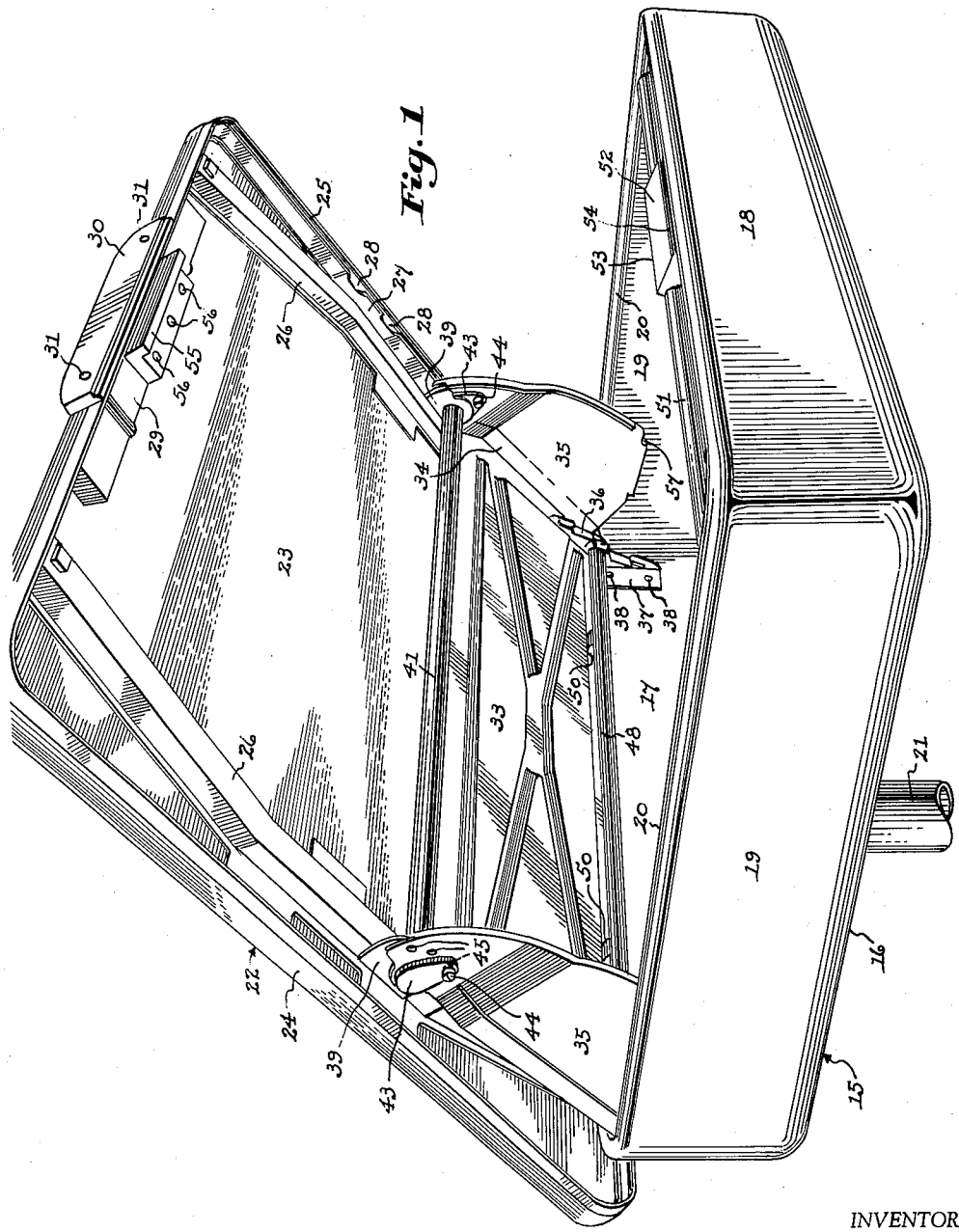
April 11, 1961 G. C. BRADLEY ET AL 2,979,370

DESK TOP CONSTRUCTION

Filed Feb. 29, 1960 3 Sheets-Sheet 1

Fig. 1



INVENTORS

George C. Bradley

Alfred C. Hoven

Walter E. Nordmark

BY John S. Braddock

ATTORNEY

WITNESS

Harry S. Brown Jr.

April 11, 1961 G. C. BRADLEY ET AL 2,979,370

DESK TOP CONSTRUCTION

Filed Feb. 29, 1960 3 Sheets-Sheet 2

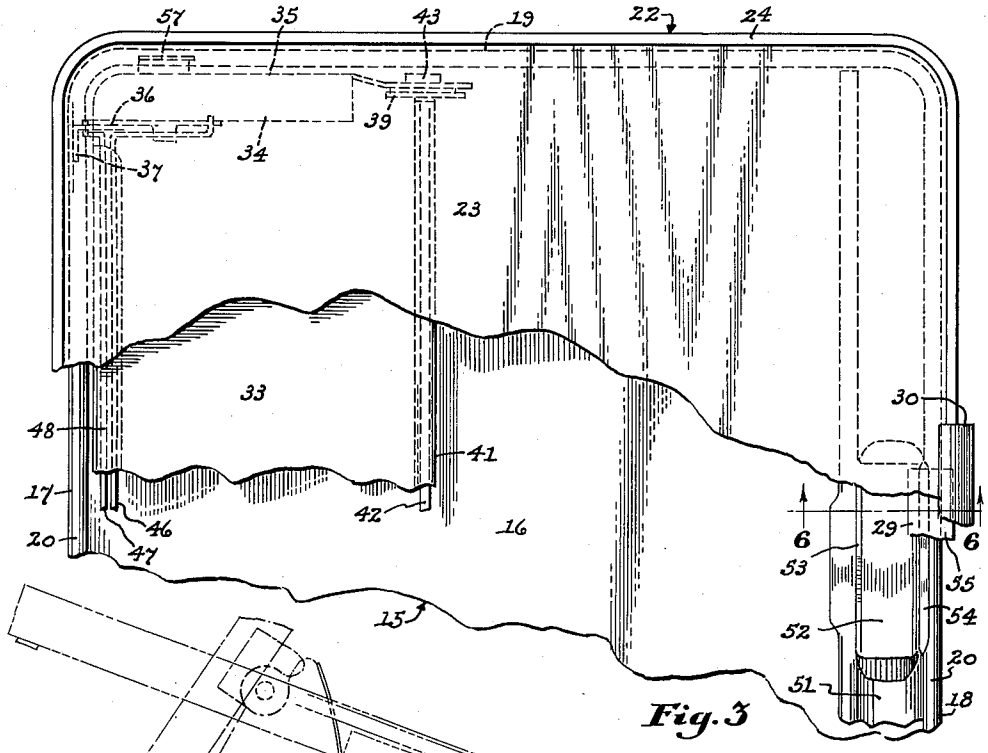


Fig. 3

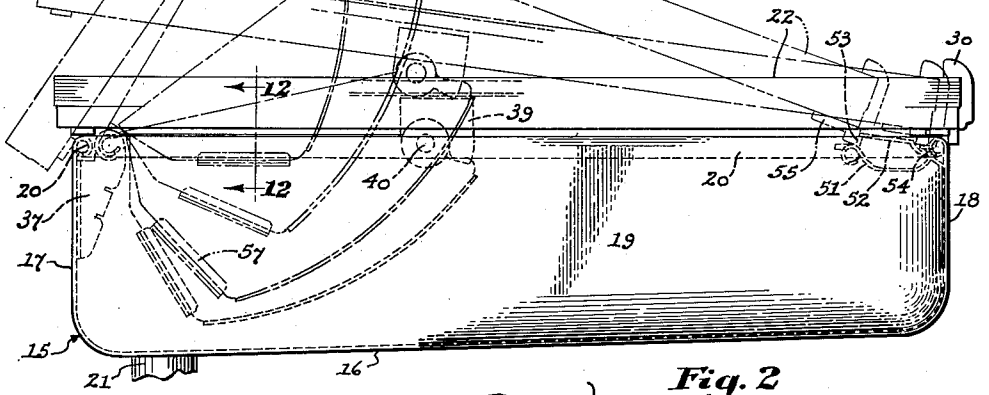


Fig. 2

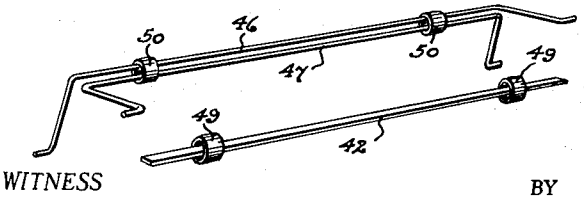


Fig. 4

INVENTORS
George C. Bradley
Alfred C. Hoven
Walter E. Nordmark

WITNESS
Harry S. Brown Jr.

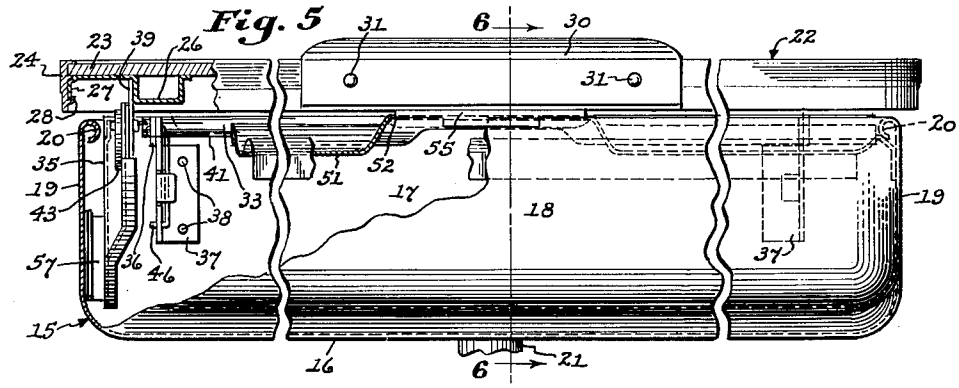
BY
John L. Braddock
ATTORNEY

April 11, 1961 G. C. BRADLEY ET AL 2,979,370

DESK TOP CONSTRUCTION

Filed Feb. 29, 1960 3 Sheets-Sheet 3

Fig. 5



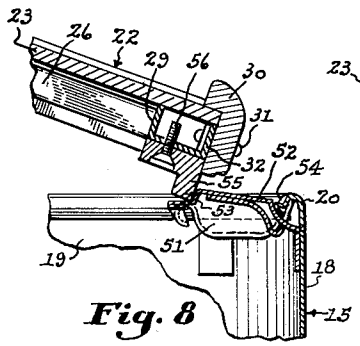


Fig. 8

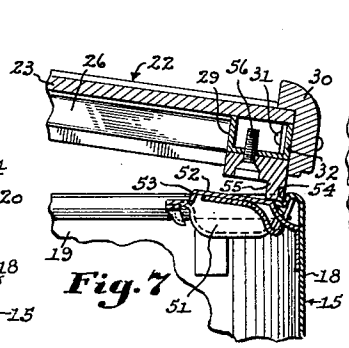
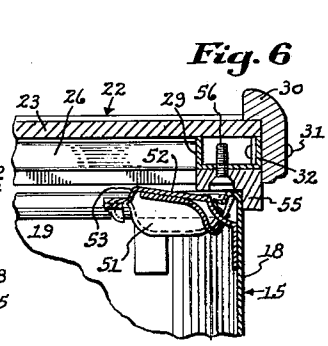


Fig. 7

Fig. 6



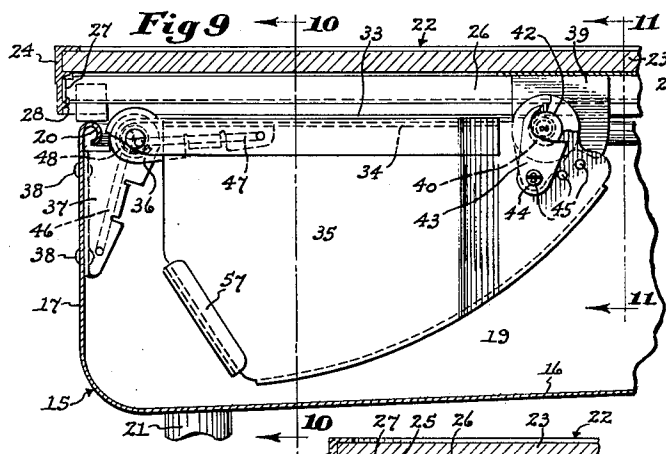


Fig 9

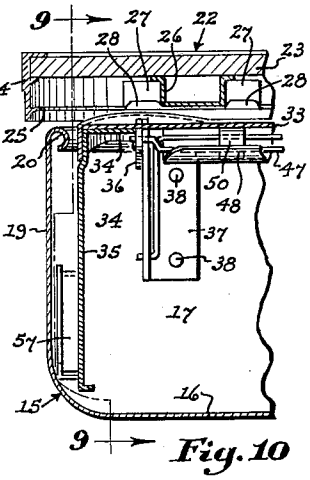


Fig. 10

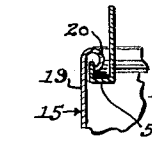


Fig. 12

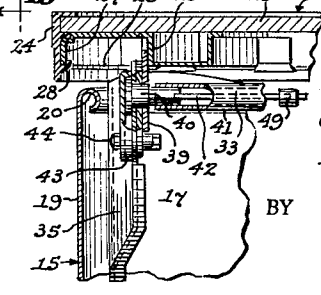


Fig. 11

INVENTORS

George C. Bradley

Alfred C. Hoven

Walter E. Nordmark

BY

John S. Braddock

ATTORNEY

WITNESS

Harry S. Brown Jr.

United States Patent Office 2,979,370 Patented Apr. 11, 1961

2,979,370

DESK TOP CONSTRUCTION

George C. Bradley, Alfred C. Hoven, and Walter E. Nordmark, Grand Rapids, Mich., assignors to American Seating Company, Grand Rapids, Mich., a corporation of New Jersey

Filed Feb. 29, 1960, Ser. No. 11,848

7 Claims. (Cl. 312—316)

The present invention relates to desk top construction and more particularly to the book box type of desk top commonly found in classrooms.

The primary objects of the invention are to provide an upwardly opening top box for a desk or the like having a cover which is hingedly mounted on the box in such a manner that it may be swung from a normally horizontal position to a rearwardly-upwardly inclined position giving access to the interior of the box and to forwardly-upwardly inclined adjusted positions for reading and writing purposes; to provide such a box in which torsion bars in the box so influence the swinging movements of the cover that it may easily be swung between various positions with a very light touch; to provide such a box in which the cover is so counterbalanced by the torsion bars that it will remain in a rearwardly-upwardly swung open position of approximately 60° inclination; to provide such a box in which, when the cover is swung rearwardly-upwardly to less than a 40° angle it may be swung downwardly in the rear about a horizontal axis beneath the cover's forward portion so that the cover assumes a forwardly-upwardly inclined position, during which pivoting of the cover its rearward part is torsion spring-cushioned in its descent; and in general to provide such a desk box construction which is smooth and quiet in operation, resonably economical in manufacture and attractive in appearance.

An illustrative embodiment of the invention is shown in the accompanying drawings, wherein:

Figure 1 is a rear perspective view of the desk box which can be mounted on the upright column 10 of a suitable supporting structure (not shown), the cover being shown in rearwardly-upwardly inclined position in this view;

Figure 2 is a side elevational view of the desk box, the cover being here shown in closed position in full lines and in various other positions in dotted and broken lines;

Figure 3 is a fragmentary top plan view of the same;

Figure 4 is a perspective view of certain torsion springs of the desk box, shown apart from the box;

Figure 5 is a rear elevational view of the closed box with portions thereof broken away;

Figure 6 is a fragmentary vertical sectional view of certain parts of the box and its cover, showing the cover in closed position, the section being taken on lines 6—6 of Figures 3 and 5;

Figure 7 is a sectional view similar to Figure 6 with the cover shown in a forwardly-upwardly inclined position;

Figure 8 is a sectional view similar to Figure 7 with the cover shown in a more steeply inclined forward-upward position;

Figure 9 is a fragmentary vertical sectional view of parts of the desk box taken on line 9—9 of Figure 10;

Figure 10 is a fragmentary vertical sectional view of the same taken on line 10—10 of Figure 9;

Figure 11 is a fragmentary vertical sectional view of parts thereof taken on line 11—11 of Figure 9, with portions broken away; and

Figure 12 is a fragmentary vertical sectional view of parts of the box and its cover as they appear in the open position of the cover, the section being indicated by the line 12—12 of Figure 2.

Referring now in detail to these drawings, the upwardly-opening desk top box 15 is of sheet metal construction and has a bottom 16, front wall 17, rear wall 18 and side walls 19. Around the upper peripheral edge of the box is an inwardly and downwardly curled rim 20. The box 15 is adapted to be mounted on a suitable desk-supporting structure including an upstanding column 21 here shown fragmentarily.

The cover 22 for the box comprises a flat panel 23 which may be of wood or a plastic laminate and a metal edge band or rim 24 extending peripherally around the panel 23. The rim 24 depends below the undersurface of the panel 23 and has an inwardly projecting flange 25 (see Figures 1 and 10) extending longitudinally of the depending portion of said rim 24. Forwardly-rearwardly extending channel struts 26 have tabs 27 at their front and rear ends and at their sides (see Figures 5 and 10) which are secured to the rim 24 by crimping the flange 25 upwardly at 28 to secure the tabs 27 and struts 26 in position. These struts 26 lend strength and rigidity to the cover structure. There is desirably provided a gap between the ends of the rim 24 at the middle rear of the cover. This gap is spanned by a channel bar 29 disposed adjacent the inside of the rim 24 and a book ledge member 30 disposed adjacent the outside of the rim 24, said channel bar 29 and book ledge member 30 being secured to the rim at opposite sides of said gap by means of rivets 31. Within the gap, the vertical rear flange 32 of the channel bar 29 is offset rearwardly so that it is flush with the front wall of the book ledge member 30 as seen in Figures 6–8. The channel bar 29 may desirably and additionally be secured to the rim 24 by means of crimped-in tabs (not shown) at its opposite ends, similar to the tabs 27 of the struts 26.

An embossed hinge panel 33 extends from side to side of the upper forward part of the box 15. A pair of hinge leaf members 34 are secured as by welding to the opposite sides of the hinge panel, and each hinge leaf member 34 (see Figures 9 and 10) has a depending outer wing portion 35, and a depending inner bearing portion 36. The bearing portions 36 are pivotally connected to mounting brackets 37 secured as by rivets 38 to the front wall 17 of the box 15, so that the hinge panel 33 is swingable about a fixed horizontal axis near the upper front edge of the box.

The outer wing portions 35 of the hinge leaf members 34 extend downwardly from their pivotal connections to the mounting brackets 37 and rearwardly into the box. Bearing brackets 39 secured as by welding to the struts 26 of the cover 22, depend from the cover alongside the upper rearward portions of the hinge leaves' outer wing portions 35. Pivot members 40 (see Figure 11) extend inwardly through aligned bearing openings in the outer wing portions 35 and the bearing brackets 39, and into the cylindrically curled rearward edge 41 of the hinge panel 33. The cover 22 is thus pivotally connected to the rearward edge of the hinge panel 33 for swinging movement relative to said hinge panel about a horizontal axis intermediate the front and rear edges of the cover.

A rear torque bar 42 is disposed within the cylindrical curl 41 at the rearward edge of the hinge panel 33 and has its opposite ends secured to the pivot members 40 at opposite sides of the box. The pivot member 40 at one side of the box is rigidly connected to the adjacent bearing bracket 39 on the cover, whereas the pivot member 40 at the other side of the box is rigidly connected

to the wing portion 35 of the adjacent hinge leaf member 34. The rear torque bar 42 biases the cover 22 upwardly in the rear and downwardly at the front so that the front part of the cover normally bears downwardly against the upper surface of the hinge panel 33. Arms 43 on the outer ends of the pivot members 40 are secured to the hinge leaves' outer wing portions 35 by means of screws 44 which pass inwardly through apertures in said arms and through selected apertures 45 in the hinge leaves' wing portions 35. These arms 43 serve to maintain the pivot members 40 in place (see Figure 11).

A pair of front torque bars 46, 47 fabricated of wire stock is disposed within the cylindrically curled forward edge 48 of the hinge panel 33. Each of these front torque bars 46, 47 has one end secured to a bracket 37 and the opposite end secured to the depending inner bearing portion 36 of a hinge leaf member 34. Both of these front torque bars 46 and 47 are preloaded so as to bias the hinge panel 33 and the cover 22 toward a rearwardly-upwardly inclined position as seen in Figure 1. These front torque bars 46 and 47 are oppositely arranged as seen in Figure 4 so as to equalize the forces exerted on the hinge panel 33 and cover 22 at opposite sides of the box.

Spacer collars 49 and 50 are desirably provided for confining the rear torque bar 42 and front torque bars 46, 47 within the cylindrically curled rear edge 41 and front edge 48 respectively of the hinge panel 33, so that the torque bars do not rub against the hinge panel. Undesirable noise and wear are thus eliminated.

A pencil tray 51 is secured as by welding to the inside upper part of the rear wall 18 of the box. The middle part of this pencil tray 51 is embossed upwardly at 52 so as to form a forward stop 53 and a rearward stop 54. A bumper 55 of suitable material such as rubber or plastic is secured as by screws 56 to the middle underside of the channel bar 29 on the cover 22. The bumper 55 is adapted for engagement with either of the stops 53 or 54 to secure the cover 22 in a selected position of rearward-downward inclination as indicated in Figure 2.

Operation

When the cover 22 is in its fully lowered position closing the top of the box 15, the rear torque bar 42 is urging the cover upwardly in the rear and downwardly at the front into engagement with the upper surface of the hinge panel 33. The front torque bars 46 and 47 are urging the hinge panel 33 toward an open, rearwardly-upwardly inclined position. The weight of the closed cover, when in this horizontal position, is just sufficient to overcome the forces exerted by all of the torque bars and the cover remains closed, but only a very slight manual lifting force at the rear edge of the cover is required to swing the cover to open position. It will be seen that the farther the cover is swung toward open position, the smaller will be the vertical component of force tending to close the cover by its own weight.

If now the cover be raised to a rearward-upward inclination of between 20° and 40° the rearward part of the cover can be lowered thus swinging the cover about its horizontal axis of pivotal connection to the rear edge of hinge panel 33. Bumper 55 may then be engaged behind stop 53 to maintain the cover at a forwardly-upwardly inclined angle of about 20° for reading, or the bumper 55 may be engaged behind stop 54 to maintain the cover at an angle of about 6° for writing.

When it is desired merely to gain access to the interior of the box and then return the cover to a level position for manipulative tasks, the cover is manually lifted at the rear to an angle of greater than 40°. When so positioned, the force tending to close the cover by its own weight is completely overcome by torque bars 42, 46 and 47 and the cover is automatically swung to a fully open position of about 60° inclination. Such movement of the cover to its fully open position is stopped by contact of outwardly turned stop flanges 57 on the hinge leaves' outer wing portions 35 with the inwardly curled flanges 20 at the upper side edges of the box 15 (see Figure 12). The cover will remain in this fully open position until moved manually downwardly to an inclination of less than 40° whereupon it may be released and permitted to gently and quietly descend to closed position.

It will thus been seen that the invention provides an improved book box for classroom desks and the like, and while but one specific embodiment of the invention has been herein shown and described it will be understood that numerous details thereof may be altered or omitted without departing from the spirit of the invention as defined by the following claims.

We claim:

1. In a desk structure of the character described: an upwardly opening top box and a cover therefor; a hinge panel hinged at its front to the upper front edge of the top box and hinged at its rear to the cover's underside intermediate the cover's front and rear edges; a rear torsion bar disposed adjacent the rear edge of the hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the cover whereby the cover is biased upwardly in the rear and downwardly at the front; and a front torsion bar disposed adjacent the front edge of the hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the top box whereby the hinge panel is biased toward a position of rearward-upward inclination.

2. In a desk structure of the character described: an upwardly opening top box and a cover therefor; a hinge panel hinged at its front to the upper front edge of the top box and hinged at its rear to the cover's underside intermediate the cover's front and rear edges, said hinge panel having its front and rear edges cylindrically curled; a rear torsion bar disposed within the curled rear edge of the hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the cover whereby the cover is biased upwardly in the rear and downwardly at the front; and a front torsion bar disposed within the curled front edge of the hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the top box whereby the hinge panel is biased toward a position of rearward-upward inclination.

3. In a desk structure of the character described: an upwardly opening top box and a cover therefor; a hinge panel hinged at its front to the upper front edge of the top box and hinged at its rear to the cover's underside intermediate the cover's front and rear edges, said hinge panel having its front and rear edges cylindrically curled; a rear torsion bar disposed within the curled rear edge of the hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the cover whereby the cover is biased upwardly in the rear and downwardly at the front; and a pair of front torsion bars disposed within the curled front edge of the hinge panel and each having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the top box whereby the hinge panel is biased toward a position of rearward-upward inclination, said pair of front torsion bars being oppositely arranged with respect to the hinge member and the top box so as to equalize the forces exerted on the hinge panel at opposite sides of the box.

4. A desk structure according to claim 3 in which resilient spacer collars circumscribing the rear torsion bar and the front torsion bars maintain said torsion bars in spaced relation to the inside walls of the hinge panel's cylindrically curled rear and front edges respectively.

5. In a desk structure of the character described: an

upwardly opening top box and a cover therefor; mounting brackets secured to the inside of the front wall of the top box at opposite sides thereof and extending rearwardly therein; a hinge panel extending from side to side of the upper forward part of the top box and having hinge leaves depending from the opposite sides thereof, said hinge leaves being pivotally connected to said mounting brackets respectively so that the hinge panel is swingable about a horizontal axis at the upper front of the top box between a level position and positions of rearward-upward inclination; bearing brackets depending from the underside of the cover at opposite sides thereof and intermediate the cover's front and rear edges, said bearing brackets being pivotally connected to the upper rearward ends of said hinge leaves respectively whereby the cover is swingable about a horizontal axis between positions of rearward-upward inclination and forward-upward inclination when the hinge panel is rearwardly-upwardly inclined; a rear torsion bar disposed adjacent the rear edge of the hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the cover whereby the cover is biased upwardly in the rear and downwardly at the front; and a front torsion bar disposed adjacent the front edge of the

hinge panel and having one end thereof rigidly connected to the hinge panel and the other end thereof rigidly connected to the top box whereby the hinge panel is biased toward a position of rearward-upward inclination.

6. A desk structure according to claim 5 in which the front and rear edges of the hinge panel are cylindrically curled to enclose said front and rear torsion bars respectively.

7. A desk structure according to claim 5 in which a plurality of stops is provided at the upper middle of the rear wall of the top box, and in which a bumper is provided in the middle of the cover's rear underside, said bumper being adapted to engage one or another of said stops to support the cover in a selected position of forward-upward inclination.

References Cited in the file of this patent

UNITED STATES PATENTS

518,639	Wilson	Apr. 24, 1894
2,579,606	Oom	Dec. 25, 1951

FOREIGN PATENTS

513,556	Great Britain	Oct. 16, 1939