Nov. 10, 1942. A. L. SUTTON 2,301,760

METHOD FOR MAKING HOLLOW ELONGATED BODIES

Filed June 28, 1940 2 Sheets-Sheet 1

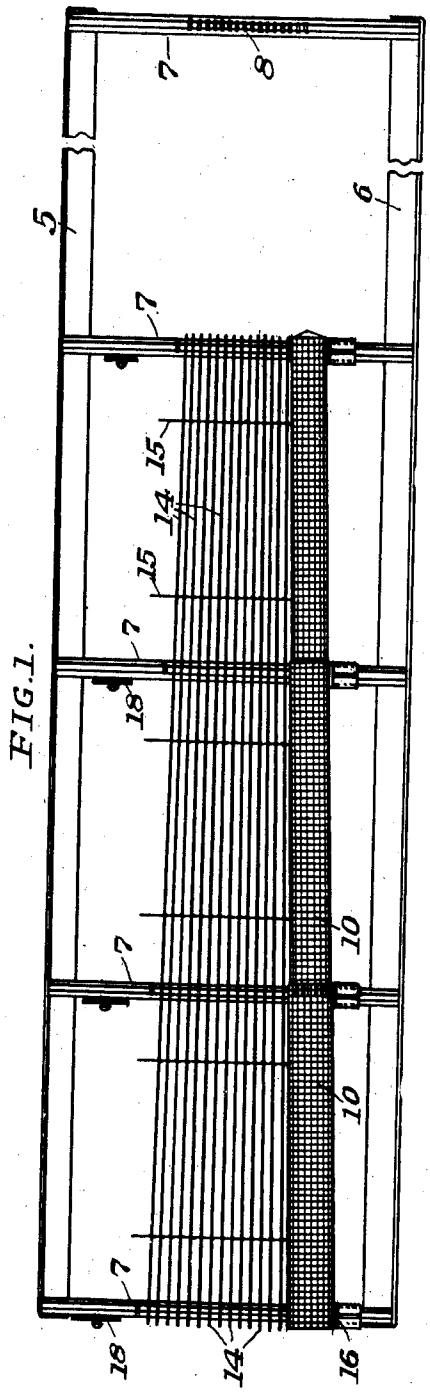

FIG. 1.

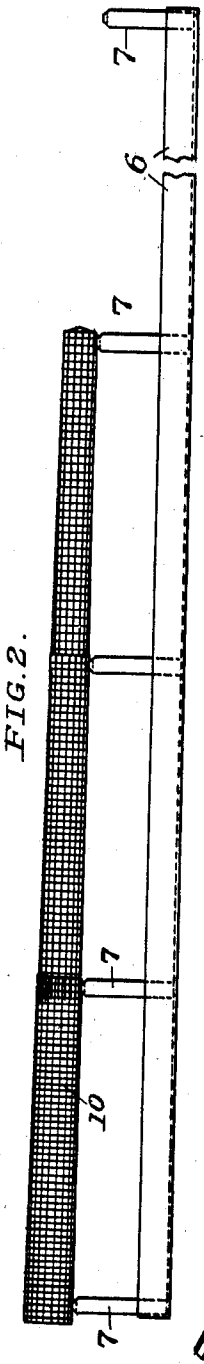

FIG. 2.

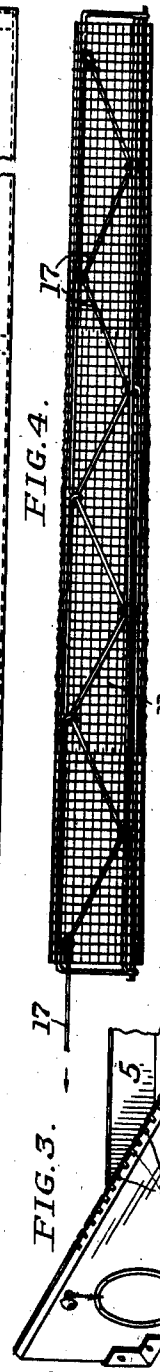

FIG. 4.

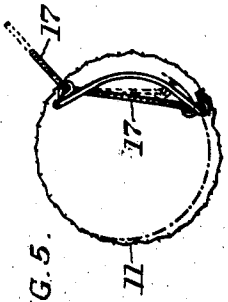

FIG. 5.

FIG. 3.

INVENTOR

Albert L. Sutton

by W. G. Woolittle

Attorney.

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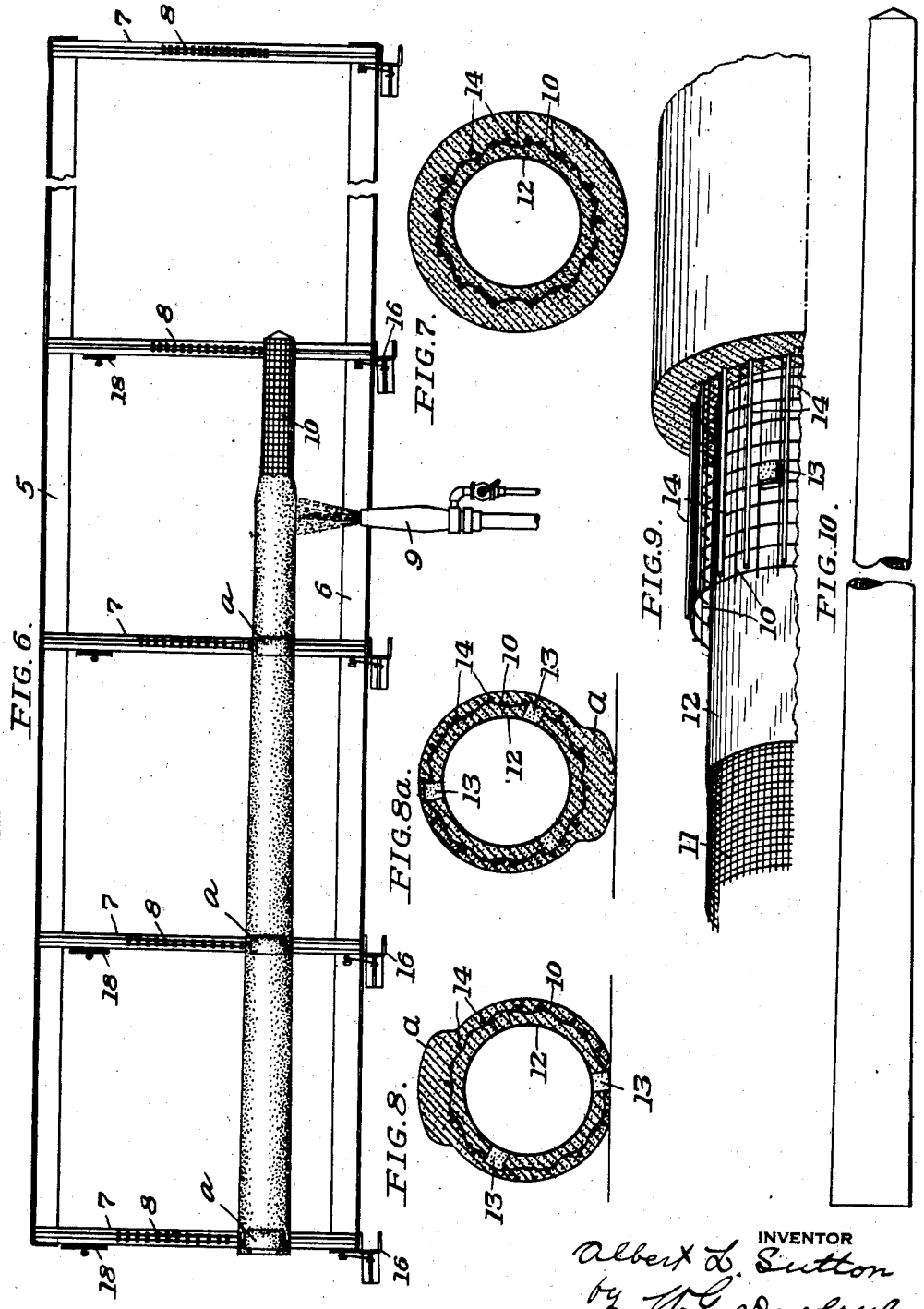

INVENTOR
Albert L. Sutton
by W. F. Doolittle
Attorney

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METHOD FOR MAKING HOLLOW ELONGATED BODIES

Albert L. Sutton, Pittsburgh, Pa., assignor of one-half to Thomas B. Sturges, Pittsburgh, Pa.

Application June 28, 1940, Serial No. 342,906

9 Claims. (Cl. 25—154)

This invention relates to the manufacture of hollow elongated tubular bodies such for example, as hollow telegraph poles, hollow telephone poles, pipes, columns and other supporting structures, and more particularly to a hollow reenforced structure of the character designated embodying a non-porous cementitious material, as a mixture of sand, cement and water or their equivalents capable of being applied to the reenforcing elements of the pole, etc., under considerable force by the employment of suitable device, such for instance, as a suitable gun.

I am aware that attempts have been made to produce poles, etc., somewhat similar to the hollow elongated bodies contemplated by my invention, such attempts however, have failed to produce a satisfactory body and have evolved in their production expensive and complicated devices for forming the hollow poles, etc.

An object of the present invention is, to provide a new and improved method of making or forming hollow elongated bodies of the types above specified by a simple and economical procedure requiring the employment of only very simple and inexpensive devices for the practice of my invention.

In carrying out my method of manufacture I contemplate the use of apparatus and devices that may be readily transported and set up to practice my method at or near the place or places where the poles, etc., are to be utilized; thus eliminating the expensive transportation costs for articles of this character.

In the accompanying drawings which illustrate new and improved apparatus and apparatus capable of being utilized in carrying out my new and improved method:

Fig. 1 is a top plan view of a structure embodying my invention and showing former sections and reenforcing rods thereon;

Fig. 2, a side elevational view;

Fig. 3, a detail perspective view showing a portion of the framing;

Fig. 4, an elevational view of a collapsible core;

Fig. 5, an enlarged end elevational view of the core and its operating means;

Fig. 6, a top plan view of the framing with former sections positioned thereon and a pressure gun associated therewith;

Fig. 7, a cross sectional view of a finished tubular member;

Fig. 8, a cross-sectional view of a partially formed tubular member particularly showing one of the spaced apart projecting portions formed in applying the cementitious material to the former section or sections;

Fig. 8a, a similar view showing the section rolled over to rest upon the projecting portion;

Fig. 9, an enlarged perspective view showing the interior and exterior of a finished product; and

Fig. 10, an elevational view of a finished pole.

In the manufacture of the products contemplated by my invention I employ a simple frame structure comprising longitudinally extending side members 5 and 6 and a series of laterally extending skids or supports 7. These skids are spaced one from the other at suitable distances and, as illustrated and as preferred, are notched on their upper edges as indicated at 8 for the purposes of acting as templates for spacing rods that may be employed for reenforcing purposes as hereinafter described.

Associated with the framing and shown diagrammatically is a suitable device or gun designated generally 9, particularly designed for shooting with considerable force the cementitious material entering into the formation of the product being made.

In following my method of manufacture it is unnecessary to employ a mold; I simply employ a former or backing made of reticulated material or wire mesh designated 10. This reticulated material is a commercial article and can be purchased in a flat state and then rolled to any desired diameter into sections of various lengths. As illustrated, these former sections 10 are slightly tapered so that an end of one section may telescope within an adjoining section.

Each section 10 is preferably provided with an inner collapsible core 11 made of wire mesh or other suitable material encased or covered by a relative thin material such as paper, thin metal, or other suitable material 12. This covering is provided for the purpose of acting as a backing or stop for the cementitious material when the latter is forced onto the former. In lieu of the collapsible core and its covering a self-sustained core of the desired size may be employed.

A core 11 together with its covering 12 is inserted into each former section 10 and is spaced from the interior of the former member by means of spacing blocks 13. By utilizing a core of this construction it will be understood that when the cementitious material is applied, part of the material will pass through the interstices of the former for a distance equal to the distance between the covering of the core and the internal

diameter of the former. It will be noted that by employing spacing blocks 13 of different thicknesses any desired thickness of cementitious material may be obtained between the interior of the former and the covering of the core.

In some instances I employ, in addition to the reticulated element of the former, a series of longitudinally extending rods 14 positioned on the said element in spaced relation.

It is of great importance that the reenforcing means employed should be of a character that will add considerable strength to the pole or the like and that there should be a strong bond between said means and the cementitious material. Further, that the reenforcing elements, while possessing the desired strength, should not be of much bulk. I have found that a wire mesh or a suitable reticulated material, rolled up into tubular form, of non-spiral configuration provides a very strong and efficient former and reenforcing element. A strong bond between the cementitious element is effected by imbedding the former within the said material as herein described.

In the event it is necessary to use the longitudinally extending reenforcing rods as a part of the former, a strong bond is likewise made between the cementitious material and the reenforcing elements. This is accomplished, whether the said material is shot on by first applying a sufficient quantity of the said material to form a layer covering the exterior and the interior of the former and then allowed to set, or whether the desired quantity or thickness of cementitious material is applied to form the finished wall of the product by a continuous application.

A very convenient manner of applying the longitudinal extending rods to the exterior of the mesh former element is to first position the rods on the skids or templates in the predetermined spaced notched portions thereof, and tie them together by wire threads 15. It will be noted that the notches on the several skids are alined to position the rods on the former in a tapered relationship.

After the rods are thus positioned an end rod is secured to the mesh element and this tubular element is then rolled on and over the rods picking them up as it rolls and locating them in the desired spaced apart positions. This manner of positioning the rods on the former element is accomplished speedily and at slight cost.

In the manufacture of poles and the like in accordance with my method any number of former sections 10 may be employed, depending on the length of the sections employed and the length of the pole or the like. As the poles or the like are usually of a tapered configuration the former sections are tapered to produce the desired effective taper in the finished article and when reenforcing rods 14 are employed these rods are positioned on the respective former sections to enter into the tapered configuration.

After the formation of the former sections together with their cores is effected the desired number of sections are placed upon the skids 7, with the ends of the sections telescoped one within another. The assembled sections are then forced against adjustable members 16 arranged along a side of the frame or at the ends of the skids for the purpose of straightening the former prior to the application of the cementitious material thereto.

After the sections have been straightened and while the section or sections are disposed in a horizontal plane on the skids the cementitious material is forced by a suitable gun device around the former in such a manner as to completely imbed the former, and if the reenforcing rods 14 are employed, said former and rods, within the cementitious material.

In practice, a layer of the material may be applied and the section or sections to which it is applied may be left on the skids until the layer of material sets. In some instances, however, the desired thickness of the cementitious material may be applied without applying it in layers and having the layers set before the application of further layers.

In cases where the material is applied to the former in layers a projecting portion *a* may be formed at a point directly over each skid and after the material has set the partially completed pole or the like is rolled over on the skids and rests upon the projection *a* as particularly shown by Figs. 8 and 8*a*. This projecting portion may be utilized as a guide for applying a following layer of material thus producing the desired wall thickness.

Attention is called to the fact that the sections to be covered by the material being positioned on the skids in a horizontal position are accessible so that the gun or device for applying the material to the structure may be readily manipulated to cover the whole section or sections in a comparatively easy manner.

After a section or sections have had the cementitious material applied thereto and the material has set, the collapsible core, if a collapsible core is employed, in each section, is removed.

The collapsible cores illustrated are of a character embodying a structure that may be collapsed by pulling a cord or rope 17 associated with the core. Where paper is employed for the core covering this paper will remain within the pipe or the like. This is also true in the event that other material is used for the covering.

The sheet mesh entering into the formation of the former may be rolled into tubular form by any suitable rolling device. 18 designates rings that may be employed for determining the desired circumference of the former sections.

What I claim is:

1. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in making a reticulated tubular former having a diameter greater than the bore of the body to be formed, positioning the former approximately horizontally and non-rotatably and exteriorly in engagement with a support with one end of the former open and exteriorly unobstructed for utilization of the former as the primary support for sand-cement material during formation of the body, inserting a core into the former through said end in spaced relation with the interior of the former while the former is supported as aforesaid to provide a space between said interior and the outer surface of the core for the sand-cement material, forcing a quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former in the said material and provide approximately the sole reinforcement.

2. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in positioning a reticulated tubular former having a diameter greater than the bore of the body to be formed, approximately

horizontally and exteriorly in engagement with a support with one end and the interior of the former open and exteriorly unobstructed, the former functioning as a primary reinforcement for the sand-cement material and carrying inwardly extending spacing blocks inserting a core into the former through said end and positioning the core by means of said blocks in spaced relation with the interior of the former while the former is supported as aforesaid to provide a space between said interior and the outer surface of the core for the sand-cement material, forcing a quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former in the said material, and then applying an additional quantity of material after the imbedding of the reenforcing means to complete the wall of the body.

3. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in disposing a reticulated tubular former having a diameter greater than the bore of the body to be formed in exterior engagement with a support, inserting a core into the former in spaced relation with the interior of the former to provide a space between said interior and the outer surface of the core for the sand-cement material, forcing a quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former in the said material and form a projection means of the material on the exterior of the former, allowing the material to set, then rolling the former and engaging said projection means in supporting relation with the support, and then forcing an additional quantity of the material under pressure against the partially formed wall-body utilizing the projections as thickness guides to complete the wall of the body.

4. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in positioning a reticulated tubular former having a diameter greater than the bore of the body to be formed, approximately horizontally and exteriorly in resting engagement on a support with one end and the interior of the former open and exteriorly unobstructed for utilization of the former as the primary support for sand-cement material during formation of the body, inserting a collapsible removable core having a covering into the former through said end in spaced relation with the interior of the former while the former is supported as aforesaid to provide a space between said interior and the outer surface of the core for the sand-cement material, forcing a desired quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former in the said material, allowing the material to set, and then collapsing and removing the core.

5. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in positioning a reticulated tubular former having a diameter greater than the bore of the body to be formed, approximately horizontally and exteriorly in resting engagement on a support with one end and the interior of the former open and exteriorly unobstructed for utilization of the former as the primary support for sand-cement material during formation of the body, attaching longitudinally extending flexibly connected rods to the exterior of the former, rolling the former to dispose said rods circumferentially about the former, inserting a removable core into the former in spaced relation with the interior of the former to provide a space between said interior and the outer surface of the core for the sand-cement material, forcing a desired quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former and the rods in the said material, allowing the material to set, and then removing the core.

6. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in making a non-spiral reticulated tubular former having a diameter greater than the bore of the body to be formed, inserting a collapsible removable core having a covering into the former in spaced relation with the interior of the former to provide a space between said interior and the outer surface of the core for the sand-cement material, supporting the former and its core in a horizontal non-rotatable position with the former exteriorly in resting engagement on a support with one end and the interior of the former open and exteriorly unobstructed accessible for an application of the sand-cement material thereto, forcing a desired quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former in the said material, allowing the material to set, and then removing the core through said end.

7. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in making a non-spiral reticulated tubular former having a diameter greater than the bore of the body to be formed, attaching longitudinally extending flexibly connected rods to the exterior of the former and rolling the former to space the rods about the exterior of the former circumferentially, inserting a collapsible removable core having a covering into the former in spaced relation with the interior of the former to provide a space between said interior and the outer surface of the core for the sand-cement material, supporting the former and rods in a horizontal non-rotatable position with the former exteriorly in resting engagement on a support with one end and the interior of the former open and exteriorly unobstructed accessible for an application of the sand-cement material thereto, forcing a desired quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and the core whereby to imbed the former and rods in the said material, allowing the material to set, and then removing the core.

8. The herein described method of forming reenforced sand-cement elongated tubular bodies which consists in making a sectional reticulated tubular former to form a primary reinforcement in the body, each section being tapered and having a diameter greater than the bore of the body to be formed, positioning the former approximately horizontally and exteriorly in resting engagement on a support with one end and the interior of the former open and exteriorly unobstructed for utilization of the former as the primary support for sand cement material during formation of the body, inserting a core

through said end into each former section in spaced relation with the interior of the former while the former is supported as aforesaid to provide a space between said interior and the outer surface of the core for the sand-cement material, forcing a quantity of the material under pressure against the exterior of each section of the former and into the space between the interior of the former section and its core whereby to imbed the former section in said material.

9. The herein described method of forming a reenforced sand-cement elongated tubular body which consists in providing a reticulated tubular former to constitute a primary reinforcement in the body, the former having a diameter greater than the bore of the body to be formed and carrying spacing blocks terminating inwardly of the inner surface of the former; attaching longitudinally extending flexibly connected rods to the exterior of the former and rolling the former to space the rods circumferentially about the exterior of the former, positioning the former approximately horizontally and exteriorly in resting engagement on a support with one end open and exteriorly unobstructed and the interior of the former open for utilization of the former as the primary support for sand-cement material during formation of the body, inserting a core means through said open end into the former and positioning the core means through the aid of said blocks in spaced relation with the interior surface of the former while the former is supported as aforesaid to provide a space between said interior surface and the outer surface of the core for the sand-cement material, forcing a quantity of the material under pressure against the exterior of the former and into the space between the interior of the former and core whereby to imbed the former in said material and form projections on the material at the outer surface thereof, allowing said material to set, then rolling the former and engaging said projections in supporting relation with the support, and then forcing an additional quantity of material under pressure against the partially formed wall-body while utilizing the projections as thickness guides to complete the wall of the body.

ALBERT L. SUTTON.