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(54) **DISASSEMBLY/ASSEMBLY AND LOCKING STRUCTURE FOR ICE SKATING BLADE**

(57) The present disclosure discloses a locking structure for assembling and disassembling a skate, which comprises a skate bracket connected to the sole, wherein the bottom of the skate bracket is provided with a cutter groove into which a skate is inserted, one end of the cutter groove is provided with a first clamping point capable of clamping a skate hook at one end, and one end of the cutter groove far away from the first clamping point is provided with a hook accommodating cavity into which the skate hook is inserted at the other end; the hook accommodating cavity is provided with a clamping member slidable back and forth to lock the skate hook in the hook accommodating cavity, and a driving member capable of driving the clamping member to slide back and forth in the hook accommodating cavity. The present disclosure uses a folding locking wrench provided at one side of the skate bracket to drive the gear provided on the driving shaft in the skate bracket to rotate, and pushes the rack on the guide member, so that the guide member can drive the locking hook to move back and forth along the guide groove in the hook accommodating cavity, so that the locking hook can lock a second skate hook in the hook accommodating cavity, or release the second skate hook from the hook accommodating cavity, so as to achieve the purpose of easily disassembling the skate.

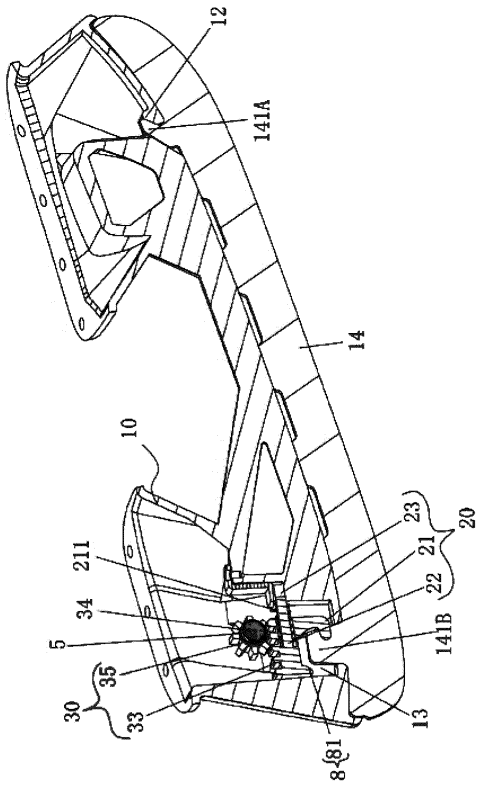

FIG. 2

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of ice racing equipment, in particular to a locking structure for assembling and disassembling a skate.

BACKGROUND

[0002] Skating is a sport that uses skates to walk or race on the ice. In winter Olympic Games, there are also many kinds of skating events, such as short-track speed skating for racing, racing speed skating and figure skating for performance. Curling and ice hockey have also appeared on the field in recent years. At the same time, countries are gradually vigorously promoting people to participate in various ice sports.

[0003] In the existing ice sports, the fierce high-speed sliding and the abrasion of skates have great influence in skating, especially in such sports as ice hockey and figure skating, where the blades are short and the longitudinal curvature is large. Whether the skates can be in the best state is very important. Therefore, at the ice hockey game or figure skating scene, it is necessary to use the gap between the games to quickly sharpen the skates without taking off the protective gear and skates. The best solution is to ensure that the skating shoes with detachable skates are in the best sharpness state. However, the existing skate replacement mechanism is very laborious and cumbersome to operate and has great potential safety problems. For example, in curling and ice hockey, it is very difficult for athletes to remove skates with thick gloves since athletes wear thick protective gear. However, removing protective gear to disassemble skates in a short gap in the competition will have many unfavorable factors for the competition, which on the one hand, may cause the adjustment to be less than optimal when wearing protective gear again, and on the other hand, may waste a lot of time. In addition, the ice residue deposited between the skates and the cutter groove in the market skates will condense after long-term sliding, which makes it difficult to remove the skates. For users who wear gloves and other protective gear, and a weak group among ordinary consumers such as women, children and the elderly, the operation when the skates need to be replaced is also very unfriendly. In order to ensure that the detachable skates are not easy to fall off in intense sports, commercially available skating shoes with replaceable skates usually uses a strong torsion spring or a high-hardness spring, so that the locking part in the disassembly and assembly of the skates can be firmly clamped with the hook on the skates, so as to ensure that there is no problem that the locking part for fixing the skates will not come loose due to the impact of external forces after the skates are installed, but it is not easy for professional ice hockey players or ordinary consumers to resist the strong torsion of the strong torsion spring or the elastic force of the spring in the process of disassembling and assembling the skates. For professional racing athletes, the time of each competition is very precious for them, and too much time cannot be wasted on changing skates. Moreover, because the parts that keep elasticity, such as springs or torsion springs, are usually made of metal, it is hard to avoid ice slag remaining in the skate bracket during skating, which easily leads to corrosion of elastic parts made of metal. In addition, due to the cold nature of sports on ice and snow, in the low temperature and rusty environment, metal is more likely to break due to sudden external force extrusion, which is very dangerous for the fierce high-speed confrontation movement.

[0004] In addition, in the prior art, there is a way to fix the skates by folding wrenches similar to those in bicycle quick-release assemblies, that is, using a hook-shaped member that can hook the hooks on the skates, and using a wrench hinged on the skate bracket at the tail of the hook-shaped member, the hook-shaped member is pressed at the top to compress the spring in the turning process, and then the hooks of the skates are released, so as to achieve the manner of quick disassembly and assembly. It is found in experiments that this method of fixing skates is very easy to cause the wrench to be turned over after the external sharp object squeezes the position of the wrench located at the bottom of the articulated shaft. Because the top pressing part of this wrench is usually designed as an eccentric wheel, it is basically inevitable that it will be turned over after being touched, which will cause very dangerous safety hazards for players or consumers who participate in high-speed skating.

[0005] Therefore, the existing locking mechanism for assembling and disassembling a skate needs to be improved urgently.

SUMMARY

[0006] The purpose of the present disclosure is to provide a locking structure for assembling and disassembling a skate, which can make users disassemble and assemble the skates more easily and quickly and can effectively and firmly lock the skates at the bottom of the skating shoes.

[0007] In order to achieve the above purpose, the present disclosure adopts the following solution: a locking structure for assembling and disassembling a skate comprises: a skate bracket connected to the sole, wherein the bottom of the skate bracket is provided with a cutter groove into which a skate is inserted, one end of the cutter groove is provided with a first clamping point capable of clamping a skate hook at one end, and one end of the cutter groove far away from the first clamping point is provided with a hook accommodating cavity into which a skate hook at the other end is inserted;

a clamping member, wherein the clamping member is provided in the hook accommodating cavity in the manner of sliding back and forth and is capable of

locking the skate hook located in the hook accommodating cavity in the hook accommodating cavity or releasing the skate hook from the hook accommodating cavity, and a guide groove is provided in the hook accommodating cavity to enable the clamping member to move back and forth in the hook accommodating cavity;

a driving member, wherein the driving member is provided on the skate bracket and located at one side of the hook accommodating cavity, and is capable of driving the clamping member to slide back and forth in the hook accommodating cavity, so that the skate hook located in the hook accommodating cavity is locked by or released from the clamping member;

a locking part, wherein the locking part is formed on the driving member and is capable of being used to cooperate with the driving member to limit the clamping member from sliding back and forth in the hook accommodating cavity.

[0008] As a further solution of the present disclosure, the clamping member is further provided with a pushing part, which, when the clamping member releases the skate hook falling out of the hook accommodating cavity, is capable of synchronously pushing the skate hook out of the hook accommodating cavity.

[0009] As a further solution of the present disclosure, the clamping member comprises a locking hook, which is movably matched with the skate hook in the hook accommodating cavity for mutually hooking together, and a guide member, which is fixedly connected to one end of the locking hook, a driving shaft is rotatably provided transversely from left to right on the skate bracket where the hook accommodating cavity is located, and the driving member is provided on the driving shaft.

[0010] As a further solution of the present disclosure, the driving member comprises a rack fixedly formed on the guide member and a gear A which is fixedly provided on the driving shaft, coaxial with the driving shaft and capable of being meshed with the rack.

[0011] As a further solution of the present disclosure, the rack is fixedly formed on the guide member.

[0012] As a preferable solution of the present disclosure, a strip-shaped groove, through which the driving shaft is capable of passing, penetrates from left to right through the side wall of the guide member, and the rack is provided on one side wall surface of the strip-shaped groove of the guide member.

[0013] As a preferable solution of the present disclosure, the driving member comprises a gear A which is fixedly provided on the driving shaft, coaxial with the driving shaft and capable of being meshed with the rack, the locking part comprises locking teeth arranged in sequence on the inner ring wall surface of the strip-shaped groove, each tooth surface of the rack coincides with adjacent tooth surfaces of the locking teeth, and the gear A is capable of moving into the strip-shaped groove to be clamped with the locking teeth when the driving shaft moves transversely, so that the gear A cannot rotate, so that the guide member cannot drive the locking hook to move back and forth in the guide groove, which effectively locks the locking hook to ensure that the skates will not be separated from the skate bracket due to the rotation of the gear A, thus avoiding the problem of breakage risk caused by using elastic parts such as springs.

[0014] As a preferable solution of the present disclosure, the driving member comprises a strip-shaped groove 31, which penetrates from left to right through the side wall of the guide member and through which the driving shaft passes, the guide member is provided with a U-shaped groove fixedly provided on one side wall surface of the strip-shaped groove, a central notch of the U-shaped groove is communicated with the strip-shaped groove 31 in the guide member, one end of the driving shaft extends into the central notch of the U-shaped groove and then passes through the strip-shaped groove, the driving shaft located in the central notch of the U-shaped groove is fixedly provided with a swing rod using the driving shaft 34 as the axis, and the swing rod squeezes the inner walls of both sides of the central notch of the U-shaped groove as the driving shaft rotates.

[0015] As a further solution of the present disclosure, the locking part comprises a clamping groove which is formed on the side wall of the inner cavity of the skate bracket and is capable of clamping the teeth of the gear A.

[0016] As a preferable solution of the present disclosure, the locking part comprises a gear B coaxial with the driving shaft and fixed on the driving shaft, and locking teeth arranged in sequence on the inner ring wall surface of the strip-shaped groove, and the gear B is capable of moving into the strip-shaped groove to be clamped with the locking teeth when the driving shaft moves transversely.

[0017] As a preferable solution of the present disclosure, the locking part comprises a polygonal block which is fixedly sleeved at one end of the driving shaft and coaxial with the driving shaft 34, the inner wall of the skate bracket where the driving shaft 34 at the end of the polygonal block is inserted is provided with a polygonal groove capable of accommodating the polygonal block, and the polygonal groove is capable of being clamped with or disengaged from the polygonal block when the driving shaft moves transversely.

[0018] As a further solution of the present disclosure, one end of the driving shaft passes through the side wall of the skate bracket, and is provided with a screwing device at the end extending out of the outer side wall surface of the skate bracket, which is capable of being turned over and opened to facilitate the rotation of the driving shaft.

[0019] As a further solution of the present disclosure, the screwing device comprises a folding locking wrench, which is hinged at the end of the driving shaft and is capable of pulling the driving shaft to axially displace when being turned over and opened, and the driving shaft

in the inner cavity of the skate bracket is provided with a reset spring capable of driving the driving shaft to reset after the folding locking wrench is turned over to be attached to the side wall of the skate bracket. One end of the reset spring is top pressed against the side wall of the inner cavity of the skate bracket, and the other end thereof is top pressed against the driving member fixed on the driving shaft. After the reset spring is turned over vertically with the folding locking wrench, it is attached to the side wall of the skate bracket, which eliminates the potential safety problem that the skates are separated after the folding locking wrench is turned over by mistake due to the impact of external force during sliding.

[0020] As a further solution of the present disclosure, a fixing part is further provided between the folding locking wrench and the outer side wall of the skate bracket, which is capable of fixing the folding locking wrench on the outer side wall of the skate bracket after the folding locking wrench is turned over and closed.

[0021] As a preferable solution of the present disclosure, the fixing part comprises a fastener provided on the outer side wall of the folding locking wrench, and a through-hole fastener formed on the outer side wall of the skate bracket into which the fastener is inserted and clamped together, respectively, wherein the fastener comprises a fastening groove formed at the tail end of the folding locking wrench and provided with an opening, the fastening groove is provided with a pressing block, one end of which extends out of the opening of the fastening groove, and the other end of which is capable of moving back and forth in the fastening groove, the pressing block extends outward from the pressing block towards the wall surface of the outer side wall of the skate bracket and is formed with a hook which is capable of being inserted into the through-hole fastener to be hooked and fixed, and a pressing spring is further provided between the pressing block and the inner side wall surface of the fastening groove, which is capable of keeping the pressing block extending outward, thus preventing the risk that the folding locking wrench is turned over during sliding due to external force.

[0022] As a preferable solution of the present disclosure, the side wall of the skate bracket is further provided with an accommodating groove capable of accommodating the folding locking wrench, so as to prevent the folding locking wrench from being opened by mistake due to collision during sliding.

[0023] As a preferable solution of the present disclosure, the guide groove is formed in the hook accommodating cavity with a high front end and a low back end, the front end of the guide groove is communicated with the hook accommodating cavity, and the back end of the guide groove is provided with a water outlet communicated with the cutter groove. The water outlet can prevent ice slag and water from existing in the guide groove and affecting the activity of the fastener.

[0024] As a further solution of the present disclosure, the pushing part comprises a top pressing member which is fixed at the bottom of the guide member, extends downwards and is capable of moving synchronously with the guide member and capable of squeezing the top of the skate hook in the hook accommodating cavity. The skate can be ejected from the cutter groove while unlocking the skate hook, thus further achieving the effect of rapidly disassembling the skates. The front bottom of the top pressing member is provided with a chamfer, which is beneficial for the top pressing member to smoothly push out the skate hook at its position.

[0025] To sum up, compared with the prior art, the present disclosure has the beneficial effects that: the present disclosure uses a folding locking wrench provided at one side of the skate bracket to drive the gear fixedly provided on the driving shaft in the skate bracket to rotate, and pushes the rack on the guide member, so that the guide member can drive the locking hook to move back and forth along the guide groove in the hook accommodating cavity, so that the locking hook can lock a skate hook in the hook accommodating cavity, or release the skate hook from the hook accommodating cavity, so as to achieve the purpose of easily disassembling the skate. The locking part is provided on the driving shaft, which can limit the rotation of the driving member, so that the locking hook cannot be separated from the skate hook. The folding locking wrench which can be completely attached to the skate bracket is matched to achieve the manner of locking the skate extremely safely and firmly, so that the situation that the folding locking wrench is accidentally opened after being touched by an external object in high-speed sliding is avoided, ensuring that the locking hook cannot be displaced again after locking the skate hook, and completely locking the skate on the skating shoes. The method of preventing falling off by using elastic parts such as springs to clamp the locking part to the hook on the skate is omitted, which is not only more convenient, fast and reliable, but also more friendly to users such as women and children with less strength. The skate can be unlocked and fixed independently and easily without too much force, and the skate can be ejected from the cutter groove while unlocking the skate hook, thus further achieving the effect of rapidly disassembling the skates. Even users wearing gloves and other protective devices or users with insufficient strength can easily disassemble the skates.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026]

Figure 1 is a three-dimensional schematic diagram of the first embodiment of the present invention.

Figure 2 is a schematic diagram of the side profile of the first embodiment of the present invention.

Figure 3 is one of the front end sectional diagrams of the first embodiment of the present invention.

Figure 4 is a schematic diagram of the second front end section of the first embodiment of the present

invention.

Figure 5 is an enlarged schematic diagram at E in Figure 3.

Figure 6 is an enlarged schematic diagram at position F in Figure 4.

Figure 7 is one of the three-dimensional schematic diagrams of the second embodiment of the present invention.

Figure 8 is a three-dimensional schematic diagram of the second embodiment of the present invention.

Figure 9 is a cross-sectional schematic diagram of the driving component and the clamping component in the second embodiment of the present invention.

Figure 10 shows the composition of the driving component, clamping component, screwing device, and locking part in the second embodiment of the present invention.

Figure 11 is a cross-sectional schematic diagram of the driving component, clamping component, screwing device, and locking part in the second embodiment of the present invention.

Figure 12 is an enlarged schematic diagram at position A in Figure 11.

Figure 13 is a cross-sectional schematic diagram of the driving component and the clamping component in the third embodiment of the present invention.

Figure 14 is a exploded schematic diagram of the driving component, clamping component, screwing device, and locking part in the third embodiment of the present invention.

Figure 15 is an enlarged schematic diagram at position B in Figure 14.

Figure 16 is a cross-sectional schematic diagram of another embodiment of the driving element, clamping element, screwing device, and locking part in the third embodiment of the present invention.

Figure 17 is a exploded schematic diagram of another implementation method of the driving component, clamping component, screwing device, and locking part in the third embodiment of the present invention.

Figure 18 is an enlarged schematic diagram at position C in Figure 16.

Figure 19 is an enlarged schematic diagram at D in Figure 17.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0027] The following detailed description provides many different embodiments or examples for implementing the present disclosure. Of course, these are only embodiments or examples and are not intended to be limiting. In addition, in different embodiments, repeated reference numbers may be used, such as repeated numbers and/or letters. These repetitions are for simple and clear description of the present disclosure, and do not mean that there is a specific relationship between the different embodiments and/or structures discussed.

[0028] In addition, space-related terms may be used, such as "under ...", "lower side", "from inside to outside", "above", "upper side" and similar terms. In order to describe the relationship between one element or feature and another element or feature in the drawing, these space-related terms include different orientations of devices in use or in operation, as well as the orientations described in the drawing. If the device may be rotated by 90 degrees in different orientations or other orientations, the space-related adjectives used therein can also be interpreted in the same way, so that they cannot be understood as limitations of the present disclosure. The terms "first" and "second" are only used for descriptive purposes, but cannot be understood as indicating or implying relative importance or implicitly indicating the number of indicated technical features. Thus, the features defined with "first" and "second" may explicitly or implicitly include one or more of the features.

[0029] The present disclosure will be further described with reference to the accompanying drawings and specific embodiments. The first embodiment of the locking structure for assembling and disassembling a skate as shown in FIGS. 1 to 6 comprises: a skate bracket 10 connected to the sole, wherein the bottom of the skate bracket 10 is provided with a cutter groove 11 into which a skate 14 is inserted, one end of the cutter groove 11 is provided with a first clamping point 12 capable of clamping a skate hook 141A at one end, and one end of the cutter groove 11 far away from the first clamping point 12 is provided with a hook accommodating cavity 13 into which a skate hook 141B at the other end is inserted; in this embodiment, the first clamping point 12 is integrally formed in the skate bracket 10 when the skate bracket 10 is injection molded;

a clamping member 20, wherein the clamping member 20 is provided in the hook accommodating cavity 13 in the manner of sliding back and forth and is capable of locking the skate hook 141B located in the hook accommodating cavity 13 in the hook accommodating cavity 13 or releasing the skate hook 141B from the hook accommodating cavity 13, and a guide groove 23 is provided in the hook accommodating cavity 13 to enable the clamping member 20 to move back and forth in the hook accommodating cavity 13;

a driving member 30, wherein the driving member 30 is provided on the skate bracket 10 and located at one side of the hook accommodating cavity 13, and is capable of driving the clamping member 20 to slide back and forth in the hook accommodating cavity 13, so that the skate hook located in the hook accommodating cavity 13 is locked by or released from the clamping member 20; by rotating the driving member 30, the clamping member 20 is driven to release the skate hook 141B when moving forward, and lock and fix the skate hook 141B when the clamping member 20 moves backward, so that it

cannot fall off from the hook accommodating cavity 13;

a locking part 6, wherein the locking part 6 is formed on the driving member 30 and is capable of being used to cooperate with the driving member 30 to prevent the clamping member 20 from sliding back and forth in the hook accommodating cavity 13.

[0030] In addition, the clamping member 20 is further provided with a pushing part 8, which, when the clamping member 20 releases the skate hook 141B falling out of the hook accommodating cavity 13, is capable of synchronously pushing the skate hook out of the hook accommodating cavity 13, so that the skate 14 is disassembled faster, and the difficulty of disassembling the skate 14 in the cutter groove 11 due to the blockage of the ice slag will be prevented, which will affect the time for replacing the skate.

[0031] The clamping member 20 comprises: a locking hook 21, which is movably matched with the skate hook 141B in the hook accommodating cavity 13 for mutually hooking together, a guide member 22, which is fixedly connected to one end of the locking hook 21, and a driving shaft 34, which is rotatably provided transversely from left to right on the skate bracket 10 where the hook accommodating cavity is located, and the driving member 30 is provided on the driving shaft 34.As shown in FIG. 2 and FIG. 3, the guide member 22 in this embodiment is a long square block, the bottom of which is fixedly and integrally formed with a locking hook 21 bent backward. The shape of the locking hook 21 matches the shape of the skate hook 141B. In this embodiment, if the hook of the skate hook 141B is bent forward, the locking hook 21 is bent backward. If the hook of the skate hook 141B is bent backward, the locking hook 21 is bent forward. The bending direction of the locking hook 21 will also change according to the shape of the skates actually matched. One end of the guide member 22 on the locking hook 21 is inserted into the guide groove 23 and can move back and forth in the guide groove 23. The guide groove 23 can be provided at the front end of the guide member 22 or at the rear of the guide member 22. It should be noted that in this embodiment, when the guide groove 23 is provided at the rear of the guide member 22, the tail end of the guide groove is an open water outlet, which is communicated with the cutter groove 11. At this time, the bottom surface of the inner cavity of the guide groove 23 is a slope surface with a high front end and a low back end, so that the ice slag and water entering the hook accommodating cavity 13 can be better removed, so as to prevent the ice slag and water from freezing in the guide groove 23 and affect the activities of the guide member 22. When the guide groove is provided at the front end of the guide member 22, there is no need to provide a water outlet and a slope surface with a high front end and a low back end. In this embodiment, the skate 14 is first inserted into the cutter groove 11, in which the skate hook 141A is aligned with the first clamping point 12 for clamping, and the skate hook 141B is turned over and inserted into the hook accommodating cavity 13. By rotating the driving shaft 34, the driving member 30 provided thereon drives the guide member 22 with the locking hook 21 at the bottom to move back and forth in the hook accommodating cavity 13. During the moving process, the locking hook 21 is hooked with or released from the skate hook 141B inserted into the hook accommodating cavity 13, so that the skate 14 is locked in the cutter groove 11 or released from the cutter groove 11.

[0032] FIG. 2 to FIG. 6 show the embodiment of the driving member 30. The driving member comprises a rack 33 fixedly formed on the guide member 22; and a gear A 35 which is fixedly provided on the driving shaft 34, coaxial with the driving shaft 34 and capable of being meshed with the rack 33. The rack 33 is fixedly formed on the bottom surface of the guide member 22. In addition, one end of the driving shaft 34 passes through the side wall of the skate bracket 10, and is provided with a screwing device 4 at the end extending out of the outer side wall surface of the skate bracket 10, which is capable of being turned over and opened to facilitate the rotation of the driving shaft 34.

[0033] FIG. 1, FIG. 3 to FIG. 6 show the embodiment of the screwing device 4. The screwing device 4 comprises a folding locking wrench 41, which is hinged at the end of the driving shaft 34 and is capable of pulling the driving shaft 34 to axially displace when being turned over and opened, and the driving shaft 34 in the inner cavity of the skate bracket 10 is provided with a reset spring 5 capable of driving the driving shaft 34 to reset after the folding locking wrench 41 is turned over to be parallel to the side wall of the skate bracket 10. In this embodiment, one end of the reset spring 5 is top pressed against the side wall of the inner cavity of the skate bracket 10, and the other end thereof is top pressed against the gear A35 (the driving member 30) which is fixed to the driving shaft 34. One end of the reset spring 5 is top pressed against the side wall of the inner cavity of the skate bracket 10, and the other end is top pressed against the gear A35 (the driving member 30) fixed on the driving shaft 34. In this embodiment, the hinging manner of the folding locking wrench 41 can be implemented with reference to the state shown in FIG. 1 and FIGS. 3 to 6. The folding locking wrench 41 is a long strip-shaped flip sheet with a rectangular notch at its bottom. The driving shaft 34 is hinged in the rectangular notch, and the position should be close to the middle of the flip sheet in the rectangular notch, so that when the folding locking wrench 41 is turned over and opened, the driving shaft 34 can be pulled to move axially toward the side wall surface of the skate bracket 10 where the folding locking wrench 41 is located (refer to FIG. 3 and FIG. 5). At this time, the reset spring 5 is compressed, and the reset spring 5 is released when the folding locking wrench 41 is turned over to be attached to the side wall and parallel to the outer wall surface of the side of the skate bracket 10. The driving shaft 34 can be axially displaced to the

other side of the skate bracket 10. The side wall of the folding locking wrench 41 is attached to the side wall of the skate bracket 10 (refer to FIG. 1, FIG. 4 and FIG. 6), and the attached state is maintained, so that the folding locking wrench 41 of the skating shoes is prevented from being touched and hit during sliding. As can be seen from FIG. 1, FIG. 3 to FIG. 6, in this embodiment, the side wall of the skate bracket 10 where the folding locking wrench 41 is located is provided with an accommodating groove 411, which can accommodate the folding locking wrench 41 in the closed state. The diameter width of the accommodating groove 411 at the position where the driving shaft 34 passes through is larger than the width of the folding locking wrench 41, while the shape of the accommodating groove 411 above the driving shaft 34 is basically the same as the length, width and height of the folding locking wrench 41, and are just slightly larger than the length, width and height of the folding locking wrench 41 by 1MM, so that the folding locking wrench 41 can be further locked to prevent accidental rotation. In actual use, compared with an eccentric wheel-shaped flip folding wrench used in bicycles, in this embodiment, when the folding locking wrench 41 is turned over to be parallel to the side wall of the skate bracket 10, the contact surface of the screwing device 4 and the skate bracket 10 can be completely attached to the side wall of the skate bracket 10, reducing the risk that the folding locking wrench 41 is easily turned over by mistake due to the impact of external force, and increasing the safety of the locking structure for assembling and disassembling a skate.

[0034] As shown in FIG. 4 to FIG. 6, in this embodiment, the locking part 6 comprises a clamping groove 60 which is formed on the side wall of the inner cavity of the skate bracket 10 and is capable of clamping the teeth of the gear A 35.The clamping groove 60 can clamp the teeth of the gear A35. When the driving shaft 34 is turned over to be in the closed state by the folding locking wrench 41 (refer to FIG. 1, FIG. 4 and FIG. 6), the reset spring 5 is released, so that the driving shaft 34 drives the gear A35 which is coaxial with the driving shaft and capable of being meshed with the rack 33 to move away from the direction where the folding locking wrench 41 is located. The clamping groove 60 which is provided on the wall surface of the inner cavity of the skate bracket 10 away from the side where the folding locking wrench 41 is located just catches the teeth of the shifted gear A35, limiting the rotation of the gear A35. As can be seen from FIGS. 5 and 6, in this embodiment, the width of the gear A35 is greater than the displacement distance. Therefore, at this time, after the locking hook 21 and the skate hook 141B inserted into the hook accommodating cavity 13 are hooked, the teeth of the gear A35 will not be separated from the rack 33 by the left-right displacement of the gear A35. That is, when the gear A35 is displaced into the clamping groove 60, the teeth at the bottom of the gear A35 are clamped into the clamping groove 60 and the teeth of the rack 33 at the same time. Finally, the folding locking wrench 41 is accommodated in the accommodating groove 411 so that it cannot rotate, so as to achieve the state of completely locking the skate 14. On the contrary, the locking hook 21 is removed from the skate hook 141B to achieve the purpose of releasing and unlocking the skate 14. In addition, in repeated experiments and feedback from users, it is found that after a long time of skating, when it is necessary to change the skate to sharpen the skate or replace the skate, the ice residue remaining in the cutter groove 11 will be condensed between the skate 14 and the cutter groove 11, which sometimes makes it difficult to remove the skate by hand, especially when wearing gloves and other protective gear. Therefore, when the skate 14 is unlocked in this embodiment, the pushing part 8 on the clamping member 20 can push the skate hook 141B out of the hook accommodating cavity 13 synchronously while unlocking the skate hook 141B, thus further realizing the effect of rapidly disassembling the skate. Specifically, as shown in FIG. 2, the pushing part 8 comprises a top pressing member 81 which is fixed at the bottom of the guide member 22 and extends downwards. The front bottom of the top pressing member 81 is provided with a chamfer (in this embodiment, the inverted arc angle is taken as an example), and the chamfer is used to squeeze the rear end of the top of the skate hook 141B during the synchronous movement of the top pressing member 81 along with the forward movement of the guide member 22, so that the skate hook 141B is forced to move downward. At this time, since the skate hook 141A at one end of the skate 14 is still clamped at the first clamping point 12, the skate 14 squeezes the back end of the top of the skate hook 141B by the top pressing member 81, and the skate will be turned over downward with the first clamping point 12 as the axis (refer to FIG. 3). After the back end of the skate 14 is pushed out of the cutter groove 11, it can be easily removed. With this design, the skate 14 will be disassembled faster, preventing the skate 14 from being difficult to be disassembled due to the blockage of ice slag in the cutter groove 11, which not only greatly shortens the time for replacing the skate, but also can be used more friendly for users who wear gloves and other protective devices or users with less strength.

[0035] FIG. 7 to FIG. 12 show a second embodiment of a locking structure for assembling and disassembling a skate of the present disclosure. It can be clearly seen from the figure that this embodiment is basically the same as the first embodiment, except that the formation of the guide member 22 is different from the implementation of the driving member 30 and the locking part 6. In this embodiment, a strip-shaped groove 31, through which the driving shaft 34 is capable of passing, penetrates through the side wall of the guide member 22 from the left to the right. The driving member 30 comprises a rack 33 fixedly formed on the guide member 22 and is located on a side wall surface of the bottom plane of the strip-shaped groove 31. A gear A35 is fixedly provided on the driving shaft 34, which is coaxial with the driving shaft 34 and

can be meshed with the rack 33. In this embodiment, both ends of the driving shaft 34 are rotatably fixed on the left and right side wall surfaces of the skate bracket 10. After the skate hook 141B on the top of the skate 14 is inserted into the hook accommodating cavity 13, the driving shaft 34 is rotated, and the gear A35 will rotate synchronously. Because the gear A35 is meshed with the rack 33, the rack 33 will be driven to move when the gear A35 rotates, thus causing a backward displacement in the guide groove 23. Immediately at the same time, the guide member 22 drives the locking hook 21 to move backward in the hook accommodating cavity 13. In this way, the hook tongue of the locking hook 21 will move towards the direction of the skate hook 141B, until the two hooks will hold each other after the hook tongue of the skate hook 141B is hooked. At this time, the locking of the skate 14 is completed. When unlocking, the driving shaft 34 can be rotated counterclockwise by the folding locking wrench 41, so that the skate 14 can be unlocked and released. The locking part 6 comprises locking teeth 32 arranged in sequence on the inner ring wall surface of the strip-shaped groove 31, each tooth surface of the locking teeth 32 at the top coincides with each tooth surface of the rack 33, and the gear A 35 is capable of being clamped with the locking teeth 32 extending into the strip-shaped groove 31. After the folding locking wrench 41 is turned over horizontally (the "horizontal turning over" of the folding locking wrench 41 in this embodiment uses the angle shown in FIGS. 7, FIG. 10 to FIG. 12 as an example, that is, the open state of the folding locking wrench 41). Due to the displacement of the driving shaft 34, the gear A35 on the driving shaft 34 will move out of the strip-shaped groove 31 having the locking teeth 32 at the same time, and then is meshed with the rack 33. The folding locking wrench 41 is rotated to unlock, install and fix the skate. When the folding locking wrench 41 is turned over to the vertical state (the "vertical" of the folding locking wrench 41 in this embodiment uses the angle shown in FIGS. 7, FIG. 10 to FIG. 12 as an example, that is, the closed state of the folding locking wrench 41), the reset spring 5 (one end of the reset spring 5 in this embodiment is top pressed against the side wall of the inner cavity of the skate bracket 10, and the other end thereof is top pressed against the gear A35 (the driving member 30) fixed on the driving shaft 34) will make the gear A35 re-enter the strip-shaped groove 31 with the locking teeth 32. As the upper and lower tooth surfaces of the gear A35 are meshed with the locking teeth 32 at the upper and lower positions in the strip-shaped groove 31, respectively, the gear A35 will be locked and cannot rotate at the present stage. Similarly, the guide member 22 will not be able to displace back and forth in the guide groove 23, which effectively ensures that the hook tongue of the locking hook 21 and the hook tongue of the skate hook 141B will not be separated from each other, and ensures the safety of athletes wearing skating shoes in fierce high-speed sliding. In this embodiment, no matter whether the folding locking wrench 41 is turned over or the gear A35 is rotated by the folding locking wrench 41 to drive the locking hook 21 to move back and forth, the disassembly and assembly of the skate can be realized without too much force, and the disassembly and assembly of the skate can be completed more quickly, which greatly saves time.

[0036] FIG. 13 to FIG. 19 show a third embodiment of the locking structure for assembling and disassembling a skate of the present disclosure. It can be clearly seen from the figure that this embodiment is basically the same as the first embodiment, except that the formation of the guide member 22 is different from the implementation of the driving member 30 and the locking part 6. A strip-shaped groove 31 penetrates through the side wall of the guide member 22 from left to right, through which the driving shaft 34 passes. A U-shaped groove 36 is fixedly provided on one side of the guide member 22 adjacent to the folding locking wrench 41. A central notch 361 of the U-shaped groove 36 is communicated with the strip-shaped groove 31 on the guide member 22. The driving shaft 34 rotatably provided transversely from left to right on the skate bracket 10 and passing through the driving shaft 34 of the strip-shaped groove 31 can also pass through the central notch 361 of the U-shaped groove 36. A swing rod 37 is provided on the driving shaft 34 at the central notch of the U-shaped groove 36. When the folding locking wrench 41 drives the driving shaft 34 to rotate counterclockwise or clockwise, the swing rod 37 can perform swinging action with the driving shaft 34 as the axis. While swinging along with the driving shaft 34, the swing rod 37 squeezes the left and right inner walls of the central notch of the U-shaped groove 36, forcing the U-shaped groove 36 to drive the guide member 22 to move back and forth along the guide groove 23, and completing the hooking or separating of the locking hook 21 and the skate hook 141B. However, the locking part 6 in this embodiment can be the same as the locking part 6 in the previous embodiment. Alternatively, a gear B is provided, which is coaxial with the driving shaft 34 and fixed on the driving shaft 34. Locking teeth 32 are arranged in sequence on the inner ring wall surface of the strip-shaped groove 31. The gear B and the locking teeth 32 are clamped with each other when the driving shaft 34 is displaced transversely into the strip-shaped groove 31. The gear B is formed on the side of the swing rod 37 and the gear A35 adjacent to the guide member 22, and is similarly fixedly sleeved on the driving shaft 34 and coaxial with the driving shaft 34. When the folding locking wrench 41 is turned over to the same vertical state as the side wall of the skate bracket 10 (the "vertical state" of the folding locking wrench 41 in this embodiment uses the angle shown in FIGS. 14 to 19 as an example, that is, the closed state of the folding locking wrench 41), the swing rod 37, the gear 35 and the gear B move along the axial direction of the driving shaft 34 with the driving shaft 34. At this time, the gear A35 and the gear B enter the strip-shaped groove 31 and are clamped with the locking teeth 32 to lock the guide member 22, so that it cannot

move back and forth in the guide groove 23. On the contrary, the folding locking wrench 41 is turned over to be vertical or horizontal to the side wall of the skate bracket 10 (the "horizontal state" of the folding locking wrench 41 in this embodiment uses the angle shown in FIGS. 14 to 19 as an example, that is, the open state of the folding locking wrench 41). Of course, it should be noted that the shape of the U-shaped groove 36 in this embodiment is not limited to U-shape, but also can be provided as an oval shape with a long top side and a long bottom side. In addition, it should also be noted that FIGS. 10 to 13 also show another embodiment of the locking part 6 based on this embodiment. A polygonal block 61 coaxial with the driving shaft 34 is fixedly sleeved at one end of the driving shaft 34 away from the folding locking wrench 41. The inner wall of the skate bracket 10 into which the driving shaft 34 at the end where the polygonal block 61 is located is inserted is also provided with a polygonal groove 62, which can accommodate the polygonal block 61. When the folding locking wrench 41 is turned over to be in the same vertical state as the side wall of the skate bracket 10, the driving shaft 34 moves in the direction of the polygonal groove 62 along the axial direction of the driving shaft 34. At this time, the polygonal block 61 is inserted into the polygonal groove 62, and the swing rod 37 and the driving shaft 34 are locked so that they cannot be reversed, achieving the effect that the locking hook 21 and the skate hook 141B hooked therewith are locked and cannot be separated from each other. On the contrary, when the folding locking wrench 41 is turned over to be vertical to the side wall of the skate bracket 10, the guide member 22 can be unlocked, so that the locking hook 21 can be separated from its hooked skate hook 141B, and the purpose of detaching the skate can be achieved. Of course, another embodiment of the locking part 6 in this embodiment can also be implemented in combination with the first embodiment of the present disclosure, that is, the polygonal groove 62 provided on the inner wall of the skate bracket 10 is used to replace the clamping groove 60 in the first embodiment, and the polygonal block 61 coaxial with the end of the driving shaft 34 is matched to replace the locking part 6 in the first embodiment.

[0037] In the embodiment of the present disclosure, a return spring 211 can also be provided at one end of the locking hook 21, one end of the return spring 211 is top pressed and fixed on the side wall end of the locking hook 21, and the other end thereof is top pressed and fixed on the inner wall of the hook accommodating cavity 13. When the locking hook 21 and the skate hook 141B are released, the return spring 211 can automatically rebound the locking hook 21, reducing the manual screwing time.

[0038] In addition, as shown in FIG. 8 and FIG. 12, in the above embodiment, a fixing part 7 is further provided between the folding locking wrench 41 and the outer side wall of the skate bracket 10, wherein the fixing part is capable of fixing the folding locking wrench 41 on the outer side wall of the skate bracket 10 after the folding locking wrench is turned over vertically. In one embodiment, the fixing part 7 comprises a fastener 71 provided on the outer side wall of the folding locking wrench 41, and a through-hole fastener 70 formed on the outer side wall of the skate bracket 10 into which the fastener 71 is inserted and clamped together, respectively. The fastener 71 comprises a fastening groove 72 formed at the tail end of the folding locking wrench 41 and provided with an opening, the fastening groove 72 is provided with a pressing block 73, one end of which extends out of the opening of the fastening groove 72, and the other end of which is capable of moving back and forth in the fastening groove 72, the pressing block 73 extends outward from the pressing block 73 towards the wall surface of the outer side wall of the skate bracket 10 and is formed with a hook 74 which is capable of being inserted into the through-hole fastener 70 to be hooked and fixed, and a pressing spring 75 is further provided between the pressing block 73 and the inner side wall surface of the fastening groove 72, which is capable of keeping the pressing block 73 extending outward. In this embodiment, after the hook 74 extends into the through-hole fastener 70, the hook is hooked on the inner side wall surface of the skate bracket 10. Because the pressing spring 75 will top press the pressing block 73 toward the opening direction of the fastening groove 72, and the hook body of the fastener will also face the opening direction of the fastening groove 72, at this time, the fastener will be firmly hooked in the through-hole fastener 70, thus preventing the hidden danger that the folding locking wrench 41 will be turned over or opened after accidental collision during sliding. Alternatively, another embodiment of the fixing part 7 comprises magnets which are respectively provided on the outer side walls of the folding locking wrench 41 and the skate bracket 10 and can be mutually attracted together. By the mutual attraction of the magnets, the effect of preventing the folding locking wrench 41 from being turned over or opened after accidental collision during sliding can also be achieved. The state after the folding locking wrench 41 is vertically turned over in the above embodiment is the overlapping state that the side wall of the folding locking wrench 41 is adhered to the wall surface of the accommodating groove 411 on the outer side wall surface of the skate support 10 (refer to the attached drawing for details).

[0039] It should be noted that the above embodiment is not the only way, and the combination of the locking part 6 and the driving member 30 can be combined according to actual use.

[0040] The basic principles, main features and advantages of the present disclosure have been shown and described above. Those skilled in the art should know that the present disclosure is not limited by the above embodiments. What is described in the above embodiments and descriptions only illustrates the principles of the present disclosure. There will be various changes and improvements of the present disclosure without de-

parting from the spirit and scope of the present disclosure, all of which fall within the scope of the claimed present disclosure. The scope of the claimed present disclosure is defined by the append claims and their equivalents.

Claims

1. A locking structure for assembling and disassembling a skate, comprising:

   a skate bracket (10) connected to the sole, wherein the bottom of the skate bracket (10) is provided with a cutter groove (11) into which a skate is inserted, one end of the cutter groove (11) is provided with a first clamping point (12) capable of clamping a skate hook at one end, and one end of the cutter groove (11) far away from the first clamping point (12) is provided with a hook accommodating cavity (13) into which a skate hook at the other end is inserted;
   a clamping member (20), wherein the clamping member (20) is provided in the hook accommodating cavity (13) in the manner of sliding back and forth and is capable of locking the skate hook located in the hook accommodating cavity (13) in the hook accommodating cavity (13) or releasing the skate hook from the hook accommodating cavity (13), and a guide groove (23) is provided in the hook accommodating cavity (13) to enable the clamping member (20) to move back and forth in the hook accommodating cavity (13);
   a driving member (30), wherein the driving member (30) is provided on the skate bracket (10) and located at one side of the hook accommodating cavity (13), and is capable of driving the clamping member (20) to slide back and forth in the hook accommodating cavity (13), so that the skate hook located in the hook accommodating cavity (13) is locked by or released from the clamping member (20);
   a locking part (6), wherein the locking part (6) is formed on the driving member (30) and is capable of being used to cooperate with the driving member (30) to limit the clamping member (20) from sliding back and forth in the hook accommodating cavity (13).

2. The locking structure for assembling and disassembling a skate according to claim 1, wherein the clamping member (20) is further provided with a pushing part (8), which, when the clamping member (20) releases the skate hook falling out of the hook accommodating cavity (13), is capable of synchronously pushing the skate hook out of the hook accommodating cavity (13).

3. The locking structure for assembling and disassembling a skate according to claim 2, wherein the clamping member (20) comprises a locking hook (21), which is movably matched with the skate hook in the hook accommodating cavity (13) for mutually hooking together, and a guide member (22), which is fixedly connected to one end of the locking hook (21), a driving shaft (34) is rotatably provided transversely from left to right on the skate bracket (10) where the hook accommodating cavity (13) is located, and the driving member (30) is provided on the driving shaft (34).

4. The locking structure for assembling and disassembling a skate according to claim 3, wherein the driving member (30) comprises a rack (33) fixedly formed on the guide member (22) and a gear A (35) which is fixedly provided on the driving shaft (34), coaxial with the driving shaft (34) and capable of being meshed with the rack (33).

5. The locking structure for assembling and disassembling a skate according to claim 4, wherein the rack (33) is fixedly formed on the guide member (22).

6. The locking structure for assembling and disassembling a skate according to claim 4, wherein a strip-shaped groove (31), through which the driving shaft (34) is capable of passing, penetrates from left to right through the side wall of the guide member (22), and the rack (33) is provided on one side wall surface of the strip-shaped groove (31) of the guide member (22).

7. The locking structure for assembling and disassembling a skate according to claim 6, wherein the driving member (30) comprises a gear A (35) which is fixedly provided on the driving shaft (34), coaxial with the driving shaft (34) and capable of being meshed with the rack (33), the locking part (6) comprises locking teeth (32) arranged in sequence on the inner ring wall surface of the strip-shaped groove (31), each tooth surface of the rack (33) coincides with adjacent tooth surfaces of the locking teeth (32), and the gear A (35) is capable of moving into the strip-shaped groove (31) to be clamped with the locking teeth (32) when the driving shaft (34) moves transversely.

8. The locking structure for assembling and disassembling a skate according to claim 3, wherein the driving member (30) comprises a strip-shaped groove (31), which penetrates from left to right through the side wall of the guide member (22) and through which the driving shaft (34) passes, the guide member (22) is provided with a U-shaped groove (36) fixedly provided on one side wall surface of the strip-shaped groove (31), a central notch of the U-shaped groove (36) is communicated with the strip-shaped groove

(31) in the guide member (22), one end of the driving shaft (34) extends into the central notch of the U-shaped groove (36) and then passes through the strip-shaped groove (31), the driving shaft (34) located in the central notch of the U-shaped groove (36) is fixedly provided with a swing rod (37) using the driving shaft (34) as the axis, and the swing rod (37) squeezes the inner walls of both sides of the central notch of the U-shaped groove (36) as the driving shaft (34) rotates.

9. The locking structure for assembling and disassembling a skate according to claim 5, wherein the locking part (6) comprises a clamping groove (60) which is formed on the side wall of the inner cavity of the skate bracket (10) and is capable of clamping the teeth of the gear A (35).

10. The locking structure for assembling and disassembling a skate according to claim 6 or 8, wherein the locking part (6) comprises a gear B coaxial with the driving shaft (34) and fixed on the driving shaft (34), and locking teeth (32) arranged in sequence on the inner ring wall surface of the strip-shaped groove (31), and the gear B is capable of moving into the strip-shaped groove (31) to be clamped with the locking teeth (32) when the driving shaft (34) moves transversely.

11. The locking structure for assembling and disassembling a skate according to claim 6 or 8, wherein the locking part (6) comprises a polygonal block (61) which is fixedly sleeved at one end of the driving shaft (34) and coaxial with the driving shaft (34), the inner wall of the skate bracket (10) where the driving shaft (34) at the end of the polygonal block (61) is inserted is provided with a polygonal groove (62) capable of accommodating the polygonal block (61), and the polygonal groove (62) is capable of being clamped with or disengaged from the polygonal block (61) when the driving shaft (34) moves transversely.

12. The locking structure for assembling and disassembling a skate according to claim 3, wherein one end of the driving shaft (34) passes through the side wall of the skate bracket (10), and is provided with a screwing device (4) at the end extending out of the outer side wall surface of the skate bracket (10), which is capable of being turned over and opened to facilitate the rotation of the driving shaft (34).

13. The locking structure for assembling and disassembling a skate according to claim 12, wherein the screwing device (4) comprises a folding locking wrench (41), which is hinged at the end of the driving shaft (34) and is capable of pulling the driving shaft (34) to axially displace when being turned over and opened, and the driving shaft (34) in the inner cavity of the skate bracket (10) is provided with a reset spring (5) capable of driving the driving shaft (34) to reset after the folding locking wrench (41) is turned over to be attached to the side wall of the skate bracket (10).

14. The locking structure for assembling and disassembling a skate according to claim 13, wherein a fixing part (7) is further provided between the folding locking wrench (41) and the outer side wall of the skate bracket (10), which is capable of fixing the folding locking wrench (41) on the outer side wall of the skate bracket (10) after the folding locking wrench is turned over and closed.

15. The locking structure for assembling and disassembling a skate according to claim 14, wherein the fixing part (7) comprises a fastener (71) provided on the outer side wall of the folding locking wrench (41), and a through-hole fastener (70) formed on the outer side wall of the skate bracket (10) into which the fastener (71) is inserted and clamped together, respectively, wherein the fastener (71) comprises a fastening groove (72) formed at the tail end of the folding locking wrench (41) and provided with an opening, the fastening groove (72) is provided with a pressing block (73), one end of which extends out of the opening of the fastening groove (72), and the other end of which is capable of moving back and forth in the fastening groove (72), the pressing block (73) extends outward from the pressing block (73) towards the wall surface of the outer side wall of the skate bracket (10) and is formed with a hook (74) which is capable of being inserted into the through-hole fastener (70) to be hooked and fixed, and a pressing spring (75) is further provided between the pressing block (73) and the inner side wall surface of the fastening groove (72), which is capable of keeping the pressing block (73) extending outward.

16. The locking structure for assembling and disassembling a skate according to any of claims 13 to 15, wherein the side wall of the skate bracket (10) is further provided with an accommodating groove (411) capable of accommodating the folding locking wrench (41).

17. The locking structure for assembling and disassembling a skate according to claim 3, wherein the guide groove (23) is formed in the hook accommodating cavity (13) with a high front end and a low back end, the front end of the guide groove (23) is communicated with the hook accommodating cavity (13), and the back end of the guide groove (23) is provided with a water outlet communicated with the cutter groove (11).

18. The locking structure for assembling and disassembling a skate according to claim 3, wherein the pushing part (8) comprises a top pressing member (81) which is fixed at the bottom of the guide member (22), extends downwards and is capable of moving synchronously with the guide member (22) and capable of squeezing the top of the skate hook in the hook accommodating cavity (13), and the front bottom of the top pressing member (81) is provided with a chamfer.

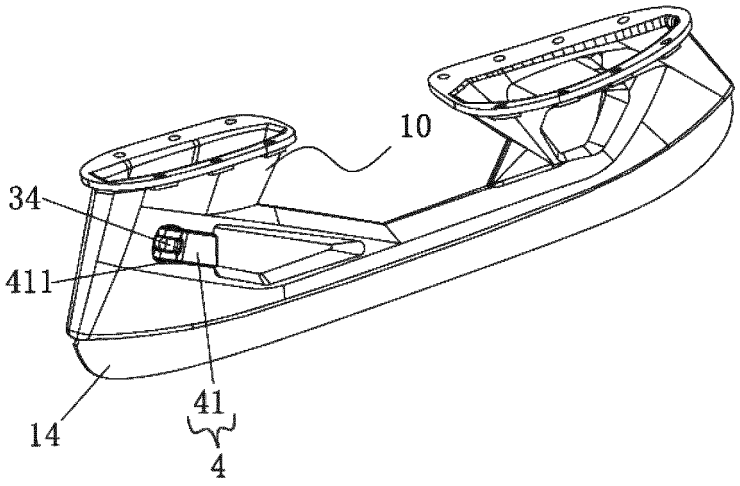

FIG. 1

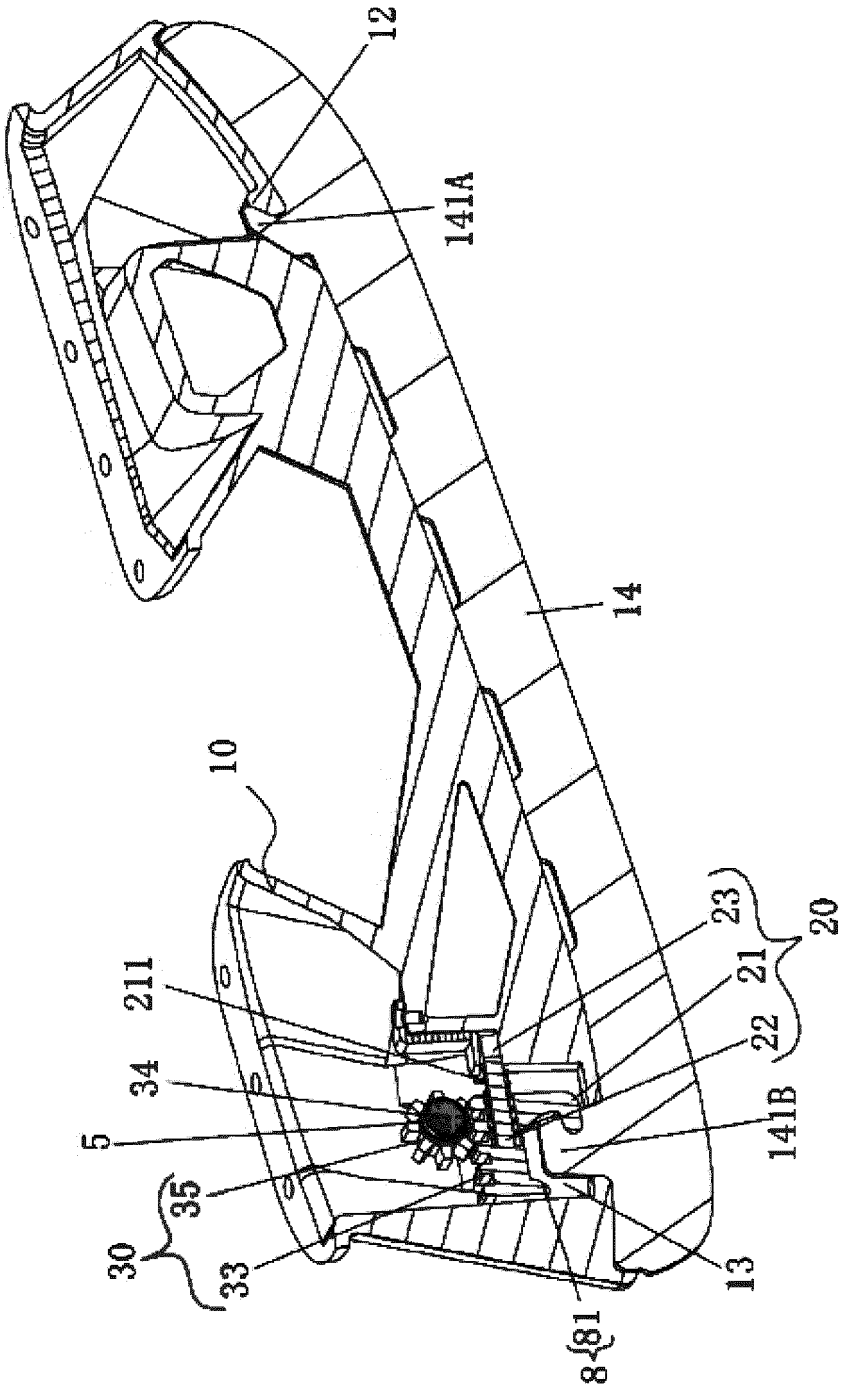

FIG. 2

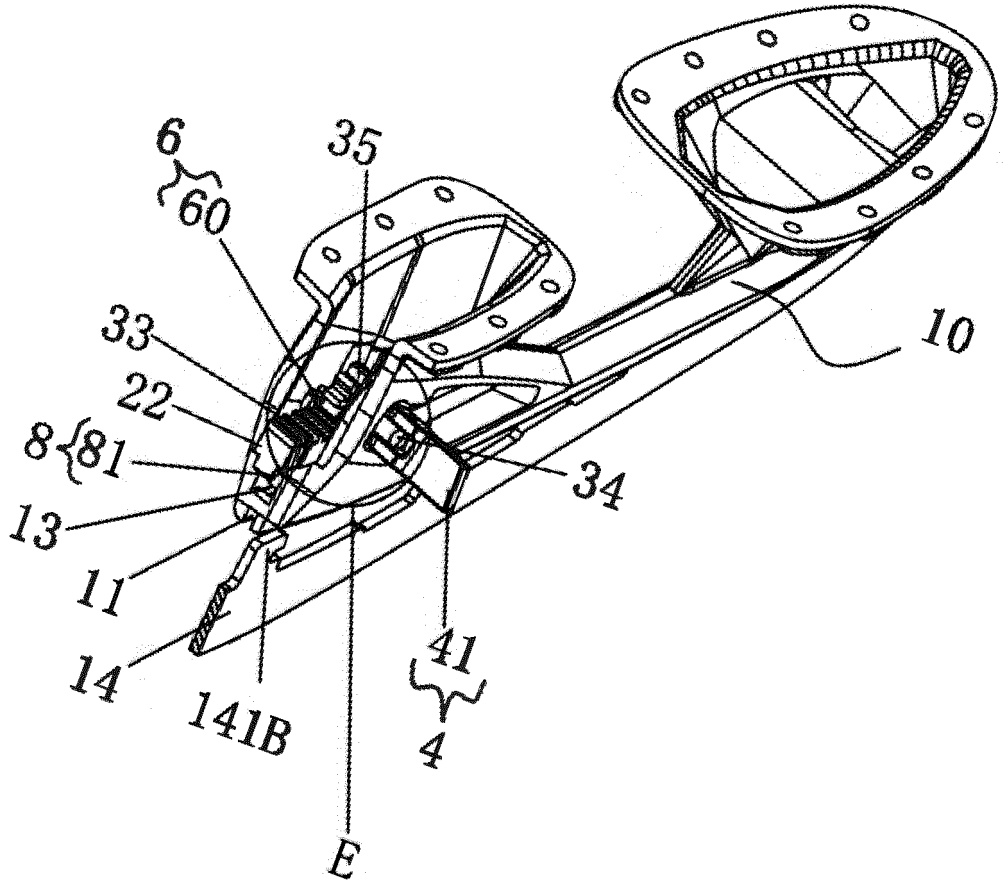

FIG. 3

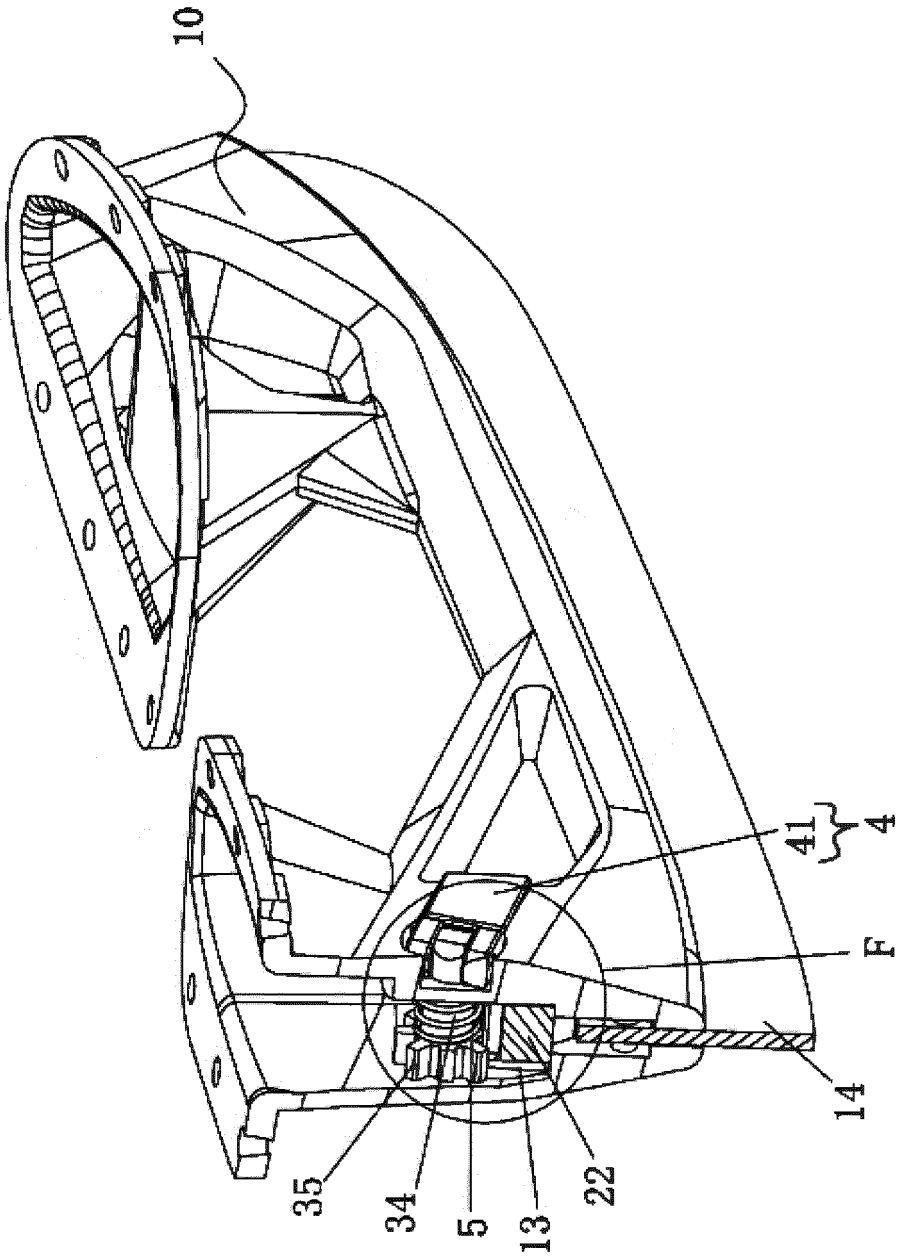

FIG. 4

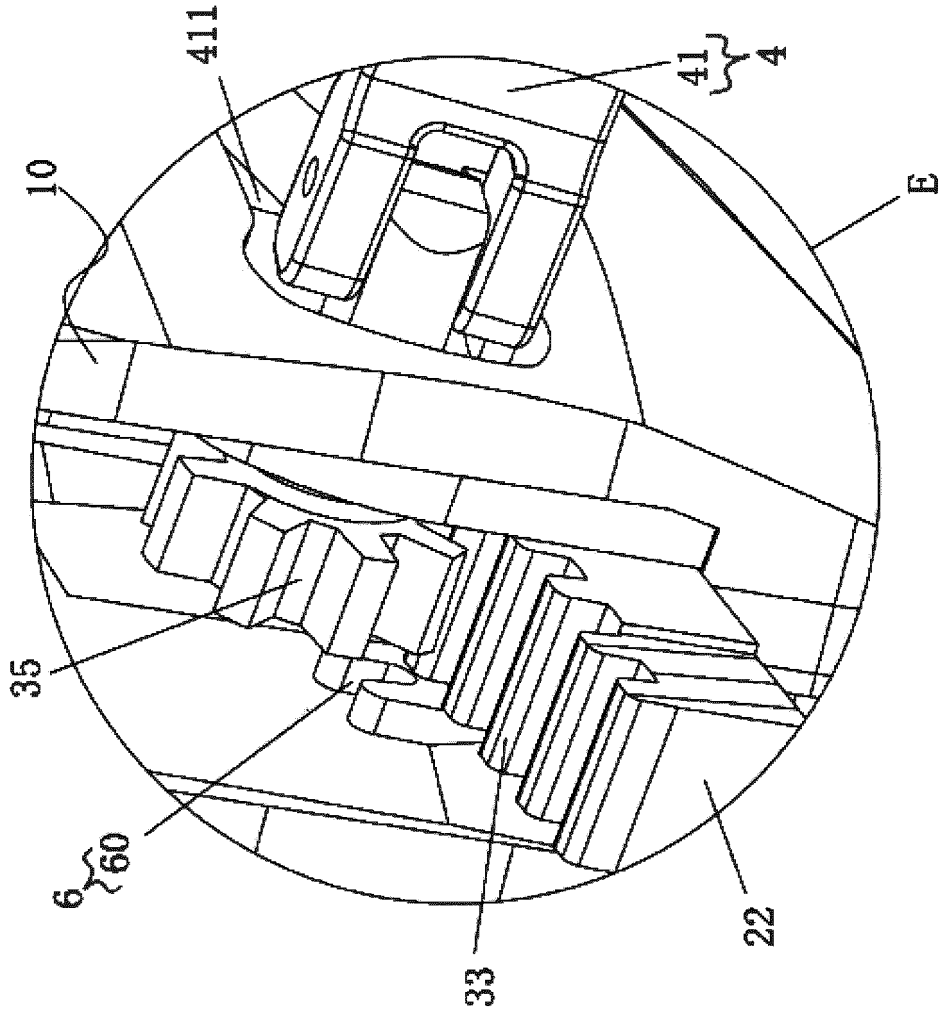

FIG. 5

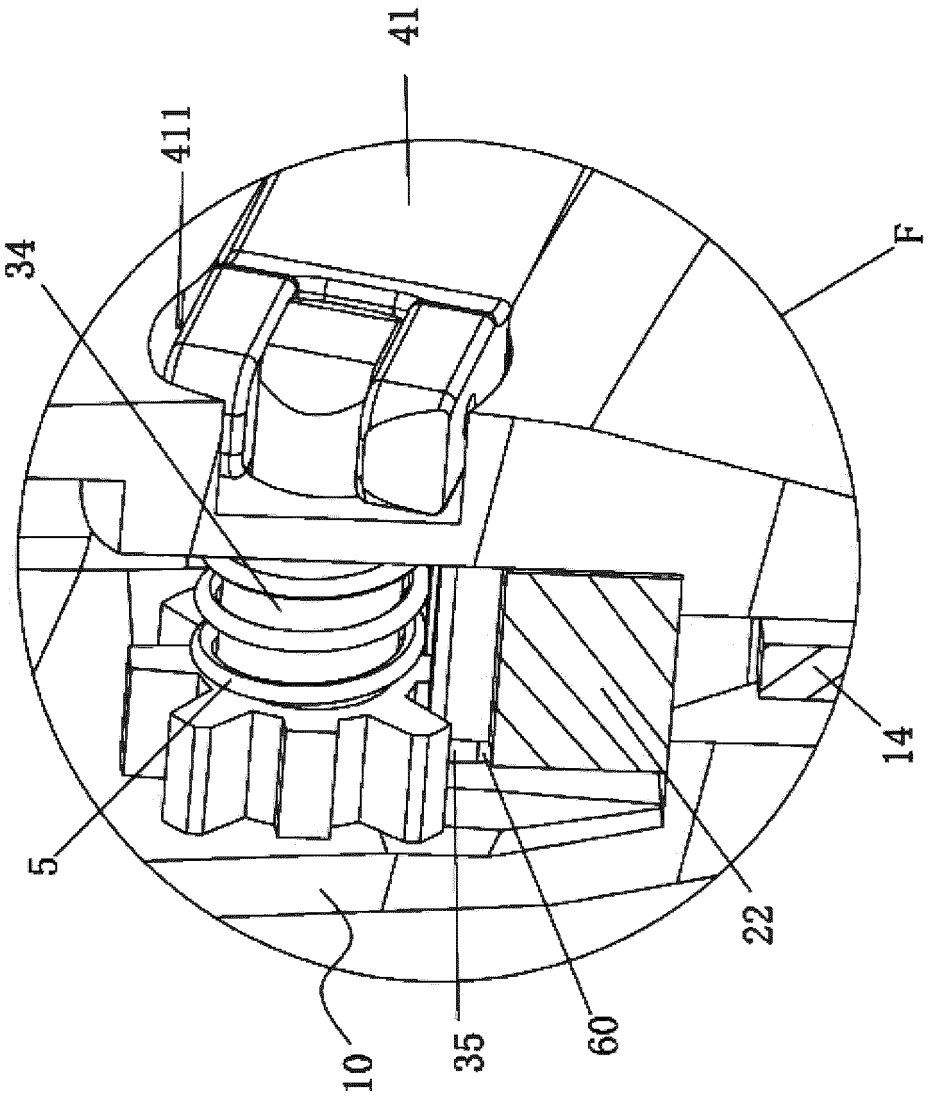

FIG. 6

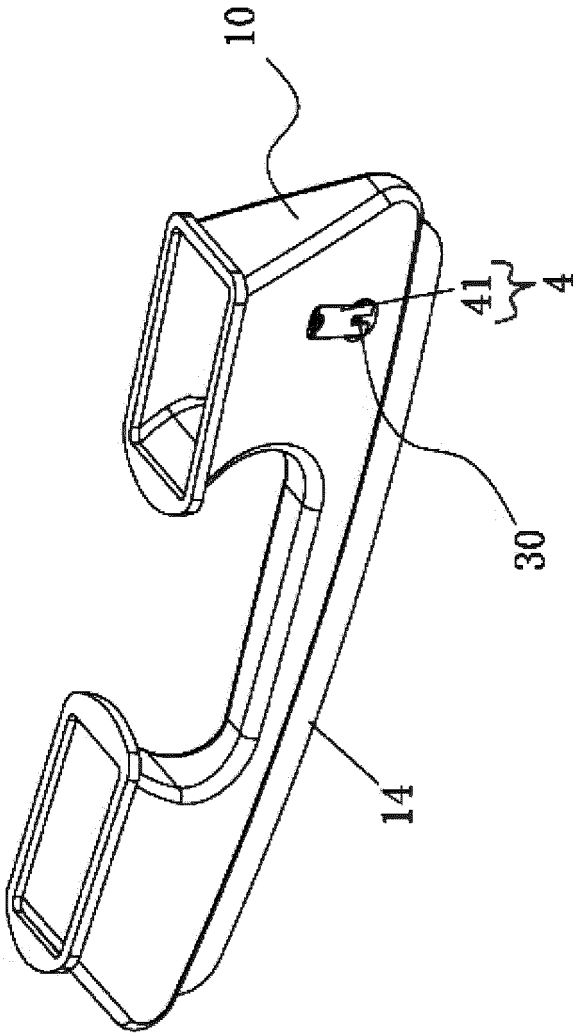

FIG. 7

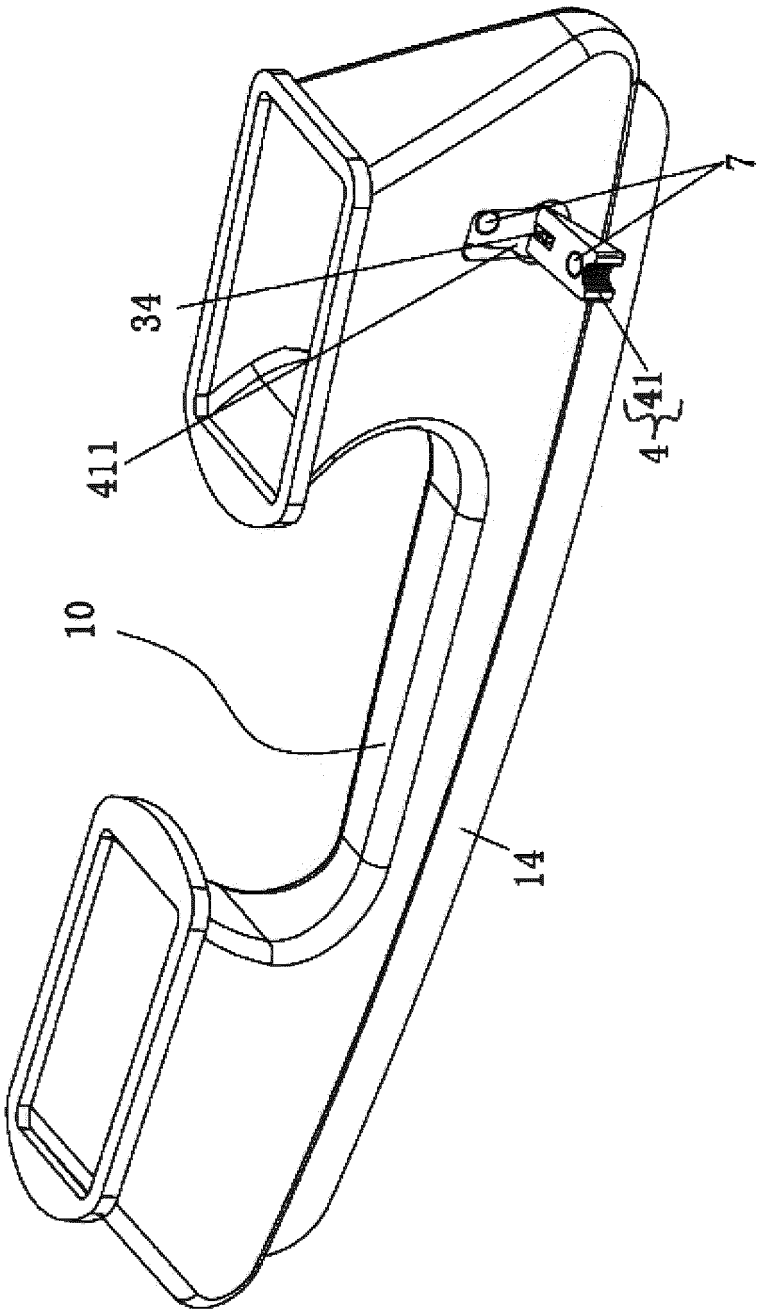

FIG. 8

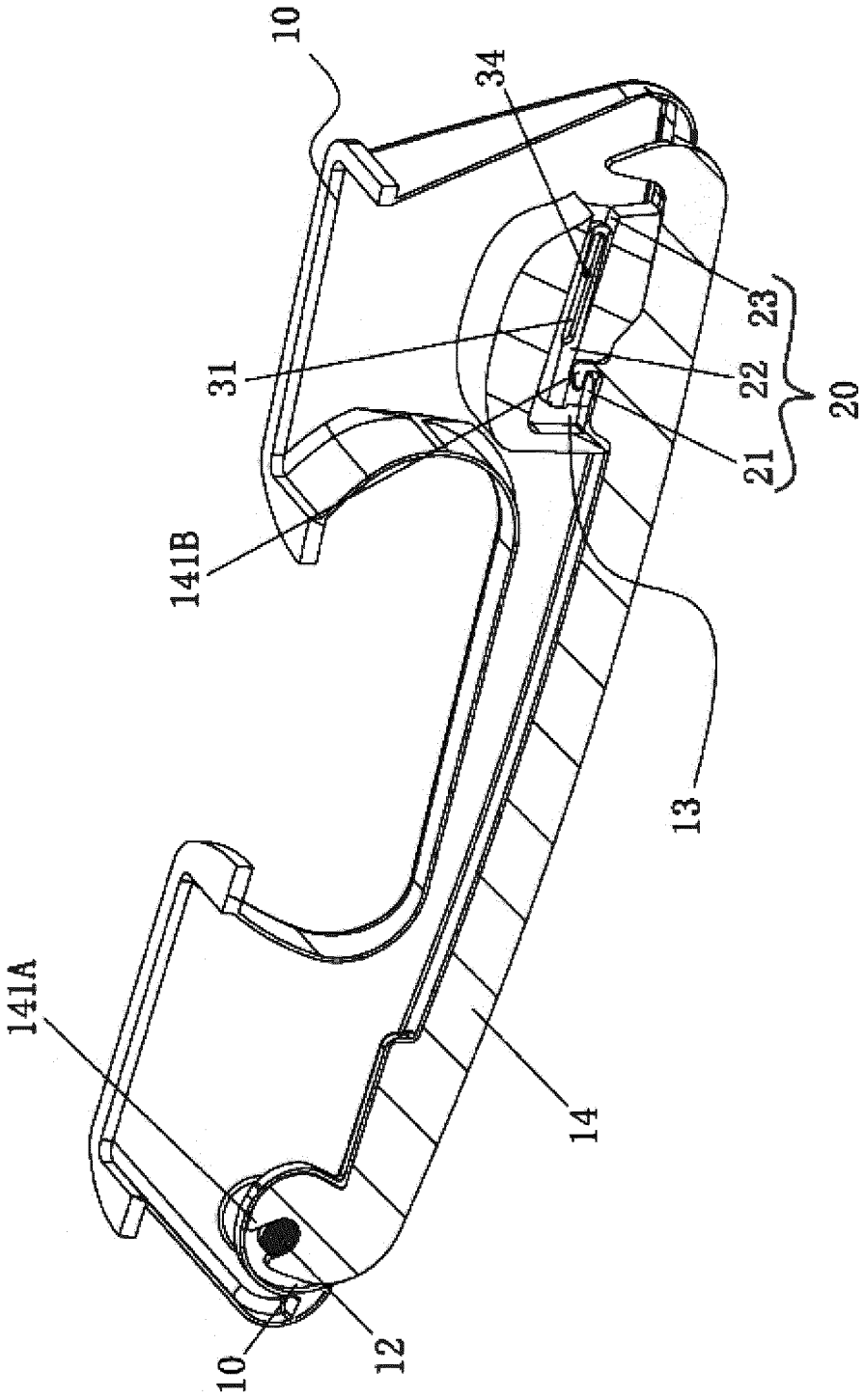

FIG. 9

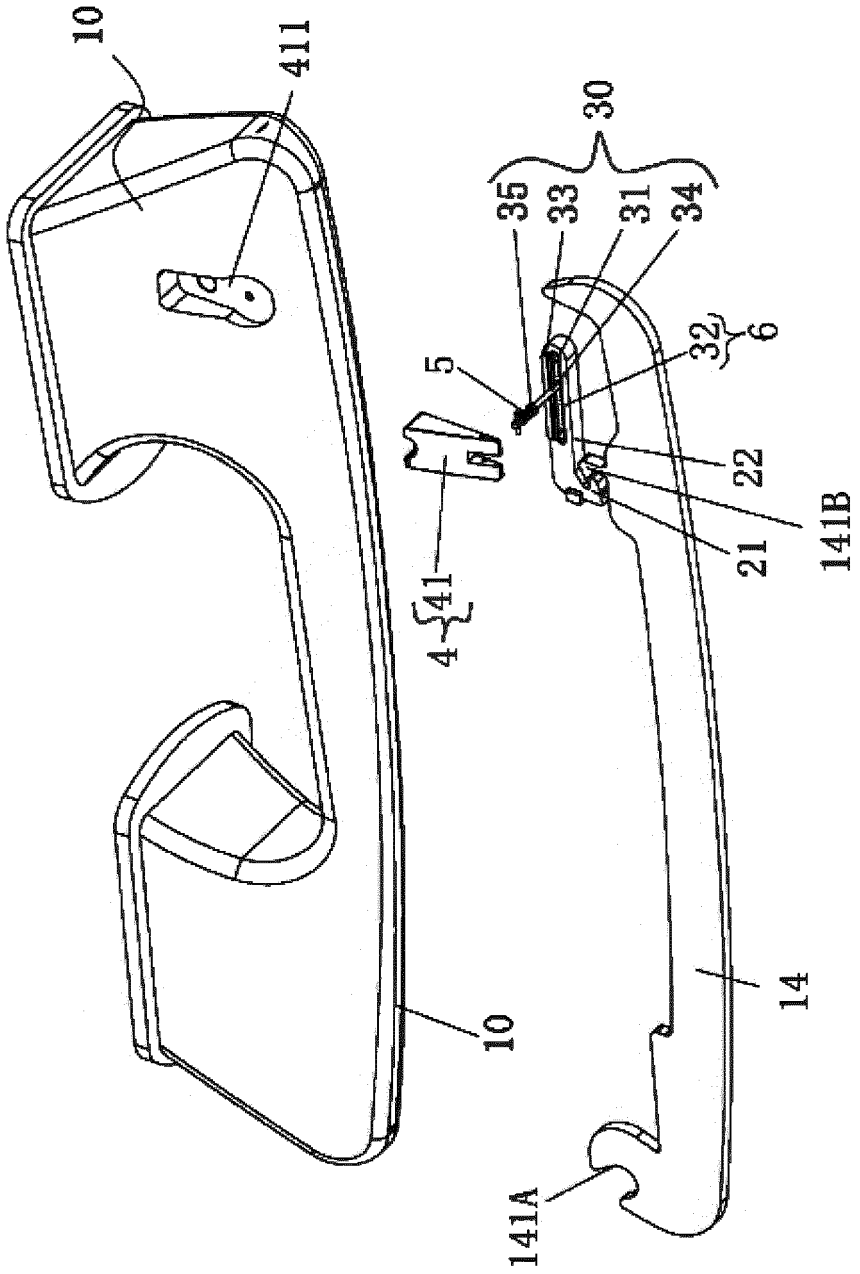

FIG. 10

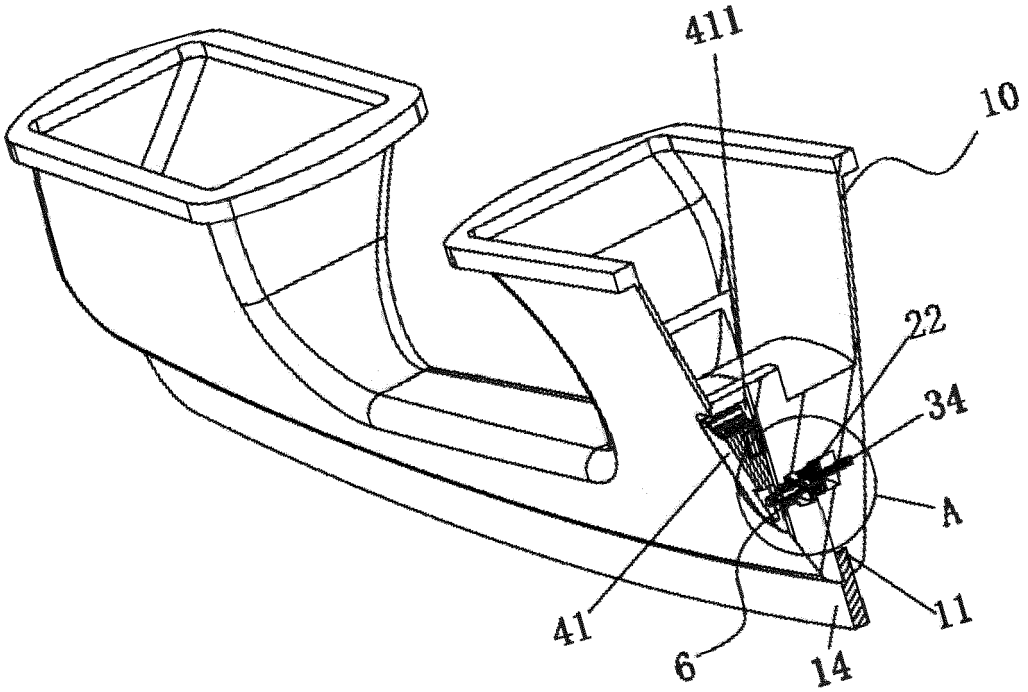

FIG. 11

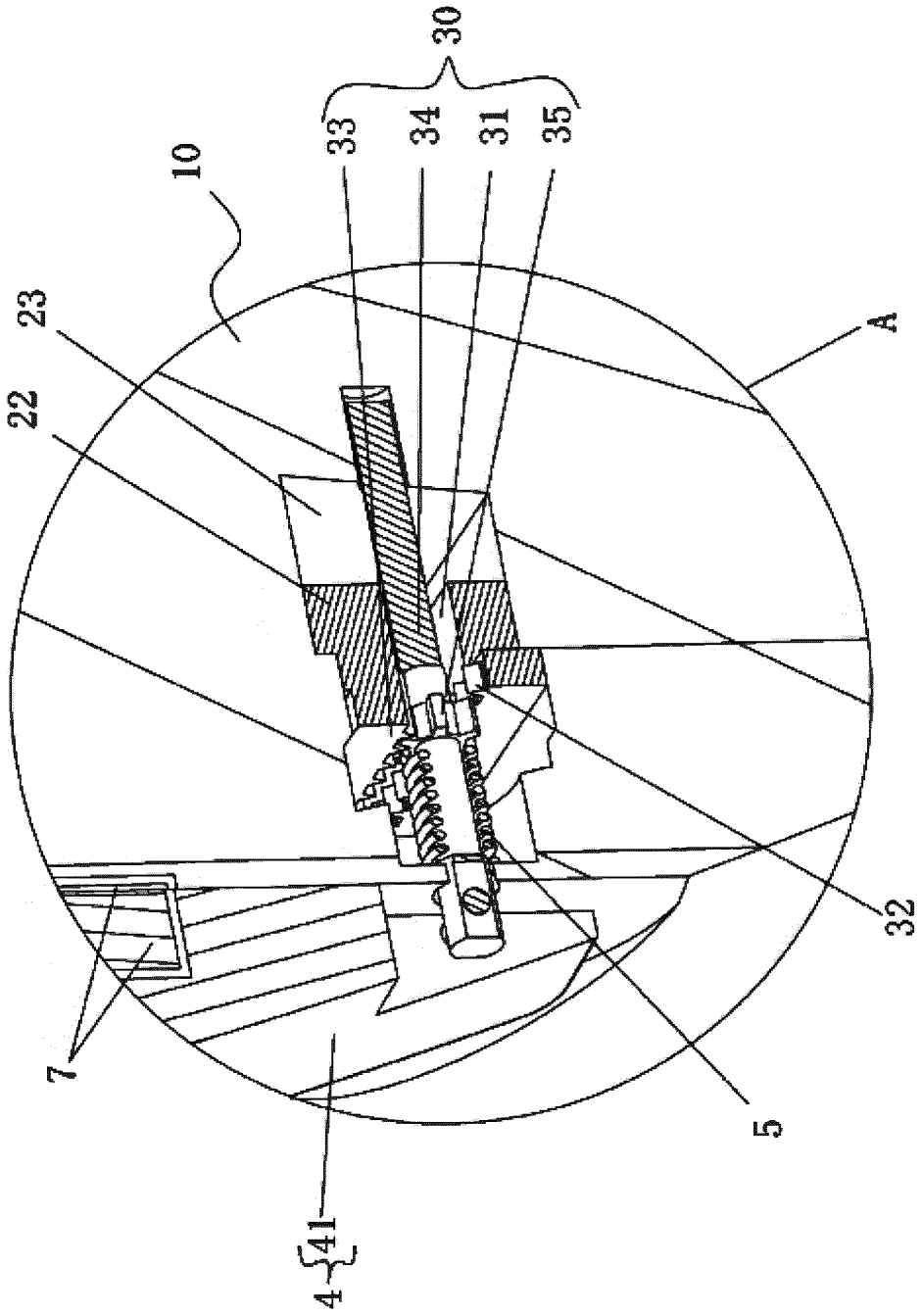

FIG. 12

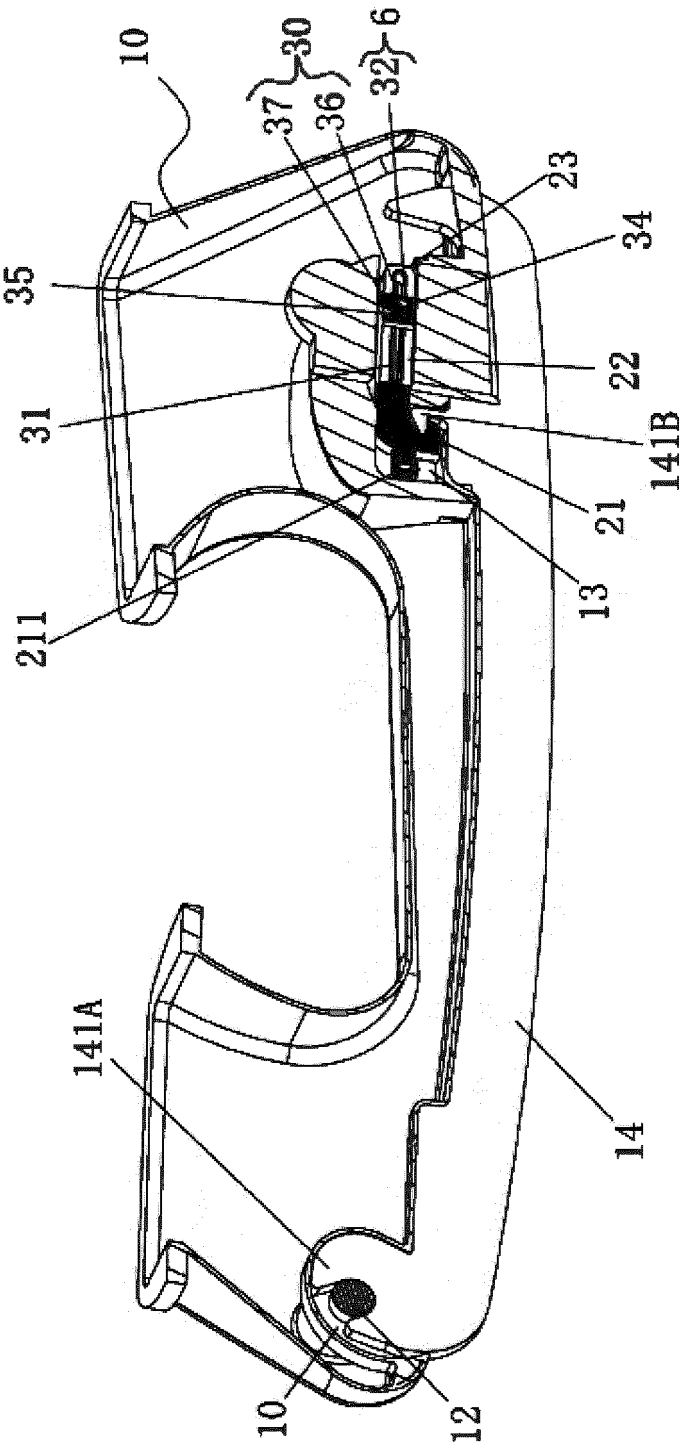

FIG. 13

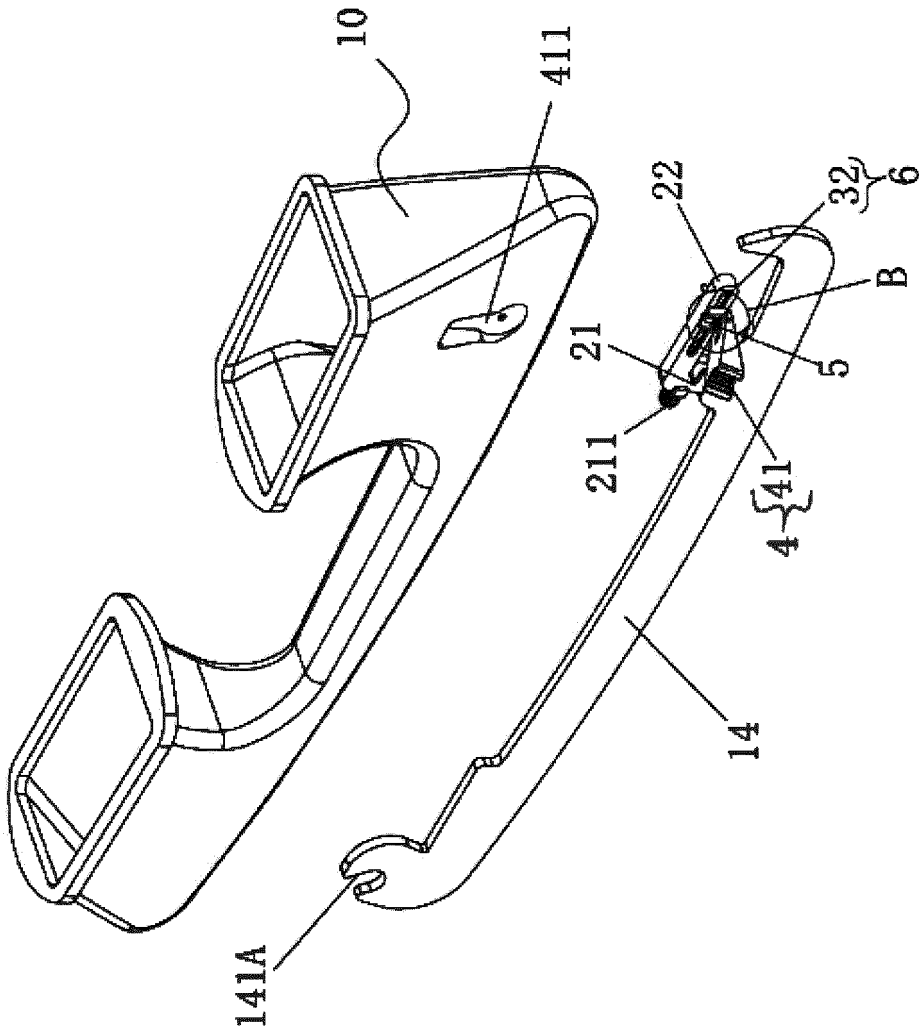

FIG. 14

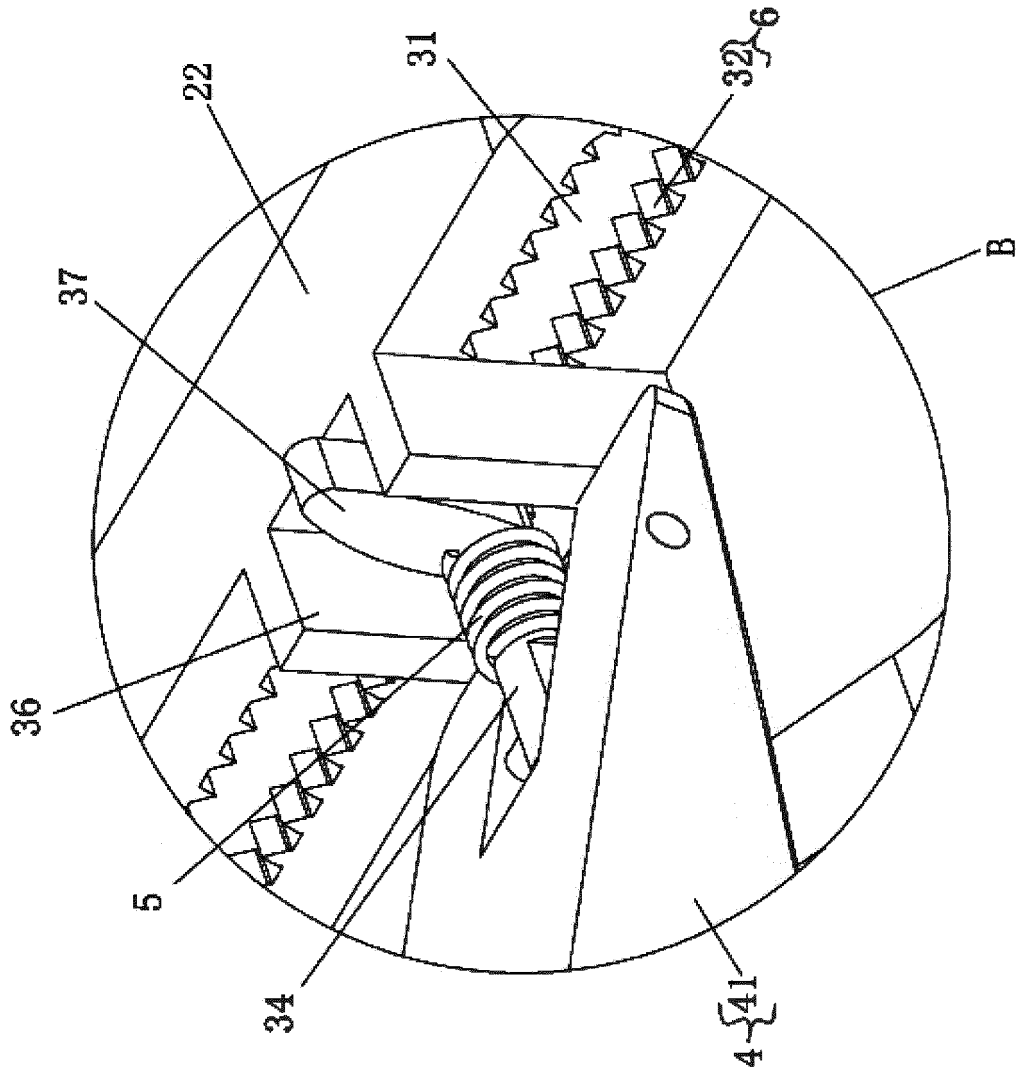

FIG. 15

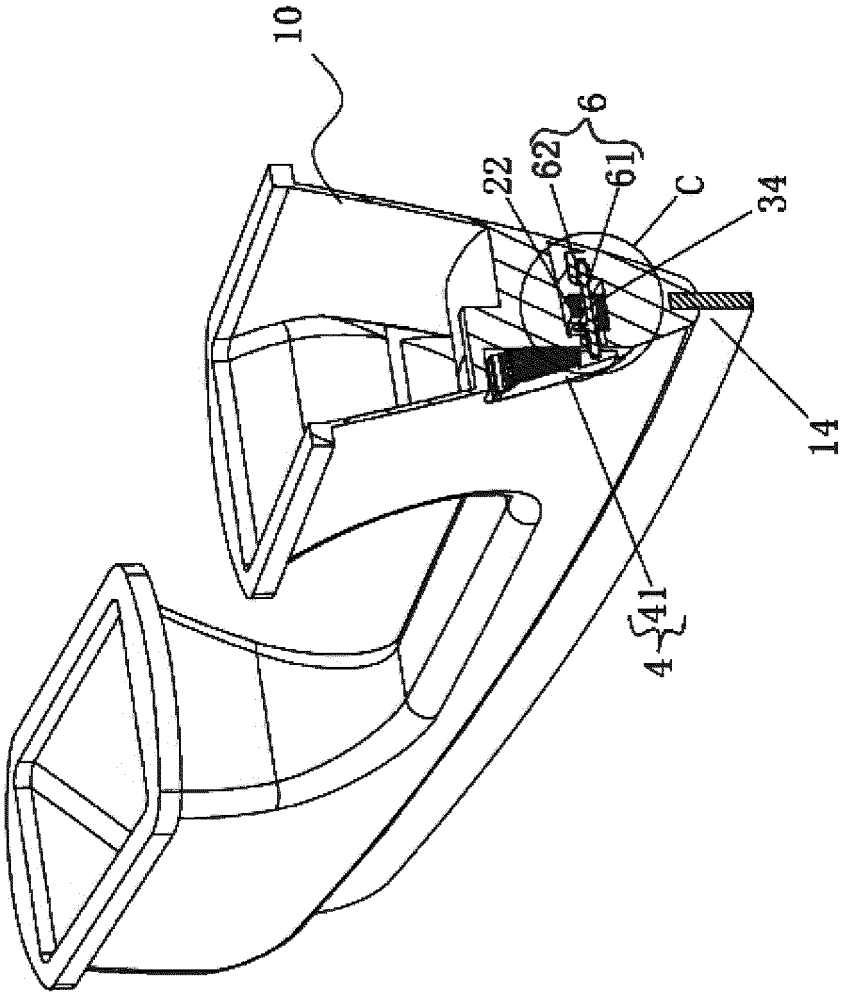

FIG. 16

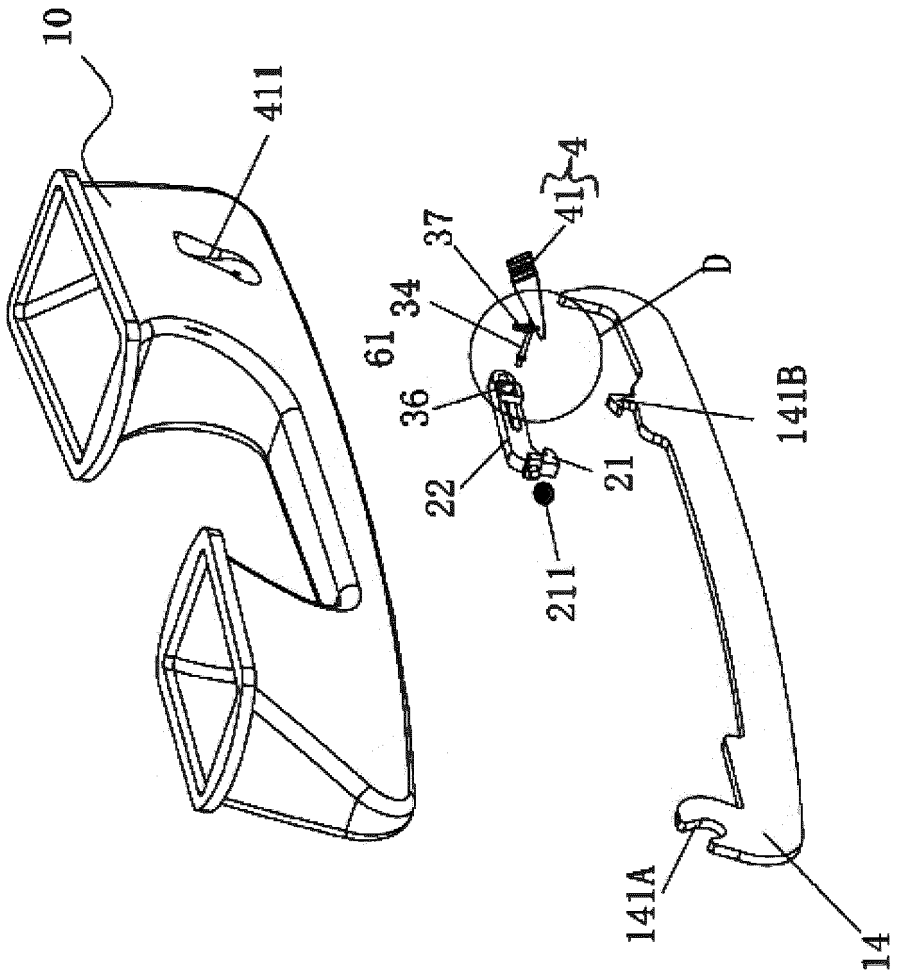

FIG. 17

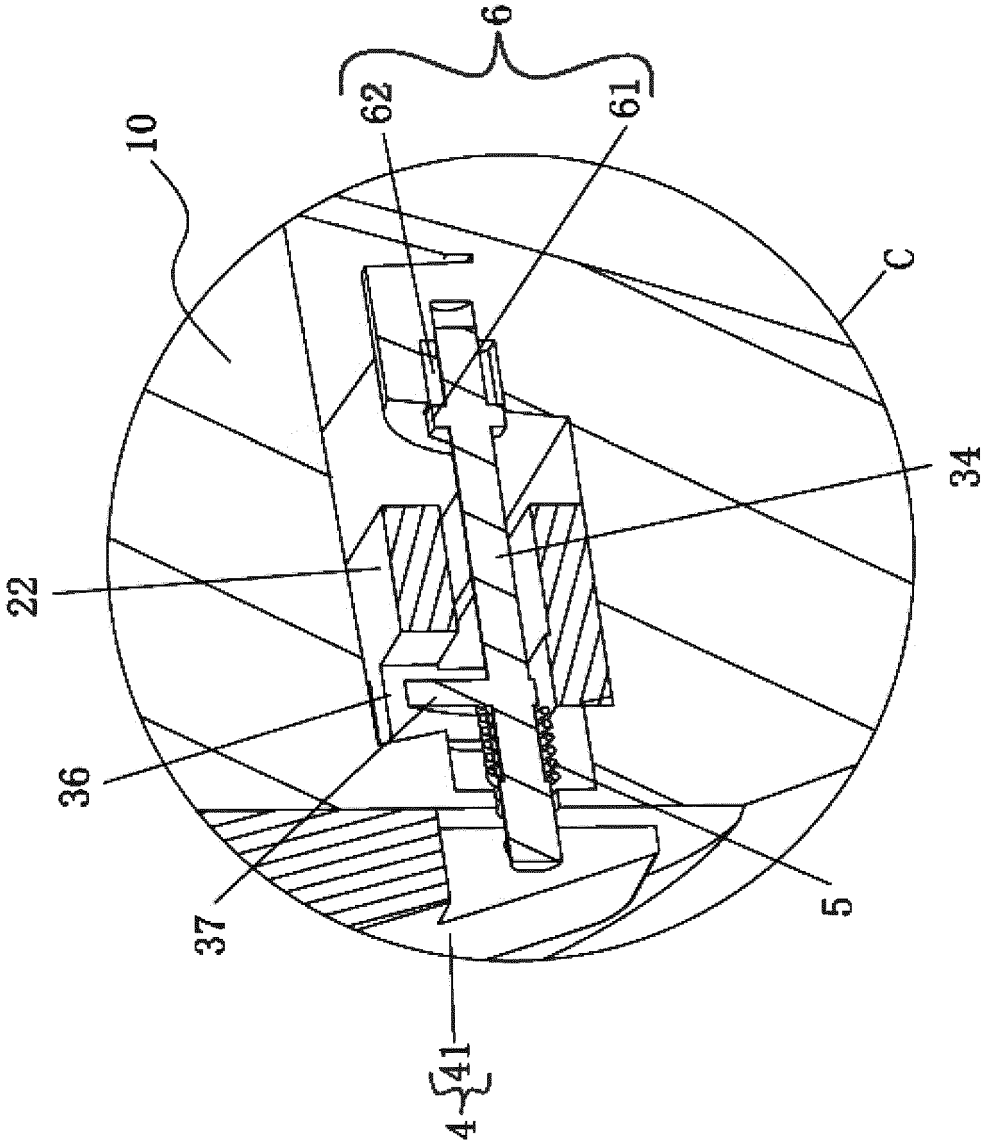

FIG. 18

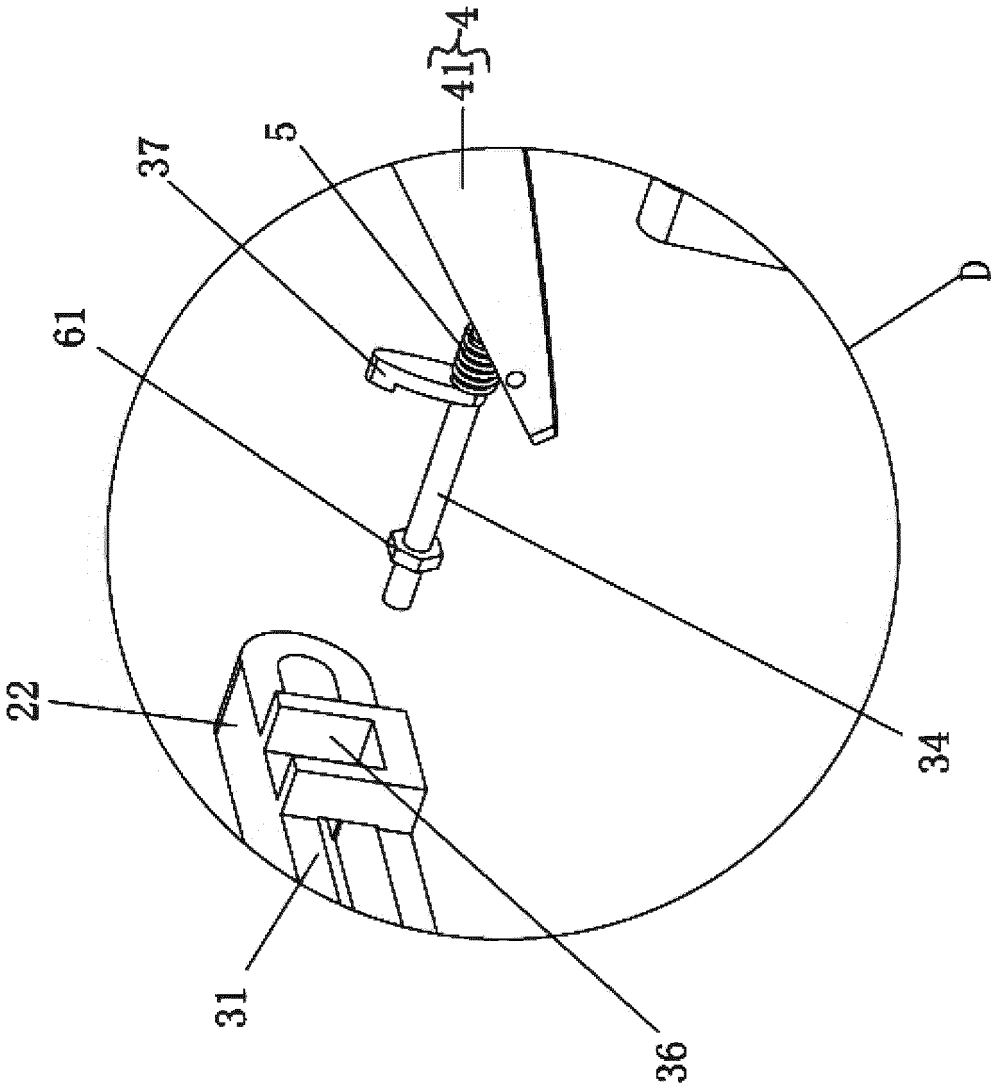

FIG. 19

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/095991

A. CLASSIFICATION OF SUBJECT MATTER

A63C 1/30(2006.01)i

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)

A63C

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)

CNABS, CNKI, VEN: 冰刀, 卡合, 锁定, 释放, 滑动, skate, blade, lock+, releas+, slid+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 111870922 A (QUANDA CARBON FIBER MANUFACTURING (ZHANGJIAKOU) CO., LTD.) 03 November 2020 (2020-11-03) description, paragraphs 27-40, and figures 1-4	1-3, 8, 12-18
Y	CN 111870922 A (QUANDA CARBON FIBER MANUFACTURING (ZHANGJIAKOU) CO., LTD.) 03 November 2020 (2020-11-03) description, paragraphs 27-40, and figures 1-4	4-7, 9-11
Y	US 5088749 A (ICARO OLIVIERI & C. S.P.A. MINUTERIE) 18 February 1992 (1992-02-18) description, specific embodiments, and figures 1-3	4-7, 9-11
X	CN 212308844 U (QUANDA CARBON FIBER MANUFACTURING (ZHANGJIAKOU) CO., LTD.) 08 January 2021 (2021-01-08) description, paragraphs 27-40, and figures 1-4	1-3, 8, 12-18
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☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
06 December 2021	**30 December 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

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PCT/CN2021/095991

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				CA	3053727	C	25 May 2021
				CA	3053727	A1	01 May 2020

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