United States Patent [19]

Russell

[11] **3,731,328**

[45] **May 8, 1973**

[54] **WATER SKI WITH VENTURI CHANNEL AND MEANS FOR SECURING FOOT RETAINERS**

[76] Inventor: **George E. Russell,** 2708 Taylor Road, Columbus, Ind. 47201

[22] Filed: **June 7, 1971**

[21] Appl. No.: **150,389**

[52] **U.S. Cl.** ..... **9/310 AA**
[51] **Int. Cl.** **A63c 15/06**
[58] **Field of Search** ..... 9/310 AA, 310 R, 9/310 A, 310 D

[56] **References Cited**

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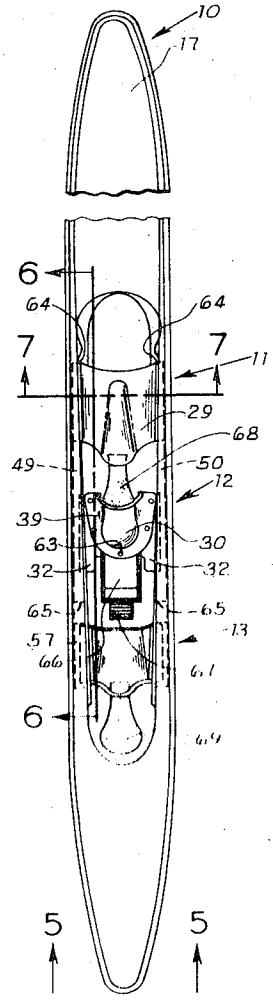
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Primary Examiner—Milton Buchler
Assistant Examiner—Paul E. Sauberer
Attorney—Woodard, Weikart, Emhardt & Naughton

[57] **ABSTRACT**

A water ski having a venturi channel formed on its bottom surface with means for securing foot retainers provided on its top surface. A converging venturi channel extending approximately two-thirds the length of the ski is formed on the bottom surface of the ski. A rib integrally attached to the bottom of the ski extends through the venturi channel and is positioned in the center of the channel. A rudder attached to the bottom of the ski is also positioned in the center of the channel. The top surface of the ski is depressed forming two pairs of channels. The front foot retainer has beaded edges along the sides and length of the foot retainer which extend into one pair of the channels being secured therein by plates. An adjustable cup assembly is slidable within the channels and is lockable to the top surface of the ski. A back foot retainer has beaded edges extending along the sides and length of the foot retainer which extend into the second pair of channels being secured therein by plates. Non-skid surfaces are integrally formed in the top surface of the channel for receiving the skier's feet.

6 Claims, 7 Drawing Figures



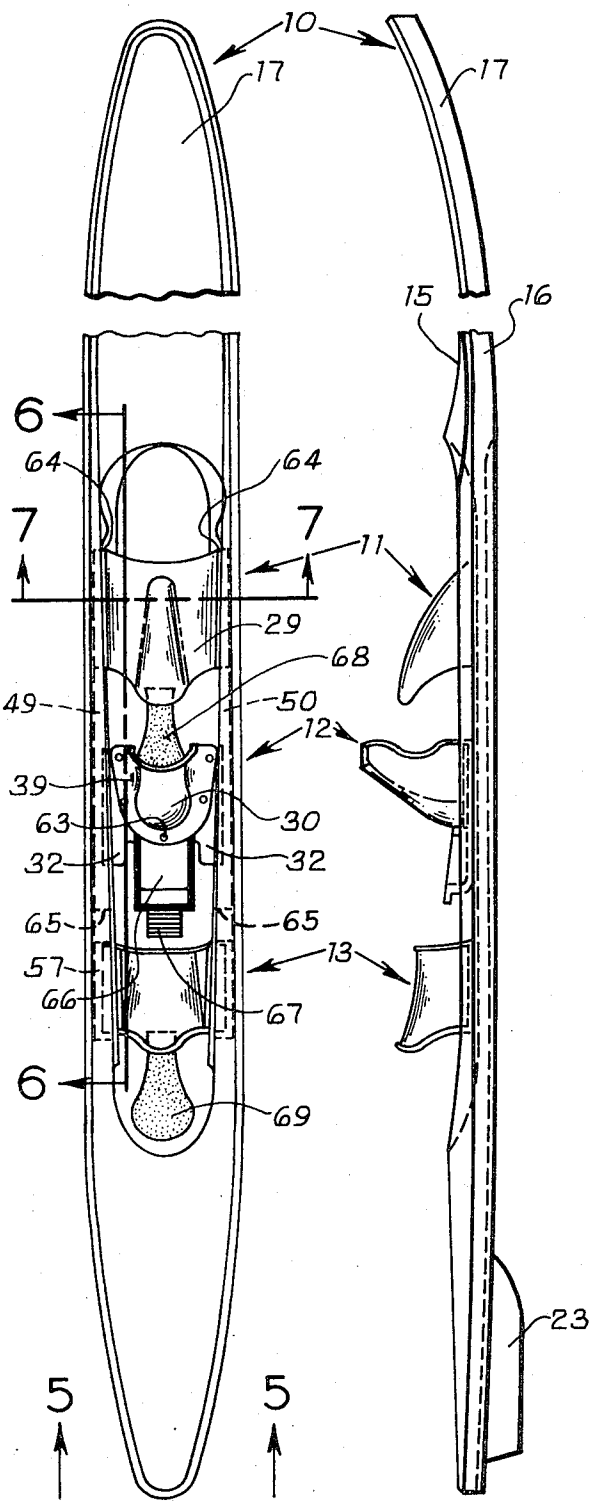


Fig.1

Fig.2

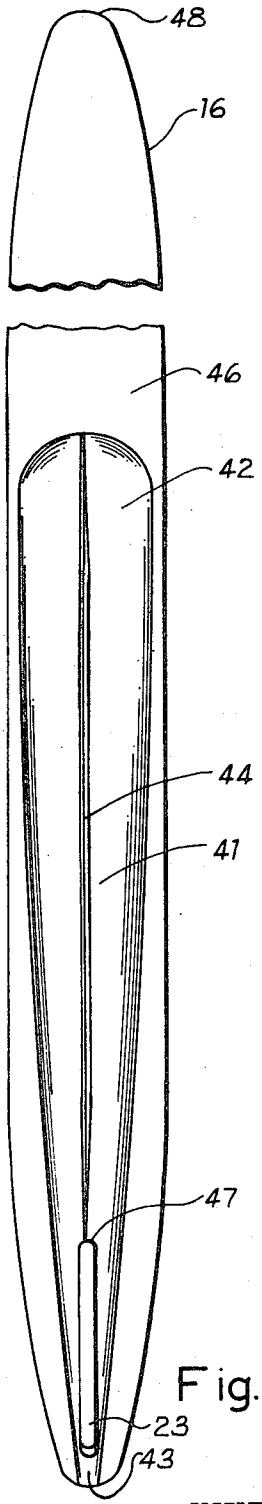


Fig.3

INVENTOR.
GEORGE E. RUSSELL
BY
Woodard, Weikart, Emhardt & Naughton
ATTORNEYS

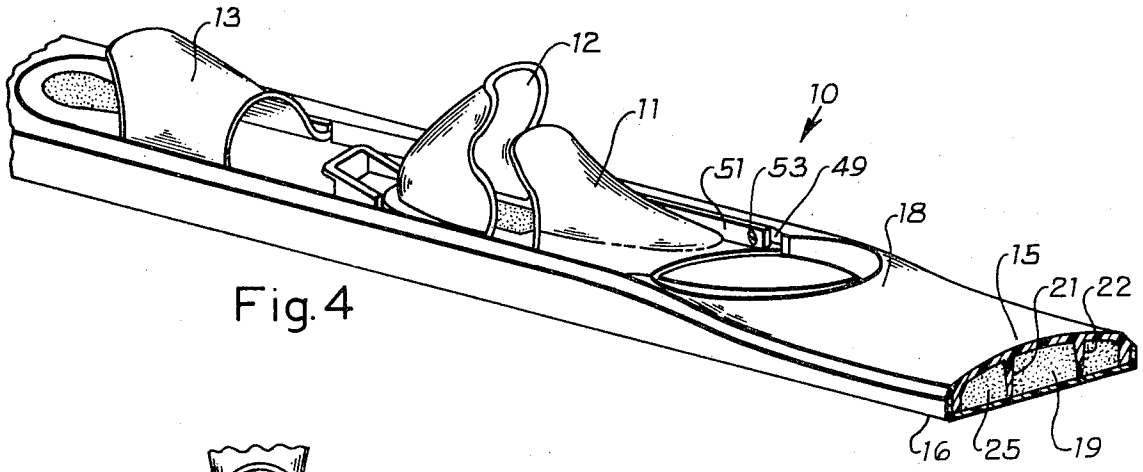


Fig. 4

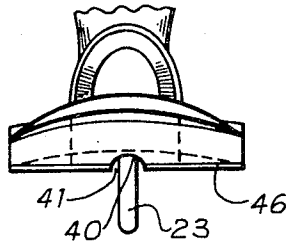


Fig. 5

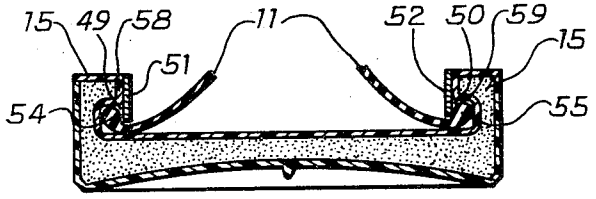


Fig. 7

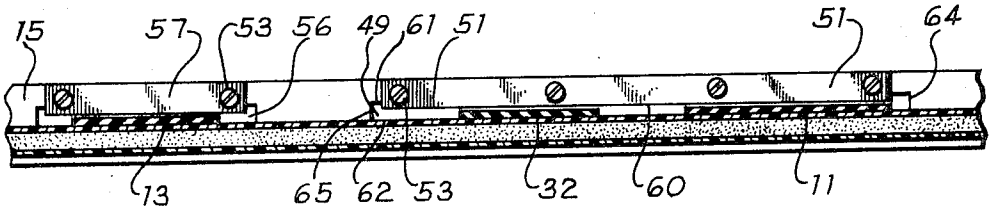


Fig. 6

INVENTOR.
GEORGE E. RUSSELL
BY
Woodard, Weikart, Emhardt & Naughton
ATTORNEYS

WATER SKI WITH VENTURI CHANNEL AND MEANS FOR SECURING FOOT RETAINERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to water skis.

2. Description of the Prior Art

Typically, water skis have various fastening devices such as bolts and nuts which are used to secure the toe and heel embracing retainers to the top of the ski. These fastening devices clutter the top surface of the ski thereby detracting from the overall appearance of the ski and also providing for the possibility of snagging of the skier or other object on to the fastening device. The present invention eliminates the necessity for having visible fastening devices for securing the toe and heel embracing assemblies. In addition, the ski disclosed herein provides for a non-skid surface to be integrally formed in the top of the ski immediately behind the toe embracing retainers. This non-skid surface provides for greater stability with respect to the skier's foot and the ski.

As is well known, greater stability is required when skiing at high speeds as contrasted to skiing at low speeds. The flat surface of traditional skis does not provide suitable high speed stability. The present ski provides such stability by having a venturi channel formed in the lower surface of the ski. The channel converges toward the rear of the ski thereby accelerating the water flowing through the channel and lifting the rear portion of the ski upwardly providing for greater stability. A rib extending through the center of the channel also provides for greater stability and functions as a miniature rudder.

SUMMARY OF THE INVENTION

A water ski having a main body with a depressed upper surface and a first and second channel positioned above and adjacent the depressed upper surface. A flexible toe retainer having a first and second edge extending the length of the toe retainer is positioned in the first and second channels. An adjustable heel embracing retainer has a plate with edges positioned in the first and second channels.

It is an object of the present invention to provide a water ski having a new means for securing the foot retainers and heel assembly to the top of the ski.

In conjunction with the previous object, it is an object of the present invention to provide a ski having a non-skid surface integrally formed in the top of the ski for receiving the skier's foot.

Yet another object of the present invention is to provide a ski having a converging concave venturi channel formed on the bottom of the ski to provide greater stability.

In addition, it is an object of the present invention to provide a rudder extending a great portion of the length of the ski for greater stability and control.

Related objects and advantages of the present invention will be apparent from the following description.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary top plan view of a water ski incorporating the present invention.

FIG. 2 is a fragmentary side elevation of the ski of FIG. 1.

FIG. 3 is a fragmentary bottom elevation of the ski of FIG. 1.

FIG. 4 is an enlarged perspective view of the center portion of the ski of FIG. 1.

FIG. 5 is an end elevation of the ski of FIG. 1 viewed in the direction of arrow 5—5.

FIG. 6 is a fragmentary enlarged cross-sectional view taken along the line 6—6 and viewed in the direction of the arrows of FIG. 1.

FIG. 7 is a fragmentary enlarged cross-sectional view taken along the line 7—7 of FIG. 1 and viewed in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENT

For the purposes of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawing and specific language will be used to describe the same. It will nevertheless be thereby intended, such alterations and further modifications in the illustrated device, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

Referring now more particularly to FIGS. 2 and 3, there is illustrated a water ski 10 with a top portion 15 and a bottom portion 16 fastened together. These top and bottom portions may be injection molded from a thermoplastic material such as polyvinyl chloride. As may be seen from FIG. 4, top portion 15 and bottom portion 16 form a cavity or hollow chamber 19 throughout the entire length of the ski. Chamber 19 may be filled with a light stuffing material 25 having a plastic character so as to give the ski greater floatation characteristics. Stiffening ribs 21 and 22 are integrally fastened to top portion 15 having bottom ends for abutting against bottom portion 16 thereby providing for structural rigidity of the ski. Ribs 21 and 22 extend approximately the entire length of the ski and are positioned immediately beneath foot retainer 11 and cup assembly 12.

At the front of the ski, tip 17 curves upward in the conventional manner with the leading edge 48 positioned above the surface of the water while a fin 23 is fastened to the rear underside of the ski to allow the skier to easily direct the ski across the water. In addition, the fin provides for greater stability. Fin 23 (FIG. 5) has a convex upper side 40 for fitting into concave channel 41 formed in the bottom surface 46 of the ski. Fin 23 may be secured to the ski by fastening devices or other suitable means. Channel 41 extends through the back end 43 (FIG. 3) of the ski to a location 42 positioned approximately two-thirds the length of the ski from end 43. Channel 41 is the widest at location 42 extending almost completely across the bottom surface 46 of the ski. Channel 41 tapers linearly from location 42 to end 43. Location 42 is located approximately below upraised portion 18 (FIG. 4). The width of channel 41 at end 43 is approximately the thickness of fin 23. Channel 41 is formed into bottom portion 16 of the ski during the molding of the ski. Of course, less space exists between the top portion 15 and bottom portion 16 of the ski adjacent to channel 41. Thus, less stuffing material 25 is inserted between the two portions of the ski. A rib 44 is integrally attached to bottom portion 16

being positioned in the center of channel **41** and extending from the start of the channel at **42** and ending at the leading edge **47** of fin **23**. Channel **41** receives water as the ski skims across the surface of the water thereby providing a venturi action allowing greater stability at high speeds. As channel **41** tapers from location **42** to end **43**, the water passing through the channel accelerates thereby raising the rear of the ski giving greater stability and higher tracking control. Rib **44** provides greater ski strength, guidance for the water flowing through channel **41** and functions as a miniature rudder. Bottom surface **46** from leading end **48** to area **42** is smooth and curved upward in the traditional manner.

Ski **10** has a pair of foot retainers **11** and **13** being positioned on either side of an adjustable cup assembly **12**. Foot retainers **11** and **13** are produced from a resilient, rubber-like fitting piece extending upward around the back of the skier's foot. FIG. **7** is an enlarged cross-sectional view taken along the line **7—7** of FIG. **1** and viewed in the direction of the arrows showing the mounting of foot retainer **11** to the top portion of the ski. Foot retainer **11** has two beaded edges **54** and **55** extending along the side and length of the retainer and which are joined to the upraised portion **29** (FIG. **1**) of retainer **11**. These beaded edges **54** and **55** fit into channels **49** and **50** formed in the top ski portion. As can be seen in FIG. **4**, top portion **15** is recessed at a location immediately in front of foot retainer **11**. This recess extends back towards the rear of the ski ending immediately behind foot retainer **13**. The resulting overhanging walls **58** and **59** forming channels **49** and **50** have plates **51** and **52** mounted thereon by conventional fastening devices **53**. FIG. **6** is a fragmentary enlarged sectional view taken along the line **6—6** of FIG. **1** and viewed in the direction of the arrows. Channel **49** and plate **51** will be described it being understood that a similar description applies to channel **50** and plate **52**. Channel **49** is a slot extending from in front of foot retainer **11** to a position behind plate **32** of heel piece **30**. Plate **51** extends approximately the length of the slot having a lower edge **60** positioned between the upper edge **61** and lower edge **62** of channel **49**. The beaded edge **54** (FIG. **7**) of foot retainer **11** is positioned within channel **49** and is held therein by plate **51**. Plate **32** extends into slots **49** and **50** and is secured therein as will be described later in this specification. The rear foot retainer **13** is secured in channels similar to those previously described for securing foot retainer **11**. This is, foot retainer **13** has beaded edges extending along the sides and length of the foot retainer each being secured within a channel formed in top portion **15**. For example, one side of foot retainer **13** (FIG. **6**) is secured within channel **56** with plate **57** fastened to top portion **15** by conventional fastening devices **53**. As previously described, the beaded edge of foot retainer **13** is secured within channel **56** by plates **57**. The channels receiving the beaded edges of foot retainer **13** are completely separate from those channels receiving the beaded edge of foot retainer **29** and plate **32**.

Cup assembly **12** (FIGS. **1** and **2**) is slidable along the top surface of the ski to facilitate sizing of the ski to the skier's foot. Assembly **12** has a resilient rubber-like heel fitting piece **30** extending upward around the back portion of the heel and ankle of the skier. Fitting piece **30** blends into a flat bottom portion **39** parallel with the top surface of ski **10** being secured to plate **32** by fastening devices, such as rivets **63**. Plate **32** extends into channels **49** and **50** previously described. Channels **49** and **50** end at location **64** (FIG. **1**) immediately in front of foot retainer **11** and extend back to location **65** positioned between cup assembly **12** and foot retainer **13**. Channels **49** and **50** actually converge toward each other. That is, the distance across the top surface of the ski at location **64** from channel **49** to channel **50** is greater than the distance across the top of the ski from channel **49** to channel **50** at location **65**. The width of plate **32** is such that both edges of the plate extending the length of the plate fit into channels **49** and **50** when the plate is positioned toward the rear of channels **49** and **50** near location **65**; however, the width of the plate is not as great as the distance from channel **49** to **50** at location **64**. When assembling a ski incorporating the present invention, plate **32** is first inserted into channels **49** and **50** at location **64** and slid back toward end **65**. Foot retainer **11** is then installed in channels **49** and **50** and plates **51** and **52** are then secured to the ski. Plate **32** is then prevented from disengaging channels **49** and **50** since retainer **11** is installed at the widest point between the channels. This assembly of plate **32** and retainer **11** provides the ski with a new uncluttered mounting arrangement. That is, the conventional fastening devices utilized to secure the toe retainer and heel retainer to the top of the ski are no longer required. Integrally attached to the back of plate **32** is locking portion **66** having a protruding rib on its lower surface for extending into and locking with ratchet-like positioning channels **67** formed in the top surface of the ski. Locking member **66** and channels **67** have been previously disclosed in my now abandoned U.S. Pat. application Ser. No. 71,569 filed on Sept. 11, 1970. Thus, further elaboration on the locking member **66** and channel **67** would be superfluous.

Best results have been obtained by producing top portion **15** and bottom portion **16** from a thermoplastic injection moldable material. During the molding of the ski, non-skid surfaces **68** and **69** are formed in the top surface of the ski being positioned respectively immediately behind foot retainers **11** and **13**. Many variations in this ski are contemplated and included in the present invention. For example, cup assembly **30** may extend up past the heel of the skier. This higher heel assembly would be utilized on racing models with a lower reinforced portion extending from the base of the foot up to the top of the heel and then with a flexible portion integrally attached thereto extending from the top of the heel up to the bottom of the calf.

It will be evident from the above description that the present invention provides a ski having new means for securing the foot retainers and heel assemblies to the top of the ski. This ski has non-skid surfaces integrally formed in the top surface of the ski for receiving the skier's foot. It will be further evident from the above description that the present invention provides a ski having a converging concave venturi channel formed on the bottom of the ski to provide greater stability. In addition, it will be evident that the ski has a rudder extending a great portion of the length of the ski thereby providing greater stability and control.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

The invention claimed is:

1. A water ski comprising:
a main body with a depressed upper surface, said body has a first and second channel positioned above and adjacent said depressed upper surface,
a first flexible toe retainer having a first and second edge extending the length of said toe retainer and being positioned in said first and second channels;
an adjustable heel retainer having a plate with edges slidably positioned in said first and second channels;
said first and second channels converge from said toe retainer to said heel retainer;
a first and second plate secured to said body extending down adjacent said first and second channel against said toe retainer securing said first and second edge therein.

2. The ski of claim 1 wherein:
said body has a lower surface with a concave converging venturi channel formed thereon; and further comprising:
a rib connected to said body and being centrally positioned in said channel.

3. The ski of claim 2 and further comprising:
a fin connected to said body being centrally positioned in said venturi channel in line with said rib, said venturi channel extending more than one-half the length of said ski.

4. The ski of claim 3 wherein:
said depressed upper surface has a non-skid surface; and further comprising:
a second flexible toe retainer attached to said body being identical to said first toe retainer and being positioned behind said heel retainer.

5. The ski of claim 4 wherein:
said fin has a convex upper side fitting into said venturi channel; and,
said main body is of thermal plastic injection moldable material.

6. The ski of claim 5 wherein:
said main body is hollow and is filled with a light stuffing material, said main body includes internal strengthening ribs.

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