DESCRIPTION

IMPROVEMENTS IN FURNITURE COMBINATION BED AND DESK

Technical Field

This invention relates to transformable furniture, single units that can fulfill alternatively more than one function. Application is for an improvement in Combination Bed and Desk furniture that admit objects to remain on desktop.

Background Art

Wall bed, (or Murphy Bed, a 1900 patent), a well known furniture, allows a double use of a certain area of a room. It usually has a very simple mechanism, which includes springs to balance the weight and diminish effort for stowing or deploying the bed. Some versions become Combination Bed and Desk, adding a folding desktop that can be deployed when the bed is stowed in vertical position. The desktop must be cleared to stow it, and then bed can be deployed. Desktop normally uses part of the area the bed was occupying.

A great number of patents combine a bed and a desk in fixed positions or folding the bed to stow it. But few designs exist that can stow a loaded desktop and deploy a bed in the same area.

Similar existing proposals are compared with our invention as follows:

Patent U.S. 4,070,715 dated January 31, 1978, proposes a Combination Bed and Desk which consists of a wall bed and a desk that goes down and up.

The mechanism used is complex, having chains, pinions, shafts and racks and (almost necessarily) it needs a motor. When desk lowers from the use position, mechanism keeps desktop leveled thus allowing objects to remain on it. Simultaneously, the bed that was stowed against the wall turns, deploying at normal level. Strokes only permit a reduced height for objects left on the desktop.

The bed and the desk, main components of the furniture, when in use, come in turn to occupy the same floor area. Heights of the desktop and of the bed are normal in their use positions.

In comparison, our design has only two or three pairs of simple auxiliary parts, with remarkable cost and simplicity advantage.

Summing up, the system is different, stowed positions and the mechanical means used are different.

Patent DE 4318785 of 1995-02-09 proposes a Combination Bed and Desktop with no additional furniture body unit. Described mechanism guides bed and desktop, linking bed and desktop to some wall fixed elements. Weight of moving parts and mechanism lever action is handled by four wheels that roll on the floor.

In final stowed position, the bed lies flat against the wall with one side next to the floor.

This mechanism is more complex than ours: it has five pairs of parts (or six or more according to criterion), and also requires adequate quality of the floor for the wheels rolling on it. If floor lacks the required quality, some work should be done on it, or additional rails must be installed.

Moreover, its main links are much longer and loaded in flexion, so our design has much greater rigidity and solidity feel for the user.

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Summing up, the system is different, stowed positions and the mechanical means used are different.

Disclosure of Invention

Furniture Body and Linkage

See Figures 1, 2, 3, 4, 5, and 6.

Furniture has a body (1) which upper part (2) is a cupboard or other storage. The mean and lower parts hold a desktop (3) and a bed frame (4) with mattress and bedding (5).When in desktop position, bed lies flat against the back of the furniture (or against the wall if the

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furniture lacks a back), and bedding is concealed from view. Desktop is supported in cantilever, its back edge resting against bed bottom. When transformed into bed, the desktop is guided downwards always leveled, and the bed deploys rotating at (6).

Furniture has two symmetrical linkages for guiding, and, for the sake of simplicity, numbers refer only to one linkage.

Bed and desktop, articulates at (8) through heads arms (7A) and (7B).

A connecting rod (9) is parallel and of equal active length to the imaginary segment defined by articulations (6) and (8). This connecting rod (9) articulates at (10) with body, and its articulation (11) guides the desktop.

A parallelogram is thus formed by points (6), (8), (10) and (11), so the desktop is maintained leveled throughout its stroke.

The parallelogram could be build complete in metal, and desktop heads fixed to corresponding side. This and other executions are variations that correspond to same invention.

By aesthetic or practical reasons, connecting rod (9) can be placed in other locations in parallel positions to the indicated one, then always forming a parallelogram and requiring adequate arms of bed and table heads to reach connecting rod articulations.

Same linkage can be employed if walls or auxiliary structures are used to give support to it, instead of a furniture body.

A balancing system can be added to lessen efforts when changing from desktop to bed or conversely.

Balancing force has to neutralize weight of desktop and bed with its contents, and can use any device like springs, torsion bar, gas springs, counterweights, etc. acting directly or by levers or cables etc. The numerous mechanical variations that can be used for balancing, do not affect the unit of invention of the present request.

Balance for direct manual conversion, has to be precise to facilitate operation, through the entire stroke.

After balancing is adjusted, ballast can be added to maintain balance when weighty objects are removed from desktop or bed.

Motorizations can be used, electrical or mechanical (handle, pedal, etc.) in order to raise and lower components easily, reducing necessity of balance exactitude.

In this case, balancing requirements are not so precise and the use of ballast could be no longer necessary.

Balancing Mechanism Preferred Embodiment

A balancing mechanism is added in this patent and explained referring to Figure 7.

Mechanism includes two symmetrical units (left and right), each unit fixed to the internal face of each body side (or to another support). References are made to one unit, for simplicity.

It has turning element (6) and connecting rod (9) necessary to guide bed and desk respectively. Each unit has a vertical (or near) box (16) that contains springs (14) whose upper ends are held by part (15) (fixed to box (16)) that can be displaced to increase the working tension. Lower ends of springs, by means of part (13), applies force at point (12) to the (connecting rod) (9) which turns at (10). This connecting rod (9) guides desktop at point (11), and also balances the moving parts as explained.

This design makes possible to match force to the effect of gravity on suspended parts throughout its entire stroke, by means of a determination of components dimensioning obtained by applicable equilibrium algorithms .

This mechanism quality contributes decisively to achieve effortless direct manual conversion.

Bedding Stowing

The bedding needs no straps or similar elements to maintain its place. This is due to adopted turning limitation of the bed, and the confinement in which it is left when it reaches a vertical position, together with appropriate lateral compression of the mattress in its lodging in the bed.

Minimum Area Model

A variation is to use a desktop of shorter length than the one of the bed. With similar conditions of support, desktop occupies then only a portion of the area previously used by the bed, so that some floor area remains available for other element like drawers or shelves. Also, such element can serve as stool, and internal face of the furniture or an adjacent wall can serve as back to conform a seat and thus to serve this disposition to work comfortably without any auxiliary element. This arrangement has the best floor use.

Brief Description of Drawings

Figure 1 Side view with stowed bed and the desktop in use position.
Figure 2 Front view with stowed bed and the desktop in use position.
Figure 3 Side view with the bed deployed and the desktop stowed. (located underneath).
Figure 4 Front view with the bed deployed and the desktop stowed. (located underneath the bed).
Figure 5 Perspective with the bed deployed and the desktop stowed. (located underneath the bed).
Figure 6 Perspective with stowed bed and the desktop in use position.
Figure 7 Exploded view of balancing mechanism.

Best Mode of Carrying out the Invention

The nature of invention permits the use of well known metal and carpentry technologies and manufacturing processes.

CLAIMS

1.- A Combination bed and desk furniture item, movable between a desk use position, in which the bed is stowed in a vertical non-use position, and a bed use position, in which the desk is stowed beneath the bed next to the floor, comprising a bed (4) pivotally connected at (6) to a fixed support (1), and a desk (3) pivotally connected at (8) to the bed, the desk also being guided by connecting rods (9) pivotally connected at the other end (10) to the fixed support, wherein the desk remains horizontal while moving and when reaching the two end positions, this arrangement of said combination furniture item conforming a parallelogram linkage ((10), (6), (8), (11)), characterized in that said parallelogram comprises:
-a fixed first substantially upright imaginary side ((10), (6)) fixed to furniture side or support;
-a skewing second adjacent imaginary side ((6),(8)) pertaining to the bed,
-a third imaginary side ((8), (11)), opposite to the first one, pertaining to the desk, which side remains parallel to the first fixed side during the movement,
-a skewing fourth side ((11), (10)) which is a connecting rod (9) linking a point (11) of the desk (3) to the low end (10) of above mentioned first fixed upright side, the result being obtained that the use and non-use positions of the desk situates substantially vertically each other .

2.- A Combination bed and desk furniture item as per Claim 1, where the guiding connecting rod (9), is connected to springs for balancing the moving parts.

3.- A Combination bed and desk furniture item as per Claims 1 and 2, characterized by the aggregation of additional storage components.

4.- A Combination bed and desk furniture item as per Claims 1 to 3, characterized by motorizations to carry out the transformation.

5.- A Combination bed and desk furniture item as per Claims 1 to 4, characterized by bed having a suitable confinement of bedding that allows not using auxiliary elements to maintain it in its place when bed is turned for conversion to be stowed vertically and is brought back.