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(54) **TWO-PURPOSE-PEDAL**

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(57) **ABSTRACT**

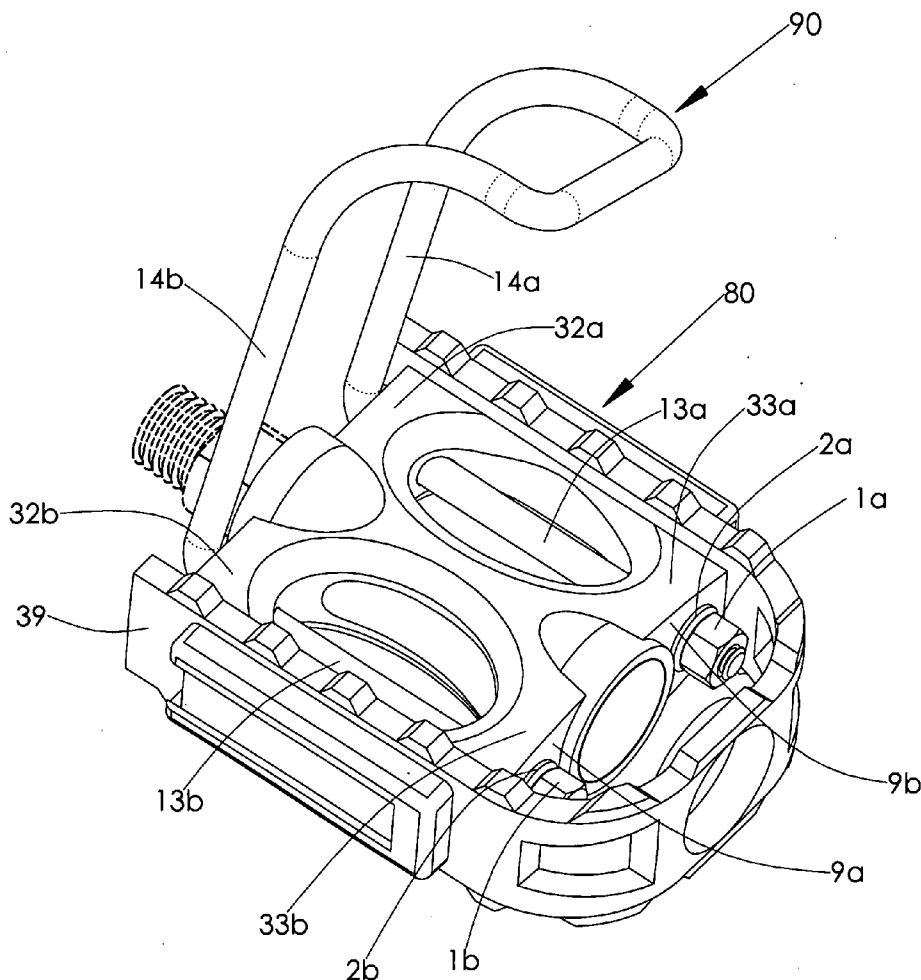
A two-purpose-pedal consists of a shaft or spindle adopted to attach to a crank-arm using one longitudinal side, a pedal body rotatably attached to the other longitudinal side of said pedal shaft, and two parallel straight holes on said pedal body sandwich said pedal shaft in the middle. Each of the said two parallel straight holes is designed to tightly fit the base of a particular instep-coupler and can be disjoined by space in between. Said two straight holes can either parallel to or perpendicular to said pedal shaft. The former require the two holes be entered from the back side of said pedal body and exit with flat surface surround the end of holes, said flat surfaces are perpendicular to the direction of the holes. The latter required the two holes located near the back side of said pedal body with flat surfaces surrounding both ends of the holes, said flat surfaces are perpendicular to the direction of the hole.

(21) Appl. No.: **11/893,838**

(22) Filed: **Aug. 16, 2007**

Related U.S. Application Data

(60) Provisional application No. 60/878,482, filed on Jan. 3, 2007.



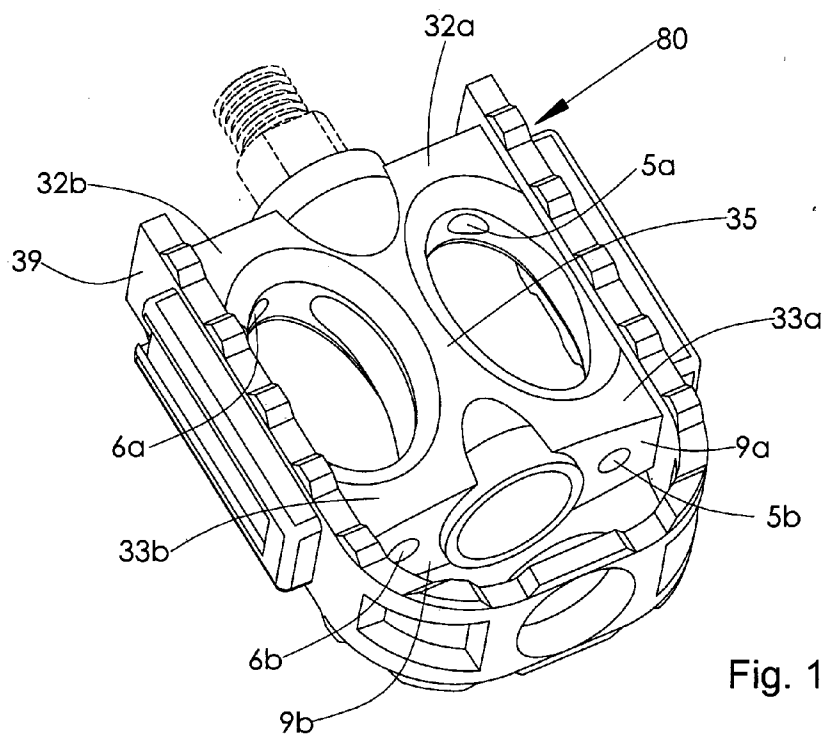


Fig. 1A

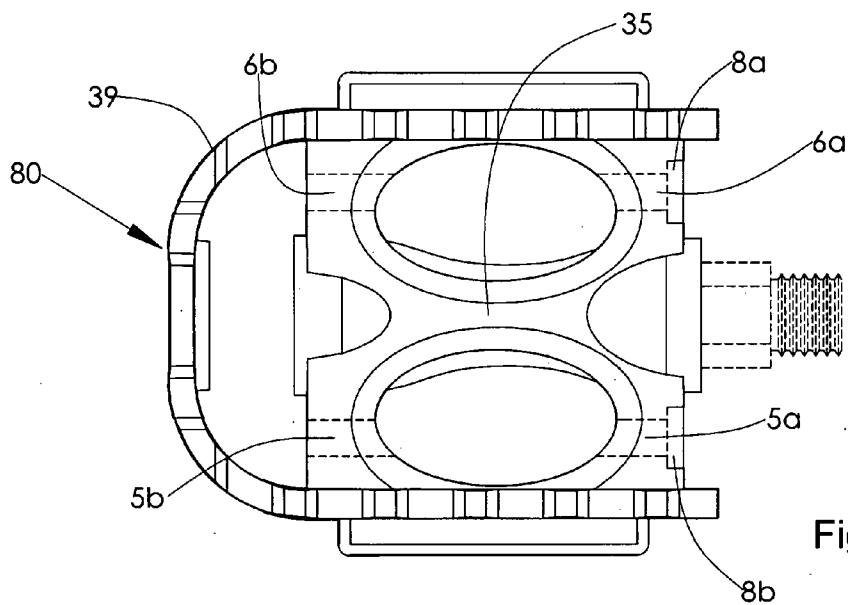


Fig. 1B

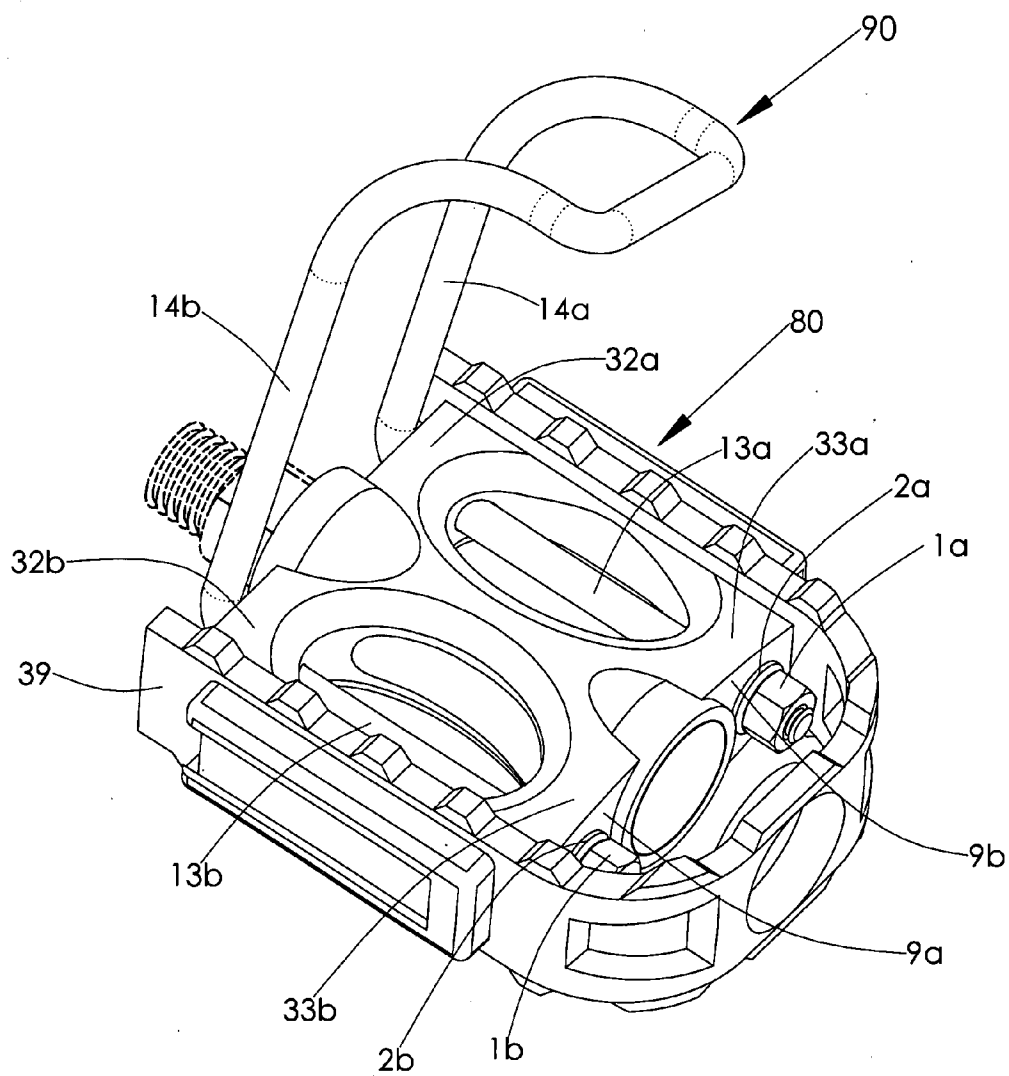


Fig. 1D

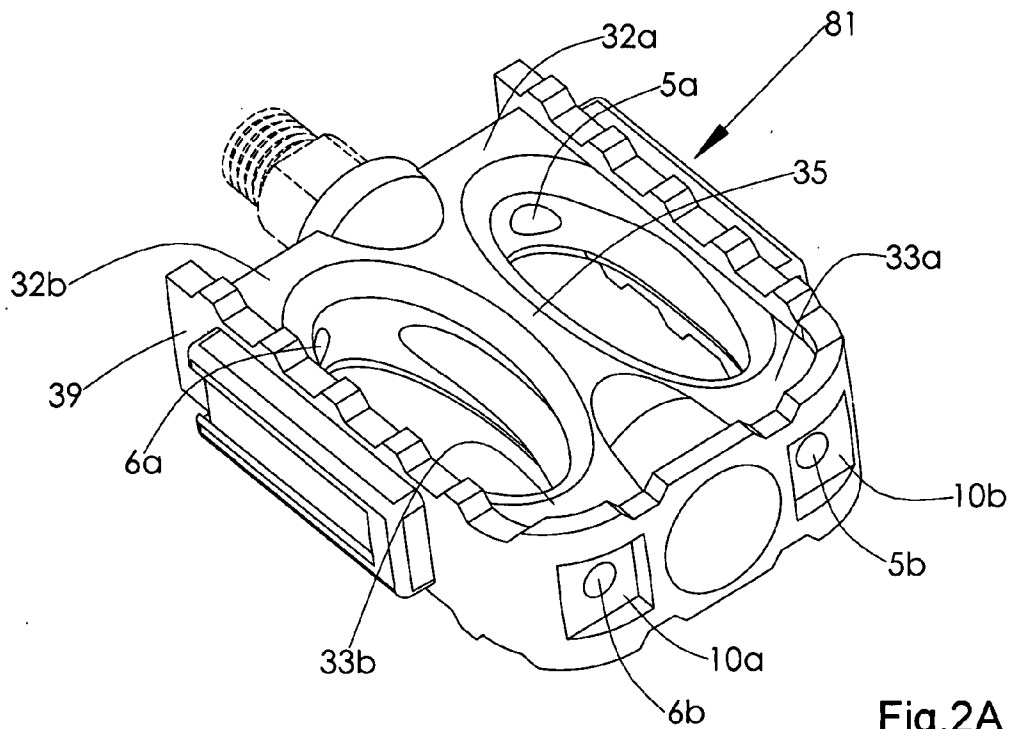


Fig.2A

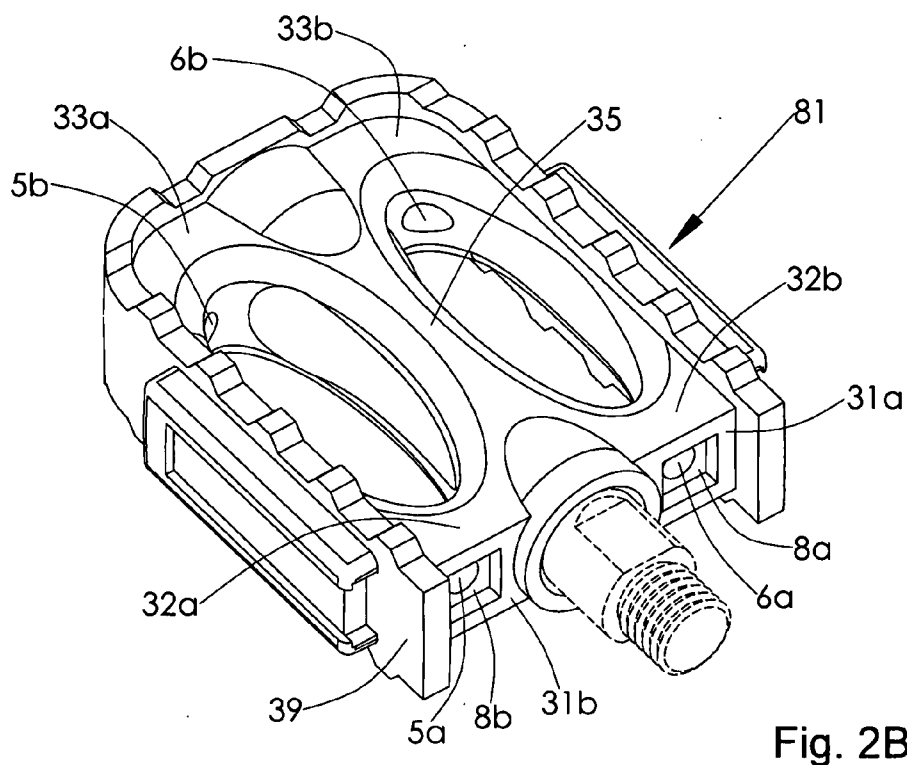


Fig. 2B

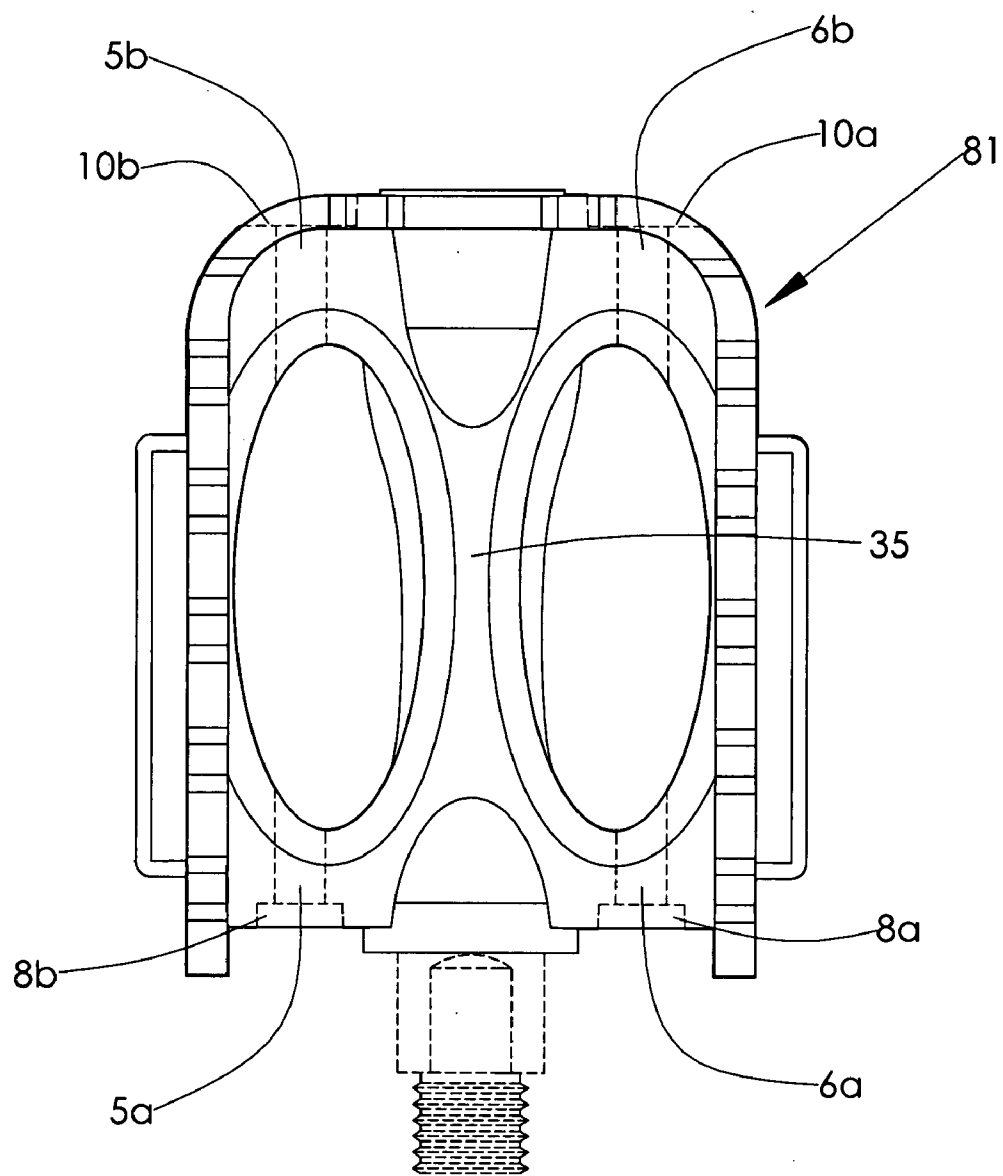


Fig. 2C

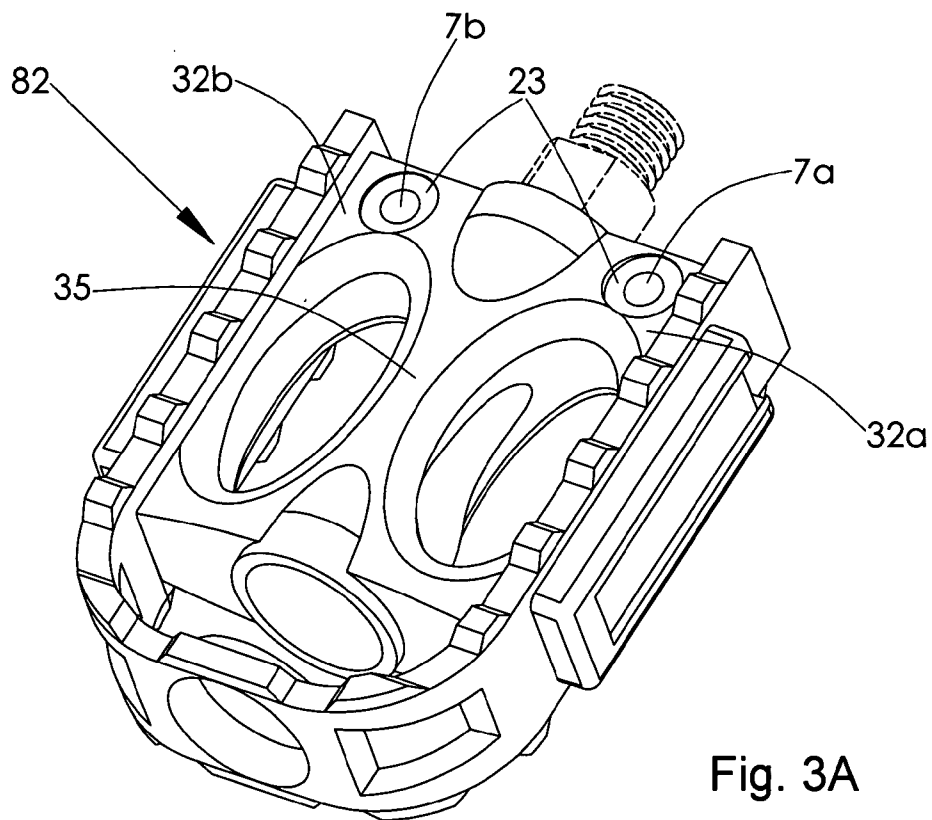


Fig. 3A

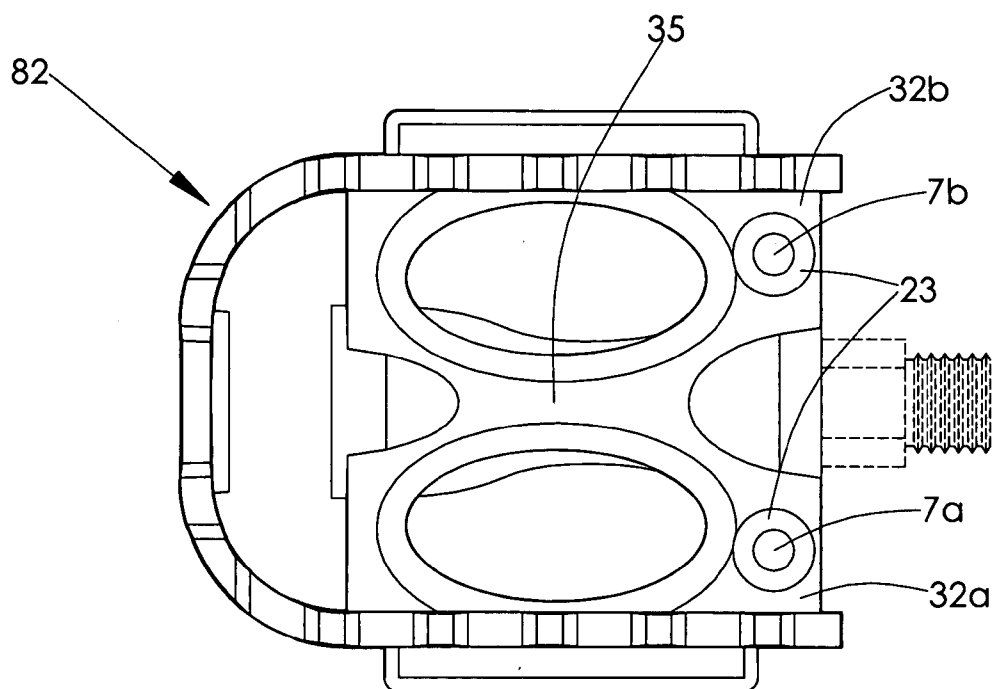


Fig. 3B

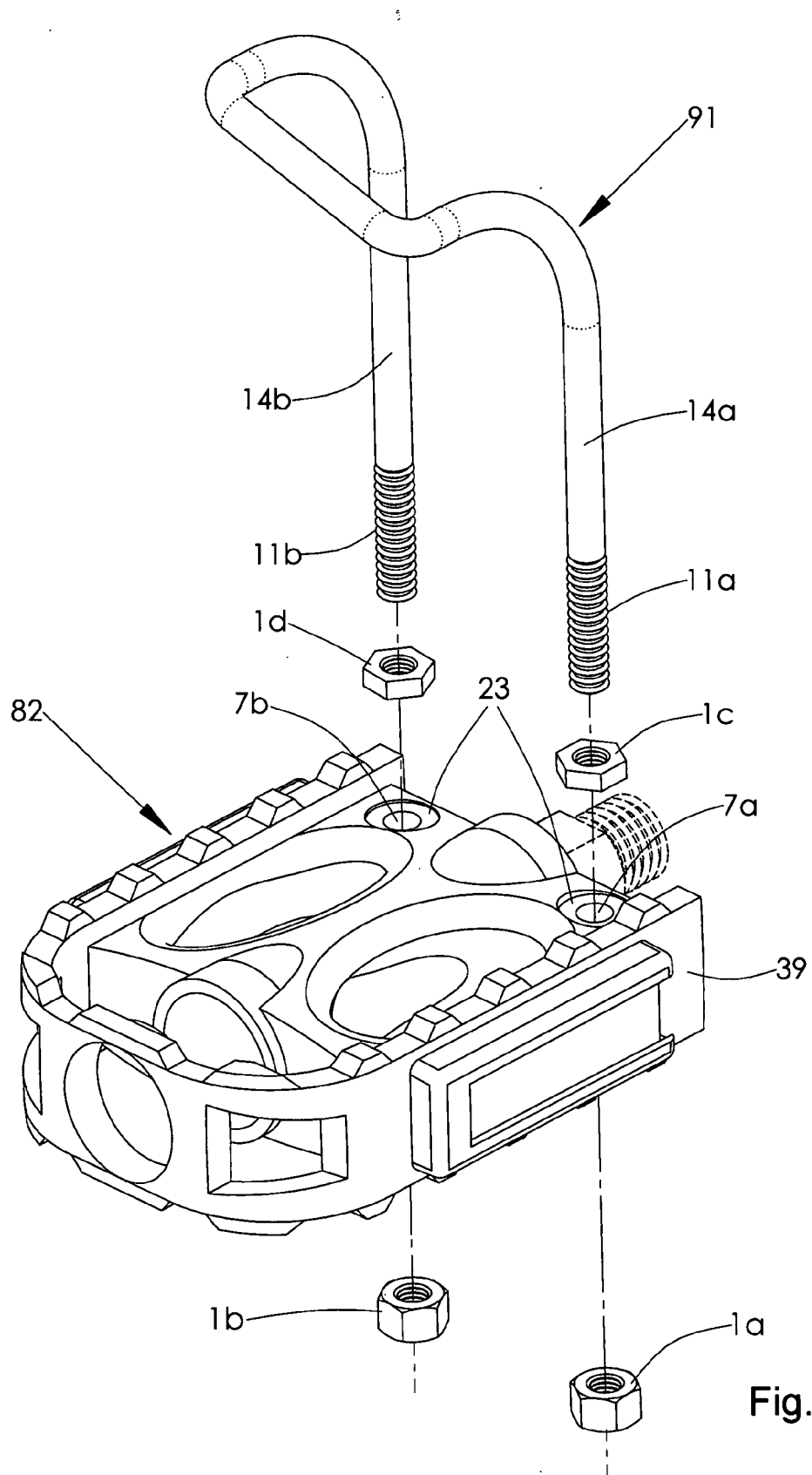


Fig. 3C

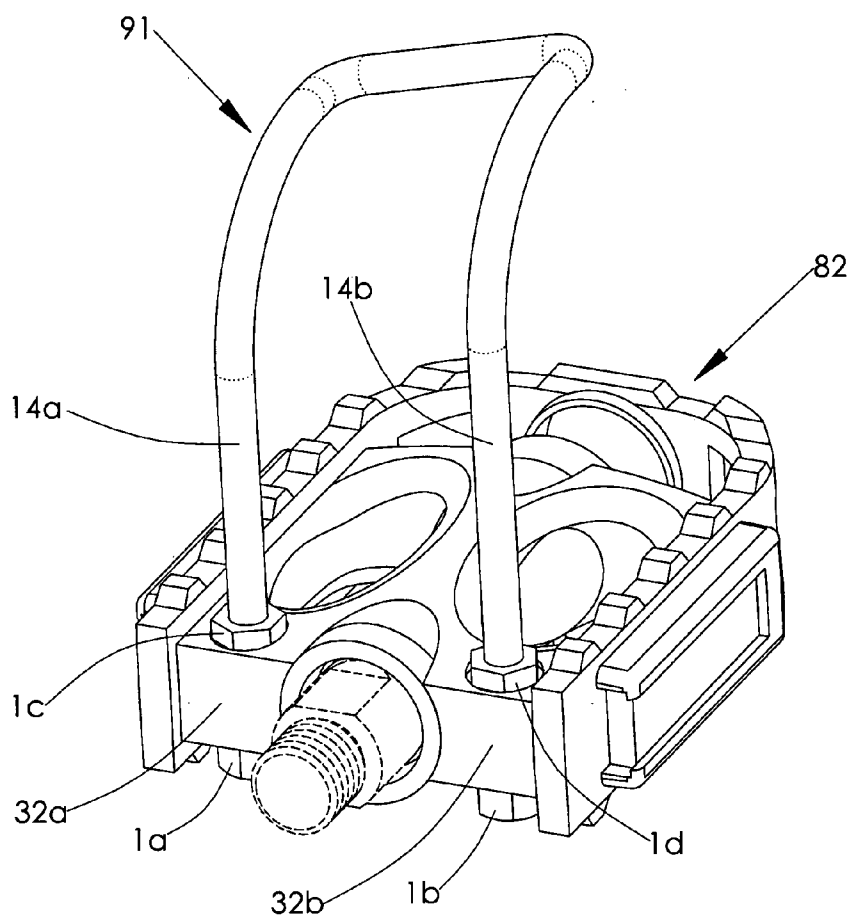


Fig. 3D

TWO-PURPOSE-PEDAL

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of provisional patent application Ser. No. 60/878,482, filed Jan. 3, 2007 by the present inventor.

FEDERALLY SPONSORED RESEARCH

[0002] Not Applicable

SEQUENCE LISTING OR PROGRAM

[0003] Not Applicable

BACKGROUND OF THE INVENTION

[0004] 1. Field of Invention

[0005] This invention is regular bicycle pedal by itself and can receive an instep-coupler attachment for push and pull pedaling mechanism.

[0006] 2. Prior Art

[0007] The basic way to pedal a bicycle is to use sole to push down onto a pedal. Currently there are special pedals that allow people to pull in addition to push using their foot. These special pedals include pedal with toe strap, pedal with strap and toe clip, and step-in or clipless pedal (pedals that required special shoes for engagement). However, many people choose not to use these special pedals in riding a bicycle; they choose to use regular bicycle pedal that designed to receive push-only pedaling mechanism from the sole. The reasons could be any of the following:

[0008] a) people do not feel confident enough that once their foot is secured onto one of said special pedal they can disengage said special pedals fast enough during an emergency to avoid an accident.

[0009] b) pedals that require special shoes to operate, are expensive, and not user friendly.

[0010] 3. Objects and Advantages

[0011] Two-purpose-pedal is a regular bicycle pedal by itself designed to attach to a crank arm to receive push-only pedaling mechanism from the sole. It is a nice pedal for people who like to use regular pedal in riding a bicycle for dairy commune, transportation, sport, joy ride, and yet reluctant to use the special pedal mentioned in prior arts for feeling of insecure, not user friendly, and too costly. Two-purpose-pedal is also designed to receive an instep-coupler attachment; cyclist can easily attach an instep-coupler to it, enabling them to pull the pedal using the peak slope of their instep onto the instep-coupler. When a two-purpose-pedal has an instep-coupler attachment, the combination has the following object and advantage over prior arts:

[0012] a) no special shoes is required to operate, simply wear your favorite sneaker,

[0013] b) provide a lot of freedom for people to quickly and easily engage and disengage the instep-coupler and the two-purpose-pedal in bicycle riding,

[0014] c) allow user number of ways to use my invention. User can choose either to step on the side of the pedal with their instep fully engage, not engage, or partially engage with the instep-coupler; or simply step on the opposite side of the pedal to allow the bicycle to pick up the speed first at the initial stage of bike riding and engage their instep with the instep-coupler later on, and

[0015] d) can also use in indoor stationary cycling bikes, user will get the benefit of quick release whenever they like.

SUMMARY

[0016] Two-purpose-pedal by itself is a regular bicycle pedal, designed to receive sole push-only pedaling mechanism when attached to a crank-arm. What makes it different from other bicycle pedal is that it is designed to receive an instep-coupler attachment, enable user to use their instep to pull when contracting in addition to push using their sole when extending. In order to receive an instep-coupler attachment there are two parallel straight holes of equal size on the pedal body that sandwich the pedal shaft in the middle. Each of said two parallel straight holes is circular and their size is chosen to tightly fit the base of an instep-coupler of particular diameter; they can be disjoined by space in between, because the designed of a pedal body is often porous, irregular, and aim to use as less material as possible. Said two straight holes can either run in the direction of the pedal shaft or perpendicular to the pedal shaft. The former required the holes be entered from the back side of the pedal body and continue toward the front side of the pedal body; the back side of a pedal body is the side of the pedal body that is facing a crank-arm when the pedal is attached to a crank-arm; while the front side of the pedal body is the said of the pedal body furthest away from the crank-arm. The latter require the two holes locate close to the back side of the pedal body. For an instep-coupler to attach to a two-purpose-pedal, it would have to insert their bases that have threading at their ends into these two parallel holes and secured by hex nuts on said threading. Thus the end of the hole that make contact with the washers or hex nuts must have flat surface surrounded; said flat surface is perpendicular to the direction of the hole that it is surrounded, so the washers or hex nuts can press against with maximum contact. For detail design specification on various instep-couplers, please refer to my different patent name "Instep-coupler for Pedal", patent number: _____.

DRAWING—FIGURES

[0017] FIG. 1A is the perspective view on two-purpose-pedal 80.

[0018] FIG. 1B is the top view on two-purpose-pedal 80; holes (5a, 5b, 6a, and 6b) are transparently shown using dashed lines.

[0019] FIG. 1C is the exploded view to how to attach instep-coupler 90 to two-purpose-pedal 80.

[0020] FIG. 1D is the perspective view on instep-coupler 90 fully attached to two-purpose-pedal 80.

[0021] FIG. 2A is the front perspective view on two-purpose-pedal 81.

[0022] FIG. 2B is the back perspective view on two-purpose-pedal 81.

[0023] FIG. 2C is the top view on two-purpose-pedal 81; holes (5a, 5b, 6a, and 6b) are transparently shown using dashed lines.

[0024] FIG. 3A is the top front perspective view on two-purpose-pedal 82.

[0025] FIG. 3B is the top view on two-purpose-pedal 82.

[0026] FIG. 3C is the exploded view on how to attach an instep-coupler 91 to two-purpose-pedal 82.

[0027] FIG. 3D is the perspective view on instep-coupler 91 fully attached to two-purpose-pedal 82.

DRAWINGS—REFERENCE NUMERALS

- [0028] 80 is the first embodiment of two-purpose-pedal
 [0029] 81 is the second embodiment of two-purpose-pedal
 [0030] 82 is the third embodiment of two-purpose-pedal
 [0031] 90 is the instep-coupler designed to attach to a host pedal similar to two-purpose-pedal 80
 [0032] 91 is the instep-coupler designed to attach to a host pedal similar to two-purpose-pedal 81 (1a, 1b, 1c, and 1d) are the hex nuts.
 [0033] (2a and 2b) are the washers
 [0034] (5a, 5b, 6a and 6b) are the holes
 [0035] (7a and 7b) are the holes
 [0036] (8a and 8b) are the recesses
 [0037] (9a and 9b) are the flat surfaces
 [0038] (10a and 10b) are the flat recesses
 [0039] (11a and 11b) are the bases (or the threading)
 [0040] (12a and 12b) are the threading
 [0041] (13a and 13b) are the bases
 [0042] (14a and 14b) are the posts
 [0043] 23 is the circular flat surfaces; four in total, symmetrically located on both side of the pedal body
 [0044] (31a and 31b) are the flat surfaces
 [0045] (32a and 32b) are the back branches
 [0046] (33a and 33b) are the front branches
 [0047] 35 is the pedal-stem
 [0048] 36 is the flat surface
 [0049] 39 is u-shape pedal cage

DETAILED DESCRIPTION—FIG. 1A, 1B, 1C, 1D—

First Embodiment

[0050] FIGS. 1A and 1B show that two-purpose-pedal 80 is a regular bicycle pedal by itself, designed to receive sole push-only pedaling mechanism when attached to a bicycle crank-arm. However, FIGS. 1C and 1D show that two-purpose-pedal 80 is also designed to receive instep-coupler 90 attachments, allow user to pull using the peak slope of their instep on instep-coupler 90. For detail specification on instep-coupler 90 and various instep-couplers please refer to my different patent name, "Instep-coupler for pedal", patent number: _____.

[0051] The exploded view of FIG. 1C shows instep-coupler 90 lines up at the back side of two-purpose-pedal 80; said back side of a pedal is the side of a pedal that is closest to a crank-arm when a pedal is attached to a crank arm. The drawing of FIG. 1C shows that instep-coupler 90 is respectively pointing its' bases (13a and 13b) toward holes (5a and 6a) and holes (5b and 6b) ready to insert into pedal 80. And respectively, washers (2a and 2b) and hex nuts (1a and 1b) are line up at the front side of pedal 80 waiting to secure onto threading (12a and 12b) that emerge from holes (5b and 6b).

[0052] For Instep-coupler 90 to insert into two-purpose-pedal 80, its threading (12a and 12b) would have to pass through structures of pedal body in the following order: first, pass through flat surfaces (31a and 31b), then recesses (8a and 8b), then holes (5a and 5b) on back branches (32a and 32b), then holes (6a and 6b) on front branches (33a and 33b), and finally emerge from flat surfaces (9a and 9b) respectively. FIG. 1D shows instep-coupler 90 is fully inserted into two-purpose-pedal 80, and secured by washers (2a and 2b) and hex nuts (1a and 1b) on the pedal body.

[0053] As a regular pedal, the body of two-purpose-pedal 80 has the following basic structures: pedal-stem 35 in the

middle for rotatably housing and coupling of a pedal shaft with ball bearings, four branches extend from said pedal-stem: two back branches (32a and 32b) and two front branches (33a and 33b), and U-shape pedal cage 39 continue with the front and the back branches and provide treads for both side of the pedal body.

[0054] What makes two-purpose-pedal 80 different from all other regular bicycle pedals are holes (5a, 5b, 6a, and 6b) on the pedal body. The size of the holes is designed to tightly fit the diameter of bases (13a and 13b) of instep-coupler 90. Holes (5a, and 6a) are located on back branches (32a and 32b), and holes (5b and 6b) are located on front branches (33a and 33b) respectively. Holes (5a and 5b) are collinear and sharing one central axis, and holes (6a and 6b) are collinear and sharing another central axis. The two central axes are 43 mm apart and sandwich the central axis of pedal-stem 35 in the middle. All three central axes are parallel and located on one single level plane that bisects the pedal body in the middle.

[0055] Holes having the same cross-sectional shape and sharing the same central axis are meant to be penetrated by one single straight base of an instep-coupler; they can be thinking of as one single hole. Thus, holes (5a and 5b) are considered as one single hole with total the length of 64 mm, and holes (6a and 6b) are considered as one single hole with the total length of 64 mm. In another word, we can assume holes 5a, 5b, 6a, and 6b as two parallel holes on the pedal body.

[0056] Flat surfaces (9a and 9b) on front branches (33a and 33b) surrounded the exit of holes (6a and 6b) are perpendicular to the central axis of said holes. This is important for washers (2a and 2b) or hex nuts (1a and 1b) to press against with maximum contact when they secure onto threading (12a and 12b) of instep-coupler 90 that emerges from holes (6a and 6b).

[0057] FIG. 1C shows other important features on the body of two-purpose-pedal 80: flat surface 36, flat surfaces (31a and 31b), and recesses (8a and 8b). They are designed to allow instep-coupler 90 to push further into two-purpose-pedal 80, so posts (14a and 14b) will not obstructing the tool such as wrench use in tightening or loosening the pedal shaft to or from a bicycle crank arm. Flat surface 36 and fat surfaces (31a and 31b) are 3 mm apart, and recesses (8a and 8b) are 3 mm into the pedal.

DETAILED DESCRIPTION—FIGS. 2A, 2B, 2C—

Second Embodiments

[0058] Two-purpose-pedal 81 is designed to receive an instep-coupler attachment similar to instep-coupler 90 mentioned in the first embodiment but with longer bases, because the distance from the entrance of holes (5a and 6a) to the exit of holes (5b and 6b) are farther apart respectively. This is due to front branches (33a and 33b), U-shape pedal cage 39, and pedal-stem 35 are all fused together; and the exit of holes (5b and 6b) are located on flat recesses (10a and 10b), and said flat recesses are located on pedal cage 39. The surface of flat recesses (10a and 10b) that surrounded the exit of said holes are perpendicular to the direction of said holes, so washers or hex nuts can press against with maximum contacts when hex nuts lock on to the threading of an instep-coupler that emerges

from recesses (10a and 10b). Also flat recesses (10a and 10b) provide a den for washers and hex nuts to rest on, so user will not accidentally step on them.

DETAILED DESCRIPTION—FIGS. 3A, 3B, 3C, 3D—

Third Embodiments

[0059] FIGS. 3A and 3B show two-purpose-pedal 82 has similar pedal body as the first embodiment, but the location of the holes for an instep-coupler attachment is different. Holes (7a and 7b) are parallel, perpendicular to the pedal shaft, located close to the back side of the pedal, on back branches (32a and 32b) respectively, sandwich the pedal-stem 35 in the middle, and 43 mm apart. The size of the holes is designed to tightly fit the diameter of bases (11a and 11b) of instep-coupler 91. There are four identical circular-flat-surfaces 23 symmetrically located on both side of the pedal, each surrounded one of the end of holes (7a and 7b), and perpendicular to direction of holes (7a and 7b). Since the surface of branches (32a and 32b) aren't flat, the four circular-flat-surfaces 23 will provide a nice flat surface for hex nuts (1a, 1b, 1c, and 1d) to press against with maximum contact when they lock onto threading (11a and 11b) of instep-coupler 91. Also, two washers can be added between the pedal body and said hex nuts.

[0060] The exploded view of FIG. 3C show instep-coupler 91 line up its bases (11a and 11b) to holes (7a and 7b) and ready to insert into two-purpose-pedal 82 and secure by hex nuts (1a, 1b, 1c, and 1d). FIG. 3D shows instep-coupler 91 is fully secured onto two-purpose-pedal 82 by hex nuts (1a, 1b, 1c, and 1d).

CONCLUSION, RAMIFICATIONS, AND SCOPE

[0061] While the above description contains many specificities, these should not be construed as limitations on the scope of the invention, but as exemplification of the presently preferred embodiments thereof. Many other ramifications and variations are possible within the teachings of the invention. For example, the two-purpose-pedal can have different shapes and sizes not just the one shown in the drawings, and the two holes that designed to allow an instep-coupler insertion do not have to be circular or parallel to each other. Thus, the scope of the invention should be determined by the appended claims and their legal equivalents, and not by the examples given.

1. A two-purpose-pedal is a pedal that function as a receiver for sole pushing mechanism and function as a host to receive an instep-coupler attachment, said two-purpose-pedal comprising:

- a) a pedal shaft or spindle adopted to attach to a crank-arm using one longitudinal side,
- b) a pedal body rotatably attach to the other longitudinal side of said pedal shaft, and
- c) two straight holes on said pedal body, sandwich said pedal shaft in the middle, having the size and the shape of the cross-section of a small or medium size chop-stick, said cross-section is perpendicular to the lengthwise of said chop-stick, and each of said straight holes can be disjoined with space in between.

2. The two-purpose-pedal of claim 1 wherein said two straight holes have their entrances located at the back side of said pedal body and run toward the front side of said pedal body; said back side of said pedal body is the side of said

pedal body that is facing a crank-arm and said front said of said pedal body is the side said pedal that is farthest away from said crank-arm when said two-purpose-pedal is attached to said crank-arm using said pedal shaft.

3. The two-purpose-pedal of claim 2 wherein said two straight holes have flat surface surrounding their exits, said flat surface is perpendicular to the direction of the hole that it is surrounded, providing nice flat wall for washers or hex nuts to press against with maximum contact when said hex nuts lock onto the threading of an instep-coupler that emerges from said exits of said two straight holes.

4. The two-purpose-pedal of claim 3 wherein said two straight holes are parallel to said pedal shaft.

5. The two-purpose-pedal of claim 3 wherein said two straight holes aren't parallel to each other, they become farther apart as they enter from said back side of said pedal body and continue toward said front side of said pedal body.

6. The two-purpose-pedal of claim 3 wherein said two straight holes aren't parallel to each other, they become closer to each other as they entered from said back side of said pedal body and continue toward said front side of said pedal body.

7. The two-purpose-pedal of claim 3 wherein said two straight holes either one or both have circular lateral cross-sectional shape.

8. The two-purpose-pedal of claim 3 wherein said two straight holes either one or both have elliptical lateral cross-sectional shape.

9. The two-purpose-pedal of claim 3 wherein said two straight holes either one or both have square lateral cross-sectional shape.

10. The two-purpose-pedal of claim 3 wherein said two straight holes either one or both have rectangular lateral cross-sectional shape.

11. The two-purpose-pedal of claim 3 wherein said two straight holes either one or both have triangular lateral cross-sectional shape.

12. The two-purpose-pedal of claim 1 wherein said two straight holes are perpendicular to the lengthwise of said pedal shaft, located close to the back side of said pedal-body, said back side of said pedal body is the side of said pedal body that is facing a crank-arm when said two-purpose-pedal is attached to a crank-arm using said pedal shaft.

13. The two-purpose-pedal of claim 12 wherein said two straight holes have flat surface surrounded their entrances and exits, said flat surface is perpendicular to the direction of the hole that it is surrounded allow washers and/or hex nuts to press against with maximum contact when said hex nuts lock on to the threading of an instep-coupler.

14. The two-purpose-pedal of claim 13 wherein said two straight holes are parallel to each other.

15. The two-purpose-pedal of claim 13 wherein said two straight holes aren't parallel to each other.

16. The two-purpose-pedal of claim 13 wherein said two straight holes either one or both have circular lateral cross-sectional shape.

17. The two-purpose-pedal of claim 13 wherein said two straight holes either one or both have elliptical lateral cross-sectional shape.

18. The two-purpose-pedal of claim 13 wherein said two straight holes either one or both have square lateral cross-sectional shape.

19. The two-purpose-pedal of claim 13 wherein said two straight holes either one or both have rectangular lateral cross-sectional shape.

20. The two-purpose-pedal of claim 13 wherein said two straight holes either one or both have triangular lateral cross-sectional shape.