

May 29, 1951

P. J. GAYLOR  
SKATING SURFACE

2,555,078

Filed May 21, 1946

4 Sheets-Sheet 1

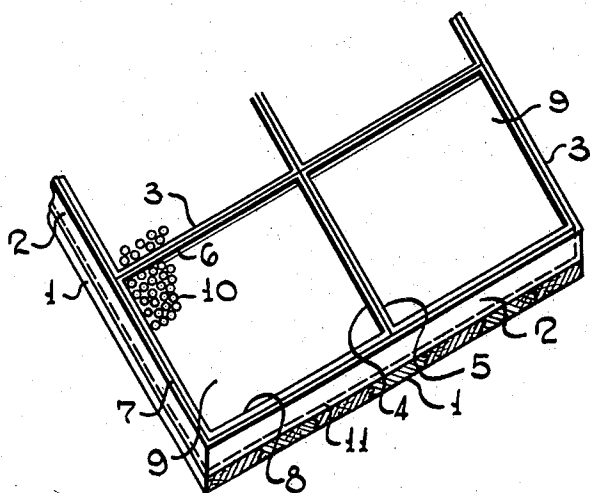


FIG. -1

FIG. -2

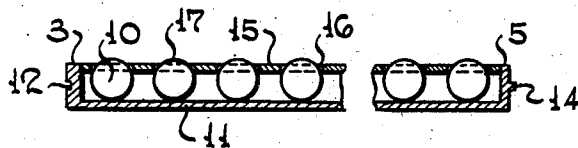
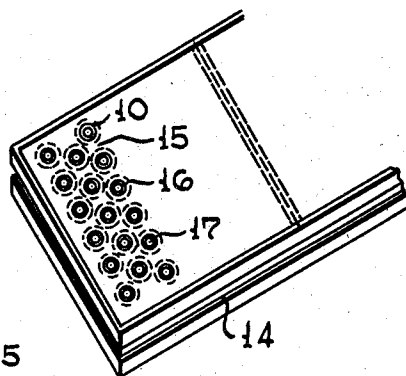


FIG. -3

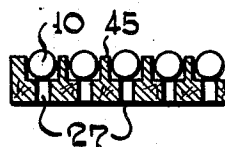


FIG. -5

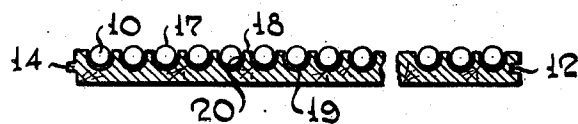


FIG. -4

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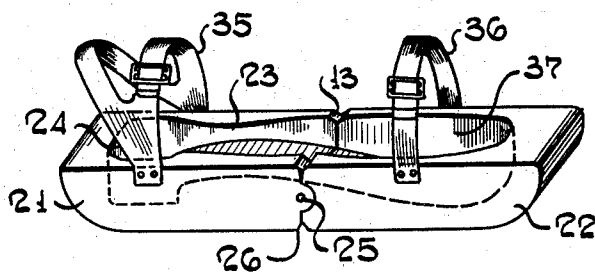


FIG. -6

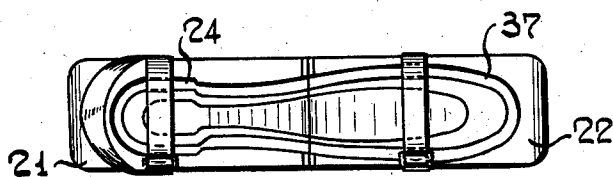


FIG. -7

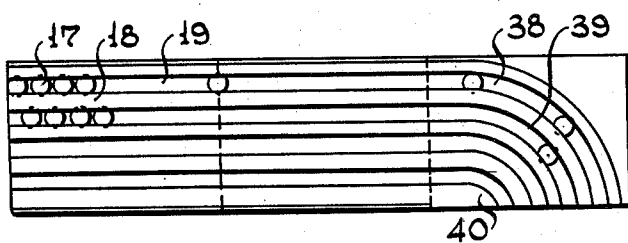


FIG. -8

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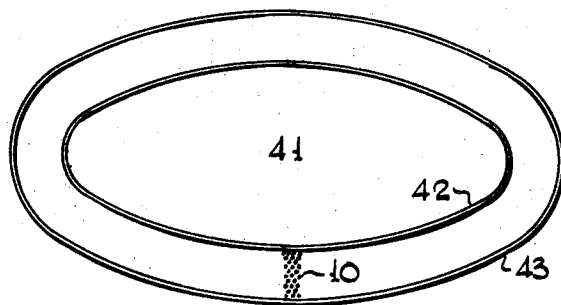


FIG. - 9

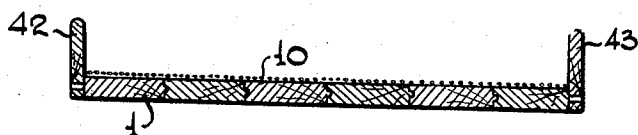


FIG. - 10

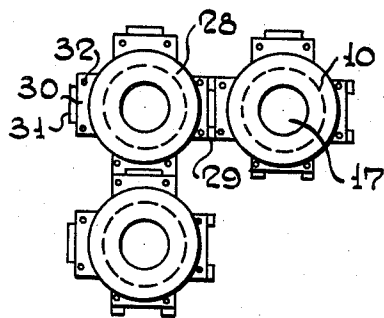


FIG. - 11

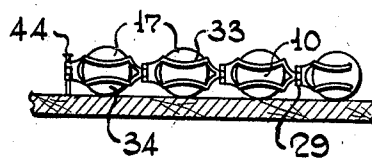


FIG. - 12

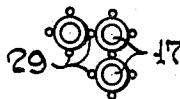


FIG. - 13

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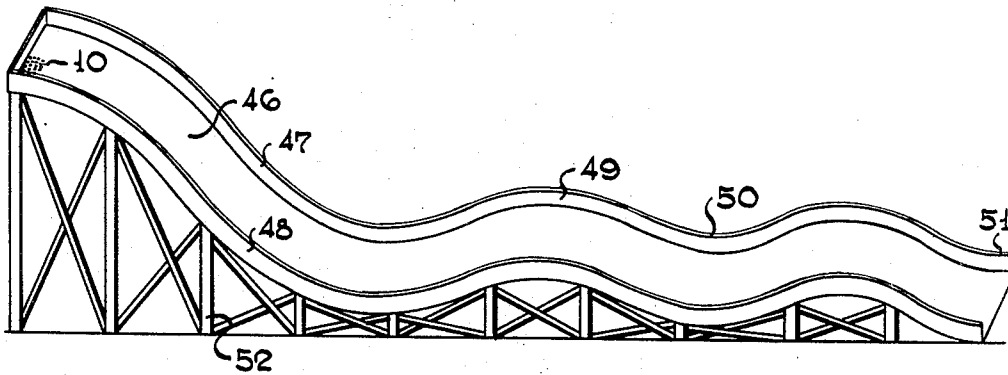


Fig. - 14

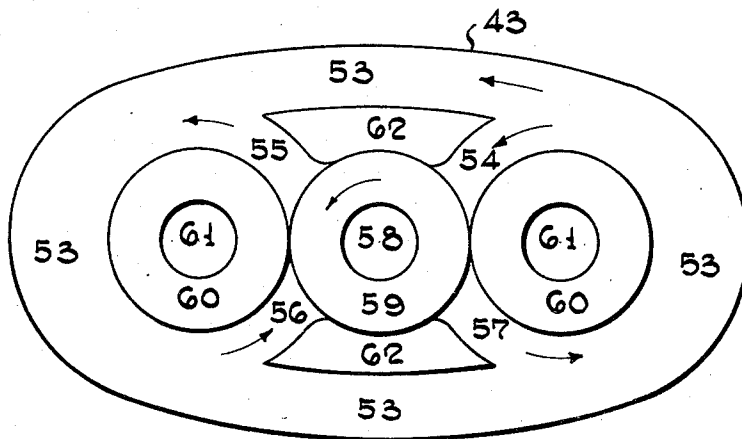


Fig. - 15

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## UNITED STATES PATENT OFFICE

2,555,078

## SKATING SURFACE

Peter J. Gaylor, Union, N. J.

Application May 21, 1946, Serial No. 671,375

4 Claims. (Cl. 272-3)

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This invention deals with gliding over mono-layer assemblies of spheres. More specifically, it deals with skating, tobogganing and other forms of riding on hard surfaces covered with mono-layers of substantially evenly-sized hard spherical pellets.

Ordinary roller skates possess a number of disadvantages, one of which is the lack of effective travel in other than the forward direction. In order to move sideways, the skater must turn the feet in that direction. Another disadvantage is the high friction loss due to the presence of bearings, shafts, and the like. There are also many other disadvantages, such as excessive noise.

An object of my invention is to overcome these disadvantages by providing a relatively noiseless skating surface and skating means whereby travel may be effected in any direction with the same efficiency. Another object is to provide a gliding surface which is easy to install and which gives greater speed than can be obtained by the use of wheels. Other objects will become apparent from the description which is to follow.

These objects are accomplished by the use of hard, preferably uniformly-graded, spherical pellets incorporated in the gliding surface and the use of special types of skates, rinks and slides.

The invention may be more clearly understood by reference to the drawings in which some of the embodiments of the invention are shown in detail. Figure 1 is a top view of one type of unitized spherical surface, while Figure 2 shows the top view of another type. In Figures 3, 4 and 5 are shown cross-sectional views of such surfaces, while Figure 6 shows an isometric and Figure 7 a plan view of a type of skate to be employed in combination with the spherical surfaces mentioned. Figure 8 shows another type of unitized spherical gliding surface, and Figure 9 shows a plan view, while Figure 10 gives a cross-sectional view of a skating rink employing another type of spherical skating surface. Other forms of unitized spherical gliding surfaces are also shown in Figures 11, 12 and 13. In Figure 14 is shown an isometric view of a toboggan slide employing the unitized spherical surfaces of the present invention, while Figure 15 discloses a novel type of skating rink which is adapted for use with the spherical gliding system heretofore mentioned. Similar numerals refer to similar parts in the various figures.

Referring again to the drawings, numeral 1 represents a hard level base of wood, concrete or the like, provided with projecting sides 2 and 3 forming an enclosure. Packed in this enclosure

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are units 9 of the spherical surface. Each unit has walls 4, 6, 7 and 8, and 3 and 5. Each of these box-like units has a hard base 11 of metal, plastic, hardwood, or the like, on which are disposed hard, uniformly sized spheres 10 which are not too tightly packed. The packing is preferably such as to allow each sphere a short rolling distance (say  $\frac{1}{2}$  to  $\frac{1}{4}$  inch, roughly).

These spheres may be made of glass, plastic, hard rubber, silica gel, silica-alumina gel, aluminum, and the like. It is preferred to employ silica gel spherical pellets made by dropping hydrogel globules into hot oil, as described in U. S. Patents 2,384,942-5, 2,384,455, and 2,400,176. When made in this manner, these gel pellets are pearly, tough particles having an exceptionally good surface hardness. They may vary in size, from about 5 microns diameter, to  $\frac{1}{2}$  inch or more. For the purpose of the unitized surfaces disclosed in Figure 1, the spheres are preferably  $\frac{1}{8}$  to  $\frac{3}{8}$  inch in diameter. It is desirable to grade these spheres by screening so that they all have substantially the same diameter. The partition walls 4, 6, 7 and 8 and 3 and 5 must extend from the base for a distance less than the diameter of the spheres. In such a case, it is possible for a person to glide from one unit to the other without hitting any of the protruding sides. These sides preferably should extend above the center of the spheres to minimize hopping over of spheres from one unit to the next.

In Figure 2 are shown similar units with spheres 10 which are partially covered with a plate 15. In this case, the plate covers all but the upper third or fourth of the sphere, the gliding by the person being done over the protruding tops of the spheres which, in this case, merely rotate and do not roll appreciably. The plate 15 has holes 16 punched therein to allow fitting over spheres 10, the tips 17 of which protrude above the plate. The plate may be attached to sides 3 and 5 which are provided with a tongue and groove joint 14, or other similar joining means to insure satisfactory joining with adjacent units. In this case, the spheres may be somewhat larger than in the case of Figure 1, and may have diameters of  $\frac{3}{8}$  to  $\frac{1}{2}$  or even  $\frac{3}{4}$  inch or more.

It is possible to allow the spheres to ride in grooves as in Figures 4 and 5. In Figure 4, the grooves 19 are circular and extend around spheres 10 to a point 18 past the center, thus preventing the spheres from coming out in any way other than by rolling out of the grooves. Gliding over the spheres causes them to rotate and to roll on inside surfaces 19 and 20.

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In Figure 5, the spheres 10 are set in channels 45, in which case the spheres could be lifted out. Slots 27 are provided in the base under the spheres to allow falling out of broken spheres, dust particles and other contaminants. These grooved gliding surfaces may be provided in unitized sections as shown in Figure 8. Besides the straight channel sections, it is possible to provide curved channel sections 40, fitting into the straight sections and having curved channels 38 and 39 for turning around corners. Such a construction can allow the spheres to roll continuously around the rink.

In Figure 10 is shown a rink having base 1 and sidewalls 42 and 43. Scattered on the base is a monolayer of fine spherical particles 10 of about 5-50 microns diameter. An oval type of rink 41 shown in Figure 9 would allow skating on these fine spheres which would roll as well as rotate continuously around the rink. At the end of each day, it is possible to shovel these spheres over a screen and thus screen out the broken ones. Some bags of new spheres can be dumped on the rink to replace broken and missing spheres. Gliding over such a surface is akin to sliding through snow or skiing.

It is possible to allow the spheres to roll around the rink. Or, if desired, stop-strips may be inserted across the rink below 42 and 43, at intervals, to minimize packing up of the spheres in one location. These strips would project above the center of the spheres but not quite to the tops thereof, so as not to interfere with gliding over the surfaces.

Instead of using loose spheres, it is possible to encase each sphere in a loose-fitting jacket, as in Figures 11, 12 and 13. In such case, the sphere is free to rotate, but cannot roll for any substantial distance unless the jacket moves. These jackets may be joined preferably by flexible means, to give a unitized construction. In the figures mentioned, spheres 10 are surrounded by jackets 28 of metal, plastic, or the like, leaving the upper surfaces 17 of the spheres exposed so as to enable gliding thereon.

The jackets are provided with oppositely disposed projections 30 having hinges 31 for engaging one jacket to another as in 29. The jackets may be hollow members 33 which merely act as a supporting framework for spheres 10. The bottom of the spheres may be enclosed inside the jackets, or exposed as shown by 34, to rotate on the hard surface on which they may be placed. The units may be fastened to such surface by a nail or screw through holes 32, or through the perforated hinge member, as in 44. Ball and socket hinges such as shown in 29 (Figure 13) may also be employed.

These unitized spherical surfaces, shown in Figures 11, 12 and 13 may be advantageously employed on curved surfaces where free spheres would be impractical. Figure 14 shows a toboggan slide which has its runway 46 surfaced with such unitized spheres 10. Sides 47 and 48 are provided to guide the rider. The inside surfaces of these sides may be cushioned and a circular toboggan having a flat bottom surface, the edges of which are also cushioned, may be employed, in which case the toboggan rotates as it slides down into the crests 49 and valleys 50, swaying from one side to the other, providing sufficient thrills for the riders. Such a slide may also be employed for skiing, in which case exit end 51 may discharge the skiers onto a flat surface

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covered with spheres. The framework for the slide is shown as 52.

In Figure 15 is shown a preferred type of skating rink employing sphere coated gliding surfaces 53, 54, 55, 56 and 57. Loose spheres, such as those shown in Figures 1 and 9 may be employed, although the other unitized types may be used. Runway 53 is employed as the fast lane and the outer part 43 may be provided with an endless hand rail which moves at rather high velocity, counterclockwise. This is to provide support to those who have difficulty in propelling themselves and to those who lack the initiative to propel themselves. Slower lanes 54, 55, 56 and 57 are provided as diversionary runways, with direction of traffic indicated by the arrows. Center 58 may be a stationary platform carrying the source of the music. Around 58 may be provided a circular runway 59 which can rotate counterclockwise. This runway may be surfaced with unitized spherical surfaces such as those shown in Figures 11, 12 and 13. Its speed would be lower than the speed on lane 53, thus enabling it to slow down traffic at the center and enable emerging from any of the outlets indicated by the arrows.

Stands 61 may also be stationary and surrounded by surfaces 60 which are not sphere-surfaced. These may be employed to provide skaters with food, beverages, and other supplies, while areas 62 may be provided with seats.

This type of surface may also be employed in the home or elsewhere to obtain the gliding effects herein described.

The skates to be employed for gliding on these surfaces must have a hard bottom surface. It is preferred that this surface be flat, although a surface having grooves or channels along the long axis may be employed. Edges, particularly the front, are preferably rounded off.

One type of skate suitable for this purpose is shown in Figures 6 and 7. It consists of a rear section 21 and front section 22 hinged at the center 25 with hinged openings 26 rounded off. A strap 36 is provided to fasten the front part to the toe section of the shoe while strap 35 fastens the rear section to the heel part of one's shoe. The center of the skate is cut out to provide a recess for the heel at 24, the instep at 23 and the toe at 37. Part 13 above the hinge is cut out to allow bending the skate in the center and thus provide some flexibility. The center may be grooved out for different sizes of shoes as shown in Figure 7.

Such a skate may be made of balsa wood having a bottom surface covered with hard plastic, aluminum, or similar hard material. It is also possible to make the skate of flexible material under which are cemented adjacent strips or slats of wood, metal, plastic, or the like, to allow for flexibility.

It might seem that the mounting of spheres on the soles of the skates would eliminate the necessity of covering the whole rink with spheres, but it has been found that spheres mounted on skates wear out quickly and are easily damaged, thus requiring considerable maintenance. With the present system, the amount of wear on each sphere is very small, since the wear is apportioned to thousands, if not millions, of the spheres.

I claim:

1. In a recreation and exercise unit for a person wherein rolling spheres are employed for carrying at least a part of the weight of the person, the improvement comprising a substantially flat, level base floor skating surface, a monolayer of

small, loose, freely rolling graded spheres made of hard, inorganic gel and packed on said surface with a density of spheres on said surface such that the spheres can roll for a short distance before stopping by contact with other spheres, and linearly disposed projections extending from said base surface to a height past the centers of the spheres and below the tops thereof, said projections being intermittently spaced on said base surface to localize linear movement of said spheres.

2. A unit according to claim 1 in which the base surface is in the form of unitized sections, each section holding a multiplicity of said spheres, and the projections extend from the edges of said sections.

3. A combination as in claim 1 in which the spheres are of hard silica gel.

4. A combination as in claim 3 in which the spheres are of hard silica-alumina gel.

PETER J. GAYLOR. 20

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