April 6, 1971 T. HERMANSON 3,574,102

COLLAPSIBLE ARTIFICIAL TREE CONSTRUCTION ADAPTED FOR CHRISTMAS DECORATION

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FIG. 1

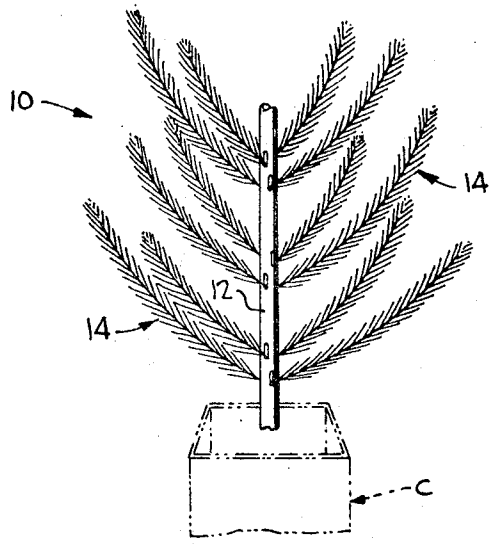


FIG. 2

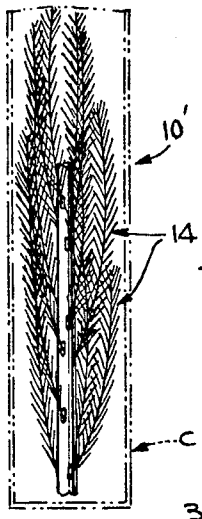


FIG. 5

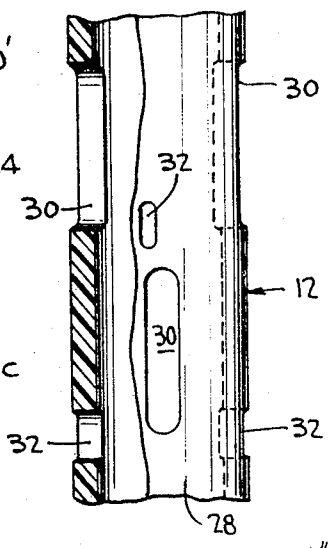


FIG. 4

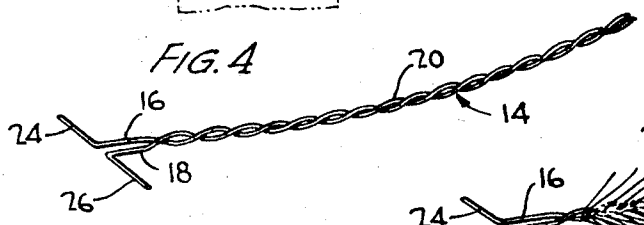


FIG. 3

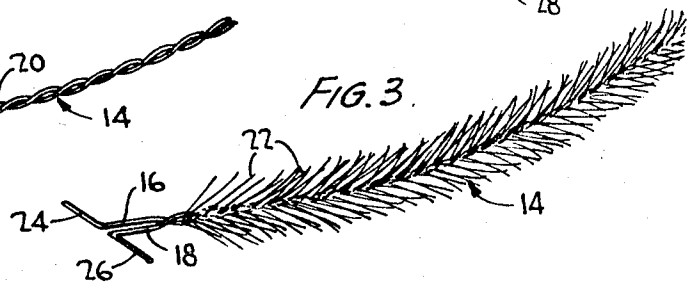


FIG. 6

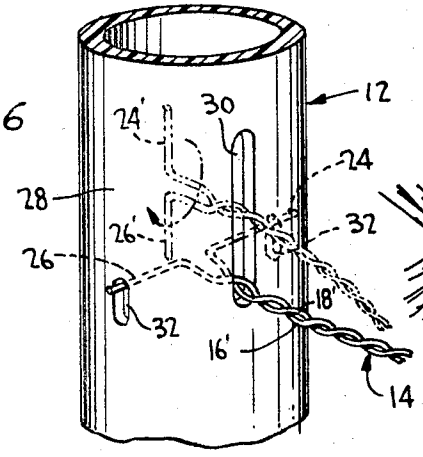


FIG. 7

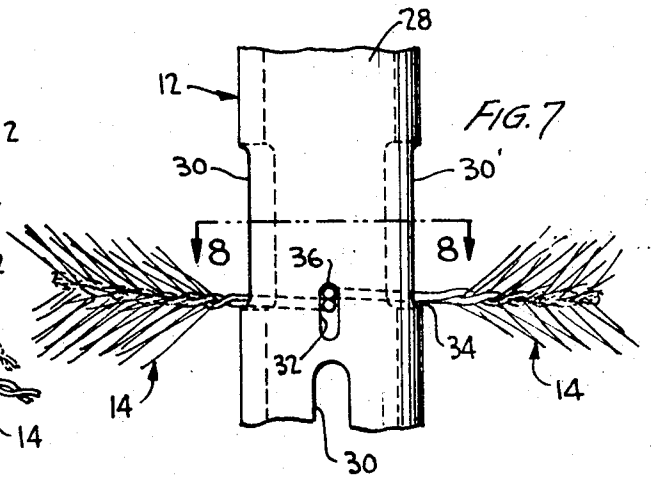
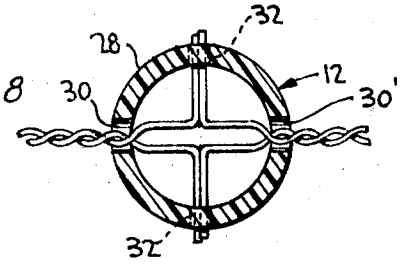


FIG. 8



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COLLAPSIBLE ARTIFICIAL TREE CONSTRUCTION ADAPTED FOR CHRISTMAS DECORATION

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FIG. 9

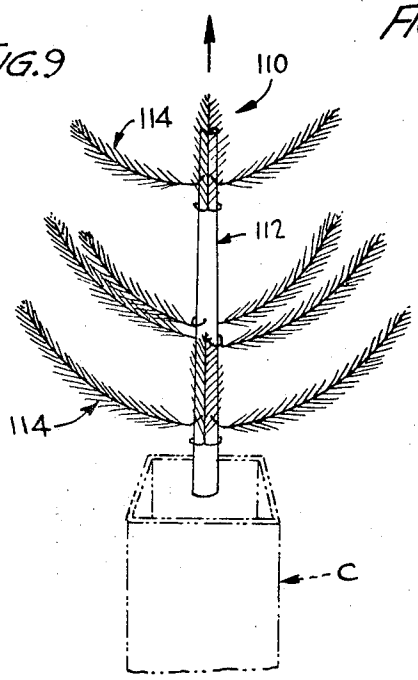


FIG. 10

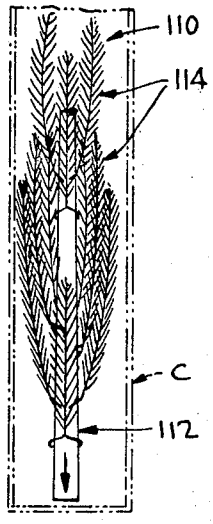


FIG. 13

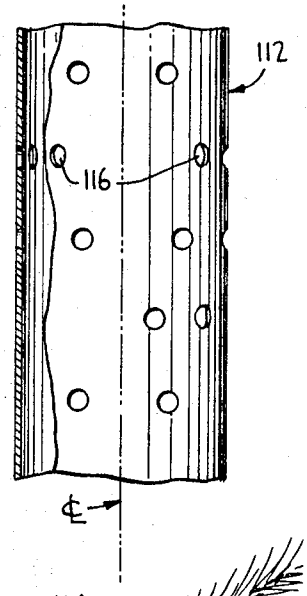


FIG. 11

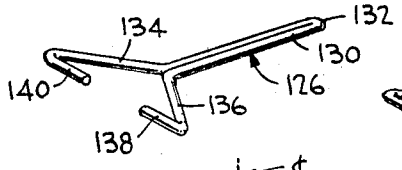


FIG. 12

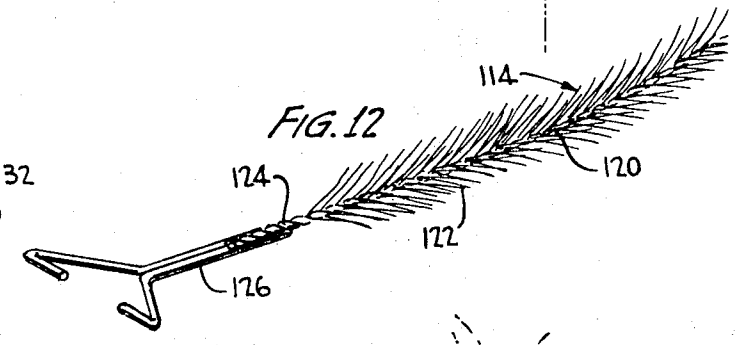


FIG. 14

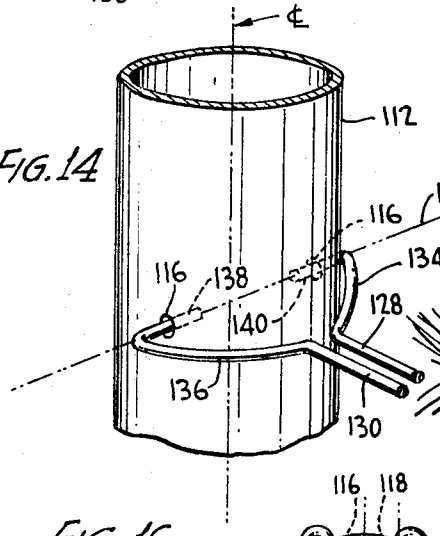


FIG. 15

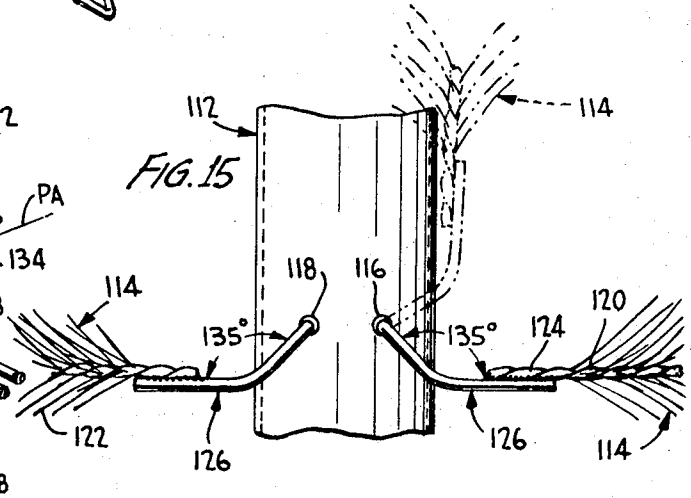
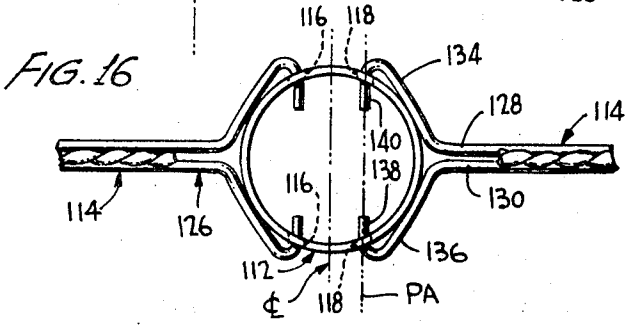


FIG. 16



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United States Patent Office 3,574,102 Patented Apr. 6, 1971

3,574,102

COLLAPSIBLE ARTIFICIAL TREE CONSTRUCTION ADAPTED FOR CHRISTMAS DECORATION

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Int. Cl. A47g 33/08
U.S. Cl. 161—14 11 Claims

ABSTRACT OF THE DISCLOSURE

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.

Artificial trees, particularly those used for Christmas decoration have become increasingly popular generally because of reduced fire hazards through the use of non-combustible 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 minimum 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; and

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.

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 one of the artificial tree limbs shown in FIG. 1;

FIG. 4 is a view similar to FIG. 3 showing the artificial tree limb base or skeleton structure;

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 of a portion of the artificial tree of FIG. 1, showing by means of phantom lines the manner in which the limbs of FIGS. 3 and 4 are assembled on the simulated trunk of FIG. 5;

FIG. 7 is an enlarged, fragmentary side elevational view of a portion of the tree of FIG. 1;

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

FIG. 9 is a fragmentary elevational view similar to FIG. 1 showing another embodiment of an artificial tree incorporating the invention;

FIG. 10 is a view similar to FIG. 2 showing the tree limbs or branches in a "folded" or collapsed condition;

FIG. 11 is a perspective view of an adapter used on an artificial tree limb or branch;

FIG. 12 is a perspective view showing the adapter of FIG. 11 secured to the terminal end of an artificial branch;

FIG. 13 is a fragmentary enlarged vertical elevation of a portion of a simulated tree trunk, similar to FIG. 5;

FIG. 14 is a fragmentary perspective view showing the adapter of FIG. 11 and how it cooperates or is installed on a tree trunk;

FIG. 15 is a fragmentary vertical elevation showing fragmentary portions of two branches mounted on the tree trunk; and

FIG. 16 is a section taken on the plane of line 16—16 of FIG. 15.

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 and branches **12** and **14** will be produced from any suitable material preferably non-inflammable. Additionally, the trunk **12** may taper from its lower toward its upper end to more closely simulate an artificial tree. The limbs or branches **14** 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.

Referring to FIGS. 3 and 4, the limbs **14** comprise a pair of 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 **22** of plastic 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 wires **16** and **18** terminate at their inner ends in oppositely directed trunnion portions **24** and **26**, respectively, which define the support shaft for the branches **14**.

Referring to FIGS. 5–8, the simulated trunk **12** may be constructed of any suitable material, metal, plastic, etc., and comprises an elongated tubular member **28** having suitably formed therein in longitudinally and circumferentially spaced relation a series of cooperating slots and pivot apertures. Each of the series of slots and pivot apertures comprises an elongated slot portion **30** flanked on opposite sides by relatively shorter, diametrically opposed pair of apertures **32**.

With respect to a given series of slots and apertures, it will be noted that slot **30**; see FIG. 7, has a lower shoulder or terminal abutment portion **34** which is in substantial horizontal alignment with the upper end **36** of its respective pair of cooperating and diametrically opposed apertures **32**.

The slot **30** will have an overall length substantially equal to or greater than the overall combined length of the trunnion portions **24** and **26**, and these portions as indicated at **24'** and **26'** in FIG. 6, may be readily introduced through a slot **30**, threafter being rotated 90° about the longitudinal axis defined by the wires **16'** and **18'**, and the trunnion portions **24** and **26** will be pivotally received within the pair of pivot apertures **32** which flank the respective longitudinal slots **30**. It will be noted that when the branches or limbs **14** are assembled in the manner illustrated in FIGS. 6 and 7, by virtue of the

substantially horizontally aligned abutment portions 34 and 36 of the respective slots and apertures, the branches will be oriented substantially horizontally and be prevented by the abutment portion 34 from pivoting extensively in a downward direction. The branches 14 may be slightly curved upwardly to simulate a normal growing appearance of a typical natural Christmas tree.

As illustrated in FIGS. 7 and 8, the slots 30 and 30' may be disposed in diametrically opposed relation, wherein a single pair of flanking pivot apertures 32 accommodate the trunnion portions of two limbs 14.

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 and 10, a fragmentary portion of the Christmas tree is indicated generally at 110, comprising a central vertical trunk or staff 112 and a plurality of longitudinally and circumferentially spaced limbs or branches 114. Wherever possible, reference numerals of the 100 series will be utilized to identify structure illustrated in the embodiment of FIGS. 9–16 to accordingly identify structure and function which is comparable to that of the embodiment of FIGS. 1–8.

The trunk 112 can taper vertically upwardly, and the branches or limbs are supported in radially extending relation when "unfolded" to automatically assume the condition shown in FIG. 1. The limbs or branches 114 remain pivotally connected to the trunk 112 when the tree is stored or taken down; however, if the branches are damaged, they can be readily replaced.

In both disclosed embodiments, as mentioned above, the storage container C will facilitate automatic folding into stored relationship as well as automatic erection when the tree is removed from the container and the branches gravitationally descend to the radially disclosed position.

In FIGS. 13 and 14 the trunk 112 is illustrated as being tubular or hollow; however, a solid rod may likewise be used.

The trunk 112 has distributed in vertically spaced relation, and in offset relationship generally to the longitudinal axis or center line of the trunk, pairs of diametrically opposed bearing apertures 116, 118, etc. which comprise trunnion-bearings, which define a pivotal axis PA between each respective pair of apertures. The pivot axes PA are generally in chordal relationship to the center line of the trunk or staff 112. For purposes of clarity, only a single pair of apertures 116 is shown in FIG. 14, for example.

The tree branches 114 comprise twisted wire elements 120 forming loops in which are secured plastic filaments 122 simulating pine needles, for example. The twisted wire elements from a shank portion 124 which will have soldered, welded or otherwise secured thereto an adapter indicated generally at 126; see FIG. 11. The adapter 126 comprises a pair of generally parallel legs 128, 130 integrally connected at one end by a bight portion 132, and having intermediate outwardly extending generally arcuate arms 134, 136, concluding in reverse-bend coaxial trunnion or stub shafts 138, 140, respectively. The arms are spring-like and can be displaced or sprung outwardly to a sufficient degree to accommodate the trunnion shaft 138, 140 in the aligned pair of apertures 116; see FIG. 14. The legs 128, 130, as previously mentioned, are welded, soldered or otherwise secured to the shank portion 124

of the artificial limb or branch 114. However, the wires 120, if desired, can have integrally formed therewith the legs 128, 130 as well as the arms 134, 136 and their trunnion shafts 138, 140, thus eliminating the necessity for welding, soldering, etc.

The legs 128, 130 are provided with an intermediate angular-bend forming an obtuse angle of approximately 135° whereby when the limbs 114 are pivoted upwardly on their trunnion shafts substantially 90° to phantom line position shown, the limbs will be in substantial overlying parallel relationship to the center line or longitudinal axis of the trunk 112. As mentioned before, the arms are sufficiently displaceable to permit the trunnion shafts to be separated (see phantom lines in FIG. 16) to permit removal and replacement or installation of the branches 114.

Briefly, in review, the artificial limbs or branches 14 or 114 by virtue of the trunnion portions are readily pivotally mounted in pivot apertures or bearing portions as seen in FIG. 6 or FIG. 15, respectively, and are freely pivoted in an upward direction for collapsing the tree as seen in FIGS. 2 and 10 and will automatically gravitate due to their cantilevered pivotal connection to an "unfolded" condition shown in FIGS. 1 and 9. The slots and cooperating pivot apertures in the artificial tree trunks 12 or 112 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 slots and cooperating pivot apertures in the artificial tree trunks 12 or 112 eliminate the necessity for complex hardware, particularly in the case of the embodiment of FIGS. 9–16, wherein 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; and
      at least one artificial tree branch having diametrically opposed, terminal trunnion shafts in coaxial relation and pivotally mounted in said pair of opposed apertures in said trunk.

2. The structure as claimed in claim 1 in which said trunk is hollow, an elongated slot extending longitudinally through said trunk between said apertures, and communicating with the interior thereof, said opposed apertures communicating with the interior of said trunk, said trunnion shafts being pivotally received in said opposed apertures and said branch projecting out through said elongated slot.

3. The structure as claimed in claim 2 in which said slot is flanked by said opposed apertures and includes a terminal end portion substantially in horizontal alignment with terminal portions of said apertures for orienting said branch in a generally horizontal attitude where the branch projects laterally from said trunk.

4. 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; and at least one artificial tree branch having diametrically opposed, terminal trunnion shafts in coaxial relation and pivotally mounted in said pair of opposed apertures in said trunk, said trunk including at least one longitudinal slot flanked by said at least one pair of opposed apertures, said at least one longitudinal slot being

one of a plurality of longitudinally spaced series of longitudinal slots having flanking apertures circumferentially spaced about said trunk, and at least one artificial branch extending through said at least one longitudinal slot and having terminal trunnion shafts pivotally engaged in said at least one pair of opposed apertures.

5. The structure as claimed in claim 1 in which said branch comprises a pair of elongated wire elements twisted longitudinally about each other, said wire elements including terminal ends extending in opposite directions and forming said trunnion shafts.

6. The structure as claimed in claim 5 in which said twisted wire elements form a plurality of longitudinally spaced loops, and simulated three foilage elements extending transversely through said loops and grippingly retained therein.

7. The structure as claimed in claim 1 in which said branch comprises a pair of legs intermediately terminating in outwardly extending, spring-arms embracing a portion of said trunk between said pair of apertures, said arms terminating in inwardly directed, coaxial stub shafts removably received in said pair of apertures.

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

9. The structure as claimed in claim 8 in which said branch comprises a pair of legs intermediately terminating in outwardly extending, spring-arms embracing a portion of said trunk between said pair of apertures, said arms terminating in inwardly directed, coaxial stub shafts removably received in said pair of apertures.

10. The structure as claimed in claim 7 in which said spring-arms of said branch are disposed in an obtuse angle relative to said legs, whereby the branch can be

substantially folded onto the outer surface of the tree trunk.

11. In combination, an artificial tree, comprising an elongated trunk, a plurality of tree branches, means pivotally mounting the branches on said trunk for movement from a gravity-assumed radially extending condition to a folded position substantially parallel to and in longitudinal alignment with the trunk and directed upwardly along said trunk; said means being constituted by a plurality of pairs of opposed apertures, each of said pairs of apertures defining a pivot axis transverse to the longitudinal axis of said trunk, each of said branches including diametrically opposed trunnion shafts in coaxial relation and pivotally mounted in a pair of said opposed apertures; and an elongated tubular container removably retaining said tree in a folded condition with the branches extending upwardly whereby said tree may be readily removed from said container, top end first, with the branches automatically gravitating to an unfolded condition radially from the trunk.

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U.S. Cl. X.R.

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