

**Sept. 12, 1972**

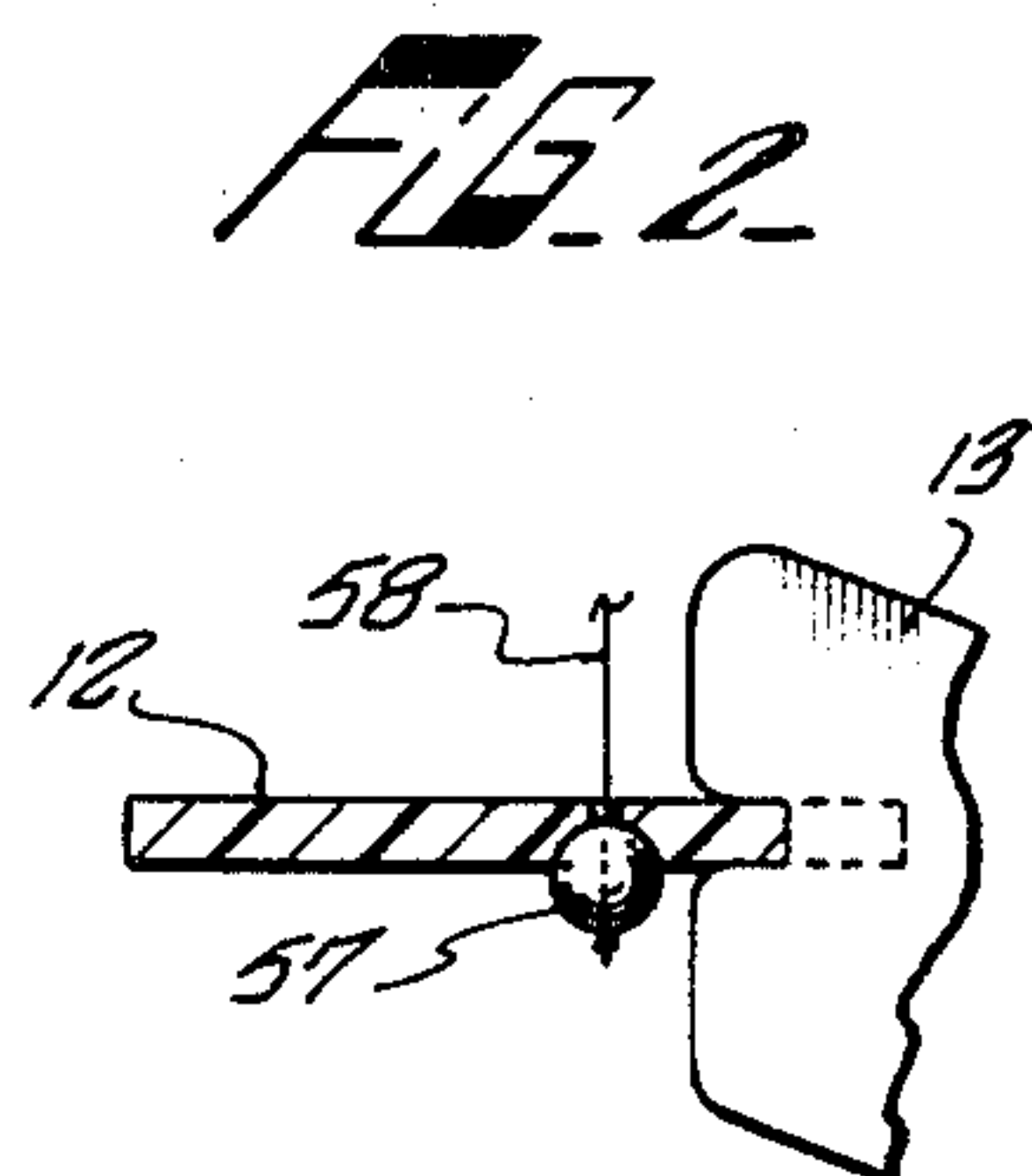
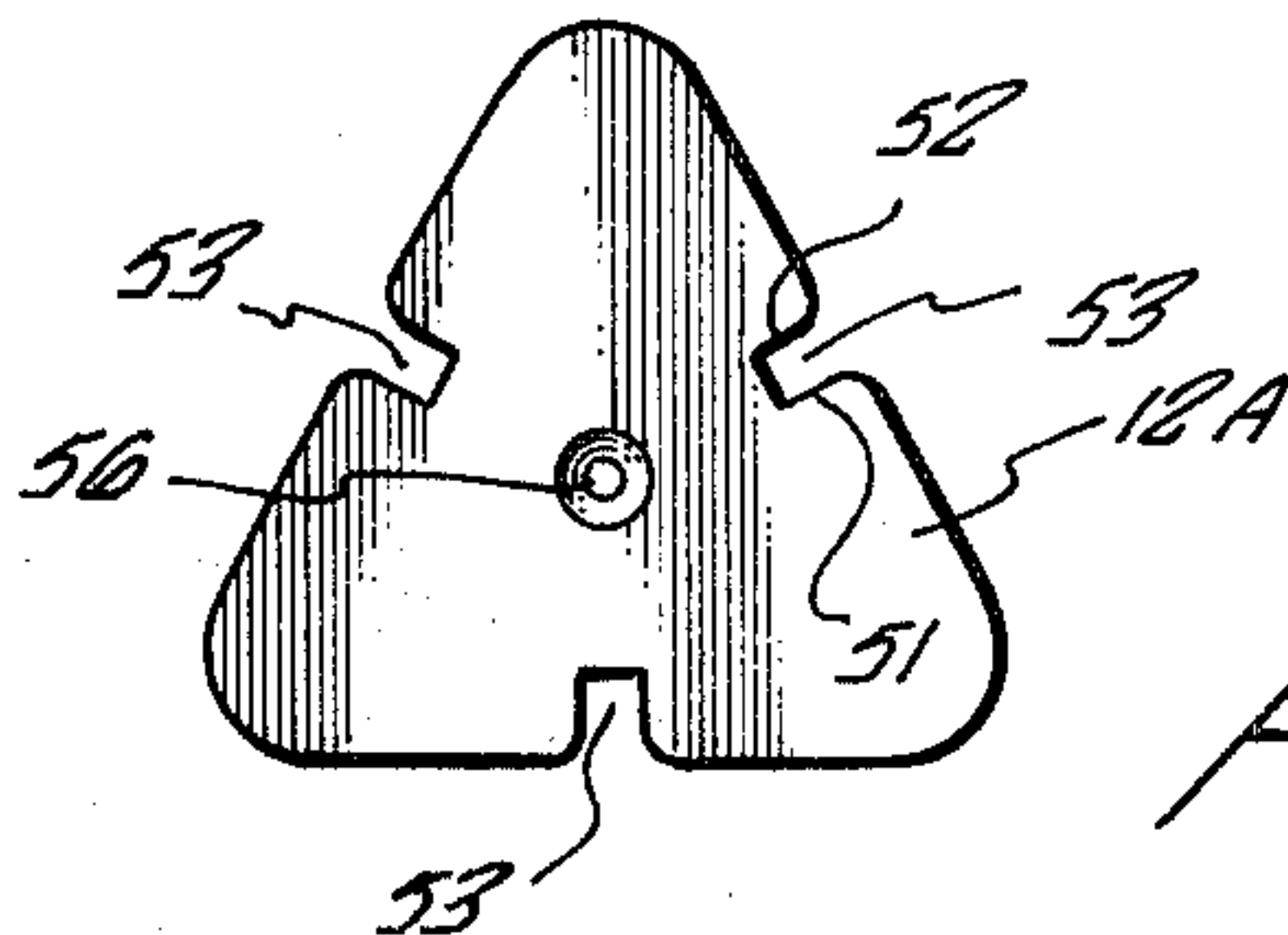
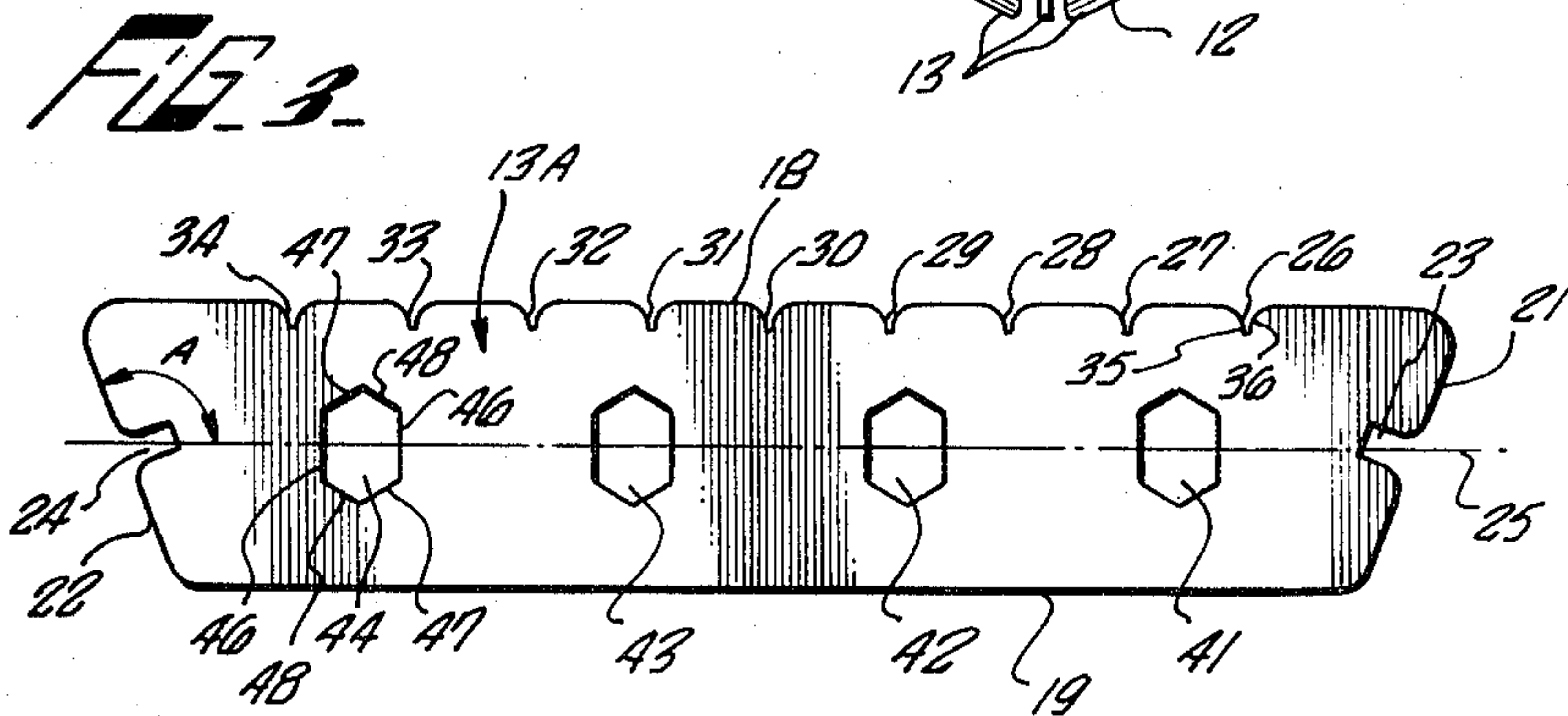
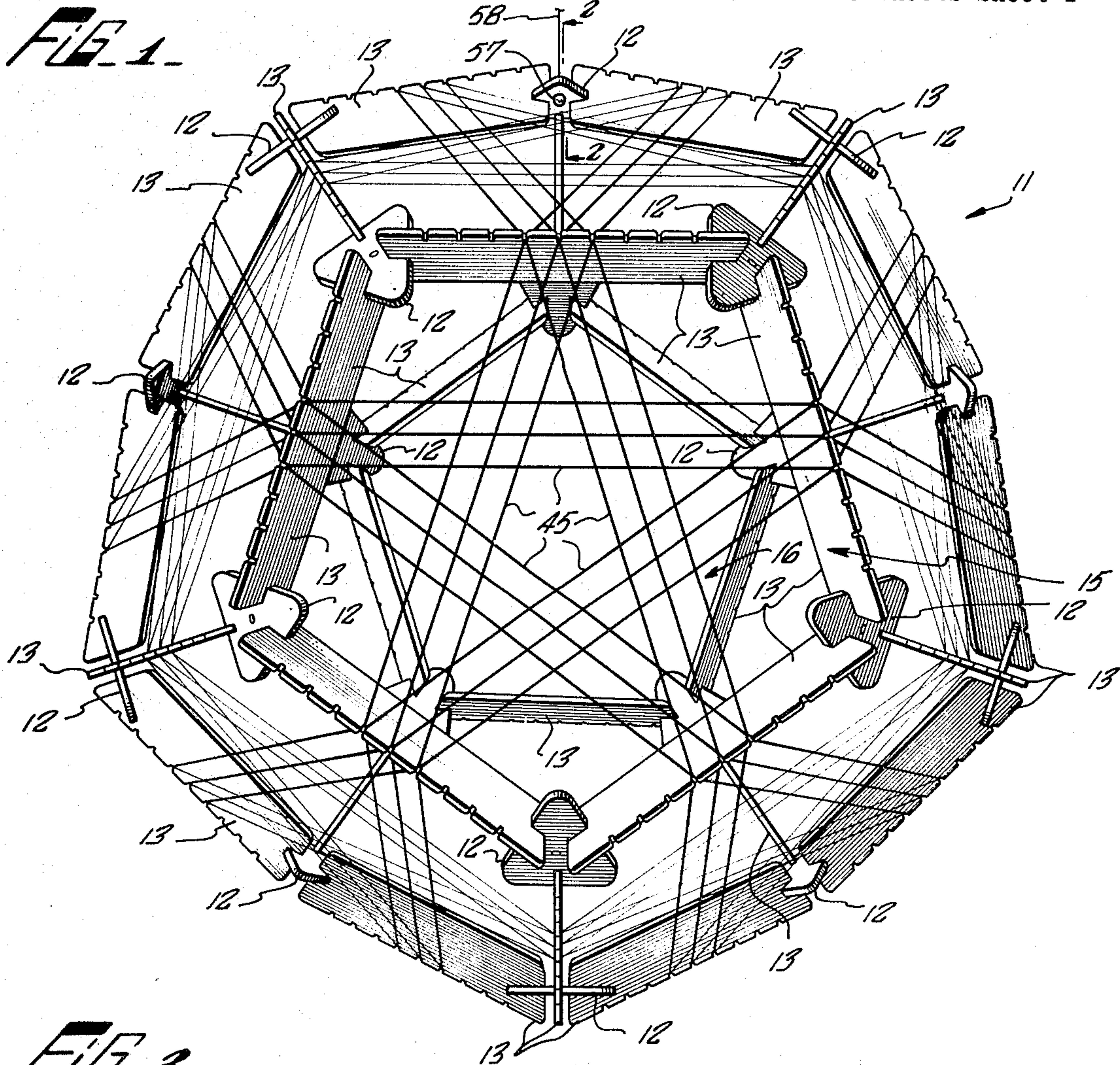
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## DODECAHEDRON ORNAMENT

Filed Nov. 30, 1970

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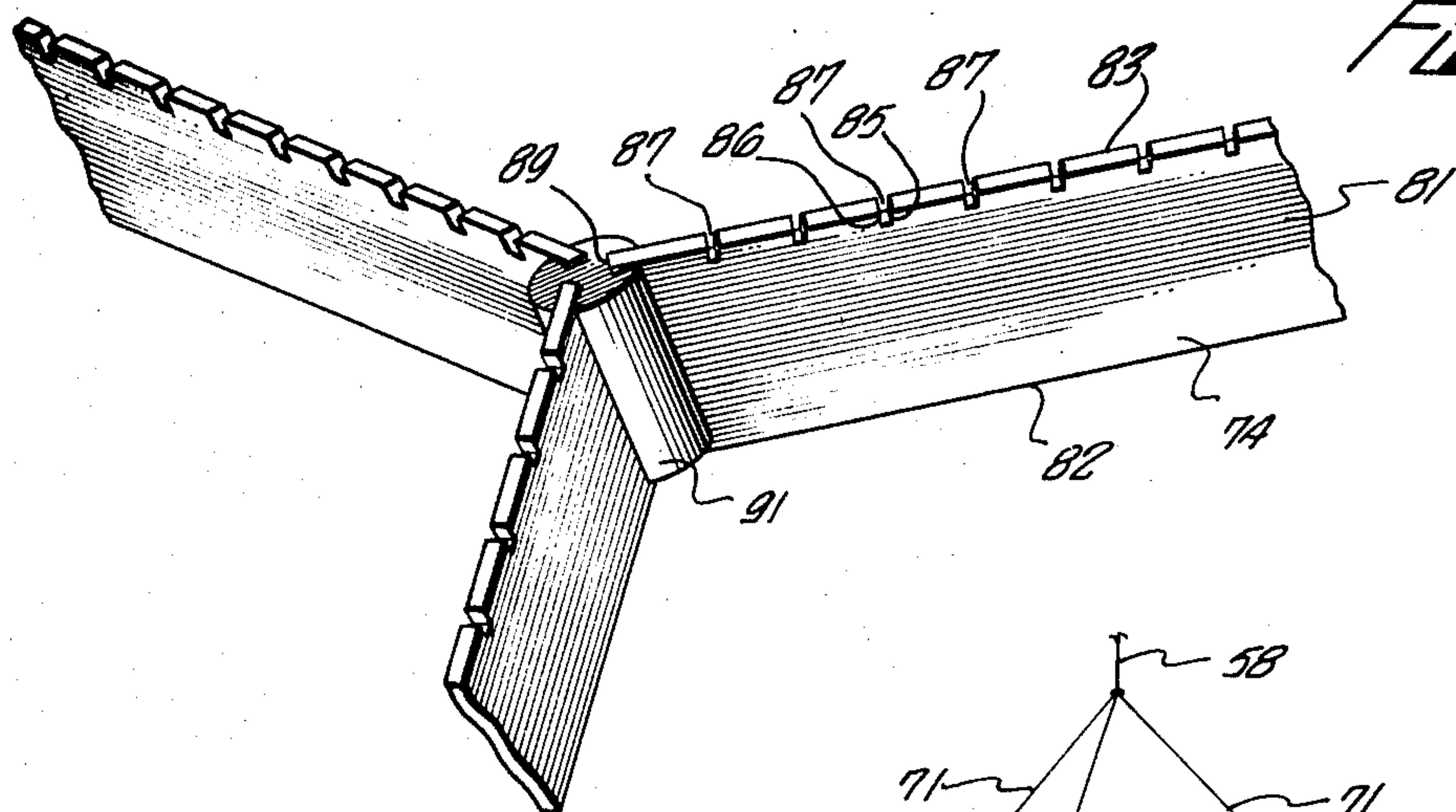
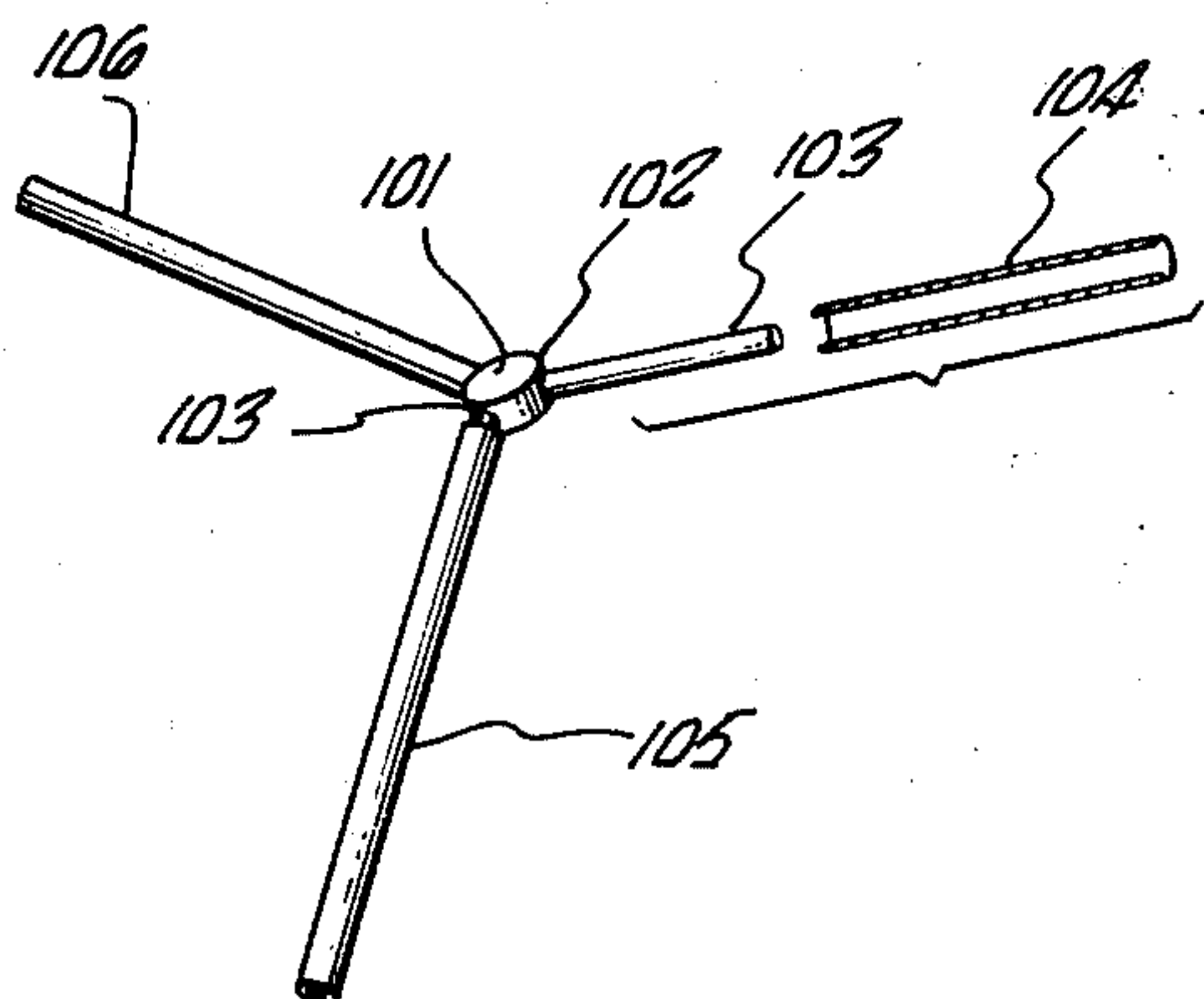
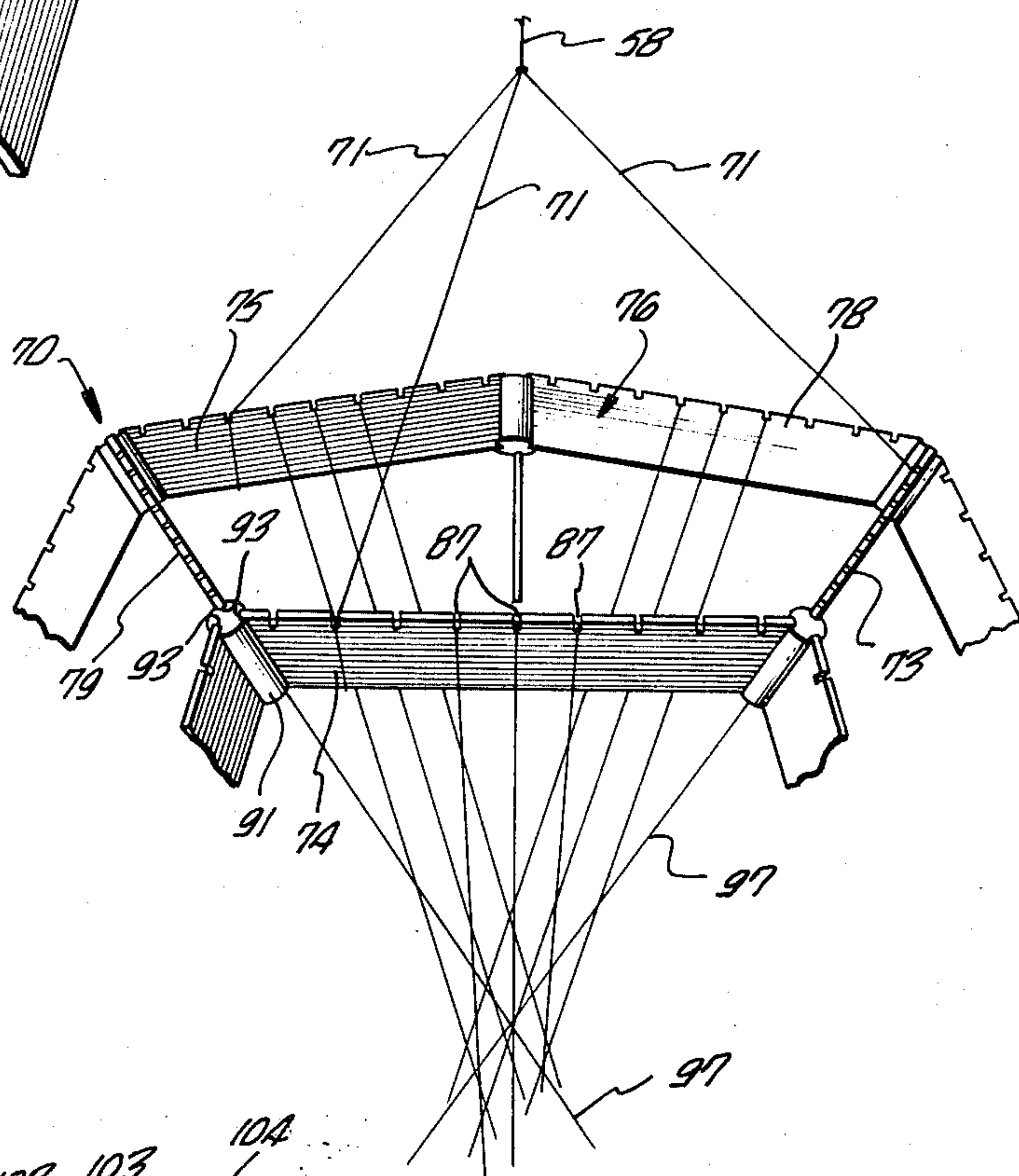


FIG. 5.

FIG. 6.





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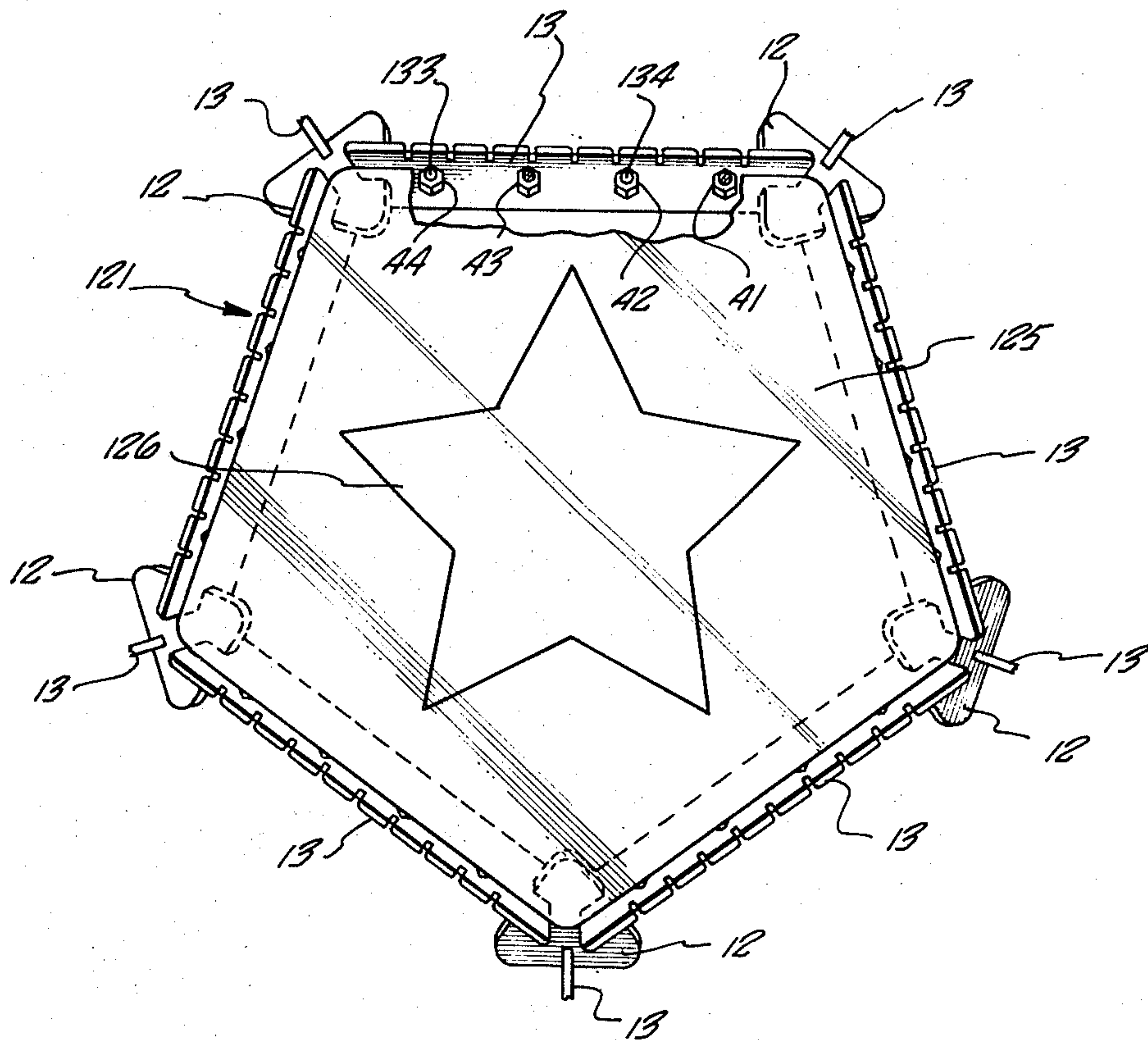
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DODECAHEDRON ORNAMENT

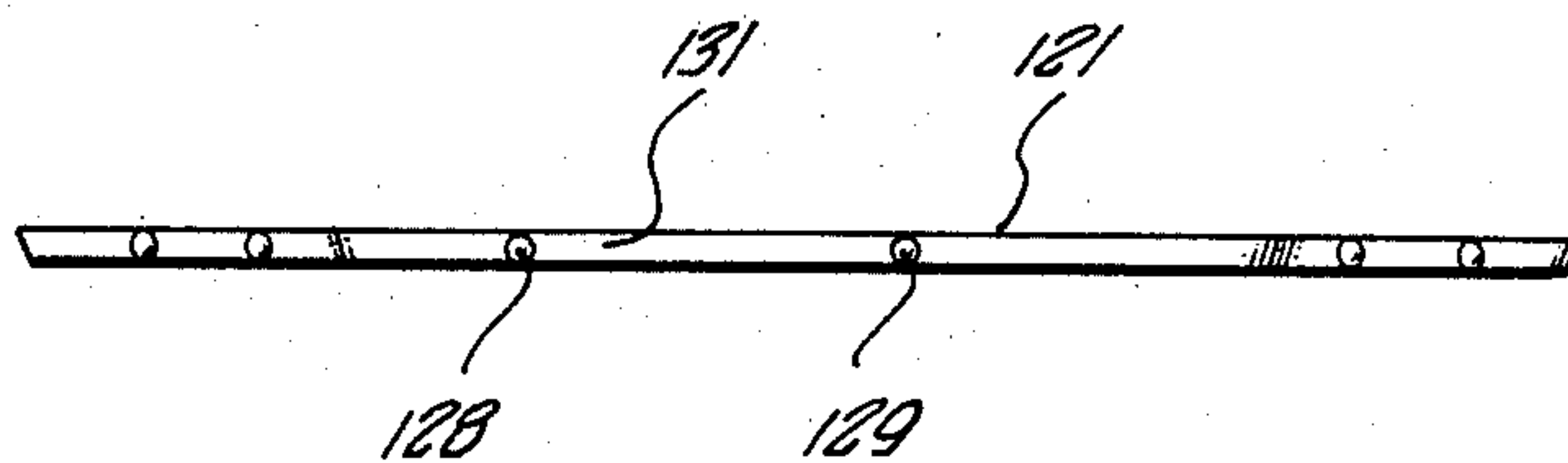
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**FIG. 8.**



**FIG. 9.**



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## DODECAHEDRON ORNAMENT

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8 Claims

### ABSTRACT OF THE DISCLOSURE

An ornament having twelve facets each defined by an open frame having corner connectors each joining three or four side members of adjoining facets. Each facet frame has four or five side members, depending upon the type of dodecahedron. The side members have notches which receive strands which extend from side member to side member of the same or opposed facets exteriorly or interiorly of the ornament to describe geometric patterns. In the case of a regular dodecahedron the corners are all similar pieces and the side members are all similar. A rhombic dodecahedron has two types of corner connectors and two types of side members.

### BACKGROUND OF THE INVENTION

The invention relates to ornament of either hanging or standing type and more particularly to such ornaments which may be assembled from a kit of parts and whose final form depends upon the wishes of the assembler.

The ornament of the invention is a dodecahedron in which the facets are open. Dodecahedrons have occupied a place in the ornamental arts in times past, but the final decorative form has been rigidly dictated by the particular materials from which the ornament is formed. For instance, paper ornaments in dodecahedron shape have been known, which, although inexpensive, have been stereotyped by the original layout of parts. I have invented a dodecahedron ornament which combines a rigid framework with panels or a flexible strand or plurality of strands or both such that the ultimate ornament achieved by the assembler can take a seemingly infinite number of design shapes. This versatility is due to the simple shape of the corner connectors and side members which define the basic dodecahedron and to the means thereon for guiding and fixing the strands with which the side members are interconnected to define the vast variety of geometric patterns mathematically possible in terms of strand paths from side member to side member.

### SUMMARY OF THE INVENTION

The invention contemplates a dodecahedron ornament comprising a plurality of similar elongate side members each having attachment means at each end and a lesser plurality of similar corner connectors each having at least three attachment means, each adapted to join an attachment means of a side member end. A decorative fill such as a panel or plurality of strand segments extends from side member to side member of the ornament. Strands may extend either about the ornament or through the ornament to define with the side members a geometric pattern. Preferably each corner connector is a flat wafer having three channels or notches oriented about 120° apart in the plane of the connector and each side member has an end surface which is notched to mate with the notch walls of the corner connectors. The end surface of each end of the side member is preferably at an angle to the extent of the member such that the end surfaces of side members common to a corner connector are mutually parallel and preferably parallel to a radius from the

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center of the dodecahedron defined by the side members and corner connectors.

The dodecahedron may be of regular or rhombic configuration. However, the regular configuration is preferred for economy in fabrication, since its regularity requires only one type of corner connector and one type of side member whereas the rhombic dodecahedron, having facet shapes of unequal angles, requires two differing corner connector types and two differing side member types.

Each side member also has a plurality of walls defining strand notches and openings, which serve to anchor and guide the strands in their extent from side to side member, as well as anchor facet panels. Each corner connector preferably has means for attachment to a support strand so that the ornament may be suspended, or so that added decorative objects, such as lights, may be attached at each corner.

The inventive apparatus fulfills the objectives of the invention which are to provide an economical ornamental object capable of either suspended or standing stance. A further object is to provide an ornamental dodecahedron in which the twelve facets are defined by like side members and like corner connectors and which affords guide and anchor means for decorative strands and panels to extend between the side members in a variety of patterns.

These and other advantages of the invention are apparent in the following detailed description and drawing.

### BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a regular dodecahedron ornament in accordance with the invention;

FIG. 2 is a fragmentary sectional elevation taken along line 2-2 of FIG. 1;

FIG. 3 shows a side member of the ornament;

FIG. 4 shows a corner connector of the ornament;

FIGS. 5 and 6 illustrate fragmentarily in perspective an alternate embodiment of the invention;

FIG. 7 shows fragmentarily in perspective one corner connector and its associated side members of a further alternate embodiment of the invention;

FIG. 8 shows in fragmentary perspective a further alternate embodiment of the invention having a facet panel; and

FIG. 9 is an edge view of the facet panel of the embodiment of FIG. 8.

In the drawings like members in the various views have like numbers.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIGS. 1 through 4 illustrate an embodiment of the invention in hanging attitude, although the same elements also may comprise a free-standing ornament. A dodecahedron ornament 11 of FIG. 1 has a plurality of triangular corner connectors 12 (detailed in FIG. 4) combined with a greater plurality of elongate side members 13 to define twelve open facets of the dodecahedron. Two opposite facets 15 and 16 are shown in true elevation in FIG. 1, with facet 16 appearing diminished because of the perspective angle. FIG. 3 details a side member 13, comprising an elongate member 13A having opposite long edges 18, 19 and end surfaces 21, 22, each with a pair of spaced parallel walls 23 defining a notch 24. The surfaces extend oppositely with respect to edge 19 at an angle of about 111.0°. The long axis 25 of the elongate member is shown so that the same obtuse angle "A" of the end surface with respect to the axis is evident. Depending upon manufacturing precision, the angle may vary 3° or 4° and still provide proper member-to-connector assembly to form the dodecahedron.

While the side members are illustrated as having parallel straight edges 18, 19, the invention does not preclude



edges which are arcs of the dodecahedron sphere or other fanciful lines.

Edge 18 is the outer edge of the side member when assembled in the dodecahedron and has a plurality of equally spaced notches 26-34, each notch being defined by parallel side walls 35, 36 blending arcuately into the edge 18. Each side member also has a plurality of openings 41-44 each defined by opposed long walls 46 and opposed short wall pairs 47, 48. Notches 26-34 and openings 41-44 may receive strands such as the monofilament line 45 of FIG. 1 to enunciate the design across the facets.

The corner connector 12A of FIG. 4 is a flat triangular wafer with sides 49 each of which has a pair of parallel walls 51, 52 defining a notch 53 to mate with a notch 24 of a side member. The notches 53 are equally spaced about the periphery of the connector. Preferably each connector has a countersunk central hole 56. The hole may receive a sphere terminus 57 on a suspending strand 58, as shown in FIG. 2, which sustains the weight of the dodecahedron ornament. The suspending strand may be fastened to a suspension member apart from the ornament. Suspension from a single strand is preferred, since it affords opportunity for the ornament to rotate freely in response to air motion in its vicinity such that the ornamental aspect is continuously changing. However, the ornament of the invention has esthetic appeal in a static position as well. A static position is achieved by resting the ornament upon the side members 13 of any one facet.

The embodiment of FIGS. 5 and 6 is also illustrated as a suspended ornament although this embodiment also is capable of a static position.

In FIG. 6 a regular dodecahedron ornament 70 is fragmentarily shown, suspended from a single suspending strand 58 by three intermediate strands 71 tied about three side members 73, 74, 75 of an open facet 76 which is further defined by fourth and fifth side members 78, 79. As can be seen from FIG. 5, each side member, such as the side member 74, is an elongate solid 81 having elongate edges 82, 83, edge 83 having a series of spaced parallel walls 85, 86, each pair of which defines a notch 87. Edges 82, 83 are substantially parallel and terminate at each end in an end planar surface indicated in FIG. 5 by the line 89. The surface extends between the edges at an obtuse angle to edge 82 approximating  $111^\circ$ .

The side members are joined in the ornament by corner connectors such as the cylindrical connector 91 of FIG. 5 whose central axis, if extended, passes through the center of the dodecahedron.

Each corner connector has three grooves 93 evenly spaced about the periphery of the connector and substantially parallel to the axis of the cylindrical connector. The width of the groove is approximately the same as the thickness of the solid 81 and the side members may be adhered in place one in each groove by a suitable plastic solvent or other adhesive. Alternatively, the side members and the connector may be pressfitted together.

As is evident from FIGS. 5 and 6, each connector joins two side members of a facet and a third side member of an adjoining facet. Because of the angle which the end surfaces 89 of each side member make to the extent of the side member, the connectors and the side members, when properly assembled, combine to form a dodecahedron of twelve open facets, defined by 30 members and 20 connectors.

The embodiment of FIG. 1 has a plurality of strand segments 45 that extend from side member to side member of a facet to define a five-pointed star within the facet. In the embodiment of FIG. 6 strand segments 97 pass through the notches 87 of the side member of a facet to the notches in the side member of a differing facet. Thus the strand segments 97 of the embodiment of FIG. 6 pass through the central portion of the dodecahedron to define various geometric configurations within the dodecahedron volume, the defined form depending

upon the orderly progression of strands between facets in accordance with mathematical concepts.

Depending on the nature of the strands, the strands may be tied, adhered or solvent-welded to the side member of origin and the side member of termination. In the embodiment of FIG. 1 the five-pointed star design of strands in each facet may be developed by a single length of material such as nylon monofilament line extending from side member to side member of a facet and thence from that second side member common to the adjoining facet to an opposite member of the second facet, etc. until each facet has been crisscrossed by the monofilament line to define the desired pattern. While the embodiment shows a surface pattern and the embodiment of FIG. 6 shows an interior pattern fragmentarily, both surface and interior patterns may be combined in the same ornament.

Such internal or external decoration is also possible with the embodiment of FIG. 7 shown fragmentarily and wherein a central corner connector 101 comprises a hub 102 from which spokes 103 extend to receive tubular side members 104, 105, 106.

The spokes are  $120^\circ$  apart. The spokes make an obtuse angle to the axis of the hub, which passes through the center of the dodecahedron, which approximates  $111.0^\circ$ . A twelve sided figure results when twenty corner connectors 101 are assembled with thirty side members like members 104, 105, 106.

Although the side members of FIG. 7 are shown with smooth surfaces, the tubes may be notched or serrated to receive strands, or the strands may be looped about the surfaces of the tubes and frictionally held in place to achieve the strand designs desired.

In the further embodiment of FIGS. 8 and 9 a dodecahedron ornament 121 similar to the ornament 11 of FIG. 1 has a plurality of side members 13 like that shown in FIG. 3, each with strand notches such as the notches 26-34 and a plurality of openings such as the openings 41-44. A plurality of strand segments may be combined with the side members of the embodiment of FIG. 8 as in the patterns of previous embodiments, although such strand segments are not shown in FIG. 8 to simplify the drawing.

A facet panel 125 having the general configuration of the dodecahedron facet extends between the side members of the facet. In the instant embodiment the panel has five sides. However, when used in a rhombic dodecahedron ornament, the panel is four-sided. The panel has a central decorative design 126 which, in the illustrative embodiment, is a five-pointed star harmonizing with the numerical order of the facet. The star may be etched, printed or otherwise applied to the facet panel in accordance with the desired artistic effect. Preferably the panel is transparent or translucent so that the design may be emphasized by internal light from the ornament.

As can be seen from FIG. 9, the panel 125 has a pair of spaced lugs, 128, 129 extending from each edge 131 of the panel. Each lug pair is located on the edge 131 to coincide with the apices of alternate openings 41-44 of the side members. In the arrangement shown the lugs 128, 129 align with openings 41 and 43. For instance, assuming that the side member 13 of FIG. 3 is in place in the ornament 121 at the top of FIG. 8, openings 41 and 43 are seen to engage the lugs 128, 129 of the panel. The lugs are shown as crosshatched in FIG. 8. The alternate openings 42, 44 of side member 13 are seen to engage lugs 133, 134 of an adjacent facet panel (not shown). Lugs 133, 134 are shown as plain circles. By locating the lugs on the edges 131 of the panels such that they coincide with alternate side member openings, panels may be fitted to adjacent facets around the dodecahedron to close it completely without interference between lugs of adjacent facet panels.

Preferably the edges of each panel taper inwardly so that the panel may make surface contact with the substan-



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tially radial surface of each side member with respect to the center of the dodecahedron.

Each of the illustrative embodiments affords an ornament that is economical to make, easy to assemble and versatile in artistic aspect. While one external and one internal strand design has been shown, it is not to be assumed that the design possibilities within the scope of the invention are limited thereto. In fact, an almost limitless variety of combinations of side members, corner connectors and strand patterns is possible when the variables are considered: strands of differing nature, patterns between one side member and each and any of the other twenty-nine members, panels within a facet, strands of different colors and texture, and even the paths from side member to side member from and to any of the side member notches. It is therefore desired that the invention be measured by the appended claims rather than by the illustrative disclosure herein.

I claim:

1. A deodechedron ornament comprising a plurality of side members identical in peripheral configuration, attachment means at each end of each side member, a lesser plurality of corner connectors identical in peripheral configuration, attachment means on each of three places, on each corner connector, said connector attachment means each adapted to join with an attachment means of a side member end, said attachment means pairs joining said side members each to a corner connector to define an angle of about 111° between the elongate side of a side member and a radius from the center of the ornament passing through a corner connector, openings in each side member, and means secured in the side openings of a side member and extending between side members of the ornament.

2. An ornament in accordance with claim 1 further comprising a plurality of facet plates each having an edge parallel to each edge of the facet defined by the side members of a facet, and means securing each edge of the plate to a side member.

3. An ornament in accordance with claim 1 further comprising a single strand adapted for attachment at one

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end to a suspension member apart from the ornament and centrally located means on a corner connector for attaching the single strand thereto at its other end.

4. An ornament in accordance with claim 1 further comprising suspension strands extending from corner connectors of a facet to a single suspending strand adapted to support the ornament.

5. An ornament in accordance with claim 1 wherein the means secured in the side openings of a side member comprises an elongate strand.

6. An ornament in accordance with claim 1 wherein each corner connector comprises a rod having an axis on the radius from the center of the ornament, each attachment means of a side member being a hollow end thereon, and evenly spaced prongs extending from each rod at an angle of about 111° to the rod axis.

7. An ornament in accordance with claim 1 wherein the attachment means for each of the side members and the corner connectors comprises a notch approximately the width of the thickness of the mating element.

8. An ornament in accordance with claim 7 wherein each corner connector comprises a triangular flat wafer.

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U.S. Cl. X.R.

35—34; 46—17; 161—14