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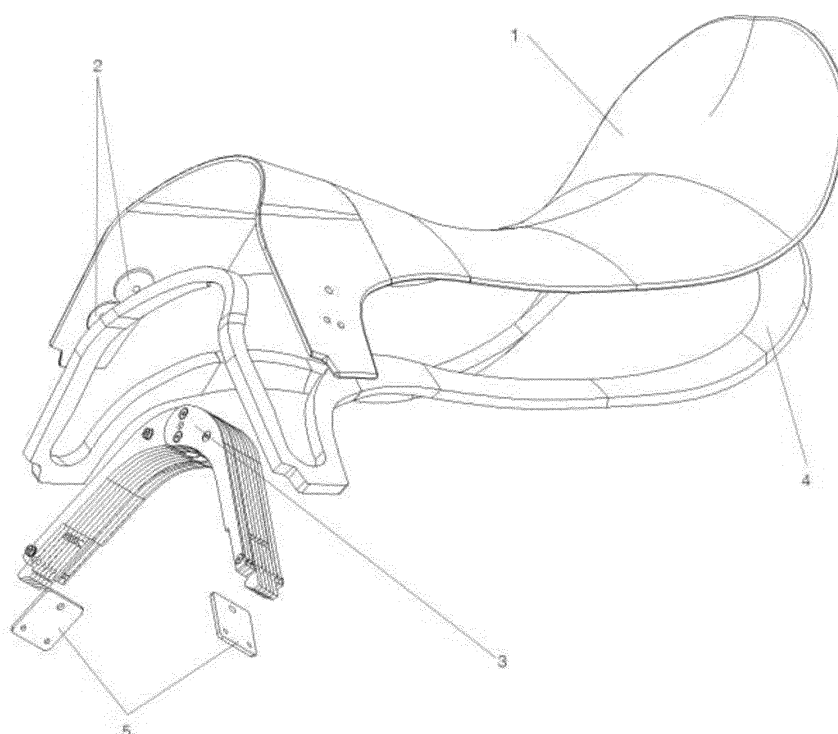
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(54) **COMPOSITE TREE GULLET FOR RIDING SADDLE AND ADJUSTMENT MECHANISMS**

(57) The aim of the present invention is to manufacture a particularly light but highly mechanical resistance gullet for riding saddle which is capable of allowing the highest performance in complete safety. Such goal is achieved thanks to a special assembly of the saddle by means of elastomer or velcro components with high ten-

sile strength so that the gullet remains flexible enough to adapt to the measurements of the withers of different horses together with a special and innovative arched mechanisms based on two gear wheels or on a calibrated spine.

Fig. 4



Description

[0001] A riding saddle includes an internal component called gullet. This is the basic structure upon which the padding, fabrics and leather parts in direct contact with the back of the horse and rider are fixed - by means of nails, glues and pins.

[0002] Traditionally, the gullet is made of metal and wood. The problem generally associated with this choice of materials is the heaviness of the entire saddle, as well as the sensitivity of the gullet to the atmospheric agents that will inevitably have to be faced, given the outdoor use of the saddle. In fact, on the one hand the metal parts will tend to rust, while the wooden components of the tree will suffer from humidity and in general do not guarantee an excellent resistance over time.

[0003] To remedy these problems, even if partially, in recent years, gullets have been produced in thermoplastic material instead of wood, while maintaining the use of metal reinforcements. On the one hand, these technical solutions will face the same risks of rusting of the metal components, on the other hand, thermoplastic is a rather fragile material (even if compared to the traditional wood gullet), causing risks of breaking the saddle due to stress during particularly intense riding sessions.

[0004] The size of the gullet, and consequently of the entire saddle, depend on the height of the rider and the size of the horse's back at the highest point of the back, called the withers (meeting point between the neck and shoulder blades). The length in the longitudinal direction of the gullet is proportional to the height of the rider, so it is an aspect to be taken into account when manufacturing and purchasing a saddle.

[0005] The frontal arch of the gullet must instead take into account the width of the withers: the more prominent and thin the horse's withers, the more the arch must be narrow. On the contrary, a horse with a prominent withers and a flat back will need a gullet with a much wider front arch.

[0006] In most products on the market the size of the front arch of the gullet is fixed and cannot be changed. Some inventions known in the state of the art - by way of example, EP1911719, EP16167321, GB2423230, US2017297893, US9315374 US8863482, WO2017205085 - provide mechanisms to modify this measure by the user or a professional, but none provides for the use of a carbon fiber saddle or innovative adjustment mechanisms such as the two preferred embodiments described below.

[0007] Consequently, in most cases the saddle will be suitable only for horses with the withers of a certain size: this forces the rider who rides horses with different physical characteristics to equip themselves with as many saddles, with large-sized gullet. In fact, the use of a not suitable saddle for the horse causes serious damage to the horse's health.

[0008] The aim of the present invention is to create a saddle which is particularly light, thanks to the use of

more suitable materials than the traditional ones of wood and metal, but which at the same time guarantees - and even better with respect to the state of the art - full solidity, mechanical resistance to the stresses of the activity and product safety, both for the rider and for the horse.

[0009] Moreover, in line with the increasing sensitivity toward the animal health, there will be an increasing need to ensure the maximum adaptability of the saddle to the specific conditions of the horse being ridden. This increased possibility of adjustment will also multiply the occasions of use of the single saddle, no longer limited to horses of a certain size, but potentially to all horses available in any riding school.

[0010] Saddlers or saddle builders are the ones who are called to answer these questions coming from the market, who have now reached the performance limits of traditional materials and therefore will welcome the possibility of using new composite materials to meet these consumer needs.

[0011] These and other advantages are obtained with the use of new composite materials in the traditional field of riding saddlery, in particular for the construction of a carbon fiber gullet impregnated with thermosetting resins. Such composite material has proven to be particularly suitable for the purpose, being able to combine characteristics of lightness and mechanical strength that guarantee the highest level of performance in maximum safety.

[0012] In addition, depending on the lamination plan performed, it can be made more flexible at certain points, to allow the adjustment of the width of the saddle with systems such as those illustrated below.

[0013] Further characteristics and advantages of the object of the present invention will be better illustrated through an examination of the description of a preferred but not exclusive embodiment of the invention illustrated by way of non-limiting example in the attached drawings and described below where:

figure 1 represents a perspective view of the invention of this patent, in which you can see the gullet (1), the elastomer (4), the metal fixing plates (5) and the bow (3);

figure 2 represents a front view of the invention subject of this patent;

figure 3 represents a lower view of the invention subject of this patent;

figure 4 represents an exploded perspective of the invention object of the present patent, which highlights the gullet (1), the circular housings (2), the bow (3), the elastomer (4), the metal plates of fixing (5); figure 5 represents a lower view of the carbon fiber gullet, which highlights the Velcro band with high tensile strength (6) to be used as an alternative to the elastomer for assembling the saddle;

figure 6 represents a perspective view of the bow (3) in one of the preferred embodiments, which shows

the central screw (7) for fixing two groups of slats (8) that will form the bow; these slats may be made of composite material, metal and / or carbon; figure 7 represents an exploded perspective view of the same bow, which shows the toothed crowns (9.10) part of the system for adjusting the width of the arch; figure 8 represents a perspective view of the bow (3) in the other preferred embodiment, which shows the calibrated pin (13) part of the system for adjusting the width of the bow itself; such adjustment occurs in a fixed measure.

figure 9 represents an exploded perspective view of the same bow, in which both the calibrated pin (13) and the central screw (12) and the holes (14) made on the slats (11) are visible, which determine the various adjustment measures of the width of the bow.

[0014] The prepreg composite material comes in the form of rolls of carbon fiber fabric already impregnated with a predetermined quantity of resin which in the present case is considered to be determined in a range between 25 and 50% of resins with respect to the weight in grams per square meter of the chosen fabric.

[0015] From the rolls of fabric, shapes are obtained which are layered inside a mold, according to a specific lamination plane. The mold is placed inside a bag and placed under vacuum. The mold, bagged and vacuum packed, is then inserted inside a press, an oven, an autoclave or other suitable equipment to create a thermal cycle such that the resin in which the fiber is impregnated solidifies and hardens.

[0016] The laminate thus created will take the shape of the mold and will have differentiated thicknesses depending on the lamination plan performed, the rigidity of the laminate is proportional to the number of overlapping layers; as a consequence, in the points where the number of layers is limited, the product will be more flexible; on the other hand, where the product has many layers it will be more rigid and resistant.

[0017] The laminate thus obtained will have very high mechanical strength and a very low weight; it will also respond differently to mechanical stresses depending on the point where the stress occurs, to some extent "adapting" elastically to the stress itself to return to its rest position when the stress ends its effect.

[0018] This manufacturing process is unknown to traditional saddle manufacturers and is typical of high-tech sectors such as aerospace and automotive.

[0019] US Patent US6691498 provides for the insertion of layers of graphite in the wood of the gullet in order to lighten the saddle while maintaining structural resistance, however, the use of the wood, exposes the saddle to the negative consequences of bad maintenance over time as traditional saddles, considering the use of wood as the main material for the gullet.

[0020] Since the carbon fiber cannot be easily studded or tapped, an additional element will be needed to complete the saddle maker's assembly. The element identi-

fied is an elastomeric material (4) which, once shaped, is glued to the carbon handle in the areas where necessary, and being of a density comparable to wood, it allows the application and sealing of pins and nails. The piece thus obtained is suitable to be inserted in the saddlers production process, replacing the traditional gullet and without changing the assembling phases already in use. However the elastomer, being of a similar density of the wood, implies an increase in weight that adds nothing to the performance of the gullet, but is functional only to the needs of the saddler and its consolidated assembling process of the saddle.

[0021] As an alternative way of the assembly system just described, a different, equally innovative configuration is achieved through the use of a Velcro type system with high tensile strength (6), which is applied directly during the rolling phase on the gullet. The gullet so obtained at the end of the lamination process already possesses, being a unique body together with the carbon fiber part, the so-called "hooks" of the velcro.

[0022] The "slotted" part of the velcro is then sewn to the fabric or leather components. The coupling therefore takes place with the simple pressure and, in case the positioning is wrong, it will be sufficient to remove and replace the part, without having to extract nails or pins.

[0023] In order to adjust the width of the front arch of the gullet (1) and thus adapting it to the measurements of the withers of different horses, two preferred embodiments of a bow mechanism (3) are proposed to be fixed on the gullet, so being able to vary its width thanks to the flexibility of the material of which the prepreg laminate is made.

[0024] A first system provides for the coupling of a defined number of blades (8) cut according to a predetermined geometry. Two groups of slats are assembled which will constitute the two arms of the bow. The coupling of the two arms to form a single and solid bow occurs through the assembly of two toothed crowns (9.10), one for each arm.

[0025] The crown gear is assembled to allow a male-female joint. The tightening through the central screw (7) of the ring gear allows the adjustment of the width of the bow.

[0026] In the second preferred embodiment, the coupling of the two groups of slats (11) or arms to form a single and solid bow occurs through the central screw (12), without the use of gear wheels.

[0027] Holes (14) are drilled around the central screw, each functional for selecting a predetermined size.

[0028] The bow width is adjusted by rotating the two arms around the central screw. When the holes corresponding to the desired bow width match, tightening will take place by inserting a calibrated pin (13) in the selected hole.

[0029] There are several patents known in the state of the art that allow the adaptation of the saddle to different sizes of the withers. Examples are the following: EP1911719, EP16167321, GB2423230,

US2017297893, US9315374 US8863482,
WO2017205085.

[0030] In all cases, these are saddles with adaptations that allow the extension of the front bow of the gullet, or directly mechanisms to be inserted on existing saddles for this purpose. None of these foresees, in addition to the use of new composite materials in the manufacture of the saddle, innovative adjustment systems such as the two just described, which allow the bow to be enlarged and narrowed directly by the user and without the aid of other pieces to add to the structure.

[0031] In fact, by way of example among the patents referred to: EP1911719 requires the intervention of a specialized technician for adjusting the width, whenever the need arises.

[0032] On the other hand, in patents EP16167321 and US8863482 the adjustment takes place through the use of interchangeable reinforcing metal elements of different sizes: based on the element used, there will be a gullet with a different width; however, this requires that the user always has these elements on hand in case of need.

[0033] In the two preferred forms described in the context of the present patent, on the other hand, all the elements for adjustment are already present in the mechanism itself, so that it will be sufficient for the user to intervene respectively on the central screw (7) or on the calibrated plug (13) to widen or shrink the bow arms, and consequently the front bow of the gullet.

[0034] The aim of the present invention has thus been achieved, that is, the manufacture of a particularly light but highly mechanical resistance gullet, which is therefore capable of allowing the highest performance in complete safety; moreover, the gullet thus created guarantees the correct assembly of the saddle by means of elastomer or velcro components with high tensile strength; finally, it remains flexible enough to adapt to the measurements of the withers of different horses, with special innovative arched mechanisms based on two gear wheels or on a calibrated spine.

shaped mechanisms (3);

4. Gullet according to the previous claims **characterized by** the addition of components made of an elastomeric material (4) easily nailable or broachable, in order to be integrated into the consolidated production processes of saddles assembly;
5. Gullet according to claims 1-3, **characterized by** the possibility of integrating a Velcro-type system with high tensile strength (6) during lamination, in order to assemble the saddle without adding the weight of the elastomeric materials as per previous claim and so replacing nails and/or pins;
6. Saddle-bow (3) according to claims 1-3, **characterized by** two groups of blades (8) preferably made of composite material, metal and/or carbon, joined together by two toothed wheels (9,10) assembled according to a male-female type junction, which allow different bow widths to be obtained by clamping them with central screw (7) in various positions;
7. Saddle-bow (3) according to claims 1-3, **characterized by** two groups of blades (11) joined together by means of a central screw (12) and provided with holes (14) at the ends, so that when clamped in different positions by a calibrated pin (13), it allows to obtain different widths of the bow.

Claims

1. Gullet for riding saddle **characterized by** the use of new composite materials, and in particular of carbon fiber impregnated with thermosetting resins, such as to make it endowed with a high strength to weight ratio;
2. Gullet according to the previous claim **characterized by** the possibility of obtaining different thicknesses in its various parts, according to the rolling plane performed, in order to obtain different levels of flexibility or rigidity within the same product;
3. Gullet according to the previous claims, **characterized by** the flexibility to adapt to different measures of the horse's withers by means of suitable arch-

Fig. 1

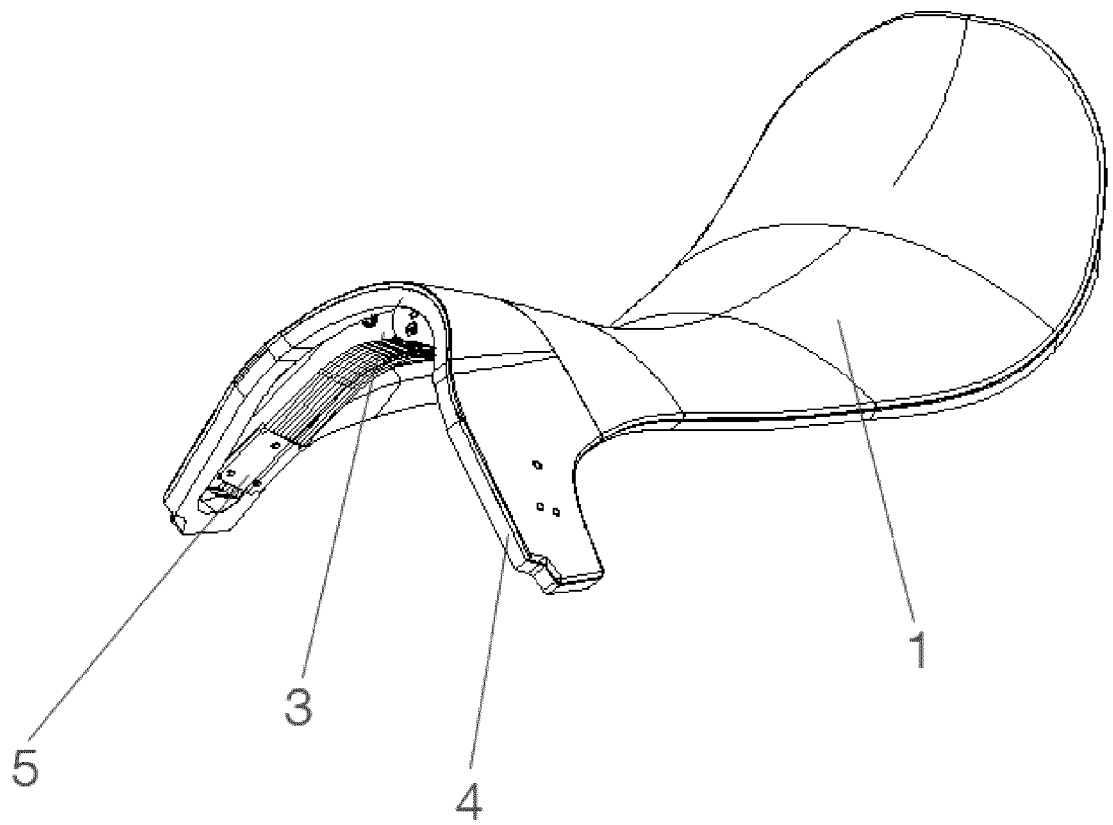


Fig. 2

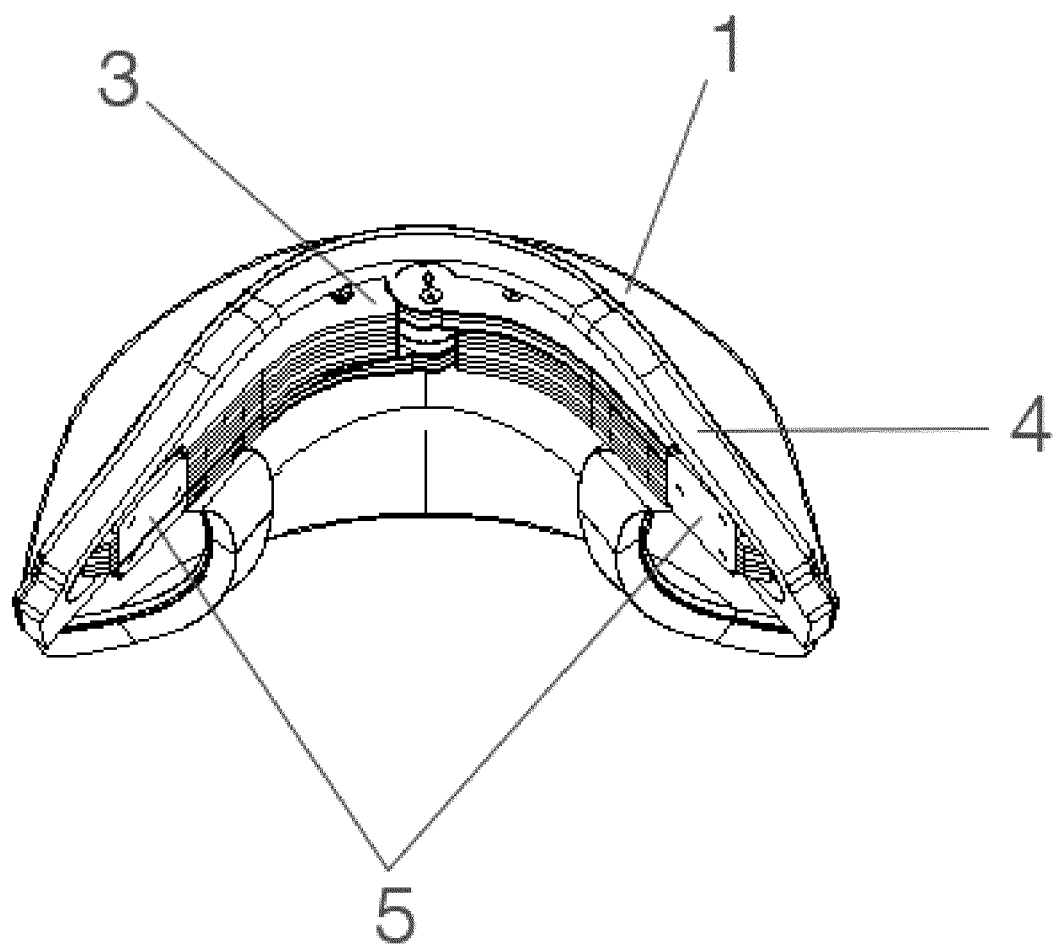


Fig. 3

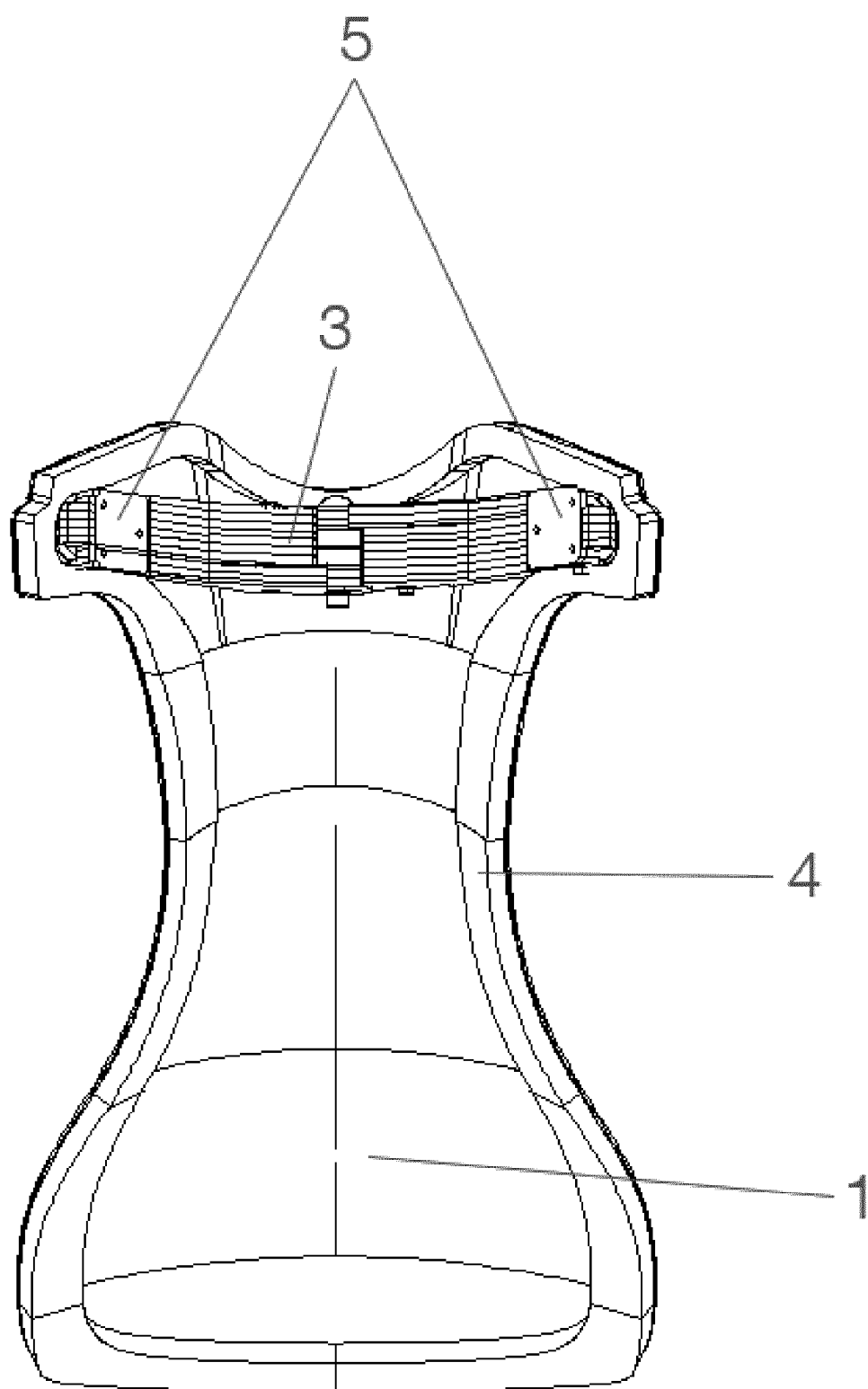


Fig. 4

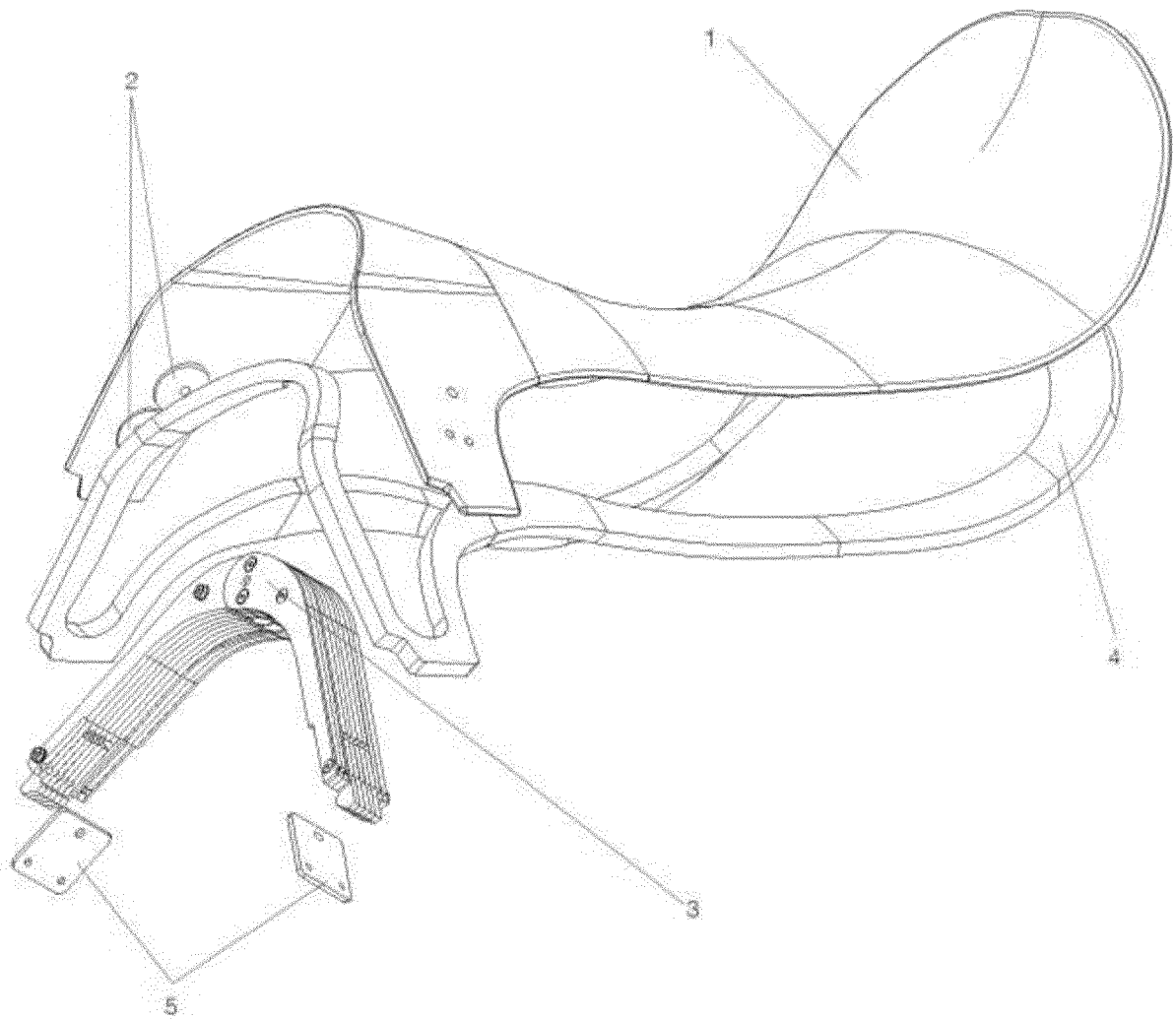


Fig. 5

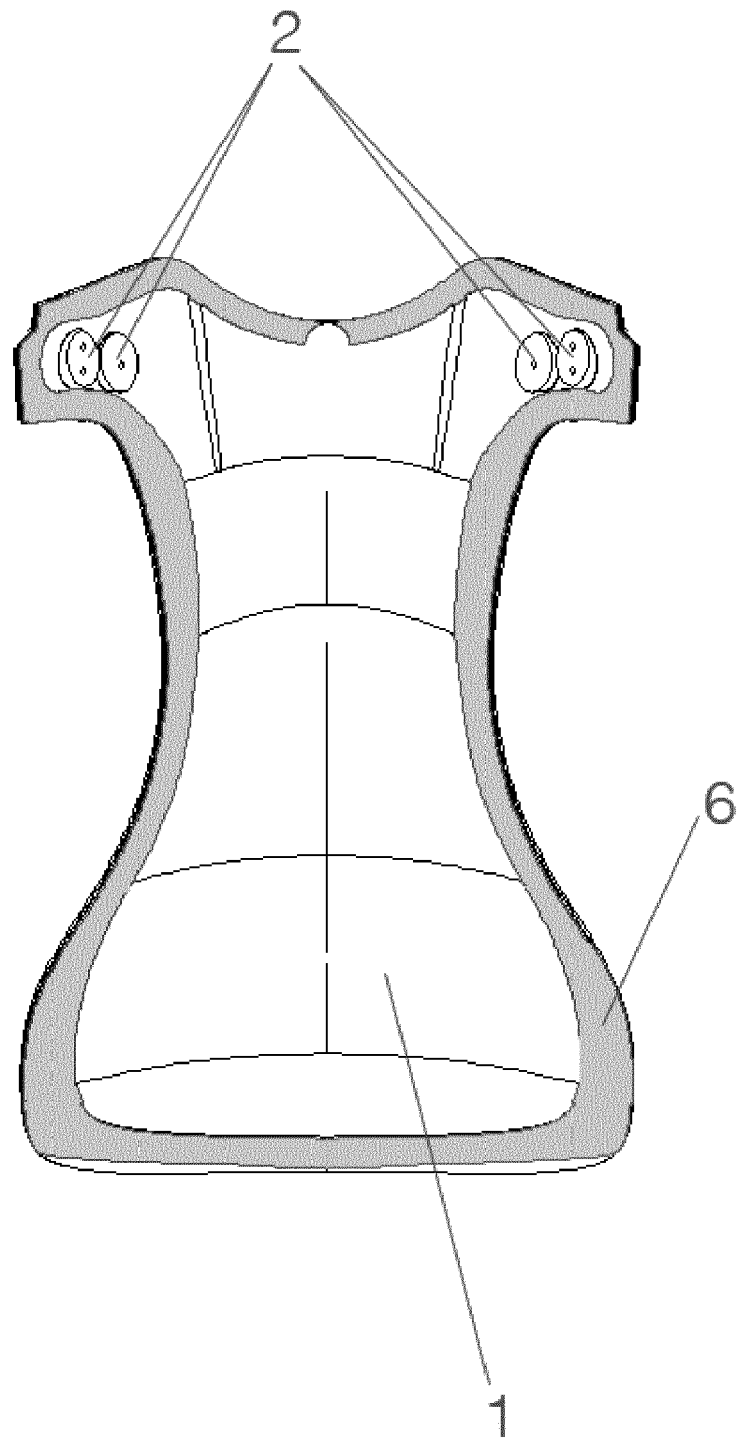


Fig. 6

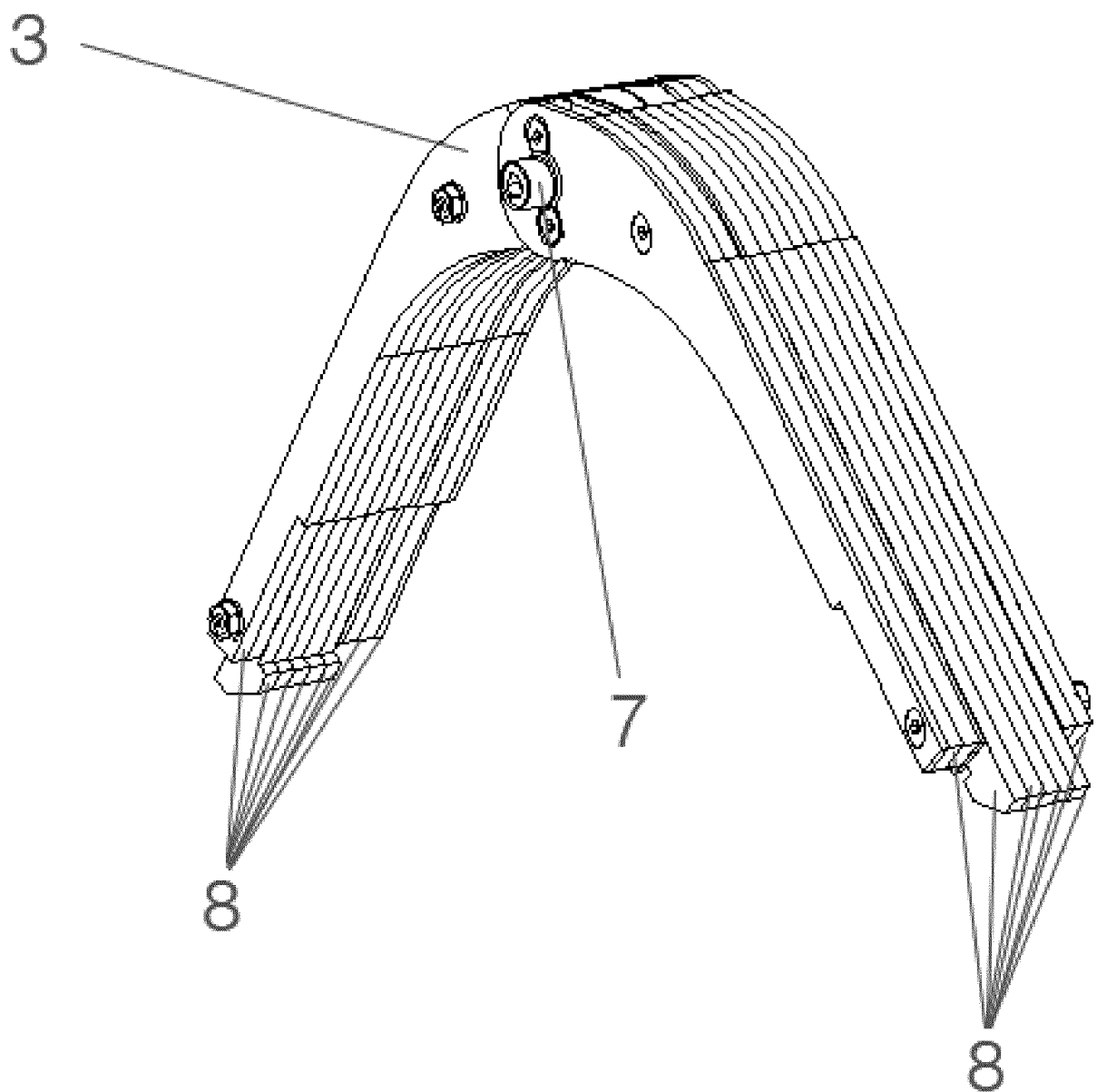


Fig. 7

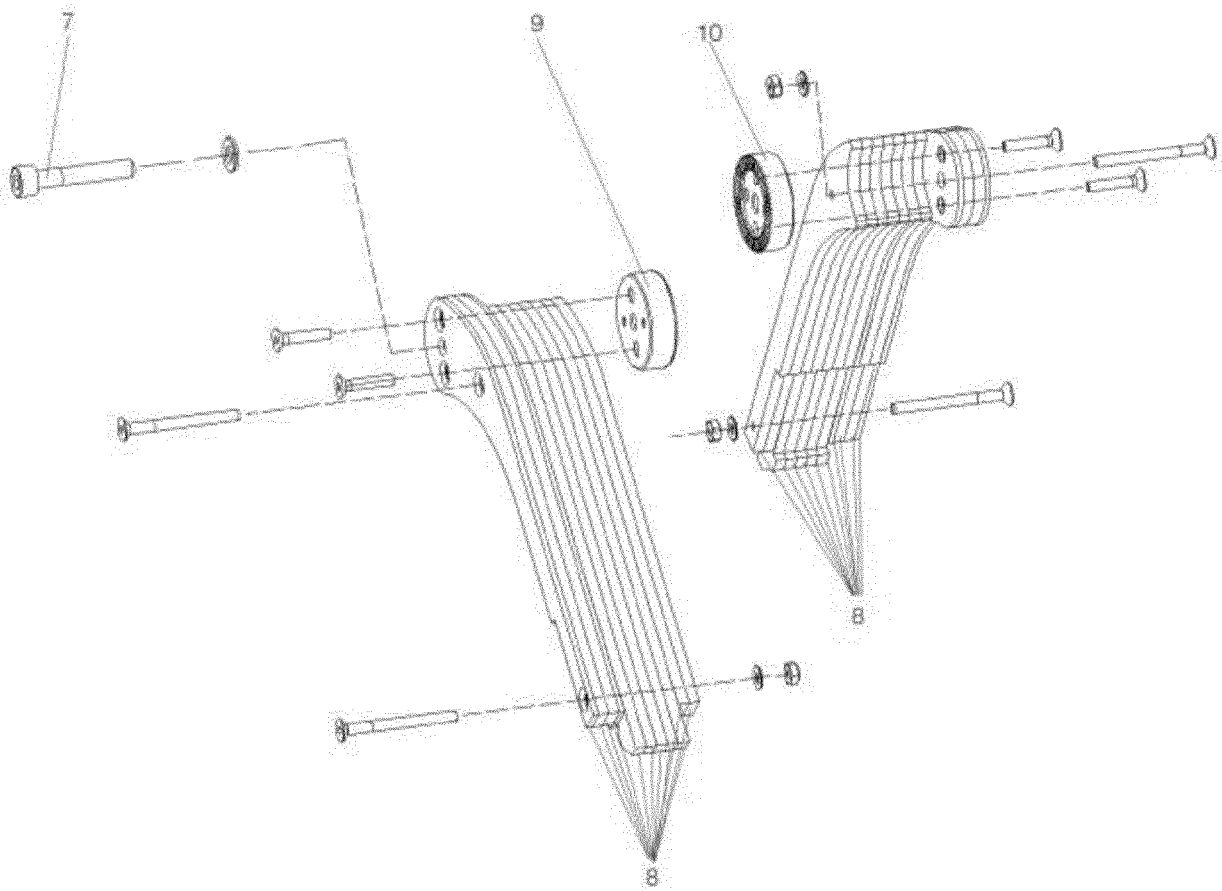


Fig. 8

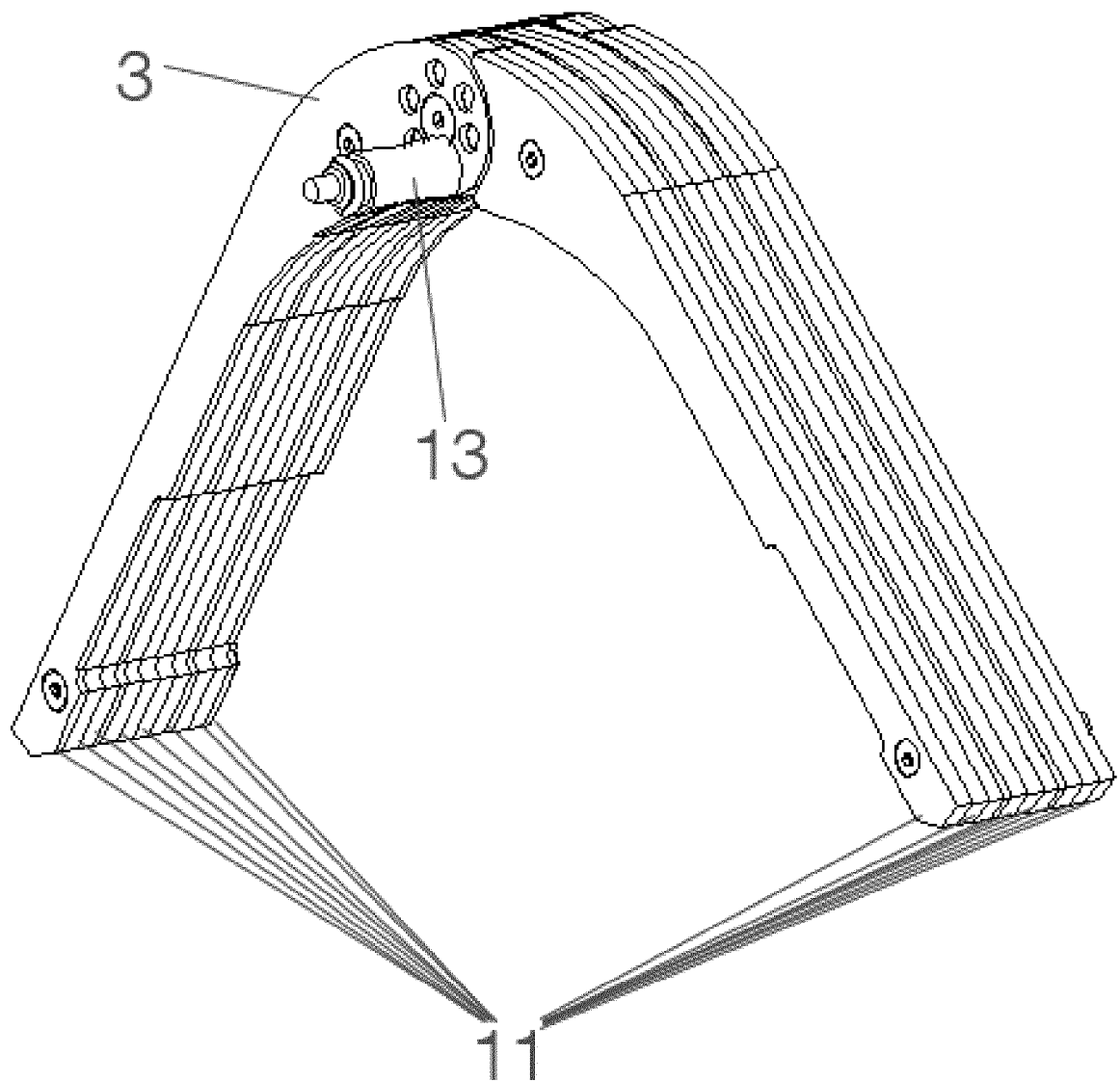
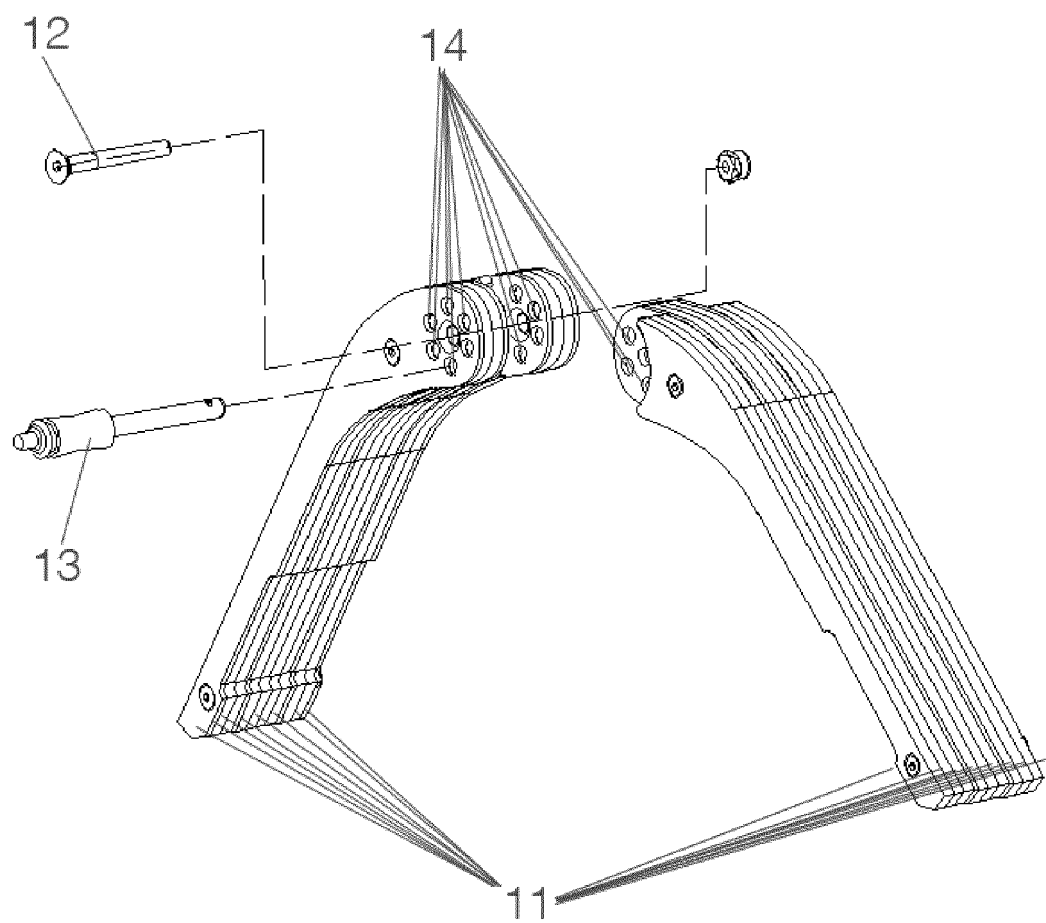


Fig. 9





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 Application Number
 EP 20 02 0057

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Place of search The Hague		Date of completion of the search 25 January 2021	Examiner Espeel, Els
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