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**(54) Replaceable bicycle shoe cleat assembly**

Austauschbare Cleat-Anordnung für Fahrradschuh

Ensemble formant crampon remplaçable de chaussure pour bicyclette

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(56) References cited:  
**US-A- 5 079 968 US-A1- 2006 016 102**  
**US-A1- 2006 080 865 US-B2- 7 219 451**

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**Description****BACKGROUND OF THE INVENTION****1. Technical Field**

[0001] The present invention relates to a replaceable bicycle shoe cleat assembly according to the preamble of Claim 1. Accordingly, the present invention relates to bicycle shoe cleat assembly cleats, and more particularly, to a replaceable bicycle shoe cleat assembly that is composed of two cleat members that can be independently replaced.

**2. Description of Related Art**

[0002] As bicycling has become the order of the day, more and more after-hours cyclists are so fond of purchasing and using professional bicycles and accessories thereof. Among others, clipless pedals are popular with cyclists for possessing the advantages of facilitating long-term riding and improving pedaling efficiency because clipless pedals also apply driving force to gears when pulled upward. Generally speaking, clipless pedals can help to improve pedaling efficiency by about 20 to 30 percent. When choosing accessories of clipless pedals, consumers' top concern is focused on safety, namely the structural reliability of the products. For cyclists to safely operate clipless pedals, the key factor is doubtlessly a reliable shoe cleat.

[0003] With consideration of manufacturing costs and product weight, the existing cleats are typically in the form of a one-piece structure made of plastic through an injection-molding process, as the element numbered as 100 in Figure 1. After repeatedly assembled to and disassembled from clamping members of a clipless pedal (not shown) that are mainly made of metal, such a cleat is unavoidably worn at the interface it contacts the rear clamping member and the worn cleat has to be immediately replaced so as to ensure the cyclist's riding safety. However, while it is normal that the cleat gets unevenly worn at the front and rear edges, the known one-piece cleat cannot be partially renewed. In other words, once the traditional cleat is worn at any part thereof, the whole cleat has to be discarded, thus being uneconomical.

[0004] In addition, referring to Figure 2, for allowing adjustment between the cleat and a shoe sole 90 where the cleat is attached to, the sole 90 is provided with a plurality of slots 91, 92 and 93. During reinstallation of a new cleat, it is important to accurately fix the new cleat with respect to the slots 91, 92 and 93 on the sole 90 in the manner that the new cleat is placed right at the position where the old cleat was positioned, so as to ensure the new cleat is installed to meet the cyclist's pedaling posture and habit. In some prior-art approach, a positioning aid 101 shaped to mate a cleat 100' is provided as an aim for alignment of the cleat 100', as the concept disclosed in US Patent 7,219,451. The positioning aid

101 includes a feature to ensure that the cleat 100' is assembled thereto in only one orientation. Thereby, in the course of replacing the cleat 100', the undetached positioning aid 101 helps to pose the cleat 100' in position, so that after the cleat 100' and the positioning aid 101 are put together, and the cleat 100' is fastened to the sole 90 by means of a screw, it is ensured that the new cleat 100' is placed right on the position where the old cleat 100' was positioned. However, this solution depends on the additional positioning aid 101, which needs additional costs for making molds, forming and assembling the additional part, thus being imperfect.

**SUMMARY OF THE INVENTION**

[0005] To achieve these and other objects of the present invention, the invention provides a replaceable bicycle shoe cleat assembly according to claim 1. Further embodiments of the invention are described in the dependent claims.

[0006] A primary objective of the present invention is to provide a cleat assembly which allows selective replacement of only a part that has been worn and unusable, thereby facilitating saving resources and reducing costs for purchasing spares.

[0007] Another objective of the present invention is to provide a cleat assembly that can be accurately positioned without the need for any additional positioning aid as used in the prior-art solution, so as to save additional costs for making molds, forming and assembling the additional part, thereby improving competitiveness.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0008] The invention as well as a preferred mode of use, further objectives and advantages thereof will be best understood by reference to the following detailed description of illustrative embodiments when read in conjunction with the accompanying drawings, wherein:

**Figure 1** is a schematic drawing showing a known cleat to be assembled to a shoe sole;

**Figure 2** is a schematic drawing showing another known cleat to be assembled to a shoe sole;

**Figure 3** is a perspective view of a replaceable bicycle shoe cleat assembly according to the present invention;

**Figure 4** is an exploded view of the replaceable bicycle shoe cleat assembly according to the present invention;

**Figure 5** and **Figure 6** are applied views of the replaceable bicycle shoe cleat assembly according to the present invention;

**Figure 7** is an exploded view of another embodiment of the replaceable bicycle shoe cleat assembly according to the present invention; and

**Figure 8** and **Figure 9** provide different concepts of a rear engaging edge of the replaceable bicycle shoe

cleat assembly of the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

[0009] The present invention provides a replaceable bicycle shoe cleat assembly. Referring to **Figures 3 to 4**, it has a first cleat member **10** and a second cleat member **20**. The first cleat member **10** has a first fastening portion **11**, a first positioning portion **13**, and at least one first through hole **111** formed therebetween. The first through hole **111** allows a screw **15** to pass therethrough and then engage with a slot **91** formed on a shoe sole **90** (referring to **Figure 5**), so as to fasten the first cleat member **10** to the shoe sole **90**. The first fastening portion **11** has a front end, namely the end opposite to the first positioning portion **13**, formed with a front engaging edge **113** for engaging a front clamping member **81** of a clipless pedal **80** (referring to **Figure 8**). The second cleat member **20** has a second fastening portion **21** and a second positioning portion **23** for mating the first positioning portion **13**. The second fastening portion **21** includes at least one second through hole **211** and at least one third through hole **213**. The second through hole **211** and the third through hole **213** allow screws **25, 27** to pass therethrough and then engage with two other slots **92, 93** formed on the shoe sole **90**, so as to fasten the second cleat member **20** to the sole **90**. The second fastening portion **21** has its rear end, namely the end opposite to the second positioning portion **23**, formed with a rear engaging edge **215** for engaging a rear clamping member **82** of the clipless pedal **80** (referring to **Figure 8**). Therein, the first positioning portion **13** of the first cleat member **10** and the second positioning portion **23** of the second cleat member **20** are configured to couple with each other only in one orientation, and when any of the mated first cleat member **10** and second cleat member **20** receives a horizontal driving force, the driving force can be transmitted to the other thereof. Therefore, when the first cleat member **10** and the second cleat member **20** are fastened by the screws **15, 25** and **27** screwed into the slots **91, 92** and **93** of the shoe sole **90**, the first cleat member **10** and the second cleat member **20** are vertically positioned by the shoe sole **90** and the screws **15, 25** and **27**, and are horizontally driven by each other. Thereby, the first cleat member **10** and the second cleat member **20**, as a whole cleat assembly, are positioned in all directions with respect to the shoe sole **90**.

[0010] Since the cleat assembly, after frequently engaging and disengaging a clipless pedal, often has the second cleat member **20** worn more than the front one, the second cleat member **20** can be independently replaced while the first cleat member **10** is remained for further use. This is favorable for saving resources and reducing costs for purchasing spares.

[0011] As shown in **Figure 5**, for replacing the second cleat member **20**, the screws **25, 27** are first unscrewed from the second through hole **211** and the third through hole **213**, and then the second cleat member **20** can be

separated from the shoe sole **90**. Afterward, the new second cleat member **20** is such placed that the second positioning portion **23** thereof mates the first positioning portion **13** of the first cleat member **10**. Since the first positioning portion **13** of the first cleat member **10** and the second positioning portion **23** of the second cleat member **20** are designed to be coupled with each other in the only orientation, the newly installed second cleat member **20** can be properly posed basing on the unmoved first cleat member **10**, and thus reach a position identical to that of the old second cleat member **20** on the shoe sole **90**. On the contrary, when it is necessary to replace the first cleat member **10**, the screw **15** is first unscrewed from the first through hole **111**, and then the worn first cleat member **10** is taken apart from the sole **90**. Afterward, the new first cleat member **10** is such posed that the first positioning portion **13** mates the second positioning portion **23** of the second cleat member **20**. Since the first positioning portion **13** of the first cleat member **10** and the second positioning portion **23** of the second cleat member **20** are designed to be coupled with each other in the only orientation, the newly installed first cleat member **10** can be properly posed basing on the unmoved second cleat member **20**, and thus reach a position identical to that of the old first cleat member **10** on the shoe sole **90**, as shown in **Figure 6**.

[0012] Thereby, the disclosed structural feature ensures the first positioning portion **13** of the first cleat member **10** and the second positioning portion **23** of the second cleat member **20** to be mated in only one posture and to position each other, so that the replaced cleat member **10** or **20** can be correctly posed and positioned without the assistance from the positioning aid used in the prior art. Thus, as compared with the prior art, the present invention helps to save additional costs for making molds, forming and assembling the additional part, thereby improving competitiveness.

[0013] In the below description, **Figures 3** through **4** are referred to illustrate one embodiment of the present invention. In the following paragraphs, configurations of the first cleat member **10** and the second cleat member **20** are discussed to show how the first positioning portion **13** and the second positioning portion **23** are mated and put together in only one orientation, and when any of the combined first and second cleat members **10, 20** receives a horizontal driving force, the horizontal driving force is transmitted to the other.

[0014] As shown, the first positioning portion **13** of the first cleat member **10** is in a W-like shape bilaterally formed with paired arms **131**. Each of the arms **131** is terminated with an anchor **133** extending in a direction perpendicular to an axis of the arm **131**. The first positioning portion **13** is centrally formed with a promontory **135** between the two arms **131**. On the other hand, the second positioning portion **23** is shaped as a recessed portion for fittingly receiving the first positioning portion **13**. In other words, the second positioning portion **23** has arm recesses **231** for fittingly receiving the arms **131**,

anchor recesses **233** for fittingly receiving the terminal anchors **133** of the arms **131**, and a promontory recess **235** for receiving the promontory **135**. Under such design, the first positioning portion **13** and the second positioning portion **23** can be only mated in a single posture.

**[0015]** When it is needed to disassemble the replaceable bicycle shoe cleat assembly of the present invention from the clipless pedal **80**, a user may horizontally swing his/her thenar in a shoe above the shoe sole **90** against a joint between the front end of the first fastening portion **11** of the first cleat member **10** and the front clamping member **81** of the clipless pedal **80**, so as to depart the rear end of the second fastening portion **21** of the second cleat member **20** from the spring-controlled rear clamping member **82** of the clipless pedal **80**. At this time, the arms **131** and the anchors **133** of the first cleat member **10** jointly act as a pushing force to transmit the swing force to a pushed force composed of the arm recesses **231** and anchor recesses **233** of the second cleat member **20**. Since the force is transmitted between the first cleat member **10** and the second cleat member **20** in an inter-surface manner, the first positioning portion **13** and the second positioning portion **23** are unlikely to break or deform under stress acts thereon.

**[0016]** In another embodiment, the first positioning portion of the first cleat member **10** and the second positioning portion of the second cleat member **20** may be shaped into a pair of noncircular mortise and tenon, such as a pair of tightly mating rectangular tenon **137** and mortise **237** as shown in **Figure 7**. With such configurations, the cleat members **10**, **20** can also be limited to mate each other in only one orientation and can drive each other horizontally.

**[0017]** In the present invention, as shown in **Figure 8**, the rear engaging edge **215** of the second fastening portion **21** for engaging the rear clamping member **82** of the clipless pedal **80**, may have a width **W1** greater than a width of the rear clamping member **82**, so that when the rear engaging edge of the second cleat member **20** is coupled with the rear clamping member **82** of the clipless pedal **80**, the user is allowed to slightly swing his/her thenar on the clipless pedal **80** to finely adjust his/her pedaling posture, so as to improve pedaling comfortableness. Alternatively, as shown in **Figure 9**, the width **W2** of the rear engaging edge of the second fastening portion may be sized to tightly fit the rear clamping member **82**, so as to ensure firm combination therebetween for enhancing the cyclist's safety in riding.

## Claims

1. A replaceable bicycle shoe cleat assembly for being removably coupled with an external clipless pedal (80), the replaceable bicycle shoe cleat assembly comprising  
a first cleat member (10) having:

a first fastening portion (11) including at least one first through hole (111), the first through hole (111) allowing a screw (15) to pass therethrough and then engage with a slot (91) formed on a shoe sole (90), so as to fasten the first cleat member (10) to the shoe sole (90); and  
a first positioning portion (13); and

a second cleat member (20) having:

a second fastening portion (21) including at least one second through hole (211) and at least one third through hole (213), the second through hole (211) and the third through hole (213) allowing screws (25; 27) to pass therethrough and then engage with two other slots (92; 93) formed on the shoe sole (90), so as to fasten the second cleat member (20) to the shoe sole (90); and  
a second positioning portion (23) for mating the first positioning portion (13), wherein, the first positioning portion (13) of the first cleat member (10) and the second positioning portion (23) of the second cleat member (20) are configured to ensure that the first and second positioning portions (13; 23) are limited to be mated with each other in only one orientation, and when any of the combined first and second cleat members (10; 20) receives a horizontal driving force, the horizontal driving force is transmitted to the other of the first and second cleat members (10;20),

wherein the first fastening portion (11) has a front end, or an end opposite to the first positioning portion (13), formed with a front engaging edge (113) for engaging a front clamping member (81) of the external clipless pedal (80), and the second fastening portion (21) has a rear end, or an end opposite to the second positioning portion (23), formed with a rear engaging edge (215) for engaging a rear clamping member (82) of the external clipless pedal (80), while the rear engaging edge (215) is sized to be horizontally loosely or horizontally fittingly received in the rear clamping member (82).

2. The replaceable bicycle shoe cleat assembly of claim 1, wherein the first positioning portion (13) of the first cleat member (10) is in a W-like shape bilaterally formed with paired arms (131), each said arm (131) being terminated with an anchor (133) extending in a direction perpendicular to an axis of the arm (131), the first positioning portion (13) being centrally formed with a promontory (135) between the two arms (131), while the second positioning portion (23) is shaped as a recessed portion for fittingly receiving the first positioning portion (13), the second positioning portion (23) having arm recesses (231) for fittingly receiving the arms (131), anchor recesses (233) for fittingly receiving the terminal anchors (133) of

the arms (131), and a promontory recess (235) for receiving the promontory (135), so that the first positioning portion (13) and the second positioning portion (23) are limited to be mated with each other in a single posture.

3. The replaceable bicycle shoe cleat assembly of claim 1, wherein the first positioning portion (13) and the second positioning portion (23) include a noncircular mortise and a noncircular tenon that is limited to tightly fit the noncircular mortise in a single posture.
4. The replaceable bicycle shoe cleat assembly of claim 3, wherein the noncircular mortise and the noncircular tenon are a rectangular mortise (237) and a rectangular tenon (137) that are tightly mated with each other.

#### Patentansprüche

1. Eine austauschbare Stollenvorrichtung für einen Fahrradschuh zum Koppeln mit einem externen cliplosen Pedal (80), die austauschbare Stollenvorrichtung des Fahrradschuhs umfasst:

ein erstes Stollenelement (10) mit einem ersten Befestigungsbereich (11) umfassend zumindest ein erstes Durchgangsloch (111), das erste Durchgangsloch (111) ermöglicht einer Schraube (15) dadurch zu gehen und dann in einen Schlitz (91), der an der Schuhsohle (90) ausgebildet ist, einzugreifen, um so das erste Stollenelement (10) an der Schuhsohle (90) zu befestigen; und ein erster Positionierungsbereich (13); und ein zweites Stollenelement (20) mit:

einem zweiten Befestigungsbereich (21) umfassend zumindest ein zweites Durchgangsloch (211) und zumindest ein drittes Durchgangsloch (213), das zweite Durchgangsloch (211) und das dritte Durchgangsloch (213) ermöglichen es Schrauben (25; 27) dadurch zu gehen und in zwei andere Schlitze (92; 93), die an der Schuhsohle (90) ausgebildet sind, einzugreifen und so das zweite Stollenelement (20) an der Schuhsohle (90) zu befestigen; und ein zweiter Positionierungsbereich (23) zum Verbinden des ersten Positionierungsbereiches (13), wobei der erste Positionierungsbereich (13) des ersten Stollenelementes (10) und der zweite Positionierungsbereich (23) des zweiten Stollenelementes (20) ausgebildet sind, um sicherzustellen, dass der erste und

der zweite Positionierungsbereich (13; 23) beschränkt sind in nur einer Orientierung miteinander verbunden zu werden, und wenn eines der kombinierten ersten und zweiten Stollenelemente (10; 20) eine horizontale Antriebskraft erfährt, wird die horizontale Antriebskraft zu dem anderen des ersten und zweiten Stollenelementes (10; 20) übertragen, wobei der erste Befestigungsbereich (11) ein Vorderende hat, oder ein Ende gegenüber dem ersten Positionierungsbereich (13), das mit einer vorderen Eingreifkante (113) für das Eingreifen eines vorderen Klemmelementes (81) des äußeren cliplosen Pedals (80) ausgebildet ist, und der zweite Befestigungsbereich (21) hat ein rückwärtiges Ende, oder ein Ende gegenüber dem zweiten Positionierungsbereich (23), das mit einer rückwärtigen Eingreifkante (215) für das Eingreifen eines rückwärtigen Klemmelementes (82) des äußeren cliplosen Pedals (80) ausgebildet ist, während die rückwärtige Eingreifkante (215) eine Größe hat, um horizontal locker oder horizontal passend von dem rückwärtigen Klemmelement (82) aufgenommen zu werden.

2. Die austauschbare Stollenvorrichtung für einen Fahrradschuh nach Anspruch 1, wobei der erste Positionierungsbereich (13) des ersten Stollenelementes (10) eine W-förmige Form hat, die bilateral mit gepaarten Armen (131) ausgebildet ist, jeder der Arme (131) endet mit einem Anker (133), der sich in einer rechtwinkligen Richtung zu einer Achse des Armes (131) erstreckt, der erste Positionierungsbereich (13) ist mittig mit einem Vorsprung (135) zwischen den beiden Armen (131) ausgebildet, wobei der zweite Positionierungsbereich (23) als ein vertiefter Bereich zum passenden Aufnehmen des ersten Positionierungsbereichs (13) geformt ist, der zweite Positionierungsbereich (23) hat Armvertiefungen (231), um die Arme (131) passend aufzunehmen, Ankervertiefungen (233), um die Endanker (133) der Arme (131) passend auszunehmen, und eine Vorsprurigvertiefung (235) zum Aufnehmen des Vorsprungs (135), so dass der erste Positionierungsbereich (13) und der zweite Positionierungsbereich (23) beschränkt sind miteinander in einer einzigen Haltung verbunden zu werden.
3. Die austauschbare Stollenvorrichtung für einen Fahrradschuh nach Anspruch 1, wobei der erste Positionierungsbereich (13) und der zweite Positionierungsbereich (23) eine nicht kreisförmige Nut und einen nicht kreisförmigen Zapfen beinhalten, der beschränkt ist eng in die nicht kreisförmige Nut in einer einzigen Haltung hineinzupassen.

4. Die austauschbare Stollenvorrichtung für einen Fahrradschuh nach Anspruch 3, wobei die nicht kreisförmige Nut und der nicht kreisförmige Zapfen eine rechteckige Nut (237) und ein rechteckiger Zapfen (137) sind, die sich eng miteinander verbinden.

## Revendications

1. Ensemble cale-chaussure de bicyclette remplaçable, destiné à être couplé de façon amovible à une pédale automatique externe (80), l'ensemble cale-chaussure de bicyclette remplaçable comprenant un premier élément de cale (10) ayant :

une première partie de fixation (11) comprenant au moins un premier trou traversant (111), le premier trou traversant (111) permettant à une vis (15) de passer à travers celui-ci puis de s'engager avec une fente (91) formée sur une semelle de chaussure (90), de façon à fixer le premier élément de cale (10) à la semelle de chaussure (90) ; et

une première partie de positionnement (13) ; et un second élément de cale (20) ayant :

une seconde partie de fixation (21) comprenant au moins un deuxième trou traversant (211) et au moins un troisième trou traversant (213), le deuxième trou traversant (211) et le troisième trou traversant (213) permettant à des vis (25 ; 27) de passer à travers ceux-ci puis de s'engager avec deux autres fentes (92 ; 93) formées sur la semelle de chaussure (90), de façon à fixer le second élément de cale (20) à la semelle de chaussure (90) ; et

une seconde partie de positionnement (23) pour un accouplement à la première partie de positionnement (13), la première partie de positionnement (13) du premier élément de cale (10) et la seconde partie de positionnement (23) du second élément de cale (20) étant configurées pour garantir que les première et seconde parties de positionnement (13 ; 23) sont limitées pour être accouplées l'une à l'autre dans une seule orientation et que, lorsque l'un quelconque des premier et second éléments de cale combinés (10 ; 20) reçoit une force d'entraînement horizontale, la force d'entraînement horizontale est transmise à l'autre des premier et second éléments de cale (10 ; 20),

la première partie de fixation (11) ayant une extrémité avant, ou une extrémité opposée à la première partie de fixation (13), formée avec un bord d'engagement avant (113) pour engagement d'un élément

de serrage avant (81) de la pédale automatique externe (80), et la seconde partie de fixation (21) ayant une extrémité arrière, ou une extrémité opposée à la seconde partie de positionnement (23), formée avec un bord d'engagement arrière (215) pour engagement d'un élément de serrage arrière (82) de la pédale automatique externe (80), tandis que le bord d'engagement arrière (215) est dimensionné pour être reçu de manière horizontalement lâche ou de manière horizontalement ajustée dans l'élément de serrage arrière (82).

2. Ensemble cale-chaussure de bicyclette remplaçable selon la revendication 1, dans lequel la première partie de positionnement (13) du premier élément de cale (10) a une forme du type W formée bilatéralement avec des bras appariés (131), chaque bras précité (131) se terminant avec un ancrage (133) s'étendant dans une direction perpendiculaire à un axe du bras (131), la première partie de positionnement (13) étant formée au centre avec un promontoire (135) entre les deux bras (131), tandis que la seconde partie de positionnement (23) est façonnée sous la forme d'une partie renforcée pour recevoir de manière ajustée la première partie de positionnement (13), la seconde partie de positionnement (23) ayant des renforcements de bras (231) pour recevoir de manière ajustée les bras (131), des renforcements d'ancrage (233) pour recevoir de manière ajustée les ancrages terminaux (133) des bras (131), et un renforcement de promontoire (235) pour recevoir le promontoire (135), de telle sorte que la première partie de positionnement (13) et la seconde partie de positionnement (23) sont limitées pour être accouplées l'une à l'autre dans une unique position.

3. Ensemble cale-chaussure de bicyclette remplaçable selon la revendication 1, dans lequel la première partie de positionnement (13) et la seconde partie de positionnement (23) comprennent une mortaise non-circulaire et un tenon non-circulaire qui est limité pour s'ajuster de façon étroite à la mortaise non-circulaire dans une unique position.

4. Ensemble cale-chaussure de bicyclette remplaçable selon la revendication 3, dans lequel la mortaise non-circulaire et le tenon non-circulaire sont une mortaise rectangulaire (237) et un tenon rectangulaire (137) qui sont accouplés de façon étroite l'un à l'autre.

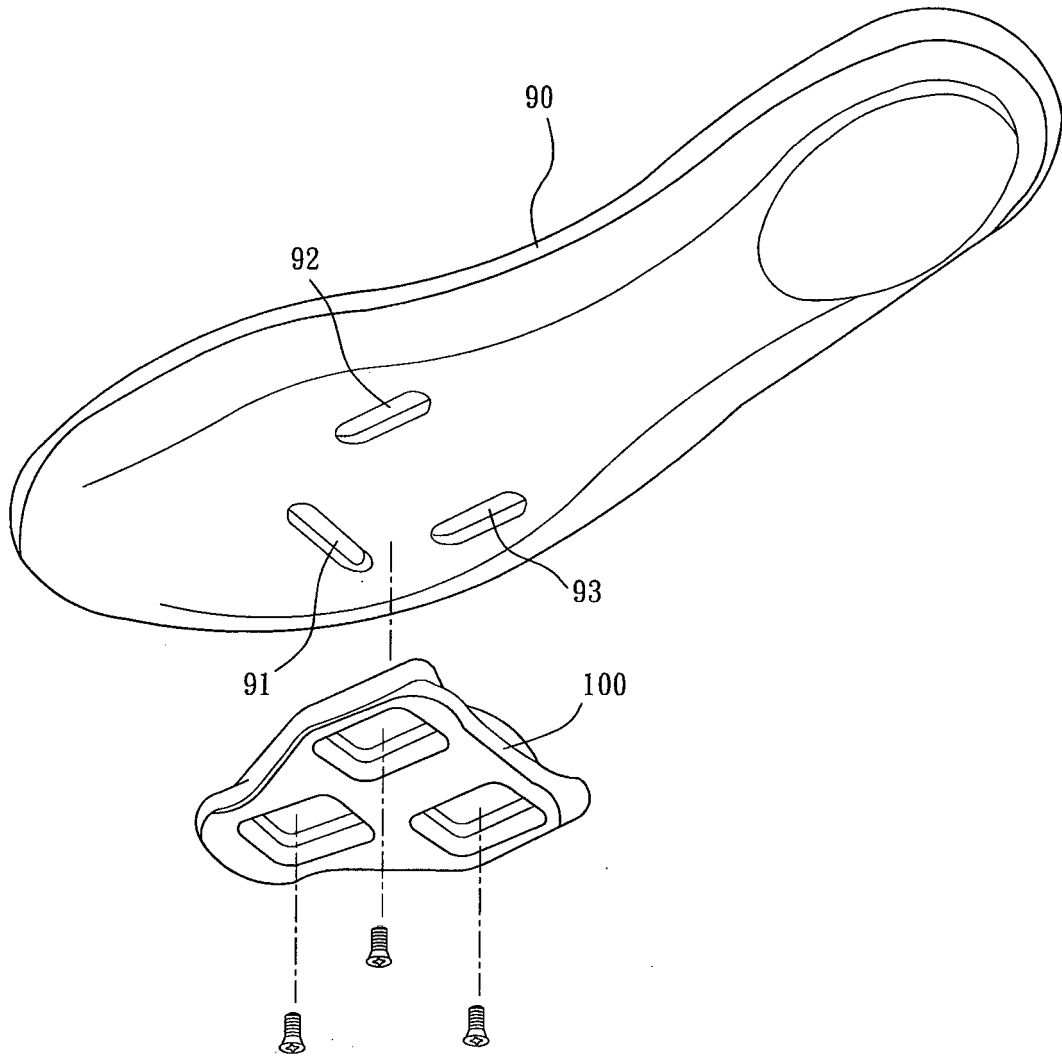


FIG. 1

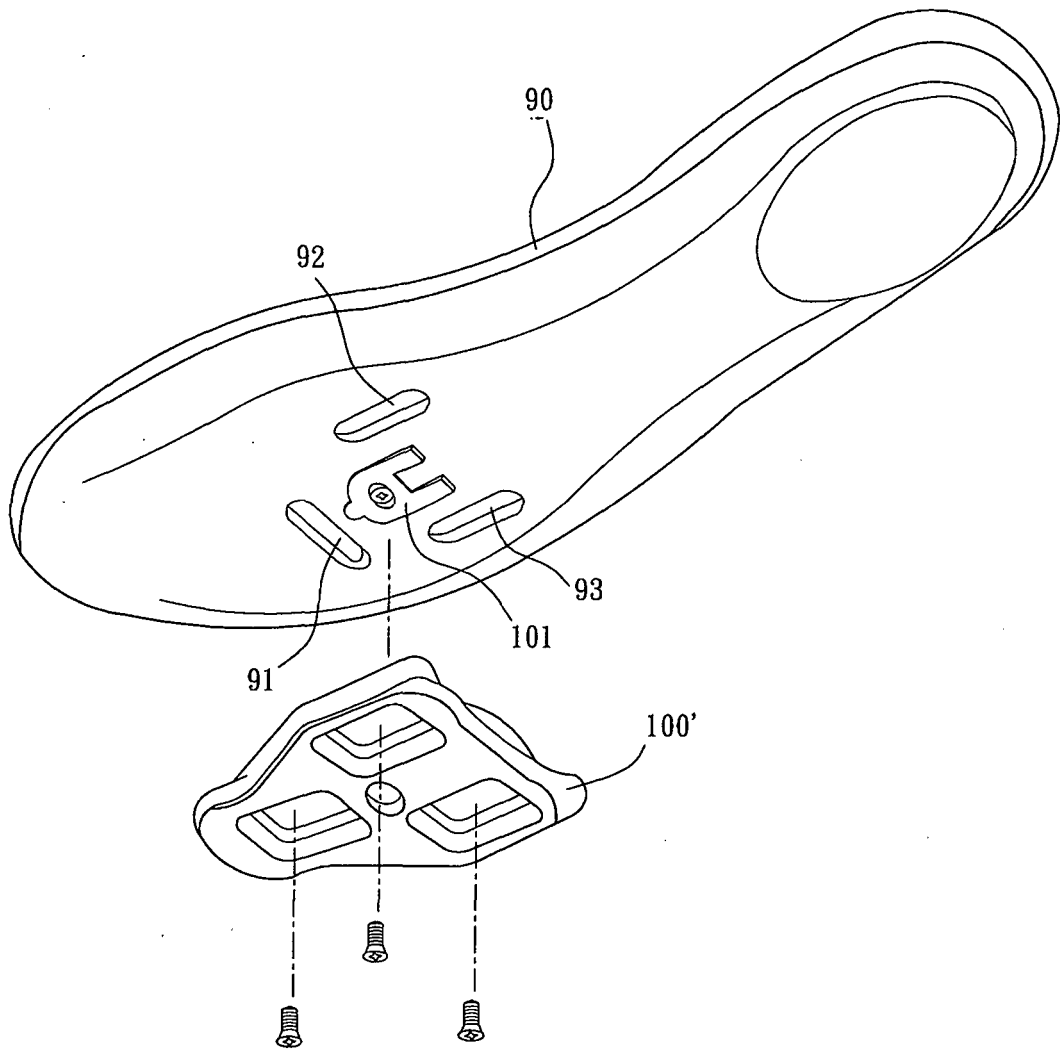


FIG. 2

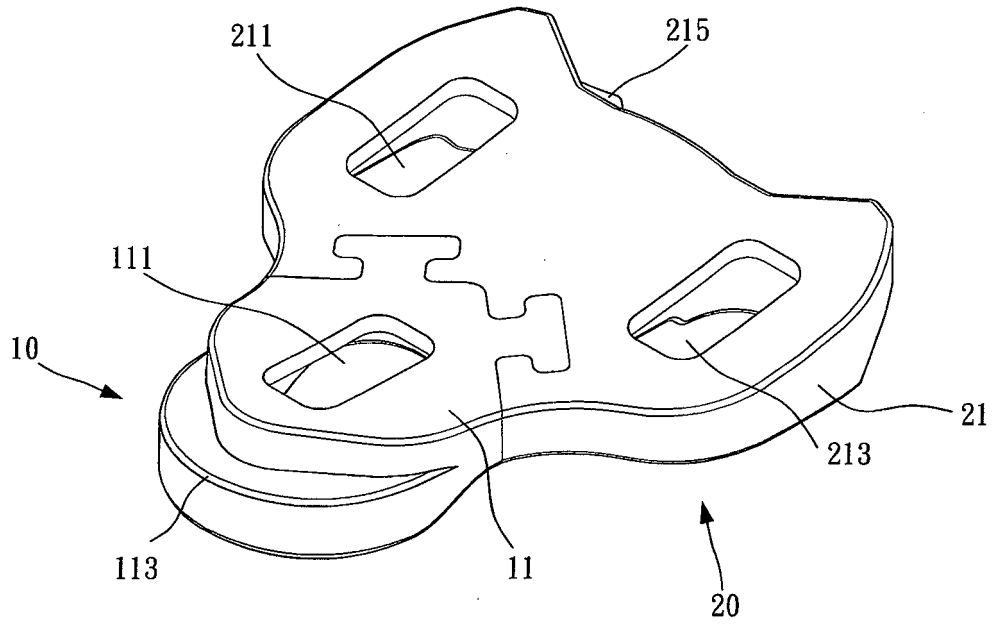


FIG. 3

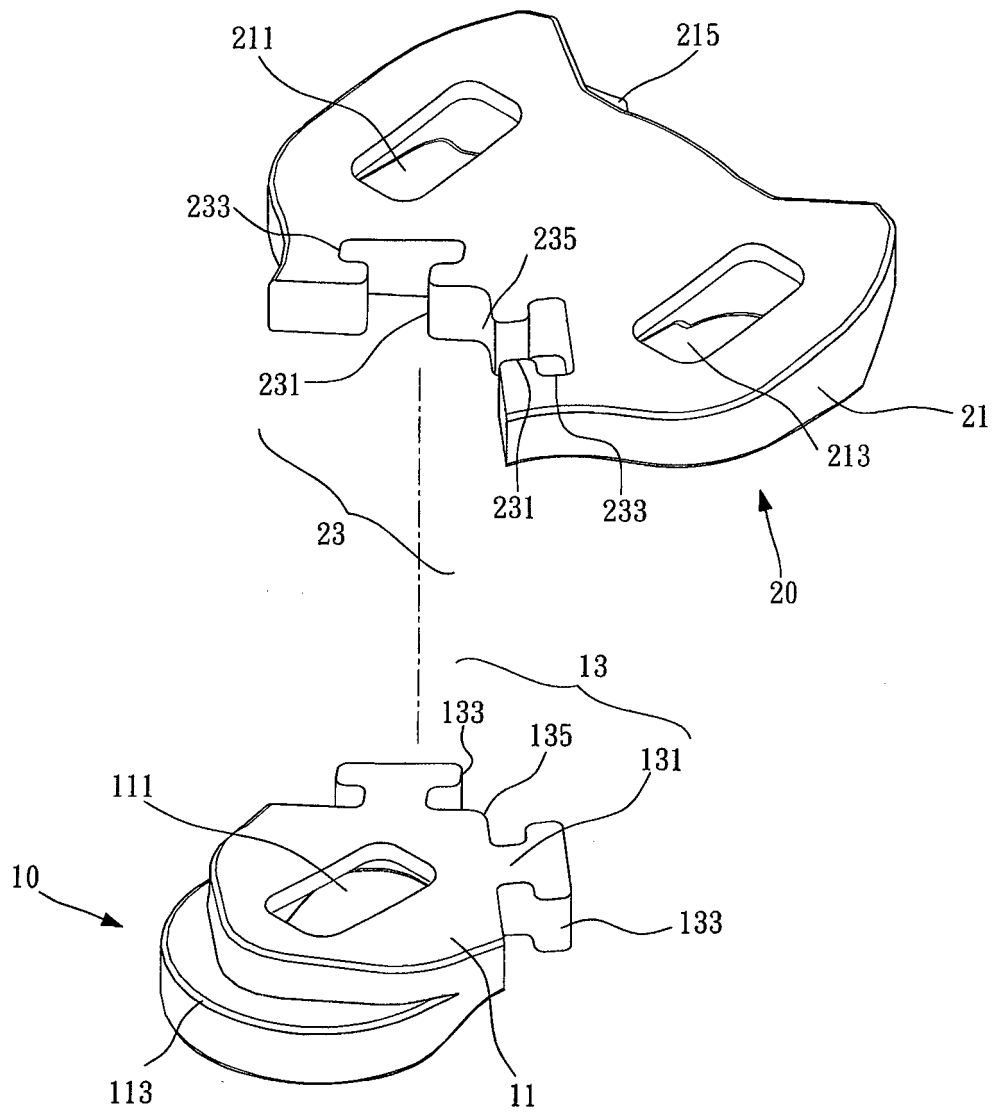


FIG. 4

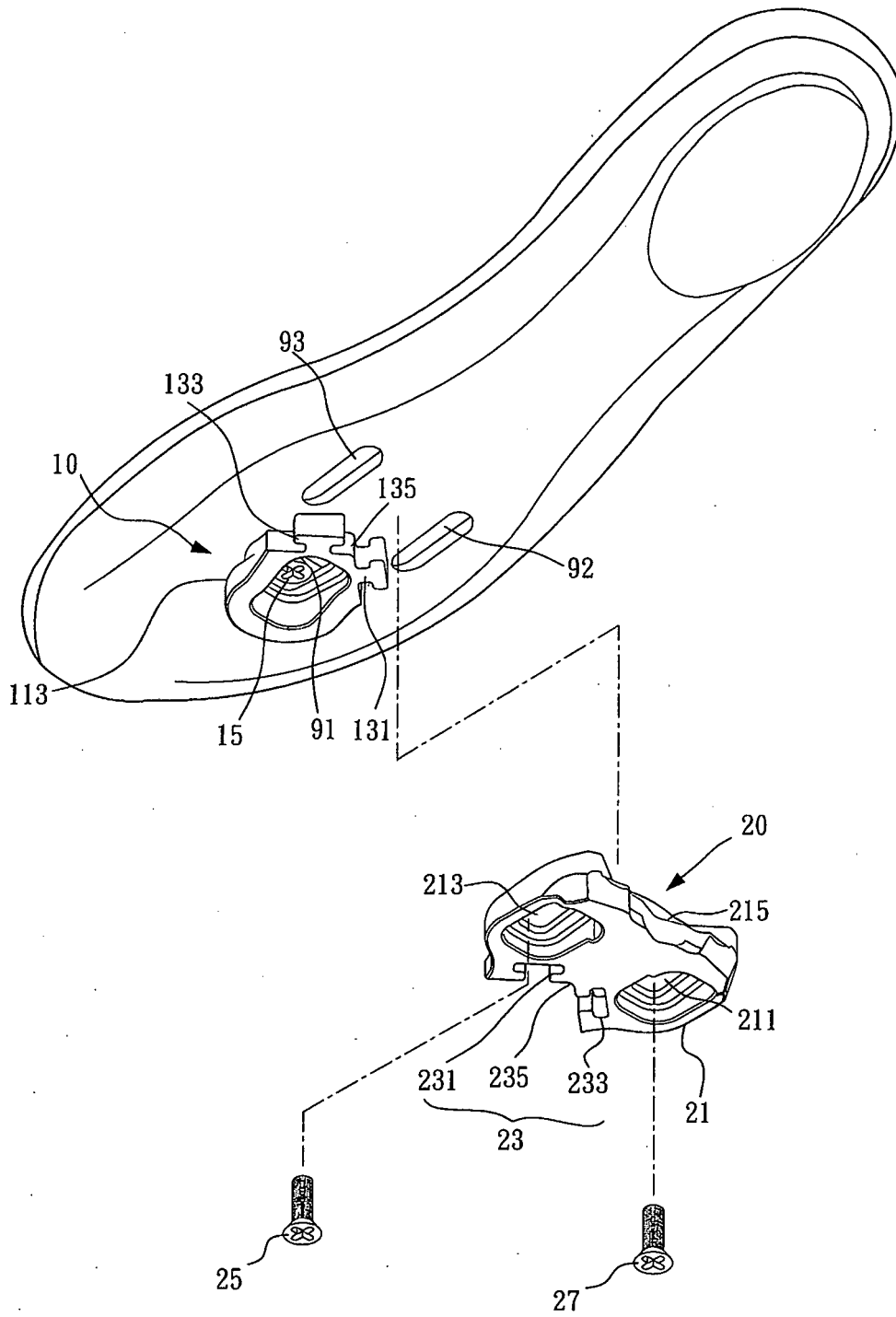


FIG. 5

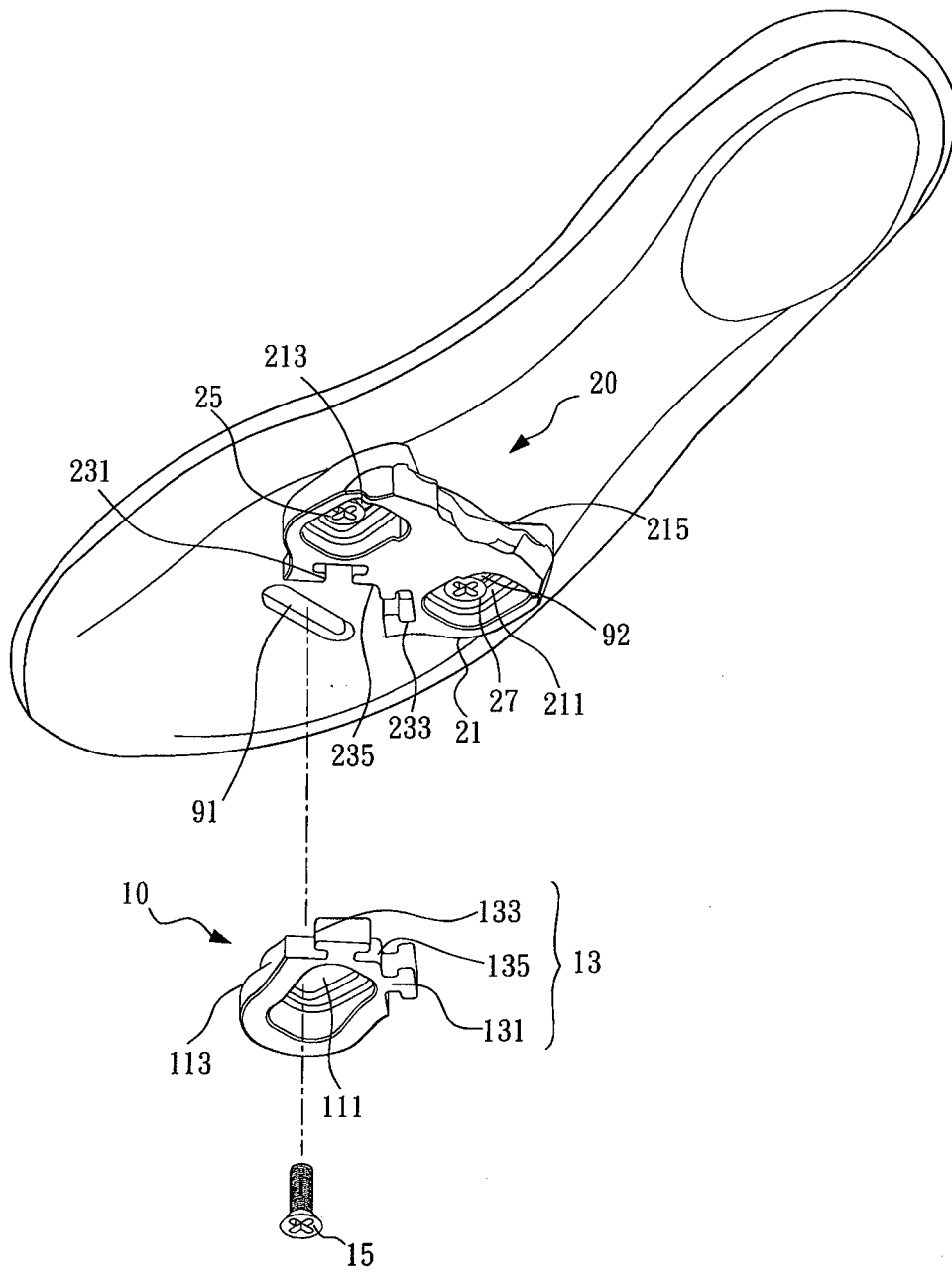


FIG. 6

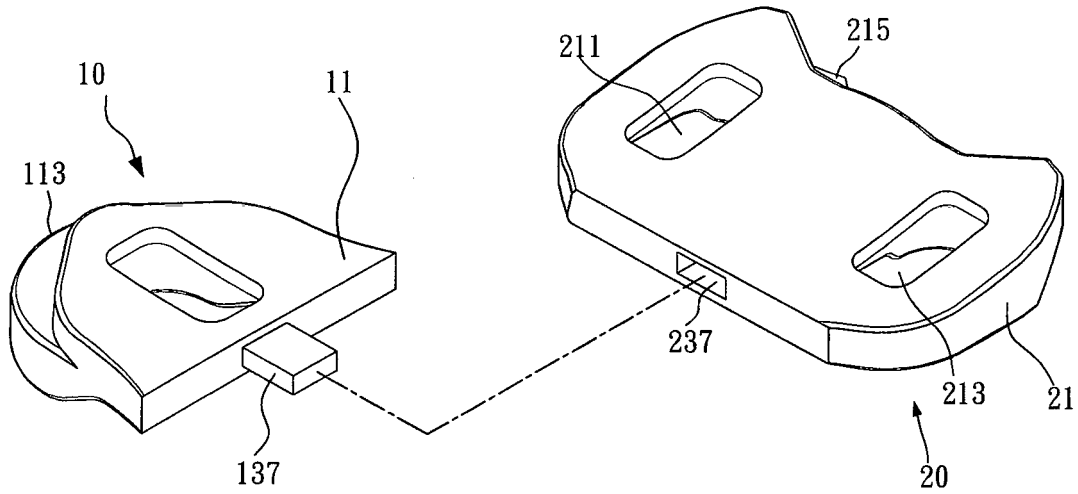


FIG. 7

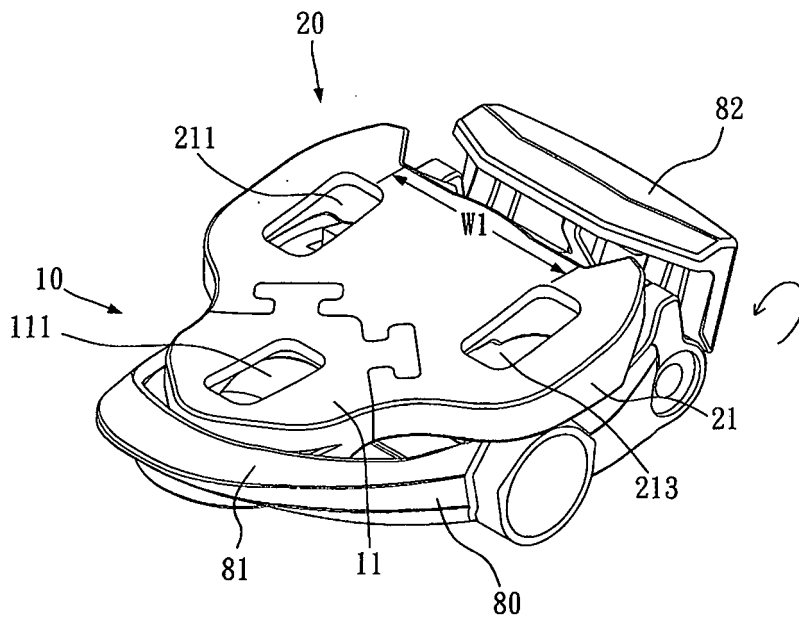


FIG. 8

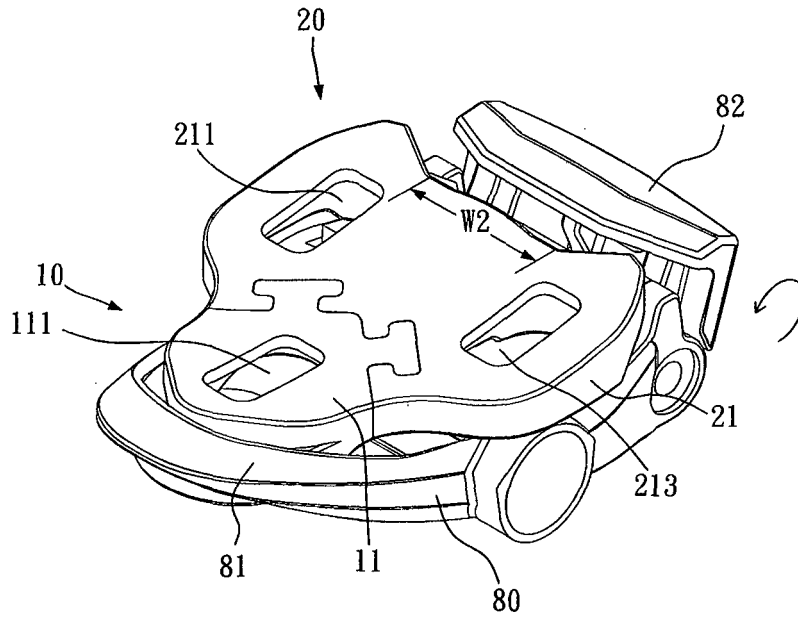


FIG. 9

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 7219451 B [0004]