

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 808 781 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.11.1997 Bulletin 1997/48

(51) Int. Cl.⁶: **B65F 1/14**, A47B 96/16

(21) Application number: **97106891.1**

(22) Date of filing: **25.04.1997**

(84) Designated Contracting States:
DE FR GB IT NL

(30) Priority: **21.05.1996 IT FO960015**

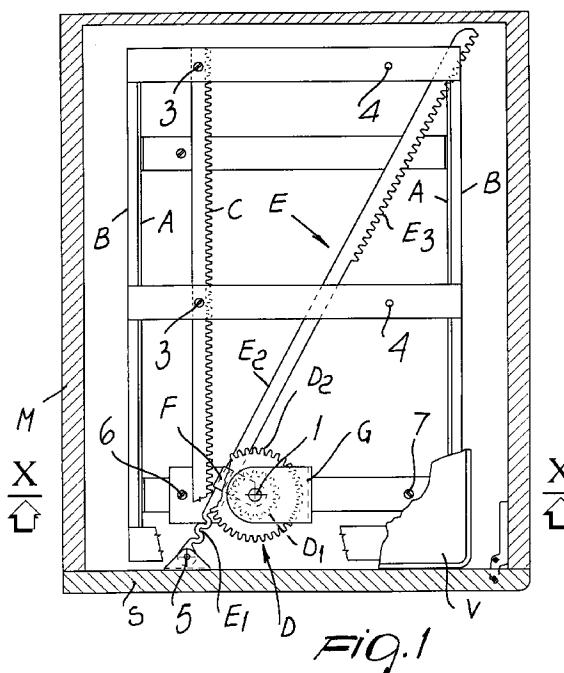
(71) Applicant:
Romagna Plastic S.r.l.
47020 Pievesestina di Cesena (Forlì) (IT)

(72) Inventors:
• **Lucci, Roberto**
20149 Milano (IT)
• **Orlandini, Paolo**
20018 Sedriano (Prov. of Milano) (IT)

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

(54) Device for automatically moving a slide for wastebaskets or other items

(57) A device for automatically moving a slide for trash baskets or other items by moving the door (S) of a piece of furniture (M) in which it is accommodated, comprises a double-rack type movement system which comprises two toothed rods (C,E), a first one whereof (C) is fixed to a pull-out slide (B), a second rod (E) being coupled to the door (S) of the piece of furniture (M), said toothed rods meshing respectively in an upper ring gear (D2) and in a lower ring gear (D1) of a vertical step-up gear system (D) which is rotatably fixed in the piece of furniture (M).



EP 0 808 781 A1

Description

The present invention relates to a device to be installed mainly in kitchen furniture and particularly in the trash cabinet so that the trash basket can exit and retract automatically when the door of the piece of furniture opens and closes.

Although solutions widely used for this purpose already exist, conventional solutions penalize the dimensions of the trash basket or its travel.

In most cases, the trash basket is in fact rather small with respect to the piece of furniture, since it is supported by the door and is therefore meant to rotate therewith. However, the small size of the trash basket, although being forced by having to rotate together with the door, is also required in order to prevent the weight of the trash introduced therein from being excessive for the door hinging means.

There are also trash baskets which can be extracted frontally and rest on a slide that is completed by a shaped guide for engaging a rigid element which protrudes from the door meant to automatically move the slide with the trash basket. An equivalent solution consists in applying to the door a plate with the shaped guide for the coupling of a tooth or pin which protrudes below the slide.

In any case, even the linear movement of the trash basket on the slide is provided with makeshift solutions which, while being appreciable from the economical point of view, are poorly functional, since the allowed travel is related to the width of the door and not to the depth of the cabinet that accommodates the trash basket. In practice, when it is necessary to work with modular furniture having standard modular dimensions, it is necessary to choose whether to use a trash basket which is considerably smaller than the cabinet assigned thereto, or to install a larger trash basket and accept a partial and insufficient exit of said trash basket from the piece of furniture.

This being the prior art, the aim of the present invention is to allow a more efficient utilization of the trash cabinet without penalizing its travel, which is in any case automatic and is correlated to the movement of the door of the piece of furniture which accommodates the trash basket.

Among the main features of the proposed device are: easy adaptation to the movement of the door (which is hinged to the right or to the left) and the possibility to design devices which are adequate to the dimensions to be moved on the basis of the invented operating principle.

In devising any device meant for the above-mentioned purposes, it is in fact difficult to meet the contrasting requirements of a particularly long travel of the moving part and of the need to delay the exit of said part due to the hindrance constituted by the door during initial opening. Accordingly, the device, while using only the final part of the opening movement of the door, must achieve an extraction of the trash basket which is suffi-

cient to use said trash basket.

Generally speaking, the device according to the present invention consists of a movement system which can be defined as a double rack system, since it uses two toothed rods: one is fixed to the pull-out slide supporting the trash basket and the other one is coupled to the door of the piece of furniture; these rods mesh with the two ring gears of a vertical step-up gear system which is rotatably fixed in the piece of furniture.

In order to better describe the device according to the present invention, drawings have been enclosed merely by way of non-limitative example, wherein:

figure 1 is a sectional top view, taken along a horizontal plane, of the device inside the piece of furniture, with the door in closed position;

figure 2 is a sectional view of figure 1, taken along the vertical plane XX;

figure 3 is a sectional top view of the device when the door is partly open and the slide is starting to be extracted or is ending its retraction;

figure 4 is a view of the device after extraction has been completed.

According to the preferred embodiment shown in the drawings, a sort of tray V, preferably made of plastics and containing one or even a plurality of trash baskets P in case of sorted trash collection, is retained by snug-fit coupling on a conventional pull-out slide B, the sliding guides A whereof are raised from the bottom of the piece of furniture M enough to arrange the movement device between said bottom and cross-members of the slide B. A bracket G is riveted at 2 in a bracket-like front cross-member of the guides A, in a point which is equidistant from the guides, and is meant to be retained to the right or to the left of the door S by means of one of the two screws 6 and 7 which fix the cross-member to the piece of furniture.

A step-up gear system D with two ring gears D1, D2 and a bracket F are pivoted in the bracket G by means of a vertical pivot 1; the bracket F surrounds a rod E of a driving rack, assisting its orientation and keeping it adjacent to a lower ring gear D1, which is the smallest one and has the smallest number of teeth.

The upper ring gear D2, i.e., the larger one, is stably meshed with a driven rack C, which is fixed at 3 below the cross-members of the slide B and parallel to the sliding guides.

In order to delay the exit of the slide B with respect to the opening of the door S, and to complete retraction before the door has completed its closing motion, the rod E, which is rotatably coupled at 5 to the door S, is toothed in a rack-like configuration only in its end portion E3 and therefore does not affect the step-up gear system when, at the beginning of the opening action or at the end of the closing action of the door, the intermediate portion E2, which is prism-shaped and toothless, slides between the bracket F and the ring gear D1.

The rod E also has, proximate to the rotatable cou-

pling 5, a multiple S-shaped portion E1 acting as a cushioning system.

By means of such a device, any trash cabinet can be used in the best possible way, by adapting thereto the ratio of the step-up gear system D and the length of the driving rack E3.

As regards the adaptation of a same device to a piece of furniture in which the door is hinged on the opposite side with respect to the illustrated example, the driven rack C is fixed to the slide B at the holes 4 of the cross-members, whilst the bracket G of the step-up gear system is retained by the screw 7 after a 180° rotation about the rivet 2.

Obviously, without altering the general characteristics which have been illustrated and described, the devised device can be susceptible of modifications and variations, which may be applied for production industrialization requirements and are in any case within the scope of the present invention.

Finally, although the device according to the present invention has arisen from the need to move trash baskets, the scope of the invention must be understood to also include other equivalent applications meant for the automatic extraction of any device, container or simple resting surface located inside a piece of furniture the dimensions whereof might otherwise hinder efficient utilization of the entire enclosed space.

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 interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for automatically moving a slide for trash baskets or other items by moving the door (S) of a piece of furniture (M) in which it is accommodated, characterized in that it comprises a double-rack type movement system which comprises two toothed rods (C,E), a first one whereof (E) is fixed to a pull-out slide (B), a second rod (C) being coupled to the door (S) of the piece of furniture (M), said toothed rods meshing respectively in an upper ring gear (D2) and in a lower ring gear (D1) of a vertical step-up gear system (D) which is rotatably fixed in the piece of furniture (M).
2. A device according to claim 1, characterized in that said second rod (C), which is stably meshed with said lower ring gear (D1) of the step-up gear system, is fixed to said pull-out slide (B) parallel to sliding guides (A) thereof.
3. A device according to claim 1, characterized in that a bracket F surrounding said first rod (E) of the double-rack type movement system is pivoted on a

pivot 1 of said step-up gear system (D), assisting its orientation and keeping it adjacent to the lower ring gear (D1) of the step-up gear system (D).

4. A device according to one or more of the preceding claims, characterized in that said first rod (E), which is rotatably coupled to the door (S), is toothed in a rack-like fashion only in an end portion (E3), and an intermediate portion thereof (E2) is prism-shaped and toothless.
5. A device according to one or more of the preceding claims, characterized in that said first rod (E) has, proximate to the connection to the door (S), a multiple S-shaped portion (E1) acting as a cushioning system.
6. A device according to one or more of the preceding claims, characterized in that said step-up gear system (D) and a bracket (F) which slidingly retains said first rod (E) are supported in a bracket (G) which is rotatably fixed to a cross-member of said sliding guides (A) of the slide and in a point which is equidistant from said guides (A), so as to obtain, by turning said bracket (G) through 180°, the orientation of said device according to the right or left hinging of the door (S).

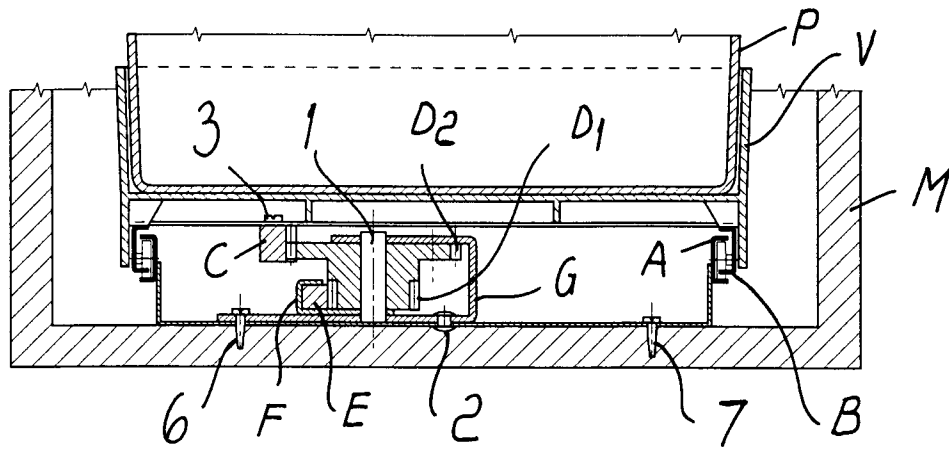


FIG. 2

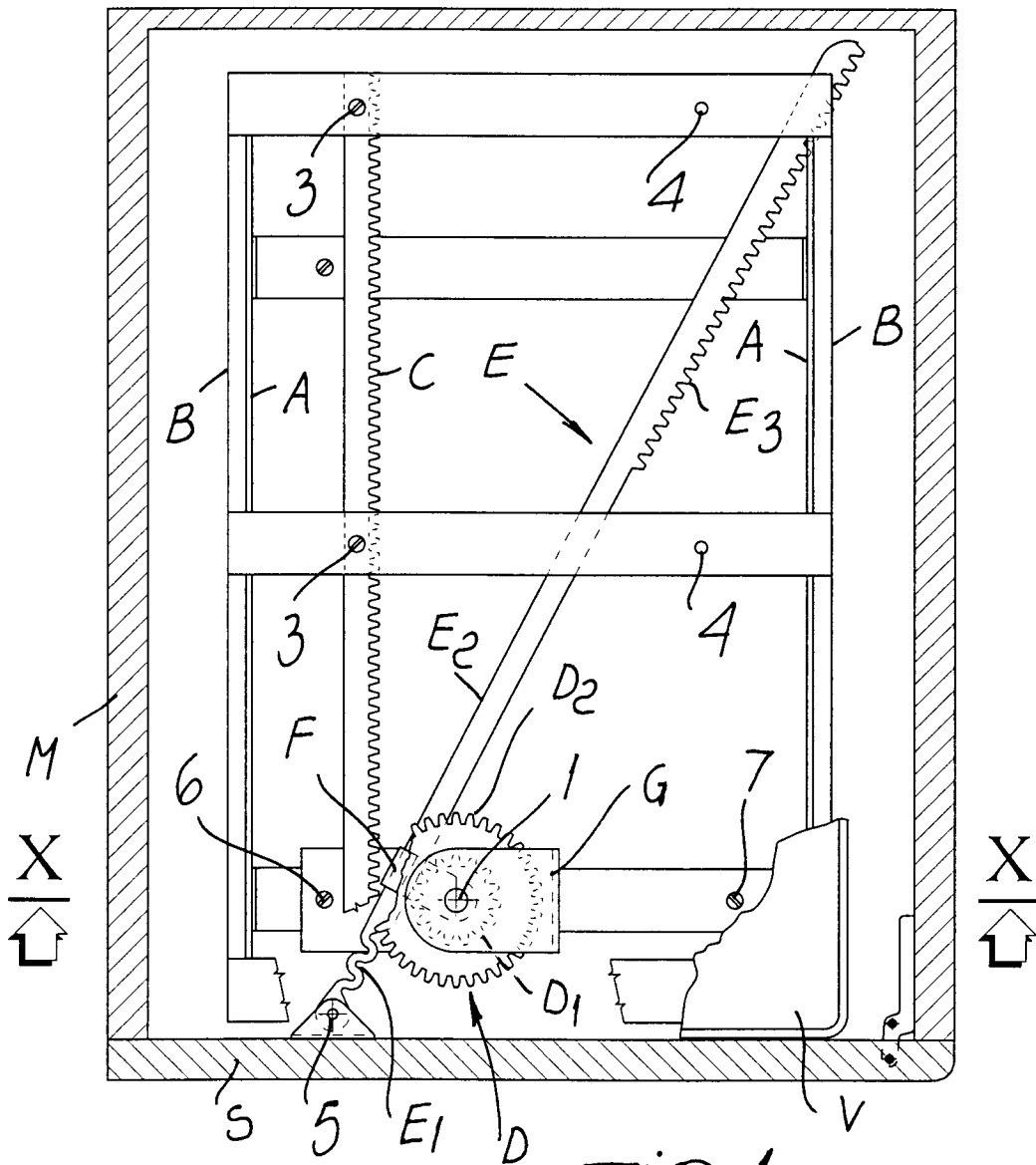
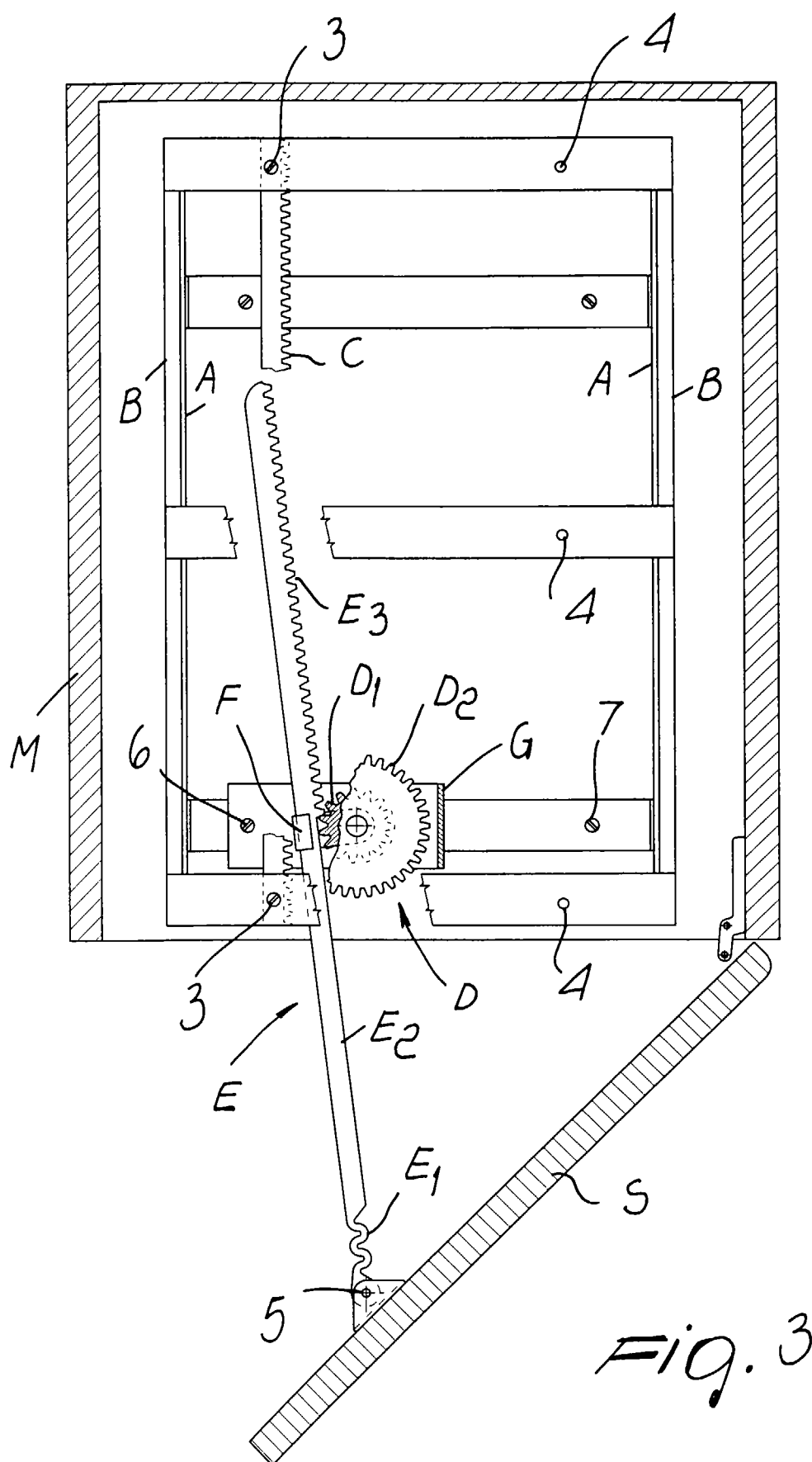
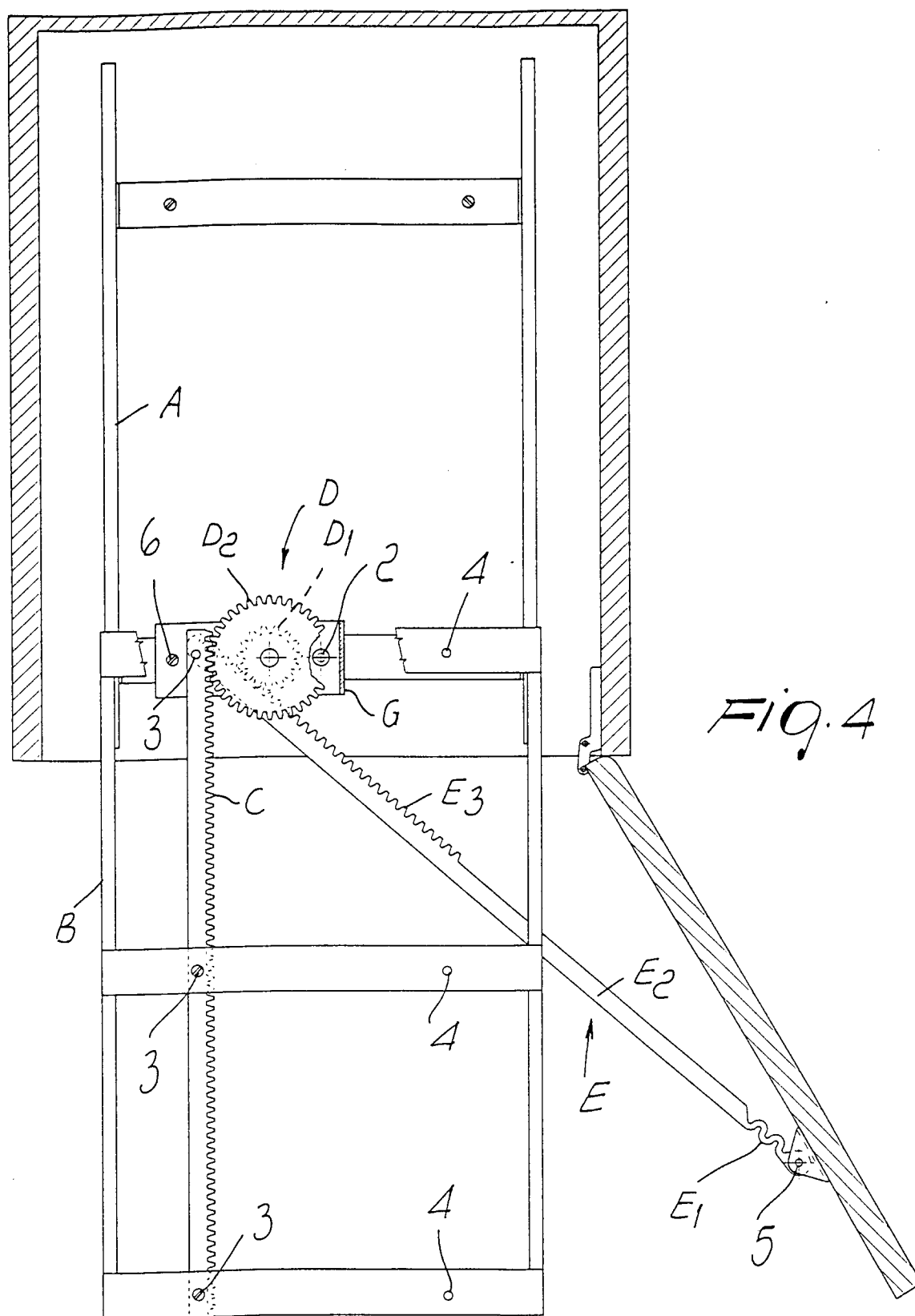


FIG. 1







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 6891

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	DE 33 04 159 C (HAILO-WERK RUDOLF LOH GMBH & CO KG) * column 3, line 20 - column 4, line 47 * * figures 1-3 * -----	1,6	B65F1/14 A47B96/16
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65F A47B
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 1997	Smolders, R	
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)