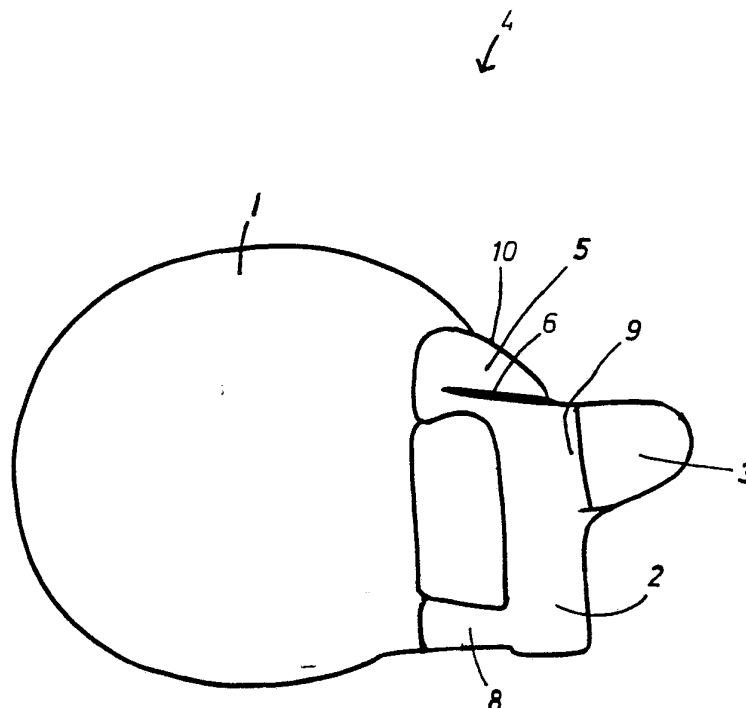




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/SE91/00438 (22) International Filing Date: 18 June 1991 (18.06.91) (30) Priority data: 9002158-5 18 June 1990 (18.06.90) SE (71)(72) Applicant and Inventor: STRÖMBERG, Rolf [SE/SE]; Stavangergatan 8, S-164 33 Kista (SE). (81) Designated States: AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH (European patent), CI (OAPI patent), CM (OAPI patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GA (OAPI patent), GB (European patent), GN (OAPI patent), GR (European patent), HU, IT (European patent), JP, KP, KR, LK, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL (European patent), NO, PL, RO, SD, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.		Published <i>With international search report.</i> <i>With amended claims.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: HANDLE MEANS FOR RACKETS**(57) Abstract**

The present invention relates to improved handle means for rackets and the like; in particular for table tennis rackets but also for other sports. The unique shape of the handle makes a very steady grip possible, at the same time as the racket blade (1) without added disadvantages can be fastened to the handle in such a position that the centre of the racket blade (1), in gripped position and with relaxed wrist, is situated below the longitudinal axis of the forearm. This means in practice a possibility to via the wrist for a so called back swing, angle the racket blade (1) downwards to a great extent, which in turn brings about great advantages particularly for table tennis game.

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Handle means for racketsTechnical field

5 The present invention relates to improved handle means for rackets and the like; in particular for table tennis rackets but also for other sports. The unique shape of the handle makes a very steady grip possible, at the same time as the racket blade 1 without added disadvantages can be fastened to the handle in such a position that the centre of the racket blade 1, in gripped position and with relaxed wrist, is situated below the longitudinal axis of the forearm. This means in practice a possibility to via the wrist for a so called back swing, angle the racket blade 1 downwards to a great extent, which in turn brings about great advantages particularly for table tennis game.

15 Prior art

For table tennis, it is well known that the height over the net for the ball, after strike, can be higher for given speed if the ball rotates with so called topspin, and it is therefore obvious and also well known that the topspin attacking shots contributes to the security in the game. Topspin is produced by a forward-upgoing motion of the racket. In actual play, it is often desirable to be able to do the topspin strokes with a pronounced wrist motion, which contributes to the speed and power of the stroke.

Wrist motion at the forehand side is best done if the racket is held in the hand with so called penhold grip. The centre of the racket blade is then in the "initial position", ie with relaxed wrist, situated somewhat below the longitudinal axis of the forearm. This means that the racket blade can be angled down and backwards to a great extent by the wrist before the stroke, and then fast, when the stroke takes place, be moved forward-upward. The forehand stroke is almost always done with some arm swing. This means that the wrist, for forehand strokes, describes a roughly circular curve, which in turn means that a centrifugal force influences the racket blade, striving to move the blade outward, in the perpendicular direction of the tangent. For penhold grip, the racket blade, at the beginning of the topspinning shot, is so situated (nearer the centre of rotation) that the possible wrist motion outward, corresponds with the direction the above mentioned centrifugal force strives to move the racket blade in. This means in practice, that wrist motion can be executed in a natural way without strain.

The great and well known disadvantage with the penhold grip is the difficulty to execute an effective backhand shot.

The other common way to grip the racket, handshake grip, allows in contrary to penhold grip a rather unhampered backhand shot, where the racket blade by the wrist can be angled backwards and even in some degree downwards, before the stroke is executed. Unfortunately, it is before topspinning forehand shots, not possible to angle the racket blade backwards and at the same time downwards by wrist motion, depending on the fact that the racket blade centre, with relaxed wrist, is situated above the longitudinal axis of the forearm. If wrist motion forward - upward for topspinning strokes should be executed, the wrist must move the racket blade inward, towards the centre of rotation, and therefore counteract the above mentioned centrifugal force. This means that the forehand shot often cannot be executed with that desirable fast wrist motion.

For both penhold and handshake grip, rackets with a simple handle in the shape of a shaft is used. It seems not possible to find a grip around such a handle which eliminates the above described drawbacks with the grips respectively, without other disadvantages being added.

Attempts have been made to solve the problems above, by translating and/or angling the racket blade in some way relative the shaft-shaped handle, for possibility to locate the racket blade lower relative the forearm longitudinal axis, when held in initial position, at the same time as possibility should be present to use both sides of the racket blade, in similarity with the handshake grip.

In Swedish patent application 7702409-9, the racket blade have simply been translated down relative the handle, and in Swedish patent application 7403032-1, the racket blade is both translated and angled.

No one of these attempts to solutions works acceptable, because of the fact that the racket blade cannot be lowered considerably relative the longitudinal axis of the forearm, without the disadvantage of either disturbing finger at the backhand side of the racket, or unstable grip, occurs.

In US pat. 3,674,268, a racket is shown where the handle longitudinal axis is parallel to the edge of the racket blade. This solution gives in practice a too unstable grip, particularly for backhand strokes, depending on the fact that the handle then have a tendency to rotate around its longitudinal axis relative the hand, in direction towards the inside of the forearm. A similar solution is shown in US pat. 3,239,224.

From the above it is clear that a need exists for a racket where a large and comfortable wrist backswing down - backwards is made possible, both for forehand and backhand strokes. At the same time, certain other demands must be fulfilled; for example, the handle must make a comfortable and particularly steady grip possible, and for table tennis, the racket blade must not be situated too far away from the

hand, which among other things can give rise to lesser control and "feeling" for the stroke.

Summary of the invention

5 The present invention has as an object to, by means of a new and unique handle, make possible a table tennis racket where the main advantages of the penhold and handshake grip is combined, without their respective disadvantages present, or other disadvantages arising.

10 Another object is, by means of a handle with the same characteristics, improve other types of rackets; mainly tennis rackets, but the invention is first described in connection with a table tennis racket.

15 As a summary can be said that for the reason that the grip portion of the racket handle according to a preferred embodiment among other things is parallel to the adjacent edge of the racket blade and at the same time is equipped with a projection, aimed to rest at the back inside of the hand, a technical effect is achieved in the way that the racket may be constructed in such a way that the racket blade, in initial position, is situated considerably lower relative the forearm longitudinal axis compared to handshake grip, with retained comfortable and particularly steady grip. This makes wrist motion for topspinning strokes considerably easier, for above related reasons. At the same time, in contrary to penhold grip, full access to the backhand side is obtained. Yet an advantage is that the racket blade is situated as near the handle as possible, which gives opportunity to steer the racket with greatest precision and speed.

25 Description of the figures

 Figure 1 shows a table tennis racket with a handle according to the invention in a side view. Fig 2 shows the racket in a view from below. Fig 3 shows an end view of the racket. Fig 4 and 5 shows a suitable way to hold the racket. In fig 6, 7 and 8 are alternative handle embodiments shown. In fig 9, parts of a tennis racket with a handle according to the present invention, are shown.

Description of an embodiment

 The symmetry plane of the racket blade is hereby defined as a plane, parallel with the surfaces of the racket blade, and situated between those.

35 For description of a preferred handle embodiment according to the invention, reference is made to fig 1 - 3. A racket blade 1, on which the rubbers (not shown) is fastened, is preferably but need not to be entirely conventional, but unlike a conventional shaft-shaped racket handle, a grip portion 2, parallel to the adjacent edge of

the racket blade 1 is present, and also a projection 3. The device as a whole is indicated 4. Grip portion 2 is fastened to the racket blade 1, by means of bridges 8 and 10.

Projection 3, in normal cases situated so near the wrist so it is not grippable
5 by the fingers, helps to stabilize the racket position relative the hand, both for fore-hand shots and particularly for backhand shots. Projection 3 is therefore one of the important parts of the present invention.

In fig 4 and 5, grip portion 2 is shown gripped by three fingers. Projection 3 rests against the thumb swelling. The forefinger rests against the upper edge of racket blade 1, and the thumb rests against support surface 5, and rim 6. A contact
10 surface 9 for mainly the middle finger and ring-finger finger-tips is also present. It is preferred that rest surface 9 passes softly to the grip portion 2 in the lower edge of the racket, for the reason that no intervening edge is to be present. Grip portion 2 rests against that part of the inside of the hand that is situated just below the little
15 finger. The little finger rests against the round part of grip portion 2, at the lower part of the racket.

Three points where the racket contacts the inside of the hand can be identified. One contact point can be said be constituted by the forefinger's contact to the upper edge of the racket blade, indicated as point A in fig 5, even if the forefinger in
20 this case in its whole length contacts racket blade 1. Another contact point is the part of grip portion 2, which is contacting the inside of the hand just below the little finger; point B in fig 5, and yet another contact point is situated where projection 3 contacts the thumb swelling; point C in fig 5.

The racket's contact points to the inside of the hand are thus three, A; B; C,
25 whose can be said constitute a triangle, ABC. The racket is pressed against the inside of the hand by the middle finger, ring-finger and the little finger, and by the thumb by support surface 5. It can be said that these fingers applies force inside triangle ABC, and by that, the position of the racket is static determined.

The thumb's contact against support surface 5, produces additional grip
30 stability, particularly for backhand shots, for which slipping of the handle in direction to the wrist is eliminated. The thumb presses also rim 6 against the side of the middle finger, at which the thumb and the side of the middle finger constitutes a pinch grip, considerably contributing to the grip stability.

For common mechanical reasons it follows, that if any part of the handle
35 should contact the inside of the hand in some point lying inside triangle ABC, the grip stability is reduced. As large part as possible of the pressing force against the inside of the hand, ought therefore to be distributed to the said three contact points

A; B; C;. This means that the handle ought to be formed so, that it does not rest substantially against any point inside the triangle ABC.

In the preferred embodiment, the material at the point denoted 12 in fig. 3 is for this reason preferably only a few millimetres thick, which also has the advantage
5 that material is saved and the weight becomes low. To save material and weight as much as possible, the preferred embodiment also has the following constructional features. The thin material leads down in a support wall denoted 13, which contributes to the total strength of the handle. On the side there are support walls 14 and 15, mainly contributing to the possibility to apply load to projection 3. Rim 6 passes
10 into the support wall 15. Projection 3 has the shape of a bowl, with the convex side towards the hand.

There are of course several ways to grip a racket according to the present invention, as several ways to grip a conventional racket exists. It should be noted however, that the invention relates to the handle itself, which of course can be held
15 in any way. The essential thing is though that the grip stability and comfort as the above described, in fig 4 and 5 shown grip gives, is made possible.

An alternative grip around the handle may be that, when also the forefinger is situated between grip portion 2 and the racket blade. For grip stability, the area above the second joint of the forefinger at the forefinger outside, ought in this case
20 rest against the edge of racket blade 1. This alternative contact point for the forefinger on the edge of the racket at the backhand side, can be said replace the forefinger contact point A above. A small soft pad may be added to the edge of blade 1 for increased comfort.

The location of racket blade 1 in relation to the handle, with regard to both
25 translation and angle, can be varied to obtain different playing properties. The racket blade angle relative the gripping hand, ought to substantially correspond with the angle a handshake rackets get, gripped with handshake grip. It is not recommended, but a racket can be made adjustable.

The handle is in the embodiment shown not symmetrical relating to the
30 symmetry plane of the racket blade, whereby left handed persons has to use a "mirrored" racket handle. In all figures, the racket is made for a right handed person.

In fig 6, an alternative embodiment is shown, where the projection 3 is situated further down and subsequently denoted 3', it being in contact with the back inside of the hand near the wrist but not with the thumb swelling. It has been shown
35 appropriate, for increased stability, to complete this embodiment with yet a projection 7, normally situated in the space between the thumb and the forefinger.

Projection 7 may be added to other embodiments.

In fig 1 - 5, an embodiment has been shown where projection 3 is situated relative high, and in fig 6, the projection 3' is situated lower. It is obvious that the projection according to the invention may be situated in all locations near and between, although this is not shown in the figures, and the projection may also be made so wide, that it contacts the whole back inside of the hand. Of course, one racket may have several projections, for example one in that position, shown in figure 1 - 5, and another in the position shown in figure 6.

In fig 7 and 8, it is also shown that the bridge 8 can be excluded, but that alters in no way the spirit and scope of the invention, and it should here be pointed out that although similar and other modifications; adding and removing material in order to support fingers or to make the handle lighter or more comfortable is not directly mentioned here, should those be considered to be in the scope of the invention.

In fig 7 is an embodiment shown, where grip portion 2 is so short that it normally can be gripped only with two fingers. Projection 7 may be added for increased stability (not shown).

In all embodiments above, the grip portion 2 is substantially parallel with the adjacent edge of racket blade 1. This is not necessary, as shown in fig 8. Angle α ought however to be small.

The handle may of course be made of every conceivable material, for example metal, hard plastic foam ie, but thin wall plastic is preferred. The fastening to racket blade 1 can for example take place by gluing.

All embodiments shown in the figures are arranged so, that the forefinger should rest on the upper edge of racket blade 1, or in practice on the upper edge of the rubber, which always covers racket blade 1. An elongation from the handle may however protrude in parallel with the upper edge of racket blade 1, so the forefinger rests against this projection instead of against racket blade 1.

The handle can also be adapted for a tennis racket. The advantages for tennis game is similar those in table tennis, because topspin is also found in tennis. Even for tennis rackets, attempts have been made to locate the playing surface lower relative a shaft formed handle in such a way that the handle longitudinal axis forms an oblique angle against the shaft. A disadvantage with this solution is that if the angle between handle and shaft decreases too much, the shaft-formed handle tends to rotate in the hand during the strokes.

In fig 9 is therefore shown, in view from the forehand side, a handle embodiment according to the invention, adapted for tennis. Parts 2'', 3'', 7'', 8'', and 10'' corresponds to the parts 2, 3, 7, 8 and 10 in the description above. Ho-

wever, the bridges 8'' and 10'' are not directly connected to the playing surface (not shown), but goes together to the racket shaft 11.

In this case, the forefinger does of course not rest against the playing surface, but preferably at the backhand side of the bridge 10'', which therefore must
5 be adapted for this. Projection 7'' may possibly be made of a relatively soft material for increased comfort.

Of course can this embodiment be modified in several ways. The angle between grip portion 2'' and shaft 11 can be varied, and projection 7'' can for example be excluded.

Claims

- 5 1. A handle arrangement including a grip part (2; 2'; 2'') and a projection (3; 3'; 3'') which arrangement in connection with a ball hitting part or play surface (1) form a racket (4) where the grip part is designed for at least two fingers to reach in the direction of the play surface in a view from the backhand side of the racket, further on around the grip part and in the direction from the play surface in a view from the forehand side of the racket, **characterized** by at least one projection emanating from the grip part, which projection when the handle is gripped constitutes a rest surface for interaction with the back inner side of the hand, the handle arrangement being such that at least one finger may lean on a part of the backhand side of the racket or an elongation of the handle arrangement in this direction so that said projection is brought into contact with the back inside of the hand, in this way bringing about a substantially unpivotal engagement with the hand.
- 10 2. Handle arrangement according to claim 1, **characterized** in that the projection is limited to interaction with the thumb swelling.
- 20 3. Handle arrangement according to claim 1 or 2, **characterized** by a rim (6) on the handle on the forehand side of the racket between the rest surface for the thumb (5) and the place for the other fingers respectively.
- 25 4. Handle arrangement according to claim 3, **characterized** by a rest surface (5) for the thumb on the forehand side of the racket, preventing slipping in the direction of the forearm in connection with backhand hits.
- 30 5. Handle arrangement according to any of the preceding claims, **characterized** by a rest surface (9) for at least two fingers, preferably the middle finger and the ring finger, for making rotation of the racket in relation to the hand more difficult.
- 35 6. Handle arrangement according to claim 5, **characterized** in that it is made of mainly thin-walled plastic material, the area (12) on the opposite side of the rest surface (9) for the middle finger being surrounded by at least three support walls (13; 14; 15).

7. Handle arrangement according to claim 6, **characterized** in that the projection (3) is made like a bowl with the convex side towards the hand.

5 8. Handle arrangement according to any of the preceding claims, **characterized** in that the grip part in at least one of its ends is attachable to the blade.

9. Handle arrangement according to any of the preceding claims, **characterized** in that another projection (7; 7') is aimed at the area between the thumb and the forefinger of the player for cooperation with the hand in this area.
10

10. Handle arrangement according to any of the preceding claims, **characterized** by a design such that the main part of the contact force of the handle arrangement towards the inside of the hand is distributed to the outer part of the palm.

AMENDED CLAIMS

[received by the International Bureau on 14 November 1991 (14.11.91);
new claim 11 added (1 page)]

7. Handle arrangement according to claim 6, **c h a r a c t e r i z e d** in that the projection (3) is made like a bowl with the convex side towards the hand.
8. Handle arrangement according to any of the preceding claims, **c h a r a c t e r i z e d**
5 in that the grip part in at least one of its ends is attachable to the blade.
9. Handle arrangement according to any of the preceding claims, **c h a r a c t e r i z e d** in that another projection (7; 7') is aimed at the area between the thumb and the forefinger of the player for cooperation with the hand in this area.
- 10
10. Handle arrangement according to any of the preceding claims, **c h a r a c t e r i z e d** by a design such that the main part of the contact force of the handle arrangement towards the inside of the hand is distributed to the outer part of the palm.
- 15
11. Handle arrangement according to any of the preceding claims, **c h a r a c t e r i z e d** by that the racket blade is translated in relation to the handle in direction towards the forehand side in such a degree that the forward part or parts (13 ; 10) of the handle arrangement is brought to contact with the forward part of the palm and therefore interacting with the forward part of the palm, said interaction substantially determining
20 the mutual distance between the racket blade symmetry plane and the forward part of the palm, said translation bringing about certain playing properties.

- 1/4 -

FIG 1

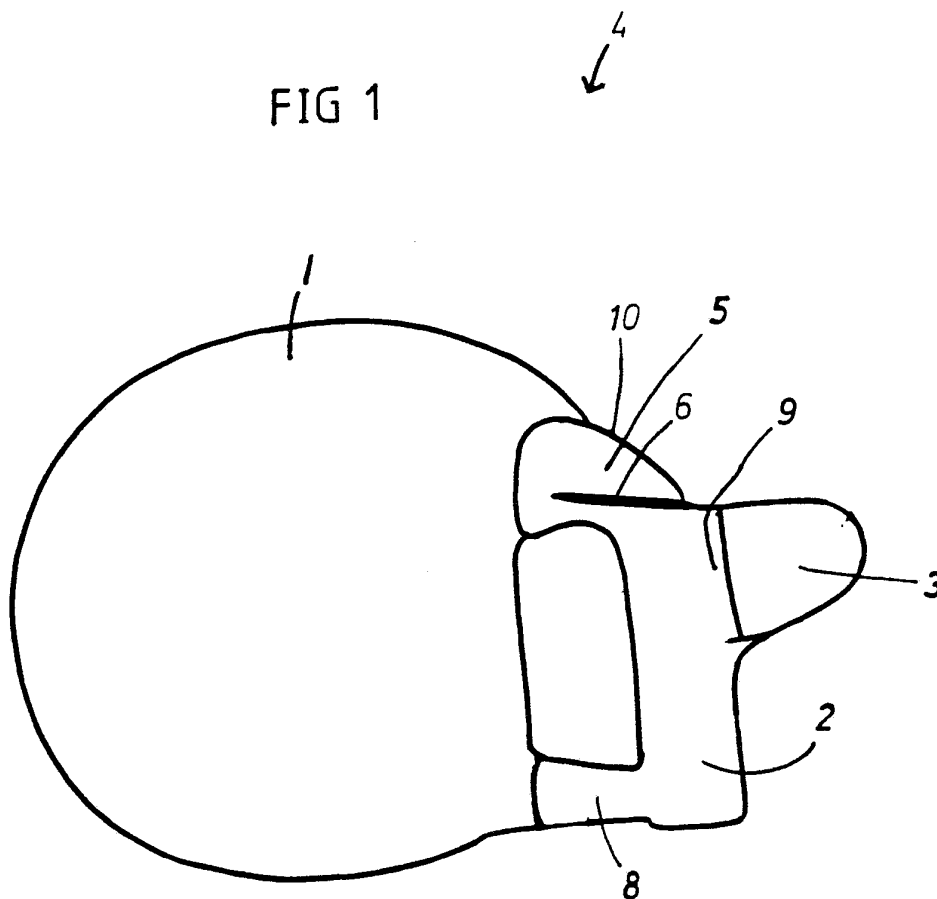


FIG 2

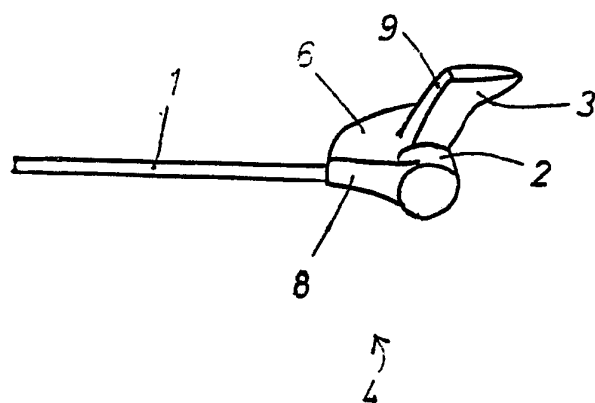


FIG 3

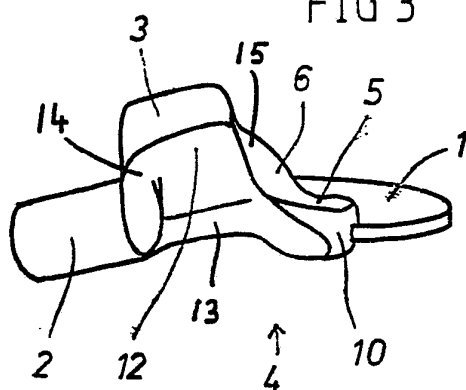


FIG 4

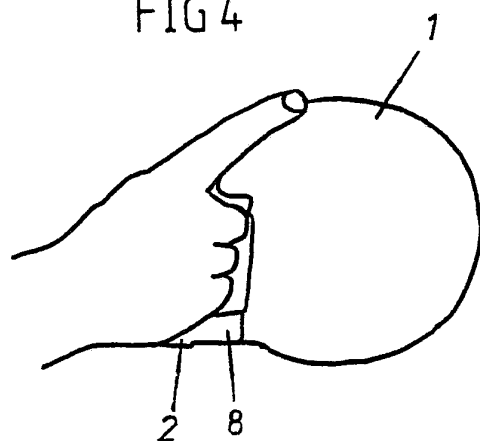


FIG 5

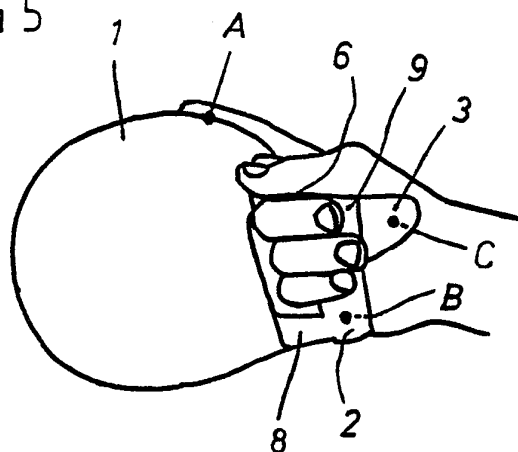


FIG 6

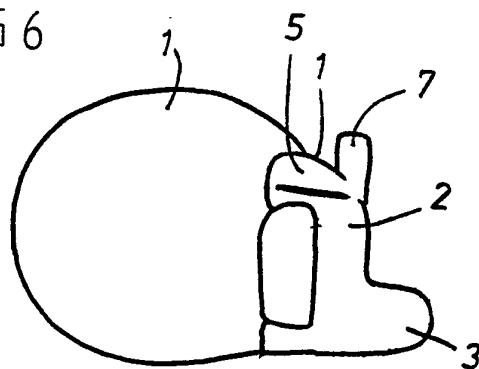


FIG 7

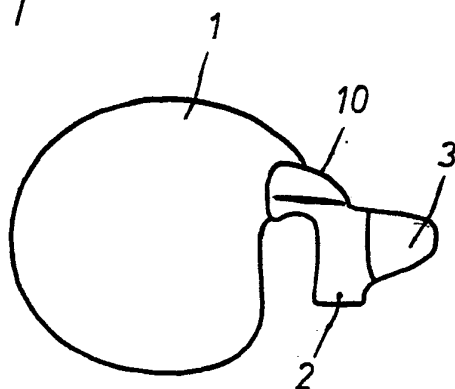
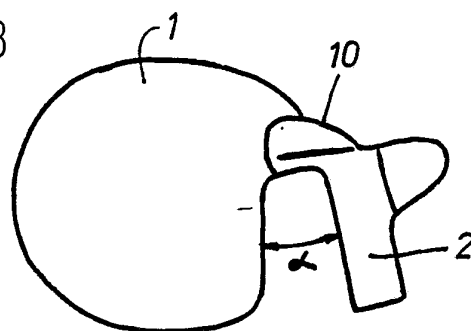
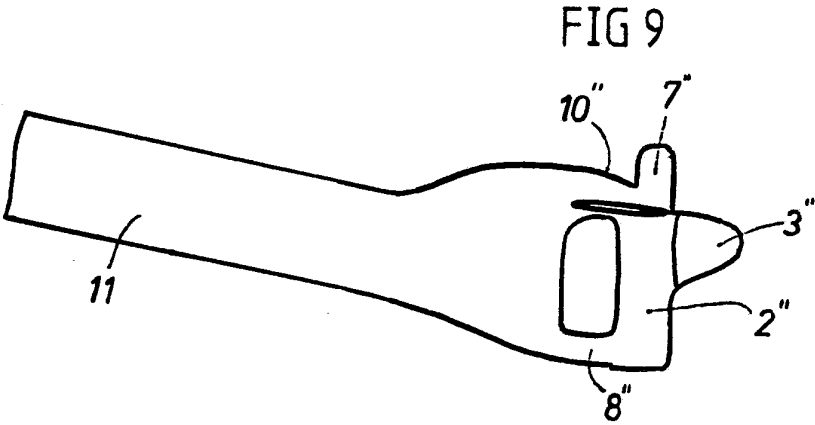


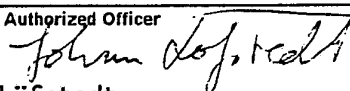
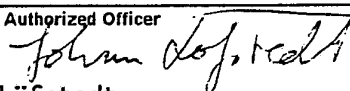
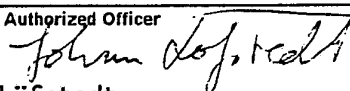
FIG 8





INTERNATIONAL SEARCH REPORT

International Application No PCT/SE 91/00438

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC IPC5: A 63 B 59/04, 49/08																	
II. FIELDS SEARCHED Minimum Documentation Searched⁷ <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%; border: 1px solid black; padding: 2px;">Classification System</th> <th style="border: 1px solid black; padding: 2px;">Classification Symbols</th> </tr> <tr> <td style="border: 1px solid black; padding: 5px; vertical-align: top;">IPC5</td> <td style="border: 1px solid black; padding: 5px; vertical-align: top;">A 63 B</td> </tr> </table> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched⁸ SE,DK,FI,NO classes as above			Classification System	Classification Symbols	IPC5	A 63 B											
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III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 10%; padding: 2px;">Category *</th> <th style="padding: 2px;">Citation of Document,¹¹ with indication, where appropriate, of the relevant passages¹²</th> <th style="width: 10%; padding: 2px;">Relevant to Claim No.¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">DE, A, 2049951 (SPÄKER, BERNHARD) 13 April 1972, see the whole document --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">DE, A1, 2928995 (CUB, VALENTING ET AL) 2 April 1981, see the whole document --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">FR, A1, 2407725 (ROLLET, C.M.J.M.) 1 June 1979, see the whole document --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">FR, A1, 2485934 (ASSAN GERARD) 8 January 1982, see the whole document --</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1</td> </tr> </tbody> </table>			Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	A	DE, A, 2049951 (SPÄKER, BERNHARD) 13 April 1972, see the whole document --	1	A	DE, A1, 2928995 (CUB, VALENTING ET AL) 2 April 1981, see the whole document --	1	A	FR, A1, 2407725 (ROLLET, C.M.J.M.) 1 June 1979, see the whole document --	1	A	FR, A1, 2485934 (ASSAN GERARD) 8 January 1982, see the whole document --	1
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A	FR, A1, 2485934 (ASSAN GERARD) 8 January 1982, see the whole document --	1															
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IV. CERTIFICATION <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border: 1px solid black; padding: 5px;">Date of the Actual Completion of the International Search</td> <td style="width: 50%; border: 1px solid black; padding: 5px;">Date of Mailing of this International Search Report</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">23rd August 1991</td> <td style="border: 1px solid black; padding: 5px;">1991 -09- 3 0</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px;">International Searching Authority</td> <td style="border: 1px solid black; padding: 5px;">Signature of Authorized Officer</td> </tr> <tr> <td style="border: 1px solid black; padding: 5px; text-align: center;">SWEDISH PATENT OFFICE</td> <td style="border: 1px solid black; padding: 5px; text-align: center;">  Johan Löfstedt </td> </tr> </table>			Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	23rd August 1991	1991 -09- 3 0	International Searching Authority	Signature of Authorized Officer	SWEDISH PATENT OFFICE	 Johan Löfstedt							
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International Searching Authority	Signature of Authorized Officer																
SWEDISH PATENT OFFICE	 Johan Löfstedt																

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	GB, A, 17501 (IKIN, F.A.) 8 April 1909, see the whole document --	1
A	GB, A, 2200290 (KWONG MING WU) 3 August 1988, see the whole document --	1
A	US, A, 3674268 (SHELLMAN, SR.) 4 July 1972, see the whole document -- -----	1

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.PCT/SE 91/00438**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on **91-06-27**
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A- 2049951	72-04-13	NONE	
DE-A1- 2928995	81-04-02	NONE	
FR-A1- 2407725	79-06-01	NONE	
FR-A1- 2485934	82-01-08	NONE	
GB-A- 17501	09-04-08	NONE	
GB-A- 2200290	88-08-03	NONE	
US-A- 3674268	72-07-04	NONE	