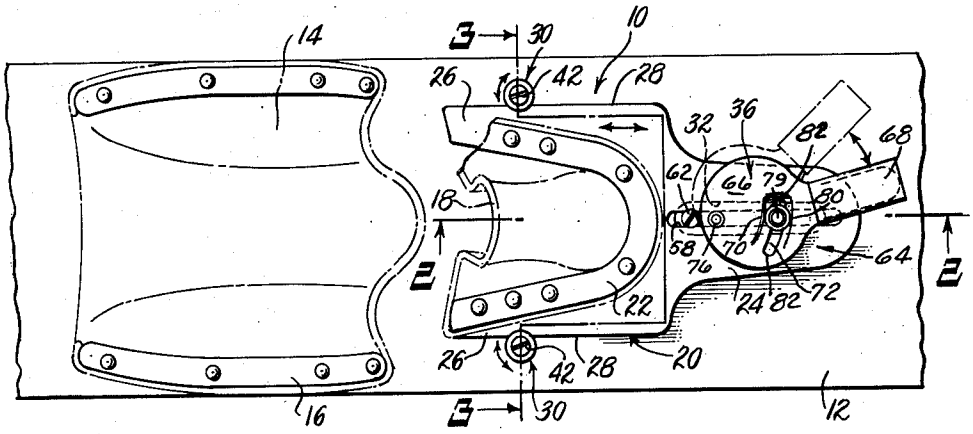
May 7, 1963 H. W. HEDLUND 3,088,137

ADJUSTABLE SKI HARNESS

Filed Aug. 29, 1960

Fig. 1.



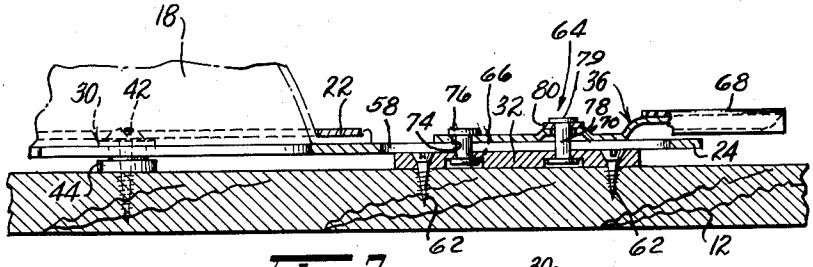
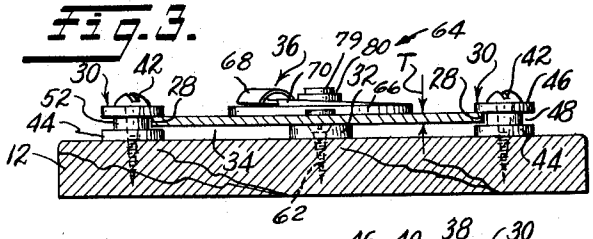


Fig. 2.

Fig. 3.



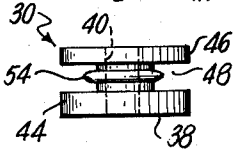


Fig. 6.

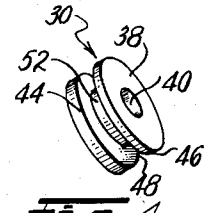


Fig. 4.

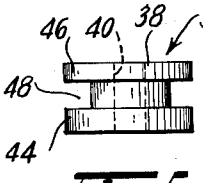


Fig. 5.

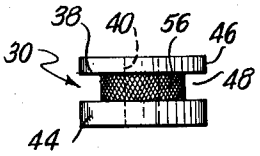


Fig. 7.

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3,088,137

ADJUSTABLE SKI HARNESS

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Filed Aug. 29, 1960, Ser. No. 52,727
13 Claims. (Cl. 9—310)

This invention relates to ski harnesses having an adjustable binder structure and more particularly to a ski harness having improved support-guide means for adjustably supporting the binder structure for movement between a plurality of positions to enable the binder structure to snugly engage various sizes of users' feet.

This application is a continuation-in-part of my co-pending application for United States Letters Patent, Serial Number 726,574, filed April 4, 1958, entitled Adjustable Ski Harness, now United States Letters Patent No. 3,010,125.

In ski harnesses, having an adjustably movable binder structure, it has long been desirable to provide spacer-guide means for supporting the binder structure during the movement thereof in a manner which assures the creation of a minimum of frictional drag on the binder structure during the movement thereof; which maintains proper alignment of the binder structure during the adjustable movement thereof and which is substantially open and unobstructed so that undesired matter, such as dirt, weeds, sand etc., may not foul, hinder or hamper the movement of the binder structure.

Accordingly, it is the primary object of this invention to provide a ski harness having an adjustable movably mounted binder structure with improved spacer-guide means for supporting the binder structure during the movement thereof relative to a support member.

It is also an object of this invention to provide improved spacer-guide means for supporting a binder structure of a ski harness so that the binder structure may be readily movable to a plurality of desired selected foot engaging positions.

Another object of this invention is to provide improved spacer-guide means for movably supporting a binder structure of a ski harness which, in effect, assures that a minimum frictional drag will be created on the movable binder structure during the movement thereof relative to a support member.

A further object of this invention is to provide improved spacer-guide means for movably supporting a binder structure of a ski harness in a manner which maintains proper alignment of the binder structure throughout the movement thereof between a plurality of adjustably selected desired positions.

A still further object of this invention is to provide improved spacer-guide means for movably supporting a binder structure of a ski harness at locations along a support member which enables the binder structure to be disposed in spaced relationship to the support member with the space being substantially open and unobstructed and with the spacer-guide means making, in effect, minimum supporting contact with the binder structure at the locations so that undesirable matter, such as dirt, weeds, sand, etc., may not foul, hinder or hamper the movement of the binder structure relative to the support member.

An additional object of this invention is to provide improved supporting-guide means for movably supporting a binder structure of a ski harness which is economical to manufacture, durable in use, reliable in operation and which possesses commercial success having consumer appeal.

In order to accomplish the desired objects, as stated above, it has been found by actual practice that a ski harness having the embodiments as described, disclosed and claimed in my co-pending application S. N. 726,574, now U.S. Patent No. 3,010,125, identified above, may be provided with improved spacer-guide means which in the preferred embodiment includes a plurality of upstanding substantially cylindrical rotatably mounted roller-like devices which engage side edge portions of a movably mounted plate having a counter member secured thereto with the roller-like devices each comprising a generally upstanding substantially cylindrical roller element having a reduced portion or groove therein which receives the adjacent edge portion of the movably mounted plate. The reduced portion or groove of each roller device is intermediate a spacer portion which is disposed adjacent a support member for spacing the plate from the support member, i.e., either a ski or base plate, and a guide portion for guiding the plate during the movement thereof between a plurality of selectable, desired positions. There is also provided suitable securing means for securing the plate in the desired position relative to the support member which a user may select.

Other objects, advantageous and important features of the invention will be apparent from a study of the specification following, taken with the drawing, which together describe, disclose and illustrate certain embodiments of the invention and what is now considered and believed to be the best mode of practicing the principles thereof. Still other embodiments may be suggested to those having the benefit of the teachings herein, and such other embodiments are intended to be reserved especially as they fall within the scope and breadth of the subjoined claims.

In the drawing:

FIGURE 1 is a plan view of a fragment of a water ski on which is mounted a ski harness having spacer-guide structure for supporting a movably mounted vamp carrying plate;

FIGURE 2 is a longitudinal sectional view taken along line 2—2 of FIG. 1 looking in the direction of the arrows;

FIGURE 3 is a transverse sectional view taken along line 3—3 of FIG. 1 looking in the direction of the arrows;

FIGURE 4 is an enlarged isometric view of one spacer-guide device illustrating the preferred embodiment thereof;

FIGURE 5 is a side elevational view of the spacer-guide device illustrated in FIG. 4;

FIGURE 6 is an enlarged side elevational view of another embodiment of the spacer-guide device, and

FIGURE 7 is an enlarged side elevational view of still another embodiment of the spacer-guide device.

Attention is now directed to the drawing wherein there is illustrated, in FIGURES 1–3, a ski harness **10** having incorporated therein certain of the structural features which define the invention as described, disclosed and claimed in my co-pending application Serial Number 726,574, for Adjustable Ski Harness, now U.S. Patent No. 3,010,125, identified above. For the sake of brevity, reference will be briefly made in the instant disclosure and description to that structure which may be considered as common to the inventions and if it is desired, reference may be made to application Serial Number 726,574, now U.S. Patent No. 3,010,125, identified above, for a more detailed description and disclosure of such common structure.

The ski harness **10**, as illustrated in FIGURES 1–3, is shown as being mounted on a primary support member **12**, such as a water ski, only a portion of which is illustrated, and it is to be understood that the ski harness **10** may be mounted to a support member, such as another type of ski, a base plate, such as is illustrated in United States Letters Patent 2,900,648, or the like.

The ski harness **10** includes binder means or structure having a vamp member **14**, of suitable material which may be secured to the ski **12** by clamping means **16**, such as clamp plates, and a heel or counter member **18**, also of suitable material which may be secured to longitudinally adjustably movable mounting means **20**, such as a counter plate, by clamping means **22**, such as a clamp plate.

In the environment of the ski harness, as illustrated, the counter plate **20** is substantially Y-shape in plan view and includes a central generally longitudinally rearwardly extending elongated tail portion **24** and generally longitudinally forwardly extending yoke portions **26** each of which defines laterally spaced generally longitudinally extending side edge portions **28** which engage spacer-guide means **30** in a manner to be described and disclosed in more detail hereinafter. The central or tail portion **24** of the counter plate **20** is provided with an elongate slot **58** that extends generally longitudinally relative to the ski **12** with the tail portion **24** of the counter plate **20** being slidably supported by elongated generally longitudinally extending substantially laterally centrally disposed spacer-guide means **32**, preferably in the form of a bar-like member or device, and it is to be noted that the counter plate **20** is spaced above or vertically upwardly a substantial distance from the support member **12** to define therebetween a space **34** which enables undesired material such as sand, dirt, weeds, etc., from becoming entangled with the counter plate **20** and thus hamper or hinder the desired longitudinal movement thereof relative to the support member **12**.

Suitable locking and securing means **36** may be provided for wedging the tail portion **24** of the counter plate **20** against the spacer-guide means **32** for securing the counter member **18** in any desired adjusted position which a user may select.

The spacer-guide means **32** not only provides support for the tail portion **24** of the counter plate **20** but also defines reaction means for the locking and securing means **36** with the means **32** being positioned generally vertically below the slot **58** in the tail portion **24** of the counter plate **20** and extends substantially parallel relative thereto and is secured to the ski **12** in such position by securing means, such as screws **62** or the like. The tail portion **24** of the counter plate **20** is slidably supported by the means **32** for longitudinal sliding movement therealong during movement of the counter member **18** between the adjustable positions.

The locking and securing means **36** may comprise wedge latch means **64** having a relatively large, substantially flat first portion or member **66**, which may be of disc-type configuration, as illustrated; suitable handle means **68** extending generally radially therefrom; wedge means, such as ramps **70**, disposed on opposed sides of an arcuate slot **72**, and an opening **74** for a pivot post **76**.

The wedge means or ramps **70** extend inwardly from the peripheral edge of the disc-like portion **66** and terminate at the inner extremity of the slot **72**. Further, it is to be noted, in the modification as illustrated, the wedge means or ramps **70** are substantially axially flush and merge with the periphery of the disc-like portion **66** adjacent the other end of the slot **72** and extend axially upwardly and generally radially inwardly therefrom so that the wedge means or ramps **70** are axially spaced upwardly from the disc-like portion **66** adjacent the inner extremity of the slot **72**.

The wedge latch means **64** pivots about a generally vertical axis, such as the pivot post **76**, which as illustrated, may be a rivet-like element secured to the means or reaction bar-like member **32**. The pivot post **76** extends upwardly through an opening in the reaction bar-like member **32**, through the slot **58** in the tail portion **24** and through the opening **74** in the wedge latch means **64**. Suitable head portions retain the pivot post **76** to the reaction bar-like member **32** and the wedge latch means **64** on the pivot post **76**. There is further provided an upper wedge reaction means **78**, such as a reaction post having a washer-like element **80** thereon, which is located longitudinally rearwardly of the pivot post **76** and, which, if desired, may comprise a slotted head machine screw with relatively fine threads which is secured into a tapped hole in the reaction bar-like member **32** or, as illustrated, may be in the form of a rivet-like element similar to the pivot post **76** and secured in a recessed portion of the reaction bar-like member **32**.

The advantage of having the reaction post **78** in the form of a slotted head machine screw, as compared to a rivet-like element, is that there is the possibility that after long and extended use, wear may cause a decrease of frictional force between the washer-like element **80** and the wedge means or ramps **70** and by using the slotted head machine screw adjustments may be made to compensate for such wear. The reaction post **78** extends upwardly through an opening in the reaction bar-like member **32** and through the slot **58** in the tail portion **24** of the counter plate **20**. The washer-like element **80** is freely axially longitudinally movably disposed and carried on the upper end portion of the reaction post **78** and a suitable head portion **79** retains the washer-like element **80** on the reaction post **78**.

The pivot post **76** and the reaction post **78** are substantially longitudinally aligned and spaced from each other relative to the ski **12**. Further, the reaction post **78** is of slightly less diameter than the width of the arcuate slot **72** in the wedge latch means **64** and the washer-like element **80** freely rides upon and in sliding engagement with the upper surface portions of the wedge means or ramps **70**.

As the wedge latch means **64** is pivoted about the pivot post **76**, clockwise as seen in FIGURE 1, by the handle means **68**, the arcuate slot **72** receives the reaction post **78**, and the wedge means or ramps **70** bear upwardly against the washer-like element **80** which has restricted upward movement because of the upper head portion **79** of the reaction post **78**. The wedge latch means **64** consequently is urged downwardly to firmly clamp the tail portion **24** of the counter plate **20** between the disc portion **66** and the reaction bar-like member **32**, note FIGURE 1 wherein the wedge latch means **64** is illustrated in solid lines as being in the clamping position.

By this wedge mechanism, the counter plate **20** and the counter member **18** which is carried thereby, are immovably anchored to the ski **12** in any desired position, as selected by the user, relative to the vamp member **14**.

To release the locking or securing means **36**, the wedge latch means **64** is pivoted counter-clockwise until the wedge means or ramps **70** relieve the clamping force on the tail portion **24**. The counter-clockwise pivotal movement of the handle means **68** to the unlocked position, as illustrated in dot-dash lines in FIGURE 1, is limited by stop means **82** preferably formed by the ends of the slot **72**. Further, the stop means **82** also facilitates in retaining the wedge latch means **64** in proper position relative to the reaction post **76**.

Also, the harness device **10** affords a rugged structure that will prevent sidewise twisting or sliding of the counter member **18** which may be subject to severe jolts and jars when in use. The spacer-guide means **30**, the post **76** and the reaction post **78** cooperate to provide a support and a device or arrangement which virtually eliminates any possibility of the counter plate **20** and the counter member **18** shifting laterally sidewise or transversely relative to the ski **12** with the pivot post **76** and the reaction post **78** of the means **32** engaging the counter plate **20** along the portion thereof which is adjacent the slot **58** therein at spaced locations thereon and restrains the counter plate **20** against lateral movement relative to the ski **12** during the movement of the counter member **18** to the selected desired adjusted positions

with the relatively large friction surface on the under side of the disc-like portion **66** of the wedge latch means **64** offering sufficient frictional contact with the top surface of the tail portion **24** of the counter plate **20**, together with the frictional contact between the lower surface of the tail portion **24** and the upper surface of the reaction bar-like member **32** to prevent the counter member **18** and the counter plate **20** from shifting when the wedge latch means **64** is in the clamping position.

It is to be understood that the means **32** and **36** may each take other structural configurations other than the configurations which are illustrated, disclosed, described, shown, taught or suggested as herein stated provided that the configuration thereof will enable the structure which corresponds to the means **32** to have engagement with the corresponding plate **20** at longitudinally spaced locations thereon and the means **36** effectively clamps the corresponding plate **20** in the desired adjustable position as selected by the user and in this way, attention is called to the above identified copending application, Serial Number 726,574, now U.S. Patent Number 3,010,125, which shows other embodiments that have been found to be effectively operable.

Having thus described and disclosed a preferred embodiment wherein the improved spacer-guide means **30** may be effectively incorporated, attention is now directed to FIGURES 4–7 which illustrate the various embodiments of the spacer-guide means **30** which, in each instance, includes a generally upwardly projecting or upstanding substantially cylindrical member or device **38** having a generally axially extending bore **40** which enables the respective device **38** to be mounted to the ski **12**, by securing means **42**, such as screws, bolts, rivets or the like, and by providing the bore **40** with a diameter which is larger than the diameter of the securing means **42** the device **38** will have rotational movement relative to the ski **12** in the direction as illustrated by the double headed arrows in FIGURE 1.

Each of the spacer-guide devices **30** further includes axially spaced radially enlarged lower **44** and upper **46** portions which are disposed adjacent to each of the respective end portions thereof and at least one radially reduced or recessed portion **48** disposed intermediate the enlarged portions **44—46** with the axial spacing between the enlarged end portions **44—46** being greater than the thickness T of the counter plate **20** to define a clearance of approximately .020 of an inch therebetween which is desirable to allow undesirable material such as sand, dirt, weeds, etc., from fouling, hindering or otherwise hampering the movement of the counter plate **20**. Each of the intermediate or reduced portions **48** may engage the respective adjacent side edge portion **28** of the counter plate **20** to define guide means therefor with such engagement being, in effect, along minimum areas of the side edge portions **28** and the devices **30**. Further, each of the lower enlarged portions **44** has an axial height or thickness which is substantially equal to the height or thickness of the spacer-guide means **32** and the lower enlarged portions **44** define axially upwardly facing radially disposed surfaces **50** which may slidably support the respective adjacent side edge portion **28** of the counter plate **20** during the longitudinal movement thereof relative to the ski **12**.

Attention is now directed to FIGURES 4–5 of the drawing wherein the preferred embodiment of the spacer-guide device **30** is illustrated wherein the reduced portion **48** is substantially axially and circumferentially smooth and defines an annular surface **52** which may engage the respective side edge portion **28** of the counter plate **20** along a generally upwardly extending line.

In the embodiment as illustrated in FIGURE 6 of the drawing, the intermediate reduced portion **48** is provided with a circumferentially continuous radially outwardly projecting tapering portion **54** which, in effect, engages

the respective side edge portion **28** of the counter plate **20** at a point.

If desired, the intermediate portion **48** of the spacer-guide device **30** may have an annular radially outwardly facing surface **56** which may be knurled, grooved, or in other ways roughened, as illustrated in FIGURE 7, to enable a more firm engagement with the respective side portion **28** of the counter plate **20**.

Further, it is to be understood that the side edge portions **28** of the counter plate **20** may also be knurled, grooved, or in other ways roughened, either in place of or together with the provision of the surface **56** on the respective spacer-guide device **30**.

While the invention has been described and disclosed in terms of certain embodiments which it has assumed in practice, the scope of the invention should not be deemed to be limited by the precise embodiments herein shown, illustrated, described and disclosed and it is to be understood that other such embodiments are intended to be reserved, especially as they fall within the scope of the claims herein subjoined.

I claim as my invention:

1. In combination with a water ski, a ski harness comprising a counter plate having a counter member secured thereto and supporting structure for disposing said counter plate in upwardly spaced substantially open relationship relative to the ski and for guiding said counter plate during movement thereof between a plurality of selectable desired positions, said counter plate having generally longitudinally extending laterally opposed edge portions and a generally longitudinally extending elongated portion, said supporting structure comprising a plurality of separate and independent substantially cylindrical generally upstanding roller-like devices, each of said devices having a reduced portion defining a groove therein disposed intermediate spaced apart upper and lower enlarged portions, means rotatably mounting said roller-like devices to said ski in laterally spaced apart relationship relative to each other to enable each of said roller-like devices to have rolling contact with the adjacent edge portion of said counter plate, said grooves of the roller-like devices each receiving the adjacent edge portion of the counter plate with the respective upper enlarged portions defining guide means for guiding the counter plate and each of said lower enlarged portions defining spacer means for spacing the adjacent edge portion of the counter plate from the ski during the movement thereof between the desired positions and a generally longitudinally extending elongated device secured to the ski in spaced relationship to and disposed laterally intermediate of the roller-like devices, said elongated device defining support means for engaging the elongated portion of the counter plate at longitudinally spaced locations thereon to restrain the counter plate against lateral movement during the movement thereof between the desired positions.

2. The structure as set forth in claim 1, wherein said grooves and the edge portions of said counter plate are substantially smooth and said rolling contact is, in effect, along a line.

3. The structure as set forth in claim 1, wherein said grooves are provided with an outwardly tapering projection each of which engages the respective edge portions of the counter plate and said rolling contact is, in effect, at the point of said engagement between the projections and the respective edge portions of the counter plate.

4. The structure as set forth in claim 1, wherein each of said roller-like devices is unitary.

5. The structure as set forth in claim 1, wherein the groove of each of the roller-like devices is provided with a roughened surface.

6. The structure as set forth in claim 1, wherein that part of the edge portion of the counter plate which is received within the groove of the respective roller-like device is provided with a roughened surface.

7. In combination with a water ski, a water ski harness

having spaced members adapted to engage portions of a user's foot, mounting means movably mounting one of said members for movement relative to the other member between a plurality of adjustable desired positions, said mounting means comprising a plate having the one member secured thereto, supporting means for supporting said mounting means, said supporting means comprising spacer means interposed between the plate and the ski to dispose said plate in upwardly spaced substantially open relationship relative to the ski, said spacer means comprising a plurality of separate and independent devices, certain of said devices being disposed in laterally spaced apart relationship relative to each other with another of the devices being disposed in spaced apart relationship relative to and laterally intermediate of the said certain devices, said certain devices defining guide track means for supporting laterally opposed portions of the plate to enable the plate to be moved between the desired positions with said another device engaging the plate at spaced locations thereon to restrain the plate against lateral movement during the movement of the plate between the desired positions, and means rotatably mounting said certain devices to the ski to enable the certain devices to have rolling contact with the respective portions of the plate.

8. In combination with a water ski, a counter member, mounting means for said counter member comprising a counter plate having the counter member secured thereto, spacer means for disposing the counter plate in upwardly spaced substantially open relationship relative to the ski, said spacer means comprising a plurality of separate and independent devices, certain of said devices being rotatably mounted on the ski in laterally spaced apart relationship relative to each other with at least another of the devices being secured to the ski in spaced apart relationship relative to and laterally intermediate of the said certain devices, said certain devices defining guide-track means for engaging edge portions of the counter plate and said another device defining support means for engaging a central portion of the counter plate at spaced locations thereon to restrain the counter plate against lateral movement while enabling the counter plate to be moved in a generally longitudinal direction between a plurality of adjusted positions relative to the ski, and means for securing the counter plate in a selected adjusted position.

9. In combination with a water ski, a counter member, mounting means for said counter member comprising a counter plate having the counter member secured thereto, spacer means for disposing the counter plate in upwardly spaced substantially open relationship relative to the ski, said spacer means comprising a plurality of separate and independent devices, certain of said devices being secured to the ski in laterally spaced apart relationship relative to each other with another of the devices being secured to the ski in spaced apart relationship relative to the said certain devices, said certain devices defining guide-track means for supporting edge portions of the counter plate and said another device defining support means for engaging the counter plate at spaced locations thereon to restrain the counter plate against lateral movement and for slideably guiding and supporting the counter plate to enable the counter member to be moved between a plurality of adjusted positions relative to the ski, and means for securing the counter member in a selected adjusted position.

10. A water ski harness having a foot-engaging member, mounting and support means for movably supporting said foot-engaging member for movement between a plurality of adjustable desired positions, said mounting and support means comprising a plate having the foot-engaging member secured thereto and spacer means for interposing between the plate and a ski to space said plate upwardly therefrom in substantially open relationship thereto, said spacer means comprising a plurality of laterally spaced apart roller-like devices defining guide-track means for supporting laterally opposed portions of the plate and another device separate and independent of said roller-like devices, means for rotatably mounting the roller-like devices to a ski to enable the roller-like devices to have rolling contact with the respective portions of the plate, means for securing the another device to a ski in spaced relationship to the roller-like devices for supporting a portion of the plate, and means for engaging the plate at spaced locations thereon to restrain the plate against lateral movement during movement of the foot-engaging member between the adjusted positions.

11. A water ski harness having a foot-engaging member, mounting and support means for movably supporting said foot-engaging member for movement between a plurality of adjustable desired positions, said mounting and support means comprising a plate having the foot-engaging member secured thereto and spacer means for interposing between the plate and a ski to space said plate upwardly therefrom in substantially open relationship thereto, said spacer means comprising a plurality of laterally spaced apart members defining guide-track means for supporting laterally opposed portions of the plate and another member separate and independent of said spaced members, said another member being disposed intermediate of and in spaced relationship to the spaced members for supporting a central portion of the plate, and means for engaging the plate at spaced locations thereon to restrain the plate against lateral movement during the movement of the foot-engaging member between the adjusted positions.

12. In combination with a water ski, a counter member, mounting means for said counter member comprising a counter plate having the counter member secured thereto, said counter plate having longitudinally extending side edge portions and a generally longitudinally extending elongated portion, spacer means interposed between the counter plate and the ski to dispose the counter plate in upwardly spaced substantially open relationship to the ski, said spacer means comprising a plurality of separate and independent members, certain of said members being secured to the ski in laterally spaced apart relationship relative to each other with another of the members being secured to the ski in spaced apart relationship relative to and laterally intermediate of the said certain members, said certain members defining guide-track means for supporting the side edge portions of the counter plate and said another member defining support means for engaging the longitudinally extending elongated portion of the counter plate at longitudinally spaced locations thereon to restrain the counter plate against lateral movement and for slideably guiding and supporting the counter plate to enable the counter member to be moved in a generally longitudinal direction between a plurality of adjusted positions relative to the ski, and means for securing the counter member in a selected adjusted position.

13. A water ski harness having a foot-engaging member, mounting and support means for movably supporting said foot-engaging member for generally longitudinal movement between a plurality of adjustable desired positions, said mounting and support means comprising a plate having the foot-engaging member secured thereto and spacer means for interposing between the plate and a ski to space said plate upwardly therefrom in substantially open relationship thereto, said plate having a generally longitudinally extending elongated portion, said spacer means comprising a plurality of laterally spaced apart members defining guide-track means for supporting laterally opposed portions of the plate and an elongated longitudinally extending member separate and independent of said spaced members, said elongated member being disposed intermediate of and in spaced relationship to the spaced members for supporting the elongated portion of the plate, and means for engaging the elongated portion of the plate to restrain the plate against lateral movement

during the longitudinal movement of the foot-engaging member between the adjusted positions.

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