

**April 9, 1935.**

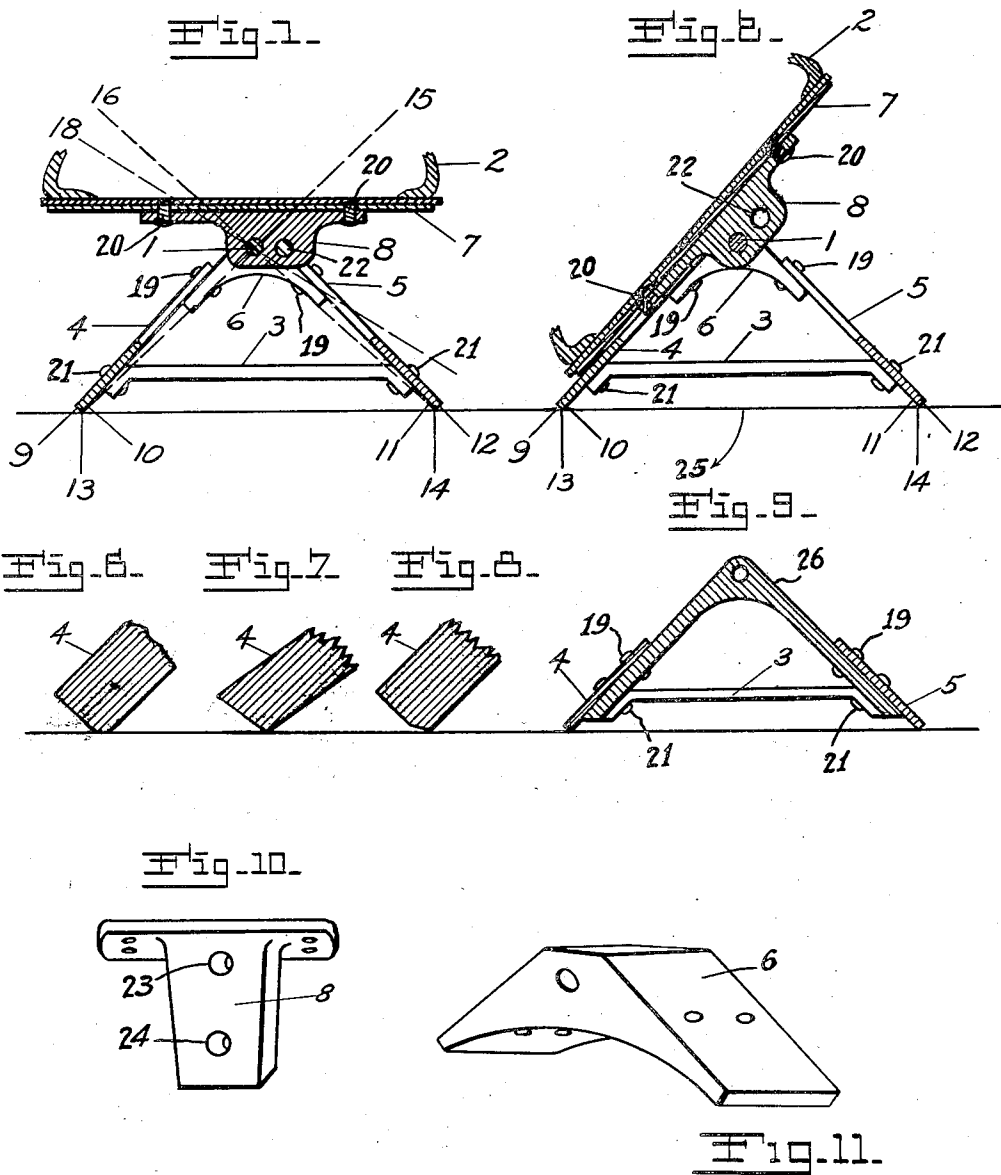
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**1,996,925**

ICE SKATE

Filed April 16, 1934

2 Sheets-Sheet 1



Ottmar Louis <sup>Inventor</sup> Kaub

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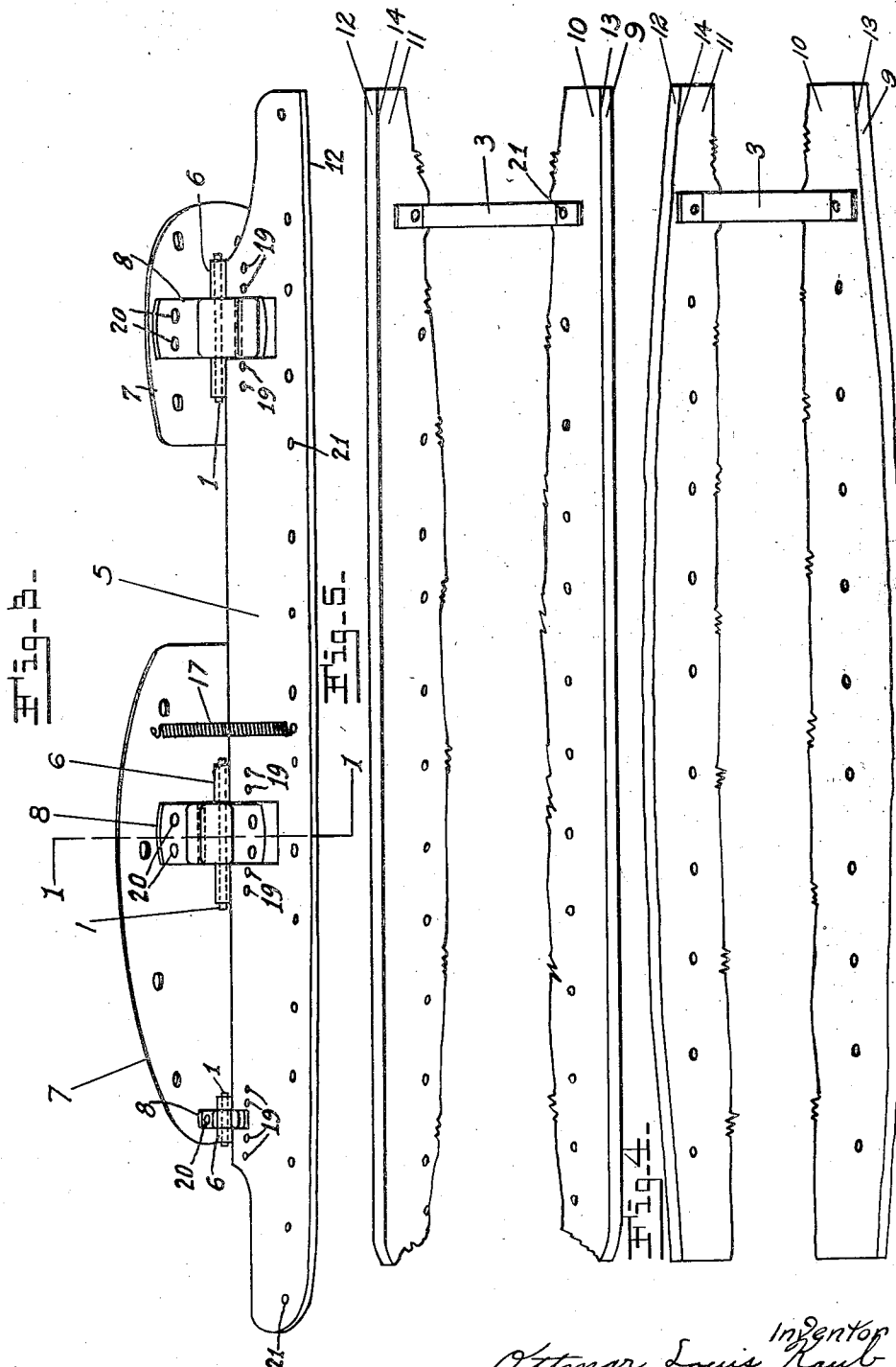
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## UNITED STATES PATENT OFFICE

1,996,925

## ICE SKATE

Ottmar Louis Kaub, St. Louis, Mo.

Application April 16, 1934, Serial No. 720,773

13 Claims. (Cl. 208—167)

This invention relates to improvements in ice skates, and is designed and constructed to eliminate the defects that are to be found in ice skates heretofore produced, and to be an improvement over ice skates in present use for racing and ordinary rink skating.

More specifically, the main purpose of this invention is the production of a skate that will simultaneously embody the following major advantages:

1. Substantial reduction of ankle strain without the use of obstructing rubber pads or other impediments.
2. A skate that will allow the shoe to thrust to any angle required in racing without attendant bending of the ankles or a lifting of one blade from the ice.
3. A skate whose shoe cannot come into contact with the ice to cause tripping.
4. A skate that will curve in accordance with the angle and direction of thrust of the skater's body.
5. A skate of practical construction, strong, exact, light in weight and compact in width and height.

Other advantages are hereinafter described and illustrated.

The skate most commonly used today is the single blade skate riveted to special skating shoes. The principal disadvantage of this skate is the ankle strain caused by the leverage of the blade against the skater's foot. This ankle strain discourages many people from enjoying the sport, and even the most practiced skaters sometimes find their ankle bending and their shoe rubbing the ice when making a fast turn.

An object of this invention is to provide a freely pivoting double blade skate with a pivoting point as close to the bottom of the foot as structurally possible in order to reduce ankle strain, and so constructed and arranged that various angles of thrust will be possible without bending the ankles or causing one blade to lift from the ice.

Another disadvantage of the single blade skate is the resistance caused by the gouging effect produced by the action of the straight side of the blade resisting the turning effect of the curved edge. An object of this invention is the elimination of such gouging.

Other inventions aim to reduce the ankle strain by the interposition of rubber pads or springs between the skater's foot and a double pair of blades. These pads, however, prevent a low inclination of the shoe. Maneuvering on the ice is accomplished by vertical pressure on one side or

the other of the pads, which inclination governs the direction of the skate.

On quadruple blade skates without rubber pads, an inadvertent inclination to either side would cause a sudden change in the skate's direction and cause the skater to lose balance.

Other double blade skates topple over when a low angle of thrust is attempted and there is no natural turning of the skate due to the angle of thrust of the skater's body, the blades persisting to follow a straight line unless continually shifted by the skater's foot.

Other double blade skates have the blades tilt with the angle of the skater's body, but there is no reduction of ankle strain without the interposition of obstructing rubber pads or other impediments.

Referring to the drawings:

Fig. 1 shows a cross section of the improved skate thru line 1—1 of Fig. 3. Fig. 2 is the same view with the shoe in position of greatest inclination. Fig. 3 shows an orthographic projection of a side of the skate. Fig. 4 shows the converging effect of the ice contacting surfaces that would take place if the blades were placed exactly flat. Fig. 5 shows the result of bending the blades outwardly from their centers. Fig. 6 shows a cross section of an enlargement of the ice contacting portion of one blade that is rounded. Fig. 7 shows an enlargement of a cross section of a rink skate blade with the ice contacting surfaces obtusely related. Fig. 8 shows an enlargement of a cross section of another form that may be given to the blade of a rink skate. Fig. 9 shows another form of construction in cross section of the skate using a light alloy like Duralumin to hold the steel blades in position. Fig. 10 shows the changeable height heel support.

Fig. 11 is a detail view of 6 of Figs. 1 and 2.

In Fig. 1, 1 is a rod about which the shoe 2 freely pivots. The center of rod 1 is the pivoting center. By placing the rod as close to the shoe sole as structurally practical, the ankle strain is reduced to a minimum while still allowing the shoe to pivot freely about the rod. These blades, or the blades and the supporting Duralumin structure are divergingly disposed from the pivot at angles, i. e. acute angles to the ice in order to allow the shoe to tilt freely to any required angle without contacting the skate structure or causing one blade to lift from the ice. 3 are the braces between the blades 4 and 5. 6 is a sleeve on the skate thru which rod 1 passes. 7 is the shoe plate. 8 is a shoe support. 9, 10, 11 and 12 are the four ice contacting surfaces of the

blades. 13 and 14 are the edges of intersection of 9, 10 and 11, 12 respectively. Lines 15 and 16, drawn thru the pivot center and the ice contacting blade edges to the ice, represent the lowest natural thrust angles of the skate as angles 15, 13, 14 and 16, 14, 13.

In Figs. 1, 2, and 3, 19 are rivets securing blades 4 and 5 to part 6. 20 are the rivets securing support 8 to the shoe plate 7. 21 are the rivets securing shoe brace 3 to the blades 4 and 5. In Fig. 9, 26 is the skate frame. In Fig. 10, 23 is the sleeve adjacent the shoe plate. 24 is an extra sleeve on the heel support thru which the rod 1 may be inserted to raise the height of the heel. In Fig. 4, surfaces 10 and 11 are shown flat with a resultant convergence of 13 and 14 at the front and rear. This convergence is undesirable because it slows down the skate. In Fig. 5, surfaces 10 and 11 are shown convex in accordance with this invention.

In Fig. 3, 17 is one of two springs on either side of the skate, one end of which is fastened to the shoe plate, the other end to the skate frame, for returning the skate to the proper angle with the shoe plate when the skate is lifted from the ice.

As long as the direction of thrust lies between 13 and 14, there is no tendency of one blade to lift from the ice. Should the thrust be outside of points 13 and 14 as line 18, one blade, 4, would attempt to leave the ice but would be held down by the shoe supporting structure. This condition would hardly ever obtain. By measuring the radius of the turn followed by racers in indoor meets, and figuring the highest speed ever attained on an indoor track, it has been calculated that the lowest angle to which a racer will lean is 50 degrees and this new skate will permit an angle of thrust lower than that at present required for racing.

Referring now to Fig. 3, it will be noted that the blades are curved to any desirable radii. I shall call these radii, outer ice contacting surfaces as 9 and 12 in Figs. 1 and 2. If the skate were constructed with the blades flat as at Fig. 4, the ice contacting surfaces would tend to converge at the front and rear. To prevent this, the blades are curved outwardly in just the proper amount to make the ice contacting edges 13 and 14 parallel. The inside surfaces 10 and 11 will now be curved convexly in curves equal to the curves of the end surfaces 9 and 12. The result of this arrangement is that the ice contacting surfaces 9 and 11 are parallel their entire length (with the exception of the upturned front portions) as are the ice contacting surfaces 10 and 12.

The curved planes 9, 11 and 10, 12 respectively are kept parallel by the braces which are exactly equal in length, and contact the blades at equal distances from the surfaces 9 and 12. The inner ice contacting surfaces 10 and 11, I shall call inner ice contacting surfaces. The result of this construction is the elimination of convergence and the gouging mentioned above.

When the skater's foot is in a horizontal position as in Fig. 1, the pressure on both blades is equal and is distributed equally on the four curved planes 9, 10, 11, 12, and the skate travels in a straight line. But when the skater takes a stroke as in Fig. 2, more pressure will be against curved surfaces 12 and 10 respectively, which surfaces will predominate, causing the skate to turn in the direction 25. The lower the angle of thrust, the greater this turning effect. The greatest turning effect is attained when the lowest thrust is reached as shown by line 18 in Fig. 2.

Further maneuvering can of course be accomplished by turning the skate laterally or by cross stepping.

Since this skate always presents very sharp edges to the ice, a very firm grip is afforded. Under some conditions, the grip of only one blade will be sufficient. For instance, in racing a left hand course, the outer blade on the right foot will receive the most thrust at all times. Therefore, the left blade can be rounded as shown in Fig. 6. This will facilitate maneuvering. The same rounding can be used on either skate wherever desirable. Also, the upturned front portion of one of the blades should be rounded to prevent the front portion of the skate from wedging into the ice.

To facilitate maneuvering on a rink skate for which a low thrust angle is not required, the ice contacting surfaces may be obtusely related as shown in Fig. 7.

Fig. 8 shows another form of the angularly related ice contacting surfaces. When skating along leisurely, the two obtusely related surfaces are effective, but when a low thrust is directed against the blade, it sinks deeply into the ice, thereby bringing a third surface into effect and giving the skate a firmer grip on the ice.

Other features of these skates are the quickly changeable height of the heel, and the several settings for the sole supports. Inasmuch as the skate structure is connected to the shoe by the easily removed rods 1, the skater can adjust the heel height very quickly by removing the rod from sleeve 23 and inserting it in sleeve 24: Fig. 10. Likewise, different offsets can be provided by the placing of additional sleeves as 22 along side the regular sleeve in the shoe supports 8 as shown in Figs. 1 and 2.

Having described my invention, what I claim is:

1. In an ice skate, a frame structure, a pair of blades attached to said frame structure and diverging downwardly from each other, a pivot sleeve, 6, in connection with said frame structure, a shoe support, 8, and a pivot, 1, connecting said shoe support with sleeve, 6, so that the shoe support, 8, can freely pivot upon the skate frame structure.

2. In an ice skate, a blade supporting frame having portions diverging downwardly, a pair of downwardly diverging blades fastened to said frame, a pivot sleeve at the upper portion of said frame, and a shoe plate 7, having a support, 8, with a pivot, 1, adjacent the shoe plate, said support being freely pivoted upon the skate frame.

3. In an ice skate, a shoe plate, a blade supporting structure pivotally connected to said plate, a pair of blades attached to said structure, said blade supporting structure and said blades diverging from the pivot to the ice contacting edges of the blades and said shoe plate being free to pivot on said skate structure when the skate is being operated by the skater.

4. In an ice skate, a shoe plate, adjacent pivot sleeves in connection with said plate, a skate structure, means freely pivotally connecting said sleeves to said skate structure, said skate structure being constructed so that the shoe plate can freely thrust to various angles without contacting the skate structure and without causing one blade to lift from the ice while in operative position on the shoe of a skater.

5. In an ice skate, a skate frame, a shoe plate pivotally connected to said frame, a pair of blades

attached to said frame, said frame and said blades diverging downwardly from the pivot to the ice contacting edges 13 and 14 of said blades, 4 and 5 respectively, said blades having curved inner and outer ice contacting surfaces, 10, 11 and 9, 12 respectively, the inner ice contacting surfaces 10 and 11 being curved convexly in curves equal to the curves of the outer ice contacting surfaces 9, 12.

6. In a double blade ice skate, a skate frame, a pair of blades attached to said frame, a pivot sleeve in said frame, a shoe supporting structure freely pivoted to said skate structure, means for the reduction of ice gouging, said means consisting of equal convex curves 9, 10 and 11, 12 on the blades 4 and 5 respectively.

7. In a double blade ice skate, a skate frame, a pair of blades 4 and 5 attached to said frame, a pivot sleeve in said frame, a shoe supporting structure freely pivoted to said skate structure, convex curves 9, 10 and 11, 12 on blades 4 and 5 respectively, and the inner curves 10 and 11 being formed by bending the blades 4 and 5 and securing them in a curved position.

8. An ice skate comprising a shoe plate, pivot engaging means secured to the under side of said plate, a pair of blades diverging downwardly from each other and attached to said plate, a pivot sleeve secured to the diverging blades, and a pivot element mounted in the sleeve and pivot engaging means for attaching said blades to said plate whereby the plate may be free to pivot on the blades.

9. An ice skate comprising a shoe plate, pivot engaging means secured to the under side of said plate, a pair of blades diverging downwardly from each other and attached to said plate, a pivot sleeve secured to the diverging blades, and a pivot element mounted in the sleeve and pivot engaging means for attaching said blades to said plate whereby the plate may be free to pivot on the blades from the horizontal position to angles equal to the angles produced by lines drawn through the pivot center and the ice contacting blade edges.

10. An ice skate comprising a shoe plate, pivot engaging means secured to the under side of said plate adjacent thereto, a pair of blades diverging downwardly from each other and attached to said plate, a pivot sleeve secured to the diverging blades at the place of convergence, and a pivot element mounted in the sleeve and pivot engaging means for attaching said blades to said plate whereby the blades may be free to pivot on the plate.

11. An ice skate comprising a shoe plate, a plurality of pivot engaging means secured to the under side of said plate, a pair of blades diverging downwardly from each other and attached to said plate, a pivot sleeve secured to the diverging blades, and a pivot element mounted in the sleeve for attaching said pivot sleeve with any one of the several pivot engaging means on the shoe plate whereby the blades may be free to pivot on the plate.

12. An ice skate comprising a shoe plate, pivot engaging means secured to the under side of said plate, a pair of blades diverging downwardly from each other and attached to said plate, a pivot sleeve secured to the diverging blades, and a pivot element mounted in the sleeve and pivot engaging means for attaching said blades to said plate whereby the plate may be free to pivot on the blades, and convexly curved ice contacting surfaces on the blades for causing the skate to turn in either direction in accordance with the angle and direction of thrust of the skater's body.

13. An ice skate comprising a shoe plate, pivot engaging means secured to the under side of said plate, a pair of blades diverging downwardly from each other and attached to said plate, a pivot sleeve secured to the diverging blades, and a pivot element mounted in the sleeve and pivot engaging means for attaching said blades to said plate whereby the plate may be free to pivot on the blades, and one of the blades having a rounded ice contacting surface.

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