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(54) **Ball serving aid.**

(57) Ball serving aid comprising a first portion (1,21) having an at least partly spherical outer form and a second portion (2,22) which defines a nest for a ball to be thrown upwardly by rapidly raising the aid.

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This invention relates to a ball serving aid. In a particular aspect, this invention relates to a tennis ball serving aid. The present invention is also believed to have application in games other than tennis such as squash.

It is well known that it is difficult to learn a good serve in tennis.

One major difficulty that I have noticed when observing tennis players is that their manner of throwing a ball upwards prior to hitting it in a serve is often unsatisfactory.

It is my view that the best manner of throwing the ball up to serve involves a vertical movement of the server's hand in a straight vertical line without any horizontal movement of the hand; for instance, the hand should not move in an arc. All too often, however, the hand movement is other than what I consider to be desirable and as a result the ball, when it leaves the server's hand, is not moving only vertically but is also moving horizontal so that to hit the ball, when it is at the desired height, the server must hit the ball in a position forward or backwards of the desired position and sometimes additionally to one side of that desired position.

The present invention seeks to provide a device which will be useful in training a games player

to serve by causing a ball to be thrown substantially only vertical not with substantially no horizontal component of motion.

The present invention provides a ball serving aid comprising a first portion having an at least partly spherical outer form and a second portion which defines a nest for a ball to be thrown upwardly by rapidly raising the aid.

The first portion and the second portion may be integrally formed with the aid or may be provided as separately formed members which have been secured together. This latter is preferred as will be explained later. Thus, in a preferred instance the present invention provides a ball serving aid comprising a first member having an at least partly spherical outer form and to which is secured a second member which defines a nest for a ball to be thrown upwardly by rapidly raising the aid.

The radius of the partly spherical outer form is preferably substantially the same as said ball. Thus, for an aid in tennis serving the diameter should be about 1-3/8 inches.

The first member preferably has an at least hemi-spherical outer form and it is more preferred that the first member is at least 3/4 of a sphere or is spherical.

It is still more preferred that the first member is actually a ball of the kind which is to be served and that the second member is secured thereto.

The nature of said nest is important as it is not desirable to nest the ball to be thrown so securely that the ball to be thrown is substantially immune to sideways forces generated by an undesirable serving action: nor is it desirable that the ball to

be thrown is nested so insecurely that difficulty is found in balancing the ball to be thrown on said nest or that minor sideways forces cause the ball to be displaced off said nest.

In general, I have found that the nesting is preferably such that the ball will not fall off the nest if the aid is tipped not more than 5^{o} but will fall off the nest if the aid is tipped more than 45^{o}. More preferred angles are 10^{o} and 40^{o} and still more preferred angles are 20^{o} and 30^{o}.

The second member may be an annulus secured to the first member.

If falling off within the angular range specified above is considered and if the ball to be thrown is to be supported by the perimeter of the annulus alone a diameter of the annulus of not more than 2 inches is preferred when the ball to be thrown is a tennis ball. In this instance, the use of an annulus of 1½ inch diameter or smaller is preferred but when the diameter is below 1 inch difficulty in balancing may be found.

The tipping angles referred to above, while providing a satisfactory test, nevertheless provide a test under static conditions and do not constitute an exact simulation of the unwanted forces which can arise as a ball is served.

Accordingly, I have found that a superior aid will be obtained if the ball to be thrown can move about sideways in said nest.

Thus, if the second member is an annulus it is preferred that it has an axial length sufficiently short and that the arrangement is such that the ball to be thrown is not simultaneously supported by diametrically opposite regions of the annulus. In one instance

of this, the first member is a ball of the kind to be served and projects into the annulus such that the ball to be thrown is supported by the annulus and the first member.

A most preferred construction, however, uses a dished surface for the nest. In this instance the surface preferably has a perimeter which cannot be contacted simultaneously in two diametrically opposite regions. One particular instance of such a surface is a part spherical surface having a radius of curvature greater than that of a ball to be thrown. Other instances of such a surface are a part of an ellipsoidal surface and a part of an oblate spheroidal surface. Other surfaces which act similarly are possible such as surfaces of revolution derived from, elipses, hyperbolae and parabolae.

In its most preferred form the second member is a body having a part spherical surface on one side in which and to which the first member which is preferably a ball of the kind to be served is received and secured and said dished surface on an opposite side. That body may be solid or hollow. That body may be a moulded body such as of synthetic plastics material.

The securement of the first member to the second member may be by an adhesive or by a mechanical fixture such as a screw, toggle bolt or capture fastener.

Specific constructions of serving aids in accordance with this invention will now be described with the aid of the accompanying drawings in which:-

Figure 1 is a perspective view of a first aid,

Figure 2 is a partly sectional view of the first aid,

Figure 3 is a perspective view of a second aid,

Figure 4 is a partly sectional view of the second aid,

Figure 5 is a sectional view of a third aid, and

Figures 6 and 7 are schematic representations which illustrate use.

Referring now to Figures 1 and 2, the first serving aid is an aid to tennis serving and comprises a tennis ball 1 to which is secured an annulus 2. Securement is had by means of an adhesive or in any other convenient way.

To use the first aid, the ball 1 is held in the fingers of a server with the annulus upwards, a free tennis ball 3 is then placed on the annulus and the first aid is then moved rapidly vertical without horizontal movement so that the ball will move directly upwardly. If the server moves his hand in an arc the ball 3 will not move directly upwardly but will move upwardly with a component of sideways movement.

As further serving practice, a server may stand in the considered best serving position, place a racquet at his feet and use the aid to throw the ball upwards: the aim being that the ball should be thrown up to land on the racquet.

Note, from Figure 2, that the ball 3 is not centrally located on the annulus 2 due to the relatively short axial length and that the ball may move about the central position but is unstable in the central position. This problem may be dealt with by making the annulus axially longer but so doing may give a server too much control over the ball.

A preferred serving aid is the second aid

shown in Figures 3 and 4.

The second aid comprises a tennis ball 21 and a body 22 which can support another tennis ball 23.

The body 22 is generally cylindrical in outer form and has a dished surface 31 on its underside in which the ball 21 is received and to which the ball 21 is secured by adhesive or other securing means. The surface 31 is on substantially the same radius of curvature as the outer surface of the ball 21 such that the ball 21 and surface 31 closely nest.

The body 22 also has a dished surface 32 on its upper side but in this instance the surface 32 has a radius of curvature greater than that of the outer surface of the ball 23. The reason for this is to provide a central stable position for the ball 23 but not one which allows a server excessive control of the ball 23 in that in using the second aid in serving similarly as described with respect to Figures 1 and 2, improper hand motion will cause the ball 23 to ride up the surface 32 to have a sideways motion transmitted to it.

Reference is now made to Fig. 6 and set out below are "instructions" which might be printed on a box containing an aid in accordance with this invention and which might be used in conjunction with Fig. 6:

"(a) Turn side on to court as for service, feet same width apart as shoulders.

(b) Place racket on ground. Bow of racket opposite front toe.

(c) Hold aid in fingers with palm of hand under ball. Place another ball in holder.

(d) Hold aid chest high above strings of

racket. Lower hand about 6 inches in a straight line and push toward the sky.

(e) The ball must be thrown high enough to be hit and MUST LAND ON THE RACKET FACE.

This action will give you control of your throw and help produce a SUPERIOR SERVICE ACTION.

When this has been achieved learn to serve the ball into court using the aid".

Figure 7 shows schematically how the aid might be used in serving a tennis ball.

The body 22 can be made of any suitable material.

The third aid shown in cross-section in Fig. 5 is similar to that of Figs. 3 and 4 excepting that the tennis ball 21 has a hole 51 therein and the body 22 has an integrally formed projection 52 which extends from the surface 31 and which comprises a shank 53 and flexible prongs 54 which, in passing the projection 52 through the hole 51 are capable of deforming to lie close to the shank 53 and, after passing through the hole 51, returning to their original position to capture the body 22 to the ball 21.

In lieu of the prongs 54 one might use a flexible skirt and in this respect reference is made to the wall fastener art which shows a variety of plugs, toggle bolts and other structures which might be used in the present invention.

The claims form part of the disclosure of this specification.

Modifications and adaptations may be made to the above described without departing from the spirit and scope of this invention which includes every novel feature and combination of features disclosed herein.

1. A ball serving aid comprising a first portion having an at least partly spherical outer form and a second portion which defines a nest for a ball to be thrown upwardly by rapidly raising the aid.

2. A ball serving aid comprising a first member having an at least partly spherical outer form and to which is secured a second member which defines a nest for a ball to be thrown upwardly by rapidly raising the aid.

3. A ball serving aid as claimed in claim 2, wherein the first member is a ball of the kind which is to be served and the second member is secured thereto.

4. A ball serving aid as claimed in claim 3, wherein the first member is a tennis ball.

5. A ball serving aid as claimed in claim 2, wherein the nest is such that the ball to be served will not fall off the nest if the aid is tipped not more than 5^{o} but will fall off the nest if the aid is tipped more than 30^{o}.

6. A ball serving aid as claimed in claim 2, wherein the nest is defined by a dished surface in the second member.

7. Á ball serving aid as claimed in claim 6,

wherein the surface has a perimeter which cannot be contacted by the ball to be served simultaneously in two diametrically opposite regions.

8. A ball serving aid as claimed in claim 7, wherein said surface is a part of a spherically concave surface having a radius greater than that of the ball to be served.

9. A ball serving aid as claimed in claim 2, wherein the second member is a body having, on a side opposite to the nest, a surface which is a part of a spherically concave surface in which and to which the first member is received and secured.

10. A ball serving aid substantially as herein-before described with reference to any one of the accompanying drawings.

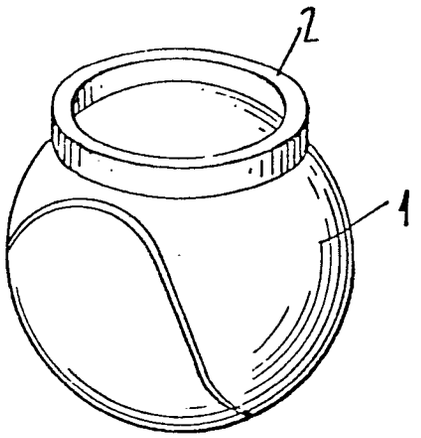

FIG. 1.

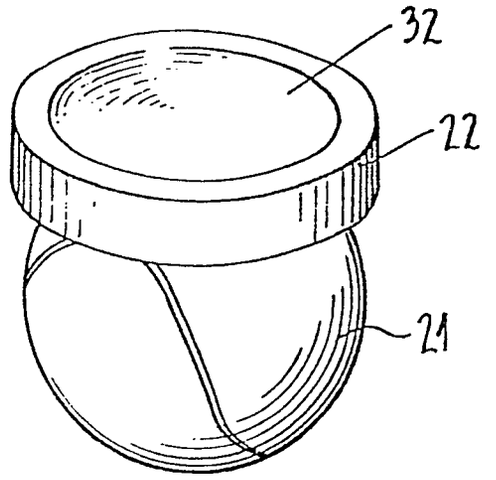

FIG. 3.

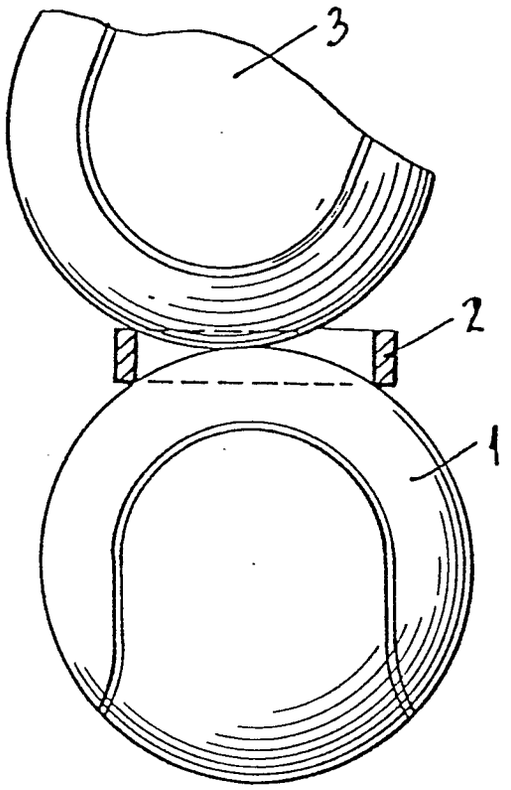

FIG. 2.

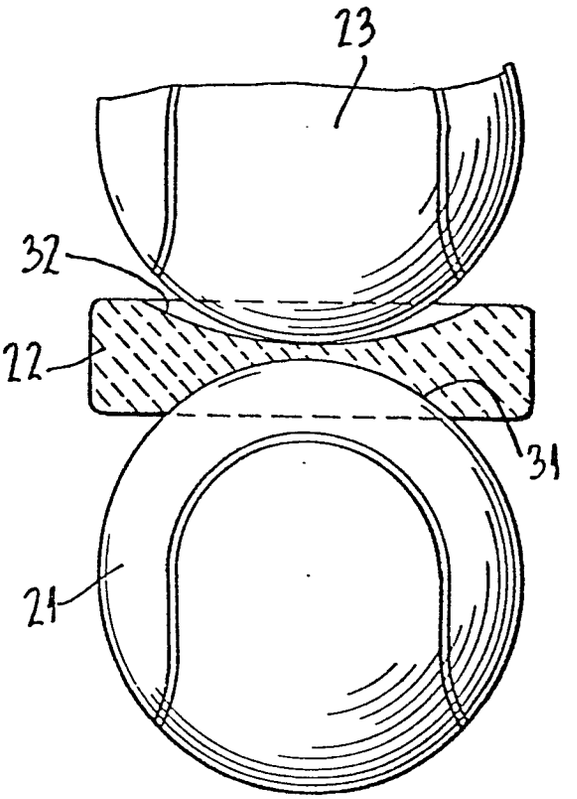

FIG. 4.

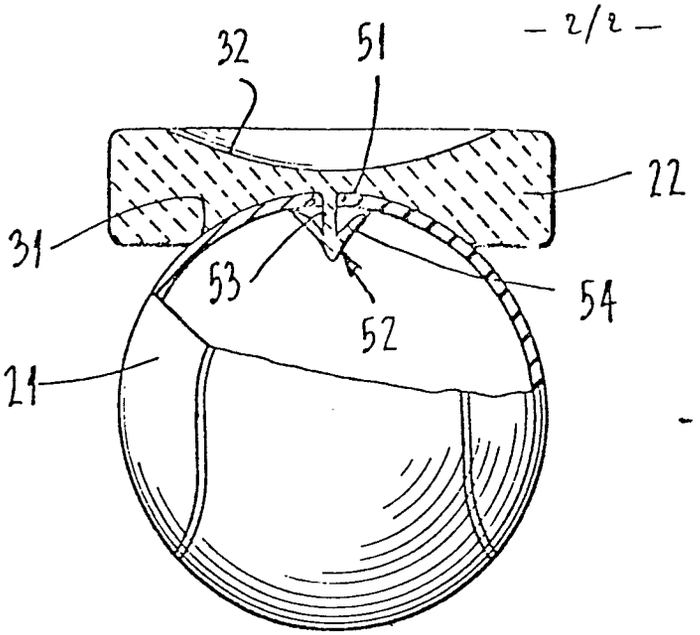

FIG. 5.

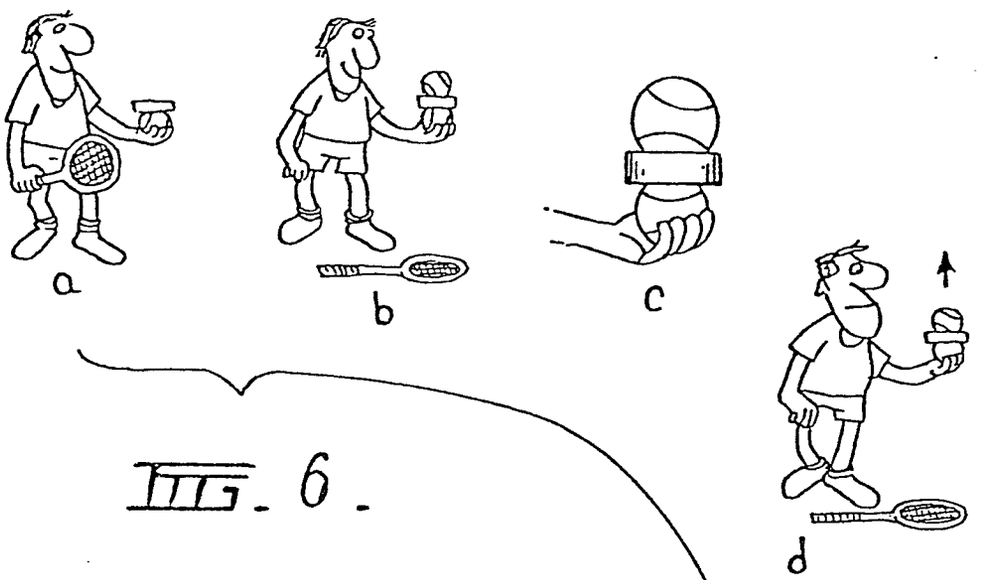

FIG. 6.

FIG. 7.

European Patent Office

EUROPEAN SEARCH REPORT

Application number
EP 79 30 2267.4

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim
X	US - A - 4 034 981 (VENEZIANO) * claim 1; column 2, lines 28 to 31; fig. 2, position 2 * --	1,2, 5,10
	GB - A - 1 254 681 (TAKAGI) * fig. 2, 6, positions 7a, 7^1 * --	6-8
T	US - A - 4 180 262 (GABRIELIDIS) * whole document * ----	1

CLASSIFICATION OF THE APPLICATION (Int Cl.³)

A 63 B 69/38

TECHNICAL FIELDS SEARCHED (Int.Cl.³)

A 63 B 47/00
A 63 B 61/00
A 63 B 65/12
A 63 B 69/00
A 63 B 69/38
A 63 B 71/00

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	23-06-1980	DROPMANN