Dec. 18, 1951 E. VAN HORN 2,578,911

ROLLER SKATE

Filed May 14, 1948 2 SHEETS—SHEET 1

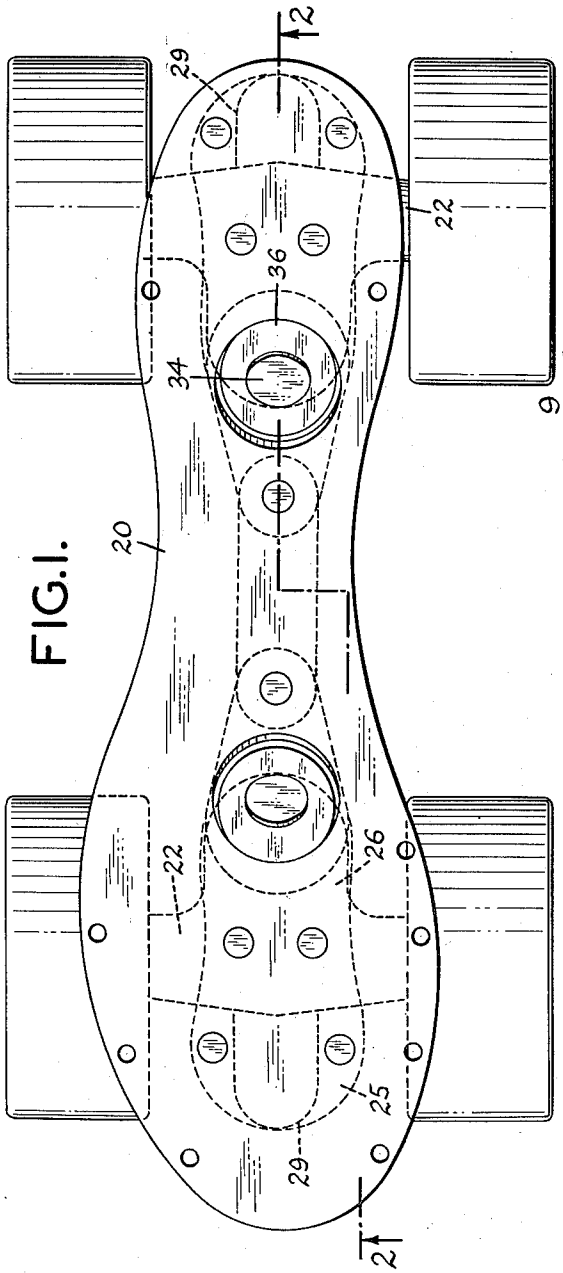


FIG. 1.

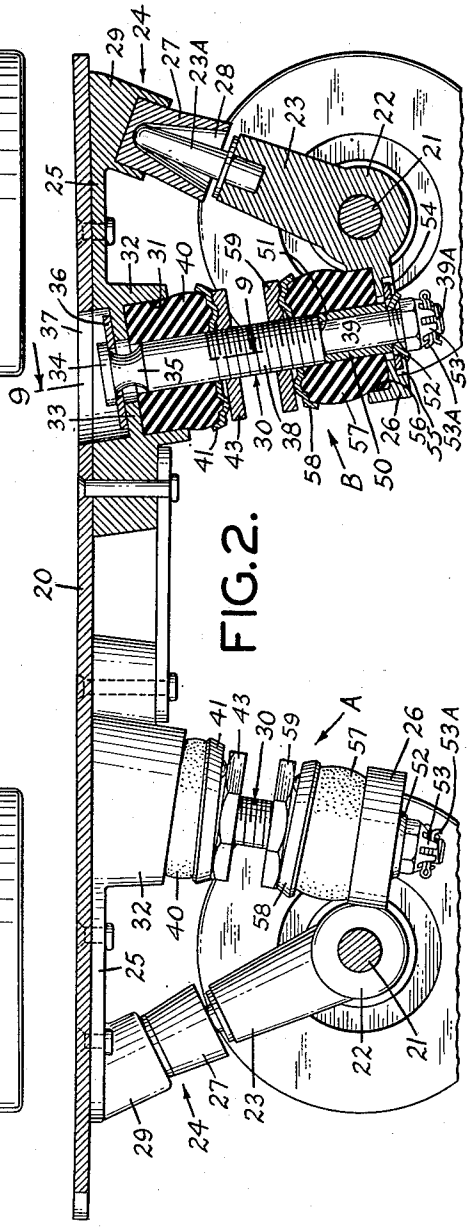


FIG. 2.

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FIG.3.

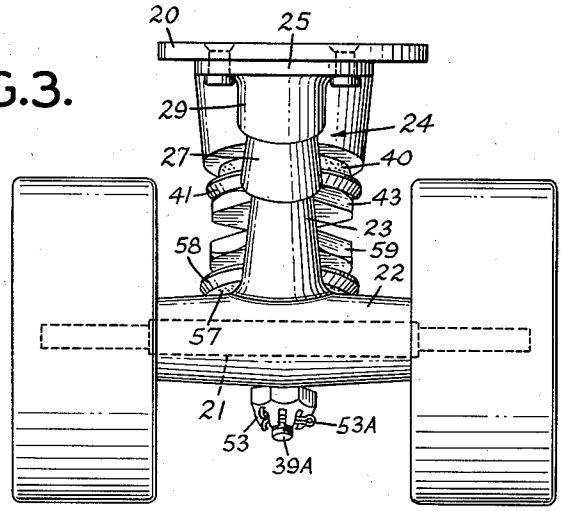


FIG.4.

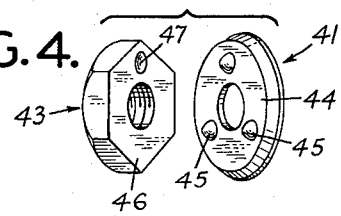


FIG.6.

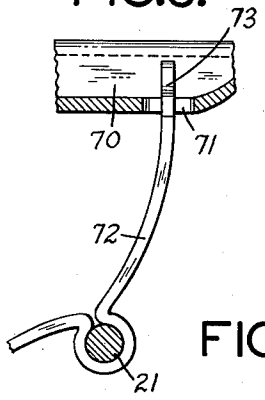


FIG.7.

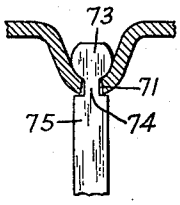


FIG.10.

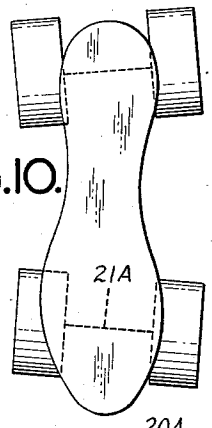


FIG.8.

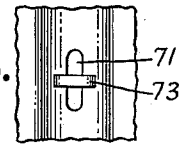


FIG.9.

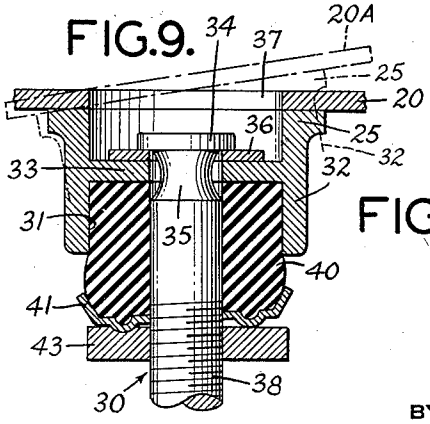
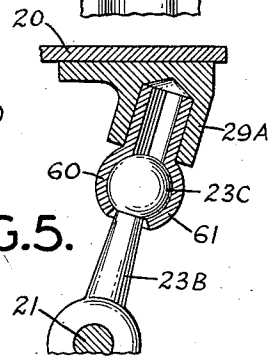


FIG.5.



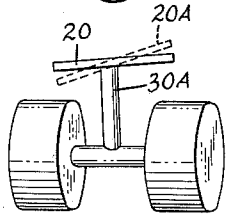


FIG.11.

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UNITED STATES PATENT OFFICE

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ROLLER SKATE

Earl Van Horn, Mineola, N. Y.

Application May 14, 1948, Serial No. 27,043

4 Claims. (Cl. 280—11.28)

1

In a copending application, Serial No. 715,097, filed December 9, 1946, now Patent 2,558,696, granted June 26, 1951, I disclosed a roller skate in which, in addition to the usual resiliently opposed flexible connection between the kingpin and the truck arm of a roller assembly, is another resiliently opposed flexible connection between the kingpin and the foot-plate. In that application the advantages of such a combination are described. The skate thus described has gone into successful use.

The object of the present application is to disclose and cover improvements over the skate shown in the aforesaid application.

In the original disclosure both of the flexible connections near opposite ends of the kingpin are opposed by adjustable resilient cushion members. It has been found desirable, in order to suit individual skater's requirements, to provide means for adjusting these resilient members independently of each other and to maintain each of them in its desired adjusted condition.

A construction which embodies an arrangement for attaining this desired result will be described in the following specification, together with certain other novel features, all of which will be defined in claims.

Referring to the figures—

Fig. 1 is a plan view and Fig. 2 a side elevation, partly in section, of a roller skate which is made according to and embodies my invention;

Fig. 3 is a rear end elevation of the skate shown in the aforesaid figures;

Fig. 4 is a perspective view of one of the adjusting nuts, and a member which cooperates with it to act as a lock washer;

Fig. 5 is a sectional elevation of a modified construction for interconnecting the truck arm of the axle bracket and the foot-plate.

Another arrangement for interconnecting the truck arm of the axle bracket and the foot-plate is shown in Figs. 6–8, of which Fig. 6 is a side elevation, partly in section, Fig. 7 is an end view, partly in section, and Fig. 8 is a plan view;

Fig. 9 is a sectional end elevation on an enlarged scale, taken on the line 9—9 of Fig. 2, illustrating the operation of the parts which interconnect the kingpin with the foot-plate.

Fig. 10 is a plan view of a skate, with the foot-plate tilted in one direction; and

Fig. 11 is a front elevation of the parts shown in Fig. 10. Figs. 10 and 11 are more or less diagrammatic and illustrate the operation of the invention.

20 designates a foot-plate, which may be secured to a skater's shoe. The two wheel assemblies A, B are below the plate. These are of identical construction, but are placed oppositely. Each of them comprises a pair of transversely spaced rollers on an axle 21 rigidly supported in an axle bracket 22, which has a truck arm 23 extending upwardly and outwardly at an oblique angle to a connection 24 with a base 25 on the under side of the foot-plate 20, and a substantially flat inwardly extending arm 26.

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In the construction shown in Figs. 1–3, the connection 24 between the upper end of the truck arm 23 and the foot-plate 20 is formed by a cylindrical socket member 27 of hardened steel having a flaring axially alined cavity 28 therein, driven into permanent engagement with a boss 29 formed on the base 25 and a pin 23A having a rounded end extending into the hollow interior of the socket member 27. The truck arm 23 is free to move laterally and vertically to a limited extent. The length of the pin 23A and the depth of the cavity 28 are such that the pin cannot come out of the socket member 27.

30 is a kingpin which passes through the center of the arm 26 of the axle bracket and through the center of a cylindrical bore 31 in a boss 32 formed on the base 25. The boss 32 is longitudinally spaced from the boss 29 to position the axis of the kingpin at an angle to that of the truck arm 23. 33 is a transverse shoulder across the bore 31 normal to the axis of the bore having a clearance hole for the kingpin. The upper end of the kingpin terminates in a head 34 of larger diameter than the main body of the pin and than the diameter of the clearance hole in the shoulder 33. The under side of the head forms a flat rim in a plane normal to the axis of the kingpin. Under the head is a neck 35 of reduced diameter. 36 is a flat hardened steel washer under the head 34. 37 is an opening in the foot-plate which registers with the bore 31 in the boss 32.

The kingpin with the washer 36 thereon is passed through the clearance hole in the shoulder 33 until the washer rests on the upper surface of the shoulder. This construction constitutes a universal joint connection between the upper end of the kingpin and the foot-plate. Then, a cylindrical pressure member 40 of resilient material, such, for example, as oil-resistance synthetic rubber, having flat transverse ends with an axial hole therethrough, is moved up over the kingpin into the bore 31 until its upper end abuts the lower surface of the shoulder 33. 41 is a cup-shaped washer under the lower end of

the pressure member, and a nut 43 engaging threads 38 on the kingpin is screwed up against the washer, deforming the pressure member 40 to a desired extent. This causes a downward pressure to be exerted upon the kingpin, which forces the washer 36 against the upper surface of the shoulder 33 and tends to hold the axis of the kingpin in a longitudinal plane at right angles to the surface of the foot-plate.

The foot-plate, however, can be tilted to either side against the action of the pressure member 40 without appreciably affecting the perpendicularity of the kingpin, as shown at 20A in dot-dash lines in Fig. 9. The degree of relative tilting produced by a given pressure will depend upon the amount of pressure which has been imposed upon the pressure member 40 by the nut 43. This obviously may be adjusted by turning the nut 43 on the kingpin.

It is necessary to maintain the parts in the desired positions in which they have been set, so that shocks to which they are subjected when in use will not disturb them. To accomplish this end I have provided a nut lock, which I will now describe.

In Fig. 4 it is shown that the surface 44 of the washer 41 is flat and that a plurality of knobs 45 project from this surface. These projections are spaced from the axis of the washer and are angularly spaced from one another. When the washer is made of sheet metal these projections are formed by stamping. The surface 46 of the nut is flat also, and an indentation 47 is formed therein, spaced from the axis the same distance as that of the projections 45 from the axis.

When the nut and washer are brought together under pressure, one of the projections 45 will enter the depression 47, as shown in Figs. 2 and 9, and effectively lock the parts together.

The lower portion 39 of the kingpin is of reduced diameter and is externally threaded near its end, as at 39A. 50 is a hollow cylindrical metallic sleeve which surrounds a part of the reduced portion 39 of the kingpin. Its outer diameter is the same as that of the body portion of the kingpin. The upper end of the sleeve 50 abuts a shoulder 51 formed between the threaded portion 38 and the reduced portion 39 of the kingpin. 52 is a spherical-shaped washer interposed between the lower end of the sleeve 50 and a castellated nut 53 engaging the threads 39A and positioned thereon by a cotter pin 53A. 54 is a hardened steel washer seated in a recess 55 in the under side of the arm 26 of the axle bracket 22. This construction constitutes a universal joint connection between the lower part of the kingpin and the axle bracket.

A similar recess 56 of larger diameter is formed in the upper side of the flange 26, in which is seated a resilient pressure member 57. Above this pressure member 57 is a cup-shaped washer 58 similar to the washer 41, and a nut 59 engaging the threads 38 on the kingpin. By this arrangement an adjustable downward pressure of flange 26 on the spherical-shaped washer 52 is effected, which has a tendency to hold the axle 21 at right angles to a vertical plane through the axes of the bosses 29, 32.

The washer 58 and the nut 59 are provided with interlocking means, such as those previously described.

When the kingpin is tilted laterally out of the vertical plane through the axes of the bosses 29, 32, as diagrammatically shown at 30A in Fig. 11, it will shift the axle to the position shown at 21A in Fig. 10. This operation is similar to the usual one, with the exception of the fact that, because of the flexible connection between the foot-plate and the kingpin, action of the kingpin on the truck arm is not positive, but is cushioned to the extent determined by the amount of pressure exerted upon the upper resilient member 40, which has a tendency to maintain the kingpin in a vertical position.

One accustomed to roller skating will feel that such positions thus diagrammatically represented are natural ones. An ice skater, however, actually tilts his foot to a greater extent in making a curve of the same radius at the same rate of speed. By the use of my skate, the foot-plate may be tilted further appreciably without shifting the wheel axles to a further extent. Thus, an ice skater finds it an easy matter to use roller skates if made according to the present disclosure. Habitual roller skaters also find that the greater flexibility of this arrangement relieves much of the strain on the muscles, especially about the ankles.

The further or additional degree of tilting of the foot-plate in relation to the kingpin is illustrated by the dot-dash line 20A in Figs. 9 and 11.

Because of the adjustability of the degree of pressure on the members 40 and 57, these parts may be regulated to suit the individual user's tastes and requirements. It has been pointed out that these adjustments can be made independently and the parts locked in the desired positions.

In the construction illustrated in Fig. 5 the truck arm 23B terminates in a ball 23C, which is embraced between a pair of members 60, 61, portions of which together form a spherical pocket, and other portions of which form a cylindrical extension which fits into the bore of a boss 29A.

Figs. 6–8 show the interconnection between a truck arm and a foot-plate which is illustrated in my application Ser. No. 715,097. In this case the foot-plate is provided with a longitudinal channel 70, in which is a longitudinally disposed slot 71. The truck arm 72, which preferably is stamped out of sheet metal, has a head 73 at its upper end, the width of which is slightly less than the length of the slot 71, so that it may be inserted into the channel through the slot. Below the head is a narrow neck 74, the width of which is slightly less than that of the slot 71. Below the neck is a part 75, which is wider than the slot. When the head is inserted through the slot into the channel and is turned 90 degrees, the truck arm is locked to the foot-plate. The lower edge of the head 73 is shaped to conform to the inner surface of the channel 71.

Various modifications in construction, mode of operation, method and use of an invention may and do occur to others, especially after benefitting from knowledge of such a disclosure as that herein presented of the principles involved, but the invention itself is not confined to the present showing.

I claim:

1. In a skate, a foot-plate, a roller assembly comprising an axle, an axle bracket having a truck arm interconnecting the foot-plate and the axle, a kingpin, a universal joint connection between one end of the kingpin and the foot-plate, a resilient pressure member between the kingpin and the foot-plate, a universal joint connection between the other end of the kingpin and the axle bracket, a second resilient pressure member between the kingpin and the axle bracket, and means for adjusting said pressure mem-

bers independently, said adjusting means comprising a pair of nuts between said pressure members in threaded engagement with the kingpin.

2. In a skate, a foot-plate, a roller assembly comprising an axle, an axle bracket having a truck arm interconnecting the foot-plate and the axle bracket, a kingpin, a universal joint connection between one end of the kingpin and the foot-plate, a resilient pressure member between the kingpin and the foot-plate, a universal joint connection between the other end of the kingpin and the axle bracket, a second resilient pressure member between the kingpin and the axle bracket, and means for adjusting said pressure members independently, said adjusting means comprising a pair of nuts between said pressure members in threaded engagement with the kingpin and a locking device for each of said nuts.

3. In a skate, a foot-plate, a roller assembly comprising an axle, an axle bracket having a truck arm interconnecting the foot-plate and the axle, a socket member on the foot-plate, a pin extending from the truck arm into the socket member, a kingpin, a universal joint connection between one end of the kingpin and the foot-plate, a resilient pressure member between the kingpin and the foot-plate, a universal joint connection between the other end of the kingpin and the axle bracket, a second resilient pressure member between the kingpin and the axle bracket, and means for adjusting said pressure members independently, said adjusting means comprising

a pair of nuts between said pressure members in threaded engagement with the kingpin.

4. In a skate, a foot-plate, a roller assembly comprising an axle, an axle bracket having a truck arm interconnecting the foot-plate and the axle, a kingpin, a universal joint connection between one end of the kingpin and the foot-plate, a resilient pressure member between the kingpin and the foot-plate, a universal joint connection between the other end of the kingpin and the axle bracket, a second resilient pressure member between the kingpin and the axle bracket, and means for adjusting said pressure members independently, said adjusting means comprising a pair of nuts in threaded engagement with the kingpin and lock washers interposed between said nuts and their adjacent pressure members.

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