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Description

[1] The invention relates to a bicycle frame in accordance with the preamble of claim 1.

5 [2] Known from EP 2 384 957 A1 is a bicycle frame that represents the closest state of the art. Two rectilinear faces set at an oblique angle to each other on a mounting bracket provided on a bicycle frame form contact faces against which rests a spring-loaded thrust member on a prop of the bicycle kickstand in either the stand position or the travel position of the prop.

10 [3] It is known from US 2008 0143074 A1 to fit a bicycle kickstand to the rear drop-out of a bicycle frame, where in a way known in itself both elements of the bicycle kickstand, namely, the mounting bracket and the prop mounted pivotably to the mounting bracket, are fitted to the bicycle frame.

15 [4] The invention is based on the problem of improving a generic bicycle frame in such a way that it helps enable the bicycle to be manufactured as economically as possible.

[5] This problem is solved by a bicycle frame in accordance with claim 1 and by a drop-out in accordance with claim 11.

[6] Advantageous embodiments are described in the subclaims.

20 [7] In other words the invention proposes designing the mounting bracket as part of a rear drop-out, which is referred to for short as a drop-out, formed on the bicycle frame. The bicycle frame typically consists of a plurality of tubes, whereas the drop-outs are typically manufactured as sheet metal blanks from plate material by, for instance, stamping, milling or laser-cutting operations. The guide contour can therefore be formed in the mounting
25 bracket without having to create an additional component. This is advantageous not only with regard to the number of different parts but also because it does not require an additional assembly step. Instead, during manufacture of the bicycle frame, since the drop-out has to be fitted
30 anyway, the mounting bracket of the bicycle kickstand is fitted with it at the same time.

- [8] A further advantageous effect is that on bicycles on which no bicycle kickstand is to be fitted integration of the mounting bracket into the drop-out produces hardly any inconvenient protuberances, compared with a mounting bracket that is arranged, for example, on a chain stay of the bicycle frame. This applies, on the one hand, to the aesthetic, possibly perceived as unsightly effect that the unused mounting bracket may have as a projection or protuberance and, on the other, to the circumstance that body parts, clothing, etc., may catch on the unused protuberance. Through integration into the drop-out the mounting bracket may be shifted as far away as possible, for example, from the circular path described by the moving pedals and so as far as possible from the feet, shoe laces and trouser legs of a person using the bicycle.
- [9] The drop-out may advantageously be manufactured from bent plate material. By this method a first portion of the drop-out is formed that can be, for example, aligned exactly vertically and serves to receive the rear axle. A second, bent portion can be bent downwards and obliquely outwards and incorporate the guide contour. It is ensured by the bend that, when swung from the travel position into the stand position, the prop is extended outwards and so together with the two running wheels creates the largest possible standing area defined for the bicycle by the support points, so positively affecting the standing stability of the bicycle.
- [10] It can be advantageously provided for to arrange in the guide contour two recesses for the two end positions of the prop, in one of which recesses the thrust member of the prop can engage when the prop is swung into its respective stand position or travel position. Each of the two recesses is delimited by two conically converging rims. The rim that is located nearer whichever is the other recess along the guide contour is referred to as the inner rim and the rim of a recess that is accordingly located at an end of the guide contour is referred to as the outer rim.

[11] On this advantageous embodiment each of the two outer rims forms a stop that delimits the pivoting movement of the prop. A clearly defined positioning of the prop in its respective end position is achieved by making the stop extend essentially parallel to the direction of movement of the thrust member, that is, essentially at right angles to the arc-shaped pivoting direction of the prop.

[12] It is further provided for on this advantageous embodiment for the thrust member to fill out the respective recess in such a way that the thrust member rests against the two rims of the recess. Because the two rims of a recess converge conically, the thrust member, assisted by spring pressure, is always pushed as far as possible into the recess and into its correspondingly conical seat so as to be held in the recess free of play. Through this the prop is held in its respective end position free of play. For the stand position this means great standing stability for the bicycle, and for the travel position it means rattle-free retention of the prop, even during travel over uneven ground.

[13] The path followed by the moving thrust member can be advantageously offset from the pivot. The extension of the path of movement along which the centre axis of the thrust member is assisted by spring pressure or runs contrary to the direction of spring pressure therefore does not pass through but extends past the pivot. The compactest possible design of the bicycle kickstand in the area of the mounting bracket and the pivot is assisted by this. If the bicycle kickstand is arranged on the bicycle frame in the area of the rear chain stay or rear wheel hub, this compact design is, on the one hand, advantageous for the bicycle rider's foot-room, because, when pedalling, the heel can be prevented by it from colliding with the prop of the bicycle kickstand.

- [14] Particularly if this aforementioned offset is advantageously achieved by offsetting the direction of movement of the thrust member downwards relative to the pivot when the prop is in its travel position, it advantageously affects the constructional degrees of freedom, as in the area of the rear wheel hub it makes more room available for fitting drive or brake components, for example, an electrical gear changing system.
- [15] The prop can be subdivided into three parts: a foot with which it stands on the ground, a leg which makes up most of the length of the prop and a head which connects the prop to the mounting bracket and mounts it pivotably to the pivot.
- [16] The mounting bracket can be advantageously designed as a sheet metal blank and be fitted round by a prop head, which is provided with a recess down its middle and accordingly extends like a fork on both sides of the mounting bracket. Particularly if the mounting bracket is provided for as an integral component of the bicycle frame, the mounting bracket can be designed as slender and as inconspicuous as possible in case the bicycle is not to be fitted with a bicycle kickstand and accordingly no prop is fitted to the mounting bracket.
- [17] The spring acting on the thrust member can be advantageously designed as an internal spring to protect it as far as possible against outside influences and the possible functional impairments resulting from them. The spring may be advantageously arranged in the head of the prop, as, while the leg is often designed as a separately manufactured tubular section, the head of a bicycle kickstand is often designed as a pressure- or die-cast component, so enabling areas by which the spring can be carried or against which the spring can be braced to be formed problem-freely on a component of this kind.

- 5 [18] The spring acting on the thrust member can be advantageously designed as a spiral spring. Its longitudinal axis or centre axis determines the direction of action of the spring and so determines the direction of movement of the thrust member. Design as a spiral spring enables easy integration into the elongated shape of a prop.
- 10 [19] The thrust member may advantageously incorporate a roof-shaped tip by which it rests against the guide contour along the pivoting movement of the prop. Even if the roof-shaped tip is preferably sharply rounded, a comparatively small contact face results between the thrust member and the guide contour and therefore less resistance and correspondingly less effort to be able to pivot the prop between its two end positions relative to the mounting bracket.
- 15 [20] In addition to a roof-shaped tip of this kind the thrust member incorporates two stop faces, by one of which it rests against a stop when the prop is in one of its two end positions. In contrast to the comparatively small contact face of the tip a comparatively large contact area between the stop faces and the guide contour, namely, by its respective stop, is enabled, so that the prop can be reliably fixed and held in its respective end position.

[21] It may be advantageously provided for for the drop-out to incorporate two parts one of which incorporates the guide contour. The drop-outs usually incorporate a number of attachment points that can be designed as, for example, through-holes. Correspondingly the part incorporating the guide contour can be designed so that it can be attached to attachment points of this kind. In this way a drop-out can be made up modularly of different components: a base element of the drop-out is always the same. On the one hand, it attaches to the seat and chain stays and, on the other, incorporates a means to receive the rear axle. For bicycles that do not incorporate, for example, a bicycle kickstand, a rear wheel mudguard or rear wheel luggage rack this base element may be the sole component of the drop-out. However, for bicycles that are to be fitted with the aforementioned components the base element of the drop-out is combined with, for example, a second part, for example, by welding, where this second part can incorporate the attachment points for a mudguard and/or a luggage rack and/or the guide contour of the bicycle kickstand in accordance with the proposal.

[22] An example embodiment of a bicycle frame in accordance with the proposal is explained in greater detail in the following with the aid of the purely schematic views, in which some components are shown transparent to enable a view of other components lying behind them. Shown are in

Fig. 1 an only partially indicated view of a bicycle frame with a bicycle kickstand, where the prop of the bicycle kickstand is in its stand position,

Fig. 2 the area around the pivot of the bicycle kickstand of Fig. 1 on a larger scale compared with Fig. 1,

Fig. 3 in a view similar to Fig. 2 the area around the pivot, where the prop is in its travel position,

Fig. 4 a side view of the thrust member, and

Fig. 5 a view of the underside of the thrust member, viewed from the foot of the prop.

[23] Fig. 1 shows a perspective view of a bicycle kickstand 1. This bicycle kickstand 1 incorporates a purely schematically indicated mounting bracket 2, which is designed as an integral component of a bicycle frame, namely, as a section of a drop-out. On the example embodiment shown the mounting bracket 2 is part of a plate that is designed as a drop-out on the bicycle frame. This plate is manufactured as a stamped part or laser blank from a piece of sheet metal having the usual thickness for a drop-out.

[24] Figs. 2 and 3 show that the plate or the drop-out incorporates a first section 2a that extends in a first, vertical plane, that is, on the example embodiment shown, in a precisely vertical plane. The opposing second drop-out on the bicycle frame is aligned likewise vertically parallel to this, and the rear axle of the bicycle wheel is held in the vertical section 2a and the opposing drop-out. The drop-out incorporates a second section 2b that extends in a second plane that is bent obliquely downwards and outwards relative to the first, vertical plane. This ensures that in the stand position a foot 16 on the bicycle kickstand 1 rests on the ground to the side of the bicycle frame and so gives the bicycle standing stability.

[25] In deviation from the example embodiment shown the mounting bracket 2 can incorporate a contact face by which it can be welded onto a bicycle frame, for example, onto a chain stay. The curved shape on the upper edge of the mounting bracket 2 is a purely schematically indicated delimitation of the vertical section 2a and on the example embodiment shown stands representatively for the aforementioned and other possible embodiments of the mounting bracket 2.

[26] While the mounting bracket 2 remains immovably fixed on the bicycle frame, a prop 3 on the bicycle kickstand 1 is movably mounted about a pivot 4. The prop 3 is designed to telescope so that it can be adapted to fit different bicycle frames. The stand position shown in Fig. 1 represents a front-end position of the prop 3 in which the prop 3 rests against a front stop 5 of the mounting bracket 2. From this front end position the prop 3 can be swung back about the pivot 4 until the prop 3 is in a horizontal travel position and rests against a rear stop 6 on the mounting bracket 3. During this pivoting movement a thrust member 7 on the prop 3 runs along a guide contour 8 on the mounting bracket 2, which guide contour 8 incorporates at its two ends the two stops 5 and 6.

[27] Fig. 2 shows the area around the pivot 4 on a larger scale than Fig. 1 and in a direction of view parallel to the pivot axis 4. The prop 3 incorporates at its upper end near to the pivot 4 a head 18 that fits like a fork around the mounting bracket 2 that is formed from a plate and also on each of these two sides encloses the pivot 4 like a ring. Arranged in the head 18 is the thrust member 7, which is pushed in the direction of the pivot 4 and so up against the guide contour 8 by a schematically indicated spiral spring 9. As Fig. 2 shows, the line of action of the spiral spring 9, that is, its notional centre axis, does not extend radially onto the pivot 4 but past and wide of the pivot 4, that is, in the direction of bicycle travel in front of the pivot 4.

[28] For contact with the guide contour 8 the thrust member 7 incorporates a tip 19 designed sharply rounded with two flanks 11 that are arranged so as to approximately form an A and on the example embodiment shown are set apart at an angle of close to 90°. Underneath the tip 19, that is, nearer to the foot 16 of the prop 3, the thrust member 7 incorporates two outer stop faces 12 that rest against the two stops 5 and 6 in the two end positions of the prop 3. To guide the spiral spring 9, the thrust member 7 incorporates a pin 20; the spiral spring 9 braces itself against the head 18 or inside the leg 10 by its lower end, that is, the end away from the pivot 4.

- [29] In the stand position shown in Fig. 2 the thrust member 7 engages in a recess in the guide contour 8, which recess is referred to as a stand recess 14, where the stand recess 14 is delimited by two contact faces 15 and extends between these two contact faces 15. One contact face 15, against which rests a stop face 12 on the thrust member 7, is formed by the front stop 5. Resting against the other contact face 15 is the flank 11 on the thrust member 7, shown right, while between the flank 11, shown left, and the guide contour 8 within the stand recess 14 a gap remains.
- [30] Because the two contact faces 15 are set at an oblique angle to each other, the stand recess 14 is delimited by two conically converging rims. The stop 5 here constitutes an outer rim of the stand recess 14, because it forms one end of the guide contour 8 as a whole, while the other contact face 15, shown right, is referred to as the inner rim. If wear occurs on the thrust member 7 and/or on the guide contour 8 or there are production tolerances, the spiral spring 9 causes the thrust member 7 to always be pressed as far as possible and correspondingly free of play into this conical seat which the stand recess 14 creates for the thrust member 7.
- [31] This is possible because the stop 5 extends in the direction of movement of the thrust member 7, so enabling the thrust member 7 to slide along the stop 5 according to the amount of wear or tolerance, until the right flank 11 of the thrust member 7 rests against the right-hand contact face 15 of the guide contour 8. The stop 5 extends essentially parallel to the longitudinal axis of the prop 3 or to the longitudinal axis of the spiral spring 9. The stop 5 thus extends essentially across the direction of movement in which the prop 3 can be moved about the pivot 4. The stop 5 therefore represents an effective delimitation of the movability of the prop 3 and gives the bicycle that has been parked by means of the bicycle kickstand 1 great standing stability.

[32] The stand position shown in Fig. 2 represents one of the two end positions of the prop 3. From the stand position the prop 3 can be swung counterclockwise about the pivot 4. At the same time the thrust member 7 follows the guide contour 8 with its tip 19. Since the guide contour 8 after the stand recess 14 extends at an increasing distance from the pivot 4, the thrust member 7 must be pushed towards the foot 16 of the prop 3 against pressure from the spiral spring 9 in order to be able to follow the guide contour 8. The resistance that is generated thereby and acts to hinder the pivoting movement of the prop 3 can be easily overcome by the user of the bicycle, while at the same time ensuring stable standing of the bicycle, if the bicycle is parked on, for example, a steep slope so as to face in a downhill direction of travel.

[33] If the aforementioned pivoting movement of the prop 3 is continued, the thrust member 7 moves, as shown in Fig. 3, along the guide contour 8 to engage in a second recess, which is referred to as a travel recess 17. This position of the prop 3 is referred to as its travel position. The travel recess 17 likewise incorporates two contact faces 15, which form respectively an inner rim and an outer rim delimiting the travel recess 17. The outer rim is formed by the stop 6. The thrust member 7 rests against this stop 6 by a stop face 12, and here too, as in the stand recess 14, the stop 6 extends essentially parallel to the longitudinal axis of the prop 3 or to the longitudinal axis of the spiral spring 9 and in particular essentially across the direction of movement in which the prop 3 has been pivoted about the pivot 4 and into the travel recess 17.

[34] Fig. 3 shows purely diagrammatically that the prop 3 is arranged only nearly but not completely in its travel position. Rather, the lower flank 11 of the thrust member 7 in Fig. 3 is shown wide of the contact face 15 assigned to it. It can be seen that, because the stop face 12 can be moved along the stop 6, the thrust member 7 can be moved problem-freely nearer to the pivot 4 until the lower flank 11 rests against its assigned lower contact face 15 on the travel recess 17. As in the case of the stand recess 14, the inner and outer rims of the travel recess 17 taper conically towards each other, so that the thrust member 7 is held free of play in its travel position by the spiral spring 9 and so guarantees rattle-free retention of the prop 3 on the mounting bracket 2 while the bicycle is being ridden.

[35] It can be seen from Figs. 2 and 3 that the direction in which the thrust member 7 can be moved by the spiral spring 9 or against the spiral spring 9 does not extend radially onto the pivot 4 but instead extends past and wide of the pivot 4. In the travel position as shown in Fig. 3 this direction of movement of the thrust member 7 extends past and under the pivot 4 and so in Fig. 3, with the prop 3 in the stand position, in front of the pivot 4. Through this embodiment the user of the bicycle is afforded the largest possible foot-room, when the prop 3 is in its travel position. A further result of this is that the position of the prop relative to the pivot is shifted further downwards, giving the bicycle designer more structural freedom above the prop 3, so leaving room there to fit, for example, elements of an electrically actuated gear changing system or a rear wheel brake, etc.

[36] Fig. 4 shows a side view of the thrust member 7. The pin 20 extends much further downwards, that is, away from the tip 19, than the two stop faces 12, so enabling a correspondingly long spiral spring 9 that is, for example, considerably longer than that indicated schematically in Fig. 2 to be used.

[37] Fig. 5 shows a view of the thrust member 7 from below. Here it can be especially clearly seen that grooves 21 adjoin the two stop faces 12. These co-act with corresponding ribs inside the head 18 to guide the thrust member 7 along its direction of movement during movements.

[38] Figs. 4 and 5 further show a safety stop 22, which protrudes outwards from the side of the thrust member 7. The safety stop 22 limits how far the thrust member 7 can be moved away from the foot 16 of the prop 3 by the spiral spring 9. For this a protruding element is provided for on the inside of the head 18 to delimit this movement by bringing the safety stop 22 up against the protruding element. If, for example, the prop 3 is demounted from the mounting bracket 2, the safety stop 22 prevents the thrust member 7 from being able to be projected uncontrolledly out of the head 18 of the prop 3 under spring pressure.

Reference signs:

[0039]

- 1 Bicycle kickstand
- 2 Mounting bracket
- 2a Section in first plane (vertical)
- 2b Section in second plane (oblique)
- 3 Prop
- 4 Pivot
- 5 Front stop
- 6 Rear stop
- 7 Thrust member
- 8 Guide contour
- 9 Spiral spring
- 10 Leg
- 11 Flank
- 12 Stop face
- 14 Stand recess
- 15 Contact face
- 16 Foot
- 17 Travel recess
- 18 Head
- 19 Tip
- 20 Pin

- 21 Groove
- 22 Safety stop

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P A T E N T K R A V

1. Cykelstel med et cykelstøtteben (1)

5 med et som sokkel (2) betegnet første element i cykelstøttebenet (1), der er udformet som integreret del af et cykelstel, og med et andet element i cykelstøttebenet (1) i form af en på soklen (2) drejeligt holdt støtte (3), der er bevægelig om en drejeakse (4) mellem to endestillinger betegnet som standstilling og kørestilling, hvor det andet element omfatter et trykstykke (7),
10 hvormed det fjederbelastet ligger an mod en styrekontur (8) på det første element og under drejebevægelsen ligger an mod forskellige steder på styrekonturen (8),

kendetegnet ved,

at soklen (2) er udformet som en del af en gaffelende.

15

2. Cykelstel ifølge krav 1, **kendetegnet ved,**

at styrekonturen (8) omfatter to recesser, der definerer de to endestillinger, recesserne er afgrænset langs styrekonturen (8) af to indbyrdes hosliggende
20 indvendige rande, der i hvert tilfælde forløber konisk mod hinanden således, at en udvendig rand i hvert tilfælde danner et anslag (5, 6), der blokerer en drejebevægelse af støtten (3) ud over den respektive endestilling,

hvor den udvendige rand forløber i det væsentlige parallelt med trykstykkets (7) bevægelsesretning, og at trykstykket (7) er udformet, så at det udfylder
25 recesserne således, at det belastet af fjederen er trykket ind i det koniske sæde af den respektive reces uden spillerum.

3. Cykelstel ifølge krav 1 eller 2,

kendetegnet ved,

30 **at** trykstykkets (7) bevægelsesretning forløber forskudt i forhold til drejeaksen (4).

4. Cykelstel ifølge krav 3,

kendetegnet ved,

at trykstykkets (7) bevægelsesretning er forskudt nedad i forhold til drejeaksen (4), når støtten (3) er anbragt i kørestillingen.

5

5. Cykelstel ifølge et af de foregående krav,

kendetegnet ved,

at et første afsnit (2a) af gaffelenden forløber i et første opretstående plan, og et andet afsnit (2b) af gaffelenden omfatter styrekonturen og forløber i et andet plan, der er vinklet skråt i forhold til det første plan.

10

6. Cykelstel ifølge et af de foregående krav,

kendetegnet ved,

at soklen (3) er udformet som pladeemne, og støtten (3) omfatter et hoved (18), der strækker sig frem til drejeaksen (4) og griber om soklen (2) gaffelagtigt på begge sider.

15

7. Cykelstel ifølge et af de foregående krav,

kendetegnet ved,

at støtten (3) omfatter et hoved (18), der strækker sig frem til drejeaksen (4), og at fjederen, der belaster trykstykket (7), er anbragt i støttens (3) hoved (18).

20

8. Cykelstel ifølge et af de foregående krav,

kendetegnet ved,

at fjederen, der belaster trykstykket (7), er udformet som spiralfjeder (9), og dennes midterakse definerer trykstykkets (7) bevægelsesretning.

25

9. Cykelstel ifølge et af de foregående krav,

kendetegnet ved,

30

at trykstykke (7) omfatter en tagformet kappe (19), hvormed det er bevægeligt langs styrekonturen (8), og omfatter to anslagsflader (12), hvormed det i hvert tilfælde i en endesstilling ligger an mod et anslag (5, 6) på styrekonturen (8).

5

10. Cykelstel ifølge et af de foregående krav,

kendetegnet ved,

at gaffelenden omfatter to dele, hvoraf en omfatter styrekonturen (8).

10

11. Gaffelende, der som en integreret del af gaffelenden omfatter en sokkel (2) på et cykelstøtteben (1), og som er bestemt til at danne en gaffelende af et cykelstel ifølge et af de foregående krav.

15

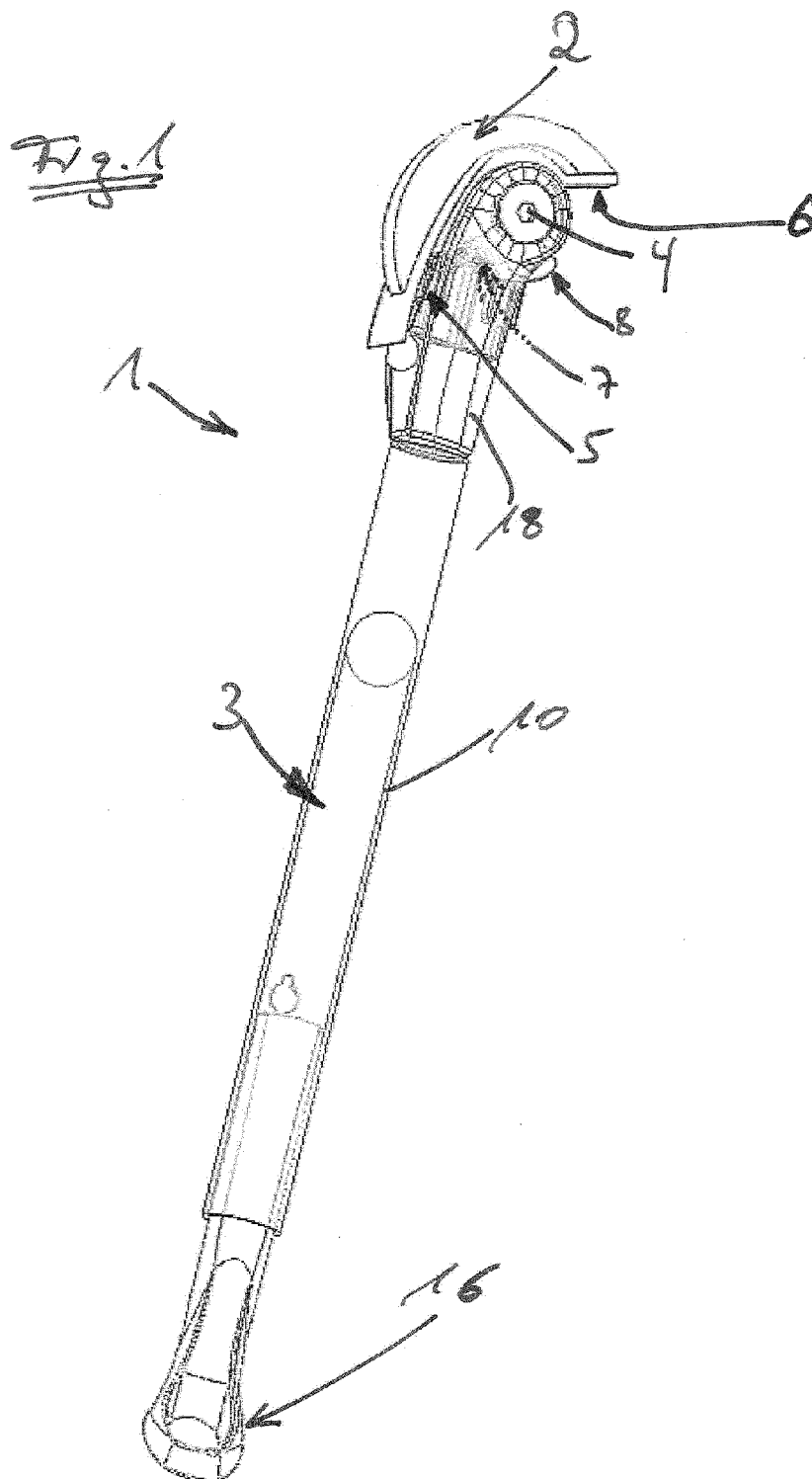


Fig. 2

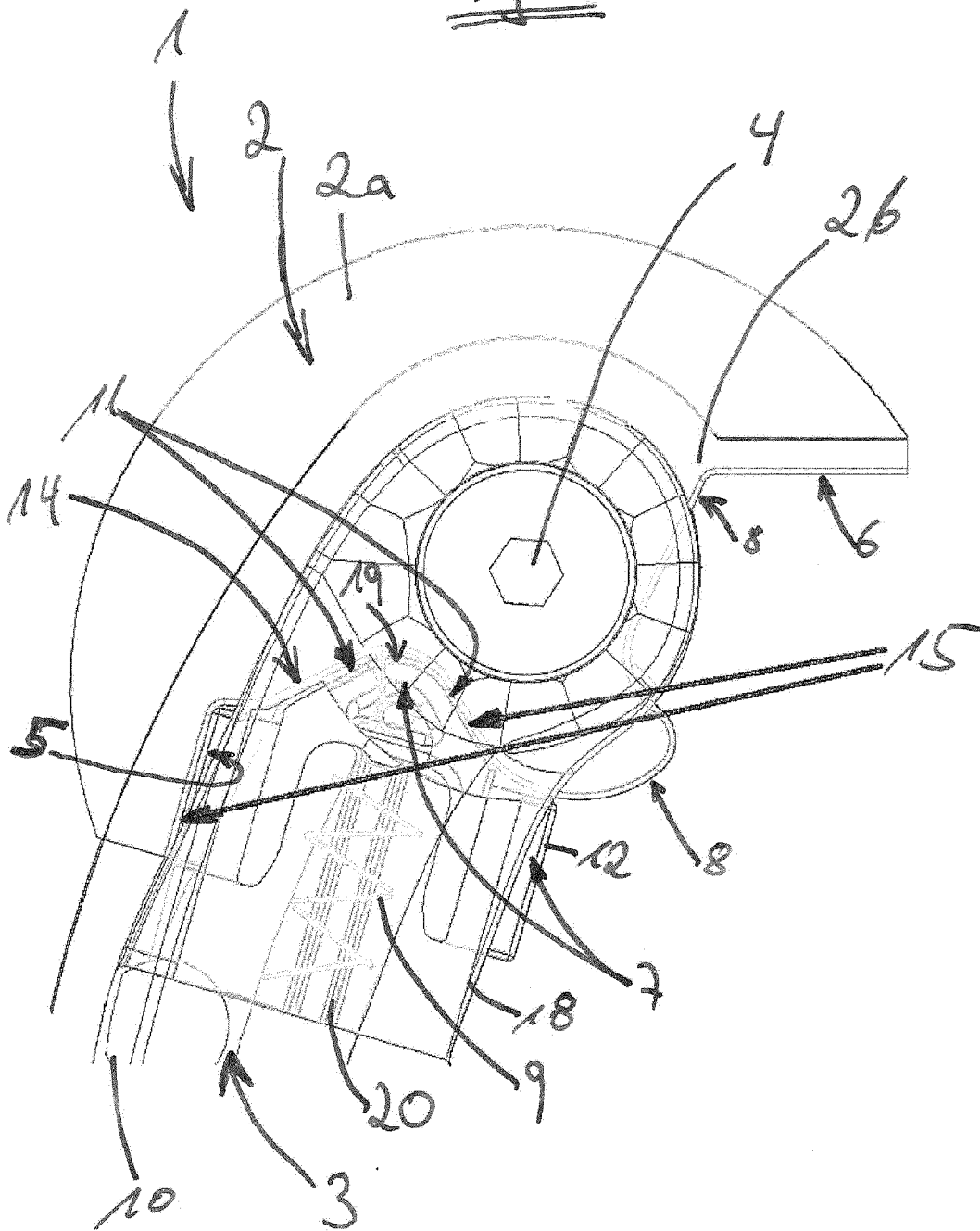


Fig. 3

