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54 Twinski.

57 A twinski is provided herein having an integral mononose section which is preferably made of exceptionally strong material to resist twisting. The integral mononose section includes an upwardly curved tip, and bifurcated tail sections separated by a longitudinal slot, with particularly disclosed ratios of widths of the mononose and of the slot. Bindings may be provided on the tail sections of the twinski adjacent the central waist portion. Bridge means are provided at the tail section adjustably and floatingly holding the tail segments in predetermined spaced-apart relation. The ski has extremely good manoeuvrability, good pivot turnability, controlled turns at substantially all speeds, good support on powder snow and excellent manoeuvrability in both packed and corn snow. The four edges provide greater control and the interconnected tail section work independently.

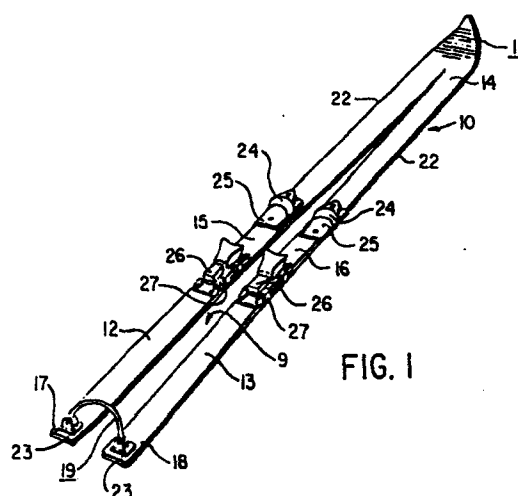


FIG. 1

TWIN SKI

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This invention relates to a twinski having
a nose section and a pair of tail sections separated
by a longitudinal slot, the tail sections being
at least five times as long as the nose section,
5 the nose section including an upwardly curved
forward tip region, the tail sections each
including a central segment and a terminal tail
segment, the twinski having its greatest thickness
at the central waist portion, and being reduced in
10 thickness both towards the tail portion and the
forward tip, the minimum thickness being adjacent
to the forward tip region and a bridge means
connecting the ends of the tail segments.

The problem with which the present invention
15 is concerned is to provide a single ski which is
adapted to support both feet of a skier. It was
attempted to solve this problem by the following
patents: United States Patent No. 3,154,312
patented by Jacques Marchand on October 27, 1964;
20 United States Patent No. 3,758,127 patented by
Michael D. Doyle and William L. Bahne, on September
11, 1973; United States Patent No. 3,685,846 patented by
Hans Schmid on August 22, 1972; and United States
Patent No. 3,802,714 patented by Stephen D. Freegard
25 on April 9, 1974.

However, the closest prior art with which the
present invention is concerned is Canadian Patent

No. 989,435 issued September 11, 1973 to
Alec Pedersen, which provided a new and improved
single snow ski which was easily controlled and
safer to use than conventional dual skis, not
5 only in powder snow, but in hard packed or
corn snow.

The present invention proposes a solution to
the problem of providing an improved monoski which
includes a wider stance for balance, is adaptable
10 to virtually all snow conditions, is lighter in
overall weight and is easy to use and to control
during many skiing manoeuvres.

This problem is solved according to this invention
by providing the nose section as an integral mononose
15 terminating in a bifurcated tail section providing
bridge means which adjustably and floatingly holds
the tail segments in predetermined spaced-apart
relation.

By one variation of this invention, the bridge
20 means is a connector plate secured to the end of
each of the tail portions and a single continuous
curved connecting rod secured at its ends to a
respective one of the connector plates.

By another variation, each end of the connecting
25 rod is pivotally connected to its respective

connector plate.

By another variation, the bridge section is a connector plate provided with an upstanding post secured to the end of the tail portions, and a connector bar interconnecting the upper ends of the upstanding posts.

By another variation, the connection between the connector bar and the upper end of each upstanding post is a universal joint to provide pivotal movement.

By another variation, the connecting bar or rod is formed of tension steel.

By still another variation, the connector bar or rod is adjustable in length to provide controlled spacing between the ends of tail portions.

By another variation, the bridge means is secured to the tail section by a bottom plate, substituting a portion of the lower skin of the twinski.

By a further variation, the upper plate is secured to the lower plate by a bolt, passing through the upper plate, the ski core and tapped holes in the lower plate.

By still another variation, the upper plate is provided with a pair of spaced-apart ears, having aligned apertures, a connecting bar disposed between the ears, the connecting bar having an aperture therethrough at the lower end; and a pin

extending through all the apertures to provide hinged connections.

By another variation, the lower plate is provided with a pair of upstanding, spaced-apart ears, which project through the ski and the upper plate, the ears having aligned apertures, a connecting bar disposed between the ears, the connecting bar having an aperture therethrough at the lower end; and a pin extending through all the apertures to provide hinged connections.

By still another variation, the connection bar is provided with a protective wrapper.

By a further variation, the twinski includes a groove in the base of each of the tail sections.

By another variation, the total width of the tail (i.e. the width of the two tail segments and the width of the slot) may be the same, or wider than the width of the tip at the mononose section.

By another variation, the width of the longitudinal slot is the same as the width of each of the tail sections.

By still another variation, each bifurcated tail section may be wider than the slot, at the tail.

By still another variation, the slot converges from the tail to the integral mononose, and especially where the slot converges more sharply into the integral mononose.

By another variation, the integral mononose section is formed of exceptionally strong material to resist twisting moments of the tail segments.

By another variation, ski bindings are mounted on the tail section of the ski adjacent the central wait portion for holding the feet of a skier in close side-by-side relation, and the bindings include a pair of toe members mounted parallel to one another on individual base plates, each such base plate secured directly onto a respective tail section of the ski, and a pair of heel members mounted parallel to one another on individual base plates, each such base plate being secured directly onto a respective tail section of the ski.

By another variation, the twinski is formed of a foam core, with stiffening members of wood, and laminated to a glass fiber sheet, and a synthetic plastics material on the bottom, running surface.

By a further variation, the twinski is formed of a laminate of hickory, ash, and glass fiber, with an upper laminated surface of airplane aluminium, and a bottom running surface of a synthetic plastics material.

By yet another variation, the twinski is formed of a honeycomb core, either of a plastics material,

or a metal, e.g. aluminium, laminated to a glass fiber sheet or to a sheet of airplane aluminium and a running surface of a synthetic plastics material.

5 By a further variation, the twinski includes four steel running edges along the edges of the tail portions of the twinski.

In preferred embodiments of this invention, the dimensions of the twinski are as follows:

10 (a) the twinski has a camber of about 10 mm to about 14 mm;

(b) the bindings extend from about 6mm to about 12 mm over the side edges of the twinski;

15 (c) the twinski may be from about 98 cm to about 220 cm;

(d) the twinski may be about 192 cm long with the integral mononose section being about 48 cm long;

20 (e) the twinski may be about 192 cm long, with the integral mononose section being about 43 cm long;

(f) the slot can be about from 144 cm to about 180 cm long;

(g) the slot is about 163 cm long;

25 (h) the slot is about 145 cm long;

(i) the slot may converge from about 6 cm at the tail to about 2 cm at the mononose;

and (j) the slot may converge from about 9 cm at the tail to about 5 cm at the mononose.

5 Advantages of the invention are that the twinski has a wider stance to improve balance, is adaptable to virtually all snow conditions, and is easy to use and to control during many skiing manoeuvres.

Preferred embodiments of this invention are shown in the accompanying drawings, wherein,

10 Figure 1 is a perspective view of a twinski according to this invention;

Figure 2 is a bottom plan view of the twinski of Figure 1;

15 Figure 3 is a side elevational view of the twinski of Figure 1;

Figure 4 is a side elevational view of one embodiment of the tail bridge structure used in the twinski according to this invention;

20 Figure 5 is a top plan view of the tail bridge structure of Figure 4;

Figure 6 is a side elevational view of another embodiment of the tail bridge structure used in the twinski of this invention;

25 Figure 7 is a top plan view of the tail bridge structure of Figure 6;

Figure 8 is a rear end view of one embodiment of an assembled bridge section showing the upper plates, ears and semi-hoop-like bridge;

5 Figure 9 is a view of a portion of the bridge section of Figure 8 showing the securement of the upper plate to the twinski;

Figure 10 is a bottom perspective view of the tail segment of the twinski showing a typical assembly of the upper and lower plates;

10 Figure 11 is a side elevation showing the assembly of the bridge to the ears;

Figure 12 is a rear end view of a portion of a bridge section of another embodiment of the invention, showing the securement to the twinski;

15 Figure 13 is a top plan view of the bridge section of Figure 12;

Figure 14 is a transverse cross-section through the tail section of one embodiment of a twinski of this invention; and

20 Figure 15 is a transverse cross-section through the tail section of another embodiment of a twinski of this invention.

Turning to Figures 1, 2 and 3, it is seen that the twinski 10 comprises an elongated body having an integral mononose 11 and a bifurcated pair of

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tail sections 12, 13 separated by a slot 9.

The twinski 10 includes an upwardly curved forward tip region 14 and a pair of central waist segments 15, 16 and a pair of tail segments 17, 18

5 optionally providing an outwardly flared tail portion. The tail segments 17, 18 are tied together, in a "floating" manner to be described herein after, by tail bridge structure 19.

Each of the four side edges may be provided with
10 a conventional steel wear-resistant edge 20. The underside of the twinski has a running surface 21 of polyethylene, or a similar plastics material, desirably having a longitudinal groove 22 extending from adjacent the forward tip 11 along substantially
15 the full length of the body of each tail section 12, 13. Grooves 22 allow the twinski to unstick from the snow more readily and to reduce friction in running. The tail segments 17, 18 of the twinski are slightly upwardly tapered and preferably the
20 tail segments 17, 18 may be protected by a reinforcing strip 23 of metal or the like.

The feet of the skier are held in side-by-side position on the central waist segments 15, 16 of the twinski 10 by any suitable bindings or boot retainers,
25 represented as toe grips 24 mounted on binding plates 25 and heel clamps 26 mounted on binding plates 27.

Many different bindings and quick-release fittings are available, and since they do not form part of this invention, need not be discussed further. Suitable securing means can be incorporated on the twinski 10 where needed.

Turning now to Figures 4 and 5, the tail bridge structure 19 comprises a curved tensile steel bar 40 disposed between two retaining members 41. Each retaining member includes a generally rectangular base plate 42 having a support base pedestal 43 thereon. Upstanding from pedestal 43 are a pair of spaced-apart lugs 44 provided with aligned apertures 45. The end plugs 46 of bar 40 are also provided with apertures 47. A hinge pin 48 is mounted through apertures 47, 45 to provide a hinged connection between the base 42 and the bar 40, to allow "floating" interconnection.

Base plates 42 are provided with fastening apertures 49 to permit securement of the base plate 42 to the tail segments 17, 18 of the twinski.

Turning now to Figures 6 and 7, a second variant of a tail bridge structure 19 is shown. It includes a horizontal bar structure 60 and a pair of vertical pedestal structures 61. Each pedestal structure includes a plate 62 with an upstanding cylindrical column 63 provided with an internally tapped bore 64. A threaded post 65 is threadedly

secured to bore 64 and to an internally tapped bore 66 in a universal 90 degree connection 67. The effective height of post 65, i.e. the vertical distance between the bottom of plate 62 and the top of connector 67 is controllably adjusted by nut 68.

90 degree universal connector 67 is provided with a spheroidal cup 69 in which a ball joint 70 of a hollow connecting rod 71 is disposed. Rod 71 is provided with an internally tapped bore 72. Universal connectors 67, connecting rods 71 and a threaded bar 73 constitute the horizontal bar structure 60. The span between the ends of connectors 67 is adjustably controlled by threading bar 73 into tapped bores 72.

Base plates 62 are provided with fastening apertures 74 to permit securement of the base plate 62 to the tail segments 17, 18 of the twinski 10.

As seen in Figure 8, the bridge section includes a pair of top plates 131, to each of which a pair of spaced-apart ears 132 are integrally provided, e.g. by welding 133. The bridge comprises a circular rod 134, bent into a semi-hooper-like shape, the ends 135 of which are each provided with an aperture 136. The ears are provided with aligned apertures 137. A pin 133 passes through apertures 137, 136 to secure the bridge means 134 to the ears 132.

The pin 138 is held in place with a washer/cotter pin arrangement 139. The bridge means 134 is covered with a protective rubber wrapping 140.

As seen in Figures 9 and 10, the tail segment 141 of the twinski is provided with top plate 131, secured to the ski core 142, where a section of the upper skin 143 of the ski has been removed (see Figure 10). A section of the lower skin 144 has also been removed to provide means for insertion of a bottom plate 145. A bolt 146 securing the top plate 131 to the bottom plate 145 passes through the ski core 142 and engages in tapped holes 147 in the bottom plate.

As an alternative procedure for securing the lower plate 145 to the upper plate 131 as seen in Figure 10, the upper plate is provided with welded-on nuts 148. A screw 149 passes through countersunk holes in the bottom plate 145 to be secured into the nuts 148.

A further variation is shown in Figures 12 and 13. Here the bottom plate is provided with a pair of ears 152 provided with aligned apertures 156 in the same manner as ears 132. The ears 152 pass through apertures 153 in the upper plate 131.

The lower end of bridge means 134 is secured to ears 152 by means of pin 158. The upper plate 131 is provided with suitable locknuts 148, made of

fiber material, or any other suitable crown nut.

The materials out of which the twinski may be made and typical transverse cross-sections of the tail sections 12, 13 of embodiments of this invention are shown in Figures 14 and 15. In figure 14, it is seen that the core of twinski 10 includes a laminate of edge-glued hickory strips 110, glass fiber sheet 111 and edge-glued strip 112 enveloped with a sheet of airplane aluminium 113. The running surface 30 is formed of polytetrafluoroethylene or any other suitable plastics material, having a single groove 22 therein. The lower side edges are provided with steel edges 20.

In Figure 15 there is shown a hard foam core 121 with a stiffening layer of edge-glued sheet 122, a lower layer of edge-glued ash sheet 123 and lateral ash strips 124 with an envelope of a sheet of fibreglass 125. The running surface 30 is formed of polytetrafluoroethylene or any other suitable plastics material, having a groove 22 (as disclosed in Figure 2) therein. The lower side edges are provided with steel edges 20.

While two embodiments of twinski construction have been shown and described, other structures may be used. Thus, the core may be made of aluminium, which is laminated to a facing sheet, e.g. of glass

fiber, or of a metal, e.g. airplane aluminium, and then provided with a lower running surface of a plastics material, e.g. polytetrafluoroethylene.

5 The camber at the waist area of each bifurcated tail section may be about 12 mm - 14 mm. The integral mononose tip and the tip region have a uniform thickness of about 80 mm; the thickness may vary to provide a degree of "softness" which can vary for weight variations of skiers. Thus, 10 the tip may taper in thickness to provide a softer tip for a 68 kg skier or it may be thicker than about 80 mm, i.e. it may be greater than 80 mm thick to provide a stiffer tip for a 114 kg skier.

15 The twinski may be from about 180 cm to about 212 cm long. The grooves may be from about 1 mm to 2 mm wide and may be about 1 mm deep. They may extend from about 28 cm from the tip of the twinski to the tail edge.

20 The ratio of the length of the integral mononose portion of the bifurcated tail portion generally is 1:5 to 1:6:5, although other proportions are permissible according to this invention. The width of the slot generally varies between about $1/4$ and $3/4$ of the total average width of the twinski 10. 25 Thus the slot may be wider, the same width or narrower than the width of each of the bifurcated tail sections.

As described above, in plan form the twinski is shorter than a conventional ski and is, on the average, approximately three to four times the width. While the exact dimensions may vary to suit the rider and the required performance characteristics, the basic proportions of a tested efficient ski are given below as typical.

In one embodiment, the ski has a length of about 180 cm. The width of the forward tip region is about 12 mm, the width at the central waist are (including tail sections and slot) is about 21 mm and the width at the tail area (including tail section and slot) is at least about 16.8 cm. The bindings are located about 4.8 cm rearward of the center part of the longitudinal axis. They are set to extend from about 6mm to about 12mm over the lateral edges of the twinski.

The grooves commence about 33 cm from the forward tip and continue right through to each of the tail sections. The lateral positioning of the longitudinal grooves is approximately one-half of the width of each tail section and the depth is approximately 18 mm to 28.8 mm. The bottom of the twinski tapers up slightly at the tail portion. In addition, the camber of the twinski is greater than that of conventional skis.

The length of the longitudinal slot is dependent, to some extent, upon the snow the twinski is adapted to be skied upon. For powder snow, the slot extends a lesser distance into the integral mononose tip than for hard packed snow. For example, some typical dimensions for a twinski particularly adapted to be used in hard packed snow are:

Total width at tail: about 26.6 cm

Width of each tail: about 7.8 cm

10 Width of slot segment: about 6 cm

Length of slot prior to apex (apex being the point where the sides of the slot converge sharply to joining together in the integral mononose):

15 about 164 cm to 180 cm (depending on the material of construction of the mononose)

Width of slot prior to apex: about 45 mm to about 40 mm

20 Length of apex of slot: about 48 mm to about 18 mm (depending on width of slot prior to apex)

Width of ski at mid-section (total): about 20 cm

25 Width of slot at mid-section: about 60 cm

Width of ski at mononose: about 20 cm

Total length of twinski: about 192 cm

The integral mononose section must be made of exceptionally strong material, e.g. a metal, for example, aluminium, in order to withstand the stress build up on the twinski due to the twisting action at the tail segments. Such twisting action is inherent in the "setting" of the

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edges of the twinski during skiing. Thus, it is essential that the tip be made very strong in order to avoid breakage. It is thus preferred that the metal integral mononose extend to the bifurcated portion, to a total length of integral mononose of, e.g. 48 cm.

Consequently, in a twinski to be used in hard packed snow, the slot converges as it approaches the integral mononose and encroaches a greater distance into the integral mononose. The length of the slot can be varied depending on the material used in the integral mononose region. Thus, for more flexible material, the slot need not be as long in order to provide a twinski which can twish under skiing conditions to "set" the edges.

In another example, for a twinski intended for powder snow, the typical dimensions are as follows:

Total width of twinski at tail:	about 24 cm
Width of each tail segment:	about 12 mm
Width of slot:	about 75 mm
Total width of twinski at mid-section:	about 20.4 cm
Width of each mid-section:	about 7.2 cm
Width of slot:	about 6 cm
Total width at integral section:	about 22 cm
Length of slot prior to apex:	about 145 cm
Width of slot at prior to apex:	about 48 mm
Length of apex:	about 13.2 cm

Total length of twinski: about 196 cm.

In this example of twinski as well, the slot converges towards the integral mononose section. It will be observed that the slot extends into the mononose section to a lesser extent than for the previously described twinski.

The twinski of this invention is capable of being manufactured and therefore being exploited by industry. The twinski is of sufficient width to hold both feet in fairly close side-by-side position in conventional bindings or boot retainers. The twinski has a relatively stiff central waist portion, with a flexible tip region, a flexible, outwardly flared tail and a maximum bottom camber. The relationship of the width at the tip region, at the waist portion and at the tail portion is important to the performance of the ski. Also essential is the "floating" interconnection of the tail sections. This permits each of the bifurcated tail sections to move vertically independently. Moreover, the rear spacing of the tail section is adjustable.

The turning characteristics of the twinski are altered from that of normal skis. Such characteristics become superior, and it is possible to effect turns uphill more smartly, faster and with greater safety, and to effect turns downhill to the fall line with equally smooth characteristics. The bindings may be set side-by-side or may be moved one slightly ahead of the other. It is preferred, however, that the bindings be set parallel to each other, equidistant from the forward tip and the tail segments.

The twinski is simple to ride, and with both feet held fairly close together, there is no tendency for the feet to separate and get out of control in extreme manoeuvres. Very tight pivot turns can be made at substantially any speed without any substantial loss of stability. The turning radius can be as little as one-third of that possible with conventional dual skis. The wide area enables the twinski to plane effectively and to ride high in soft snow, which also facilitates manoeuvring. In a fall, the risk of injury is greatly reduces, since the feet do not fly in different directions, each with a long unwieldy ski attached.

It is believed that the likelihood of injury in the case of the use of the twinski is reduced because the legs are held fairly close together. The majority of accidents result from crossed or diverging skis, with or without proper bindings. Preferred bindings are side release bindings of the safety type. They should be set 30 to 40% looser than is the usual practice. In test falls, a skier has been found to come down without discomfort in a sitting position. It is believed that this is due to the characteristics of the twinski in unusual attitudes, and the weight of the skier is essentially towards the rear.

Accordingly, advantages of the twinski provided herein are extreme manoeuverability, good pivot turnability, controlled turns at all speeds and good support on powder snow and excellent manoeuverability in both packed and corn snow.

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The four edges provide greater control and the twinski provides a wider stance for balance enabling greater use by a novice.

The interconnected tail sections work independently. Moreover, the twinski is lighter and easier to carry.

CLAIMS:

1. A twinski (10) having a nose section (11) and a pair of tail sections (12,13) separated by a longitudinal slot, (19) the tail sections being at least five times as long as the nose section, the nose section including an upwardly curved forward tip region, the tail sections each including a central segment, said twinski having its greatest thickness at the central waist portion, and being reduced in thickness both towards the tail portion and the forward tip, the minimum thickness being adjacent to said forward tip region and a bridge means (19) connecting the ends of the tail segments, (17,18) characterized in that the nose section is a mononose (11) terminating in bifurcated tail sections (12,13) providing said pair of tail sections, (17,18) and further in that said bridge means (19) adjustably and floatingly holds the tail segments (17,18) in predetermined spaced-apart relation.

2. The twinski of claim 1 characterized in that said bridge means (19) comprises a connector plate (42) secured to the end of each of the tail segments (17,18) and a single continuous curved connecting rod (40) the ends of the connecting rod (40) being preferable connected (48) to their respective connector plate.

3. The twinski of claim 1 characterized in that said bridge means (19) comprises a connector plate (62) provided with an outstanding post (63) secured to the end of each of the tail segments (17,18) and a connector bar (60) interconnecting the upper ends of the upstanding posts, preferably by a universal joint.

4. The twinski of claim 3 characterized in that said connector bar (60) is adjustable in length to provide the controlled spacing between the ends of tail portions.

5. The twinski of claim 1 characterized in that said bridge means (19) is secured to the tail sections (17,18) by a bottom plate (145) e.g. secured to the lower plate by a bolt (146) passing through the lower plate, (145) the ski core (142) and nuts (148) secured around apertures in the upper plate, (131) substituting a portion of the lower skin (144) of the twinski, and by an upper plate (131) secured to the lower plate by a bolt, (146) passing through the upper plate, (131) the ski core (142) and tapped holes in the lower plate, (144) substituting a portion of upper skin (143) of the twinski.

6. The twinski of claim 1 characterized in that said bridge means (19) comprises a connecting bar (134) of semi-hoop-like shape, and is provided with an aperture there-through (136) at each end, whereby the connecting bar (134) may be connected

to spaced-apart ears (132) on one of said plates (131) by means of a pin (138) extending through aligned apertures in the ears and the connecting bar.

7. The twinski of any one of the preceding claims characterized in that said connecting rod (40,60,134) is formed of tension steel.

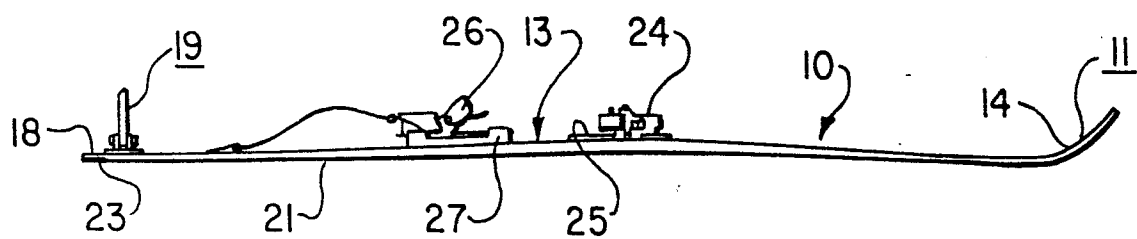
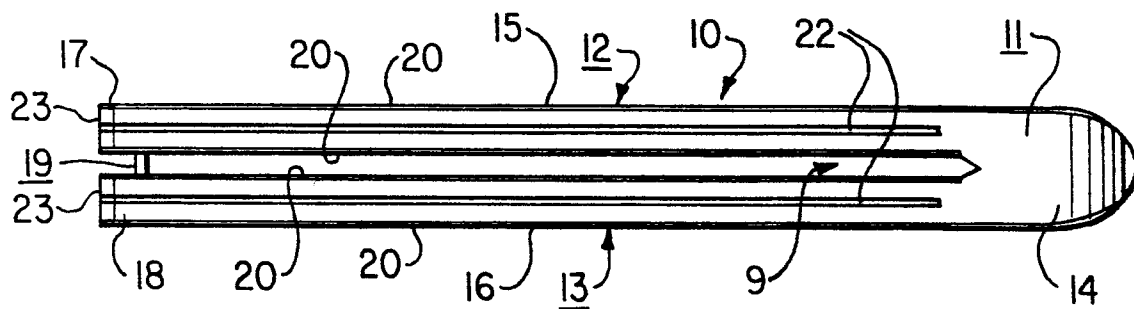
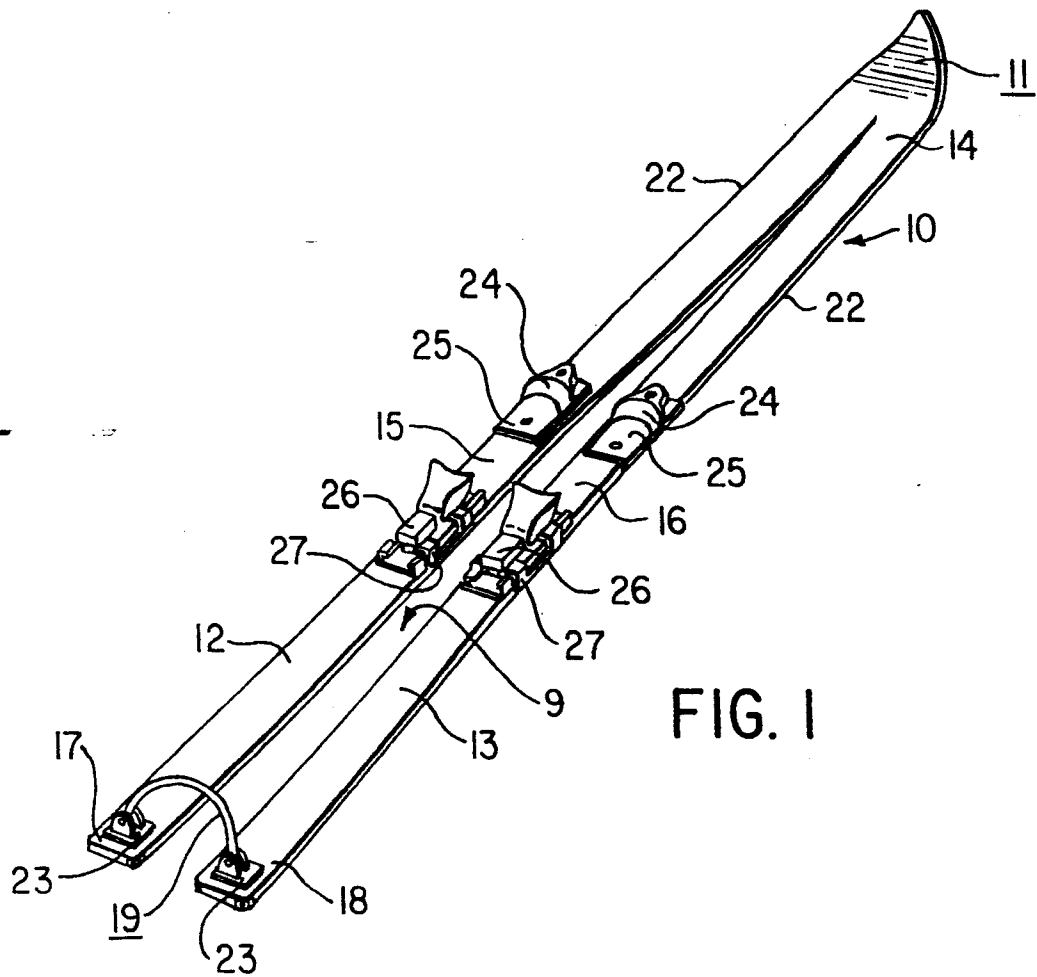
8. The twinski of claim 13 characterized in that said connecting bar is provided with a protective wrapper (140).

9. The twinski of any one of the preceding claims characterized in that it includes ski bindings (24, 25) mounted on said tail sections (12,13) of said twinski (10) adjacent said central waist (15,16) portion e.g. secured to said bifurcated tail section and extending slightly over the side edges (20) thereof, for holding the feet of a skier in side-by-side relation.

10. The twinski of any one of the preceding claims characterized in that it is formed of a lamination of a foam core (121) with stiffening members of wood, (122,123) and a glass fiber sheet envelope (125) with a synthetic plastics material (130) on the bottom, running surface, or of a laminate of hickory, (110) ash, (112) and glass fiber, (111) an airplane aluminium envelope, (113) with a bottom running surface of a synthetic plastics material, (30) or from a lamination of a honeycomb

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core, an envelope of a sheet of glass fibre or airplane aluminium and a running surface of a synthetic plastics material.



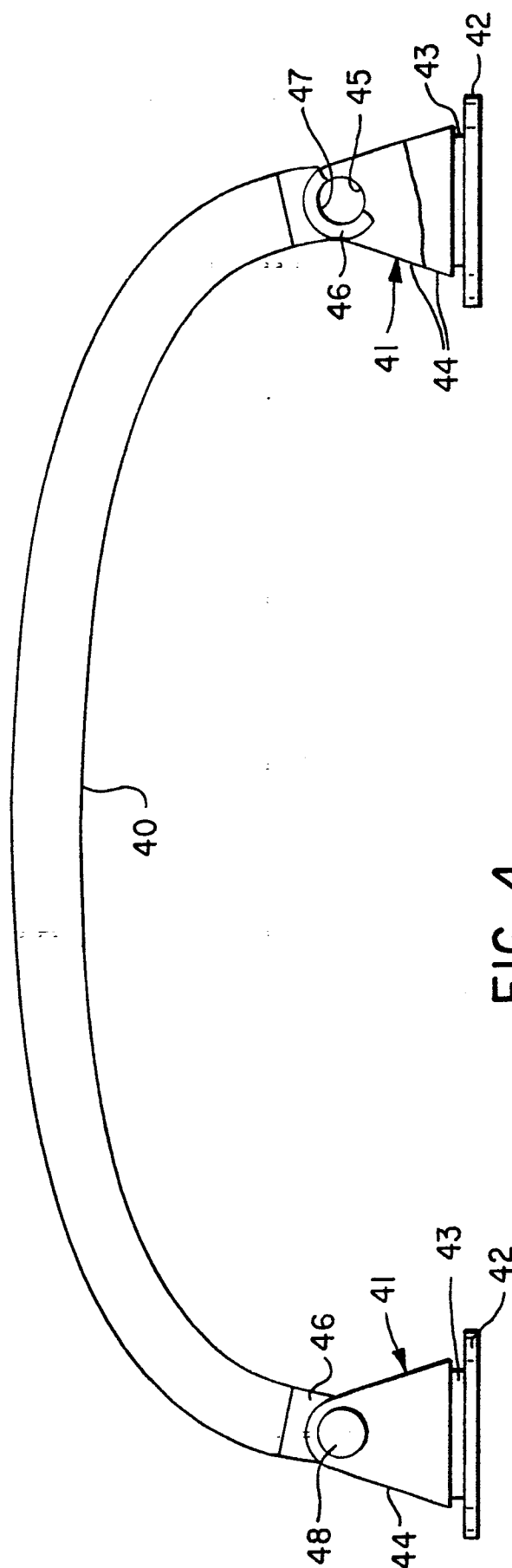


FIG. 4

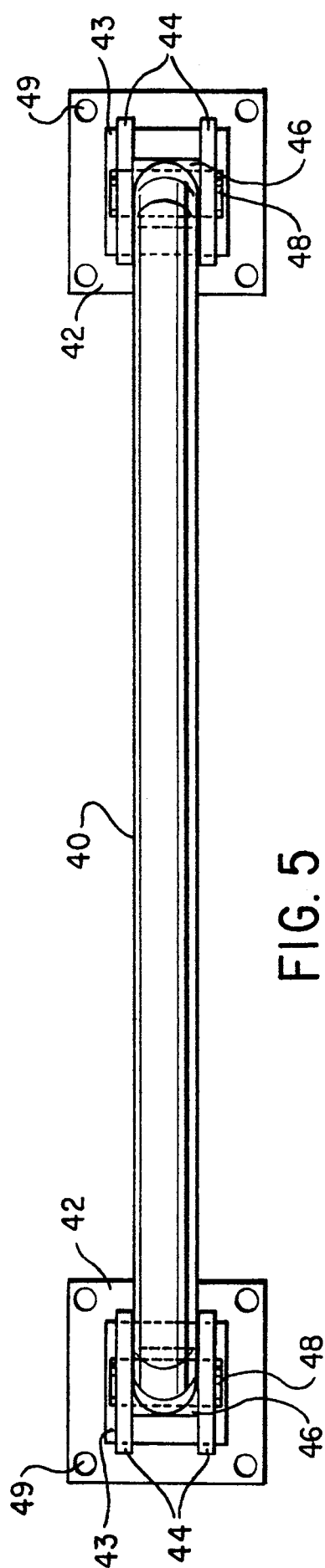
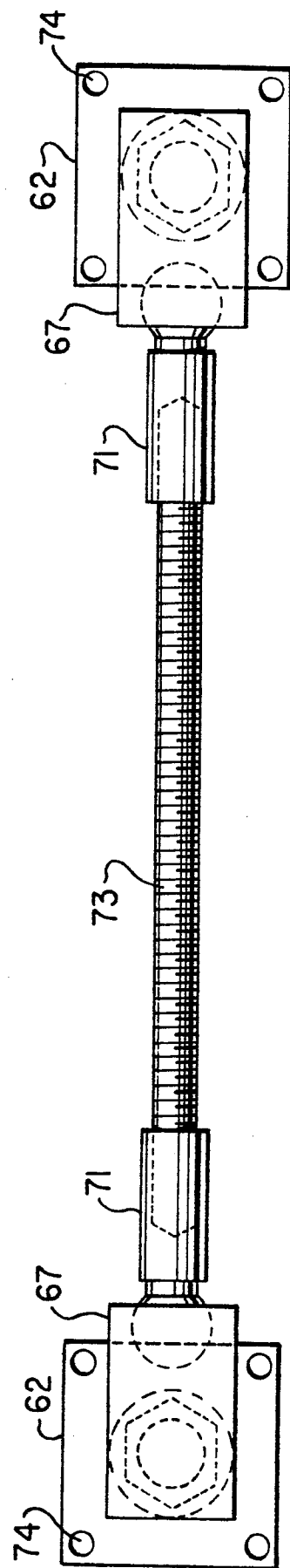
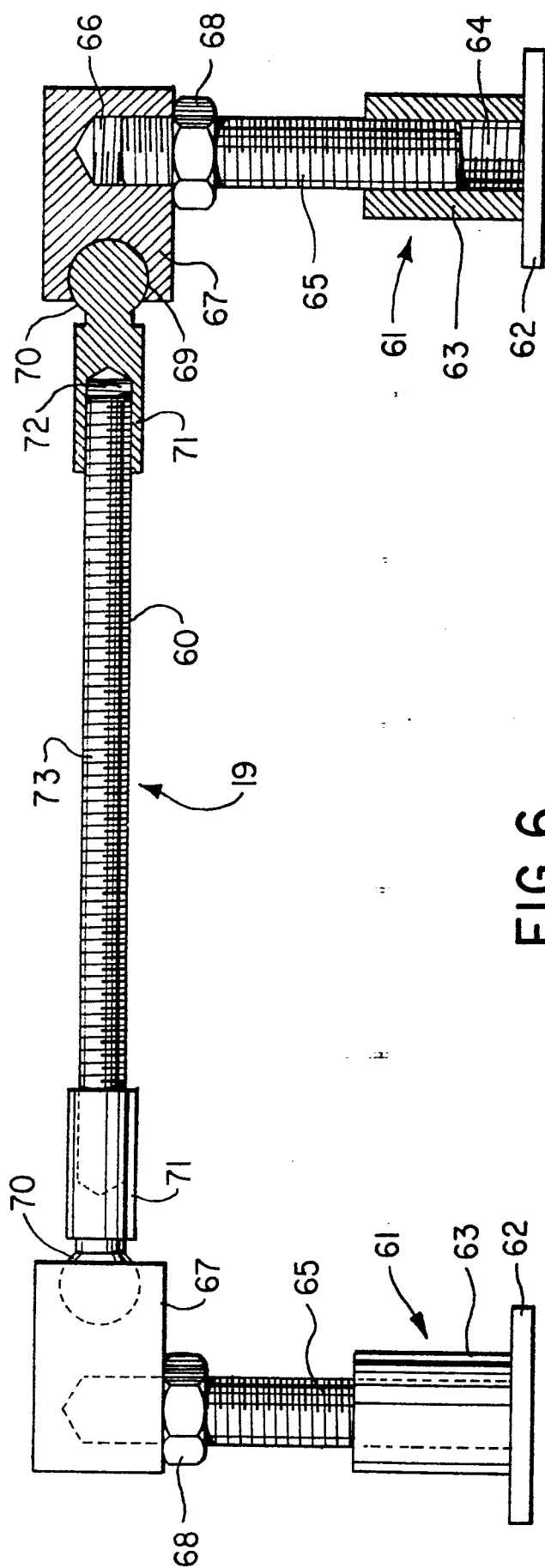


FIG. 5



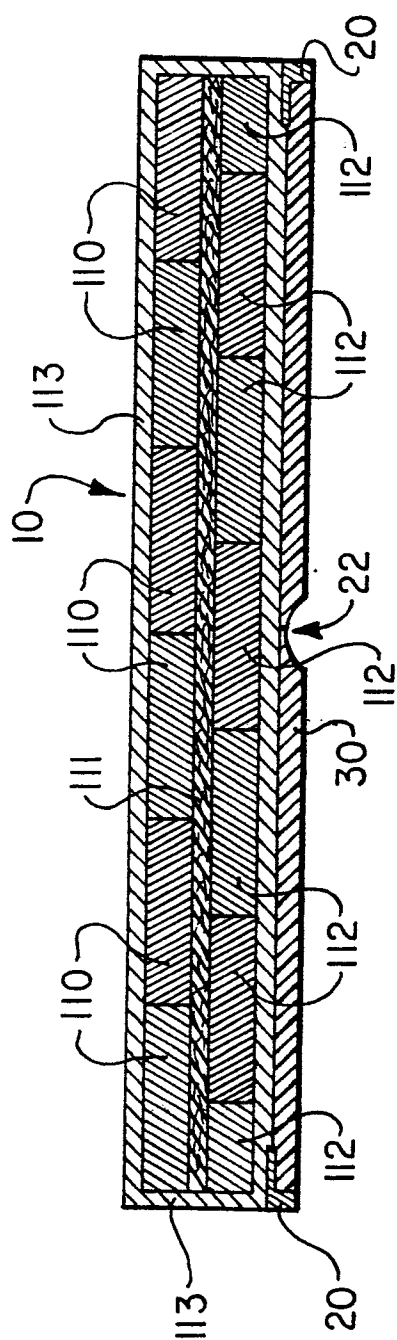


FIG. 8

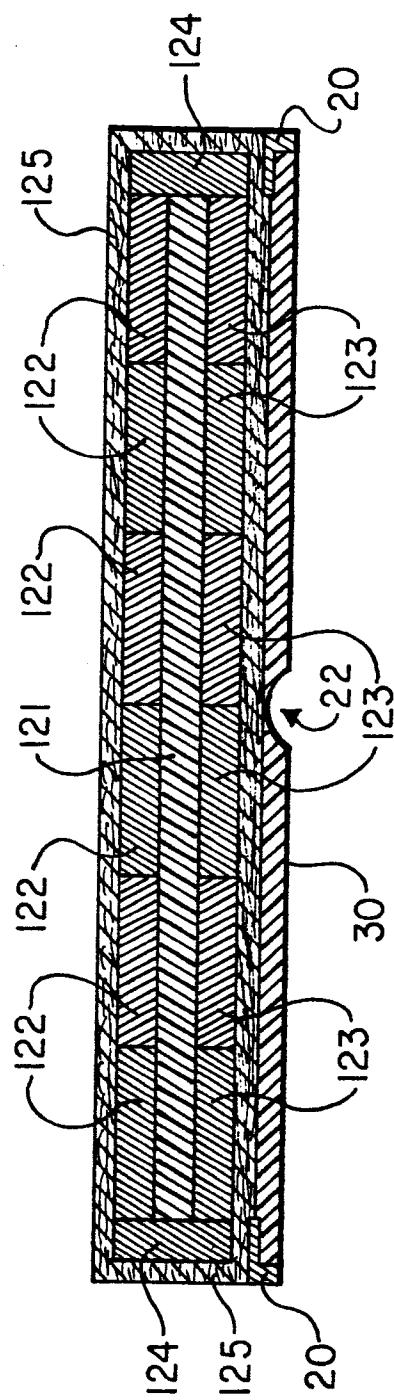


FIG. 9

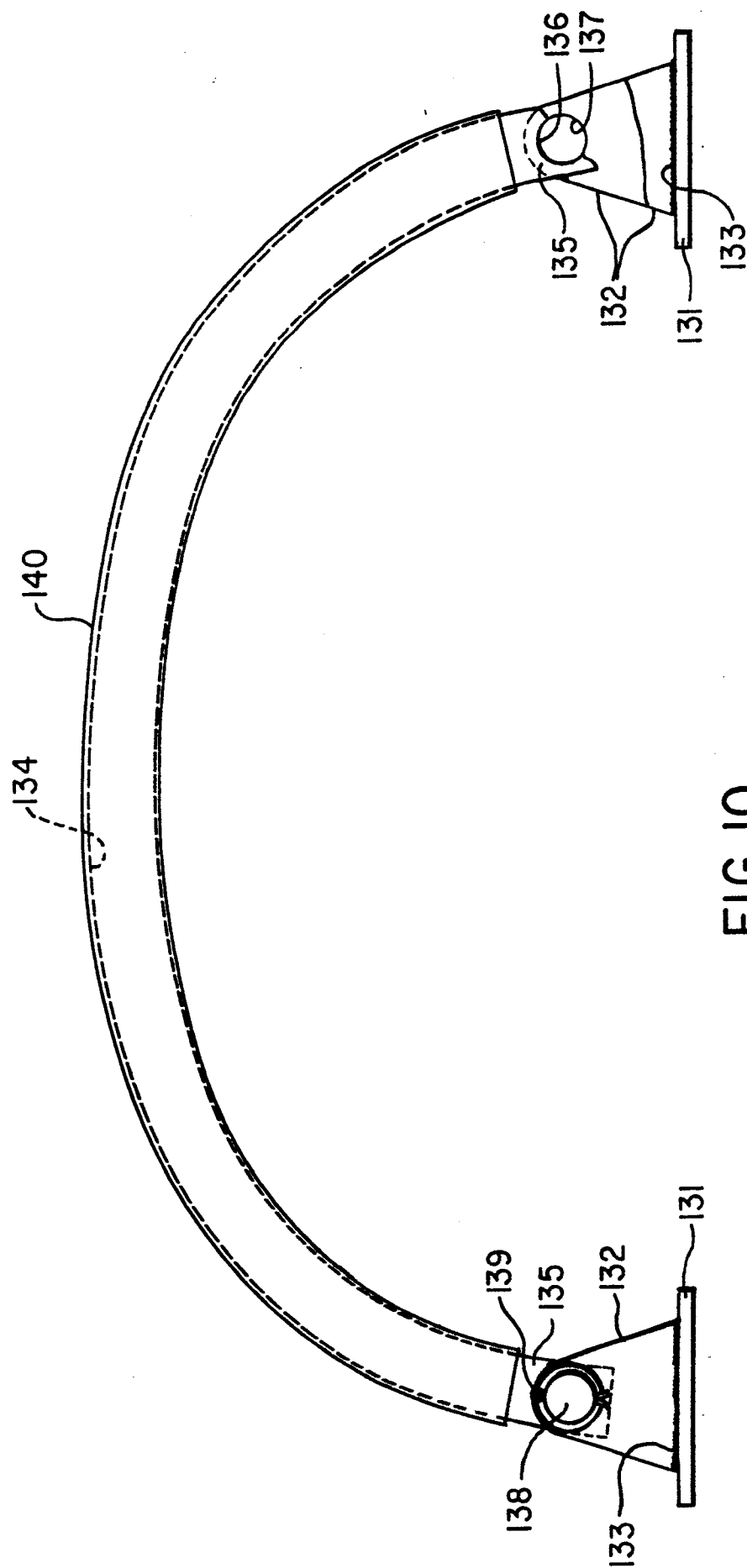


FIG. 10

