Nov. 26, 1963 C. M. SWEET 3,112,119

ROLLER SKATE WITH HEEL BRAKE

Filed April 25, 1961 2 Sheets-Sheet 1

FIG. 1

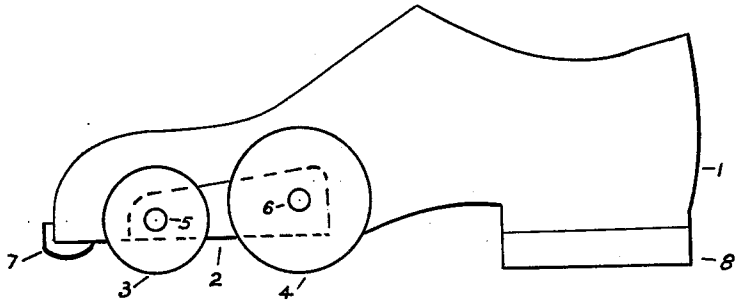


FIG. 2

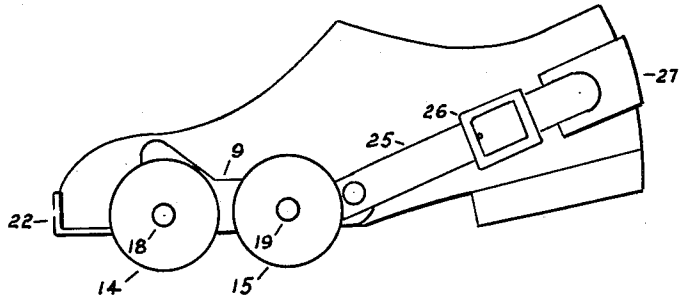


FIG. 3

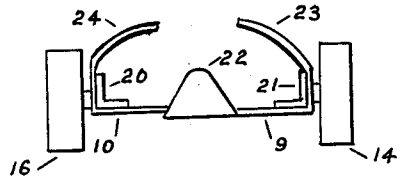
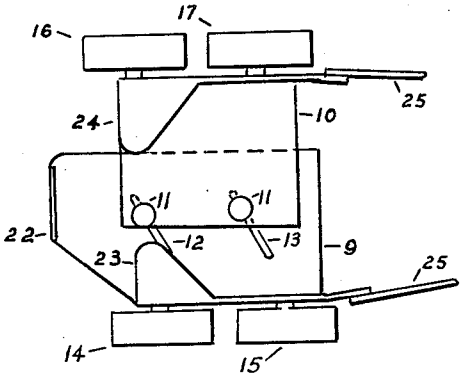


FIG. 4



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ROLLER SKATE WITH HEEL BRAKE

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FIG. 5

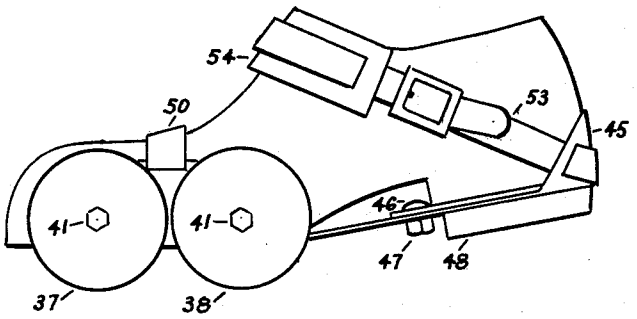


FIG. 6

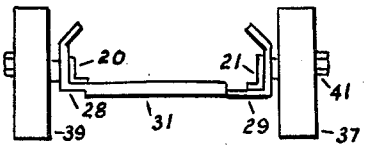


FIG. 7

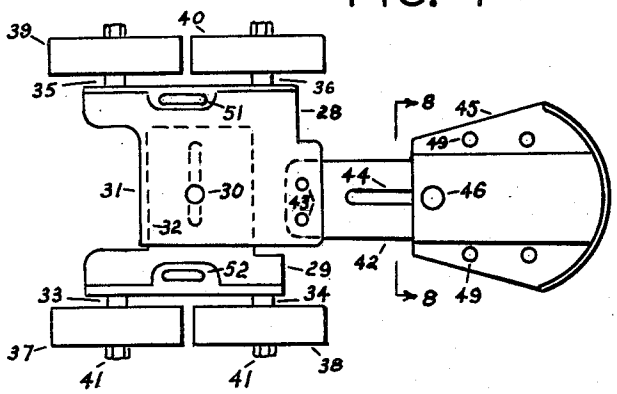


FIG. 8

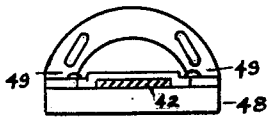


FIG. 9

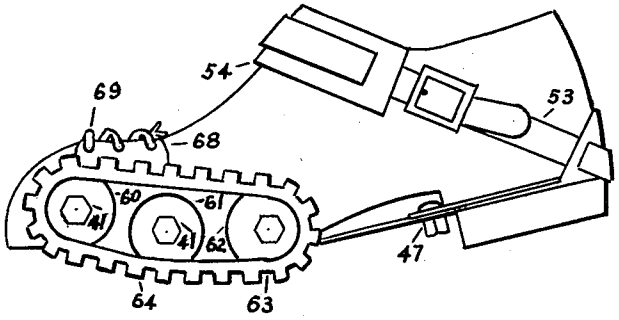


FIG. 11

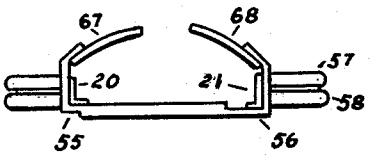
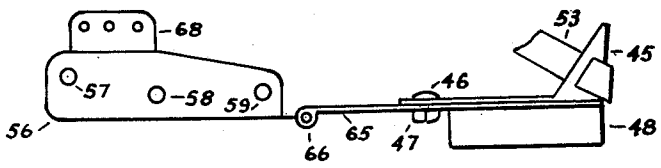


FIG. 10



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United States Patent Office 3,112,119 Patented Nov. 26, 1963

3,112,119

ROLLER SKATE WITH HEEL BRAKE

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Filed Apr. 25, 1961, Ser. No. 105,313
19 Claims. (Cl. 280—11.2)

This invention was originally filed May 3, 1960 as application Serial Number 26,600, now abandoned. It relates to roller skates and particularly to a low cost roller skate on which a skater can walk or roll with safety.

The children's roller skates that can be purchased in the average sporting goods store consist of a skate structure with four rollers that can be strapped to a shoe. This skate is used for skating on flat side walks. Children often fall when the climb stairs or go down a hill with them. The reason they fall is there is no friction device to prevent them from rolling in either direction. In the past there have been roller skates invented with brakes. Those that the writer has seen were cumbersome and expensive to manufacture.

It is therefore an object of this invention to provide a safer skate and a method of skating by which a skater can skate using rollers to support the front part of the shoe and a heel that can be rotated above the skating surface to support the rear part of the shoe to allow the skater to walk, climb stairs, climb medium size hills, and roll down medium size hills with safety.

A further object is to provide skates in different cost brackets, so that most any child can afford to own a pair, and adults who have to do considerable walking in their work, can save energy by their use.

Another object is to provide the skate with an endless tread which will give the skate the same effect as a skate with large wheels, and make it easier to skate on side walks that have cracks.

A further object is to show that by bringing the foot closer to the skating surface the leg can exert a greater force in pushing the skater forward.

The accompanying drawings illustrate various embodiments of the invention presently contemplated to be the best mode of carrying out the invention.

In the drawings:

FIGURE 1 is a schematic outline of a side elevation of a roller skate that is permanently attached to a shoe showing how it would look when the skater is standing still with the shoe heel resting on the same surface that the rollers rest on.

FIGURE 2 is a schematic side elevation of a roller skate that is attached to a shoe by straps and a formed section that partially encloses the toe of the shoe, showing how the skate would look in skating position with the skaters weight on the front of the foot and the heel raised above the skating surface.

FIGURE 3 is a schematic end view of the skate in FIGURE 2, looking at it from the left hand side, showing the skate structure, the formed sections that partially enclose the shoe toe, the upraised section that rests against the shoe toe and the rollers on both sides of the skate structure.

FIGURE 4 is a schematic plan view of FIGURE 3, showing the structure that supports the shoe, the rollers that support the skate structure, and the means of adjusting the rollers closer or farther apart for different width shoes.

FIGURE 5 is a schematic side elevation of a roller skate that has rollers supporting the front part of a shoe, a heel to support the back of the shoe, a flexible means of connecting the front of the skate and the heel, and a means of strapping the skate to a shoe.

FIGURE 6 is an end view of FIGURE 5, looking at it from the left side, showing the skate structure that supports the shoe, the rollers that support the skate structure, and bent sections on which the straps that enclose the toe of the shoe are attached.

FIGURE 7 is a plan view of the skate shown in FIGURE 5, without the straps, showing how the distance between the rollers can be adjusted for different width shoes, and how the heel can be adjusted for different length shoes.

FIGURE 8 is an end view of the heel structure of FIGURE 7, looking at it from section 8—8, showing the back of the heel structure that comes in contact with the shoe heel, the slots for the heel strap, the rectangular link that connects the roller structure and the heel structure, and the heel that acts as a brake.

FIGURE 9 is a schematic side elevation of a skate that has endless treads for supporting the front part of the shoe, a heel to support the back of the shoe, a hinge to connect the heel structure and the front part of the skate, a strap to fasten the heel structure to the shoe, and a lacing to fasten the front of the skate to the toe of the shoe.

FIGURE 10 is a schematic view of FIGURE 9 with the rollers and endless track removed, showing the structure that supports the shoe, the hinge that connects the front and back of the shoe, and the heel assembly that supports the heel of the shoe.

FIGURE 11 is an end view of the skate structure of FIGURE 10, looking at it from the left hand side, showing the structure that supports the shoe, the roller axles that protrude from both sides of the structure, and the parts without the lacing that enclose the shoe toe.

In the construction of FIGURE 1 is a shoe 1 that has a skate structure 2 that is permanently attached to it, preferably by rivets. The skate structure 2 has wheels or rollers 3 and 4 mounted on both sides of the shoe and fastened to the axles 5 and 6 by nuts or other well known means of fastening, such as riveting over the end of the axle. The wheels or rollers can be made of metal, rubber, or plastic similar to the roller skates now on the market. The skate has a friction device 7 that is fastened to the toe of the shoe. The friction device provides a means of pushing the skater forward when the skater changes from skating on one foot to skating on the other foot. The shoe heel has an extension 8 that raises the conventional heel the same amount that the rollers raise the front part of the shoe. Part 8 should be made of a wear resistant substance, such as brakes are made of, or it could be largely of metal.

FIGURE 1 shows the rollers on the front half of the shoe. There may be some skaters who desire a skate that has a greater distance between the front and back rollers and is therefore more stable. This can be obtained by moving roller 4 towards the shoe heel. If the rollers are moved back it is believed for best operating conditions they should not be positioned farther than seventy-five percent of the length of the shoe from the toe end of the shoe. Also the structure on which the shoe rests must not interfere with the heel moving towards and away from the skating surface.

The advantage of the above structure is that it is light in weight, the skater can roll when he desires, and the heel acts as a brake when the skater prefers to stand still in safety. The structure allows the skater to climb steps, climb hills, climb into buses, descend hills and travel most any place that has paved streets and cement side walks. It also helps prevent a skater from bumping another skater when several are skating in a rink. In climbing steps the skater should be careful in placing the heel on the step first, and lifting the heel last. This is best accomplished by going up or down the steps with the body in a sideways position or approximately ninety

degrees to the position the body normally assumes in going up or down steps. In climbing hills having a small slope the skater can walk. This is accomplished by walking with most of the weight on the heels. It requires that a skater pick up his foot before his body travels too far ahead of it. In going down hills the skater should have one foot ahead of the other, approximately twelve inches, with the body's weight evenly distributed on both roller skates and the heels raised above the skating surface.

The roller skate shown in FIGURES 2, 3, and 4 is used in a similar manner to the skate described in FIGURE 1. The skate is a low cost skate for children which after it is adjusted can be slipped on the shoe without having to adjust the straps or using a key to tighten clamps. The skate structure consists of parts 9 and 10 that form a platform on which the front of the shoe rests. Parts 9 and 10 are fastened together by two rivets 11 in part 10 that can slide in slots 12 and 13 in part 9 to cause rollers 14 and 15 to be adjusted closer to or farther apart from rollers 16 and 17 to fit the width of the shoe the skater is wearing. The rollers 14 and 15 rotate on axles 18 and 19. The axles are special bolts or rivet like structures that are brazed or welded to part 9. Part 10 also has axles fastened to it to support rollers 16 and 17. Parts 9 and 10 are made of a thin material and have reenforcing angles 20 and 21 that are preferably welded into the corners to strengthen the structure. This reenforcing is not necessary on small size skates as the metal can have ribs formed in it to provide ample strength. Part 9 is bent up at the end to form an abutment 22 that presses against the toe of the shoe and prevents the skate from sliding backwards on the shoe. Part 9 has a formed part 23 and part 10 has a formed part 24 that forms an enclosure over part of the shoe toe. The skate has straps 25 and buckles 26 on both sides of the shoe that hold a rubber strap over the heel of the shoe.

The advantage to this construction is that when it is once adjusted for a certain size shoe it is not necessary to adjust the buckles when the skate is placed on the shoe. All that is necessary is to place the shoe toe against the abument 22 and pull the rubber strap 27 over the back of the heel. When this is done the part 10 slides along the slotted holes 12 and 13 and causes the parts 20 and 21 to grip the sides of the shoe sole.

It also should be noted that the skate shown in FIGURE 2 does not necessarily require the method of strapping the skate to the shoe as is shown. Other well known methods of strapping can be used. An example is using part of the criss cross strapping shown in Anderson's patent, Number 829,050.

The construction shown in FIGURES 5, 6, 7, and 8 is similar to the skate shown in FIGURES 2, 3, and 4. The main difference is that it has a heel added to it. The front part of the shoe is supported by part 28 that acts as a platform for the shoe to rest on. Part 28 is fastened to part 29 by a flat headed rivet 30. The drawing does not show it but parts 28 and 29 could be made with a formed slot so that rivet 30 does not protrude above the surface 28. Part 28 has a flange 31 along which the edge 32 of part 29 slides. Parts 28 and 29 have axles 33, 34, 35, and 36 joined to them preferably by welding. The axles support rollers 37, 38, 39 and 40 that are held on the axles by nuts 41. Part 28 has a reenforcing angle 21 that allows parts 28 and 29 to be made of a relatively thin material. As stated above the reenforcing angles 20 and 21 could be eliminated by forming ribs in the corners of parts 28 and 29. A flexible part 42, that joins the front and back of the skate, is held to part 28 by rivets 43. Instead of rivets part 42 could be joined to part 28 by a brazing process. The flexible part can be made of steel or other material that will flex. The flexible part 42 should be bent and installed on the skate as is shown in FIGURE 5. This will allow it to be bent up or down without placing too much stress in it. Instead of part 42 being made of a flexible material it could be made in conjunction with a hinge as is shown in FIGURE 10. The flexible part 42 has a slot 44 that allows adjustment of the heel structure 45 towards or away from the rollers to provide for different length shoes. Flexible part 42 is fastened to the heel structure 45 by a screw 46 that slides in slot 44 and is held in place by nut 47. Heel stamping 45 has a heel 48 that is fastened to it by screws 49. The heel could also be fastened to the stamping by a gluing process. The toe of the skate is fastened to the parts 28 and 29 by a strap 50 extending through slotted holes 51 and 52. Instead of a strap this could be a lacing or one of the other well known methods of fastening skates to shoes. The heel of the skate is fastened to the shoe by a strap 53, that encircles the ankle, and a sponge rubber pad 54 that reduces the pressure on the ankle.

The advantage of this skate over the skate shown in FIGURES 2, 3, and 4 is that the shoe is held level when the skater is standing at rest, and the heel being made of a wear resistant material it will wear much longer than using the conventional heel on the shoe as a brake.

The construction shown in FIGURES 9, 10, and 11 is similar to the construction in FIGURES 5, 6, 7, and 8. The main difference is that the skater can use rollers to skate on or a flexible tread can be installed over the rollers to provide an endless tread rolling surface. The shoe is supported by parts 55 and 56 that are similar to parts 28 and 29 in FIGURE 7. Parts 55 and 56 can be adjusted closer together or farther apart to provide space for a narrow shoe or a wide shoe. Part 56 has axles 57, 58, and 59 that are preferably welded or brazed to it. The axles support rollers 60, 61, and 62 that are held in place by nuts 41. Instead of a nut this could be another type of fastening. The rollers preferably have a convex surface that provides a means of holding the tread 63 on the rollers. The tread has upraised surfaces 64 that provide a long life and allow the tread 63 to flex in going over the rollers. Part 65 connects the front and the back of the skate, and has a hinge 66 that allows the heel structure to move above the skating surface when the endless tread is in use. The front of the skate is held to the toe of the shoe by flexible parts 67 and 68 that are connected by a lacing 69. Parts 67 and 68 can be made of leather, plastic, or a fabric type material.

The advantage of the design in FIGURES 9, 10, and 11 is that the endless tread will act like a large wheel and allow the skater to roll over cracks in the side walk that a smaller roller would have difficulty in going over.

Although only FIGURE 1 shows a friction device 7 on the toe of the shoe to propel the skater forward, it could be incorporated in all the models. The advantage to the friction device in this skate over other skates is that being lower it does not cost as much and being closer to the foot more force can be exerted with the same amount of effort.

The skating surfaces of the rollers in this skate are also closer to the foot than in conventional roller skates and therefore they apply a greater side thrust in pushing the skater forward. The reason this is true is that the skate is a form of lever that is fastened to the foot. The shorter the lever arm the greater is the thrust it can exert. This skate being lower it has a shorter lever arm and for that reason the leg can exert a greater side thrust on the rollers.

Placing rollers on the sides of the shoe and holding the shoe as close to the skating surface as possible has other advantages not previously mentioned. The conventional roller skate has a pivot arrangement to allow the platform the shoe rests on to pivot with respect to the skating surface. This pivot arrangement is necessary when shoes that are laced high on the ankle are used.

The reason for using high laced shoes is that the skating surface is a considerable distance from the foot and to control the rollers it is necesary to attach them firmly to the foot with high laced shoes. When a shoe is laced high on the angle it is difficult for the ankle to bend when the skater inclines his body to less than ninety degrees with the skating surface for skating in an arc. For that reason a pivot arrangement is built into conventional skates. The skate in this disclosure has rollers on both sides of the foot, with the foot close to the skating surface. This construction reduces the torque that has a tendency to twist the shoe off the foot. With less torque twisting the shoe off the foot a lower shoe, that does not have to be laced as high, can be worn. When a lower shoe is worn the ankle can bend easier and the built in pivot arrangement on the skate is not as necessary.

There may be some who desire a lighter weight skate than those shown. In FIGURES 1 through 7 this can be acomplished by removing one of the front rollers such as roller 37 or 39 in FIGURE 7. A three roller type skate will not be as stable as the four roller type, but it will be lighter. The disadvantage of a three roller or a two roller skate is that any time one roller passes over a hole in the skating surface the roller will fall in and slow the speed of the skater. When four rollers are used one roller can not fall into a hole as easily and therefore the skater receives a smoother ride.

Another advantage of the four roller skate over the two roller is that it provides a wider base to support the center of gravity of the body. When a skater increases his speed he leans forward. This causes the skater's center of gravity to move forward and place a greater load on the toes of the foot. Due to this shifting of the body's center of gravity a wide base to support the body, as can be obtained with four rollers, is preferred over a narrow base.

There have been roller skates that have one roller on each side of the foot. One of the difficulties with this type of skate is that when the skater's center of gravity moves forward the platform on which the shoe rests pivots about the center line of the rollers and allows the toe of the shoe to touch the skating surface. In order to prevent the shoe from touching the skating surface the platform on which the shoe rests must be at a greater distance from the skating surface than a four roller skate as shown in this disclosure. The shoe on the two roller skate being at a greater distance from the skating surface the leg can not exert as great a force on the rollers and the skater must continually balance himself on a pivot.

In the construction of FIGURES 1 through 11 the theory has been to provide a roller skate having rollers or an endless tread that will support the front part of the foot and will allow the skater to travel on rollers at any time. It is also provides for a heel that will act as a brake at any time. This combination will make skating much more pleasant for many people. Many children stop skating after experiencing a few falls. This skate will prevent falling backwards and will give a skater greater confidence.

There may be some who believe that skating only on the front part of the foot is very tiring. It is not tiring if done in short periods. It is similar to dancing in which a person moves with his weight resting on the front part of the feet.

Various embodiments of the invention may be employed within the scope of the accompanying claims which will particularly point out and distinctly set forth the subject matter regarded as the invention.

I claim:

1. A roller skate, comprising a structure having means of holding the front part of the shoe above the skating surface, said structure having more than two rollers that support the front part of the shoe, part of said rollers to be located on one side of the foot and part on the opposite side of the foot with the foot between the rollers, part of said rollers to be in front and part in back of the skater's center of gravity when the skater's weight is on the front part of the foot whereby the tendency of the skate to tilt is reduced when the skater moves his body forward or backward with respect to the foot, a rubbing surface secured to the heel of the skater's shoe and means that permits the skater to skate on at least part of said rollers supporting the front part of the foot and simultaneously move the rubbing surface on one heel or both heels against the skating surface causing the heel to act as a brake to stop the skater whereby after the skater stops, the skater can stand in a restful position with rollers supporting the front part of each foot and a heel brake supporting the heel of each foot, and means of fastening said structure to the shoe.

2. The construction of claim 1 in which the skate is fastened permanently to a shoe.

3. The construction of claim 1 in which said structure has means of adjusting the distance between the rollers on one side of the foot and the rollers on the opposite side of the foot thereby providing for using the skate on different width shoes.

4. The construction of claim 1, said structure having a wear resisting surface directly below the heel of the shoe that acts as a brake when it rubs on the skating surface.

5. The construction of claim 1 in which a means is provided for adjusting the distance of said rubbing surface from the rollers thereby providing for a rubbing surface that can be placed directly under the heel on different length shoes.

6. The construction of claim 1 in which an endless tread is mounted on at least two rollers on one side of the foot and a second endless tread is mounted on at least two rollers on the opposite side of the foot whereby the skater has the combined advantage of being able to more easily roll over cracks in the sidewalk and apply a simple heel brake with both feet when desired.

7. The construction of claim 1 in which a friction device is mounted on the toe end of the structure whereby the skater can use the friction device to push himself forward.

8. A roller skate, comprising a skate structure supporting the front part of a shoe, said structure having tandem rollers that are located on both sides of the shoe with the shoe between the rollers, said tandem rollers being located within 75 percent of the shoe length from the toe end of the shoe, whereby the skate can not easily be tipped forward or backward when the skater's weight is on the front part of the foot and the shoe can be supported closer to the skating surface, said structure having a heel structure added to it and said structure having means that permits the foot to move the shoe heel up or down when at least two rollers are supporting the front part of the foot whereby the skater can either skate on the rollers or stop by pressing the heel against the skating surface.

9. The construction of claim 8 in which the skate is fastened permanently to the shoe.

10. The construction of claim 8 in which said structure has means of adjusting the distance between the rollers on one side of the foot and the rollers on the opposite side of the foot thereby providing for using the skate on different width shoes.

11. The construction of claim 8 in which the heel structure has a wearing surface directly below the heel of the shoe.

12. The construction of claim 8 in which means is provided for adjusting the distance of the heel structure from the rollers thereby providing for a heel structure that can be placed directly under the heel on various size shoes.

13. The construction of claim 8 in which a friction device is mounted on the toe end of the structure, said structure supporting the shoe a distance not to exceed 1¼ inches above the skating surface whereby the surface

on the friction device that comes in contact with the skating surface being close to the shoe it can exert a greater force in propelling the skater forward than if the shoe were disposed at more than 1¼ inches above the skating surface as is customary.

14. A roller skate, comprising a skate structure having means of holding the front part of the shoe above the skating surface, said structure having at least four rollers that support the front part of the shoe, at least two of said rollers to be located on one side of the foot and part on the opposite side of said foot, with the foot between the rollers whereby the foot can be held close to the skating surface, means of adjusting the distance between the rollers on one side of the foot and the rollers on the opposite side of the foot whereby the skate can be adjusted to fit different width shoes, said structure having a heel structure attached to it that can be adjusted to different distances from the rollers for different length shoes, means that permit the foot to move the heel structure above the skating surface to allow the skater to skate or to move the heel against the skating surface to cause the heel to rub on the skating surface to stop the skater, and means of fastening said structure and heel structure to a shoe.

15. A roller skate, comprising a skate structure on which the front part of the shoe can rest a heel secured to said shoe, said structure having upturned flanges between which the front part of the shoe is located, said upturned flanges having rollers mounted thereon that have their axis at approximately ninety degrees to the length of the foot, at least two rollers to be mounted on each side of the foot in approximate tandem thereby reducing the amount the shoe can pivot about a roller axis when the skater's weight is on the front part of the foot, said structure having means whereby the foot can move the heel up to allow the skater to roll on the rollers or the foot can move the heel down to allow the skater to stand on at least two rollers that support the front part of the foot and a heel that presses against the skating surface to act as a brake and, said structure having means of fastening to a shoe.

16. A roller skate, comprising a skate structure that has means of fastening to a shoe, a heel secured to said shoe, said structure supporting the front part of the shoe, said structure having upturned flanges between which the shoe is located, said upturned flanges supporting rollers on both sides of the front part of the foot, one of said flanges supporting at least two rollers, said two rollers limiting the amount the structure can pivot about a roller axis whereby said structure being limited to the amount it can pivot it can be closer to the skating surface and said structure can hold the foot closer to the skating surface than skates having only two rollers, said structure having means whereby the foot can move the heel above the skating surface to allow the skater to skate or the foot can move the heel against the skating surface, causing said heel to rub against the skating surface to act as a brake.

17. A roller skate for use on flat surfaces such as sidewalks, comprising a skate structure that has means of fastening to a shoe, a heel secured to said shoe, said structure having more than two rollers that support the front part of the foot in an area that represents at least twenty percent of the length of the foot and fifty percent of the width of the foot, thereby providing a base that can not easily be tipped sideways or pivoted endways when the skater's weight is on the front part of the foot, said structure having means whereby the foot can move the wearing surface on the heel above the skating surface to allow a skater to skate or both feet can move the wearing surface on their respective heels against the skating surface to gradually or quickly reduce the speed of the skater and when it is desired to stand still in safety and comfort the skater can support the body's weight on rollers under the front of each foot and a heel under each foot.

18. A roller skate for use on flat surfaces such as sidewalks, comprising a skate structure that has means of fastening to a shoe, said structure having rollers on which the front part of the foot can roll and a heel under the back of the foot that acts as a brake, said rollers supporting the front of the foot in an area that represents at least twenty percent of the length of the foot and fifty percent of the width of the foot whereby said structure resists tipping the skate sideways or pivoting the skate endways when the skater's weight is on the rollers at least two rollers to be on both sides of the foot with the foot between the rollers whereby the shoe can be held close to the skating surface and said structure having means whereby the foot can pivot the heel upwardly about the two rollers closest to the heel to allow the skater to skate or the foot can pivot the heel downwardly to cause the heel to rub on the skating surface to stop the skater.

19. A roller skate, comprising a structure supporting the front part of the shoe, said structure having rollers on both sides of the shoe near the toe of the shoe, rollers on both sides of the shoe near the center of the shoe and a wear resisting surface under the heel of the shoe, said wear resisting surface to be disposed a small distance above the skating surface when the rollers on the toe of the shoe and the rollers near the center of the shoe are on the skating surface whereby when the rollers near the center of the shoe are resting on the skating surface the foot can pivot the skate about said rollers and cause the rollers near the toe of the shoe to engage the skating surface to provide a stable platform on which to skate either forward or backward, and when it is desired to stop the skater can pivot the skate in the opposite direction about said rollers near the center of the shoe to cause the rollers near the toe of the shoe to rise above the skating surface and the wear resisting surface on the heel to rub on the skating surface to stop the skater and said structure having means of fastening to a shoe.

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