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Brownson

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[54] **WATER SKI CONSTRUCTION**

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Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 180,612, Sept. 15, 1971, abandoned.

[52] **U.S. Cl.** ..... **9/310 A,** 280/11.13 S

[51] **Int. Cl.** **A63c 15/00**

[58] **Field of Search** ..... 280/11.13 S, 11.13 Y; 9/310 A, 310 R, 310 B, 310 C, 310 D, 310 E; D71/1 CC

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[57] **ABSTRACT**

A water ski construction wherein the lower surface of the ski is smoothly contoured in the forward zone, the ski contains a double channel in the mid zone with the channels being separated by a longitudinal convex ridge, the height of the ridge in the mid zone being less than the height of the edges of the ski, the aft zone of the ski being tapered and also being smoothly contoured, a fin may be provided in the aft zone for lateral stability.

3 Claims, 9 Drawing Figures

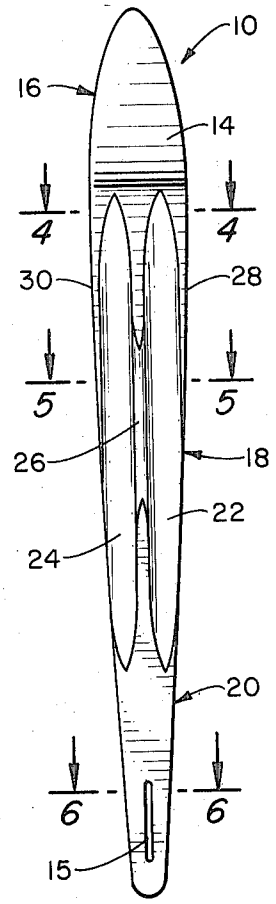


Fig. 1.

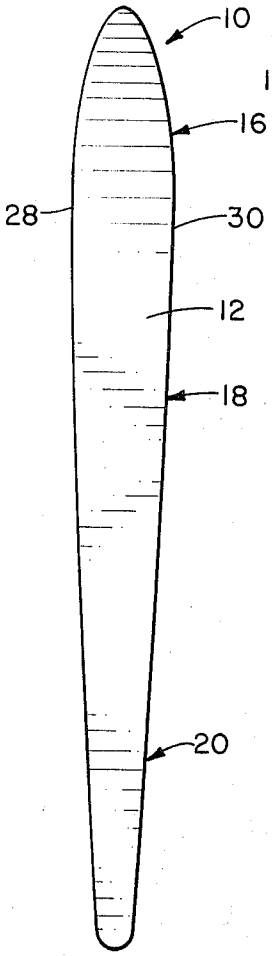


Fig. 2.

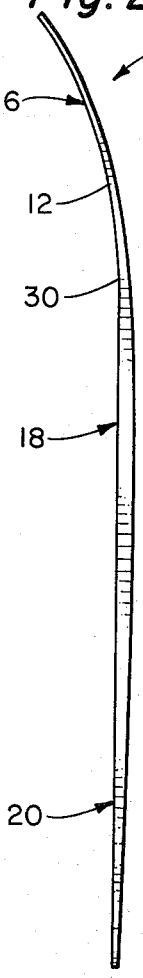


Fig. 3.

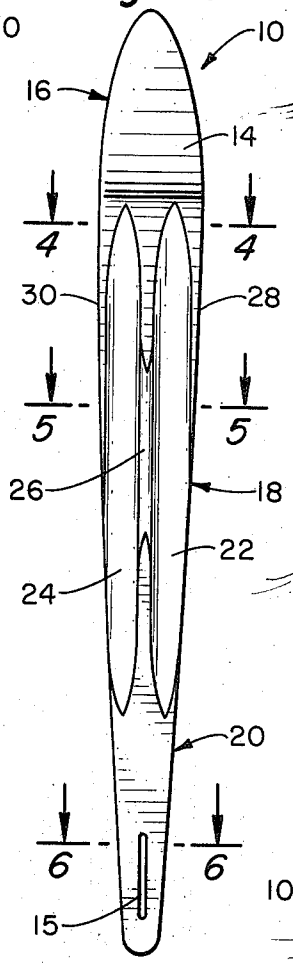


Fig. 7.

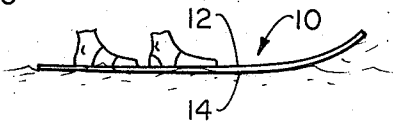


Fig. 8.

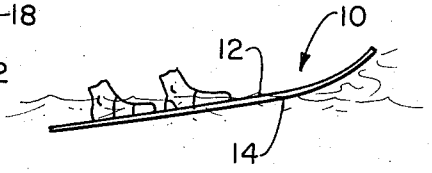


Fig. 9.

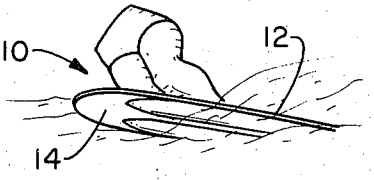


Fig. 4.

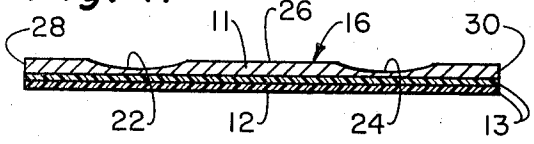


Fig. 5.

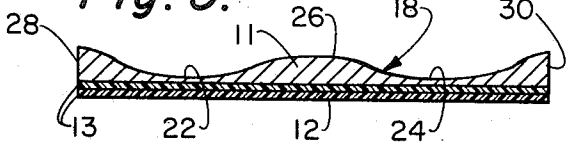
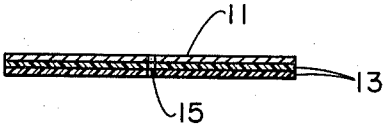


Fig. 6.



WATER SKI CONSTRUCTION

BACKGROUND OF THE INVENTION

This application is a continuation-in-part of U.S. Pat. application Ser. No. 180,612, filed Sept. 15, 1971 now abandoned.

The field of this invention relates to the construction of water skis and more particularly to a water ski which is particularly adapted to being employed in slalom skiing.

Slalom skiing relates to skiing upon a particular type of course in competition with other skiers. Basically, a slalom course employs the use of a plurality of buoys formed into two lines with the buoys in each line being spaced apart a predetermined distance. The lines of buoys are arranged in the water in a parallel relation and spaced apart at a predetermined distance. A boat pulling a skier is to travel centrally between the lines of buoys with the skier being required to ski around the first buoy in the first line and then ski all the way across to the second line and move around the first buoy in the second line, and then back to the first line and then ski around the second buoy in the first line. This procedure is repeated until the skier skis around each of the buoys in each of the lines.

Normally, the boat travels at a prescribed velocity in between the lines of buoys. However, the course can become increasingly more difficult by progressively decreasing the length of the tow line, therefore making it more difficult to move around the buoys. It is common to start out with a 75 foot length tow line with the tow line being progressively shortened down to 60 feet, 53 feet, 47 feet, 43 feet, 40 feet and 37 feet.

Successfully completing an official slalom course demands many skillful attributes on the part of the skier. However, there are three basic requirements which relate specifically to ski design. These requirements are:

1. Making sharp turns around each buoy.
2. Decelerating rapidly before making the turn around the buoy.
3. Rapid acceleration after completion of the turn around the buoy.

Heretofore, it has been known that if the ski was made convex, such substantially lessens the friction of the ski with the water when the ski makes a turn. However, a convex ski surface performs very poorly during periods of deceleration. During periods of deceleration it has been found that a concave ski surface is best to rapidly slow down the ski and skier. Additionally, it has been found that during periods of acceleration, the convex type of ski surface has less drag and therefore performs best.

Heretofore, it has been common to make skis either to have a flat, planar configuration or a concave skiing surface. These types of skiing surface are maintained constant except possibly in the area of the fore end of the ski which is convexly curved with respect to the water and is adapted to normally not be in contact with the water. Skis which have a strictly planar skiing surface are basically mediocre in all qualities.

It also has been known to design a ski in which a portion of the bottom of the ski includes a pair of flutes which are separated by a ridge. Such a ski is known to have been manufactured and sold by the Vogue Ski Company of Temple City, California. The flutes of the aforesaid ski are located primarily in the aft zone of the ski and the mid-zone of the ski. The flutes are narrow

and make no effort to trap air. The ridge separating the flutes is at the same height as the edges of the ski. It is believed that these flutes do not significantly alter ski performance in any given mode.

This invention employs the use of a pair of spaced apart channels along a portion of the bottom of the ski and are of a width substantially equal to the ski width. The ridge separating the channels is of a height less than the edges of the ski in order to trap air and also assist in the movement of the ski through the water during the turning modes. It is found to be desirable for the channels to be located primarily in the mid-zone of the ski with the channels extending into the fore zone and just into the aft zone. The extension of the channels completely through the aft zone offers no significant advantage.

The present invention makes a substantial improvement in all three of the following areas:

1. Capable of making turns sharper.
2. Facilitates rapid deceleration.
3. Facilitates rapid acceleration.

SUMMARY OF THE INVENTION

The water ski constructed in accordance with this invention relates to forming within the lower surface of the ski a double channel configuration with the channels being separated by a longitudinally convex ridge. The fore end of the ski is smoothly contoured thereby eliminating the channel and ridge configuration. Within the mid-zone of the ski, the height of the ridge is less than the height of the edges of the ski. The aft zone of the ski is laterally tapered inwardly toward the middle of the ski and also is smoothly contoured. A fin may be provided in the aft zone for lateral stability. The ridge within the mid-zone causes the ski to function similar to a hydrofoil during acceleration and thereby facilitating rapid acceleration.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of the upper surface of the ski formed in accordance with this invention;

FIG. 2 is a right side view of the ski formed in accordance with this invention;

FIG. 3 is a bottom view of the ski of this invention showing more clearly the dual channel and separating ridge arrangement;

FIG. 4 is a cross-sectional view through the ski of this invention taken along line 4—4 of FIG. 3.

FIG. 5 is a cross-sectional view through the ski of this invention taken along 5—5 of FIG. 3;

FIG. 6 is a cross-sectional view through the ski of this invention taken along line 6—6 of FIG. 3;

FIG. 7 is a diagrammatic representation of the ski of this invention as it would operate in an acceleration mode;

FIG. 8 is a diagrammatic representation of the ski of this invention as the ski would function during the deceleration mode; and

FIG. 9 is a diagrammatic representation of the ski of this invention as the ski would function during the turning mode.

DETAILED DESCRIPTION OF THE SHOWN EMBODIMENT

Referring particularly to the drawing, there is shown the ski 10 of this invention having an upper surface 12

and a lower surface **14.** The foot retaining structure to retain the feet of the skier is secured to the upper surface **12.** The ski **10** is divided into a fore zone **16,** and a mid-zone **18,** and an aft zone **20.** Generally, the fore zone **16** comprises the forward front one-third of the ski **10,** with the aft zone generally comprising the back one-third of the ski **10.** The mid-zone comprises the remaining portion of the ski **10** located in between the forward zone **16** and the aft zone **20.** However, it is to be understood that there are no exact limits for the forward zone **16,** the mid-zone **18** and the aft zone **20.** Each zone is to be considered generally and may vary with different types or sizes of skis.

Formed within the lower surface **14** of the ski **10** is a first channel **22** and a second channel **24.** The channels **22** and **24** are formed longitudinally along the length of the ski **10** and extend completely through the mid zone **18** into but not through the aft zone **20.** Each of the channels **22** and **24** are smoothly contoured into a surface formed by a solid revolution. However, the exact cross-sectional configuration of each of the channels **22** and **24** is considered to be a matter of choice or design.

Separating the first channel **22** from the second channel **24** is a longitudinal ridge **26.** The ridge **26** is convexly formed with respect to the lower surface **14.** It is also to be noted that the ridge **26** is smoothly contoured; however, it is again to be understood that the cross-sectional configuration of the ridge **26** may be a matter of choice or design.

The ski **10** of this invention may be formed by first machining the channels **22** and **24** within a narrow elongated planar, rectangular blank **11** of ski material. It is to be noted that during this procedure the height of the ridge **26** is to be made slightly less than the height of the edges **28** and **30.**

The next forming step is to sand smooth the lower surface **14** of the fore zone **16** and the aft zone **20** to thereby eliminate the channels and the separating ridge within each zone. If desired, one or more thin layers **13** can be laminated to the sheet material blank **11** for appearance or thickness and the fore zone is then curved into a shape approximating a parabola and held while the laminating cement sets. Thereafter, within the aft zone **20,** each of the edges **28** and **30** are laterally tapered inwardly toward the ridge **26.** Actually, this tapering of the edges starts within the mid-zone **18.** The configuring of the ski **10** is such that the fore zone **16** of the ski is laterally curved somewhat in the shape of a parabola.

Within the mid-zone **18,** it is to be noted that the ridge **26** is of a height less than the edges **28** and **30.** In actual practice it is found that the height difference should preferably be approximately one-eighth to one-quarter of an inch. The reason for this is that the lower surface of the ski within the area of the mid-zone **18** tends to laterally restrain the water between the edges **28** and **30.** This lateral restraining of the water holds the ski laterally in a firm manner within the water, thereby giving the skier a greater amount of stability. Additionally because the channels **22** and **24** are employed, the water pressure is spread between the channels **22** and **24** and by the center ridge. When a skier is turning in the water, the ski is canted with respect to the water surface. Within the conventional type of ski wherein the lower surface of the ski is planar, when the ski is canted, the water tends to spill from under the ski past the edge of the ski which is in the water. This tends to cause the ski to slide during the turning movement. In the present invention, the spilling of water past the ski edge is resisted by the concave shape of the channel remaining in the water.

Because of the use of two channels **22** and **24,** during turning when the ski is canted, one of the channels will always be within the water tending to restrain the ski laterally. In essence this gives the ski a degree of lateral stability heretofore not possible when making turns.

Also, during acceleration of the ski as illustrated in FIG. **7,** air tends to be trapped between the water and the channels **22** and **24.** This trapped air is conducted through the channels **22** and **24** and is expelled within the aft zone **20.** This trapped air reduces surface tension of the water with respect to the ski, thereby permitting the ski **10** to pass through the water with less friction. As a result, the ski is caused to accelerate at a faster rate.

Within the aft zone **20,** the ridge **26** has been eliminated. As a result, no entrapment of the water or air occurs within the aft zone **20.** It is desirable to eliminate the effect of the channels **22** and **24** within the aft zone **20.** The construction of the aft zone **20** is produced from the blank **11** by the inwardly tapering of each of the edges **28** and **30** toward the ridge **26** as shown in FIG. **3** of the drawing. The aft zone **20** substantially decreases the pressure of the water in the aft zone **20** because the water is free to spill over the edges **28** and **30** of the ski, since the convex shape of the channels has been eliminated thereby preventing entrapment of the water. Further, resistance to turning is reduced because the surface area of the aft zone has been reduced. As a result, during the turning movement of the ski within the water, the turns can be accomplished much easier. An aperture **15** is formed in the aft zone **20** and is to be employed to retain a stabilizing fin (not shown).

OPERATION OF SKI

Considering the overall ski configuration, during periods of acceleration, the ski would be in the position as shown in FIG. **7** of the drawing. The water is conducted through the mid-zone **18** and is laterally restrained within the channels **22** and **24** of the mid-zone **18.** Also, as the water passes through the channels **22** and **24** within the mid-zone **18,** air is entrapped which tends to facilitate low frictional movement of the ski through the water during periods of acceleration. Additionally, air flows through the channels to produce a hydrofoil effect which facilitates accelerating movement of the ski through the water.

During periods of turning of the ski, the ski assumes the position of FIG. **9** wherein the channel remaining in the water resists spill of the water past the edge of the ski.

Rapid deceleration is accomplished by changing the angle of the ski as shown in FIG. **8.** When the aft zone is displaced further down in the water it is not possible for water or air to traverse the full length of the channels **22** and **24.** With the ski in this angled attitude, the curved outer edges of channels **22** and **24** at the mid-zone **18** inhibit the escape of water from the bottom of the ski. This increases the water pressure against the bottom of the ski which rapidly decreases the skis forward progress, enabling the skier to slow down in a shorter space of travel than is possible to do on conventionally designed skis. It is to be remembered that for

a skier skiing a slalom course it is highly advantageous to be able to slow down quickly in a short space because this allows him to travel at top speed a greater percentage of the distance between buoys. The skier who rounds the greatest number of buoys without missing one is the winner. The tow boat is traveling at a prescribed speed so the elapsed time for a skier between buoys is the criterion to a winning performance. Therefore, rapid deceleration is as important as rapid acceleration.

The ski **10** can be made from any conventional material or can be made in any conventional manner. However, it is envisioned that the ski **10** will be made of a laminated construction. The lower surface **14** (blank **11**) can be of a wood material such as Phillipine mahogany of a thickness of three-quarters to seven-eighths of an inch. In between the Phillipine wood layer **11** and the top layer **12** can be one or more strengthening layers **13** of a suitable material.

What is claimed is:

1. A water ski construction comprising:

a narrow elongated element being divided in the longitudinal direction into a fore zone, a mid-zone and a aft zone, the lower surface of said element being adapted to contact the water;

said mid-zone over at least a portion thereof having a cross section in which said lower surface comprises first and second concave longitudinal channels separated by a longitudinally convex ridge, said ridge being equidistantly spaced from the edges of said element and being less in height than the edges of said element within said mid-zone portion to distribute water between said channels for stability, at least one of said channels being within the water during a turn in either direction,

said aft zone being laterally tapered inwardly toward the longitudinal center axis of said element to reduce the transverse width of said element at said aft zone;

said element being progressively reduced in thickness within said fore and aft zones by at least the depth of said channels thereby eliminating said channels and ridge within said fore and aft zones, said fore and aft zones being substantially flat and said fore zone being turned upwardly.

2. A water ski construction as defined in claim **1** wherein each of said channels being approximately equal in size and smoothly contoured into a surface formed by a solid of revolution, said ridge having a smoothly contoured surface.

3. A water ski construction as defined in claim **2**, the conbined width of said channels being just slightly less than the width of said narrow elongated element, said channels being of greater length than said ridge.

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