April 27, 1965 G. K. WARE 3,180,651

TOE STOP STRUCTURE FOR ROLLER SKATE

Filed Aug. 27, 1962

Fig. 1.

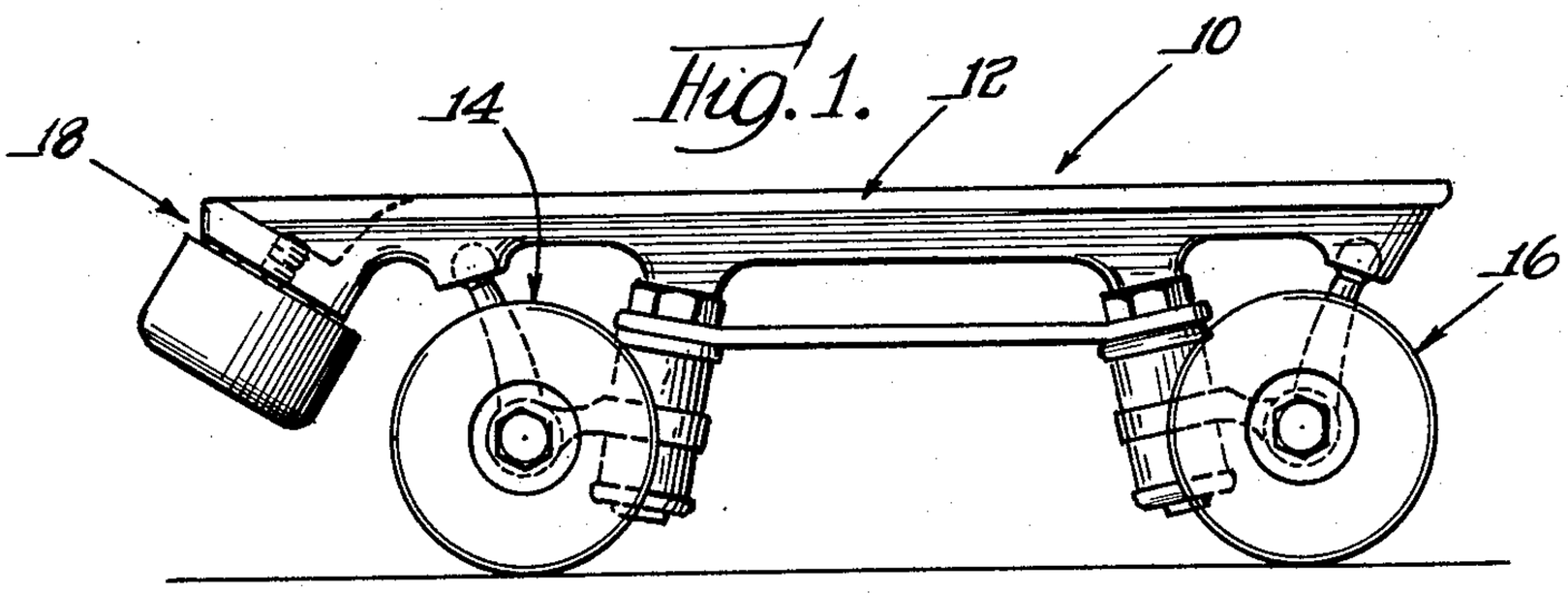


Fig. 2.

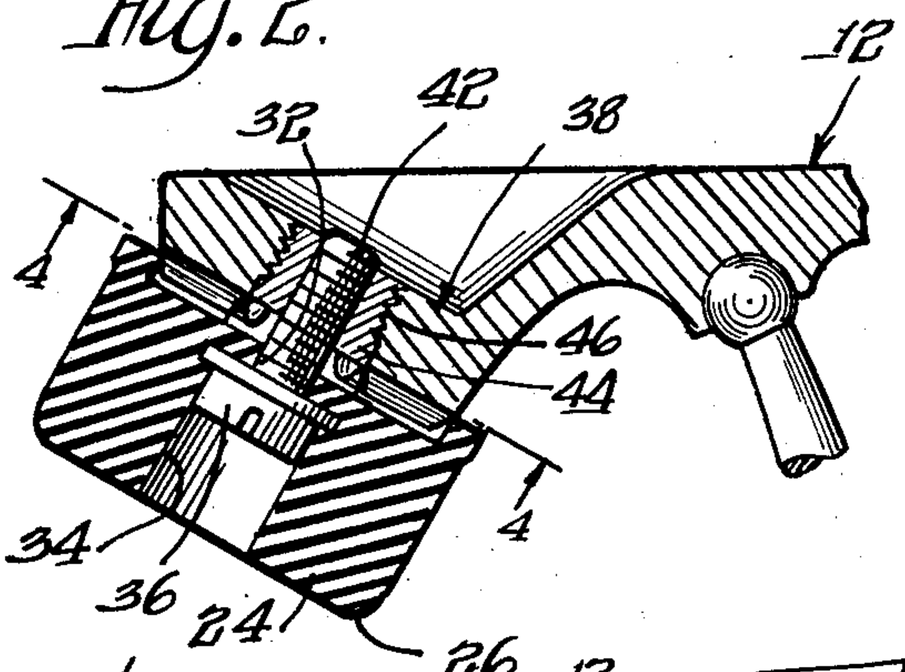


Fig. 3.

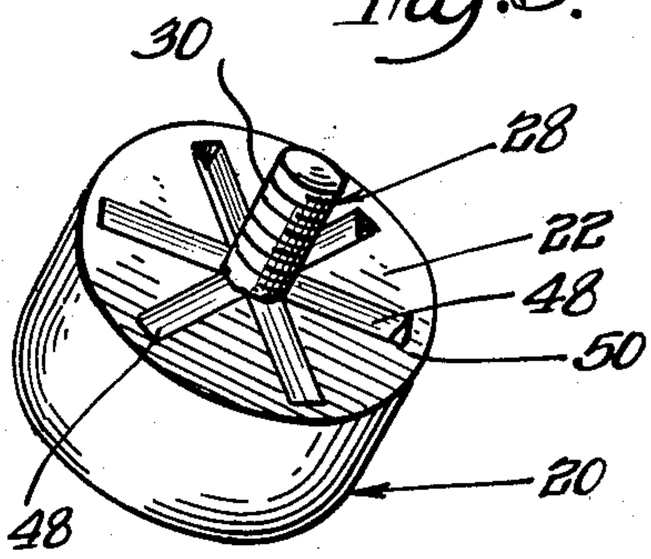


Fig. 4.

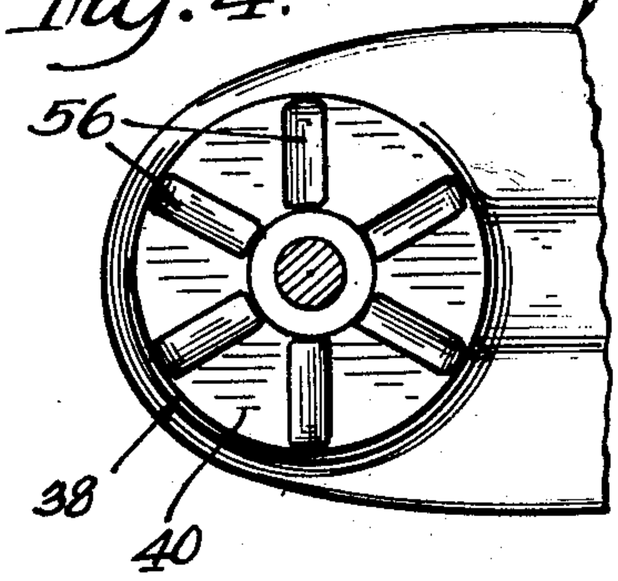


Fig. 5.

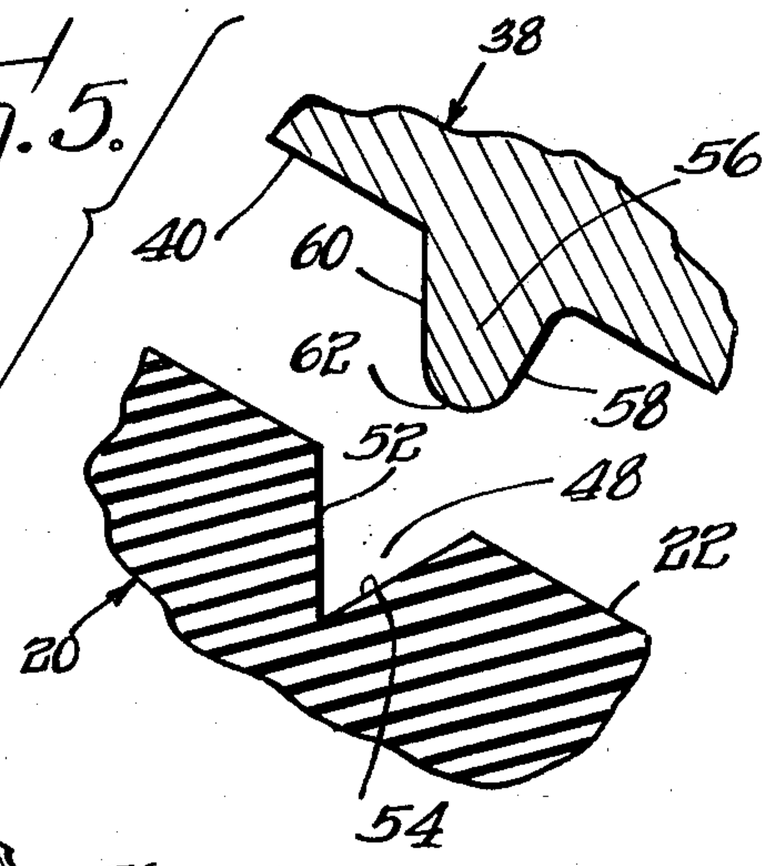
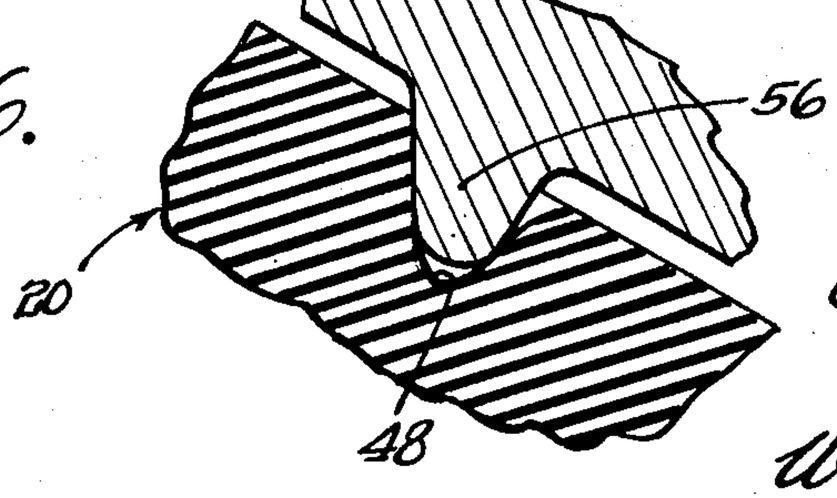


Fig. 6.



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TOE STOP STRUCTURE FOR ROLLER SKATE

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The present invention relates to a novel toe stop structure for roller skates.

Toe stop structures have heretofore been proposed which include a stop member formed from rubber or rubber-like material and a support therefor, which support may be formed integrally with a sole plate of a roller skate or provided as a separate element or bracket. The toe stop member has usually been connected with the support means or bracket by a screw element. While certain heretofore proposed toe stop structures have functioned generally satisfactorily, it has been found that when a skater engages the toe stop member against the floor, there is frequently a tendency of the toe stop member to rotate about its axis in a manner which may cause loosening of the screw and thus loosening of the toe stop member.

It is an important object of the present invention to provide a novel toe stop structure of the above-described type which is constructed so as substantially to preclude unauthorized or accidental loosening of the toe stop member.

A further object of the present invention is to provide a novel toe stop structure which minimizes any possibility of loosening of the toe stop member and which is of simple, economical and reliable construction.

Other objects and advantages of the present invention will become apparent from the following description wherein:

FIG. 1 is a side elevational view showing a skate incorporating a toe stop structure constructed in accordance with features of the present invention;

FIG. 2 is an enlarged fragmentary sectional view showing a toe stop structure incorporating features of the present invention;

FIG. 3 is a perspective view showing a toe stop member constructed in accordance with the present invention;

FIG. 4 is a sectional view taken along line **4—4** in FIG. 2;

FIG. 5 is an enlarged fragmentary and exploded sectional view showing mating portions of a toe stop member and a toe stop support element in spaced apart relationship; and

FIG. 6 is a sectional view similar to FIG. 5 but shows the parts in fully assembled relationship.

Referring now more specifically to the drawings wherein like parts are designated by the same numerals throughout the various figures, roller skate **10** incorporating features of the present invention is shown in FIG. 1. The skate **10** comprises a sole plate **12** and front and rear wheel truck assemblies **14** and **16** which are constructed and connected with the sole plate in a known manner. A toe stop construction **18** incorporating features of the present invention is disposed at the forward end of the sole plate.

The toe stop construction **18** comprises a stop member **20** preferably molded from a rubber or rubber-like friction material. The toe stop member has a substantially flat upper end or face **22** and a lower end or face **24** which preferably has a rounded marginal edge **26**. In order ot secure the toe stop member with respect to the support therefor, which is described in detail below, a screw element **28** in provided. The screw element has a threaded shank portion **30** which extends through a bore

32 in the toe stop member. The toe stop member is provided with an enlarged counterbore **34** for accommodating a head portion **36** of the screw member.

The toe stop construction further includes a mounting or supporting element **38** for supporting the stop member **20**. In the embodiment shown, the support element **38** is in the form of a boss integral with the sole plate **12**. However, it is to be understood that the support element **38** could be provided in the form of a separate bracket secured to the sole plate or connected with the front wheel truck **14**.

The support element is constructed so as to present a forwardly and downwardly facing surface **40** adapted to overlie the upper end or surface **22** of the stop member **20**. The surface **40** has a peripheral configuration similar to the configuration of the stop member surface **22**, which, in the embodiment shown, is substantially circular. However, as shown in FIG. 2, the diameter of the surface **40** is substantially less than the diameter of the stop member.

The stop member is provided with a central internally threaded aperture means **42** for threadedly receiving the screw shank **30**. In the embodiment shown, the aperture means **42** is in an insert **44**, which has external threads cooperable with an internally threaded aperture **46** integral with the support element **38**. With this arrangement, toe stop members **20** of different sizes and having different sizes of securing screws assembled therewith may be connected with the support element **38** by selectively removing or replacing the insert **44**. This, of course, changes the effective size of the aperture means within the support element, so that the aperture means is adaptable for accommodating securing screws of different sizes.

As will be understood, when a skater engages the toe stop member **20** against the floor for accomplishing a braking action, a substantial torque may be applied to the toe stop member **20** tending to rotate the toe stop member about the screw **28**. The direction of such rotation will, of course, depend on the particular portion of the toe stop member which is engaged against the floor, but it frequently happens that the direction of such rotation will cause loosening of the screw member.

In order to prevent rotation of the stop member **20** relative to the support element **38**, means are provided for interlocking these parts with respect to each other. More specifically, as shown in FIGS. 2, 3, 5 and 6, the stop member **20** has a plurality of grooves **48** formed therein and spaced around the surface **22**. The grooves **48** extend substantially radially from the screw **28** toward the periphery of the toe stop member. However, it is to be noted that the grooves terminate short of the periphery of the toe stop member whereby the toe stop member has a peripherally continuous edge **50**. As shown in FIG. 5, each of the grooves **48** is formed so that it has a substantially triangular cross sectional configuration and so that opposite sides **52** and **54** thereof are inclined substantially equally from the surface **22**.

The support element **38** has a plurality of ribs **56** formed integrally therewith. The ribs **56** extend generally radially of the surface **40** and project from the surface **40** for cooperative engagement with the grooves **48** in the toe stop member **20**. As shown best in FIGS. 5 and 6, each of the ribs **56** has a first side **58** extending generally perpendicularly from the surface **40**, and a second side **60** which is inclined at an acute angle with respect to the surface **40** toward the side **58**. A rounded outer end **62** joins the sides **58** and **60**.

When the stop member **20** is assembled with the support element **38**, the stop member is first positioned so that its grooves **48** are in alignment with the ribs **56**. Then the screw member **28** is turned by means of a

suitable tool, not shown, for drawing the stop member 20 against the support element 38. This action causes the ribs to be forced into the grooves as shown best in FIG. 6. It is particularly to be noted that while the surface 60 of each rib is inclined at an angle similar to the inclination of an opposing surface of an associated groove 48, the non-symmetrical cross section of the rib created by the angular position of the surface 58 provides the outer end portion 62 of the rib with an effective thickness or transverse cross section greater than the width of the narrow bottom portion of an associated V-shaped groove. Thus, when a rib is forced into a groove as shown in FIG. 6, wall portions of the groove are deformed, thus allowing intimate and interlocking contact with the rib.

It is further to be noted that the effective height of each rib is greater than the effective depth of its associated groove whereby the surface 22 will be spaced from the surface 40 even after the screw member 28 has been fully tightened as shown in FIG. 6. This provides assurance that the entire clamping pressure will be applied between the inter-engaging surfaces of the ribs and the grooves whereby to minimize any possibility of slippage between the grooves and the ribs as a result of the compressibility of the rubber or rubber-like stop member.

While a preferred embodiment of the present invention has been shown and described herein, it is obvious that many details may be changed without departing from the spirit and scope of the appended claims.

This invention is claimed as follows:

1. In a roller skate construction, a toe stop structure comprising a support element presenting a forwardly and downwardly facing generally circular surface having a predetermined diameter, said element having internally threaded aperture means therein, a plurality of spaced ribs on said element, said ribs extending generally radially of said aperture means and projecting from said surface, said ribs extending substantially straight from immediately adjacent said aperture means continuously substantially to a peripheral edge of said surface, a stop member having a face disposed in opposing relationship to said surface and a diameter greater than said surface diameter, and a screw member connected with said stop member and threaded into said aperture means, said stop member having a plurality of radially extending groove means in said face thereof, said groove means having a radial length at least as great as said ribs and receiving and inter-engaging with said ribs for positive locking of said stop member against rotation relative to said support element, the length of said groove means and said ribs being substantially greater than transverse dimensions of the ribs and groove means, and the thickness of the outer end portions of the ribs being greater than the width of the bottom portions of associated groove means whereby the sides of the ribs engage the sides of the groove means for supporting the stop member with the face thereof spaced from the surface of said support element.

2. A toe stop structure, as defined in claim 1, wherein each of said ribs includes opposite side surfaces inclined at different amounts with respect to said surface for promoting wedging of the ribs into said groove means.

3. A toe stop structure, as defined in claim 1, wherein said stop member comprises a continuous and uninterrupted peripheral edge portion surrounding and closing radially outer ends of said groove means and partially covering radially outer ends of said ribs.

4. A toe stop structure for a roller skate comprising a support element for presenting a forwardly and downwardly facing surface having a predetermined diameter, said element having generally centrally located internally threaded aperture means therein, a plurality of annularly spaced ribs integral with said element, said ribs extending generally radially of said aperture means and from immediately adjacent said aperture means substantially straight to immediately adjacent a peripheral edge of said surface, said ribs having a predetermined height and projecting from said surface of said element, a stop member of resilient material having a face disposed in opposing and slightly axially spaced relationship with respect to said surface, a screw element connected with said stop member and threaded into said aperture means, and a plurality of generally radially extending groove means having a generally V-shaped transverse cross section in said stop member face, receiving and inter-engaging with said ribs for locking said stop member against rotation relative to said support element, said groove means having substantially straight flat side surfaces merging along a narrow apex and said ribs including substantially straight flat opposite side surfaces joined by blunt rounded outer end margins which engage the side surfaces of said groove means above said narrow apex in wedging contact for supporting the stop member with the face thereof spaced from the surface of said support element.

5. A toe stop structure as defined in claim 4, wherein said stop member has a diameter greater than said predetermined diameter of the support element surface, said stop member including a continuous uninterrupted marginal portion, closing outer ends of said groove means and partially covering outer ends of said ribs.

References Cited by the Examiner

UNITED STATES PATENTS

2,595,751	5/52	Balstad	280—11.2 X
2,706,641	4/55	Van Horn	280—11.2
2,719,723	10/55	Ware	280—11.2
3,003,776	10/61	Ware	280—11.2
3,035,846	5/62	Asad	280—11.2

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