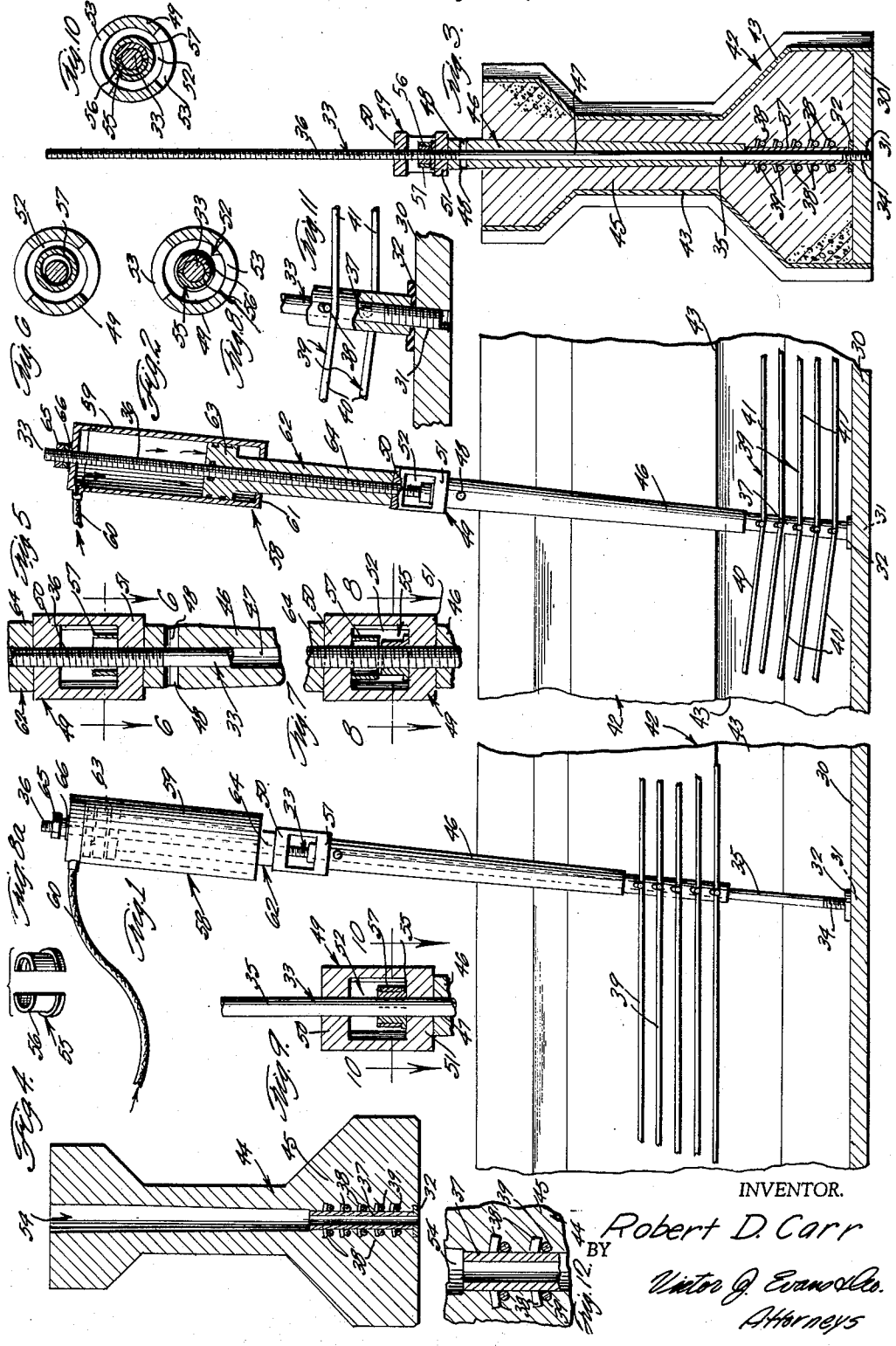
April 9, 1963 R. D. CARR 3,084,909

PULL DOWN HARDWARE

Filed Sept. 28, 1961



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United States Patent Office 3,084,909 Patented Apr. 9, 1963

3,084,909

PULL DOWN HARDWARE

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Filed Sept. 28, 1961, Ser. No. 141,518
1 Claim. (Cl. 254—51)

The present invention relates to the formation of pre-stressed concrete members such as beams, posts, piles, sleepers, tubes or the like, and the present invention is an improvement over the devices shown and described in my prior co-pending patent application Serial No. 722,589, filed March 19, 1958, and in my Patent No. 3,013,322.

An object of the present invention is to provide an improved means for deflecting the strands and wherein an actuating mechanism is provided consisting of a hydraulic jack to provide the necessary force for accomplishing the desired results.

Another object is to provide an apparatus of the character described which consists of pull down hardware using a center hole jack, and wherein a hydraulic jack is adapted to be utilized.

Another object is to provide an apparatus of the character described that may be utilized speedily and with precision by even inexperienced operators.

Further objects and advantages are to provide improved elements and arrangements thereof in a device of the character described that is economical to produce, durable in form, and conducive to the most economical use of materials and uniformity of members formed therefrom.

Still further objects and advantages will become apparent in the subsequent description and specification.

In the drawings:

FIGURE 1 is a side elevational view illustrating pull down hardware using a center hole jack, and showing the position of the parts prior to deflection.

FIGURE 2 is a view generally similar to FIGURE 1, but with parts broken away and in section, and showing the parts in a different position after deflection of the strands or wires.

FIGURE 3 is a sectional view after the jack is removed.

FIGURE 4 is a sectional view taken through the completed pre-stressed concrete article.

FIGURE 5 is a fragmentary sectional view illustrating certain constructional details of the present invention.

FIGURE 6 is a sectional view taken on the line 6—6 of FIGURE 5.

FIGURE 7 is a fragmentary sectional view showing the ring raised above the split nut.

FIGURE 8 is a sectional view taken on the line 8—8 of FIGURE 7.

FIGURE 8*a* is a perspective view showing the parts of the split nut separated.

FIGURE 9 is a fragmentary sectional view generally similar to FIGURE 7, but showing the ring on the split nut.

FIGURE 10 is a sectional view taken on the line 10—10 of FIGURE 9.

FIGURE 11 is a fragmentary elevational view, with parts broken away and in section, showing the connection of the stud to the anchor plate.

FIGURE 12 is a fragmentary sectional view on an enlarged scale showing a portion of the completed pre-stressed member.

Referring in detail to the drawings, and more particularly to FIGURES 1 through 12 of the drawings, the numeral 30 indicates an anchor plate which is provided with a threaded opening 31, FIGURE 3, and the numeral 32 indicates a sealing element or neoprene seal which is arranged contiguous to the anchor plate 30. The numeral 33 indicates an elongated stud which includes a lower threaded portion 34 that is arranged in threaded

engagement with the threaded aperture or opening 31 in the anchor plate 30, and the stud 33 further includes a non-threaded or smooth portion 35 as well as an upper threaded section or portion 36, for a purpose to be later described.

As shown in the drawings, there is provided a sleeve 37 which is mounted on the lower portion of the stud 33, and the sleeve 37 has affixed thereto or formed integral therewith a plurality of diametrically opposed spaced apart lugs 38 for engaging therebelow strands or steel wires 39 which are to be deflected, and as shown in FIGURE 1 initially the strands 39 have a straight formation, and after being deflected the strands are adapted to have inclined end portions 40 as well as intermediate straight portions 41. In FIGURE 3, the numeral 42 indicates a portion of a mold or form which may have any desired shape or configuration, and the mold 42 is shown to comprise spaced apart wall members 43. In FIGURE 4 the numeral 44 indicates the completed pre-stressed concrete article or member which is formed in accordance with the present invention. It is to be understood however that the external shape or configuration of such a member can vary as desired or required, and the present invention is only concerned with the deflecting and consequential final stage of pre-stressing of the strands or wire members 39 in the concrete 45.

There is further provided a support member or tapered sleeve which is indicated generally by the numeral 46, and the member 46 is provided with an elongated longitudinally extending bore 47 for the projection therethrough of a portion of the stud 33, and the outer portion of the support member 46 has a tapered formation whereby the upper end thereof is of greater diameter than the lower end so as to facilitate removal of the member 46 from the article to provide the space or recess as indicated by the numeral 54 in FIGURE 4. The upper end of the support member 46 may be provided with diametrically opposed openings 48, and the numeral 49 indicates a housing that is arranged above the support member 46, and the housing 49 is mounted on the stud 33, and the housing 49 includes upper and lower portions 50 and 51 as well as an intermediate recessed portion 52 and side recesses or cutouts 53. The numeral 55 indicates a split nut which is adapted to be readily arranged in the recess 52, and as shown in FIGURE 8*a*, the nut 55 includes separate segments or pieces 56, and ring 57 is adapted to be arranged in engagement with the segments 56.

The numeral 58 indicates a center hole jack which includes a cylinder 59 that is adapted to be connected to a suitable source of actuating medium such as hydraulic fluid under pressure as for example by means of the conduit 60, and a vent or aperture 61 may be arranged in the lower portion of the cylinder 59, FIGURE 2. The numeral 62 indicates a plunger which includes an upper piston portion 63 arranged for reciprocal engagement with the interior of the cylinder 59, and the plunger 62 further includes a portion 64 above the housing 49.

As shown in FIGURE 1 for example, there is provided top nuts 65 and 66 which are arranged in threaded engagement with the portion 36 of the stud 33.

In use, with the parts arranged as shown in the drawings and in particular as shown in FIGURES 1 through 12 of the drawings, the jack 58 can be used in conjunction with the other elements and the jack 58 may be hydraulically operated by hydraulic fluid which can be supplied from a suitable source of supply to the interior of the cylinder 59 through the conduit 60, and FIGURE 1 illustrates the position of the parts before deflection of the strands or wires 39, while FIGURE 2 illustrates the position of the parts after the deflection, FIGURE 3 shows the parts in position after removal of the jack, while FIGURE 4 shows the completed pre-stressed con-

crete member 44 which is adapted to be formed according to the present invention. As shown in FIGURE 4 the sleeve 37 remains in the molded article or member 44, but the member 46 as well as the stud 33 and its associated parts are removed from the completed member 44.

The following is given as a detailed description of operation in connection with FIGURES 1 through 12. In order to deflect the stressing strands of the mechanism of FIGURES 1 through 12 the following procedure is followed. Initially the two top nuts 65 and 66 are applied to the top of the stud 33 and locked together. Then, the center hole jack 58, the housing 49 and split nut ring 57, the support member 46, the sleeve 37, and the sealing element 32 are slipped onto the stud 33. The bottom of the stud 33 is lowered down between the stressing strand 39 and screwed into the anchor plate 30. The sleeve 37 is positioned between the strands 39 and said strands are hooked onto the lugs 38. Pressure is induced through the conduit 60 through the jack 58, and said jack pushes up against the nut 66 and down against the split nut housing 49, and in turn against the support member 46, the sleeve 37, and the strands 39.

The distance from the lowest lug 38 to the bottom of the sleeve 37 is such that when the strands 39 are pulled down to the final positions 40 and 41, the sleeve 37 is properly pressed into the sealing element 32. While the jack 58 holds the strands 39 in position, the split nut ring 57 is raised and both halves of the split nut pieces 66 are arranged in threaded engagement with the stud 33 and snug against the lower portion 61 of the housing 49. Then, the ring 57 is slipped down over the split nut pieces 56 and the pressure is released from the jack 58. While a wrench applied to both nuts 66 and 65, the lower nut 66 is held and the upper nut 65 is removed, and then the lower nut 66 is removed. The jack 58 is removed and this portion of the work is ready for the placement of the concrete 45.

After the concrete has hardened sufficiently, the top nuts 65 and 66 are reinstalled and, by applying a wrench to the lower nut 66, the stud 33, the split nut 55, and the housing 49 are removed. A round bar is adapted to be passed through the holes 48 at the top of the support

member 46. By the use of the handle thus formed a torque and an upward thrust are applied to the support member 46 which is removed from the concrete member 44.

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

What is claimed is:

A device of the character described, comprising an anchor plate, a sealing element of yieldable material contiguous to said anchor plate, an elongated stud including a lower threaded portion extending through said sealing element, and threadedly engaging said anchor plate, said stud further including a non-threaded smooth portion and upper threaded section, a sleeve mounted on the lower portion of said stud above said sealing element, a plurality of diametrically opposed spaced apart lugs affixed to said sleeve and said lugs adapted to have steel strands engaged therebelow; a support member positioned above said sleeve and said support member having a longitudinally extending bore for the projection therethrough of said stud, said support member having a tapered outer formation and wherein the upper portion of the support member is of greater diameter than the lower portion thereof, a housing mounted above said support member and said housing including upper and lower sections and an intermediate opened recess portion, a split nut mounted on said stud and arranged in the intermediate recess portion of the housing, a ring for engaging said split nut, a center hole jack comprising a cylinder adapted to be connected to a source of actuating medium under pressure, a plunger having its lower end contiguous to the top of the housing and said plunger having a piston portion on its upper end reciprocally engaged in said cylinder, and top nuts contiguous to the upper end of said cylinder and said top nuts being arranged in threaded engagement with the threaded upper sections of said stud.

References Cited in the file of this patent

UNITED STATES PATENTS

3,013,322 Carr ---------- Dec. 19, 1961