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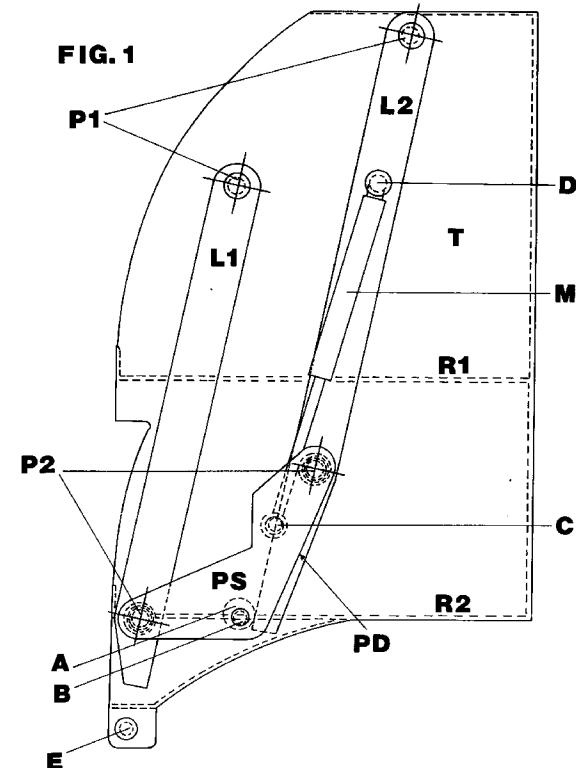
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(54) **A shelf-carrying structure with the possibility of varying the levels for wall units, shelves and cupboards.**

(57) The shelf-carrying structure according to the present invention allows to exploit the high spaces in ambients in which there are wall units, shelves and cupboards, by means of two carrying means each one comprising two levers (L1) and (L2), each of said levers having a fix lower fulcrum and a movable upper fulcrum contained in a vertical plane, said levers being connected to a frame with planes parallel to the ground and vertical to the sides of said piece of furniture, so that said levers, rotating on fix fulcrums and keeping always parallel and aligned, move said shelves in the space without changing their traces, with interaxial distances between the constant fulcrums.



The present invention concerns a shelf-carrying structure for wall units, shelves and cupboards, comprising means for obtaining a level variation.

It is well known that in houses and in offices wall units, shelves and cupboards are used for containing any kind of objects, with the consequent need of organizing the spaces needed for said objects in an ergonomic manner.

In consideration of the usual dimensions of the users, it may be desumed that the best range of exploitation of the spaces is comprised between 80 cm and 185 cm from the ground, as below said range the user must bend and above said range he must make use of a ladder or similar.

It is the aim of the present invention to make use also of the high spaces of those ambients in which wall units, shelves and various cupboards are installed above the optimal height range, without making use of ladders or similar, and therefore increasing the ergonomy and reducing the risk of incidents due to falling in houses and in offices.

The aim set forth is obtained, according to the present invention, by means of a structure consisting of two carrying means of equal dimensions and placements (one on the right and one on the left) and of a supported frame with different shapes, according to the cases. Each carrying means comprises two levers, each having a fix lower fulcrum and a movable upper fulcrum, contained in a vertical plane so that said levers rotate on fix fulcrums and always keep parallel and aligned, and move one element, connected to the upper movable fulcrums, in the space, without modifying its traces, with interaxial distances between the constant fulcrums.

Above described structure may be applied to pieces of furniture, shelves, cupboards, wardrobes and similar for determining the coming out and the lowering of the level of frames containing shelves, by providing in two internal opposite sides of the pieces of furniture - that represent the two vertical planes - each one containing two fix lower fulcrums, two levers for each side equally placed in couples in their lower fulcrums, and connecting said levers with the relative upper fulcrums to a frame containing planes parallel to the ground and vertical to the sides of said pieces of furniture. The inclination of the levers, from the lower fulcrums to the upper ones, corresponds to the one of the back of the piece of furniture so that, in resting position, the frame is kept inside the piece of furniture until an extractive force is applied on the rotation plane, the levers start rotating, dragging the frame which, remaining horizontal and parallel to itself, lowers its level until the overlaying of the levers is reached, or stops in intermediate positions, according to the needs.

In consideration of the fact that also heavy objects may be placed onto the shelves, the present invention provides the possible presence of gas or

mechanical springs for braking the descent and supporting the rising of the structure.

The advantages of the structure according to the present invention are:

- 5 - the exploitation of the higher parts of wall units, shelves and cupboards of different kinds, with a consequent increased ergonomy in the ambients;
- 10 - the convenience in use derived from the lowering to the user's level of the objects placed on the higher shelves;
- 15 - safeness in functioning because there is no need of making use of ladders and similar, which sometimes cause falling downs.

The present invention will be explained more in detail hereinbelow relating to the enclosed drawings in which a preferred embodiment is shown.

Figure 1 shows a lateral scheme of a possible shelf-carrying structure according to the present invention, having the possibility of changing levels, in closed position.

Figure 2 shows a scheme of a front view and in open position.

The enclosed drawings show a shelf-carrying structure with level variation for wall units, shelves and cupboards according to the present invention, comprising a right plate Pd and a left plate Ps, that are perfectly overlaying and that may be applied by means of screws into the two internal sides of a piece of furniture.

Each plate Pd and Ps is provided with threaded holes for housing pins P1 for placing levers L1 and L2 into the fix lower fulcrums, the rest pin B for supporting the shockproof material A with a decentralized hole, and a pin C for the lower supporting of the gas spring M connected to the lever L2, with a pin D.

In the upper part of the levers L1 and L1, the pins P1 connect the same through the upper movable fulcrums to a frame T that is the carried element containing, in this present case, the shelves R1, R2 and the handle E.

When taking the handle E with the hands, and keeping in mind that, having appropriately dimensioned the frame, the handle is consequently placed at such a height that it may be grasped without using ladders and similar, and applying a force, which may also be not necessarily tangential and parallel to the plane that contains the rotation to the longitudinal axis of the levers, from the inside to the outside of the piece of furniture, it occurs that said levers start rotating, transporting the frame T containing shelves R1 and R2 making it, at the same time, come out of the piece of furniture and lower its level to the predetermined point, in opening position.

At this level the shelves R1 and R2 may be easily reached without using any means, and ready for being loaded with any object and material. From this position, and with an upward push, the frame T starts

rising and re-entering, until one point of the two levers L2 rests onto the shockproof material A for staying there.

During the whole opening, using and closing cycle, the gas springs that are appropriately calculated and placed, facilitate the whole operation.

For what concerns the embodiment shown in the figures, it is believed that, even if no weight is placed on shelves R1 and R2, the frame T remains in the opening position without performing any force, because the force of the gas springs M, appropriately calculated, does not overcome, in that position, the weight of the frame T; in such conditions, the moment of the spring Mm is smaller than the moment Mt of the frame.

The lower part of the frame T is provided in such a shape that during the movement it does not bump against objects placed in possible fix underlaying shelves, belonging to the piece of furniture.

What above described and shown is only one of the possible mechanical embodiments of the structure according to the present invention, and many variants are possible without leaving the limits of the present invention.

It is furthermore obvious that mechanical solutions, variations in dimensions, measures, shape of the shelves and materials used may be determined according to the needs.

5 3. A shelf-carrying structure according to claim 1, characterized in the presence of gas or mechanical springs for braking the descent and supporting the rising of the structures.

10 4. A shelf-carrying structure according to claim 1, characterized in that in the upper part of levers (L1) and (L2), the pins (P1) connect said levers, through movable upper fulcrums, to the frame (T) that is the supported element containing, in the present case, the shelves (R1) and (R2) and the handle (E), so that grasping the handle said levers start rotating, transporting the frame (T) containing the shelves (R1) and (R2) and, at the same time, making it come out of the piece of furniture and lower its level to the predetermined point, in opening position.

15 5. A shelf-carrying structure according to claim 1 characterized in that by means of an upward push, the frame (T) begins rising again, from the lowered position, and re-entering until a point of the two levers (L2) rests onto the shockproof material (A) for remaining there.

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Claims

1. A shelf-carrying structure with the possibility of varying the level, for wall-units, shelves and cupboards, for using also the high spaces of the ambients where the furniture is placed, comprising two carrying means of equal dimension and placement, one on the right and one on the left, and a supported frame, characterized in that each carrying means comprises two levers, each having a fix lower fulcrum and a movable upper fulcrum, contained in a vertical plane so that said levers, rotating on the fix fulcrums and remaining always parallel and aligned, move one element, connected to the movable upper fulcrums, in the space without changing its traces, with interaxial distances between the constant fulcrums.

2. A shelf-carrying structure according to claim 1, characterized in the presence, in each of the two internal and opposite sides of the piece of furniture, that represent the two vertical planes, two fix lower fulcrums so that, connecting said levers, with the relative upper fulcrums, to a frame containing shelves parallel to the ground and vertical to the sides of said piece of furniture, the coming out and the lowering of the level of the frame containing the shelves is obtained.

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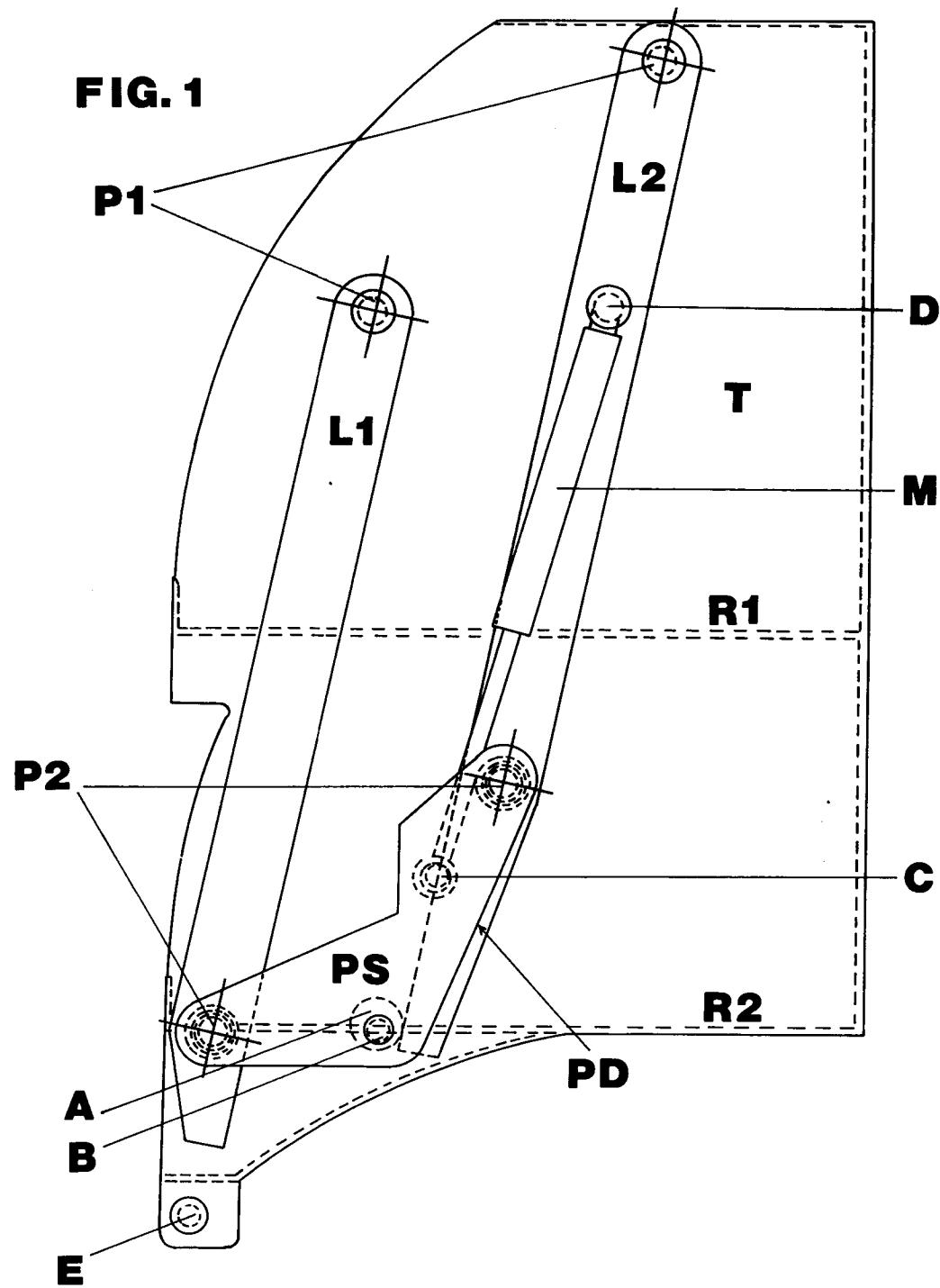
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FIG. 1



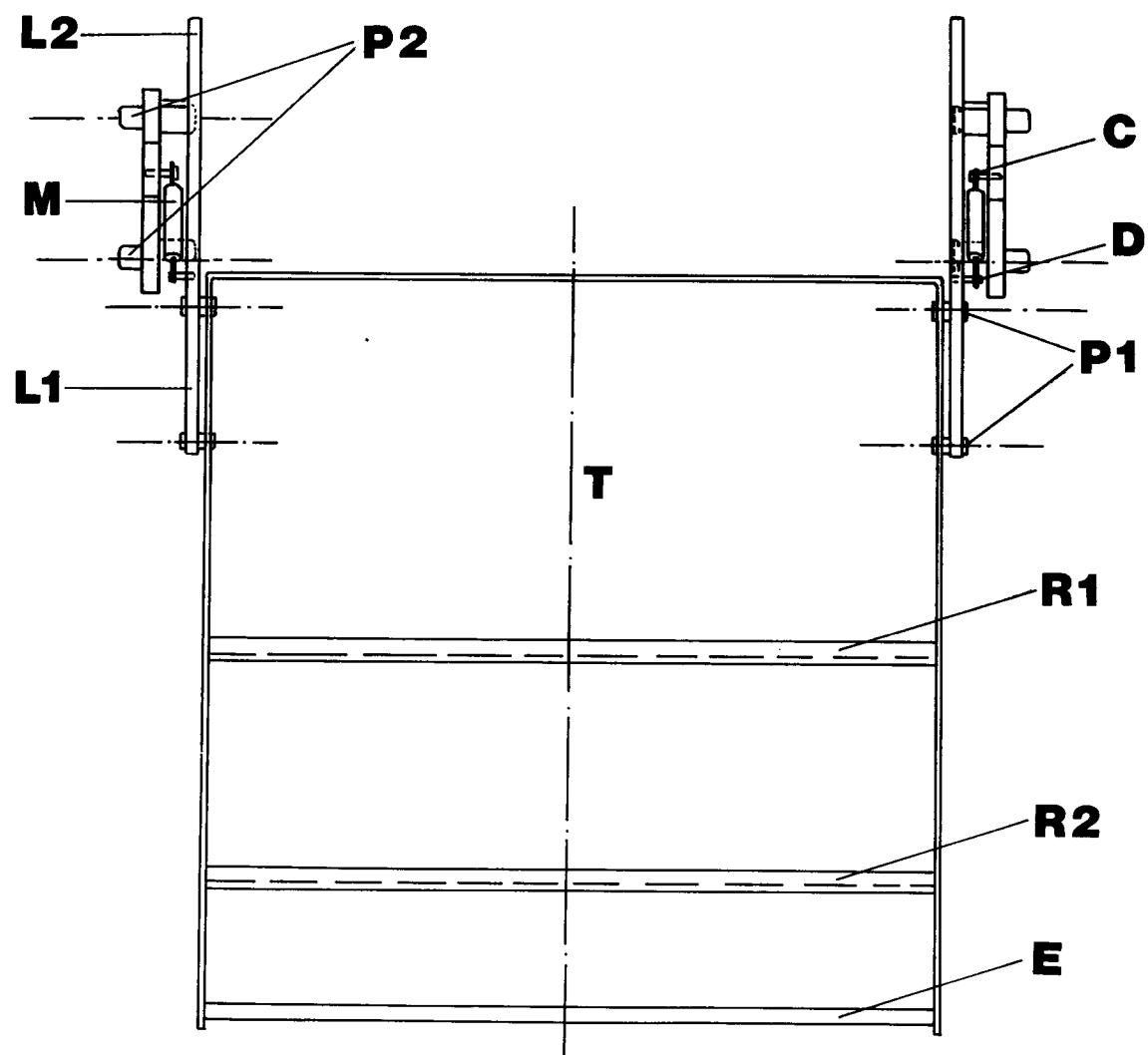


FIG.2