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(54) SOFA CHAIR FRAME WITH IMPROVED STRUCTURE

(57) The present invention discloses a sofa chair frame with an improved structure, comprising an underframe structure, a leg structure, a back structure and an activating device, also comprising an linkage mechanism, two ends of which are respectively connected to the leg structure and the back structure; the linkage mechanism comprises a rotating rod (51) of the leg, an linkage rod (52), a rotating rod (53) of the back and a swinging rod (54); one end of the rotating rod (51) of the leg is connected to the leg structure, and the other end of the rotating rod (51) of the leg is connected to the linkage rod (52); one end of the rotating rod (53) of the back is connected to the back structure, and the other end of the rotating rod (53) of the back is connected to the swinging rod (54); and one end of the linkage rod (52) is connected to the swinging rod (54) by a rotating shaft (55), and the other end of the linkage rod (52) is connected to the swinging rod (54) by a connecting rod structure (56). With the linkage rod of the present invention, just by providing a rotating shaft at one end to be connected to the swinging rod, adjustment between the linkage mechanism and the leg structure and back structure can be achieved. The present invention is simple in structure, convenient in assembly, and effective in simplifying the process flow and saving the raw material, thus greatly reducing the production cost.

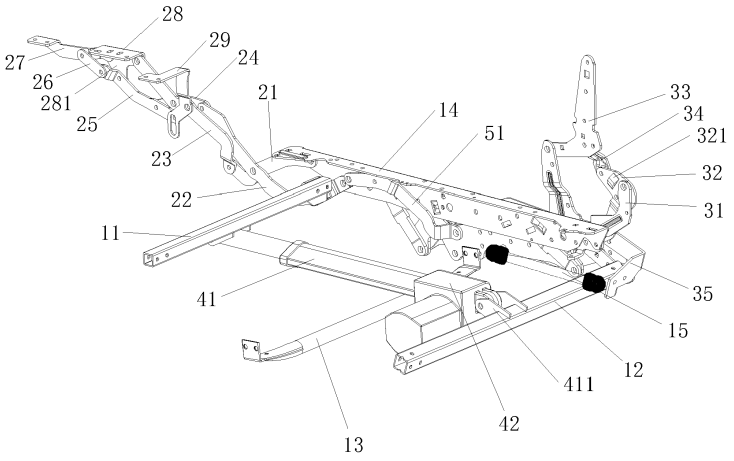

FIG. 1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the technical field of a framework of a sofa chair, and in particular to a sofa chair frame with an improved structure.

BACKGROUND ART

[0002] Currently, sofa is applicable to various aspects of life, for example, offices, living rooms, bedrooms, outdoors and the like. With economic development, a wider variety of furniture are used in daily life, and the requirements on the functions of furniture are higher. For example, sofas such as lifting sofas, rotatable sofas, leisure sofa chairs suitable for the elder are much more popular due to the diverse functions, convenient use, comfortable and healthy property thereof. Those different sofas mentioned above can function as traditional sofas, and also, they can be flexibly adjusted according to a user's requirements of usage so as to meet a user's different requirements of usage.

[0003] For most sofa underframes of the existing sofas, an interior transmission mechanism and a supporting mechanism serve as the framework. The transmission mechanism and the supporting mechanism are adjusted to put a sofa in different states, so as to adjust different functions of the sofa. The more functions a sofa has, the higher the requirements on reliability of the transmission mechanism and the supporting mechanism are. In order to achieve more functions and meet the requirements on reliability, the existing sofa underframes are complicated in the structure of the interior mechanism, complex in the assembly process, and high in cost. Particularly for a sofa having a leg and a back which can be stretched simultaneously, mechanisms for the leg and the back are mainly to be adjusted to allow for lying and assisting in standing. For this purpose, the leg and the back are to be stretched and retracted. The existing sofa chair frames having a leg and a back which can be stretched simultaneously have relatively complicated interior transmission mechanisms and supporting mechanisms. Besides, the interior mechanism mentioned above is generally exposed outside, which influences the overall shape and shortens the service life of the sofa. Thus, the user experience is greatly degraded.

[0004] Thus, it is necessary to provide a sofa chair frame with an improved structure to overcome the problem mentioned above.

SUMMARY

[0005] An objective of the present invention is to provide, with regard to defects in the prior art, a sofa chair frame with an improved structure.

[0006] To achieve the above objective, the present invention employs the following technical solutions.

[0007] A sofa chair frame with an improved structure is provided, including an underframe structure, a leg structure, a back structure and an activating device; the leg structure and the back structure are respectively connected to the underframe structure; and the activating devices are respectively in an activating connection with the leg structure and the back structure. The sofa chair frame with an improved structure also includes a linkage mechanism, two ends of which are respectively connected to the leg structure and the back structure. The linkage mechanism includes a rotating rod of a leg, a linkage rod, a rotating rod of a back and a swinging rod. One end of the rotating rod of the leg is connected to the leg structure, and the other end of the rotating rod of the leg is connected to the linkage rod. One end of the rotating rod of the back is connected to the back structure, and the other end of the rotating rod of the back is connected to the swinging rod. The swinging rod is provided on an outer side of the linkage rod; one end of the linkage rod is connected to the swinging rod by a rotating shaft, and the other end of the linkage rod is connected to the swinging rod by a connecting rod structure. Two ends of the linkage rod are connected to the underframe structure.

[0008] Wherein, the leg structure includes: a back rod of the leg, one end of which is connected to the underframe structure; a support rod of the leg, one end of which is connected to the rotating rod of the leg; a stretchable rod of the leg, one end of which is connected to the other end of the back rod of the leg; a transmission rod of the leg, one end of which is connected to the other end of the support rod of the leg; and a connection rod of the leg, one end of which is connected to the other end of the transmission rod of the leg; a locking rod of the leg and a front rod of the leg, one end of the locking rod of the leg being connected to the other end of the connection rod of the leg, the other end of the locking rod of the leg being connected to the front rod of the leg. The sofa chair with an improved structure also includes: a brace of the leg, a lug being provided on the brace of the leg, two ends of the lug being respectively connected to the other end of the stretchable rod of the leg and the front rod of the leg; and after components of the leg structure are collapsed, the components are in a folded state and located beneath the underframe structure.

[0009] Further, the leg structure also includes an intermediate fixing rack of the leg, which is located in the intermediate of the stretchable rod of the leg and connected to the stretchable rod of the leg.

[0010] Wherein the back structure includes: a fixing rack of the back mounted on the underframe structure; a rotating rack of the back, one end of which is connected to the fixing rack of the back and the other end of which is connected to the rotating rod of the back; a supporting frame of the back, including a back rod and a leaning rod which are integrated, one end of the back rod being connected to the fixing rack of the back, the other end of the back rod being connected to the rotating rack of the back by a joint.

[0011] Further, the structure of the back also includes a mounting rack of the back, one end of which is connected to the swinging rod and the other end of which is connected to the underframe structure.

[0012] Further, a stopping bump is provided at an end of the rotating rack of the back close to the joint; and the stopping bump is located inside the connection portion between the fixing rack of the back and the rotating rack of the back.

[0013] Wherein, the underframe structure includes a front beam connected to the leg structure; a back beam connected to the back structure; an intermediate frame connected to the linkage rod; and a seat mounting rack, two ends of which are connected to the leg structure and the back structure, respectively.

[0014] Preferably, the seat mounting rack is a bent sheet metal part and has a "¬ "-shaped cross section.

[0015] Wherein, the activating device includes an activating stretchable rod, two ends of which are connected to the front beam and the back beam respectively by a fixing lug; an activating motor mounted to the activating stretchable rod, the activating motor being in an activating connection with the activating stretchable rod; and the activating device is located above the underframe structure.

[0016] Further, the underframe structure also includes: a tension spring, one end of which is connected to the back beam and the other end of which is connected to a positioning column protruded from the linkage rod.

[0017] The present invention has the following advantageous effects.

[0018] In the present invention, power is provided by an activating device; a leg structure and a back structure are driven by a linkage mechanism, and in this way, the leg structure and the back structure can be retracted and stretched; with the linkage rod of the present invention, by only providing a rotating shaft at one end to be connected to the swinging rod and providing a common connecting rod structure to be connected to the swinging rod, power can be transmitted between the leg structure and the back structure. That is, adjustment between the linkage mechanism and the leg structure as well as back structure can be achieved. The linkage mechanism is simple in structure, convenient in assembly, and effective in simplifying the process flow and saving the raw material, thus greatly reducing the production cost.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Fig. 1 is a schematic structure diagram of the present invention when stretched;

Fig. 2 is a schematic structure diagram of the present invention when retracted;

Fig. 3 is a schematic structure diagram of the present invention when retracted, from another view; and

Fig. 4 is a schematic structure diagram of an linkage mechanism of the present invention,

in which:

11: front beam;
12: back beam;
13: intermediate frame;
14: seat mounting rack;
15: tension spring;
21: back rod of the leg;
22: support rod of the leg;
23: stretchable rod of the leg;
24: transmission rod of the leg;
25: linking rod of the leg;
26: locking rod of the leg;
27: front rod of the leg;
28: brace of the leg;
29: intermediate fixing rack of the leg;
281: lug;
31: fixing rack of the back;
32: rotating rack of the back;
33: support rack of the back;
331: back rod;
332: leaning rod;
34: joint;
35: mounting rack of the back;
321: stopping bump;
41: activating stretchable rod;
42: activating motor;
411: fixing lug;
51: rotating rod of the leg;
52: linkage rod;
53: rotating rod of the back;
54: swinging rod;
55: rotating shaft;
56: connecting rod structure;
521: positioning column.

DETAILED DESCRIPTION

[0020] The present invention will be further described in detail with reference to the accompanying drawings.

[0021] As shown in Figs. 1 to 4, a sofa chair frame with an improved structure of the present invention is provided, including an underframe structure, a leg structure, a back structure and an activating device; the leg structure and the back structure are respectively connected to the underframe structure; and the activating devices are respectively in an activating connection with the leg structure and the back structure. The sofa chair frame with an improved structure also includes a linkage mechanism, two ends of which are respectively connected to the leg structure and the back structure. The linkage mechanism includes a rotating rod of the leg 51, a linkage rod 52, a rotating rod of the back 53 and a swinging rod 54. One end of the rotating rod of the leg 51 is connected to the leg structure, and the other end of the rotating rod of the leg 51 is connected to the linkage rod 52. One end of the

rotating rod of the back 53 is connected to the back structure, and the other end of the rotating rod of the back 53 is connected to the swinging rod 54. The swinging rod 54 is provided on an outer side of the linkage rod 52; one end of the linkage rod 52 is connected to the swinging rod 54 by a rotating shaft 55, and the other end of the linkage rod 52 is connected to the swinging rod 54 by a connecting rod structure 56. Two ends of the linkage rod 52 are connected to the underframe structure.

[0022] In the present invention, power is provided by an activating device; the leg structure and the back structure are driven by an linkage mechanism, and in this way, the leg structure and the back structure can be retracted and stretched; with the linkage rod 52 of the present invention, by only providing a rotating shaft 55 at one end to be connected to the swinging rod 54 and providing a common connecting rod structure 56 at the other end to be connected to the swinging rod 54, power can be transmitted between the leg structure and the back structure. That is, adjustment between the linkage mechanism and the leg structure as well as the back structure can be achieved. Two ends of the linkage rod 52 are connected to the underframe structure to further ensure that the linkage rod 52 is stable. In this way, the linkage mechanism becomes simple in structure, convenient in assembly, and effective in simplifying the process flow and saving the raw material, thus greatly reducing the production cost.

[0023] Wherein, the leg structure includes: a back rod of the leg 21, one end of which is connected to the underframe structure; a support rod of the leg 22, one end of which is connected to the rotating rod of the leg 51; a stretchable rod of the leg 23, one end of which is connected to the other end of the back rod of the leg 21; a transmission rod of the leg 24, one end of which is connected to the other end of the support rod of the leg 22; a connection rod of the leg 25, one end of which is connected to the other end of the transmission rod of the leg 24; and a locking rod of the leg 26 and a front rod of the leg 27, one end of the locking rod of the leg 26 being connected to the other end of the connection rod of the leg 25, the other end of the locking rod of the leg 26 being connected to the front rod of the leg 27. The sofa chair frame with an improved structure also includes: a brace of the leg 28, a lug 281 being provided on the brace of the leg 28, two ends of the lug 281 being respectively connected to the other end of the stretchable rod of the leg 23 and the front rod of the leg 27. After components of the leg structure are collapsed, the components are in a folded state and located beneath the underframe structure.

[0024] The leg structure of the present invention is formed of a plurality of components which are pivoted successively. First, a pivot end is extended from the back rod of the leg 21 connected with the underframe structure, and another pivot end is extended from the support rod of the leg 22 connected with the rotating rod of the leg 51. Then, the pivot end extended from the back rod of the leg 21 is continuously connected to the stretchable rod of the leg 23, and the another pivot end extended from the support rod of the leg 22 is continuously connected to the transmission rod of the leg 24, the connection rod of the leg 25, the locking rod of the leg 26 and the front rod of the leg 27. In addition, a brace of the leg 28 is provided at the two pivot ends near the front rod of the leg 27, and the brace of the leg 28 is respectively pivoted to the two pivot ends, so that the whole leg structure is stretched and retracted. Since a plurality of components are successively extended forward by two pivot ends, the leg can be unfolded when the leg structure is stretched; and when the leg structure is retracted, the leg can be folded successively, so that a thin assembly can be formed after the leg structure is retracted and then stored beneath the underframe structure without occupying the space between the underframe structure and the ground. Such a compact structure can effectively save space, further provide the sofa chair frame with good breathability and ventilation after the sofa chair frame is assembled into a sofa, and reduce dust. The structure is not only elegant in appearance, but also can prolong the service life of the leg structure.

[0025] Further, the leg structure also includes an intermediate fixing rack of the leg 29, which is located in the intermediate of the stretchable rod of the leg 23 and connected to the stretchable rod of the leg 23.In the present invention, an intermediate fixing rack of the leg 29 is provided in the intermediate portion of the leg structure when stretched, i.e., at the stretchable rod of the leg 23 of the present invention. After the leg structure is stretched, the leg structure can be provided with high load-bearing capability, and the comfort in use can be effectively improved.

[0026] Wherein, the back structure includes: a fixing rack of the back 31 mounted on the underframe structure; a rotating rack of the back 32, one end of which is connected to the fixing rack of the back 31 and the other end of which is connected to the rotating rod of the back 53; a supporting frame of the back 33, including a back rod 331 and a leaning rod 332 which are integrated, one end of the back rod 331 being connected to the fixing rack of the back 31, the other end of the back rod 331 being connected to the rotating rack of the back 32 by a joint 34.

[0027] In the present invention, the back structure is mounted on the underframe structure by the fixing rack of the back 31. First, stability of a back rest is achieved. Then, two pivot ends are extended from the two ends of the fixing rack of the back 31. The two pivot ends form a retractable enclosed structure by means of the support rack of the back 33, the joint 34 and the rotating rack of the back 32. In this way, for the back structure, the angle of the back can also be adjusted according to a user's requirements, thus manifesting the multi-functionality of the present invention.

[0028] Further, the back structure also includes a mounting rack of the back 35, one end of which is connected to the swinging rod 54 and the other end of which

is connected to the underframe structure. The back structure of the present invention is further mounted between the swinging rod 54 and the underframe structure in the form of a mounting rack of the back 35, so that the angle of the back structure is adjusted within a certain range. In this way, the adjustment of the back structure is safer.

[0029] Still further, a stopping bump 321 is provided at an end of the rotating rack of the back 32 close to the joint 34; and the stopping bump 321 is located inside the connection portion between the fixing rack of the back 31 and the rotating rack of the back 32.In the present invention, by providing a stopping bump 321 on the rotating rack of the back 32, the support rack of the back 33 is prevented from being over inclined. Being over inclined can cause discomfort to users, especially to the elder. In this way, the sofa chair frame of the present invention is further safer and more comfortable.

[0030] Wherein, the underframe structure includes a front beam 11 connected to the leg structure; a back beam 12 connected to the back structure; an intermediate frame 13 connected to the linkage rod 52; and a seat mounting rack 14, two ends of which are connected to the leg structure and the back structure, respectively. In the present invention, the underframe structure mainly consists of the front beam 11, the back beam 12, the intermediate frame 13 and the seat mounting rack 14. The underframe structure is mainly used to bear the major sofa structure. Further, the underframe structure also includes: a tension spring 15, one end of which is connected to the back beam 12 and the other end of which is connected to the positioning column 521 protruded from the linkage rod 52. Since the tension spring 15 is elastic, tension between the linkage rod 52 and the underframe structure can be strengthened. In addition, the structure is easy to restore to the original position, and thus highly practicable.

[0031] As a preferred implementation, the seat mounting rack 14 is a bent sheet metal part with a "┐"-shaped cross section. In the present invention, the seat mounting rack 14 is set as a structure of a bent sheet metal part, so that a plane thereof for bearing the major sofa structure is increased, that is, a plane of the seat mounting rack 14 facing upward is increased. In the prior art, structurally, the seat mounting racks 14 are almost single sheet metal parts or have a narrow plane facing upward. Thus, the present invention can provide better balance when bearing the major sofa structure, and can facilitate mounting of the major sofa structure. In this way, the practicability of the sofa chair frame of the present invention is further enhanced.

[0032] In the present invention, the activating device includes an activating stretching rod 41, two ends of which are connected to the front beam 11 and the back beam 12 by the fixing lug 411; and the activating motor 42 which is mounted on the activating stretchable rod 41 and in an activation connection with the activating stretchable rod 41. The activating device is located above the underframe structure and provides activating force by the activating motor 42. The stretch amount of the activating stretchable rod 41 is adjusted according to the unfolding extent of the leg structure and the back structure. In this way, the whole leg structure and the back structure are effectively driven.

[0033] In the present invention, pivot members are provided at all pivot positions of the components, for realizing connections between the components, and will not be enumerated. This is well known to those skilled in the art.

[0034] The foregoing descriptions are merely preferred embodiments of the present invention. For a person of ordinary skill in the art, on the basis of the concept of the present invention, changes may be made to the specific implementations and application ranges. The contents of the description shall not be regarded as forming any limitation to the present invention.

Claims

1. A sofa chair frame with an improved structure, comprising an underframe structure, a leg structure, a back structure and an activating device, the leg structure and the back structure being respectively connected to the underframe structure, the activating device being in an activating connection with the leg structure and the back structure respectively, wherein,
   the sofa chair frame also comprises: a linkage mechanism, two ends of which are respectively connected to the leg structure and the back structure;
   the linkage mechanism comprises a rotating rod (51) of a leg, a linkage rod (52), a rotating rod (53) of a back and a swinging rod (54);
   one end of the rotating rod (51) of the leg is connected to the leg structure, and the other end of the rotating rod (51) of the leg is connected to the linkage rod (52);
   one end of the rotating rod (53) of the back is connected to the back structure, and the other end of the rotating rod (53) of the back is connected to the swinging rod (54);
   the swinging rod (54) is provided on an outer side of the linkage rod (52); one end of the linkage rod (52) is connected to the swinging rod (54) by a rotating shaft (55), and the other end of the linkage rod (52) is connected to the swinging rod (54) by a connecting rod structure (56); and
   two ends of the linkage rod (52) are connected to the underframe structure.

2. The sofa chair frame with an improved structure according to claim 1, wherein the leg structure comprises: a back rod (21) of the leg, one end of which is connected to the underframe structure;
   a support rod (22) of the leg, one end of which is connected to the rotating rod (51) of the leg;
   a stretchable rod (23) of the leg, one end of which is connected to the other end of the back rod (21) of

the leg;
a transmission rod (24) of the leg, one end of which is connected to the other end of the support rod (22) of the leg;
a connection rod (25) of the leg, one end of which is connected to the other end of the transmission rod (24) of the leg; and
a locking rod (26) of the leg and a front rod (27) of the leg, one end of the locking rod (26) of the leg being connected to the other end of the connection rod (25) of the leg, the other end of the locking rod (26) of the leg being connected to the front rod (27) of the leg;
also comprises a brace (28) of the leg, a lug (281) being provided on the brace (28) of the leg, two ends of the lug (281) being respectively connected to the other end of the stretchable rod (23) of the leg and the front rod (27) of the leg; and
after components of the leg structure are collapsed, the components are in a folded state and located beneath the underframe structure.

3. The sofa chair frame with an improved structure according to claim 2, wherein the leg structure also comprises: an intermediate fixing rack (29) of the leg, which is located in the intermediate of the stretchable rod (23) of the leg and connected to the stretchable rod (23) of the leg.

4. The sofa chair frame with an improved structure according to claim 1, wherein the back structure comprises: a fixing rack (31) of the back mounted on the underframe structure;
a rotating rack (32) of the back, one end of which is connected to the fixing rack (31) of the back and the other end of which is connected to the rotating rod (53) of the back;
a supporting frame (33) of the back, comprising a back rod (331) and a leaning rod (332) which are integrated, one end of the back rod (331) being connected to the fixing rack (31) of the back, the other end of the back rod (331) being connected to the rotating rack (32) of the back by a joint (34).

5. The sofa chair frame with an improved structure according to claim 4, wherein the back structure also comprises: a mounting rack (35) of the back, one end of which is connected to the swinging rod (54) and the other end of which is connected to the underframe structure.

6. The sofa chair frame with an improved structure according to claim 4, wherein a stopping bump (321) is provided at an end of the rotating rack (32) of the back close to the joint (34); and the stopping bump (321) is located inside the connection portion between the fixing rack (31) of the back and the rotating rack (32) of the back.

7. The sofa chair with an improved structure according to claim 1, wherein the underframe structure comprises a front beam (11) connected to the leg structure;
a back beam (12) connected to the back structure;
an intermediate frame (13) connected to the linkage rod; and
a seat mounting rack (14), two ends of which are connected to the leg structure and the back structure, respectively.

8. The sofa chair frame with an improved structure according to claim 7, wherein the seat mounting rack (14) is a bent sheet metal part and has a "¬ "-shaped cross section.

9. The sofa chair frame with an improved structure according to claim 7, wherein the activating device comprises an activating stretchable rod (41), two ends of which are connected to the front beam (11) and the back beam (12) respectively by a fixing lug (411);
an activating motor (42) mounted to the activating stretchable rod (41), the activating motor (42) being in an activating connection with the activating stretchable rod (41); and
the activating device is located above the underframe structure.

10. The sofa chair frame with an improved structure according to claim 7, wherein the underframe structure also comprises: a tension spring (15), one end of which is connected to the back beam (12) and the other end of which is connected to a positioning column (521) protruded from the linkage rod (52).

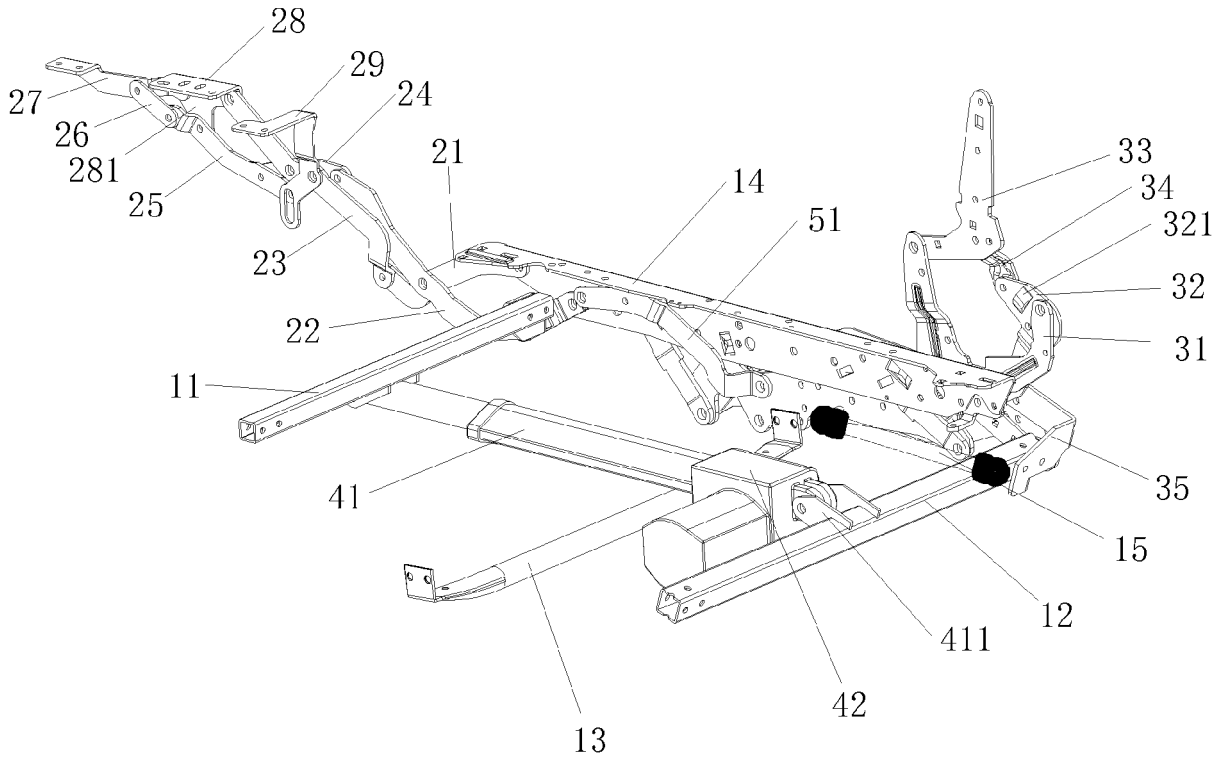
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FIG. 1

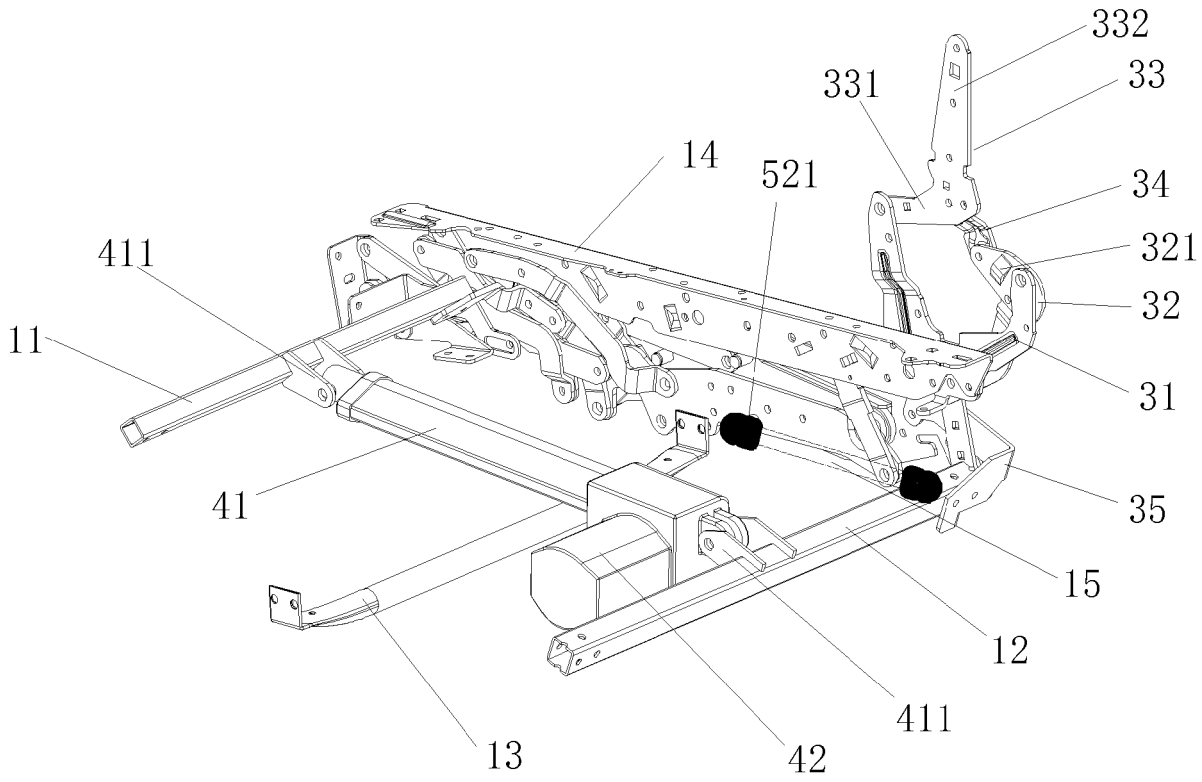

FIG. 2

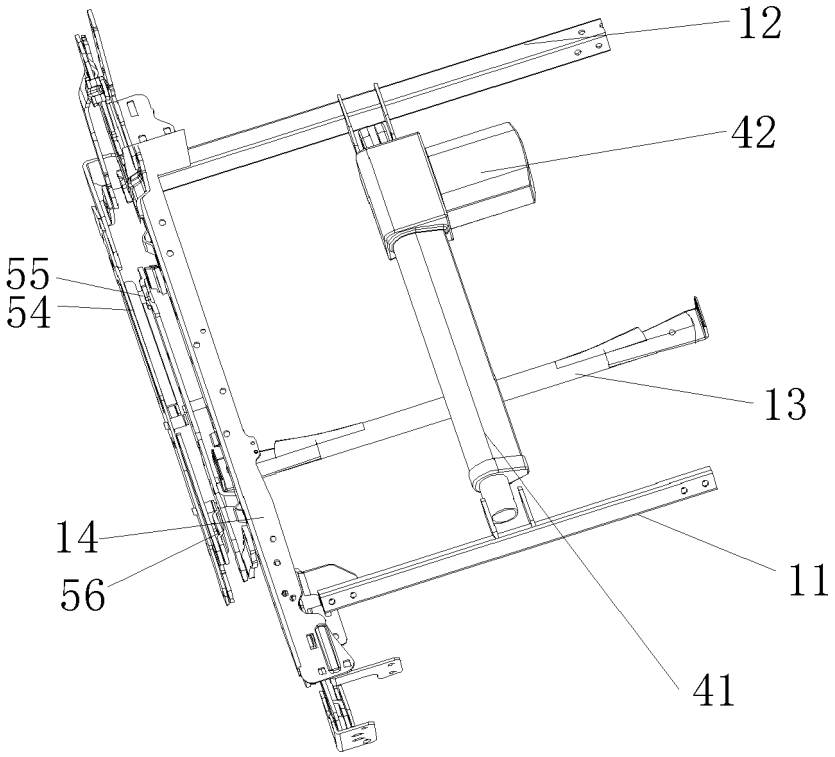

FIG. 3

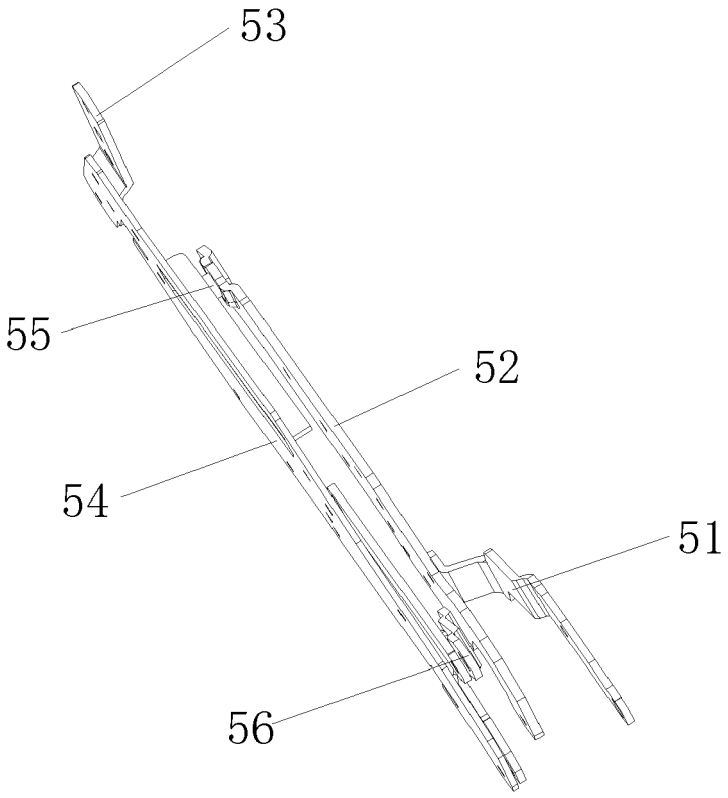

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 16 18 4876

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 31 01 329 A1 (HIMOLLA HIERL GMBH C [DE]) 2 September 1982 (1982-09-02)	1	INV. A47C1/0355
Y	* page 7, line 12 - page 9, line 25;	7-10	
A	figures 1-4 *	2-6	

X	WO 2015/066943 A1 (JIANGSU SHUYIDA MACHINERY CO LTD [CN]) 14 May 2015 (2015-05-14)	1	
Y	* the whole document *	7-10	

X	US 3 137 521 A (RE FRANK M) 16 June 1964 (1964-06-16)	1	
	* column 1, line 43 - column 5, line 63; figures 1-4 *		

TECHNICAL FIELDS SEARCHED (IPC)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 August 2017	Lehe, Jörn

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 18 4876

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82