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(54) Sliding mechanism for moving a movable furniture member with respect to a base framing furniture member.

(57) Sliding mechanism for moving a movable furniture member (8) with respect to a base framing furniture member (3), for instance a displacement of a seat framing (8) with respect to a seat base framing (3) in a seating construction wherein the seat framing is pivotally connected with the backrest (6). The displacement of the seating framing is performed by a motor driven operating tube (11) which is slidable within a guiding tube (14) which is rigidly connected to the base framing. The operating tube (11) has such a less diameter than the guiding tube (14) that a tubular space (16) is formed therebetween in which are provided two load carrying guiding bushings (17, 19), one (17) of which being rigidly connected with the guiding tube, and the other (19) being rigidly connected with the operating tube. The movement of the operating tube (11) is achieved by a motor driven conveyor screw (20) which extends through the second guiding bushing (19).

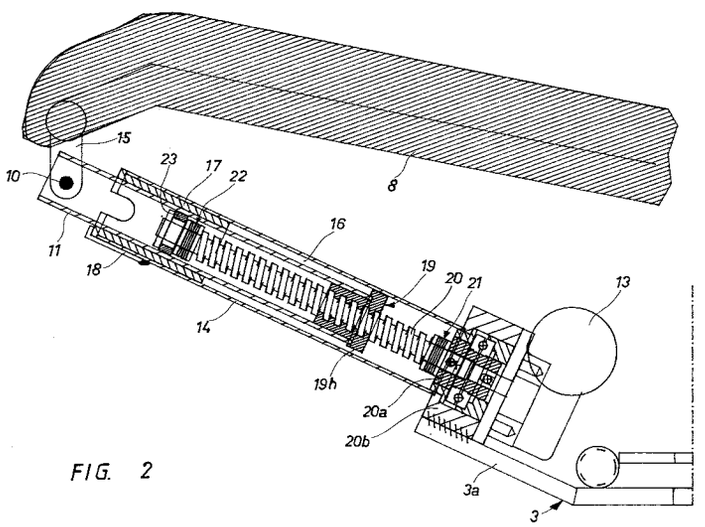

FIG. 2

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FIELD OF THE INVENTION

The present invention relates to a sliding mechanism for moving a movable furniture member with respect to a base framing furniture member, the sliding mechanism having a slide member, one end of which is connected with the movable furniture member, the slide member being longitudinally displaceable in a telescopic manner within a guiding tube which is connected with the base framing furniture member.

The invention is applicable for all kinds of furniture. The movable furniture member may, for instance, be a displaceable seat, a tiltable bed portion or a displaceable or pivotable table member.

BACKGROUND ART

Such known sliding mechanisms for seat constructions are mainly of two types. The oldest is intended to be operated only by muscular strength. A desired fore movement of the seat is thereby accomplished if a seat occupant leans back such that the backrest, if pivotally connected with the base framing, will recline and force the seat to move forwardly. However, the seat occupant must possess a certain agility and technique in order to manage to reset seat and backrest to their initial positions. Also said first easy operation, i.e. the reclining of the backrest, can sometimes be difficult to perform by some people. The known mechanisms of this type are, therefore, difficult and unsuitable to be used by for instance elderly and handicapped people. Similar difficulties arise in hospital beds or the like, where it is desired to tilt a portion of the bed.

The other type of known sliding mechanisms, especially used in rest chairs, is motor driven, either by a battery motor or by a mains-operated electric motor. Because the slide member when used in rest chairs often has to work at an acute angle with respect to the horizontal there will appear such unsymmetrical stresses on the mechanism that the known sliding mechanisms have not adequate structural stability in order to carry by itself any heavier seat occupant weights. The slide of the known motor driven sliding mechanisms must, therefore, be assisted by an extra guiding slide member arranged under the central portion of the seat framing and adapted to carry the major part of stresses acting on the seat framing.

SUMMARY OF THE INVENTION

The object of the inventon is, therefore, to provide a sliding mechanism of the kind mentioned by way of introduction having a slide member which is motor driven and capable of carrying by itself the entire load from the seat framing. This object will be achieved by a sliding mechanism according to the invention having the characteristics set forth in Claim 1.

Further developments of the invention are set forth in the subclaims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in more detail by reference to the accompanying drawings which illustrate a preferred embodiment in connection with a rest chair.

Fig. 1 is a side view of a chair provided with a sliding mechanism according to the invention.

Fig. 2 is a longitudinal section of the sliding mechanism according to Fig. 1.

Fig. 3 is a longitudinal section of a guiding bushing incorporated in the sliding mechanism of Fig. 2.

Fig. 4 is an end view of the guiding bushing of Fig. 3.

PREFERRED EMBODIMENT

Fig. 1 illustrates, by way of example, a chair in the shape of an armchair with foot 1, leg 2 and a base framing 3. Each side of the armchair has an armrest frame 4, one of which is shown, the two armrests being rigidly connected with the base framing 3 by for instance a screw connection 5. At each side of a backrest 6 is provided a pivot pin connection means 7 for pivotally suspending the backrest in the upper aft portion of a respective one of the armrests 4.

A seat framing 8 has its aft end pivotally connected with the lower portion of backrest 6 via a pivot pin 9. The fore portion of seat framing 8 is, via a pivot pin 10, pivotally connected with a metallic slide member 11 which is, by means of an electric motor 13, powered by a battery 12, movable in a telescopic manner into and out of a metallic guiding tube 14, which is, for instance by welding, rigidly connected with base framing 3, in order to effect a movement which conveys seat framing 8 forwardly or backwardly when at the same time forcing backrest 6 to increase or decrease, respectively, its recline angle.

Slide member 11 and its guiding tube 14 are orientated in acute angle with respect to the horizontal, and are disposed under the central portion of seat framing 8, as seen in its lateral direction, in order to manage to carry by itself the load of seat framing 8. Slide member 11, battery 12, electric motor 13 and guiding tube 14 constitute parts of the sliding mechanism according to the invention, a section of which is shown in more detail in Fig. 2.

Fig. 2 illustrates the sliding mechanism of Fig. 1 on an enlarged scale. Its slide member 11 is, via pivot pin 10, pivotally mounted in two brackets 15, which are rigidly fastened to seat framing 8, and consists of a cylindrical tube, below referred to as operating tube, which has such less diameter than guiding tube 14 that a tubular space 16 is formed between operating tube 11 and guiding tube 14. The tubular space 16 is filled, along a predetermined distance from the open end of guiding tube 14 that faces the seat framing 8, by a first tubular load carrying guiding bushing 17, which is fastened to the inner wall of guiding tube 14 by means of for instance a glue or a friction joint. Guiding bushing 17 is coaxially disposed within guiding tube 14, such that its inner wall forms a cylindrical sliding surface for operating tube 11. The fastening of guiding bushing 17 to guiding tube 14 is enhanced by means of a locking heel 18, only schematically shown. Guiding bushing 17 is suitably manufactured of hard plastic, for instance HD polythene.

The other end of tubular space 16 is filled, along a predetermined distance, by a second tubular load carrying guiding bushing 19 disposed coaxially around operating tube 11. Guiding bushing 19 is movable with respect to guiding tube 14, but rigidly connected with the inner end of operating tube 11, and it has a cylindrical outer surface (19g, see Figs. 3-4) which forms a cylindrical-sliding surface against the inner wall of guiding tube 14. Second guiding bushing 19 is suitably manufactured of hard plastic, for instance the nylon material Andramid®. Guiding bushing 19 will be described in further detail in connection with Fig. 3 and 4.

Second guiding bushing 19 has a screw threaded bore 19a, see Fig. 4, extending coaxially with respect to operating tube 14, for effecting a screw thread connection with a conveyor screw 20, see Fig. 2. The rotation of screw 20 with respect to second guiding bushing 19 and the resulting movement of screw 20 through guiding bushing 19 will cause operating tube 11 to move out of guiding tube 14 while at the same time conveying seat framing 8, such that this will move forwardly and thus force backrest 6 to recline. In the position shown in Fig. 2, operating tube 11 has moved a small distance out of guiding tube 14.

The screw 20 is mounted in a rotary element 20a which, in a way not shown, is driven by motor 13. Rotary element 20a is journalled in a metallic sleeve 20b which is rigidly connected with guiding tube 14, and rigidly connected, for instance by means of welding, with a supporting plate 3a incorporated in base framing 3.

Conveyor screw 20 has, adjacent each one of its ends, an end positioning means 21 and 22, respectively, which, in a known way, consist of a number of dish springs, disposed between two plates arranged coaxially with respect to screw 20, for effecting a motion attenuation. The inner end positioning means 21 restricts the inwardly movement of operating tube 11 into guiding tube 14, whereas the outer end positioning means 22 is arranged to abut against an end surface 19b, see Fig. 3, of a cylindrical portion 19c of second guiding bushing 19, which protrudes into operating tube 11 for effecting a restriction of the movement of operating tube 11 out of guiding tube 14. The outer cylindrical jacket surface 19d of the cylindrical portion 19c is adapted to be rigidly secured, for instance by means of a glue or screw connection, to the inner wall of the innermost end of operating tube 11. This securing is made structurally more stable by the insertion of the innermost end of operating tube 11 into an annular groove 19e being arranged in a flange of the cylindrical "slide" portion 19f of guiding bushing 19.

Screw 20 has, adjacent the end positioning means 22, a third cylindrical guiding bushing 23, disposed coaxially with respect to operating tube 11, the cylindrical outer jacket of the third guiding bushing forming a load carrying sliding surface against the inner wall of operating tube 11 during the movement of operating tube 11 with respect to conveyor screw 20. Also this third guiding bushing 23 is suitably made of hard plastic, for instance of the nylon material Andramid®

As is seen from Fig. 3 and 4, a portion 19h of the sliding surface 19g of second guiding bushing 19 removed, for instance by milling, in order to allow a free movement of second guiding bushing 19 in guiding tube 14 also if any unevennesses are present in the wall of guiding tube 14, which may arise for instance as a result of welding operations on the exterior surface of operating tube 14.

Claims

1. A sliding mechanism for moving a movable furniture member (8) with respect to a base framing furniture member (3), the sliding mechanism having a slide member (11), one end of which is connected with the movable furniture member, the slide member being longitudinally displaceable in a telescopic manner within a guiding tube (14) which is connected with the base framing furniture member, **characterized** in that the slide member (11) consists of a cylindrical tube, below referred to as operating tube (11), which has such a less diameter than the guiding tube (14) that a tubular space (16) is formed between the guiding tube and the operating tube, the tubular space being filled at one end, along a predetermined distance, by a cylindrical first load carrying guiding bushing (17), which is ar-

ranged to abut against the inner wall of the guiding tube, and which is disposed coaxially with respect to the guiding tube, the inner wall of the guiding bushing forming a cylindrical sliding surface against the operating tube, the other end of the tubular space (16) being filled along a predetermined distance by a second load carrying guiding bushing (19), which is rigidly connected with the other end of the operating tube, the second guiding bushing having a cylindrical outer jacket surface (19g) forming a cylindrical sliding surface against the inner wall of the guiding tube (14), the second guiding bushing (19) having a screw threaded bore (19a), orientated coaxially with respect to the operating tube, for effecting a screw thread connection with a motor driven conveyor screw (20), the rotation of which, with respect to the second guiding bushing, and the resulting movement through this will cause the operating tube (11) to move out of the guiding tube (14) while at the same time conveying the movable furniture member (8).

2. Sliding mechanism according to Claim 1, **characterized** in that the conveyor screw (20) has an end positioning means (22) which is arranged to co-operate with a cylindrical portion (19c) of the second guiding bushing (19), which cylindrical portion protrudes into the operating tube (11), for effecting a restriction of the movement of the operating tube (11).

3. Sliding mechanism according to Claim 2, **characterized** in that said cylindrical portion (19c) has a cylindrical outer jacket surface (19d) which is adapted to be rigidly secured to the inner wall of the operating tube (11).

4. Sliding mechanism according to Claim 2 or 3, **characterized** in that the conveyor screw (20) has a cyindrical third guiding bushing (23), coaxially orientated with respect to the operating tube (11), the cylindrical outer jacket surface of the third guiding bushing forming a load carrying sliding surface against the inner wall of the operating tube (11) during the movement of the operating tube with respect to the conveyor screw.

5. Sliding mechanism according to any preceding Claim, **characterized** in that a portion (19h) of the cylindrical sliding surface (19g) of the second guiding bushing (19) is removed in order to allow free movement of the second guiding bushing (19) also if unevennesses are present in the inner wall of the guiding tube (14).

6. Sliding mechanism according to any preceding Claim, **characterized** in that, in order to improve the structural stability of the operating tube (11) and the second guiding bushing, the second guiding bushing has an annular groove (19e) into which the other end of the operating tube (11) is arranged to protrude.

7. Sliding mechanism according to any preceding Claim, **characterized** in that the slide member (11) is connected with the movable furniture member (8) in a central portion thereof, as seen in a lateral direction with respect to the moving furniture member.

8. Sliding mechanism according to any preceding Claim, **characterized** in that the furniture is a chair and that the movable furniture member is a seat framing (8) which is pivotally connected with a backrest (6) which is pivotally connected with the base framing (3) of the chair.

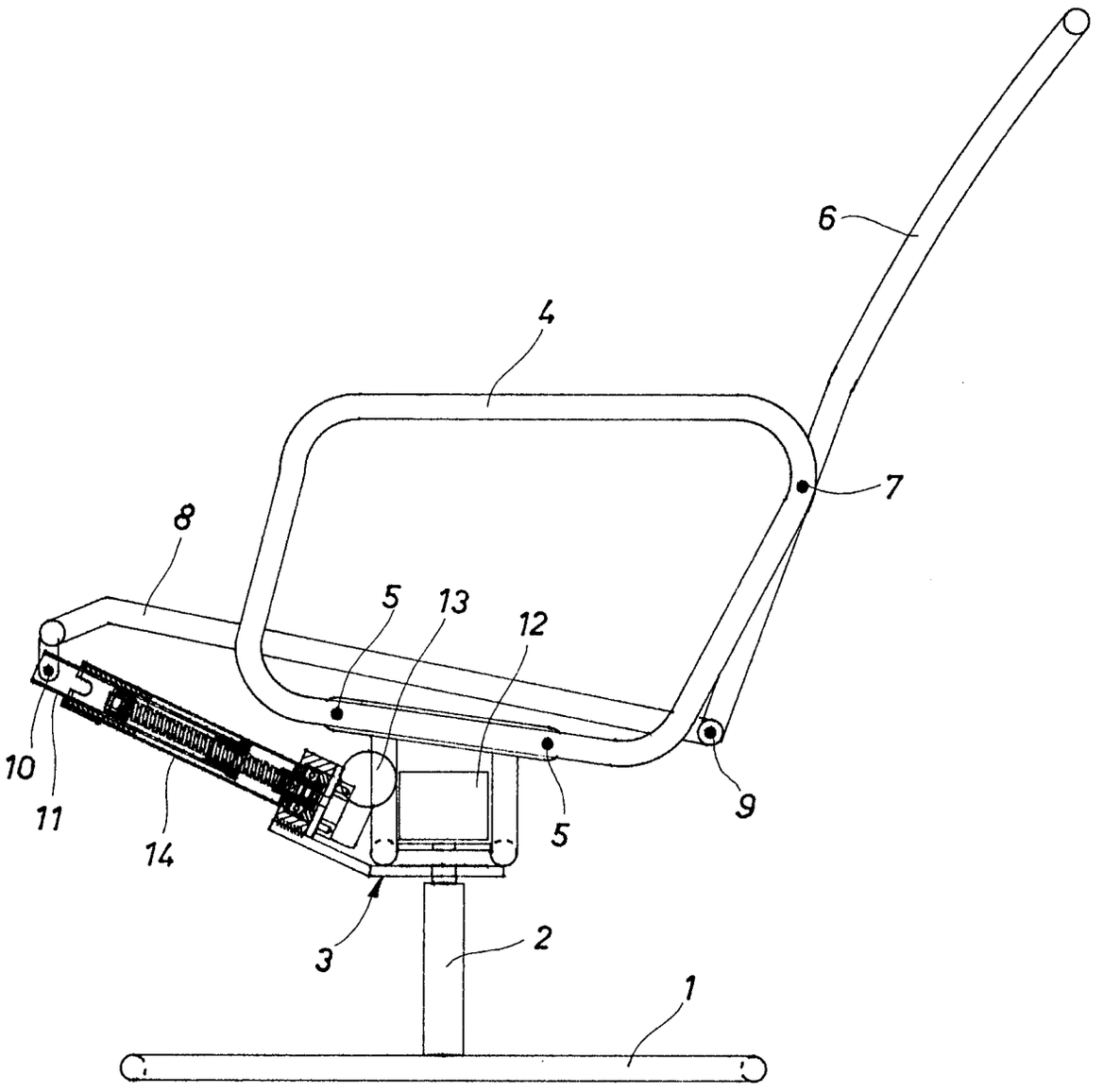

FIG. 1

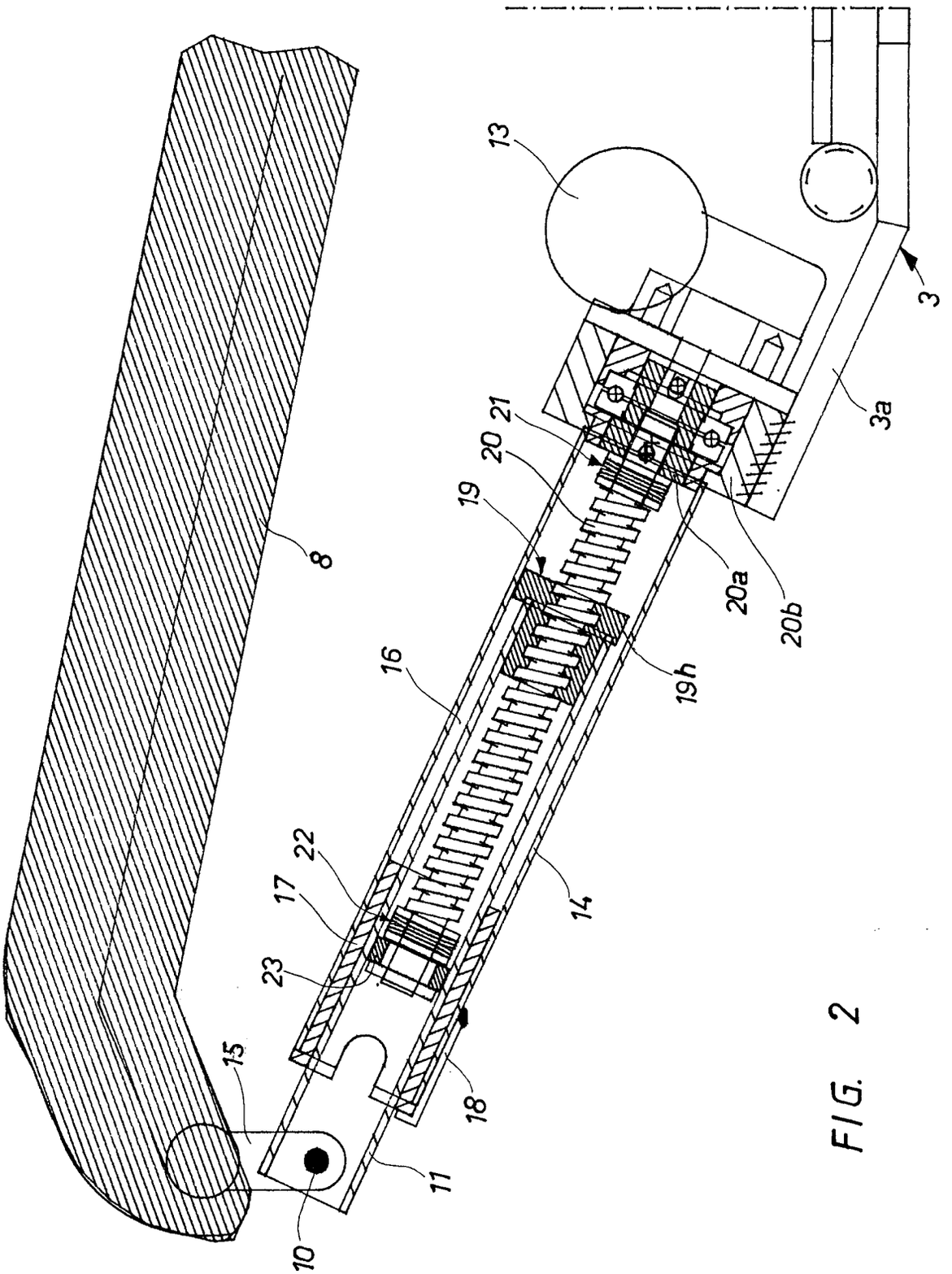

FIG. 2

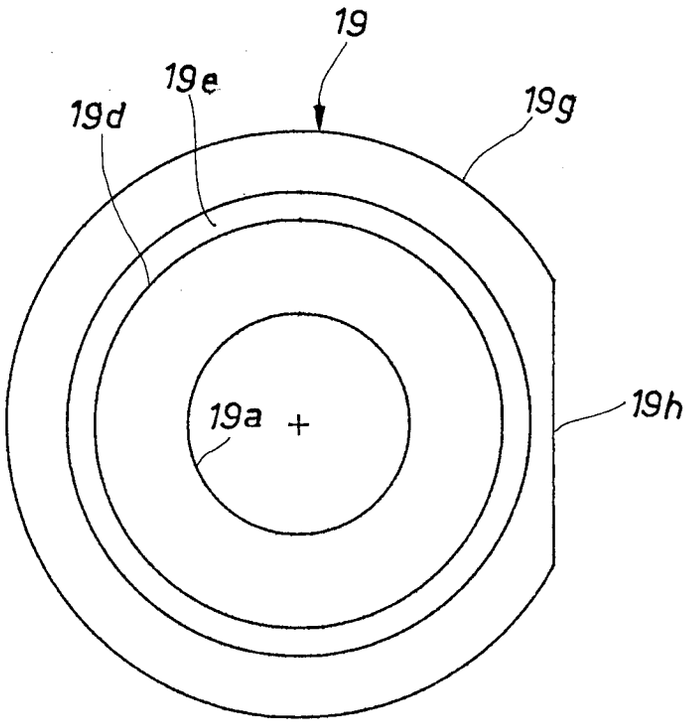

FIG. 4

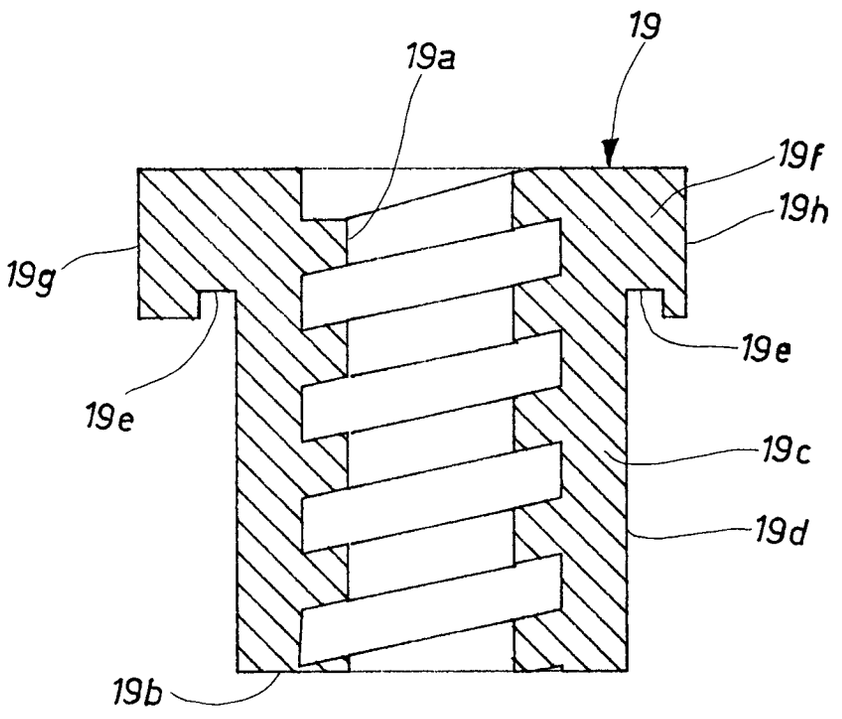

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 95 20 0355

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.6)
A	FR-A-1 174 489 (MOORE) * figure 5 *	1	A47C1/032
A	CH-A-303 985 (BAUR ET AL.) * figure *	1,3	
A	FR-A-1 592 825 (NORITUBE S.A.R.L.) * page 2, line 26 - line 32 * * figures *	1	
A	US-A-4 752 102 (RASMUSSEN) * figures 5-7 *	1	
A	US-A-4 750 701 (FOLSON ET AL.) * figure 2 *	6	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 July 1995	Guthmuller, J

CATEGORY OF CITED DOCUMENTS

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