



Publication number:

0 583 660 A1

EUROPEAN PATENT APPLICATION

Application number: **93112073.7**

Int. Cl.⁵: **A47C 20/04**

Date of filing: **28.07.93**

Priority: **31.07.92 IT MI921901**

Date of publication of application:
23.02.94 Bulletin 94/08

Designated Contracting States:
BE DE ES FR GB NL

Applicant: **CIAR S.r.l.**
Via Brigata G.A.P., 17
I-61027 Villa Fastigi (Pesaro)(IT)

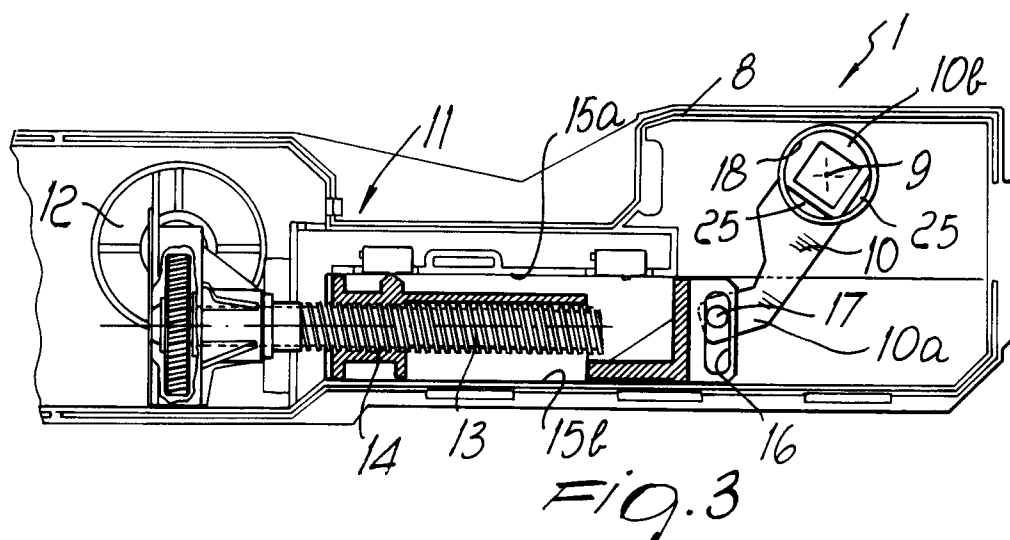
Inventor: **Marcantoni, Egidio**
Via Fanti 40
61100 Pesaro(IT)

Representative: **Modiano, Guido, Dr.-Ing.**
Modiano & Associati S.r.l.
Via Meravigli, 16
I-20123 Milano (IT)

Device for inclining beds and couches.

The device is utilizable for beds and couches of the type having a flat base with an inclinable headboard and/or footboard. A main shaft is arranged transversely with respect to the longitudinal extension of the bed and is rotatably supported by an intermediate portion of the base. Transverse arms are connected to the main shaft and slideably engage the underside of the inclinable headboard. In order to actuate the main shaft, a gearmotor (12) is

housed in a casing (8) fixed to the underside of the intermediate portion and supports a lever (10) rotatable about an axis (9) which is coaxial with the main shaft. A connecting element rotatively connects the lever (10) to the main shaft. The threaded output shaft (13) of the gearmotor (12) couples with a female thread defined in a slider (14), having formed therein a transverse slot (16) which is slideably engaged by a pin (17) connected to the lever (10).



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The present invention relates to a device for inclining beds or couches, and in particular to a device for inclining the variable-tilt headboards and/or footboards of adjustable beds or couches.

Beds and couches with a variable-tilt headboard and/or footboard are known. These kinds of bed or couch are generally provided with a base comprising a fixed intermediate portion which supports two end portions corresponding to the footboard and to the headboard and hinged to the intermediate portion about two axes which are transverse to the extension of the bed or couch. The intermediate portion furthermore supports, proximate to each pivoting axis of the related end portion, a shaft which is arranged parallel to the pivoting axes of the end portions and is rotatable about its own axis with respect to the intermediate portion of the base of the bed or couch. Each shaft is arranged below the supporting surface defined by the base and is provided, proximate to its axial ends, with two transverse arms rigidly coupled thereto and resting, with their free end, on the lower side of the related end portion. The tilt of the headboard or footboard is changed by partially rotating these shafts, so that their arms produce a partial rotation of the related end portion, about the related pivoting axis, with respect to the intermediate portion of the base.

The shafts are rotated by means of appropriate actuation devices associated with the intermediate portion of the base in a downward region and generally comprising two electric gearmotors which are actuated mutually independently and act, by means of a kinematic transmission arranged transversely to the shaft to be actuated, on the end of actuation levers or arms which are rigidly coupled to the shaft to be actuated, causing its partial rotation.

Some of these devices are supported by the intermediate portion of the base of the couch or bed and require excessive assembly time to connect the shaft actuation levers.

Other kinds of device are preassembled within a box-like body associated with the shafts at the actuation levers. With these kinds of device, there is the advantage of a simpler and quicker installation, but there is also the drawback that, since the actuation levers are disconnected from the transmission which connects them to the related motor, it is necessary to make resort to special structural arrangements to eliminate any play between the levers and the transmission. These arrangements, generally based on adjusting the overall volume occupied by the transmission, unavoidably complicate the structure of the device and thus its manufacture.

An aim of the present invention is to solve the above described problem by providing a device for

actuating bedsprings for beds or couches with a variable-tilt headboard and/or footboard, which is simple and quick to install without requiring, during installation, adjustment operations for recovering any play.

Within the scope of this aim, an object of the present invention is to provide a device which also simplifies manufacture of the couch or bed base in which said device is to be installed.

Another object of the present invention is to provide a device the production costs whereof are competitive with those of known devices.

With the foregoing and other objects in view, there is provided a device for inclining beds and couches as defined in the appended claims.

Further characteristics and advantages of the present invention will become apparent from the following description of two preferred but not exclusive embodiments thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic view of a bed with an inclinable headboard and footboard, equipped with the device according to the present invention;

figure 2 is a view of the bed of figure 1 with the footboard in a raised position;

figures 3 to 7 are views of the device according to the invention in a first embodiment, and more particularly:

figure 3 is a schematic sectional view of a portion of the device according to the invention in an operating position;

figure 4 is a schematic sectional view, similar to figure 3, of the device according to the invention in another operating position;

figure 5 is an exploded perspective view of the actuation lever and the main shaft;

figure 6 is a front elevation view of the device fitted on a main shaft of a bed or couch;

figure 7 is an enlarged-scale sectional view of a detail of figure 4;

figures 8 to 11 are views of the device according to the invention in a second embodiment, and more particularly:

figure 8 is a schematic sectional view of a portion of the device according to the invention;

figure 9 is a view of a detail of figure 8, showing the coupling between the actuation lever and the main shaft;

figures 10 and 11 are front elevation views of the operation for coupling the device according to the invention to the main shaft of a bed or couch.

With reference to the above figures, the device according to the present invention in its first embodiment, generally designated by the reference numeral 1, is used to actuate beds or couches with

a movable footboard and/or headboard of the type comprising, in a manner known per se, a couch or bed base 2 with a supporting intermediate portion 3 and with at least one end portion 4, constituting the headboard or footboard, which is pivoted to the intermediate portion 3 about an axis 5 which is transverse to the extension of the bed or couch. The intermediate portion 3 rotatably supports, in a downward region, a main shaft 6; the shaft is arranged parallel to the axis 5 and is provided with transverse arms 7a and 7b which slidably couple with their free ends on the lower side of the stringers of the end portion 4 of the base. In this manner, a partial rotation of the main shaft 6 about its axis 6a causes, by means of the action of the arms 7a and 7b, a variation in the angle of the end portion 4 with respect to the intermediate portion 3, raising or lowering the headboard or footboard of the bed or couch, as schematically shown in figure 2.

The device according to the invention comprises a casing 8 which may be fixed to the underside of the intermediate portion 3 of the bed or couch base 2. The casing supports at least one lever 10 for rotation about an axis 9, and actuation means 11 acting on the lever 10 so as to cause its rotation about the axis 9 with respect to the casing 8. The lever 10 is detachably associable with the main shaft 6 so that it rotates rigidly therewith about an axis 6a. The rotation axis 9 of the lever 10 is substantially coaxial with the axis 6a.

More particularly, the actuation means 11 comprise a gearmotor 12 supported by said casing 8 and having an output shaft 13 which is threaded and arranged substantially at right angles to the rotation axis 9.

The output shaft 13 couples to a female thread defined inside a slider 14 which is slideable along guides 15a and 15b constituted by raised portions of the internal walls of the casing 8. The guides 15a and 15b extend parallel to the output shaft 13, and the end of the slider 14 which is opposite to the gearmotor 12 is provided with a slot 16 transversely elongated with respect to the sliding direction of the slider 14; a pin 17 couples in said slot and is connected to the free end 10a of the lever 10 which is directed towards the slider.

The opposite end 10b of the lever 10 is substantially cylindrical and is rotatably coupled in a supporting seat 18 defined in the casing 8. The rotation axis 9 constitutes the fulcrum of the lever 10.

For connection between the lever 10 and the main shaft 6 there is a connecting element which is movable axially along the main shaft 6 and is rotatably coupled thereto about its axis 6a.

In the first embodiment, illustrated in figures 3 to 7, the main shaft 6 is formed by two parts 19a and 19b mutually axially aligned and mutually

spaced by a length which is equal to, or greater than, the axial length of the end 10b of the lever 10, so that the end 10b of the lever 10 is arrangeable between the two parts 19a and 19b of the main shaft 6 with the rotation axis 9 aligned with the axis 6a of the shaft 6.

An axial seat 20 having a polygonal or otherwise non-circular cross-section is defined inside the two parts 19a and 19b around the axis 6a. The end 10b is also axially crossed by a through seat 21, the axis whereof coincides with the rotation axis 9; said seat 21 is shaped substantially like the axial seat 20.

The connecting element is constituted by a dowel 22 which is shaped so as to match the axial seat 20 and the seat 21, and is axially slidably accommodated in the part 19a of the main shaft 6.

By means of its axial sliding, the dowel 22 is insertable in the part 19b of the main shaft 6 by passing through the seat 21 of the lever 10.

The coupling of the dowel 22 to the seat 21 rigidly couples the lever 10 to the main shaft 6 in rotation about the axis 6a and, at the same time, also causes the device according to the present invention to be supported by the main shaft 6.

The axial movement of the dowel 22 is achieved by means of a pin 23 fixed to the dowel 22 and protruding outwardly from an axial groove 24 defined in the part 19a of the shaft 6.

Conveniently, in order to facilitate the centering of the shaft 6 with respect to the lever 10, said shaft 6 is provided with a polygonal outer profile, for example a square one, except for its end portions which are supported by the intermediate portion of the couch or bed base, and the axial ends of the portion 10b of the lever 10, in which the seat 21 is provided, have protrusions 25 defining a support for the outer lateral surface of the shaft 6.

In the second embodiment of the device, generally designated by the reference numeral 1a and illustrated in particular in figures 8 to 11, the actuation means and the end 10a of the lever 10 are practically identical to what has already been described with reference to the first embodiment; for this reason, the same reference numerals used in figures 3 to 7 have been kept for these components.

In this second embodiment, the end 10b of the lever 10 has been designed so that it is coupleable to a monolithic main shaft 6.

A through seat 30 having a polygonal or otherwise non-circular transverse cross-section is again defined in the end 10b of the lever 10 around the rotation axis 9.

Said through seat 30 is open laterally, and at the opening of the seat 30 there is also an opening 31 in the casing 8 of the device.

The size of the opening 31 of the casing, transversely to the rotation axis 9, is such as to allow the passage of the shaft 6 with a movement of the casing 8 in a lateral direction with respect to the shaft 6, whereas the through seat 30 is sized so as to receive, besides the shaft 6, also a sleeve 32 axially slideable along the shaft 6.

Said sleeve 32 is rigidly coupled to the shaft 6 in rotation about its axis 6a and is externally shaped with a polygonal or otherwise non-circular profile, so as to match the shape of the through seat 30.

The sleeve 32 constitutes the element for connecting the main shaft 6 to the lever 10 and rigidly couples these two elements to each other in rotation about their respective coinciding axes 6a and 9.

Advantageously, in the illustrated embodiment the shaft 6, the sleeve 32 and the lever 10 have a square cross-sectional profile.

A shoulder 33 is provided in order to stop the axial sliding of the sleeve 32 in one direction along the shaft 6 after coupling to the seat 10.

Conveniently, the opening 31 of the casing 8 is provided with a removable closure cover 34 preventing the infiltration of dust or dirt inside the casing.

The device according to the invention preferably comprises, instead of a single gearmotor 12, two gearmotors which are actuatable mutually independently and respectively actuate a lever 10, which as described is associable with a main shaft 6 for lifting or lowering the footboard, and another lever 10 associable with another main shaft 6 to lift or lower the headboard of a bed or couch.

In practice, this device corresponds to the device described and illustrated with reference to figures 3 and 8, with the two levers 10 mutually spaced and with the two gearmotors 12 arranged between said two levers.

Assembly and operation of the device according to the present invention are evident from what has been described and illustrated.

In particular, it is evident that the device according to the invention can be assembled in a very short time and very easily by connecting the main shafts of a bed with a movable headboard and/or footboard to the levers 10 of the device which are located inside the casing 8.

In practice it has been observed that the device according to the invention fully achieves the intended aim and objects, since it allows rapid and precise installation as it is already internally provided with the levers for actuating the shafts which actuate the rotation of the footboard and/or headboard of the bed.

A further advantage is simplification of the manufacture of the base of the bed or couch of this

type.

Another advantage of the device according to the invention is that it can be fitted without problems on the base of a couch or bed of any width.

The device thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may furthermore be replaced with other technically equivalent elements.

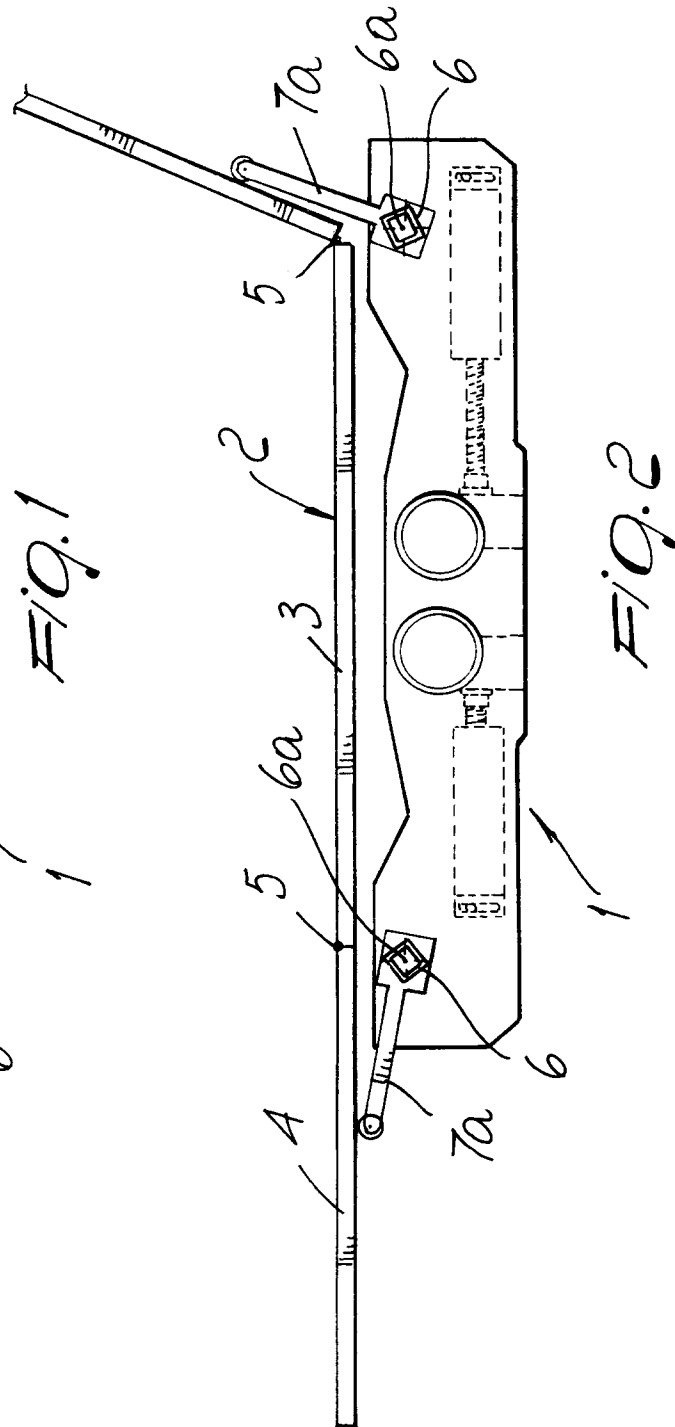
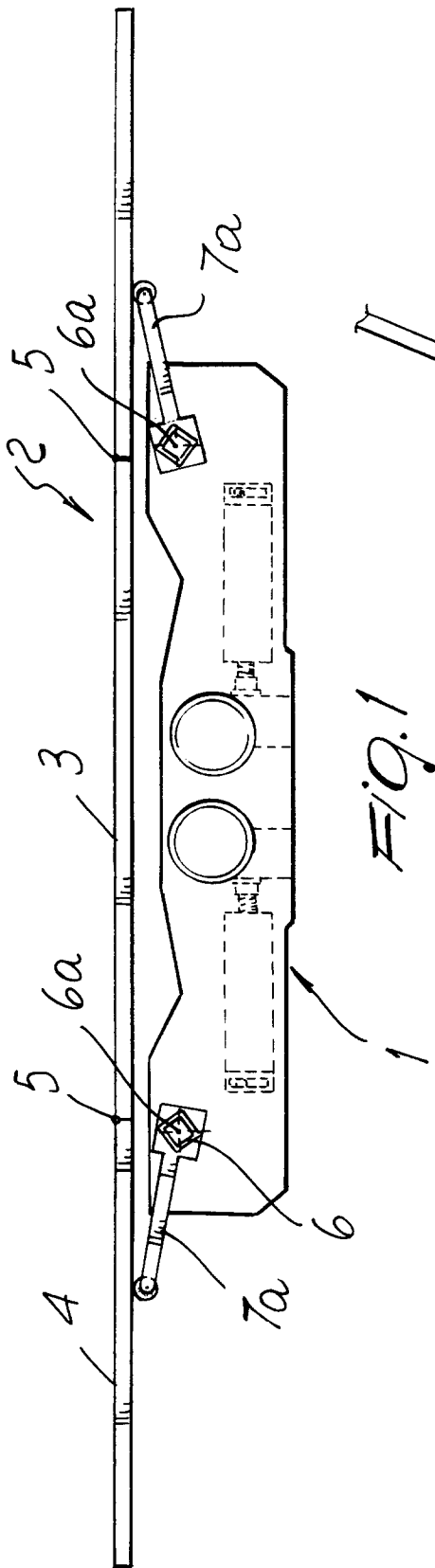
In practice, the materials employed, as well as the dimensions, may be any according to the requirements and the state of the art.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Device for inclining beds or couches having a base with a supporting intermediate portion and with at least one end portion, constituting a headboard or footboard, pivoted to said intermediate portion about a transverse axis, said device comprising at least one main shaft arranged transversely to the extension of the base and rotatably supported by said intermediate portion about its own axis, said main shaft being provided with at least one transverse arm the free end whereof acts on the lower side of said end portion for its rotation about said transverse axis upon the rotation of said main shaft about its own axis; characterized in that it comprises a casing supporting at least one lever rotatable about a rotation axis and actuation means acting on said lever for its rotation about said rotation axis with respect to said casing, said lever being detachably associable with said main shaft so that it rotates rigidly together with said main shaft about the axis thereof, and wherein said axis of said main shaft and said rotation axis substantially coincide.
2. Device according to claim 1, characterized in that said actuation means comprise at least one gearmotor supported by said casing, with a threaded output shaft coupled to a female thread defined in a slider which is slideable, along a direction transverse to said rotation axis, within a guide formed inside said casing, said slider being articulated about said rotation axis at the end of said lever which is opposite to the end pivoted to said casing.

3. Device according to the preceding claims, characterized in that said slider has, on its side directed toward said lever, a slot elongated transversely with respect to the sliding direction of the slider and to said rotation axis, a pin being coupled in said slot and being connected to the end of said lever which is directed towards said slider. 5
4. Device according to one or more of the preceding claims, characterized in that a through seat is defined in the end of said lever which is pivoted to said casing, said seat extending around said rotation axis and being rigidly rotationally associable with a connecting element which is movable axially along said main shaft and is rigidly coupled to said main shaft in rotation about its axis. 10 15
5. Device according to one or more of the preceding claims, characterized in that said main shaft is made of two parts which are mutually axially aligned and arranged at a distance which is greater than, or equal to, the thickness of said lever at said through seat, said connecting element being constituted by a dowel which has a polygonal or non-circular transverse cross-section and is slidably accommodated in a correspondingly shaped axial seat defined in said shaft, said dowel being insertable in said correspondingly shaped through seat of the lever. 20 25 30
6. Device according to one or more of the preceding claims, characterized in that said main shaft is formed monolithically and in that the end of said lever in which said through seat is defined and said casing have, at said lever, an opening for the insertion of a portion of said shaft in said through seat, said connecting element being constituted by a sleeve which is rigidly coupled to said main shaft in rotation about its axis and is movable axially externally along said main shaft, said sleeve having a cross-section with a polygonal or non-circular external profile which is coupleable to said correspondingly shaped through seat by movement along the axis of said main shaft which coincides with said rotation axis. 35 40 45 50
7. Device according to one or more of the preceding claims, characterized in that said casing is provided with a cover for closing the opening for the insertion of said main shaft at said lever. 55
8. Device according to one or more of the preceding claims, characterized in that said casing supports two levers mutually spaced and rotatable about two mutually parallel rotation axes, and independently acting actuation means, each of which acts on one of said levers for its rotation about the related rotation axis with respect to said casing, each lever being detachably rigidly rotationally associable with a main shaft provided with arms acting on an end portion of the base for its rotation about a transverse axis with respect to said intermediate portion of the base.
9. Base for a bed or couch with a variable-tilt headboard and/or footboard, of the type comprising a structure with an intermediate supporting portion and with at least one end portion, constituting the headboard or footboard, which is pivoted to said intermediate portion about a transverse axis and with at least one main shaft arranged transversely to the extension of the bedspring and rotatably supported by said intermediate portion about its own axis, said main shaft being provided with at least one transverse arm the free end whereof acts on the lower side of said end portion for its rotation about said transverse axis upon the rotation of said main shaft about its own axis, characterized in that it comprises a device, according to one or more of the preceding claims, for varying the tilt of the headboard and/or footboard.



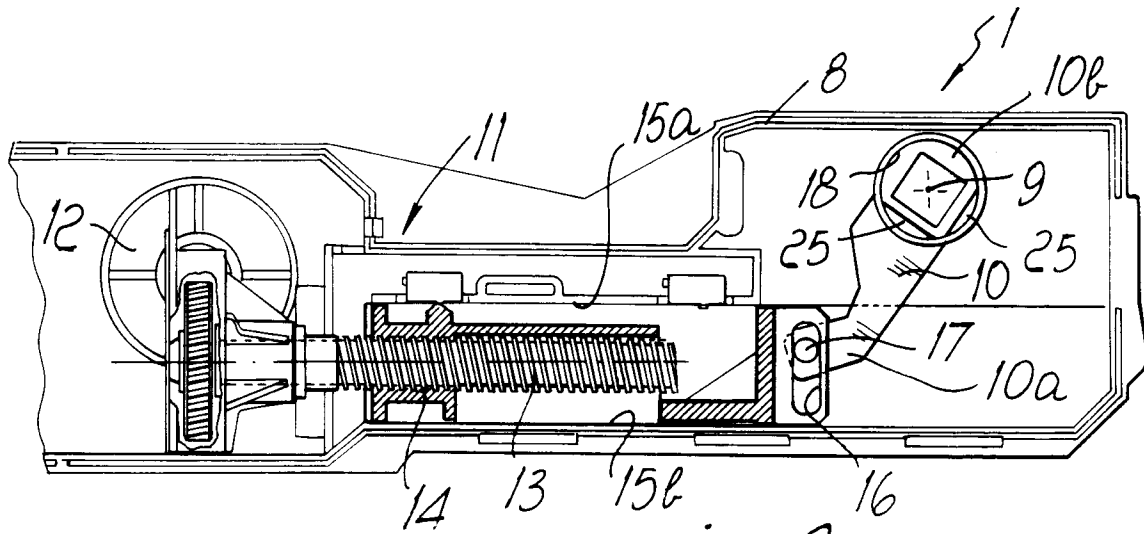


Fig. 3

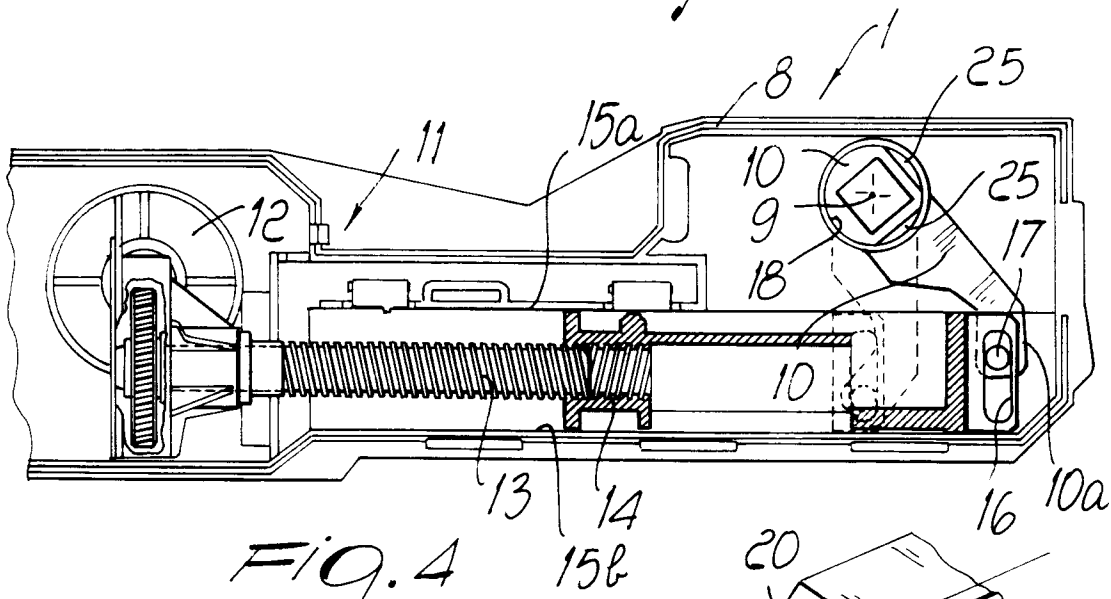


Fig. 4

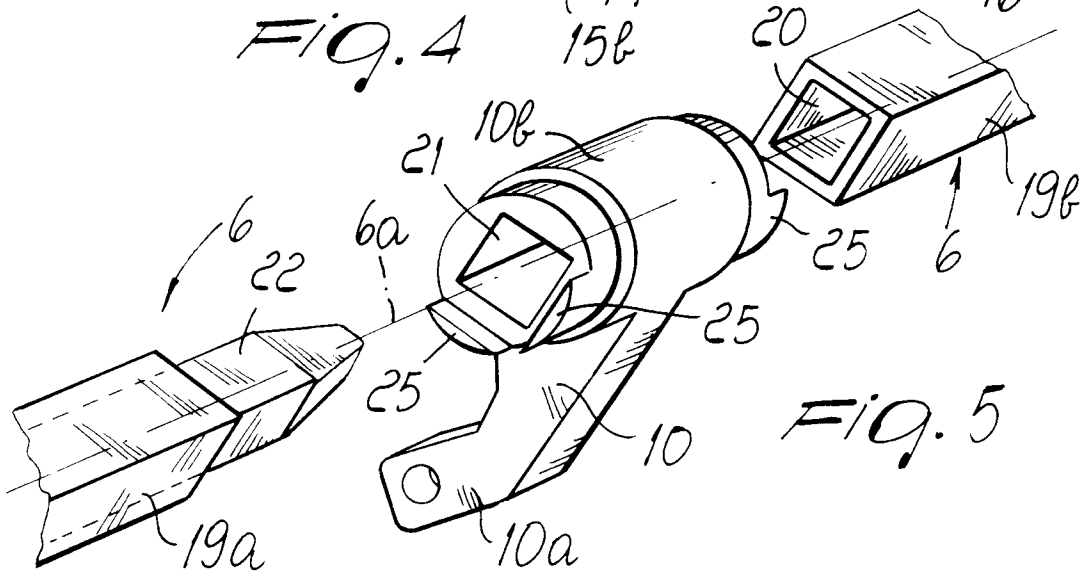
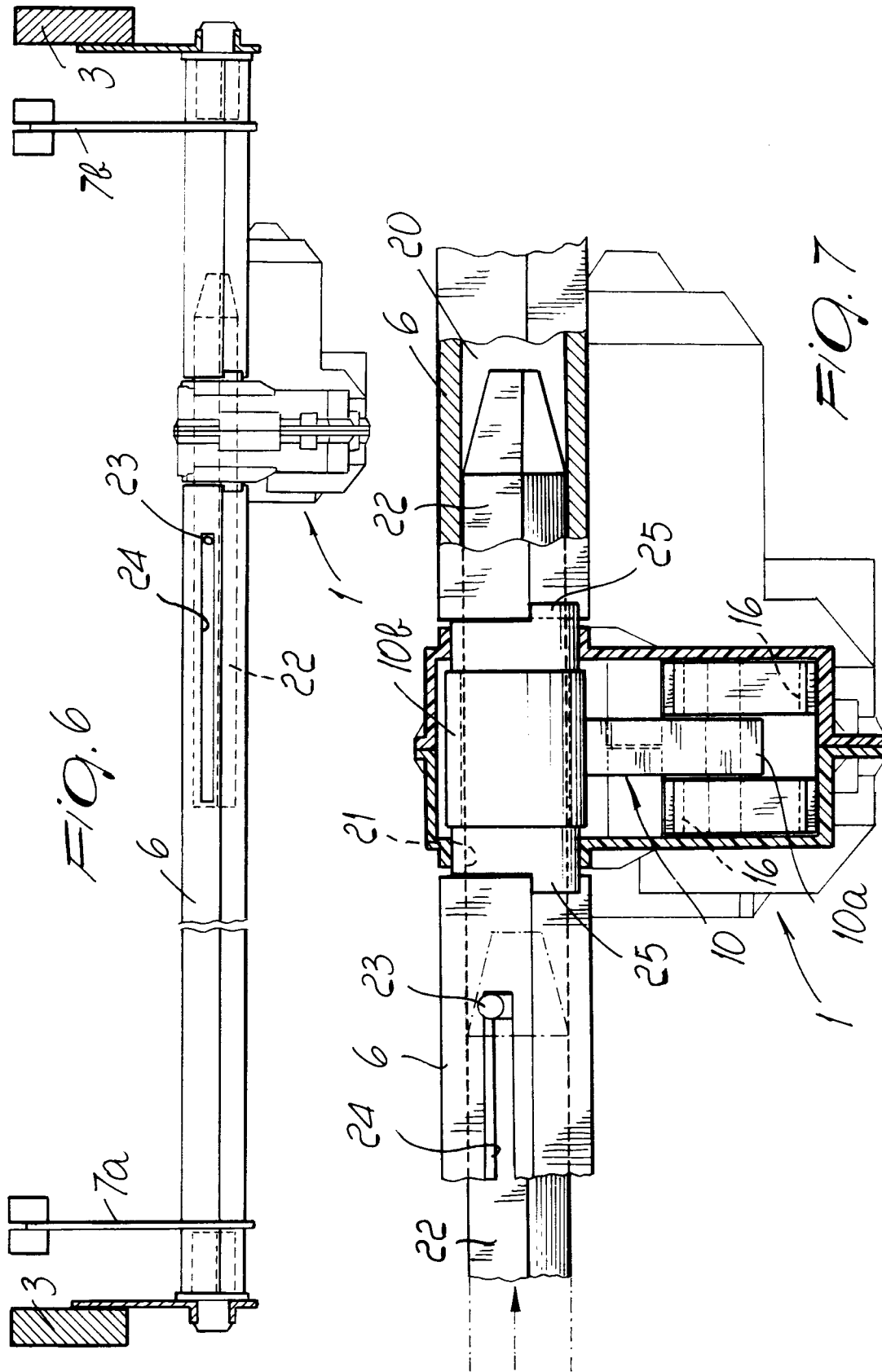
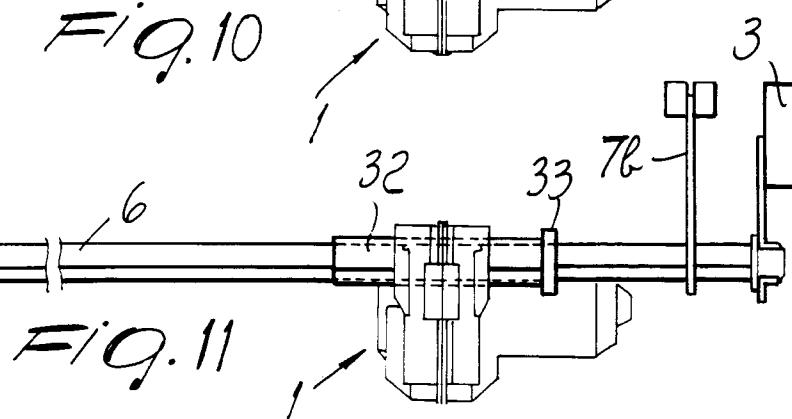
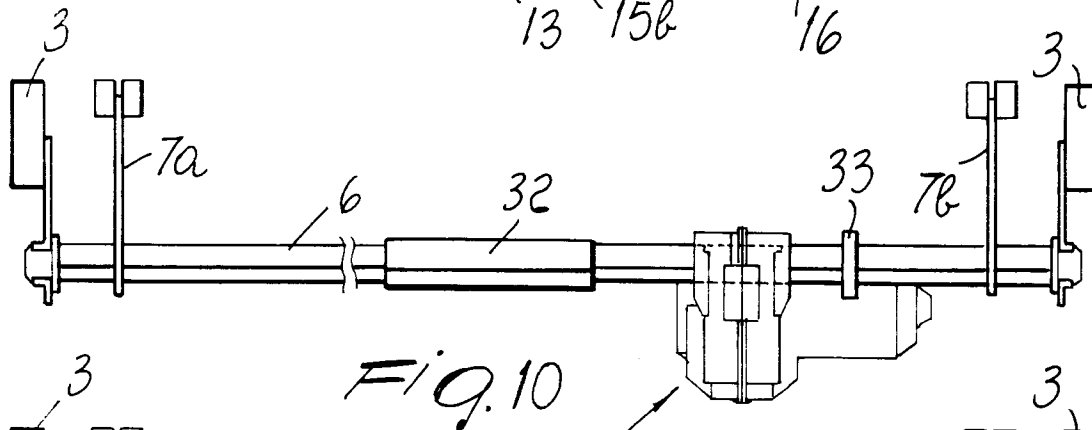
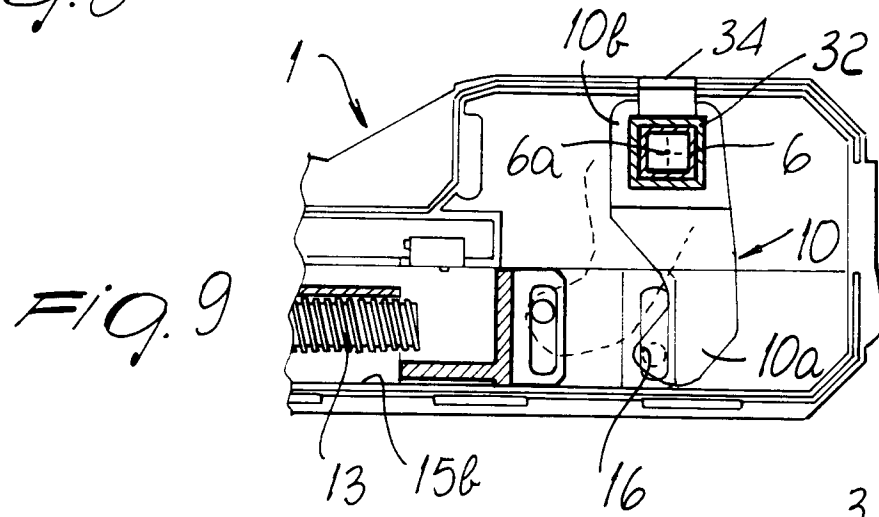
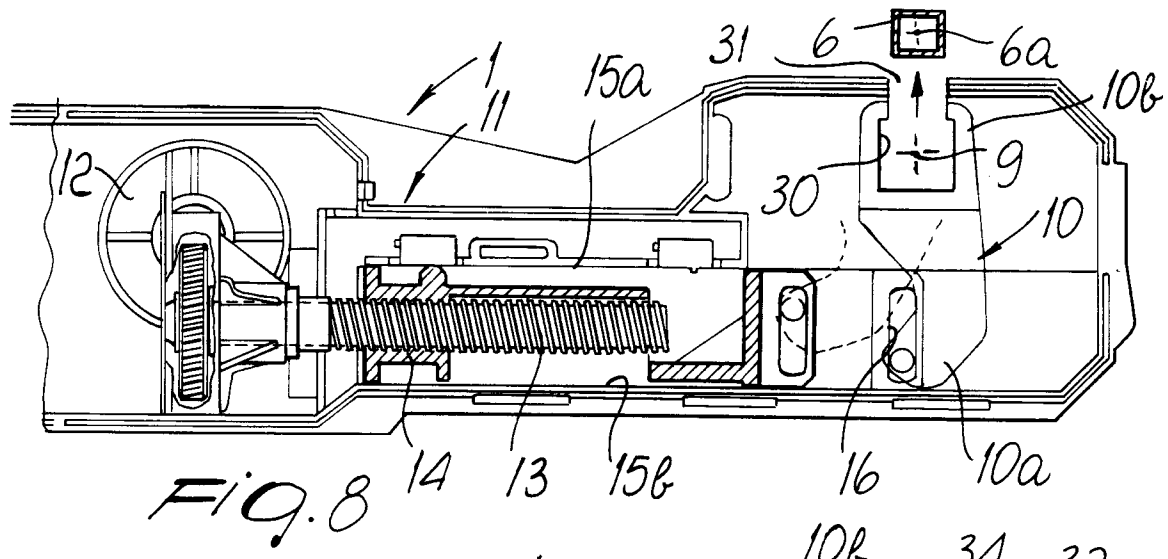


Fig. 5







European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 93 11 2073

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.5)
A	FR-A-2 351 629 (HANNING ELEKTRO-WERKE) * page 3, line 36 - page 4, line 23; figures *	1,4,6,8, 9	A47C20/04
A	CH-A-615 333 (MAGNETIC ELEKTROMOTOREN) * page 2, column 2, line 29 - line 55; figures 1,2 *	2,3	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			A47C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 5 November 1993	Examiner VANDEVONDELE, J
CATEGORY OF CITED DOCUMENTS			
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