United States Patent

Hermanson

[15] **3,639,196**

[45] **Feb. 1, 1972**

[54] COLLAPSIBLE ARTIFICIAL TREE

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[73] Assignee: **Mr. Christmas Incorporated,** New York, N.Y.

[22] Filed: **Nov. 6, 1970**

[21] Appl. No.: **87,402**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 800,218, Feb. 18, 1969, Pat. No. 3,574,102.

[52] **U.S. Cl.** **161/14,** 161/24, 161/109, 161/17, 248/42

[51] **Int. Cl.** **A47g 33/06**

[58] **Field of Search** 161/12, 14, 17, 22, 24, 27, 161/109; 248/42

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Primary Examiner—Philip Dier
Attorney—Karl W. Flocks

[57] **ABSTRACT**

A collapsible artificial tree construction particularly adapted for Christmas decoration in which simulated branches are freely foldable substantially parallel to the simulated tree trunk in one direction and freely pivot to an unfolded laterally extending direction when the artificial tree is to be erected and used, and in which the branches freely gravitate to an unfolded condition whereby insertion of the tree trunk into a tubular container automatically folds the branches upwardly and along the trunk, and removal of the tree from a tubular container results in the branches being automatically unfolded. Also, the branches may be folded against the trunk by gravity by turning the tree upside down.

14 Claims, 14 Drawing Figures

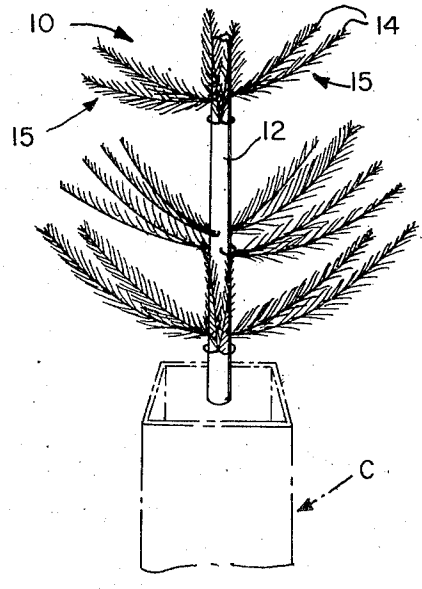


FIG. 1

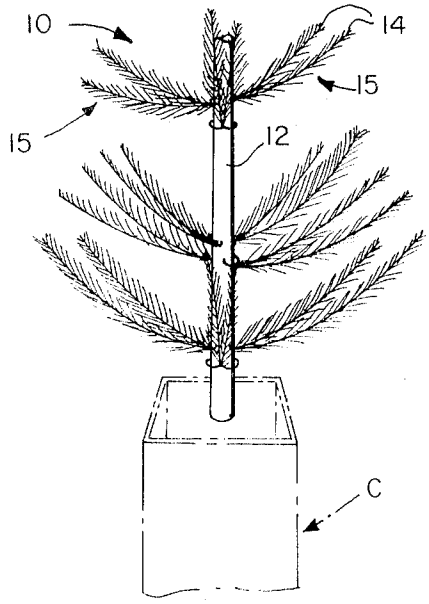


FIG. 2

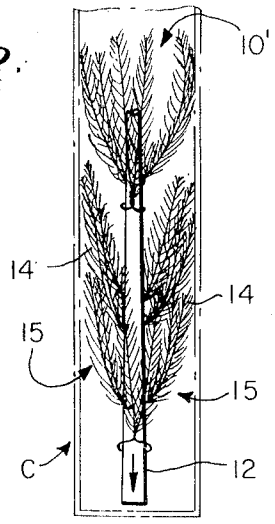


FIG. 5

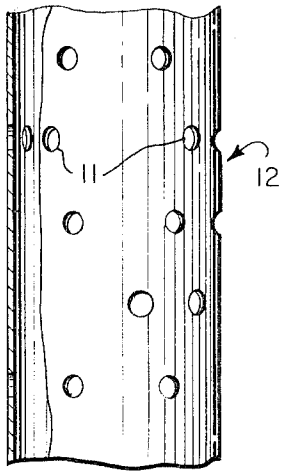


FIG. 3

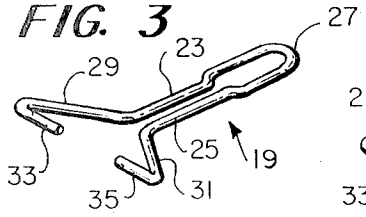


FIG. 4

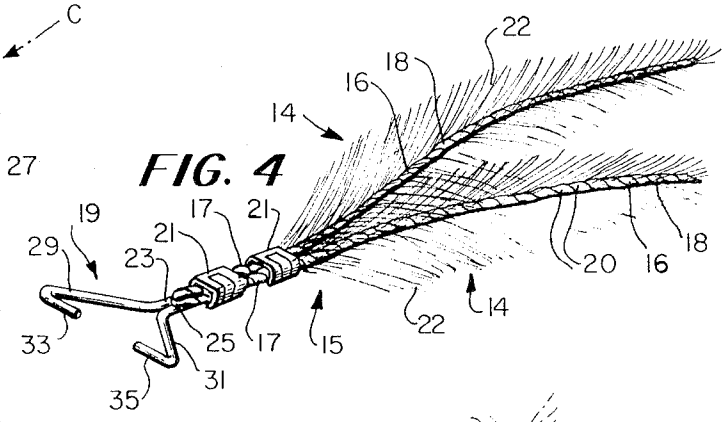


FIG. 6

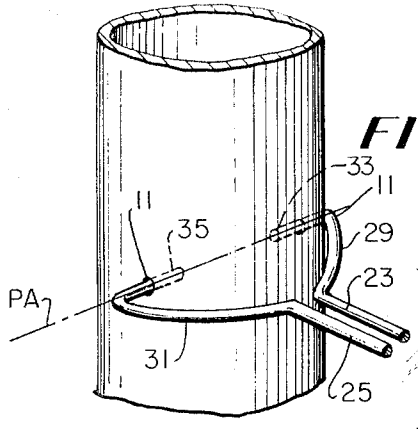


FIG. 7

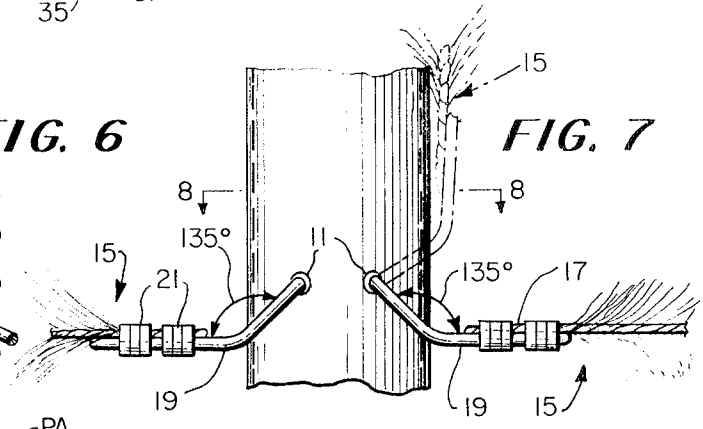
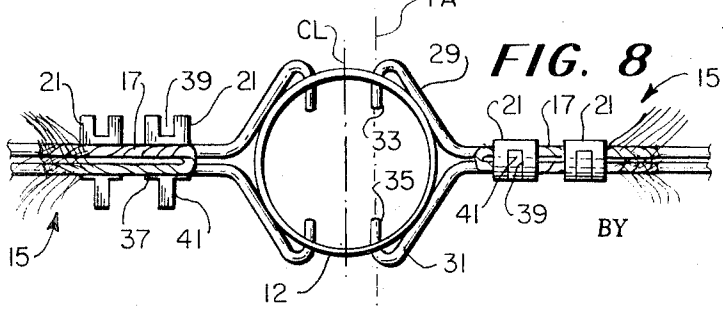


FIG. 8



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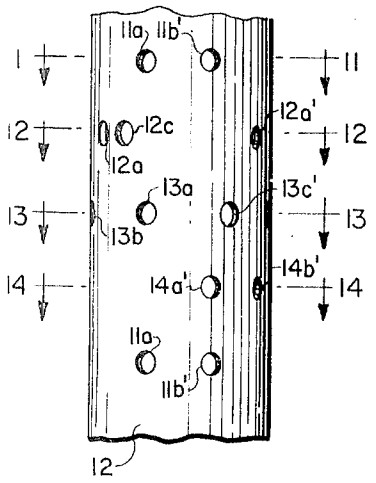


FIG. 9

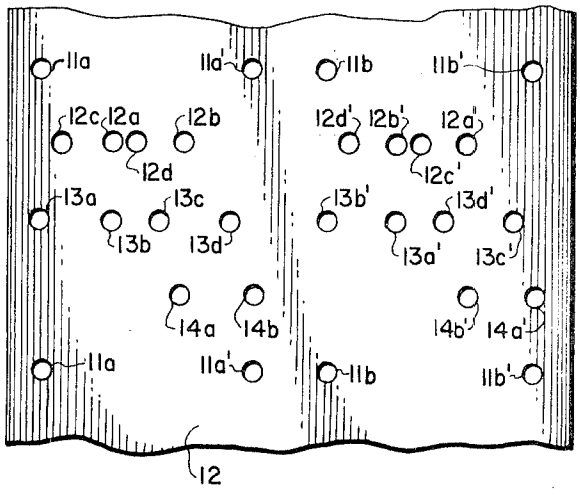


FIG. 10

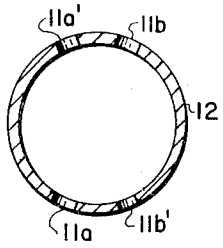


FIG. 11

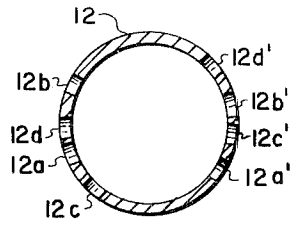


FIG. 12

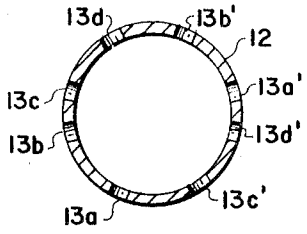


FIG. 13

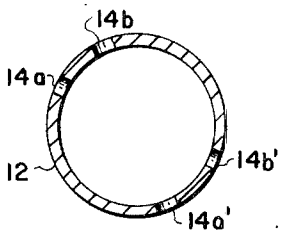


FIG. 14

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COLLAPSIBLE ARTIFICIAL TREE

This is a continuation-in-part of my copending application, Ser. No. 800,218, filed Feb. 18, 1969 now U.S. Pat. No. 3,574,102.

Artificial trees, particularly those used for Christmas decoration have become increasingly popular generally because of reduced fire hazards through the use of noncombustible materials, durability, ready storage and continued reuse over a number of years.

Primary objects of the present invention are to provide an artificial tree which can be readily collapsed and stored and in which the simulated "foldable" limbs of the tree substantially "unfold" with a minumum of effort and without physically distorting tree-forming elements;

- to provide a novel artificial tree which includes "foldable" limbs mounted on a simulated trunk which affords a natural appearance;
- to provide a novel means for pivotally mounting artificial tree limbs on a hollow tree trunk;
- to provide a novel artificial tree which is automatically folded when inserted into a tubular storage container and is automatically unfolded when removed from the container;
- to provide a perfectly shaped artificial tree which may be compactly stored in a carton of minimum size;
- to provide a more attractive artificial tree with means for economically mounting a relatively large number of limbs or branches; and
- to provide a novel artificial tree having a trunk capable of selectively supporting limbs or branches in different circumferential positions therearound.

These together with other and more specific objects and advantages will become apparent from a consideration of the following description when taken in conjunction with the drawing forming a part thereof, in which:

FIG. 1 is a fragmentary elevational view of an artificial tree showing the limbs "unfolded";

FIG. 2 is a fragmentary elevational view of the tree of FIG. 1 showing the limbs in a "folded" or collapsed condition;

FIG. 3 is an enlarged perspective view of an adapter for mounting the limbs or branches on the artificial tree;

FIG. 4 is a perspective view showing the adapter of FIG. 3 secured to terminal portions of an artificial tree limb or branch unit;

FIG. 5 is an enlarged fragmentary elevational view of a portion of the tree trunk of FIG. 1, with portions broken away to show detail;

FIG. 6 is a fragmentary perspective view showing the adapter of FIG. 3 and how it is installed on and cooperates with the tree trunk;

FIG. 7 is a fragmentary vertical elevation view showing fragmentary portions of two branch units mounted on the tree trunk;

FIG. 8 is a section taken on the plane of line 8—8 of FIG. 7;

FIG. 9 is an enlarged fragmentary portion of the trunk of FIG. 1 showing the pattern of apertures in greater detail;

FIG. 10 shows the trunk portion of FIG. 9 in a preliminary sheet metal form with the pattern of apertures punched therein, but before being rolled into tubular form;

FIG. 11 is a view of the trunk taken on the plane of line 11—11 of FIG. 9;

FIG. 12 is a view of the trunk taken on the plane of line 12—12 of FIG. 9;

FIG. 13 is a view of the trunk taken on the plane of line 13—13 of FIG. 9; and

FIG. 14 is a view of the trunk taken on the plane of line 14—14 of FIG. 9.

Referring to FIGS. 1 and 2, a fragmentary portion of an artificial tree, generally of the type used for Christmas decoration is indicated generally at 10 and comprises a vertical or central support staff or trunk 12 and a plurality of longitudinally and circumferentially spaced artificial limbs or branches indicated generally at 14. The lower end of the trunk 12 will be maintained vertical in a suitable base or support stand, not shown. Additionally, both the trunk 12 and branches 14 will be produced from any suitable material preferably noninflammable. Additionally, the trunk 12 may taper from its lower toward its upper end to more closely simulate an artificial tree. The branches 14 are mounted on the trunk 12 in units 15 of at least a pair of branches 14. The limb or branch units 15 are pivotally connected at their inner ends to the trunk 12 in a manner to subsequently be described in detail, and will normally gravitate to the condition shown in FIG. 1 from that indicated at 10' in FIG. 2. The branches or limbs 14 are readily "folded" to the condition shown in FIG. 2 by inserting the artificial tree in a suitably dimensioned elongated rectangular carton or cylindrical tube. Alternatively, the tree may be turned upside down allowing gravity to automatically fold the branches or limbs 14 against the trunk 12 before slipping an enclosure thereover for storage. The branch units 15 remain pivotally connected to the trunk 12 in storage, but may be readily replaced in case of damage.

Referring to FIG. 4, the branch unit 15 comprises a pair of branches 14 which are made from longitudinally twisted, fairly stiff wire elements 16 and 18 which form a plurality of longitudinally spaced loops 20 through which are transversely disposed foliage-forming filaments of plastic filaments 22 which afford simulated pine needles or the like. The branches or limbs 14 will be graduated in length to provide various elevational profiles to the artificial tree. The twisted wires 16 and 18 form a shank portion 17 at their inner ends to which is secured an adapter 19 by clips 21.

The similated trunk 12 may be constructed of any suitable material, metal, plastic, etc., and preferably comprises an elongated tubular member, as shown in FIGS. 5–8, although it may be in the form of a solid rod. The trunk 12 has distributed in vertically spaced relation and in offset relationship from the longitudinal centerline of the trunk pairs of diametrically opposed bearing apertures 11 which comprise trunnion bearings defining a pivot axis PA between each respective pair of apertures 11. Each pivot axis PA is generally in chordal relationship with the centerline of trunk 12. The pattern of apertures in trunk 12 has been carefully worked out so that it can be used for different size trees or the same size trees, but having different numbers of branch units thereon. The pattern shown is designed to repeat itself approximately every 20 inches.

Prior to assembly, the adapter 19 resembles a wire form of a bottle opener with the loop open at the wide end as shown in FIG. 3. In this form the adapter 19 comprises a pair of generally parallel legs 23, 25 with a bulb portion 27 extending form one end thereof. A pair of generally outwardly directed arms 29, 31 extend from the end of the legs 23, 25 and terminate in a reverse bend to form coaxial trunnion shafts 33, 35, respectively. The arms 29, 31 are springlike and can be displaced or sprung apart to allow the trunnion shafts 33, 35 to be inserted into or removed from aligned apertures 11 in the trunk 12 as seen in FIGS. 6 and 8.

The legs 23, 25 of adapter 19, as previously noted, are secured to shank portion 17 of the artificial limbs or branches 14 by clips 21. The clips 21, as clearly shown in FIG. 8, include a generally rectangular portion 37 with a slotted opening 39 facing in one direction and a finger portion 41 pointed in the opposite direction. In use, the clip 21 has the finger portion 41 bent around and into the slotted opening 39. Although the adapter 19 is illustrated and described as being secured to shank portion 17 of the artificial limbs or branches 14 by clips 21, it is clear that only a single clip may do the job. Also, adapter 19 may be secured to the branches 14 by welding, soldering, or other securing means instead of by use of the clips 21.

An important feature of branch unit 15 is that it is made with the continuous twisted wires 16, 18 bent in the form of the letter U or V to form shank portion 17 with two branches 14. Each branch unit 15 thus provides two branches 14 at a single hinge adapter support fixture. While this may appear to be simple, the saVings afforded thereby is significant, as the number of clips and the labor required in this assembly opera-

tion is reduced by approximately 50 percent. Of equal importance is the additional saving due to the reduction in number of wire form adapters **19** required per branch **14**. Additionally, the use of the V-type twin branch unit **15** avoids the problem of branch rotation which is prevalent in the single-stem-type branches. In the single-stem-type branch arrangements, the branches are frequently turned or twisted and even pulled away from the adapter member. This situation is eliminated by using the V-type twin branch unit **15** which, because of its added lateral cross section, provides a high resistance to rotation thereof.

In assembly the shank portion **17** of the branch unit **15** is secured to the adapter **19** by clips **21** as shown in FIG. **4**. The branch unit **15** is thus supported by the legs **23**, **25** and the bulb portion **27** of the adapter **19**, which pass through the clips **21** and under the shank portion **17**. The branch unit **15** and the adapter **19** are secured together, as described, to prevent relative rotation therebetween.

Turning to FIGS. **6–8**, it is seen that the trunnion portions **33**, **35** are pivotally received in aligned apertures **11** in the trunk **12**. The adapter **19**, as best shown in FIG. **7**, is formed with an intermediate angular bend forming an obtuse angle of approximately 135° between the legs **23**, **25** and the arms **29**, **31**. This angular construction allows the branch unit **15** to be pivoted upwardly about its trunnion shafts **33**, **35** to the phantom line position, shown in FIG. **7**, where it will be substantially parallel to the trunk **12** for storage purposes. In order that branch units **15** may at different elevations extend from the trunk and point at different angles, the angular bend of adapter legs **23**, **25** may be bent at angles other than 135°. This variation in adapter form provides for a closer simulation of a real tree wherein branches at different heights point in different directions. For example, branches near the top of a tree generally would point more in an upward direction and the lower branches would have a greater tendency to point in a lateral direction. A further embodiment of the adapter **19** may assume longer proportions than illustrated, to which a greater number of V-type twin branches may be attached.

As illustrated by phantom lines in FIGS. **1** and **2**, a tubular container C having a rectangular, polygonal, or circular cross section will removably receive the artificial tree when folded in the condition shown in FIG. **2**. When the artificial tree as shown in FIG. **1** is inserted into the container or tube C, the limbs **14** automatically fold upwardly toward the position shown in FIG. **2**, and when the tree is entirely contained within the tube, the tree is folded and stored.

Of course, when the tree is removed, upper end first, from the container, as the limbs are being withdrawn from the embrace of the tube, the uppermost limbs will automatically gravitate radially outwardly to an unfolded condition, i.e., as shown in FIG. **1**.

Referring to FIGS. **9–14** wherein the pattern of apertures for pivotally receiving the trunnion shafts **33**, **35** of hinge adapter **19** is shown in greater detail, it is noted this pattern has been carefully worked out so that the trunk **12** may be used for different size trees or for trees of the same size but having a different styling or number of limb or branch units **15** thereon. It is noted in FIGS. **10** and **11** that the apertures **11***a* and **11***a'* in a first horizontal plane or level are spaced apart from each other a distance equal to that which apertures **11***b* and **11***b'* are spaced apart from each other. The spacing of these apertures as described provides for the cooperation of apertures of like subscript in a given plane or level to pivotally receive and support the trunnion shafts **33**, **35** of hinge adapter **19**. Thus apertures **11***a* and **11***a'* are spaced to pivotally receive the trunnion shafts **33**, **35** of adapter **19**. Similarly, apertures **11***b* and **11***b'* are spaced to pivotally receive the trunnion shafts **33**, **35** of a second adapter **19**.

Moving down the trunk **12** from the plane or level of apertures **11***a*, **11***a'* and **11***b*, **11***b'*, it is seen that four pairs of apertures **12***a*, **12***a'*; **12***b*, **12***b'*; **12***c*, **12***c'* and **12***d*, **12***d'* are provided at the next level with apertures of similar subscripts being spaced apart a distance equal to that of apertures of similar subscripts immediately thereabove and for similarly cooperating with adapters **19**. It is noted in FIG. **10** that none of the apertures designated **12** are in vertical alignment with any aperture designated **11**. It is clear that as between these two levels of the trunk **12** the adapters **19** will be circumferentially staggered therearound.

Moving down the trunk **12** from the level of apertures **12***a*, **12***a'*; **12***b*, **12***b'*; **12***c*, **12***c'* and **12***d*, **12***d'*, it is seen that an additional four pairs of apertures **13***a*, **13***a'*; **13***b*, **13***b'*; **13***c*, **13***c'* and **13***d*, **13***d'* are provided with apertures of similar subscript being spaced apart a distance equal to that of apertures of similar subscripts immediately thereabove and for similar cooperation with hinge adapters **19**. It is noted in FIG. **10** that none of the apertures designated **13** are in vertical alignment with any aperture designated **12** in the level immediately thereabove. It is thus clear that as between adjacent levels of trunk **12**, adapters **19** will be circumferentially staggered therearound.

Moving down the trunk **12** from the level of apertures designated **13** to the level of apertures designated **14**, it is seen that two pairs of apertures **14***a*, **14***a'* and **14***b*, **14***b'* are provided with apertures of similar subscripts being spaced apart a distance equal to that of apertures of similar subscripts immediately thereabove and for similar cooperation with hinge adapters **19**. It is noted in FIG. **10** that none of the apertures designated **14** are in vertical alignment with any aperture designated **13** in the level immediately thereabove. It is thus clear that as between these levels of trunk **12**, hinge adapters **19** will be circumferentially staggered therearound.

Moving down the trunk **12** from the level of apertures designated **14** to the next level of apertures, it is seen that two pairs of apertures **11***a*, **11***a'* and **11***b*, **11***b'* are provided with apertures of similar subscripts being spaced apart a distance equal to that of apertures of similar subscripts immediately thereabove and for similar cooperation with hinge adapters **19**. It is noted in FIG. **10** that none of these apertures designated **11** are in vertical alignment with any aperture designated **14** in the level immediately thereabove. It is thus clear that as between adjacent levels of trunk **12**, hinge adapters **19** will be circumferentially staggered therearound. It will further be noted, however, that these apertures **11***a*, **11***a'* and **11***b*, **11***b'* are in vertical alignment with the apertures identically designated in the first level. Thus it is noted that the pattern repeats itself. In this way a machine with an array of punching or stamping dies may be used to form the apertures in a desired pattern and repeat the pattern along the length of a sheet of trunk forming metal. The pattern as shown may have any dimensional spacing. For convenience, the pattern shown in FIG. **9** repeats itself every 2 inches of trunk length.

From the foregoing it is seen that an effectively attractive tree may be economically made so that the ultimate user may arrange the branch units according to a number of positions around the tree.

Briefly, in review, the artificial limb or branch units **15** by virtue of the trunnion portions are readily pivotally mounted in pivot apertures as seen in FIGS. **6** and **7**, and are freely pivoted in an upward direction for collapsing the tree as seen in FIG. **2** and will automatically gravitate due to their cantilevered pivotal connection to an "unfolded" condition shown in FIG. **1**. The pivot apertures in the artificial tree trunks **12** eliminate the necessity for additional hardware, etc., and afford an economy of assembly and construction which was heretofore never realized. Further, the trees can be deposited in a storage carton or tube automatically collapsing the tree limbs, and when the tree is pulled from the container C it automatically "opens" or "unfolds."

However, as is clearly evident, removal of the tree from the tube results in automatic erection or radial gravitation of the branches. In addition, the pivot apertures in the artificial tree trunks **12** eliminate the necessity for complex hardware, particularly in that the tree trunk or staff can be either hollow or solid.

It will be obvious to those skilled in the art that various changes may be made without departing from the scope of the invention and the invention is not to be considered limited to what is shown in the drawings and described in the specification.

What is claimed is:

1. In an artificial tree,

an elongated trunk,

said trunk including at least one pair of opposed apertures defining a pivot axis transverse to the longitudinal axis of said trunk;

at least one artificial branch unit having diametrically opposed, coaxial terminal trunnion shafts pivotally received in said pair of opposed apertures in said trunk; and

said artificial branch unit comprising a plurality of simulated branches.

2. The structure as claimed in claim 1 in which said branches of said branch unit comprise elongated wire elements twisted longitudinally about each other to define a series of turns.

3. The structure as claimed in claim 2 in which said twisted wire elements include a series of closed loops alternating with said turns and simulated foliage elements extending transversely through said loops and grippingly retained therein.

4. The structure as claimed in claim 1 in which said trunnion shafts comprise a pair of legs having spring arms extending outwardly from one end and embracing a portion of said trunk between said pair of apertures, said arms terminating inwardly to form said coaxial trunnion shafts, which are removably received in said pair of apertures, and said legs having an integral bulb portion extending from the other end thereof.

5. The structure of claim 1 in which said apertures are offset in a plane spaced from the longitudinal axis of said trunk.

6. The structure as claimed in claim 5 in which said trunnion shafts comprise a pair of legs having outwardly extending spring-arms at one end which embrace a portion of said trunk between said pair of apertures, said arms terminating in inwardly directed, coaxial stub portions forming said trunnions, which are removably received in said pair of apertures, and said legs having an integral bulb portion extending from the other end.

7. The structure as claimed in claim 6 in which said spring-arms of said branch unit are disposed at an obtuse angle relative to said legs, whereby the tree limb can be substantially folded onto the outer surface of the tree trunk.

8. The structure as claimed in claim 3 in which said plurality of simulated branches are limited to a pair of branches in said branch unit, said elongated wire elements forming part of said branches include a bent portion in the form of the letter V, and wherein portions adjacent the vertex of the V are close together and form a shank portion.

9. The structure as claimed in claim 8 in which said trunnion shafts comprise a pair of legs having spring-arms extending outwardly from one end and embracing a portion of said trunk between said pair of apertures, said arms terminating inwardly to form said coaxial trunnion shafts, which are removably received in said pair of apertures, said legs having an integral bulb portion extending from the other end thereof, and in which said apertures are offset in a plane spaced from the longitudinal axis of said trunk.

10. The structure as claimed in claim 9 in which the shank portion of said branches extend over and are secured to said pair of legs and said integral bulb portion extending from said trunnion shafts by clip means.

11. The structure of claim 10 in which said clip means is generally rectangular, with a slotted opening at one end, and a finger portion bent from the other end into the slotted opening.

12. The structure as claimed in claim 7 in which additional branch units having trunnion shafts pivotally received in pairs of opposed apertures on said trunk, characterized in that the trunnion shafts of said additional branch units include pairs of legs having outwardly extending spring-arms disposed at an angle relative to said legs, with said angle being different for branch units at different levels of the tree to provide for branch units at higher levels of the tree to point more skyward or vertically than branch units at lower levels of the tree.

13. An artificial tree trunk having a pattern of pairs of opposed apertures adapted to receive pairs of trunnion shafts of hinge adapters for holding artificial branch units thereon, characterized in that said pattern of pairs of apertures includes a plurality of pairs of apertures on a first horizontal level with the circumferential spacing between the apertures of each pair being equal, additional levels of plurality of pairs of apertures with the circumferential spacing between the apertures of each pair being equal as in the pairs of apertures on said first horizontal level, some of said additional levels having more pairs of apertures than other levels, said apertures in each level being vertically out of alignment with apertures of adjacent levels so that branch units will be circumferentially staggered between adjacent levels of said trunk, and said pattern repeating itself over the length of the trunk.

14. An artificial tree comprising the trunk of claim 13 and wherein each of said pairs of opposed apertures define a pivot axis transverse to the longitudinal axis of said trunk; at least one artificial branch unit having diametrically opposed, coaxial terminal trunnion shafts pivotally received in one of said pairs of opposed apertures in said trunk; and said artificial branch unit comprising a plurality of simulated branches.

* * * * *