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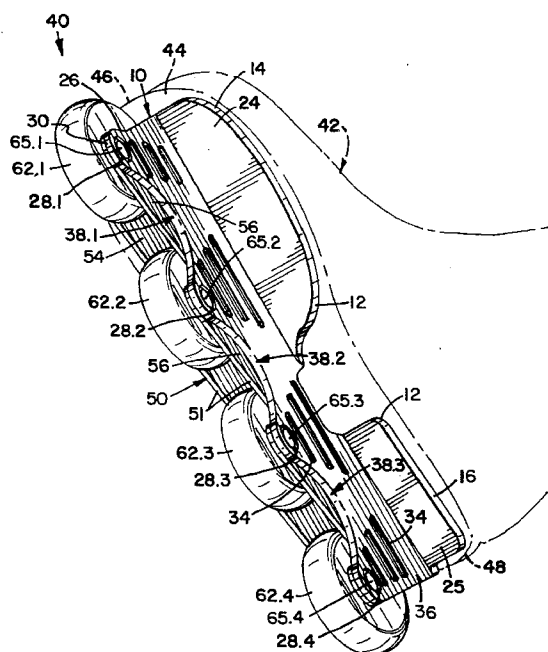
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(54) Grind plate for skates

(57) A grind plate (10) for a skate (40) having a boot (42) with a sole (44) including a toe area (46) and heel area (48), a frame (50) attached to the boot (42), wheels (62.1-62.4) with wheel bores rotatably mounted to the frame (50), and a plurality of axle apertures in the frame (50) coaxially aligned with the wheel bores. The grind plate (10) includes a toe platform (14) having an upper surface (18) opposing a portion of the toe area (46) of the sole and a heel platform (16) having an upper sur-

face (18,20) opposing a portion of the heel area (48) of the sole (44). The grind plate (10) also has an elongated lower portion (26) extending downwardly from the toe platform (14) and the heel platform (16) such that the lower portion (26) is adjacent to selected areas of the frame (50) when the grind plate (10) is attached to the skate (40). Finally, the grind plate (10) includes fastening means for fastening the grind plate (10) to the skate (40).

FIG. 1



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Description

Technical Field

The present invention relates generally to skates. More particularly, the present invention relates to grind plates for skates.

Background

In recent years, roller skating and in-line skating have become extremely popular. Many participants in these sports have developed an interest in what is known as "aggressive" or "extreme" skating. Such skating includes jumping, flipping, sliding across raised surfaces, sliding down rails, and other similar types of maneuvers.

Skates generally have a boot and a frame attached to a sole of the boot. Many in-line skates also have hard outer shells covering portions of the boot. Typically, the frame of a skate is made of plastic or metal and has a platform with an upper surface and a lower surface. The platform generally has a toe area and a heel area, with the heel area being vertically higher than the toe area. Some platforms have separated toe and heel areas. The boot is positioned with its sole abutting the upper surface of the frame platform. The boot is often attached to the frame by rivets that extend through the sole of the boot and the frame platform, with the heads or nuts of the rivets in opposing contact with the lower surface of the platform.

Wheels are attached to a lower portion of the frame. Generally, the lower portion of the frame includes inner and outer elongated parallel rails each being longitudinally connected to the lower surface of the platform and aligned along a center portion of the platform such that the platform forms oppositely disposed inner and outer lateral flanges. The inner lateral flange extends outwardly from the inner rail and the outer lateral flange extends outwardly from the outer rail.

In one example of aggressive or extreme skating maneuvers, the outer rail and the lower surface of the outer lateral flange of the platform come into sliding or grinding contact with abrasive surfaces such as concrete walls, metal rails and the like. Repeated grinding contact with such surfaces quickly wears away the skate frame. In addition, grinding in this area of the frame wears away the rivets connecting the boot to the frame. Eventually, the frame will fall off of the boot if the heads or nuts of the rivets are worn away. The attached boot and its shell also frequently come into contact with the abrasive surface when, for example, the platform does not completely cover the sole of the boot, the skater grinds at a sharp angle, the skater slips causing the boot or its shell to hit the surface, or the skater purposely grinds on the shell itself.

In another type of extreme skating, skaters jump on-to a metal rail such that the longitudinal axis of the skate

frame is transverse to the rail, with a portion of the bottom edge of the skate frame engaging the rail. Typically, skaters grind on the portion of the skate frame bottom edge, which is disposed between the two middle wheels. If the skater has momentum and lands on the rail as described, the portion of the skate frame bottom edge, which engages the rail, will slide along the rail. This type of sliding or grinding wears away the bottom edge of the skate frame. Many skaters choose to purposely form a groove on this area of the skate frame to facilitate sliding or grinding on rails. However, once the skater has achieved the desired groove, sliding or grinding in the groove will continue to wear down the skate frame. As the skate frame wears away, the stability and performance of the skate decreases.

Some skates have replaceable frames. This solution, however, requires a complete disassembly of the skate and reassembly with the new frame which can be expensive and time-consuming. Moreover, sometimes the shell of the boot and even the boot itself is damaged from such grinding. Finally, some skates are integrally molded to the frame, thereby preventing replacement of the frame.

The present invention provides a solution to this and other problems and offers other advantages over the prior art.

Summary

The present invention relates to a grind plate for a skate. Typical skates include a boot with a sole having a toe area and a heel area, a frame attached to the boot, wheels with wheel bores, and a plurality of axle apertures formed through the frame and coaxially aligned with the wheel bores. The grind plate includes a toe platform having an upper surface opposing a portion of the toe area of the sole of the boot, a heel platform having an upper surface opposing a portion of the heel area of the sole of the boot. The grind plate also includes a lower portion extending downwardly from the toe platform and the heel platform such that the lower portion is adjacent to selected areas of the frame of the skate when the grind plate is attached to the skate. The grind plate has a fastening means for fastening the grind plate to the skate.

In one embodiment, the fastening means includes a plurality of apertures, near a bottom edge of the lower portion of the grind plate, sized to slidably receive a wheel axle. When the grind plate is attached to the frame, each of the grind plate apertures is coaxial with at least one axle aperture in the frame. A variety of configurations of wheel axles may be used to attach the grind plate to the skate.

Brief Description of the Drawings

FIG. 1 is a left side and bottom perspective view of a grind plate of the present invention, attached to

an in-line skate;

FIG. 2 is a left side elevation view of the grind plate of Fig. 1, attached to an in-line skate, with a portion of the grind plate cut away to show the in-line skate frame;

FIG. 3 is a front elevation view of the grind plate of Fig. 1, attached to an in-line skate;

FIG. 4 is a right side elevation view of the grind plate of Fig. 1; and

FIG. 5 is a top plan view of the grind plate of Fig. 1.

Detailed Description

With reference to the drawings in which like elements are numbered identically throughout, a detailed description of the invention is provided. This description does not limit the scope of the invention, which is limited only by the scope of the attached claims.

In general terms, the present invention relates to a grind plate 10 for use with a skate to protect a frame and a skate boot of the skate. The grind plate 10 may be integrally molded into the frame of a skate or may be removable and replaceable. It will be apparent that the grind plate 10 can be configured for use with any type of skate, but is described with reference to in-line skates, such as skate 40 shown in Fig. 1.

Fig. 1 is a representative drawing of a typical construction of an in-line skate 40. The in-line skate 40 has a boot 42 with a sole 44 having a toe area 46 and a heel area 48. Many boots have a hard outer shell, such as shell 41, covering selected areas of the boot. The in-line skate 40 has a frame 50 with a sole platform 52 and elongated inner and outer parallel rails 54 and 56 having axially aligned pairs of frame axle apertures (not shown) sized to slidably receive a wheel axle. The rails 54 and 56 are longitudinally connected to a lower surface 60 of the sole platform 52 and are aligned near a center portion of the sole platform 52. In-line wheels, such as, for example, wheels 62.1 through 62.4 having wheel bores (not shown), are rotatably mounted between the rails 54 and 56. Each frame axle aperture of the pairs of frame axle apertures is sized to slidably receive a wheel axle, such as wheel axle 65.1 shown in Fig. 3, for mounting an in-line wheel therebetween. When a wheel is mounted between a pair of frame axle apertures, the wheel bore is coaxially aligned with one of the pairs of frame axle apertures and is sized to slidably receive a wheel axle, such as wheel axle 65.1.

An upper surface of the sole platform 52 of the frame 50 receives a portion of the toe area 46 of the sole 44 of the boot 42 and a portion of the heel area 48 of the sole 44 of the boot 42. The sole platform 52 forms oppositely disposed inner and outer front flanges 68 and 69 that extend outwardly from the inner and outer rails 54 and 56, respectively, near the front, or toe area of the frame 50. The sole platform 52 forms inner and outer rear flanges (not shown) that extend outwardly from the inner and outer rails 54 and 56, respectively, near the

rear, or heel area of the frame 50. The frame 50 is typically secured to the sole 44 of the boot 42 by at least one rivet 43.1 extending through the sole 44 of the boot 42 and the inner front flange 68 as shown in Fig. 3, at least one rivet 43.2 extending through the sole 44 of the boot 42 and the outer front flange 69 as shown in the cut away area of Fig. 2, and at least two rivets (not shown) wherein one rivet extends through the sole 44 of the boot 42 and the inner rear flange and the other rivet extends through the sole 44 of the boot 42 and the outer rear flange.

The grind plate 10 includes an upper platform 12 for receiving an outer portion of the sole 44 of the boot 42. The upper platform 12 may be separated into a toe platform 14 and a heel platform 16 having upper surfaces 18 and 20 and lower surfaces 24 and 25, respectively. The upper surface 18 of the toe platform 14 has an inner depression 22 aligned along an inner edge 19 of the toe platform 14. The inner depression 22 is shaped to receive the front outer flange 69 that is riveted or otherwise connected to the toe area 46 of the sole 44 of the boot 42. The remaining portion of the upper surface 18 of the toe platform 14 abuts a portion of the toe area 46 of the sole 44 of the boot 42. The upper surface 20 of the heel platform 16 is substantially flat. When the grind plate 10 is attached to the skate 40, the upper surface 20 of the heel platform 16 is vertically spaced below the heel area 48 of the sole 44 of the boot 42. As shown in Fig. 2, the upper surface 20 of the heel platform 16 may abut a downwardly extended portion of the shell 41 of the boot 42. It will be apparent to those in the art, that the toe and heel platforms 14 and 16 of the grind plate 10 can be configured in many different ways to accommodate varying shapes of skate frames and boots.

The grind plate 10 also has an elongated lower portion 26, extending downwardly from said toe and heel platforms 14 and 16. The lower portion 26 is substantially perpendicular to the toe platform 14 and adjoins the toe and heel platforms 14 and 16 adjacent to inner edges 19 and 21 of the toe and heel platforms 14 and 16, respectively. As shown in Fig. 1, the elongated lower portion 26 is configured to be positioned adjacent to selected portions of the outer rail 56 of the frame 50 when the grind plate 10 is attached to the in-line skate 40. It will be apparent to those in the art, that the grind plate 10 could also be configured to be positioned adjacent to the inner rail 54 of the frame 50 or to be positioned adjacent the wheels 62 if the frame has only one elongated rail disposed on the opposite side of the wheels from the lower portion 26 of the grind plate 10.

The elongated lower portion 26 has a plurality of grind plate apertures 28.1 through 28.4 near a bottom edge 30 of the elongated lower portion 26. The grind plate apertures 28.1 through 28.4 are spaced longitudinally along the elongated lower portion 26 such that each grind plate aperture 28.1 through 28.4 is coaxial with one of the plurality of axially aligned pairs of axle apertures of rails 54 and 56, when the grind plate 10 is

attached to the in-line skate 40. The grind plate apertures 28.1 through 28.4 are each sized to slidably receive a wheel axle 65.1 through 65.4, respectively, for connecting the grind plate 10 to the in-line skate 40. It will be apparent that various wheel axle configurations could be utilized to attach the grind plate 10 to the in-line skate 40.

The bottom edge 30 of the elongated lower portion 26 is shaped in a plurality of arcs 38.1, 38.2 and 38.3. Each arc 38.1 through 38.3 is extended between two grind plate apertures 28.1 through 28.4. When the grind plate 10 is attached to the skate 40, portions of the outer rail 56 of the frame 50 are exposed below each of the arcs 38.1, 38.2 and 38.3.

The elongated lower portion 26 has inner and outer surfaces 35 and 36, respectively. Substantially parallel grooves 34 are formed on the outer surface 36 of the lower portion 26. The grooves 34 help reduce the material used in the grind plate 10, thereby reducing the weight of the grind plate 10. The grind plate 10 is preferably made of 30% glass-filled nylon. However, any other suitable material could be used. The inner surface 35 of the lower portion 26 has reliefs 37 and 39, which are formed in the grind plate 10 to accommodate the particular shape of the skate frame 50. It will be apparent that such reliefs could be formed in any manner to accommodate varying shapes of the skate frame, or, alternatively, such reliefs may not be needed at all.

When attaching the grind plate 10 to the in-line skate 40, the wheel axles 65.1 through 65.4 must be removed. As shown in Figs. 1-3, the grind plate 10 is then positioned adjacent to the outer rail 56 of the skate frame 50, with each of the grind plate apertures 28.1 through 28.4 axially aligned with one of the plurality of axially aligned pairs of frame axle apertures, wherein each of the wheels 62.1 through 62.4 is inserted between one of the pairs of frame axle apertures. Also, the toe and heel platforms 14 and 16 of the grind plate 10 are positioned such that their respective upper surfaces 18 and 20 abut the toe and heel areas 46 and 48, respectively, of the sole 44 of the boot 42, with the inner depression 22 receiving the outer front flange 69 of the frame 50. A wheel axle 65.1 through 65.4 is then inserted into each of the aligned grind plate apertures, and its coaxially aligned pair of axle apertures and wheel bore, and clamped to securely hold the respective wheel and the grind plate 10 in place.

An extreme skater may "grind" on several areas of the grind plate 10 when skating on an in-line skate. For example, the skater may build up momentum and jump onto a raised surface area, landing on the lower surface 24 of the toe platform 14 of the grind plate 10. The skater will continue to slide along the raised surface while he maintains balance and momentum. When skating without a grind plate, skaters will often slow down by leaning back to press the heel area of the sole 44 of the boot 42 onto the raised surface. This action also causes the outer rear flange of the sole platform 52 of the frame 50 to

slide along the raised surface. When the grind plate 10 is attached to a skate, however, the lower surface 25 of the heel platform 16 can be pressed into the raised surface along which the skater is sliding, in order to slow down the skater. Because the heel platform 16 is vertically spaced below the heel area 48 of the sole 44 of the boot 42, the skater will not have to lean back as far as usual in order to slow down. It will be apparent that the grind plate 10 need not be configured with a vertically lowered heel platform 16. Rather, the heel platform 16 of the grind plate 10 could be configured to receive the heel area 48 of the sole 44 of the boot 42 in a manner similar to the toe platform 14 of the grind plate 10.

Although grinding will eventually wear away the toe and heel platforms 14 and 16 of the grind plate 10, the rivets, such as rivet 43.2, which connect the skate frame 50 to the boot 42 will be protected because the grind plate 10 will prevent direct contact between the rivets and abrasive surfaces contacting the skate 40 during grinding. Moreover, the grind plate 10 can be replaced at any time with a new grind plate 10. Finally, typical grinding often results in the sole 44 and shell 41 of the boot 42 sliding along abrasive surfaces. The grind plate 10 substantially covers outer portions of the toe and heel areas 46 and 48 of the sole 44 of the boot 42, thus protecting the boot 42 from abrasive surfaces.

An alternative method of "grinding" involves metal rails and pre-formed grooves in the skate frame 50. Skaters who grind on metal rails will usually pre-form a groove in the bottom edge 51 of the skate frame 50 between two of the wheels 62.1 through 62.4. Typically, the groove is formed between the two middle wheels 62.2 and 62.3. Skaters will rub the bottom edge 51 of the skate frame along an abrasive surface until the bottom edge 51 of the skate frame 50 has been worn away enough to permit grinding along rails. The grind plate 10 has arcs 38 already formed to prevent the skater from having to exert additional effort to grind away the bottom edge 30 of the grind plate 10 to create the pre-formed groove. The grind plate 10 arcs 38.1 through 38.3 are also advantageous for grinding in this manner because once the groove in the bottom edge 51 of the skate frame 50 is flush with one of the arcs 38.1, 38.2 or 38.3 of the grind plate 10, the additional material of the grind plate 10, which is adjacent to the pre-formed groove, slows down the rate at which grinding erodes the bottom edge 51 of the skate frame 50.

It is to be understood that even though numerous characteristics and advantages of various embodiments of the present invention have been set forth in the foregoing description, together with details of the structure and function of various embodiments of the invention, this disclosure is illustrative only, and changes may be made in detail, especially in matters of structure and arrangement of parts within the principles of the present invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

Claims

1. A grind plate for a skate having a boot with a sole, a frame attached to the boot, and wheels with wheel bores, the frame forming a plurality of axle apertures coaxially aligned with the wheel bores, the sole including a toe area and a heel area, said grind plate comprising:
 - a toe platform having an upper surface opposing a portion of the toe area of the sole;
 - a heel platform having an upper surface opposing a portion of the heel area of the sole;
 - a lower portion extending downwardly from said toe platform and said heel platform such that said lower portion is adjacent to selected areas of the frame when said grind plate is attached to the skate; and
 - fastening means for fastening said grind plate to the skate.
2. The grind plate according to claim 1 wherein said grind plate is made of an abrasion resistant material.
3. The grind plate according to claim 2 wherein said material is 30 percent glass-filled nylon.
4. The grind plate according to claim 1 wherein said fastening means comprises:
 - a plurality of grind plate apertures defined by said lower portion and spaced such that each of said plurality of grind plate apertures is in coaxial alignment with at least one of the plurality of frame axle apertures and at least one of the wheel bores;
 - each of said plurality of grind plate apertures sized to slidably receive a wheel axle configured to be slidably received through at least one wheel bore of the plurality of wheels and at least one of the plurality of frame axle apertures.
5. The grind plate according to claim 1 wherein said lower portion has an outer surface defining a plurality of substantially parallel grooves.
6. The grind plate according to claim 1 wherein said lower portion has a bottom edge forming a plurality of arcs, each of said plurality of arcs formed between two of said plurality of grind plate apertures.
7. The grind plate according to claim 1 wherein said grind plate is removable from said skate.
8. The grind plate according to claim 1 wherein
 - said upper surface of said toe platform of said
- grind plate defines an inner depression for receiving an outwardly extending front portion of the frame, the outwardly extending front portion being secured to the toe area of the sole of the boot; and
- said upper surface of said heel platform being substantially flat and opposing a portion of the heel area of the sole of the boot with a space defined therebetween.
9. The grind plate according to claim 8 wherein said upper surface of said heel platform of said grind plate abuts a downwardly extending portion of a shell surrounding the boot.
10. A skate comprising:
 - a boot having a sole with a toe area and a heel area;
 - a rigid frame having an upper platform attached to said sole of said boot and having a vertically extending wheel portion with a plurality of skate wheels secured thereto, each skate wheel defining a wheel bore axially disposed there-through, said wheel portion defining a plurality of axle apertures, each of said wheel bores coaxially aligned with at least one of said plurality of frame axle apertures;
 - a grind plate having a toe platform opposing a portion of the toe area of the sole, a heel platform opposing a portion of the heel area of the sole, and a lower portion extending downwardly from said toe platform and said heel platform such that said lower portion is adjacent to selected areas of the frame when said grind plate is attached to said skate; and
 - fastening means for fastening said grind plate to said skate.
11. The skate according to claim 10 wherein said grind plate is more abrasion resistant than said frame.
12. The grind plate according to claim 11 wherein said grind plate is made out of 30 percent glass-filled nylon.
13. The skate according to claim 10 wherein said fastening means comprises:
 - a plurality of grind plate apertures defined by said lower portion and spaced such that each of said plurality of grind plate apertures is in coaxial alignment with at least one said plurality of frame axle apertures and at least one of said wheel bores when said grind plate is attached to said skate; and
 - a plurality of wheel axles, each of said plurality of wheel axles slidably insertable through one

of said plurality of grind plate apertures, at least one of said plurality of frame axle apertures, and at least one of said wheel bores.

least one frame axle aperture, and at least one wheel bore, for connecting said grind plate to said frame.

14. The skate according to claim 10 wherein said lower portion of said grind plate has a bottom edge forming a plurality of arcs, each of said plurality of arcs formed between two of said grind plate apertures.

15. The skate according to claim 10 wherein said grind plate is removable from said skate.

16. The skate according to claim 10 wherein

said upper platform of said frame includes lateral toe and heel portions extending outwardly from said lower wheel portion, said toe and heel portions being secured to said toe and heel areas, respectively, of said sole of said boot; said upper surface of said toe platform of said grind plate defining an inner depression for receiving said lateral toe portion of said frame; and said upper surface of said heel platform of said grind plate being substantially flat and opposing a portion of said heel area of said sole of said boot with a space defined therebetween.

17. The skate according to claim 10 wherein said grind plate is removable from said skate.

18. A grind plate for a skate having a boot with a sole, a frame attached to the boot, and wheels with wheel bores, the frame forming a plurality of axle apertures coaxially aligned with the wheel bores, the sole including a toe area and a heel area, said grind plate comprising:

a platform having toe and heel upper surfaces, said toe upper surface configured to oppose a portion of the toe area of the sole and said heel upper surface configured to oppose a portion of the heel area of the sole; a lower portion extending downwardly from said toe platform and said heel platform such that said lower portion is adjacent to selected areas of the frame when said grind plate is attached to the skate; and said lower portion of said grind plate defining a plurality of grind plate apertures spaced to be coaxially aligned with at least one of the frame axle apertures and at least one of the wheel bores when said grind plate is attached to the skate.

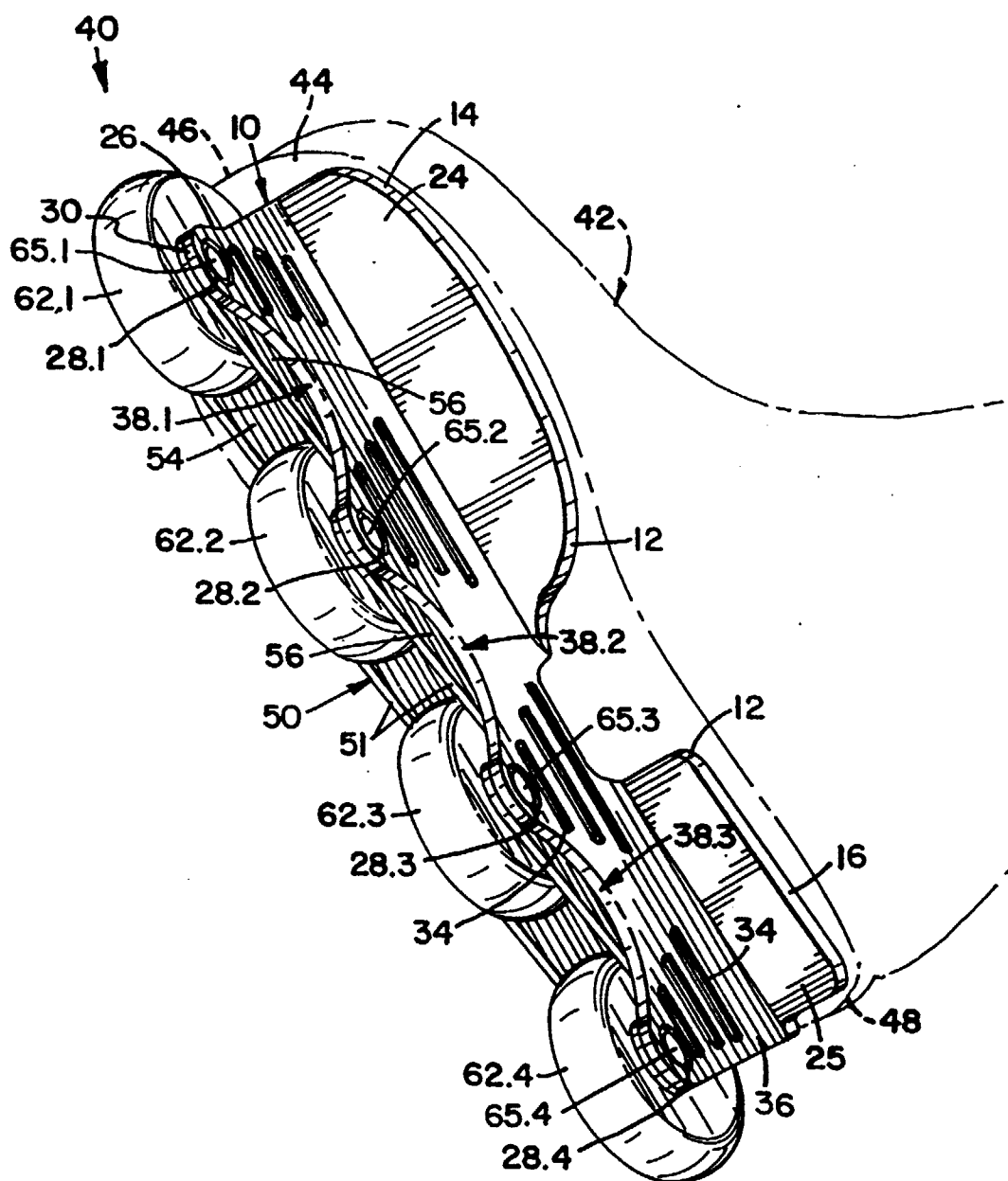
19. The grind plate according to claim 18 wherein each of said plurality of grind plate apertures is sized to slidably receive a wheel axle insertable through at

5 20. The grind plate according to claim 18 wherein

said toe upper surface of said platform defines an inner depression for receiving an outwardly extending front portion of the frame, the outwardly extending front portion being secured to the toe area of the sole of the boot; and said heel upper surface of said platform is substantially flat and opposes a portion of the heel area of the sole of the boot with a space defined therebetween.

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FIG. 1



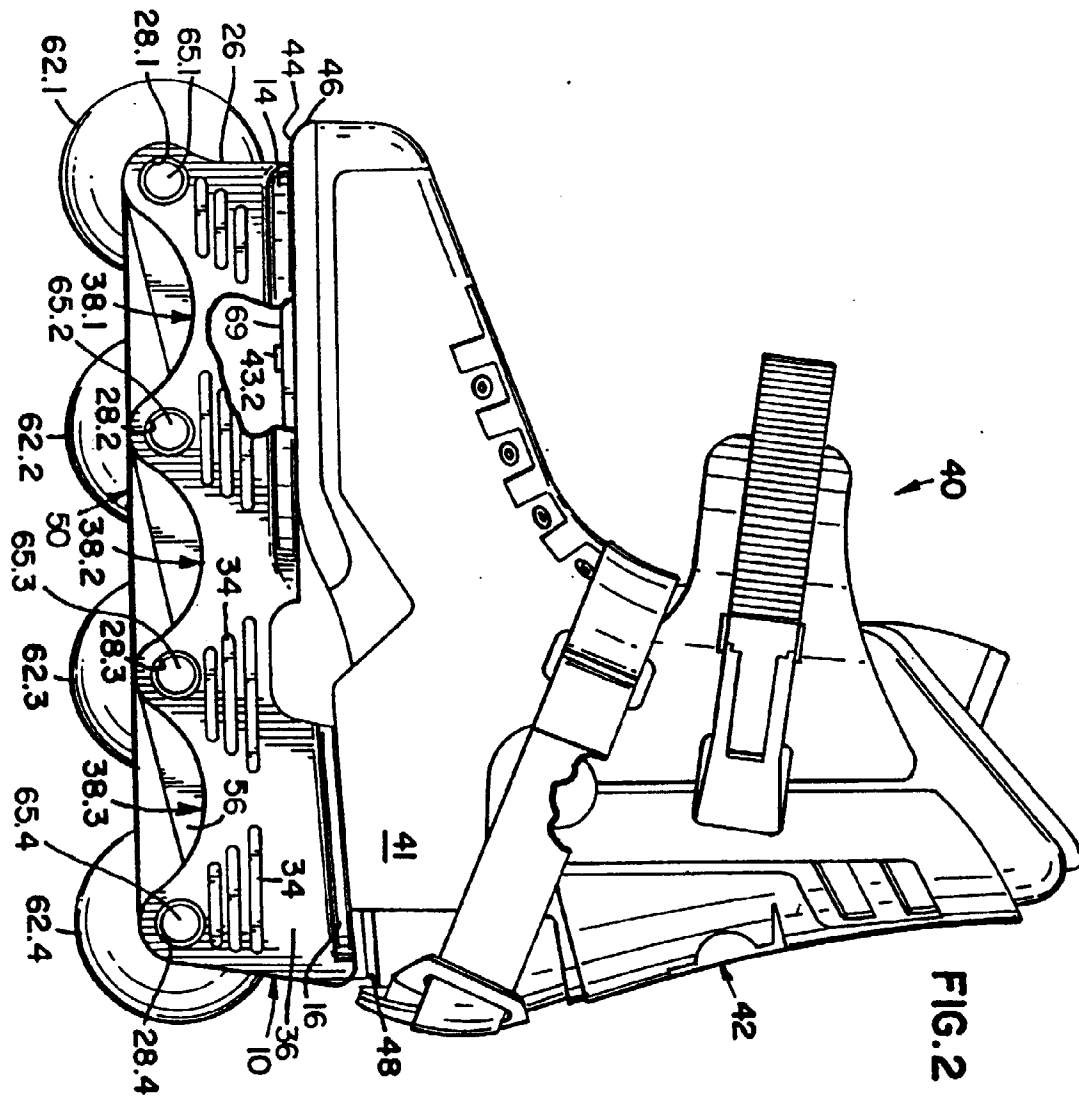
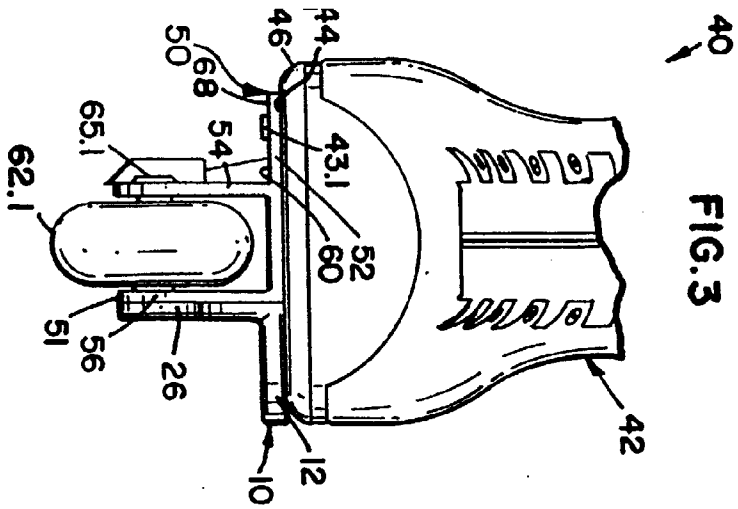


FIG. 5

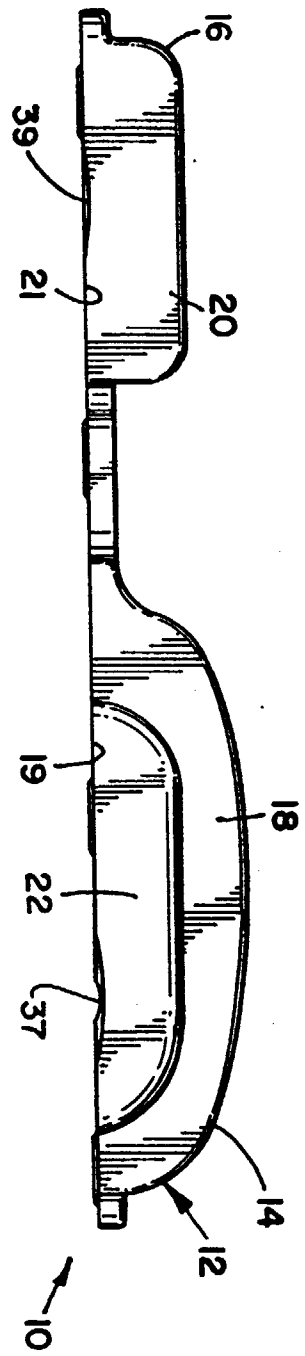
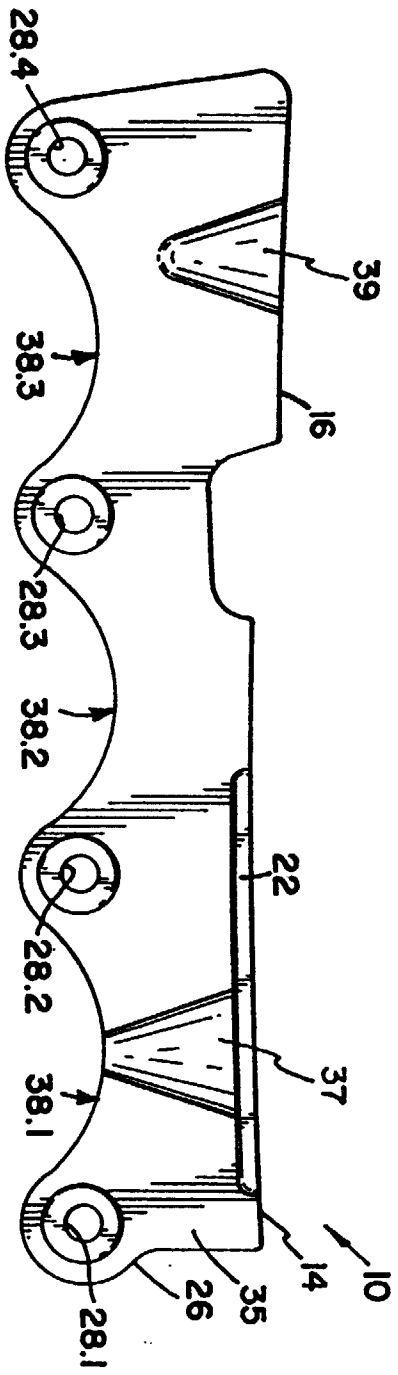


FIG. 4





European Patent
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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 98850007.0
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
Y	<u>DE 29615352 U1</u> (LANGER et al.) 16 January 1997 (16.01.97), the whole document.	1, 2	A 63 C 17/06
A	--	4, 10, 11, 17, 18	
Y	<u>AT-E 133872 T1</u> (ROLLERBLADE, INC.) 10 June 1996 (10.06.96), fig. 1, 3, claims 1, 4.	1, 2	
A	--	4, 10, 16, 18	
A	<u>DE 3300601 A1</u> (BOUCHER) 04 August 1983 (04.08.83), fig. 1, abstract.	1, 2, 7, 10, 11, 17	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			A 63 C 17/00
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 24-03-1998	Examiner SCHÖNWÄLDER
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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