# United States Patent [19]

**Archer et al.**

[11] **3,793,794**

[45] **Feb. 26, 1974**


[54] **STACKED COLUMN**


[75] Inventors: **Bill Archer**, Meridian; **John L. Low, III**, Laurel, both of Miss.

[73] Assignee: **Arlo, Inc.**, Laurel, Miss.



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[21] Appl. No.: **289,701**

[52] **U.S. Cl.** ..... **52/632**, 52/725, 52/726, 52/724, 52/115

[51] **Int. Cl.** ..... **E04h 12/34**

[58] **Field of Search** ... 52/115, 40, 223 R, 224, 225, 52/296, 297, 725, 726, 724, 632



[56] **References Cited**

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| 3,514,918 | 6/1970 | Archer | 52/223 R X |

FOREIGN PATENTS OR APPLICATIONS

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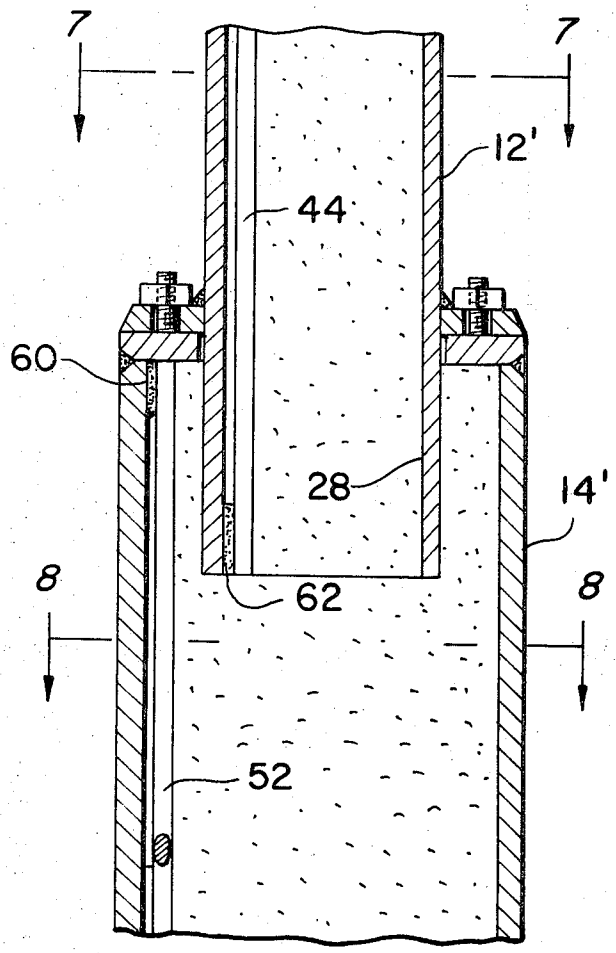
*Primary Examiner*—Alfred C. Perham



[57] **ABSTRACT**

A column comprised of a plurality of concrete-filled stacked tubes of increasingly smaller diameter, the tubes engaging each other in overlapping relationship and being secured by means of locking rings at the point of their engagement, prior to pumping the tube interiors with concrete. A modification of invention includes the positioning of longitudinally extending tension rods in the tubes on a tension and or compression side, so as to counteract anticipated load prior to pumping of concrete.


**4 Claims, 9 Drawing Figures**



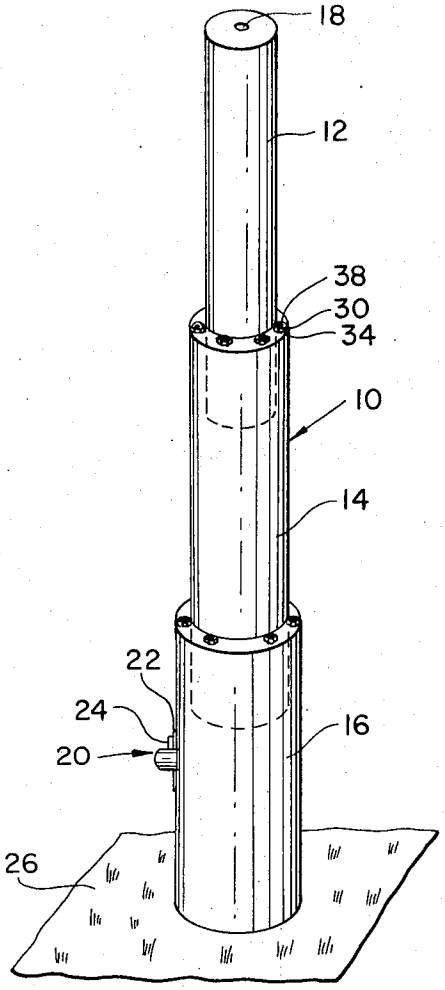



FIG. 1

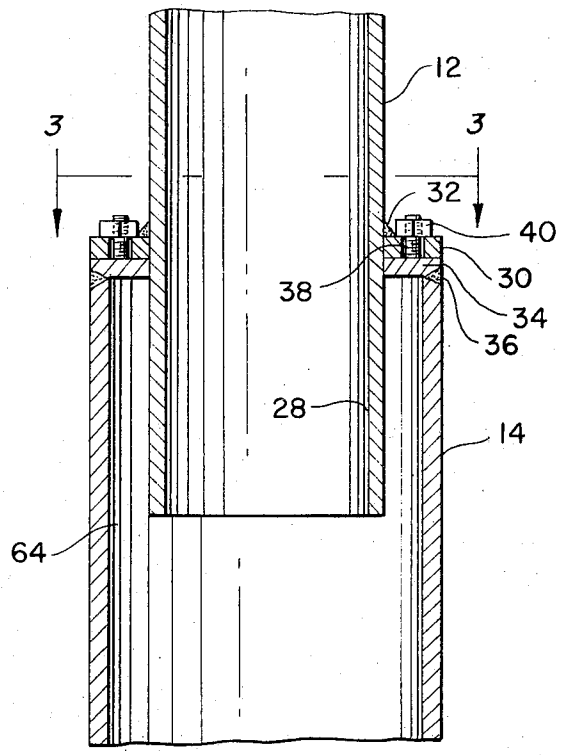



FIG. 2

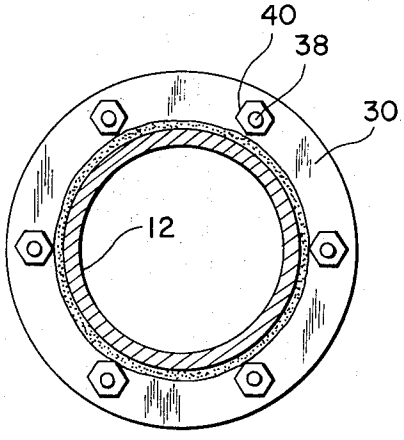



FIG. 3

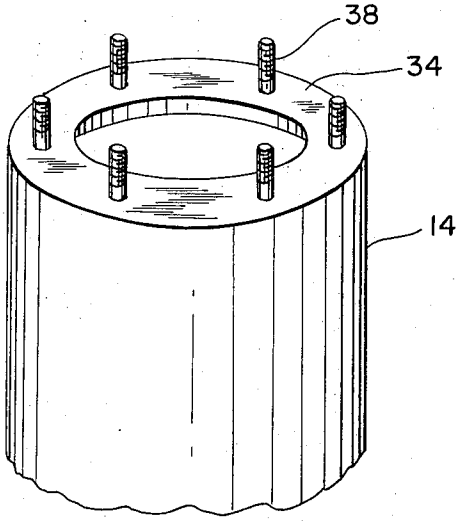



FIG. 4

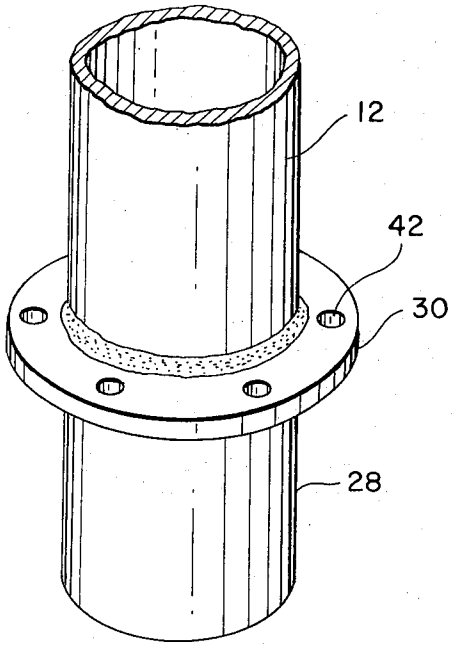



FIG. 5

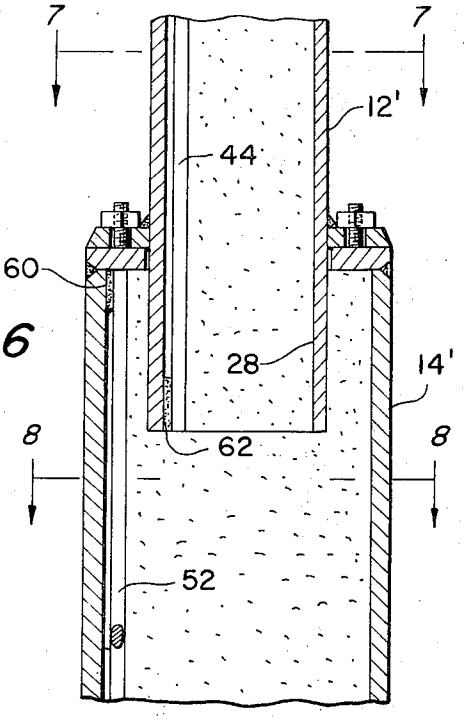



FIG. 6

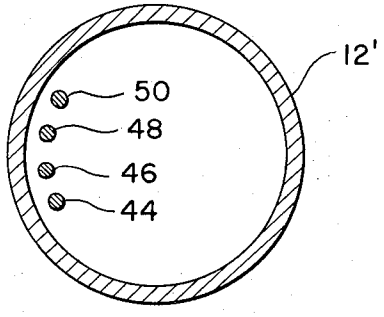



FIG. 7

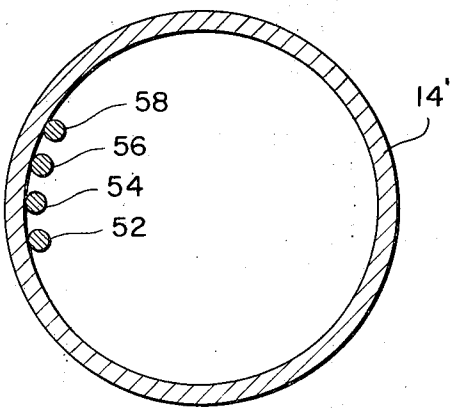



FIG. 8

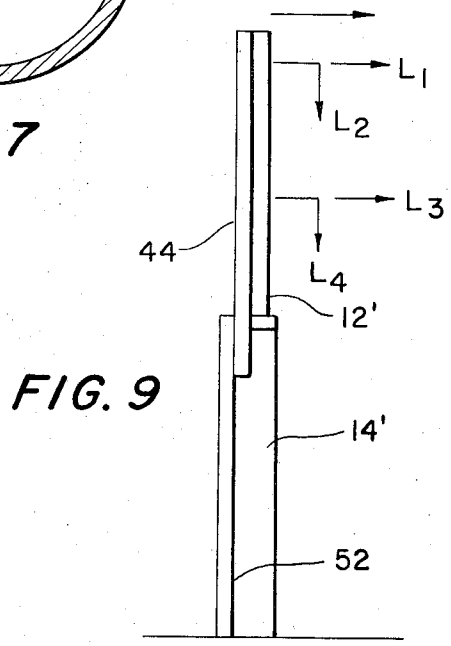



FIG. 9

# STACKED COLUMN

## CROSS REFERENCES TO RELATED APPLICATIONS

Applicants' use of the tension rods is an improvement upon the pretensioning characteristic capability disclosed in the earlier filed application entitled METHOD OF PRESTRESSING A COLUMN (U.S. Pat. No. 3,514,918). In this patent, stressing of the concrete-filled column was accomplished by drawing a tension from one of the extended sections away from the column, so as to bend the column away from its vertical axis and the anticipated load.

## BACKGROUND OF THE INVENTION

1. Field of the Invention

According to the present invention, utility poles of the type supporting an eccentric load for angle poles are stressed away from the anticipated eccentric load. For example, utility poles used in supporting power lines have a line angle converging at the pole. A dead-end utility pole or an utility pole supporting a long span adjacent to a short span are prestressed away from the anticipated load, eliminating the necessity for conventional guide wires or lateral supporting struts and the like.

2. 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. However, the forms were bolted to a rigid base and were not necessarily interlocked. Prior art does not show developing a vertical column by pumping of concrete into interlocking, longitudinally aligned, overlapping sections which are secured to each other by abutting interior and exterior ring means. The prior art does not show the stressing of these sections by means of placing longitudinally extending rods.

The most pertinent prior art is: SIEWERT — 989,069 FROST — 1,568,596 DILL — 1,684,663 MANEY — 2,660,049 JOELSON — 212,189 (Sweden)

## SUMMARY OF THE INVENTION

According to the present invention, a column is developed from a plurality of stacked tubes of increasingly smaller diameter. The tubes are provided with inner and outer rings which abut one another and are secured together as the tubes are placed in extended, overlapping relationship and prior to pumping of concrete. The tubes may be stressed or reinforced against anticipated load by placing of longitudinally extending reinforcing rods on the anticipated stressed sides of the column.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a column-comprised of three stacked and overlapping tubes;

FIG. 2 is an enlarged fragmentary vertical section of the interlocking of two such tubes;

FIG. 3 is a transverse section taken along section line 3—3 of FIG. 2;

FIG. 4 is an enlarged fragmentary perspective of a bottom tube having vertically extending studs tackwelded to its inner lip;

FIG. 5 is a fragmentary perspective of a top or smaller diameter tube having an outer lip encircling its bottom with a plurality of apertures complementally aligned with the vertical studs of the bottom or larger diameter tube;



FIG. 6 is a fragmentary vertical section of a modification of invention, showing the use of overlapping, longitudinally extending tension rods;

FIG. 7 is a transverse section taken along section line 7—7 of FIG. 6;

FIG. 8 is a transverse section taken along section line 8—8 of FIG. 6; and

FIG. 9 is a side elevation of a column stressed on its tension side by means of longitudinally extending, overlapping tension rods.

In FIG. 1, a stacked column 10 is illustrated as comprised of three tubes of varying diameter 12, 14, and 16, stacked so as to be interlocking. Top, smallest diameter tube 12 may have an air escape aperture 18 and bottom, larger diameter tube 16 may have a concrete pumping port 20 supported by means of flanges 22 and closable by means of sliding gate valve 24. The gate 24 may be threadedly attached to flanges 22 so as to be removable after closing of the gate valve 24.

As illustrated in FIG. 2, tube 12 may have an outer locking ring 30 tackwelded as at 32 at its bottom portion 28 so as to complementally abut lower section 14 inner ring 34 secured by welding or the like 36. A plurality of vertically extending studs 38 may be secured on top of ring 34 so as to engage corresponding apertures 42 in the outer ring 30 of section 12. Hexagonal lock nuts 40 or the like may be used to secure these elements together. As will be apparent, the overlapping of tubes 12 and 14 defines an annulus 64 into which the pumped concrete enters and sets so as to further rigidize the tubes with respect to each.

According to the modification illustrated in FIG. 6, top tube 12' may be provided with a plurality of longitudinally extending reinforcing rods 44, 46, 48 and 50, tackwelded as at 62 at their top and bottom. Manifestly, various other means of securing the rods may be provided. Bottom section 14 is provided with a similar set of reinforcing rods 52, 54, 56 and 58 tackwelded as at 60 to the interior top and bottom of section 14'. As will be apparent in the sectional views shown in FIGS. 7 and 8, the tension rods are formed in an arcuate array concentric with respect to the exterior of the tube and opposed to the anticipated load which a utility pole or the like might place on the column, as illustrated in FIG. 9.

Any number of such rods may be employed and their length, and cross-sectional configuration may be varied without departing from the spirit of invention.

We claim:

1. A column comprised of at least two concrete filled stacked tubes of increasingly smaller diameter and including:

A. a bottom tube having:

i. an inner lip at its top periphery;

ii. a plurality of longitudinally extending rods secured to stressed sides of the interior of said tube at the top thereof and extending parallel with respect to the periphery of said tube;

B. a top tube having:

i. an outer lip encircling its bottom periphery so as to complementally abut said inner lip of said bottom tube as said tubes are engaged;

ii. a plurality of longitudinally extending rods secured to stressed sides of the interior of said top

tube at the top thereof, said rods in said top tube extending from the top thereof to the bottom in parallel and overlapping relationship with respect to the rods in said bottom tube; and

C. lock means securing said inner and outer lips together.

**2.** A column comprised of at least three concrete filled stacked tubes of increasingly smaller diameter as in claim **1.**

**3.** A column comprised of a plurality of concrete-filled stacked tubes as in claim **2,** overlapping portions of said top tube and said bottom tube defining a peripheral annulus about said bottom of said top tube so as to admit concrete around the bottom interior and exterior of said tube.

**4.** A column comprised of at least two stacked tubes of increasingly smaller diameter and including:

A. a bottom tube having:



i. an inner lip at its top periphery;

ii. a plurality of longitudinally extending rods secured to a stressed side of the interior of said tube at the top thereof and extending parallel with respect to the periphery of said tube;

B. a top tube having:

i. an outer lip encircling its bottom periphery so as to complementally abut said inner lip of said bottom tube as said tubes are engaged;

ii. a plurality of longitudinally extending tension rods secured to a stressed side of the interior of said top tube at the top thereof and extending from said top to the bottom in parallel and overlapping relationship with respect to the rods in said bottom tube; and

C. lock means securing said inner and outer lips together.

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