CONVENTION APPLICATION FOR A PATENT

WILKHAHN WILKENING + HAHN GMBH & CO.

Landerfeld 8, D-3252 Bad Munder 2, Federal Republic of Germany

hereby apply for the grant of a Patent for an invention entitled:

DEVICE FOR SPRUNG TILTING MOVEMENT OF A COMPONENT

which is described in the accompanying complete specification. This application is a Convention application and is based on the application numbered:

P33. 35. 168.1

for a patent or similar protection made in the Federal Republic of Germany on 28th September 1983.

Our address for service is Messrs. Edw. Waters & Sons, Patent Attorneys, 50 Queen Street, Melbourne, Victoria, Australia.

Dated the 26th day of September 1984.

LODGED AT

by Tom A Barnes

Reg'd Patent Attorney

To: THE COMMISSIONER OF PATENTS.
DECLARATION IN SUPPORT OF A CONVENTION
APPLICATION FOR A PATENT OR PATENT OF ADDITION

In support of the Convention Application made by

WILKHANH WILKENING + HAHNE GMBH & CO.

(herinafter referred to as the Applicant)

for a patent.

for an invention entitled:

DEVICES FOR SPRING TILTING MOVEMENT OF A COMPONENT

We solemnly and sincerely declare as follows:

1. We are authorised by the applicant for the patent to make this Declaration on its behalf.

2. The basic application as defined by Section 141 of the Act was made on the 28th day of September 1932, by

WILKHANH WILKENING + HAHNE GMBH & CO.

in the Federal Republic of Germany.

4. The basic application referred to in paragraph 2 of this Declaration was the first application made in a Convention country in respect of the invention the subject of the application.

DECLARED at: Munich, Federal Republic of Germany

this 30th day of August 1934.

To: THE COMMISSIONER OF PATENTS.

[Signature]
AUSTRALIAN PATENT ABSTRACT

AU-A-33679/84

SPRUNG TILTING MOVEMENT

WILKHANH WILKENING AND HAHNE GMBH AND CO.

Claim

1. Device for sprung tilting movement of a component, especially an inclining mechanism for a seat arrangement with a part which can be tilted, comprising:
   a) at least one tiltably mounted component and
   b) a spring system arranged between the tiltably mounted component and a stationary support, characterised by the following features:
      c1) the spring system is formed by at least one spring rod (2) which is arranged in one bearing (e.g. 4, 10) at each of at least two points on its length and is rotatable about its axis in at least one of these bearings,
      c2) one of these bearings (4) is the support which is stationary in the operating state, whilst the other bearing (10) which is connected to the tiltable component is rotatable about an axis (10b) which is spatially offset relative to the axis of the spring rod (2).
Name of Applicant: WILKHAHN WILKENING + HAHNE GMBH & CO.

Address of Applicant: Landfeld 8, D-3252 Bad Munder 2, Federal Republic of Germany

Actual Inventor: KLAUS FRANCK

Address for Service: EDWD. WATERS & SONS, 60 QUEEN STREET, MELBOURNE, AUSTRALIA, 3000.

Complete Specification for the invention entitled:

DEVICE FOR SPRUNG TILTING MOVEMENT OF A COMPONENT

The following statement is a full description of this invention, including the best method of performing it known to: 118
Device for sprung tilting movement of a component.

The invention relates to a device (formed according to the preamble to claim 1) for sprung tilting movement of a component, especially an inclining mechanism for a seat arrangement with a part which can be tilted.

Inclining mechanisms (tilting devices) for seat arrangements are known in which the spring system is formed by torsion rods. Such constructions are not very reliable in operation since torsion rods run a comparatively high risk of breaking.

The state of the art also includes devices in which the spring system of the inclining mechanism is formed by leaf springs. These constructions have the disadvantage that they occupy a comparatively large space and the design is relatively complex.

The object of the invention, therefore, is to construct a device of the type set out in the preamble to claim 1 in such a way that the design is simple and light, it only occupies a small space and a high degree of operational reliability is ensured.

This object is achieved according to the invention by the characteristic features of claim 1.

In the device according to the invention the spring rod which is mounted so as to be rotatable about its axis is not stressed on torsion but exclusively on bending. This results in the desired high degree of operational
DECLARATION

To: THE COMMISSIONER OF PATENTS

Munich, Federal Republic of Germany

this 30th day of August 19__

(1) Signature of Applicant or Applicants

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reliability.

The arrangement of the spring rod in two bearings, of which one is stationary in the operating state whilst the other bearing is rotatable about an axis which is spatially offset relative to the axis of the spring rod, facilitates a particularly simple and space-saving connection of the spring rod to the tiltable component: the latter can be connected directly to the rotatable bearing. In this way a very simple, light and space-saving construction is achieved.

Advantageous embodiments of the invention are the subject matter of the subordinate claims.

The device according to the invention is actually intended in particular as an inclining mechanism for a seat arrangement with a tiltable part. However, it can also be advantageously used for numerous other applications in which a component carries out a spring-tilting movement in operation. Thus the device according to the invention is suitable for example for the automatic return of doors, shutters, levers and the like which are deflected out of their rest position against spring tension.

Some embodiments of the invention are illustrated schematically in the drawings, in which:

Figures 1a and 1b show a first embodiment of the invention (in the rest position and in the deflected position),
Figures 2a and 2b show a second embodiment of the invention,
Figure 3 shows a schematic representation of the application of the invention to a seat.

The device illustrated in Figure 1a comprises a spring rod 2 which is arranged at three points on its length, namely in the region of its centre and at its two ends, in one bearing each 4, 10, 12 respectively, and the spring rod 2 is actually mounted so as to be freely rotatable about its axis in the bearing bores 4a, 10a and 12a. The spring rod 2 can be secured in the usual manner against longitudinal displacement in one of the three bearings.

The central bearing 4 constitutes the support which is stationary in the operating state. The two outer bearings 10 and 12 by contrast are rotatable about their axes 10b and 12b respectively. These axes 10b, 12b of the outer bearings 10, 12 are spatially offset relative to the axis of the spring rod 2. The bearing bores 10a, 12a are thus arranged eccentrically in the outer bearings 10 and 12 which are constructed as round bodies.

The rotatable outer bearings 10 and 12 are connected to the tiltable component (not shown in Figure 1). If this component (which can be for example the seat surface or back rest of a seat) carries out a tilting or inclining movement, then the outer bearings 10 and 12 are tilted in the direction of the arrows 10c and 12c respectively. Since the central bearing 4 remains stationary during this and the spring rod 2 is mounted so as to be freely rotatable in the bearing bores 4a, 10a and 12a, the spring rod 2 undergoes a bending deflection in the manner
shown in Figure 1b. In this way an elastic return force is produced which seeks to return the tiltable component which is connected to the outer bearings 10 and 12 to its starting position.

From the above description it will be clear that neither the central bearing 4 nor the outer bearings 10 and 12 need to be constructed as round bodies. Thus for example the outer bearings 10 and 12 can also be constructed in the form of simple levers. It is merely essential that these outer bearings 10 and 12 are pivotable about an axis 10b and 12b respectively which is spatially offset relative to the axis of the spring rod 2 and the bearing bores 10a, 12a.

In the further embodiment which is illustrated in Figure 2 the spring system is formed by two spring rods 16, 18 which are arranged in the rotatable outer bearings 10 and 12 so as to be symmetrical with the axis of rotation 10b and 12b respectively of these bearings. Equally the spring rods 16 and 18 are also passed symmetrically through the central bearing which is stationary in the operating state.

By using a plurality of spring rods an increase in the elastic return force is achieved in a simple manner without additional space being required. It goes without saying that more than two spring rods could be provided if required.

Equally it is also possible within the scope of the invention to vary the number of bearings. In the simplest
form one stationary bearing and one rotatable bearing are provided. Apart from the constructions illustrated in Figures 1 and 2 with a total of three bearings, variants with a greater number of bearings are also possible.

Figure 3 illustrates the application of the embodiment according to Figure 1 to a seat (for example a swivel chair) of which only the central column of the supporting frame is shown. The spring rod 2, the central bearing 4 and the two rotatable outer bearings 10 and 12 are arranged in a cross tube 22 which is fixed to the central column 20. The central bearing 4 is either arranged in the cross tube 22 so as to be fixed against rotation and immovable or - as shown - arranged in the cross tube 22 so as to be movable in the peripheral direction and capable of being fixed in the position shown. A screw 24 is provided in order to move and/or fix the central bearing 4.

Connected to the outer bearings 10 and 12 are angle irons 26, 28 the free sides of which point outwards or (as shown by broken lines) inwards and to which the component to be tilted, e.g. the seat of a swivel chair, is connected.

The use of the screw 24 makes it possible to adjust the initial tension of the elastic system consisting of the spring rod 2, the central bearing 4 and the outer bearings 10 and 12 in the desired manner. This can be achieved for example by constructing the seat surface so that it can be tilted forwards over the normal position.
The adjustment of the initial tension can also be achieved for example by using a screw to exert tangential forces on the central bearing 4 in order to rotate this central bearing 4 (relative to the cross tube 22).

It goes without saying that the angle of rotation of the bearings 10 and 12 which are connected to the tiltable component can be adjustable, for example by means of stops which are advantageously adjustable.

It is also possible within the scope of the invention for locking of the rotatable bearings which are connected to the tiltable component to be provided in selected angular positions, in the case of a seat arrangement for example in the most forward seat position and in various intermediate positions.

The spring rods used in the device according to the invention can be made from the most varied elastic, fatigue-resistant materials. In addition to spring steel, rods made in particular from resilient plastics and glass fibres could be considered.

A bundle of spring rods, preferably made from glass fibre reinforced polyester, could be used for example.
THE CLAIMS

1. Device especially with a pair
   a) at least
   b) a spring mount
   c) the shaft
   15. a shaft bearing
   20. of the shaft bearing
easy to spring
   25. A device for the spring
   the center support and
   bearing (1)
THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

CLAIMS

1. Device for sprung tilting movement of a component, especially an inclining mechanism for a neat arrangement with a part which can be tilted, comprising:

a) at least one tiltedly mounted component and

b) a spring system arranged between the tiltedly mounted component and a stationary support, characterised by the following features:

c) the spring system is formed by at least one spring rod (2) which is arranged in one bearing (e.g. 4, 10) at each of at least two points on its length and is rotatable about its axis in at least one of these bearings,

d) of these one bearing (4) is the support which is stationary in the operation state, whilst the other bearing (10) which is connected to the tilted component is rotatable about an axis (10b) which is spatially offset relative to the axis of the spring rod (2).

2. Device as claimed in claim 1, characterised in that the spring rod (2) is arranged in its central region in the central bearing (4) which forms the stationary support and at each of its two ends (6, 8) in an outer bearing (16, 18) which is connected to the tiltedly

3. Device as the spring rods (16, 18) with the axis thereof.

4. Device as the spring rod bearing (16) with the axis thereof.

5. Device as the bearing of the rotatable body respectively in respect to it for rotatable

6. Device as the bearing of the state is new to the spring rod.

7. Device as the bearing (6) of the state is new to the tiltedly mounted component an respectively axis the
component and is rotatable about an axis (10b, 12b respectively) which is spatially offset relative to the axis of the spring rod (2).

3. Device as claimed in claim 1, characterised in that the spring system is formed by a plurality of spring rods (16, 18).

4. Device as claimed in claim 3, characterised in that the spring rods (16, 18) are arranged in the rotatable bearing (10 or 12 respectively) so as to be symmetrical with the axis of rotation (10b or 12b respectively) thereof.

5. Device as claimed in claim 1, characterised in that the rotatable bearing (16 or 12) which is constructed as a round body has at least one bearing bore (10a or 12a respectively) which is arranged eccentrically with respect to its axis of rotation (10b or 12b respectively) for rotatable accommodation of the spring rod (2).

6. Device as claimed in claim 2, characterised in that the bearing (4) which is stationary in the operating state is movable for adjustment of the initial tension of the spring rod (2).

7. Device as claimed in claim 6, characterised in that the bearing (4) which is stationary in the operating state is constructed as a round body, provided with a bearing bore (4a) which is arranged eccentrically with respect to its axis for rotatable accommodation of the
spring rod (2) and is movable by rotation about its axis in order to adjust the initial tension of the spring rod.

3. Device as claimed in claim 1, characterised in that the angle of rotation of the rotatable bearing (10 or 12) which is connected to the tiltable component is adjustable.

9. Device as claimed in claim 1, characterised in that the rotatable bearing (10 or 12) which is connected to the tiltable component can be locked in selected angular positions, in the case of a seat arrangement for example in the most forward seat position and in various intermediate positions.

10. Device as claimed in claim 2 for a seat arrangement the seat surface and/or back rest of which is tiltable about a horizontal axis, characterised in that the central bearing (4) is connected to the central column (20) of the supporting frame of the seat arrangement and the outer bearings (10, 12) are connected to the tiltable part of the seat arrangement.

11. Device as claimed in claim 1, characterised in that a cross tube (26) which accommodates the spring rod (2) and has the central bearing (4) arranged fixed in its central region and the two outer bearings (10, 12) arranged rotatably in its end regions is connected to the central column (20) of the supporting frame of the seat arrangement.
12. Device as claimed in claims 9 and 11, characterised in that the central bearing (4) can be moved in the peripheral direction in the cross tube (22) and can be fixed in the selected angular position.

13. Device as claimed in claim 12, characterised in that a screw (24) is provided for moving and/or fixing the central bearing (4) in the cross tube (22).

DATED this 26th day of September 1984.

WILKAHN WILKENING + HAHNE GMBH & CO.

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END