



- (51) **International Patent Classification:**
A43B 3/00 (2006.01) A43B 13/22 (2006.01)
A43B 5/00 (2006.01)
- (21) **International Application Number:**
PCT/IT20 15/000071
- (22) **International Filing Date:**
18 March 2015 (18.03.2015)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
102015000006322
16 February 2015 (16.02.2015) IT
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- (81) **Designated States** (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM,

AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— with international search report (Art. 21(3))

(54) **Title:** PAIR OF SOLES FOR GOLF SHOES AND PAIR OF SHOES INCORPORATING SAID PAIR OF SOLES

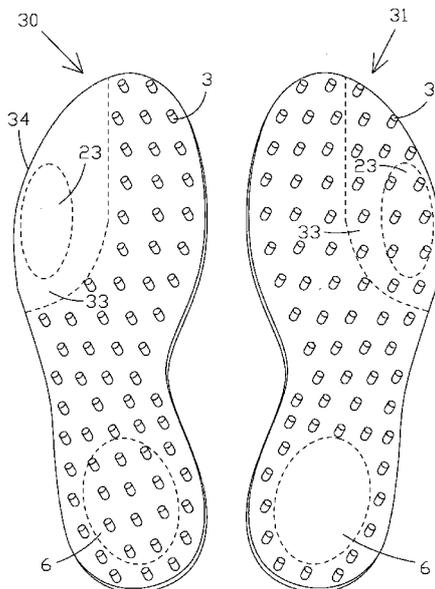


FIG. 4

(57) **Abstract:** The invention refers to a pair of soles for golf shoes having a different roughness at a first sole portion in which a heel presses against the ground when a shoe incorporating the sole is worn by a person in erect position. By way of example, the sole having lower roughness at the first portion is the left sole. In a first variant of the pair of soles, subject of the invention, the left sole has a roughness less than that of the right sole also at a second portion comprised between the first portion and the rear edge of the sole. In a second variant of the pair of soles, subject of the invention, the right sole has a roughness less than that of the left sole at a third sole portion in which the metatarsal head furthest from the hallux presses against the ground when a shoe incorporating the sole is worn by a person in erect position. In a third variant of the pair of soles, subject of the invention, the right sole has a roughness less than that of the left sole also at a fourth portion comprised between the third portion and the lateral edge of the sole closest to the third portion. The invention also refers to a pair of golf shoes incorporating one of said pairs of soles.

WO 2016/132388 A1

Pair of soles for golf shoes and pair of shoes incorporating said pair of soles

Field of application of the invention

The present invention has application in the footwear field. In particular, the invention refers to so-called "sport" footwear, i.e. footwear that is differentiated from conventional footwear due to a particular shape of the sole and/or of the upper, as a function of the posture and/or stability needs that may arise for an athlete while he practices a sport. The shoes of this type have different characteristics in accordance with the sport for which they were conceived. By way of example, the shoes for playing soccer are differentiated from conventional shoes due to the presence of small projections (usually termed "cleats") at both soles in order to increase the friction between the soles and the ground, so as to confer greater stability to the athlete while running or sprinting (i.e. a quick and sudden acceleration of the pace).

More precisely, for descriptive ease, the present invention refers to a pair of soles for golf shoes; nevertheless, hereinbelow in the present description, with the word "shoes" it is intended to identify any one shoe provided with a sole for contact with the ground.

The present invention also refers to a pair of shoes incorporating the pair of soles, subject of the invention.

Review of the prior art

One of the movements most frequently performed by those who play golf is the

"swing", i.e. that is the movement that is performed for hitting a ball with a club. As is known, in order to carry out a swing, the club is gripped with both hands and is rotated around the trunk in a plane that is slightly tilted with respect to a vertical axis. Due to this, during a swing, an angular moment is generated that is compensated by a constraining reaction of the ground on the shoes of the golfer. It is due to said constraining reaction that the golfer does not lose equilibrium while rotating the club. For said constraining reaction to be generated, it is however necessary for the golfer to be stably connected to the ground during a swing. In order to meet this need, the soles of the golf shoes are characterized by the presence of a multiplicity of projections distributed on the lower surface of the sole, i.e. on the surface of the sole intended to come into contact with the ground.

Analogous to the cleats of the soles of soccer shoes, the projections of the soles of golf shoes serve for increasing the friction between the soles and the ground. Said projections are however less projecting than the cleats of the soccer shoes since, given the same treaded ground, the component tangential to the ground of the force imparted by each foot during a swing is less than the tangential component of the force that is imparted while running or sprinting.

During a swing, the feet of a golfer do not however remain stopped with respect to the ground. In order to impart a desired drive to the ball, it is in fact suitable that the feet complete rotational movements that facilitate the torsion of the trunk. Before performing a swing, the feet are nearly parallel to the sagittal plane of the golfer. During the swing, with reference, by way of example, to a golfer who hits the ball while the club rotates from right to left (i.e. in clockwise sense for the golfer), the right foot is raised at the heel and is rotated around the metatarsal head in a manner so as to move the heel away from the sagittal plane. The left foot is slightly raised at the metatarsal head and slightly rotated around the heel in a manner so as to move the metatarsal head away from the sagittal plane. At the end of the swing, the right foot is in a position nearly orthogonal to the starting position, while the left foot is slightly tilted with respect to the latter.

With the left foot only slightly raised at the metatarsal head, the projections of

the left of the golf shoes, while conferring stability during a swing, are opposed to the abovementioned rotational movement of the left foot, compromising the intensity of the drive imparted to the ball and the precision of the shot.

The above-described rotational movements of the feet are reversed if the golfer hits the ball while the club rotates from left to right. In such case, the problem described above thus refers, in an equivalent manner, to the rotational movement of the right foot.

Objects of the invention

With reference, by way of example, to a golfer who hits the ball while the club rotates from right to left, the object of the present invention is to overcome the aforesaid drawback and to indicate a pair of soles for golf shoes which facilitate the rotational movement of the left foot during a swing.

Summary of the invention

Subject of the present invention is a pair of soles, preferably for golf shoes, comprising a first sole and a second sole, each sole comprising a first portion at which a heel presses against the ground when a shoe incorporating the sole is worn by a person in erect position, wherein, according to the invention, the first sole has an absolute roughness less than that of the second sole at least at the first portion.

By "pair of soles" it is intended a right sole and a left sole, i.e. soles which respectively equip a right shoe and a left shoe of the same pair of shoes.

Given that the aforesaid first portion is the sole part at which the heel presses against the ground, the first portion of each sole is a portion of the surface of the sole intended to come into contact with the ground. Since the sole has greater extension than that of the sole of the foot, the first portion generally has an extension less than that of the rear part of the sole.

By "absolute roughness" of a surface it is intended the average height of the projections present on the surface, i.e. the arithmetic mean value of the deviations in absolute value of the actual profile of the surface with respect to an average profile thereof.

In order to better understand what is intended by "absolute roughness", it is considered, by way of example, a surface shaped like a chessboard, ideally

smooth, in which the black squares are in relief, at a same height, with respect to the white squares. If the height at which the black squares lie with respect to the white squares is 1 mm, the average profile of the surface is a plane arranged at a height of + 0.5 mm with respect to the white squares. The black squares therefore lie at a height of + 0.5 mm with respect to the average profile, while the white squares lie at a height of - 0.5 mm with respect to the average profile. At every point of the surface, the deviation in absolute value between the actual profile and the average profile is therefore 0.5 mm. The absolute roughness of said surface, i.e. the arithmetic mean value of said deviations, is therefore 0.5 mm.

With reference to a golfer who hits the ball while the club rotates from right to left, the sole having lower roughness at the first portion is the left sole. With respect to the conventional soles for golf shoes, the smaller roughness of the left sole at the first portion reduces, during a swing, the friction between the ground and the sole at the heel. This facilitates the rotational movement of the left foot without simultaneously compromising the stability of the golfer, ensured by the increased roughness of the first portion of the right sole.

Further innovative characteristics of the present invention are described in the dependent claims.

According to one aspect of the invention, the first sole has an absolute roughness less than 1 mm at least at the first portion, the second sole having an absolute roughness equal to or greater than 1 mm at least at the first portion.

With reference to a golfer who hits the ball while the club rotates from right to left, the first sole is the left sole and the second sole is the right sole.

Advantageously, the first sole is substantially smooth at least at the first portion. In such a manner, the rotational movement of the left foot during a swing is facilitated to an even greater extent.

According to another aspect of the invention, the first sole has an absolute roughness preferably less than 0.5 mm at least at the first portion, and still more preferably less than 0.02 mm.

In order to better understand, from a practical standpoint, what is intended by "absolute roughness not greater than 0.02 mm" it will suffice to know that glass

has an absolute roughness comprised between 0.0015 mm and 0.02 mm.

According to another aspect of the invention, each sole comprises a second portion comprised between the first portion and at least part of the rear edge of the sole, the first sole having an absolute roughness less than that of the second sole also at the second portion.

By "rear edge of the sole" it is intended the edge section of the sole lying on the side opposite the coronal plane with respect to the metatarsal head of a foot fit in a shoe incorporating the sole. In the current case, in order to define the position of the coronal plane with respect to the foot, it is assumed that the coronal plane comprises a transverse axis passing through the malleoli of the tibia, i.e. the rotation axis of the tibio-tarsal articulation around which the flex-extension movements of the foot are carried out.

Advantageously, the first sole having a roughness less than that of the second sole also in a zone surrounding the first portion, the rotational movement of the left foot during a swing is facilitated to an even greater extent.

According to another aspect of the invention, the first sole has an absolute roughness less than 1 mm at the second portion, the second sole having an absolute roughness equal to or greater than 1 mm at the second portion.

According to another aspect of the invention, the first sole has an absolute roughness preferably less than 0.5 mm at the second portion, and still more preferably less than 0.02 mm.

According to another aspect of the invention, each sole comprises a third portion at which the metatarsal head furthest from the hallux (i.e. the metatarsal head of the toe corresponding with the little finger of the hand) presses against the ground when a shoe incorporating the sole is worn by a person in erect position, the second sole having an absolute roughness less than that of the first sole at least at the third portion.

Given that the aforesaid third portion is the sole part at which the metatarsal head furthest from the hallux presses against the ground, the third portion of each sole, analogous to the first and second portion, is a portion of the surface of the sole intended to come into contact with the ground. In a right sole, the third portion is situated at a zone nearly surrounding the right end of the trans-

verse arc of the right foot (i.e. the right end of the anterior ovoid).

With reference once again to a golfer who hits the ball while the club rotates from right to left, with respect to the conventional soles for golf shoes, the smaller roughness of the right sole at the third portion reduces, during a swing, the friction between the ground and the sole at the metatarsal head furthest
5 the friction between the ground and the sole at the metatarsal head furthest from the hallux. This facilitates the rotational movement of the right foot without simultaneously compromising the stability of the golfer, ensured by the increased roughness of the third portion of the left sole.

According to another aspect of the invention, the second sole has an absolute
10 roughness less than 1 mm at least at the third portion, the first sole having an absolute roughness equal to or greater than 1 mm at least at the third portion.

Advantageously, the second sole is substantially smooth at least at the third portion. In such a manner, the rotational movement of the right foot during a swing is facilitated to an even greater extent.

15 According to another aspect of the invention, the second sole has an absolute roughness preferably less than 0.5 mm at least at the third portion, and still more preferably less than 0.02 mm.

According to another aspect of the invention, each sole comprises a fourth portion comprised between the third portion and at least part of the lateral edge of
20 the sole closest to the third portion, the second sole having an absolute roughness less than that of the first sole also at the fourth portion.

Advantageously, the second sole having a roughness less than that of the first sole also in a zone surrounding the third portion, the rotational movement of the right foot during a swing is facilitated to an even greater extent.

25 According to another aspect of the invention, the second sole has an absolute roughness less than 1 mm at the fourth portion, the first sole having an absolute roughness equal to or greater than 1 mm at the fourth portion.

According to another aspect of the invention, the second sole has an absolute roughness preferably less than 0.5 mm at the fourth portion, and still more preferably
30 less than 0.02 mm.

Another object of the invention is a pair of shoes, preferably golf shoes, comprising the pair of soles that is already the object of the invention.

Brief description of the figures

Further objects and advantages of the present invention will be clearer from the following detailed description of an embodiment thereof and from the enclosed drawings, given as merely exemplifying and non-limiting, in which:

- 5 - **figure 1** shows, in perspective view, a pair of soles according to the present invention;
- **figure 2** shows, in perspective view, a first variant of the pair of soles of figure 1;
- **figure 3** shows, in perspective view, a second variant of the pair of soles of
10 figure 1;
- **figure 4** shows, in perspective view, a third variant of the pair of soles of figure 1.

Detailed description of several preferred embodiments of the invention

15 Hereinbelow in the present description, a figure can also be illustrated with reference to elements not expressly indicated in that figure but in other figures. The scale and proportions of the various depicted elements do not necessarily correspond with the actual scale and proportions.

Figure 1 shows a pair of soles 1 and 2, by way of example for golf shoes, having a multiplicity of projections 3 at the surface 4 and 5 of each sole 1 and 2 intended to come into contact with the ground. The projections 3 serve for increasing the friction between the soles 1 and 2 and the ground when the latter is tread by a pair of shoes incorporating the soles 1 and 2. By way of example, the projections 3 have a nearly cylindrical shape, with a height preferably comprised between 5 mm and 15 mm, and still more preferably between 7 mm and
20 12 mm. The diameter of the bases of each projection 3 is preferably comprised between 4 mm and 8 mm, and still more preferably between 5 mm and 7 mm. The soles 1 and 2 are made, by way of example, of polymer material and are obtained by means of molding.

The projections 3 are preferably distributed over the entire surface 4 of the right
30 sole 1 (to the left in the figure). By way of example, the projections 3 are nearly equidistant from each other and are distributed in a manner and number such that the surface 4 has an absolute roughness preferably equal to or greater than

1 mm.

The left sole 2 (to the right in the figure) is differentiated from the sole 1 due to the fact that it lacks projections 3 at a portion 6 of the surface 5 (previously indicated with the expression "first portion") in which the heel of a left foot presses against the ground when a shoe incorporating the sole is worn by a person in erect position. Due to the absence of the projections 3, the sole 2 has an absolute roughness less than that of the sole 1 at the portion 6. In particular, at the portion 6, the sole 2 has an absolute roughness preferably less than 1 mm and still more preferably less than 0.5 mm. By way of example, at the portion 6, the sole 2 has an absolute roughness less than 0.02 mm.

According to a variant of the sole 2 not shown in the figures, the left sole comprises projections also at the portion 6 with an absolute roughness preferably less than 1 mm.

The soles 1 and 2 are adapted to be incorporated in golf shoes wearable by a golfer who prefers hitting the ball while the club rotates from right to left. If a golfer prefers hitting the ball while the club rotates from left to right, the shape of the soles 1 and 2 must be reversed. In other words, the right sole must be shaped like the sole 2 and the left sole must be shaped like the sole 1.

Figure 2 shows a pair of soles 10 and 11 that are differentiated from the soles 1 and 2 due to the fact that the left sole 11 (to the right in the figure) lacks projections 3 not only at the portion 6, but also at a portion 13 (previously indicated with the expression "second portion") comprised between the portion 6 and the rear edge 14 of the sole 5. Due to the absence of the projections 3, the sole 2 has an absolute roughness less than that of the sole 1 also at the portion 13. In particular, at the portion 13, the sole 2 has an absolute roughness preferably less than 1 mm and still more preferably less than 0.5 mm. By way of example, at the portion 13, the sole 2 has an absolute roughness less than 0.02 mm.

According to a variant of the sole 11 not shown in the figures, the left sole comprises projections also at the portion 13 with an absolute roughness preferably less than 1 mm.

The soles 10 and 11 are adapted to be incorporated in golf shoes wearable by a golfer who prefers hitting the ball while the club rotates from right to left. If a

golfer prefers hitting the ball while the club rotates from left to right, the shape of the soles 10 and 11 must be reversed. In other words, the right sole must be shaped like the sole 11 and the left sole must be shaped like the sole 10.

Figure 3 shows a pair of soles 20 and 21 that are differentiated from the soles 1 and 2 due to the fact that the right sole 20 (to the left in the figure) lacks projections 3 at a portion 23 (previously indicated with the expression "third portion") of the surface 22 intended to come into contact with the ground, in which the metatarsal head furthest from the hallux of a right foot presses against the ground when a shoe incorporating the sole is worn by a person in erect position.

5

10 Due to the absence of the projections 3, the sole 20 has an absolute roughness less than that of the sole 21 at the portion 23. In particular, at the portion 23, the sole 20 has an absolute roughness preferably less than 1 mm and still more preferably less than 0.5 mm. By way of example, at the portion 23, the sole 20 has an absolute roughness less than 0.02 mm.

15 According to a variant of the sole 20 not shown in the figures, the right sole comprises projections also at the portion 23 with an absolute roughness preferably less than 1 mm.

The soles 20 and 21 are adapted to be incorporated in golf shoes wearable by a golfer who prefers hitting the ball while the club rotates from right to left. If a golfer prefers hitting the ball while the club rotates from left to right, the shape of the soles 20 and 21 must be reversed. In other words, the right sole must be shaped like the sole 21 and the left sole must be shaped like the sole 20.

20

The above considerations are of course valid in the case in which the sole 20 is combined with the sole 11 of figure 2 instead of with the sole 21.

25 Figure 4 shows a pair of soles 30 and 31 that are differentiated from the soles 20 and 21 due to the fact that the right sole 30 (to the left in the figure) lacks projections 3 not only at the portion 23, but also at a portion 33 (previously indicated with the expression "fourth portion") comprised between the portion 23 and the lateral edge 34 of the sole 30 closest to the portion 23. Preferably, the portion 33 is extended on the lower part (i.e. towards the rear part of the sole) to the edge of the anterior ovoid, on the upper part and laterally (in moving away from the edge 34) up to the central metatarsus. Due to the absence of the pro-

30

jections 3, the sole 30 has an absolute roughness less than that of the sole 31 also at the portion 33. In particular, at the portion 33, the sole 30 has an absolute roughness preferably less than 1 mm and still more preferably less than 0.5 mm. By way of example, at the portion 33, the sole 30 has an absolute roughness less than 0.02 mm.

According to a variant of the sole 30 not shown in the figures, the right sole comprises projections also at the portion 33 with an absolute roughness preferably less than 1 mm.

The soles 30 and 31 are adapted to be incorporated in golf shoes wearable by a golfer who prefers hitting the ball while the club rotates from right to left. If a golfer prefers hitting the ball while the club rotates from left to right, the shape of the soles 30 and 31 must be reversed. In other words, the right sole must be shaped like the sole 31 and the left sole must be shaped like the sole 30.

The above considerations are of course valid if the sole 30 is combined with the sole 11 of figure 2 instead of with sole 31.

Another object of the invention is a pair of golf shoes (not shown in the figures) incorporating one of the pairs of soles described above, i.e.: 1 and 2 (figure 1), 10 and 11 (figure 2), 20 and 21 (figure 3), 20 and 11, 30 and 31 (figure 4), 30 and 11.

On the basis of the description provided for a preferred embodiment, it is clear that some changes can be introduced by the man skilled in the art without departing from the scope of the invention as defined by the following claims.

C L A I M S

1. Pair of soles (1, 2; 10, 11; 20, 21; 30, 31) comprising a first sole (2, 11, 21, 31) and a second sole (1, 10, 20, 30),
each sole (1, 2; 10, 11; 20, 21; 30, 31) comprising a first portion (6) at which
5 the heel of a person, in erect position, wearing shoes incorporating said
soles (1, 2; 10, 11; 20, 21; 30, 31), presses against the ground,
said pair of soles (1, 2; 10, 11; 20, 21; 30, 31) being characterized in that
the first sole (2, 11, 21, 31) has an absolute roughness less than that of the
second sole (1, 10, 20, 30) at least at said first portion (6).
- 10 2. Pair of soles (1, 2; 10, 11; 20, 21; 30, 31) according to claim 1, character-
ized in that the first sole (2, 11, 21, 31) has an absolute roughness less than
1 mm at least at said first portion (6), the second sole (1, 10, 20, 30) having
an absolute roughness equal to or greater than 1 mm at least at said first
portion (6).
- 15 3. Pair of soles (1, 2; 10, 11; 20, 21; 30, 31) according to claim 2, character-
ized in that the first sole (2, 11, 21, 31) has an absolute roughness less than
0.5 mm at least at said first portion (6).
4. Pair of soles (10, 11) according to one of the preceding claims, character-
ized in that each sole (10, 11) comprises a second portion (13) comprised
20 between said first portion (6) and at least part of the rear edge (14) of the
sole (10, 11), the first sole (11) having an absolute roughness less than that
of the second sole (10) also at said second portion (13).
5. Pair of soles (10, 11) according to claim 4, characterized in that the first sole
(11) has an absolute roughness less than 1 mm at said second portion (13),
25 the second sole (10) having an absolute roughness equal to or greater than
1 mm at said second portion (13).
6. Pair of soles (20, 21; 30, 31) according to claim 1, characterized in that
each sole (20, 21; 30, 31) comprises a third portion (23) at which the meta-
tarsal head furthest from the hallux presses against the ground when a
30 shoe incorporating the sole (20, 21; 30, 31) is worn by said person in erect
position, the second sole (20, 30) having an absolute roughness less than
that of the first sole (21, 31) at least at said third portion (23).

7. Pair of soles (20, 21; 30, 31) according to claim 6, characterized in that the second sole (20) has an absolute roughness less than 1 mm at least at said third portion (23), the first sole (21) having an absolute roughness equal to or greater than 1 mm at least at said third portion (23).
- 5 8. Pair of soles (30, 31) according to claim 6 or 7, characterized in that each said sole (30, 31) comprises a fourth portion (33) comprised between said third portion (23) and at least part of the lateral edge (34) of the sole (30, 31) closest to said third portion (23), the second sole (30) having an absolute roughness less than that of the first sole (31) also at said fourth portion
10 (33).
9. Pair of soles (30, 31) according to claim 8, characterized in that the second sole (30) has an absolute roughness less than 1 mm at said fourth portion (33), the first sole (31) having an absolute roughness equal to or greater than 1 mm at said fourth portion (33).
- 15 10. Pair of shoes characterized in that it comprises a pair of soles (1, 2; 10, 11; 20, 21; 30, 31) according to one of the preceding claims.

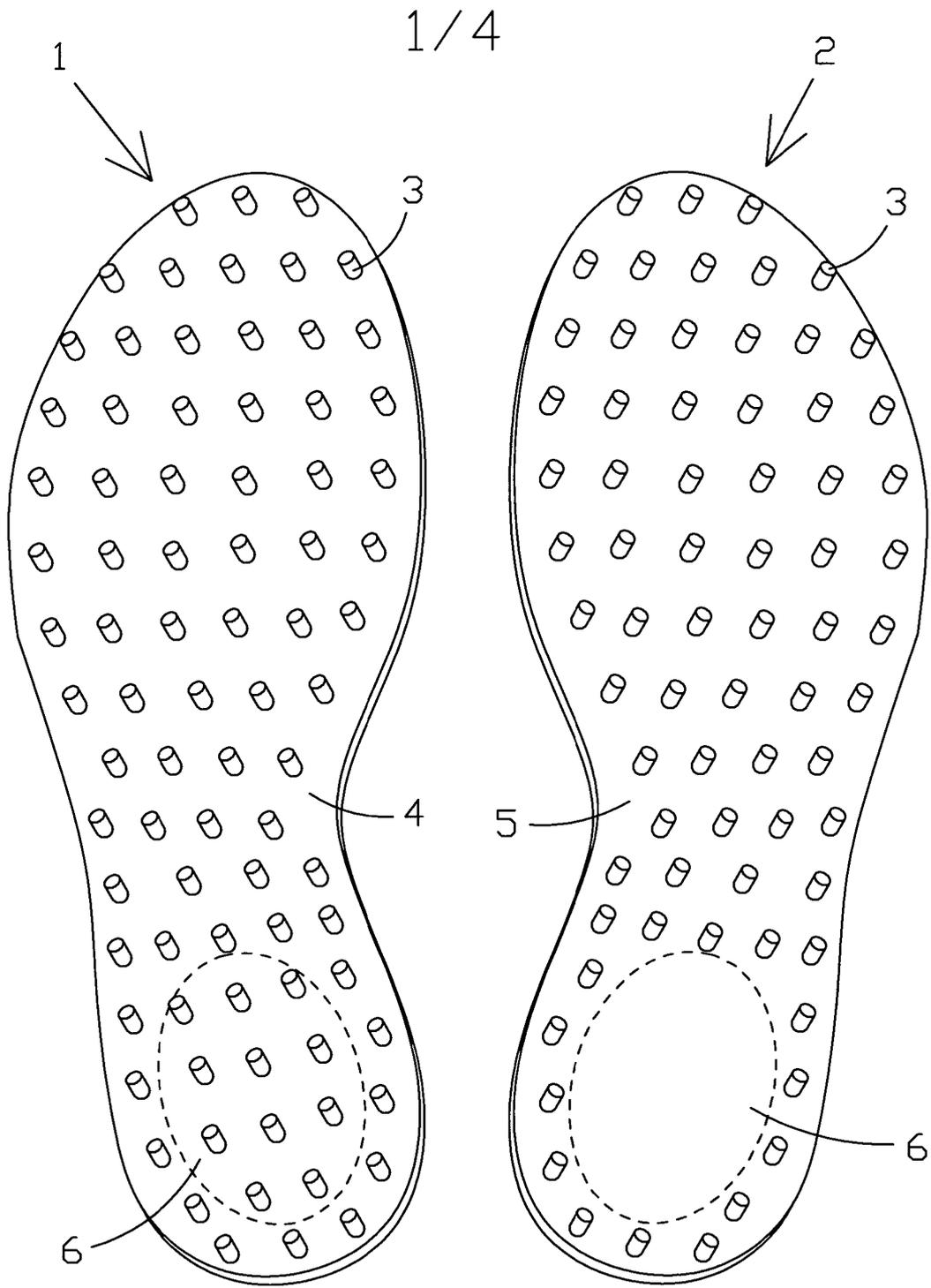
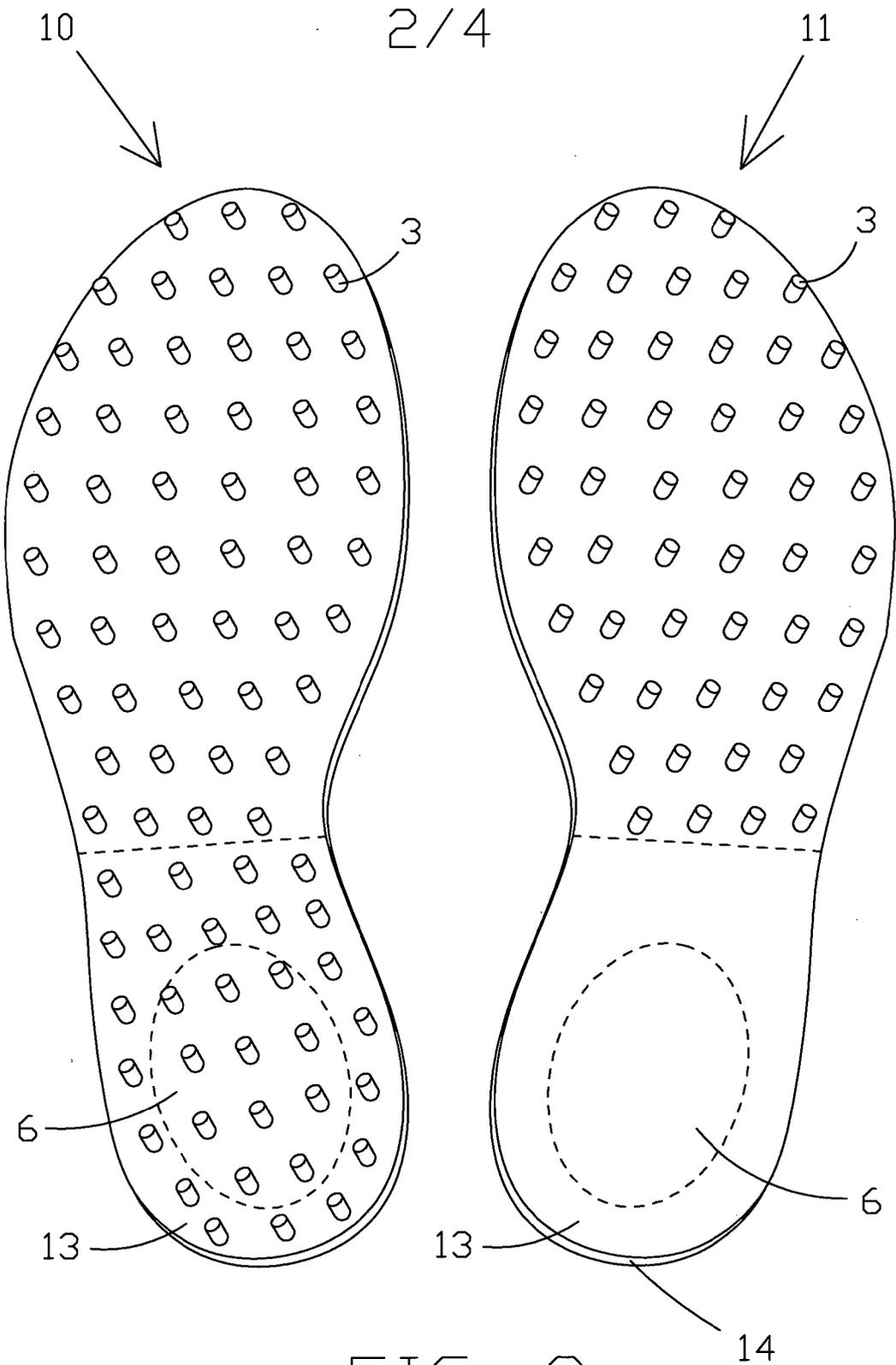


FIG. 1



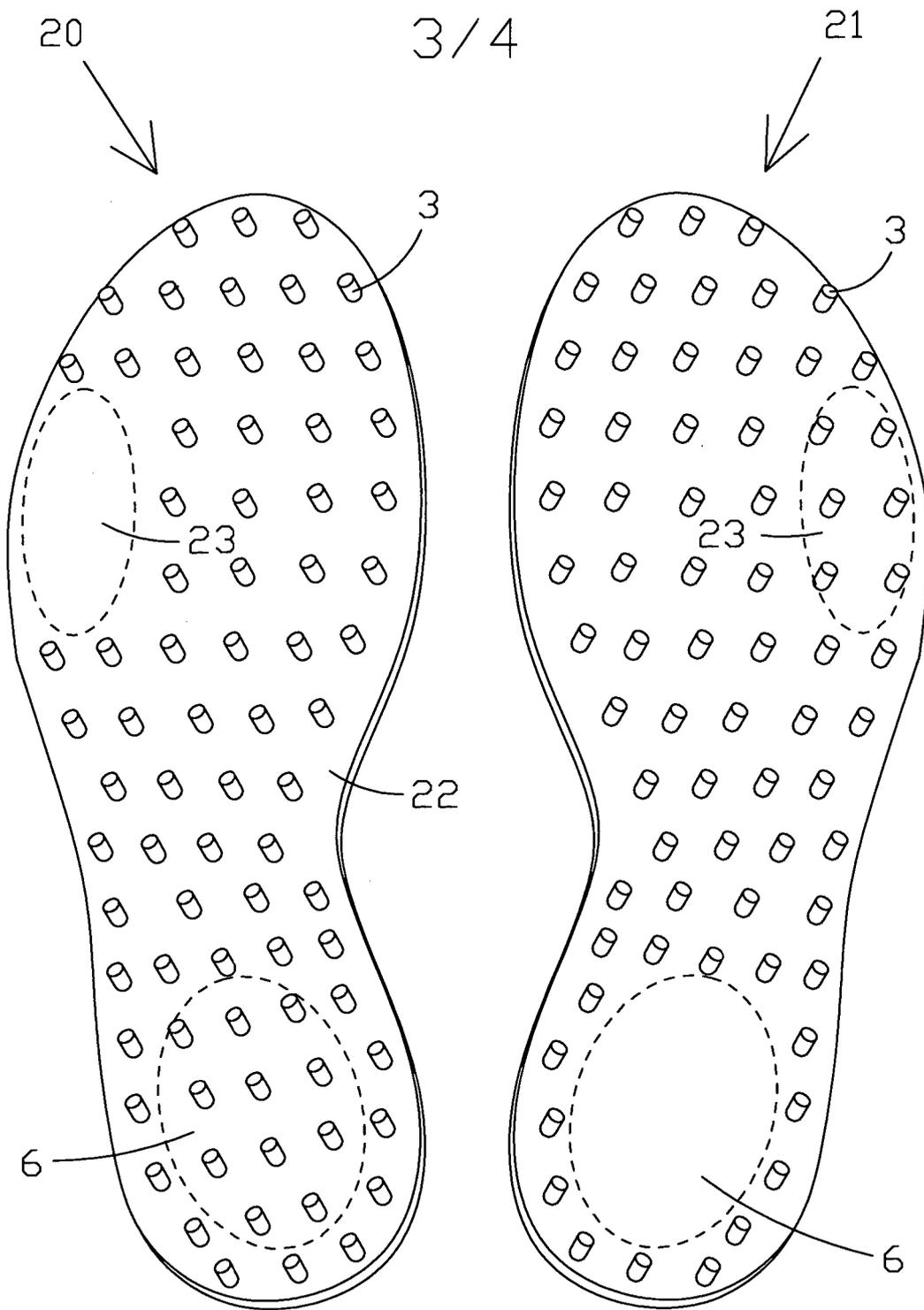


FIG. 3

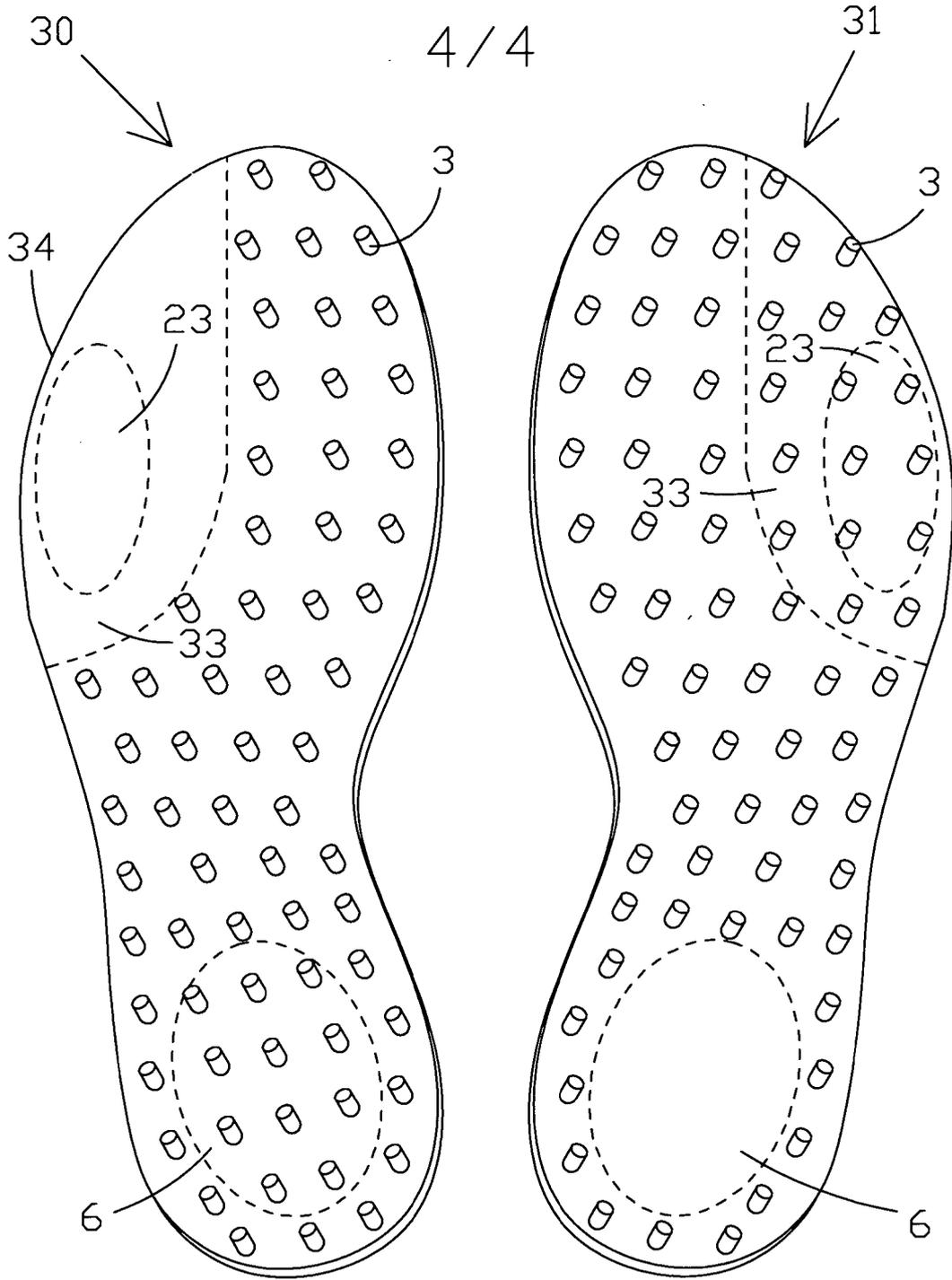


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2015/000071

A. CLASSIFICATION OF SUBJECT MATTER
 INV. A43B3/00 A43B5/00 A43B13/22
 ADD.
 According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 A43B A43C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 428 555 A (DEAN MARTIN WILLIAM FREDERICK [GB]) 7 February 2007 (2007-02-07) page 9; figures -----	1,4-10
X	US 2013/255102 AI (TERRELL RAYFORD [US]) 3 October 2013 (2013-10-03) paragraph [0015]; figures -----	1-3 , 10
X	US 4 527 345 A (LOPEZ LOPEZ JULIO [ES]) 9 July 1985 (1985-07-09) claims 1-3; figure 4 -----	1, 10
X	US 6 301 804 BI (BATTAGLIA VINCENT P [US]) 16 October 2001 (2001-10-16) column 5, lines 51-64; claim 1 -----	1, 10
	-/--	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 12 October 2015	Date of mailing of the international search report 20/10/2015
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Cl audel , Benoit
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INTERNATIONAL SEARCH REPORT

International application No PCT/IT2015/000071

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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