

(19) **DANMARK**

(10) **DK/EP 3585644 T3**



(12) **Oversættelse af
europæisk patentskrift**

Patent- og
Varemærkestyrelsen

-
- (51) Int.Cl.: **B 60 N 2/24 (2006.01)** **B 60 N 2/42 (2006.01)** **F 41 H 7/04 (2006.01)**
- (45) Oversættelsen bekendtgjort den: **2021-08-23**
- (80) Dato for Den Europæiske Patentmyndigheds bekendtgørelse om meddelelse af patentet: **2021-06-02**
- (86) Europæisk ansøgning nr.: **18713303.8**
- (86) Europæisk indleveringsdag: **2018-02-21**
- (87) Den europæiske ansøgnings publiceringsdag: **2020-01-01**
- (86) International ansøgning nr.: **FR2018050403**
- (87) Internationalt publikationsnr.: **WO2018154231**
- (30) Prioritet: **2017-02-24 FR 1700189**
- (84) Designerede stater: **AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**
- (73) Patenthaver: **NEXTER Systems, 13 Route de la Minière, 78034 Versailles Cedex, Frankrig**
- (72) Opfinder: **Tanty, Fabien, c/o NEXTER Systems DS/PID, 7 route de Guerry, CS90328, 18023 Bourges, Frankrig**
Lebaillif, David, c/o NEXTER Systems DS/PID, 7 route de Guerry, CS90328, 18023 Bourges, Frankrig
Mallat, Didier, c/o NEXTER Systems DS/PID, 7 route de Guerry, CS90328, 18023 Bourges, Frankrig
Carrie, Sébastien, c/o NEXTER Systems DS/PID, 7 route de Guerry, CS90328, 18023 Bourges, Frankrig
DRESSY, Jean-Claude, C/O NEXTER SYSTEMS DS/PID, 7 route de Guerry, CS 90328, 18023 Bourges, Frankrig
- (74) Fuldmægtig i Danmark: **Holme Patent A/S, Valbygårdsvej 33, 2500 Valby, Danmark**
- (54) Benævnelse: **Sæde til et køretøj omfattende mindst et dæmpningsmiddel**
- (56) Fremdragne publikationer:
EP-A1- 2 857 260
EP-A2- 2 028 040
FR-A1- 2 932 428

SEAT FOR A VEHICLE, COMPRISING AT LEAST ONE DAMPING MEANS

The technical field of the invention is that of vehicle seats and more particularly seats intended for armored
5 vehicles.

Armored vehicles are frequently confronted with mines and IEDs (Improvised Explosive Devices) or in French EEI (Engins Explosifs Improvisés) in the field of operations. These IEDs generate significant stresses on the vehicles targeted by
10 their explosion.

The shocks received by the structure, and in particular the floor of the vehicles, are considerable and, when designing the vehicle seats, one generally tries to isolate them from the floor.

15 However, the shocks received by the vehicle cabin impart to the seats an acceleration whose excessive level can cause serious injuries, in particular to the spine.

It is known from patent FR2932428 to produce a seat whose pivoting seat part is connected to the seat support by a
20 connecting means which ensures, in the case of a load of a predetermined level, the release of a stop of the seat part and the pivoting of the latter beyond the extended position.

This arrangement prevents the person occupying the seat from being subjected to a shock of a higher level than the one
25 releasing the stops of the seat. The person falls on the floor of the cabin, but after the critical moment when the forces are maximum.

This device thus allows the maximum forces that the seat occupant could undergo to be capped. The stop is of course
30 calibrated so that the break occurs at a shock level that avoids any injury. These shock levels are well known and have been the subject of numerous publications. For example, Gaurav Nilakantan's thesis published on 08/03/2006 cites maximum load values on the lumbar spine at 6672 Newtons.

One can also consult the NATO technical report of April 2007 on the "test methodology for the protection of vehicle occupants against the effects of anti-vehicle landmines" which also gives tolerance levels for the lumbar spine. These
5 elements are also specified by the NATO standard STANAG 4569 AEP55 volume 2.

While this break of the stop of the seat part effectively protects the seat occupant from the effects of the acceleration imparted to the seat part by the explosion of the
10 explosive device, it is desirable to improve the protection of the occupant by limiting the residual forces induced by a sudden rebound of the seat part which, once released, strikes the floor or the seat supports, and is projected towards the seat occupant.

15

It is the purpose of the invention to propose a vehicle seat that allows such disadvantages to be overcome.

The seat according to the invention is thus simple in structure and ensures an excellent level of protection against
20 the shocks received by the vehicle during the explosion of a mine or an IED while preventing the injuries that can be caused by a rebound of the seat.

Thus, the object of the invention is a vehicle seat, comprising a seat part pivotably mounted relative to at least
25 one fixed support between a folded position in which it is substantially vertical and an unfolded position in which it bears against at least one first stop and lies substantially horizontal, the seat part cooperating with the fixed support(s) by a means ensuring, in the case of a load of a
30 predetermined level, the release of the first stop(s) and pivoting of the seat part beyond the extended position, the seat being characterized in that it comprises at least one means for damping the stroke of the seat part after releasing the first stop(s).

According to a particular embodiment, the seat comprises at least a second stop limiting maximum opening of the seat part.

Advantageously, the means for damping the stroke may
5 incorporate a non-return blocking means.

According to one embodiment, the means for damping the stroke can comprise at least one blade cooperating, when the seat part pivots, with at least one surface including a tilted profile interfering with the blade during the pivoting motion,
10 thus causing the blade to bend, the blade(s) and tilted profile(s) forming the means for damping the stroke of the seat part.

The surface cooperating with the blade may be carried by a plate having a plane substantially perpendicular to the plane
15 of the blade.

Advantageously, the plate or plates can be detachably fastened.

According to another feature, the tilted profile of the plate may end with a projection forming the second stop.

According to a particular embodiment, the plate(s) can be
20 integral with the fixed support and the blades(s) can be integral with the seat part.

A reverse arrangement would of course be possible with the blades(s) integral with the fixed support and the plate(s)
25 integral with the seat part.

According to a particular embodiment, the means for damping the stroke of the seat part may comprise at least one yoke formed by two blades, each cooperating with a surface of the fixed support including a tilted profile interfering with
30 said blade during the pivoting motion.

The first stop may cooperate with a pin having a calibrated area reduction and bearing against the first stop, upon pivoting the seat and prior to engaging the means for damping the stroke.

The invention will be better understood on reading the following description of a particular embodiment, a description made with reference to the attached drawings wherein:

- 5 - Figures 1a and 1b show schematically a portion of the seat part according to the invention, articulated on its fixed support, the seat part being in an unfolded position, Figure 1a being a view according to the plane whose trace AA is visible in Figure 1b and Figure 1b being a section according to the plane whose trace BB is visible in Figure 1a;
- 10 - Figure 1c is a view of one of the plates alone;
- Figures 2a and 2b show the same seat part after releasing the first stop, Figure 2a being a view according to the plane whose trace AA is visible in Figure 2b and Figure 2b being a section according to the plane whose trace BB is visible in Figure 2a;
- 15 - Figures 3a and 3b show this same seat part when it starts to engage the damping means, Figure 3a being a view along the plane whose trace AA is visible in Figure 3b and Figure 3b being a section along the plane whose trace BB is visible in Figure 3a;
- 20 - Figures 4a and 4b show this same seat part when it is in contact with the second stop, Figure 4a being a view according to the plane whose trace AA is visible in Figure 4b and Figure 4b being a section according to the plane whose trace BB is visible in Figure 4a.
- 25

Referring to Figures 1a and 1b, a vehicle seat 1 is represented very schematically and it comprises a seat part 2 which is pivotally mounted relative to a fixed support 3 between a folded position in which it is substantially vertical (position not shown) and an unfolded position in which it is substantially horizontal (the position according to Figures 1a and 1b).

30

The seat part is represented here in a simplified way in the form of a single lateral bar 2a. In fact, the complete seat may comprise two parallel bars 2a, each of which is articulated to a separate support 3.

5 The seat 1 can thus comprise a plate (not shown) which will be fixed to the two bars 2a and which will allow to receive a user.

Depending on the application envisaged, a complete seat may thus comprise two bars 2a parallel to each other, each bar
10 being pivotable relative to a support 3.

However, it is possible to define a seat comprising only one bar pivoting relative to a single support.

In the rest of the description and for the simplification of the presentation of the operation, the sole bar 2a will be
15 often referred as the seat part, whether this bar is single or double.

The support 3 is made here in the form of a bracket in folded sheet metal and comprises a base 3a and two wings 3b and 3c which are perpendicular to the base 3a. The base 3a is
20 fixed by means not shown (such as screws) to a wall of the vehicle or to an upright, fixed for example to the ceiling of the vehicle. Each wing 3b, 3c has a hole 4 that receives a pin 5 allowing the seat part 2 to pivot relative to the support 3. Figure 1b shows the screw heads 6 that hold the pin 5 in
25 relation to the wings 3b and 3c. A washer 7 is interposed between each screw head 6 and the wing involved, 3b or 3c. Of course, functional clearance is maintained between the washer 7 and the wing 3b or 3c to allow the pivoting of the seat part 2.

30 As shown in Figure 1a, when the seat part 2 is in the unfolded position, it bears against a stop 8 on which a pin 9 carried by the seat part 2 rests.

This stop 8 comprises a body 8a that is fixed to the base 3a of the support 3 by screws (of which only the axes 10 are

shown). The body 8a passes through the base 3a at the level of a slot 11 and the screws are carried by a fold (not visible in the Figure) that is perpendicular to the plane of Figure 1 and comes to bear against the base 3a.

5 The stop 8 comprises a nose 8b that extends perpendicularly to the body 8a and towards the seat part 2. The end of the pin 9 comes to bear against the nose 8b which constitutes a first stop for the seat part 2.

10 As can be seen in Figure 1a, the pin 9 has an area reduction 9a that is calibrated. This area reduction is defined in accordance with the teaching of patent FR2932428 cited in the preamble of the present text.

15 Thus, when a force greater than a certain level is exerted vertically from top to bottom on the seat part 2 (inertial force following the explosion of the mine), this force is communicated to the stop 8b and causes the pin 9 to break, thus releasing the stop 8b of the seat part. This release causes the seat part 2 to pivot beyond the unfolded position shown in Figure 1a.

20 This arrangement prevents the person occupying the seat from being subjected to a shock higher than the one that releases the stops of the seat part. The person (who is also attached to the seat by a harness not shown) goes down to the floor of the cabin, but after the critical moment when the
25 forces are maximum.

 The maximum forces that the seat occupant could undergo are thus capped. The pin 9 and its area reduction 9a are of course calibrated so that the breaking of the pin 9 occurs at an impact level that avoids any injury.

30 It is of course possible, as a variant, to provide on the seat part 2 a non-weakened pin 9 that will cooperate with a nose 8b that will have the desired calibrated weakening.

According to the invention, the seat 1 also comprises at least one means for damping the stroke of the seat part after release of the first stop 8b.

5 According to the embodiment described here, the means for damping the stroke comprises a yoke 12 held by a rear portion of the bar 2a of the seat part 2.

The yoke 12 is more particularly visible in Figure 1b. It comprises two blades 12a, 12b separated by a space 13. It can be seen in Figure 1a that the blades 12a and 12b have an end forming a point 14 which is delimited by an upper face 15 and an external face 16. The upper face 15 is substantially parallel to the nose 8b in the extended position of Figure 1a (thus substantially horizontal). The external face 16 forms an angle of less than 90° relative to the upper face 15 (to avoid any mechanical interference during the pivoting of the seat part 2).

The space 13 is delimited by the blades 12a and 12b and by a tilted plane 17, also allowing the avoidance of mechanical interferences during the pivoting of the seat part 2.

20 Moreover, the support 3 holds two plates 18a and 18b that are fixed to the base 3a of the support 3 by screws (of which only the axes 19 are shown in Figure 1a).

As can be seen in Figure 1b, these plates 18a and 18b have a flat shape and the plane of the plates extends between the wings 3b and 3c of the support 3 in the direction of the blades 12a and 12b of the yoke 12 and substantially perpendicular to the planes of the blades 12a, 12b.

Figure 1c shows plate 18a alone, to facilitate understanding of its shape. The plate 18b is identical to the plate 18a and is fixed on the wing 3c in a symmetrical way relative to a median plane parallel to the wings 3b and 3c.

30 Thus, it can be seen that the plate 18a (or 18b) comprises a base surface 19a (or 19b) that is fitted against the wing 3b or 3c of the support 3. The plate 18a (or 18b) comprises a

lateral surface 20a (or 20b) that is inclined with respect to the base surface 19a (or 19b). The lateral surface 20a (or 20b) ends in a front surface 21a (or 21b) perpendicular to the base surface 19a (or 19b). The front surface 21a (or 21b) constitutes a projection forming a second stop intended to limit the maximum opening of the seat part 2. The mark 22 designates the holes for fixing the plate 18a (or 18b) to the support 3.

The lateral surfaces 20a and 20b of the plates 18a and 18b are intended to cooperate with the blades 12a and 12b to dampen the stroke of the seat part 2.

Figures 2a and 2b show the seat part 2 after the first stop 8b has been released (i.e., after the pin 9 has been sheared off). The seat part 2 can therefore continue to pivot, driven by the user's weight.

Figures 3a and 3b show the seat part 2 as it begins to engage the damping means. The yoke 12 engages between the plates 18a and 18b carried by the support 3. The plates 18a and 18b then come to oppose the continuation of the pivoting motion of the seat part 2. Each blade 12a or 12b comes to bear against an inclined lateral surface 20a or 20b of a plate 18a or 18b. The inclined side surfaces 20a and 20b interfere with the blades 12a and 12b of the yoke 12 during the pivoting motion of the seat 2, causing erosion of the plates 18a and 18b and deformation of the blades 12a and 12b.

The blades 12a and 12b (thus the yoke 12) and the tilted profiles 20a and 20b thus form a means for damping the stroke of the seat part 2.

The dimensional and mechanical features of each blade 12a, 12b are defined in such a way that each blade consumes, by its deformation, a part of the energy communicated by the seat part 2 through the contact of the blades 12a, 12b with the plates 18a and 18b.

Figures 4a and 4b finally show the seat part 2 when the blades 12a and 12b come into contact with the second stop 21a or 21b of the plate 18a or 18b.

5 It can be seen that the blades 12a and 12b are at their maximum deformation. The second stop 21a, 21b limits the maximum possible opening for the seat part 2.

10 The damping means 12, 20a, 20b thus enable slowing down the rotation speed of the seat part 2 during its pivoting. This adds a damping of the motion of the seat part during the sliding of the occupant on his seat. The interaction between the occupant and the seat is thus better controlled in the event of an impact due to the explosion of a mine. Moreover, the risk of rebound of the seat towards the occupant is limited thanks to the deformation of the blades 12a, 12b and
15 to the erosion profile that they generate on the plates 18a, 18b.

Of course, each bar 2a of the seat part may incorporate a damping means 12, 20a, 20b.

20 Advantageously, the means for damping the stroke can incorporate a non-return blocking means that will definitely prevent the rebound of the seat part 2.

As a non-return blocking means, indentations (not shown) in the tilted profiles 20a and 20b of the plates 18a and 18b may be provided.

25 In a variant, the tilted profiles 20a and 20b may be carried by the support 3 itself and not by plates fixed to the support.

In a variant, the yoke 12 may also be replaced by a single blade 12a that will cooperate with a plate 18a.

30 It has been noted that the plate or plates 18a, 18b are fixed to the support in a removable manner. Such an arrangement makes it possible to provide the seat with damping means whose characteristics can be adapted according to the needs, without it being necessary to completely redefine the

seat. It is thus possible to replace the initially fixed plates by other plates having an tilted profile with a different slope. The damping characteristics are thus modified, the deformation of the blades 12a, 12b by the plates becoming stronger or weaker. The plates can also be replaced by plates whose stop surface 21a is positioned closer or further from the lower edge of the plate. This changes the maximum possible opening angle for the seat.

In a variant, a damping means can also be defined in which a yoke, integral with the seat part, is not deformed with fixed surfaces provided by the support, but a symmetrical structure is defined in which a rigid element carried by the seat deforms a means, integral with the support, the deformation of which consumes the pivoting energy and achieves a rotational blocking by the deformation of the parts.

Krav

1. Køretøjssæde (1), indbefattende en siddebase (2), der er drejeligt monteret i forhold til mindst en fastmonteret understøtning (3) mellem en foldet position, i hvilken den i det væsentlige er lodret, og en udfoldet position, i hvilken den ligger an mod mindst et første stop (8b) og ligger i det væsentlige vandret, siddebasen samvirker med den/de fast(e) understøtning(er) ved hjælp af et middel, der i tilfælde af en kraftpåvirkning på et forudbestemt niveau sikrer frigørelsen af det/de første stop (8b) og drejningen af siddebasen ud over den udfoldede position, sædet er **kendetegnet ved at** det omfatter mindst et middel (12, 18a) til dæmpning af siddebasens (2) vandring efter frigivelse af det/de første stop (8b).
2. Køretøjssæde ifølge krav 1, **kendetegnet ved at** det omfatter mindst et anden stop (21a), der begrænser den maksimale åbning af siddebasen.
3. Køretøjssæde ifølge et af kravene 1 eller 2, **kendetegnet ved at** midlerne (12, 18a) til dæmpning af vandringen inkorporerer et middel til at blokere for returnering.
4. Køretøjssæde ifølge et af kravene 1 til 3, **kendetegnet ved at** midlerne til dæmpning af vandringen omfatter mindst en vinge (12a, 12b), der når siddebasen drejer, samvirker med mindst en overflade, der omfatter et skråtstillet profil (20a, 20b), der kommer til at gribe fat i vingen (12a, 12b) under den drejende bevægelse, og bevirker derved bøjning af vingen, vingen eller vingerne og det eller de skråstillede profil(er) danner midlerne til dæmpning af siddebasens vandring.

5. Køretøjssæde ifølge krav 4, **kendetegnet ved at** overfladen, der samvirker med vingen, bæres af en plade (18a, 18b), der har et plan, der i det væsentlige er vinkelret på vingens (12a, 12b) plan.
- 5
6. Køretøjssæde ifølge krav 5, **kendetegnet ved at** pladen eller pladerne (18a, 18b) er aftageligt fastmonteret/fastmonterede.
- 10 7. Køretøjssæde ifølge et af kravene 4 til 6, **kendetegnet ved at** pladens (18a, 18b) skråtstillede profil (20a, 20b) ender i et fremspring (21a), der danner det andet stop.
- 15 8. Køretøjssæde ifølge et af kravene 4 til 7, **kendetegnet ved at** pladen eller pladerne (18a, 18b) er fast forbundet/forbundne med den fastmonterede understøtning, og vingen eller vingerne (12a, 12b) er fast forbundet/forbundne med siddebasen (2).
- 20 9. Køretøjssæde ifølge krav 8, **kendetegnet ved at** midlerne til dæmpning af siddebasens vandring omfatter mindst en kappe (12) dannet af to vinger (12a, 12b), der hver samvirker med en overflade på den fastmonterede understøtning, der omfatter et skråtstillet profil (20a, 20b), der kommer til
- 25 at gribe fat i nævnte vinge (12a, 12b) under den drejende bevægelse.
10. Køretøjssæde ifølge et af kravene 1 til 9, **kendetegnet ved at** det første stop (8b) samvirker med en
- 30 aksel (9), der har en afpasset reduceret sektion (9a) og kommer til at støtte mod det første stop (8b), når siddebasen drejes og inden indgreb med midlerne til dæmpning af vandringen.

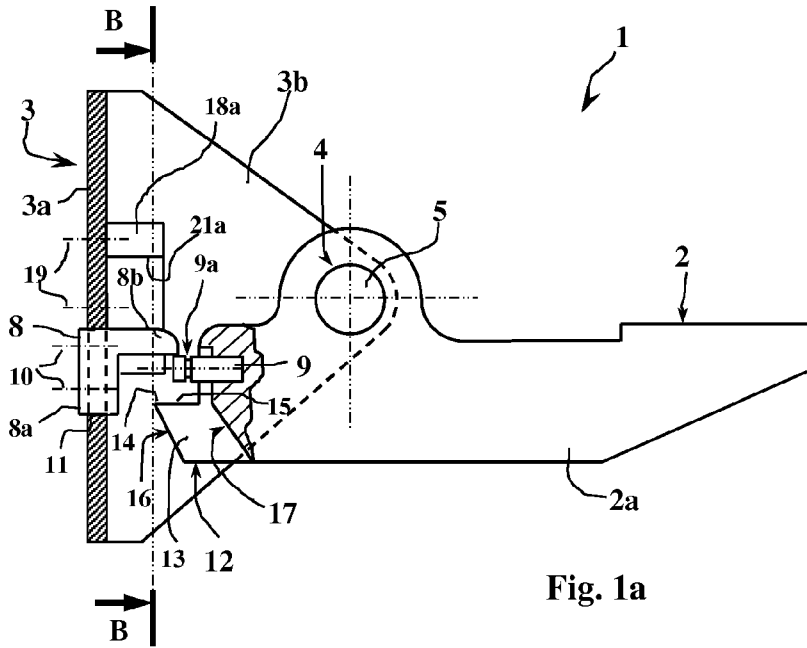


Fig. 1a

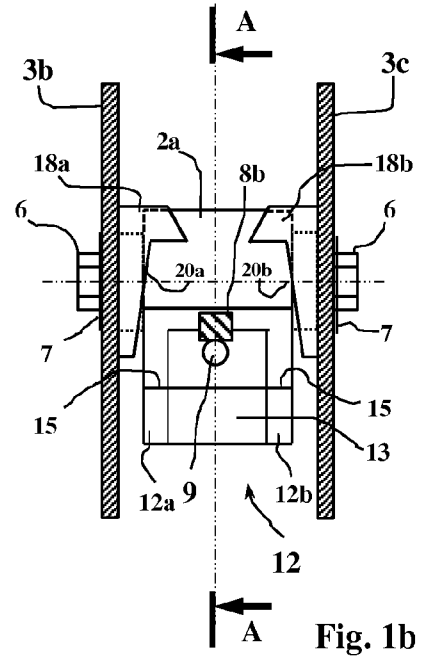


Fig. 1b

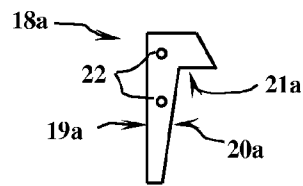


Fig. 1c

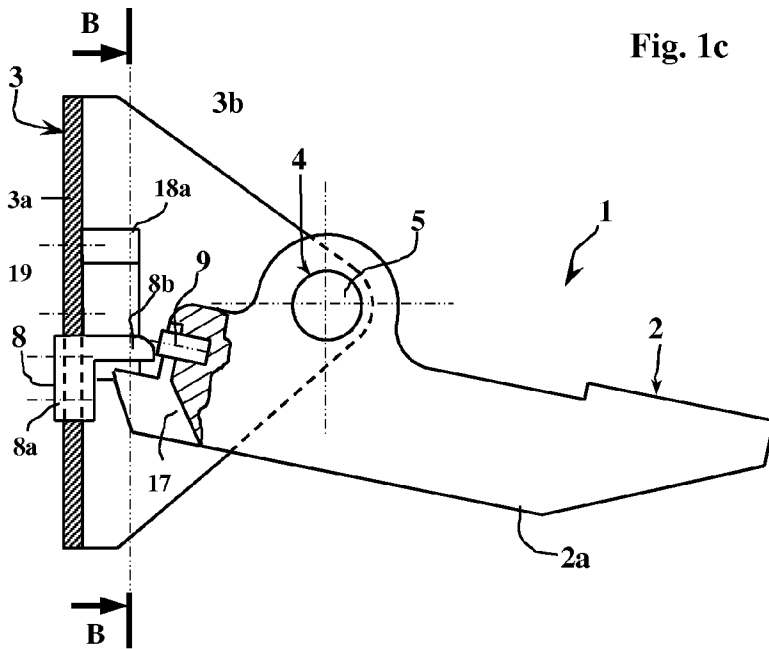


Fig. 2a

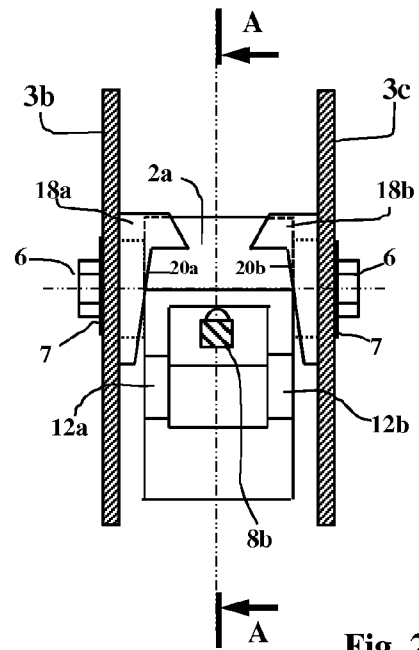


Fig. 2b

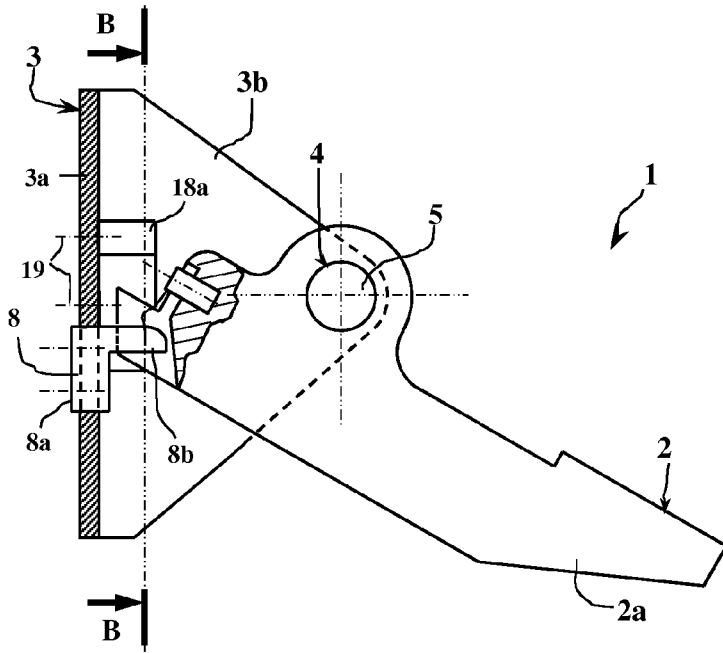


Fig. 3a

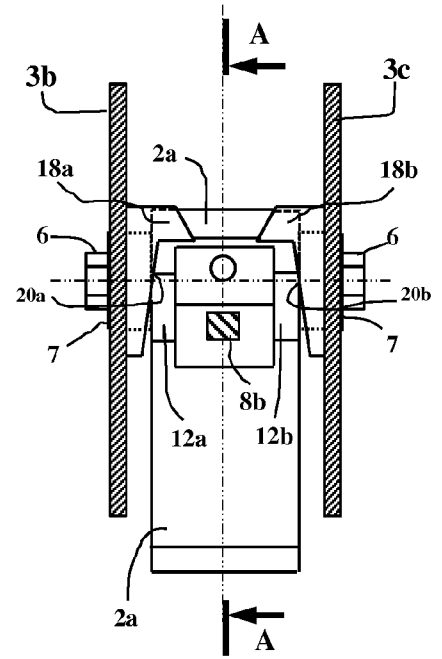


Fig. 3b

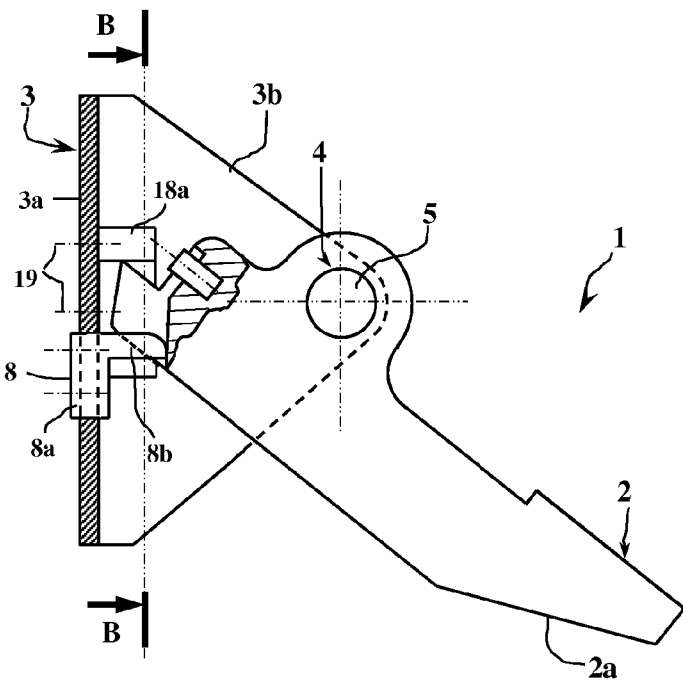


Fig. 4a

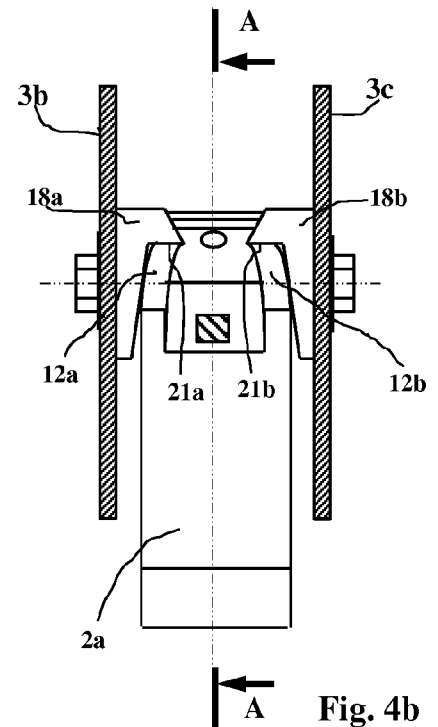


Fig. 4b