ADJUSTABLE ICE SKATE
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This invention relates generally to ice skates and more particularly to improved means for laterally adjusting the skate blade in a horizontal plane, and that would be visible. 

The vast majority of ice skates in use today are mass produced with the blade of the skate located on a substantially centralization longitudinal axis of the sole and heel plates. This location represents, at best, a compromise since the optimum position is a function of the physical characteristics of the ultimate user. What is proper for one individual may not be comfortable for another individual.

For such reason, most standardized ice skates do not meet with the requirements of the expert or for competitive sports. The average or casual user is compelled to have the blades remounted on the shoes to best conform to his or her line of balance. Such a resetting involves the removal of the skate from the shoe, which is a laborious procedure and a remounting thereon along a desired line of balance which usually is empirically determined. Where the heel and sole plate are riveted onto the leather sole of the shoe only a few changes may be made before the shoe, which is quite expensive, becomes unusable and requires rebuilding. Proper balance is important even to the novice as improper balance during the learning process more difficult and materially adds to the likelihood of physical injury, particularly to the ankles and associated muscles.

As the skater becomes more adept, and particularly where the ice skates are to be used in competition, such as figure skating and speed skating, the problem of balance becomes more critical. In these highly competitive sports every means possible to fully utilize the skill of the skater must be employed in order to insure the best possible performance. Each improvement in the equipment of the skater can be directly translated into more skillful skating.

It is known from the prior art that laterally adjustable skates will improve the skater's performance. For example, in my prior United States Patent No. 2,230,553, dated February 4, 1941, I disclosed means for moving the skate blade relative to the skate shoe. The general drawbacks to the known prior art devices were that the adjustment means were awkward to manipulate while the skates were being worn. The two clamping screws required, one on each side of each of the scars, accounts for the difficulty in adjustment of the prior art device. Furthermore, the clamping screws could easily become lost because they were not captive. A particular disadvantage of the prior art adjusting means was the relatively crude appearance imparted to the skates by reason of the exposed clamping screws. For the foregoing reasons my prior device did not achieve public acceptance.

By the way of contrast, the present invention provides an effective, simple and inexpensive means to make lateral adjustments in the blade position. Only one captured screw, substantially larger in diameter than the prior art and the adjustment may be made while the skate is worn by merely assuming a sitting position and placing one skate on the opposite knee. A small inconspicuous hole will then be accessible through which a concealed screw may be manipulated by means of a simple tool. The adjustable skate of the present invention provides an esthetically appealing configuration since none of the adjusting mechanisms are visible. Accordingly, the stanchions may be gracefully tapered.

It is therefore, an object of the present invention to provide improved means for adjusting the lateral position of an ice skate blade.

Another object is to provide means to lock a skate blade in position that requires only one screw per stanchion. Still another object of the present invention is that the aforesaid locking screw is completely concealed.

A further object of the present invention is that the aforesaid locking screw be of the captured type and be larger in diameter than that used in the prior art.

An additional object is to provide improved skate adjustment means that may be utilized while the skate is being worn.

Still another object is to provide an improved skate blade that may readily be displaced laterally on the skate plates or may be removed therefrom by the use of a simple tool.

These and other features, objects and advantages of the invention will, in part, be pointed out with particularity and will, in part, become obvious from the following more detailed description of the invention, taken in conjunction with the accompanying drawings, which forms an integral part thereof.

In the various figures of the drawing like reference characters designate like parts.

In the drawing:

FIG. 1 is a side elevational view of an improved ice skate employing the improved adjusting means of the present invention;

FIG. 2 is an enlarged, exploded, sectional elevation view taken along line 2—2 of FIG. 1 with the screw tightening tool shown partially inserted;

FIG. 2A is an enlarged, fragmentary sectional view similar to the upper portion of FIG. 2 but rotated 90° about a vertical axis and with the components assembled;

FIG. 3 is a top plan view taken along line 3—3 of FIG. 1;

FIG. 4 is a bottom plan view taken along line 4—4 of FIG. 1; and

FIG. 5 is an enlarged, fragmentary view similar to the lower portion of FIG. 2 but illustrating the present invention utilized with a figure skate.

Referring now to the drawing and in particular to FIG. 1, the ice skate 10 is comprised of a blade portion 12 which is integral with a tubular backbone 14. Vertically disposed stanchions 16 and 18 are fixedly secured to backbone 14, as by welding or soldering, and serve to removable support sole and heel plates 20 and 22, respectively. A shoe 5 (partially shown in phantom) is secured by rivets 23 to the sole and heel plates by utilizing holes 24 positioned about the periphery thereof. The sole and heel plates are each further provided with a laterally elongated cavity or well 26 and 28, respectively.

FIG. 2 illustrates the components of the present invention. It will be seen from the drawing and the ensuing description that the elements are relatively simple and inexpensive to manufacture and assemble. A socket headed screw 30 is placed within the stanchion with its head down until peripheral edge portion 32 rests on the inside surface of the tapered stanchion. By reason of the improved construction, a large diameter screw, say 7/16″ or even 3/8–24, may be employed with an attendant increase in holding power over my prior device which was limited to an 8–32 screw because of space consideration.

Plug 34, having a central aperture 36 is secured in the upper, open end of the stanchion by soldering or welding so that, except for the presence of clearance hole 38, the stanchion interior is closed off and screw 30 is captured in an upright position, in readiness for use. FIG. 2 and FIG. 2A further illustrate that the upper ends of the
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3 stanchions are flared outwardly at 35 and upwardly at 37. This construction serves the dual purpose of providing additional bearing surface between the stanchion and the well and also prevents the stanchion from turning or twisting with respect to the well. The upwardly flared portions 37 straddle the well so that, in effect, the stanchion is keyed to the well.

One further step is required to complete the assembly of the stanchion. A small, unobtrusive hole 38 is formed through the wall of tubular backbone 14 in order to communicate with the interior of the stanchion. This can best be seen in FIG. 2, the axis of the hole 38 extends chordally across the body of backbone 14 and in reality passes through the wall in two places. Tool 40, having a hexagonal, square or similarly functional forward end adapted to mate with a like formation in screw head 30, passes through holes 38 in order to be able to advance the screw axially by rotation thereof. It should be noted that in order to clear blade 12, the common axis of holes 38 is at some small angle with the theoretical longitudinal center line of thestanchion. For this reason, it has been found desirable to form the lower face 34a of plug 34 at the angle $\alpha$ with respect to its upper face and the clearance hole in the plug is also made at the same small angle $\alpha$ with the theoretical center line of the stanchion. The head of screw 32 is countersunk at 32a so the tool is naturally guided into the socket.

For purposes of the discussion, FIG. 1 represents the ice skate for the right foot so that hole 38 will be on the inside and therefore available. Moreover, when the user wants to make a minor lateral change in blade position he merely places his right foot on his left knee when in a seated position and access hole 38 is available at a convenient angle for the simple insertion of tool 40.

Prior to riveting the sole and heel plates to the underside of the shoe, a rectangular nut 42 is placed in the wells of the plates. FIG. 2 and FIG. 3 show that both the well and the nut are rectangular in shape with the long dimension of the well being substantially greater than the comparable nut dimension while the short dimension of the well is substantially the same as a comparable dimension of the nut. It will also be seen that the long dimension of the well is transverse the longitudinal axis of the skate blade as is slot 44 formed in the well. It is obvious then that the nut may move laterally with respect to the sole and heel plates but may not move in a direction parallel to the length of the blade. Nut 42 provides a means of controlling the movement of the screw. In the assembled condition, each pair of apertures is disposed one above the other on a line chordal to the diameter of the sole and heel stanchions 16 and 18, respectively, is welded or soldered to the backbone.

FIG. 7 illustrates the utilization of the adjustment means of the present invention in combination with a figure skate. Like the stanchion and application in the embodiment is substantially the same as described hereinabove except that stanchion 72, which is typical of both the toe and heel stanchions, is secured directly to blade 70 by welding or soldering. Access hole 74 is provided on the inside of the stanchion to accommodate the insertion of tool 40.

It is apparent from the foregoing description that improved adjustable attachment means for speed and figure skate blades has been provided. The adjustment can be made easily even while the skate is being worn and once the correct setting has been found, it can be repeated at a subsequent time if the blade is removed for replacement or repair. The access ports for making the adjustment are unobtrusive and the single screw used to clamp either the sole or heel plate to the stanchion cannot be seen when the skate is worn in a normal condition. The access holes also serve as ventilation holes. Furthermore, the adjustment means do not detract from the appearance of the skate because both the screw and the nut are completely concealed. No special skill is required to manipulate the setting tool.

There has been disclosed heretofore the best embodiments of the invention presently contemplated and it is to be understood that various changes and modifications may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. An ice skate comprising:
   (a) a sole plate adapted to be secured to a shoe, said sole plate having a well formed therein and a slot formed in said well, said slot being disposed transverse to the longitudinal axis of the shoe;
   (b) a heel plate adapted to be secured to a shoe in tandem with said sole plate, said heel plate having a well formed therein and a slot formed in said well, said slot being disposed transverse the length of the shoe;
   (c) a pair of hollow stanchions;
   (d) a blade supported in spaced relation to said sole and heel plates by said stanchions;
   (e) a screw entirely disposed and concealed within each of said stanchions, the head of the screw in its lowermost position abutting the interior wall of said stanchion, said screw being axially movable from a point outside of said stanchion;
   (f) a plug secured to the end of said stanchion opposite the end secured to said backbone, said plug having an aperture through which said screw extends; and
   (g) a nut disposed in said well whereby upon threading engagement between said screw and said nut, said stanchion will be drawn into tight abutment with each of said sole and heel plates, said nut being capable of movement in such a direction as to move the longitudinal axis of said blade.

2. An ice skate comprising:
   (a) a sole plate adapted to be secured to a shoe, said sole plate having a well formed therein and a slot formed in said well, said slot being disposed transverse to the longitudinal axis of the shoe;
   (b) a heel plate adapted to be secured to a shoe in tandem with said sole plate, said heel plate having a well formed therein and a slot formed in said well, said slot being disposed transverse the length of the shoe;
   (c) an integral blade and hollow backbone, said backbone having two pairs of apertures formed therein, each pair of apertures being disposed one above the other on a line chordal to the diameter of said back-
bone said pairs of apertures being in tandem along the length of said blade;
(d) a pair of hollow stanchions secured perpendicularly to said backbone whereby each pair of apertures in said backbone communicate with the interior of one of said stanchions;
(e) a screw entirely disposed and concealed within each of said hollow stanchions, the head of the screw in its lowest position abutting the interior wall of said stanchion, said screw being axially movable from a point outside of said stanchion;
(f) a plug secured to the end of said stanchion opposite the end secured to said backbone, said plug having an aperture through which said screw extends; and
(g) a nut disposed in said well whereby upon threading engagement between said screw and said nut, said stanchion will be drawn into tight abutment with each of said sole and heel plates, said nut being capable of movement in a direction transverse the longitudinal axis of said blade.

3. The device of claim 2 wherein at least one of the abuttingly opposed surfaces of said well and said nut is knurled.

4. The device of claim 2 wherein said well is rectangular in shape and wherein said greater dimension of said rectangle is transverse the longitudinal axis of said blade.

5. The device of claim 2 wherein the threads of said nut are formed at a small angle with respect to the longitudinal vertical center line of said stanchion, said angle being substantially the same as the angle formed between the backbone apertures' chordal line and the vertical plane of said blade, the interior face of said plug being disposed at the same small angle to a horizontal plane transverse the plane of said blade.

6. The device of claim 2 wherein the cross sectional dimension of said stanchion is greater at one end than the other end, the change in cross sectional dimension providing means for supporting the head of said screw when said screw is in its lowermost position.

7. In combination with the device of claim 2, a tool adapted for insertion through said backbone apertures, said tool having means to rotate and axially displace said screw.

8. The device of claim 2 including indicia on the sole plate and the stanchion for indicating the relative displacement between the two members with respect to a reference position.

9. An ice skate comprising:
(a) a sole plate adapted to be secured to a shoe, said sole plate having a well formed therein and a slot formed in said well, said slot being disposed transverse to the longitudinal axis of the shoe;
(b) a heel plate adapted to be secured to a shoe in tandem with said sole plate, said heel plate having a well formed therein and a slot formed in said well, said slot being disposed transverse the length of the shoe;
(c) an elongated blade;

(d) a pair of hollow stanchions secured perpendicularly to said blade in tandem, each of said stanchions having an aperture;
(e) a screw entirely disposed and concealed within each of said hollow stanchions, the head of the screw in its lowermost position abutting the interior wall of said stanchion, said screw being axially movable from a point outside of said stanchion; and
(g) a nut disposed in said well whereby upon threading engagement between said screw and said nut, said stanchion will be drawn into tight abutment with each of said sole and heel plates, said nut being capable of movement in a direction transverse the longitudinal axis of said blade.

10. The device of claim 9 wherein at least one of the abuttingly opposed surfaces of said well and said nut is knurled.

11. The device of claim 9 wherein said well is rectangular in shape and wherein said greater dimension of said rectangle is transverse the longitudinal axis of said blade.

12. The device of claim 9 wherein the threads of said nut are formed at a small angle with respect to the longitudinal vertical center line of said stanchion, said angle being substantially the same as the angle formed between the backbone apertures' chordal line and the vertical plane of said blade, the interior face of said plug being disposed at the same small angle to a horizontal plane transverse the plane of said blade.

13. The device of claim 9 wherein the cross sectional dimension of said stanchion is greater at one end than the other end, the change in cross sectional dimension providing means for supporting the head of said screw when said screw is in its lowermost position.

14. In combination with the device of claim 9, a tool adapted for insertion through said backbone apertures, said tool having means to rotate and axially displace said screw.

15. The device of claim 9 including indicia on the sole plate and the stanchion for indicating the relative displacement between the two members with respect to a reference position.

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