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SEAT AND TORSION DAMPER COMPRISING SAME

Abstract

A seat intended to be placed on one end of a first spring, notably of a torsion damping device for a vehicle. The seat includes a dorsal part having a body, which is designed to cooperate with the end of the first spring, and a bar portion forming a surface designed to be one element of a pivot connection. A frontal part of the seat is designed to be connected to the dorsal part by having complementing shapes.

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Background/Summary

[0001] The invention relates to seats for springs integrated in particular in torsion dampers for a transmission line of a vehicle. The invention also relates to torsion damping devices comprising such seats.
[0002] A torsion damping device integrated in a friction clutch is known. This device comprises a set of springs, the ends of which cooperate with the rest of the device via one-piece metal seats. More specifically, the torsion damping device has two coaxial parts mounted rotatably relative to one another counter to the aforementioned, circumferentially acting springs, with the one-piece metal seats acting between at least one of the spring ends, on one side, and one and/or the other of the coaxial parts, on the other side. To that end, each one-piece metal seat comprises a frontal part for abutting and/or centring the end of the spring or spring assembly with which it cooperates, and a dorsal part backing onto the frontal part and having a protruding bar portion that provides a pivot link with one and/or the other of the coaxial parts.
[0003] However, these one-piece seats are expensive to manufacture. Moreover, they have considerable mass, and this makes them complicated to use in respect of the overall requirements of reducing the mass of the friction clutch.
[0004] The present invention notably aims to further improve the seats of torque damping devices.
[0005] To that end, the invention provides a seat intended to be placed on one end of a first spring, notably of a torsion damping device for a vehicle, comprising: [0006] a dorsal part comprising a body, which is designed to cooperate with the end of the first spring, and a bar portion forming a surface designed to be one element of a pivot connection; and [0007] a frontal part designed to be connected to the dorsal part by having complementing shapes.
[0008] As a result, the seat according to the invention is in two parts, or is bipartite (i.e. the seat is not one-piece). These two parts of the seat offer a wide variety of shapes for reducing the mass of the seat and making it easier to manufacture while at the same time opposing the centrifugal movement of the first spring and allowing said first spring to work under good conditions, even at full torque, by keeping its ends parallel. The invention makes it possible to obtain cost-effective and lightweight seats without sacrificing their effectiveness.
[0009] Decreasing the mass of the seats has a direct impact on reducing the fuel consumption and on improving the recyclability of said seats. In addition, decreasing the mass of the seats also makes it possible to reduce the inertia of the torsion damping device.
[0010] The two distinct parts of the seat make it easier to design and manufacture each of said parts, it being possible for each of the components to have a dedicated manufacturing process. Moreover, the two parts can be assembled simply, i.e. by having complementing shapes, enabling rapid, simple and effective installation of the seat. In addition, manufacturing a seat in two parts makes it possible to make one of the parts, preferably the dorsal part, a standard part, making it possible to have a single reference irrespective of the products proposed and to only need to adapt the other of the parts, preferably the frontal part, to the specific dimensions of said products.
[0011] According to one of the aspects of the invention, the bar portion forms a cylindrical surface. This optimizes the pivot connection.
[0012] According to one of the aspects of the invention, the frontal part is independent of the dorsal part. Thus, the frontal part is not rigidly secured to the dorsal part, for example by adhesive bonding or welding, before being mounted. This freedom between the two parts of the seat makes it easier to mount or dismount the seat in the torsion damping device.
[0013] According to one of the aspects of the invention, the frontal part consists at least partially of a first material and the dorsal part consists at least partially of a second material, which is different from the first material. This makes it possible to choose the most suitable material for each of the

parts of the seat by taking into account the constraints linked to their function while still looking to decrease the mass and the manufacturing costs of the seat.
[0014] According to one of the aspects of the invention, the frontal part of the seat is at least partially made of a synthetic material. This reduces the weight and the manufacturing cost of the seat without sacrificing its effectiveness.
[0015] According to another of the aspects of the invention, the frontal part of the seat is wholly made of a synthetic material. This further reduces the weight and the manufacturing cost of the seat without sacrificing its effectiveness.
[0016] According to one of the aspects of the invention, the dorsal part of the seat is at least partially made of metal. This maintains optimum effectiveness of the seat.
[0017] According to another of the aspects of the invention, the dorsal part of the seat is wholly made of metal. This maintains optimum effectiveness of the seat.
[0018] According to one of the aspects of the invention, the body of the dorsal part comprises at least one protuberance, which extends perpendicularly from an edge of said body and is designed to guide the first spring. As a result, the first spring abuts the body of the dorsal part and the at least one protuberance makes it possible to guide said first spring so that the latter does not move centrifugally. The at least one protuberance extends perpendicularly, or radially, in relation to the main surface of the body of the dorsal part.
[0019] According to one of the aspects of the invention, the body of the dorsal part comprises at least two protuberances, preferably four protuberances, situated opposite one another in pairs. As a result, the first spring is perfectly guided.
[0020] According to one of the aspects of the invention, the bar portion is tubular and has an open cross section facing the frontal part. This reduces the mass of the dorsal part without sacrificing its effectiveness.
[0021] According to one of the aspects of the invention, the frontal part comprises a body designed to provide at least one of the following: centring of the first spring, centring of a second spring internal to the first spring, and abutment of the second spring.
[0022] According to one of the aspects of the invention, the body of the frontal part is cross-shaped. This optimizes the shape of the body between its centring function and the minimization of its mass.
[0023] According to one of the aspects of the invention, the body of the frontal part comprises at least one first rib, which is secured to a first edge of said body, extends radially in relation thereto, and is designed to be inserted into a first slot formed on the body of the dorsal part. As a result, the dorsal part and the frontal part are nested one in the other by having complementing shapes. Furthermore, the first rib is designed to axially hold the seat in the event of angular travel with compression of the first spring.
[0024] According to one of the aspects of the invention, the body of the frontal part comprises two first ribs which extend facing one another.
[0025] According to one of the aspects of the invention, the body of the frontal part also comprises at least one second rib, which is secured to a second edge, situated opposite the first edge, of said body and extends radially in relation to said body, the second rib being designed to be inserted into a second slot formed on the body of the dorsal part. As a result, the dorsal part and the frontal part are nested one in the other by having complementing shapes. Furthermore, the second rib is designed to axially hold the seat in the event of angular travel with compression of the first spring.
[0026] According to one of the aspects of the invention, the body of the frontal part comprises two second ribs which extend facing one another.
[0027] According to one of the aspects of the invention, the first spring bears against the at least one first rib and against the at least one second rib. As a result, the first spring makes it possible to keep the dorsal part and the frontal part together.
[0028] The invention also relates to a torsion damping device, in particular for a vehicle,

comprising two coaxial parts mounted rotatably relative to one another counter to at least one first spring with, positioned circumferentially between one of the ends of said first spring and one of the coaxial parts, a seat as described above, the dorsal part of the seat being designed to bear against said first spring and to itself bear against said coaxial part, and the frontal part of the seat being designed to be connected to the dorsal part by having complementing shapes.

Description

[0029] Other features, details and advantages of the invention will become more clearly apparent from reading the following description, on the one hand, and from several exemplary embodiments given by way of non-limiting indication with reference to the appended schematic drawings, on the other hand, in which:
[0030] FIG. **1** is a front view, in semi-perspective, of a friction clutch comprising seats according to the invention;
[0031] FIG. **2** is a partial view of an enlargement of FIG. **1**;
[0032] FIG. **3** is identical to FIG. **2**, with an alternative embodiment of the seat according to the invention;
[0033] FIG. **4** is a front view, in perspective, of the dorsal part of the seat according to the invention;
[0034] FIG. **5** is a rear view, in perspective, of the dorsal part of FIG. **4**;
[0035] FIG. **6** is a front view, in perspective, of the frontal part of the seat according to the invention;
[0036] FIG. **7** is a rear view, in perspective, of the frontal part of FIG. **6**;
[0037] FIG. **8** is a front view, in perspective, of the seat according to the invention;
[0038] FIG. **9** is a rear view, in perspective, of the seat of FIG. **8**;
[0039] FIG. **10** is a front view, in perspective, of the frontal part of the seat according to the alternative embodiment of FIG. **3**;
[0040] FIG. **11** is a front view, in perspective, of the seat comprising the frontal part of FIG. **10**.
[0041] The features, variants and various embodiments of the invention may be combined with one another, in various combinations, as long as they are not mutually incompatible or mutually exclusive. It will be possible, in particular, to imagine variants of the invention that comprise only a selection of the features described below, in isolation from the other features described, if this selection of features is sufficient to confer a technical advantage and/or to distinguish the invention from the prior art.
[0042] In the description and the claims, the terms “outer” and “inner” and also the orientations “axial” and “radial” will be used, according to the definitions given in the description, to refer to elements of the torsion damping device. The axis of rotation X determines the “axial” orientation. The “radial” orientation is orthogonal to the axis of rotation X. The “circumferential” orientation is orthogonal to the axis of rotation X and orthogonal to the radial direction. Furthermore, the angles and angular sectors expressed are defined in relation to the axis of rotation X. The terms “outer” and “inner” are used to define the relative position of one component with respect to another, with reference to the axis of rotation X; a component close to said axis is thus described as inner as opposed to an outer component located radially at the periphery.
[0043] “Vehicle” is to be understood to mean motor vehicles, which comprise not only passenger vehicles but also industrial vehicles, this comprising in particular heavy goods vehicles, public transport vehicles or agricultural vehicles, but also any transport unit that makes it possible to move a living being and/or an object from one point to another, or any immobile unit that performs mechanical work.
[0044] Ordinal numeral adjectives are used to distinguish between features. They do not define the

position of a feature. Consequently, for example, a third feature of a product does not mean that the product has a first and/or a second feature.

[0045] FIG. **1** shows, by way of example, the use of the invention for a friction clutch **10**, in particular for a vehicle.

[0046] The friction clutch **10** may comprise a hub **11** and a friction disc **12**, with a torsion damping device **14** acting in between.

[0047] The friction disc **12** may be designed to be wedged in rotation on a driving shaft, or crankshaft, connected to the engine of the vehicle. The hub **11** may be designed to be wedged in rotation on a driven shaft connected to the gearbox. The hub **11** may be rotatable about an axis of rotation X.

[0048] The friction disc **12** may comprise a web and, to provide clamping between the two plates of a clutch, which is not shown, two friction linings **16** each respectively attached to the periphery of the web, one on each side thereof. The web may be thin and possibly broken up into blades.

[0049] The torsion damping device **14** is designed to act at high torques. The torsion damping device **14** may comprise two coaxial parts **14**A, **14**B which, within the limits of a determined angular travel, are mounted rotatably relative to one another counter to damping devices **22** that act circumferentially between them. Each damping device **22** may comprise a single first spring **20**. The first spring **20** may be a helical spring.

[0050] As an alternative, each damping device **22** may comprise a first spring **20** and a second spring **21**, internal to the first spring **20**. The first spring **20** is the external spring or the spring of larger diameter. The second spring **21** is the internal spring or the spring of smaller diameter. Thus, the outside diameter of the second spring is smaller than the inside diameter of the first spring **20**. The first and the second spring are coaxial. The second spring **21** may be a helical spring. The second spring **21** may have a stiffness lower than the stiffness of the first spring **20**. Each damping device **22** may also comprise a third spring located axially between the first and the second spring. The three springs are coaxial. The third spring may be a helical spring.

[0051] The coaxial part **14**A may comprise two guide washers **23**. The two guide washers **23** can be parallel to one another, preferably at a distance from one another. The two guide washers **23** may be connected, at their smallest-diameter periphery and with or without play, to the hub **11** in order to transfer the torque thereto.

[0052] The coaxial part **14**B may comprise a web **25**. The web **25** may act between the guide washers **23**. The friction disc **12** may be fixed to the web **25**.

[0053] It is possible to reverse the structure, with the web **25** meshing with play, for example via a toothing, with the hub **11** whereas the guide washers **23** are mounted rotationally freely in relation to the hub **11** by being connected to one another and secured to the friction disc **12**, the latter being for example fixed by riveting to one of them.

[0054] The torsion damping device **14** may comprise a plurality of damping devices **22**. In the example shown in FIG. **1**, the torsion damping device **14** comprises five damping devices **22**. The damping devices **22** may be evenly distributed circumferentially, by all being elongate substantially tangentially to a single circumference of the whole. The damping devices **22** may be each received in a receiving portion **28**. The receiving portion **28** may be formed by a window provided on the guide washers **23** and by a window provided on the web **25**.

[0055] Between at least one of the ends of the first spring **20** and one and/or the other of the coaxial parts **14**A, **14**B, a seat **32** may be circumferentially positioned. The seat **32** may comprise a frontal part **33** and a dorsal part **34**.

[0056] The seat **32** may be bipartite. The frontal part **33** and the dorsal part **34** may be independent of one another. Before the seat is mounted in the torsion damping device **14**, the frontal part **33** is not rigidly secured to the dorsal part **34**. Each of the parts may be manufactured independently of the other of the parts and have its own manufacturing process, shape and/or material.

[0057] As an alternative, the seat **32** may be composed of a plurality of parts or units. For example,

the frontal part **33** may be composed of a plurality of units. The dorsal part **34** may be composed of a plurality of units.
[0058] The frontal part **33** and the dorsal part **34** may be assembled by having complementing shapes. The dorsal part **34** may bear against the first spring **20**. The dorsal part **34** may moreover abut one and/or the other of the coaxial parts **14**A, **14**B, by being mounted pivotably relative thereto about an axis parallel to their/its own axis and, thus, to the axis of rotation X of the hub **11**. The frontal part may centre the first spring **20**. As an alternative, the frontal part **33** may bear against and/or centre the second spring **21**.
[0059] A seat **32** may be installed at each of the ends of the damping devices **22**.
[0060] All the seats **32** may be identical.
[0061] The frontal part **33** may comprise a body **24**. The body **24** may extend in the axial direction between a first end **29** and a second end **30**. The body **24** may extend in the radial direction between a first edge **18** and a second edge **19**. The body **24** may form a cross, with the first arm of the cross extending between the first end **29** and the second end **30** and the second arm of the cross extending between the first edge **18** and the second edge **19**. Each of the edges and ends is designed to centre the first spring **20**. Each of the edges and ends may additionally or alternatively abut the second spring **21**. Each of the edges and ends may additionally or alternatively centre the second spring **21**. The body **24** may have a flat first surface **26** facing the first spring **20**. The body **24** may have a flat second surface opposite the first surface **26**.
[0062] As an alternative, the body **24** may have a circular shape. The first surface **26** may comprise a stepped section **60** for the centring of the first spring **20**. As an alternative or in addition, the stepped section **60** may enable the abutment and/or the centring of the second spring **21**. The first surface **26** of the body **24** may comprise a single step **60**. As an alternative, the first surface **26** of the body **24** may comprise, annularly and concentrically, two steps **60**. The outermost step **60** centres the first spring **20**, and the innermost step **60** abuts and centres the second spring **21**.
[0063] Each of the steps **60** may comprise, perpendicularly in relation to the axis of the first spring **20** at rest, a transverse segment for the abutment of the first or second spring in question, and, parallel to that axis, an axial segment for centring that spring.
[0064] The frontal part **33** can also comprise at least one first rib **50**. The first rib **50** may extend radially between an inner end **51** and an outer end **52**. The first rib **50** may be secured to the body **24**. More particularly, the first rib **50** may be secured to the first edge **18**. The inner end **51** of the first rib **50** may be secured to the first edge **18** of the body **24**. As an alternative, an intermediate segment, between the inner end **51** and the outer end **52**, of the first rib may be secured to the first edge **18**. The first rib **50** may be circumferentially offset from the body **24**. The first rib **50** may extend circumferentially between a first end at least partially secured to the body **24** and a free second end. The first end of the first rib **50** may be flat. The first end of the first rib **50** may be parallel to the body **24**. The free second end of the first rib **50** may be flat. The free second end of the first rib **50** may be tangential to the body **24**.
[0065] With preference, the frontal part **33** may comprise a pair of first ribs **50** parallel to one another, preferably at a distance from one another.
[0066] The frontal part **33** can also comprise at least one second rib **55**. The second rib **55** may extend radially between an inner end **56** and an outer end **57**. The second rib **55** may be secured to the body **24**. More particularly, the second rib **55** may be secured to the second edge **19**. The inner end **56** of the second rib **55** may be secured to the second edge **19** of the body **24**. As an alternative, an intermediate segment, between the inner end **56** and the outer end **57**, of the second rib may be secured to the second edge **19**. The second rib **55** may be circumferentially offset from the body **24**. The second rib **55** may extend circumferentially between a first end at least partially secured to the body **24** and a free second end. The first end of the second rib **55** may be flat. The first end of the second rib **55** may be parallel to the body **24**. The free second end of the second rib **55** may be flat. The free second end of the second rib **50** may be parallel to the body **24**.

[0067] With preference, the frontal part **33** may comprise a pair of second ribs **55** parallel to one another, preferably at a distance from one another.
[0068] The first rib **50** and the second rib **55** may extend axially between the web **25** and the guide washers **23**, their axial spacing depending on the thickness of the web **25**. The function of the first rib **50** and the second rib **55** is to axially wedge the seats **32** on the web **25**, to avoid them coming out of the receiving portions **28** of the damping device **22**.
[0069] The frontal part **33** may be produced by a forging process. As an alternative, the frontal part **33** may be produced by a cold heading process.
[0070] The dorsal part **34** may comprise a body **35**. The body **35** may be at least partially circular. The body **35** may be circular with a flat segment. The body **35** may have a continuous edge **36**. The body **35** may have a flat first surface **37** facing the first spring **20**. The surface **37** may be designed to serve as abutment for the first spring **20**. The body **35** may have a flat second surface opposite the first surface **37**. The second surface may be in contact with one and/or the other of the coaxial parts **14**A, **14**B.
[0071] The body **35** may also comprise a bar portion **43**. The bar portion **43** may be a part of the body **35**, more particularly a part of the second surface of the body **35**. The bar portion **46** may be designed to bear against one and/or the other of the coaxial parts **14**A, **14**B. The bar portion **43** may protrude from the second surface of the body **35**. The bar portion **43** may extend axially, i.e. parallel to the axis of rotation X of the hub **11**. The bar portion **43** may, at least locally, have a cylindrical surface. The cylindrical surface may have a curved cross section.
[0072] The bar portion **43** may be formed by stamping on the body **35**.
[0073] Via this dorsal part **34**, the seat **32** may be rockingly engaged with a notch, of curved profile, on one of the radial edges of the windows of the guide washers **23** of the coaxial part **14**A, and/or with a notch, of curved profile, on one of the radial edges of the windows of the web **25** of the coaxial part **14**B. The profiles of the notches may complement the profile of the bar portion **43**.
[0074] By way of this rocking, the seats **32** advantageously allow the ends of the damping devices **22** to remain substantially parallel to one another during use. At rest, they bear against the radially innermost part of the radial edges of the windows of the guide washers **23**. At the end of the angular travel between them and the web **25**, they bear against the radially outermost part of these radial edges.
[0075] The cylindrical surface of the bar portion **43** may have a circular cross section.
[0076] The bar portion **43** may be tubular. The cross section may be circularly closed. With preference, as shown in the figures, the cross section of the bar portion **43** may be open towards the frontal part **33**, at an opening angle less than 180°.
[0077] The bar portion **43** may form an insert on which at least one part of the body **24** of the frontal part **33** can be inserted. The body **24** of the frontal part **33** may completely go into the inner volume of the bar portion **43**. With preference, the body **24** of the frontal part **33** may partially go into the inner volume of the bar portion **43**.
[0078] In a variant, the bar portion **43** may be solid.
[0079] If the bar portion **43** is solid, the material of the body **24** of the frontal part **33** coats it.
[0080] The first rib **50** and the second rib **55** of the frontal part **33** may be disposed, facing one another, on either side of the bar portion **43**. The first rib **50** and/or the second rib **55** may extend over at least one segment of the bar portion **43**, for example by closely following the shape thereof at least locally. The first rib **50** and the second rib **55** may make it possible to snap-fit the bar portion **43** to the frontal part **33**. To this end, the first rib **50** and the second rib **55** may extend slightly at an angle, by converging towards one another on either side of the bar portion **43**. In this embodiment, the frontal part **33** is not independent of the dorsal part **34**.
[0081] As an alternative, the first rib **50** and the second rib **55** of the frontal part **33** may be at a distance from the bar portion **43**. The first spring **20** may exert a pressure on the first rib **50** and the second rib **55** in order to keep the frontal part **33** with the dorsal part **34**.

[0082] The dorsal part **34** can also comprise at least one protuberance **38**. The protuberance **38** may extend circumferentially. The protuberance **38** may extend perpendicularly in relation to the body **35** between an integral first end of said body **35** and a free second end. The protuberance **38** is designed to guide the first spring **20**. The protuberance **38** may have a curved shape. The shape of the protuberance **38** may be designed to closely follow the shape of the turns of the first spring **20**.
[0083] With preference, the dorsal part **34** may comprise a pair of protuberances **38**, preferably opposite one another in pairs. More particularly, the dorsal part **34** may comprise two pairs of protuberances **38**, preferably opposite one another in pairs.
[0084] The dorsal part **34** can also comprise at least one first slot **39**. More particularly, the body **35** of the dorsal part **34** may comprise at least one first slot **39**. The first slot **39** may be a through-slot. The first slot **39** may be closed. The first slot **39** is designed to receive the first rib **50** by having complementing shapes.
[0085] With preference, the dorsal part **34** may comprise a pair of first slots **39** parallel to one another, preferably at a distance from one another.
[0086] The dorsal part **34** can also comprise at least one second slot **40**. More particularly, the body **35** of the dorsal part **34** may comprise at least one second slot **40**. The second slot **40** may be a through-slot. The second slot **40** may be open on at least one of its ends, preferably its inner end. The second slot **40** is designed to receive the second rib **55** by having complementing shapes.
[0087] With preference, the dorsal part **34** may comprise a pair of second slots **40** parallel to one another, preferably at a distance from one another.
[0088] According to the invention, the frontal part **33** of the seats **32** may be at least partially made of a first material. As an alternative, the frontal part **33** may be wholly made of this first material. The dorsal part **34** of the seats **32** may be at least partially made of a second material. As an alternative, the dorsal part **34** may be wholly made of this second material. The first material may be different from the second material. The first material may be a synthetic material, for example plastic or polyamide 6.6. The second material may be metal such as a steel with a high proportion of carbon or aluminium.

Claims

1. Seat intended to be placed on one end of a first spring, notably of a torsion damping device for a vehicle, comprising: a dorsal part comprising a body, which is designed to cooperate with the end of the first spring, and a bar portion forming a surface designed to be one element of a pivot connection; and a frontal part designed to be connected to the dorsal part by having complementing shapes.
2. Seat according to claim 1, wherein the frontal part is independent of the dorsal part.
3. Seat according to claim 1, wherein the frontal part consists at least partially of a first material and the dorsal part consists at least partially of a second material, which is different from the first material.
4. Seat according to claim 1, wherein the body of the dorsal part comprises at least one protuberance, which extends perpendicularly from an edge of said body and is designed to guide the first spring.
5. Seat according to claim 1, wherein the bar portion is tubular and has an open cross section facing the frontal part.
6. Seat according to claim 1, wherein the frontal part comprises a body designed to provide at least one of the following: centring of the first spring, centring of a second spring internal to the first spring, and abutment of the second spring.
7. Seat according to claim 6, wherein the body of the frontal part comprises at least one first rib, which is secured to a first edge of said body, extends radially in relation thereto, and is designed to be inserted into a first slot formed on the body of the dorsal part.

8. Seat according to claim 7, wherein the body of the frontal part additionally comprises at least one second rib, which is secured to a second edge, situated opposite the first edge, of said body and extends radially in relation to said body, the second rib being designed to be inserted into a second slot formed on the body of the dorsal part.
9. Seat according to claim 8, wherein the first spring bears against the at least one first rib (**50**) and against the at least one second rib.
10. Torsion damping device, in particular for a vehicle, comprising two coaxial parts mounted rotatably relative to one another counter to at least one first spring with, positioned circumferentially between one of the ends of said first spring and one of the coaxial parts, a seat according to claim 1, the dorsal part of the seat being designed to bear against said first spring and to itself bear against said coaxial part, and the frontal part of the seat being designed to be connected to the dorsal part by having complementing shapes.
11. Seat according to claim 2, wherein the frontal part consists at least partially of a first material and the dorsal part consists at least partially of a second material, which is different from the first material.
12. Seat according to claim 2, wherein the body of the dorsal part comprises at least one protuberance, which extends perpendicularly from an edge of said body and is designed to guide the first spring.
13. Seat according to claim 2, wherein the bar portion is tubular and has an open cross section facing the frontal part.
14. Seat according to claim 2, wherein the frontal part comprises a body designed to provide at least one of the following: centring of the first spring, centring of a second spring internal to the first spring, and abutment of the second spring.
15. Torsion damping device, in particular for a vehicle, comprising two coaxial parts mounted rotatably relative to one another counter to at least one first spring with, positioned circumferentially between one of the ends of said first spring and one of the coaxial parts, a seat according to claim 2, the dorsal part of the seat being designed to bear against said first spring and to itself bear against said coaxial part, and the frontal part of the seat being designed to be connected to the dorsal part by having complementing shapes.
16. Seat according to claim 3, wherein the body of the dorsal part comprises at least one protuberance, which extends perpendicularly from an edge of said body and is designed to guide the first spring.
17. Seat according to claim 3, wherein the bar portion is tubular and has an open cross section facing the frontal part.
18. Seat according to claim 3, wherein the frontal part comprises a body designed to provide at least one of the following: centring of the first spring, centring of a second spring internal to the first spring, and abutment of the second spring.
19. Torsion damping device, in particular for a vehicle, comprising two coaxial parts mounted rotatably relative to one another counter to at least one first spring with, positioned circumferentially between one of the ends of said first spring and one of the coaxial parts, a seat according to claim 3, the dorsal part of the seat being designed to bear against said first spring and to itself bear against said coaxial part, and the frontal part of the seat being designed to be connected to the dorsal part by having complementing shapes.
20. Seat according to claim 4, wherein the bar portion is tubular and has an open cross section facing the frontal part.