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(71) Applicant: **Sidorov, Mikhail Evgenyevich**
Nizhny Novgorod 603010 (RU)

(72) Inventor: **Sidorov, Mikhail Evgenyevich**
Nizhny Novgorod 603010 (RU)

(74) Representative: **Osmans, Voldemars et al**
Agency Tria Robit
P.O. Box 22
LV-1010 Riga (LV)

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(54) **MECHANISM FOR RAISING A FOOTREST IN A RECLINING ARMCHAIR**

(57) The invention relates to the folding armchair assembly and is used to lift the footrest from a vertical position. The technical result of the invention is an increase in the range of the technical means, development of the simple to manufacture and reliable mechanism for lifting the footrest in the folding armchair. A mechanism for lifting of the footrest in the folding armchair is proposed, which includes a fixed seat and an associated swivel footrest, including a base, the first and the second connecting elements, each of which is rigidly connected at one end

to the base, and at the other end is pivotally connected to the seat, while the connecting elements are in the shape, the base part of which is U-shaped, and in the area of connection with the seat they contain the inward elbow with the upper and lower sides, in which at least one connecting element contains the swivel joint with the pusher located in the seat, while the axis of the upper side of the elbow forms an angle with the axis of the pusher less than 180 degrees.

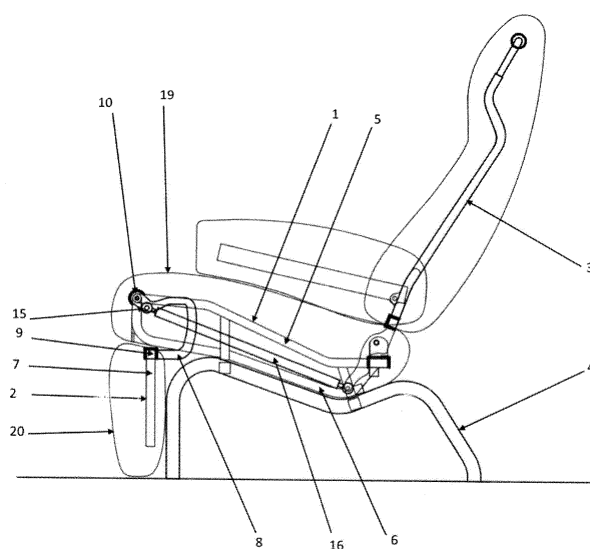


Fig. 1

Description

TECHNICAL FIELD

[0001] The invention relates to the folding armchair assembly and is used to lift the footrest from a vertical position.

BACKGROUND OF THE INVENTION

[0002] From the background of the invention the folding armchairs which can be modified from a sitting position to a lying or reclining position for sleeping are known. In this case a lifting of the footrest and a reverse tilt of the armchair back takes place. The change in the position of the armchair back may be connected with the movement of the footrest or the armchair back may change position independently of the other mechanisms.

[0003] From the background of the invention a folding armchair mechanism, international application WO2004034849, IPC A47C7/50, published on 29.04.2004 is known. The known mechanism of the folding armchair allows you to rotate and simultaneously push forward the footrest to the desired distance due to the use of the system of telescopic retractable profiled elements. The disadvantage of the known mechanism is the technological complexity of its manufacture.

[0004] From the background of the invention an armchair, patent FR2732201, IPC A47C7/50, published on 04.10.1994 is known. The known armchair contains a seat and a footrest, which are pivotally connected to each other. The footrest lifting mechanism rotates it 180 degrees so that in the folded position the footrest is horizontally under the seat and parallel to it, and in the raised position it is horizontally in front of the seat. On either side of the seat the known mechanism is equipped with two curved elements pivotally connected to each other (front and rear), one of which (front) is connected to the footrest, and the other (rear) is connected to the seat. At the same time the mechanism contains a shaft rigidly connected to the rear curved elements in the place of their connection with the footrest. In the middle part of the shaft an additional element is fixed at one end, which is identical to the rear elements and located parallel to them. At the other end the additional element is pivotally connected to the gas strut. When extended, the gas strut rotates the additional element, which in turn transmits torque to the shaft. The shaft transmits torque to the rear curved elements, which move the front curved elements. The front curved elements rotate the footrest relative to its swivel joint with the seat to the unfolded position. The disadvantage of the known device is the complexity of its manufacture, since tough requirements are imposed on the shaft rigid connections with the curved elements due to the large load that falls on them during the operation. Therefore, the known mechanism is also unreliable.

DISCLOSURE OF THE INVENTION

[0005] The technical result of the invention is an increase in the range of the technical means, development of a simple to manufacture and reliable mechanism for lifting the footrest in the folding armchair.

[0006] The technical result is achieved due to the fact that a mechanism for lifting the footrest in the folding armchair is proposed, which includes a fixed seat and an associated swivel footrest, including a base, the first and the second connecting elements, each of which is rigidly connected at one end to the base, and at the other end is pivotally connected to the seat, while the connecting elements are in the form, the base part of which is U-shaped, and in the area of connection with the seat they contain the inward elbow with the upper and lower sides, in which at least one connecting element contains the swivel joint with the pusher located in the seat, while the axis of the upper side of the elbow forms an angle with the axis of the pusher less than 180 degrees.

[0007] The proposed invention is illustrated with the graphic material.

[0008] In Fig. 1 the folding armchair with the footrest in the folded (upright) position is shown.

[0009] In Fig. 2 the folding armchair with the footrest in the raised position is shown.

[0010] In Fig. 3 the connecting element is shown.

[0011] In Fig. 4 the connecting element and the pusher in the folded position of the footrest are schematically shown.

[0012] In Fig. 5 the exterior of the folding armchair with the footrest in the folded position is shown.

[0013] In Fig. 6 the exterior of the folding armchair with the footrest in the raised position is shown.

[0014] The armchair contains fixed seat 1, footrest 2, armchair back 3 and armchair legs 4. Seat 1 is a frame that includes upper part 5 and lower part 6. Footrest 2 includes base 7 and first and second connecting elements 8, one on each side of seat 1. In Fig 1, 2, 5, 6 the first connecting element is shown. First connecting element 8 at one end is rigidly connected to base 7 at point 9, and the other end is pivotally connected to seat 1 at point 10. Therefore, point 10 is the pivot point of footrest 2. The second connecting element (not shown in the figure) is located on the other side of the armchair and, like the first one, is rigidly connected to base 7 at one end, and is pivotally connected to seat 1 at the other end. The first and the second connecting elements are in the form, the base part of which is U-shaped and contains front side flange 11, rear side flange 12 and lower flange 13 connecting them. Rear side flange 12 contains inward elbow 14. Elbow 14 has two sides -upper side 17 and lower side 18. First connecting element 8 in the area of elbow 14 is pivotally connected at point 15 to pusher 16. Upper side 17 forms a lever arm: the distance between the point 10 and point of connection 15 with pusher 16. In the folded position of footrest 2 (Fig. 4) the axis of side 17 forms the angle α with the axis of pusher 16, which is

less than 180 degrees. Pusher 16 can form a gas strut located in the seat between the upper part of frame 5 and the lower part of frame 6.

[0015] In the first version of execution the proposed mechanism is associated with the movement of the armchair back. At the same time, on the other side of the armchair second connecting element 8 at point 15 is pivotally connected by the rigid tie rod to the back of the armchair for the synchronous transformation. The above-noted rigid tie rod interacts with the lever (not shown in the figure), which allows you to lock its position. In this version of the armchair the force of the adjustable gas strut and the length of the lever arm are selected in such a way that when unlocking the rigid tie rod it helps to lift the footrest more easily and has an optimal slight resistance when folding. The weight distribution of the back and the footrest are in balance and the lifting of the footrest and the back tilt can be easily stopped in any comfortable position.

[0016] In the second version of execution the proposed mechanism is not associated with the movement of the back of the armchair. In this case the second connecting element is pivotally connected to the other independent gas strut.

[0017] Bear in mind that the axial extension or movement of pusher 16 can be provided by other actuators, for example, electrically driven ones. Seat 1 and footrest 2 have upholstery 19 and 20, respectively, which completely covers their upper portions and the butt ends. In the folded position of the footrest (Fig. 5) the elements of the proposed mechanism are completely hidden from the eyes of the consumer. In the raised position the footrest is spaced from the seat at a certain distance, which provides a comfortable position for the seated person, in which his feet with the posterior malleolar part lie on this footrest. This position is ensured due to the fact that the dimensions of the footrest and the coordinates of the location of point 10 are optimally selected: the feet of a person with a height not higher than average will be on the floor if the footrest is in the folded position, and the feet will lie on the footrest if it is in the raised position. In the raised position of the footrest only lower flange 13 of connecting element 8 is partially seen, this flange fits well into the overall design of the armchair (Fig. 6).

EMBODIMENT OF INVENTION

[0018] The proposed mechanism in the version of the armchair with the synchronous operation of the footrest and the back works as follows.

[0019] In the lowered position of footrest 2 its base 7 is located vertically. To lift footrest 2 the person sitting in the armchair forces on the lever (not shown in the figure), and the rigid tie rod moves to the released position. Further, the seated person forces on the back of the armchair, tilting it back to the comfortable position. In this case the rigid tie rod associated with the back forces on second connecting element 8 at point 15, and the gas

strut is elongated and forces on first connecting element 8, thereby facilitating the lifting of footrest 2. As a result of this action, the first and the second connecting elements rotate footrest 2 around point 10. The shape of the connecting element is due to its kinematic connection with the gas strut (pusher 16). Obviously, angle α , which is less than 180 degrees, under the elongation of the gas strut ensures rotation of the lever arm (side 17) around point 10 only clockwise. The maximum raised position of the footrest is shown in Fig. 2, 6. To lock the position of the armchair, the seated person releases the lever, and the rigid tie rod associated with the footrest and the back moves into the locked position.

[0020] In order to move the footrest to the lowered position, the seated person forces on the lever, as a result of which the rigid tie rod moves into the released position. With the effort of the legs the seated person forces on the footrest, it turns around point 10 to the upright position. In this case the rigid tie rod associated with it shifts the back to the sitting position. To lock the position of the armchair the seated person releases the lever and the rigid tie rod associated with the footrest and the back moves to the locked position.

INDUSTRIAL APPLICABILITY

[0021] The proposed mechanism is simple to manufacture and reliable in use, while its elements do not compromise the integrity of the armchair upholstery visible to the consumer.

Claims

1. lifting mechanism for the footrest of the folding armchair, which includes a fixed seat and a swivel footrest connected with it, **characterized by** the fact the footrest includes the base, the first and the second connecting elements, each of which is rigidly connected to the base at one end, and at the other end is pivotally connected to the seat, while the connecting elements have the shape, the base part of which is U-shaped and in the area of connection with the seat they contain the inward elbow with the upper and the lower sides, in which at least one connecting element contains the swivel joint with the pusher located in the seat, while the axis of the upper side of the elbow forms an angle with the axis of the pusher less than 180 degrees.

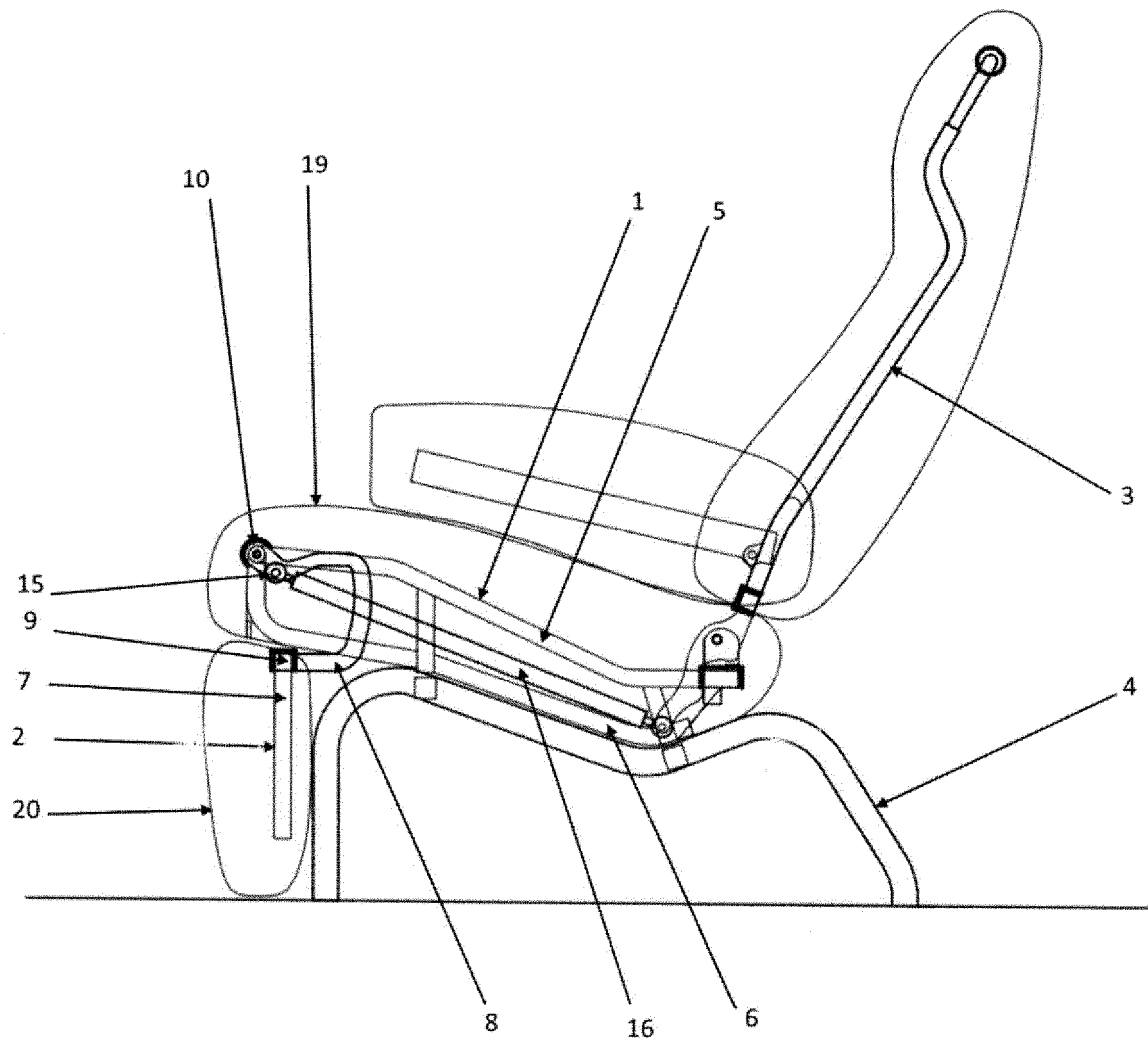


Fig. 1

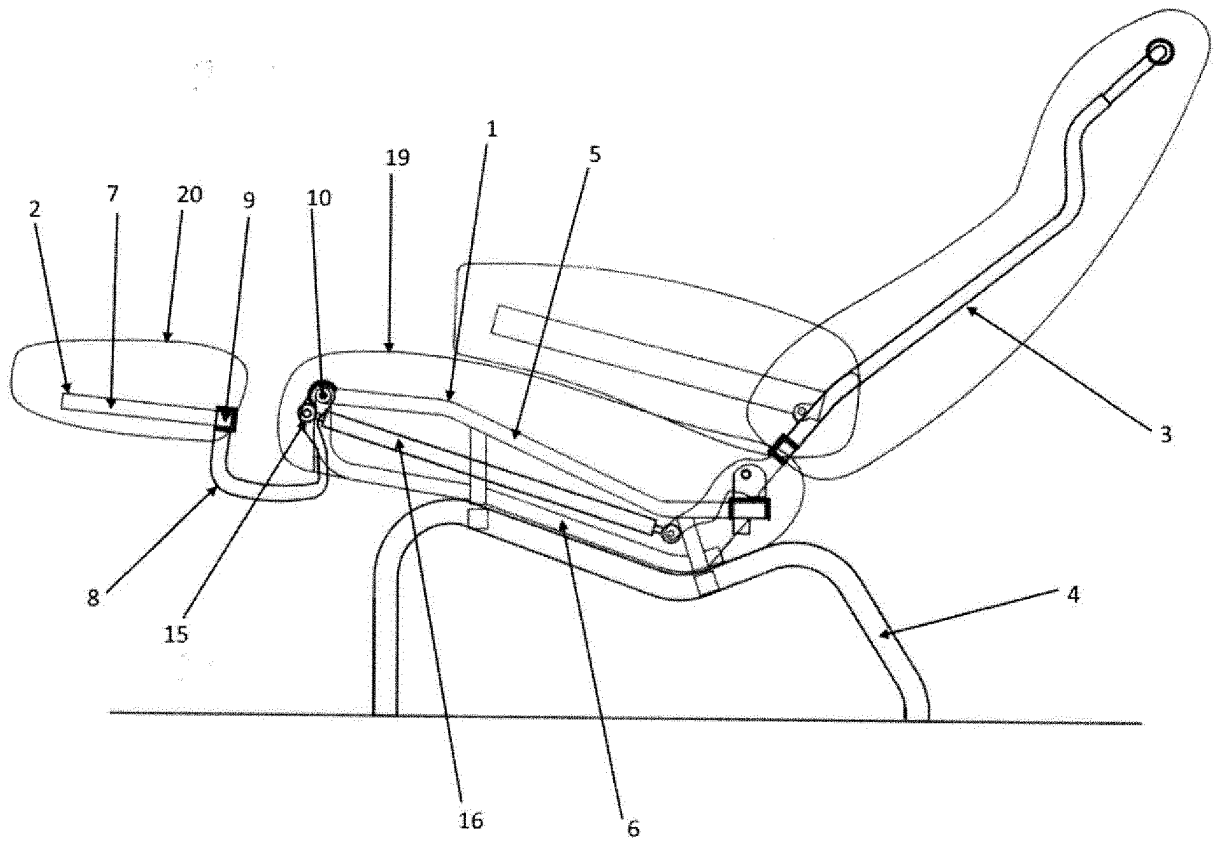


Fig. 2

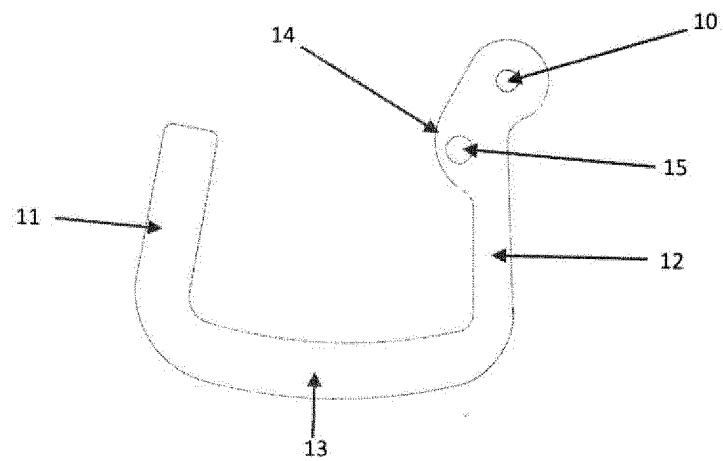


Fig. 3

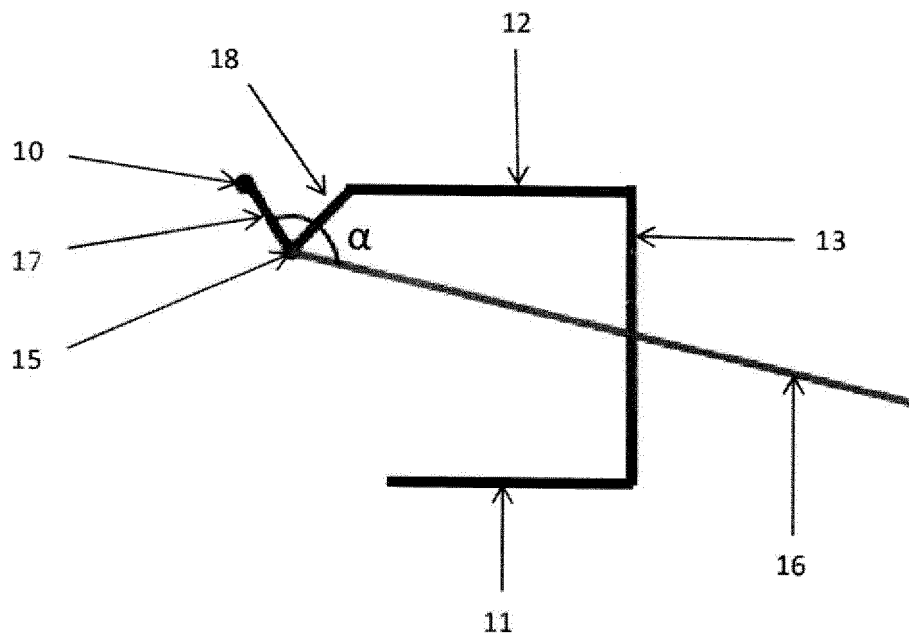


Fig. 4

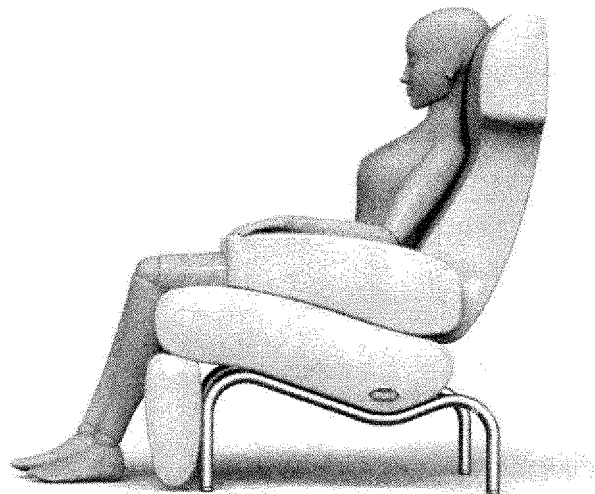


Fig. 5

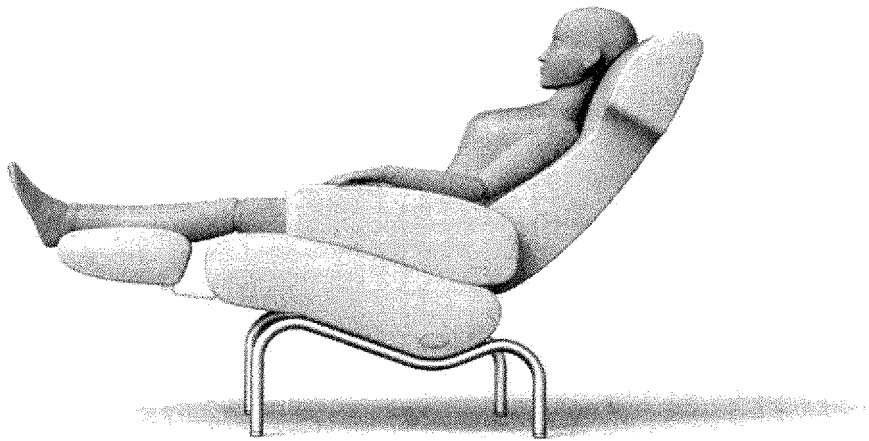


Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/RU 2019/000129

A. CLASSIFICATION OF SUBJECT MATTER

A47C 1/034 (2006.01)

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)

A47C

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 practicable, search terms used)

PatSearch (RUPTO internal), Espacenet, DWPI, PAJ, USPTO, CIPO, PubMed, MEDLINE, RMZh

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2004/034849 A1 (DE VROE NV et al.) 29.04.2004	1
A	FR 70569 E (CASAGRANDE PRIMO) 29.05.1959	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"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

05 July 2019 (05.07.2019)

Date of mailing of the international search report

01 August 2019 (01.08.2019)

Name and mailing address of the ISA/

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2004034849 A [0003]
- FR 2732201 [0004]