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(54) **Fastening lever, particularly for sports shoes**

(57) A fastening lever for sports shoes comprising a first flap to be joined to a second flap. The fastening lever has a base associated with the first flap and a lever arm articulated to the base; a traction member is pivoted to the lever arm and bears a bridge which has a pivot which can be selectively associated with one of a plurality of

teeth of a rack associated with the second flap. The lever arm can be actuated in order to join the flaps with a selected closure force. The fastening lever comprises a preloaded elastically deformable member provided with a load adjustment means and operating between the base and the lever arm in order to keep the closure force constant.

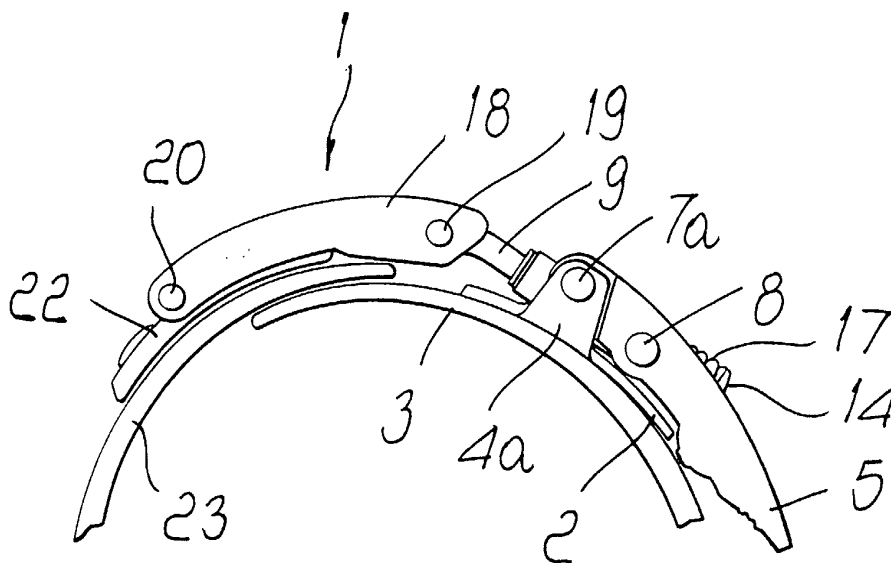


Fig. 2

Description

[0001] The present invention relates to a fastening lever, particularly for sports shoes such as ski boots, roller skates, ice skates, or ice-climbing boots.

[0002] A problem encountered in sports shoes is to achieve optimum fastening of the flaps of a quarter or shell while maintaining good comfort.

[0003] A conventional fastening lever is generally constituted by a lever arm articulated to a base which is rigidly coupled to a first member of the shoe and by a spring traction member which is associated with a second member of the shoe.

[0004] The lever arm has, on its lower surface, a plurality of teeth for engaging the free end of the spring traction member, which is constituted by two parallel cylindrical springs which are mutually rigidly coupled at the free end of the traction member.

[0005] With respect to other conventional fastening levers wherein the traction member has no elastically deformable members, such "elastic" lever has the advantage that it allows effective and uniform mutual closure of the two flaps over each other, while the springs tend to compensate for the differences in adjustment that frequently occur among the various levers of the sports shoe.

[0006] However, such conventional elastic fastening lever has an important drawback: as the fastening is tightened, engaging the teeth that lie further from the pivoting point of the lever arm, the closure action becomes increasingly difficult for the user, because the force that has to be applied to the lever arm increases.

[0007] A further drawback is that, during the fastening action, the two cylindrical springs are subjected to possibly considerable elongations, according to the intended fastening that can be imparted to the lever.

[0008] This situation entails the fact that, especially for the teeth that lie furthest from the pivoting point of the lever arm, the two cylindrical springs elongate excessively, to their yield point, causing even greater difficulty in the fastening action.

[0009] Moreover, since the springs are very large and are arranged outside the lever arm, in an exposed position, they are prone to breaking or at least to being damaged by impacts with objects, such as rocks, branches, other shoes, skis and anything else that might accidentally make contact with the sports shoe.

[0010] A further drawback is that dirt, mud and grass blades, or any other solid object, such as small fragments of rocks, pebbles or ice fragments, can easily penetrate between the springs, causing possible defects in the operation of the lever and also possible damage thereto.

[0011] A second conventional type of elastic lever is constituted by a lever arm, which is articulated to a base which protrudes from a first flap or member of a shoe, and by a traction member, which is associated with the second flap of the shoe and has elastically deformable

parts.

[0012] Teeth protrude downward from the lever arm and engage the free end of the traction member, which is constituted by two telescopic members which contain mutually parallel elastically deformable members. Each member has a hollow cylinder in which a piston is slidably arranged, the piston being constituted by a head and a stem which protrudes outside the hollow cylinder in the opposite direction with respect to the second flap.

[0013] A cylindrical spring, which is coaxial to the stem, is arranged so that it is compressed by the head of the piston when the stem slides toward the outside of the cylinder, so as to contrast the elongation of the traction member.

[0014] The stems of the pistons that lie outside the hollow cylinders are mutually connected so as to form the free end, which interacts with the teeth of the lever arm.

[0015] This second type of conventional elastic lever too has the advantage of allowing effective and uniform closure of the two flaps. The lever in fact has a structure which is fully similar to the previously described conventional type of fastening lever and differs only in the type of elastically deformable member that is used.

[0016] This second conventional type of lever, however, has drawbacks which are similar to those of the preceding fastening lever. The lever arm is disadvantageous and the closure action becomes more and more difficult as the distance of the tooth used for connection to the free end of the traction member with respect to the pivoting point of the lever arm increases.

[0017] Moreover, the telescopic members are difficult to manufacture, because they are composed of several parts, most of which are small, requiring expensive precision processes.

[0018] All the conventional types of levers in general have a further drawback: since the shoes are provided with more than one lever, closing a lever which is adjacent to another one, which is already fastened, can usually affect the already fastened lever and the position of the flaps of the shoe. This entails several re-adjustments of the levers until a compromise is reached.

[0019] The aim of the present invention is to solve the above-noted drawbacks and the described technical problems, by providing a lever in which the user can achieve optimum comfort for the foot while maintaining a constant closure load.

[0020] An object of the invention is to provide a lever which provides for a constant closure load even when the flaps, by settling and elongating, tend to reduce the initial closure load of the lever.

[0021] Another important object is to provide a lever which reduces the number of adjustments of the closure of the various levers applied to the sports shoe.

[0022] Another object is to provide a lever whose closure does not entail the accidental opening of an adjacent lever.

[0023] Another object is to provide a lever in which it

is possible to indicate the obtained closure load value.

[0024] Another object is to provide a lever which is structurally simple and has low manufacturing costs.

[0025] This aim, these objects and others which will become better apparent hereinafter are achieved by a fastening lever as claimed in the appended claims.

[0026] Further characteristics and advantages of the invention will become better apparent from the detailed description of a particular embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Fig. 1 is a front view of the fastening lever according to the invention, illustrated in an open position;

Fig. 2 is a front view of the fastening lever, according to the invention, illustrated in a closed position;

Fig. 3 is a front section view of a sports shoe provided with the lever of Figs. 1 and 2, shown in the open position;

Fig. 4 is a front section view of the sports shoe provided with the lever of Figs. 1 and 2, shown in the open position;

Fig. 5 is an enlarged top view of a detail of the fastening lever, shown in the closed position;

Figs. 6 and 7 are front views of the spring shown respectively in the packed position and in the normally preloaded position;

Fig. 8 is a sectional top view of the spring shown in the normally preloaded position;

Fig. 9 is a front view of the fastening lever according to a further aspect of the invention, illustrated in an open position;

Fig. 10 is a front view of the fastening lever of Fig. 9, illustrated in a closed position;

Fig. 11 is a front section view of a sports shoe provided with the lever of Figs. 9 and 10, shown in the open position;

Fig. 12 is a front section view of the sports shoe provided with the lever of Figs. 9 and 10, shown in the open position.

Fig. 13 is a front view of the fastening lever according to a further aspect of the invention, illustrated in an open position;

Fig. 14 is a front view of the fastening lever of Fig. 13, illustrated in a closed position;

Fig. 15 is a top view of a detail of the fastening lever of Figs. 13 and 14, shown in the closed position;

Fig. 16 is a front view of the fastening lever according to a further aspect of the invention, illustrated in an open position;

Fig. 17 is a front view of the fastening lever of Fig. 16, illustrated in a closed position;

Fig. 18 is a top view of a detail of the fastening lever of Figs. 16 and 17, shown in the closed position;

Fig. 19 is a front view of the fastening lever according to a further aspect of the invention, illustrated in an open position;

Fig. 20 is a front view of the fastening lever of Fig.

19, illustrated in a closed position;

Fig. 21 is a top view of a detail of the fastening lever of Figs. 19 and 20, shown in the closed position;

Fig. 22 is a front view of the fastening lever according to still a further aspect of the invention, illustrated in an open position;

Fig. 23 is a front view of the fastening lever of Fig. 22, illustrated in a closed position;

Fig. 24 is a top view of a detail of the fastening lever of Figs. 22 and 23, shown in the closed position.

[0027] With reference to the above-cited figures, the reference numeral 1 designates a fastening lever particularly for sports shoes such as for example skates and ski boots.

[0028] The lever 1 has a base 2, which is rigidly coupled to a first flap 3 of the sports shoe.

[0029] The base 2 is flat and is laterally provided with two shoulders 4a and 4b that protrude at right angles to the first flap 3 and face each other so that a lever arm 5 can be articulated between them.

[0030] The lever arm 5 is U-shaped so as to form two wings 6a and 6b that are pivoted, at their respective free ends, to the two shoulders 4a and 4b, by means of two first pivoting members 7a and 7b, respectively.

[0031] A traction member, designated by the reference numeral 9, is pivoted between the two wings 6a and 6b, preferably in an intermediate position, by means of a shaft 8.

[0032] The traction member 9 has an approximately central longitudinal through slot 10 accommodating the shaft 8 for the pivoting of the traction member 9 to the pair of wings 6a and 6b.

[0033] At a first end 11a, the traction member 9 has a sleeve 13 which has a smaller diameter and is internally threaded in order to receive the stem of a screw 14.

[0034] The sleeve 13, by having a smaller diameter than the traction member 9, has a step-like surface 15 adapted to blend with the traction member 9. The surface acts as an abutment for an annular member 16 having a C-shaped cross-section.

[0035] The shaft 8 slides within the through slot 10 in contrast with an elastically deformable member 17, which is preloaded and interposed between the head of the screw 14 and the annular member 16.

[0036] The elastically deformable member 17, which is for example constituted by a cylindrical spring, keeps the closure load of the lever 1 constant.

[0037] At a second end 11b, the traction member 9 is rotatably associated with a bridge 18, by means of, second pivoting members 19.

[0038] The bridge 18 is U-shaped and has a pivot 20, at its free end. Pivot 20 is arranged transversely to the traction member 9 and is adapted to be selectively associated with one of a plurality of teeth 21 protruding from a rack 22.

[0039] The teeth 21 protrude from the rack 22 preferably approximately at right angles to a second flap 23

which is arranged above the first flap 3 with which the rack 22 is associated.

[0040] In a transverse cross-section, the teeth 21 have a shape which is curved in the opposite direction with respect to the traction member 9, so as to prevent any motion of the pivot 20 towards the traction member 9.

[0041] The operation of the fastening lever according to the invention is as follows. When the lever arm 5 is raised, the pivot 20 is arranged at the selected tooth 21 and the lever arm 5 is rotated about the pair of first pivoting members 7a and 7b, until it lies parallel to the first flap 3.

[0042] The arrangement of the traction member 9 between the first flap 3 and the plane that passes between the first pivoting members 7a and 7b and the shaft 8 allows to lock the lever 1 in the intended position.

[0043] During the rotation of the lever arm 5, the shaft 8 performs a translatory motion, inside the slot 10, toward the screw 14, pressing on the annular member 16 and thus compressing the spring 17 until its turns are placed in mutual contact ("packed" arrangement of the spring).

[0044] After a few flexing motions, or when an adjacent lever is closed, the settling of the foot inside the sports shoe entails that the first and second flaps of the shoe have adapted and mutually overlapped more extensively.

[0045] The spring 17, preloaded in closure, compensates, by elongating, for the greater overlap of the flaps, moving the screw 14 away from the annular member 16 and thus keeping the traction member 9 in traction.

[0046] Accordingly, the closure force applied between the flaps is thus kept approximately unchanged, ensuring effective locking of the foot.

[0047] The lever 1 allows quicker and simpler fastening of the various levers arranged along the quarter and the shell, because the spring 17 allows to compensate for the differences that are inevitably present among the fastening forces of the various levers.

[0048] It has been observed in practice that the invention has achieved the intended aim and objects, a lever having been provided in which the user can achieve optimum comfort for the foot while maintaining a constant closure load.

[0049] The fastening lever also allows more rapid and effective closure of the sports shoe, avoiding a plurality of adjustments of the fastening levers.

[0050] The fastening lever according to the invention is susceptible of several modifications and variations, within the scope of the appended claims.

[0051] Thus, for example, Figures 9 to 12 show a fastening lever 101, according to a further aspect of the invention, comprising a first base 102 which is rigidly associated with a first flap 103 of a sports shoe.

[0052] The first base 102 is flat and laterally provided with two shoulders 104a and 104b, which protrude at right angles to the first flap 103 and face each other so

that a lever arm 105 can be articulated between them.

[0053] The lever arm 105 is U-shaped so as to form two wings 106a and 106b pivoted to the pair of shoulders 104a and 104b by means of a pair of first pivoting members 107a and 107b respectively.

[0054] A shaft 108 is arranged between the pair of wings 106a and 106b, in an intermediate position.

[0055] The shaft 108 allows for the pivoting of a first end 130a of an elastically deformable member, such as a cylindrical spring 117, which is associated with a traction member 109 at its second end 130b.

[0056] The traction member 109 is rotatably associated, at its free end, with a bridge 118, by means of second pivoting members 119.

[0057] The bridge 118 is U-shaped and has a pivot 120, at its free end. The pivot 120 is arranged transversely to the traction member 109 and can be selectively associated with one of a plurality of teeth 121, protruding from a rack 122.

[0058] The teeth 121 protrude from the rack 122 preferably approximately at right angles to a second flap 123 which is arranged above the first flap 103, with which the rack 122 is associated.

[0059] In a transverse cross-section, teeth 121 have a shape which is curved in the opposite direction with respect to the traction member 109, so as to prevent any motion of the pivot 120 towards the traction member 109.

[0060] The operation and the advantages of the lever 101 are similar to those of the lever 1, and in this case too the elastically deformable member keeps the closure load during the use of the shoe constant.

[0061] The lever 101, according to this further aspect of the invention, is simpler and cheaper than the lever 1, according to the first aspect of the invention, because it is constituted by a reduced number of component parts.

[0062] The lever 101 is of the advantageous type, since it allows the user to perform a first step of the closure of the lever without affecting the elastically deformable member and therefore without using considerable closure forces.

[0063] The elastically deformable member is activated only during the last step of the closure of the lever arm, in which it is already partially turned.

[0064] In this step, the position of the lever arm, which is almost parallel to the first flap, allows to produce a low force to complete the closure action, simultaneously achieving the packed, or almost packed, compression of the elastically deformable member.

[0065] Figs. 13 to 15 show a fastening lever 201 according to still a further aspect of the invention and comprising a base 202, which is slidingly associated with a first flap 203 of the sports shoe.

[0066] The base 202 can in fact slide longitudinally by means of a sliding guide constituted by a longitudinal slot 204, which is formed along the central line of the base 202.

[0067] A rivet 205 has a stem 206 interposed between the base 202 and the first flap 203 and a pair of heads 207a and 207b, and is adapted to engage the longitudinal slot 204.

[0068] The base 202 is flat and laterally provided with two shoulders, 208a and 208b, protruding at right angles to the first flap 203 and facing each other so that a lever arm 209 can be articulated between them.

[0069] Two wings 210a and 210b protrude from the pair of shoulders 208a and 208b toward the end of a second flap 222 to be joined to the first flap 203 and lie on a plane which is approximately perpendicular to the first flap 203 and to the pair of shoulders 208a and 208b.

[0070] The base 202 can slide along the first flap 203 in contrast with a pair of elastically deformable members 211a and 211b interposed between the pair of wings 210a and 210b and a connecting member, constituted by a resting member 212.

[0071] Two resting surfaces 212a and 212b protrude from the resting member 212, which is associated with the first flap 203, and respectively face the pair of wings 210a and 210b.

[0072] The elastically deformable members 211a and 211b, constituted by a pair of helical cylindrical springs, keep the closure load of the lever 201 constant.

[0073] The lever arm 209, articulated to the pair of shoulders 208a and 208b, is U-shaped in plan view so as to form two wings 213a and 213b, which are adapted to be pivoted, at the respective free ends, to the two shoulders 208a and 208b, by means of two first pivoting members 214a and 214b.

[0074] A traction member 216 is pivoted, through a shaft 215, between the two wings 213a and 213b, in an intermediate position.

[0075] The traction member 216 is rotatably associated, at its free end, with a bridge 217, by means of a second pivoting member 218.

[0076] The bridge 217 is U-shaped and has a pivot 219 at its free end. Pivot 219 is arranged transversely to the traction member 216 and can be selectively associated with one of a plurality of teeth 220, protruding from a rack 221.

[0077] The teeth 220 have, in a transverse cross-section, a shape which is curved in the opposite direction with respect to the traction member 216, so as to prevent any motion of pivot 219 towards the traction member 216.

[0078] The operation of the fastening lever is as follows. When the lever arm 209 is raised, the pivot 219 is arranged at the selected tooth 220 and the lever arm 209 is rotated about the pair of first pivoting members 214a and 214b until it lies parallel to the first flap 203.

[0079] The arrangement of the traction member 216 between the first flap 203 and the plane that passes between the first pivoting members 214a and 214b and the shaft 215 allows to lock the lever 201 in the intended position.

[0080] During the rotation of the lever arm 209, the

base 202 slides along the first flap 203, because of the guiding action of rivet 205 in the longitudinal slot 204. Such sliding is contrasted by the springs 211a and 211b that, by resting on the resting surfaces 212a and 212b, are compressed until the turns are placed in mutual contact ("packed" arrangement of the springs).

[0081] Figs. 16 to 18 show a fastening lever 301 according to still a further aspect of the invention and comprising a base 302, which rests on, or is slidably associated with, a first flap 303 of the sports shoe.

[0082] The base 302 is flat and is associated, at a first end 330a, with at least one elastically deformable member 311, such as a cylindrical helical spring, which is in turn associated with the first flap 303 by a connecting member, such as a separate rivet 331.

[0083] The elastically deformable member 311 is preferably arranged approximately in a region below the free end of the lever arm 309.

[0084] Proximate to the second end 330b, the base 302 is laterally provided with two shoulders 308a and 308b protruding at right angles to the first flap 303 and facing each other so that a lever arm 309 can be articulated between them.

[0085] The lever arm 309, articulated to the shoulders 308a and 308b, is U-shaped so as to form two wings 313a and 313b pivoted to the shoulders 308a and 308b, by means of two first pivoting members 314a and 314b.

[0086] A traction member 316 is pivoted, by means of a shaft 315, between the wings 313a and 313b, preferably in an intermediate position.

[0087] The traction member 316 is rotatably associated, at its free end, with a bridge 317, through a second pivoting member 318.

[0088] The bridge 317 is U-shaped and has a pivot 319, at its free end. Pivot 319 is arranged transversely to the traction member 316 and can be selectively associated with one of a plurality of teeth 320 protruding from a rack 321.

[0089] The teeth 320 have, in a transverse cross-section, a shape which is curved in the opposite direction with respect to the traction member 316, so as to prevent any motion of the pivot 319 towards the traction member 316.

[0090] The operation and the advantages of the lever 301 are similar to the above described lever, and, here too, the elastically deformable member keeps the closure load constant during the use of the shoe.

[0091] The lever 301 is simpler and cheaper than the lever 201, because it is constituted by a reduced number of components.

[0092] Figs. 19 to 21 show a fastening lever 401 according to still a further aspect of the invention and comprising a first base 402, which is rigidly associated with a first flap 403 of the sports shoe.

[0093] The first base 402 is flat and is laterally provided with a pair of shoulders 404a and 404b protruding at right angles to the first flap 403 and facing each other so that a lever arm 405 can be articulated between them.

[0094] The lever arm 405 is U-shaped so as to form two wings 406a and 406b pivoted, at the respective free ends, to the shoulders 404a and 404b by means of first pivoting members 407a and 407b.

[0095] A traction member 409 is pivoted, by means of a shaft 408, between the pair of wings 406a and 406b, in an intermediate position.

[0096] The traction member 409 is rotatably associated, at its free end 410, with a bridge 411, by means of second pivoting members 412.

[0097] The bridge 411 is U-shaped and has a pivot 413, at its free end. Pivot 413 is arranged transversely to the traction member 409 and can be selectively associated with one of a plurality of teeth 414 protruding from a rack 415.

[0098] In a transverse cross-section, teeth 414 have a shape which is curved in the opposite direction with respect to the traction member 409, so as to prevent any motion of the pivot 413 towards the traction member 409.

[0099] The rack 415 is slidingly guided longitudinally to a second base 417, which lies below it, by means of a guided connection means 418 which protrudes below the rack.

[0100] The guided connection means 418 is constituted by T-shaped protrusions each having a stem 450 which slides within a through slot 451 formed longitudinally to the second base 417, and having a head 452 which slides below the second base 417.

[0101] The second base 417 is approximately L-shaped and has a flat body 419 terminating with a tab 420. The flat body 419 is arranged above a second flap 416 of the shoe and has at least one end associated therewith. The tab 420 protrudes towards the bridge 411 at the end of the second base 417 that is directed toward the lever arm 405.

[0102] The rack 415 slides toward the lever arm 405 in contrast with at least one elastically deformable member, designated by the reference numeral 421, which is arranged between the rack 415 and the tab 420.

[0103] The elastically deformable member 421, constituted by a cylindrical helical compression spring, keeps the closure load of the lever 401 constant.

[0104] Operation is therefore as follows: with reference to the above figures, when the lever arm 405 is raised, the pivot 413 is arranged at the selected tooth 414 and the lever arm 405 is rotated about the pair of first pivoting members 407a and 407b until it lies parallel to the first flap 403.

[0105] The arrangement of the traction member 409 between the first flap 403 and the plane that passes between the first pivoting members 407a and 407b and the shaft 408 allows to lock the lever 401 in the intended position.

[0106] During the rotation of the lever arm 405, the rack 415 slides along the second base 417 toward the lever arm 405, compressing the spring 421 until its turns are placed in mutual contact ("packed" arrangement of

the spring).

[0107] After a few flexing motions, or when an adjacent lever is closed, the settling of the foot inside the sports shoe entails the fact that the first and second flaps of the shoe have adapted and mutually overlapped more extensively.

[0108] The spring 421, preloaded in closure, compensates by elongating for the greater overlap of the flaps, moving the rack 415 away from the tab 420.

[0109] Accordingly, the closure force applied between the flaps is thus kept approximately unchanged, ensuring effective locking of the foot.

[0110] The lever 401 also allows a quicker and simpler fastening of the various levers arranged along the quarter and the shell, because the spring 421 allows to compensate for the differences that are inevitably present among the fastening forces of the various levers.

[0111] Figs. 22 to 24 show a fastening lever 501 according to still a further aspect of the invention and comprising a first base 502 which is rigidly associated with a first flap 503 of the sports shoe.

[0112] The first base 502 is flat and is laterally provided with two shoulders 504a and 504b protruding at right angles to the first flap 503 and facing each other so that a lever arm, designated by the reference numeral 505, can be articulated between them.

[0113] The lever arm 505 is U-shaped so as to form two wings 506a and 506b pivoted, at the respective free ends, to the shoulders 504a and 504b by means of first pivoting members 507a and 507b.

[0114] A shaft 508 is arranged between the pair of wings 506a and 506b, preferably in an intermediate position.

[0115] The traction member 509 is rotatably associated, at its free end, with a bridge 511 by means of second pivoting members 512.

[0116] The bridge 511 is U-shaped and has a pivot 513 at its free end. Pivot 513 is arranged transversely to the traction member 509 and can be selectively associated with one of a plurality of teeth 514 protruding from a rack 515.

[0117] In a transverse cross-section, the teeth 514 have a shape which is curved in the opposite direction with respect to the traction member 509, so as to prevent any motion of the pivot 513 towards the traction member 509.

[0118] The rack 515 has an end 531 which is directed away from the lever arm 505 and has such end associated with at least one elastically deformable member 521, which is in turn associated with a second flap 516 of the shoe.

[0119] In this manner, the elastically deformable member 521, preferably constituted by a cylindrical spring, is adapted to act in contrast to the sliding motion of the rack 515 toward the lever arm 505 and therefore to keep constant the closure load of the lever 501.

[0120] The operation and the advantages of the lever

501 are similar to those of the preceding lever and in this case too, the elastically deformable member keeps the closure load during the use of the shoe constant.

[0121] The lever 501 is simpler and cheaper than the preceding lever, since it is constituted by a reduced number of components.

[0122] The lever 501 is also of the advantageous type, since it allows the user to perform a first step for closing the lever without affecting the elastically deformable member and therefore without using considerable closure forces.

[0123] The elastically deformable member is activated only during the last step of the closure of the lever arm, in which it is already partially turned.

[0124] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to specific requirements.

Claims

1. A fastening lever, particularly for sports shoes comprising a first flap to be joined to a second flap, said lever comprising a base associated with said first flap and a lever arm articulated to said base, a traction member being pivoted to said lever arm and bearing a bridge which has a pivot which can be selectively associated with one of a plurality of teeth of a rack associated with said second flap, said lever arm being actuated in order to join said flaps with a selected closure force, **characterized in that** said fastening lever comprises a preloaded elastically deformable member provided with a load adjustment means and operating between said base and said lever arm in order to keep the closure force constant.
2. The lever according to claim 1, **characterized in that** said base has a pair of shoulders, said lever arm being U-shaped and being articulated between said shoulders, said traction member being pivoted between the wings of said U-shaped arm and being rotatably associated, at its free end, with said bridge, said traction member having a longitudinal through slot which accommodates a shaft for pivoting said traction member to said wings, said shaft sliding within said slot in contrast with said preloaded elastically deformable member which is interposed between said shaft and said load adjustment means which is associated with a first end of said traction member.
3. The lever according to claim 2, **characterized in that** said load adjustment means is constituted by a screw which is rotatably and axially associated with said first end of said traction member.

4. The lever according to one or more of the preceding claims, **characterized in that** said first end of said traction member is constituted by an internally threaded sleeve which has a smaller diameter than said traction member, the stem of said screw being rotatably and axially associated with said sleeve.
5. The lever according to one or more of the preceding claims, **characterized in that** said sleeve has a step-like surface for blending with said traction member, said surface acting as an abutment for an annular member which has a C-shaped cross-section.
6. The lever according to one or more of the preceding claims, **characterized in that** said pivoting shaft slides within said longitudinal through slot in contrast with said preloaded elastically deformable member, which is constituted by a cylindrical spring which is interposed between the head of said screw and said annular member.
7. The lever according to claim 1, **characterized in that** said elastically deformable member is associated with said traction member at the end that is adjacent to said lever arm, said elastically deformable member being in turn associated with a shaft for pivoting to said pair of wings.
8. The lever according to claim 7, **characterized in that** said elastically deformable member is activated during the last step of the closure of said lever arm, in which it is already partially rotated.
9. The lever according to claim 1, **characterized in that** said base has two shoulders between which said lever arm is articulated, said lever arm being U-shaped and having wings, said traction member being pivoted between the wings of said U-shaped arm, said traction member being rotatably associated, at its free end, with said bridge, said base being slidably associated with said first flap in contrast with said elastically deformable member which interacts with a connecting member which is associated with said first flap.
10. The lever according to claim 9, **characterized in that** said base slides longitudinally with respect to said first flap by means of a guide constituted by a longitudinal slot formed along the central line of said base.
11. The lever according to claim 10, **characterized in that** it comprises a rivet having a stem engaging said longitudinal slot, said rivet having a pair of heads between said base and said first flap.
12. The lever according to claim 11, **characterized in**

that said elastically deformable member is interposed between said pair of shoulders and said connecting member, which is associated with said first flap.

13. The lever according to claim 12, **characterized in that** a pair of wings protrudes from said pair of shoulders toward the end of said second flap, said wings being arranged on a plane which is approximately perpendicular to said first flap and to said pair of shoulders.
14. The lever according to claim 13, **characterized in that** said connecting member comprises a pair of resting surfaces which protrude in an upward region so as to respectively face said pair of wings.
15. The lever according to claim 14, **characterized in that** said elastically deformable member is constituted by a pair of elastically deformable members which are interposed between said pair of wings and said pair of resting surfaces.
16. The lever according to claim 1, **characterized in that** said base is associated, at a first end, with said elastically deformable member, which is in turn associated with said first flap by means of said connecting member, which is constituted by a separate rivet.
17. The lever according to claim 16, **characterized in that** said elastically deformable member is constituted by a cylindrical helical spring which is arranged approximately in a region below the free end of said lever arm.
18. The lever according to claim 1, **characterized in that** it comprises a first base which is rigidly coupled to said first flap and is provided with two shoulders between which said lever arm is articulated, said lever arm being U-shaped and said traction member being pivoted between the wings of said U-shaped arm, said traction member being rotatably associated, at its free end, with said bridge, said rack being slidably associated with said second flap of said shoe and sliding toward said lever arm in contrast with said elastically deformable member.
19. The lever according to claim 1, **characterized in that** said rack is slidably guided longitudinally with respect to a second base which is arranged below it by guided connection means.
20. The lever according to claim 19, **characterized in that** said second base is L-shaped and is associated with said second flap at least at one end.
21. The lever according to claim 20, **characterized in**

that said second base is constituted by a flat body arranged above said second flap and provided with a tab which protrudes toward said bridge at the end of said second base which is directed toward said lever arm.

22. The lever according to claim 21, **characterized in that** said guided connection means which protrudes below said rack is constituted by one or more protrusions which interact with a through slot formed longitudinally in said second base.
23. The lever according to claim 22, **characterized in that** said one or more protrusions are T-shaped and are constituted by a stem which can slide within said through slot and is associated with a head which can slide below said second base.
24. The lever according to claim 23, **characterized in that** said elastically deformable member is arranged between said rack and said tab of said second base.
25. The lever according to claim 24, **characterized in that** said elastically deformable member is constituted by a cylindrical helical spring which acts by compression upon a translation movement of said rack toward said lever arm.
26. The lever according to claim 1, **characterized in that** said rack, at its end directed away from said lever arm, is associated with said at least one elastically deformable member, which is in turn associated with said second flap.
27. The lever according to claim 26, **characterized in that** said elastically deformable member comprises a cylindrical spring acting in contrast with the sliding motion of said rack toward said lever arm.

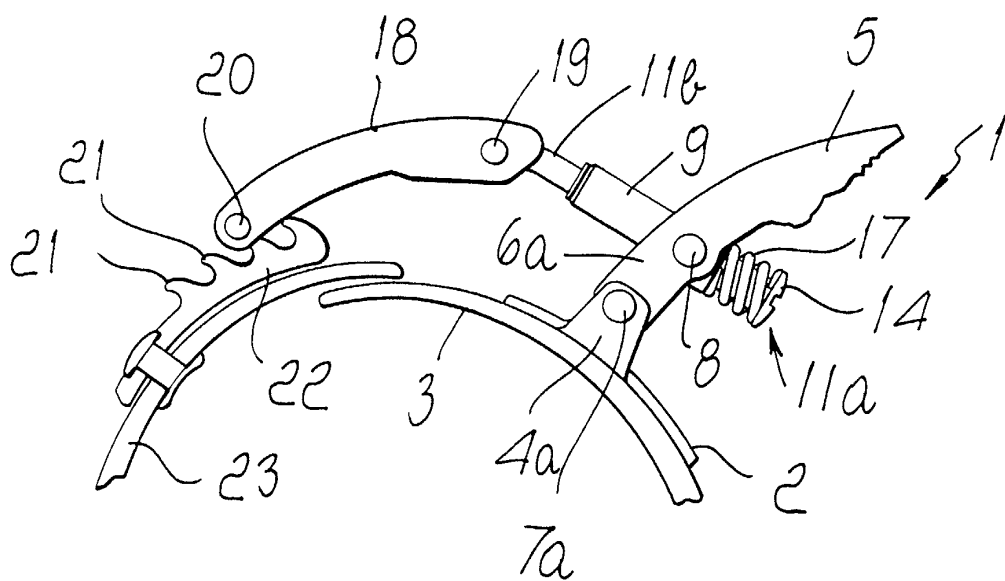


Fig. 1

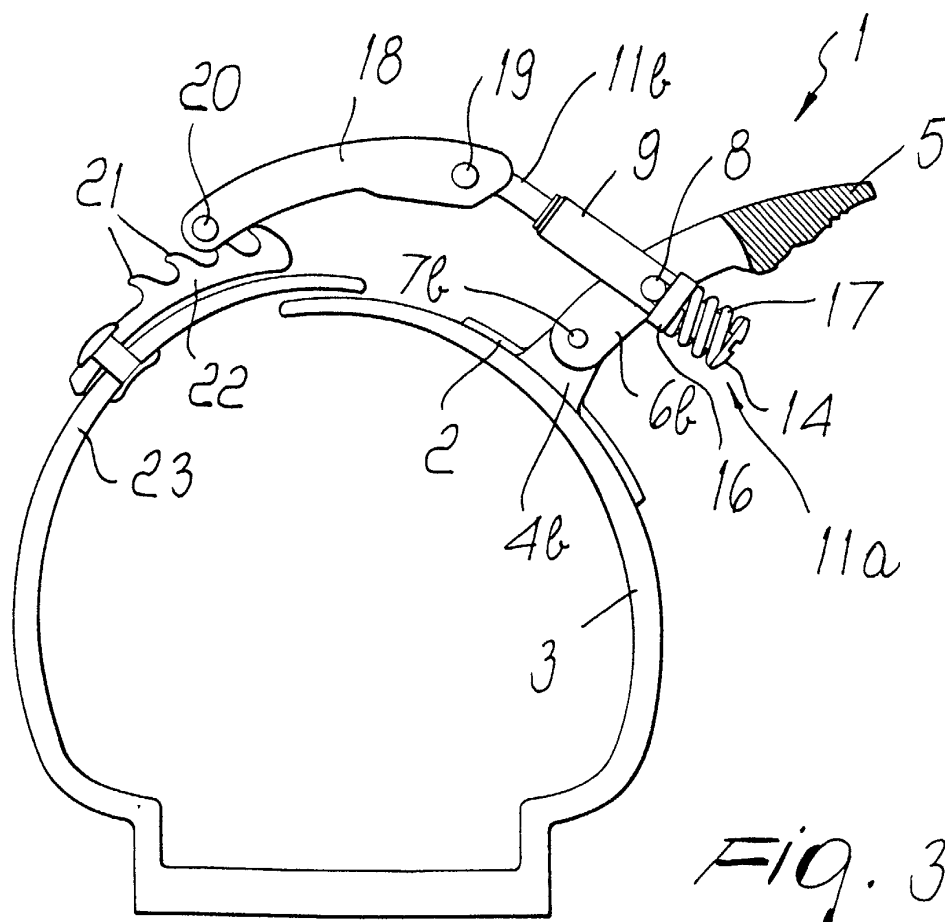


Fig. 3

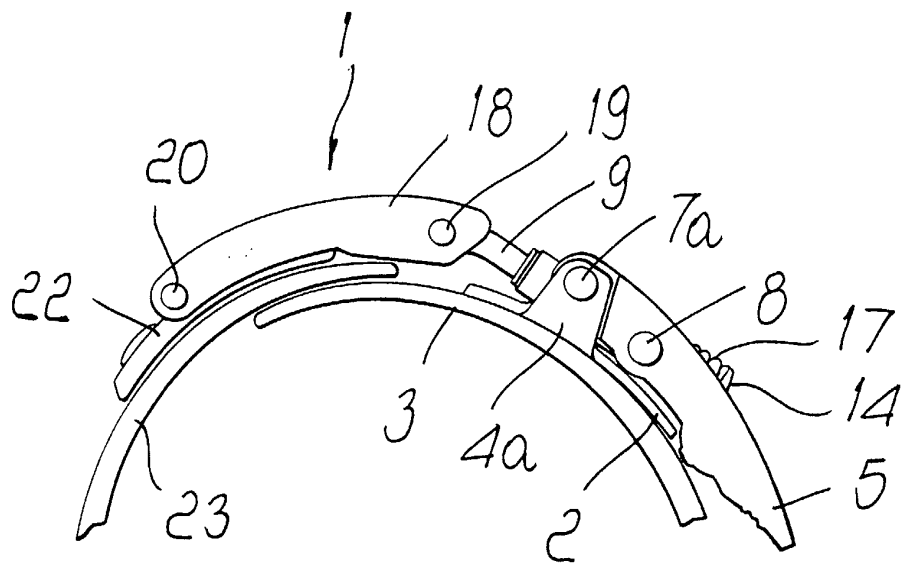


Fig. 2

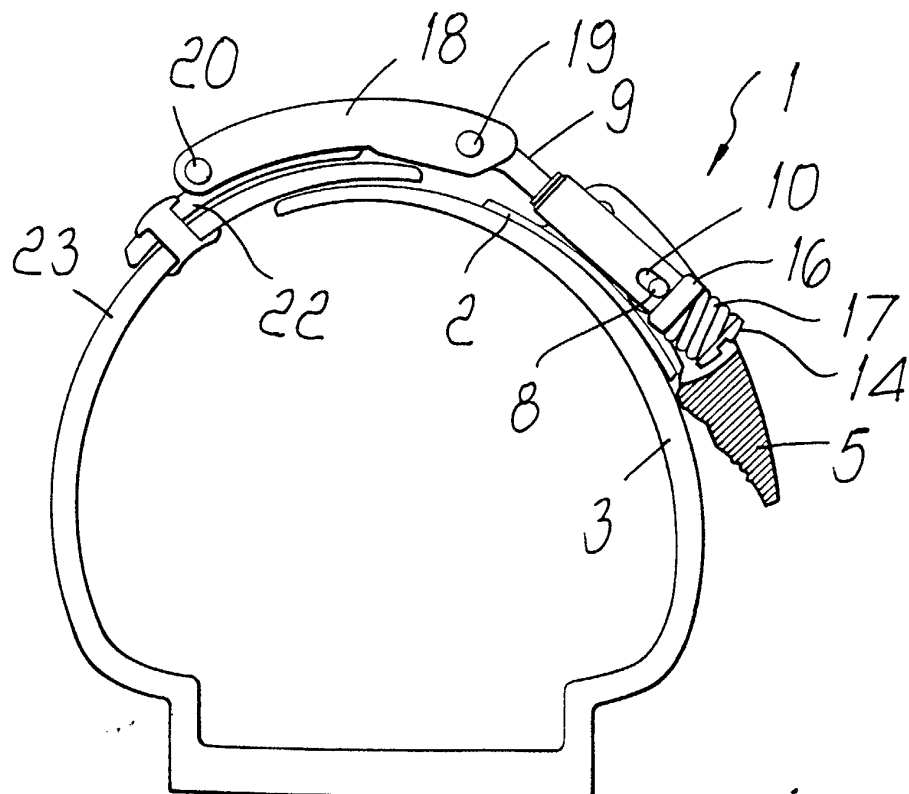
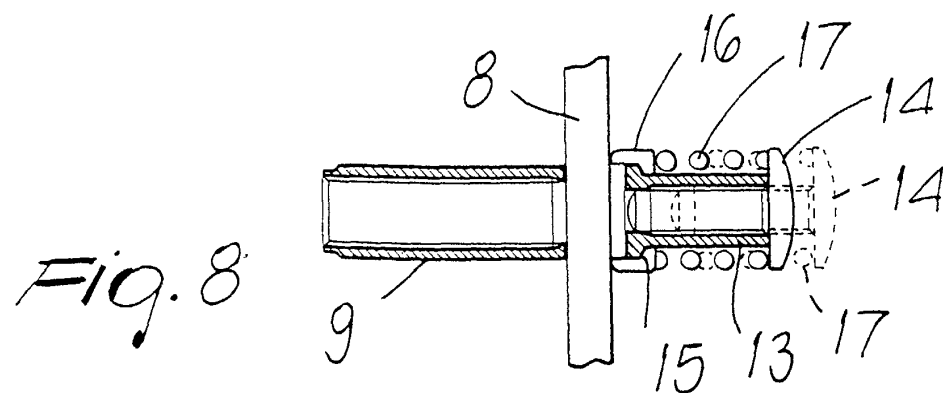
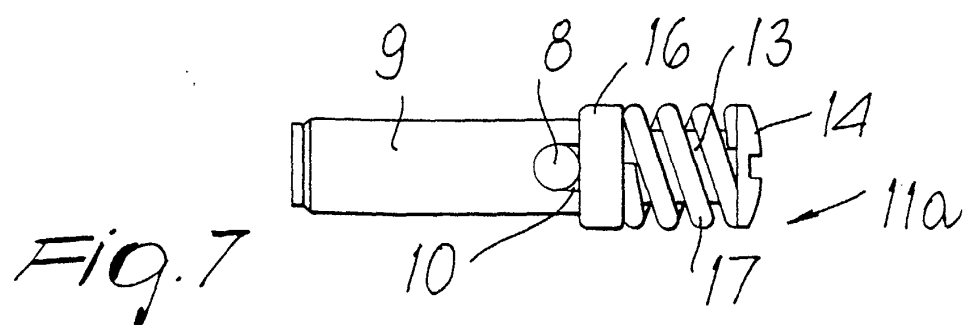
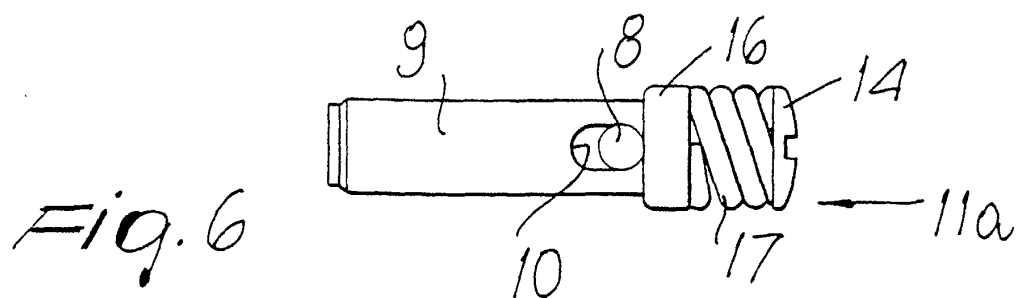
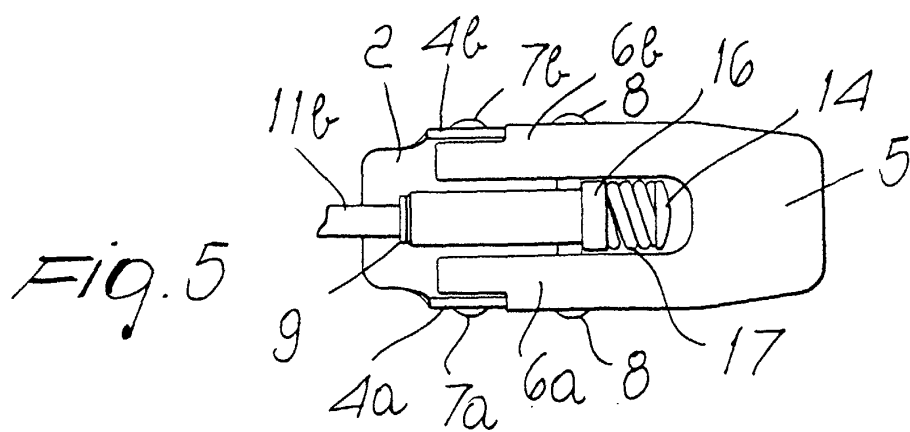


Fig. 4



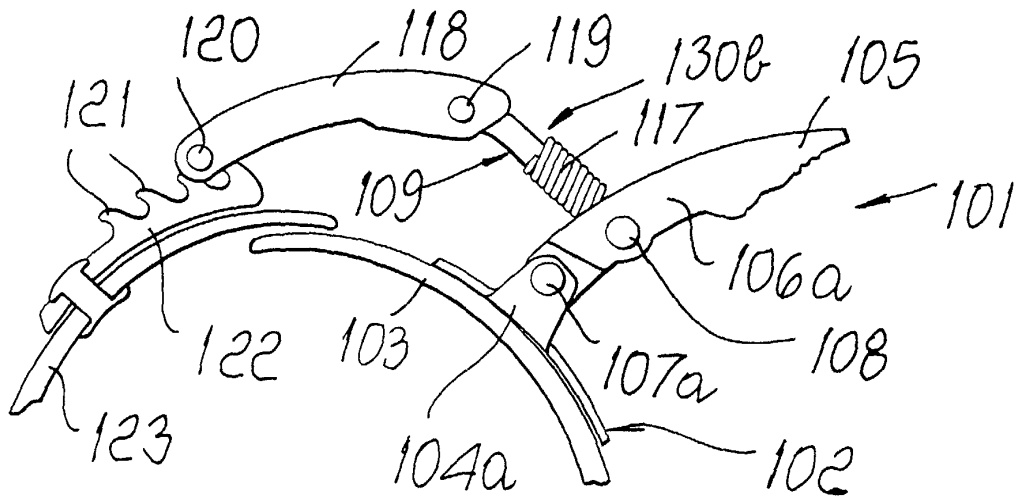


Fig. 9

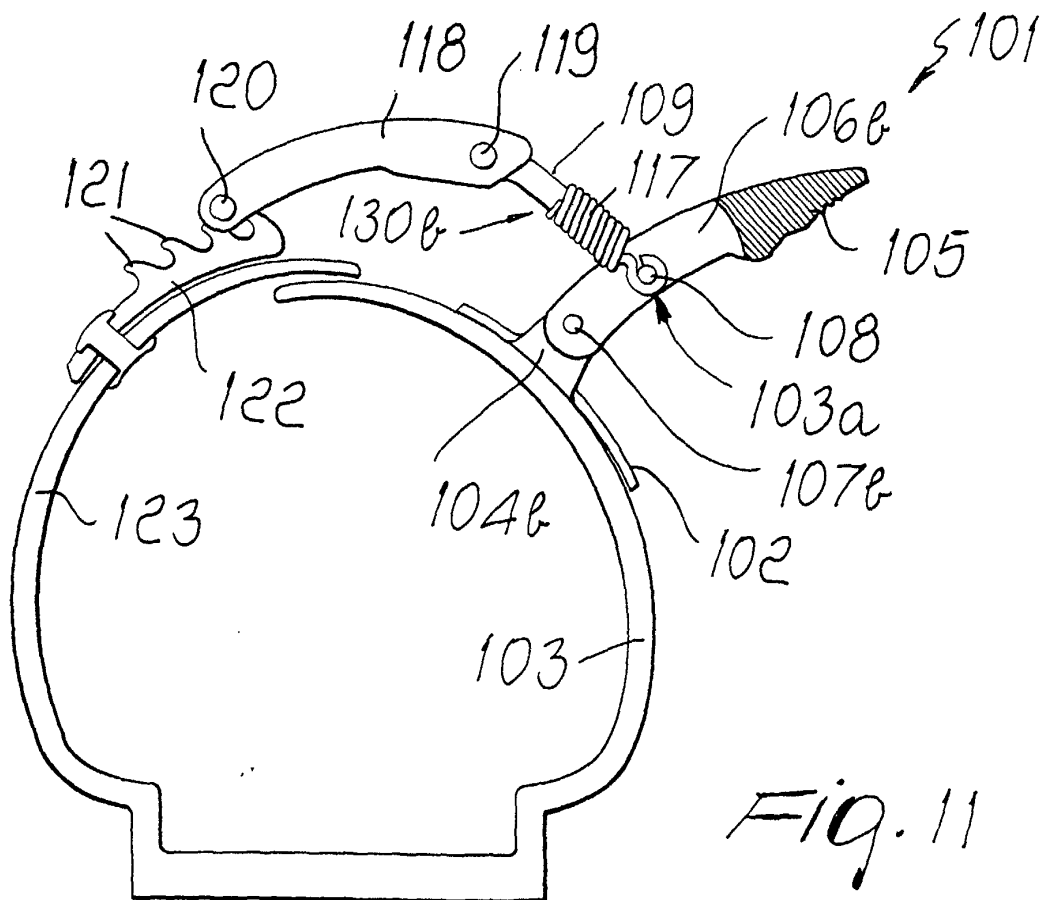


Fig. 11

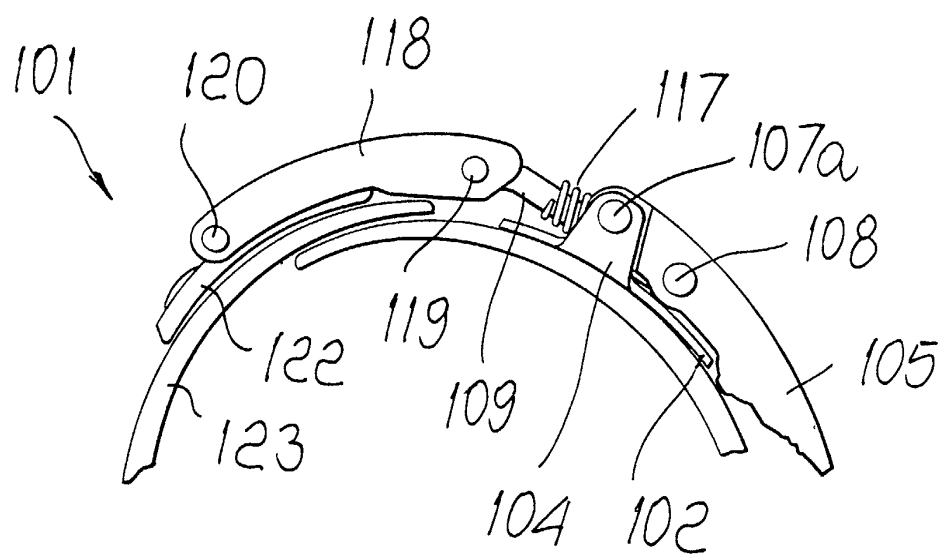


Fig. 10

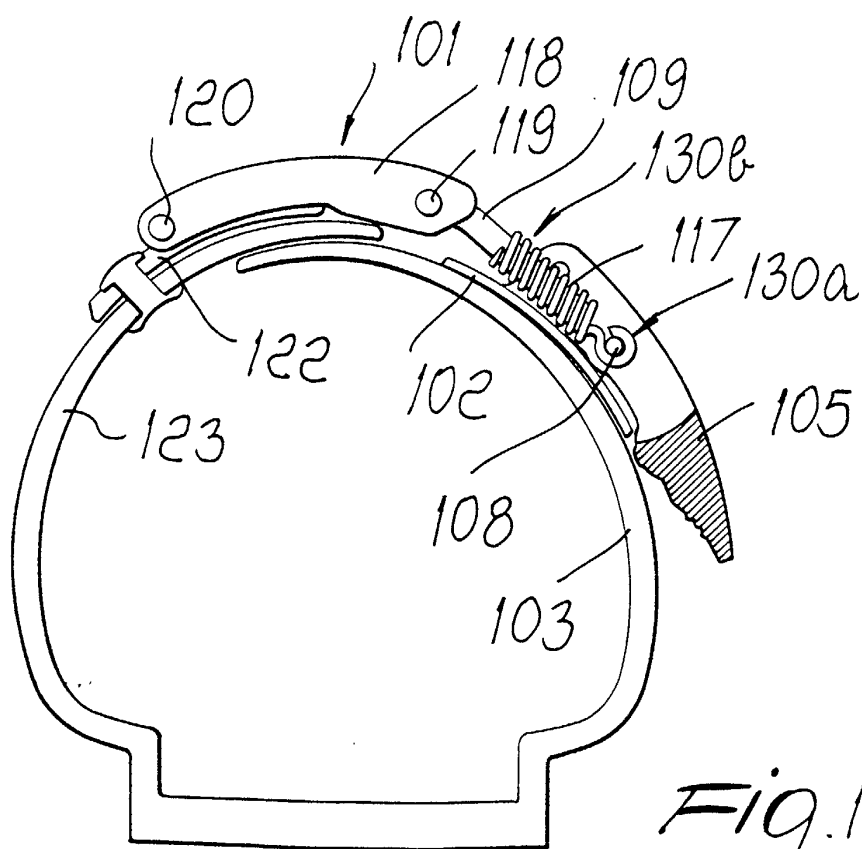


Fig. 12

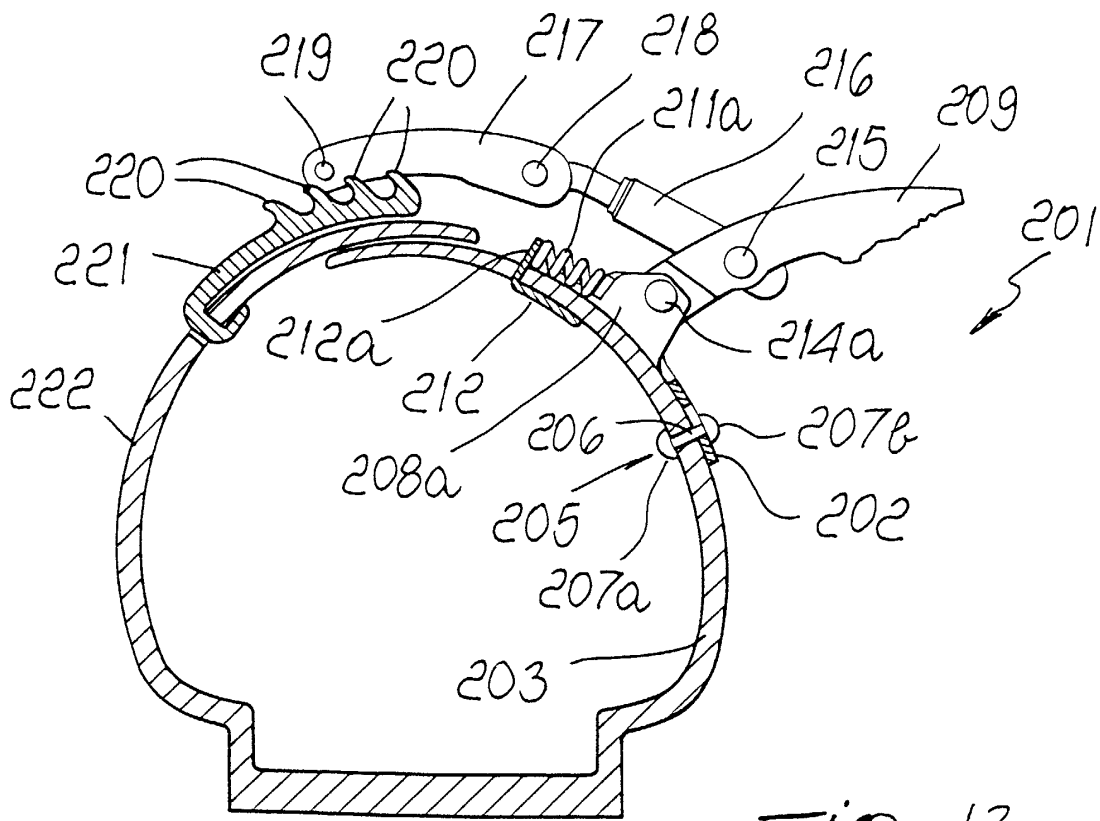


Fig. 13

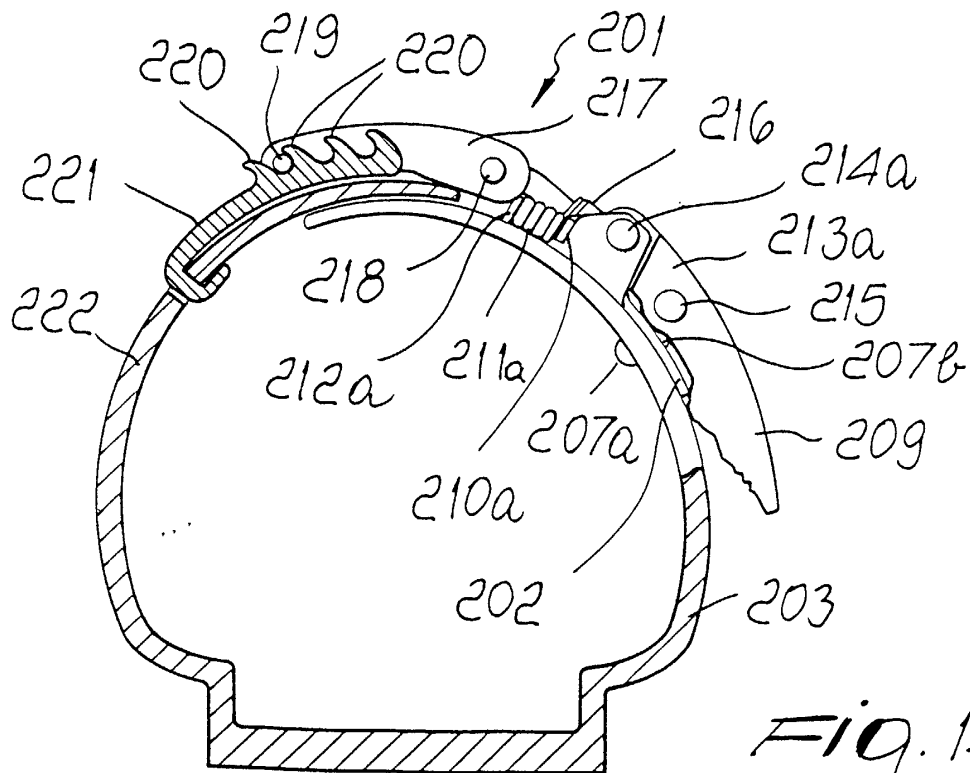


Fig. 14

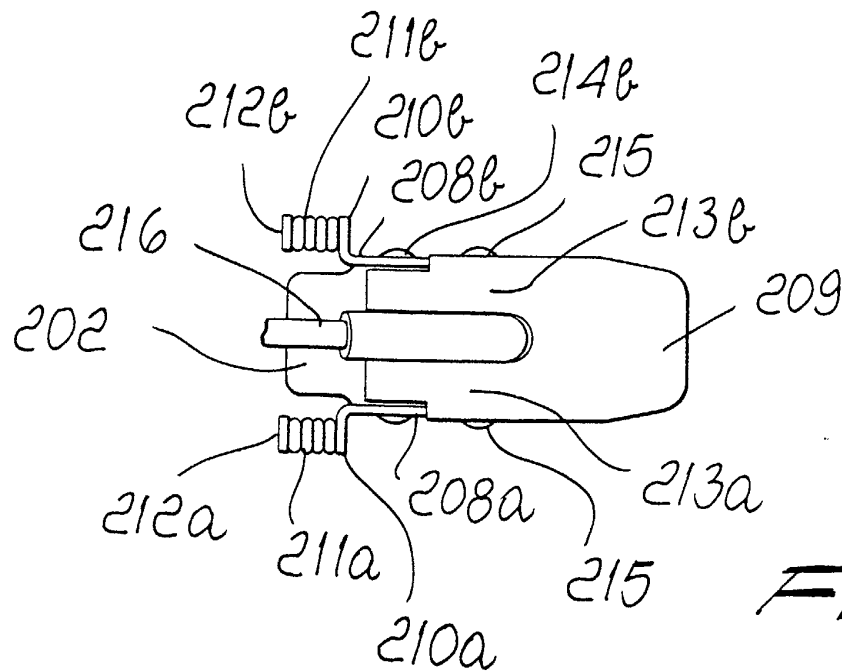


Fig. 15

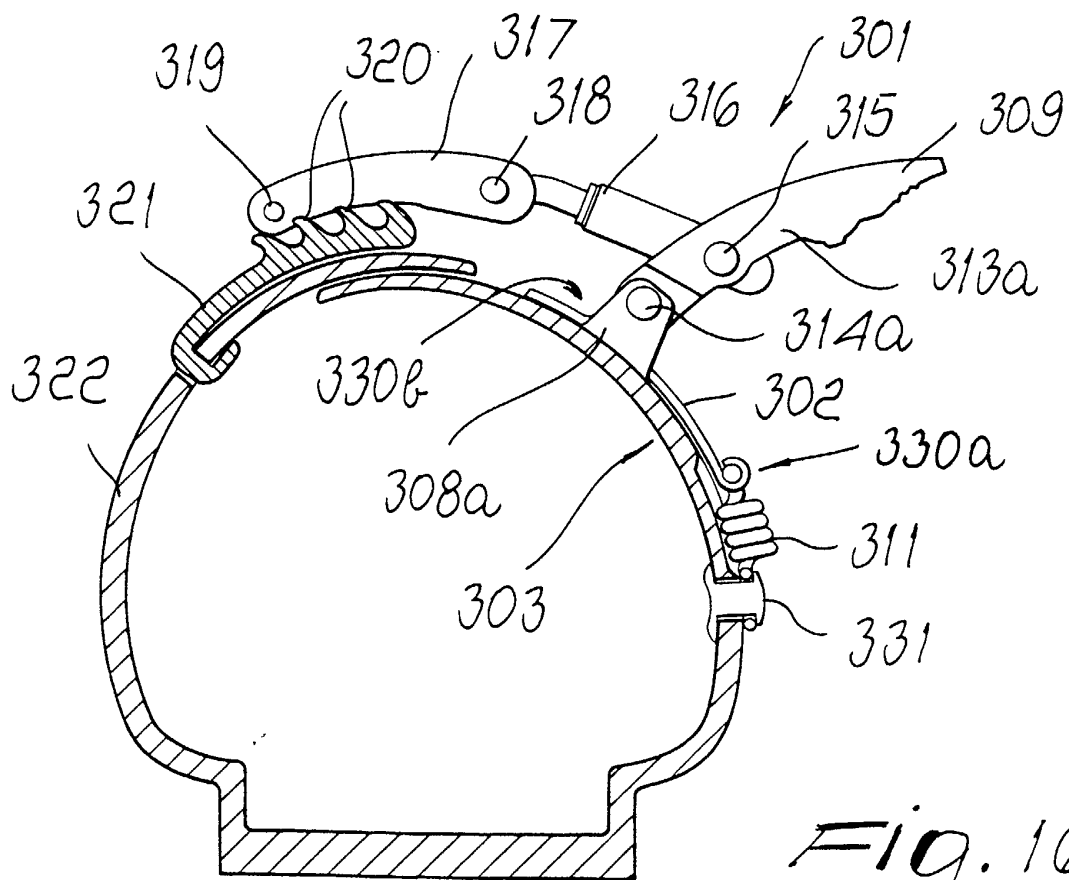


Fig. 16

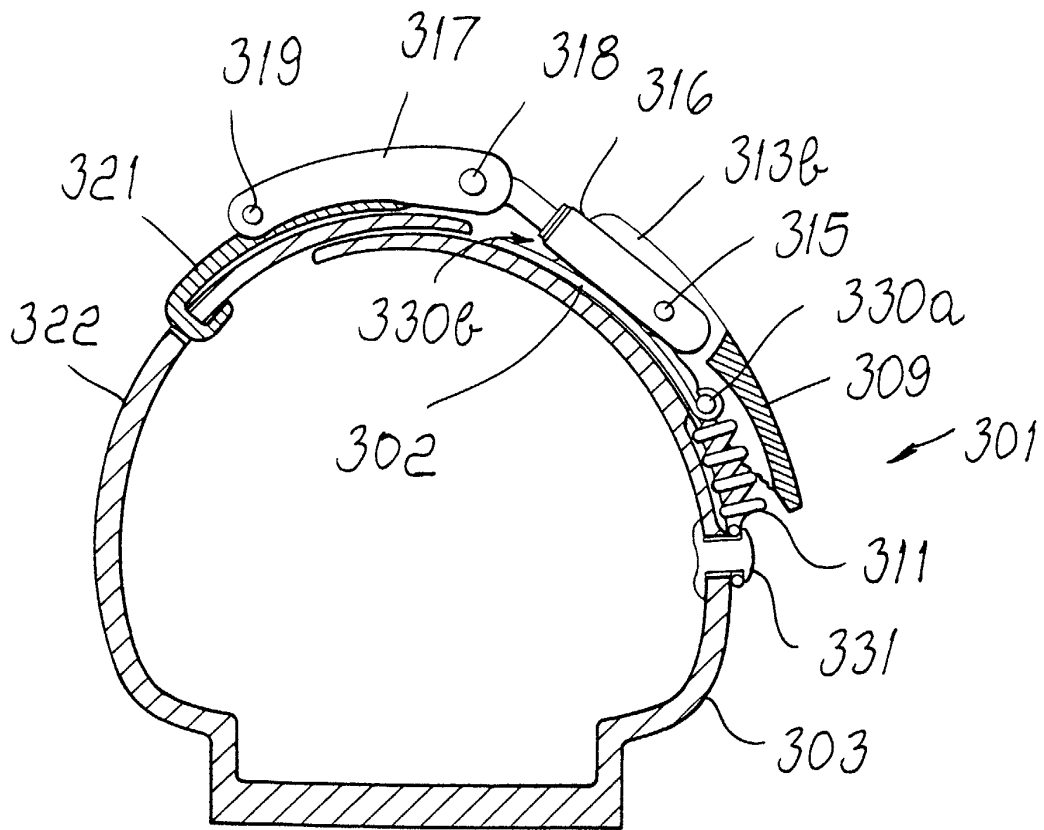


Fig. 17

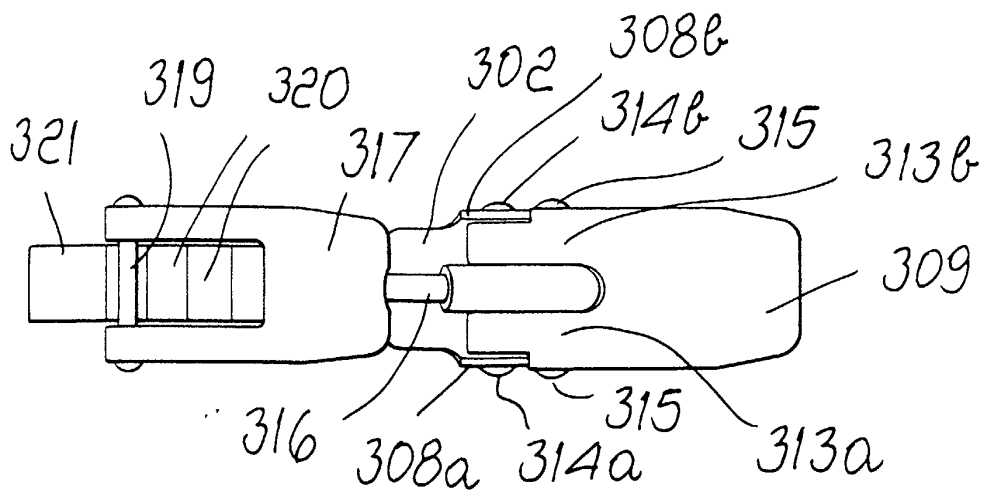


Fig. 18

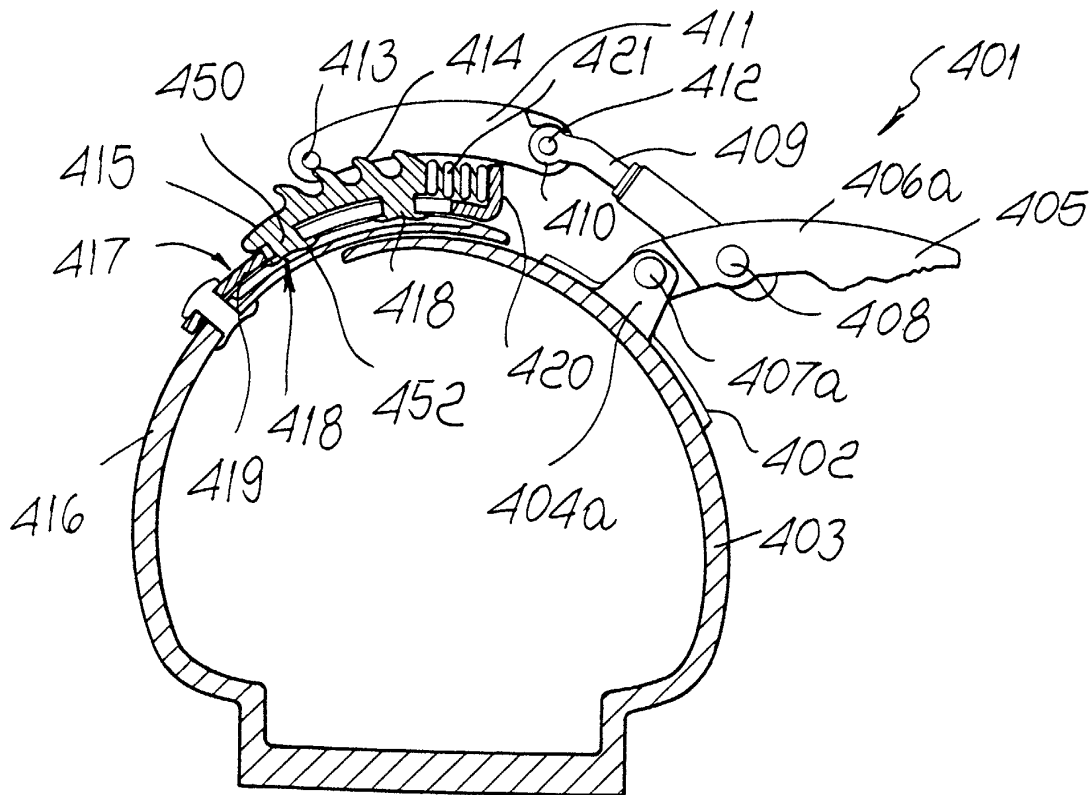


Fig. 19

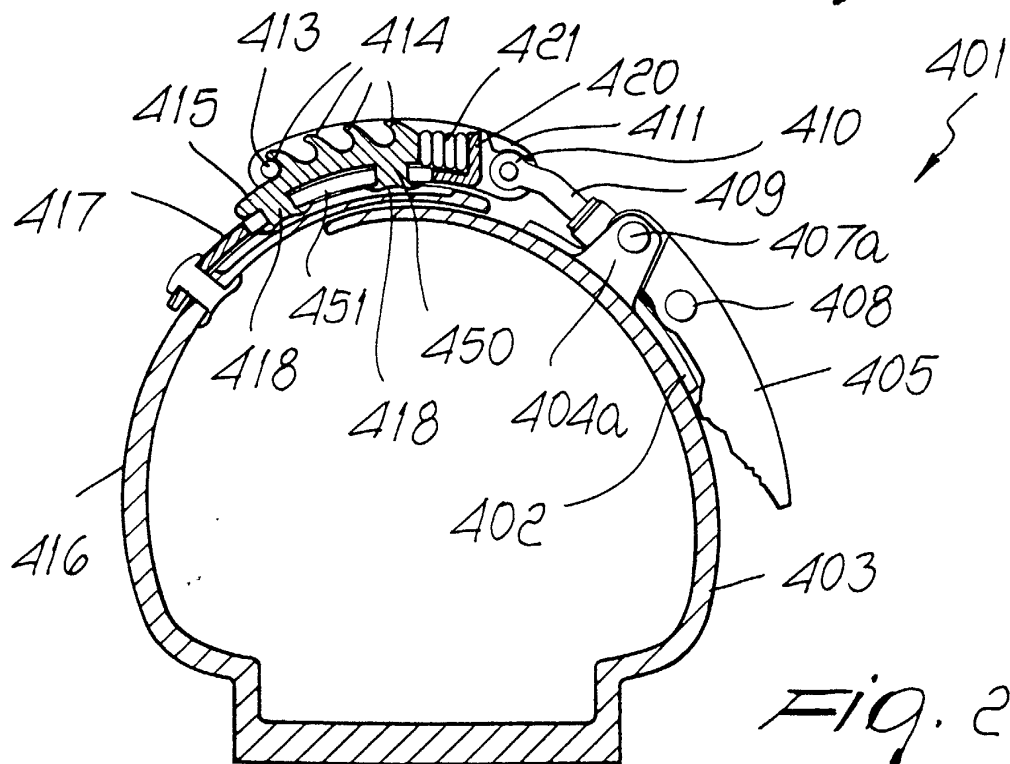
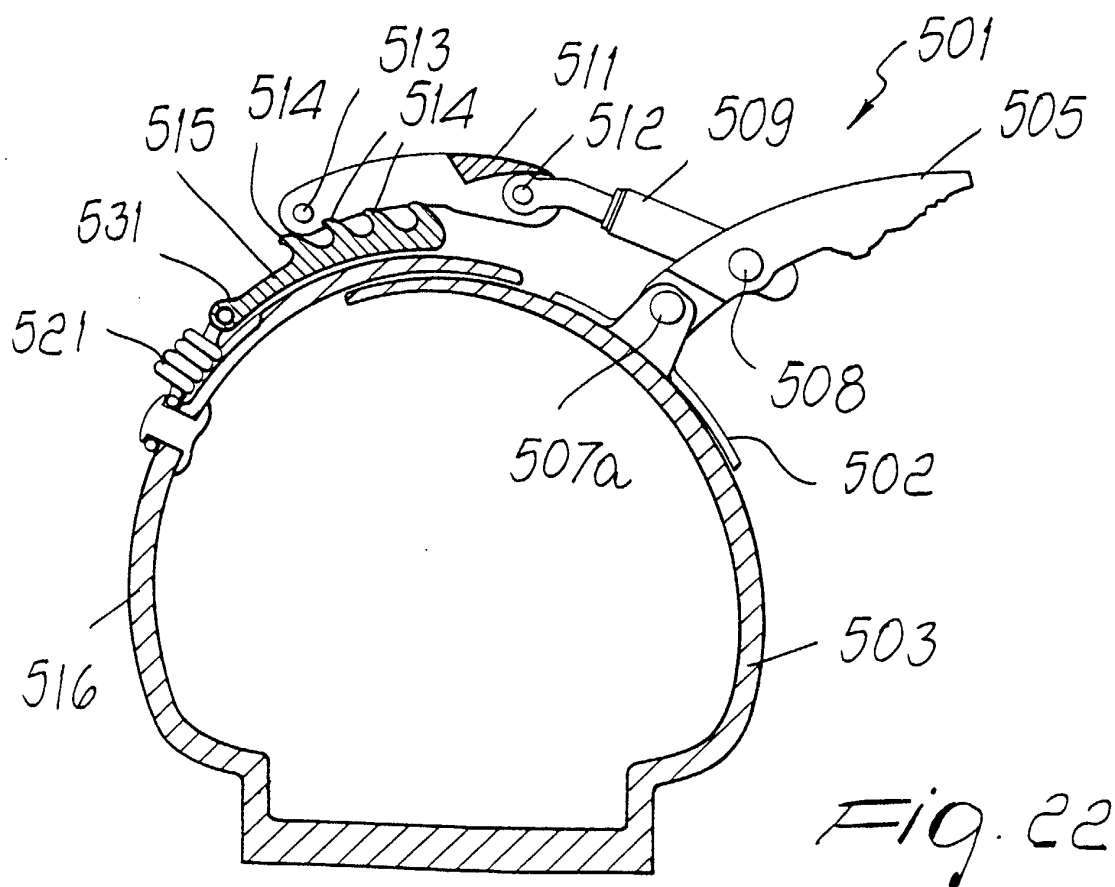
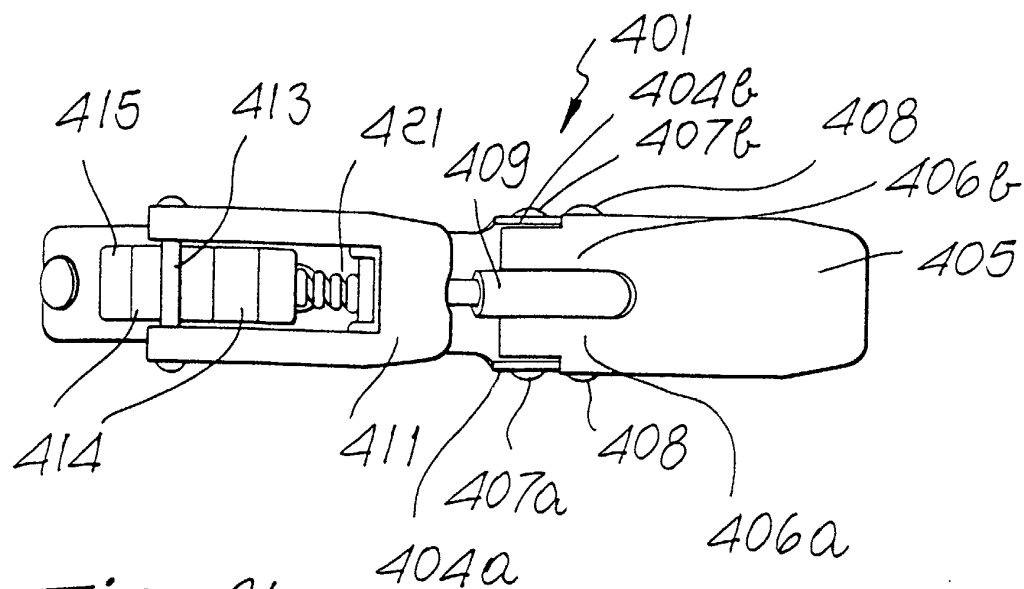


Fig. 20



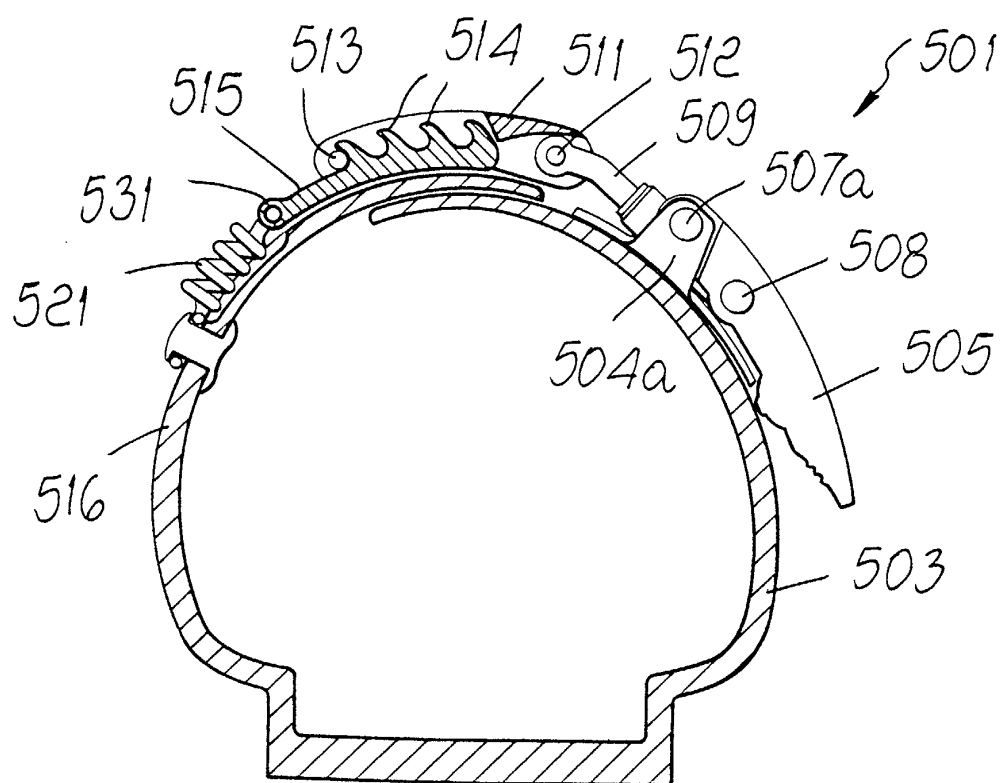


Fig. 23

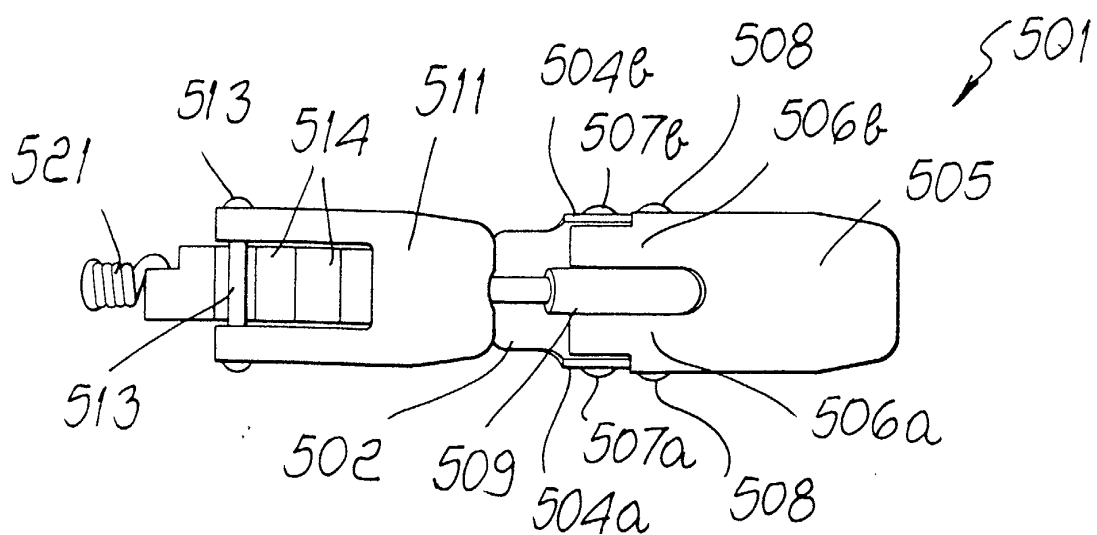


Fig. 24