



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶: B62D 1/18, F16C 29/10	A1	(11) International Publication Number: WO 95/01901 (43) International Publication Date: 19 January 1995 (19.01.95)
(21) International Application Number: PCT/GB94/01431 (22) International Filing Date: 1 July 1994 (01.07.94) (30) Priority Data: 9314263.6 9 July 1993 (09.07.93) GB (71) Applicant: THE TORRINGTON COMPANY LIMITED [GB/GB]; Torrington Avenue, Coventry, Warwickshire CV4 9AE (GB). (72) Inventor: BARTON, Laurence, George, Herbert; 15 Pleasant Way, Leamington Spa, Warwickshire CV32 5XA (GB). (74) Agents: FEA KINS, Graham, Allan et al.; Raworth, Moss & Cook, 36 Sydenham Road, Croydon, Surrey CR0 2EF (GB).		(81) Designated States: AU, BR, CA, CN, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i>
(54) Title: ANTIFRICTION ELEMENT FOR USE BETWEEN RELATIVELY SLIDING COMPONENTS OF AN ADJUSTABLE STEERING COLUMN		
(57) Abstract An antifriction element (1) for use between two relatively sliding metal components (2, 3) of an adjustable steering column is locatable between the two components and is formed such that, in an unclamped state of the components, two opposed resilient flanges (7) act to urge the components away from contact with one another to allow relative free sliding of the components on the element (which is of plastics material) and, in a clamped state of the components, the flanges are deflected to allow direct contact between surfaces of the metal components to provide the clamping friction. The drawings illustrate the antifriction element (1) and its application. The top drawing is a perspective view of the element (1), which is a U-shaped channel with resilient flanges (7) on its inner surfaces. It is shown with a cross-section (4) and a longitudinal section (8). The bottom two drawings are cross-sectional views of the element (1) installed between two metal components (2 and 3). The left view shows the components in an unclamped state, where the resilient flanges (7) are deflected to create a gap between the components. The right view shows the components in a clamped state, where the resilient flanges (7) are pressed against the components, allowing direct contact between their surfaces to provide friction.		

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

ANTIFRICTION ELEMENT FOR USE BETWEEN RELATIVELY SLIDING
COMPONENTS OF AN ADJUSTABLE STEERING COLUMN

5 This invention relates to an antifriction element for use
between relatively sliding components of an adjustable
steering column construction for a vehicle.

10 With known constructions of clamping mechanisms for
adjustable steering columns, whether rake and/or reach
adjustable, the clamping mechanism allows relative sliding
between one part of the steering column and another part of
it in an unclamped condition, whilst the two parts are
clamped together once the desired location has been set by
the driver. The two parts are metal and so the relatively
15 sliding metal faces can give an unsatisfactory "feel" to the
user.

20 According to one aspect of the present invention, there is
provided an antifriction element for use between relatively
sliding components in a clamping mechanism of an adjustable
steering column construction for a vehicle, the element being
locatable between two said components, characterised in that,
in an unclamped state of the components, a part of the
element acts to urge the components away from contact with
25 one another to allow relative free sliding of the components
on the element and, in a clamped state of the components,
said part is deflected to allow direct contact between
surfaces of the components to provide the clamping friction.

30 The invention also extends to an adjustable steering column
incorporating an antifriction element essentially as just
defined.

- 2 -

According to another aspect of the present invention, there is provided a steering column clamping mechanism for an adjustable steering column comprising: a first clamp member; a second clamp member slidable relative to the first clamp member, the first clamp member and the second clamp member being in contact with one another when the steering column is in a clamped state; and an antifriction element interposed between the first clamp member and the second clamp member, characterised in that the antifriction element biases the first clamp member and the second clamp member out of contact with one another when the steering column is in an unclamped state, the first clamp member and the second clamp member each being in sliding contact with the antifriction element when the steering column is in the unclamped state.

Preferably, the antifriction element is formed of a plastics material, the relatively sliding components being of metal.

The element can be in the form of a flanged, slotted liner, the or each flange of the liner having a degree of resilience and being formed in such a way as to constitute said part as hereinbefore defined.

For a better understanding of the invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which:-

Figure 1 is a diagrammatic perspective view of an antifriction element for use between relatively sliding components of an adjustable steering column construction for a vehicle,

- 3 -

Figure 2 illustrates the antifriction element of Figure 1 located between two such relatively sliding components in an unclamped condition,

5 Figure 3 is a view similar to Figure 2 but showing the clamped condition,

10 Figure 4 is a side view, partly in section, which shows an adjustable steering column construction incorporating two such antifriction elements, one being for a linear adjustment of the steering column and the other being for a vertical adjustment of the steering column, and

15 Figure 5 is an end view in section of the construction illustrated in Figure 4.

Referring to Figure 1, the antifriction element illustrated is in the form of a slotted, flanged plastics liner 1 for interposition between two relatively sliding components 2, 3, respectively, of an adjustable steering column for a vehicle.

20 The liner 1 has a substantially rectangular form with a longitudinal slot 4 to accommodate an adjustment bar 5 of the adjustment mechanism, the adjustment bar 5 being linked to a clamp handle 6 (Figures 4, 5) of the clamping mechanism. As shown in Figure 4, two liners 1 are provided, one of them (1A) being for linear or reach adjustment of the steering column and the other (1B) being for vertical or rake adjustment of the column.

30

As best seen in Figure 1, the liner 1 has two opposing flanges 7 extending in its free state at an angle from the plane of an upper surface 8 of the liner.

- 4 -

As illustrated in Figures 2 to 5, the plastics liners 1 are located between the two relatively sliding metal components 2, 3 and Figure 2 shows that, when the clamping mechanism is in its unclamped condition, the flanges 7 of the liner 1 act to urge the components 2 and 3 away from one another so that relative sliding takes place on the plastics surface 8 of the liner 1 in a low friction manner (rather than the greater frictional reaction as would be the case of relatively sliding metal components in direct contact with one another).

Figure 3 illustrates the components in the clamped condition of the mechanism and here it will be seen that the flanges 7 have been deflected towards the plane of the surface 8 by the components 2 and 3 being pressed one against the other, so that the adjacent surfaces of the components 2 and 3 contact one another to provide a high resistance clamp force in a metal-to-metal contact.

As previously stated, Figure 4 shows two such liners although it will be appreciated that only one such liner need be provided for a mechanism which only adjusts in one plane.

The part labelled 2/3 in Figure 5 is of course the metal component 3 which is clamped into contact with the metal component 2 of the vertical adjustment liner 1B and it is also the metal component 2 which comes into contact with the metal component 3 with the interposition of the liner 1A of the linear adjustment facility.

Thus, the present construction of the element allows for a dual purpose slotted liner which allows low friction plastics contact for adjustment and high friction metal contact for positive locking of the mechanism.

- 5 -

CLAIMS:

1. An antifriction element (1) for use between relatively sliding components (2, 3) in a clamping mechanism of an adjustable steering column construction for a vehicle, the element (1) being locatable between two said components (2, 3), characterised in that, in an unclamped state of the components, a part (7) of the element acts to urge the components away from contact with one another to allow relative free sliding of the components on the element and, in a clamped state of the components, said part is deflected to allow direct contact between surfaces of the components to provide the clamping friction.
2. An element according to claim 1, and being made of plastics material.
3. An element according to claim 1 or 2, and being in the form of a flanged, slotted liner (1), the or each flange (7) of the liner having a degree of resilience and being formed in such a way as to constitute said part.
4. An element according to claim 3, wherein two said flanges (7) are provided, one on each opposing side of a surface (8) of the liner on which one of said components (2, 3) is intended to slide, the flanges extending in the free state of the liner at an angle to said surface of said liner.
5. An element according to claim 4, wherein the slot (4) of said liner is in said surface (8) of said liner.
6. An adjustable steering column for a vehicle, incorporating an antifriction element according to any one of the preceding claims.

- 6 -

7. An adjustable steering column according to claim 6, wherein two said elements (1) are provided, one for use in connection with rake adjustment and the other for use in connection with reach adjustment.

5

8. A steering column clamping mechanism for an adjustable steering column comprising: a first clamp member (2); a second clamp member (3) slidable relative to the first clamp member, the first clamp member and the second clamp member being in contact with one another when the steering column is in a clamped state; and an antifriction element (1) interposed between the first clamp member and the second clamp member, characterised in that the antifriction element (1) biases the first clamp member (2) and the second clamp member (3) out of contact with one another when the steering column is in an unclamped state, the first clamp member and the second clamp member each being in sliding contact with the antifriction element when the steering column is in the unclamped state.

10
15
20

1/3

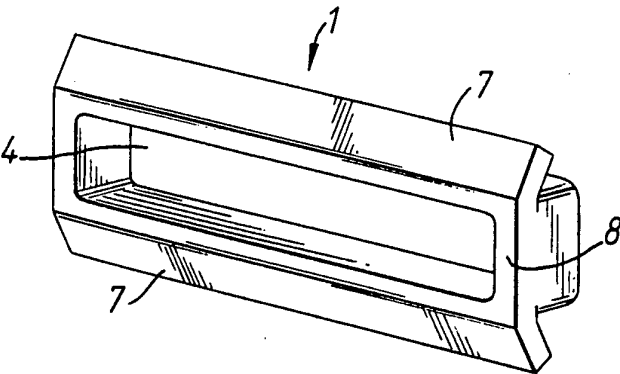


Fig.1

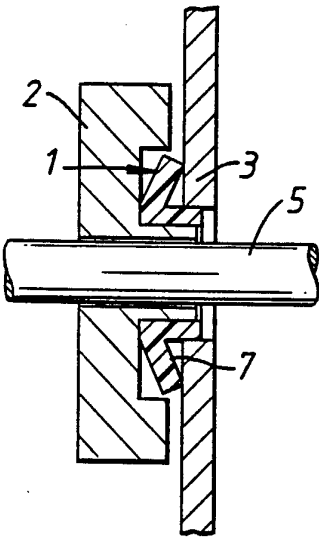


Fig.2

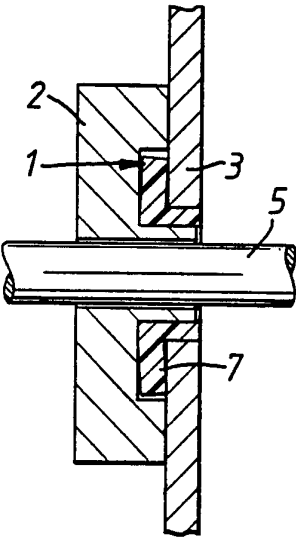
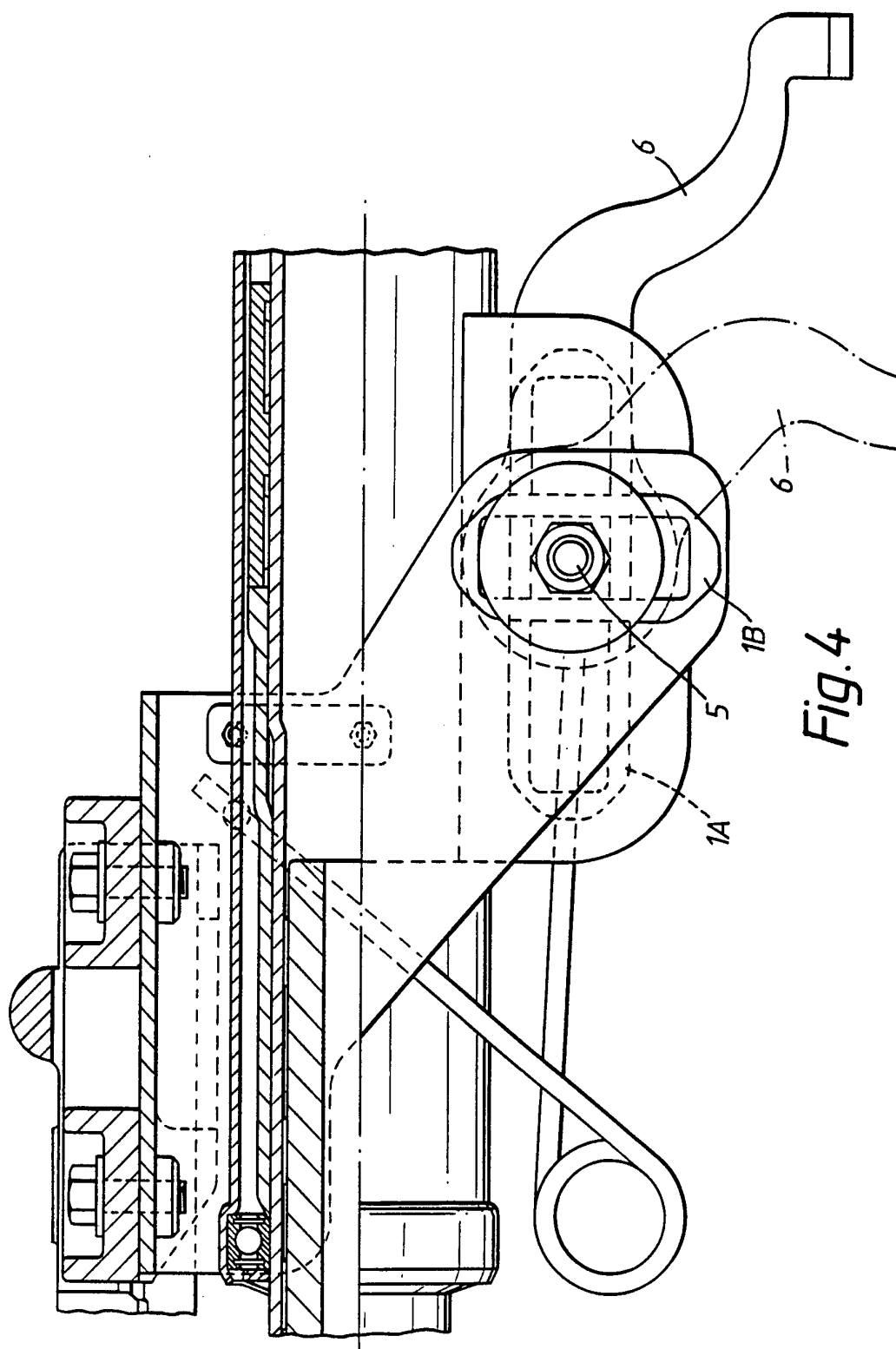


Fig.3

2/3



3/3

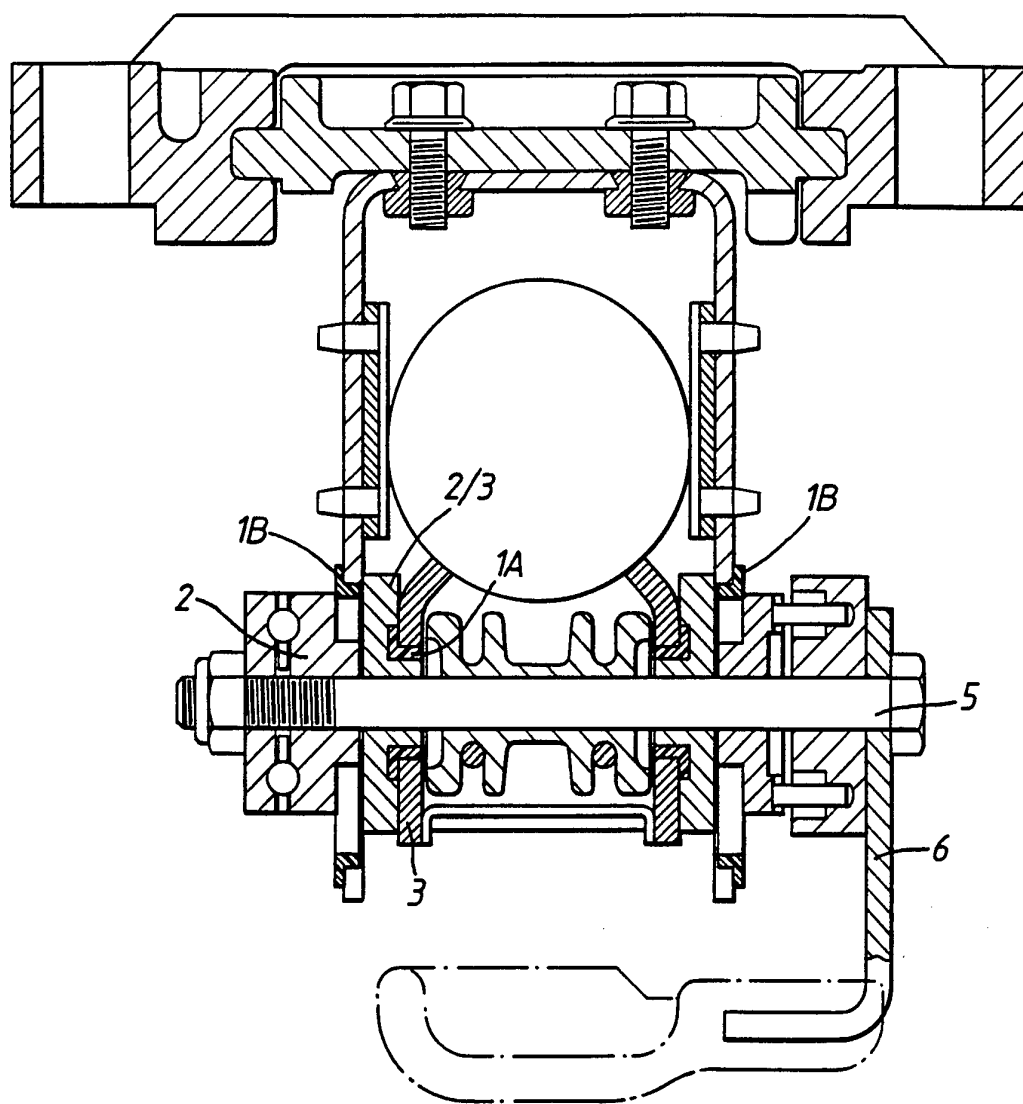


Fig.5

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B62D1/18 F16C29/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B62D F16C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 529 769 (THE TORRINGTON COMPANY LIMITED) 3 March 1993 see page 2, column 2, line 22 - page 3, column 3, line 38; figures 3-8 -----	1-3,6,8

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

20 September 1994

Date of mailing of the international search report

22.09.94

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+ 31-70) 340-3016

Authorized officer

Kulozik, E

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 94/01431

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0529769	03-03-93	GB-A- 2259132	03-03-93
		JP-A- 6183353	05-07-94
		US-A- 5213003	25-05-93
