US 20220267008A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2022/0267008 A1**

Shiels et al. (43) **Pub. Date: Aug. 25, 2022**

(54) **AIRCRAFT SEAT WITH CAM FOLLOWERS**

(71) Applicant: **Safran Seats GB Limited**, Cwmbran (GB)

(72) Inventors: **Christopher Shiels**, Cwmbran (GB); **Clive Pearce**, Cwmbran (GB); **Louis Flanagan**, Cwmbran (GB)

(21) Appl. No.: **17/630,295**

(22) PCT Filed: **Jul. 17, 2020**

(86) PCT No.: **PCT/GB2020/051720**

§ 371 (c)(1),
(2) Date: **Jan. 26, 2022**

(30) **Foreign Application Priority Data**

Aug. 7, 2019 (GB) 1911277.0

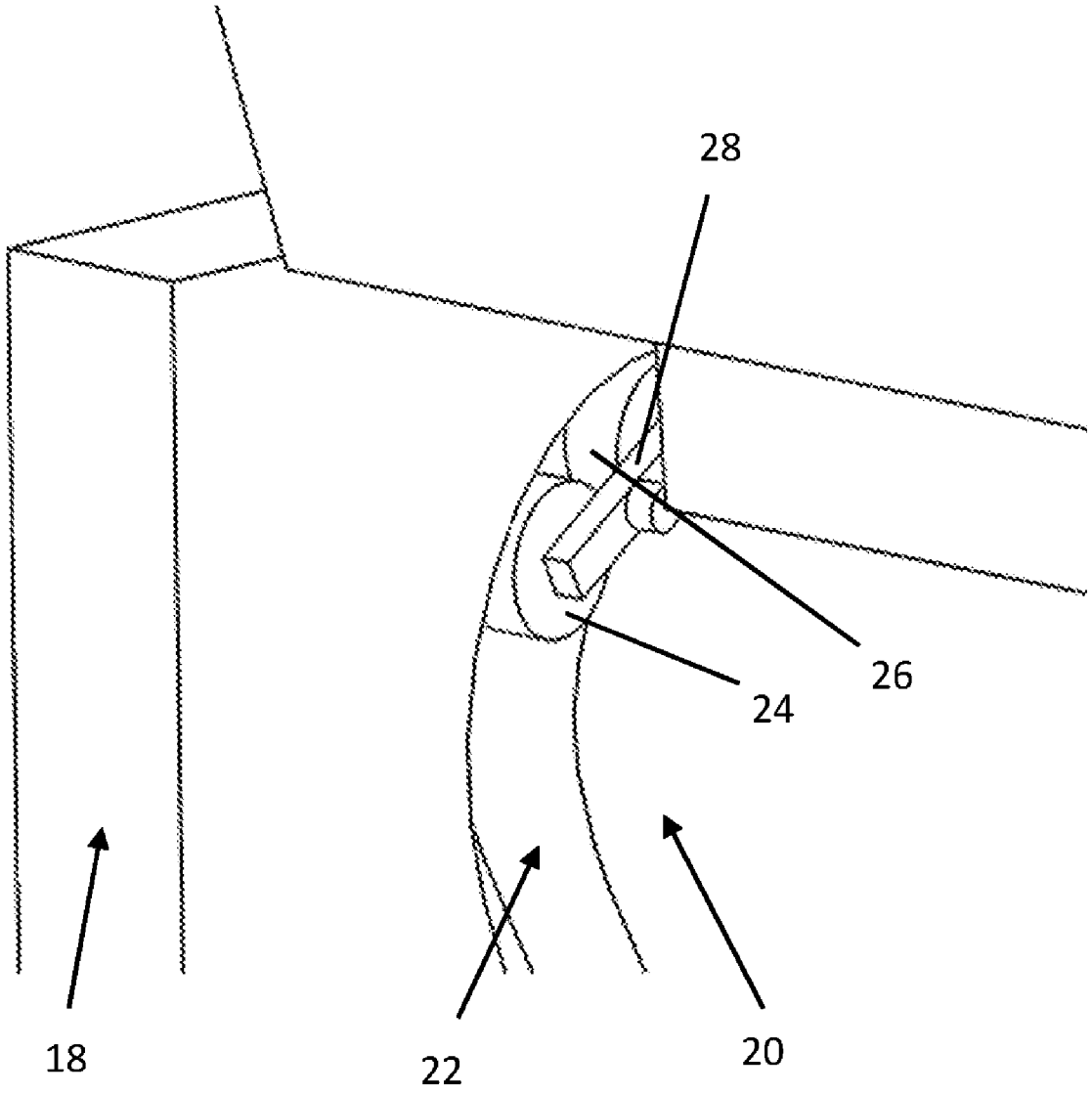
Publication Classification

(51) **Int. Cl.**
B64D 11/06 (2006.01)
F16H 53/06 (2006.01)

(52) **U.S. Cl.**
CPC ***B64D 11/064*** (2014.12); ***B64D 11/0641*** (2014.12); ***F16H 53/06*** (2013.01)

(57) **ABSTRACT**

The present invention concerns an aircraft seat. The aircraft seat comprises at least one moveable element, and a cam follower arrangement associated with the moveable element. The cam follower arrangement comprises a first cam follower and second cam follower attached to a common bogie. Spreading the load over two cam followers attached to a common bogie may reduce the wear on each individual cam follower. This reduction in wear may result in fewer maintenance tasks associated with the aircraft seat, and may make the aircraft seat more robust.



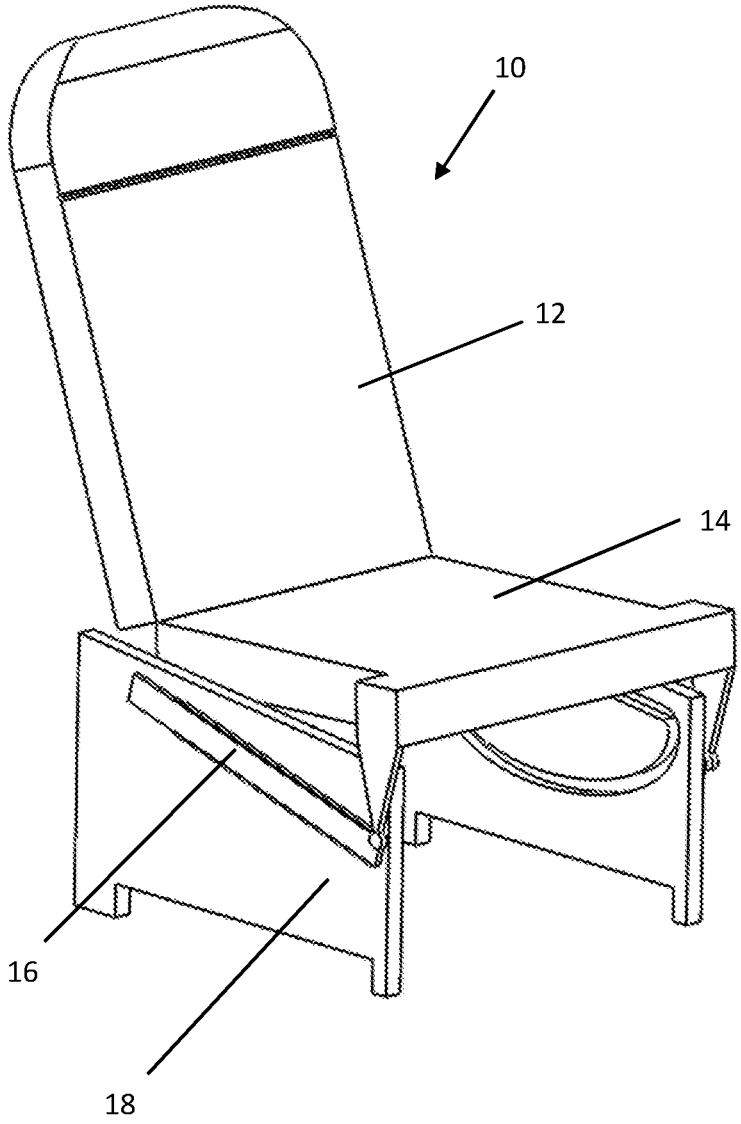


Fig. 1

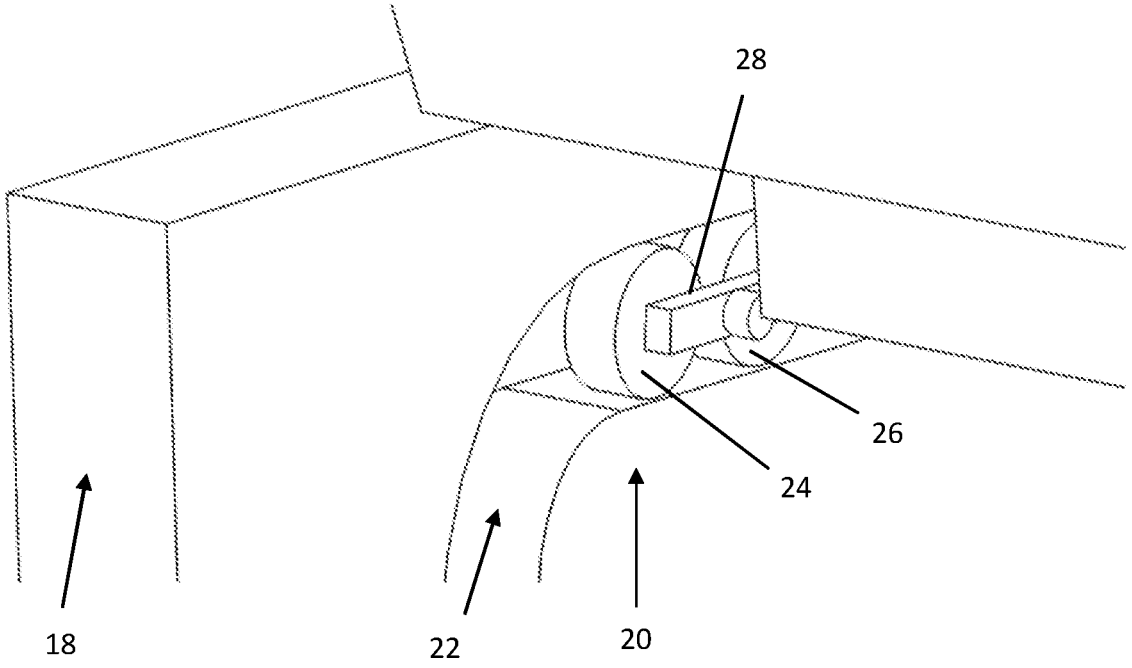


Fig. 2

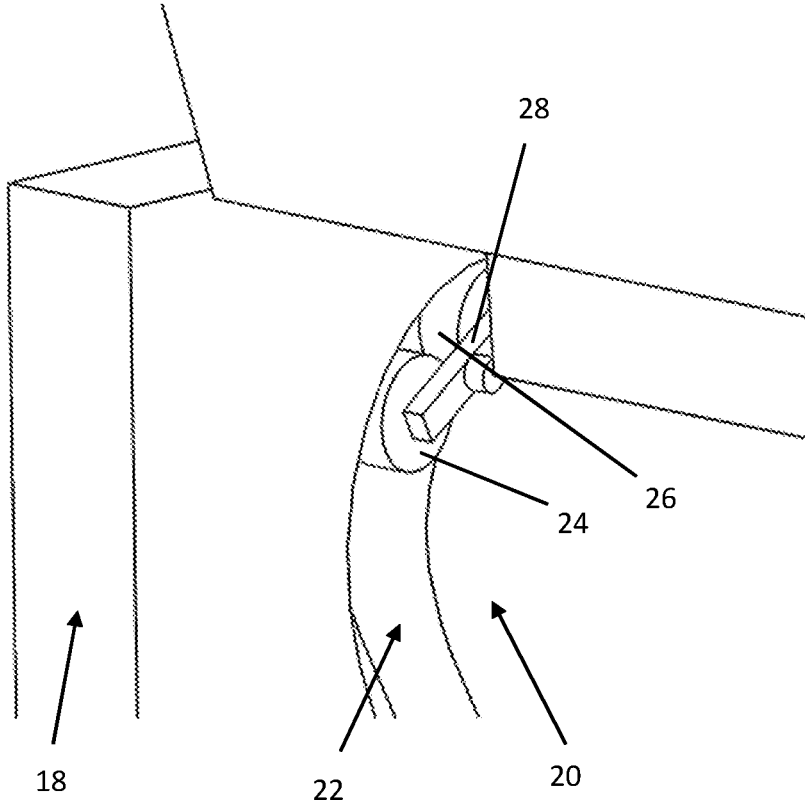


Fig. 3

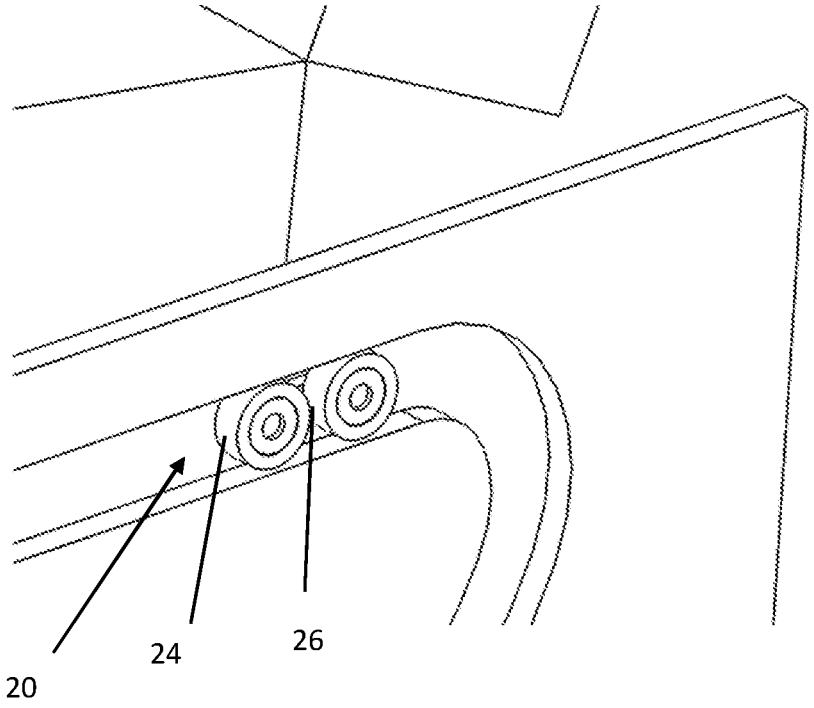


Fig 4

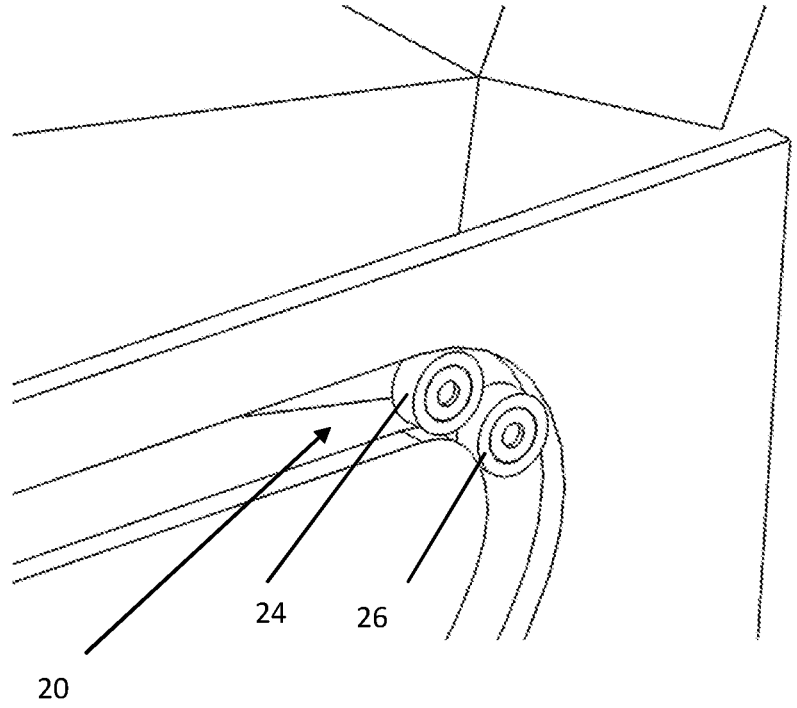


Fig 5

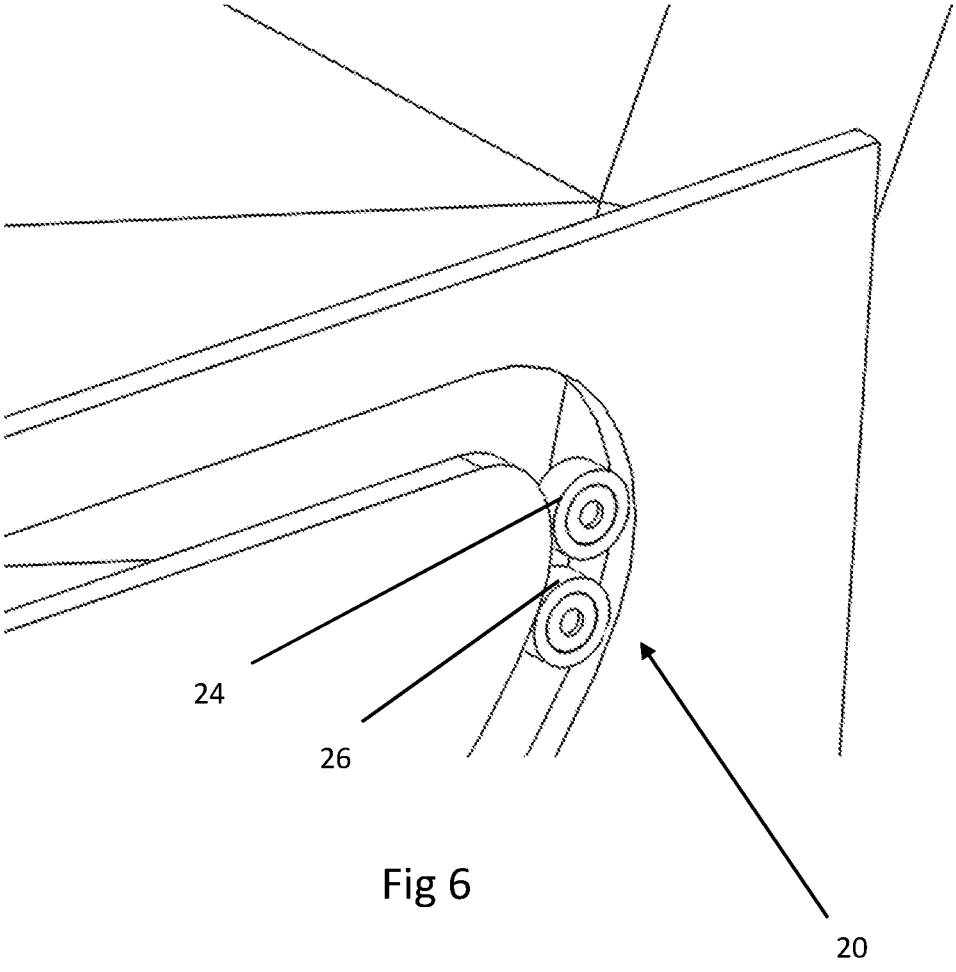


Fig 6

AIRCRAFT SEAT WITH CAM FOLLOWERS

FIELD OF THE INVENTION

[0001] The present invention concerns an aircraft seat. More particularly, but not exclusively, this invention concerns an aircraft seat with cam followers. The invention also concerns cam followers.

BACKGROUND OF THE INVENTION

[0002] A cam follower is often used in aircraft seats in order to help manipulate the aircraft seat as it moves between various different positions. The cam follower may be attached to, for example, the seat back or the seat pan, and control the angle of the seat back and/or seat pan as they are moved forwards or backwards, for example between an upright or bed position. Significant loads may be experienced by the cam follower, leading to wear which results in restorative maintenance or replacement being required. A cam follower often has internal bearings which emit swarf, further adding to the wear of the cam follower.

[0003] The present invention seeks to mitigate the above-mentioned problems. Alternatively or additionally, the present invention seeks to provide an improved cam follower arrangement.

SUMMARY OF THE INVENTION

[0004] The present invention provides, according to a first aspect, an aircraft seat, the aircraft seat comprising at least one moveable element, a cam follower arrangement associated with the moveable element, wherein the cam follower arrangement comprises a first cam follower and second cam follower attached to a common bogie.

[0005] Provision of a first cam follower and a second cam follower attached to a common bogie spreads the load experienced by each individual cam follower. As such, the wear on each individual cam follower is reduced. This reduction in wear may result in fewer maintenance tasks associated with the aircraft seat, and may make the aircraft seat more robust.

[0006] The moveable element may be a seat pan. The moveable element may be a seat back. The association of the cam follower with the moveable element may, for example, be a mechanical connection to a mounting point on the moveable element. The common bogie may be mechanically connected to the moveable element. The common bogie may be mechanically connected to the moveable element such that the common bogie is rotatable relative to the moveable element.

[0007] The cam follower may be arranged to follow a cam path. The cam path may form part of the aircraft seat chassis. The bogie may be rotatably connected to the moveable aircraft seat element.

[0008] According to a second aspect of the invention there is also provided a cam follower arrangement, the cam follower arrangement comprising a first cam follower and a second cam follower attached to a common bogie. The bogie may comprise a connector allowing rotational connection of the bogie to a moveable element, for example part of an aircraft seat unit. The first cam follower and second cam follower may be identical in construction. The first cam follower and second cam follower may comprise a common diameter. The first cam follower and second cam follower may be attached to the common bogie such that they are spaced no further apart than the common diameter. The spacing referred to is the spacing from the closest points of the two external perimeters of the first cam follower and second cam follower. The first cam follower and second cam follower may be located immediately adjacent to one another. Locating the first cam follower and second cam follower close together may provide a cam follower arrangement that is capable of following cam follower paths with tighter curvature than if the cam followers are located far apart.

[0009] It will of course be appreciated that features described in relation to one aspect of the present invention may be incorporated into other aspects of the present invention. For example, the first aspect of the invention may incorporate any of the features described with reference to the second aspect of the invention and vice versa.

DESCRIPTION OF THE DRAWINGS

[0010] Embodiments of the present invention will now be described by way of example only with reference to the accompanying schematic drawings of which:

[0011] FIG. **1** shows a schematic view of an aircraft seat according to a first embodiment of the invention;

[0012] FIGS. **2** and **3** show a section of the aircraft seat comprising a cam follower arrangement according to the first embodiment of the invention; and

[0013] FIGS. **4** to **6** show the cam follower arrangement in different positions along a cam path.

DETAILED DESCRIPTION

[0014] FIG. **1** shows an aircraft seat **10** comprising a seat back **12** and a seat pan **14**. The seat back **12** and the seat pan **14** are pivotally connected to each other. The seat pan **14** is mounted to a first and second slide **16**, the slides **16** located to either side of the aircraft seat **10**. The slides **16** are mounted to a seat chassis **18**. An actuator (not shown) is used to move the aircraft seat **10** between an upright position (for example, taxi, take off, and landing position—TTL) and a bed position. The aircraft seat **10** may also be moved into one or more seating positions between the upright position and bed position. The seat pan **14** includes a cam follower arrangement **20**, with the cam follower arrangement **20** located within a cam path **22** provided by the seat chassis **18**. The cam path **22** includes a curved section configured to cause the seat pan **14** to change angle as the seat pan is moved forwards and backwards by the slides **16**.

[0015] Further detail can be seen in FIG. **2**, where the cam follower arrangement **20** comprises a first cam follower **24** and a second cam follower **26**, each mounted to a bogie **28**. The bogie **28** is rotatably mounted to the seat pan **14**. The rotational connection to the seat pan **14** allows the cam follower arrangement **20** to rotate as required when moving around the curved section of the cam path. FIG. **3** shows the cam follower arrangement **20** in the curved section of the cam path **22**. FIGS. **4** to **6** show how the rotation provided by the rotational connection of the bogie **28** to the seat pan **14** allows movement from the straight section of the cam path **22** to the curved section of the cam path **22**.

[0016] Whilst the present invention has been described and illustrated with reference to particular embodiments, it will be appreciated by those of ordinary skill in the art that the invention lends itself to many different variations not specifically illustrated herein.

[0017] Where in the foregoing description, integers or elements are mentioned which have known, obvious or foreseeable equivalents, then such equivalents are herein incorporated as if individually set forth. Reference should be made to the claims for determining the true scope of the present invention, which should be construed so as to encompass any such equivalents. It will also be appreciated by the reader that integers or features of the invention that are described as preferable, advantageous, convenient or the like are optional and do not limit the scope of the independent claims. Moreover, it is to be understood that such optional integers or features, whilst of possible benefit in some embodiments of the invention, may not be desirable, and may therefore be absent, in other embodiments.

1. An aircraft seat, the aircraft seat comprising at least one moveable element, a cam follower arrangement associated with the moveable element, wherein the cam follower arrangement comprises a first cam follower and second cam follower attached to a common bogie.

2. An aircraft seat as claimed in claim **1**, wherein the moveable element is a seat pan.

3. An aircraft seat as claimed in claim **1**, wherein the moveable element is a seat back.

4. An aircraft seat as claimed in claim **1**, wherein the cam follower is arranged to follow a cam path, the cam path forming part of the aircraft seat chassis.

5. An aircraft seat as claimed in claim **1**, wherein the bogie is rotatably connected to the moveable aircraft seat element.

6. A cam follower arrangement, the cam follower arrangement comprising a first cam follower and a second cam follower attached to a common bogie.

7. A cam follower arrangement as claimed in claim **6**, wherein the bogie comprises a connector for allowing rotational connection of the bogie to a moveable element.

* * * * *