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(54) Benævnelse: **APPARAT TIL FASTGØRELSE AF EN SKINNE**

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Technical field

The present invention relates to a device for fastening running rails to a supporting structure.

Background of the invention

Not only in the rail systems of railway installations, but also in overhead crane systems, harbour cranes, gantry cranes or automated warehouses, it is common practice to fasten the rails to a base or rail support by means of fastening components which pinch or clamp the rail. The rail support may comprise a support plate or a supporting cross-piece to which the fastening components, also known as clips, clamps or alternatively claw plates, are arranged so as to hold the rail in position.

The rail is commonly made up of a lower part or flange which rests on the rail support and a vertical central part or web which connects the lower part to an upper part. The upper part comprises a rolling or running head for a vehicle.

To hold the rail in place, the fastening component generally bears down on the top of the flange by means of a lug protruding towards the rail. The fastener may alternatively or additionally bear against the outer edge of the flange to form a lateral stop for positioning the rail.

Depending on the situation, the fastening components are bolted and/or welded to the rail support. In the case of welded mounting, commonly used fasteners comprise a base welded to the support and an upper part forming a rail retaining flange removably fastened to the base. In the other mounting variant, the fasteners are anchored to the mounting support by means of bolts. Bolted fastening components are easier to disassemble but are not capable of withstanding as high loads as welded fastening components.

Fastening components which are well known in the field are those sold by GANTRAIL (Gloucestershire, United Kingdom) or GANTREX (Nivelles, Belgium), which offer welded and bolted rail clamping clips. The clip comprises a body from which extends a holding lug equipped with a resilient pad (also known as a nose)

which comes into contact with the upper face of a flange of a rail. The body comprises an oblong opening which allows a fastening bolt to pass through while nevertheless permitting translational adjustment of the body with respect to the side face of the rail so as to limit lateral displacement of the rail. On installation, the bolt is first put in place and then the body is engaged over the bolt. A washer is placed between the clamping nut and the body. The washer has a lower face with a profile which cooperates with the upper surface of the body around the oblong hole so as to achieve self-locking.

The resilient pad is generally an elastomer which may either be vulcanised or adhesively bonded to the face of the holding lug facing towards the flange. Fitting typically entails its spending 15 to 20 min in an oven at a temperature of 200°C.

Although the Gantrail or Gantrex clips are very widely used, they do have some drawbacks. During installation, the position of the clip along the rail is adjusted by hammering after the clip has been partially tightened. This is not a highly precise operation. Furthermore, the washer being a separate part, there is a risk of its being lost during transport. Finally, the resilient pad (or nose) remains a fragile part which is sensitive to the operating conditions: rain, salt, UV, temperature. The clips are therefore frequently replaced during track maintenance campaigns because the resilient pad (or nose) is worn out.

Other conventional rail fastening clips are described in US 4,821,957, EP 1,013,827, and GB 2,551,404.

Object of the invention

The object of the present invention is to provide an improved fastening device for fastening a rail to a supporting structure which does not exhibit the drawbacks of known fastening components.

General description of the invention

In accordance with the present invention, a fastening device for fastening a running rail to a supporting structure comprises

a body capable of being fastened along a rail on the supporting structure by means of a screw fastening member engaged through the body, for example in a through-passage;

a holding lug configured to extend from the body above a flange of the rail; and

a compression pad or nose fastened to a face of the holding lug facing towards the rail flange and intended to bear on an upper face of the rail flange.

It will be appreciated that the device according to the invention also comprises positioning means enabling the position of the body to be adjusted with respect to the rail when the fastening member is engaged through the body, in particular in the through-passage. Furthermore, the compression nose is fastened to the holding lug by way of removable fastening means.

In use, the fastening member, which generally takes the form of a pin or cylindrical rod with an externally threaded end, is therefore engaged from below up through the body. The externally threaded end stands proud of the top of the body and a nut is screwed onto this end, so bearing on the upper part of the body to clamp it against the supporting structure.

As explained above, the compression nose is one of the earliest wearing parts of the device. This is due to the fact that it is often made of a polymeric material, in particular of elastomer. The removable fastening means by the compression nose enable replacement of the nose, should it wear, independently of the other elements of the device and so save a complete manufacturing process of the device each time a repair is necessary.

The nose may be fastened to the holding lug by elastic deformation and/or by form-fit.

The nose takes the form of a bar, in particular with a substantially rectangular or trapezoidal section, said bar comprising a fastening face in contact with the holding face of the fastening lug, and an opposing bearing face intended to come into contact with the upper face of the rail flange. At least two studs project from the

fastening face of the nose and are forcibly engaged in holes, preferably through-holes, in the lug.

In common applications, the nose is made of polymeric material. It is typically manufactured by injection moulding. Any suitable polymer can be used, in particular elastomers such as, for example SIPLOPRENE or MEGOL. For applications exposed to elevated temperatures, such as, for example running rail tracks installed in a furnace, the nose may be manufactured from metal, in particular from steel.

According to one variant of the welded clip type, the body comprises a through-passage in the form of an oblong hole and the fastening member is anchored in a fixed seat, which supports the body and is welded to the rail-supporting structure rail, said fastening member being engaged in the through-passage of the body. The seat preferably comprises faces for guiding the body in translational movement.

According to one variant of the bolted clip type, the positioning means comprise a cam accommodated in the body and comprising a through-passage for the fastening member. The cam is mobile in the body so as to allow modification of the relative position of the fastening member with regard to the body. In particular, the cam is accommodated in a cylindrical through-passage, and is rotationally mobile in this passage about a pivot axis passing through the centre thereof. The through-passage for the fastening member is offset relative to the pivot axis. The result is a compact clip with an eccentric cam that allows easy adjustment of the body relative to the rail. Advantageously, the cam comprises a lateral surface with an annular portion tapered, in particular conical, in form which bears on a corresponding surface of the internal wall of the cylindrical passage. The use of a cam with a profile of revolution which is not a right cylinder makes it possible to distribute the loads over the entire circumference of the cam and therefore to avoid the localised wear which might occur with a right cylinder.

In practice, the fastening member comprises a bolt, the head of which is accommodated below the body (locked in the seat or in the supporting structure),

and a nut which is screwed onto the bolt end standing proud of the through-passage and is loaded against the body or the cam.

Depending on the variant embodiments, the through-passage advantageously comprises an internal thread, and the cam comprises an external thread corresponding to the internal thread of the passage. In use, the external thread of the cam is loaded against the internal thread of the passage by tightening a nut screwed onto the screw fastening member end standing proud of the cam. Here again, the presence of the external/internal thread provides good circumferential contact between the two parts.

The external and internal threads are preferably configured such that, in the fully screwed-in position of the cam, or starting or lower position, the through-passage for the fastening member is positioned distally of the lug, and after rotation of approximately half a turn, the cam is in the upper position, elevated relative to the starting position, and the through-passage for the fastening member is positioned proximally of the lug. Thanks to this structural measure, if the cam is loaded to move from the starting position towards the upper position, the cam undergoes an ascent which is braked by the nut.

A blocking stop is preferably provided in the passage so as to limit rotation of the cam. The upper part of the cam is shaped to cooperate with said cam so as to limit the rotation to less than one turn, in particular approximately half a turn.

Preferably, a collar protrudes from the upper face of the cam and surrounds the through-passage of the fastening member, the collar having an external contour suitable for engagement with a tool allowing application of a rotational movement to the cam, the external contour preferably being hexagonal.

Detailed description with reference to the figures

Other details and features of the invention will emerge from the following detailed description of at least one advantageous embodiment, provided by way of illustration with reference to the appended drawings, in which:

[Fig. 1] is a view of a first embodiment of the present rail fastening device mounted against the flange of a rail;

[Fig. 2] is an exploded view of the device of Figure 1;

[Fig. 3] is a plan view of the device of Figure 1, with the body in its extreme distal position;

[Fig. 4] is a plan view of the device of Figure 1, with the body in its extreme proximal position;

[Fig. 5] is a perspective view of a second embodiment of a fastening device for fastening a rail to a supporting structure;

[Fig. 6] is an exploded view of the device of Figure 5;

[Fig. 7] is a plan view of the device of Figure 5, with the body in its extreme distal position;

[Fig. 8] is a plan view of the device of Figure 5, with the body in its extreme proximal position;

[Fig. 9] is a sectional view along a plane 9-9 of Figure 7, the device being mounted against a flange of a rail;

[Fig. 10] is a sectional view along a plane 10-10 of Figure 8, the device being mounted away from a flange of a rail;

[Fig. 11] is a plan view of a third embodiment of a fastening device for fastening a rail to a supporting structure;

[Fig. 12] is a sectional view of the device of Figure 11, with the body in an extreme distal position; and

[Fig. 13] is a sectional view of the device of Figure 11, with the body in an extreme proximal position.

A first embodiment of the present rail fastening device will be described in relation to Figures 1 and 2. The device 10 comprises a body 12 with a holding lug 26 integral therewith, which extends laterally beyond the body 12 so as to be located above a lateral flange 14 of a running rail 15 (represented in abstract). The body 12 cooperates with a seat 16 fastened to a supporting structure 17 of the rail 15, such as typically a supporting side member or plate. Once assembled, the body 12 is typically fastened in contact with the flange 14. Reference sign 24 denotes a side contact face of the body, beneath the lug 26, oriented towards the flange.

In this embodiment, the body 12 rests by its lower portion known as the sole 18 on the seat 16, which is fastened to the supporting structure by welding. This type of device 10 is thus commonly known as a welded clip.

The body 12 comprises a through-passage 20, here taking the form of an oblong hole, intended to receive a screw fastening member 22.

The fastening member 22 is generally a bolt, and in particular a pin 28 and a nut 30. The pin 28 is engaged in the through-passage 20 of the body 12, from the bottom upwards and stands proud of the upper surface of the body 32 where the nut 30 is arranged. In welded clips, the pin 28 is typically anchored in the welded seat 16. To this end, the seat 16 is provided with a receptacle formed by a notch 34 which allows the pin 28 to be introduced into the seat 16. A head 36 of the pin preferably comprises a rotation blocking element held in place in the notch 34 by form-fit. The head 36 of the pin is here rectangular in shape, as is the notch 34.

When the welded clip 10 is fastened as shown in Figure 1, the contact face 24 faces towards the rail, and comes into contact with an outer edge 38 of the flange 14 of the rail to limit lateral displacement of the rail.

The holding lug 26 extends above the flange, from the body 12, in a substantially horizontal plane. The purpose of the lug 26 is to limit vertical movement of the rail. It bears on an upper face 40 of the flange by means of a compression nose 42. The nose 42 is fastened in a lower face known as the holding face 44 of the lug 26, facing towards the upper face 40 of the flange 14.

It will be appreciated that the compression nose 42 is fastened to the holding lug 26 by means of removable fastening means 46. The nose 42 may thus be fastened to the body 12 of the device 10 and then removed from the body 12 without impact on the quality and functionality of the other elements of the clip 10.

The compression nose 42, also known as a compression pad, takes the form of a bar with a substantially rectangular or trapezoidal section which has a fastening face 48 in contact with the holding face 44 of the lug 26, and an opposing bearing face 50 in contact with the upper face 40 of the flange 14 of the rail.

The height of the nose 42 between the fastening face 48 and the bearing face 50 is selected as a function of the height of the flange of the rail on which device 10 is to be mounted. The device 10 is therefore adaptable to different types of rails by modifying the profile of the nose 42 which is attached to the lug 26.

The bearing face 50 of the nose 42 may be flat or, as shown in the figures, concave. When the nose 42 is made from a resilient material, the concavity of the lower face allows the nose 42 to deform against the flange and conform to the shape of the flange and increase its contact surface.

The fastening face 48 comprises a flat part 52 which corresponds to the holding face of the lug 26 of the body 12, and comprises two studs 46. These studs may be for example cylindrical and/or conical.

Through-holes 54 of the holding lug 26 receive the studs 46, the holes 54 having a profile which may cylindrical and/or conical and is compatible with the studs 46. The nose is assembled in this case by inserting the studs 46 into the holes 54 of the holding lug, in particular by pressing. The assembly method is thus very quick and involves neither costly nor complex machinery. The stud/hole assembly thus forms a removable fastening means for the nose. The studs are dimensioned to allow them to be introduced forcibly into the holes 54 and be fastened by an interference fit. It will be noted that the holding force of the studs 46 is not critical because, when in service, the nose 42 is pressed against the lug and there is no risk of its becoming

detached. The nose may be easily be detached from the holding lug by releasing the studs from the holes.

A person skilled in the art will understand that any appropriate fastening means may be used to create a removable connection between the compression nose 42 and the holding lug 26 of the body of the device.

Depending on the variant, the fastening means may comprise a fastening system involving resilient deformation, a fastening system involving a form-fit such as, for example, a dovetail connection, or alternatively a fastening system involving screwing, riveting or clamping the nose against the lower face of the holding lug.

The compression nose 42 is preferably made of an elastomeric material. The elastomeric material is advantageously adapted to the environment in which the rail will be installed. An elastomeric material resistant to UV, to seawater, or to temperatures of up to 100-120°C may accordingly be selected. Injection moulding will be the preferred manufacturing method for the nose, but any appropriate manufacturing method may of course be used. In installations where the environment is more restricting such as, for example in a furnace type installation, the compression nose may also be made from a metallic material, for example from S355 steel or equivalent.

The holding face 44 preferably comprises a slight recess (approximately 1 mm deep) which receives the base of the nose 42. When the device is mounted against the flange of the rail, the nose is thus held at its base against transverse and longitudinal forces, which means that shearing problems can be avoided.

The device 10 is furthermore designed to allow the position of the body 12 to be adjusted relative to the rail, when the fastening member 22 is engaged in the through-passage 20 (and therefore stationary). In this variant, the oblong shape of the through-passage 20 forms a positioning means enabling displacement of the body 12 on the (stationary) seat 16 by horizontal translation in the direction of the flange 14 of the rail.

The seat 16 is a substantially flat part which rests with its lower face 58 on the supporting structure 17 of the rail and comprises an opposing upper face 60 which supports the body 12 of the device 10. The seat 16 comprises vertical faces joining the lower face 58 to the upper face 60. The vertical faces comprise a front face 62 facing towards the flange 14 of the rail, a rear face 64 opposite the front face and two side faces 66. Welding is generally provided right around the seat 16.

The body 12 comprises a lower face 75 which rests on the upper face 60 of the seat. The device 10 is designed such that displacement of the body 12 on the seat is guided. A first vertical, oblique guide face 68, which joins the front face 62 and a side face 66, is arranged to enable guidance of the body 12 on the seat 16. The seat 16 comprises an element 70 which projects above its upper face 60, and the projecting element 70 comprises a second guide face 72 parallel to the first guide face 68.

The sole 18 of the body 12 which rests on the seat 16 comprises two parallel, vertical translation faces 74 arranged facing the guide faces 68, 72 of the seat 16. The two guide faces 68, 72 thus serve as guide stops for the translation faces 74 of the body 12.

It will be noted that the oblong hole 20 is oriented with its length extending in a direction parallel to the translation faces 74. Thus, even when the fastening member 22 is inserted in the passage 20, the body can slide against the guide faces 68, 72 of the seat 16 between two positions: an extreme distal position shown in Figure 3, in which the body 12 is away from the flange 14; and an extreme proximal position, shown in Figure 4, in which the body 12 is in contact with the flange 14.

Advantageously, the upper face 60 of the seat 16 has an incline, not visible, relative to the lower face 58, which is oriented in the sliding direction of the body. This incline creates an increase in the thickness of the seat 16 from the proximal edge of the rail towards the distal edge of the rail. The lower face 75 of the body 12 then comprises an incline similar to the incline of the seat 16, with a smaller thickness on the proximal side of the rail. These complementary inclines mean that the total thickness of the clip increases when the body 12 moves away from the rail on the seat 16

(from the configuration of Fig. 4 towards that of Fig. 3), which increases the clamping force applied by the nut and enables a self-tightening or self-locking effect.

Once the body has been installed and positioned, the nut is screwed tight so as to lock the device in position.

A second embodiment of the rail fastening device 110 will now be described with reference to Figures 5 to 10. This embodiment is described in comparison with the first embodiment and identical or similar elements are denoted by the same reference signs incremented by 100.

In this second embodiment, the device 110 comprises a body 112 capable of being arranged directly against a supporting structure of the rail 117 by means of a fastening member 122 extending through the body 112.

The fastening member 122 is here a bolt fastener comprising a bolt 129 and a nut 130. It will be understood that the bolt may be inserted into an orifice of the supporting structure or attached thereto by any appropriate means in order to secure the bolt 129 in the track support. The fastening device 110 of the second embodiment is commonly known as a bolted clip.

The body 112 rests on the rail-supporting structure 117 by its lower part known as the sole 118, and comprises a contact face 124 oriented towards the flange. Reference sign 126 denotes a holding lug integral with the body 112 and projecting beyond the contact face 124 and thus beyond the body 112. The contact face 124 and the holding lug 126 are arranged in a manner similar to the first embodiment. Thus, the holding lug 126 comprises a holding face 144 facing towards an upper face 140 of the flange 114, and a compression nose 142, in the form of bar, is fastened to the holding face 144 by removable fastening means 146, here taking the form of studs projecting from the rear face of the nose.

The device 110 also comprises positioning means allowing adjustment of the position of the body 112 relative to the rail when the fastening member is engaged in a through-passage 120. The positioning means differ from those of the first

embodiment and include an eccentric cam 178 mounted on the bolt 129 and accommodated in a passage formed by the generally circular through-passage 120.

The cam 178 is a generally cylindrical part of revolution with a stepped side surface. At the upper face 132 of the body 112, it is surmounted by a head taking the form of an outer collar 180 with a hexagonal contour. The cam 178 is pivotable in the opening 120 about an axis R_1 extending substantially through the centre of the passage 120 (cf. Fig. 9). Reference sign 182 denotes a through-orifice, eccentric relative to the axis of rotation R_1 of the cam, which allows the bolt 129 to pass through the cam 178, and therefore through the body 112. Axis R_2 is likewise in the centre of the collar 180. The outer collar 180 may be engaged by an appropriate wrench so as to rotate the cam 178 about the axis R_2 of the bolt 129. The nut 130 is screwed onto the part of the bolt 129 standing proud of the head.

When the cam 178 is rotated in the passage 120, it moves horizontally around the bolt 129, displacing the body 112 between two positions: a starting position, shown in Figures 8 and 10, in which the cam is oriented such that the hole 182 is a position distal to the rail, the body 112 normally being mounted in contact with the flange 114; and a “high” position (see below) shown in Figures 7 and 9, in which the cam has rotated by approximately half a turn and the hole 182 is in a position proximal to the rail, the body 112 then being away from the flange 114.

The two extreme positions of the cam 178 are delimited by a finger 184 formed in an internal wall 176 of the through-passage 120, and comprising two stop faces 190 which limit the rotation of the cam 178. To this end, the cam has in its upper section a projecting annular segment 185 which extends over approximately 180°.

The interaction between the cam 178 and the body 112 via the internal wall 176 will now be described in detail.

The internal wall 176 defines a generally conical passage, there being an inlet section 188, an intermediate conical (frustoconical) section 187 and a lower right circular section 186. The passage section narrows in the direction of the lower section.

Similarly, the cam 178 has a generally conical body and comprises a side wall 200 having an upper section 202, an intermediate conical section 204 and a lower circular section 206 circular of smaller diameter.

Threads 208 and 210 are provided respectively on the wall 200 of the cam 178 and the wall 176, over approximately one revolution, at the level of the conical parts. In the position of Figures 7 and 8, the cam 178 is screwed into the opening, abutting against the finger 184. It will be noted that the shapes of the cam 178 and the opening 120 are complementary.

When the cam 178 is rotated into the opening, it follows the threads and is driven in vertical translation. The rotation of the cam 178 is limited to 180°, due to the configuration of the upper section 202 which comprises two portions with different radial extensions (due to the annular segment 185) which extend respectively over approximately half a circumference of the passage.

The structure of the present device 110 is advantageous in that, in all the angular positions of the cam 178, the latter is in contact via the threads with the body 112 through a surface inclined relative to the axis of the fastening member 122. This makes it possible to distribute the cam forces circumferentially on the body, minimising localised wear.

It will also be noted that the direction of the thread is such that, when the cam 178 rotates in the direction which permits movement away from the rail (from the starting position towards the upper position), the cam 178 rises. This structural measure allows the clip 110 to be self-locking. Once the clip has been mounted, the forces which tend to rotate the body relative to the cam are opposed by an increase in the clamping force due to the elevation of the cam 178.

It remains to be noted that while, in the above two embodiments, each device 110 is designed to be mounted with one screw fastening member, there may be a plurality thereof. In this case, body will have separate through-passages for the fastening members, and separate positioning means associated with each of the fastening members.

In the case of two fastening bolts, in the welded clip variant, there will be for example one body with a single lug but two parallel longitudinal orifices, each having a bolt passing therethrough. The two bolts are anchored in a single seat.

In the bolted clip variant, there will be one body with two through-passages and therefore an eccentric cam in each passage.

Finally, Figures 11 to 13 show a last variant of the rail fastening device, denoted 211. The design of device 211 is very similar to that of device 110. Similar or identical elements are therefore denoted by the same reference signs, incremented by 100.

As is apparent from the figures, the body 212 is capable of being arranged directly against a rail-supporting structure by means of a fastening member 222 extending through the body 212 and comprising a bolt 229 and a nut 230.

The body 212 rests on the rail-supporting structure by its lower part known as the sole 218, and comprises a contact face 224 oriented towards the flange of the rail. Reference sign 226 denotes a holding lug integral with the body 212 and projecting beyond the contact face 224. Thus, the holding lug 126 comprises a holding face 244 which, in service, faces towards an upper face of the rail flange. A compression nose 242, in the form of bar, is fastened to the holding face 244 by removable fastening means 246, here taking the form of studs projecting from the rear face of the nose and forcibly engaged in holes in the holding lug 246.

The device 211 mainly differs from device 110 in that it comprises a simplified threadless eccentric cam 278. The cam 278 is thus a generally cylindrical part of revolution with a stepped side surface. There is an upper cylindrical section 302, surmounted by a head in the form of an outer collar 280 with a hexagonal contour, an intermediate frustoconical part 304, and lower right cylindrical part 306.

The cam is pivotable in the opening 220 about the axis R_1 extending substantially through the centre of the passage 220. The bolt 229 extends through the cam 278 through a through-orifice 282 which is eccentric to the axis of rotation R_1 of the cam. The through-orifice 282 of axis R_2 is aligned with the collar 280.

The passage 220 of the body 212 has an internal profile adapted to the profile of the cam 278. The internal wall defines a generally conical passage, there being an inlet section 188, an intermediate conical (frustoconical) section 287 and a lower right circular section 286. The passage section 220 narrows in the direction of the lower section.

The internal wall of the passage 220 and the outer surface of the cam 278 are smooth and of corresponding dimensions, give or take an operating clearance.

By engaging a wrench on the outer collar 280, the cam 178 can be rotated about the axis R_2 of the bolt 129. Unlike the variant of Figures 7 to 10, the cam is not elevated.

When the device 211 is screwed onto a track, the cam 278 loaded by the bolt 222 on the body 212 is therefore in intimate contact with the later, according to a circular surface corresponding to the conical sections 287 and 304 facing the cam and the body.

The rotation of the cam 278 is limited by a stop 284 positioned in the upper part of the passage 220. The stop 284 projects into the passage 220 and cooperates with an annular segment 285 projecting from the side face of the section 302. The annular segment 285 extends over approximately 150° and makes it possible to limit the rotation of the cam to approximately 180°.

Figures 11 and 12 show the cam 278 in a first stop position, the head 280 being close to the nose 226: this is the “distal” position, similar to Figures 7 and 9. Figure 13 shows the opposing extreme position of the cam 278 which corresponds to the proximal position of Figures 8 and 10.

Patentkrav

1. Fastgørelsesapparat til fastgørelse af en skinne på en bærestruktur, idet fastgørelsesapparatet omfatter:

et legeme (12; 112; 212), der er egnet til at fastgøres langs en skinne (15) på bærestrukturen ved hjælp af et skrue-fastgørelsesorgan (22; 122; 222), der er ført ind gennem legemet;

en holdeflig (26; 126; 226), der er udformet til at strække sig fra legemet over en skinnefod; og

en kompressionsnæse (42; 142; 242) fastgjort på en side (44; 144; 244) af holdefligen, der vender mod skinnefoden og er beregnet til at støtte på en overside af en skinnes fod;

i hvilket apparatet endvidere har placeringsmidler, der tillader indstilling af legemets (12; 112; 212) placering i forhold til skinnen, når fastgørelsesorganet er ført ind gennem legemet; og

i hvilket kompressionsnæsen (42; 142; 242) er fastgjort til holdefligen med aftagelige fastgørelsesmidler, idet næsen (42; 142; 242) tager form af et spænde, idet spændet har en side til fastgørelse (48) i kontakt med fastgørelsesfligens (26) holdeside, og en modstående bæreside (50), der er beregnet til at komme i kontakt med skinnefodens (14) overside (40); **kandetegnet ved, at** mindst to tappe (46) stikker frem fra næsens (42) fastgørelsesside (48) og med kraft er ført ind i huller (54) i fligen (26).

2. Fastgørelsesapparat ifølge krav 1, i hvilket næsen (42; 142; 242) har form af et spænde med i det væsentlige rektangulært eller trapezformigt tværsnit.

3. Fastgørelsesapparat ifølge krav 1 eller 2, i hvilket de huller (54) i fligen (26), der modtager tappene (46), er gennemgående.

4. Fastgørelsesapparat ifølge et hvilket som helst af kravene 1, 2 eller 3, i hvilket næsen er af et elastomert materiale eller af metal.

5. Fastgørelsesapparat ifølge et hvilket som helst af de foregående krav, i hvilket legemet (12) omfatter en gennemgående passage i form af et aflangt hul (20); og fastgørelsesorganet (22) er forankret i en faststående sokkel (16), der bærer

legemet (12) og er svejset til skinnens bærestruktur, og er ført ind i den gennemgående passage (20);
idet soklen (16) fortrinsvis omfatter flader (68, 72) til translationsbevægelse af legemet (12).

6. Fastgørelsesapparat ifølge et hvilket som helst af kravene 1 til 4, i hvilket placeringsmidlerne omfatter en i legemet (112; 212) anbragt kam (178; 278), som omfatter en gennemgående passage (182; 282) for fastgørelsesorganet (122; 222), idet kammen er bevægelig i legemet for således at tillade ændring af fastgørelsesorganets relative placering i forhold til legemet.

7. Fastgørelsesapparat ifølge krav 6, i hvilket kammen (178; 278) er anbragt i en gennemgående cylindrisk passage (120; 220),
kammen er drejelig i den cylindriske passage om en drejebolt (R_1), der passerer gennem dens dens centrum, idet den gennemgående passage (182; 282) for fastgørelsesorganet er forskudt for drejebolten (R_1).

8. Fastgørelsesapparat ifølge krav 6 eller 7, i hvilket kammen (178; 278) omfatter en sideflade med en ringformig del (204; 304) med tilspidset, især konisk form, som støtter på en tilsvarende overflade (187; 287) på den cylindriske passages indervæg.

9. Fastgørelsesapparat ifølge et hvilket som helst af kravene 6, 7 eller 8, i hvilket den gennemgående passage (120; 220) omfatter et indvendigt gevind, og kammen (178; 278) omfatter et udvendigt gevind svarende til passagens indvendige gevind; og
i hvilket det udvendige gevind og det indvendige gevind fortrinsvis er udformede således, at den gennemgående passage for fastgørelsesorganet i en fuldstændig tilskruet stilling af kammen, betegnet udgangsstillingen, er i en distal stilling af fligen, og kammen efter en drejning på omkring en halv omdrejning, er i den øvre stilling, som er hævet i forhold til udgangsstillingen, og den gennemgående passage for fastgørelsesorganet er i en proksimal stilling af fligen.

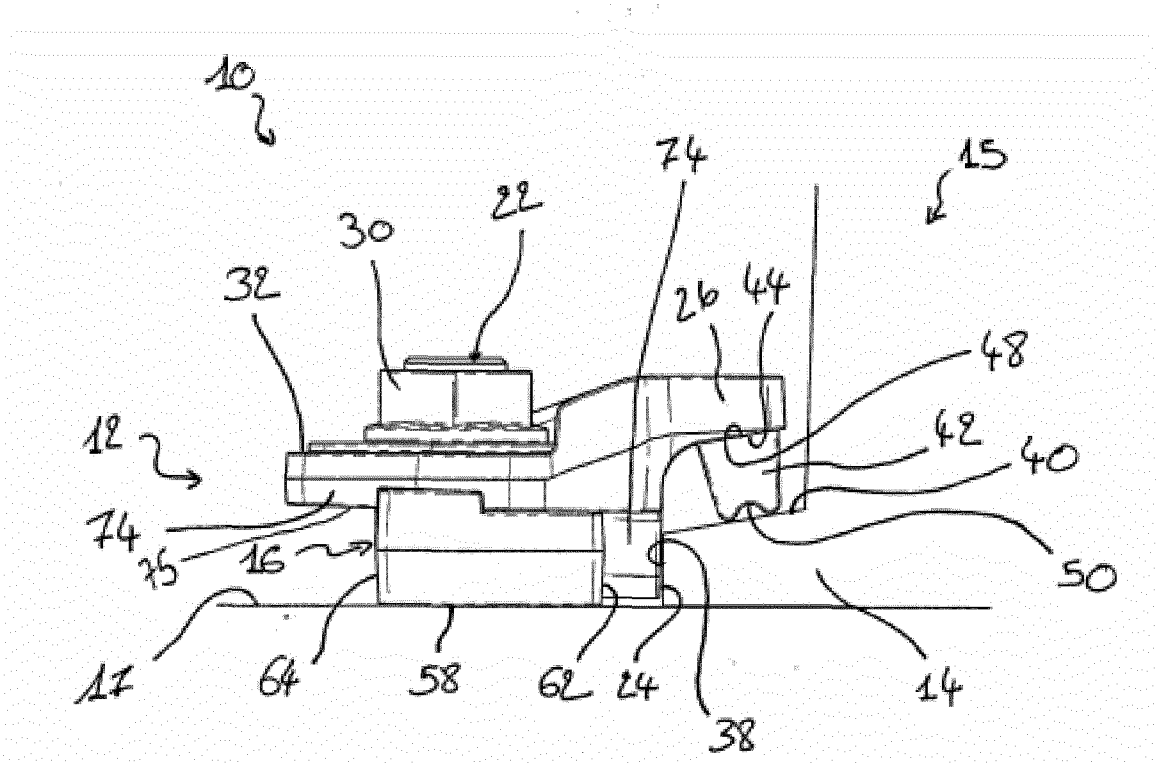
10. Fastgørelsesapparat ifølge et hvilket som helst af kravene 6 til 9, i hvilket passagen omfatter et anslag til blokering af kammens rotation, idet den øvre del

af kammen er formet til at samvirke med kammen, således at rotationen begrænses til mindre end en omdrejning, især omkring 1 halv omdrejning.

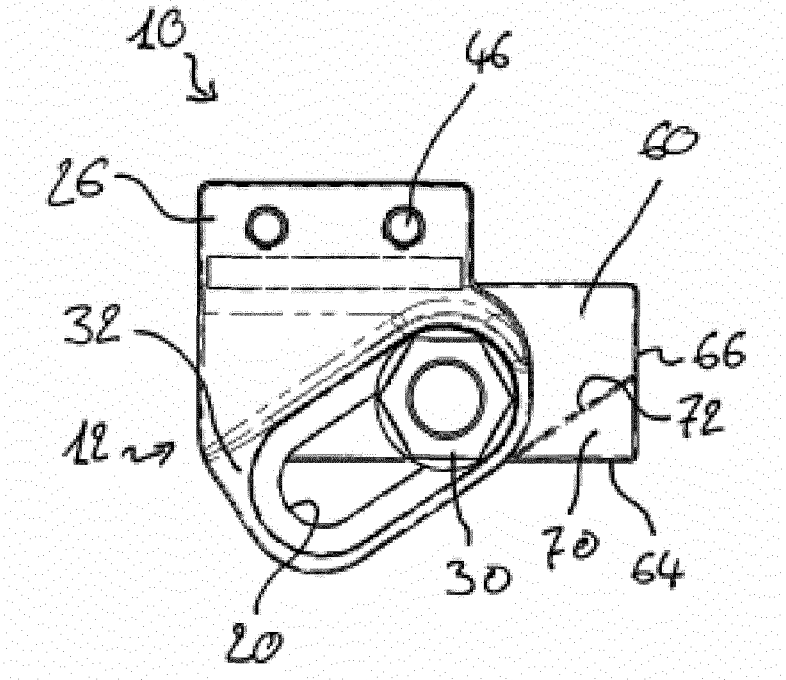
11. Fastgørelsesapparat ifølge et hvilket som helst af kravene 6 til 10, i hvilket en flange (180; 280) stikker frem på kammens (178; 278) overside og omgiver fastgørelsesorganets gennemgående passage (182; 282), idet flangen har en ydre kontur, der er tilpasset til at tages med et værktøj, der tillader at påføre kammen en drejebevægelse, idet den ydre kontur fortrinsvis er sekskantet.

12. Fastgørelsesapparat ifølge et hvilket som helst af de foregående krav, i hvilket fastgørelsesorganet har en skrue (28; 129; 229), hvis hoved er anbragt under legemet og en møtrik (30; 130; 230) skruet på enden af skruen, der passerer gennem den tværgående passage (20; 182; 282) og ligger an mod legemet (12), henholdsvis kammen (178; 278).

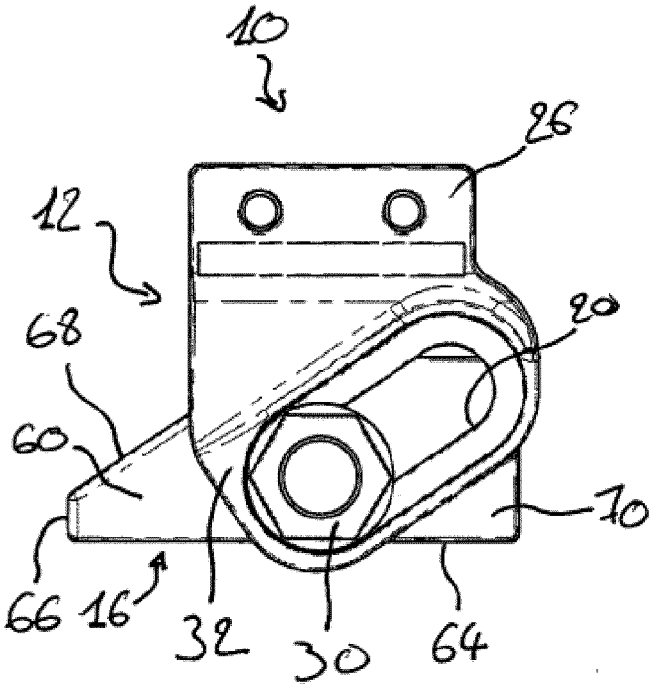
[Fig 1]


10
74
15
22
30
32
26
44
48
12
42
40
74
25
16
50
17
64
58
62
24
38
14

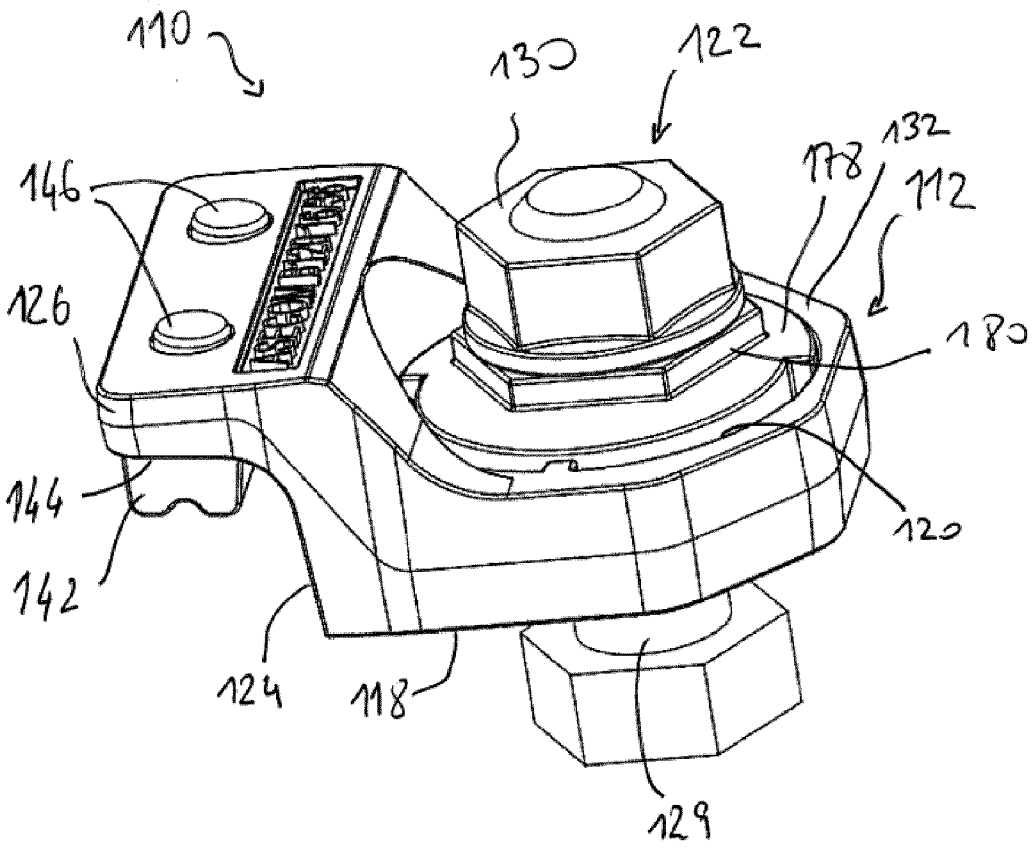
[Fig 3]


10
46
26
60
32
66
72
12
30
70
64
20

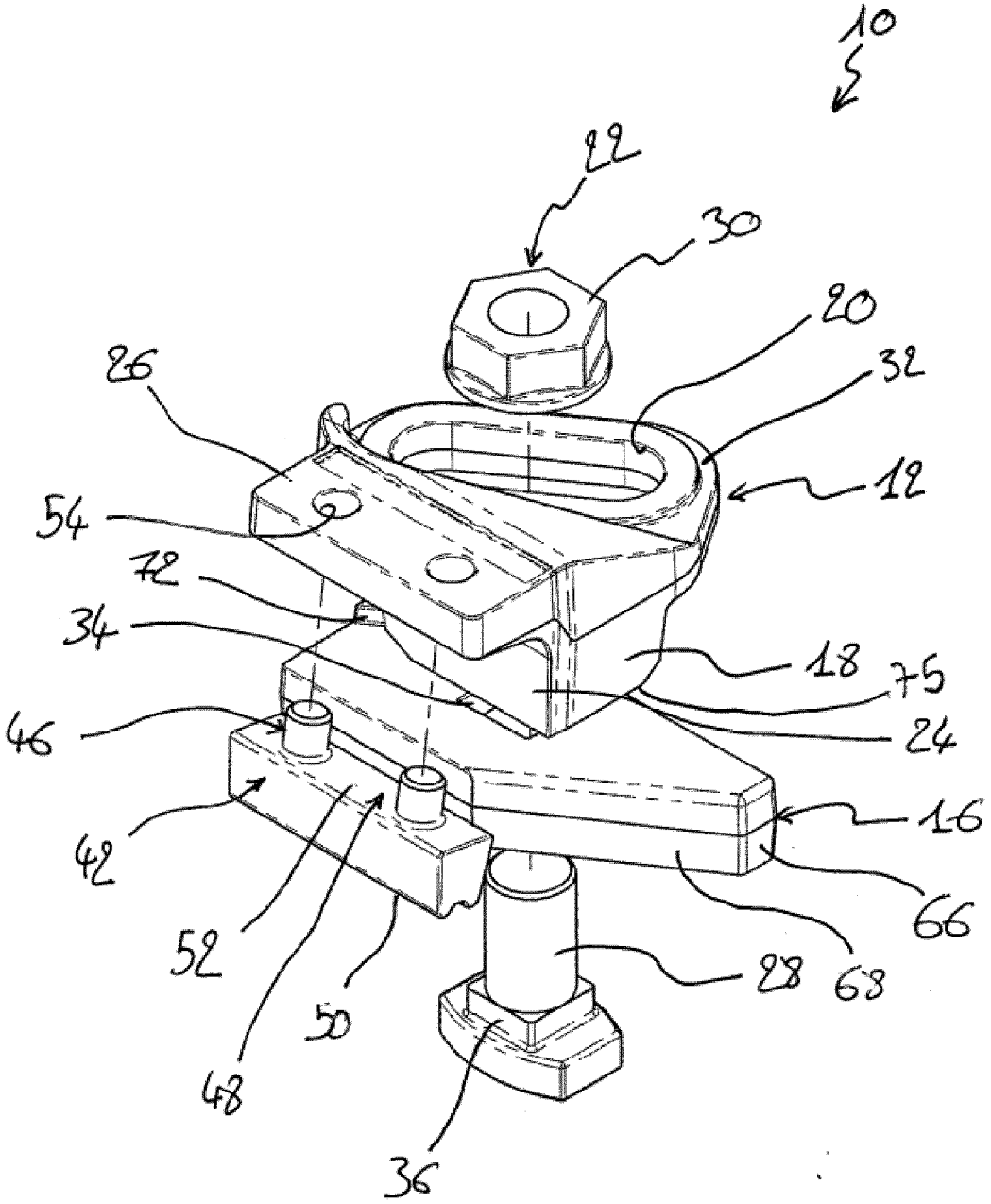
[Fig 4]


10
26
12
68
20
60
70
66
16
32
30
64

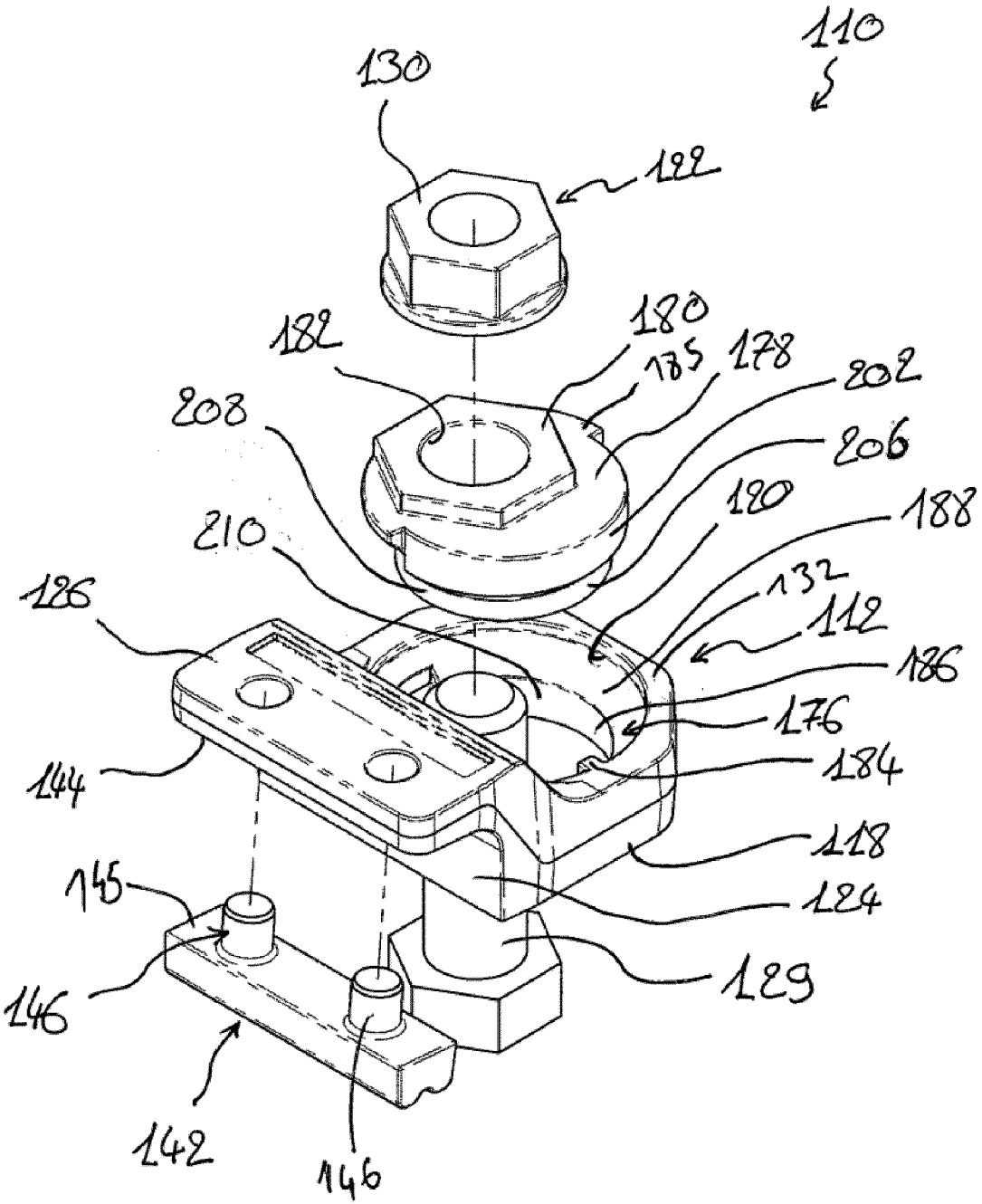
[Fig 5]


110
130
122
132
178
112
146
126
180
144
120
142
124
118
129

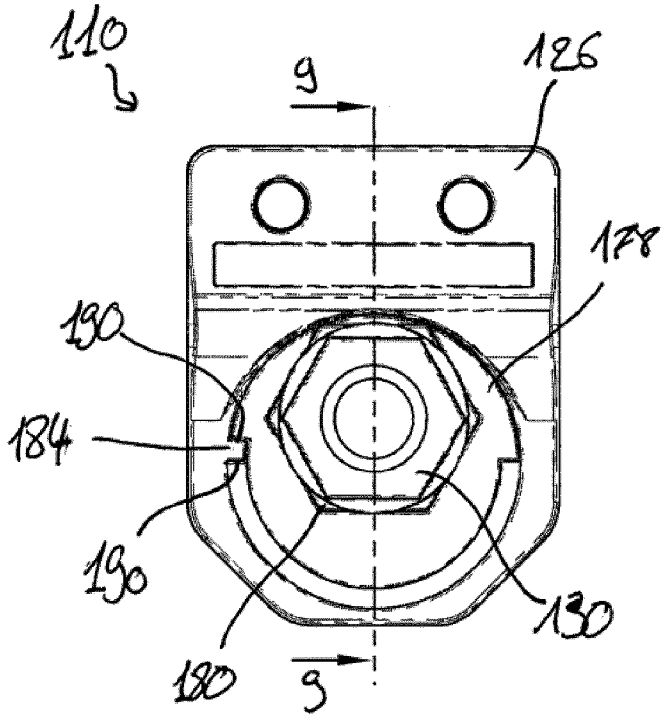
[Fig 2]



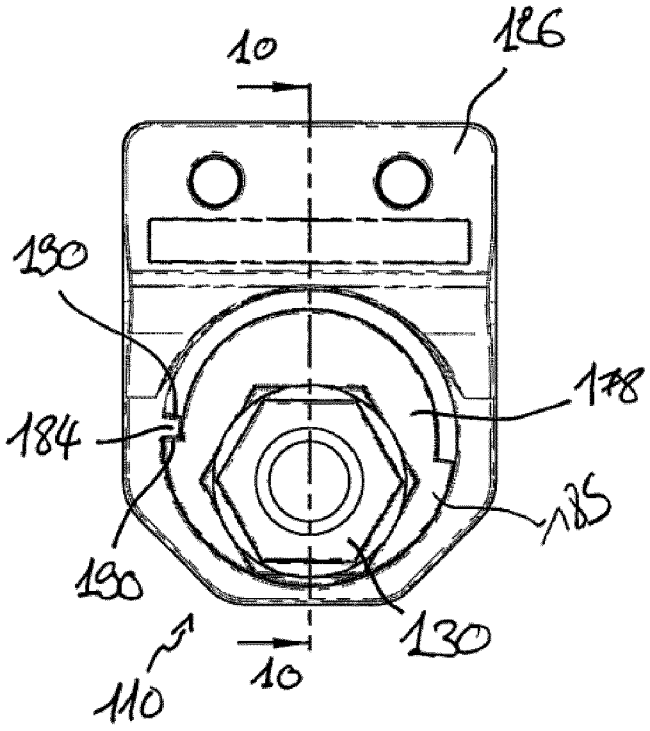
[Fig 6]


110
130
122
182
180
185
178
202
208
206
210
180
188
132
112
186
176
184
118
124
129
186
144
145
146
142
146

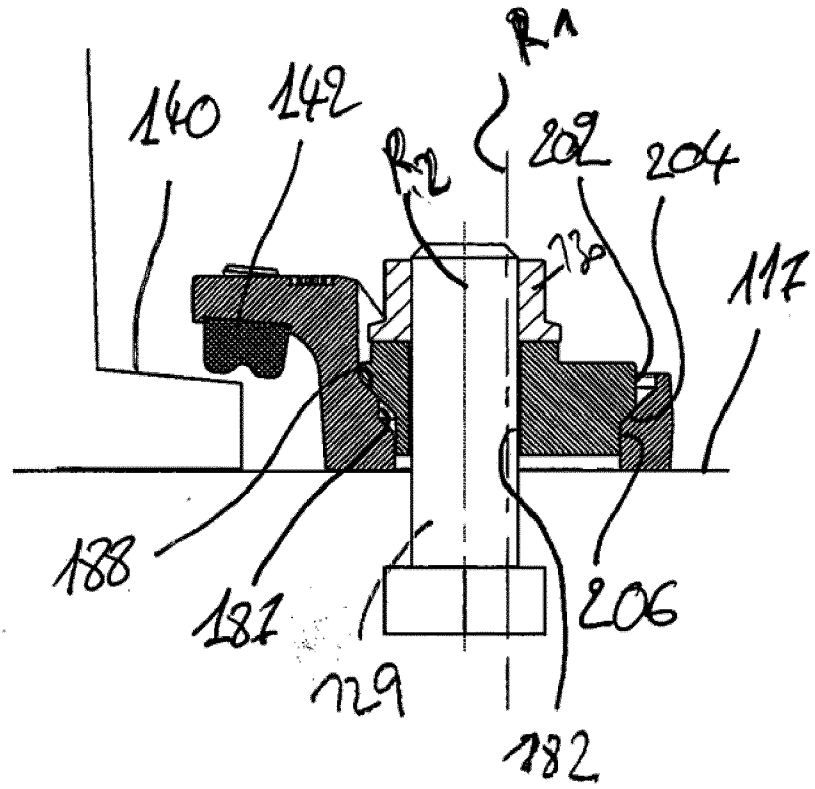
[Fig 7]


110
9
186
178
190
184
190
130
180
9

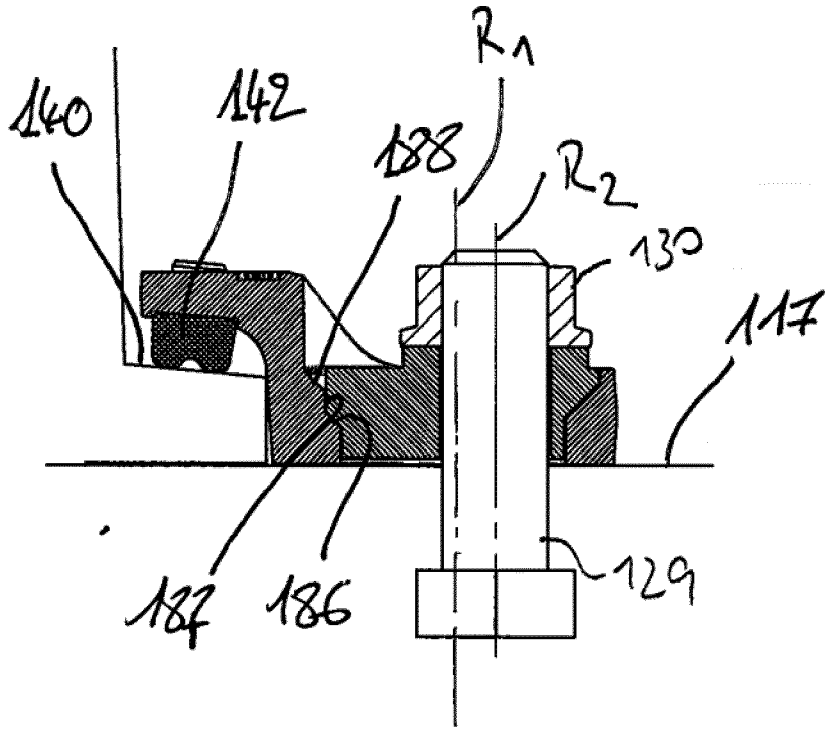
[Fig 8]


10
186
190
178
184
185
190
130
110
10

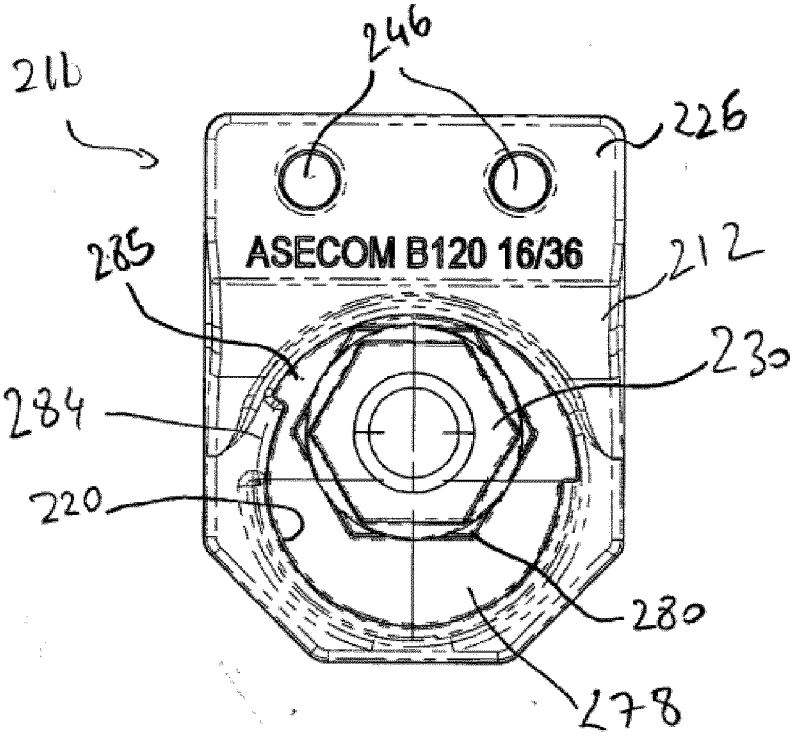
[Fig 9]


R1
140
142
R2
202
204
130
117
188
187
206
129
182

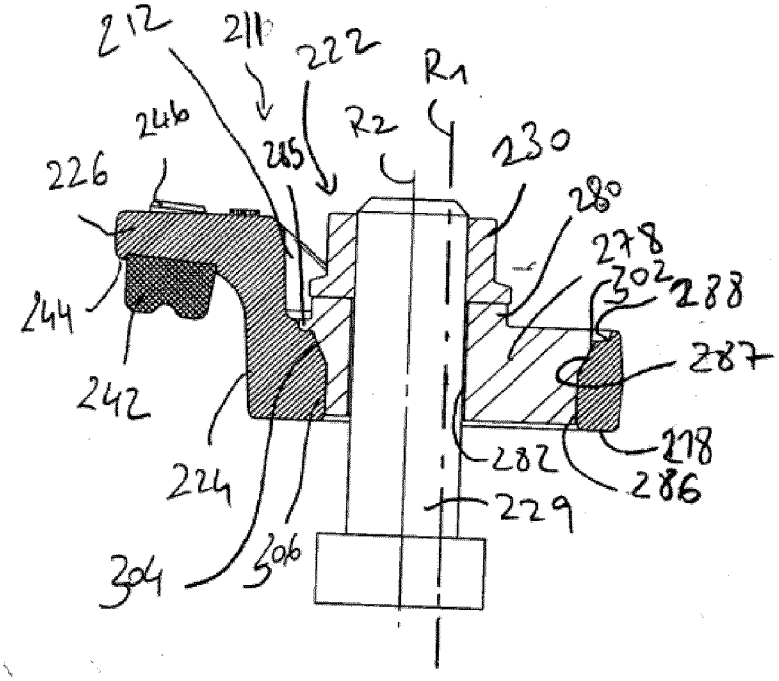
[Fig 10]


R1
140
142
188
R2
130
117
187
186
129

[Fig 11]


246
216
226
ASECOM B120 16/36
212
285
230
284
220
280
278

[Fig 12]


212
216
222
R1
R2
246
226
285
230
280
278
302
288
244
287
242
278
282
286
224
229
304
306

[Fig 13]