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APPARATUS FOR EXTRUDING PRESTRESSED CONCRETE PRODUCTS

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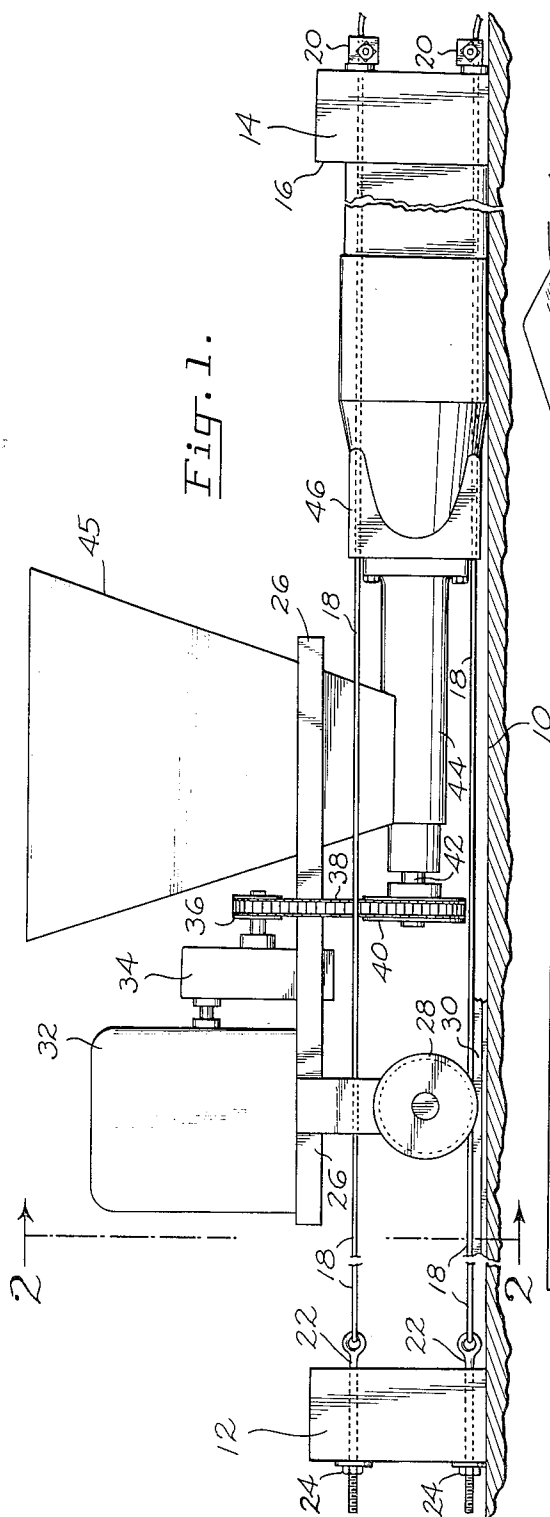


Fig. 1.

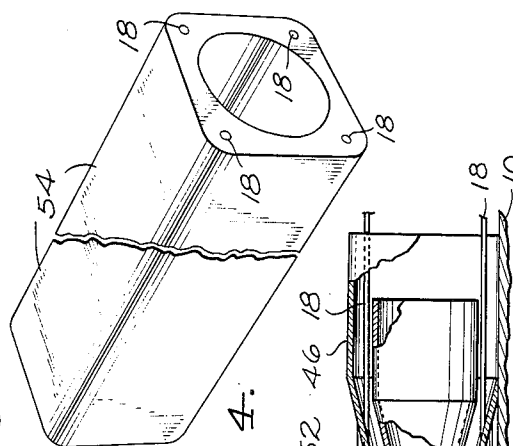


Fig. 4.

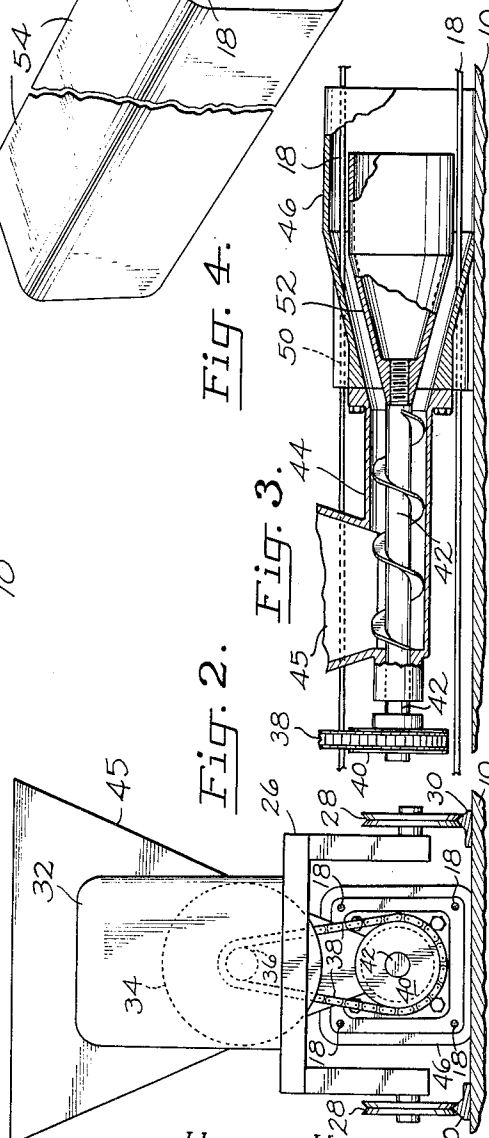


Fig. 2.

Fig. 3.

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APPARATUS FOR EXTRUDING PRESTRESSED CONCRETE PRODUCTS

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1 Claim. (Cl. 25—118)

This invention relates to an apparatus for making prestressed concrete products. It pertains particularly to an apparatus for making beams, poles, piling, street light stands, and similar products from prestressed concrete.

It is the general object of this invention to provide an apparatus for extruding elongated prestressed concrete products of uniform composition and high strength. These products may be either solid or hollow and may be formed in lengths of several hundred feet which then may be divided into shorter lengths suitable for the contemplated end use.

In the drawings:

FIG. 1 is a side elevation of the presently described apparatus;

FIG. 2 is a transverse sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a longitudinal sectional view of the apparatus; and

FIG. 4 is a perspective view of an extruded, prestressed concrete pole produced by the apparatus of FIGS. 1—3.

In general, the herein described method of forming prestressed concrete objects comprises first tensioning at least one cable arranged substantially horizontally above a casting bed. The cable and casting bed extend outwardly from a vertically arranged abutment. An uncured, self-sustaining concrete mix is extruded from a receptacle upon the bed and against the abutment. During this operation the receptacle is propelled along the bed principally by the propelling force created by the extrusion of the concrete against the abutment. The extruded concrete is molded about the cable to the desired exterior configuration, after which the concrete is permitted to set. The tension then is released on the cable, after which the extrusion may be cut into lengths.

The apparatus of the invention broadly comprises means for effectuating the foregoing method steps.

Considering the foregoing in greater detail and with reference to the drawings:

In practicing the invention there is provided first a casting floor 10 which may be made of concrete and covered with a release composition to which molded prestressed concrete objects will not stick. Fixed to the casting floor are a pair of anchor blocks 12, 14 which may be spaced apart by as much as several hundred feet. One of the anchor blocks, e.g. block 14, is provided with a vertical abutment face 16.

Cables 18 are mounted between blocks 12, 14 at spacings determined by the requirements of the prestressed product. Although various means of securing the cables may be employed, a convenient means comprises passing them through block 14 and securing their ends with clamps 20. The even surface of abutment 16 thus is preserved.

The other ends of cables 18 may be secured to bolts 22 which penetrate block 12 and are secured by nuts 24. Thus the cables may be tensioned to the desired degree by means of jacks or other suitable tensioning apparatus, after which the tension is maintained by adjustment of nuts 24.

The extruding apparatus is mounted on a vehicle which is guided by cables 18 and which traverses the casting bed between the anchor blocks. In the illustrated form of the invention the vehicle comprises a frame 26 one end of which is supported on wheels 28 moving on tracks 30.

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Frame 26 supports a motor 32 coupled through a gear box 34 to a drive sprocket 36. This sprocket drives a chain 38 which is connected to and drives a second sprocket 40 keyed to the shaft of a screw 42. The screw is housed in a screw case 44 with which communicates the lower end of a hopper 45.

An outwardly flaring mold 46 is bolted to the trailing end of screw case 44. The mold is of dimensions determined by the size of the object to be extruded. It is three sided, the surface of casting bed 10 forming the bottom.

Guideways 50 extend longitudinally through the mold. These receive cables 18 which penetrate to the interior of the mold in the manner indicated particularly in FIG. 3.

In the event that hollow articles are to be extruded, a coring element 52 may be affixed to the end of screw 42 as a longitudinal extension thereof. In the illustrated form of the invention, the coring member is conical so that the contour of its outer surface parallels the contour of the inner surface of mold 46. A passageway of the desired width thus is provided between these two members.

Operation

In extruding finished prestressed concrete articles 54 by the present invention, cables 18 are threaded through guideways 50 in mold 46 and connected at one end to anchor block 14 by clamps 20 and at the other end to anchor block 12 by eye bolts 22.

The required tension is placed on the cables by means of jacks and maintained by adjusting nuts 24.

The apparatus then is placed with the open trailing end of mold 46 squarely against abutment surface 16 of anchor block 14. A stiff concrete mix, e.g. one having a moisture content of from 5—15%, by weight, is introduced into hopper 45.

Worm 42 is driven by motor 32 whereupon the concrete mix is extruded through the passageway between coring element 52 and mold 46. The resulting pressure against abutment surface 16 drives the vehicle mounting hopper 45 across casting bed 10 in a direction determined by cables 18 and guides 50, and at a rate determined by the rate of extrusion of the concrete product.

Because of its inherent stiffness, the concrete retains the shape imparted to it by mold 46 and coring member 52. In addition, its interior surface is trowled smooth by the rotary motion of the coring element.

The operation is carried on continuously until a product of the desired length has been extruded about the tensioned cables. This product may be several hundred feet long. It is permitted to cure, after which cables 18 may be released and the product cut into lengths suitable for use as prestressed concrete pipe, poles, pilings and the like.

Accordingly it is apparent that by the present invention we have provided an apparatus for producing prestressed concrete articles of various types, all of which are characterized by great strength, and a uniform surface. The technique permits the production of either solid or hollow articles without using forms, and the finished articles can be produced continuously at low cost and then stockpiled. Hence there is afforded an economical, efficient procedure for the large scale production of such articles.

It is to be understood that the form of our invention herein shown and described is to be taken as a preferred example of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of our invention or the scope of the subjoined claim.

Having thus described our invention, we claim:

Apparatus for forming prestressed elongated concrete articles comprising in combination a horizontal elongated

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casting bed, elongated track means substantially parallel to the bed, a vehicle, wheel means on the leading end of the vehicle engaging the track means for movably supporting and guiding the leading portion of the vehicle on the track means, extrusion means, a hollow mold on the trailing end of the vehicle communicating with the extrusion means for receiving and forming extruded concrete in a continuous elongated shape upon longitudinal movement of the vehicle, the mold having elongated cable guide means extending therethrough into the hollow thereof and longitudinally of the vehicle, a cable snugly but slidably confined in the guide means and extending through the hollow of the mold, stationary anchor means spaced apart at opposite ends of the casting bed, and tensioning means on the anchor means releasably securing the cable at its opposite ends in tensioned condition between the stationary anchor means, said cable serving as a guide for the trailing end of the vehicle in

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the longitudinal extruding movement of the latter and forming reinforcing means for the extruded concrete articles said guide means being so located that said cable is clear of the extruding unit.

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