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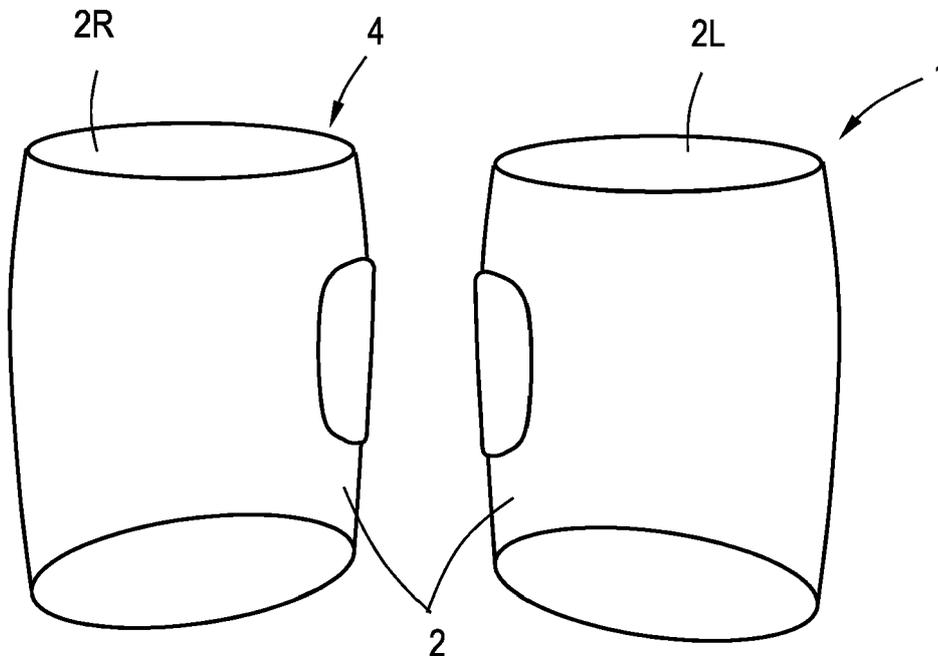
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(54) **SWIMMING AID AND METHOD FOR TRAINING SWIMMING**

(57) A set of two mutually magnetically attracted anklets. The anklet may for example be made of a stretchable material and comprise a right side anklet shaped to fit a right side ankle and a left side anklet shaped to fit a left side ankle, wherein the magnet of the right side anklet

is positioned at a left side of the anklet, while the magnet of the left side anklet is positioned at a right side of the anklet. The anklets can be used for training swimming skills.



**Fig.1**

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## Description

**[0001]** The invention relates to a swimming aid and a method of teaching swimming, in particular the breaststroke or backstroke, more particular of leg movement during breaststroke or backstroke swimming.

**[0002]** During training of the breaststroke leg movement - also known as the "frog kick" or "whip kick" - provides most of the thrust. However, leg movement is also the more difficult part to train. Leg movement includes a thrust phase and an insweep phase. Starting from an initial position with the legs stretched out backward, the feet are moved together towards the buttocks, while the knees stay together. Then the feet point outward in preparation for the thrust phase. In the thrust phase, the legs are moved elliptically back to the initial position. During this movement, the knees are kept together. The legs move slower while bringing the legs into position for the thrust phase, and move very fast during the thrust phase to enhance the thrust. The generated thrust does not only propel the swimmer but also improves stability of the swimmer.

**[0003]** When young children learn to swim insufficient thrust during the thrust phase results in a number of faulty movements substantially slowing down the learning process.

**[0004]** Swimming aids have been developed to support children during their training. NL 1036820, DE 2658584 A1 and DE 102007003508 disclose examples of swimming shoes which need to be applied to the user's feet. The drawback of such swim aids is that they can only be used after the pupils are already acquainted with the base movements.

**[0005]** It is an object of the invention to facilitate easy and effective learning and training of swimming.

**[0006]** The object of the invention is achieved with a set of two mutually magnetically attracted anklets. It has been found that the use of such anklets during swimming considerably supports a pupil to improve coordination and motion of the legs during the thrust phase, but also during the insweep phase. The magnets guide the closing motion of the legs during the thrust phase. The improved coordination and motion during the thrust phase results in more thrust and also in improved position and stability. This makes it easier and more natural for the pupil to perform the right arm stroke.

**[0007]** At the end of the thrust phase the legs return to the initial position and the magnets click to each other, providing sensible feedback for the pupil confirming that he made the right movement. This enhances the pupil's self-confidence and has a motivating effect.

**[0008]** After the thrust phase the anklets also support coordination of the legs when the knees are bent to move the feet jointly towards the posterior. When the legs are subsequently spread, the magnets provide a counterforce, which requires tightening of the muscles of the hips, buttocks, back and hamstrings, which significantly improves coordination of the overall motion.

**[0009]** The anklets can already be used at the first lesson, when the pupil does not yet have any swimming experience. Since the anklets noticeably support and improve the pupil's coordination and swimming motion the pupil will experience a positive mood of success, which enhances motivation and self-confidence.

**[0010]** The anklets can also be used to train experienced swimmers, e.g., in top sports, particularly when heavier magnets are used to train the muscles used during spreading of the legs.

**[0011]** The anklets are also a probate aid for training diving techniques, e.g., for diving from land into a swimming pool or for surface diving, i.e., diving from a swimming or floating position towards the bottom of the swimming pool. Both diving techniques require that the feet are held closely together.

**[0012]** The anklets can also be used with dry land swimming exercises in order to train the pupil and support the required motion.

**[0013]** In this respect it is noted that anklets with magnetic sections are known, for instance from the field of alternative health care, such as the anklet disclosed in WO 01/30446. US 9,084,415 discloses magnetic bracelets for repelling sharks. However, a set of two mutually magnetically attracted anklets has not been disclosed.

**[0014]** The anklets may for example comprise oppositely polarized magnets, in particular permanent magnets. Alternatively, one anklet may comprise a permanent magnet, while the other one comprises a magnetizable part, e.g., of a ferromagnetic material, such as a suitable steel.

**[0015]** The magnets of the set of anklets may be configured to guide leg motion during swimming allowing fluent leg movement without obstructing spreading movement by the legs.

**[0016]** The field strength and the flux of the magnets, the number and size of the magnets and the size of their contact surfaces may for example be selected in such a way that the force required to pull the magnets apart is below 10 N, e.g., below 8 N, e.g., below 7 N.

**[0017]** The magnets may for example be a ceramic magnet, such as barium ferrite (BaFe) or a rare earth magnet, such as samarium cobalt (SmCo) or neodymium iron boron (NdFeB) or can be made of any other suitable metal or alloy.

**[0018]** To prevent loss of magnetism the magnets can be coated, e.g., triple coated, e.g., by two layers of nickel sandwiching a copper layer. This helps to prevent corrosion. Optionally and additional epoxy top coating is used.

**[0019]** The anklets can for example be made of a stretchable material. The set a set of shaped right side and left side anklets, the right side anklet being shaped to fit a right side ankle and the left side anklet being shaped to fit a left side ankle. In that case, the magnet of the right side anklet is positioned at a left side of the anklet, while the magnet of the left side anklet is positioned at a right side of the anklet. When wearing the anklets the magnets will always face each other, so they

can cooperate during the thrust phase of the legs stroke. The stretchability of the material makes it possible to use a single size fitting all intended users, particularly if the anklets are provided with a velcro closure.

**[0020]** The magnets may for example be enclosed in a compartment or pocket of the anklet, for instance a waterproof sealed compartment. Optionally, one or both anklets may comprise one or more further compartments, e.g., sealed compartments enclosing one or more sensors, such as depth sensors, motion sensors, positioning sensors, etc.. Optionally, may comprise an antenna to transfer sensor data with identification data to a receiving computer.

**[0021]** The anklets may further comprise a section for surrounding a sole of a user, and for instance be shaped as a sock. Such a sock may for example comprise a sole section with an anti-slip surface. The sock may comprise an opening for user's heel and/or an opening for a front part of a user's foot, or it may be a complete sock, if so desired.

**[0022]** In an alternative embodiment, the anklets can be made as foil straps having outer end sides provided with fasteners, e.g., Velcro fasteners, the magnet being located halfway between the two fasteners. The straps can be tied about the ankles. A user will typically place the Velcro fasteners laterally. As a result the magnets are placed between the user's ankles facing each other.

**[0023]** To make it easier to fit the straps around the user's ankle, the straps can be provided with seams forming folding lines parallel to the end sides with the fasteners.

**[0024]** The straps may for example comprise waterproof outer layers spaced by foam layers. The magnets may for example be embedded between two adjacent foam layers.

**[0025]** The anklet can be made of any suitable flexible swimwear material, such as silicone, neoprene or PVC.

**[0026]** The invention also relates to a method of training swimming comprising the step of providing both lower legs of a pupil with a wearable, such as an anklet, the two wearables being mutually magnetically attracted. The pupil is trained to swim the breaststroke and/or to dive.

**[0027]** The invention will be further explained with reference to the accompanying drawing.

Figure 1: shows a pair of anklets;

Figure 2: shows one of the anklets of Figure 1 in side view, worn by a user;

Figure 3: shows in cross section an alternative embodiment;

Figure 4: shows the anklet of Figure 3 unfolded in top view;

Figure 5: shows a further embodiment of an anklet.

**[0028]** Figure 1 shows a set 1 of two mutually magnetically attracted anklets 2, shaped as socks without a heel and without a toe section. Hence, both anklets have an

opening 4 at the ankle side, an opening 5 exposing the heel and an opening 6 exposing the toes. The anklets 2 are made of a stretchable swimwear material, such as neoprene. The set 1 comprises a right side anklet 2R shaped to fit a right side ankle and a left side anklet 2L shaped to fit a left side ankle. The right side anklet 2R comprises a sealed compartment 7 enclosing a magnet at a left side of the anklet 2R, while the left side anklet 2L comprises a sealed compartment 7 enclosing a magnet at a right side of the anklet 2L. The magnets are oppositely polarized and attract each other. When worn by a user, the magnets face each other so they attract each other when a person wearing the anklets 2 puts his legs side by side, such as at the end of a thrust phase during breaststroke swimming.

**[0029]** A lower side of the anklets 2 cover the user's sole and may be provided with an antislip surface 8.

**[0030]** Figure 3 shows a folded anklet 10. The anklet 10 is made of a foldable and layered material, e.g., having outer layers with one or more foam spacer layers between the outer layers. The outer layers may for example be made of Neoprene or PVC foils. When unfolded the anklet 10 is a substantially rectangular strip 11 with a length of about 220 - 260 mm and any suitable width, for instance of about 30 - 70 mm. The shorter sides of the rectangular strip are provided with Velcro fasteners 12 at opposite side faces of the strip 11 so they can cooperate when the strip 11 is folded to form the anklet 10, as shown in Figure 3. The strip 11 has four folding lines 14 formed by seams parallel to the shorter sides. The folding lines 14 divide the strip 11 into five sections: a first Velcro section 16 comprising one of the Velcro fasteners 12, a shine bone section 17, a magnet section 18, a rear section 19 and a second Velcro section 20. The magnet section 18 comprises a sealed compartment holding a magnet.

**[0031]** Figure 4 shows an anklet 30 similar to the anklet 10 of Figure 3 but without folding lines. The anklet 30 comprises a strip 31 with a first Velcro section 36, a shine bone section 37, a magnet section 38, a rear section 39 and a second Velcro section 40. The shine bone section 37 has a lower edge provided with a curved recess 32 for the instep of a user. The magnet section 38 comprises a magnet 41 in a sealed compartment. The rear section 39 has a lower edge with a small recess 42 for the user's heel.

**[0032]** Part 43 is a pictogram, e.g., for informing the user whether the anklet is a right side or left side anklet.

**[0033]** Figure 5 shows a further embodiment of an anklet 50. The anklet 50 is similar as the anklet 30 of Figure 4 but has a buckle closure 51 instead of a Velcro closure. Other closures, such as snap fasteners, clasps, buttons, slide fasteners or zippers can also be used.

**[0034]** A user will put on the anklets 10, 30 in such way that the Velcro parts 12 are on the outside, so the magnet sections 18 of the two anklets 10 face each other and attract each other.

**[0035]** The anklet 2, 10, 30 is part of a set comprising

a left side ankle and a right side ankle which have mirrored configurations and mirrored recesses for the swimmer's instep, ankle and heel (not shown). Colour coding and/or pictograms can be used to indicate whether an anklet should be worn on the left ankle or the right ankle.

**[0036]** When a user wears the anklets 2, 10, 30 during swimming, the force between the magnets will guide the leg motion, especially at the end of the leg kick in the thrust phase by bringing the legs together with the legs straight and the toes pointed. After the leg kick the magnets will help to keep the feet closely together to stabilize the body position and to maximize the streamline of the swimmer's body. During spreading of the legs the magnets will generate a counter force triggering the user to tighten the muscles involved with this motion. This helps to optimize the motion of the legs sweeping outwards.

### Claims

1. A set of two mutually magnetically attracted anklets.
2. The set of claim 1, the anklets comprising oppositely polarized magnets.
3. The set of anklets according to claim 1 or 2, made of a stretchable material, the set comprising a right side anklet shaped to fit a right side ankle and a left side anklet shaped to fit a left side ankle, wherein the magnet, or magnetizable element, of the right side anklet is positioned at a left side of the anklet, while the magnet, or magnetizable element, of the left side anklet is positioned at a right side of the anklet.
4. The set of anklets according to claim 2 or 3, wherein the magnets or magnetizable elements, are received in a compartment or pocket of the respective anklet.
5. The set of anklets of claim 4, at least one of the anklets comprising one or more further compartments, e.g., sealed compartments enclosing one or more sensors.
6. The set of any preceding claim, wherein the anklets comprise a section for surrounding a sole of a user.
7. The set of claim 6, comprising an anti-slip sole section.
8. The set of claim 6 or 7, the anklets comprising an recess or opening for a user's heel.
9. The set of claim 6, 7 or 8, comprising an opening for a front part of a user's foot.
10. The set of any one of claims 1 - 5, wherein one or both anklets are a foil strap having outer end sides provided with fasteners, e.g., Velcro fasteners, the magnet being located halfway between the two fasteners.
11. The set of claim 10, being provided with seams forming a folding lines parallel to the end sides with the fasteners.
12. The set of claim 10 or 11 comprising waterproof outer layers spaced by foam layers.
13. The set of any preceding claim made of a swimwear materials, such as neoprene or PVC.
14. Method of training swimming comprising the step of providing both lower legs of a pupil with a wearable, such as an anklet according to any preceding claim, the two wearables being mutually magnetically attracted.
15. The method of claim 14, wherein the pupil is trained to swim the breaststroke and/or to dive and/or the pupil is trained by dry land swimming exercises.

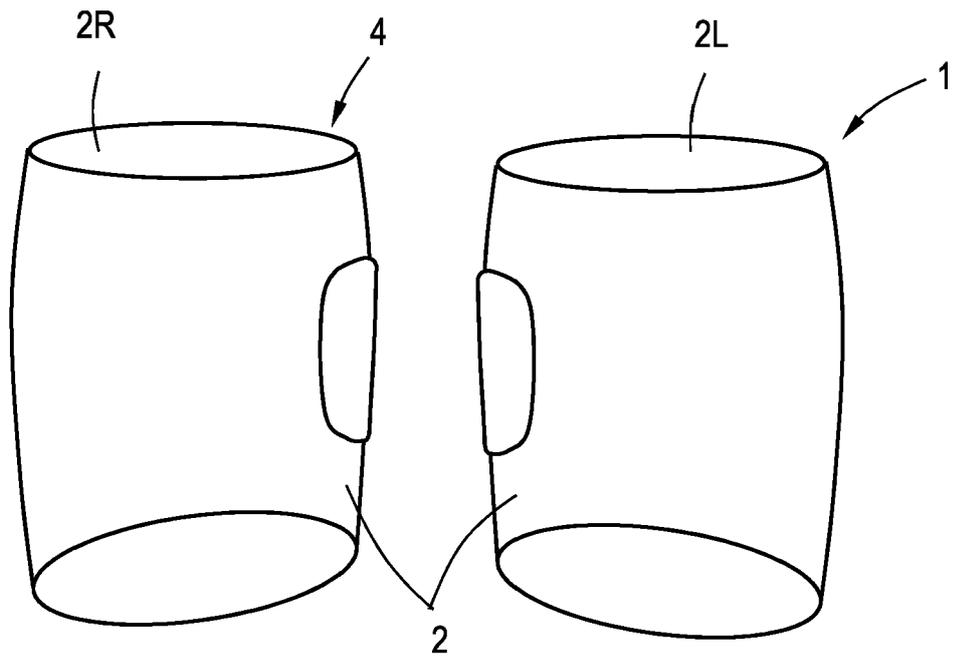


Fig.1

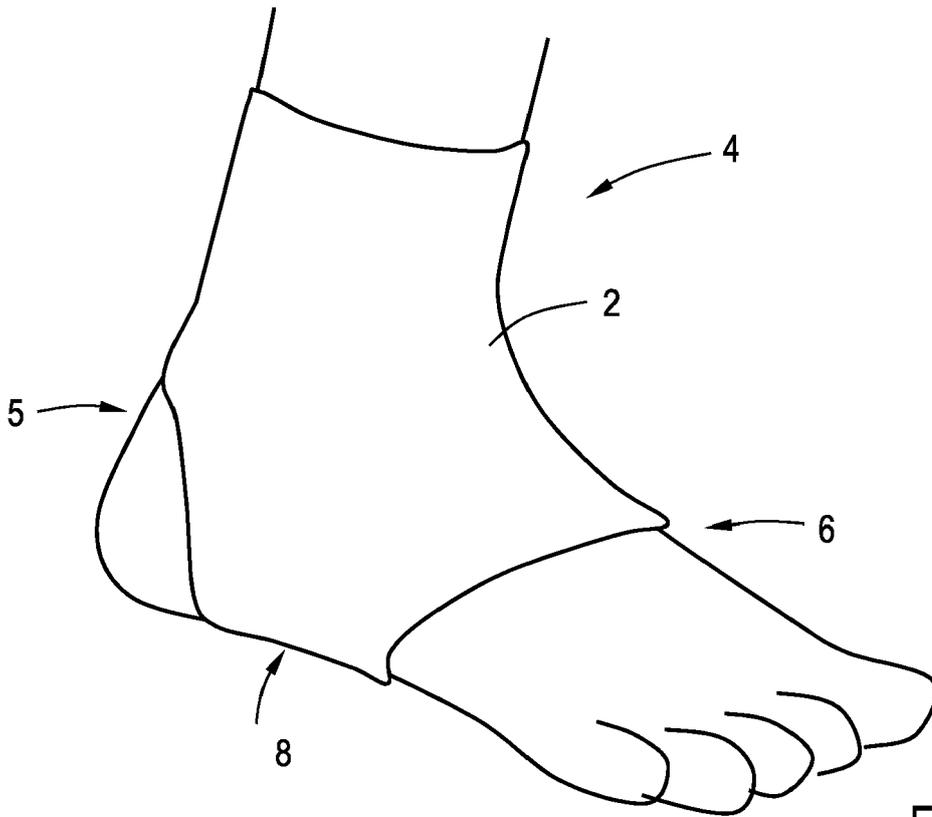


Fig.2

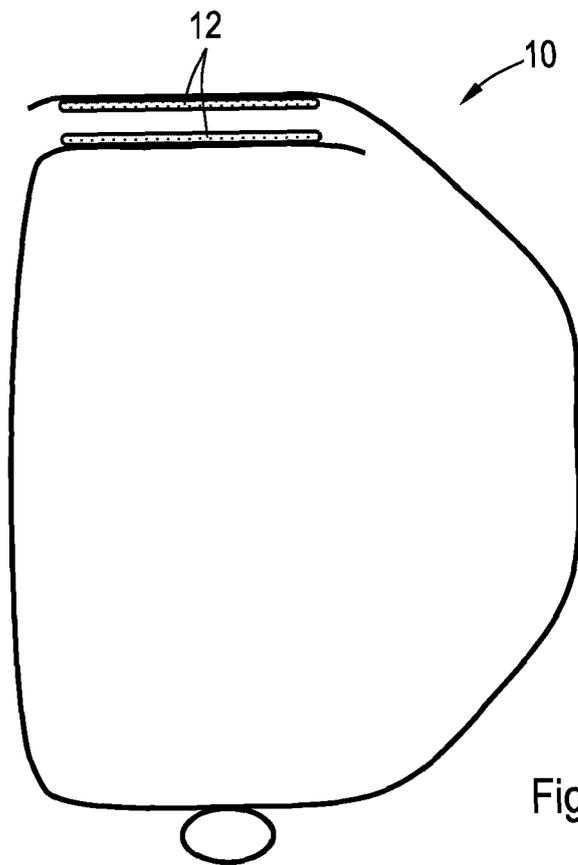


Fig.3

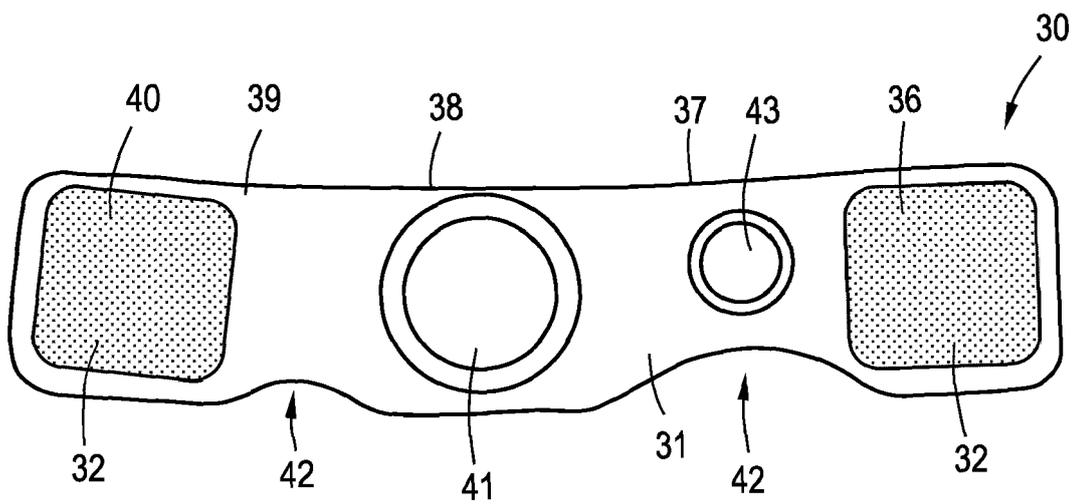


Fig.4

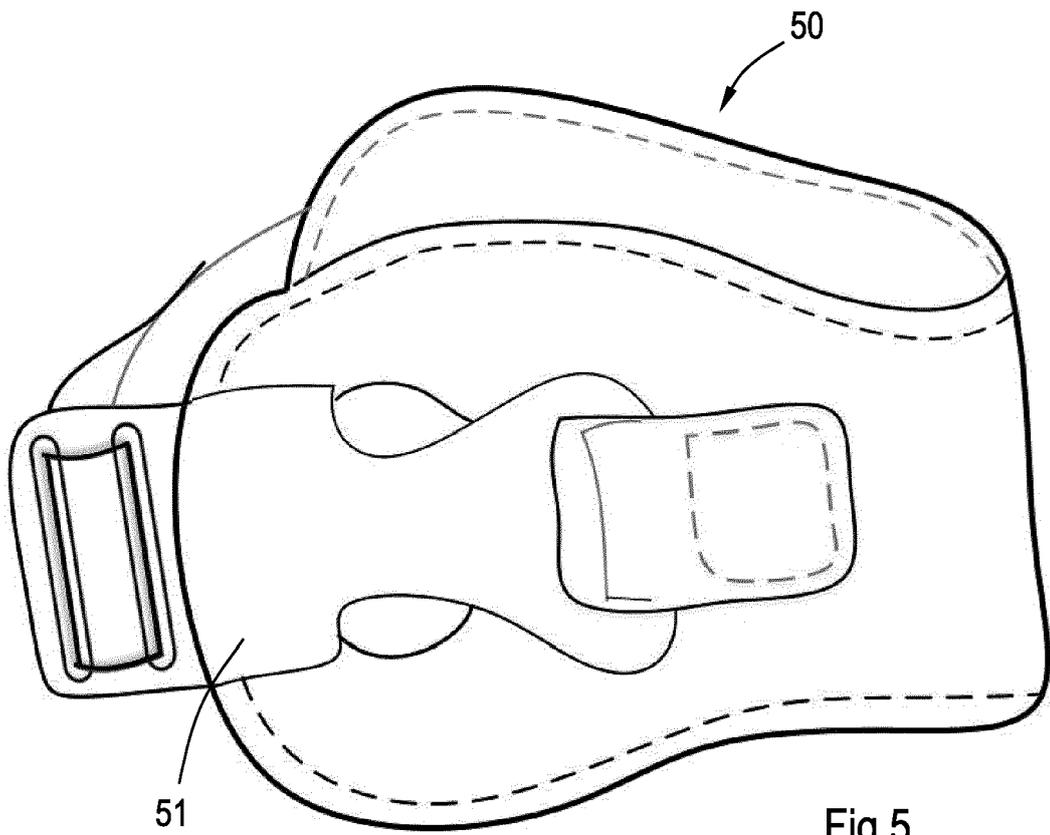


Fig.5



EUROPEAN SEARCH REPORT

Application Number  
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ANNEX TO THE EUROPEAN SEARCH REPORT  
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