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(54) **IMPROVED FOOTWEAR**

(57) The present invention relates to footwear (10) comprising: an upper (12); an outsole (14), fastened to said upper (12), and at least one compartment (20) designed to house a transmitting device (30).

According to the invention, the footwear (10) further comprises one-use closing means (40) for sealing said at least one compartment (20).

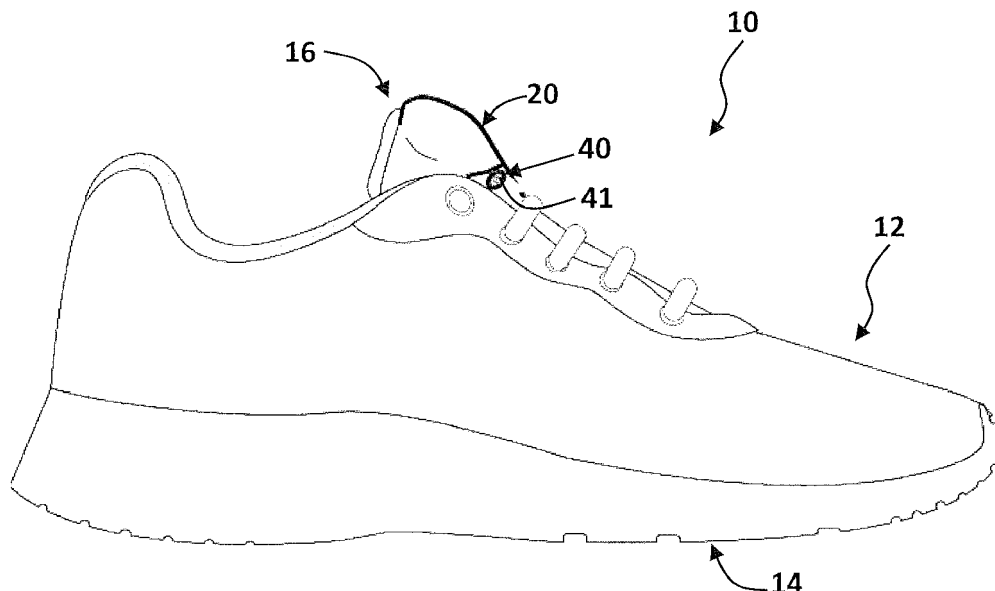


Fig. 1

Description

[0001] The present invention relates to improved footwear. In particular, the present invention relates to footwear with a compartment for a transmitting device.

[0002] Recently the use of "wearable technology", namely the use of footwear or clothing which contain an electronic device to provide additional functionality to the user, has become more and more popular.

[0003] Focusing particularly on the working environment, for example in a factory or a building site, a number of companies are offering solutions to help trace the position of workers in order to improve worker safety. This is most frequently achieved by using an active RFID tag which is stored somewhere on the body of the user.

[0004] JP2006013544 gives an example of an active RFID tag which consists of a battery, transmitting antenna and a small electronic circuit. The tag emits a continuous signal with a unique code to identify the user. In conjunction with a reader, this transmitted code can improve the safety of workers in various ways, such as stopping a piece of machinery if a worker approaches, limiting access to forbidden areas, or ensuring that always two or more workers are present if a particular job cannot be conducted safely by only one person.

[0005] To provide reliable information the RFID tags need to be associated with a single user and to be inserted in an article of clothing which does not require regular washing as the tags can be easily damaged by water.

[0006] In view of the above, it is generally believed that the best place to position active RFID Tags is inside the shoes of the workers. As a matter of fact, the shoes are not undergoing washing treatments in the same way the apparel is, and although it may not be forbidden to share shoes between workers, this occurrence is extremely rare due to the individual's concern on foot hygiene.

[0007] In this connection, EP1896970B1 discloses a shoe that contains an active RFID tag in conjunction with other sensors. In this case the active RFID is used to warn the user of approaching traffic (and vice versa).

[0008] WO2019/202006 discloses a safety boot with an active RFID tag to provide benefits in the workplace as already outlined above.

[0009] However, even if the addition of active RFID tags into shoes provides some advantages, such a solution still has additional problems to be solved.

[0010] The first is that the tags are produced by many different companies and each tag has its own different reader and software compatibilities, apart from shape and size differences. This causes problems for the footwear manufacturers as they have to manufacture custom shoes for just one tag type and, even though the electronic device may be similar in size, a large amount of inventory must be created for just one tag type and consequently the cost of the shoe is increased.

[0011] A further problem is that most active RFID tags have a single use battery. Such a solution is preferable

than the use of a rechargeable battery because the workers may forget the recharging operation, especially if it is not critical to complete the job in hand.

[0012] Tags with single use batteries can last three years with normal use. Given that the average life of safety footwear is 12-18 months, such a duration would be optimal. However, it is to be considered that the tag is inserted when the shoe is manufactured and that the shoe may remain in various warehouses (distributor/wholesaler/retailer) before arriving to the final user. This arrival may occur 1-2 years after the insertion of the tag into the shoe and thus the risk exists that the battery expires without having the possibility to change it.

[0013] In such an occurrence the worker would be at risk because the safety benefits of the active tag would suddenly cease and thus he would need to buy a new pair of shoes before the current pair is actually worn out.

[0014] The main object of the present invention is therefore to provide footwear with a compartment for a transmitting device, configured to overcome or at least reduce the above mentioned drawbacks with reference to the known footwear.

[0015] More specifically, the main object of the present invention is to provide footwear with a compartment for a transmitting device, configured for allowing the use of different transmitting devices manufactured by different manufacturers.

[0016] Another object of the present invention is to provide footwear with a compartment for a transmitting device, configured for allowing the insertion of the transmitting device when the shoe is delivered to the user.

[0017] A further object of the present invention is to provide footwear with a compartment for a transmitting device, configured to avoid that the transmitting device can be transferred, once it is installed, in a different shoe without permanently damaging the shoe to remove it. Finally, an object of the present invention is to provide footwear with a compartment for a transmitting device which permits easy insertion of the transmitting device into the compartment.

[0018] The above mentioned objects, and other objects that will better appear in the following of the present description, are achieved by footwear according to claim 1.

[0019] The advantages and the characteristic features of the invention will appear more clearly from the following description of preferred, but not exclusive, embodiments of footwear, illustrated in the accompanying figures in which:

- Figure 1 shows a side view of a first embodiment of footwear according to the present invention;
- Figure 2 shows a side view of a second embodiment of footwear according to the present invention;
- Figure 3 shows a side view, partially exploded, of a third embodiment of footwear according to the present invention;
- Figure 4 shows a side view, partially exploded, of a

further embodiment of footwear according to the present invention;

- Figure 5 shows a top view of the footwear of figure 1;
- Figure 6 shows a top view of the footwear of figure 2, wherein additionally an under heel compartment is shown;
- Figure 7 shows a cross sectional view of the tongue portion of the footwear of figure 1;
- Figure 8 shows a cross sectional view of the tongue portion of the footwear of figure 2.

[0020] With reference to the attached figures, the present invention relates to footwear 10, where footwear is understood as being any type of footwear, be it of the low or high type or designed for sporting, working or walking use.

[0021] In the description of the footwear 10 and its individual components which will be provided below, "front" will be used to indicate the part of the footwear, or of its individual components, which is relatively closer to the toe zone of the foot, while "rear" will be used to indicate the part of the footwear, or of its individual components, which is relatively closer to the heel. Similarly, "top" will be used to refer to the part of the footwear, or of its individual components, which is relatively distant from the ground, while "bottom" will be used to indicate the part of the footwear, or of its individual components, which is relatively closer to the ground.

[0022] With reference to figures 1-6, the footwear 10 comprises an upper 12 and an outsole 14 fastened to the upper 12.

[0023] The upper 12 can be made from different types of material, such as leather, fabric or textile.

[0024] The upper 12 may also comprise knitted areas.

[0025] The outsole 14 in turn is preferably made with polymeric material, like for example styrene-butadiene-styrene rubber (SBS rubber) or styrene-butadiene-rubber (SBR rubber) or with thermoplastic polyurethane (TPU).

[0026] The outsole 14 can be formed by a single layer as shown in the enclosed figures. Alternatively, the outsole 14 can comprise a tread and a midsole which in turn can be formed by a plurality of layers.

[0027] The outsole 14 can be manually applied to the upper 12 (by gluing or stitching) or it can be joined thereto by means of direct injection.

[0028] Advantageously the footwear 10 can be safety footwear. In this case the footwear comprises a reinforced toe cap and/or an anti-puncture layer, the latter being positioned between the bottom portion of the upper and the top portion of the outsole.

[0029] The footwear comprises at least one compartment 20 designed to house a transmitting device 30.

[0030] Preferably the transmitting device 30 is a wireless communication device. In particular, the wireless communication device 30 can be an active or passive RFID tag. Such tags are suitable for transmitting data, like a code or a part number to a central tracking data-

base.

[0031] Advantageously, the wireless communication device 30 can be part of an IOT (Internet of things) network.

5 **[0032]** Alternatively, the wireless communication device can be a beacon device. Preferably the beacon device is based on a Bluetooth protocol, like for example the Bluetooth 4.0 protocol which assures a low consumption of energy.

10 **[0033]** In a further embodiment, the transmitting device 30 can include a GPS module for providing at an output terminal geographic information corresponding to the position of the user of footwear. Such information, as above mentioned, can be used to improve the safety of the user in working places.

[0034] As shown in figures 1 and 2, the compartment 20 for housing the transmitting device 30 can be arranged at the upper 12. Preferably, the compartment 20 is arranged in the tongue 16 of the upper 12. More preferably, the compartment 20 consists of a pocket 17 provided into the top portion of the tongue 16.

[0035] Alternatively, the compartment can be arranged in the toe or heel portion of the upper 12.

25 **[0036]** In a further embodiment, the compartment 20 can be arranged at the outsole 14 (see figures 3 and 4). Preferably the compartment 20 is arranged in the heel portion of the outsole 14. Advantageously, the compartment 20 can be arranged in a side area of the heel portion of the outsole 14 so as to be accessible from outside.

30 **[0037]** Alternatively, the compartment can be arranged in a central area of the heel portion so as to be accessible only from the interior of the footwear. In figure 6 such a compartment is identified by the reference 20C.

35 **[0038]** Advantageously, the footwear 10 can be provided with a first compartment 20A arranged in the upper 12 and a second compartment 20B arranged in the outsole 14 (see figure 4). Both compartments 20A, 20B are suitable for housing a transmitting device 30. Alternatively, the transmitting device 30 can be positioned only in the first compartment 20A or in the second compartment 20B according to the use of the footwear.

40 **[0039]** The footwear can comprise a plurality of compartments 20.

45 **[0040]** Preferably, if the transmitting device 30 is large or heavy, it will be put inside a compartment 20 arranged in the outsole, so as to avoid discomfort to the user.

[0041] According to the invention, the footwear 10 further comprises one-use closing means 40 for sealing the compartment 20.

50 **[0042]** As "one-use closing means" is to be intended closing means which, once closed, make it impossible to access again to compartment 20 without permanently damaging the footwear 10.

55 **[0043]** In particular, the one-use closing means 40 permit, once the transmitting device 30 has been positioned inside the compartment 20, to seal the latter so as to prevent that the transmitting device 30 is removed from the footwear 10. As a matter of fact, the removal of the

transmitting device 30 will inevitably cause damage to the footwear 10, such as a rip in the tongue 16 or a break-in in the outsole 14.

[0044] As it will be disclosed in detail in the following, thanks to the provision of the one-use closing means 40, the footwear 10 can be sold with the compartment 20 not sealed by the closing means 40.

[0045] As a matter of fact, the compartment 20 can be advantageously sealed, after having inserted therein the transmitting device 30, just before passing the footwear 10 onto the end user.

[0046] With reference to figure 1, if the compartment 20 is arranged at the upper 12, the one-use closing means 40 can comprise at least one single use press fastener 41.

[0047] As shown in detail in figure 7, the single use press fastener 41 is arranged at an opening 32 of the compartment 20 to secure the opposite edges of the opening 32.

[0048] If the compartment 20 is arranged at the tongue 16, the fastener 41 can comprise a reinforcement ring 48 fastened to the lower portion of the tongue 16, for example by stitching or ultrasonic moulding, and designed to be engaged by the barbed conical element 50, fastened to the opposite portion of the tongue 16, of the fastener 41.

[0049] As shown in figure 7, once the element 50 is inserted inside the ring 48, the opposite edges of the opening 32 are secured to each other and it is not possible to remove the element 50 from the compartment 20 without damaging the fastener 41.

[0050] An example of such a fastener 41 is disclosed in GB2037874.

[0051] Preferably, as shown in figure 5, the footwear comprises a plurality of fasteners 41 arranged along the opening of the compartment 20. The fasteners 41 can be spaced apart to each other so as to secure the opposite edges of the opening 32 in more than one point.

[0052] The fasteners 41 can also be used to seal compartments 20 arranged in different portions of the upper 12.

[0053] In a further embodiment, see for example figures 2, 6 and 8, the one-use closing means 40 consist of a single use zip fastener 42 arranged at the opening 32 of the compartment 20. The single use zip fastener 42, once closed, is no longer reusable.

[0054] Such a single use zip fastener 42 can consist in a common zip having a first row of teeth applied on a first edge of the opening 32 and a second row of teeth applied on a second edge of the opening 32, the zip cursor 52 being designed to be blocked, once it has reached its end stop, by means of a corresponding press fastener. For example, the press fastener 41 previously disclosed can be used.

[0055] In a different embodiment the single use zip fastener 42 can be the zip fastener disclosed in US2010/0257822.

[0056] The location of the compartment 20 at the upper

12, in particular at the tongue portion 16, is advantageous for the transmission of the signal emitted by the transmitting device 30.

[0057] As a matter of fact, the RFID devices and the beacon devices transmit radio waves which are often blocked by water, a lot of which is present inside the human body. By providing the transmitting device 30 at the tongue portion 16 of the upper 12, only the transmission directed behind the leg of the user would be affected. All other transmission directions are free of obstacles and thus the transmission of the signal emitted by the transmitting device 30 is highly reliable.

[0058] As above mentioned, the compartment 20 can be arranged at the outsole 14 (see figures 3 and 4).

[0059] The one-use closing means 40 may consist of a cover 44 having dimensions apt to seal the compartment 20, the cover 44 being secured to the outsole 14 by means of one way screw fasteners or rivets 46 (see figures 3 and 4). Such a solution is particularly advantageous when the compartment 20 is arranged at the side area of the heel portion of the outsole 14.

[0060] The cover 44 can be made with polymeric material, like for example polyurethane, while the rivets 46 may be like the fasteners 41 previously disclosed with reference to the compartment arranged at the tongue portion 16.

[0061] In a further embodiment, not shown in the enclosed figures, the cover 44 can be directly moulded as part of the outsole 14. In this case, one edge of the cover 44 is integral with the outsole 14, while the opposite end can be blocked by means of a rivet 46, after having inserted the transmitting device 30 inside the compartment, so as to seal the latter.

[0062] The compartment 20 can also be positioned in proximity of the toe area of the footwear 10. In a further embodiment, see figure 6, the one-use closing means 40 may comprise a covering layer 47 having dimensions apt to seal the compartment 20 C and designed to be fixed by means of adhesive on top of the compartment 20C.

[0063] Such a solution is particularly advantageous if the compartment 20C is arranged in the central area of the heel portion. Preferably, the underside of the covering layer 47 is provided with a piece of high strength double sided tape 49. Once the backing of the tape 49 is removed the covering layer 47 can be fastened to the compartment 20C so as to seal it.

[0064] As the footwear is used, the weight of the user standing on top of the covering layer 47 would press the tape 49 so as to prevent future removal of the transmitting device 30 housed inside the compartment 20C.

[0065] Advantageously, the covering layer 47 can be part of an insole positioned inside the footwear 10 over the outsole 14.

[0066] Preferably, the compartment 20 has dimensions greater than the dimensions of the transmitting device 30 so as to guarantee that different devices manufactured by different manufacturers can all be housed

inside the compartment 20. In this way the number of models of footwear to be produced is reduced.

[0067] If the compartment 20 is arranged at the outsole, a filler 60 can be positioned in the voids between the compartment 20 and the transmitting device 30 in order to block the latter inside its compartment.

[0068] Such a filler 60 can be poured in the compartment 20. Preferably the filler 60 is a polyurethane based glue compound or an epoxy resin so as to permanently bond the transmitting device 30 inside the compartment 20.

[0069] It is thus clear how the present invention allows to achieve the above defined objects.

[0070] The provision of one-use closing means 40 permits to insert the transmitting device 30 when the footwear is delivered to the user, so as to be sure that the battery does not expire during the use of the footwear.

[0071] Moreover, in this way, it is possible to house different transmitting devices from different manufactures inside the compartment of the footwear.

[0072] Again, the one-use closing means assure that, once the transmitting device is inserted inside the footwear, the transmitting device cannot be removed without damaging the footwear.

[0073] Moreover, even if the footwear is provided with a compartment with one-use closing means, the transmitting device can be easily inserted inside the compartment.

[0074] With regard to the embodiments of the footwear described above, the person skilled in the art may, in order to satisfy specific requirements, make modifications to and/or replace elements described with equivalent elements, without thereby departing from the scope of the accompanying claims.

Claims

1. Footwear (10) comprising:

- an upper (12);
- an outsole (14), fastened to said upper (12);
- and
- at least one compartment (20) designed to house a transmitting device (30);

the footwear (10) being **characterized by** further comprising one-use closing means (40) for sealing said at least one compartment (20).

2. Footwear (10) according to claim 1, **characterized in that** said at least one compartment (20) is arranged at the upper (12).

3. Footwear (10) according to claim 2, **characterized in that** said at least one compartment (20) is arranged in the tongue (16) of the upper (12).

4. Footwear (10) according to claim 1, **characterized in that** said at least one compartment (20) is arranged at the outsole (14).

5. Footwear (10) according to any one of the previous claims, **characterized in that** said one-use closing means (40) comprise at least one single-use press fastener (41); said at least one single-use fastener (41) being arranged at an opening (32) of said at least one compartment (20).

6. Footwear (10) according to claim 1, **characterized in that** said one-use closing means (40) is a single use zip fastener (42) arranged at an opening (32) of said at least one compartment (20).

7. Footwear (10) according to claim 1, **characterized in that** said one-use closing means (40) comprise a cover (44) having dimensions apt to seal the at least one compartment (20); said cover (44) being secured to the outsole (14) by means of one way screw fasteners or rivets (46).

8. Footwear (10) according to claim 1, **characterized in that** said one-use closing means (40) comprise a covering layer (47) having dimensions apt to seal the at least one compartment (20); said covering layer (47) being designed to be fixed by means of adhesive on top of said at least one compartment (20).

9. Footwear (10) according to claim 8, **characterized in that** the covering layer (47) is part of an insole applied inside the footwear (10) over the outsole (14).

10. Footwear (10) according to claim 1, **characterized by** comprising said transmitting device (30).

11. Footwear (10) according to claim 10, **characterized in that** said transmitting device (30) is a wireless communication device.

12. Footwear (10) according to claim 11, **characterized in that** said wireless communication device is an active or passive RFID tag or a beacon device.

13. Footwear (10) according to claims 4 and 10, **characterized in that** said at least one compartment (20) has dimensions greater than the dimensions of the transmitting device (30); a filler (60) being positioned in the voids between the at least one compartment (20) and the transmitting device (30).

14. Footwear (10) according to claim 1, **characterized in that** said footwear is safety footwear comprising a reinforced toe cap and/or an anti-puncture layer.

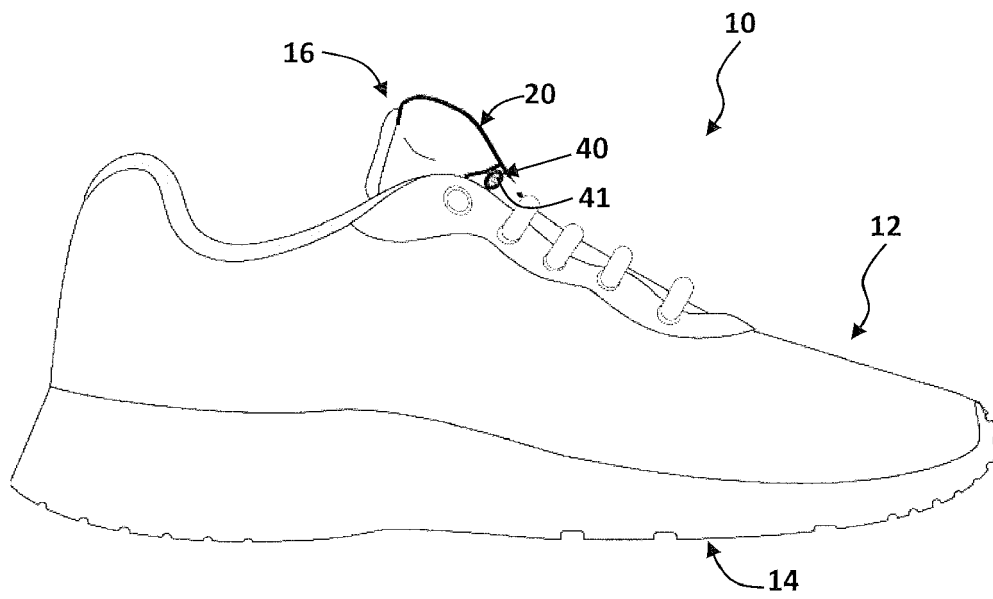


Fig. 1

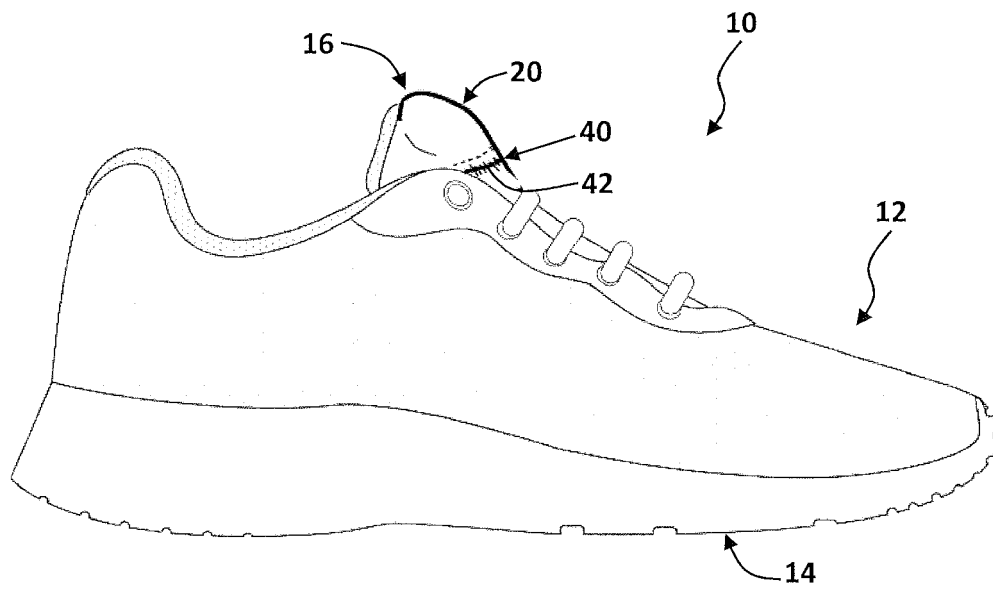


Fig. 2

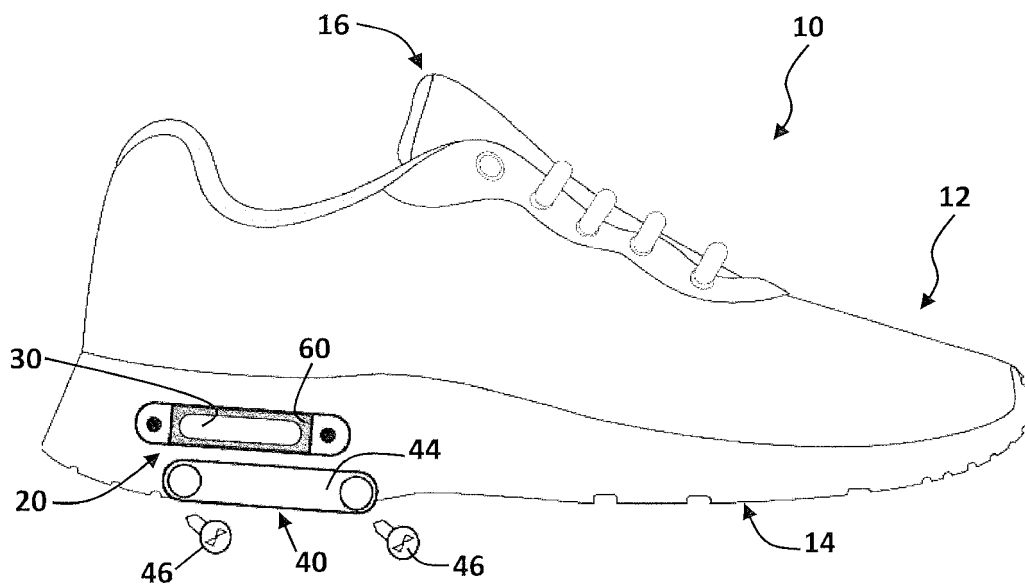


Fig. 3

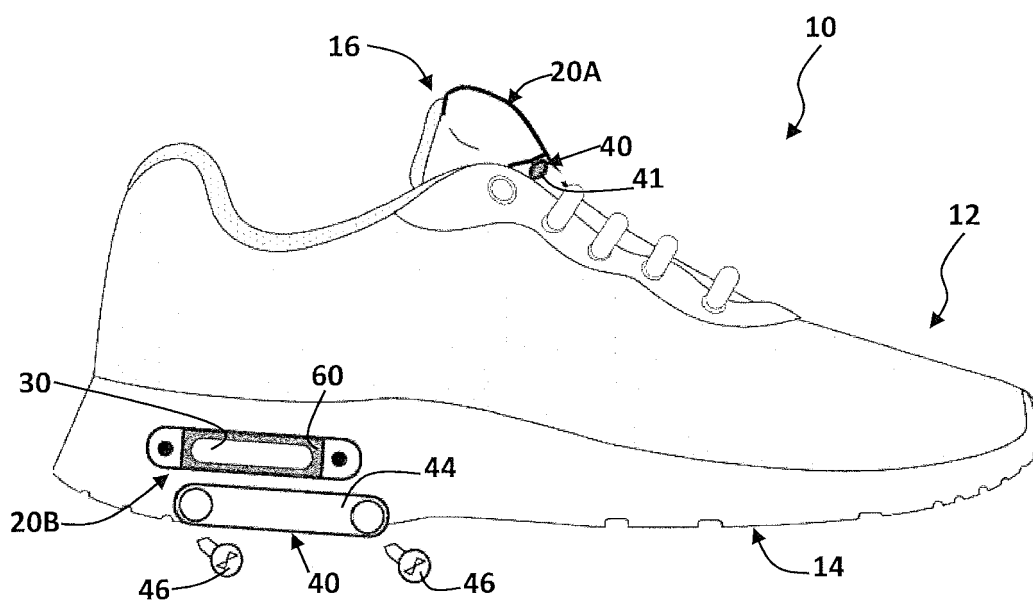


Fig. 4

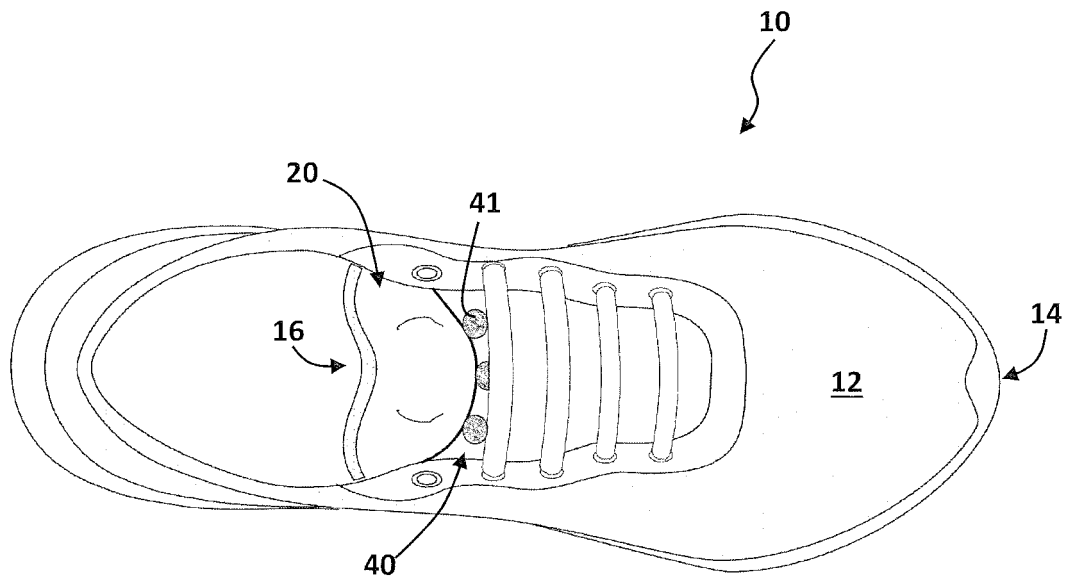


Fig. 5

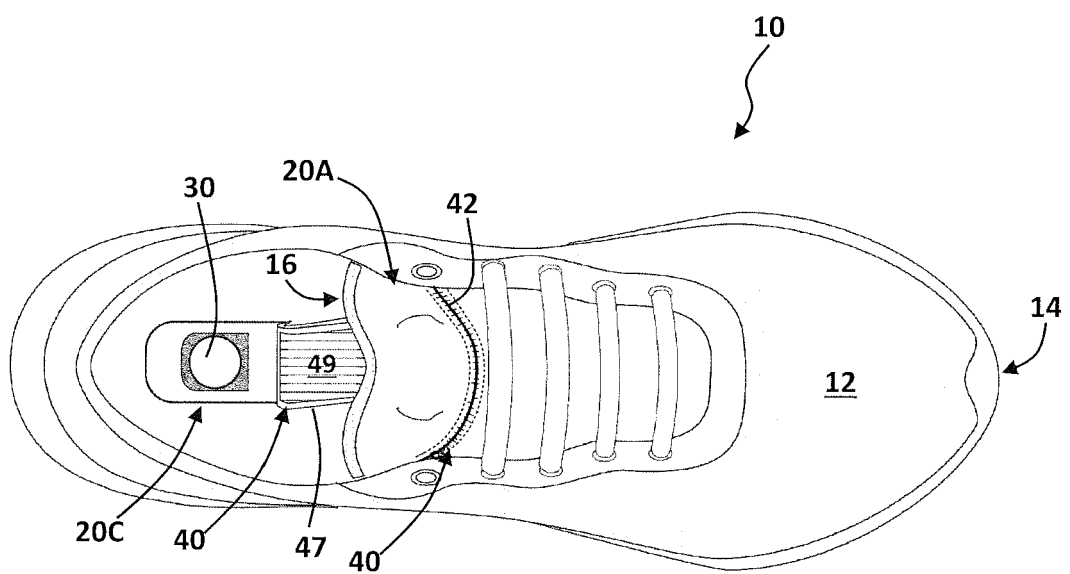


Fig. 6

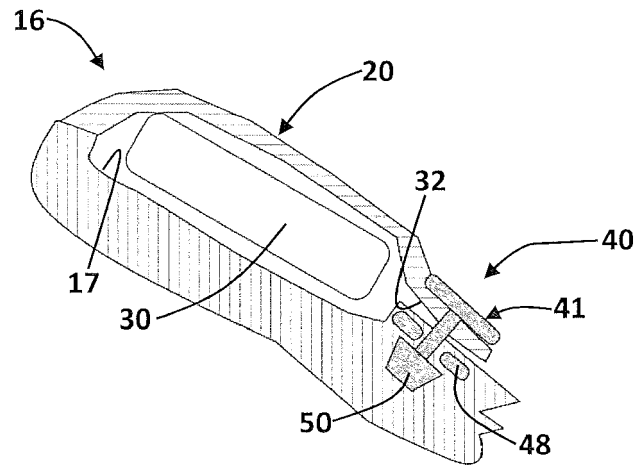


Fig. 7

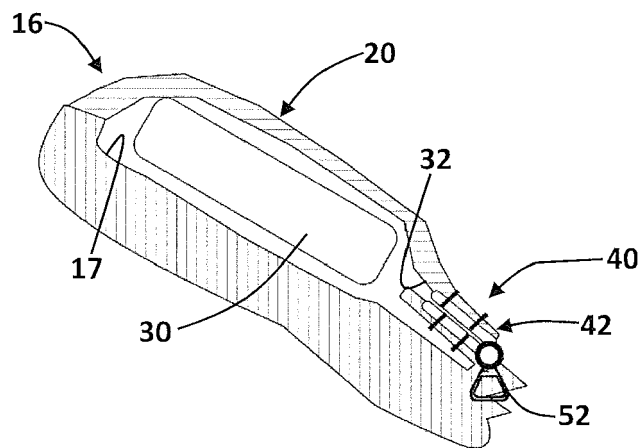


Fig. 8



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Application Number

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Place of search The Hague		Date of completion of the search 9 May 2022	Examiner Papatheofrastou, M
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