(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 500 187 A1**

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **92200503.8**

(51) Int. Cl.5: **A47B 9/04**

(22) Date of filing: **20.02.92**

(30) Priority: **22.02.91 NL 9100324**

(43) Date of publication of application:
26.08.92 Bulletin 92/35

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI LU MC NL PT SE

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(54) **Leg structure.**

(57) The invention lies in the field of tables whereof the work surface is height-adjustable.

The invention has for its object to provide a leg structure (1) which, using simple means, offers a greatly increased mechanical stability and a greatly improved load-taking capacity of the work surface (3) and provides a leg structure with adjustable length for bearing together with at least one other leg structure a work surface, which leg structure comprises: a foot (2) for placing on the ground; a support (4) for coupling to the work surface; two pillars of adjustable length which are rigidly connected on one side to the foot and on the other to the support, each of which pillars comprises: two parts telescopically movable relative to one another, namely an upper part that is connected to the support and a lower part connected to the foot and provided with a spindle nut into which is screwed a screw spindle mounted on the upper part; a right angle transmission present on the upper part wherein the right angle transmissions of both pillars have equal transmission ratios and are mutually coupled such that when the screw spindles are rotated the pillars undergo equal changes in length; and drive means for rotatably driving the screw spindles.

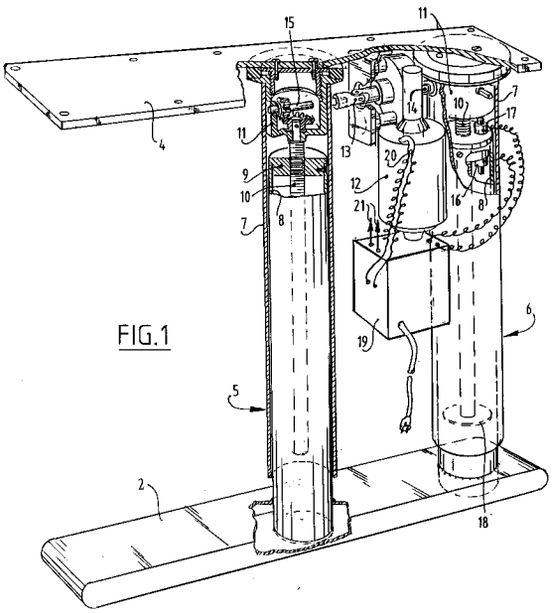

FIG.1

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The invention lies in the field of tables whereof the work surface is height-adjustable. Such tables are known for instance from the European patent application EP-A-0 283 103 of applicant. A leg structure therein comprises a foot, a pillar of adjustable length connected thereto and consisting of two parts telescopically movable relative to one another and a table top fixed to the upper of these parts.

The invention has for its object to provide a leg structure which, using simple means, offers a greatly increased mechanical stability and a greatly improved load-taking capacity of the work surface.

In this respect the invention provides a leg structure with adjustable length for bearing together with at least one other leg structure a work surface, which leg structure comprises:

a foot for placing on the ground;

a support for coupling to the work surface;

two pillars of adjustable length which are rigidly connected on one side to the foot and on the other to the support, each of which pillars comprises:

two parts telescopically movable relative to one another, namely an upper part that is connected to the support and a lower part connected to the foot and provided with a spindle nut into which is screwed a screw spindle mounted on the upper part;

a right angle transmission present on the upper part wherein the right angle transmissions of both pillars have equal transmission ratios and are mutually coupled such that when the screw spindles are rotated the pillars undergo equal changes in length; and

drive means for rotatably driving the screw spindles.

Right angle transmissions of different types are known. There exist for instance worm gearings and gear wheel transmissions. For a transmission that is as free of friction as possible it is recommended according to the invention that the right angle transmissions are gear wheel transmissions, for instance of the type with bevel gear wheels. Such gear wheel transmissions also have the advantage of being generally better capable than worm gearings of causing input and output shaft to exchange function. It will be apparent in the light of the description following hereinafter that this is essential, certainly for particular embodiments of the leg structure according to the invention.

The embodiment is recommended in which the right angle transmissions are mutually coupled by means of a coupling shaft having at least one cardan joint. The non-round coupling parts extending in horizontal direction, which can be seen as the input or output shaft of the right angle transmissions, will never lie exactly in line with each other. By coupling by means of a coupling shaft having at least one cardan joint a positive transmission between both gear wheel transmissions is ensured under all conditions.

Also recommended in this respect is that the coupling shaft is slidable to a limited extent relative to the right angle transmissions.

Use can be made of a rotatable handle to adjust the leg structure and therewith the height of the table. It is preferred however that the drive means comprise a motor. The motor can be of per se known type. An inexpensive, commercially available windscreen wiper motor has for instance been found to be very suitable.

In a particular embodiment the motor is incorporated in a leg. Depending on the dimensions of the motor, which may possibly have to drive a number of leg structures simultaneously, there may not always be sufficient space available in a leg. In that case the motor is placed internally and can engage for instance onto the or a coupling shaft.

A determined embodiment is characterized by coupling means at least present on one of the right angle transmissions for coupling to another leg structure of adjustable length. It will be apparent that it is preferred that all leg structures of a table are coupled mechanically for rotation with each other by joint driving. On the one hand this limits the number of drives and therewith the costs; on the other this provides in the most natural way an exactly similar height adjustment of the various leg structures.

In a specific embodiment the leg structure comprises limit switches which switch off the motor when respectively a highest or lowest position has been reached. It will be apparent that with a table having more than one leg structure only one of the leg structures is required to have such limit switches.

The invention will now be elucidated with reference to annexed drawings of an embodiment. In the drawings:

figure 1 shows a partly broken away perspective view of a leg structure according to the invention; and

figure 2 shows a table with two leg structures according to the invention.

Figure 1 shows a leg structure 1 of adjustable length, which comprises: a foot 2 for placing on the ground; a support 4 for coupling to a work surface 3 (see figure 2); two pillars 5, 6 of adjustable length which are rigidly connected on one side to the foot 2 and on the other to the support 4. Each of these pillars 5, 6 comprises two hollow parts telescopically movable relative to one another, namely an upper part 7 that is connected to the support 4 and a lower part 8 connected to the foot 2 and provided with a spindle nut 9 which is locked against rotation and into which is screwed a screw spindle 10 mounted on the upper part 7, and a right angle

transmission 11 present on the upper part 7. These right angle transmissions 11 of both pillars 5, 6 are identical and of the type with bevel gear wheels.

A motor 12 is coupled slightly slidably via cardan transmissions 13, 14 to the horizontal shafts 15 of the right angle transmissions 11. The coupling between cardan transmissions 13, 14 and the horizontal shafts of the right angle transmissions 11 takes place by means of complementary non-round parts.

The lower part 8 of leg 6 carries on the spindle nut 9 two limit switches 16 and 17 respectively. These limit switches can co-act respectively with a disc 18 present on the bottom end of the screw spindle 10 for defining the greatest length of leg structure 1 and with the underside of the housing of the right angle transmission 11 for defining the shortest length of leg structure 1. For this purpose the limit switches embodied as microswitches are connected to a feed and control unit 19 which is designated only schematically and which can be mounted at any desired location, for instance under the table top 3. This unit 19 can be connected to the mains supply and drives the motor 12 via wires 20 under the control of a switch 21 (not drawn) with which the user can cause the motor 12 to turn in respectively the one or other direction and to the limit switches 16, 17 which stop the motor by terminating the energizing when the extreme positions are reached.

The table 22 according to figure 2 comprises two leg structures 23, 24, wherein the leg structure 24 bears the drive motor 25 and the other leg structure 23 is driven via a coupling shaft 26 from a right angle transmission 27 of the gear wheel type. It is noted that all input and output shafts of the right angle transmission 27-30 are centrally oriented, that is, the said coupling shafts are radially oriented and the screw spindles 10 are coaxially oriented. The coupling shaft 26 likewise comprises two schematically depicted cardan joints 31, 32.

Claims

1. Leg structure with adjustable length for bearing together with at least one other leg structure a work surface, which leg structure comprises:

   a foot for placing on the ground;

   a support for coupling to the work surface;

   two pillars of adjustable length which are rigidly connected on one side to the foot and on the other to the support, each of which pillars comprises:

   two parts telescopically movable relative to one another, namely an upper part that is connected to the support and a lower part connected to the foot and provided with a spindle nut into which is screwed a screw spindle mounted on the upper part;

   a right angle transmission present on the upper part, wherein the right angle transmissions of both pillars have equal transmission ratios and are mutually coupled such that when the screw spindles are rotated the pillars undergo equal changes in length; and

   drive means for rotatably driving the screw spindles.

2. Leg structure as claimed in claim 1, **characterized in that** the right angle transmissions are gear wheel transmissions, for instance of the type with bevel gear wheels.

3. Leg structure as claimed in claim 1, **characterized in that** the right angle transmissions are mutually coupled by means of a coupling shaft having at least one cardan joint.

4. Leg structure as claimed in claim 3, **characterized in that** the coupling shaft is slidable to a limited extent relative to the right angle transmissions.

5. Leg structure as claimed in claim 1, **characterized in that** the drive means comprise a motor.

6. Leg structure as claimed in claim 5, **characterized in that** the motor is incorporated in a leg.

7. Leg structure as claimed in claim 5, **characterized in that** the motor engages onto the coupling shaft.

8. Leg structure as claimed in claim 1, **characterized by** coupling means at least present on one of the right angle transmissions for coupling to another leg structure of adjustable length.

9. Leg structure as claimed in claim 5, **characterized by** limit switches which switch off the motor when respectively a highest or lowest position has been reached.

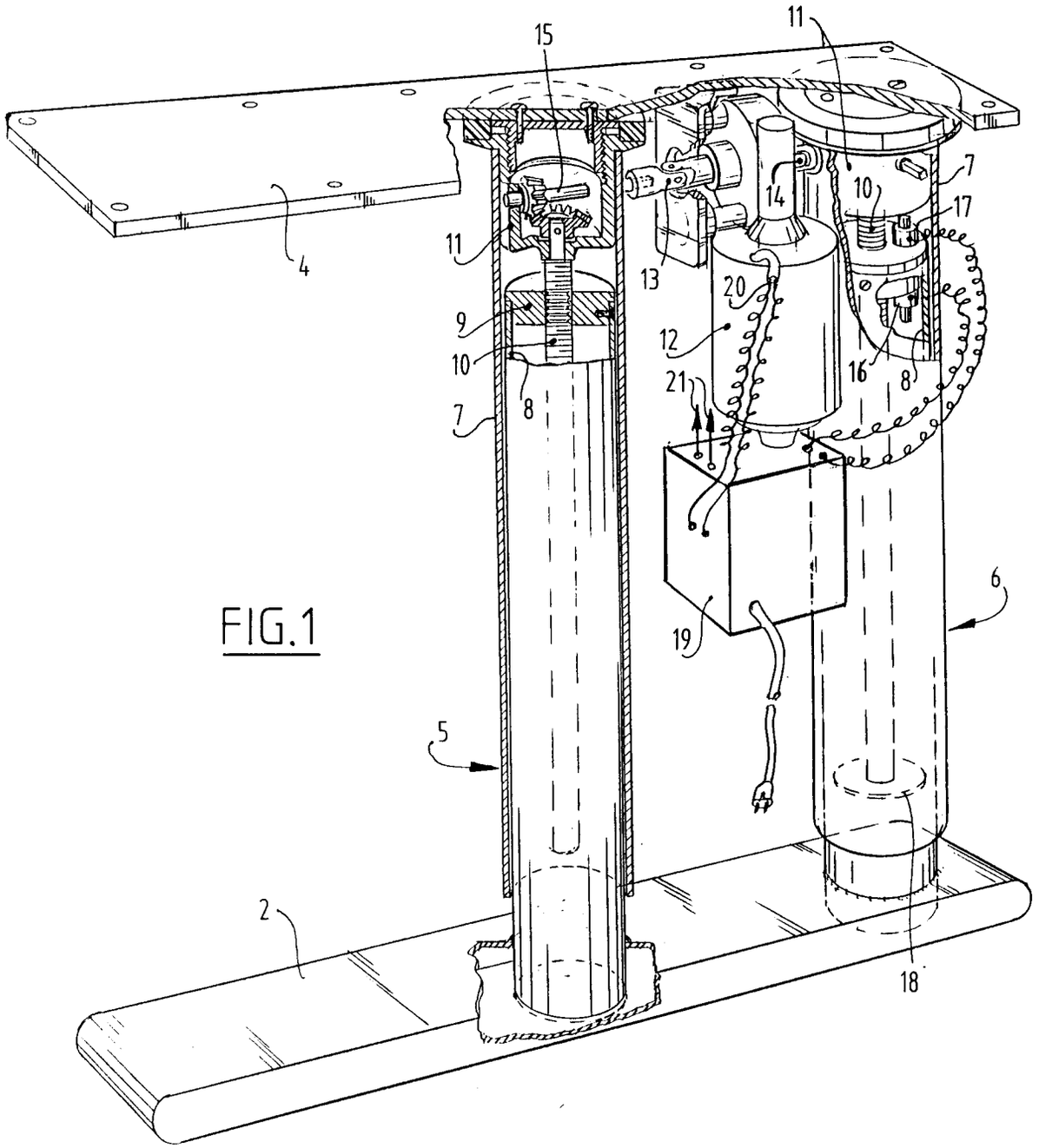

FIG.1

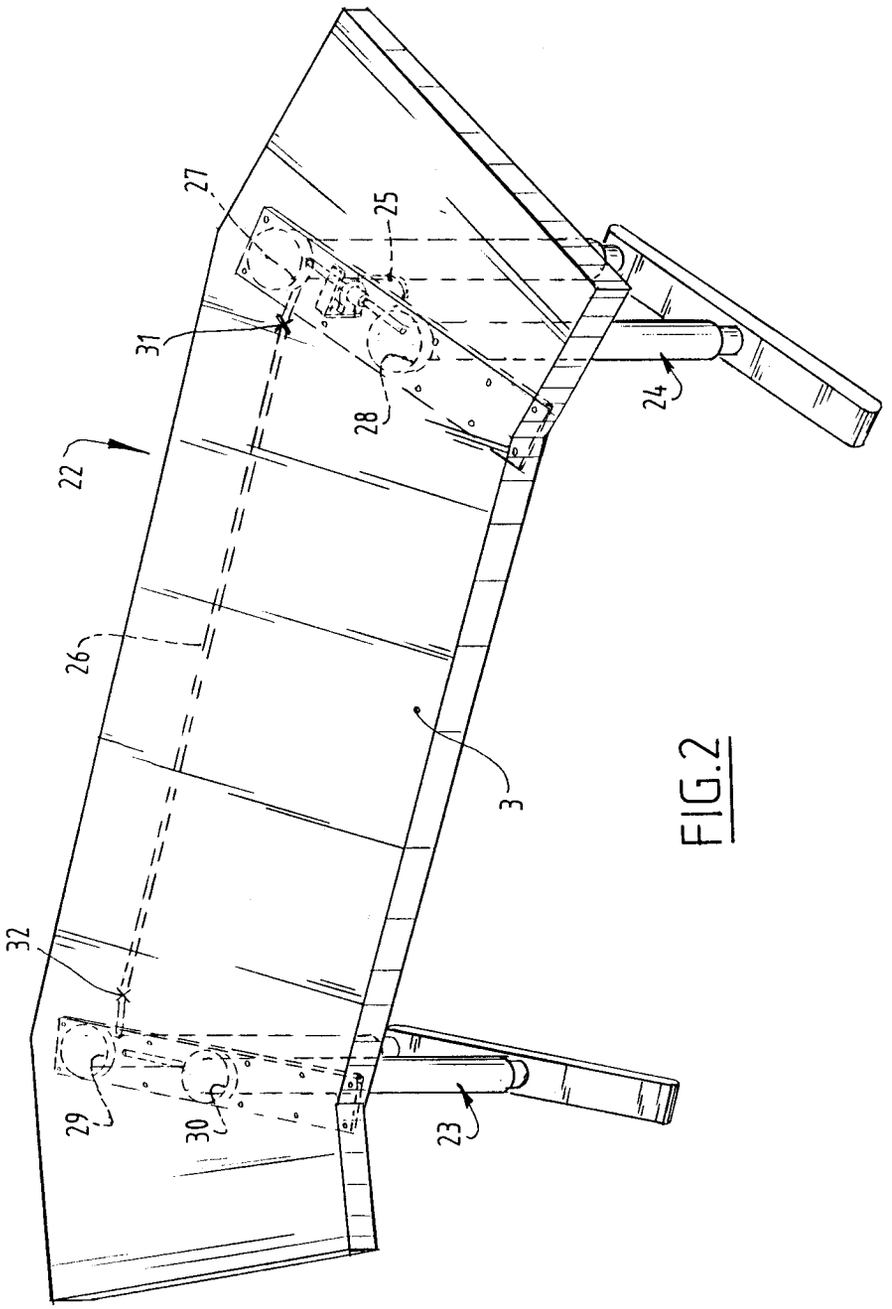

FIG.2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 20 0503

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)
X	WO-A-8 301 183 (WILLY FLEISCHER METALLWARENFABRIK GMBH & CO. KG) * page 5 - page 6; figures 1-3 * ---	1-2	A47B9/04
A	DE-C-858 012 (FRANZ MINET MÖBELFABRIK AG) 26 March 1953 * figures 1-2 * -----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

A47B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12 MAY 1992	NOESEN

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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