Oct. 14, 1969 B. ARCHER ET AL 3,471,980

METHOD FOR DEVELOPING A COLUMN

Filed Oct. 18, 1967 4 Sheets-Sheet 1

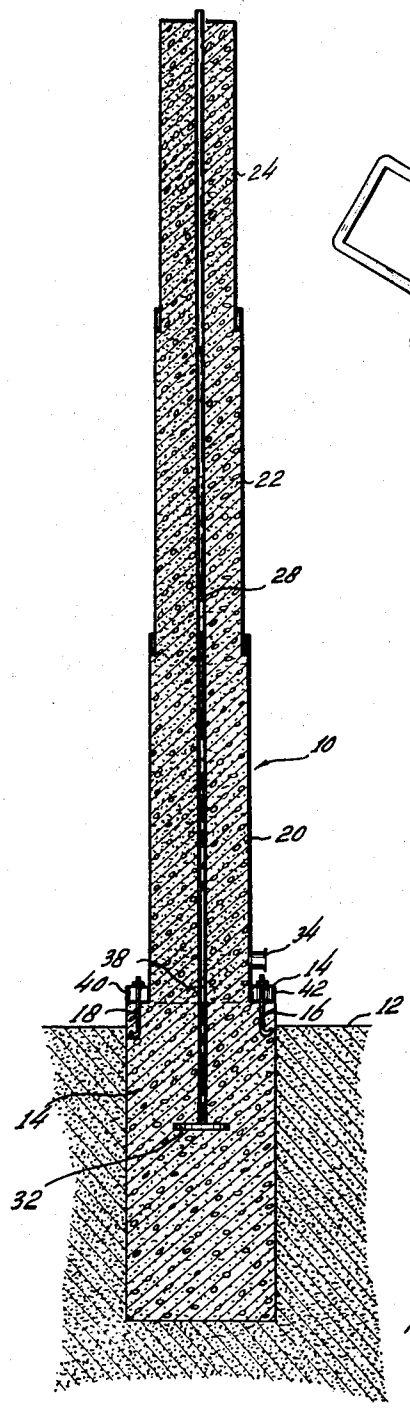


FIG. 1

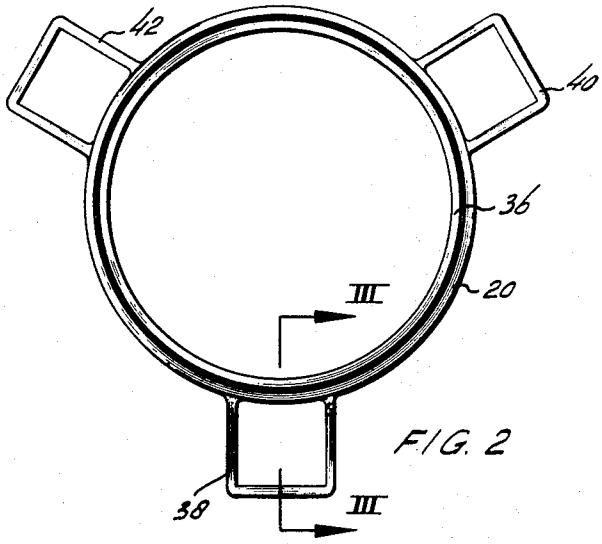


FIG. 2

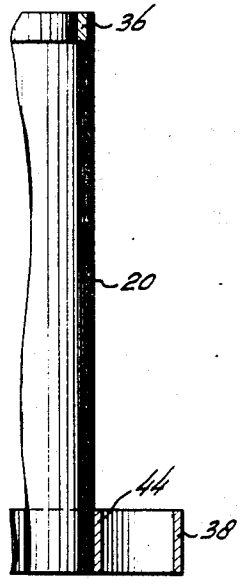


FIG. 3

INVENTOR
BILL ARCHER
JOHN L. LOW III
BY Semmes & Semmes
ATTORNEYS

Oct. 14, 1969 B. ARCHER ET AL 3,471,980

METHOD FOR DEVELOPING A COLUMN

Filed Oct. 18, 1967 4 Sheets-Sheet 2

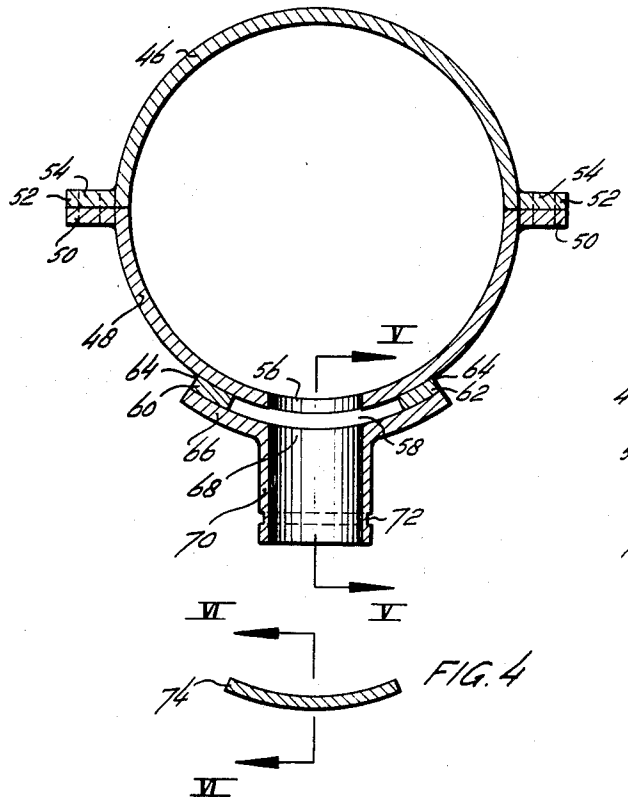


FIG. 4

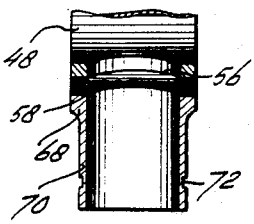


FIG. 5

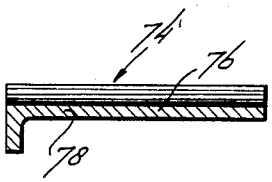


FIG. 6

INVENTOR
BILL ARCHER
JOHN L. LOW III

BY Semmes & Semmes

ATTORNEYS

Oct. 14, 1969 B. ARCHER ET AL 3,471,980

METHOD FOR DEVELOPING A COLUMN

Filed Oct. 18, 1967 4 Sheets-Sheet 3

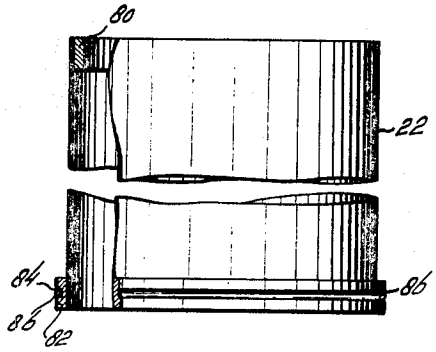


FIG. 8

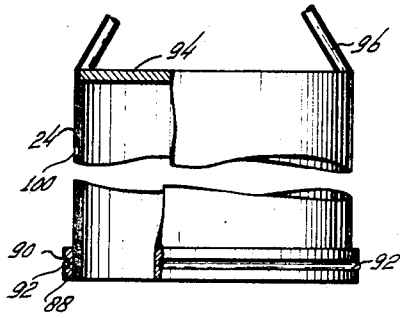


FIG. 10

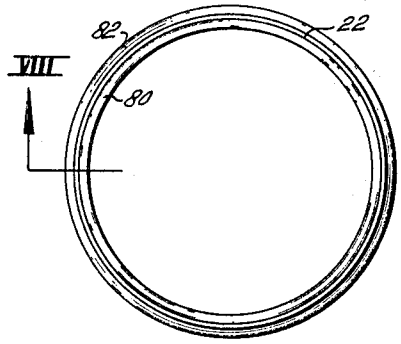


FIG. 7

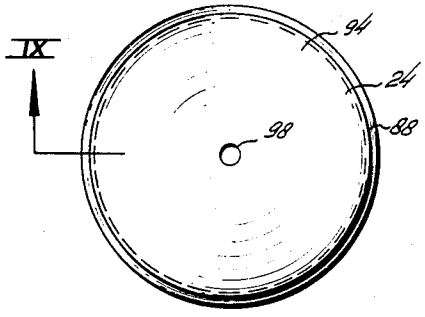


FIG. 9

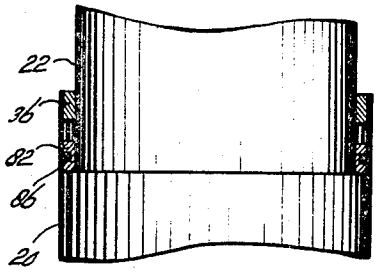


FIG. 11

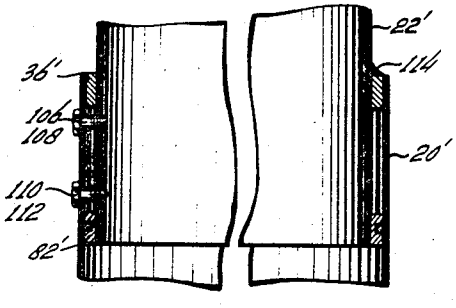


FIG. 12

INVENTOR
BILL ARCHER
JOHN L. LOW III

BY Semmes & Semmes

ATTORNEYS

Oct. 14, 1969 B. ARCHER ET AL 3,471,980

METHOD FOR DEVELOPING A COLUMN

Filed Oct. 18, 1967 4 Sheets-Sheet 1

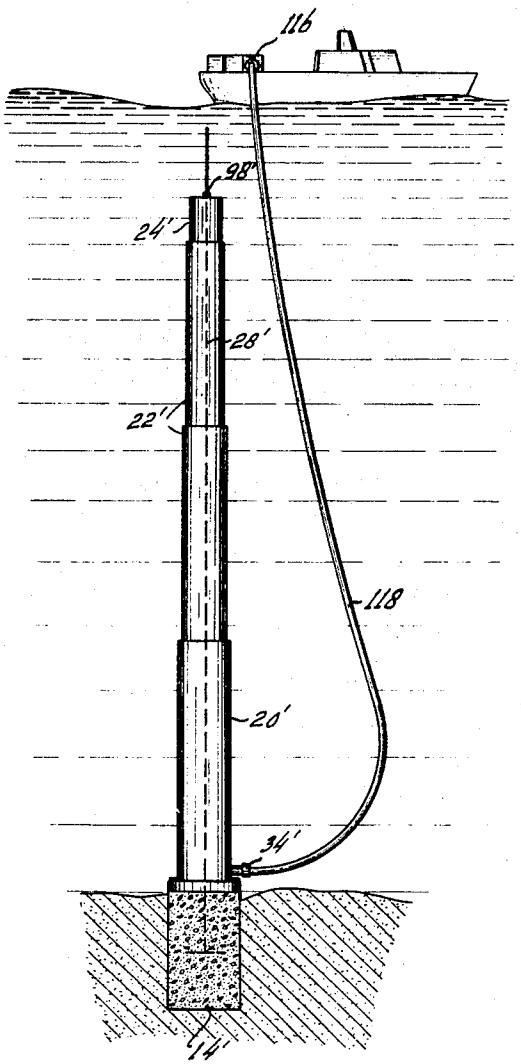


FIG. 13

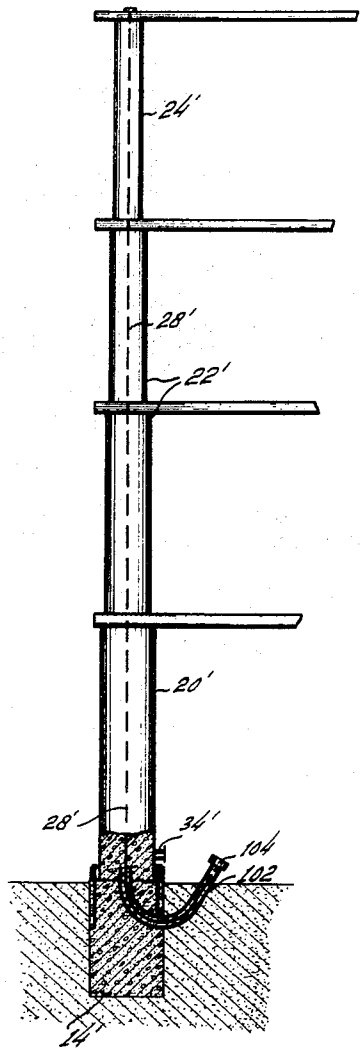


FIG. 14

INVENTOR
BILL ARCHER
JOHN L. LOW III

BY Semmes & Semmes

ATTORNEYS

United States Patent Office 3,471,980
Patented Oct. 14, 1969

3,471,980

METHOD FOR DEVELOPING A COLUMN

Bill Archer, Meridian, and John Lewis Low III, Laurel, Miss., assignors to Arlo, Inc., Jackson, Miss., a corporation of Mississippi

Filed Oct. 18, 1967, Ser. No. 676,286
Int. Cl. E04h 12/12, 12/34; E02d 5/22
U.S. Cl. 52—115 7 Claims

ABSTRACT OF THE DISCLOSURE

Method for developing a telescoping column or utility pole by pumping fluid such as concrete into one of several aligned, telescoping sections, so as to longitudinally extend said sections from a rigid pre-cast base to which they are locked. The telescoping sections may be removed or left held in place as the concrete sets.

BACKGROUND OF THE INVENTION

Field of the invention

According to the present method, utility poles, such as telephone poles or street lamp poles, may be developed simply from a collapsed telescoping form by pumping concrete into one of the telescoping form sections so as to extend the aligned sections vertically above the base to which they are locked. According to the "first-in, first-out" principle, the first-pumped concrete rises while setting with the smallest diameter telescoping section to the top of the pole as fresh concrete is introduced at the bottom of the pole. Since the sections are interlocked and pressure sealed with respect to each other they are vertically aligned, as they are extended and there is no necessity for the use of any other forms. The telescoping sections may serve as a tensioning or stressing means. Also, a wire extending from the furthermost form to the base form may serve as a tensioning means.

As a result, there is eliminated the necessity for carrying pre-cast long poles through croweded city streets at great expense. Also, there is eliminated the necessity for set-up and tear-down of elaborate forms prior to and subsequent to the pouring operation.

Description of the prior art

Prior inventors have considered the possibility of using metallic, vertically aligned forms for the pouring and setting of concrete as columns. These forms have been bolted to a rigid base and locked with respect to each other. The form sections were telescoping and, apparently, no previous inventor has considered the possibilities of developing the column by pressurizing a telescoping form with fluid, such as concrete, so that the concrete longitudinally extends the sections with respect to each other.

Kelsey et al. (975,135) is fairly typical of post or pole forms, consisting of cylindrical metal sections bolted one to another prior to pouring of concrete through the top. Also, Kelsey teaches the employment of a transverse stiffener H (FIG. 3).

Rodgers (883,569) provides a metallic unitary mold for casting of fence posts in situ. Rodgers fills from the upper end and removes the form after the concrete is set.

Cotten (1,342,424) shows the use of telescoping sections in a pile driving apparatus. The sections are extended longitudinally downwardly during the pile driving operation and are entirely removed, prior to pouring. Alternatively the sections are removed one by one, as the concrete is poured. There is no suggestion of extending the sections by developing a hydraulic pressure from the concrete being poured. In fact, the pile driving purpose of the Cotten device would preclude the use of concrete or fluid as the pressurizing medium.

Summary of the invention

According to the present method, a concrete column is developed by anchoring a telescoping form of the type including a plurality of aligned interlocking sections to a rigid base, then pumping fluid such as concrete into the forms, so as to longitudinally extend the sections above the base and maintaining fluid pressure with the form, so as to rigidize the sections with respect to each other. In the case of concrete, pressure is maintained by closing a gate at the concrete entry port as the concrete sets. In the case of extending the column by the use of pumped fluid, such as air or oil, the pressure is maintained by sealing the fluid within the column. In such case additional strength may be provided by transversely locking abutting portions of the extending sections with respect to each other. Tensioning of the column may be accomplished by drawing a tension from the furthermost extended section to the base.

The entire method may be accomplished not only on land but also beneath the sea, the telescoping sections being locked to a rigid base on the sea bottom then developed vertically underwater by pumping the concrete or other fluid medium from a surface vessel through a hose to the base section locked to the rigid base. The invention is considered to have considerable potential in underwater drilling and mining operations.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view showing the longitudinally aligned, vertically extended sections with concrete set therein, phantom lines being inserted to show possible floor levels for pouring of floors as the column may be used in conventional building construction;

FIG. 2 is a top plan view of the bottom of base section **20** which is anchored to the rigid base by means of radially extending brackets **38**, **40** and **42**;

FIG. 3 is a side elevation thereof;

FIG. 4 is a sectional view of the base section **20**, showing the fluid pumping gates **34** and gate **74** exploded with respect thereto;

FIG. 5 is a transverse section taken along section line **5—5** of FIG. 4 showing the pumping gate;

FIG. 6 is a side elevation of the sealing gate;

FIG. 7 is a top plan of intermediate telescoping section **22**;

FIG. 8 is a vertical section through one side thereof;

FIG. 9 is a top plan of the furthermost extended section **24**;

FIG. 10 is a fragmentary vertical section thereof;

FIG. 11 is a schematic fragmentary detail showing the interlocking of telescoping sections with respect to each other;

FIG. 12 is a schematic view showing a modification, wherein the sections are locked transversely to one another in their abutting portions either by bolt means or welding;

FIG. 13 is a fragmentary view showing the developing of a column beneath the sea; and

FIG. 14 is a schematic view showing a post stressing modification of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 a utility pole generally designated as **10** is shown as comprising telescoping sections **20**, **22** and **24**. The furthermost section **24** may include a fluid escape aperture **26**. A tensioning wire **28** may extend from furthermost section **24** top into anchor plate **32** mounted in concrete base **14**. Anchor bolts **16** and **18** extend from base **14** into base section stabilizing brackets **38**, **40** and **42**. A pump gate **34** is provided for the introduction of concrete or other pressurizing fluid.

As illustrated in FIGS. 2 and 3, bottom section **20** stabilizing brackets **38, 40** and **42** may be welded to bottom lip **44**. At the upper part of section **20** is peripheral aligning guide **36** which engages intermediate section **24**, in the manner illustrated in FIG. 11.

The pump gate structure **34** is particularly illustrated in FIGS. 4–6, as comprised of half-round tubular sections **46** and **48** secured to each other by means of abutting ears **52** and **50**. Bolts (not illustrated) may extend through aligned ear apertures **54**. A three inch diameter hole **56** cut within section **48** serves as the fluid entry portal adjacent gate slot **58** which is defined by side pieces **60** and **62** welded as at **64** to section **48**. Gate front **66** having aperture **68** supports concrete feeding conduit **70**. Feeding conduit **70** may have a victaulic slot **72** for securement to the pumping tube or hose. Gate **74** includes aperture **76** and gate top **78** permitting the gate to slide vertically within slot **58**, then be battened down on top of gate front **66**, as the pouring operation is completed.

Turning to FIG. 7, intermediate section **22** is illustrated as comprising top aligning guide **80** and bottom aligning seal **82** having ceiling slot **84** into which sealing O-ring **86** is fitted. As illustrated in FIG. 11 O-ring **86** abuts the exterior surface of the telescoping section **20** to provide a seal thereagainst.

In FIG. 9 the top or furthermost section **24** is illustrated as including a top piece **94** having tap hole aperture **98**, as well as an optional air hole aperture **100**. Bottom seal **88** has a slot **90** for supporting O-ring **92**.

In the FIG. 12 modification the longitudinally extended sections **20'** and **22'** are locked transversely one to another in their overlapping portion either by bolts (not illustrated) extending through holes **106, 108, 110, 112** or by welding in the medial overlapping area **114**. An optional lifting loop **96** may be provided for ease in handling the collapsed telescoping sections.

In the FIG. 13 modification the method for developing a column is carried out underwater, a diver fitting tube **118** to gate **34'** thence pumping concrete via surface vessel pump **116** to longitudinally extend the sections. When the concrete sets, the column may be used conventionally as a piling.

A post stressing modification is shown in FIG. 14 wherein wire or cable **28** may be drawn or tensioned from top section **24** through the previously set concrete **141** through tube **102** and there locked to bracket **104**. The cable **28** may be asphalt-covered or bare, depending upon the tensioning requirement.

As will be apparent, the telescoping sections may be of plastic or heavy paper tubing, as well as metal. The concrete may be pumped at approximately 1800 p.s.i. to develop a column 100–150 feet high. Since the sections are telescoped by the concrete being pumped there is eliminated the time element or factor in the concrete form. There is no necessity for setting of the concrete in the first section prior to introduction of additional concrete. The first-in concrete is first-up and sets out of place, while the new concrete is being pumped. The FIG. 12 modification of welding the sections one to another is suggested when the fluid pressure is developed by air.

Since the column is rigidized unto itself there is no necessity for the use of supporting "dead men" or guy wires, as in conventional utility poles. Also, since the telescoping sections may serve a stressing purpose, they can be left in place and are not necessarily stripped, as are conventional form. A particular application is in the placement of business signs such as at filling stations or in the placement of micro-wave towers having eleborate antennae. The signs are placed on the section **24** prior to pumping, then raised with the section **24** as the concrete is introduced. Similarly, a water tank might be constructed by placing the tank on a plurality of telescoping section

units which are then vertically raised simultaneously by pumping of the concrete. Alternatively, the columns may be extended by pumping with oil or air, then filled with concrete, the oil being driven out through tap hole **98**. Another modification of invention includes the development of a smokestack by employing concentric telescoping sections, concrete being pumped into the annulus defined by the parallel sections, the innermost telescoping section being simultaneously extended by a fluid medium such as air.

We claim:

1. Method for developing a column comprising:
(A) anchoring a telescoping form of the type including a plurality of longitudinally aligned, interlocking sections to a rigid base;
(B) pumping fluid concrete into said sections so as to longitudinally extend said sections above said base;
(C) maintaining fluid concrete pressure within said sections so as to rigidize said sections with respect to each other.

2. Method for developing a column comprising:
(A) anchoring a telescoping form of the type including a plurality of longitudinally aligned, interlocking sections to a rigid base;
(B) pumping concrete into a section adjacent said base so as to longitudinally extend said sections above said base; and
(C) tensioning said sections by drawing a tension from the furthermost extended section to said base prior to setting of said concrete.

3. Method for developing a column as in claim **2**, wherein said tensioning is accomplished subsequently to setting of said concrete.

4. A longitudinally extending column comprising:
(A) a rigid base;
(B) a plurality of longitudinally aligned interlocking, telescoping sections, fluid-sealed with respect to each other, the largest diameter section being locked to said base and including:
(i) a pumping gate for the introduction of fluid concrete into said sections;
(C) a tensioning wire extending from the furthermost of said sections to said base; and
(D) a set concrete interior filling said telescoping sections and encompassing said tensioning wire.

5. A longitudinally extending column as in claim **4**, the furthermost section including an aperture for passage of fluid concrete being pumped.

6. Method for developing a column as in claim **1**, including pumping of said fluid concrete into the section furthermost from said base.

7. A longitudinally extending column as in claim **5**, said extending sections being locked to one another intermediate abutting telescoped portions.

References Cited

UNITED STATES PATENTS

989,069	4/1911	Siewert	52—632
1,285,940	11/1918	Chodakowski	52—2
2,809,415	10/1957	Covelle	25—155
2,949,705	8/1960	Carper	52—723 XR
3,196,991	7/1965	Johnson et al.	52—632 XR
2,812,769	11/1957	Schaefer et al.	52—2
2,888,111	5/1959	Evans	52—115 XR

FOREIGN PATENTS

212,189	11/1966	Sweden.

BOBBY R. GAY, Primary Examiner

A. M. CALVERT, Assistant Examiner

U.S. Cl. X.R.

25—118; 52—720