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3,583,047

APPARATUS FOR MANUFACTURING PRESTRESSED CONCRETE POLES, PILES AND THE LIKE

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Fig. 1.

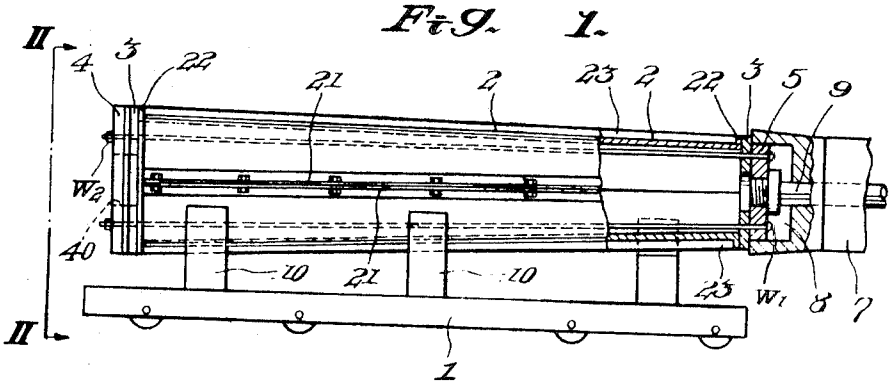


Fig. 2.

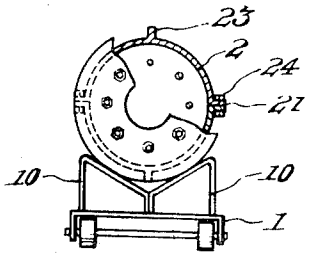


Fig. 5.

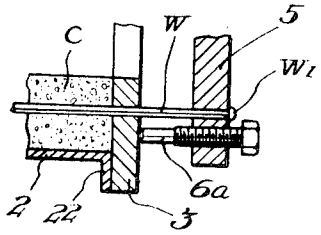


Fig. 4.

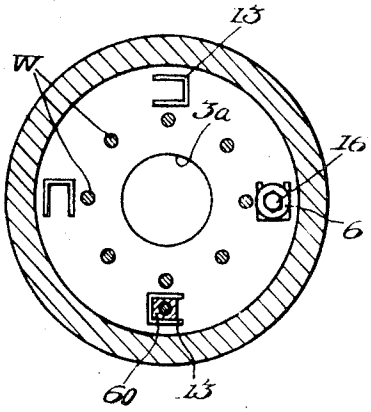
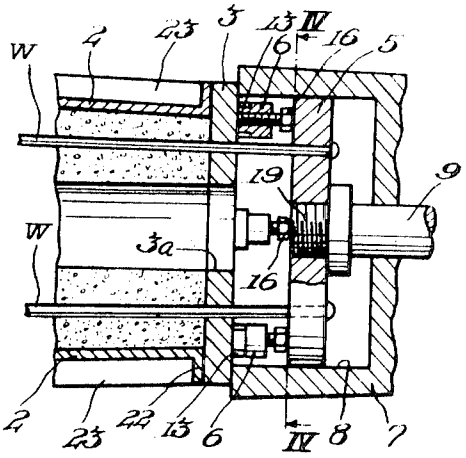


Fig. 3.



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APPARATUS FOR MANUFACTURING PRESTRESSED CONCRETE POLES, PILES AND THE LIKE

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Original application Apr. 3, 1967, Ser. No. 627,911. Divided and this application Aug. 20, 1969, Ser. No. 851,611

Int. Cl. B28b 21/30

U.S. Cl. 25—118T 3 Claims

ABSTRACT OF THE DISCLOSURE

In the manufacture of prestressed concrete poles, piles or the like, particularly of tubular form, adjustable distance pieces are employed between one of the end discs of the formwork and the adjacent anchor plate to maintain steel tendons arranged in the formwork in their stretched state. The use of such distance pieces enables the tendons to be tensioned with particular uniformity and facilitates mass production of the articles.

This invention relates to methods of manufacturing prestressed concrete poles, piles and the like.

This application is a division of my previous application Ser. No. 627,991 now abandoned.

The present invention has for its object to stretch, simultaneously, a multiplicity of steel tendons or reinforcing steel wires in a formwork to impart uniform stress to the wires.

Another object of the present invention is to place concrete material in the formwork for consolidation therein while securely maintaining the multiplicity of reinforcing steel wires in the stretched state.

Still another object of the invention is to provide a simple means to facilitate the manufacture of prestressed concrete poles, piles and the like on a mass production basis.

Attention now is particularly directed to the accompanying drawing, which illustrates an apparatus of appropriate construction usable in performing the method of the present invention and in which:

FIG. 1 is a side elevation, partly in section, of the apparatus;

FIG. 2 is a front end elevation of same partly in section taken along the line II—II in FIG. 1;

FIG. 3 is a fragmentary enlarged longitudinal section showing the concrete cast with the steel wires maintained in their stretched state;

FIG. 4 is a transverse cross section taken along the line IV—IV of FIG. 3 with the distance pieces shown in front elevation or section; and

FIG. 5 illustrates one modification of the distance pieces.

Referring to the drawing and particularly to FIGS. 1 and 2, reference numeral **1** generally indicates a wheeled platform having a plurality of support brackets **10** for supporting a formwork **2** and serving the purpose of carrying the formwork to any desired place. The formwork **2** shown is generally of truncated conical shape and is comprised of a pair of form segments of semicircular cross section having longitudinal flanges **21** hinged together on one side and those bolted together, as at **24**, on the other side of the formwork. Numeral **23** indicates longitudinal ribs formed on the outer periphery of the formwork **2**.

The formwork **2** also has on its opposite end flanges **22** to which are closely secured respective end discs **3** each having a central opening **3***a*. Arranged outside of said end discs **3** are anchor plates **4** and **5**, respectively, which

have a multiplicity of aligned through holes to receive reinforcing steel wires W to be anchored at their opposite ends to the plates.

At both ends, each of the steel wires W is formed with an enlarged head W1 or carries a clamp nut W2 for the anchoring purpose. Obviously, each of the end discs **3** also is formed with through holes in alignment with those formed in the anchor plates **4** and **5** to permit the steel wires W to be arranged in the hollow interior of the formwork **2** and through the end discs.

Referring further to FIGS. 3 and 4, a plurality, four in the illustrated example, of distance pieces **6** are arranged between one of the end discs **3** and the adjacent anchor plate **5** for the purpose of maintaining the wires W in a state stretched by actuation of the anchor plate **5** as described hereinafter. For positioning the distance pieces **6**, U-shaped brackets **13** are welded or otherwise secured to the outer face of the end disc **3**, as clearly shown in FIG. 4, to receive the respective distance pieces **6**, each of which includes a body portion **60** of square section to snugly fit in the associated U-shaped bracket **13**. The bracket defines a slot, opening in a direction other than radial. A stud **16** is threadably fitted to the body of each of the distance pieces **6** for adjustment of the axial distance provided thereby between the associated end disc **3** and adjacent anchor plate **5**.

One modification of the distance pieces **6** is shown in FIG. 5, which takes the form of studs **6***a* threadably fitted to the anchor plate **5** for abutting engagement at their end with the adjacent end disc **3**.

For actuation of the anchor plate **5**, a hydraulic jack means **7** is provided as seen in FIGS. 1 and 3, which has an internal tubular bearing surface **8** to receive the anchor plate **5**, for sliding engagement therewith and also has a plunger **9** with its end **19** threaded for threadable engagement with the anchor plate **5**.

In practicing the method of the present invention with the apparatus described above, reinforcing steel wires are first cut desired fixed length and each end of the wire lengths is upset to form an enlarged head W1 or threaded to carry a nut W2 or otherwise worked providing for anchoring action. A multiplicity of steel wires W thus prepared are inserted through the aligned holes formed in the opposite end discs **3** and anchored at their opposite ends to the respective anchor plates **4** and **5** (see FIG. 1). The wheeled platform **1** is placed adjacent the engaging end of hydraulic jack **7** in alignment therewith and the anchor plate **5** is positioned in the tubular end of the jack **7** for sliding movement therein. Upon energization of the hydraulic jack **7**, the anchor plate **5**, previously secured to the threaded end **19** of the jack plunger **9**, is moved to the right, as viewed in FIG. 3, apart from the adjacent end disc **3** and the steel wires W anchored to the anchor plate **5** are correspondingly stretched as shown in FIG. 3. Subsequently, a plurality of distance pieces **6**, previously adjusted to the specified length, are mounted in the respective U-shaped brackets **13** on the end disc **3** to maintain the adjacent anchor plate **5** in its position moved apart therefrom and the steel wires W in their stretched or tensioned state. Then, the threaded connection between the jack plunger **9** and anchor plate **5** is released and the jack **7** is moved axially in relation with the formwork **2** to disengage the anchor plate **5** from the tubular bearing surface **8** in the adjacent end of the jack **7**.

Subsequently, an appropriate amount of concrete material is poured into the interior of the formwork through a central opening **40** (FIG. 1) provided at the other, left, end thereof while the formwork **2** is being turned on its axis by a drive means not shown so that the poured concrete forms under the centrifugal force into a hollow truncated conical shape of an appropriate radial thickness ex-

tending about the inner peripheral surface of the formwork 2 and consolidates. Subsequently, the formwork 2 and other members including anchor plates 4, 5 are disassembled to obtain a desired truncated conical pole or pile.

Though description has been made herein with particular reference to the fabrication of truncated conical poles or piles, it should be readily understood that the principles of the invention can also be employed in fabricating straight cylindrical poles or piles by the use of a straight cylindrical formwork in place of the truncated conical one used in the apparatus shown.

What is claimed is:

1. Apparatus for manufacturing prestressed concrete poles, piles and the like comprising an elongate tubular formwork with end discs secured thereto at the ends thereof, two opposed anchor plates arranged outside of the respective ends of said formwork with one anchor plate being fixedly secured thereto and one anchor plate being movable, pressure providing means for engaging said movable anchor plate, and moving it axially, means securing reinforcing wires to and extending between said anchor plates, distance pieces adapted to be positioned between said one movable anchor plate and the adjacent end disc in circumferentially spaced and balanced relation to maintain the reinforcing wires in their stretched state, a plurality of brackets secured to the outer face of the said adjacent end disc, each of said distance pieces having a body portion engaging a said bracket to be held in position thereby, and each of said distance pieces including a stud threadably engaging therewith and adjustable in its effective length, and engaging said movable anchor plate.

2. Apparatus as in claim 1 where said brackets are of U-shape and the open ends thereof do not face in a radial direction whereby on centrifugal concrete casting action, the reenforcing wires and distance pieces are maintained in position.

3. Apparatus as in claim 1 where said brackets each have a slot extending thereinto from a margin thereof, which slot is open in other than a radial direction, a said body being received in each of said slots.

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25—30C; 249—97; 254—29.5; 264—228