March 13, 1956 H. E. HUTZELMAN 2,738,247

SUSPENSION FOR EXTENDABLE TYPEWRITER SHELF

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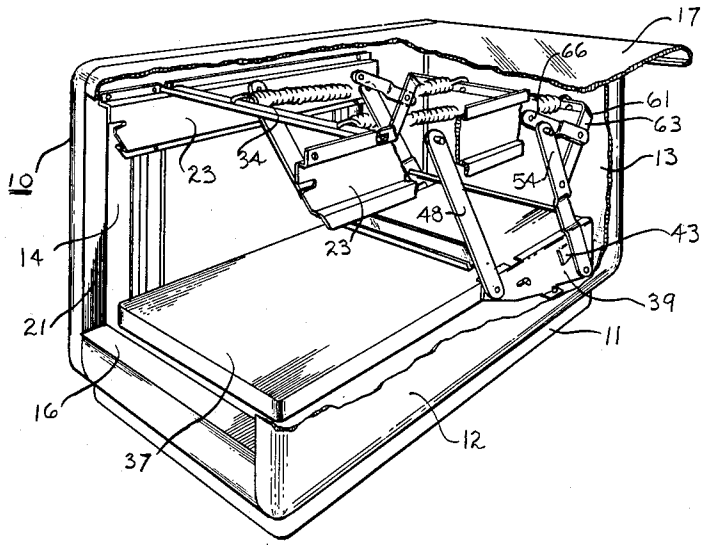



Fig. 1

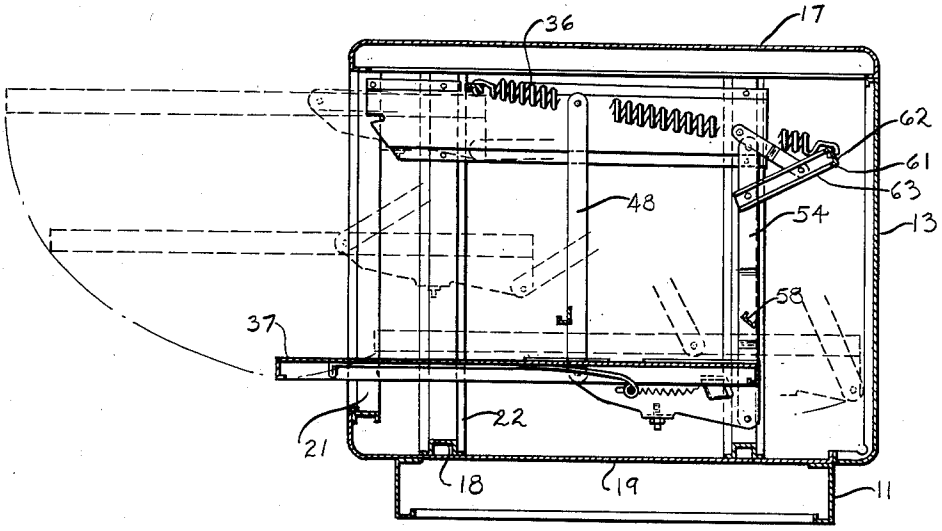



Fig. 2

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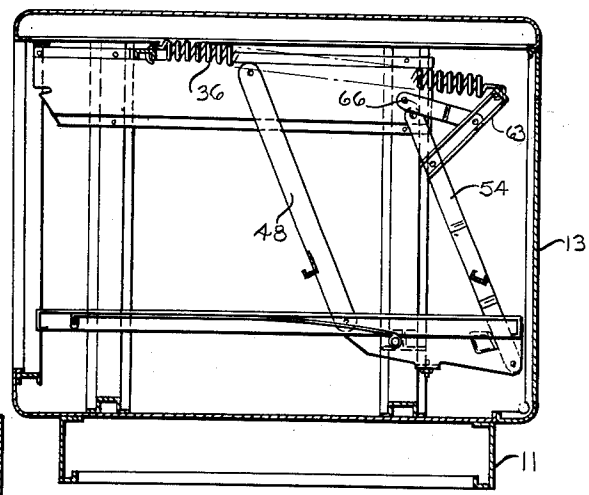



Fig. 3

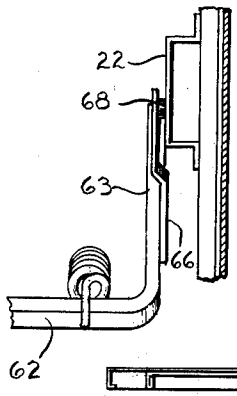



Fig. 10

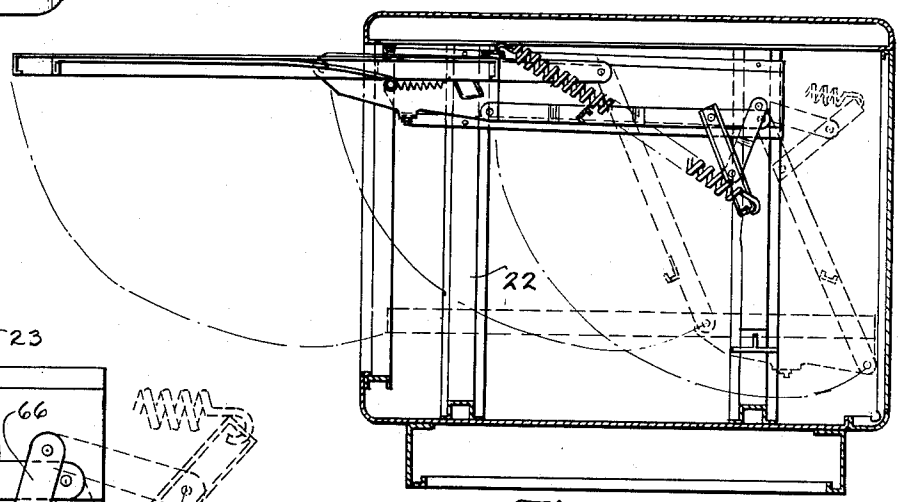



Fig. 4

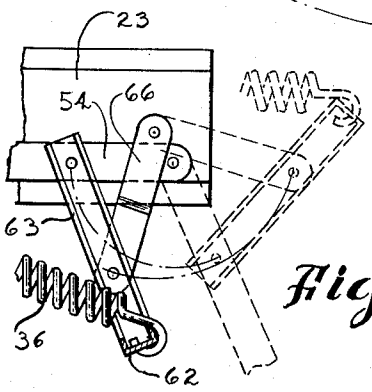



Fig. 9

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SUSPENSION FOR EXTENDABLE TYPEWRITER SHELF

Filed Dec. 4, 1952 4 Sheets-Sheet 3

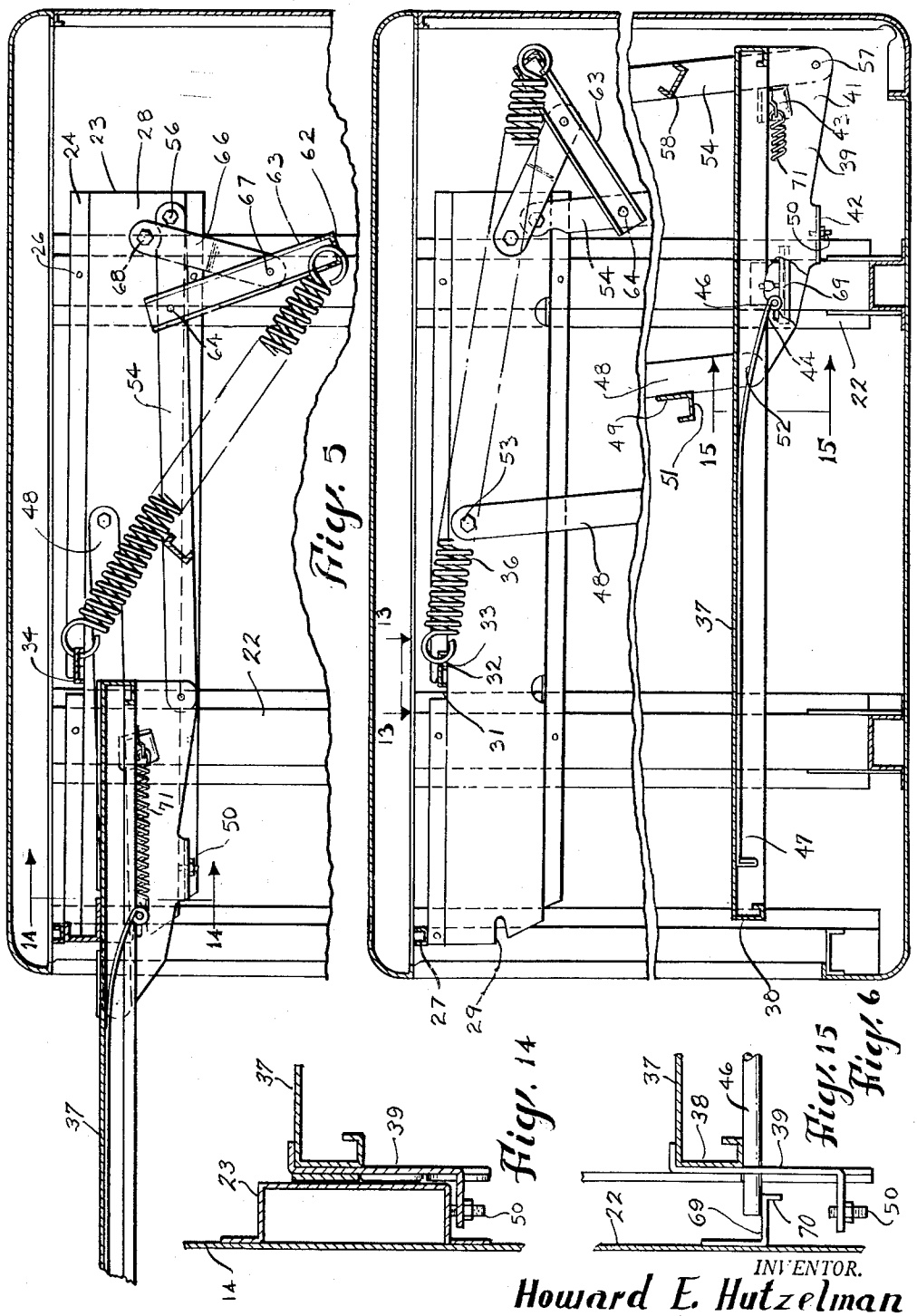


Fig. 5



Fig. 14



Fig. 15

Fig. 6

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SUSPENSION FOR EXTENDABLE TYPEWRITER SHELF

Filed Dec. 4, 1952 4 Sheets-Sheet 4

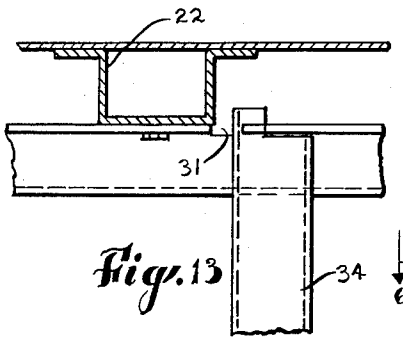



Fig. 13

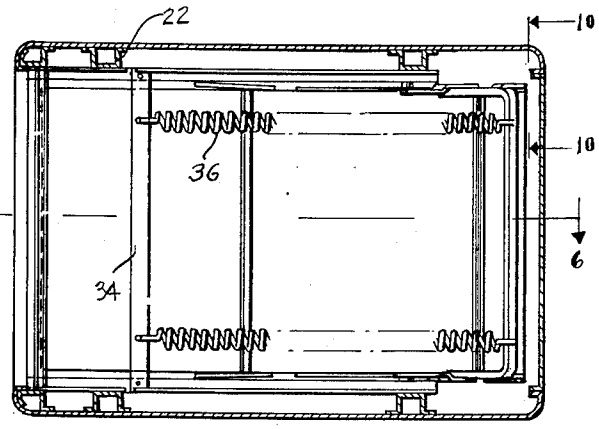



Fig. 7

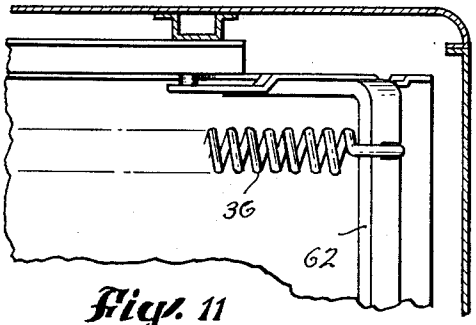



Fig. 11

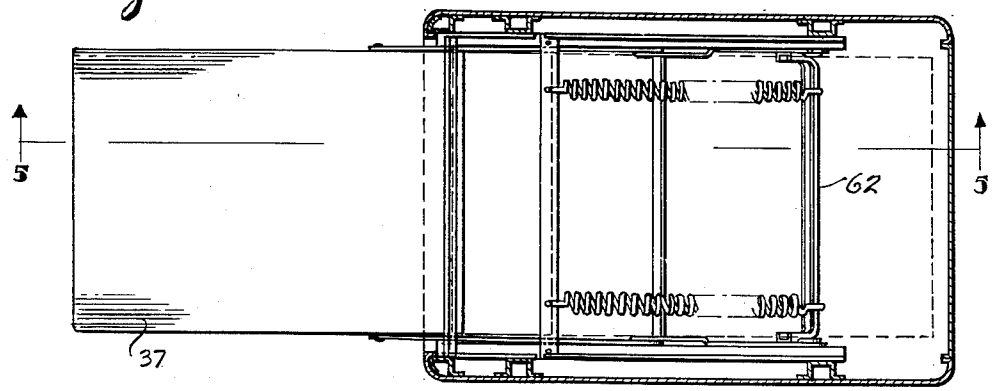



Fig. 8

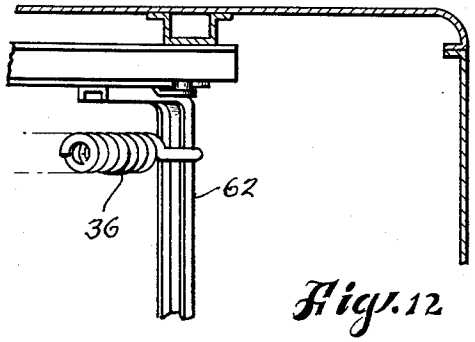



Fig. 12

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United States Patent Office 2,738,247
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2,738,247

# SUSPENSION FOR EXTENDABLE TYPEWRITER SHELF

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Application December 4, 1952, Serial No. 323,999

9 Claims. (Cl. 312—27)

This invention relates to desks or other articles of furniture having a pedestal that is provided with a compartment suitable for housing a typewriter. More particularly the invention is directed to means mounted in the pedestal for supporting a typewriter in such manner that it may be moved from a retracted position within the compartment to an extended, raised position of use, and includes improved supporting and swinging mechanism for a typewriter shelf, together with novel counterbalancing structure.

Swing mechanisms for pedestal contained typewriter shelves have been in use in one form or another for many years. Insofar as can be determined, many of these swing mechanisms have not proven entirely satisfactory with respect to convenience or manipulation thereof into and out of position of use. It has been found that many of these mechanisms fail to embody structure that could be so latched or secured as to rigidly secure the shelf and typewriter in an extended, raised position. To be sure, some of these mechanisms have embodied counterbalances such as weights or springs for the purpose of relieving part of the shelf load torque, but mostly this has been for the purpose of enabling easier manipulation by an operator. However, such counterbalances and the swing mechanisms with which they have heretofore been associated would not fully or even nearly relieve the combined torque load of the shelf and typewriter throughout the entire travel from retracted to extended position. It was heretofore considered sufficient to provide a partial counterbalance structure with the greatest effectiveness thereof occurring at or near the end of travel of the shelf and typewriter into extended position. This was objectionable in that the full effect of the counterbalance, when supplemented by the upward pull of an operator, caused the shelf to so rapidly come into position of use that the typewriter, shelf, and swing mechanism were subjected to a considerable jarring when the position of use was reached. Similarly, such structure provided little or no counterbalancing effect at the approach of the shelf and mechanism to retracted position. The consequence of this was, of course, that even with some retarding effort on the part of an operator, the shelf and typewriter would move so rapidly into the compartment as to reach fully retracted position with excessive jarring of all the parts.

The present invention has been particularly designed and constructed to provide a swing mechanism for a typewriter shelf that is so controlled by counterbalancing means that the combined load or weight torque of a shelf and typewriter is substantially balanced at all times; that is, throughout the entire path of travel, whether the shelf and typewriter are being moved into extended position of use or into retracted position of storage and this, therefore, constitutes the invention's principal object.

Another important object of the invention lies in the provision of a typewriter shelf swing mechanism that is of extremely simple and rugged construction and enables extending or retracting a typewriter through a single, smooth, arcuate path of travel.



A further important object of the invention lies in the provision of means that enables altering the effectiveness of the counterbalancing structure in such a manner as to adapt it to the control of typewriters of different weights.

Another and further object of the invention lies in the provision of a typewriter shelf swing mechanism in which arms cooperate to rigidly support the shelf and includes locking means by which to hold said arms in their fully extended position.

Other objects and advantages of the invention will be more fully understood from a consideration of the following specification, taken in conjunction with the accompanying drawings; in which

Fig. 1 is a fragmentary perspective view of the pedestal of an article of furniture and shows the shelf swing mechanism embodying the invention;

Fig. 2 is a longitudinal vertical sectional view through the pedestal showing the shelf and swing mechanism in partially and fully extended position in dotted lines;

Fig. 3 is a view similar to Fig. 2 and shows the shelf and swing mechanism in fully retracted position;

Fig. 4 is a view similar to Fig. 3 and shows the shelf and swing mechanism in fully extended position in full lines and in fully retracted position in dotted lines;

Fig. 5 is a greatly enlarged longitudinal vertical sectional view of the shelf and swing mechanism, being taken substantially on the line 5—5 of Fig. 8;

Fig. 6 is also an enlarged longitudinal vertical sectional view showing the shelf and spring mechanism in fully retracted position, being taken substantially on the line 6—6 of Fig. 7;

Fig. 7 is a top plan view of the swing mechanism and shelf, the pedestal top being removed for this purpose, and shows the structure in fully retracted position;

Fig. 8 is a view similar to Fig. 7 showing the relationship of the operative parts when the shelf is in fully extended position;

Fig. 9 is an enlarged fragmentary elevational view of the spring control linkage in shelf extended position in full lines (Fig. 4) and shelf retracted position in dotted lines (Fig. 3);

Fig. 10 is an enlarged fragmentary vertical sectional view taken substantially on the line 10—10 of Fig. 7;

Fig. 11 is an enlarged fragmentary plan view of the spring control linkage when the mechanism is in the retracted position shown in Fig. 7;

Fig. 12 is an enlarged fragmentary plan view of the spring control linkage when the shelf is in extended position as shown in Fig. 8;

Fig. 13 is an enlarged fragmentary view, being taken substantially on the line 13—13 of Fig. 6 and shows means by which the counterbalancing mechanism may be adapted to the support of typewriters of different weights;

Fig. 14 is an enlarged fragmentary vertical sectional view, taken substantially on the line 14—14 of Fig. 5 and shows adjustable means for determining the extended stop position of the shelf; and

Fig. 15 is an enlarged fragmentary vertical sectional view taken substantially on the line 15—15 of Fig. 6 and shows means for latching the shelf in fully retracted position.

Referring more particularly to the drawing, the reference numeral 10 is employed to generally designate a pedestal of the type common to desks or tables. Present design of desks or tables, desks particularly, mounts the pedestal on a stepped in base, such as indicated at 11, or on some form of runner, this structure being conventionally substituted for previously applied legs of one form or another. The pedestal, in the present disclosure, consists of an inner wall 12, rear wall 13 and outer wall 14. The inner and outer walls 12 and 14 are flanged along their vertical edges to form an opening 16

adapted to be closed by a side hung door. The top 17 of the pedestal generally constitutes a part of the desk or table top. In the present instance, the pedestal is reinforced interiorly by inverted channels 18 that extend transversely of and are permanently secured to the base wall 19 of the pedestal. A shallow frontal channel 21, at least in part, frames the opening 16. The side walls 12 and 14 of the pedestal are reinforced by front and rear channels 22, these channels being permanently attached to the walls in any suitable manner. The structure thus far described is intended only as a means of orienting the structural features of the invention inasmuch as it constitutes no part thereof. The structure embodying the invention takes the form of a swingable suspension. The suspension is carried in its entirety by a pair of side rails 23 which are of the nature of channels. The flanged edges 24 are intended to abut the outstanding base walls of the side channels 22 and are secured thereto in any suitable manner, as by screws 26. At the forward ends of the rails 23 is a channel bar 27 that forms a part of the pedestal. Beneath the bar 27, the laterally projecting central portion 28 of the rail is formed with a forwardly opening notch 29, the lower wall of which is inclined slightly downwardly. From this wall the portion 28 is cut away at an incline and the flange 24 therebeneath is also cut away, substantially as suggested in Figs. 1 and 6 of the drawing. Just to the rear of the forward channels 22, the upper flanges 24 of the supporting channels are notched, as at 31. One wall of this notch takes the form of a finger 32 and provides a recess 33. The ends of a cross bar 34 are projected into the notches 31 and moved beneath the finger 32 into the recess 33. This bar is intended to secure the forward ends of counterbalancing springs 36. A typewriter shelf 37 consists of a flat top portion that is rigidified by depending marginal flanges 38. The rear portions of offset side flanges of the shelf serve to mount brackets 39. These brackets do not extend above the shelf's surface but do depend below the flanges 38 and each includes a rear portion 41 and central portion 42 formed with a laterally extending flange. The rear portion is formed with an outwardly offset blister 43, the purpose of which will later be set out. Near the forward end, the bracket is provided with a horizontal slot 44. The slots of these brackets receive the ends of a latching rod 46 which is carried by the inner end of a latch release handle 47. The flange of the central portion 42 mounts an adjusting screw 50.

The suspension for the shelf 37 is carried by the rails 23 and includes a forward pair of arms 48. These arms, at their upper ends, are attached for pivotal movement to the bars 23 approximately midway of the bar ends. The lower ends of these arms are pivotally joined to the forward ends of shelf brackets 39. A short distance above the arms' connection with the bracket is a channel 49, this channel being permanently secured at its ends to the arms and includes a portion 51 which, when the shelf is in raised position, acts as a filler to close off finger access to the interior of the pedestal above the shelf. It will be noted that the pivotal connection 52 of the arms 48 with the brackets 39 is along the shelf flange 38 and that the pivotal connection 53 of the upper ends of these arms is near the upper edge of the rails 23. A rearward pair of suspension arms 54 is provided. The upper ends of these arms are secured to the extreme rear, lower ends of the rails 23 by pivot pins 56. The lower ends of these arms are joined to the lower ends of the rear portions of brackets 39 by means of pivot pins 57. A channel 58 connects arms 54 approximately one third of the distance up from their pivotal connections 57 with brackets 39. This channel, when the shelf approaches fully extended position, contacts springs 36, slightly deflecting them and, in effect, cushions the final movement of the shelf into extended position. It will be understood that arms 48 and 54 are of the same length and are parallel, but that the forward arms have connection with the shelf 37 through pivots positioned considerably higher than the connection through brackets 39 therewith. Also, that the pivots 53 of arms 48 are located much higher on the rails 23 than are the pivots 56 for the arms 54. The structure thus far described provides a suspension for the shelf that enables movement thereof, for example, through an arc suggested in Figs. 2 and 4, from position of use to position of storage. It will be noted, however, when the arms 48 and 54 extend vertically downwardly and with the shelf at its lowermost position, said shelf is not in fully retracted position (see Fig. 2). For the shelf to move into fully retracted position, the arms 48 and 54 must swing rearwardly, thus raising the shelf to the position shown in Figs. 3 and 6. The purpose of this will be more fully considered.

Attention is now directed to the structure having to do with the control and manipulation of the counterbalance springs 36. This structure includes a member 61 that consists of a cross bar 62 with integral end legs 63. The bar portion of this member secures the other ends of counterbalance springs 36. The ends of the legs 63 are joined by means of pivots 64 to the rear arms 54 a short distance from the pivots 56 of said arms with rails 23. Control links 66 are provided. The lower end of each of these links is pivotally connected, as at 67, to the legs 63 approximately one-third of the length of said leg from the cross bar 62. Centrally, each link is laterally offset for clearance purposes in its manipulation. The other end of each link is secured to the rail 23 by pivots 68 which, it will be noted, are located above and forwardly of pivots 56.

It is to be particularly noted that the legs 63 of the member 61, together with links 66 and the upper ends of suspension arms 54, comprise triangular units which, through the provision of two different but proximate pivots—namely, 56 and 68—provide such a path of movement of the cross bar 62 as to produce a prescribed path of travel for said bar. The forward ends of the springs 36 are, of course, stationary by reason of their attachment to cross bar 34. The rear ends of the springs, being attached to cross bar 62, will follow the path of travel of the cross bar and expand and contract in accordance therewith. It is to be noted that this particular structure functions to provide a torque in said springs such that the springs will hold the shelf in fully retracted position and also serve as a varying force to substantially equal the weight torque of the shelf and a typewriter mounted thereon and to a progressive extent as the torque of these parts increases as a result of movement of the shelf from a depending, suspended position into a position of use.

To more fully understand the advantages residing in the present disclosure, a description of the operation of the various parts is set out. It is to be assumed that the springs 36 are of such proper size and tension as to be capable of substantially equalling the weight torque of the shelf and a typewriter mounted thereon. The shelf, in fully retracted position, is shown in Figs. 1, 3 and 6. Referring more particularly to Fig. 6, it will be noted that the blisters 43 of brackets 39 abut the forward edges of arms 54 and, thus, relatively movable parts of the suspension serve as a stop to prevent undesired further rearward movement of the shelf to an extent where it might contact the rear wall of the pedestal. Two small brackets 69 are secured to the rear channels 22 and extend horizontally therefrom toward opposite sides of the shelf at a position slightly below the position of rest of said shelf. The ends of the latching rod 46 are in the plane of the flanges 70 of the brackets 69 when the shelf is in its lowermost position (Fig. 2). Rearward movement of the shelf moves the rod against tension of the spring 71 the length of the slots in the brackets 39. During this movement of the rod, the shelf has swung sufficiently upwardly to bring the rod ends above the flange 70 and

permit the spring 71 to snap the rod to the other ends of the slots and into a position of rest on bracket 69. By this means it is possible to secure the shelf in the position above described wherein blisters 43 and arms 54 abut.

When it is desired to withdraw the shelf from latched position within the pedestal, the latch release handle 47 is drawn forwardly to the extent determined by the permissive travel of the ends of the rod 46 within the slots of the brackets 39. This movement of the rod withdraws its ends from the bracket 69 and enables the operator to swing the shelf downwardly and forwardly. Any torque produced by the springs 36 at this point is negligible and, consequently, the weight torque of the shelf and typewriter will, almost without operator assistance, start movement of the shelf in its arc of travel such, for example, as from the position of Fig. 3 to that of Fig. 2. As the shelf is further drawn forwardly and upwardly the cross bar 62 moves the ends of the springs joined thereto, through and beyond a dead-center position the springs exerting a counterbalance torque substanitally equal to the weight torque of the shelf and typewriter, thus enabling almost floating movement of the shelf upwardly toward position of use. The springs, as the shelf moves further upwardly, produces a progressively increasing torque in the linkage which is equal to the weight torque of the typewriter and shelf. The bar 62, to which corresponding ends of the spring are attached, does not, of course, follow an arcuate path about the pivot 64 for the reason that pivot 64 is moving in an arcuate path of its own about pivot 56. Thus, as the shelf continues toward fully extended, raised position the weight torque thereof increases, and the applied torque of the springs, to counterbalance this weight torque, increases at approximately the same rate.

As the shelf nears fully extended position, the ends of the latching rod 46 ride upwardly along the inclined forward edges of the side rails 23 until they reach notches 29. In the course of the rod's movement up the incline of the rails, spring 71 has been extended and, consequently, the ends of the rods snap into these notches and hold the shelf in raised, extended position. It will be understood that this latch bar prevents inadvertent swinging movement of the shelf under any and all conditions of use. If, at this point in the manipulation of the shelf, a slight play exists, the screws 50 are adjusted to contact the under sides of the rails 23.

It will be obvious that to return the shelf to secured position within the pedestal, it is merely necessary to operate the latch release handle 47 and withdraw the ends of the rod 46 from the notches 29. Slight pressure on the part of the operator swings the shelf downwardly through the path of travel defined by the sets of arms 48 and 54 and, of course, as the shelf moves into the pedestal, the rod ends are moved and engage brackets 69 in the manner previously described.

Although applicant has shown and described only one form of the invention, it will be understood that variations of the structure thereof may be made and are contemplated insofar as they are within the spirit and scope of the invention as set out in the annexed claims.

Having thus set forth my invention, what I claim as new and for which I desire protection by Letters Patent is:

1. A swingable suspension for a pedestal contained typewriter shelf comprising front and rear pairs of arms pivotally joined at their upper ends to side supports of said pedestal and at their lower ends to said shelf, counterbalance linkage further pivotally connecting the rear arms with the side supports of said pedestal, a spring secured at one end to a cross support of said pedestal, means connecting the other end of said spring with swingable portions of said linkage remote from the connections of said linkage with said supports and said rear arms, said spring developing a torque substantially equal



to the weight torque of said shelf and a typewriter mounted thereon in substantially all positions of said shelf, a latch bar on said shelf, brackets on said pedestal engageable by said latch bar when said shelf is in a retracted position, said bar being receivable in recesses provided in said pedestal when said shelf is in a fully extended position.

2. A swingable suspension for a typewriter shelf and the like comprising front and rear parallel arms pivotally connecting said shelf with fixed supports, swingable linkage connecting the rear arms with said supports, a spring connected at one end with a fixed member, a connector on said linkage engaged by the other end of said spring, said connector, during movement of said shelf and said linkage, pivoting about a constantly changing center and causing the torque resulting from said spring action to at all times substantially balance the weight torque of said shelf.

3. A swingable suspension for a shelf adapted to be located in a pedestal or other enclosure, said suspension comprising a front pair of arms connecting an intermediate portion of said shelf with the pedestal, a rear pair of arms connecting the rear of said shelf with said pedestal, a swingable cross bar, counterbalance linkage mounting said bar for movement about a constantly changing pivot during movement of said shelf, a spring fixed at one end to said pedestal and joined at the other end to said bar, said linkage, during movement of said shelf through a path defined by said arms, causing said bar to so tension said spring that the resulting torque in said linkage, throughout movement of said shelf, will at all times substantially balance the combined weight torque of said shelf and a typewriter mounted thereon.

4. A swingable suspension for a pedestal contained typewriter shelf comprising a front pair of arms connecting an intermediate portion of said shelf with said pedestal, a rear pair of arms connecting the rear of said shelf with said pedestal, counterbalance linkage including relatively swingable parts further connecting said rear arms with said pedestal, a cross bar on one pair of said parts, a spring fixed at one end to said pedestal and joined at the other end to said bar, said parts, during movement of said shelf into extended position, having such movement as to constrain said bar to move through a curbed path defined by a constantly changing center whereby the effecitve torque in said linkage is substantially equal to the weight torque of said shelf and a typewriter thereon throughout the full travel of said shelf.

5. A swingable suspension for a pedestal contained typewriter shelf comprising a front pair of arms pivotally connecting intermediate side portions of said shelf with said pedestal, a rear pair of arms pivotally connecting the rear ends of said shelf with said pedestal, pivotal links further pivotally connecting said rear arms with said pedestal, the pivot points for the links connected with said pedestal being above the pivot points of connection of said rear arms with said pedestal whereby to cause said links to follow a course different from that of said rear arms, a spring secured at one end to said pedestal, means connecting the other end of said spring with said links at a point removed from their pivotal connection, said spring, as controlled by said links, developing a torque in said linkage substantially equal to the weight torque of said shelf and a typewriter mounted thereon throughout travel of said shelf into extended position.

6. A swingable suspension for a typewriter shelf adapted to be supported by the rails of a containing pedestal, said suspension comprising front and rear pairs of parallel arms, connected at their upper ends with said rails and at their lower ends with said shelf, a cross bar, legs extending in a common direction from the ends of said bar, the ends of said legs being pivotally connected with said rear arms at a point removed from the pivotal connection of said rear arms with said rails, links pivotally connected at corresponding ends with said rails at a

point removed from the pivotal connection of said rear arms with said rails, the other ends of said links being pivotally joined to said legs between their ends, a spring fixed at one end to a cross member carried by said rails and joined at the other end to said cross bar, said bar, during movement of said shelf through a path defined by said pairs of arms, being caused to so tension said spring, throughout movement of said shelf, that the resulting torque will at all times substantially balance the combined weight torque of said shelf and a typewriter mounted thereon.

7. A swingable suspension for a typewriter shelf adapted to be carried by the rails of a containing pedestal, said suspension comprising front and rear pairs of parallel arms connected at their upper ends with said rails and at their lower ends with said shelf, linkage pivotally connecting said rear arms with said rails, the pivotal connection of said linkage with said rails being at a point removed from the pivotal connection of said rear arms with said rails, a spring secured at one end to a cross member carried by said rails, means remote from all pivotal connections of said linkage engaged by the other end of said spring, said means, during movement of said shelf and said linkage, being constrained to pivot about a constantly changing center and causing the torque resulting from said spring action to at all times substantially balance the combined weight torque of said shelf and a typewriter mounted thereon.

8. A swingable suspension for a typewriter shelf adapted to be carried by the rails of a containing pedestal, said suspension comprising front and rear pairs of arms connected at their upper ends with said rails and at their lower ends with said shelf, a pair of pivotally connected links having their free ends pivotally joined to one of said rails and one of said rear arms, a spring secured at one end to a cross member carried by said rails, means extending beyond the pivotal connection of the links of each pair, said means providing connection for the other



end of said spring, said means, during movement of said shelf and said links, being moved about a constantly changing center and causing the torque resulting from the change of tension of said spring to at all times substantially balance the weight torque of said shelf and a typewriter mounted thereon.

9. A swingable suspension for a typewriter shelf, adapted to be mounted on the rails of a containing pedestal, said suspension comprising front and rear pairs of arms connected at their upper ends with said rails and at their lower ends with said shelf, a swingable cross bar, counterbalance linkage pivotally connected with said rear pair of arms and said rails, said bar being joined to said linkage at a point such that, during pivotal movement of said linkage, said bar is constrained to follow a curved path defined by a constantly changing center, a spring secured at one end to a cross member carried by said rails, the other end of said spring being secured to said bar, said bar, during movement of said shelf and said linkage, causing the torque resulting from the tension of said spring to at all times substantially balance the weight torque of said shelf and a typewriter mounted thereon.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 1,072,121 | Hunter | Sept. 2, 1913 |
| 1,137,261 | Dyke | Apr. 27, 1915 |
| 1,491,781 | Axen | Apr. 29, 1924 |
| 1,606,975 | Tobey | Nov. 16, 1926 |
| 2,243,087 | Burdick | May 27, 1941 |
| 2,322,648 | Lundstrom | June 22, 1943 |
| 2,358,917 | Emde | Sept. 26, 1944 |
| 2,585,566 | Lundstrom | Feb. 12, 1952 |
| 2,642,327 | Swanson | June 16, 1953 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 576,906 | France | Aug. 28, 1924 |
| 743,300 | France | Mar. 27, 1933 |