United States Patent [19]

Archer et al.

[11] **3,792,554**

[45] **Feb. 19, 1974**

[54] **ANTI-ROTATIONAL LOCKING, SEALING AND STEP ATTACHMENTS FOR TELESCOPING COLUMNS**

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

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

[22] Filed: **Feb. 15, 1973**

[21] Appl. No.: **332,831**

[52] **U.S. Cl.** **52/115**, 52/184, 182/189

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

[58] **Field of Search** .. 52/115, 184, 2; 182/189, 62.5

[56] **References Cited**

UNITED STATES PATENTS

3,196,991	7/1965	Johnson et al.	52/115
3,259,209	7/1966	Brown	182/189
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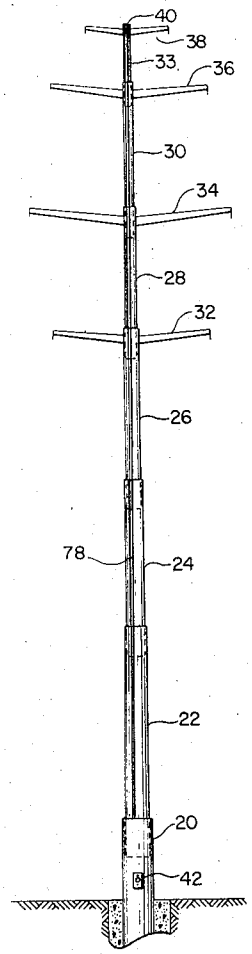
3,564,804	2/1971	Archer et al.	52/741

Primary Examiner—Alfred C. Perham

[57] **ABSTRACT**

Columns or vertical poles of the type developed from pumping of concrete into a series of interlocking, telescoping tubes, so as to extend the tubes vertically from the ground. Particularly, locking rings, locking strips and splines for locking the tubes vertically and horizontally with respect to each other as they are extended by the concrete pumping.

7 Claims, 16 Drawing Figures



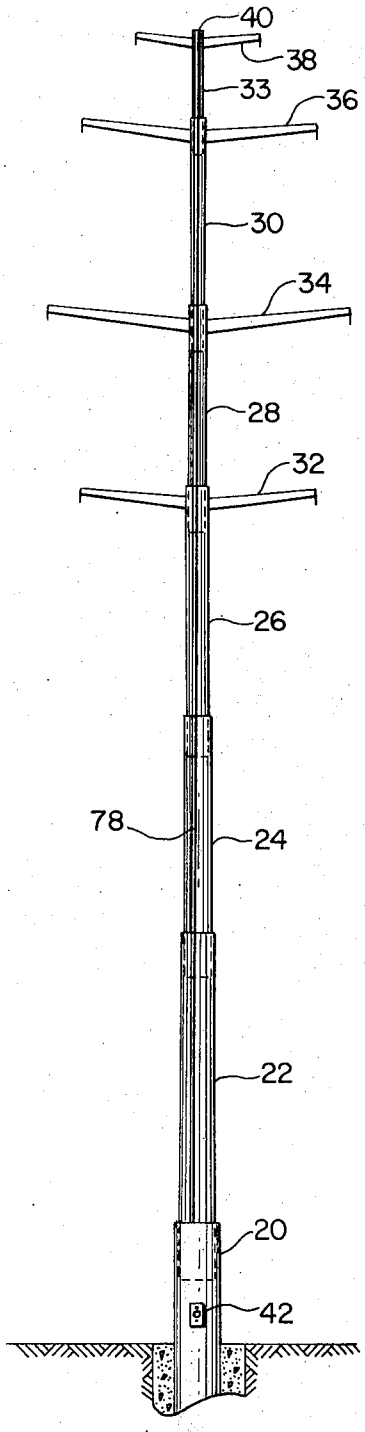
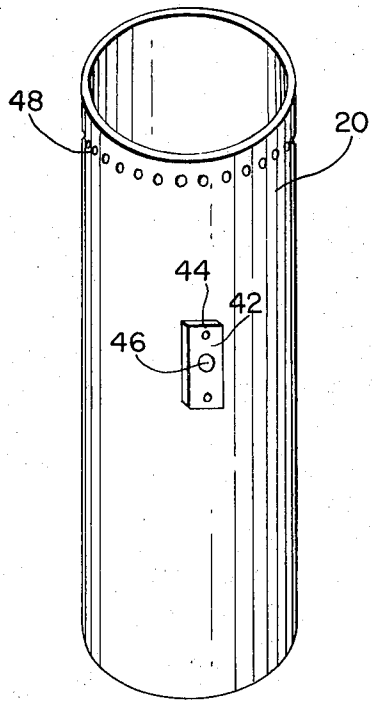


FIG. 1

FIG. 2



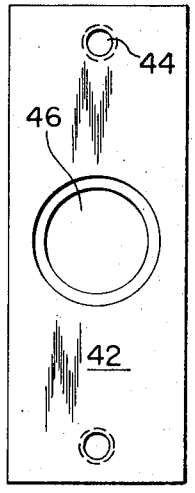


FIG. 3

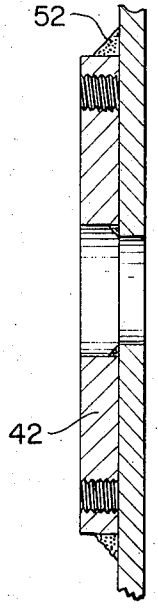


FIG. 4

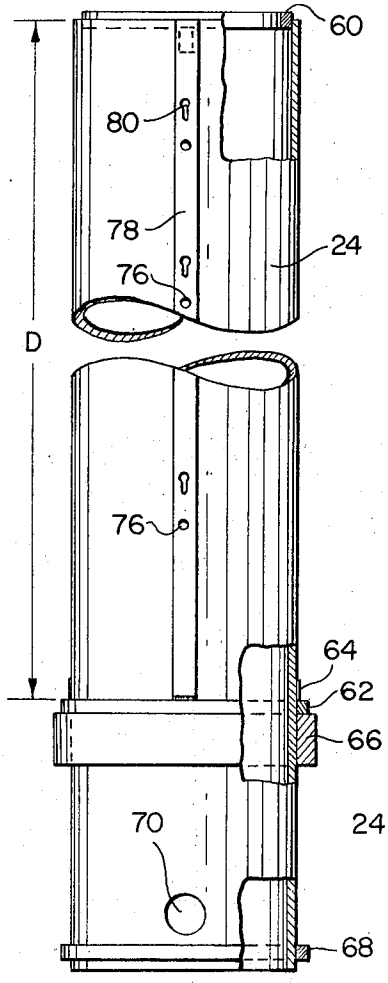


FIG. 5

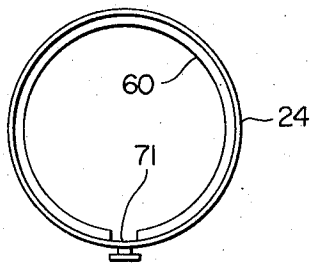


FIG. 6

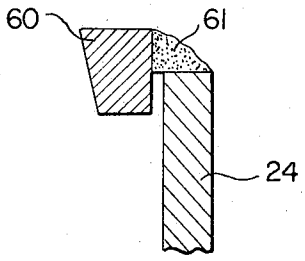


FIG. 7

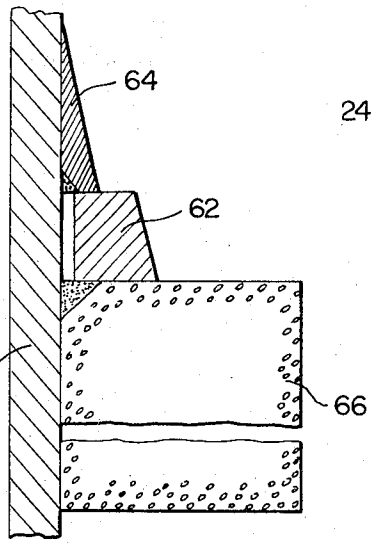


FIG. 8

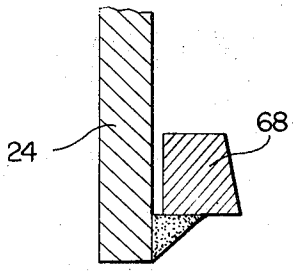


FIG. 9

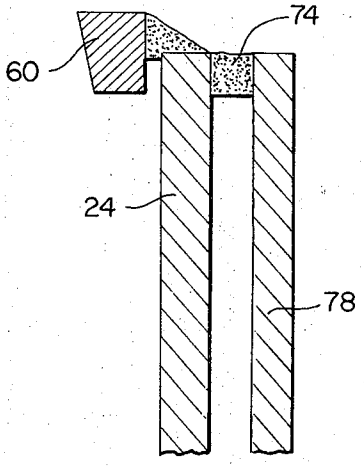


FIG. 10

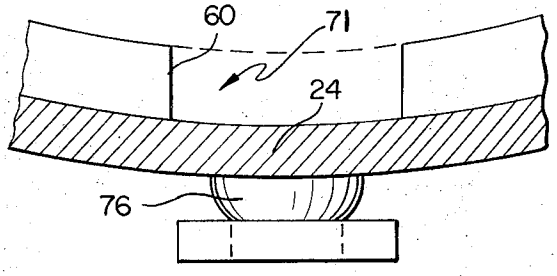


FIG. 12

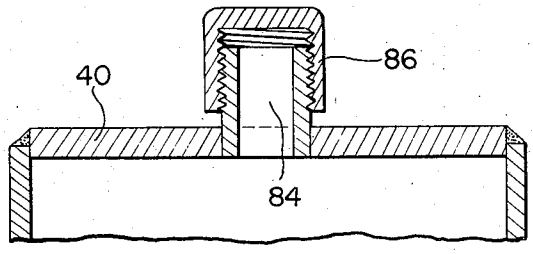
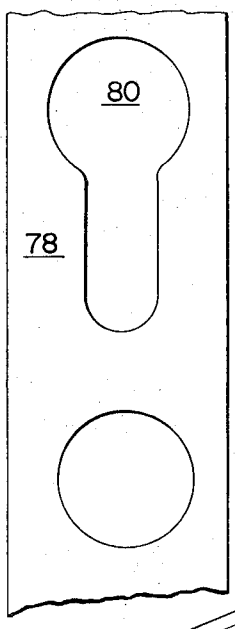


FIG. 13

FIG. 11



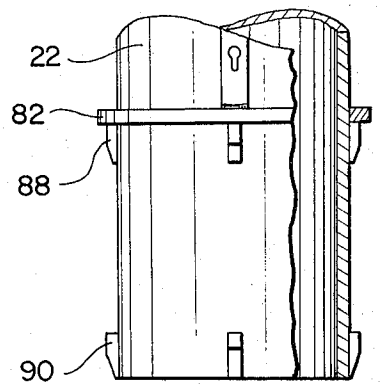


FIG. 14

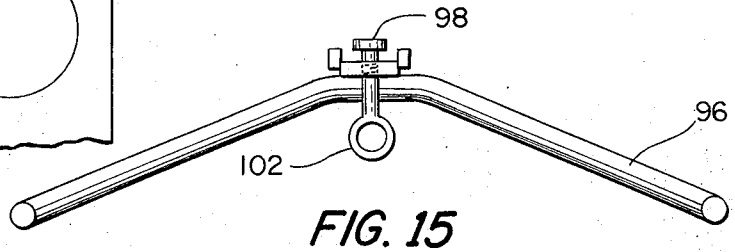


FIG. 15

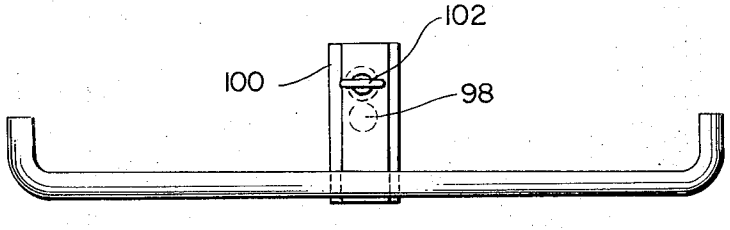


FIG. 16

ANTI-ROTATIONAL LOCKING, SEALING AND STEP ATTACHMENTS FOR TELESCOPING COLUMNS

A locking feature of the type adaptable to the pumping of concrete-filled columns, such as in applicants' earlier U.S. Pat. Nos. 3,469,558 and 3,471,980.

BACKGROUND OF THE INVENTION:

1. Field of the Invention

Concrete-filled columns. Particularly utility poles, sign poles, stanchions and the like developed from pumping of concrete into a plurality of interlocking tubular sections, so as to extend the sections above the ground and form a rigid pole or column, immediately as the concrete sets. Cross arms and conductors may be secured to the pole, prior to pumping.

2. Description of the Prior Art:

In applicants' Archer and Low's earlier U. S. Pat. Nos. 3,469,558, and 3,471,980; 3,514,918; 3,564,804; and 3,594,973, there was disclosed methods for developing concrete-filled columns. Attention has been directed, also, to the use of locking rings for locking the tubular sections with respect to each other, as they are extended and sealing of the interlocking joints, so as to prevent discharge of pumped concrete, as well as the introduction of rainwater and the like after construction. There was not disclosed any means for locking the sections against rotary or lateral twisting with respect to each other as they are aligned or to climbing after pumping. Since applicants' contemplate that the cross arms may be secured to the poles prior to pumping and vertical extension, the provision of a lock against rotary or twisting action, insures that the cross arms will be correctly positioned, as the concrete column is pumped.

SUMMARY OF THE INVENTION

According to the present invention, the interlocking, telescoping tubes are locked vertically with respect to each other by a plurality of abutting inner and outer locking rings, affixed respectively to the top and bottom of interlocking sections. Compressible seals are provided to exude air during concrete pumping, while preventing moisture entering the joint as the column is completed. The columns are locked against rotary or lateral twisting by means of a longitudinal locking strip applied to the exterior of the upper tube and engaging a locking aperture in the inner locking ring of the bottom tube. Thus, the locking strip is in registry with the aperture in the bottom tube as it is extended vertically. The locking strip includes apertures for the attachment of removable steps for climbing the column after it is erected.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical elevation of a utility pole with cross arm conductor supports for power lines and developed according to the present invention;

FIG. 2 is an enlarged, fragmentary view of a foundation tube for the pole;

FIG. 3 is an enlarged, front elevation of a foundation tube concrete pump inlet;

FIG. 4 is a fragmentary, enlarged, vertical section of the pump inlet;

FIG. 5 is a fragmentary, enlarged elevation of an upper intermediate tube, showing the dual outer stop and guide rings and seals affixed to its lower exterior and the longitudinally extending anti rotational locking strip affixed intermediate its top and the first outer guide ring;

FIG. 6 is a top plan of the inner stop ring of tube shown in FIG. 5;

FIG. 7 is a fragmentary section showing welding securement of an inner stop ring to the top of the tube shown in FIG. 5;

FIG. 8 is a fragmentary, enlarged section showing the mounting of the outer stop and guide ring and top and bottom seals at the bottom of tube shown in FIG. 5;

FIG. 9 is a fragmentary, enlarged section showing mounting of the bottom outer guide ring at the bottom of the tube shown in FIG. 5;

FIG. 10 is a fragmentary, enlarged section showing positioning of the inner stop ring and longitudinally extending locking strip with respect to the tube next above;

FIG. 11 is a fragmentary, front elevation of the longitudinally extending locking strip, showing its plug weld supports and keyhole aperture for step attachment.

FIG. 12 is a fragmentary top plan of the tube shown in FIG. 5, showing the alignment of the anti rotational longitudinally extending locking strip and the locking aperture in the top inner stop ring;

FIG. 13 is an enlarged fragmentary vertical section of the upper tube, showing the top with an aperture and closing cap;

FIG. 14 is an enlarged elevation, partially in section, showing the employment of a locking ring and aligning splines at the bottom of the lower tube, as an assistance in fitting and locking into the foundation tube;

FIG. 15 is a top plan of a step securable to the sections; and

FIG. 16 is a front elevation of the step.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In FIG. 1 a utility pole is illustrated as comprised of a foundation tube **20** secured in the ground and a plurality of interlocking concrete-filled telescoping tubes **22, 24, 26, 28, 30** and **33**. Pairs of laterally extending cross arms **32, 34, 36** and **38**, each with appropriate conductor supports for power lines may be affixed to the top of the upper tubes. The top tube **33** may have a top **40**, particularly illustrated in FIG. **13** with a lifting aperture **84**, closeable by means of a threaded cap **86**.

The foundation tube **20** may include a pump inlet plate **42** secured to its exterior by means of welds **52** or the like so that its pumping aperture **46** is aligned with a corresponding aperture in the exterior ot tube **20**. Concrete may be introduced into the foundation tube and the nested sections **22–33** by means of a conventional concrete pump. The foundation tube may also include at its top a plurality of clamp holes **48** for attaching clamps evenly spaced at its top perimeter to restrain upward pumping pressure. The clamps are removed after the concrete sets.

As illustrated in FIG. **14**, tube **22** may have a special outer bottom locking ring **82** and a first series of aligning splines **88** and a second series of aligning splines **90** so as to set the bottom of the tube in vertical alignment within the foundation tube.

Intermediate tube **24** and its counterparts, **26, 28, 30** and **33** may be constructed, as illustrated in FIGS.

5–12, modifying the top of 33 per FIG. 13. An inner locking ring 60 may be affixed to the top of tube 24 by means of weld 61 or the like.

A top outer guide and stop ring 62 may be affixed to the lower exterior by means of conventional welds and a bottom outer guide ring 68 having an inclined shoulder may be similarly welded adjacent the bottom of tube 24. A silicone sealant gasket 64 inclined outwardly from top to bottom may be affixed after the tube has been galvanized or painted extending onto the top of outer ring 62. An open cell urethane or other sponge-like seal 66 of greater diameter than outer ring 62 may be affixed beneath top outer ring 62 after galvanizing or painting of the tubes. The sponge-like urethane is compressible during filling of the tubes and their vertical extension with respect to each other, so as to exude air, while subsequently preventing the leaking of concrete from the locking joint.

A longitudinally extending anti rotational locking strip 78 may be affixed intermediate the top of tube 24 and its top outer ring 62 by means of a series of longitudinally spaced plug welds 76, welded at the top as at 74 intermediate the strip 78 and the tube 24 exterior, as illustrated in FIGS. 10 and 11. A series of punchkey apertures 80 may be spaced at intervals along the locking strip, so as to admit removable step 96, such as illustrated in FIGS. 15 and 16. The headed stud 98 fits into aperture 80 and slides down locking in place. The threaded eye bolt 102 is turned into the upper part of aperture 80 after the headed stud 98 slides down to prevent accidental uplift. The eye bolt 102 allows for a safety belt hook (not illustrated) to be attached.

A series of holes 70 may be cut into the bottom tube so as to admit pumped concrete intermediate the top outer ring 62 and the bottom outer ring 68 and intermediate overlapping portions of the tube, as they are extended with respect to each other.

Manifestly, the stop rings, seals and locking strip may be variously configured and developed without departing from the spirit of invention.

We claim:

1. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, an anti rotation lock for such tubes, comprising:

A. an inwardly extending, lock ring attached to the inner periphery at the top of a lower tube and having an aligning aperture cut into said locking ring;

B. an outwardly extending lock ring attached to the lower, outer periphery of an upper tube, so as to abut and stop against said inner stop ring of said lower tube, as said sections are vertically extended with respect to each other by pumping of concrete;

C. a longitudinally extending anti rotation locking strip secured to the exterior of said upper tube intermediate its top and said outer stop ring, so as to engage complementally said locking aperture in the inner stop ring of said lower tube, as said sections are vertically extended with respect to each other; and

D. a longitudinally extending anti rotation locking strip apertured for the attachment of steps.

2. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, a lock for such tubes, as in claim 1, a stop ring further including top gasket and bottom compressive seal positioned respectively, above and below said outer stop ring.

3. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, a lock for such tubes, as in claim 2, said top gasket being inclined outwardly from top to bottom and said bottom seal being of a sponge-like material, sufficient to exude air during compression.

4. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, a lock for such tubes, as in claim 3, said top gasket being inwardly inset with respect to said outer stop ring and said bottom seal being outwardly offset with respect to said outer stop ring.

5. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, a lock for such tubes, as in claim 4, said stop ring further including a second outer ring positioned at the bottom of said upper tube so as to align said upper tube with respect to said lower tube during vertical extension of said upper tube with respect to said said lower tube.

6. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, a lock for such tubes, as in claim 5, said upper tube having a plurality of peripherally extending apertures at its bottom so as to admit concrete intermediate abutting portions of said upper and lower tubes and intermediate said upper and lower stop rings.

7. In a column of the type developed by pumping concrete into a plurality of interlocking, telescoping tubes, a lock for such tubes, as in claim 6, the lower tube including an outer locking ring at its lower periphery and a first and second longitudinally separated series of aligning splines, said locking ring and said aligning splines being engageable with a foundation tube in which said lower tube is secured.

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