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(54) **Manufacturing method of components of a lever for a closing hook of sporting footwear**

(57) The invention relates to a method for manufacturing a component 20, 30, 40 of a lever 10 for a closing buckle, comprising the following steps: manufacturing, by means of extrusion of an aluminium alloy billet, an extruded profile 20a extending in a plane XY and provided with at least two ribs 60 suitable for defining a groove 27 extending along the extrusion direction X; said ribs 60 extending at least partially along a direction Z which is perpendicular to the plane XY; partially blanking said extruded profile 20a in order to interrupt the structural continuity of the ribs 60 so as to define, along the groove 27, one or more guide seats 21a, 22a, 31a, 32a, 43a, 44a; bending the ribs 60 defining the guide seats 21a, 22a, 31a, 32a, 43a, 44a in order to obtain, along the groove 27, one or more holes 21, 22, 31, 32, 43, 44 suitable for housing the hinging pins 25, 34 and/or anchoring pins 24, 35 of the lever 10 and completely blanking the extruded profile 20a in order to separate the finished component 20, 30, 40 from the extruded profile 20a.

The invention also relates to a component 20, 30, 40 of a lever 10 for a closing buckle obtainable according to the method of the present invention.

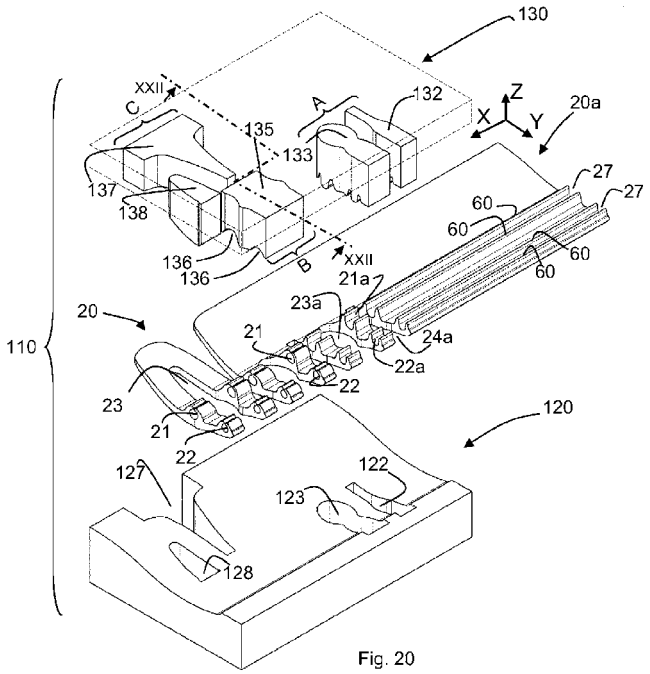

Fig. 20

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Description

[0001] The present invention relates to a method for manufacturing the components of a lever for a closing buckle of sports footwear, in particular ski-boots.

[0002] Hitherto, the closing of sports footwear, such as ski-boots, is performed by means of ratchet devices which are mounted on the opposite flaps of the footwear which must be kept in position next to each other.

[0003] A rack system is mounted on a first flap, while a lever, consisting of an arm and a fork hinged together by means of a tie-piece, is mounted on a second flap. The fork is designed to engage with each of the teeth on the rack, while the lever arm is designed to pull the fork so as to perform closing of the boot.

[0004] The lever arm, the fork and the tie-piece are provided with holes which act both as a rotational pivot and as a point for joining together the said components. The various holes, in fact, seat internally the hinging pins or anchoring pins which allow the components of the lever of the closing buckle to be hinged or anchored together respectively.

[0005] At present, most of the closing buckles for ski-boots are made using aluminium alloys, for example 6000 series aluminium alloys.

[0006] These alloys have a high degree of hot deformability and may have an increased mechanical strength following suitable heat treatment which causes the formation of hardening phases which are homogeneously dispersed in the aluminium matrix.

[0007] The known methods for machining the components of a closing device envisage firstly the extrusion, through a suitably shaped die, of an aluminium billet.

[0008] This operation produces an extruded bar which may have a length of several metres and has a width equal to the length of the finished component which is to be obtained.

[0009] Owing to the mechanical properties of the 6000 series aluminium alloys, it is possible to obtain extruded bars already provided with longitudinal holes.

[0010] The extruded bars are then machined by means of stock-removal machining operations. These operations are performed by means of milling cutters/saws which allow the finished component to be cut from the extruded bar.

[0011] The component thus obtained may undergo, if required, further machining operations such as bending, blanking and embossing.

[0012] This manufacturing method, although widely used, is not defect-free.

[0013] Firstly, the stock-removal machining operations performed in order to cut the extruded aluminium profiles have a limited productivity.

[0014] Moreover, in the case where the cut components are already provided with longitudinal holes, any bending, blanking and embossing operations cannot be performed in the region of the holes, in order to avoid compression or deformation of the said holes which would in fact result in the component becoming unusable.

[0015] This further limitation on the one hand slows down even further the process for manufacturing the components of the closing device and on the other hand results in an increase in costs due to the need to perform several machining operations in sequence, using different machinery.

[0016] The object of the present invention is therefore to overcome at least partly the drawbacks mentioned above with reference to the prior art.

[0017] In particular, an aim of the present invention is to provide a method for manufacturing the components of a lever for a closing buckle for sports footwear which is able to reduce the machining time and the associated costs.

[0018] Furthermore, an aim of the present invention is to provide a method for manufacturing the components of a lever for a closing buckle of sports footwear which has a performance the same as, if not superior to, that of the known closing devices.

[0019] Finally, an aim of the present invention is to provide a method for manufacturing the components of a lever for a closing buckle of sports footwear which can be easily implemented on an industrial level.

[0020] These and other objects and aims are achieved with a manufacturing method according to Claim 1 and a component of a lever for a closing buckle for sports footwear according to Claim 7.

[0021] The characteristic features and further advantages of the invention will emerge from the description, provided hereinbelow, of a number of examples of embodiment, provided by way of a non-limiting example, with reference to the accompanying drawings in which:

- Figure 1 shows a perspective view of a closing buckle for footwear, the components of which have been obtained by means of the manufacturing method according to the invention;
- Figure 2 shows an exploded view of the lever according to Figure 1;
- Figure 3 shows a perspective view of a different lever obtained by means of the manufacturing method according to the invention;
- Figure 4 shows an exploded view of the lever according to Figure 3;
- Figure 5 shows a side view of the lever arm of the lever according to Figure 1 at the end of a machining step of the manufacturing method according to the invention;
- Figure 6 shows a perspective view, from below, of the lever arm according to Figure 5;
- Figure 7 shows in schematic form a machining step of the manufacturing method according to the invention carried out on the lever arm according to Figure 5;
- Figure 8 shows a side view of the lever arm according to Figure 5 at the end of the machining step schematically shown in Figure 7;

- Figure 9 shows a perspective view, from below, similar to that of Figure 6, of the lever arm according to Figure 8;
- Figure 10 shows a side view of the engaging fork of the lever according to Figure 1 at the end of a machining step of the manufacturing method according to the invention;
- Figure 11 shows a perspective view, from below, of the engaging fork according to Figure 10;
- Figure 12 shows in schematic form a machining step of the manufacturing method according to the invention carried out on the engaging fork of Figure 10;
- Figure 13 shows a side view of the engaging fork according to Figure 10 at the end of the machining step schematically shown in Figure 12;
- Figure 14 shows a perspective view, from below, similar to that of Figure 11, of the engaging fork according to Figure 13;
- Figure 15 shows a side view of the tie-piece of the lever according to Figure 3 at the end of a machining step of the manufacturing method according to the invention;
- Figure 16 shows a perspective view, from below, of the tie-piece according to Figure 15;
- Figure 17 shows in schematic form a machining step of the manufacturing method according to the invention carried out on the tie-piece according to Figure 15;
- Figure 18 shows a side view of the tie-piece according to Figure 15 at the end of the machining step schematically shown in Figure 17;
- Figure 19 shows a perspective view, from below, similar to that of Figure 16, of the tie-piece according to Figure 18;
- Figure 20 shows in schematic form the manufacturing method according to the invention for obtaining the lever arm according to Figure 9;
- Figure 21 shows in schematic form the different machining steps of the manufacturing method according to the invention carried out using an extruded product with a conventional aluminium alloy;
- Figure 22 shows in schematic form the cross-section along the plane indicated by XII-XII in Figure 20, during a first machining step;
- Figure 23 shows in schematic form the cross-section along the plane indicated by XII-XII in Figure 20, during a second machining step;
- Figure 24 shows an enlarged view of Figure 21 not including, for greater clarity, the apparatus used to perform the different machining steps of the manufacturing method according to the invention.

[0022] With reference to the accompanying figures, a lever of a closing buckle for sports footwear is indicated in its entirety by 10.

[0023] The lever 10 comprises a lever arm 20 and an engaging fork 30 which are hinged together by means of a tie-piece 40.

[0024] The lever 10, by means of the fixing means 50, is designed to be permanently connected to a first flap of footwear, while the fork 30 is designed to engage, in at least one position, with a rack provided on a second flap of the footwear. The first and second flaps of the footwear and the rack are parts which are known per se and are not shown in the accompanying figures.

[0025] In accordance with the embodiments shown in the accompanying figures, the lever arm 20 comprises an anchoring hole 22 and a hinging hole 21.

[0026] The anchoring hole 22 is intended during use to be aligned with a corresponding hole 52 formed in the fixing means 50. In particular, the anchoring hole 22 is designed to be engaged by an anchoring pin 24 by means of which the lever arm 20 can be rotatably fastened to the fixing means 50 and, consequently, to the first flap of the footwear.

[0027] The hinging hole 21 is intended during use to be aligned with a corresponding hinging hole 43 formed in the tie-piece 40. In particular, the hinging hole 21 of the lever 20 and the corresponding hinging hole 43 of the tie-piece 40 are designed to be engaged by a first hinging pin 25.

[0028] The fork 30, in the embodiments shown in Figures 1 and 2 and 10 to 14, comprises a hinging hole 31 intended during use to be aligned with a corresponding hinging hole 44 formed in the tie-piece 40. In particular, the hinging hole 31 of the fork 30 and the corresponding hinging hole 44 of the tie-piece 40 are designed to be engaged by a second hinging pin 34.

[0029] The two hinging pins 25 and 34 allow the lever 20 and the fork 30 to be fastened together by means of the tie-piece 40. Moreover, the arrangement of these hinging pins 25 and 34 also allows hinging together of the fork 30 and lever 20.

[0030] With reference to Figures 1 and 2, the tie-piece 40 allows variation, in a controlled manner, of the distance between the first hinging pin 25 and the second hinging pin 34.

[0031] The tie-piece 40 shown in Figures 3 and 4 and 15 to 19 instead connects rigidly together the two hinging pins 25 and 34.

[0032] In a manner known per se, some closing levers 10, not shown in the accompanying drawings, may be provided with a single pin for hinging together lever arm and engaging fork.

[0033] In accordance with the embodiments shown in the accompanying figures, the lever arm 20 is substantially U-shaped and comprises a central opening 23 which extends longitudinally over most of the length of the arm 20 and which is intended, during use, to receive the tie-piece 40.

[0034] This central opening 23 passes through the hinging hole 21, anchoring hole 22 and anchoring pin 24, dividing them into two.

[0035] The fork 30 in the embodiment shown in Figures 1 and 2 and 10 to 14 also has a central opening 33 designed during use to receive part of the toothed portion

of the rack.

[0036] The fork 30 also comprises an engaging hole 32 designed to be engaged by an engaging pin 35. This engaging pin 35, in a manner known per se, is suitable for engaging, when the lever 10 is closed, a recess of the toothed portion of the rack so as to ensure closing of the first flap and second flap of the footwear.

[0037] In accordance with the embodiment shown in Figures 3 and 4, the fork 30 comprises a substantially wire-like, U-shaped, metal structure.

[0038] The two side ends 34 of this U-shaped structure are designed to engage the hinging hole 44 provided in the tie-piece 40, while the end portion 35 is designed to engage, when the lever 10 is closed, a recess of the toothed portion of the rack.

[0039] As mentioned above, the present invention relates to an innovative method for manufacturing a lever arm 20, an engaging fork 30 and a tie-piece 40 of a lever 10 for a closing buckle of sports footwear.

[0040] In particular, the method for manufacturing said components 20, 30, 40 of the lever 10 for a closing buckle according to the present invention envisages the following steps:

- manufacturing, by means of extrusion of an aluminium alloy billet, an extruded profile 20a extending in a plane XY and provided with at least two ribs 60 suitable for defining a groove 27 extending along the extrusion direction X; said ribs 60 extending at least partially along a direction Z which is perpendicular to the plane XY;
- partially blanking said extruded profile 20a in order to interrupt the structural continuity of the ribs 60 so as to define, along the groove 27, one or more guide seats 21a, 22a, 31a, 32a, 43a, 44a;
- bending the ribs 60 defining the guide seats 21a, 22a, 31a, 32a, 43a, 44a in order to obtain, along the groove 27, one or more holes 21, 22, 31, 32, 43, 44 suitable for housing the hinging pins 25, 34 and/or anchoring pins 24, 35 of the lever 10;
- completely blanking the extruded profile 20a in order to separate the finished component 20, 30, 40 from the extruded profile 20a.

[0041] The step of manufacturing the profile 20a provided with at least two ribs 60 will be analysed first of all.

[0042] This extruded profile 20a in a manner known per se may have a length of several metres and generally has a width equal to the width of the finished component which is to be obtained.

[0043] According to the method of the present invention the extruded profile 20a also comprises at least two longitudinal ribs 60. A groove 27 may be defined by means of these ribs 60 along the entire length of the extruded profile 20a.

[0044] In accordance with the embodiment shown in the accompanying figures, it is possible to note how the ribs 60 extend at least partially along the direction Z so that there are no undercuts between the ribs themselves and the channel of the groove 27.

[0045] The height of the ribs 60, which is calculated along the direction Z, and the width of the groove 27, calculated along the direction Y, depend on the dimensions of the holes 21, 22, 31, 32, 43, 44 which must be obtained and must be defined during design of the extrusion die.

[0046] The thicknesses of the ribs 60 must also be defined during design of the extrusion die. Ribs 60 which are too thin might not ensure an adequate strength of the hinging and anchoring holes of the various components of the closing lever 10.

[0047] Ribs 60 which are too thick could prevent correct deformation thereof, not allowing, as will be explained in detail below, the respective adjacent flaps to move closer together or come into contact with each other.

[0048] The extruded profile 20a is made of an aluminium alloy chosen from the group of 6000 or 7000 series aluminium alloys.

[0049] In accordance with the embodiments of the components of the lever shown in Figures 5, 6, 10, 11, 15 and 16, the ribs 60 are arranged along the operating portion of the extruded profile 20a, "operating portion" being understood as meaning the portion of the profile in which the hinging holes 21, 31 or anchoring holes 22, 32 of the various components of the lever 10 obtained by means of the method according to the invention will be provided.

[0050] In this connection it should be noted that, in Figures 20 to 24, specific reference is made, for the sake of clarity, to the steps for machining the lever arm 20 of the lever 10.

[0051] In accordance with the embodiments shown in the accompanying figures, the extruded starting profile 20a has four separate ribs 60 which are parallel to each other and suitable for defining two separate grooves 27 which are in turn parallel.

[0052] The comments below are however also applicable to the other components of the lever 10, i.e. the engaging fork 30 and tie-piece 40, which may be advantageously made by means of the method of the present invention.

[0053] With reference to Figure 20, at the end of the extrusion operation, the extruded profile 20a is preferably loaded onto a vertical blanking press, by means of a suitable feed device positioned at the entrance to the working surface of the press. The feed device and press are not shown in the accompanying figures.

[0054] In a manner known per se, a mould 110, formed by a base 120 and a cover 130, is mounted on the blanking press. The mould 110 is generally made of steel.

[0055] The base 120 during operation of the press remains stationary, while the cover 130 moves alternately along a direction parallel to the direction Z.

[0056] In the preferred embodiment the operations of partial blanking, bending and complete blanking of the

extruded profile 20a described above are performed in sequence by means of a single progressive mould 110.

[0057] In the progressive mould 110 shown in Figure 20, in fact, three different operating stations A, B, C may be defined, the operations of partial blanking, bending and complete blanking of the extruded profile being respectively performed in each of them.

[0058] In Figure 20 the operating station B is shown more or less aligned with the operating station C. As is well-known to the person skilled in the art, the three operating stations A, B and C of the mould 110 may in reality be positioned in succession.

[0059] The characteristic steps of the method according to the invention will be described individually as though they were occurring in succession. However, it should be noted how, on the basis of the above description, with each mould closure different machining operations are performed simultaneously on different portions of the extruded profile 20a.

[0060] As already mentioned, at the end of the extrusion step, the extruded profile 20a is loaded, when the mould 110 is open, onto the press feed device.

[0061] By means of the feed device the extruded profile is imparted a displacement along the direction of extrusion X, allowing the extruded profile to advance by an interval "p" (see Figure 24).

[0062] Following this advancing movement the extruded profile 20a is positioned between the base 120 and the cover 130 of the mould 110, along the operating zone A of the mould.

[0063] The operation of partial blanking of the extruded profile 20a is performed at the same time as a first closing of the mould 110 and, as already mentioned, is performed in order to interrupt the structural continuity of the ribs 60.

[0064] This operation is indispensable for allowing correct bending of the ribs 60 during the following machining step.

[0065] By means of this operation, in fact, the guide seats 21a, 22a, 31a, 32a, 43a, 44a of the extruded profile 20a are defined.

[0066] In accordance with the embodiments shown in Figures 5, 6, 10, 11, 15 and 16, in which for greater clarity only the portion of the extruded profile subject to partial blanking is shown, these guide seats 21 a, 22a, 31 a, 32a, 43a, 44a are defined by the ribs 60 which will be bent during the following machining step.

[0067] At the same time, since a partial blanking operation is involved, the structural continuity of the extruded profile 20a is not interrupted and consequently the latter may continue to advance, via the feed device, within the working plane of the mould 110.

[0068] With specific reference to the embodiment shown in Figure 20, in the case where the lever arms 20 are obtained from the extruded profile 20a, two punches 133 and 132 are provided along the operating zone A of the cover 130 of the mould 110.

[0069] In detail, the punch 132, when the mould 110 is closed, after partially blanking the extruded profile, penetrates into a corresponding die 122 provided in the base 120, creating a first clearance 24a with a width equal to "h".

[0070] At the same time, the punch 133, penetrating in turn into a corresponding die 123 provided in the base 120, blanks the extruded profile, creating a second clearance 23a (see Figure 6). This clearance 23a, with a width equal to "j", coincides substantially with the opening 23 which, when the lever arm 20 is finished, extends longitudinally over most of the length of the arm 20 and intended to receive the tie-piece 40 (see Figure 9).

[0071] In a similar way, in the case where the anchoring forks 30 are obtained from the extruded profile 20a, by means of partial blanking of the extruded profile, in addition to interrupting the structural continuity of the ribs 60, a first clearance 33a is created (see Figure 11). This clearance 33a coincides substantially with the opening 33 which, when the fork has been completed, extends longitudinally over most of the length of the fork 30 and is intended to receive part of the toothed portion of the rack (see Figure 14).

[0072] In the case where the tie-pieces 40 shown in Figure 3 are obtained from the extruded profile 20a, the partial blanking operation is performed by means of a single punch (not shown in the accompanying Figures) with the aim of interrupting the structural continuity of the ribs 60. In view of the shape of the tie-piece 40 it is in fact not necessary to create further clearances inside the semi-finished article.

[0073] As already mentioned, the partial blanking operation allows the guide seats 21a, 22a, 31a, 32a, 43a, 44a to be defined (see Figures 5, 6, 10, 11, 15 and 16).

[0074] In detail, with reference to Figure 24, the seats 21a, 22a have a width equal to "k".

[0075] It should be noted how the feed interval "p" of the feed device of the vertical press, in the schematic diagram shown in Figure 24, coincides with the sum of the widths of the first clearance 24a and second clearance 23a and of the seats 21a and 22a.

[0076] This feed interval "p" will generally be equal to the width of the component being machined, plus a minimum amount of machining waste.

[0077] Following the partial blanking step described above, the method according to the present invention envisages that bending of the ribs 60 which define the guide seats 21a, 22a, 31a, 32a, 43a, 44 is performed.

[0078] In this way it is possible to obtain, in fact, along the grooves 27, one or more hinging holes 21, 31, 43, 44 and/or anchoring holes 22, 32 suitable for housing the hinging pins 25, 34 and/or anchoring pins 24, 35 of the lever 10.

[0079] In detail, after the operation of partial blanking of the extruded profile 20a has been performed, the progressive mould 10 is opened, separating from each other the cover 130 and base 120.

[0080] At the same time, the extruded profile 20a is fed forwards, by means of the feed device, by a further interval "p", allowing the previously machined portion of

the extruded profile to be arranged along the operating zone B of the progressive mould 110.

[0081] In accordance with the embodiment shown in the accompanying figures, a punch 135 is provided in the operating zone B of the cover 130 of the mould 110.

[0082] The bottom surface of this punch 135, i.e. the surface intended to come into contact with the extruded profile 20a, has at least one suitably shaped cavity 136.

[0083] This cavity 136 preferably has a semi-cylindrical shape.

[0084] As schematically shown in Figures 7, 12 and 17, when the cover 130 of the mould 110 comes into contact against the base 120 of the mould 110, the force exerted by the surfaces of the cavity 136 causes a plastic deformation of the ribs 60 of the guide seats 21a, 22a, 31a, 32a, 43a, 44a.

[0085] In particular, the composition of the forces "f" generated by the surfaces of the cavity 136 causes bending and shaping of the ribs 60.

[0086] These ribs, in fact, following the plastic deformation action, no longer extend only in the direction Z but also assume a curved configuration. In particular, the ends of the ribs 60 of each seat 21a, 22a, 31a, 32a, 43a, 44a are bent and moved close together so as to define along the groove 27 one or more holes 21, 22, 31, 32, 43, 44 (see Figures 8, 9, 13, 14, 18, 19 and 23).

[0087] The plastic deformation of the ribs 60 causes also work-hardening thereof, improving their hardness and mechanical strength.

[0088] Advantageously, it is possible to shape suitably the cavities 136 of the cover 130 such that the ends of the ribs 60 at the end of the bending operation are in contact with each other, thus forming closed holes (not shown in the accompanying figures).

[0089] Following the bending step described above, the method according to the invention envisages that complete blanking of the extruded profile 20a is performed in order to separate the finished component 20, 30, 40 from the extruded profile 20a.

[0090] In detail, after the operation of bending of the ribs 60 has been performed, the progressive mould 10 is opened, separating from each other the cover 130 and base 120.

[0091] At the same time, the extruded profile 20a is fed forwards, by means of the feed device, by a further interval "p", allowing the previously machined portion of the extruded profile to be arranged along the operating zone C of the progressive mould 110.

[0092] With specific reference to the mould 110 used for manufacturing a lever arm 20, a first punch 137 and a second punch 138 may be arranged in the operating zone C of the mould cover.

[0093] In detail, when the mould 110 is closed, the first punch 137 and the second punch 138 blank the extruded profile 20a, penetrating respectively into a first die 127 and a second die 128 provided in the base 120.

[0094] Following this blanking operation, the finished part, i.e. lever arm 20, is separated from the extruded profile.

[0095] The punches or single punch provided in the operating zone C of the cover 130 of the mould 110 allow, if required, not only separation of the component from the extruded profile, but also surface shaping of the non-operating portion of the profile, "non-operating portion of the profile" being understood as meaning the surface which is not passed through by the ribs 60.

[0096] Owing to the possibility of shaping the surface of the extruded profile, at the same time as the blanking operation, it is advantageously possible to obtain a finished component ready for use (apart from any heat and/or aesthetic treatment steps).

[0097] In the known production methods, instead, once separation of the single component from the extruded profile has been performed, any bending and embossing operations must be performed subsequently and require the use of different machinery.

[0098] As mentioned above, the surface shaping of the profile does not affect the operating portion of the profile itself.

[0099] This portion, in fact, once the step for bending of the ribs 60 has been completed, no longer comes into contact with the operating surfaces of the mould 110 and does not undergo any plastic deformation.

[0100] Subsequent machining operations, in fact, could crush the holes 21, 22, 31, 32, 43, 44, making in fact the component obtained unusable.

[0101] The invention also concerns a component 20, 30, 40 of a lever 10 for a closing buckle which can be obtained according to the method of the present invention, in which the holes 21, 22, 31, 32, 43, 44 suitable for housing the hinging pins 25, 34 and/or anchoring pins 24, 35 of the lever 10 are bounded by at least two ribs 60, the ends of which are arranged close together.

[0102] Finally, the invention also concerns a component 20, 30, 40 of a closing lever 10 which can be obtained according to the method of the present invention, in which the holes 21, 22, 31, 32, 43, 44 suitable for housing the hinging pins 25, 34 and/or anchoring pins 24, 35 of the lever 10 are bounded by at least two ribs 60, the ends of which are in contact with each other.

[0103] From the above description, the advantages offered by the method and the component according to the present invention compared to the prior art are evident.

[0104] Firstly, it must underlined how the machine time necessary for performing the operations of partial blanking, bending and complete blanking of the extruded profile 20a is decidedly less than the machine time required to perform the milling operations by means of the known methods.

[0105] In fact, as already mentioned above, with each mould closure, owing to the use of a progressive mould 110, a finished component is obtained.

[0106] It should also be noted how the same extrusion step is more economical than the corresponding extrusion step of the known production methods, in which the extruded profile is generally obtained already provided

with longitudinal holes.

[0107] The extrusion die used to extrude the profile provided with ribs 60 has a profile which is simplified and therefore less costly, for the same outer profile, compared to an extrusion die which must pierce the aluminium billet.

[0108] Moreover, the machining method according to the invention can be easily implemented on an industrial level and does not require the use of specialized labour.

[0109] Finally, the components obtained by means of the method according to the invention have mechanical properties which are the same as if not superior to those of the components obtained by means of the methods of the prior art.

[0110] The plastic deformation of the ribs 60, together with the plastic deformation which occurs during extrusion, in fact results in an improvement in the mechanical properties of these components.

[0111] To conclude, from the above description it is clear that the manufacturing method according to the invention and the components obtained by means of this method have characteristics such as to overcome advantageously the problems and drawbacks of the prior art.

[0112] With regard to the embodiments of the method and the lever components described above, the person skilled in the art may, in order to satisfy specific requirements, make modifications to and/or replace elements described with equivalent elements, without thereby departing from the scope of the accompanying claims.

Claims

1. Method for manufacturing a component (20, 30, 40) of a lever (10) for a closing buckle, comprising the following steps:

   - manufacturing, by means of extrusion of an aluminium alloy billet, an extruded profile (20a) extending in a plane (XY); said extruded profile (20a) being provided with at least two ribs (60) suitable for defining at least one groove (27) extending along the extrusion direction (X); said at least two ribs (60) extending at least partially along a direction (Z) which is perpendicular to the plane (XY);
   - partially blanking said extruded profile (20a) in order to interrupt the structural continuity of the at least two ribs (60) so as to define, along the at least one groove (27), one or more guide seats (21a, 22a, 31a, 32a, 43a, 44a);
   - bending the at least two ribs (60) defining the guide seats (21a, 22a, 31a, 32a, 43a, 44a) in order to obtain, along the at least one groove (27), one or more holes (21, 22, 31, 32, 43, 44) suitable for housing a hinging pin (25, 34) and/or an anchoring pin (24, 35) of the lever (10);
   - completely blanking the extruded profile (20a) in order to separate the finished component (20, 30, 40) from the extruded profile (20a).

2. Method according to Claim 1, wherein the steps of partial blanking, bending and complete blanking of the extruded profile (20a) are performed in sequence by means of a single progressive mould (110).

3. Method according to Claim 1, wherein the extruded profile (20a) is made of an aluminium alloy chosen from the group of 6000 or 7000 series aluminium alloys.

4. Method according to Claim 1, wherein the holes (21, 22, 31, 32, 43, 44) are bounded by at least two ribs (60), the ends of which are arranged close together.

5. Method according to Claim 1, wherein the holes (21, 22, 31, 32, 43, 44) are bounded by at least two ribs (60), the ends of which are in contact with each other.

6. Method according to Claim 1, wherein, at the same time as the step for complete blanking of the extruded profile (20a), surface shaping of the portion of the extruded profile (20a) not crossed by the ribs (60) is carried out.

7. Component (20, 30, 40) of a lever (10) for a closing buckle obtainable according to the method of any one of Claims 1 to 6, wherein the holes (21, 22, 31, 32, 43, 44) suitable for housing a hinging pin (25, 34) and/or an anchoring pin (24, 35) of the lever (10) are bounded by at least two ribs (60), the ends of which are arranged close together.

8. Component (20, 30, 40) according to Claim 7, wherein the holes (21, 22, 31, 32, 43, 44) suitable for housing a hinging pin (24, 35) and/or an anchoring pin (24, 35) are bounded by at least two ribs (60), the ends of which are in contact with each other.

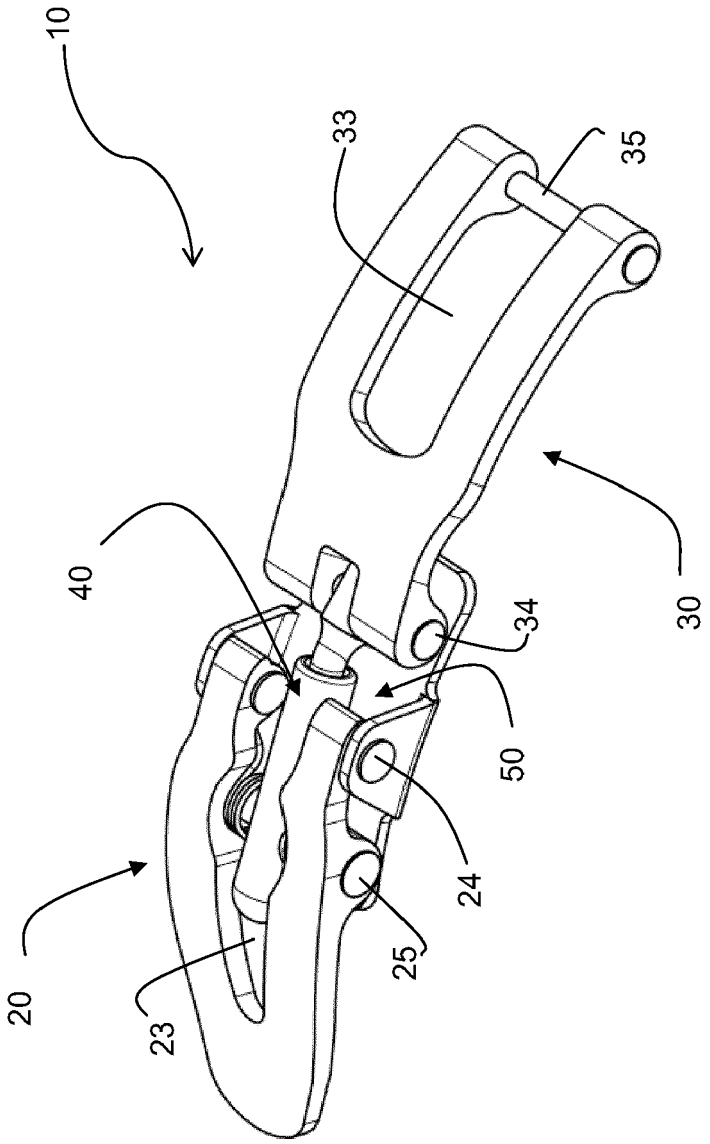


Fig. 1

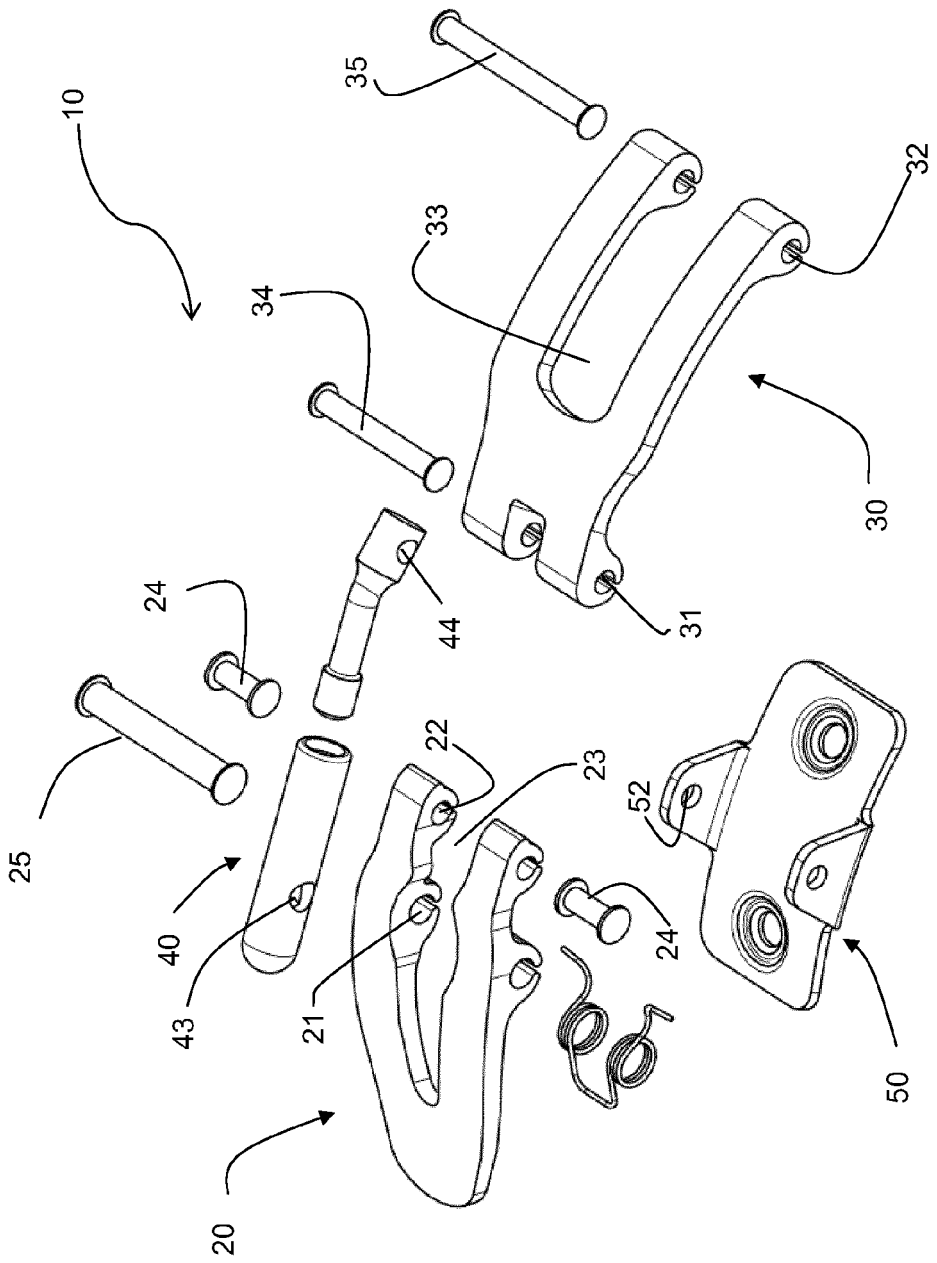
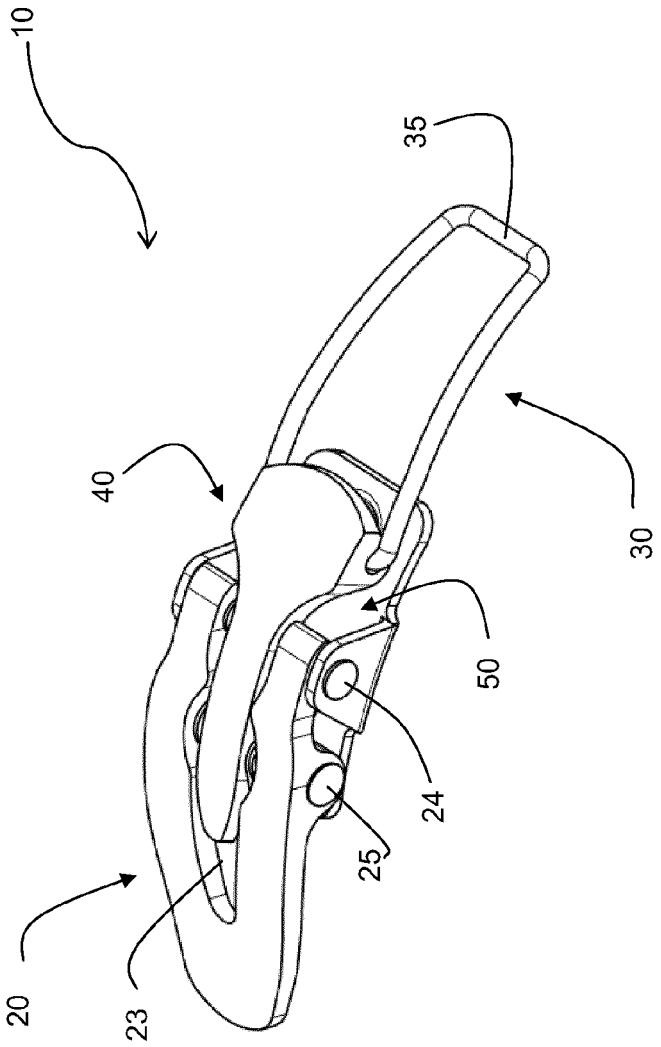


Fig. 2



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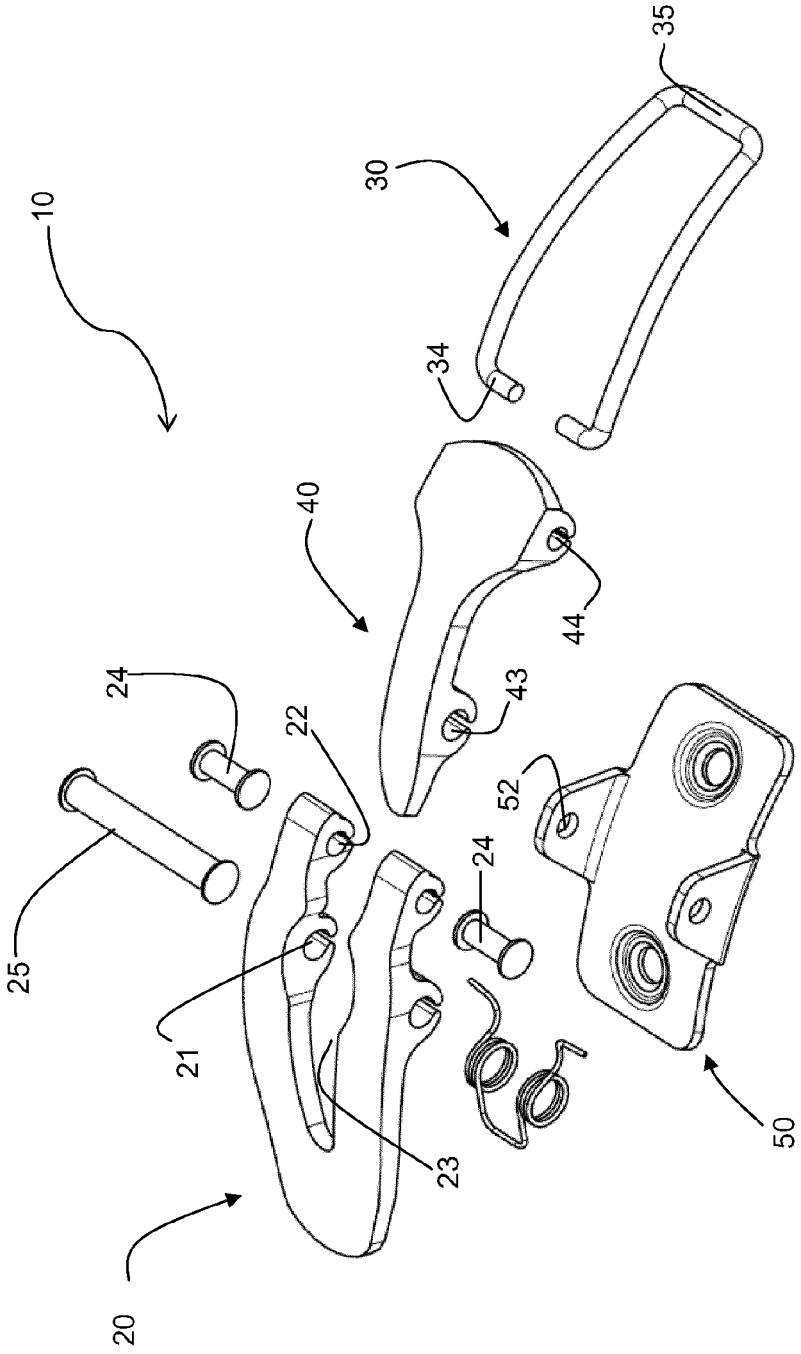


Fig. 4

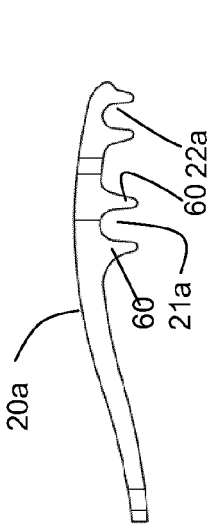


Fig. 5

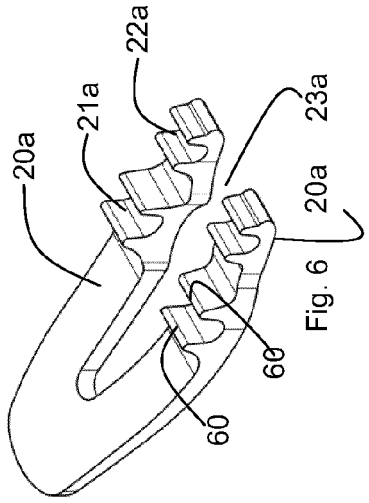


Fig. 6

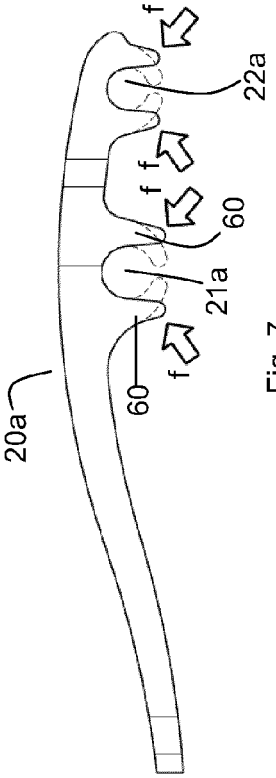
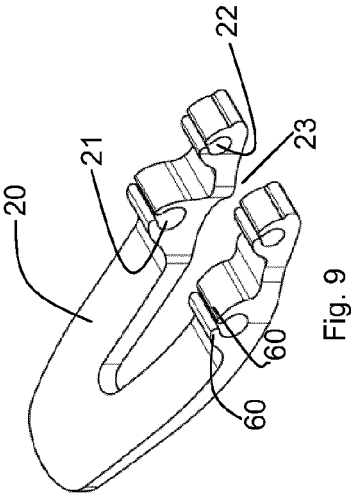


Fig. 7

Fig. 8



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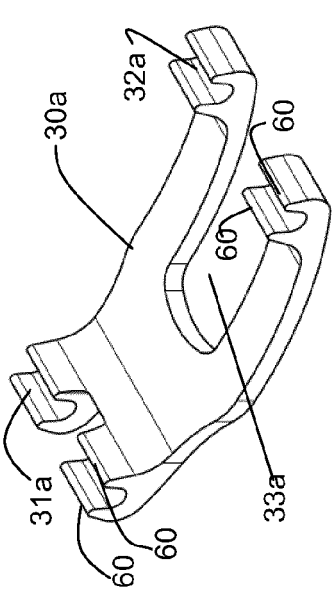

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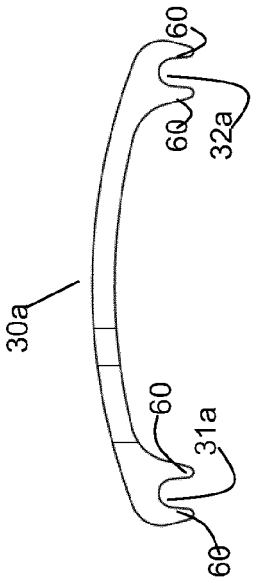


Fig. 10

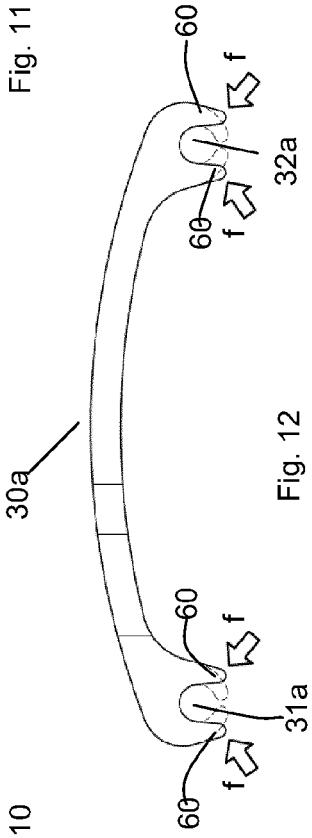


Fig. 12

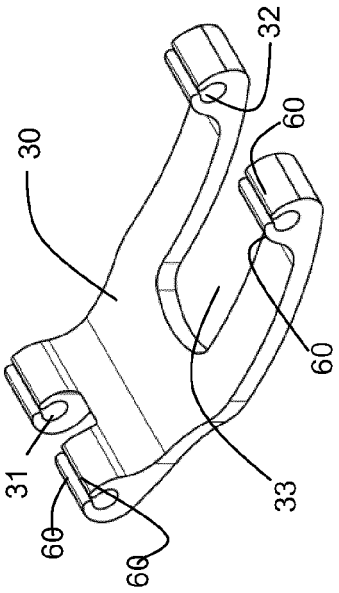


Fig. 14

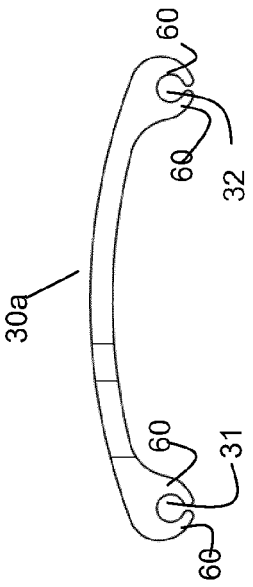
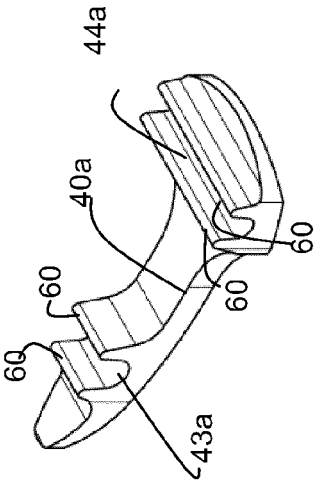


Fig. 13



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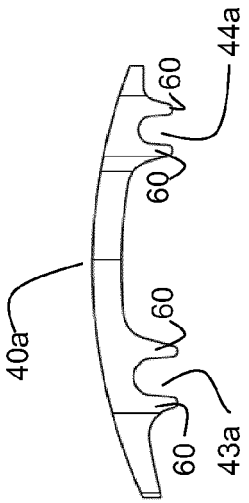

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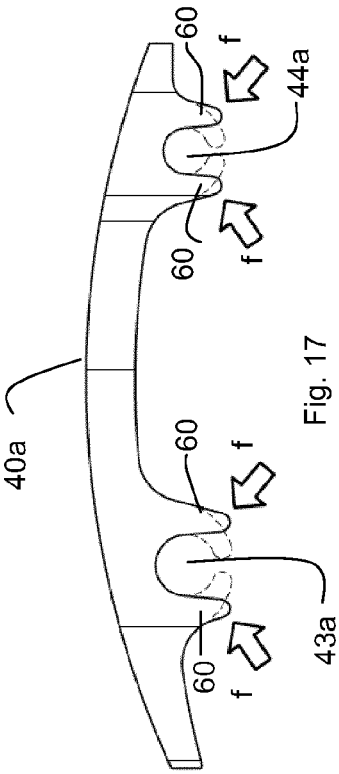

Fig. 17

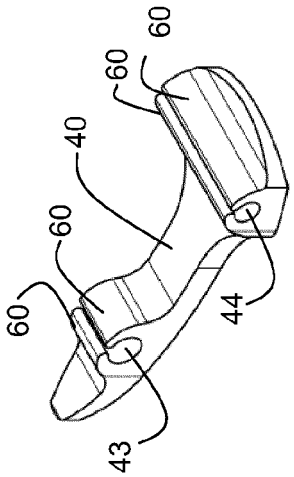

Fig. 19

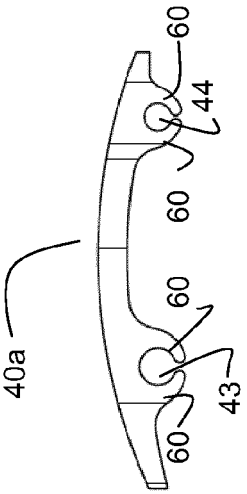

Fig. 18

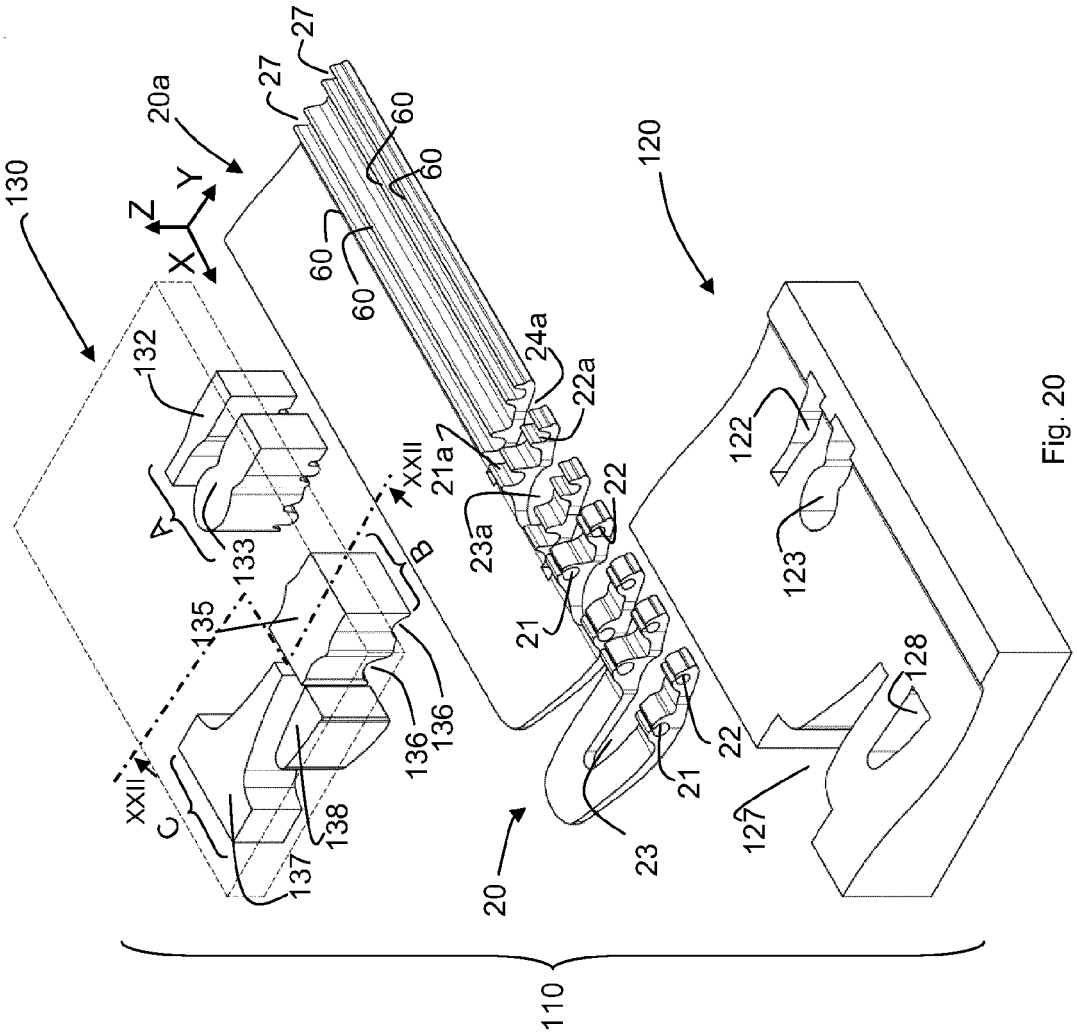
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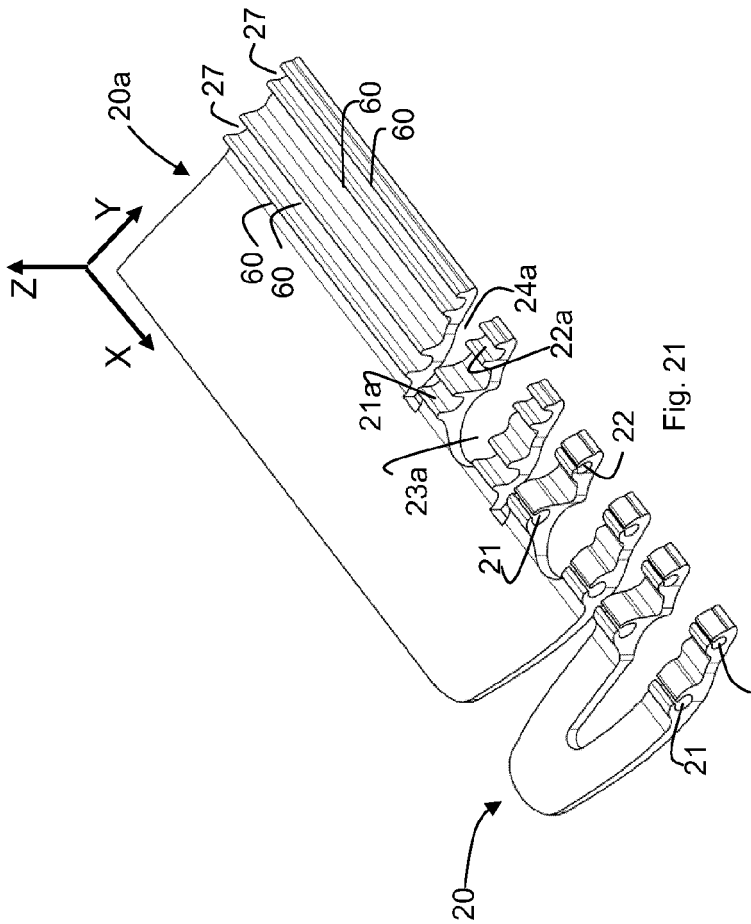
Fig. 20



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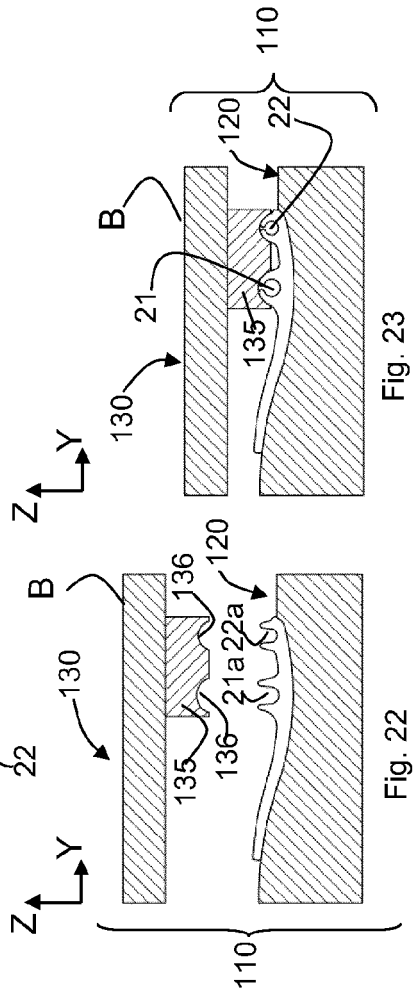

Fig. 23

Fig. 22

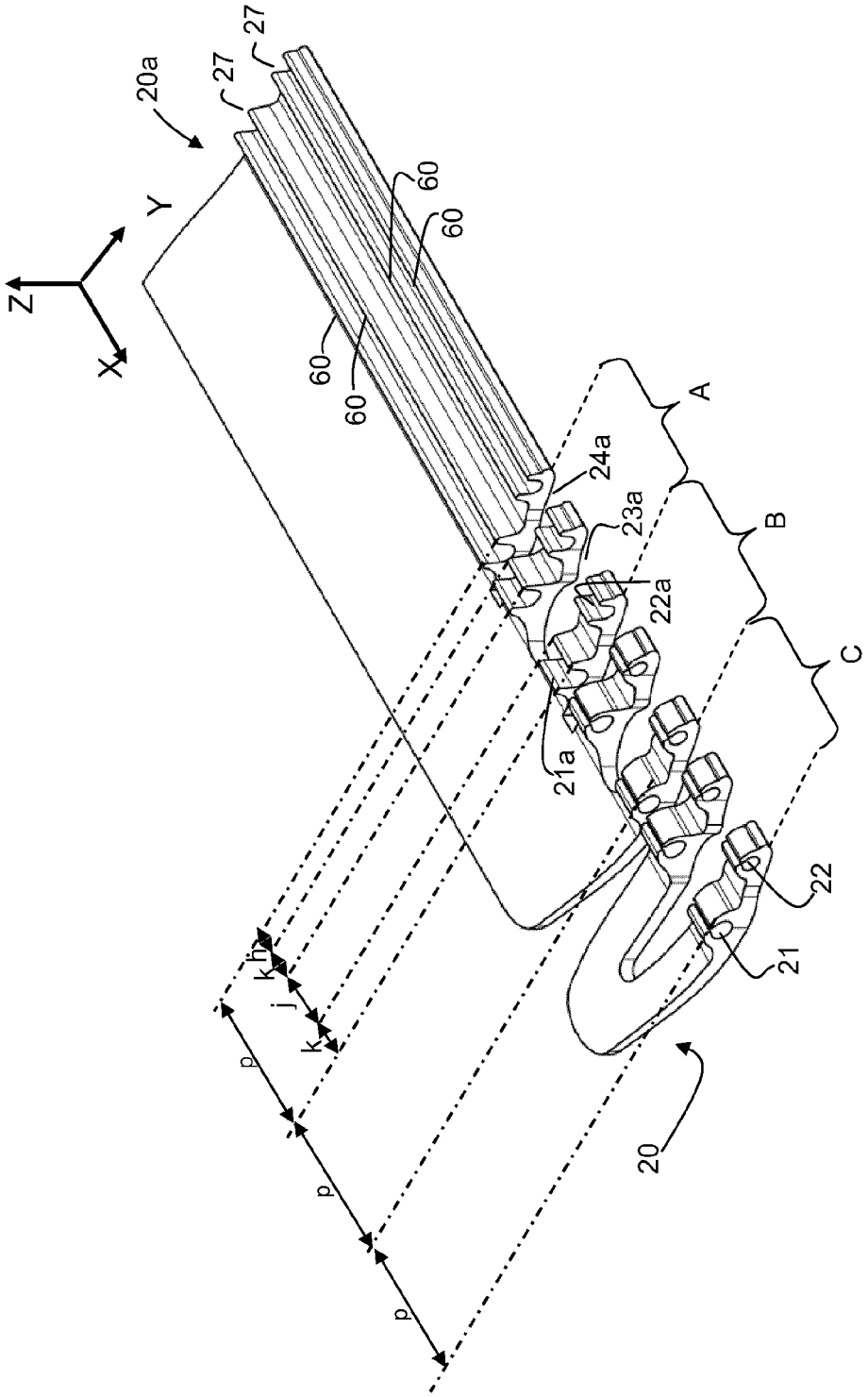

Fig. 24

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EUROPEAN SEARCH REPORT

Application Number
EP 12 16 4567

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

A43C
A43D
B21C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 September 2012	Cianci, Sabino

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1

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