



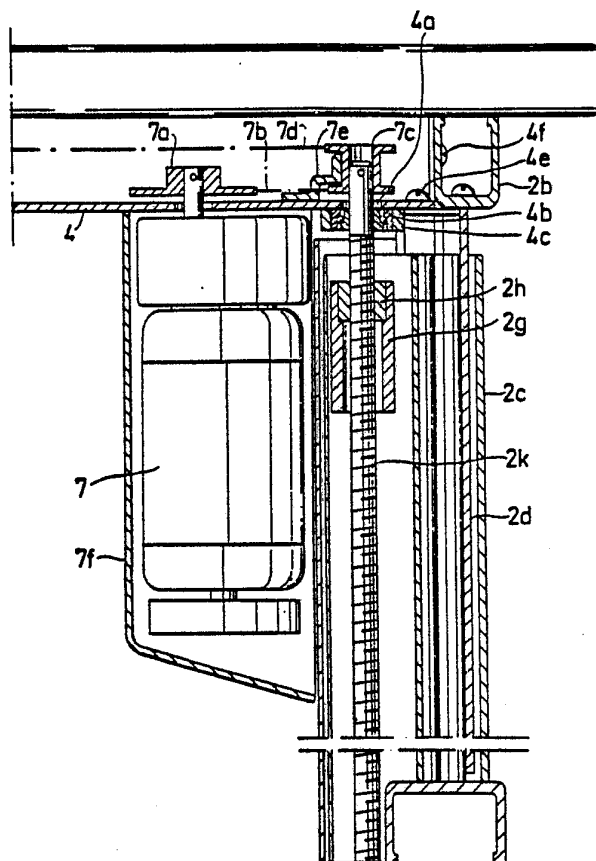
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/SE87/00205 (22) International Filing Date: 22 April 1987 (22.04.87) (31) Priority Application Number: 8601871-0 (32) Priority Date: 23 April 1986 (23.04.86) (33) Priority Country: SE (71) Applicant (for all designated States except US): TEL- EVERKET [SE/SE]; Färnebogatan 81-87, S-123 86 Farsta (SE). (72) Inventor; and (75) Inventor/Applicant (for US only) : LUNDSTRÖM, Kurt [SE/SE]; Teli, IZS, Svedjevågen 12, S-931 36 Skellefteå (SE). (74) Agents: HOLMQVIST, Lars, J., H. et al.; Lars Holmqvist Patentbyrå AB, P.O. Box 4289, S-203 14 Malmö (SE).		(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK, FI, FR (European patent), GB (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent), US. Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: DESK COMPRISING A DESK TOP THAT IS VERTICALLY ADJUSTABLE WITHIN A GREAT RANGE

(57) Abstract

A table comprising a top (1) or the like, vertically adjustable by means of telescopic legs. A driving motor (7) is arranged for engagement and disengagement so that adjustment of the top can be done to a desired level within the range. The level adjustment is effected by means of a screw 2k, driven by the motor (7) via the transmission members. The respective telescopic legs (pair of legs) consist of inner and outer profiles, mutually guided by linear ball guides or expansion fittings.



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Desk comprising a desk top that is vertically adjustable within a great range

TECHNICAL FIELD

The present invention relates to a table having a vertically adjustable table top or an equal working plane. The table is of the kind where the top is to be vertically adjustable within a great range. The table comprises a motor which is engageable and disengageable for adjusting the top to a desired level within the range and a screw or the like which is operable by the motor via transmission members executing the adjustment of the top in dependence of the operation (actuation) of the motor.

TECHNICAL BACKGROUND

Different types of tables having a vertically adjustable table top or working plane are previously known. Tables of this kind comprise a stand with telescopic legs on which the top is placed. Different types of driving members, such as hydraulic cylinders, electric motors, cranks, etc. are being used in connection with elevating and lowering the table top above a reference level, normally consisting of a floor or an equal ground on which the table is placed. The known tables also present various transmission members, through which the table top is actuated to a desired level by means of a present driving member.

DESCRIPTION OF THE INVENTION

TECHNICAL PROBLEM

In connection with tables and working places there is in certain cases a need of the possibility of controlling the elevation adjustment of the top within a relatively wide control range. This is the case with tables that must be functionable as a sitting-down working place as well as a working place for



standing. The requirements on the elevation adjustment function are high where there are desired big travels on elevating and lowering the table top. The stability of the table top in the various side directions must be possible to maintain. The need
5 of tables with vertically adjustable tops within a wide control range appears among other things from ergonomic aspects. It is important for people who are tightly bound to their working places to be able to work in a standing as well as a sitting working position. In this connection it may be mentioned that in
10 a standing working position the load on the back is reduced by a half relative to the case when you have a sitting working position. There is therefore a need of having a choice between a sitting and a standing working position so as to reduce the possibilities of back, shoulder and neck pains coming up.

15

THE SOLUTION

The object of the present invention is among other things to solve the problems mentioned above and suggests a table construction where the travel range for elevating and lowering
20 the table top is outstandingly great, e.g. approx. 500 mm or more. The great adjustment range can be maintained despite good stability existing in the table top in its various elevation adjusted positions.

What can essentially be considered characterizing for the
25 novel table is that the respective telescopic leg of the table consists of inner and outer profiles mutually guided by linear ball guides or so called expansion fittings.

In an embodiment of the inventive idea the outer profile is shaped with an essentially rectangular cross section, having a
30 ball guide with two parallel ball cages disposed at one long side. In a further embodiment the inner and outer profiles can be guided by means of two or more parallelly co-ordinated ball guides, whereby at least two of the parallelly disposed ball guides can be arranged at angles relative to each other in order
35 to give a further increased stability in the main directions of the table top in its own plane.

In a preferred embodiment a screw is to be arranged in or

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at the respective telescopic leg, the associated nut of which is fixed to the outer profile. The screw follows the movements of the table top and the screw tip interacting with the transmission members is journaled in the table top.

5 Further embodiments of the inventive idea relate to specific embodiments of the inner and outer profiles. These are to be shaped in a specific way so as to journal one or more ball guides, in a suggested embodiment the ball guides being arranged at angles relative to each other.

10 The screws in or at the respective telescopic leg are driven by a common motor which preferably consists of an electric motor. The driving is carried out via transmission members in the form of drive chains, the screw in a first telescopic leg being arranged to a chain wheel which is operable
15 via a first chain from the motor. Said chain wheel, via a second chain, drives the screw in a second telescopic leg having a further chain wheel for said second chain. The respective screw can be provided with a trapezoidal thread.

. In a preferred embodiment the travel is to be 500 mm or
20 more, and the adjustment range is to be located within the range of 600-1200 mm relative to the floor or an equal ground.

The transmission members are arranged in an elongated unit and chain wheels disposed in the unit are placed at the end of the unit. The unit is attachable to the under side of the table
25 top in a way known per se, e.g. by means of screws. The screws of the telescopic legs are connectable to the unit such that after attaching the unit to the table top the screws can be connected to their respective chain wheels in the unit. In this way the unit works as an easily connectable unit which during
30 transport can accompany the table.

ADVANTAGES

By the above-mentioned suggestion the technical requirements according to the above can be met by means of the
35 novel table. Besides, there is a joining principle in the new table resulting in that the table can acquire a small volume in transport. Construction of the different parts of the table and

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the driving furthermore enables the table to be built out to comprise two or more telescopic legs.

DESCRIPTION OF THE DRAWINGS

5 A presently suggested embodiment of a table presenting the characteristic features of the invention will be described below with reference to the appended drawing in which:

Fig. 1 in perspective obliquely from below to the right shows the table;

10 Fig. 2 in cross section shows a telescopic leg belonging to the table according to Fig. 1;

Fig. 3 in perspective shows driving and transmission members being parts of the table according to Fig. 1;

Fig 4 shows a vertical section of the table taken at one of
15 its telescopic legs.

THE PREFERRED EMBODIMENT

The table according to the figures relates to a vertically adjustable table in which the table top can be adjusted within
20 the elevation range of 650-1150 mm. In this way there is achieved a working place where the table user can optionally choose an ergonomically appropriate working position sitting as well as standing. The adjustment range is chosen as great as 500 mm in order to provide for the desire to choose if the person in
25 question wants to sit or stand working irrespective of whether the person in question is tall or short.

The table consists of a table top 1 being built of a framework of tightly glued laminas generally of pine or another appropriate wood material. The table top is supported by a stand
30 consisting of two or more telescopic legs 2. The respective leg comprises two telescopically disposed parts and by each leg is an interposed stretcher 3. Between the telescopic legs and in a close connection to the table top there is applied a unit 4 comprising the driving means of the table. Said unit comprises
35 an upper support for the legs and is furthermore the holder of a cable groove 5. The unit also comprises the holder for the multiple plug 6 and the holder for a driving motor 7. The unit

is furthermore a protection against the interior load transmitting transmission. When placing the table on a rough ground the level adjustment is effected by means of foot screws 8 accessible by a screw driver or a key 9. The driving motor 5 consists in the present case of an electric motor and the electrical parts of the table are connectable to a wall socket or the like via a plug 10.

The respective telescopic leg construction is made suitably of extruded aluminum profiles but may also be manufactured of 10 pressed or rolled steel sections. Supports on the floor or ground consist of a profile which is parallel or substantially parallel with a ground. Transversely or substantially transversely to this profile there is arranged an outer or an inner telescopic profile. In the present case the outer profile 15 2c is attached to the floor profile. The inner leg profile 2d is secured to the profile which is directly supporting the table top 2b. Between the outer and the inner leg profile there is a supporting expansion fitting (a so called ball guide) 2e. Consequently, telescopic legs herein relates to a pair of legs 20 having mutually telescopic leg-pair portions.

The expansion fitting consists of three included parts, viz. a ball carrier 2ea, a ball carriage 2eb, and balls 2ec. All parts are mutually linearly telescopic. The expansion fitting is telescopic at least 100% relative to the initial length. One of 25 the ball carriers is stationary on the outer leg portion and the other is located and attached together with the inner leg portion. The strain on the table top is transferred according to above via the table profile to the inner leg profile via ball carrier, balls, ball carriage, ball carrier to the outer leg 30 portion profile and via the ground profile to the ground. Thus, the expansion armature will constitute a load carrying unit. To increase the stability of the table in two directions there are in one embodiment of the inventive idea two expansion fittings, one of which 2f is angular relative to the other.

35 To protect against the driving means 2k, constituting a driving member, e.g. a driving screw, a releasable cover plate 2i is snapped on the outer leg portion. An outer cover profile

2j is applied on the top of the leg portion or in an equal way, following the movements of the table top. The nut 2h, cooperating with the driving screw, is attached into a special bracket 2g, fixed to the outer leg profile portion. On the
5 inside of the outer leg profile portion a groove or the like may be disposed to enable a releasable application of the stretcher 3.

The operation of the table is performed by means of an electric motor 7. The motor is secured to the driving unit
10 profile 4. On the motor shaft there is arranged a driving wheel 7a. This driving wheel may consist of a chain wheel, a belt wheel or a similar wheel or pulley. The last-mentioned wheel can be driven in two rotation directions to execute the up and down directions for the table top. Said wheel drives another similar
15 wheel 7c via a transmission, e.g. a chain transmission 7b. The latter, via a further transmission 7d, drives in turn a further wheel in the other end of the driving unit profile. The wheel 7c is kept in place during transport by a holder 7e. The driving screw 2k can be connected to the wheel 7c which is possible due
20 to the profile of the unit (the driving unit) being provided with a hole 4a. In connection with the driving unit profile there is arranged a bearing 4b placed into an associated bearing support. The bearing can carry radial as well as axial loads. The bearing support constitutes a unit of the driving unit
25 profile. A motor cap 7f works as a mechanical and sound absorbing shield. When the motor is rotating the driving screw is following the movements of the table, while the nut 2k is fixed to the outer leg profile in the nut bracket 2g. The outer profile is fixed relative to the ground.

30 The table has a construction allowing it to be delivered in five main portions (this refers to a table having two pair of legs). The table top 1 constitutes one portion, the pair of legs 2 form two portions, the stretcher 3 forms one portion and the driving unit in the form of the parts 4, 5 and 7 forms its own
35 separate portion. If the table is provided with more than two telescopic legs there are required further portions the number of which corresponds to the number of telescopic legs in

question.

In assembling, it is suitable first to fix the leg stands 2 with the intermediate stretcher 3. Thereafter, the driving unit 4, 7 is applied between the leg stands. This is done by means of 5 the shaft pivot on the respective driving screw 2k being fitted into the hole 7c and locked. Thereafter, the driving unit profile is locked with the fastening member 4e of the inner leg profile 2d. The driving unit profile is being locked also with the table profile 2b with a fixing screw 4f. After this 10 operation being executed on the leg stands, the table top can be placed on the leg stands and fixed, whereupon the table is ready for use.

The invention is not limited to the above exemplifying embodiment but can be subjected to modification within the scope 15 of the appended claims or the inventive idea.

CLAIMS

1. A table comprising a top, vertically adjustable within a great range by means of telescopic legs (2c, 2d), an engageable and disengageable motor (7) for adjusting the top in a desired level within the range and a screw (2k), operable by the motor
5 via transmission members, executing the adjustment of the top in dependence of the operation of the motor, the respective telescopic leg consisting of inner and outer profiles,

c h a r a c t e r i z e d in that the inner and outer profiles are mutually guided by linear ball guides (expansion
10 fittings) comprising two mutually telescopic portions, one portion of which is attached inside the inner profile and the second portion is attached inside the outer profile.

2. A table according to claim 1, c h a r a c t e r i z e d in that the outer profile (2c) presents a substantially
15 rectangular cross section, having a ball guide (expansion armature) with two parallel ball cages (2eb) arranged at one long side thereof.

3. A table according to claim 1 or 2,
c h a r a c t e r i z e d in that the inner and outer profiles
20 are guided by means of two (2e, 2f) or more parallel arranged ball guides (expansion fittings), at least two of the parallel disposed ball guides being arranged at angles relative to each other to give stability in various main directions.

4. A device according to any one of the preceding claims,
25 c h a r a c t e r i z e d in

that the outer profile presents a substantially rectangular cross section and an substantially rectangular building-up portion along the long side of the rectangular cross section, to which the nut of the screw is fixed,

30 that the outer profile is provided with an inner portion, having a bow-shaped cross section, the intermediate portion and legs of which, together with the inner profile, incloses space for ball guides,

that a first outer portion of a first ball guide is

attached inside said intermediate portion and a second outer portion of the first ball guide is attached to the inside of a straight part of the inner profile.

5 5. A device according to claim 4, characterized
in that the inner profile presents a bow-shaped cross section, the legs of which present a section extending essentially parallel to the intermediate portion of the inner profile, and that at least one of the inner profile legs together with the leg of the inner portion of the outer profile provides space for
10 a second ball guide, a first outer portion of which is attached to the outside of the leg of the inner portion of the outer profile and a second outer portion of which is attached to the inside of the leg of the inner profile.

6. A table according to any one of the preceding claims,
15 characterized in that the table constitutes a number of joinable portions, the table top (1) forming one portion, the respective telescopic legs forming each one portion, and a stretcher, being part of the table, forming one portion and the driving unit with an electric motor and the
20 transmission member forming one separate portion, the portions being arranged such that the stretcher in a first moment is joinable to the telescopic legs, the driving unit thereafter is attachable between the telescopic legs, and finally, the table top is applicable to the leg stands.

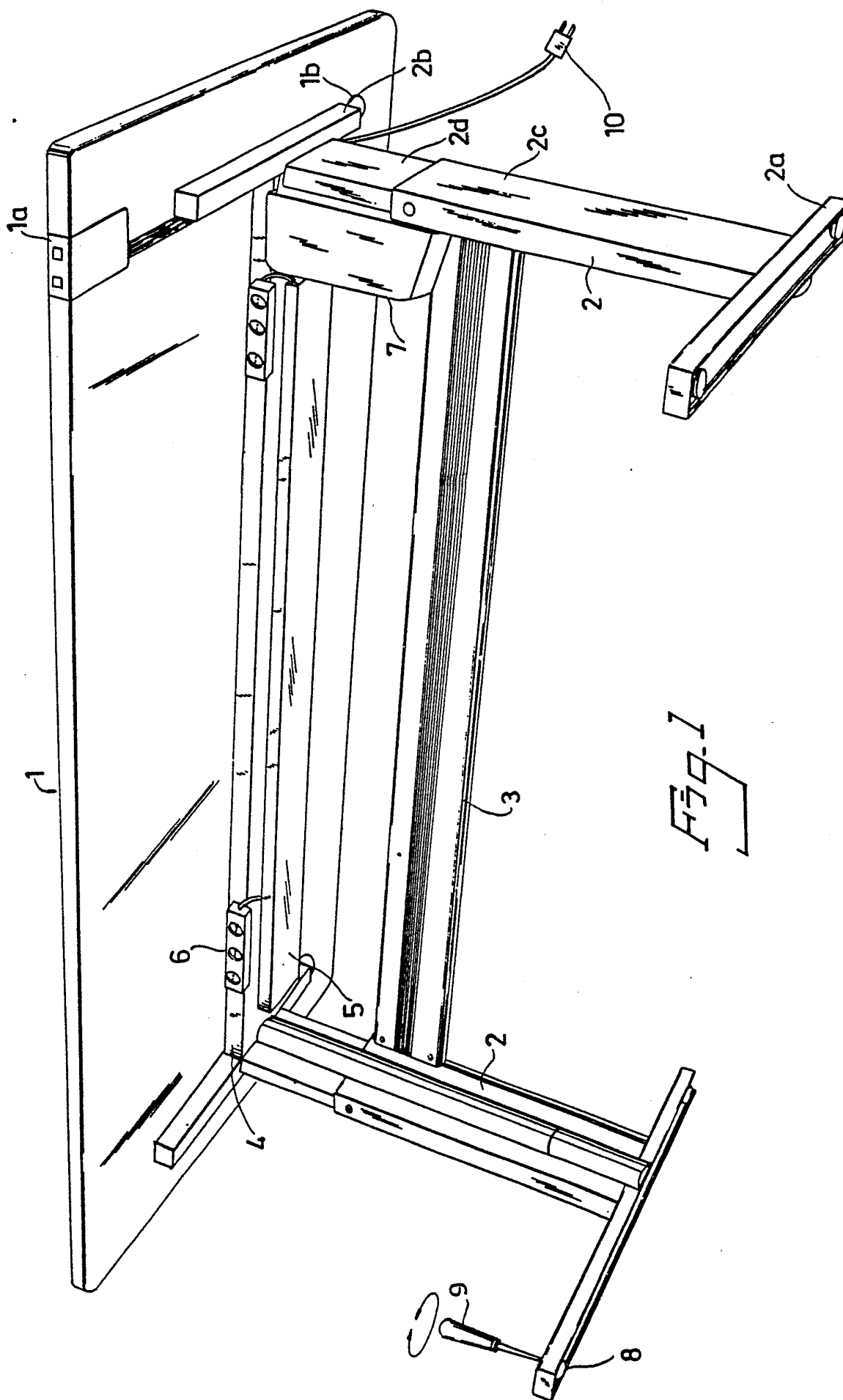


Fig. 1

Fig. 2

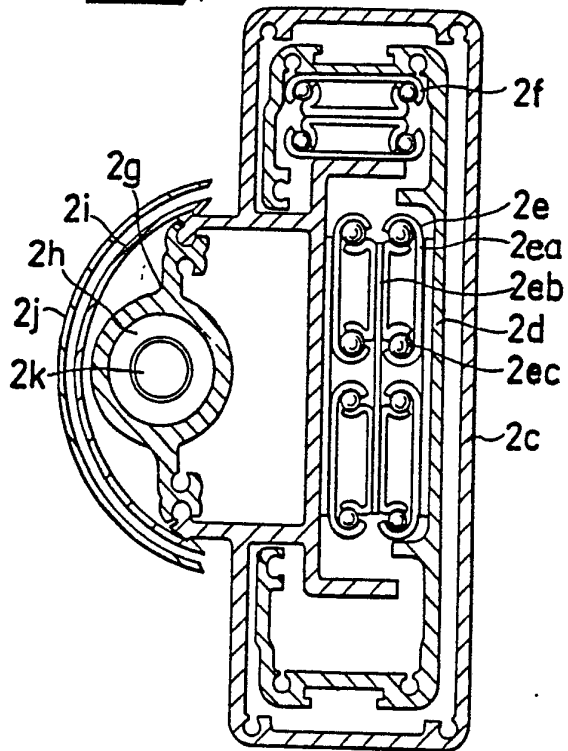


Fig. 3

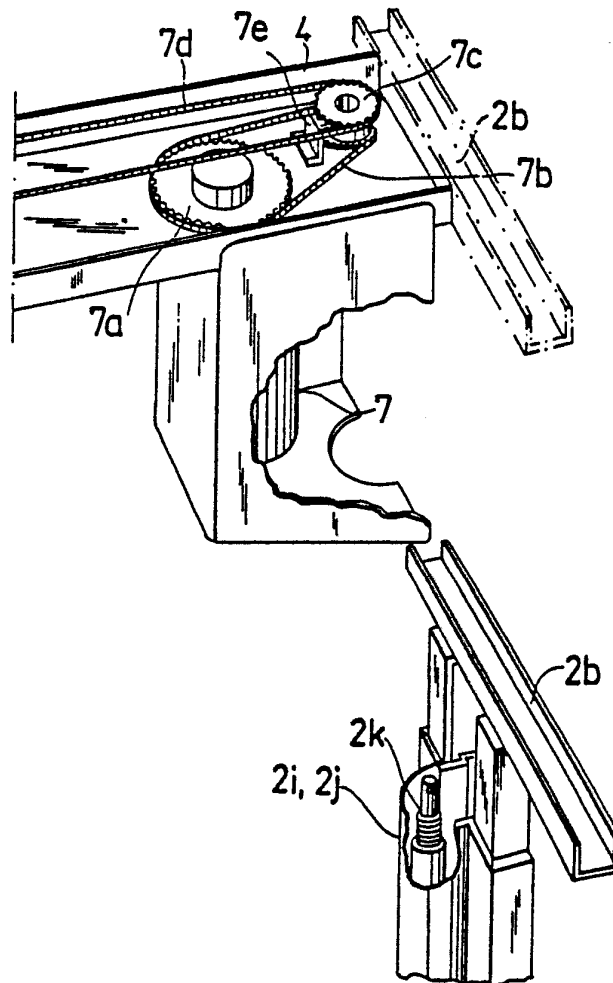
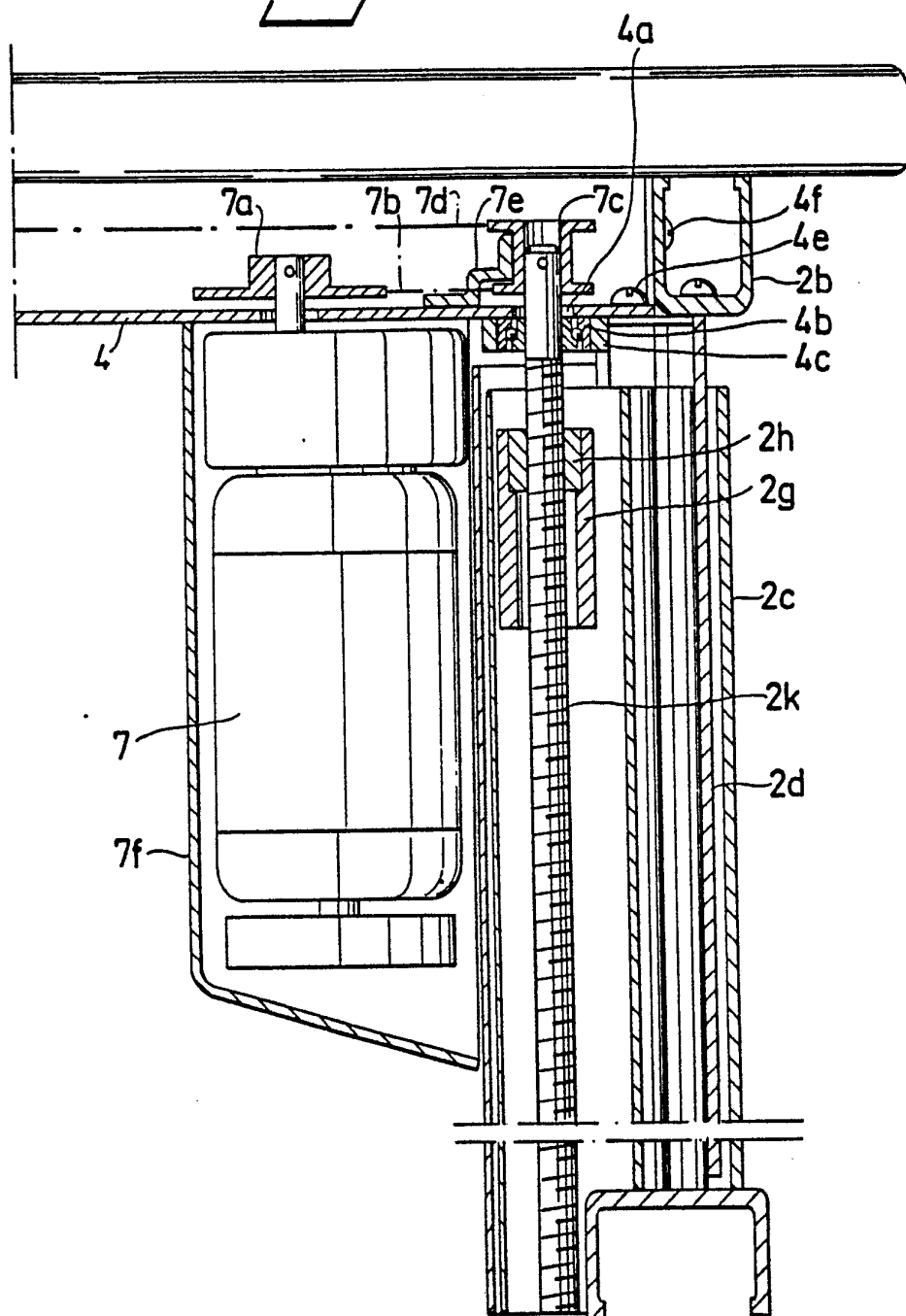
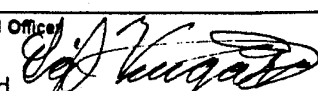


Fig. 4



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE87/00205

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
A 47 B 9/20		4
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC	A 47 B 3/00, /06, 9/00, /04, /20	
Nat C1	34i:5/04, 7/01	
US C1	108:106, 144, 147, 153, 155, 156, 157; 248:188.2, 4,5	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched *		
SE, NO, DK, FI classes as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT *		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	DE, A1, 3 049 357 (HORN GmbH & CO)	1, 2
Y	29 July 1982	6
A	SE, B, 446 498 (JOHANSSON ET AL)	1-5
	22 September 1986	
A	SE, B, 446 499 (JOHANSSON ET AL)	1-5
	22 September 1986	
Y	WO, A1, 81/02248 (EHRlich)	6
	20 August 1981	
Y	US, A, 3 866 549 (BERTON)	6
	18 February 1975	
* Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "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 "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		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
1987-07-17	1987-07-21	
International Searching Authority	Signature of Authorized Officer	
Swedish Patent Office	 Leif Vingård	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers..... because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers..... because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers..... because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☒ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ²

This International Searching Authority found multiple inventions in this international application as follows:

Claims 1-5 Refer to a table having a top with variable height.
Claim 6 Refers to a table built up from separable parts.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

- ☒ The additional search fees were accompanied by applicant's protest.
☐ No protest accompanied the payment of additional search fees.