

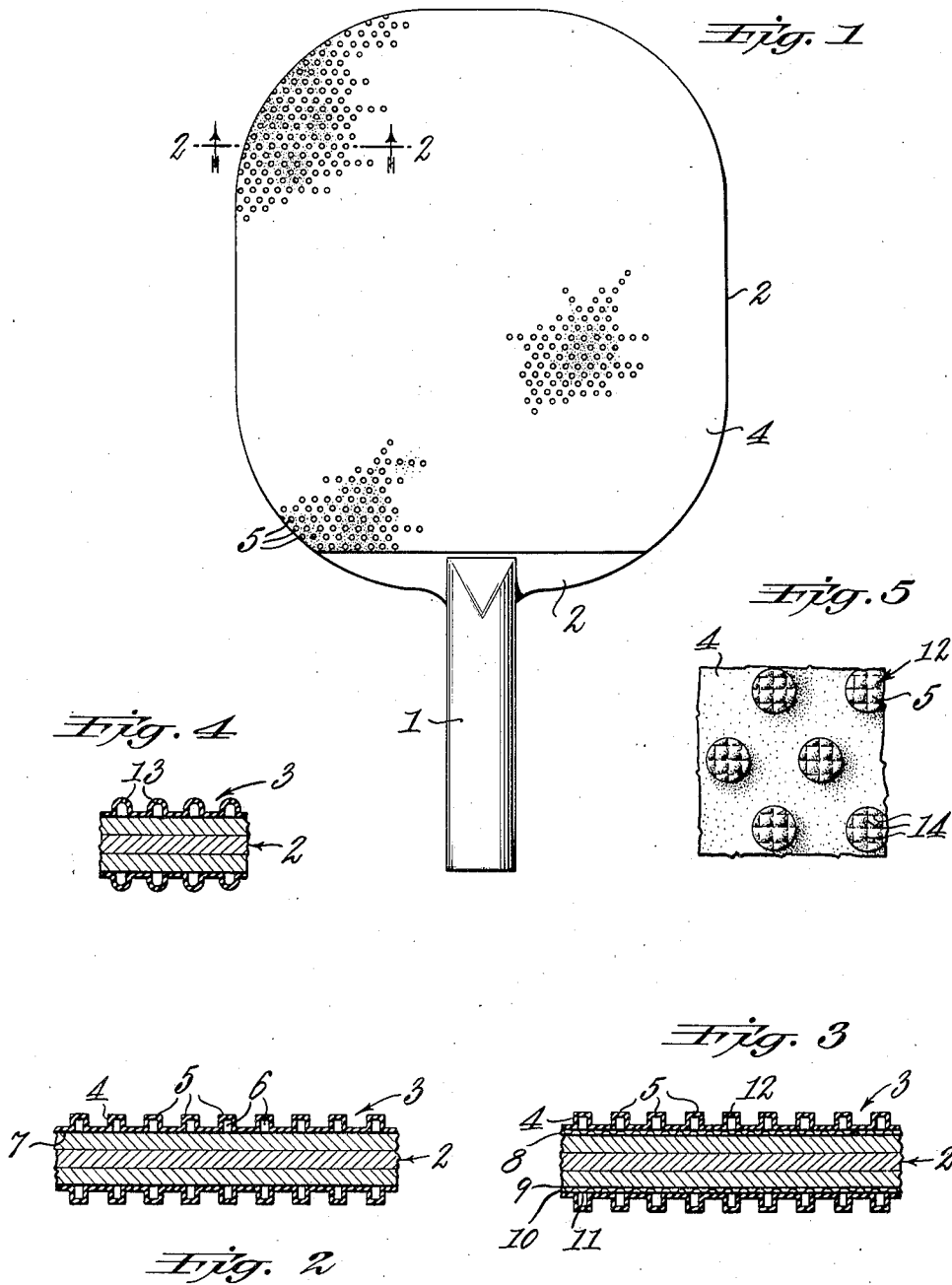
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V. H. HURT

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TABLE TENNIS RACKET

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INVENTOR.
Victor H. Hurt
BY *Seaton J. Rudlong*
ATTORNEY

UNITED STATES PATENT OFFICE

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TABLE TENNIS RACKET

Victor H. Hurt, Cranston, R. I., assignor to
United States Rubber Company, New York,
N. Y., a corporation of New Jersey

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This invention relates to rackets, bats and paddles, particularly rackets adapted for indoor games such as table tennis.

In the past it has been the practice to provide various types of playing surfaces on table tennis rackets or paddles. In an effort to provide a non-slipping playing surface it has been common to apply a layer or a sheet of sand paper as a playing or hitting surface. Sandpaper provides a certain amount of grip but fails to furnish any resilient or cushioning action, resulting in too rapid a bounce for expert play. At the other extreme, it has been proposed to provide for cushioning and resilient properties a relatively thick layer of sponge rubber on the playing surfaces. Sponge rubber surfaces have the disadvantage of preventing a sufficiently rapid bounce and furthermore are uneven in texture. Up to the present invention, the surface which has been found to be best adapted, both for a rapid bounce and for gripping action to produce a cut, is a layer of sheet rubber having a multiplicity of solid knobs or projections regularly extending therefrom. Rubber surfaces of this type provide a degree of resilience and limited deformation of the individual solid rubber knobs. The present invention constitutes a definite improvement over all these prior types of playing surface.

According to the present invention a racket or paddle is provided with a rubber surface having a multiplicity of minute hollow knobs or protuberances extending from the playing surface thereof. The bat or racket is especially adapted for indoor ball games such as table tennis but may be employed for other games, as in certain forms of badminton or in various other sports involving the use of a striking surface against a ball or other projectile.

It has been discovered that a table tennis racket according to the present invention has playing qualities superior to the previous rackets described above. The feature of providing hollow projecting knobs permits greater deformation and resilience in addition to a pneumatic cushioning effect, as compared with surfaces of sand paper, solid rubber, or sponge rubber. The effectiveness of the present racket is particularly evident when the player is attempting to put a cut on the ball.

While the present invention is not predicated on any particular theory of operation of a cut stroke, it is known that the more spin that is imparted to a ball by the hitting or striking surface, the greater will be the angle of deviation from the original direction of travel after the ball has taken

the first bounce. It is believed that in order to impart a sharp cut there must be a gripping action by the striking surface of the racket accompanied by an instant of delay before the travelling ball has bounded away from the racket. It is obvious that these desirable results will be obtained when the striking surface may be deformed both normally and angularly with respect to the incident direction of travel of the ball. The former sand paper racket, by providing a hard surface, did not provide the necessary instant of delay for the surface of the racket to grip the ball to impart the desired spin. The sponge rubber type of surface, being very soft, allows the ball to sink into the racket surface, but is not capable of supplying the necessary driving force on the rebound. The solid knobs or projections sometimes provided on the playing surface permit only a limited degree of deformation of the surface and do not become sufficiently twisted or squashed out of shape as is the case with the racket according to the present invention.

When a ball is hit by the present racket the knobs or projections in contact with the ball are twisted and almost flattened sidewise by the impact when the racket is held at an angle. As the ball leaves the surface the spin imparted by the angular stroke is augmented by the tendency of the hollow elastic knobs to reassume their original projecting cylindrical shape. The knobs also provide a degree of pneumatic action by virtue of the air enclosed by them. They may be completely sealed off interiorly, as when a sheet of rubber is secured directly to the supporting member or racket surface proper, or they may have a semi-pneumatic action or a delayed pneumatic reaction when a fabric or other air-pervious sheet is interposed between the solid body of the racket and the rubber sheet material carrying the projections. Furthermore, the pneumatic feature of the present invention provides a more positive resilient action than the prior solid rubber knobs wherein the whole thickness of the knob was only partially deformed. In practice the present rackets have been found to produce, with the same type of stroke and under the same conditions, up to twice as great a cut or spin on a regulation Celluloid table tennis ball.

The accompanying drawing illustrates certain present preferred forms of the invention, in which:

Fig. 1 is a plan view of a table tennis racket;

Fig. 2 is a cross-section enlarged with respect to Fig. 1 taken along the line 2—2 of Fig. 1;

Fig. 3 is a cross-section, similar to Fig. 2, of an

alternative embodiment showing the intermediate air-pervious layer of material;

Fig. 4 is an alternative embodiment showing a different type of configuration of the knobs or projections; and

Fig. 5 is a greatly enlarged plan view of a portion of the knobs or projections illustrating the ridges therein.

Referring to Figs. 1 and 2, the table tennis racket comprises the usual parts, namely a handle 1 and a playing member 2 secured thereto. The playing member may be of the normal material such as ply wood and constitutes a supporting member for the playing surface 3 which, as shown in Fig. 1, comprises a sheet or layer 4 of rubber having a plurality of knobs or projections 5, each of the knobs, as shown in Fig. 2, having a hollow interior 6. An adhesive 7, for example, a rubber cement, may be employed to secure the rubber playing layer 4 to the supporting member 2.

The embodiment shown in Fig. 3 has the same type of rubber layer 4 with the projecting knobs 5, but an intermediate air-pervious layer 8 of fabric or other sheet material is interposed between the playing surface 3 and the supporting member 2. In some instances, the intermediate fabric layer is desirable in order to provide a strong bond between the playing surface and the supporting member so that layers of adhesive 9 and 10, on either side of the fabric layer 8 may furnish a better bond. The provision of the fabric layer 8 may augment the softness of the playing surface when such is desired. The adhesive or cement layer 9 may be of such consistency and supplied in sufficient thickness to effectively seal off the opening 11 leading into the interior 6 of each knob 5. If desired, however, a porous adhesive or an adhesive provided in an extremely thin layer, may be sufficiently pervious to provide some interconnection between the interior of the knobs and the thin interstices of the fabric layer 8. In this latter construction, air may be expelled from the interior of the knobs and diffused through the layer of fabric or other air-pervious material. It is preferred, however, that the interior of the knobs be sealed off at 11 either by direct contact with the surface of the supporting member 2 or by the film of adhesive securing the playing surface thereto.

It is to be understood that the rubber layer may be of any desired relatively flexible resilient material, and consequently the term "rubber" as used herein embraces rubber substitutes, such as synthetic rubbers, artificial rubbers, and similar rubber-like natural or artificial materials. It is preferred that the outermost portion 12 of the knobs be closed in order to produce the pneumatic effect which has proven desirable both for limited cushioning and for gripping the ball. Obviously the hollow knobs or projections may permit of other configurations, as for example, polyhedrons, cones, or the round knobs 13 shown in Fig. 4. It is preferred that all of the knobs be regularly arranged on the surface of the rubber sheet and that they project equidistantly so as to provide a plane discontinuous playing surface. The outermost surface 12, as shown in Fig. 5, is preferably provided with minute ridges 14 or other rough form. The roughness thereby provided augments the gripping action of the playing surface.

The individual knobs are preferably of the order of $\frac{1}{16}$ " in diameter or smaller and are arranged in rows so that their distance apart and

height are of similar order, although various larger or smaller diameters, widths and heights, and other arrangements and distances apart may be employed for effective operation.

The described rubber sheet material may be produced by an embossing process such as described in my co-pending application Serial No. 350,931, filed August 3, 1940. Obviously the invention is not limited to any particular method of producing the hollow projections. This material is preferably of thin gauge of the order of .010 to .060 inch depending on the size of the knobs and the desired weight of the racket, and is of substantially the same thickness throughout, that is, the side walls and external wall of the projections are of a thickness similar to that of the flat portion of the sheet material. In most instances, however, the rubber comprising the shell of the knob is slightly thinner than the main body portion of the rubber layer when the embossed material is made in accordance with the process described.

The intermediate layer 8, while preferably a fabric, may be of any soft or hard foraminous or air-pervious material. While the arrangement of the projections is shown in the drawing to be along straight intersecting lines, other arrangements may be provided as, for example, concentric or intersecting circles or arcs. It is preferred, however, to position the projections or knobs sufficiently close together so that a ball will strike more than one knob at a time in order to prevent uncontrolled deflection thereof.

While I have shown and described certain preferred embodiments of the invention it is to be understood that it may be otherwise embodied within the spirit thereof and within the scope of the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A game bat or racket having on its hitting surface a multiplicity of hollow resilient projecting knobs the outer ends of which are closed.

2. A sports racket having a playing surface comprising a multiplicity of hollow resilient cylindrical knobs, said knobs projecting substantially equidistantly from said surface and being closed at their outer ends.

3. A sports racket having a playing surface comprising a sheet of rubber having a plurality of upstanding hollow knobs extending from the body of the racket, the outer ends of said knobs being closed.

4. A sports racket having a playing surface comprising a sheet of rubber having a plurality of upstanding hollow knobs extending from the body of the racket, and a fabric backing for said rubber sheet, the outer ends of said knobs being closed.

5. A racket comprising a supporting member and a resilient playing surface secured thereto, said playing surface comprising a sheet of soft rubber having integral hollow knobs extending therefrom, the ends of said knobs being closed, the area of the rubber material extending between the hollow portions of said knobs being adhered to said supporting member to seal said hollow knobs at their bases.

6. A sports racket having a playing surface provided with a multiplicity of hollow resilient cylindrical knobs, said knobs having closed outer ends projecting substantially equidistantly from said surface, the ends having substantially flat roughened surfaces.

7. A sports racket having a playing surface

provided with a multiplicity of hollow resilient round knobs, said knobs projecting substantially equidistantly from said surface, said knobs being shaped to entrap air between their hollow portions and the underlying face of the racket.

8. A racket surfacing material comprising a sheet of resilient material having a multiplicity of hollow upstanding resilient knobs projecting from its surface, the ends of said knobs being closed, and the surfacing material extending between said knobs being in a common plane beneath the ends of the knobs.

9. A game bat having on its hitting surface a multiplicity of hollow resilient knobs projecting from the body of the bat, the outer ends of the knobs being sealed and the inner ends of the knobs being closed with air-pervious material.

10. A game bat having on its hitting surface a multiplicity of hollow resilient knobs projecting from the body of the bat, both ends of each knob being sealed to provide a confined body of gaseous medium within the body of the knob.

VICTOR H. HURT.