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(54) **ERGONOMIC CHAIR**

(57) An ergonomic chair (1) comprising a seat (3), a backrest (4), a pair of armrests (5) constrained to said backrest (4) and a frame (6) for supporting the seat (3) wherein each armrest (5) comprises an articulated struc-

ture (21) adapted to adjustably change the configuration and the angular position thereof with respect to the seat (3) in a substantially horizontal plane and so to adapt to the shape and to the size of the bust of the user.

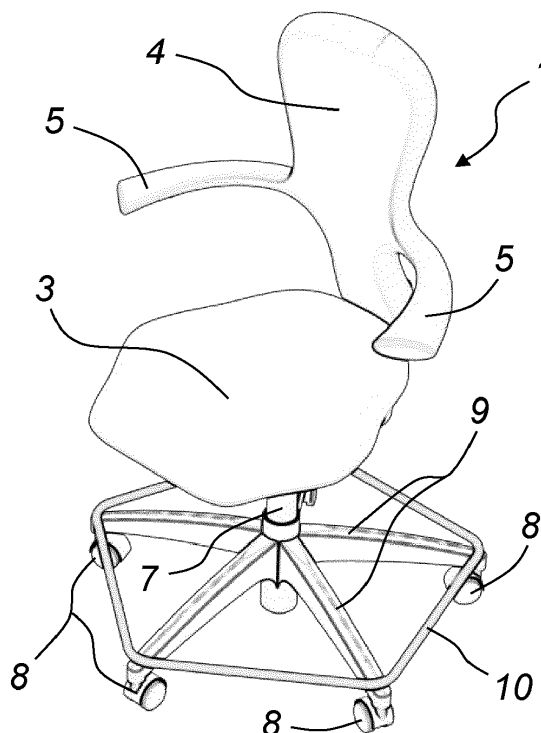


FIG. 1

Description

Field of the invention

[0001] The present invention generally relates to the technical field of furnishing accessories and particularly relates to an ergonomic chair.

State of the art

[0002] The use of ergonomic chairs, particularly but not exclusively, for use in offices has been long known in the furnishing accessories industry.

[0003] Generally, these types of chairs comprise a seat connected to a backrest, a pair of armrests substantially parallel to the seat and a frame for supporting the seat.

[0004] Typically, the frame for supporting the seat for an office chair comprises a pneumatic column which can be adjusted height-wise provided with swivel casters at the lower end thereof and fixed armrests constrained to the backrest, to the seat or to the frame for supporting the seat.

[0005] However, with a seat raised and with the column adjusted to the maximum height thereof, the lower limbs of the user press on the edge of the seat with ensuing limitation of the blood flow toward the feet.

[0006] Furthermore, the fixed armrests prevent users with above-average bust size from using the chair.

[0007] Vertically inclinable seats and/or armrests which can be adjusted width-wise have been developed in order to at least partially overcome these drawbacks.

[0008] WO0005996 discloses a chair provided with a mechanism for adjusting the inclination of the seat in an automated fashion depending on the distribution of the weight of a user.

[0009] In this known device, the mechanism comprises a fixed casing adapted to house a support pivoted using a pin in a central area of the seat and coupled to the casing using a spring.

[0010] In this manner, when the user is seated on the chair and shifts his/her weight backwards, the spring extends and the support rotates around the pin inclining backwards. Vice versa, when the user shifts his/her weight forward, the spring is compressed inclining the support forward through the pin until it comes into contact with an abutment point.

[0011] US6923505 and KR20190014681 disclose chairs provided with ergonomic armrests which comprise a structure having a stationary element on whose lateral ends there are fixing brackets for connection to pairs of parallel arms at whose end there is a vertical rod for the support of an adjustable ergonomic support for the forearms of the user.

[0012] Furthermore, the fixing brackets allow the width-wise lateral adjustment of the pairs of arms, which can be in turn moved even vertically using respective pins.

[0013] A first drawback of these known systems lies in

the fact that they have numerous components with ensuing increase of manufacturing, assembly and maintenance costs.

[0014] A further drawback lies in the fact that once widened horizontally the armrest cannot bear the weight of a user, with ensuing impossibility to be used for all types of physique of the user.

[0015] In order to overcome these known problems, there have been developed articulated or link chain systems as described in DE9110121U and US2010/141005. However, these systems are not applicable to the backrest of chairs to improve the ergonomic qualities thereof given that they would require a large number of technical modifications.

[0016] In conclusion, there is felt the need to improve known chairs in order to overcome the aforementioned drawbacks.

Technical problem

[0017] In the light of the prior art, the object of the present invention is to solve the technical problem by providing an ergonomic chair which can be adjusted in every direction to improve the comfort of a user.

Summary of the invention

[0018] The object of the present invention is to solve the aforementioned problem by providing an ergonomic chair which is highly effective and cost-effective.

[0019] A particular object of the present invention is to provide an ergonomic chair of the type indicated above which can be adjusted both in the vertical direction and in the horizontal direction.

[0020] Another object of the present invention is to provide an ergonomic chair of the type indicated above which can be used for above-average high desks.

[0021] A further object of the present invention is to provide an ergonomic chair of the type indicated above which can be used by users with different physique.

[0022] Another object of the present invention is to provide an ergonomic chair of the type indicated above which allows a user to sit both resting the back and the chest against the backrest.

[0023] The objects mentioned above and others which will be more apparent hereinafter are achieved by an ergonomic chair, according to claim 1, which has a seat, a backrest, a pair of armrests constrained to said backrest and a frame for supporting the seat and wherein each armrest comprises an articulated structure adapted to adjustably change the configuration and the angular position thereof with respect to the seat in a substantially horizontal plane and so to adapt to the shape and size of the bust of the user.

[0024] Advantageously, the articulated structure comprises at least three base plates and each base plate is substantially flat and it has a pair of mutually facing horizontal surfaces, coplanar to each other and rotatably

connected by connection means.

[0025] Due to this combination of characteristics, the ergonomic chair can be adjusted by a user in all directions to improve the comfort thereof.

[0026] Advantageous embodiments of the invention are attained according to the dependent claims.

Brief description of the drawings

[0027] Further characteristics and advantages of the invention will be more apparent in the light of the detailed description of a preferred but not exclusive embodiment of an ergonomic chair like the one mentioned above, shown by way of non-limiting example with reference to the drawings below, wherein:

FIG. 1 is a perspective view of the ergonomic chair according to the invention;

FIG. 2 is a front view of the chair of **Fig. 1**;

FIGS. 3A and 3B are lateral views of the chair of **Fig. 1** respectively in a first and a second operative position of the seat;

FIGS. 4A and 5A are respectively enlarged lateral and front views of the chair of **Fig. 3A**;

FIGS. 4B and 5B are respectively enlarged lateral and front views of the chair of **Fig. 3B**;

FIGS. 6A and 6B are respectively a top view of the chair of **Fig. 3A** and a cross-sectional lateral view of the chair of **Fig. 3B**;

FIGS. 7A and 7B are top views of the chair of **Fig. 1** respectively in a first and a second operative position of the armrests;

FIGS. 8 and 9 are respectively a perspective view of the frame and a detailed view of the backrest of the chair of **Fig. 1**;

FIG. 10 is an exploded view of the armrest of the chair of **Fig. 9**.

Detailed description of a preferred embodiment

[0028] With particular reference to the figures, there is shown an ergonomic chair, indicated in its entirety with reference numeral **1**, which has a framework **2** comprising a seat **3**, a backrest **4**, a pair of armrests **5** substantially parallel to the seat **3** and a frame **6** for supporting the seat **3**.

[0029] In a per se known manner, the framework **2** may be at least partially padded to improve the comfort of a user of the chair **1**, as shown in **FIGS. 1-3, 7**.

[0030] In a preferred embodiment of the invention, the frame **6** for supporting the seat **3** comprises a pneumatic column **7** which is substantially vertical and which can be adjusted height-wise between a first maximum height position and a second minimum height position.

[0031] Furthermore, the pneumatic column **7** is provided with swivel casters **8** to facilitate the movement along a support plane **P** when using the chair **1**, as better visible in **FIGS. 1-3**.

[0032] The pneumatic column **7** comprises an upper end **7'** operatively connected to the seat **3** and a lower end **7''** facing toward the support plane **P** of the chair **1** and provided with a plurality of radial legs **9** each provided with a swivel caster **8**.

[0033] Furthermore, the radial legs **9** may comprise a ring-like assembly **10** of the circular or polygonal type adapted to connect each radial leg **9** and adapted to act as a support for the feet of the user.

[0034] Preferably, the ring-like assembly **10** is positioned the closest possible to the support plane **P** of the chair **1** to facilitate the stretching of the legs of the user.

[0035] In an alternative embodiment, not shown in the figures, the support frame **6** comprises at least three substantially vertical legs connected to the seat **3**.

[0036] As better shown in **FIGS. 3-6**, the seat **3** comprises a first **11** and a second member **12** which are substantially flat and which can be mutually arranged side-by-side and a support plate **13** for the user, also substantially flat.

[0037] The first flat member **11** is integrally joined to the support frame **6** and the second flat member **12** is superimposed to the first flat member **11**, as well as integrally joined with the support plate **13**.

[0038] Each flat member **11**, **12** and the support plate **13** comprise a first end portion **11'**, **12'**, **13'** distal from the backrest **4** and a second end portion **11''**, **12''**, **13''** proximal to the backrest **6**.

[0039] Furthermore, the first end portion **13'** of the support plate **13** is spaced apart with respect to the first end portions **11'**, **12'** of the flat members **11**, **12**.

[0040] Therefore, the first **11** and the second flat member **12** are mutually hinged in proximity of their first end portion **11'**, **12'** to allow the second flat member **12** and the support plate **13** to incline in a substantially vertical direction.

[0041] Such inclination may occur due to the weight of the user who pushes the knees toward the support plane **P** of the chair **1** or toward the ring-like assembly **10** which supports the feet of the user.

[0042] It is clear that this possibility of inclination between the first **11** and the second flat member **12** facilitates the ergonomic qualities of the chair **1**.

[0043] As a matter of fact, when the seat **3** is at the first maximum height position, or in proximity thereof, the user may incline it independently by shifting his/her weight forward and therefore preventing the first end portion **13'** of the support plate **13** of the seat **3** from blocking the blood flow of the user towards the feet.

[0044] In the preferred embodiment of the invention, shown in **FIGS. 3-6**, the first **11** and the second flat member **12** are hinged at their first end portion **11'**, **12'** using a substantially horizontal pin **14**.

[0045] Preferably, the first **11** and the second flat member **12** are respectively hinged in the central portion and at the horizontal ends of the pin **14**.

[0046] Advantageously, the first **11** and the second flat member **12** are mutually connected at the respective sec-

ond end portion **11''**, **12''** proximal to the backrest **4** using elastic means **15**.

[0047] Preferably, the elastic means **15** comprise at least one spring which is compressed when the second flat member **12** is inclined with respect to the first flat member **11** or when their second respective end portions **11''**, **12''** are spaced from each other.

[0048] In the embodiment shown in FIG. 6B, the maximum inclination angle α_1 of the first flat member **11** with respect to the second flat member **12** is 10° , preferably 8° .

[0049] Suitably, the first flat member **11** is connected to the backrest **4** of the seat **1** using a bracket **16** which is substantially angular and which can be inclined by the user using adjustment means **17** of the type known in the prior art.

[0050] The adjustment means **17** of the chair **1** are adapted to allow the inclination of the backrest **4** dependently or independently from the inclination of the support plate **13** of the seat **3**.

[0051] Alternatively, the chair **1** may be without the angular bracket **16** and the backrest **4** be integrally joined with the support plate **13** or with the support frame **6** without departing from the scope of protection of the present invention.

[0052] Preferably, the backrest **4** has a shape widened at the upper portion **18'** thereof distal from the seat **3** and a shape narrowed at the lower portion **18''** proximal to the seat **3**, as better shown in FIGS. 2 and 9.

[0053] The particular narrowed shape of the lower portion **18''** of the backrest **4** allows the user to insert his/her legs upon sitting on the seat **3** resting the chest against the backrest **4**.

[0054] Furthermore, as better shown in FIGS. 7-10, the pair of armrests are constrained to the backrest **4** using a plate-like element **19** positioned in the central portion **18'''** of the seat **4** and provided with coupling means for each armrest **5**.

[0055] Advantageously, each armrest **5** comprises an articulated structure **21** adapted to adjustably change the configuration and the angular position thereof with respect to the seat **3** in a substantially horizontal plane and so as to adapt to the shape and size of the bust of the user.

[0056] In the embodiment shown in the figures, the articulated structure **21** comprises at least three substantially flat base plates **22**, coplanar and rotatably connected to each other by means of suitable connection means **23**.

[0057] Preferably, at least one of the base plates **22** is welded to the coupling means **20** of the plate-like element **19** of the backrest **4**.

[0058] Each base plate **22** is substantially flat and it comprises a pair of horizontal surfaces **24** which are mutually facing and coplanar to each other.

[0059] Furthermore, the horizontal ends of each base plate **22** comprises at least one pair of substantially vertical end-stroke surfaces **25A**, **25B** adapted to limit the angular stroke thereof in the horizontal direction.

[0060] Therefore, when the articulated structure **21** is

fully open or fully closed, an end-stroke surface **25A**, **25B** of a first base plate **22** is facing the corresponding end-stroke surface **25B**, **25A** of a second base plate **22**, as better visible in FIG. 10.

[0061] Therefore, the end farthest from the backrest **4** of each armrest **5** can be adjusted in width between a minimum angle α_2 and a maximum angle α_3 with respect to a vertical plane π passing through the centreline of the backrest **4** using the articulated structure **21**.

[0062] Preferably, the minimum angle α_2 is comprised between 35° and 45° , while the maximum angle α_3 is comprised between 50° and 65° . More preferably, the minimum angle α_2 is equal to 40° and the maximum angle α_3 is equal to 57° .

[0063] Obviously, the angular stroke in the horizontal direction can be calculated from the difference between the maximum angle α_3 and the minimum angle α_2 . Therefore, the angular stroke in the horizontal direction is preferably comprised between 5° and 30° , more preferably equal to 17° .

[0064] Furthermore, the articulated structure **21** comprises at least two pairs of connection plates **26** positioned above and below the pair of surfaces **24** and rotatably connected to the base plates **22** using the connection means **23**.

[0065] Preferably, the connection means **23** comprise through screws **27** engageable in suitable threaded holes **28** obtained in the base plates **22** and connection plates **26**.

[0066] Preferably, the through screws **27** are mounted with a force amounting to at least 3Nm and at least the base plates **22** are made of high-strength steel, with hardness comprised between 350 HBW and 510 HBW, more preferably made of Hardox[®] steel.

[0067] Furthermore, the connection means **23** comprise cup springs **29** and suitable washers **30** interposed between the base plates **22** and connection plates **26**.

[0068] It is clear that the particular articulated structure **21** has a very limited number of components and it allows lower manufacturing, assembly and maintenance costs with respect to the adjustable armrests of the prior art.

[0069] Furthermore, in the light of the above it is clear that the ergonomic chair **1** can be adjusted by a user both in the vertical direction and in the horizontal direction, appropriate for any physique and facilitating blood circulation of the lower limbs of the user.

[0070] Therefore, in the light of the above it is clear that the ergonomic chair **1** according to the invention achieves the pre-established objects and in particular it can be adjusted in all directions to improve the comfort of a user.

[0071] The ergonomic chair according to the invention is susceptible to numerous modifications and variants all falling within the inventive concept outlined in the attached claims.

[0072] Even though the chair has been described with particular reference to the attached figures, the reference numerals used in the description and in the claims are meant for improving the intelligibility of the invention and

thus do not limit the claimed scope of protection in any manner whatsoever.

[0073] Throughout the description, reference to "an embodiment" or "the embodiment" or "some embodiments" indicates that a particular characteristic, structure or element described is comprised in at least one embodiment of the object of the present invention.

[0074] Furthermore, the particular characteristics, structures or elements may be combined in any appropriate fashion in one or more embodiments.

Industrial applicability

[0075] The present invention is industrially applicable as it can be produced in an industrial scale by industries pertaining to the field of furnishing accessories, in particular chairs.

Claims

1. An ergonomic chair (1) comprising a seat (3), a backrest (4), a pair of armrests (5) constrained to said backrest (4) and a frame (6) for supporting the seat (3) wherein each of said armrests (5) comprises an articulated structure (21) adapted to adjustably change the configuration and the angular position thereof with respect to said seat (3) in a substantially horizontal plane and to adapt to the shape and size of the bust of the user, wherein said articulated structure (21) comprises at least three base plates (22), each base plate (22) being substantially flat and having a pair of horizontal surfaces (24) mutually faced and rotatably connected by connection means (23), **characterised in that** said horizontal surfaces (24) are coplanar to each other, said base plates (22) comprising at least one pair of end-stroke surfaces (25A, 25B) adapted to limit the angular stroke thereof in the horizontal direction.
2. Chair as claimed in claim 1, **characterised in that** said articulated structure (21) is adjustable in width between a minimum angle (α_2) and a maximum angle (α_3) with respect to a vertical plane (π) passing through the centreline of said backrest (4), said minimum angle (α_2) being comprised between 35° and 45° and said maximum angle (α_3) being comprised between 50° and 65°.
3. Chair as claimed in claim 1, **characterised in that** said articulated structure (21) comprises at least one pair of connection plates (26) positioned above and below said pair of horizontal surfaces (24) and rotatably connected with said base plates (22).
4. Chair as claimed in claim 3, **characterised in that** said connection means (23) are through screws (27) engageable in suitable threaded holes (28) obtained

in said base plates (22) and connection plates (26), said through screws (27) being mounted with a force of at least 3Nm.

5. Chair as claimed in claim 3, **characterised in that** said articulated structure (21), in correspondence of said connection means (23), comprises cup springs (29) and suitable washers (30) interposed between said base plates (22) and connection (26) plates.
6. Chair as claimed in claim 1, **characterised in that** at least said base plates (22) are made of high-strength steel with hardness comprised between 350 HBW and 510 HBW.
7. Chair as claimed in claim 1, **characterised in that** said seat (3) comprises a first (11) and a second substantially flat members (12), said first member (11) being integrally joined to said support frame (6) and said second member (12) being superimposed with said first member (11).
8. Chair as claimed in claim 7, **characterised in that** said first (11) and second flat members (12) are mutually hinged at their first end portion (11', 12') distal from said backrest (4) so as to allow said second member (12) to incline in a substantially vertical direction, said first (11) and second flat members (12) being mutually connected at their second end portion (11'', 12'') proximal to said backrest (4) using elastic means (15).
9. Chair as claimed in claim 8, **characterised in that** said elastic means (15) comprise at least one spring which is compressed when said second end portions (11'', 12'') are spaced from each other.
10. Chair as claimed in claim 1, wherein the chair (1) is configured to allow the user to sit resting the chest on said backrest (4), **characterised in that** said backrest (4) has a shape widened at the upper portion (18') thereof distal from said seat (3) and a shape narrowed at the lower portion (18'') thereof proximal to said seat (3), said lower portion (18'') being configured to allow the user to introduce the legs.

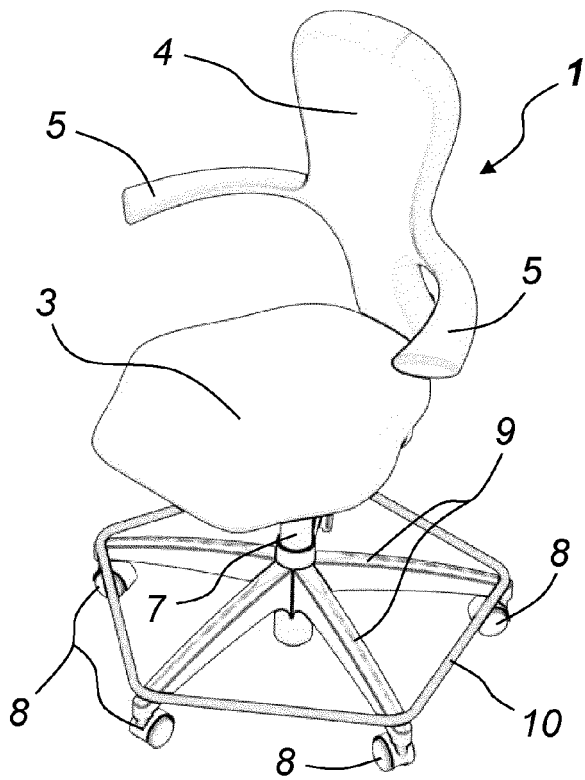


FIG. 1

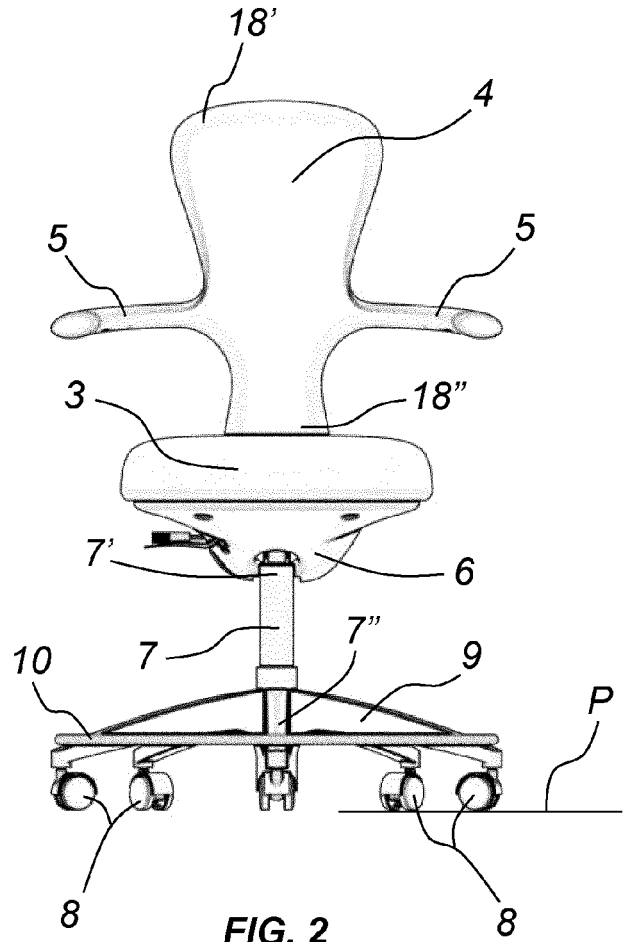


FIG. 2

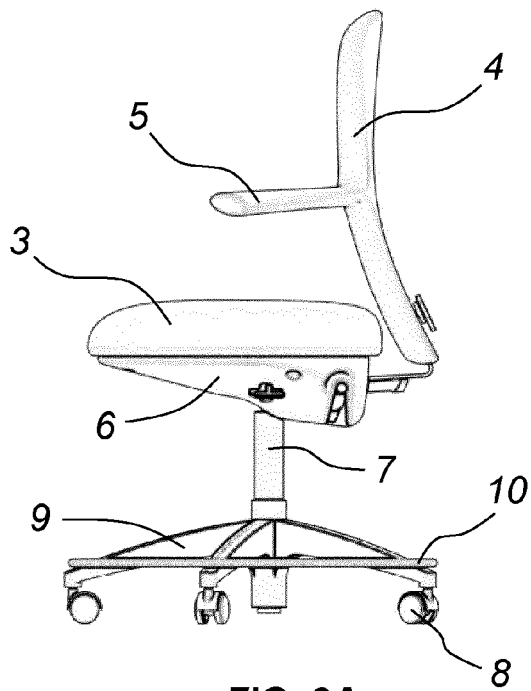


FIG. 3A

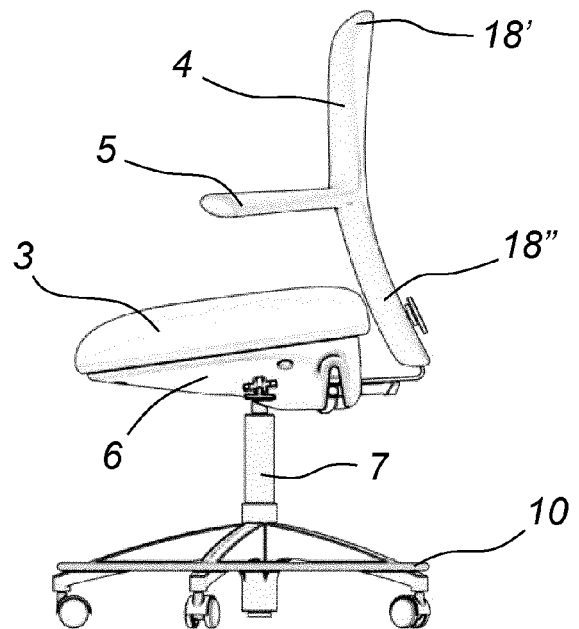


FIG. 3B

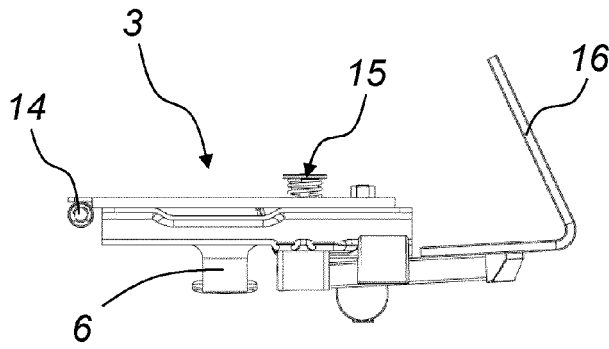


FIG. 4A

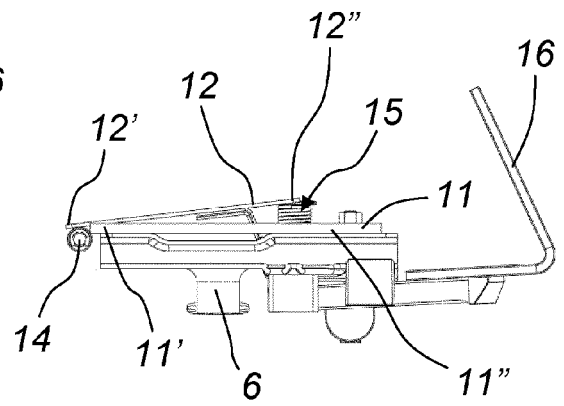


FIG. 4B

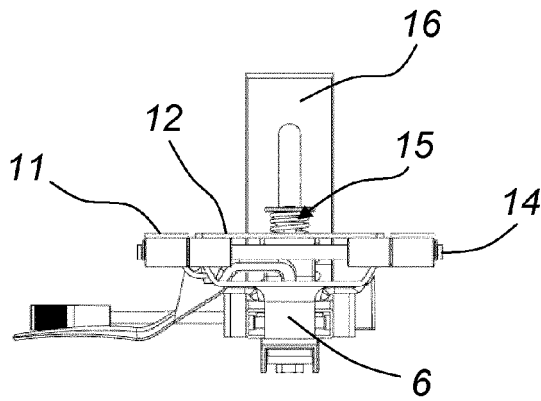


FIG. 5A

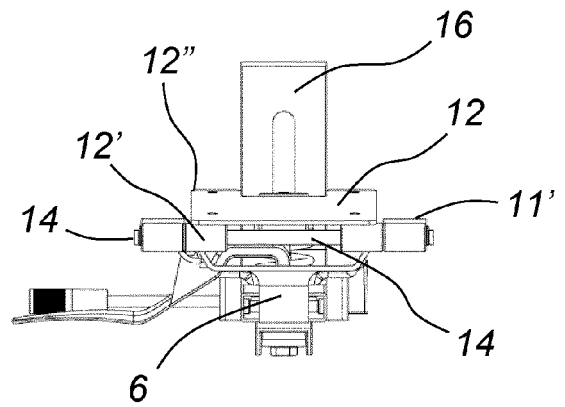


FIG. 5B

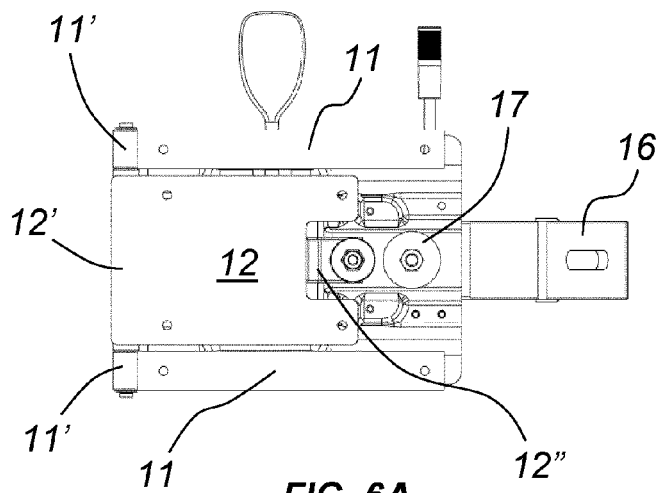


FIG. 6A

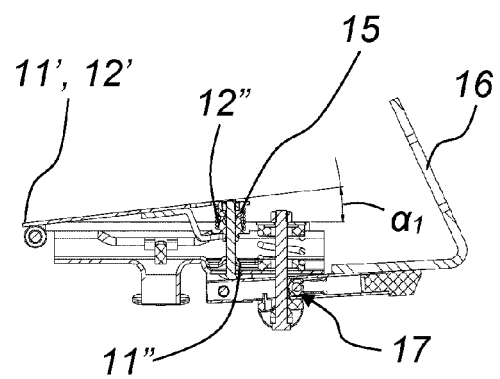


FIG. 6B

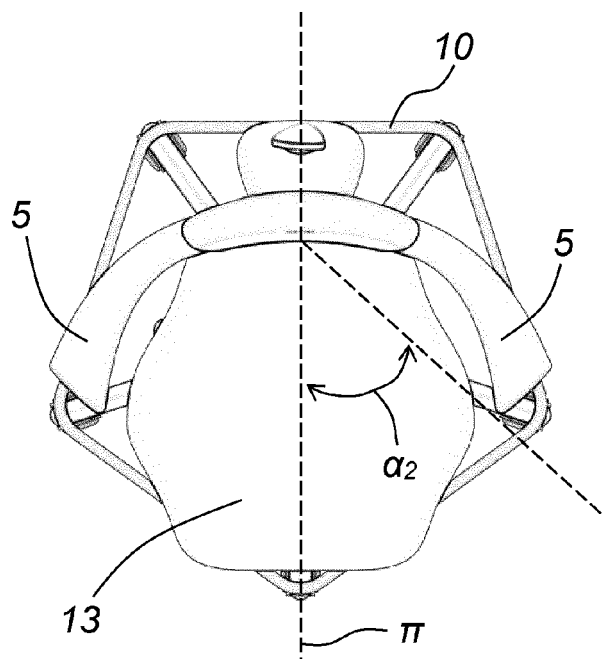


FIG. 7A

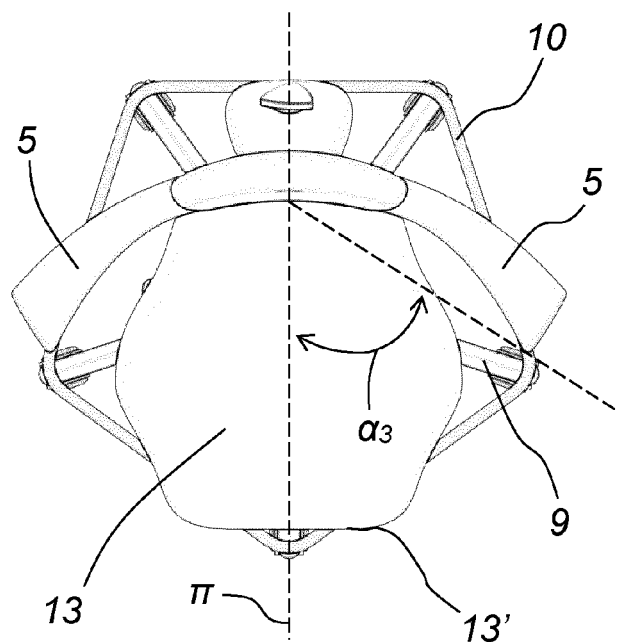


FIG. 7B

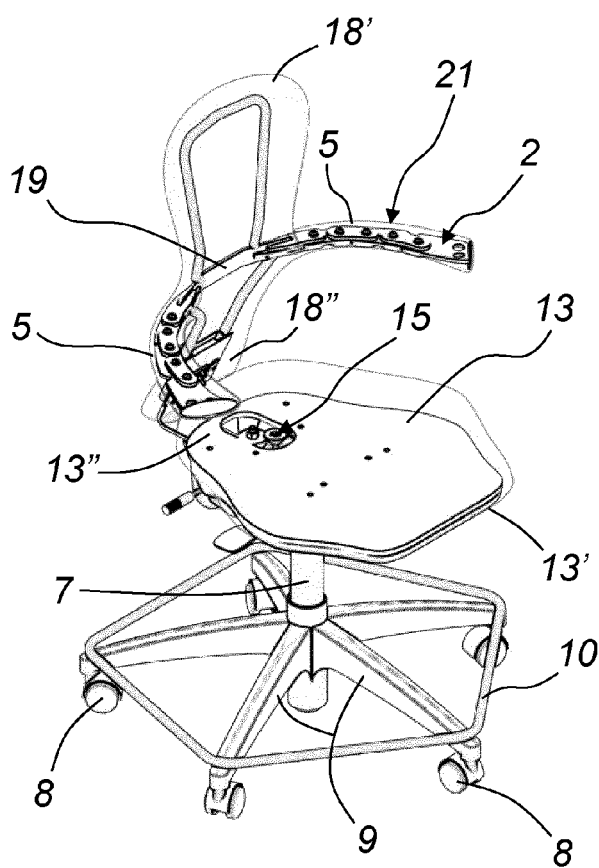


FIG. 8

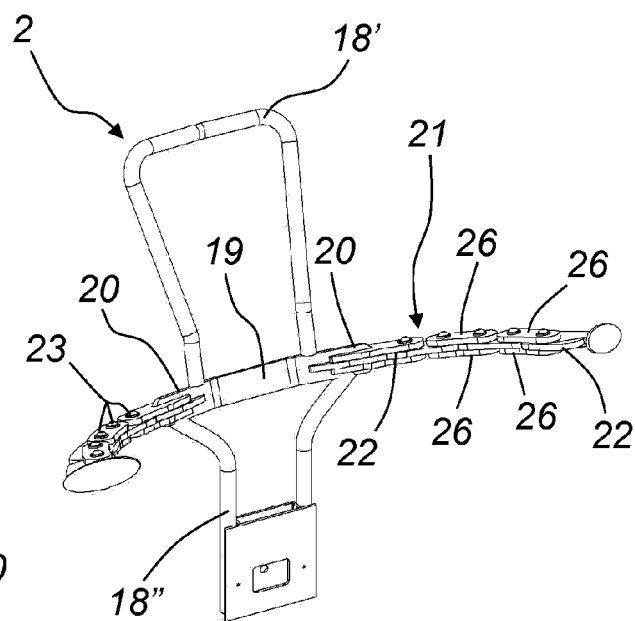


FIG. 9

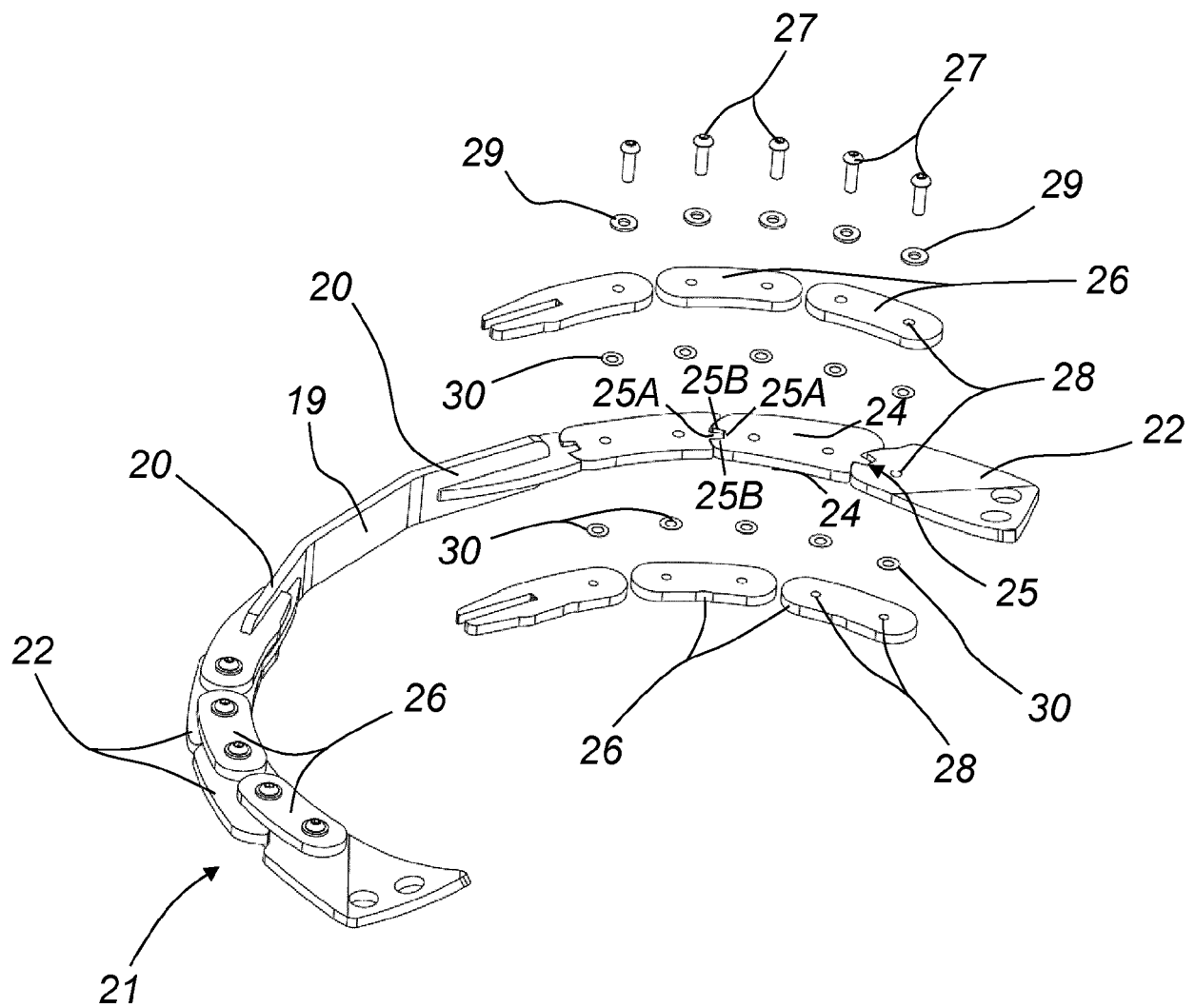


FIG. 10



EUROPEAN SEARCH REPORT

Application Number

EP 23 15 8314

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EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	KR 2019 0014681 A (UNIV KOREA RES & BUS FOUND [KR]) 13 February 2019 (2019-02-13) * paragraph [0025] - paragraph [0048]; figures 1-5 * -----	1-9	INV. A47C1/03 A47C7/00 A47C7/40 A47C9/00 A47C1/022
Y	DE 91 10 121 U1 (KEMMANN & KOCH) 26 September 1991 (1991-09-26) * page 1, paragraph 3 * * page 2, line 4 - page 6, line 5 * figures 1-4 * -----	1, 3-9	
Y	US 2010/141005 A1 (MACKERT MICHAEL [DE]) 10 June 2010 (2010-06-10) * paragraph [0021] - paragraph [0032]; figures 1-4 * -----	1-9	
			TECHNICAL FIELDS SEARCHED (IPC) A47C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 11 July 2023	Examiner Kus, Slawomir
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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ON EUROPEAN PATENT APPLICATION NO.**

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20190014681 A	13-02-2019	NONE	
DE 9110121 U1	26-09-1991	NONE	
US 2010141005 A1	10-06-2010	AT 516455 T	15-07-2011
		DE 102006058948 A1	12-06-2008
		DK 2094992 T3	24-10-2011
		EP 2094992 A1	02-09-2009
		PL 2094992 T3	30-12-2011
		US 2010141005 A1	10-06-2010
		WO 2008065008 A1	05-06-2008

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EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 0005996 A [0008]
- US 6923505 B [0011]
- KR 20190014681 [0011]
- DE 9110121 U [0015]
- US 2010141005 A [0015]