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R. D. CARR
APPARATUS FOR DEPRESSING OR DEFLECTING
WIRE, CABLE, OR STRAND

3,013,322

Filed March 19, 1958

2 Sheets-Sheet 1

Fig. 4.

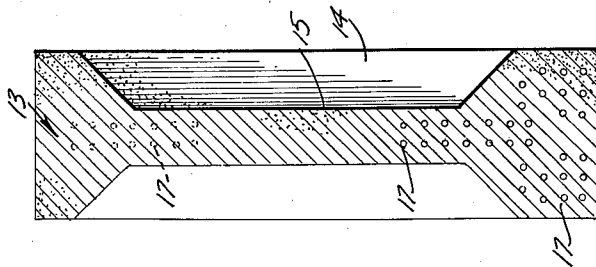
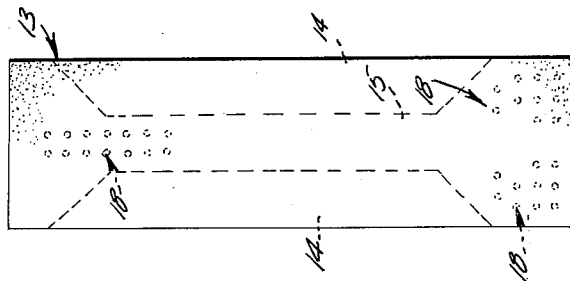
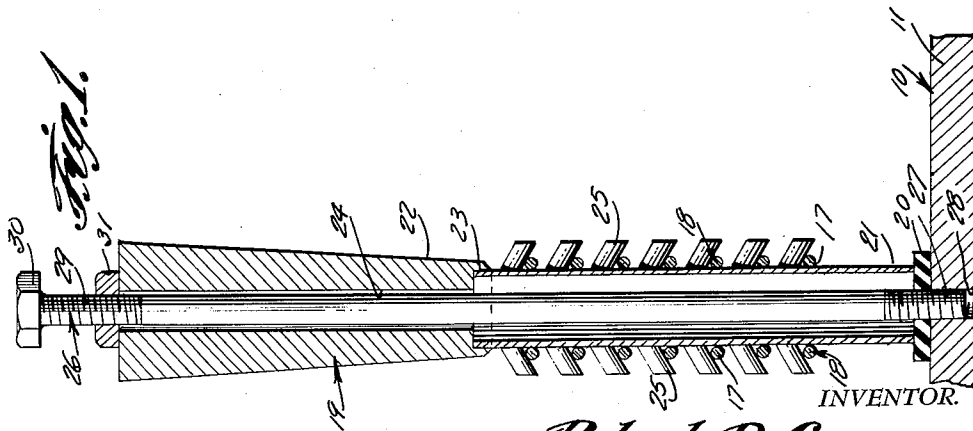


Fig. 2.



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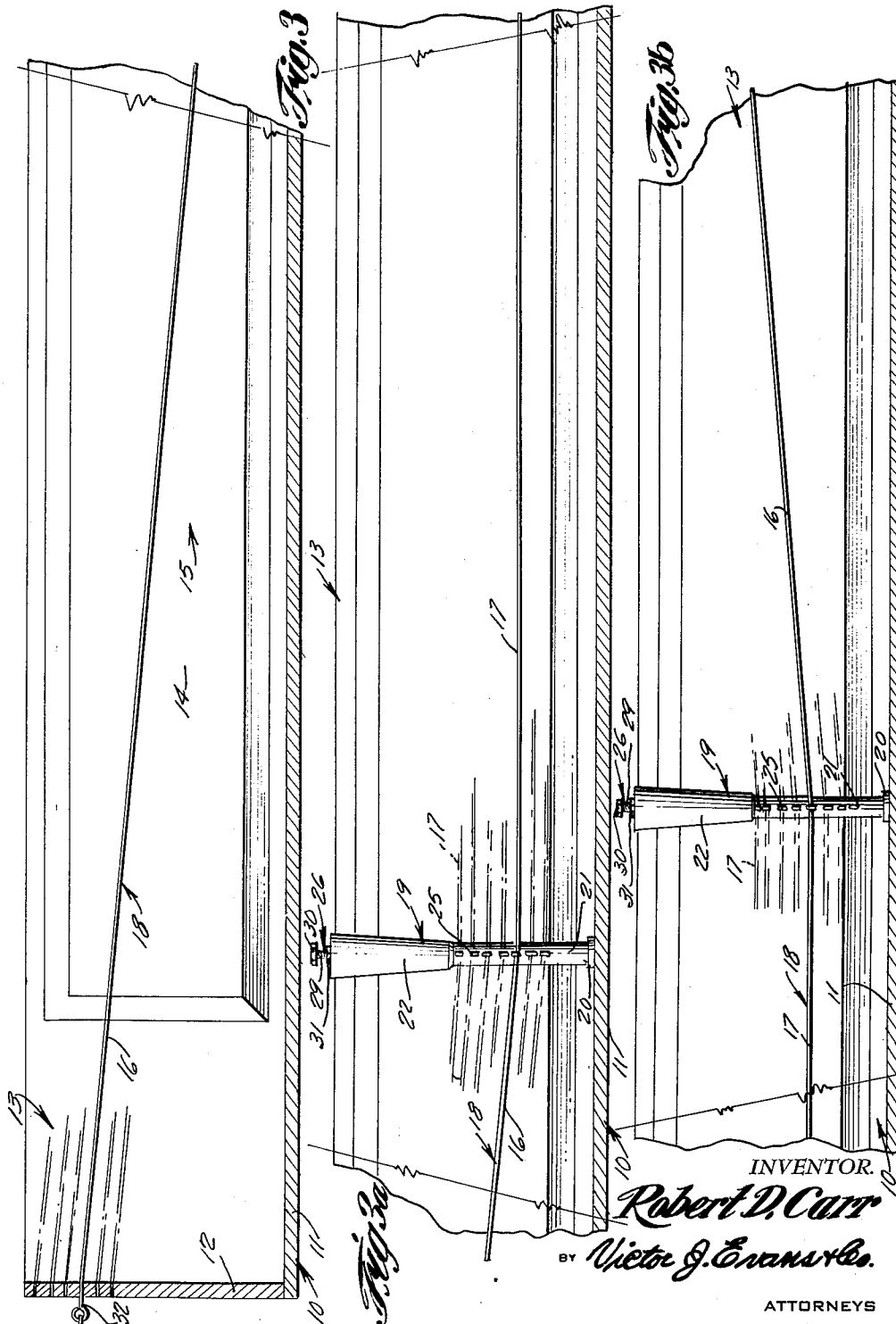
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1

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APPARATUS FOR DEPRESSING OR DEFLECTING WIRE, CABLE, OR STRAND

Robert D. Carr, P.O. Box 53, Victoria, Tex.

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3 Claims. (Cl. 25-118)

This invention relates to the production of concrete articles or products, and more particularly to a means for depressing or deflecting wire, strands or the like, as for example strands which are to be used in the formation of pre-stressed concrete products.

An important object of the present invention is to provide a means for holding reinforcing strands in their proper position so that pre-stressed concrete products formed will have added strength and wherein certain of the parts can be used over and over again so that the present invention can be used repeatedly in the formation of pre-stressed concrete members.

A still further object of the invention is to provide hold-down devices for use in making pre-stressed concrete products, wherein the hold-down devices serve to retain the reinforcing strands or wires in their proper position in the concrete members; as for example when such strands have been properly located by means of the arrangement shown and described in my co-pending patent application Serial No. 722,589 filed March 19, 1958.

A further object of the invention is to provide a concrete pre-stressing assembly which is extremely simple and inexpensive to manufacture.

Other objects and advantages will be apparent during the course of the following description.

In the accompanying drawings, forming a part of this application, and in which like numerals are used to designate like parts throughout the same:

FIGURE 1 is a vertical sectional view taken through one of the hold-down devices.

FIGURE 2 is an end elevational view of a concrete pre-stressed body member and showing the ends of the strands therein.

FIGURE 3 is a fragmentary sectional view showing an end of the concrete body member positioned in a form, and showing an end portion of one of the pre-stressed strands.

FIGURE 3a is a view similar to FIGURE 3, but illustrating an intermediate portion of the strand.

FIGURE 3b is a view similar to FIGURES 3 and 3a but showing the other end portion of a strand.

FIGURE 4 is a transverse sectional view taken through the intermediate portion of the pre-stressed concrete member, and showing the strands therein.

Referring in detail to the drawings, the numeral 10 indicates a removable form which is shown to comprise a horizontally disposed base member or bottom wall 11 and vertically disposed end walls 12, FIGURE 3. The numeral 13 indicates a concrete body member which is adapted to be formed in the mold or form 10, and the body member 13 may have different shapes and sizes although it is shown in the drawing to have recessed portions 14 which define an intermediate section 15.

As shown in the drawings, there is provided a plurality of strands or wires or cables which are each indicated by the numeral 18, and it is to be noted that the strands 18 have end portions 16 which are inclined or arranged angularly with respect to the longitudinal axis of the body member 13, and the strands 18 have their intermediate portions 17 arranged parallel to the longitudinal axis of the body member 13 as shown in FIGURES 3, 3a and 3b.

The numeral 19 indicates each of a plurality of hold-down devices, which have the same construction, and

2

each hold-down device 19 includes a plug 20 which may be made of a suitable resilient material such as rubber. Arranged above each plug 20 is an upstanding collar 21, and positioned above the collar 21 is a sleeve 22 which is shown to have its outer surface tapered. A recess 23 is arranged in the lower end of the sleeve 22 for receiving the upper end of the collar 21.

The sleeve 22 is provided with a longitudinally extending elongated bore 24, and extending outwardly and downwardly from the collar 21 and secured thereto is a plurality of spaced apart fingers 25, and portions of the strands 18 are held beneath the inclined fingers 25.

Each hold-down device 19 further includes a bolt or rod 26 which has a lower threaded portion 27 that threadably engages an opening 28 in the base member 11. The rod 26 extends through the bore 24 and through the collar 21, and the upper portion of the rod 26 is threaded as at 29, and there is provided a head 30 on the upper end of the rod 26. A suitable securing element such as a nut 31 is arranged in engagement with the portion 29 of the rod 26.

From the foregoing, it is apparent that there has been provided a method of and means for pre-stressing strands such as strands which are to be used in reinforcing pre-stressed concrete. According to the present invention, the strands 18 are pre-stressed by means of an arrangement such as that shown in my co-pending patent application Serial No. 722,589 filed March 19, 1958, and the hold-down devices 19 include collars 21 which have the fingers 25 that serve to retain the strands 18 in the position shown in the drawings. Thus, it will be seen that in the drawings the strands 18 are arranged so that their end portions 16 are inclined with respect to the longitudinal axis of the body member 13, while the intermediate portions 17 of the strands 18 extend parallel to the longitudinal axis of the body member. Thus, when pressure is released on the strands 18, they will place the concrete under compression so that the concrete member will have the necessary strength.

It is to be noted that initially the part, such as the hold-down member 19 is in the position shown in FIGURES 1 or 3a or 3b, and after the concrete cures or hardens, the bolt or rod 26 can be unscrewed from the opening 28 in the base member 11 whereby the rod 26 can be removed. Then, due to the tapered formation of the sleeve 22, the sleeve 22 can be removed and the collar 21 will remain in place in the completed concrete member 13. Since the collar 21 has the plurality of inclined fingers 25 secured thereto, it will be seen that the strands 18 will be maintained in their proper position. The lock nut 31 helps retain the rod 26 in its proper assembled position. Thus, it will be seen that since the sleeve 22 and rod 26 are removable, these parts can be used over and over again.

Thus, according to the present invention it will be seen that there has been provided a method for fastening down wire, cable or strand under tension as for example when such strands are used in the manufacture of concrete products that are to be put into compression by means of putting the wire, cable or strand in tension prior to the pouring of the concrete, and after the concrete has attained the required strength, putting it into compression by releasing the tension on the wire, strand or cable into the concrete or what is commonly called pre-stressed concrete products.

As previously stated the hold-down device 19 includes the sleeve 22 and collar 21 and the lugs or fingers 25 extend from the collar 21 for preventing the wire or strands from rising. The number and spacing of these lugs or fingers 25 can be varied as desired so as to accommodate any pattern of wire, cable or strand. The member 19 can be affixed to the casting bed, table or form by any suitable means, as for example it can be at-

tached by means of the threaded rod 26 or else it can be attached by means of a pin, wedge or other suitable device. The rod 26 is of a sufficient length to extend above the concrete product being manufactured so as to make it readily accessible for easy removal. The collar 21 is of such a length as to extend to the surface of the casting or, in the deeper sections, the tapered sleeve 22 is used and the taper of the sleeve permits the sleeve to be removed so that it can be reused.

It is to be understood that the completed concrete member may be provided with various types of inserts or incidental hardware for the purpose of attaching forms or other members used in connection with the structure being built.

The pre-stressing procedure is as follows. First, the lower group of strands 18 may be stressed as for example to approximately 18,500 lbs. per square inch per strand. Then, the upper group of strands may be stressed to a suitable pressure as for example they may be stressed to 5,570 lbs. per square inch. After the strands have been tensioned by means of the device shown in my co-pending patent application, the hold-down members 19 are inserted between the strands and the bolt 26 is attached through the tubing or collar 21 to the casting bed 11. After all of the hardware or hold-down members 19 are in position, the strands will be deflected simultaneously throughout the entire length of the bed in pairs. After the forms 10 have been removed and the concrete cure has been completed, the hold-down devices 19 may be applied near the strand deflection points, and with the hold-down devices in place, the bolts or rods 26 can be removed in the deflection hardware. Then, tension on the beams can be released gradually and simultaneously and the beams 13 can be removed from the casting bed, and the rubber plugs 20 can be removed and the user can then grout up the holes or openings 28.

The strands may have different sizes, as for example they may be $\frac{7}{16}$ " in diameter.

As illustrated in FIGURE 3, the pre-stressed strands have their end portions extend beyond the ends of the beams 13 as indicated by the numeral 32.

The various corners of the concrete may be chamfered, and the various parts can be made of any suitable material and in different shapes or sizes.

Minor changes in shape, size and rearrangement of details coming within the field of invention claimed may be resorted to in actual practice, if desired.

I claim:

1. In a hold-down device for concrete products, a resilient plug, a cylindrical collar extending upwardly from said plug, a plurality of angularly arranged fingers extending downwardly from said collar and secured thereto, said fingers adapted to engage strands in the concrete products, a tapered sleeve provided with a longitudinally extending bore, said sleeve having a recess in its lower end for engagement with the upper end of the collar, a rod extending through the bore in said sleeve and through said collar and through said plug and the

lower end of the rod being threaded, said rod including an upper threaded portion, and a securing element arranged in engagement with the upper threaded portion of the rod.

2. In a hold-down device for concrete products, a plug, a collar extending upwardly from said plug, a plurality of fingers extending downwardly from said collar and secured thereto, said fingers adapted to engage strands in the concrete products, a sleeve provided with a bore, said sleeve having a recess in the lower portion thereof for engagement with said collar, a rod extending through the bore in said sleeve and through said collar and through said plug, and an element contiguous to the upper portion of said sleeve and said element being arranged in engagement with the upper portion of the rod.

3. In a device of the character described, a form adapted to have a concrete body member arranged therein, said form embodying a horizontally disposed base member, said body member having a plurality of spaced apart strands extending longitudinally therethrough, means supporting said strands whereby said strands have their end portions inclined with respect to the longitudinal axis of the body member, the intermediate portion of the strands being arranged parallel to the longitudinal axis of the body member, said last mentioned means including a plurality of hold down devices arranged in spaced apart relation with respect to each other, each of said hold down devices including a resilient plug arranged contiguous to the upper surface of the base member, a cylindrical collar extending upwardly from said plug, a plurality of angularly arranged fingers extending downwardly from said collar and secured thereto, said fingers engaging said strands, a tapered sleeve provided with a longitudinally extending bore, said sleeve having a recess in its lower end for engagement with the upper end of the collar, a rod extending through the bore in said sleeve and through said collar and through said plug and the lower end of the rod being threaded and threadably engaging the base member, said rod including an upper threaded portion, and a securing element arranged in engagement with the upper threaded portion of the rod.

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