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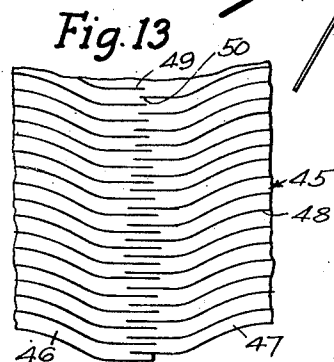
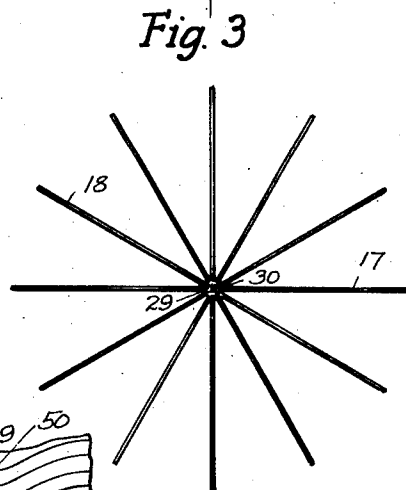
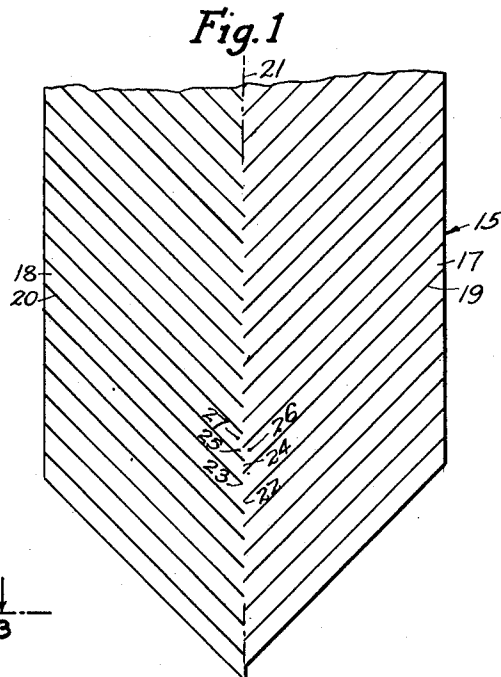
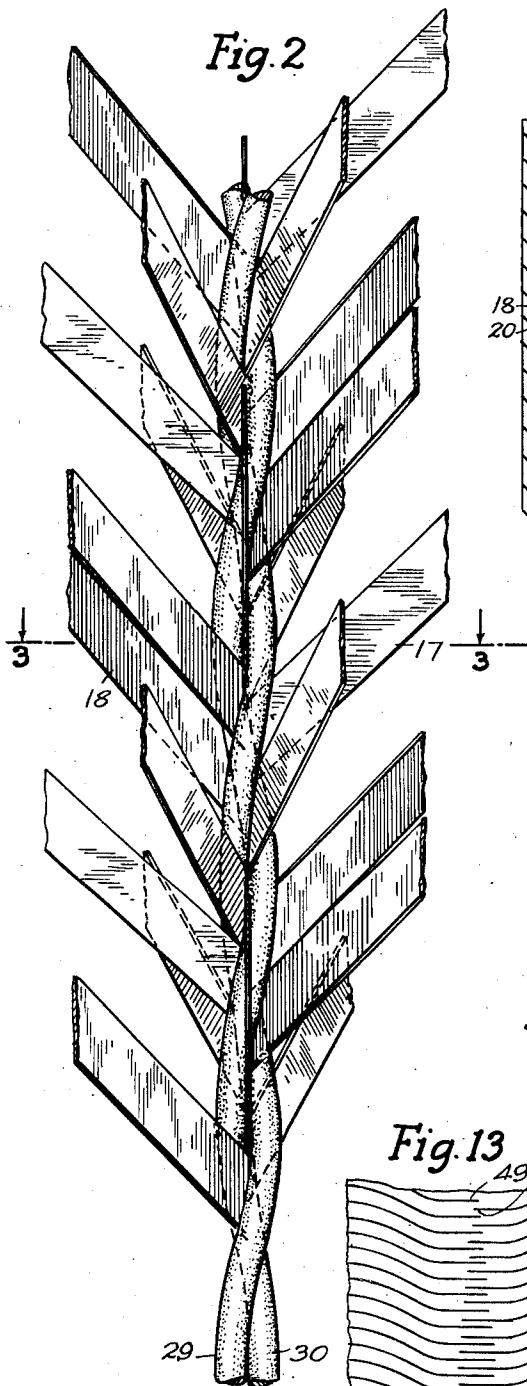
M. SEEWALD

2,639,532

BRANCHED ARTICLE AND METHOD OF MAKING SAME

Filed Feb. 5, 1952

2 Sheets-Sheet 1



INVENTOR
Monte Seewald
BY
Harry Jacobson
ATTORNEY

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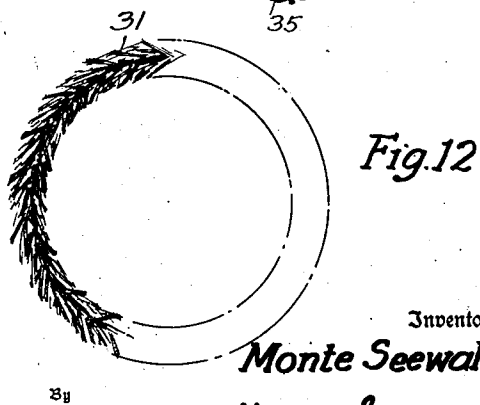
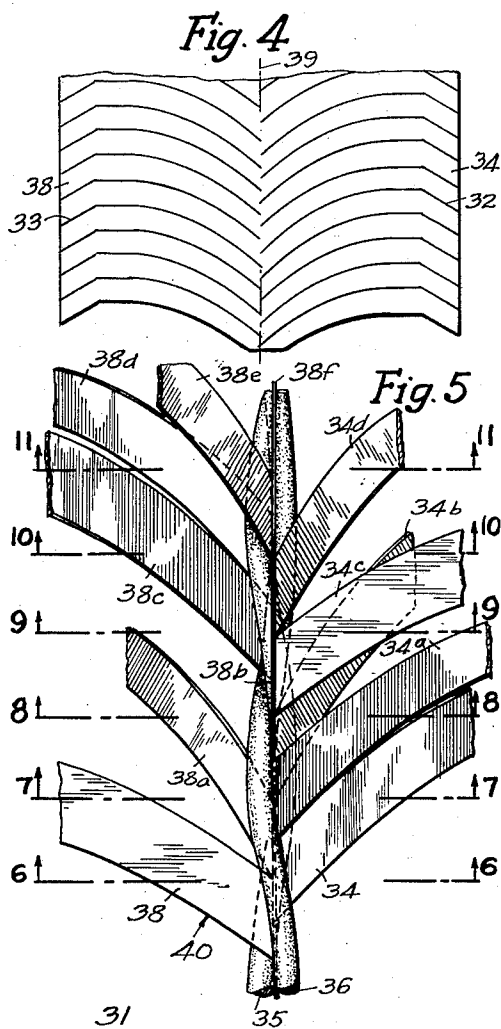
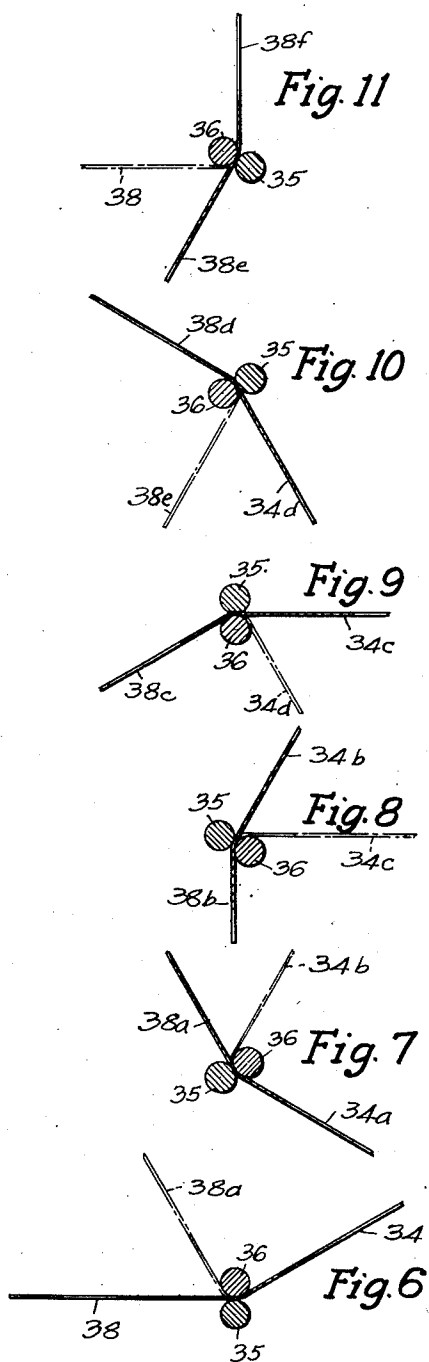
M. SEEWALD

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BRANCHED ARTICLE AND METHOD OF MAKING SAME

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2 Sheets-Sheet 2



Inventor
Monte Seewald
Harry Jacobson
Attorney

UNITED STATES PATENT OFFICE

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BRANCHED ARTICLE AND METHOD
OF MAKING SAME

Monte Seewald, Long Beach, N. Y., assignor to
Decorative Novelty Co., Inc., Brooklyn, N. Y., a
corporation of New York

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16 Claims. (Cl. 41—10)

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This invention relates to branched articles such as decorative material usable for garlands, wreaths, sprigs and the like and also usable for brushes, the invention relating also to the method of making the same.

Heretofore, in making such articles out of thin flexible but relatively inelastic sheets or ribbons of metal foil, paper, plastic or the like, it has been essential, to avoid tearing or creasing, that the sheets be corrugated or shirred to provide excess material at those places subjected to tension or compression during the manufacturing process which may include twisting the sheet. The excess material of the corrugations or folds thus provided, can straighten or tend to flatten out where the material would otherwise have to stretch or rupture. The corrugated material can also contract into tighter or accentuated folds where it is subjected to compression and hence where creasing would otherwise occur. However, the use of such excess material is uneconomical and consequently objectionable.

When such sheet is corrugated and then twisted into a decorative product, the overall length of such product is frequently reduced to a fraction of the length of the initial flat sheet. Without corrugations or shirring, as has been indicated, the flat sheet cannot be twisted into the form required without such tearing and unforeseeable creasing as renders the resulting product commercially valueless because of the indeterminate tearing, creasing or folding which prevents the production of a uniform product of a predetermined dependable shape and of uniform diameter.

The present invention therefore contemplates the provision of a method of making branched articles such as decorative sprigs and the like having a large number of projecting branches from a relatively thin inelastic sheet to provide a product with substantially no waste of material and of substantially the same length as that of the initially flat sheet.

The invention further contemplates the provision of a method of making a continuous length of a branched article from a flat sheet of the same length, the method comprising cutting the sheet by two sets of cuts, the cuts in each set terminating at such aligned points at or past the longitudinal medial line of the sheet as to enable the material between cuts to be slightly bent about said medial line without rupture or stretching and then arranging wires on opposite sides of the sheet and twisting the wires with the sheet therebetween to cause the strips between adjacent cuts

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to move out of the initial plane of the sheet beginning at said medial line and to radiate from the wires like self-sustained branches in a number of different directions, each strip making the same angle with the adjacent strips of the same set.

The invention further contemplates the provision of a method of rutting a sheet into interconnected strips whereby when the sheet is held between the wires and the wires are twisted, the strips leave the initial plane of the sheet and radiate out from the line along which the wires are tangent to the sheet, the wires being maintained tangent to the sheet throughout the lengths thereof after twisting.

The invention further contemplates the provision of an article comprising a single sheet having cuts therein sufficiently long to divide the sheet into branches or strips radiating from a given longitudinal line when the sheet is twisted with oppositely arranged wires, one on each face of the sheet and tangent to the sheet at said line, the article being usable in a garland, wreath, brush or the like.

The invention further contemplates the provision of a sheet having one set of cuts therein extending generally transversely on one side of and terminating at a given line and having another set of cuts therein extending transversely of and on the other side of said line and terminating at the same given line but at different points thereon whereby the cut sheet may be twisted about the given line as an axis to provide strips radiating in different directions from the given line.

The invention further contemplates the provision of a branched article free of corrugations or shirring, the respective branches of which are not separate pieces but are integrally connected to adjacent branches, all being part of the same twisted sheet.

The various objects of the invention will be clear from the description which follows and from the drawings, in which,

Fig. 1 is an elevational view of one form of the cuts which may be made in a flat unstretchable sheet to enable the sheet to be twisted, the cuts being shown as straight parallel and equally spaced apart.

Fig. 2 is a fragmentary elevational view of the branched article made from the sheet or ribbon of Fig. 1, the outer parts of the branches or strips being broken off.

Fig. 3 is a vertical sectional view of Fig. 2 on a reduced scale, taken on the line 3—3.

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Fig. 4 is a fragmentary elevational view, similar to Fig. 1, of a sheet having a different form of cuts therein.

Fig. 5 is a fragmentary view of a modified form of the branched article made from the sheet of Fig. 4 and twisted with a clockwise twist.

Figs. 6 to 11 inclusive are sectional views of the branched article taken on the respective lines 6—6, 7—7, 8—8, 9—9, 10—10 and 11—11 of Fig. 5, the dash-dot lines indicating that branch just behind and touching the particular cutting plane at the longitudinal center line of the article.

Fig. 12 is a fragmentary elevational view of a typical wreath or garland into which the branched article may be made.

Fig. 13 is an elevational view of another modified form of the cut sheet wherein the inner ends of the cuts overlap variably.

In the practical embodiment of the invention shown by way of example, the continuous sheet or ribbon 15 of Fig. 1 is cut into two sets of strips none of which are completely severed from the sheet. One set of strips as 17 begins at, and is arranged entirely on one side of the straight longitudinal center or medial line 21 of the sheet and extends to one side edge of the sheet, while the other set of strips 18 begins at, and is arranged on the other side of the center line and extends to the other side edge of the sheet. The cuts 19 forming the strips 17 are shown to be straight cuts on the right hand half of the sheet 15, to be parallel to each other and equally spaced apart, though it will be understood, as shown in Fig. 4, that the cuts need not be straight, but may be of such shape as is found convenient or desirable. Should it be intended that the strips be not of the same width or shape, or if the strips need not be regularly spaced apart angularly in the branched article made from the sheet, the cuts obviously need not be spaced equally apart. The parallel relation of the cuts and the equal spacing thereof are consequently shown only for illustrative purposes as for the purpose of making a product which presents a uniform appearance.

Similarly, for uniformity, the cuts 20 are shown to be at the same angle to the center line 21 as are the cuts 19, said cuts 20 being also shown as parallel to each other and as being arranged substantially transversely of the left hand half of the sheet. The extreme innermost end points 22 and 23 of the cuts 19 and 20 lie on the same center line 21, but the set of end points 22 alternate with the other set of end points 23, the theoretical center line 21 passing through all of said end points, this being an important feature of the invention shown in Fig. 1 wherein considerably inclined cuts are used.

The strips 17 and 18 therefore become arranged in staggered relation to each other, the lower half 24 of the width (as viewed in Fig. 1) of the end portion of one strip 17 being adjacent to being common to and merging with the upper half 27 of the width of the end portion of, the opposite strip 18. The other half 26 of the width of said end portion of the strip 17 is adjacent to and merges with the lower half 25 of the width of the end portion of and is common to the next adjacent strip 18. The strips are consequently incompletely severed from each other and remain attached permanently to the remainder of the sheet and to adjacent strips. However, there remains no uncut area or band extending throughout the length of the strip and subjected to stretching or crushing when the sheet is later twisted, since the only unsevered

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part of the sheet extending the whole length of the sheet, namely, the material along the theoretical line 21, has no width but has length only.

The member hereinbefore referred to as the sheet 15 may be provided in the form of flat sheets or ribbons of predetermined length arranged in a stack, or in the form of a continuous roll. Regardless of the precise form in which the sheets may be presented to a cutter for the purpose of making the cuts described preparatory to the twisting step, the sheet is preferably fed to a flat position between suitable cutters having the required shearing edges and surfaces to make the desired number of strip-forming cuts 19 and 20 through the sheet while that part of the sheet being cut is at rest and properly supported. After a sufficient length of the sheet has been cut as described by cutters such as well known in the art, the thus cut sheet is fed while substantially flat in between two initially straight wires or similar members as 29 and 30, one arranged on one surface of the sheet at the line 21 and the other arranged on the opposite surface of the sheet and also at said line.

While the wires are being fed longitudinally with the sheet therebetween, the assembled wires and sheet are simultaneously twisted to the desired pitch, that is, to give the desired number of turns to the inch, and into the position shown for example, in Figs. 6 to 11. The twisting operation may be done by any suitable twisting mechanism well known for that purpose and which therefore need not be illustrated nor further described. It need merely be said that the above described staggered and aligned arrangement of the innermost points 22 and 23 of the cuts makes it possible to perform an otherwise impractical twisting operation, there being no area on the strips which resists twisting about the line joining the inner ends of the cuts. All of the sheet material on both sides of the line mentioned is severed somewhere and only the material on the line itself remains unsevered. In other words, the theoretical line such as the center line 21 joining only the ends of the adjacent but opposite cuts 19 and 20 if continued throughout the entire length of the sheet, does not otherwise cross any of the cuts, while every other longitudinal line which might be drawn on the sheet intersects a plurality of cuts at points intermediate the ends of the cuts instead of only at the ends. It is further noted that the line 21 remains substantially straight and undistorted after the twisting operation and that each of the wires 29 and 30 is substantially tangent along said undistorted line 21 to that surface of the sheet on which the wire is arranged. Only the end portions 24, 25, 26 or 27 of each strip 17 and 18 is consequently bent, in whole or in part, to carry the remainder of the self-supporting strip out of the initial plane of the sheet to any practical extent about said line as a limiting edge, depending on the amount of the twist of the sheet and wires, without folding, creasing or tearing.

A relatively small substantially triangular area of any of the end portions 24—27, beginning at the line 21 is bent around the cylindrical surface of one or the other of the wires 29 and 30, depending on the angle of twist and the width of the strips. The end of the strip is thereby wrapped in a single direction only, which is readily accomplished without stretching. Since parts of adjacent portions 24—27 may contact different parts of the length of the same wire, or

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may contact adjacent lengths respectively of both wires which are arranged in angular relation to each other, it usually happens, especially when the wires and sheet have a relatively great number of turns per inch, that one part of a portion 24-27 may be partially wrapped around one wire and an adjacent part of an adjacent portion wrapped partially around the other wire. Because of such different wrapping of adjacent parts, one half of the width of the inner end part of a given strip may be convex and the other half of the end part of the same strip may be concave in a given direction. When this occurs, the change from convexity to concavity takes place on the line, as 21, joining the inner ends of the cuts, the line 21 remaining undistorted and straight and constituting the inner limit of the triangular area of contact between the wire and the sheet. In all cases, each strip becomes twisted relatively to the adjacent strips and said strips radiate from the wires in various directions as shown in Figs. 2 and 3, wherein the wires are shown twisted in a counter-clockwise direction. An opposed pair of strips 17 and 18 may not lie in the same plane, depending on the degree or pitch of the twist, the diameters of the wires and the widths of the strips. As shown in Fig. 3, the strips 17 and 18 make an angle of less than 180° with each other. When the strips are of the same length, that is, when the line 21 is the center line of the sheet, the outer or free ends of the strips all lie in a common cylindrical surface.

As has been indicated, the material of the sheet 15 may be any available flexible material even though relatively inelastic such as metal foil, paper, vinyl plastic or the like, and the material of the wires may also be varied, though metal is preferred. The thickness of the sheet and the widths of the strips depend on the purpose for which the branched article is to be used, it being understood that in those cases where the article is to be subjected to severe handling or stresses as in brushes, the thickness of the sheet is much greater than where the article is used for decorative purposes only. For economy, the metallic wires may be replaced by those made of cord, plastic, twisted paper or other suitable material. The wires may be of rectangular or square cross section, if desired, as when cut from a sheet of the desired material. For use as a decoration, the article may be made continuous and of indefinite length, and later cut to the size required for garlands, streamers or the like. The cut lengths may readily be fashioned into wreaths as 31 (Fig. 12) or into branches for Christmas trees or the like.

In that form of the invention shown in Figs. 4 and 5, the wires 35, 36 are twisted in a clockwise direction with the sheet 37 therebetween. The cuts 32, 33 in the sheet are illustrated as of a different shape than the cuts 19, 20 of Fig. 1 and show the use of other than straight cuts to form the strips. However, all of the cuts in this modification are also illustrated as reaching up to but not passing the longitudinal center line 39 because of the relatively sharp angle which the inner ends of the cuts make with the center line. Prolongation of the inner ends of the greatly inclined cuts past each other at the center is apt to so weaken the sheet as to permit it to rupture under the stresses of handling. It will be understood, however, that the ends of both sets of cuts need not necessarily terminate on the same line, nor on any straight line, provided that, as shown in Fig. 13, the inner ends of the cuts reach up to

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or pass that line along which the wires are initially arranged preparatory to twisting. In Fig. 4 nevertheless, the inner ends of the cuts have been shown as in longitudinal alignment and on the center line 39.

When the wires 35, 36 are arranged at said line and twisted, the various strips 38, 38a, 38b, 38c, 38d and 38e will assume positions radiating out from the wires at regular angular intervals as shown in Figs. 6-11, in one half of the article, and alternate strips 34, 34a, 34b, 34c, 34d will similarly assume radial positions in the other half of the article. While all of the strips are shown to be of the same length in the cut sheet, it will be understood that such lengths may be varied by shaping the side edges of the sheets 15 or 37 in other than straight lines in a manner which will now be obvious. It will further be understood that differently shaped cuts may be made in the same sheet to attain variety in the appearances of the branches and that the cuts may be irregularly spaced instead of being spaced apart uniformly on the sheet. In other words, the product is adapted for manufacture in a wide range of materials, sizes and shapes and has numerous practical and commercial applications, some of which have been hereinbefore indicated.

In the modified form of the sheet as 45 shown in Fig. 13, two sets 46 and 47 of curved cuts 48 are made in the sheet. Here the cuts differ in length. The inner ends 49 of the cuts 46 extend past the inner end portions 50 of the other set of cuts 47 and past the center of the sheet. The unsevered part of the sheet therefore does not lie on a straight line as in Figs. 1 and 4, but being disposed around the ends of the cuts, takes a sinuous form. Should the cuts fall short of the line on which the wires are arranged, the sheet cannot properly be twisted without tearing or creasing as previously mentioned. It is sufficient, however, if the inner ends of both sets of cuts reach at least up to the same line, which is preferably, though not necessarily, a center line. The inner ends of one set of cuts may if desired extend further and pass or overlap the inner ends of adjacent cuts of the other set without adversely affecting the twistability of the assembly. Obviously, if the inner ends of the cuts extend much past the center line of the sheet, the outer parts of the cuts become visible in the finished twisted article.

Certain specific embodiments of the invention have herein been shown and described, but various changes may obviously be made therein without departing from the spirit of the invention defined in the appended claims.

I claim:

1. The method of making a branched article free of creases and tears from an initially flat thin and flexible sheet of relatively inelastic material comprising cutting the sheet into two similar sets of plane self-sustaining strips without completely separating any of the strips from the remainder of the sheet and from adjacent strips, the inner ends of all of the cuts of both sets extending toward each other enough to intersect the same straight longitudinal line, placing an elongated member along and at said longitudinal line and twisting together the member and the sheet to bend the member into helical form and also to bend partway around the member only those inner end portions of the strips, which portions begin at said line, the twisting operation thereby projecting the remainders of the strips

radially from said line in various directions and out of the initial plane of the sheet while the inner end edges of the strips remain fixed on said line and are maintained in said initial plane.

2. The article making method of claim 1, the twisting operation including the bending of a second elongated member placed on the opposite face of the sheet from that on which the first mentioned elongated member is placed, the bending of the second member being around the first mentioned member with the sheet therebetween and being performed at the same time as the bending of the first mentioned member.

3. The article making method of claim 2, half of the inner portion of each strip moving during the twisting operation into contact with one of the members and the adjacent half of said portion moving into contact with the other member, and the length of the sheet being maintained substantially unchanged during the twisting operation.

4. A branched article comprising a single sheet of inelastic material having a first set of cuts therein largely on one side of a substantially straight longitudinal line of the sheet and having a second set of cuts therein largely on the other side of said line, the cuts intersecting said line and dividing the sheet into two oppositely arranged sets of strips, successive cuts of the first set alternating respectively with those of the second set, the sheet being twisted about said line as an axis, and a twisted elongated element at said line and maintaining the sheet in the twisted position thereof.

5. The article of claim 4, the inner part of each strip having a concave bend therein extending through approximately half of the width of said inner part and having a convex bend therein extending through the remainder of the width of said inner part.

6. The article of claim 4, the straight longitudinal line being the medial line of the sheet.

7. The article of claim 4, the elongated element being self-sustaining and relatively rigid.

8. The article of claim 4, the length of the article being substantially the same as the length of the sheet.

9. The article of claim 4, the elongated element comprising a pair of wires one on each face of the sheet and twisted together.

10. The article of claim 9, the inner part of each strip having a concave bend and an adjacent convex bend therein, one bend being around part of one wire and the other bend being around part of the other wire.

11. The article of claim 4, the cuts of each set being straight, parallel, equally spaced apart and at an angle to said longitudinal line other than a right angle.

12. The article of claim 4, the cuts of each set being along lines other than straight lines.

13. The article of claim 12, the cuts of each set being long enough to extend past the innermost ends of adjacent cuts of the other set.

14. A branched article comprising a sheet of metallic foil having a first set of cuts therein across half of the sheet beginning at the longitudinal medial line of the sheet, the sheet having a second set of cuts therein across the other half of the sheet beginning at said medial line, successive cuts of the first set alternating with the respective cuts of the second set and dividing the sheet into two oppositely arranged sets of strips, a pair of wires at said line, one wire being on one face of the sheet and the other wire being on the other face, the wires and the sheet being twisted together about said line as an axis and thereby locked in a twisted state with the strips self-sustaining and flat and successive strips arranged in uniform circumferential spaced relation and radiating at equal intervals from said line.

15. The branched article of claim 14, half of the inner part of each strip being bent partly around one wire and the other half of said part being bent around the other wire.

16. The branched article of claim 15, the length of the article being equal to the initial length of the sheet.

MONTE SEEWALD.

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