Jan. 24, 1967 C. L. REED, JR 3,300,226

SKI CONSTRUCTION AND METHOD FOR VARYING THE FLEXIBILITY THEREOF

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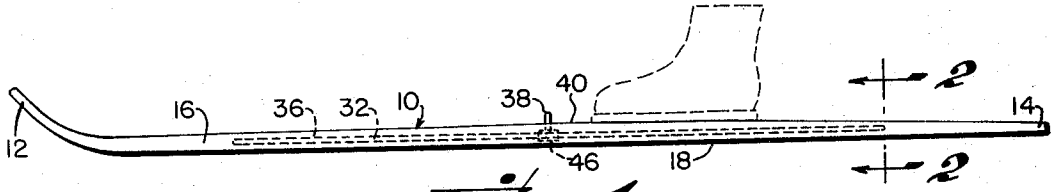

Fig. 1

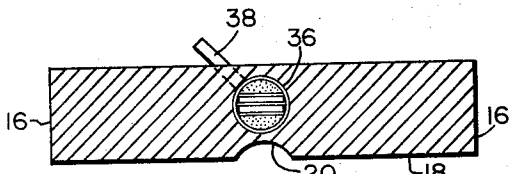

Fig. 2

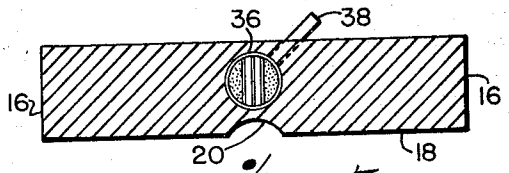

Fig. 3

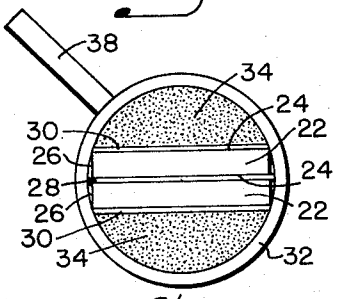

Fig. 4

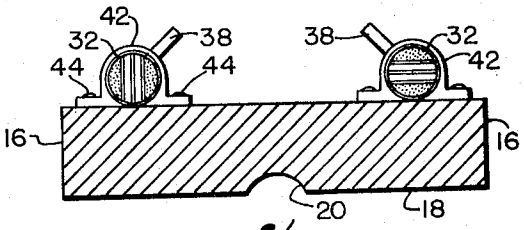

Fig. 6

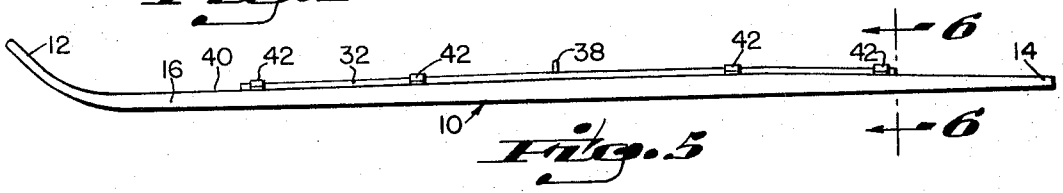

Fig. 5

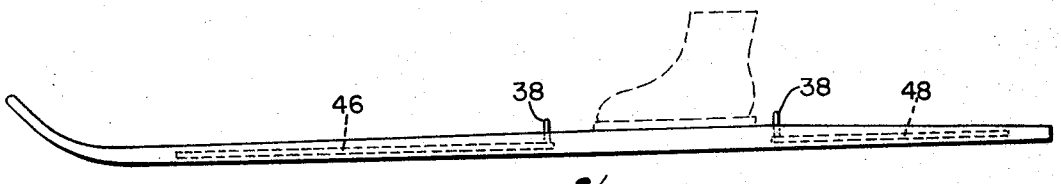

Fig. 7

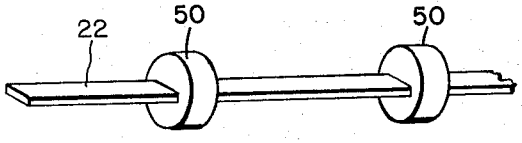

Fig. 8

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SKI CONSTRUCTION AND METHOD FOR VARYING THE FLEXIBILITY THEREOF

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The present invention relates to a ski construction and method for varying the flexibility thereof.

In the use of skis for travel, the travel surface is found to change in character or condition as changes occur in the weather. Depending upon its exposure to the sun, the temperature, atmospheric moisture, and the deposit of different types of new snow, a travel surface may assume various degrees of hardness, density, and slickness. The different conditions of the travel surface, of course, may either be beneficial to ski travel, or detrimental thereto. To compensate for changing conditions of the travel surface, skis of differing designs or characteristics have been made available in the past, but the necessity of substituting one form of ski for another has not proven popular or desirable.

An object of the present invention is to provide a method and means for imparting to a given pair of skis, various degrees of flexibility and resiliency in order to suit the skis to various travel surface conditions.

Another object of the invention is to provide means which is instantaneously adjustable for obtaining various degrees of flexibility and resiliency in the body of a ski.

Another object is to provide means of a simple, durable, and effective nature for varying the flexibility and resiliency of skis in the direction of bending.

A further object is to provide a novel and effective variable stiffener for bendable elongate bodies.

The foregoing and other objects are attained by the means described herein and illustrated upon the accompanying drawing, in which:

FIG. 1 is a side elevational view of a ski embodying the means of the present invention.

FIG. 2 is an enlarged cross-section taken on line 2—2 of FIG. 1, indicating one position of a stiffener.

FIG. 3 is a view similar to FIG. 2, showing the stiffener in alternative position.

FIG. 4 is an end view on an enlarged scale, showing the construction of the variable stiffener.

FIG. 5 is a side elevation of a ski incorporating the invention in modified form.

FIG. 6 is an enlarged cross-section taken on line 6—6 of FIG. 5.

FIG. 7 is a side elevation similar to FIG. 1, illustrating a modification.

FIG. 8 is a fragmental perspective view of a modified form of stiffener.

The reference character **10** indicates the body of a ski, usually constructed of wood, metal, or plastic, or a combination thereof, and having a forward end **12** and a rear end **14**. As is usual, the body of the ski may be from 2 to 8 feet long, and has opposite side edges **16**. In cross-section, the ski body may be substantially rectangular as shown. The underface **18** of the body may be provided with one or more longitudinal grooves **20**, in accordance with common practice.

Under ordinary conditions, a ski constructed as above described will possess an inherent flexibility and resiliency in a plane perpendicular to underface **18** and including the major axis of the ski body. Such flexibility and resiliency, in accordance with the present invention, are to be controlled and rendered variable according to the will of the user. The means employed for the purpose may be referred to as a variable stiffener.

The variable stiffener or compensator may comprise

one or more flat metal bars or ribbons **22** of considerable length, having a width dimension which exceeds substantially the thickness of the bar or ribbon. The bar has opposite faces **24** of major area or extent, and a pair of parallel edges **26** which are of minor areas, relatively. The bars by preference are formed of rolled or wrought steel.

The bar or ribbon will have high flexibility if bent in a direction perpendicular to width surface **24**, however, if bent in the direction perpendicular to the thickness surface **26**, the bar or ribbon will have relatively low flexibility.

As illustrated by FIG. 4, a plurality of bars **26** may be disposed flatwise, with the ends thereof coinciding, and between the faces of the bars may be interposed a slick shim **28** having lubricating qualities. Such a shim may be formed of a material of the class of Teflon, and may be dimensioned in correspondency with the dimensions of a face **24**. The shim will of course minimize friction between the innermost faces of the bars, whenever the bars are flexed or bowed.

Similar shims or cover elements **30** may overlie the outer faces of the bars. The bars and shims may be enclosed within a tubular elongate sheath or casing **32** which is coextensive with the length of the bars and shims. The sheath or casing is preferably formed of Teflon or an equivalent self-lubricating material. The spaces between the outer faces of shims **30—30** and the inner face of the sheath, may be packed with a dense filler material **34**, such as hard but pliable rubber, which will tend to reinforce and retain the cylindrical form of the sheath.

In order to install the variable stiffener within the body of a ski, the body may be constructed with a longitudinal bore or channel **36**, the axis of which may be parallel to or in coincidence with the major axis of the ski body. Such bore, or channel, is to receive the stiffener unit with sufficient clearance provided, that the stiffener unit may be rocked or rotated axially therein. For the purpose of rocking the stiffener unit, the unit may be provided with a rigid lever **38** securely fixed to the unit and extended laterally therefrom. Lever **38** is to be accessible for manual actuation, preferably at the upper face **40** of the ski body.

When lever **38** is rocked to one limit of travel, as in FIG. 2, the stiffener unit is rotated to a position at which the bars or ribbons **26** are parallel to the mean plane of the ski body. In this position of the stiffener unit, the bars will flex or bend readily as the ski body is flexed or bowed lengthwise. On the other hand, disposition of lever **38** to the FIG. 3 position will rotate the stiffener unit to dispose its bars **26** at right angles to the mean plane of the ski body, thereby to oppose lengthwise flexing or bowing of the ski body. In this latter position of the stiffener unit, therefore, the ski body will be stiffened or rigidified to the maximum degree offered by the stiffener unit. Various intermediate degrees of flexibility may be imparted to the ski body, by disposing the lever **38** to positions intermediate the limits depicted in FIGS. 2 and 3.

In the modification illustrated by FIGS. 5 and 6, stiffener units are shown exposed upon the upper face **40** of the ski body, and held in place thereon by means of a series of brackets or eyelets **42** which are screwed or otherwise fixed at **44** to the body. Each stiffener unit is rotatable within the brackets or eyelets, within limits as indicated at the right and left sides of FIG. 6, by means of a lever **38**. While FIG. 6 shows the application of two identical stiffener units to the ski body, it is to be understood that a single unit may suffice in most instances. In some cases two or more stiffeners may be desirable. The stiffeners of course extend in parallelism with the major axis of the ski body.

In the construction illustrated by FIG. 1, the actuating lever 38 is shown applied to a connector 46, which joins the meeting ends of two axially aligned stiffening units installed in the ski body. It should be understood, however, that a single unit might as well be incorporated in the ski body, with lever 38 affixed intermediate the ends thereof, or at any desired location along the length of the unit.

The modified construction, FIG. 7, may be quite similar to FIG. 1, with the exception that stiffeners indicated at 46 and 48 are installed in the ski body independently of one another, each having its own adjusting lever 38. This construction makes possible a selective stiffening of the forward portion of the ski body to a different degree than the rear portion thereof. Stiffeners 46 and 48 may be axially aligned one with the other, or in the alternative, they may be disaligned or offset one to the other. The forward and rear portions of the ski body may each embrace more than one stiffener, if desired.

The simplified form of stiffener illustrated by FIG. 8, may comprise simply a bar or ribbon 22 like that of FIG. 4, without the application of any filler material 34 or spacing shims. The bar or ribbon of FIG. 8 may support, at intervals along its length, a series of cylindrical bearing members 50 adapted for rotation with the bar or ribbon. The bearing members may be dimensioned for reception in brackets such as 42 of FIG. 6, with such clearance as is necessary to permit rotational adjustment of the bar or ribbon for varying the stiffness of the ski body.

The structure of FIG. 8 may be applied also in the manner of FIGS. 1 and 7 with or without the use of a tubular sheath or casing such as 32. That is, the FIG. 8 structure may be rotationally supported within a longitudinal bore or channel such as 36 formed in the ski body, with or without the aid of a sheath or casing 32. The bearing members 50 may be formed of any suitable material capable of supporting the bar or ribbon 22, and need not necessarily be of Teflon though this material is found very satisfactory for the purpose.

It is to be understood that various modifications and changes may be made in the structural details of the device, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed is:

1. In combination, an elongate substantially flat body possessed of inherent bendability mainly in one direction only, an elongate stiffener including an elongate substantially flat member possessed of inherent bendability mainly in one direction only, and means carried by said body for supporting said member for rotational adjustment, said member extending longitudinally of said body.

2. The combination as set forth in claim 1, wherein is included means accessible exteriorly of the body, for selective manipulation of said bendable member from a rotated position opposing bendability of said body, to a rotated position of substantial non-interference with bendability of said body.

3. In combination, an elongate substantially flat body possessed of inherent bendability in one direction and substantial rigidity in an opposite direction, an elongate substantially flat compensating member possessed of inherent bendability in one direction and substantial rigidity in an opposite direction, and means carried by said body for supporting said compensating member for rotational adjustment, said member extending longitudinally of said body for rotation from a position opposing bendability of said body, to a position of substantial non-interference with bendability of said body.

4. A ski construction comprising in combination: a substantially flat elongate body possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction; an elongate stiffener including an elongate substantially flat member possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction; means associated with the ski body for supporting the stiffener lengthwise thereon for rotational adjustment, to dispose the plane of bendability of the stiffener member at selected angles relative to the mean plane of the ski body, for varying flexation of the ski body in the direction of bendability thereof.

5. The device as set forth in claim 4, wherein the ski body includes an elongate passageway extending lengthwise thereof to accommodate the length of the stiffener; and means on the stiffener exposed exteriorly of the passageway, for manipulating the stiffener to the selected rotated positions aforesaid.

6. The device as set forth in claim 4, wherein the combination includes bracket means upstanding upon one face of the ski body adapted to embrace the stiffener, the stiffener being adjustable rotationally relative to the bracket means, for disposing the stiffener member at the selected angles aforesaid.

7. An adjustable ski construction comprising in combination: a substantially flat elongate body possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, an elongate stiffener comprising an elongate tubular casing having a major axis, a plurality of elongate flat and thin bars disposed in parallelism within the casing lengthwise thereof adjacent to the major axis, said bars each being possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, means spacing a flat face of one bar from the flat face of another bar, with said flat faces in parallelism within the casing, a pliable filler material intermediate the bars and the adjacent inner wall of the tubular casing, and means carried by the ski body for supporting said casing lengthwise of the ski body for rotational adjustment, whereby the bars may be rotated in unison with the casing from a position at which the planes of the bars are parallel to the mean plane of the ski body, to other positions at which the planes of the bars meet the mean plane of the ski body at selected angles of intersection.

8. The device as set forth in claim 7, wherein the ski body includes an elongate passageway extending lengthwise thereof to accommodate the length of the stiffener, and means on the stiffener casing exposed exteriorly of the passageway, for manipulating the casing and bars to the selected rotated positions aforesaid.

9. The device as set forth in claim 7, wherein the combination includes bracket means upstanding upon one face of the ski body adapted to embrace the casing of the stiffener, the casing being adjustable rotationally relative to the bracket means, for disposition of the casing and bars to the selected rotated positions aforesaid.

10. In combination, a substantially flat elongate body possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, said elongate body having forward and rear end portions; an elongate stiffener for the forward portion, and an elongate stiffener for the rear portion of said body, said stiffeners each including an elongate substantially flat member possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction; means associated with the body for individually supporting the stiffeners lengthwise thereon for individual rotational adjustment, to dispose the plane of bendability of each stiffener member at selected angles relative to the mean plane of the body, for varying flexation of the forward and rear portions of the body in the direction of bendability thereof.

11. The combination as set forth in claim 10, wherein the stiffeners are disposed in endwise alignment upon the body.

12. In a ski, a ski body and a stiffener operatively connected therewith and comprising an elongate sub-

stantially flat bar disposed longitudinally thereof and possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, and a plurality of cylindrical bearing members disposed along said bar at spaced locations.

13. The method of varying flexation of a substantially flat body possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, said method consisting of applying lengthwise to said body an elongate substantially flat compensating member possessed of inherent bendability in one direction, and of substantial rigidity in an opposite direction, and axially rotating said compensating member to selected positions at which the plane of bendability of the compensating member meets the plane of bendability of the body at differing angles of intersection.

14. The method of varying flexation of a substantially flat ski body possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, said method consisting of embedding in the ski body for rotation an elongate substantially flat compensating member extending lengthwise of the ski body, said compensating member being possessed of inherent bendabilty in one direction and inherent substantial rigidity in a transverse direction, disposition of the compensating member serving to dispose its plane of bendability at selected angles of intersection with the mean plane of the substantially flat ski body.

15. The method of varying flexation of a substantially flat ski body possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, said method consisting of mounting for rotation upon a face of the ski body an elongate substantially flat compensating member extending lengthwise of the ski body, said compensating member being possessed of inherent bendability in one direction and inherent substantial rigidity in a transverse direction, the variation of flexation of the ski body in the direction of bendability being established by rotating the compensating member to selected positions at which the plane of bendability of the compensating member meets the mean plane of the ski body at different angles of intersection.

References Cited by the Examiner

UNITED STATES PATENTS

2,258,046	10/1941	Clement	280—11.13
2,918,293	12/1959	Tavi	280—11.13

FOREIGN PATENTS

1,118,857	3/1956	France.
146,568	6/1920	Great Britain.

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