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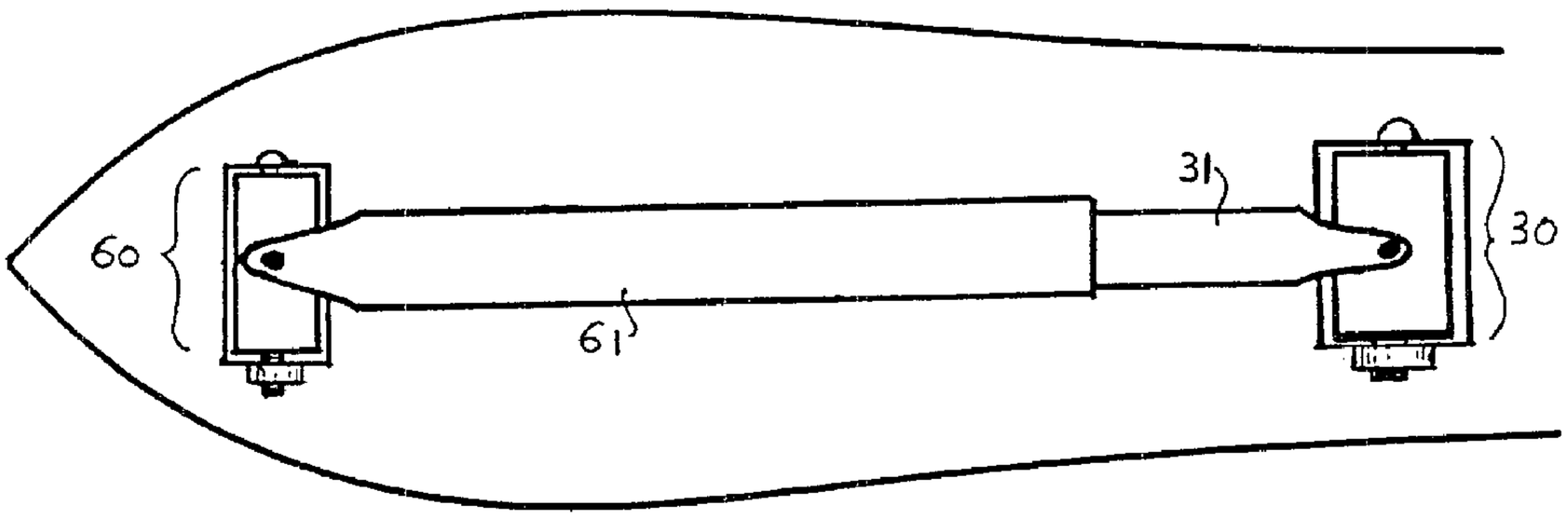
(54) **MONTAGE DE SPATULE ANTI-VIBRATILE**
(54) **SKI VIBRATION DAMPING LINKAGE**



(57) This invention, in one aspect, relates to a ski and a spatula attachment, reducing the spatula vibrations without affecting other ski or spatula characteristics. The damping is obtained through a dissipative spatula to ski linkage. The various embodiments described achieve dissipative action through frictionally slidably engaged surfaces. Another aspect of this invention relates to a linkage forming an integral part of a ski, wherein the spatula vibrational, torsional and flex characteristics are substantially determined by the linkage as described in the various embodiments.

Abstract of the Disclosure.

This invention, in one aspect, relates to a ski and a spatula attachment, reducing the spatula vibrations without affecting other ski or spatula characteristics.
The damping is obtained through a dissipative spatula to ski linkage. The various embodiments described achieve dissipative action through frictionally slidably engaged surfaces.
Another aspect of this invention relates to a linkage forming an integral part of a ski, wherein the spatula vibrational, torsional and flex characteristics are substantially determined by the linkage as described in the various embodiments.

2,035,668
amendments in response to
Examiner's report dated
1999/01/20

Vibration Damping Linkage.

When skiing on hard surfaces, skis frequently develop a considerable amount of vibration. It is believed that ski vibrations reduce the amount of control a skier may have over his skis. The spatula plays an important part in guiding the ski along its intended traject. Most ski vibrations are the result of the ski spatula encountering rigid irrigularities and protrusions of the terrain while making only intermittent contact with the running surface.

It is an object of this invention to provide a vibration damping spatula and ski attachment.

The vibration damping attachment in one embodiment according to this invention comprises a linkage having damping means, frictionally dissipating some of the vibrational energy imparted to the spatula and reducing the amplitude and duration of the vibrations. The vibration damping linkage in another embodiment according to this invention comprises damping means more specifically coacting with a ski having a modified spatula. The total amount of energy that can be stored in the spatula is proportional to the mass of the spatula. Therefore, it is important to maintain the spatula mass at a minimum, compatible with requirements of strength and flex.

It is an object of this invention to provide a ski having a more weight efficient spatula comprising a resiliently compressive dissipative linkage.

The damping attachment according to this invention takes advantage of the ski and spatula geometry and in one embodiment comprises two longitudinally frictional slidably and frictional rotatably engaged telescopic tubes, forming a linkage element, of which a first termination is vertically frictional hingedly and torsional rigidly attached to a forward portion of the spatula through a universal type joint and of which the second termination is vertically frictional hingedly and torsional rigidly attached to a forward portion of the ski.

When the upper portion of the spatula of a forward moving ski encounters a rigid surface protrusion, the spatula and to a lesser extend the forward ski portion flexes, slidably compressing the telescopic tubes. The frictional engagement between the two telescopic tubes dissipates some of the energy imparted to the spatula. When the spatula and forward ski portion returns to its original position, the two telescopic tubes extend relatively to each other, again dissipating some of the energy imparted to the spatula.

It is an object of this invention to provide vibration damping through dissipative frictional slidable engagement between two slidably engaged portions of the linkage.

When the lower rearward portion of the spatula of a forward moving ski encounters a rigid surface protrusion, the rearward spatula portion and the forward ski portion may flex, changing the vertical angle between the telescopic tubes and the forward ski portion without compressing the telescopic tubes but changing the angle between the linkage and the forward ski portion. The vertical angular movement between the forward ski portion and the frictional hingedly attached telescopic tubes dissipates some of the energy imparted to the spatula. When the angle between the telescopic tubes an the forward ski portion returns to its original position, the angular frictional movement again dissipates some of the energy imparted to the spatula.

It is an object of this invention to provide vibration damping through vertically frictional hinged engagement between the telescopic tubes and the forward ski portion. When the spatula twists torsionally, the torsion is transmitted to the telescopic tubes via a universal type joint and causes a rotating movement between the frictionally engaged telescopic tubes, dissipating some of the energy imparted to the spatula.

It is an object of this invention to provide torsional vibration damping through frictional rotatable engagement between the telescopic tubes.

The spatula damping attachment may be provided as a detachable damper.

It is an object of this invention to provide a ski attachment, retrofittable to conventional skis, for damping of the ski and spatula vibrations, without substantially affecting the ski and spatula characteristics.

A conventional spatula is only partially and intermittently in contact with the running surface, inviting undamped spatula vibrations. A more downwardly cambered and more flexible spatula is advantageous in respect to spatula vibrations, since it urges the spatula towards more prolonged contact with the running surface. However, a more flexible and downwardly cambered spatula is not compatible with more fundamental spatula requirements such as strength and may lack torsional rigidity. When made an integral portion of the ski, the linkage according to this invention is resiliently urged towards a neutral position, allowing a redesign of the spatula, resulting in a more effective and more weight efficient spatula structure.

It is an object of this invention to provide an improved ski wherein the spatula and forward ski portion are optimized to provide a frictionally damped downward flex in conjunction with the linkage according to this invention.

In a conventional ski, a vertically flexible spatula is equated with a torsionally flexible spatula.

It is an object of this invention to provide an improved ski wherein the spatula may be vertically flexible while simultaneously being torsionally rigid.

When the ski is equiped with a binding support such as described in Canadian Patents Nr.750,259 and Nr.767,525, one of the linkage engaging devices may advantageously be made part of the forward mounting portion of the binding support, limiting the amount of ski top surface mounting hardware.

It is an object of this invention to provide a damping linkage of which one of its linkage engaging devices is frictional hingedly attached to and integral with the forward mounting portion of a binding support.

These and other objects and advantages will become apparent from the following description when taken in conjunction with the accompanying drawings forming a part thereof, wherein identical parts have the same numerals.

Brief description of the Drawings.

Figure 1 is a side elevational view, showing a ski having an attachment according to this invention moving forward, towards an encounter with a surface protrusion.

Figure 2 is a top plan view, showing a ski having an attachment according to this invention moving forward towards a central encounter with a surface protrusion.

Figure 3 is a side elevational view of a ski having an attachment according to this invention centrally encountering a surface protrusion.

Figure 4 is a top plan view of of a ski having an attachment according to this invention moving forward towards an off centre encounter with a surface protrusion.

Figure 5 is a top plan view of a ski having an attachment according to this invention showing the torsionally twisting deflection of the spatula upon an encounter with an off centre surface protrusion.

Figure 6 is a detailed side elevational view of a ski and spatula having an attachment according to this invention.

Figure 7 is a detailed top plan view of a ski and spatula having an attachment according to this invention.

Figure 8 is an exploded perspective view of an embodiment of a linkage engaging device.

Figure 9 is a top plan view of an alternative embodiment of a linkage engaging device.

Figure 10 is a side elevational view of the alternative embodiment shown in figure 9.

Figure 11 is a top plan view of another alternative embodiment of a linkage engaging device.

Figure 12 is a cross-sectional view taken along the plane of line 12-12 of figure 11.

Figure 13 is a side elevational view of the embodiment shown in figure 11.

Figure 14 is a top plan view of an embodiment of the telescopic tubes.

Figure 15 is a top plan view of another embodiment of the telescopic tubes.

Figure 16 is a top plan view of another embodiment of a linkage engaging device.

Figure 17 is a cross-sectional view taken along the plane of line 17-17 of figure 16.

Figure 18 is a side elevational view of the embodiment shown in figure 16.

Figure 19 is a cross-sectional taken along the plane of line 19-19 of figure 18.

It is understood that skis are generally used in pairs, being either identical or mirror images, therefore only one ski and its attachments, modifications and improvements will be shown and described.

For the purpose of this disclosure, the shovel or spatula is defined as the forward upturned ski portion while the ski portion immediately behind the spatula is defined as the forward ski portion.

The foremost limit of the ski is defined as the ski tip and the most rearward ski portion as the ski tail.

Referring to the drawings in detail:

Figure 1 shows a forward moving ski 20 having a forward tip 21, a shovel or spatula 22, a forward ski portion 23 and a tail portion 24, shown in relation to a skiing surface 25 and a surface protrusion 26. The vibration damping linkage is generally identified as 30-60 and comprises a telescopic tube 31, a telescopic tube 61, a linkage engaging device 30 and a linkage engaging device 60.

Figure 2 is a top plan view of the ski shown in figure 1 wherein 27 are the spatula side margins, 28 are the ski side margins and 30-60 indicates the vibration damping linkage. A portion of the linkage is secured to the spatula by linkage engaging device 60 while another portion of the linkage is secured to the forward ski portion by linkage engaging device 30.

Figure 3 shows a ski having a vibration damping linkage according to this invention, wherein the spatula is vertically deflected by surface protrusion 26.

At the initial encounter with the surface protruson, the spatula is deflected upwardly, transforming some of the ski's forward momentum into an upwards movement of the spatula, resulting in a marginal slowdown of the ski.

Depending on the energy imparted to the spatula, the spatula may momentarily lose contact with the surface protrusion while the mass of the spatula tends to maintain the spatula in an oscillating pendulum like motion until the energy imparted has been frictionally dissipated.

The spatula and ski flexing resulting from a spatula encounter with a rigid surface protrusion depends substantially on the point of impact between protrusion and spatula. In one case, the spatula deflection may cause a shortening of line 30-60 of figure 3 without a change in angle a'. This causes telescopic tubes 31 and 61 to longitudinally move relative to each other, dissipating some of the energy imparted to the spatula through frictional slidable engagement between tube 31 and tube 61.

In another case, the spatula deflection may cause a change in angle a' without changing the distance between 30 and 60,

and wherein the upwards spatula deflection will only result in a vertical angular movement, frictionally dissipating some of the energy imparted to the spatula.

In the example shown, the spatula encountered a surface protrusion along the longitudinal axis of the ski. Frequently these encounters take place away from the longitudinal ski axis.

Figure 4 shows a ski heading towards an encounter with a surface protrusion wherein the encounter will take place away from the longitudinal ski axis.

Figure 5 shows the resulting torsionally twisting movement of the spatula and the movement of linkage 30-60 from a position as shown in figure 2 to a position as shown by line 30-60 of figure 5. This twisting spatula movement causes a rotational movement between the two telescopic tubes, again providing frictional dissipation of the energy imparted to the spatula.

Figure 6 is a side elevational view of the vibration damping linkage according to this invention, more particularly showing the attachment area between linkage engaging device 30 and the forward ski top surface and the attachment area between linkage engaging device 60 and the top surface of the spatula. Figure 7 is a top plan view of the linkage shown in figure 6.

More particularly showing the position of linkage engaging device 30 relative to the ski side margins and the position of linkage engaging device 60 relative to the spatula side margins. It shows the vertical rotatable axis of the linkage engaging devices to be perpendicular to the longitudinal ski axis and shows the telescopic tubes to be parallel to the longitudinal ski axis.

Figure 8 is a detailed exploded view of linkage engaging device 30.

In the embodiment shown, tube 31 terminates in linkage terminations 32 and 33 which comprise attachment apertures 34 and 35. Screws 36 and 37 rotatably secure the linkage terminations to friction bar 38 which comprises friction bar flanges 39, 40 and retaining aperture 41. Friction bar flanges 39 and 40 as well as other frictionally engaged surfaces forming a part of the embodiments of this invention may be coated with materials that enhance dissipative slidable engagement. The linkage engaging device further comprises mounting portion 42 which is either removably attached to the upper forward ski portion, is an integral part of the forward ski portion, or forms an integral part of the forward portion of a binding support, and is disposed within the ski side margins 28.

Mounting portion 42 is secured to the ski by screws 43 and 44 which protrude through apertures 45 and 46 in the base of mounting portion 42. Mounting portion 42 comprises two side flanges 47 and 48, having apertures 49 and 50 which rotatably engage friction bar 38. The friction bar is frictional rotatably secured to the side flanges by pin 51, which comprises a head 52 at one end, a threaded portion 53 and a knurled adjustment nut 54 at the opposite end. The degree of frictional engagement between the flanges of friction bar 38 and mounting portion side flanges 47 and 48 is determined by the pressure exerted on the side flanges by head 52 and knurled adjustment nut 54. Removal of pin 51 allows quick detachment and attachment of various different linkages.

In figures 1 through 7, linkage engaging device 30 as shown is identical to linkage engaging device 60. In the following description of the different embodiments, various combinations of linkage engaging devices and linkages may be utilized.

Figure 9 is a top plan view of an alternative embodiment of a linkage engaging device, wherein pillow blocks 70 and 71 are secured to the upper ski surface via screws 72, 73, 74 and 75.

Friction bar 76 is frictionally vertical rotatably secured to the pillow blocks and is transverse rotatably secured to the telescopic tube as described in reference to figure 8. Portion 76 is prevented from transverse movement by collars 79 and 80.

Figure 10 is a side elevational view of the embodiment shown in figure 9. The end sections of portion 76 are slotted providing a more consistent pressure onto the inner sliding surface of the pillow blocks.

One or both hinges of the linkage engaging devices may be of the character as described in this alternative embodiment.

In another embodiment of this invention, the two telescopic tubes are rigidly secured together, forming one single tube while the longitudinal frictional slidable movement, the vertical frictional rotatable movement and the torsional frictional movement is provided by the first linkage engaging device, the second linkage engaging device, or is shared between both devices.

In one embodiment, retaining aperture 41 of friction bar 38 shown in figure 8 is sufficiently enlarged to allow longitudinal, torsional, lateral, as well as vertical angular movement between portion 38 and pin 51.

Figure 11 is a top plan view of a linkage engaging device providing longitudinal frictional sliding movement, frictional vertical rotatable movement and frictional torsional twisting movement. The linkage comprising single tube 90 is forwardly secured to the spatula via one of the linkage engaging devices described in this disclosure. Rearwardly, tube 90 is transverse hingedly secured to friction bar 91.

Friction bar 91 is frictional slidably retained within the limits of mounting portion 92.

Figure 12 is a cross-sectional view taken along the plane of line 12-12 of figure 11, particularly indicating the limits of torsional twisting and wherein 93 is the mounting portion, 94 and 95 are the mounting screws securing mounting portion 93 to the forward upper ski surface. The transverse movement limiting side flanges are identified as 96 and 97 and the torsional movement limiting upper flanges as 98 and 99.

Figure 13 is a side elevational view of the embodiment shown in figure 11, showing the circular cross-section of portion 91 in dotted lines.

In another embodiment similar to the embodiment shown in figure 11, tube 90, instead of being transverse hingedly secured to friction bar 91, is rigidly secured to portion 91,

while the frictional retaining action between portions 91 and 92 allow sufficient lateral angular movement. Finally, portion 91 may be retained within the confines of portion 92 with the aid of low resilience yieldably deformable materials.

The embodiments as shown and described indicate various ways to enhance a conventional ski spatula by providing an attachment retrofittable to conventional skis or forming an integral part of a conventional ski.

The spatula plays an important role in accurately guiding the ski along its intended path, more particularly where it involves following a predetermined course as in the case of slalom competition. When made an integral part of the ski, the linkage according to this invention allows the implementation of various features, providing a more technologically advanced spatula, affording characteristics not obtainable within a conventional spatula structure. More particularly: Improved control over torsional and flex parameters in conjunction with vibrational damping, providing a spatula that is torsionally rigid while being vertically flexible.

Figure 14 is a top plan view of a linkage forming an integral portion of a ski wherein longitudinal aperture 100 disposed in tube 61 and guiding pin and key 101,

disposed on the outer surface of tube 31 provides a telescopic linkage with a spline structure that affords longitudinal movement and prevents any torsional twisting motion between the telescopic tubes. When combined with torsionally rigid linkage engaging device embodiments as shown in figures 6,7,9 and 10, the spatula will be torsionally rigidized without being vertically rigidized.

Figure 15 is a top plan view showing another embodiment of this invention wherein the longitudinally slidable and frictionally engaged telescopic tubes are resiliently urged towards a neutral position by means of coil spring 110, shown externally for clarity. Spring 110 is attached to tube 31 at 111 and to tube 61 at 112. Spring 110 may advantageously be replaced by an internal coil spring or other resilient positioning means.

Figure 16 is a top plan view of another alternative embodiment of a linkage engaging device wherein friction bar 91 is longitudinal frictional slidably, vertical hingedly and torsional rigidly guided by portion 130 and urged towards the linkage by spring 120. The linkage comprising single tube 90, which is shown as being lateral hingedly attached to friction bar 91, may in another embodiment be rigidly secured to friction bar 91. Friction bar 91 as shown in figure 16 is urged towards the linkage by coil spring 120.

In another embodiment it may be urged towards the linkage by a block of resilient material.

Figure 17 is a cross-sectional view taken along the plane of line 17-17 of figure 16 particularly indicating the limits of torsional twisting, wherein 131 is the mounting portion, 132 and 133 are mounting screws securing the mounting portion to the forward upper ski surface. The side flanges are identified as 134 and 135.

The upper flanges are identified as 136 and 137.

The upper flanges, side flanges and part of mounting portion 131 form channels to guide friction bar 91.

Figure 18 is a side elevational view of the embodiment shown in figure 16.

Figure 19 is a a cross-sectional view taken along the plane of line 19-19 of figure 18.

It is obvious that the embodiments as described are not limited to the exact size, shape, contour or combinations of the various portions. Numerous alternative embodiments can be envisioned without departing from the broader scope and spirit of this invention.

Therefore, the scope of this invention is not limited to the exact embodiments as shown, but only as indicated by the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1 A dissipative vibration damping attachment, for mounting onto a ski having a central longitudinal axis; a transverse axis; an upper surface; a forward upper surface; and a forward upturned upper surface, comprising: a linkage element, terminating at its longitudinal limits in a first termination and in a second termination; a first linkage engaging device, engaging said first termination; a second linkage engaging device, engaging said second termination; and dissipative surfaces; wherein said linkage element dissipative slidably joins said first and second linkage engaging devices via said dissipative surfaces, and wherein said linkage engaging devices are positionally interchangeably spaced apart along said central longitudinal axis, secured onto said forward upper surface and onto said forward upturned upper surface, and wherein said dissipative surfaces mutually slide upon ski flexion.

2 A dissipative vibration damping attachment as defined in claim 1, wherein said dissipative surfaces comprise frictional dissipative materials.

3 A dissipative vibration damping attachment as defined in claim 1, wherein at least one of said first and second linkage engaging devices comprise: a mounting portion, securing at least one of said linkage engaging devices onto said forward upper surface; side flanges, integral with said mounting portion and extending upwardly, disposed juxtaposed and parallel to said central longitudinal axis; dissipative surfaces, affixed to said side flanges; a friction bar, having affixed dissipative surfaces and; hinging means, wherein said friction bar is vertical rotatable hingedly secured to said side flanges via said hinging means, mutually engaging said side flanges and friction bar affixed dissipative surfaces and wherein said dissipative surfaces impede movement between said friction bar and said side flanges, and wherein one of said first and second terminations is transverse hingedly secured to said friction bar, providing rotatable dissipative engagement between said linkage element and said upper surface.

4 A dissipative vibration damping attachment as defined in claim 3, wherein said side flange affixed dissipative surfaces and said friction bar affixed dissipative surfaces comprise frictional dissipative materials.

5 A dissipative vibration damping attachment as defined in claim 1, wherein at least one of said first and second linkage engaging devices comprise: pillow blocks; internal cylindrical dissipative bearing surfaces, affixed to said pillow blocks; and a friction bar having affixed dissipative surfaces, wherein said pillow blocks are secured onto said forward upper surface, wherein said friction bar is vertical rotatably secured to said pillow blocks via said pillow block affixed dissipative surfaces and said friction bar affixed dissipative surfaces and wherein one of said first and second terminations is transverse hingedly secured to said friction bar, providing rotatable dissipative engagement between said linkage element and said upper surface.

6 A dissipative vibration damping attachment as defined in claim 5, wherein said pillow block affixed dissipative surfaces and said friction bar affixed dissipative surfaces comprise frictional dissipative materials.

7 A dissipative vibration damping attachment as defined in claims 1, 3,or 5, wherein said linkage element comprises: tubular portions, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged, and

wherein said dissipative surfaces comprise dissipative materials, providing dissipative slidable and rotatable movement.

8 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged, and wherein said dissipative surfaces comprise frictional dissipative materials, providing frictional dissipative slidable and rotatable movement.

9 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged, and a spline, providing longitudinal slidably dissipative movement and minimal rotatable slidable movement between said telescopic tubes.

10 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged, and a spline, providing longitudinal slidably

frictional dissipative movement and minimal rotatable slidably movement between said telescopic tubes.

11 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed external to said telescopic tubes; wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

12 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed internal to said telescopic tubes; wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

13 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed external to said telescopic tubes portions; wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

14 A dissipative vibration damping linkage as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed internal to said telescopic tubes; wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

15 A dissipative ski vibration damping attachmment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed external to said telescopic tubes and a spline, wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

16 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed internal to said telescopic tubes and a spline, wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

17 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element disposed external to said telescopic tubes, and a spline, wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

18 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a resilient element, disposed internal to said telescopic tubes; and a spline, wherein said resilient element urges said telescopic tubes towards a longitudinally extended position.

19 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; and a spring, disposed external to said telescopic tubes, wherein said spring urges said telescopic tubes towards a longitudinally extended position.

20 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; and a spring, disposed internal to said telescopic tubes, wherein said spring urges said telescopic tubes towards a longitudinally extended position.

21 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; and a spring, disposed external to said telescopic tubes and wherein said spring urges said telescopic tubes towards a longitudinally extended position

22 A dissipative vibration damping attachment as defined in claims 1,3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably rotatable slidable engaged; and a spring, disposed internal to said telescopic tubes and wherein said spring urges said telescopic tubes towards a longitudinally extended position.

23 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipatve surfaces, longitudinal slidably and rotatable slidably engaged; a spring, disposed external to said telescopic tubes; and a spline, wherein said spring urges said telescopic tubes towards a longitudinally extended position.

24 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a spring, disposed internal to said telescopic tubes; and a spline, wherein said spring urges said telescopic tubes towards a longitudinally extended position.

25 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a spring, disposed external to said telescopic tubes; and a spline, wherein said spring urges said telescopic tubes towards a longitudinally extended position.

26 A dissipative vibration damping attachment as defined in claims 1, 3, or 5, wherein said linkage element comprises: telescopic tubes, having frictional dissipative surfaces, longitudinal slidably and rotatable slidably engaged; a spring, disposed internal to said telescopic tubes; and a spline, wherein said spring urges said telescopic tubes towards a longitudinally extended position.

27 A dissipative vibration damping attachment as defined in claim 1, wherein at least one of said first and second linkage engaging devices comprise: a mounting portion, securing at least one of said linkage engaging devices onto said upper surface; channels, integral with said mounting portion, disposed juxtaposed and parallel to said central longitudinal axis; a friction bar; dissipative surfaces, affixed to said channels, mounting portion and friction bar, and wherein said friction bar is longitudinal slidably and vertical rotatably guided by said channels, wherein said dissipative surfaces impede rotatable and slidable movement between said friction bar, said channels and said mounting portion, and wherein one of said first and second terminations is secured to said friction bar, providing rotatably slidable and longitudinally slidable dissipative engagement between said linkage element and said upper surface.

28 A dissipative vibration damping attachment as defined in claim 27 wherein said channels and mounting portion affixed dissipative surfaces and said friction bar affixed dissipative surfaces comprise frictional dissipative materials.

29 A dissipative vibration damping attachment as defined in claim 27 wherein said channels and mounting portion affixed dissipative surfaces and said friction bar affixed dissipative surfaces comprise yieldably deformable dissipative materials.

30 A dissipative vibration damping attachment as defined in claim 27, wherein at least one of said first and second linkage engaging devices comprise: a compressively resilient element, urging said friction bar towards said linkage element,impeded by said dissipative surfaces.

31 A dissipative vibration damping attachment as defined in claim 28, wherein at least one of said first and second linkage engaging devices comprise: a compressively resilient element, urging said friction bar towards said linkage element, impeded by said frictional dissipative surfaces.

32 A dissipative vibration damping attachment as defined in claim 29, wherein at least one of said first and second linkage engaging devices comprise: a compressively resilient element, urging said friction bar towards said linkage element, impeded by said yieldably deformable dissipational surfaces.

33 A dissipative vibration damping attachment as defined in claim 27, wherein at least one of said first and second linkage engaging devices comprise: a spring, urging said friction bar towards said linkage element, impeded by said dissipative surfaces.

34 A dissipative vibration damping attachment as defined in claim 28, wherein at least one of said first and second linkage engaging devices comprise: a spring, urging said friction bar towards said linkage element, impeded by said frictional dissipative surfaces.

35 A dissipative vibration damping attachment as defined in claim 29, wherein at least one of said first and second linkage engaging devices comprise: a spring, urging said friction bar towards said linkage element, impeded by said yieldably deformable dissipative surfaces.

36 A ski comprising: the dissipative vibration damping attachment, as defined in any one of claims 1 through 35.

37 A ski comprising: a flexible forward portion and spatula, and the dissipative vibration damping attachment as defined in any one of claims 1 through 35, wherein the forward ski portion and spatula longitudinal and torsional flexing characteristics are substantially determined by the dissipative vibration damping attachment.

38 A ski comprising: a binding supporting structure and the dissipative vibration damping attachment, wherein the most forward portion of the binding supporting structure is integral with one of the linkage engaging devices as defined in any one of claims 1 through 35.

FIG.1

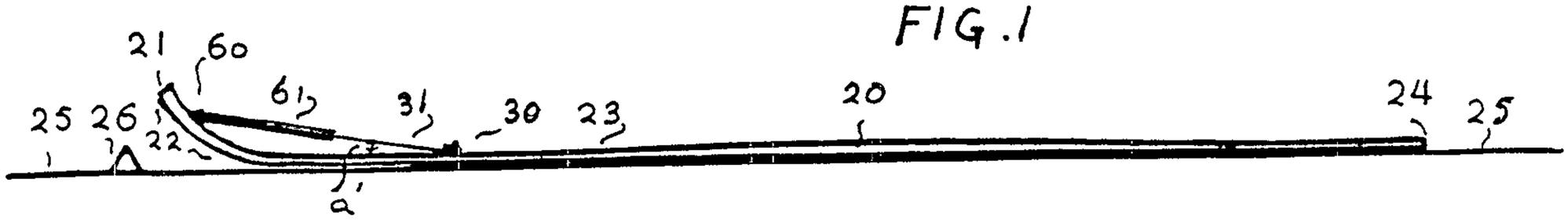


FIG.2

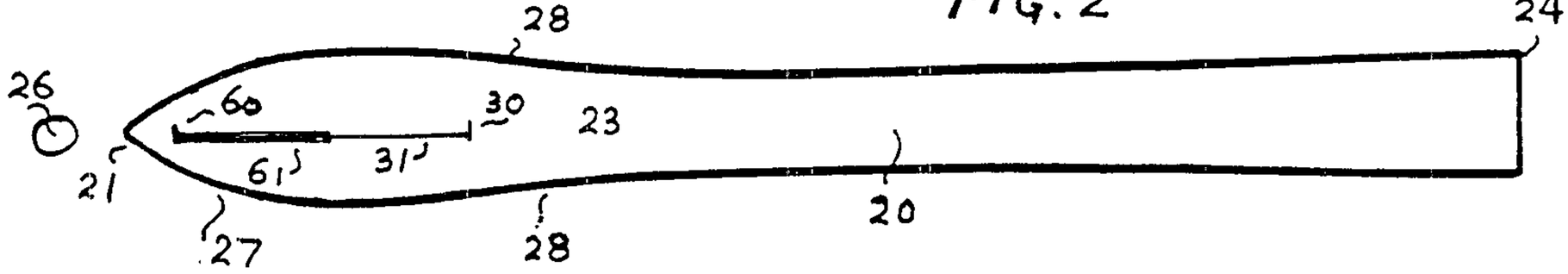


FIG.3

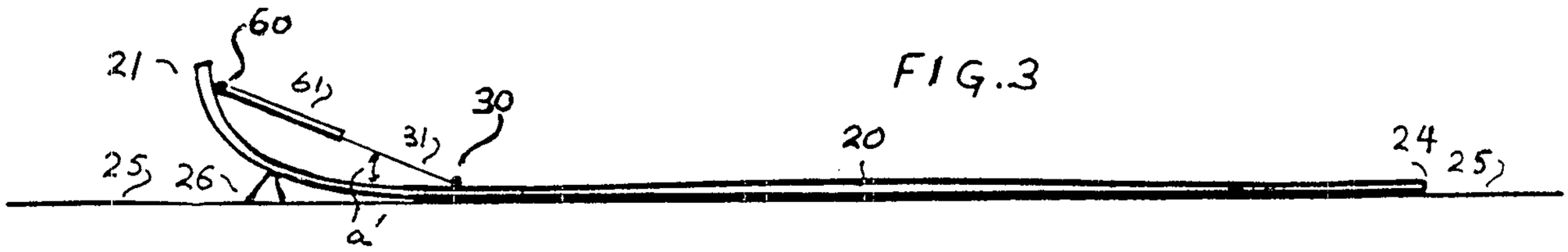


FIG.4

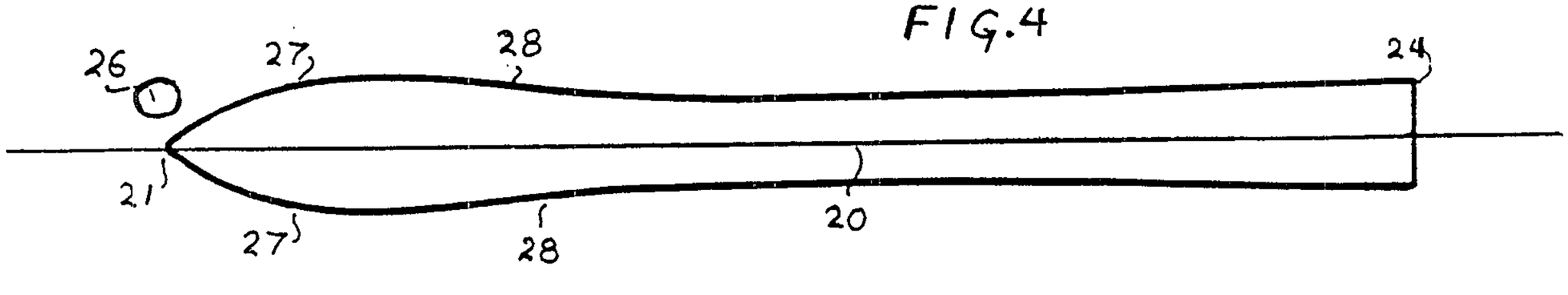


FIG.5

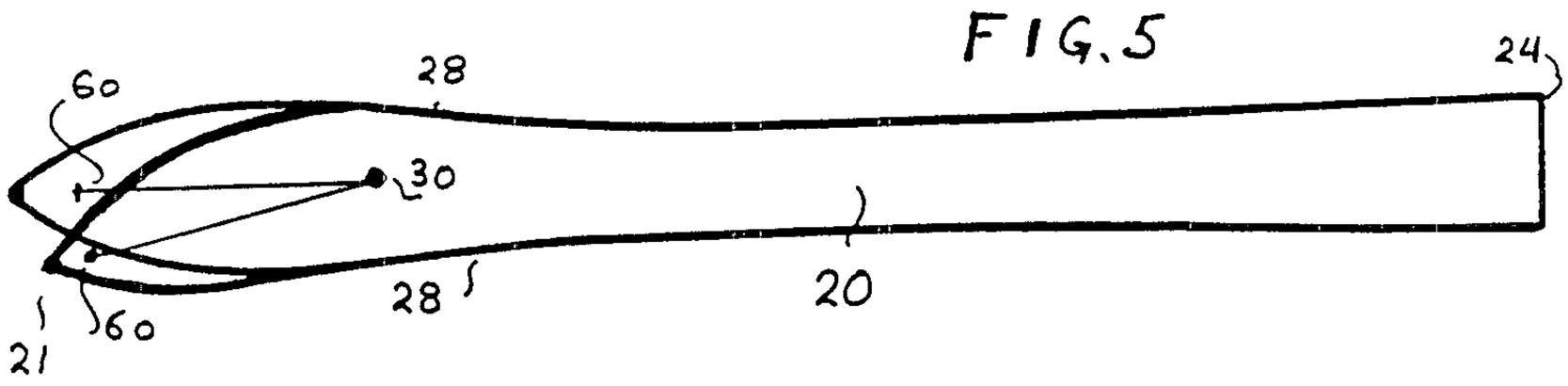


FIG 6

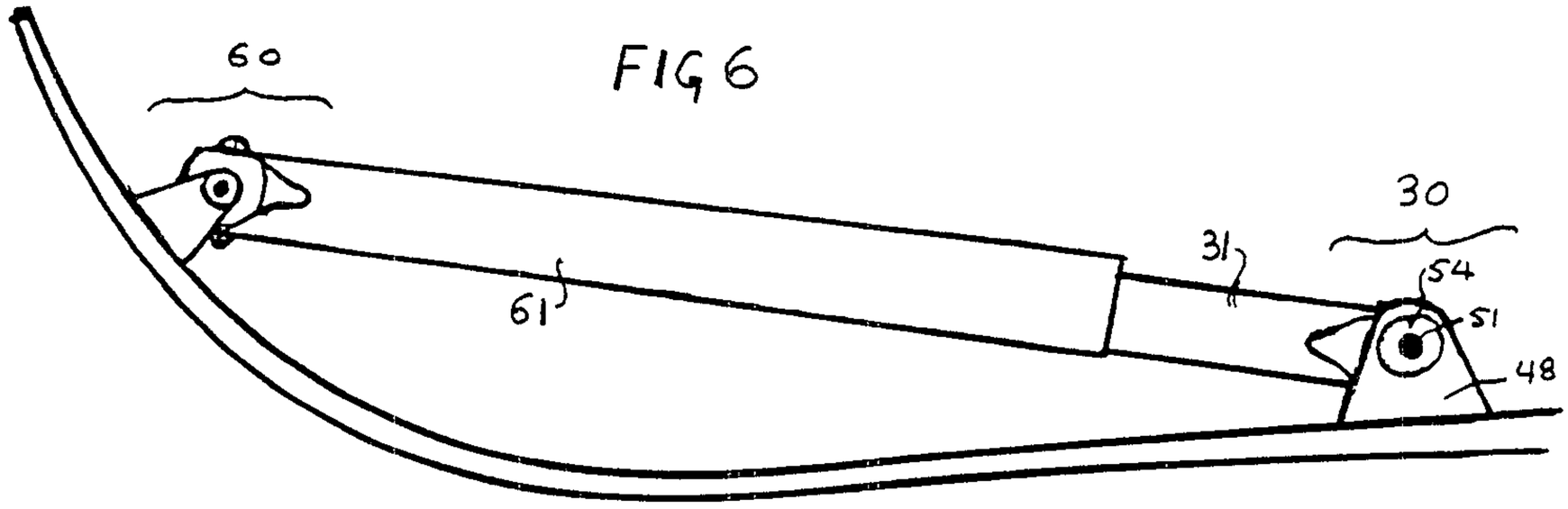


FIG 7

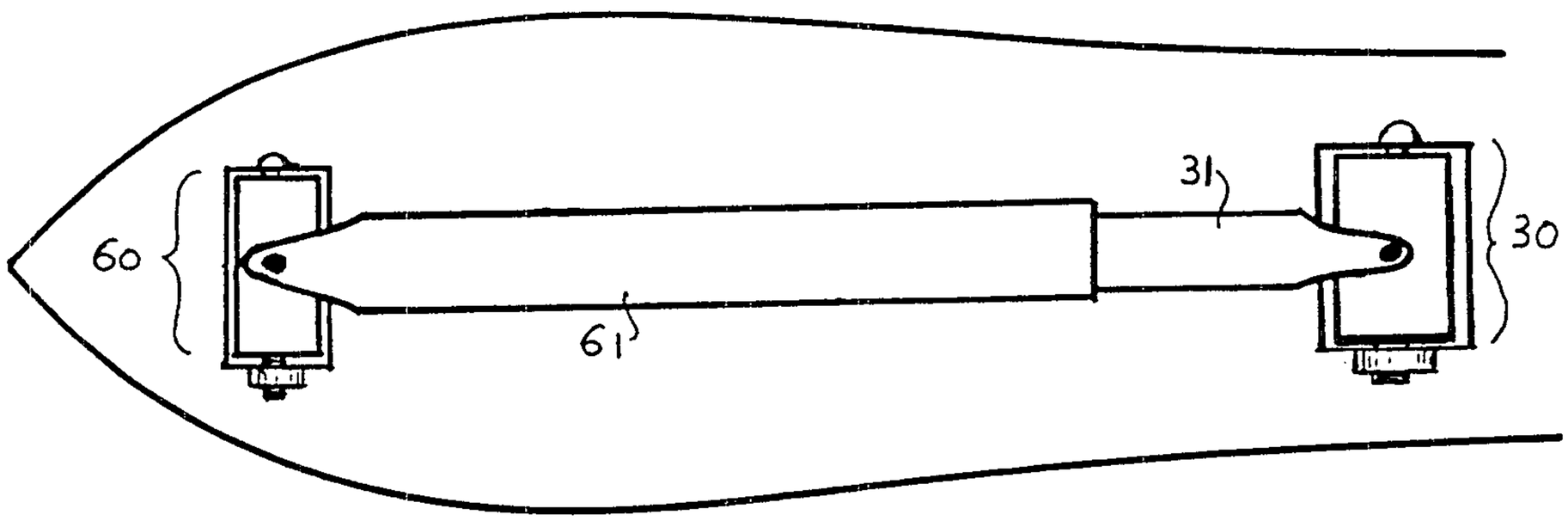


FIG 8

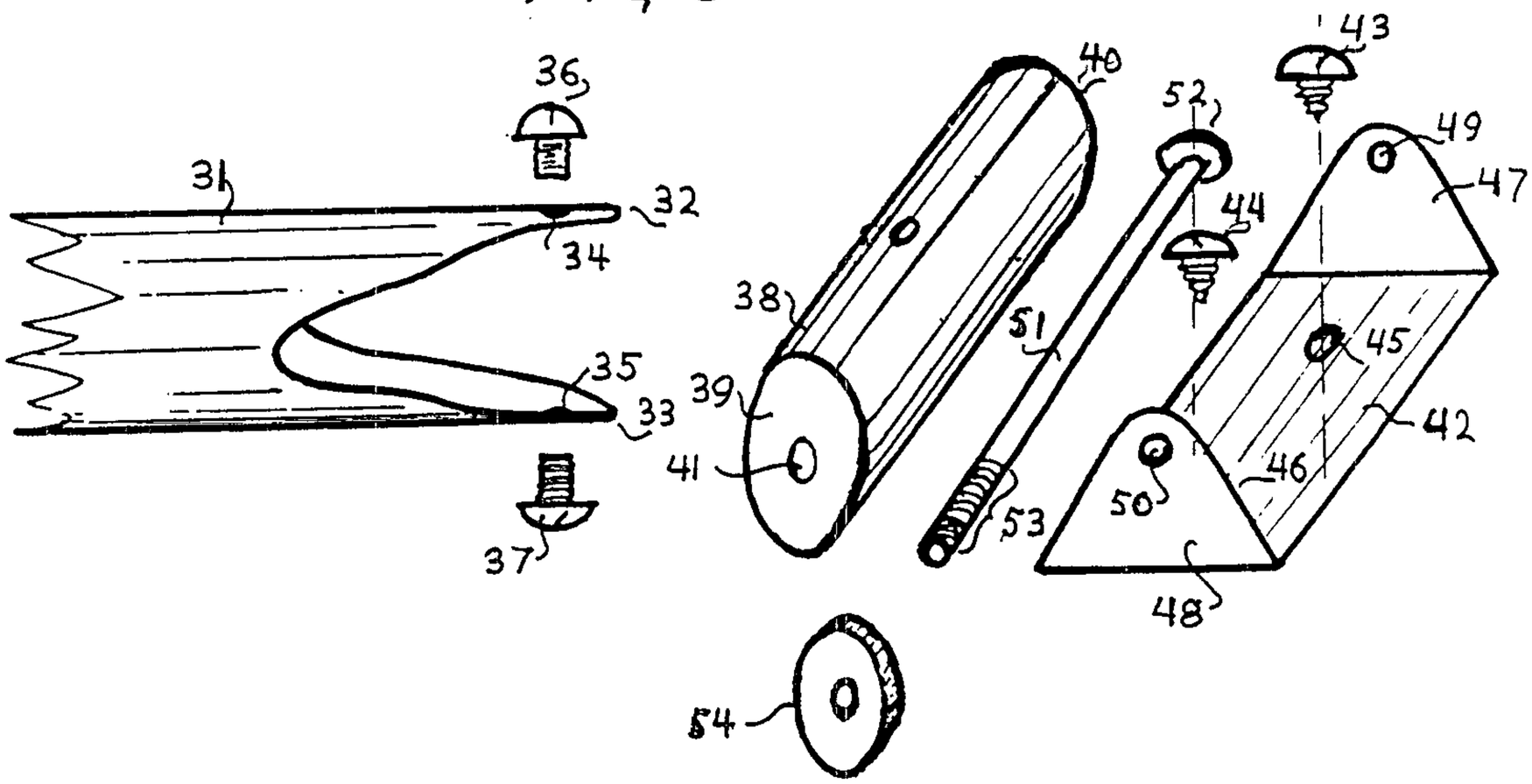


FIG. 9

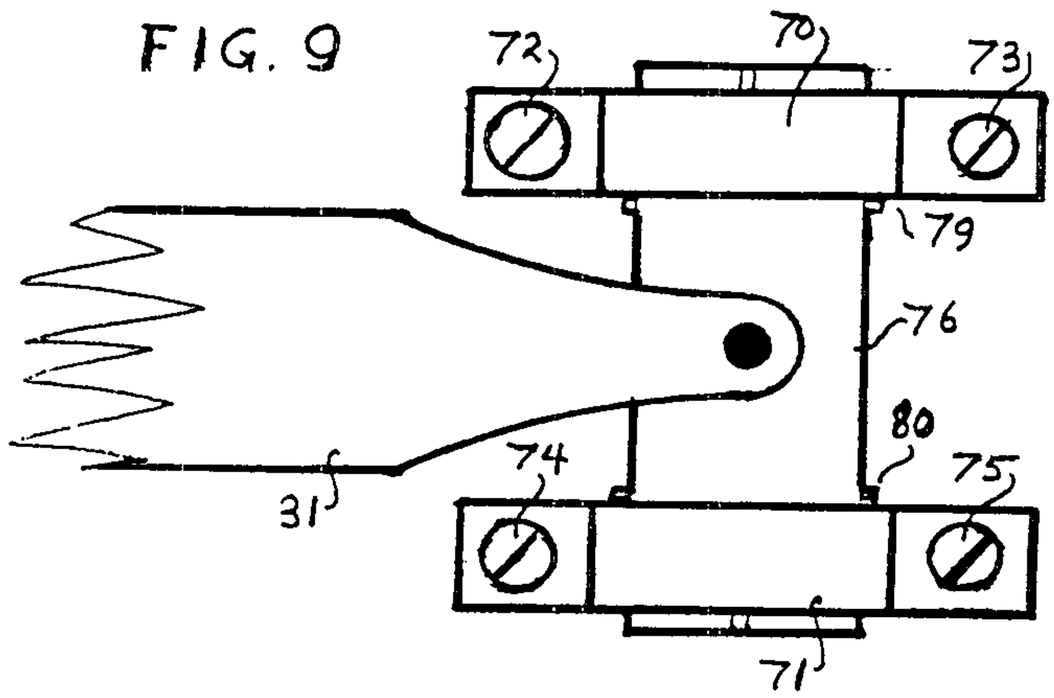


FIG. 10

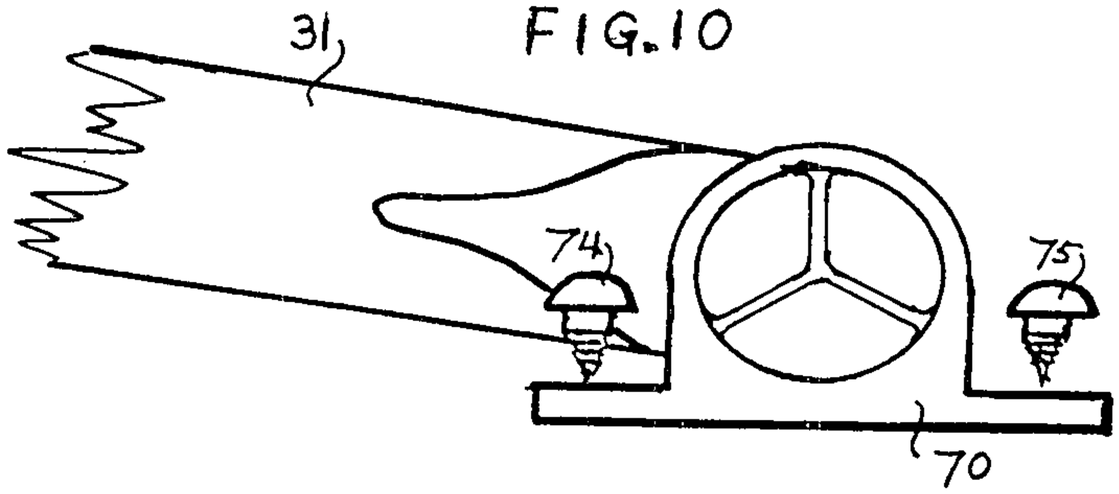


FIG. 11

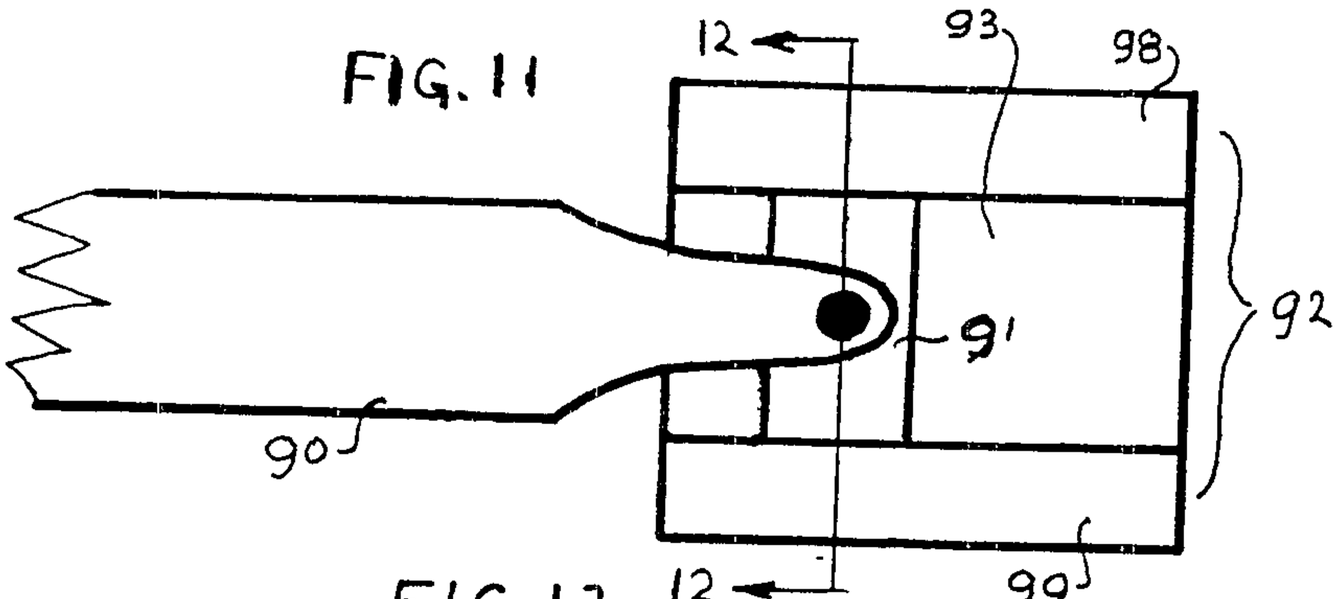


FIG. 12

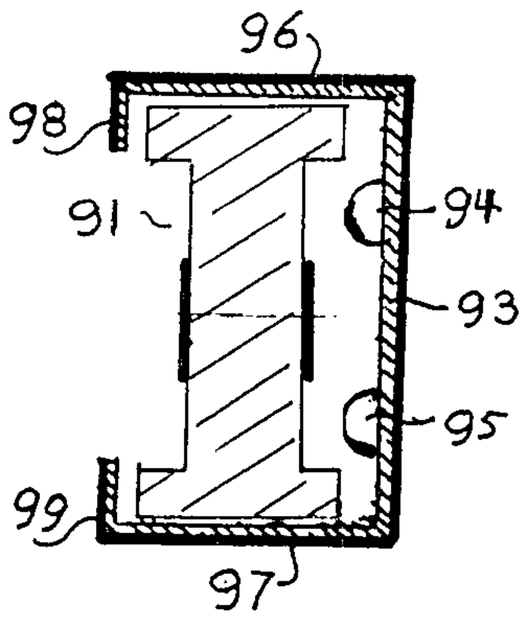


FIG. 13

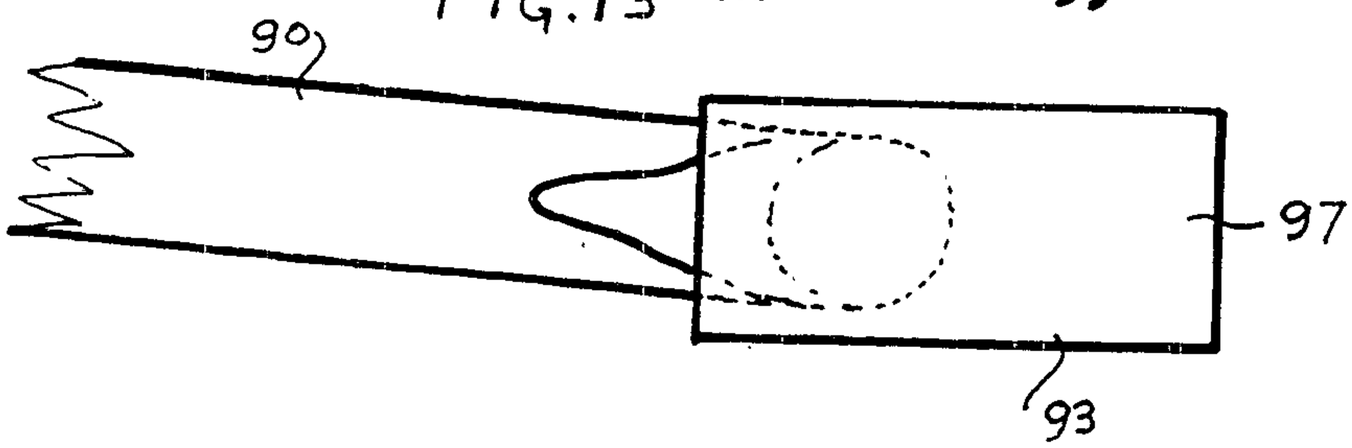


FIG. 14

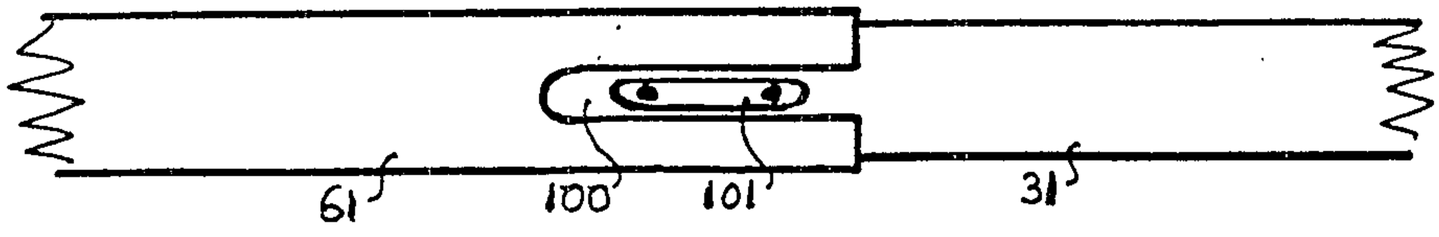


FIG. 15

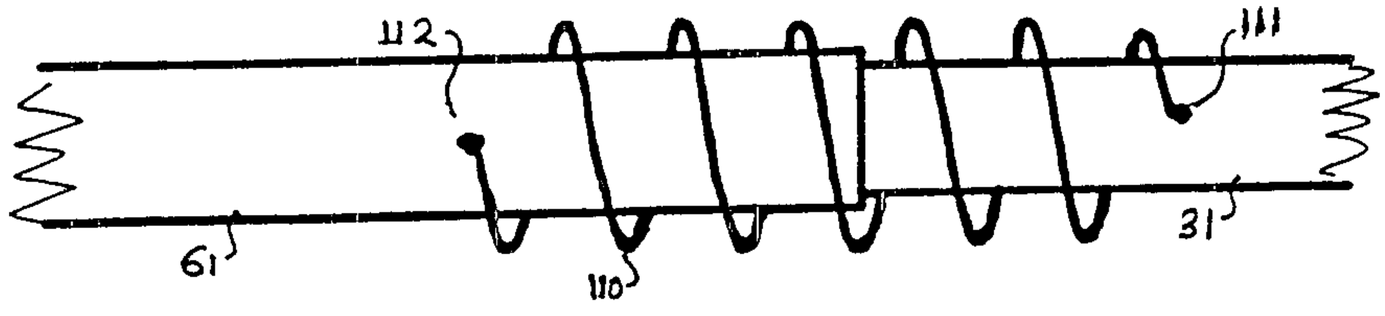


FIG. 16

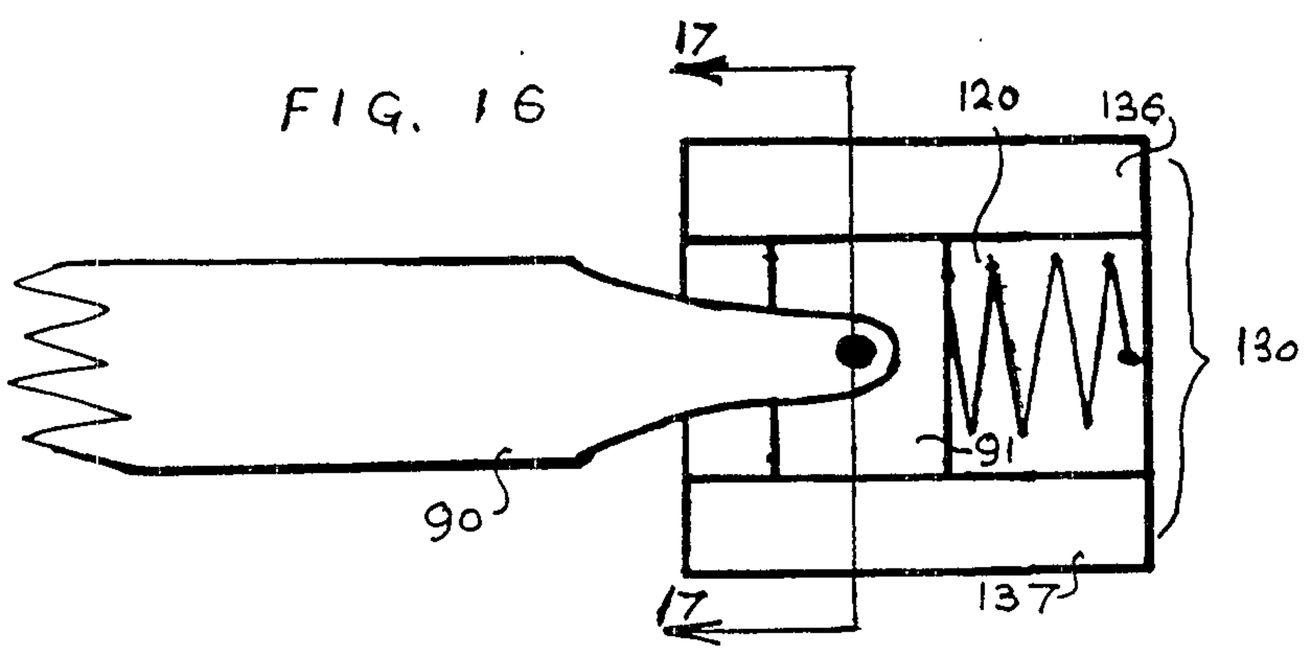


FIG. 17

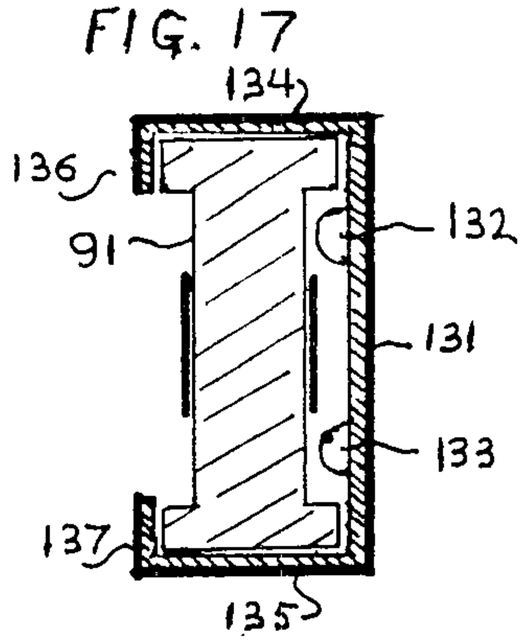


FIG. 18

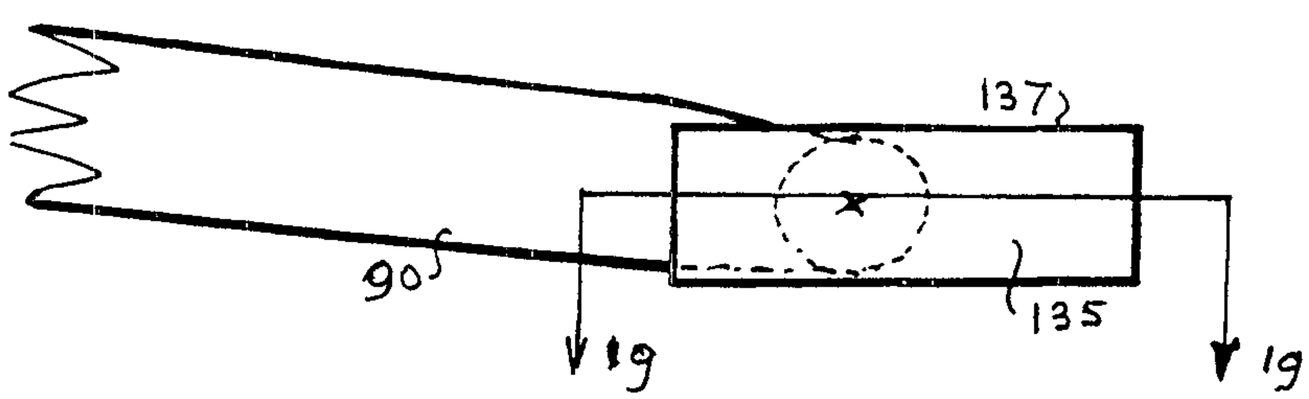


FIG. 19