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WATER SKI BINDER

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2 Sheets-Sheet 2

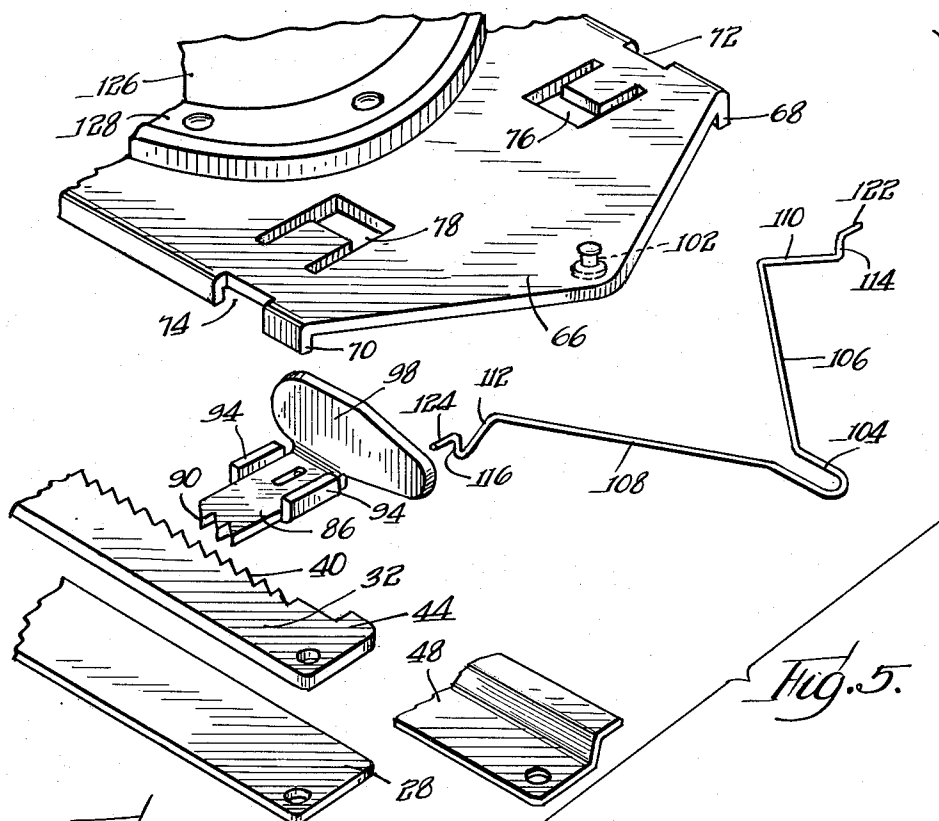


Fig. 6.

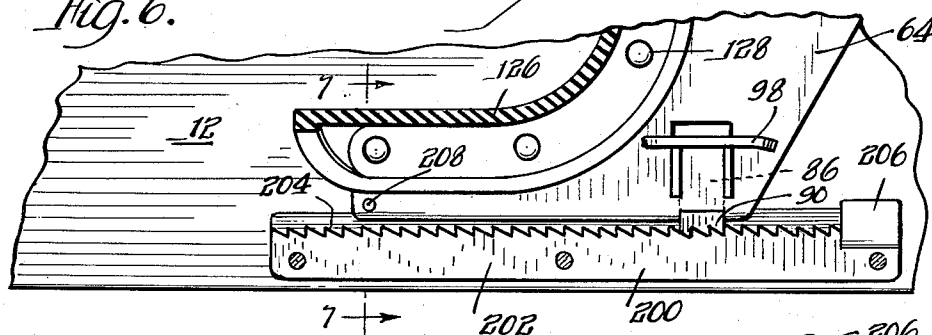


Fig. 7.

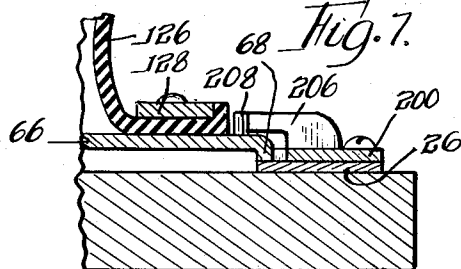


Fig. 8.

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WATER SKI BINDER

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This invention relates to a water ski binder and more particularly to one which allows a wearer to apply readily a ski to the wearer's foot or to remove readily the ski from the wearer's foot under adverse circumstances.

In water skiing there are occasions when a water skier takes a spill, i.e., falls into the water so that the skier must swim or tread water until a boat which was pulling him can either pick him up or he can again "come up" and resume skiing. It is well known that a water skier's skis must be attached to his feet securely. On the other hand, it is particularly desirable that the skier be able to remove the skis from his feet when he takes a spill so that he may conveniently tread water. When a skier takes a spill, his problems are compounded in that in order to resume skiing after a spill he must again place the skis on his feet while he is treading water had he removed his skis. It is apparent that a water skier must have bindings which readily come loose and are easy to apply to his feet while he is treading water.

In order to accomplish the results required, many prior art binders have been developed. However, each of the prior art binders has a particular fault in that either the skier must have a loose fit for his binder, or if the fit is not loose, then the ski is very difficult to remove when the skier is in the water. One of the common difficulties is that many of the prior art binders have a locking means to hold the rear portion of the binder against the skier's foot. The locking means is such that as the skier's heel presses against the rearward portion of the binder, the locking means becomes more firmly engaged to hold the binder in place. This condition makes it extremely difficult to remove a ski from the skier's foot when the skier is attempting to tread water, especially in the case of an inexperienced skier who is not a good swimmer. It should be further noted that water skis are customarily worn by a number of different water skiers having different size feet so that the problem is further compounded, inasmuch as, the binder must be adjustable to receive a plurality of lengths of feet.

It is therefore one of the principal objects of the present invention to provide a water ski binder which has a readily releasable rear portion even when force is applied against the rear portion of the binder.

It is another object of this invention to provide an improved water ski binder which is adjustable for feet of varying lengths and may be readily applied to a wearer's foot though the wearer may be treading water.

It is a further object of the hereindisclosed invention to provide a water ski binder which is safe for a water skier to apply while he is treading water.

It is a still further object of the hereindisclosed invention to provide a water ski binder which is economical to manufacture, easy to assemble and has a high degree of reliability.

Other objects and uses of the instant invention will become readily apparent to those skilled in the art upon a perusal of the following specification in light of the accompanying drawings in which:

FIGURE 1 is a perspective view of a water ski including a binder embodying the hereindisclosed invention;

FIGURE 2 is a plan view of the rear portion of the binder shown in FIGURE 1 with portions broken away and shown in cross section to show better the construction of the instant binder;

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FIGURE 3 is a cross-sectional view taken on line 3—3 of FIGURE 2;

FIGURE 4 is a cross-sectional view taken on line 4—4 of FIGURE 2;

FIGURE 5 is an exploded view of a fragmentary portion of the rear portion of the binder shown in FIGURE 2 but with certain members broken away in order to show better the construction of the instant binder;

FIGURE 6 is a fragmentary plan view with portions broken away and others in cross section of a rear portion of a binder showing a modification of the instant invention;

FIGURE 7 is a cross-sectional view taken on line 7—7 of FIGURE 6; and

FIGURE 8 is a perspective view of a fragmentary portion of a rack which is a part of the binder shown in FIGURE 6.

Referring now to the drawings and especially to FIGURE 1, it may be seen that a water ski, generally indicated by numeral 10, includes a ski 12 and a binder generally indicated by numeral 14. The binder 14 includes a forward portion 16 and a rear or heel portion 18. The forward portion 16 includes a forward flexible cover 20 which is held on to the ski by a pair of crescent shaped plates 22 and 24.

Looking now to FIGURE 2, it may be seen that the rear portion is an adjustable rear holder which allows a portion of the holder to be moved back to allow easy entrance of the foot into the space defined by the forward cover 20 and the ski 12. The holder includes a pair of slide plates 26 and 28 which slide plates are in engagement with the upper surface ski 12. Positioned above and in engagement with the slide plates 26 and 28 are a pair of racks 30 and 32, respectively. Each of the racks 30 and 32 has a body portion 34 and 36, respectively, which body portions have buttress teeth 38 and 40, respectively, formed therein. As may be clearly seen in FIGURE 2, the teeth each have one face perpendicular to the racks and a second face sloping outward of the opposite rack. Each of the racks 30 and 32 has stops 42 and 44, respectively, formed integral therewith. The racks 30 and 32 are positioned parallel to each other so that the teeth of the respective racks are adjacent to each other for reasons which will become apparent hereinafter. Lock plates 46 and 48 are mounted in engagement with racks 30 and 32, respectively, to provide a protective covering over the racks.

Each of the slide plates racks and lock plates has three mounting holes extending therethrough. The holes in each of the racks is in registry with the holes through the adjacent slide plates and lock plates. Positioned in each of the holes is a wood screw 50 which is imbedded in the ski to fix the lock plates racks and slide plates to the ski. The lock plates 46 and 48 include mounting strips 52 and 54, respectively, which contain the above mentioned holes. Formed integral with the mounting strips 52 and 54 are inclined strips 56 and 58, respectively, which inclined strips have holding strips 60 and 62, respectively, formed integral therewith.

Positioned between the racks 30 and 32 and below the holding strips 60 and 62 but above the ski is a guide plate 64. The guide plate includes a base 66 which has runners 68 and 70 formed integral therewith and the runners 68 and 70 are positioned below strips 60 and 62, respectively, but above slide plates 26 and 28, respectively. The runners slide on their respective slide plates to prevent any wear on the ski thereby insuring a sliding metal-to-metal contact rather than a metal-to-wood contact which would cause considerable wear in the ski. The plate 64 includes a pair of lug apertures 72 and 74 through runners 68 and 70, respectively. The lug apertures 72 and 74 each have immediately adjacent thereto

guide apertures 76 and 78, respectively. The guide apertures 76 and 78 are identical to each other and each has a general U shape with the arms of the U extending toward its respective lug aperture as is clearly shown in FIGURE 5. Positioned in the respective guide apertures 76 and 78 are lugs 80 and 82.

The lugs 80 and 82 are substantially identical in construction, however, lug 80 is a right-hand lug and lug 82 is a left-hand lug. Each of the lugs 80 and 82 includes a base 84 and 86, respectively. The base 84 includes three teeth 88 which mate with teeth 38 of rack 30 while base 86 of lug 82 has three teeth 90 which mate with teeth 40 of rack 32. The bases 84 and 86 with their respective teeth protrude through lug apertures 72 and 74 to engage the teeth of the adjacent racks. The bases 84 and 86 also have formed integral therewith pairs of ears 92 and 94, respectively. The ears 92 fit into the arms of the U-shaped guide aperture 76 while the ears 94 fit into the arms of the U-shaped aperture 78. It is readily apparent that the coaction of the ears in the guide plate guides the movement of the lugs in the direction of the U-shaped aperture arms. Inasmuch as the arms of the U-shaped apertures are perpendicular to the racks, the movement of the lugs in their respective apertures is perpendicular to the respective racks. The lugs 80 and 82 also include gripping tabs 96 and 98, respectively, which gripping tabs are substantially perpendicular to their respective bases and the tabs protrude above the upper surface of the plate so that a skier may conveniently move the lugs.

In order to provide a means for keeping the lugs in engagement with their respective racks, a spring means is provided in the form of spring 100. The guide plate 64 includes a spring post 102 which is positioned on the underside of the plate. The spring 100 includes a U-shaped post gripping section 104 which is in engagement with the post. Formed integral with the gripping section is a pair of arms 106 and 108. Each of the arms 106 and 108 is formed integral with perpendicular connectors 110 and 112, respectively. The connectors 110 and 112 have pins 114 and 116, respectively, formed integral therewith and perpendicular to their respective connectors. These pins 114 and 116 are positioned in apertures 118 and 120 of lug bases 84 and 86, respectively. Stays 122 and 124 are formed integral with respective pins 114 and 116 to hold the pins in engagement with their respective lugs.

The rear holder is completed by a flexible heel back 126 which is fixed to the guide plate. As is evident from FIGURE 2, the guide plate has a U-shaped aperture in its forward portion and the flexible heel back 126 being generally U-shaped is fixed to the plate by a generally U-shaped mounting plate 128 which is held to the guide plate in a conventional fashion by a plurality of rivets 130.

From the foregoing description it is evident how the instant device is assembled. The slide plates and their respective racks and holding plates are first positioned relative to the ski. The lock plates are removed and the guide plate is positioned between the racks with the heel back fixed thereon in a conventional fashion. The spring is attached to the post prior to the positioning of the guide plate and the lugs are positioned in their respective apertures prior to positioning. With the guide plate in position, the lock plates are then applied to hold the guide plate in its position between the racks.

If any skier desires to use the ski, it is only necessary for the skier to grasp the grippers 96 and 98 and move them toward each other to retract the lugs from their respective racks and then the entire guide plate may be moved back until the guide plate engages stops 42 and 44. The skier then positions his foot beneath cover 20, and the rear holder is simply pushed forward inasmuch as the construction of the teeth 38 and 40 and the respective lugs is such to allow movement in a direction toward the front cover by displacing the lugs from the racks

against the force of spring 100 by a ratchet effect. With the rear holder positioned against the heel of the foot under cover 20, the skier's foot is securely bound to the water ski.

In the event that a skier should take a spill and it is necessary for the skier to remove the skis while he is in the water, the skier need only grasp the grippers 96 and 98 to retract the lugs from their respective racks. It should be noted that the construction of the instant binder is such that it provides a straight line draw for its locking lugs. This means that the lugs do not bind even when a force is applied to the lugs to hold them in secure engagement with their respective rack teeth. By the use of this particular construction, the unhappy situation of a skier treading water with his skis on, but unable to remove the skis is eliminated because the rear portion may be readily removed even when a rearward force is applied to the guide plate. Thus, the instant binder is one which allows a closer fit to be made to a skier's foot of any size thereby providing secure attachment, and the degree of safety of the present binder is high in that it may be readily loosened whenever it is desired.

A second embodiment of the present invention is shown in FIGURES 6, 7 and 8. In this second embodiment the construction is identical to the binder described in detail above. However, the stop means for the second embodiment is an improved construction which allows the rear binder to be moved a greater distance away from the front cover to allow easier ingress and egress for a skier having particularly long feet. FIGURE 6 shows only one side of the rear portion of a binder and it is to be understood that the other side is identical in construction. The improved stop means includes a rack 200 having a body 202 with a plurality of buttress teeth 204 which are identical to teeth 38 and 40. It should be noted that each of the buttress teeth 204 has one face perpendicular to the rack and that face extends toward the front cover which is not shown and the teeth mate with the teeth of lug 82. The rack 200 has a stop 206 formed integral therewith. The stop 206, as may be seen in FIGURE 7, extends upward and above the guide plate 64 so that the guide plate passes under the stop. However, guide plate 64 has a stop pin 208 adjacent to its forward edge, which stop pin is engageable with the stop 206. It is therefore readily apparent that though the guide plate 64 may be retracted past the stop 206, the stop pin 208 engages the stop 206, thereby allowing the binder further retraction than with the first mentioned stop means.

The rack 200 has three holes which receive the screws 50 which screws 50 hold the lock plate over the rack though the lock plate is not shown in position over the rack as well as the slide plate 28 which is below the rack 200.

From the foregoing description it may be seen how the above-described stop means provides for easier insertion or removal of a long foot into the binder, inasmuch as the rear portion of the binder may be withdrawn to a substantial distance from the front cover. It should also be noted that though there is a pin protruding from the binder, this pin is adjacent to the flexible back portion and is not in a position where a skier may come into engagement with the pin and harm himself.

While a specific embodiment of the hereindisclosed invention has been shown and described in detail, it is to be expressly understood that the present invention is in no way limited by the instant disclosure, inasmuch as those skilled in the art may make various modifications and changes without departing from the spirit and scope of the invention. It is to be expressly understood that the present invention is limited only by the appended claims.

What is claimed is:

1. A binder for use on a water ski including a formed flexible covering to hold a foot in place on a ski compris-

ing, in combination, a pair of slide plates positioned on the ski adjacent to the formed forward flexible covering, a guide plate mounted on the slide plates, said guide plate including a pair of runners, each of said runners being engageable with its respective slide plate and slideable thereon, a rack mounted on each of said slide plates adjacent to the guide plate, means for holding the guide plate between the racks, means movably mounted in the guide plate engageable with said racks to releasably lock the guide plate to the racks, said means movably mounted in the guide plate being limited to movement in a direction perpendicular to the respective racks, and a heel member connected to said guide plate for engagement with a foot positioned under the forward flexible covering.

2. A binder for use on a water ski in cooperation with a forward flexible covering to hold a foot in place on a ski comprising, in combination, a pair of spaced parallel racks, a plate movably mounted between said racks, said plate being movable in a path parallel to said racks, a flexible heel back mounted on said plate for engagement with a foot to hold the foot in the forward flexible covering, a pair of locking lugs movably mounted on said plate, each of said locking lugs being engageable with one of said racks to lock the plate to the rack in one direction, means for determining a path of movement by each of said lugs relative to the plate in a direction perpendicular to its respective rack, spring means engageable with said lugs to urge the lugs toward the respective racks, and stop limit means cooperative with said racks and the plate to limit the movement of the plate in one direction.

3. A binder for use on a water ski in cooperation with a forward flexible covering to hold a foot in place on the ski comprising, in combination, a pair of spaced parallel slide plates mounted on the water ski, a rack mounted on each of said slide plates, each of said racks being parallel to each other and having a plurality of buttress teeth having faces extending toward the forward flexible covering and stops extending toward each other, a guide plate movably mounted between said racks, said guide plate having a pair of parallel runners engageable with the slide plates, said guide plate having a pair of lug apertures and a pair of U-shaped guide apertures having the arms of the U-shaped guide apertures extending toward the respective racks and being perpendicular thereto, a locking lug positioned in each of the lug apertures and the adjacent U-shaped guide aperture, each of said lugs having a plurality of teeth mating with the teeth of its respective rack, each of said lugs having a pair of guides positioned in the guide apertures to determine the path of movement of the lug in a direction perpendicular to its respective rack, each of said lugs having a gripper to provide a convenient grasping means, a spring post mounted on said guide plate, a spring attached to said spring post and connected to the lugs to urge the lugs into engagement with the respective racks, a locking plate mounted on each of said racks and extending over the guide plate to lock the guide plate in a vertical direction, whereby the guide plate may be moved forward toward the flexible front cover by simply applying a force to the guide plate in that direction however the movement of the guide plate away from the front cover is precluded by the cooperation of the locking lugs with their respective racks and the locking lugs may be released by movement of the locking lugs in a direction perpendicular to the movement of the guide plate.

4. A binder for use on a water ski including a forward flexible covering to hold a foot in place on a ski compris-

ing, in combination, a pair of spaced parallel slide plates mounted on the ski behind the forward flexible covering, a rack positioned on each of said slide plates, each of said racks having a plurality of buttress teeth having one face facing the forward flexible cover and the teeth of said racks being adjacent to each other, each of said racks having a stop formed integral therewith, a guide plate positioned between the racks and movable in a path parallel to the racks, said guide plate having a pair of lug apertures and a generally U-shaped aperture adjacent to each of said lug apertures, each of said U-shaped guide apertures having its arms extending toward the adjacent rack and having its arms perpendicular to the rack, a lug mounted in each of said lug apertures, each of said lugs having a plurality of teeth mating with the teeth of its respective rack, each of said lugs having a guide ear extending therefrom and being positioned in the U-shaped guide aperture to control the movement of the lug relative to the plate in a path substantially perpendicular to the respective rack, a post positioned on the guide plate adjacent to the ski, a spring including a mounting portion in engagement with said post, said spring having a pair of elongated resilient arms formed integral with the mounting portion, said spring having a connector formed integral with each of the resilient arms and being perpendicular thereto, said spring having a pin formed integral with one end of each of the connectors, each of said lugs having a spring aperture contained therein and a pin of the spring being positioned in each of the apertures to urge the lug into engagement with the respective rack, said guide plate having a U-shaped opening contained in one side adjacent to the forward flexible covering, a flexible heel back positioned on said guide plate adjacent to the U-shaped opening for engagement with the heel of a foot positioned under the forward flexible covering, and means on said guide plate for engagement with the stops of said rack to limit the movement of the guide plate from the forward flexible covering.

5. A binder for use on a water ski including a formed flexible covering to hold a foot in place on a ski comprising, in combination, a slide plate positioned on the ski adjacent to the formed flexible covering and adjacent to one edge of the ski, a guide plate mounted on the slide plate, said guide plate including a runner engageable with and slideable on the slide plate, a ratchetlike rack mounted on the slide plate adjacent to the guide plate, means for holding the guide plate adjacent to the rack, means movably mounted in the guide plate engageable with said rack to releasably lock the guide plate to the rack in one direction and to allow the guide plate to move freely relative to the rack in the opposite direction, said means movably mounted in the guide plate being limited to movement in a direction perpendicular to the rack, and a heel member connected to said guide plate for engagement with a foot positioned under the forward flexible covering.

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