spirit of my invention; hence I do not wish to be understood as limiting myself to the exact form, arrangement, construction and combination of parts herein shown and described or uses mentioned

What I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the character described and in combination, form members disposed in opposed relation, flexible means disposed between the form members, means projecting through one of the form members and engaged with the flexible means, separable means disposed outside of the form members and operatively connected to the last-mentioned means to have a portion thereof move axially for tensioning the flexible means, means for securing the flexible means to the other form member and means for cutting said flexible member to disengage same.

2. In apparatus of the kind described and in combination, form members disposed in opposed relation, flexible means disposed between the form members, means projecting through one of the form members and engaged with the flexible means, means including relatively movable members disposed outside of the form members and making threaded engagement with the last-mentioned means for tensioning the flexible means, means for securing the flexible means to the other form member and means for cutting said flexible member to disengage same.

3. In apparatus of the character described and in combination, form members disposed in opposed relation, flexible means disposed between the form members, a hollow member projecting through one of the form members and having an opening disposed on the outer side of said form member, a portion of said first mentioned means being passed through said hollow member, means including relatively movable parts held against displacement toward said form member and engageable with said hollow member for tensioning the flexible means, and means for securing the flexible means to the other form member.

4. In apparatus of the character described and in combination, form members disposed in opposed relation, flexible means disposed between the form members, a hollow member projecting through one of the form members and having an opening disposed on the outer side of said form member, a portion of said first mentioned means being passed through

said hollow member, means held against displacement toward said form member and having means threaded into said opening for tensioning the flexible means, and means entirely on the outer side of said form member for securing the flexible means to the other form member.

5. In apparatus of the character described and in combination, form members disposed in opposed relation, flexible means disposed between the form members, an element projecting through one of the form members and secured to said flexible means, a reinforcing member extending along the outer side of said form member, an angular clamp, means seated on said reinforcing member and confined between the angularities of said clamp, and means including means cooperating with the clamp and disposed to one side of the reinforcing member for engaging said element to tension the flexible means, and means for securing the flexible means to the other form member.

6. In an apparatus of the character described and in combination, form members disposed in opposed relation, flexible means between said form members, means for securing one end of the flexible member to one of the form members, a reinforcing member disposed upon the outer side of the other form member, a tubular member extending through one of the form members and engaged with the flexible member, a rod threaded at both ends with one end detachably connected to the outer end of the tubular member, a U-shaped clamp embracing one edge of the reinforcing member, and means adjustably mounted on the outer end of the rod and bearing against said clamp for tensioning the flexible member.

7. In apparatus of the kind described and in combination, form members arranged in opposed relation, flexible means between said form members, means for connecting one end of the flexible member to one of the forms, a tubular member having transverse openings adjacent its inner end through which the flexible means is extended, a reinforcing element disposed upon the outer side of the form, a rod detachably connected with the outer end of the tubular member and extending through said reinforcing member, and means adjustably mounted upon the outer end of said rod for tensioning said flexible member.

8. In an apparatus of the character described and in combination, form members arranged in opposed relation, flexible means between said form members, means for securing the flexible member to one of the forms, a tubular member extending through the other form and having its inner end closed, said tubular member having opposed openings therethrough through which the flexible means is extended, a reinforcing member disposed upon the outer side of the form member, a U-shaped clamp embracing one edge of the reinforcing member, a rod detachably connected with the outer end of the tubular member and extending through said reinforcing member, and a clamping nut threaded on to the outer end of the rod and bearing against the U-shaped clamp for adjusting the rod and tensioning the flexible member.

9. In apparatus of the character described and in combination, form members disposed in opposed relation, flexible means disposed between said form members, tubular means projecting through said form members and engaged with said flexible means, means movable in said tubular means for separating said flexible means from said tubular means, and means for moving said tubular means axially.

In testimony whereof, I have hereunto signed my name.

CHESTER I. WILLIAMS.