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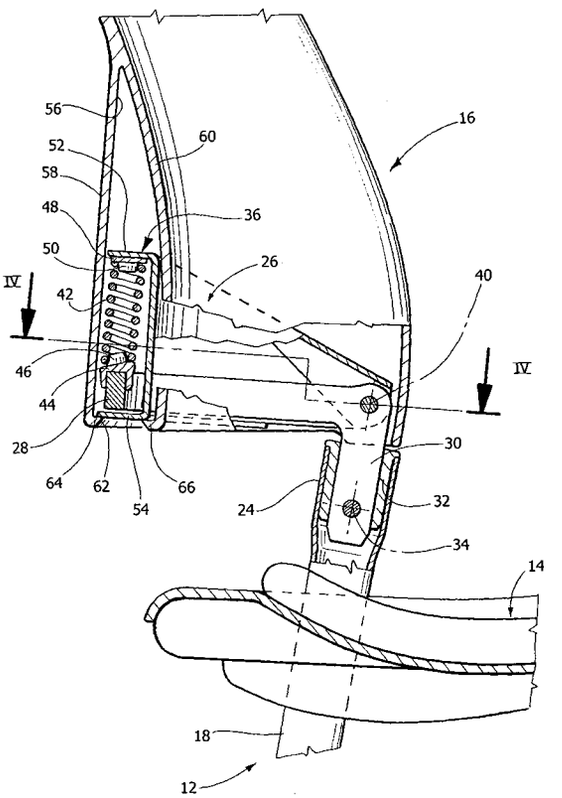
(54) A chair with oscillating backrest

(57) A chair with oscillating backrest, comprising a base structure (12), a seat (14), a backrest (16) and an elastic device (26) which allows a rearward oscillation of the backrest (16) under the action of a rearwards thrust applied by the user, and in which the elastic device (26) applies to the backrest an elastic force which tends to thrust the backrest towards a resting position against the rearward thrust applied by the user.

The elastic device (26) comprises:

- a stationary transverse element (28) fastened to the base structure (12),
- an oscillating element (36) articulated to the transverse element (28) around a transverse horizontal axis (38), and
- elastic means (42) positioned between the stationary transverse element (28) and the oscillating element (36).

FIG. 3



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Description

[0001] The present invention relates to a chair with oscillating backrest.

[0002] More specifically, the invention relates to a chair comprising a base structure, a seat, a backrest and an elastic device that allows a rearwards oscillation of the backrest under the action of a rearwards thrust applied by the user, and in which the elastic device applies to the backrest an elastic force which tends to thrust the backrest towards a resting position against the rearwards thrust applied by the user.

[0003] There are many types of chairs with oscillating backrest, provided with more or less complex mechanisms that allow to obtain a rearwards oscillation of the backrest and which produce an elastic reaction that contrasts the rearwards thrust applied by the user.

[0004] The object of the present invention is to provide a chair with oscillating backrest provided with an elastic device that is particularly simple and has reduced cost.

[0005] According to the present invention, said object is achieved by a chair having the characteristics set out in claim 1.

[0006] The features and the advantages of the present invention shall become readily apparent from the detailed description that follows, provided purely by way of non limiting example, with reference to the accompanying drawings, in which:

- Figure 1 is a partially sectioned lateral view of a chair according to the present invention in resting position,
- Figure 2 is a lateral section view showing the backrest of the chair of Figure 1, in position of maximum rearwards inclination,
- Figure 3 is a partial section view in enlarged scale of the part designated by the arrow III in Figure 1,
- Figure 4 is a partial plan section view according to the line IV-IV of Figure 3, and
- Figure 5 is a partial front elevation view according to the arrow V of Figure 4.

[0007] With reference to Figure 1, the number 10 designates a chair according to the present invention, comprising a base structure 12, a seat 14 and a backrest 16.

[0008] The base structure 12 comprises two rear legs 18, two front legs 20 and two lateral elements 22 supporting the seat 14. The seat 14 is fastened to the base structure 12.

[0009] The base structure 12 comprises portions for supporting the backrest 24 which projects above the rear part of the chair 14. In the illustrated example, the supporting portions of the backrest 14 are formed by extensions of the two rear legs 18.

[0010] The backrest 16 is preferably constituted by a monolithic piece of injection moulded plastic material and is connected to the portion supporting the backrest 24 by means of an elastic device 26.

[0011] With reference in particular to Figures 3, 4 and 5, the elastic device 26 comprises a stationary transverse element 28 fastened, at each of its ends, to the corresponding portion supporting the backrest 24. The transverse element 28 is preferably constituted by a metal bar, for example made of steel, having in a plan view an arched shape with concavity oriented towards the front part of the chair. In the illustrated example, the transverse element 28 has a rectangular transverse section and has at each end a fastening portion 30 fastened to the corresponding portion supporting the backrest 24. As shown in Figure 3, the fastening portion 30 is preferably constituted by a downwards bent portion of the transverse element 28. The fastening portion 30 is fastened to a bushing 32 by means of a transverse pivot 34. The bushing 32 is inserted and fastened in the open upper end of the supporting portion of the backrest 24. Preferably, the bushing 32 is formed in two parts and is glued to the support portion 24.

[0012] The elastic device 26 comprises an oscillating element 36 articulated to the stationary transverse element 28. The oscillating element 26 has a cross section with a C profile facing the rear part of the chair and in plan view it has an arched shape with its concavity facing the front part of the chair. The oscillating element 26 extends in the transverse direction between the two support portions of the backrest 24. The two opposite ends of the oscillating element 26 are articulated to the stationary transverse element 28 around a horizontal axis 38. As shown in particular in Figures 4 and 5, in correspondence with each end the oscillating element 26 has a cross section with a C shape oriented downwards and each of these ends is articulated to the stationary transverse element 28 by means of a pivot 40 that extends according to a horizontal and transverse direction coinciding with the axis 38. The articulation pivot 40 is preferably situated above the corresponding supporting portion of the backrest 24, in the area in which the stationary transverse element 28 is bent by 90° to form the fastening portion 30 oriented downwards. The oscillating element 26 is free to oscillate relative to the stationary transverse element 28 around the horizontal transverse axis 38.

[0013] The elastic device 26 comprises elastic means positioned between the stationary transverse element 28 and the oscillating element 36 and tending to cause the oscillating element 26 to oscillate upwards and towards the front part of the chair relative to the stationary transverse element 28. In the example illustrated in the figures, these elastic means comprise a plurality of helical springs in compression 42 positioned with their axes substantially parallel to each other and oriented according to substantially vertical directions.

[0014] As shown in particular in Figures 3 and 5, the lower ends of the springs 42 act on a lower retaining element 44, preferably made of plastic material provided with projections 46 which are inserted within the springs 42. The lower retaining element preferably has an in-

verse U section which is coupled with the upper part of the stationary transverse element 28. The upper ends of the springs 42 act on an upper retaining element 48 provided with projections 50 which are inserted within the springs 42. The upper retaining element 50 is preferably provided on its lower face with pivot shaped projections (not shown) which engage corresponding holes (also not shown) provided on the upper wing 52 of the oscillating element 36.

[0015] The compressed helical springs 42 tend to cause the forward oscillation of the oscillating element 36. In the resting position, the forward oscillation of the oscillating element 36 ends in the position in which the lower wing 54 of the oscillating element 36 comes to abut against the lower surface of the stationary transverse element 28. Between the surfaces in mutual contact there may be interposed small pads made of elastomeric material (not shown). The lower wing 54 of the oscillating element 36 thus forms an end stop which defines the position of maximum forward inclination of the elastic device 26.

[0016] The elastic device 26 is also provided with a second end stop which limits the position of maximum rearward inclination of the elastic device. As shown in particular in Figure 4, this second end stop is preferably formed by a pair of downwards projecting tabs 52 (only one of which is shown in Figure 5) integrally formed with the upper retaining element 48, which bear against the upper surface of the stationary transverse element 28 in the maximum rearwards inclination of the elastic device 26.

[0017] The backrest 16 is fastened to the oscillating element 36 and is therefore free to oscillate together therewith around the transverse axis 38 between the position of maximum forward inclination (resting position) illustrated in Figure 1 and the position of maximum rearward inclination illustrated in Figure 2. The backrest 16 has a bearing surface 54 against which, in use, bears the user's back. In a section in a horizontal plane (Figure 4) the bearing surface 54 has an arched shape with concavity oriented towards the front part of the chair. In a section in a vertical plane (Figure 1 and 2) the bearing surface 54 has an arched shape with the convexity oriented towards the front part of the chair.

[0018] The backrest 16 is preferably fastened to the oscillating element 36 with a snap-on system. As shown in Figures 3 and 4, in the rear part of the backrest 16 is provided a transverse cavity 56 defined between two integral walls 58, 60. The transverse cavity 56 has such a shape as to receive within it the elastic device 26. The two walls 58, 60 are provided at their lower ends with an opening 62 through which the elastic device 26 is inserted in the cavity 56. The edges of the opening 62, designated by the reference numbers 64 and 66, form snap-on engagement surfaces which engage the lower wing 54 of the oscillating element 36. The dimensions of the cavity 56 are such that the backrest 16 is fastened without play to the oscillating element 36.

[0019] In the resting position shown in Figure 1 the backrest 16 is in the position of maximum forward inclination. When the user applies a rearwards thrust to the bearing surface 54, the springs 42 are compressed and the backrest 16 oscillates backwards. The springs create an elastic reaction that contrasts the rearwards thrust applied by the user. The backward oscillating motion of the backrest 16 ends when the end stop elements 52 of the oscillating element 26 come in contact with the stationary transverse element 28. In this position, illustrated in Figure 2, the backrest 16 is in the maximum rearwards inclination. When the rearwards thrust applied by the user on the bearing surface 54 ceases, the backrest 16 automatically returns to the resting position under the action of the springs 42.

Claims

1. A chair with oscillating backrest, comprising a base structure (12), a seat (14), a backrest (16) and an elastic device (26) that allows a rearwards oscillation of the backrest (16) under the action of a rearwards thrust applied by the user, and in which the elastic device (26) applies to the backrest an elastic force which tends to thrust the backrest towards a resting position against the rearwards thrust applied by the user,

   characterised in that the elastic device (26) comprises:

   - a stationary transverse element (28) fastened to the base structure (12),
   - an oscillating element (26) articulated to the transverse element (28) around a transverse horizontal axis (38), and
   - elastic means (42) positioned between the stationary transverse element (28) and the oscillating element (36).

2. A chair as claimed in claim 1, **characterised in that** the stationary transverse element (28) comprises a metal bar with an arched shape fastened to support portions of the backrest (24) projecting above the upper part of the seat (14).

3. A chair as claimed in claim 2, **characterised in that** said support portions of the backrest (24) are formed by extensions of the rear legs (18) of the base structure (12).

4. A chair as claimed in claim 3, **characterised in that** the oscillating element (36) has in plan form an arched shape with its concavity oriented towards the front part of the chair and is articulated at its own ends to the stationary transverse element (28) in correspondence with said support portions of the backrest (24).

5. A chair as claimed in claim 4, **characterised in that** the oscillating element (36) has a substantially C shaped cross section oriented towards the rear part of the chair.

6. A chair as claimed in claim 5, **characterised in that** said elastic means comprise a plurality of helical springs in compression (42) positioned with their axes oriented in substantially vertical direction.

7. A chair as claimed in claim 6, **characterised in that** said helical springs in compression (42) act against an upper wing (52) of the oscillating element (36).

8. A chair as claimed in claim 7, **characterised in that** the oscillating element (36) comprises a lower wing (54) which bears against a lower surface of the stationary transverse element (28) to define a first end stop position of the backrest (16).

9. A chair as claimed in claim 8, **characterised in that** the oscillating element (36) bears a second end stop element (52) which bears against an upper surface of the stationary transverse element (28) to define a second end stop position of the backrest (16).

10. A chair as claimed in claim 1, **characterised in that** the backrest (16) is fastened in snap-on fashion to the oscillating element (36).

FIG. 1

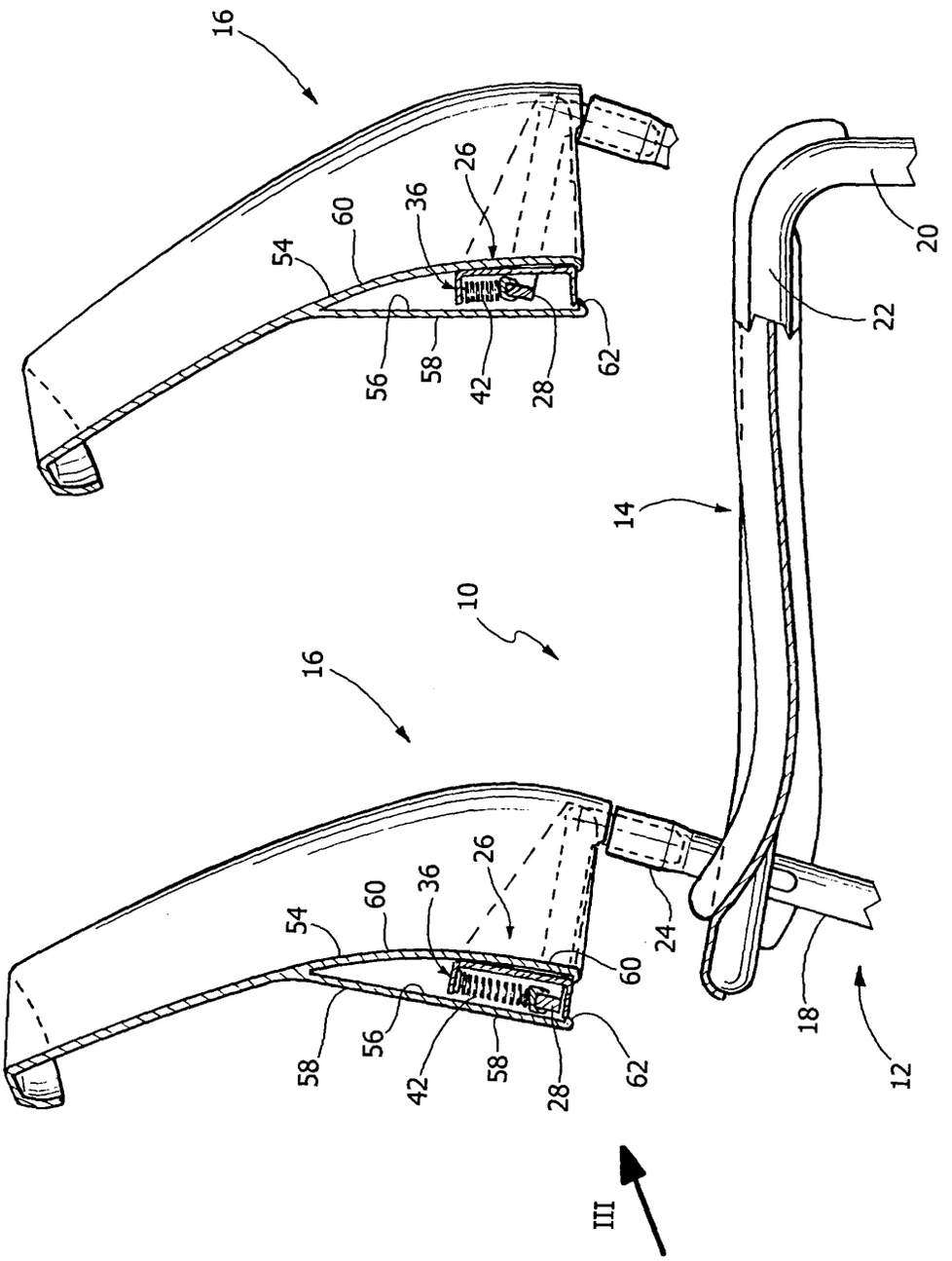

FIG. 2

FIG. 3

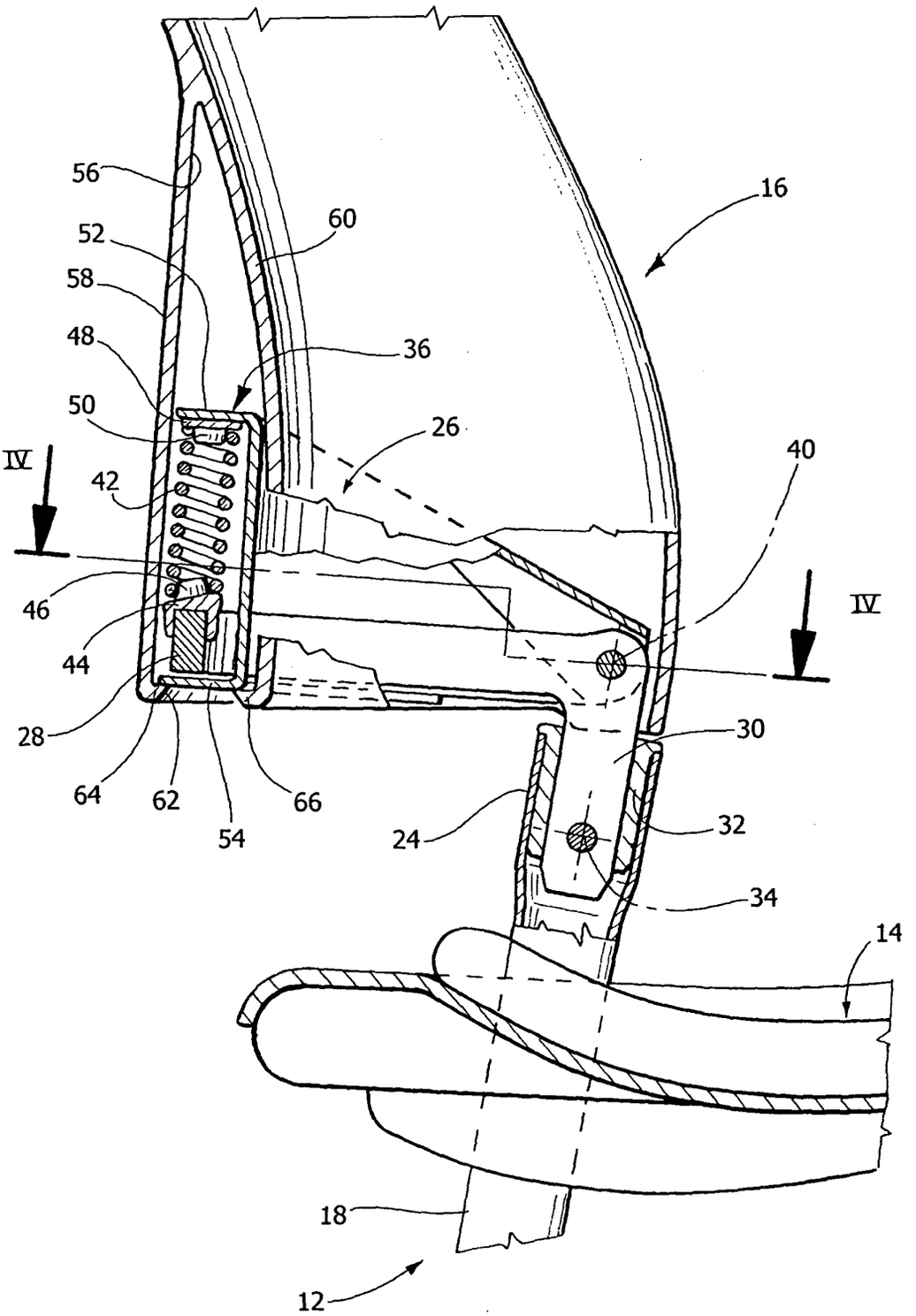
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FIG. 4

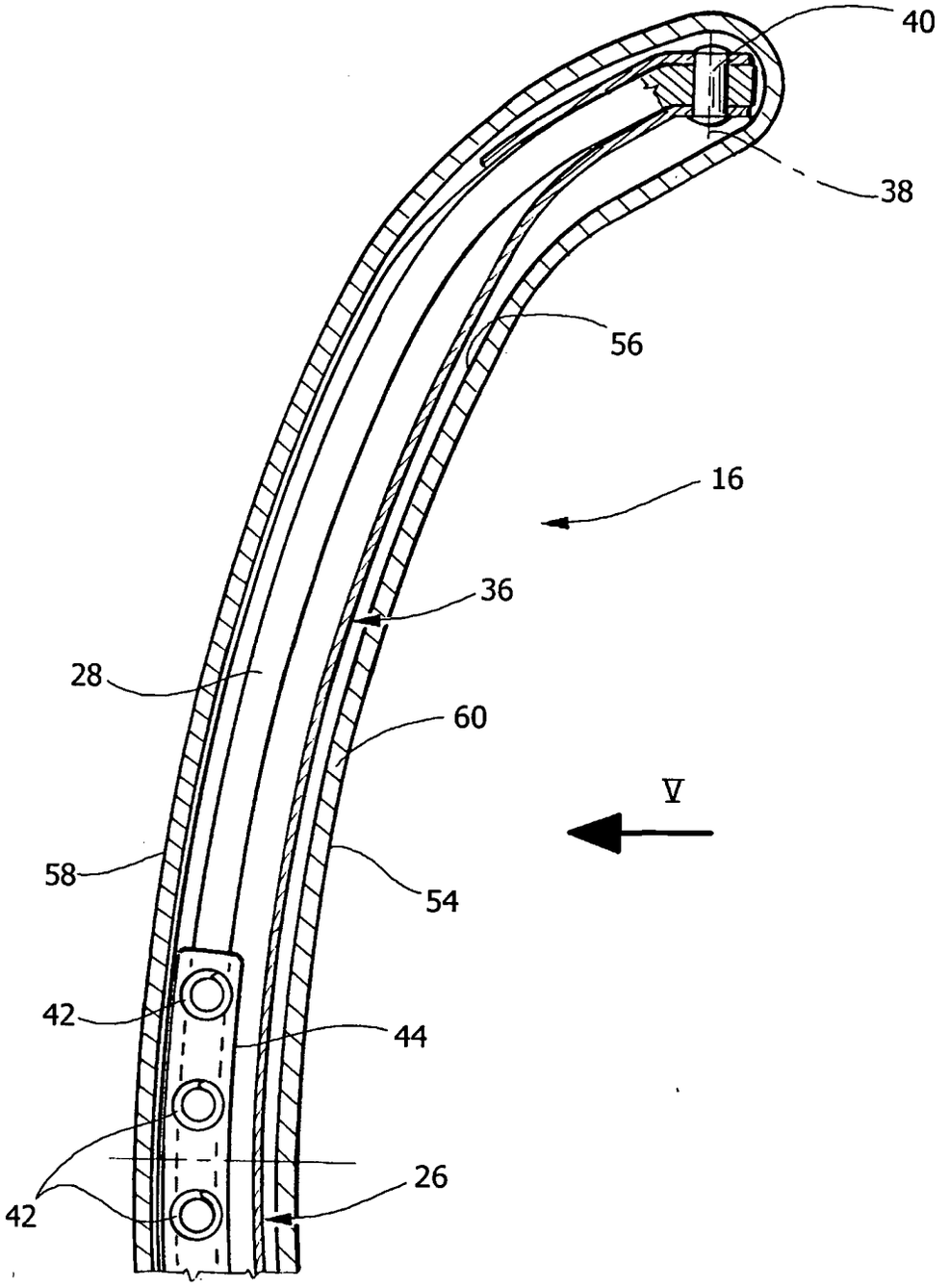
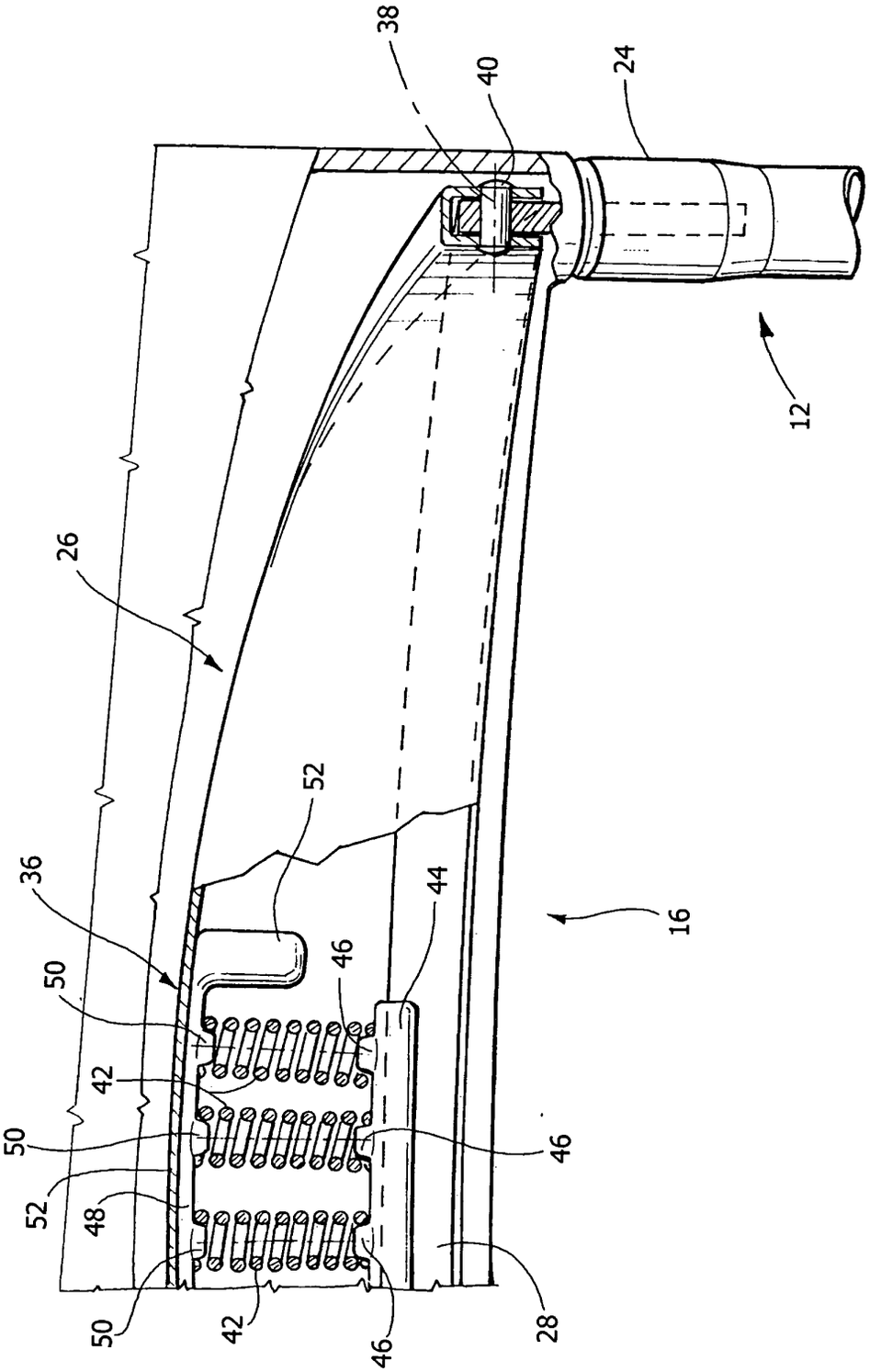


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 04 42 5190

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 149 236 A (BRAEUNING EGON) 21 November 2000 (2000-11-21) * abstract; figures 1-3 * * column 3, line 25 - column 3, line 56 * ---	1,2	A47C1/024
X	US 5 964 503 A (INOUE NOBORU) 12 October 1999 (1999-10-12) * abstract; figures 1,2 * * column 3, line 26 - column 3, line 45 * ---	1	
X	US 4 479 679 A (FAIKS FREDERICK S ET AL) 30 October 1984 (1984-10-30) * abstract; figures 1,2 * * column 1, line 10 - column 1, line 14 * * column 4, line 45 - column 4, line 54 * ---	1	
X	US 4 703 974 A (BRAEUNING EGON) 3 November 1987 (1987-11-03) * abstract; figures * * column 4, line 28 - column 5, line 21 * ---	1	
A	EP 0 249 584 A (PRO CORD SRL) 16 December 1987 (1987-12-16) * abstract; figures * -----	1-10	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	10 August 2004	MacCormick, D

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10-08-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6149236 A	21-11-2000	AT 209011 T	15-12-2001
		AU 4315397 A	11-05-1998
		DE 59706076 D1	21-02-2002
		EP 0949875 A1	20-10-1999
		WO 9816140 A1	23-04-1998
		JP 2000505677 T	16-05-2000
		JP 3278170 B2	30-04-2002
US 5964503 A	12-10-1999	JP 3136280 B2	19-02-2001
		JP 10295479 A	10-11-1998
US 4479679 A	30-10-1984	CA 1189782 A1	02-07-1985
US 4703974 A	03-11-1987	AT 43954 T	15-06-1989
		CA 1238569 A1	28-06-1988
		DE 3570973 D1	20-07-1989
		DE 8529359 U1	28-11-1985
		DK 484385 A ,B,	24-04-1986
		EP 0179357 A2	30-04-1986
		JP 1771527 C	30-06-1993
		JP 4061642 B	01-10-1992
		JP 61100204 A	19-05-1986
EP 0249584 A	16-12-1987	IT 206947 Z2	26-10-1987
		AT 65171 T	15-08-1991
		AU 574288 B2	30-06-1988
		AU 7402187 A	07-01-1988
		BR 6701119 U	21-06-1988
		DE 3771395 D1	22-08-1991
		DK 298287 A	13-12-1987
		EP 0249584 A2	16-12-1987
		GR 3002324 T3	30-12-1992
		HK 16392 A	06-03-1992
		IN 170024 A1	25-01-1992
		JP 2618637 B2	11-06-1997
		JP 63099806 A	02-05-1988
		KR 9514762 B1	14-12-1995
		NO 872448 A	14-12-1987
		NZ 220502 A	21-12-1989
		PT 85069 A ,B	01-07-1988
		SG 20892 G	16-04-1992
		US 4796952 A	10-01-1989
		ZA 8703975 A	02-12-1987

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82