Oct. 6, 1942. H. E. BRANNON 2,297,870

SKATE

Filed Dec. 20, 1940 2 Sheets-Sheet 1

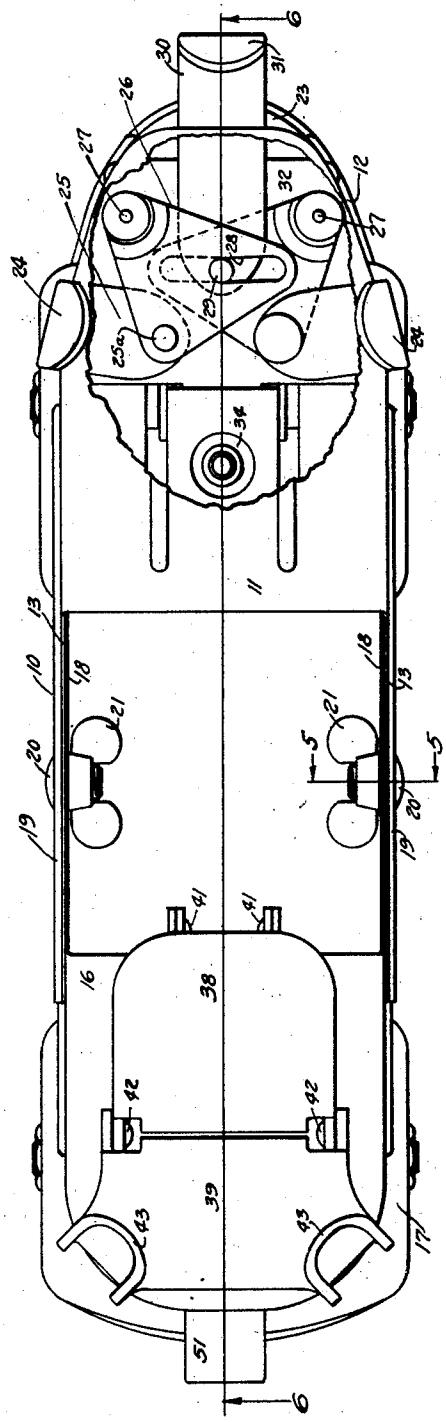


FIG 1

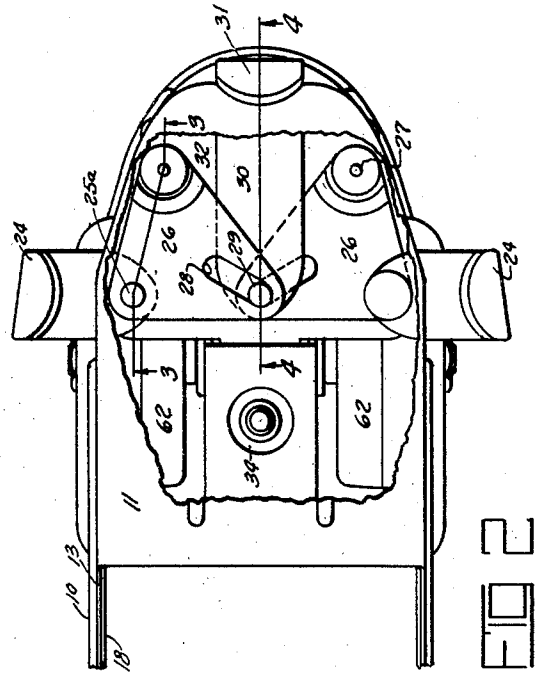


FIG 2

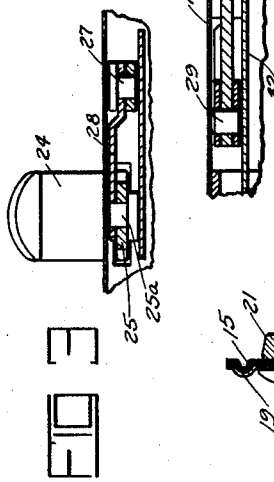


FIG 3

FIG 4



FIG 5

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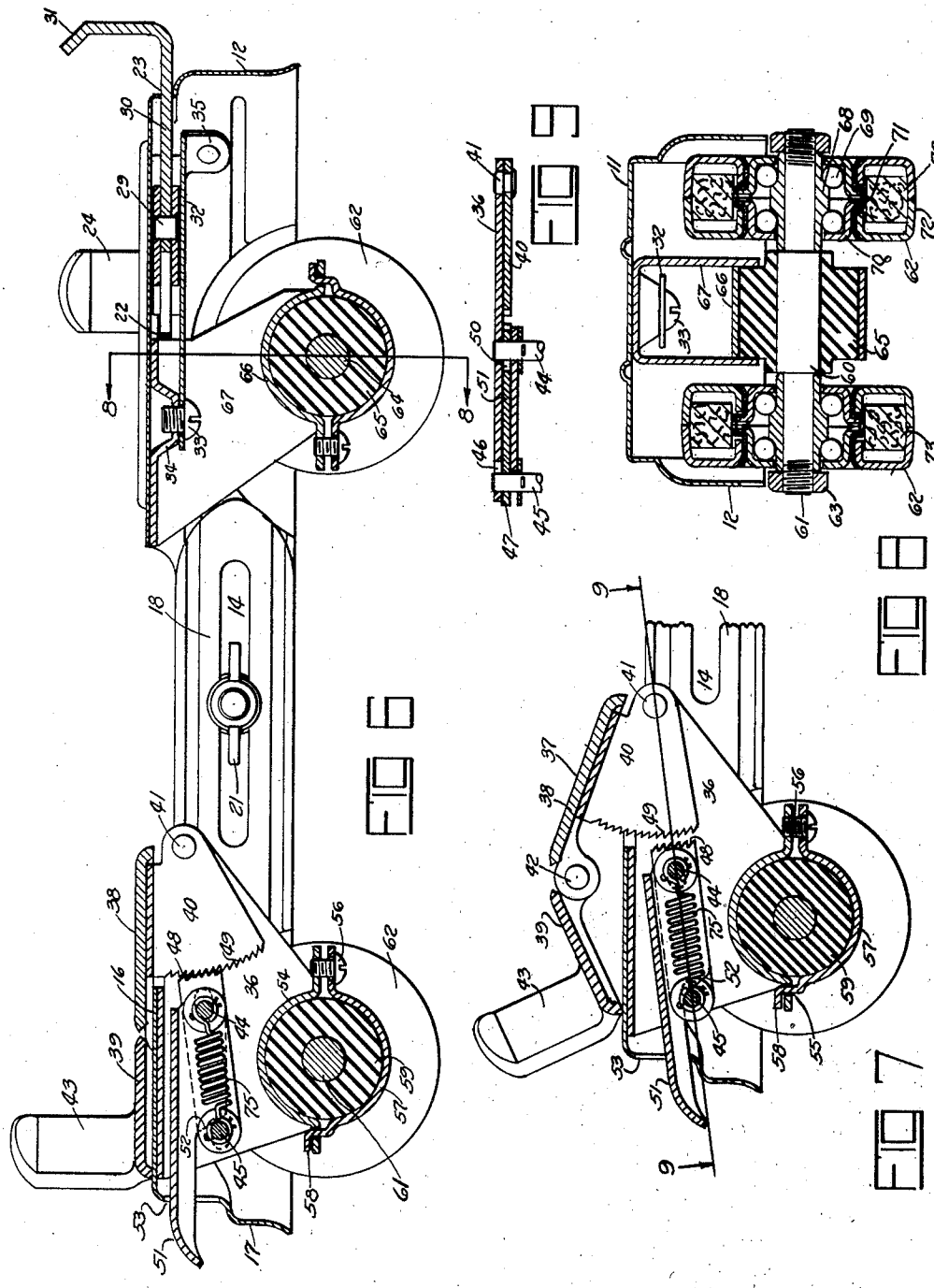


FIG. 6

FIG. 5

FIG. 8

FIG. 7

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SKATE

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Application December 20, 1940, Serial No. 371,004

7 Claims. (Cl. 280—11.31)

This invention relates to skates, and more particularly to the mechanism for attaching a skate to the wearer's foot.

The principal object of the invention is to provide a skate having novel mechanism for attaching the skate to the foot of the wearer which entirely eliminates the use of straps.

Another object of the invention is the provision of a skate having mechanism which automatically clamps the skate to the wearer's foot when the latter is placed on the skate.

A further object of the invention is to provide a skate having a novel toe clamp thereon.

A still further object is to provide a movable heel plate which moves from an inclined position to a horizontal position when the skate is attached to the foot, the heel plate having means for releasably holding it in its horizontal position.

These objects will more fully appear in the following specification when read in connection with the accompanying drawings, wherein:

Figure 1 is a plan view of a skate embodying the invention, a portion of the sole plate being broken away to show the toe clamping mechanism in its operative position;

Figure 2 is a fragmentary plan view of the front portion of the skate shown in Figure 1 with the toe clamping mechanism in its released position;

Figure 3 is a fragmentary cross-sectional view taken on substantially the line 3—3 of Figure 2;

Figure 4 is a fragmentary cross-sectional view taken on the line 4—4 of Figure 2;

Figure 5 is a cross-sectional view taken on substantially the line 5—5 of Figure 1;

Figure 6 is a cross-sectional view taken on substantially the line 6—6 of Figure 1 and showing the heel plate in operative position;

Figure 7 is a cross-sectional view of the rear part of the skate and similar to Figure 6 but showing the heel plate in its released or inoperative position;

Figure 8 is a cross-sectional view taken on substantially the line 8—8 of Figure 6; and

Figure 9 is a fragmentary cross-sectional view taken on substantially the line 9—9 of Figure 7.

The skate in which the invention is embodied comprises a frame 10 which is made up of two relatively adjustable sections, a front section and a rear section. The front section of the frame 10 is a one piece stamping consisting of a sole plate 11 having a turned down flange 12 extending about its front and sides. The flange 12 projects rearwardly from the sole plate 11 on both sides thereof to provide extensions 13. These extensions are provided with longitudinally extending slots 14 and a pair of horizontal ribs 15.

The rear section of the frame is another one piece sheet metal stamping. It consists of a flat heel plate support 16 having a downwardly extending flange 17 thereon. The flange 17 projects forwardly to form a pair of extensions 18. The extensions 18 have slots therein which register with the slots 14 in the extensions 13. The extensions 18 are provided with ribs 19 which cooperate with ribs 15 to keep the two sections properly aligned. The extensions 13 and 18 are held together by a pair of bolts 20 and wing nuts 21.

The flange 12 on the front part 10 of the frame has formed therein slots 22 on opposite sides of the sole plate 11. A third slot 23 is formed in the flange 12 at the front end of the sole plate. On opposite sides of the sole plate 11 are toe clips 24. The toe clips are provided with horizontal portions 25 which project beneath the sole plate through the slots 22. Pivotally connected to the inner ends of the horizontal portions 25 by pins 25a are triangular links 26. The links 26 are pivotally connected to the sole plate 11 by pins 27 which are projection welded to the sole plate. Each of the links 26 has an elongated slot 28 therein adjacent its laterally inner end. The two slots 28 register with each other for at least a portion of their length and receive an upstanding pin 29 that is mounted on an actuating bar 30. The actuating bar 30 extends out through the slot 23 in the flange 12 and is provided at its front end with an upstanding toe engaging lug 31 similar in shape to the toe clips 24.

Rigidly secured to the underside of the sole plate 11, and extending downwardly therefrom, is a U-shaped front bolster 66. The horizontal web of the bolster is provided with a depending boss 34. A metal plate 32 is secured to the boss 34 by a screw 33 and extends forwardly therefrom. The plate 32 cooperates with the sole plate 11 and flange 12 to partially house and protect the clip actuating mechanism previously described.

A rear bolster 36, also U-shaped, is attached to the under side of the heel plate support 16. Pivotally attached to the bolster 36 by pins 41, is a triangular segment 40. The rear edge of the segment 40 is of arcuate shape and provided with teeth 49. Rigidly secured to the upper edge of the segment 40 is the front section 38 of a

heel plate 37. The heel plate 37 has a rear section 39 pivotally connected to the front section 38 by pins 42. At the rear corners of the rear section 39 are upstanding heel clips 43. The heel clips 43 are similar to the toe clips 24.

Extending transversely of the bolster 36 and projecting through the side walls thereof are two pins 44 and 45. The pin 44 is immovably mounted in the side walls of the bolster 36. The pin 45 is mounted in longitudinal slots 46 in the side walls of the bolster so as to be movable forwardly and rearwardly with respect to the bolster 36. Between the side walls of the bolster 36 is a U-shaped locking bar 47 which has a plurality of teeth 48 at its front edge cooperating with the teeth 49 on the sector 40. The vertical side walls of the locking bar 47 are each provided with a hole to receive the pin 45. A slot 50 is also provided in each side wall of the locking bar to receive the pin 44 and thereby permit longitudinal movement of the locking bar. A tension spring 75 connects the pins 44 and 45 and constantly urges them together, thus urging the locking bar forward also. Between the side walls of the locking bar 47 is a finger lever 51. Finger lever 51 is U-shaped in cross-section and has openings adjacent the front ends of its side walls that receive the pin 44. The side walls of the finger lever 51 are cut away on an incline at 52 to form a cam which fits over and engages the front side of the pin 45. The rear end of the finger lever 51 projects through an opening 53 in the flange 17 so as to be accessible to the operator.

The operation of the clamping mechanism will now be described. When the skate is put into use it is first adjusted to the approximate length of the wearer's foot by loosening the wing nuts 21 and sliding the front and rear sections of the frame toward or away from each other to the desired position. The wing nuts are then tightened. The toe clips 24 are in their released position shown in Figure 2, and the heel plate is in the position shown in Figure 7. The user then inserts the toe of his shoe between the toe clips 24 and against the upstanding lug 31 on the actuating bar 30. Then when the heel is pushed downwardly against the heel plate 37 it rocks the front section 38 counter-clockwise and causes the rear section 39 to pivot clockwise about the pin 42. This causes the heel clips 43 to tilt forwardly about the rear edge of the section 39 and crowd the wearer's foot ahead against the lug 31. The forward movement of the lug 31 causes the actuating bar to pivot the links 26 toward each other and pull the toe clips 24 into firm engagement with the sides of the toe of the shoe.

The locking bar 47 automatically engages the teeth 49 on the sector 40 and latches the latter in its horizontal position. Thus, it will be seen that the shoe of the wearer is firmly engaged and held on the skate at five points by means of the two toe clips 24, the lug 31 and the two heel clips 43.

When it is desired to release the skate, pressure is applied in a downward direction upon the finger lever 51 causing the cam surface 52 to act against the pin 45, thereby forcing the locking bar 47 to the rear. Rearward movement of the locking bar 47 is permitted by the slots 46 and 50 and spring 75. The teeth 48 on the locking bar are disengaged from the teeth 49 on the sector 40 so that the heel plate can swing upwardly. When the teeth 48 and 49 are disengaged it is merely necessary to lift the heel upwardly and pull the toe rearwardly from between the toe clips 24.

What may be termed the running gear of the skate will now be described. Welded to the side walls of the bolster 36 is the upper half 54 of a semi-circular bearing. One of the free ends of the bearing 54 has a slot 55 therein and the other end is provided with a threaded opening to receive a screw 56. The lower half 57 of the bearing has a rearwardly projecting lug 58 which is adapted to enter the slot 55 in the upper half of the bearing. The forward end of the half 57 has an opening to receive the screw 56. Between the two halves 54 and 57 of the bearing is a rubber bushing 59. The bushing is mounted between the halves 54 and 57 of the bearing and held tightly therein by tightening the screw 56. The bushing 59 receives the enlarged and knurled central portion 60 of an axle 61.

A pair of wheels 62 are mounted on the respective ends of the axle 61 and held thereon by nuts 63.

Another axle 64 is mounted in a similar bushing 65 which in turn is mounted in a bearing 66 identical to that just described. The bearing is mounted between the side walls of a U-shaped yoke 67 rigidly attached to the bottom of the sole plate 11.

The wheels 62 used on the skate are all identical and are best shown in Figure 8. Each wheel consists of a bushing 68 mounted on the axle and held thereon by the nuts 63.

The bushing 68 has a pair of axially separated ball races that receive ball bearings 69. A ball bearing cage 70 fits over the ball bearings 69 and holds them in place on the bushing 68. Preferably the cage 70 is made up of two parts of Z-shaped cross-section welded together at their adjacent edges. Centrally of the cage 70 are circumferentially spaced radially extending apertures 71, the purpose of which will appear presently.

The rim of the wheel is made up of two circular members 72 of channel shaped cross-section which are welded together at their outer peripheries. The inner axially extending walls of the U-shaped rim are spaced apart to receive the outer legs of the Z-shaped members 70.

Inside of the hollow rim formed by the two parts 72 is a mass of felt 73 which is saturated with oil. This felt 73 may be in the form of an annular ring, if desired.

As will be noted from Figure 8, the radially outer surface of the rim of the wheel is slightly crowned. Therefore, the contact between the wheels and the crown is at the axial center of the wheel and causes most of the wear to occur in that zone. As the wheel wears, the central part of the rim becomes thinner and tends to curl radially inwardly, thereby exerting pressure upon the felt 73. When pressure is exerted upon the oil saturated felt 73 the oil is squeezed out through the hole 71 and into the ball bearing cage to lubricate the balls. This provides a self-lubricating wheel that never needs oil.

From the foregoing it will be seen that this invention provides a novel mechanism which entirely eliminates the use of straps for holding the skate to the foot and which is easily and automatically attached and detached from the wearer's foot.

The scope of the invention is indicated in the appended claims.

I claim:

1. A skate comprising a sole plate, a pair of toe clips mounted on opposite sides of said sole plate for movement toward and away from each other, an actuating bar mounted on said sole plate for longitudinal reciprocation relative thereto and having a toe engaging lug at its forward end, said actuating bar being connected to said toe clips to move the latter toward each other when said bar is moved forwardly.

2. A skate comprising a sole plate, a pair of toe clips, a pair of links, each of said links being pivotally connected to said sole plate and to one of said clips at spaced apart points, an actuating bar having a toe engaging lug at its front end mounted on said sole plate for longitudinal reciprocation relative thereto, said actuating bar being connected to each of said links whereby to pivot the latter about their connections with said sole plate and move said toe clips toward each other when said bar is moved forwardly.

3. A skate comprising a frame, a heel plate, said heel plate consisting of a front section pivotally connected to said frame on a transverse axis, and a rear section pivotally connected on a transverse axis adjacent its forward edge to the rear edge of the front section, both of said sections being movable to a horizontal position, a pair of upstanding heel clips adjacent the rear edge of said rear section, and releaseable locking means for holding said heel plate in a horizontal position relative to said frame.

4. A skate comprising a frame, a heel plate pivotally connected adjacent its forward edge to said frame and movable between inclined and horizontal positions, a locking bar slidably connected to said frame, means on said heel plate cooperating with said locking bar for holding said heel plate in its normal horizontal position, and a manually actuated cam connected to said frame for sliding said locking bar out of engagement with the cooperating means on the heel plate.

5. A skate comprising a frame, a sole plate thereon, a pair of toe clips mounted upon opposite sides of said sole plate for movement toward and away from each other, an actuating bar having an upstanding toe engaging lug at its front end mounted on said sole plate for longitudinal reciprocation relative thereto, means connecting said actuating bar to said toe clips for moving the latter toward each other when said actuating bar is pushed forwardly, a heel plate having a portion thereof mounted on said frame for rocking movement about a transverse axis adjacent its rear edge between an inclined position and a horizontal position, a pair of upstanding heel clips at the rear of said heel plate, said heel clips being adapted to exert a force in a forward direction against a heel placed upon said heel plate when said heel plate is locked in its horizontal position, and cooperating means on said frame and said heel plate for releasably holding the latter in its horizontal position.

6. A skate comprising a frame, a heel plate, said heel plate consisting of a front section pivotally connected to said frame on a transverse axis adjacent its front edge, and a rear section pivotally connected on a transverse axis adjacent its front edge to the rear edge of the front section, both of said sections being movable to a horizontal position, a pair of upstanding heel clips adjacent the rear edge of said rear section, a toothed sector rigidly connected to said front section and movable therewith, and toothed means mounted on said frame and cooperating with said sector for releaseably locking said heel plate in a horizontal position relative to said frame.

7. A skate comprising a frame, a sole plate thereon, a pair of toe clips mounted upon opposite sides of said sole plate for movement toward and away from each other, an actuating bar having an upstanding toe engaging lug at its front end mounted on said sole plate and movable relative to said frame in a longitudinal plane, means connecting said actuating bar to said toe clips for moving the latter toward each other when said actuating bar is moved forwardly, a heel plate, said heel plate consisting of a front section pivotally connected to said frame on a transverse axis adjacent its front edge, and a rear section pivotally connected on a transverse axis adjacent its front edge and the rear edge of the front section, both of said sections being movable to a horizontal position, a pair of upstanding heel clips adjacent the rear edge of said rear section, and releaseable locking means for holding said heel plate in a horizontal position relative to said frame.

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