

**May 3, 1949.**

W. E. NORDMARK

**2,469,239**

## DESK STRUCTURE

Filed Nov. 24, 1947

3 Sheets-Sheet 1

***Fig. 1***

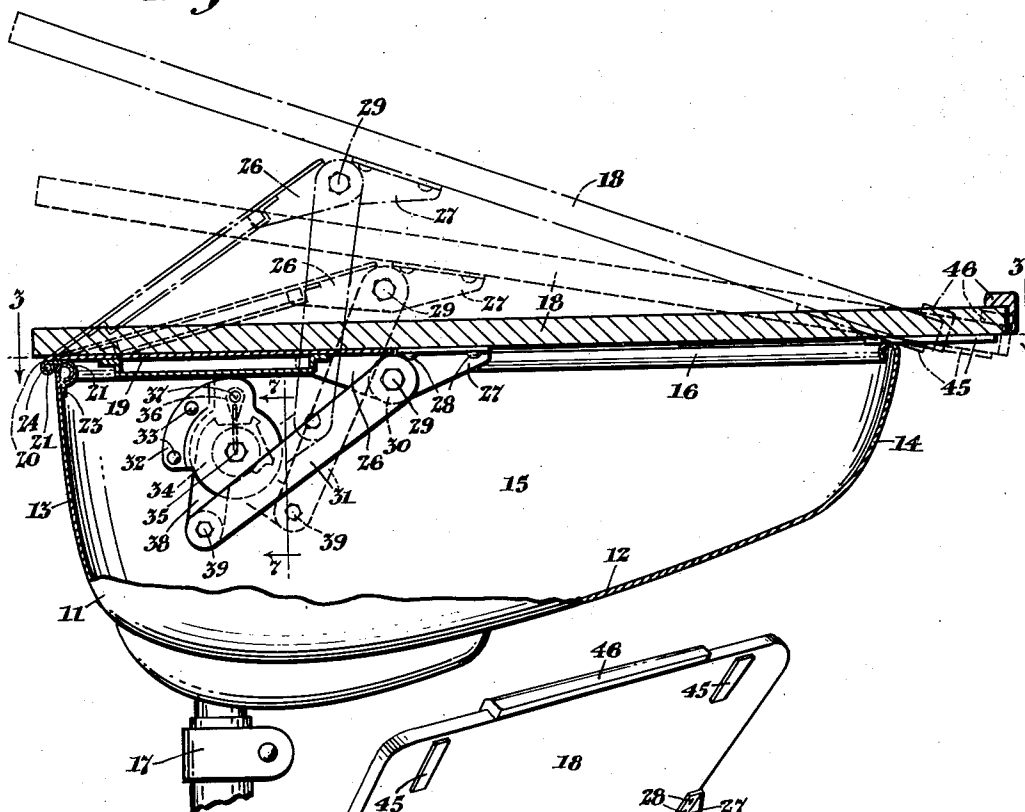
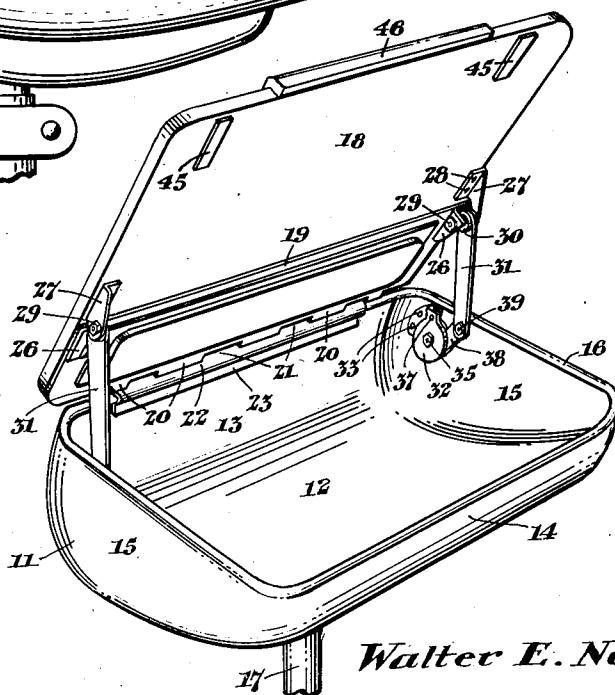


***Fig. 2***



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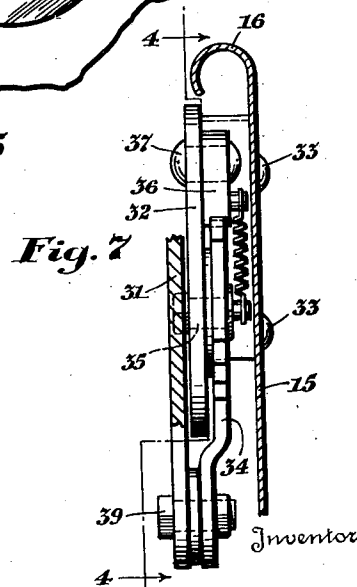
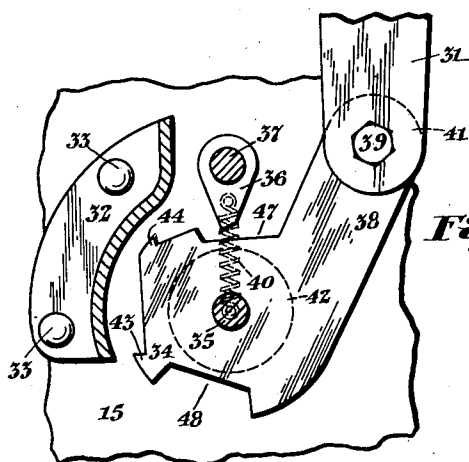
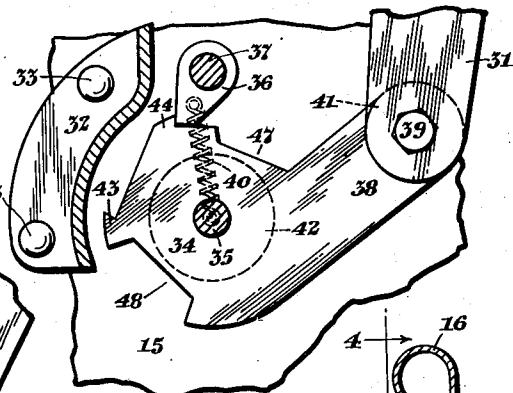
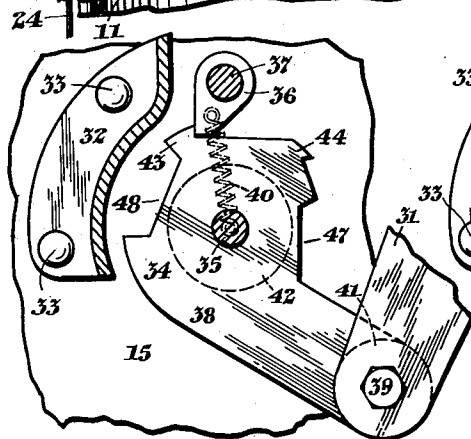
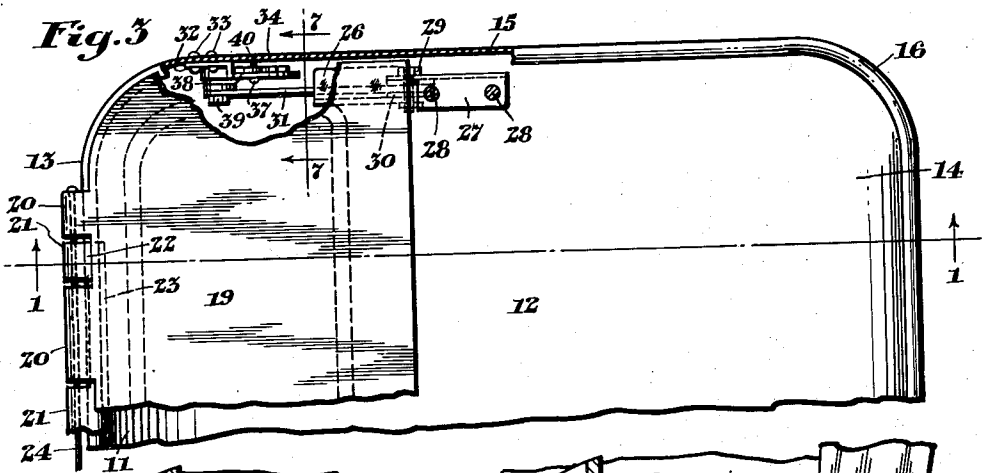
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DESK STRUCTURE

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*Fig. 8*

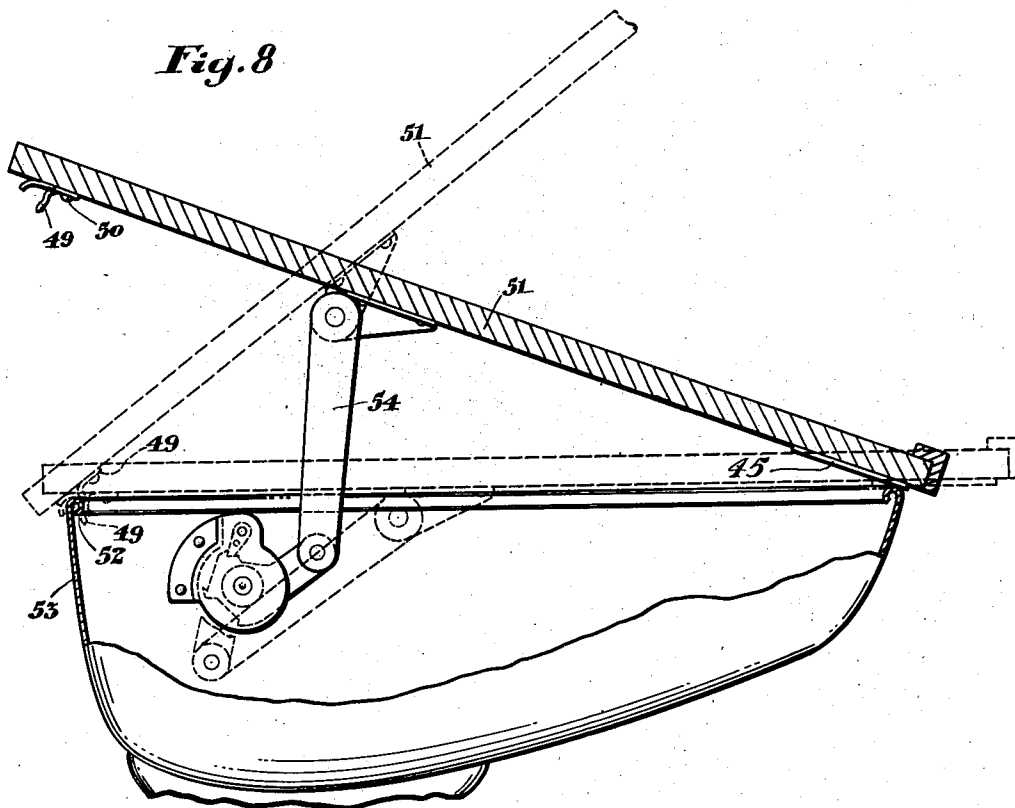


*Fig. 9*

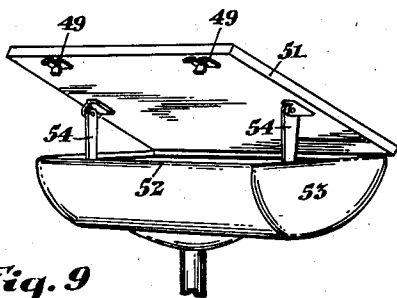
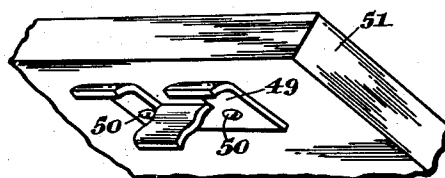


*Fig. 10*



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## UNITED STATES PATENT OFFICE

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## DESK STRUCTURE

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Application November 24, 1947; Serial No. 787,651

6 Claims. (Cl. 45-91)

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The present invention relates to desk structures and more particularly to such structures for use in classrooms or the like.

The primary objects of this invention are to provide an improved box-type desk top having a cover which may be manually lifted in the rear to give access to the interior of the desk top; to provide an improved mechanism for supporting the cover when swung to any of several rearwardly-upwardly inclined elevated positions, in such a manner that the cover may then be lowered in the rear so that it assumes a rearwardly-downwardly inclined elevated position for convenient use as a writing desk or reading desk; to provide an improved mechanism for so supporting the top in inclined elevated positions, the mechanism being such that the cover may be lowered to its normal horizontal position wherein it serves as a closure for the open top-box of the desk; by merely lifting the cover in the rear to its maximum height thereby disengaging the supporting mechanism, and thereafter manually lowering the rear of the cover; to provide such a mechanism which is especially quiet and smooth in operation; and in general to provide such a desk structure which is efficient in operation, reasonably economical in manufacture and attractive in appearance.

Illustrative embodiments of the invention are shown in the accompanying drawings, wherein:

Figure 1 is a side elevational view of box-type desk top, the supporting pedestal for which is shown fragmentarily and which pedestal may be of the inverted U-shaped type shown in the corresponding application identified above wherein the desk top is mounted on the upper end of one leg of the U-shaped support and a chair mounted on the other leg of said support, certain parts in this view being shown in vertical section taken on line 1-1 of Figure 3, and the cover for the top box being shown in normal horizontal position in full lines, and in two inclined positions in dotted lines and broken lines respectively;

Figure 2 is a rear perspective view of the top-box with the cover therefor in rearwardly-upwardly inclined position wherein access may be had to the interior of the box;

Figure 3 is a fragmentary horizontal sectional view thereof taken on line 3-3 of Figure 1;

Figure 4 is an enlarged, fragmentary, vertical sectional view of certain operating parts of the structure, the section being taken on line 4-4 of Figure 7 and the moving parts being shown in positions for supporting the cover in its inclined position shown in dotted lines in Figure 1;

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Figure 5 is a view similar to Figure 4, the moving parts being here shown in their positions for supporting the cover in its position shown in broken lines in Figure 1;

Figure 6 is a view similar to Figures 4 and 5, the moving parts being here shown in positions wherein the cover is raised to its maximum inclined position;

Figure 7 is an enlarged vertical sectional view of the same taken on lines 7-7 of Figures 1 and 3, the moving parts being here shown in their normal positions wherein the cover is lowered to horizontal position;

Figure 8 is a fragmentary, side elevational view, shown partly in vertical section, of a modified form of the box-type desk top;

Figure 9 is a perspective view of the desk top shown in Figure 8; and

Figure 10 is an enlarged fragmentary perspective view of one corner of the cover as seen in Figure 9.

Referring now in detail to these drawings, and first to the form of the invention shown in Figures 1-7 inclusive, the box-type desk top there shown comprises a formed sheet metal top box 11 having a bottom 12, front wall 13, rear wall 14, side walls 15, and a continuous, inwardly-downwardly curled flange 16 around the upper edges of said walls. The top box may be mounted in any conventional manner atop a supporting pedestal 17 therefor.

The cover 18 for the top box is preferably made of wood and is of generally rectangular shape. When in its lowered or horizontal position shown in full lines in Figure 1 the cover serves as a closure for the open top box 11 and also as a horizontal work surface. The front edge of the cover 18 is pivotally associated with the upper front edge of the top box 11 by means of a flat sheet metal hinge member 19 having curled hinge portions 20. Similar curled hinge portions 21 are provided on the forwardly extending upper flange 22 of a metal strip 23 whose lower portion is secured as by spot welding to the inner surface of the front wall 13 of the top box. An elongated hinge pin 24 passes through the curled hinge portions 20 of the hinge member 19 and hinge portions 21 of the strip 23, thus pivotally securing the hinge member to the top box. The hinge member 19 is desirably strengthened by means of a reinforcing plate 25 secured to the underside thereof.

The hinge member 19 has brackets 26 secured as by spot welding to the underside of its rearward marginal edge, and at the opposite sides of

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the hinge member. Similar brackets 27 are secured to the underside of the cover 18 intermediate its front and rear edges and at opposite sides of said cover as by means of wood screws 28. Pintles 29 pass through aligned openings in the adjacent pairs of brackets 26, 27, and also through openings in rawhide friction washers 30 and depending links 31 interposed between the brackets of each pair. The hinge member 19 and cover 18 are thus pivotally connected, and it will be seen that these parts may be swung in unison about the horizontal axis of the hinge pin 24 to rearwardly-upwardly inclined positions wherein access may be had to the interior of the top box, as best illustrated in Figure 2.

When the cover 18 is swung to a rearwardly-upwardly inclined position as above described the links 31 are also elevated, and means are provided for supporting these links 31 in elevated positions so that the links form a pivotal support about which the top may be swung to rearwardly-downwardly inclined position for writing or reading. These supporting means comprise housing 32 secured to the opposite inner side walls 15 of the top box as by rivets 33, toothed ratchet wheels 34 rotatably mounted in the housings 32 by means of pivot pins 35, and pawls 36 mounted in the housings 32 by means of pivot pins 37. The ratchet wheels 34 have arms 38 to the outer ends of which are secured the lower ends of links 31 as by means of pivot pins 39, the links 31 thus having eccentric pivotal connections to the ratchet wheels 34. Coiled tension springs 40 normally urged the pawls 36 toward the ratchet wheels 34. Friction washers 41 are preferably interposed between the arms 38 of ratchet wheels 34 and the links 31, and similar friction washers 42 are interposed between the ratchet wheels 34 and the housings 32, all for cushioning the interrelative movements of these parts.

#### Operation

When it is desired only to gain access to the interior of the top box, the cover is raised at its rearward edge to a rearwardly-upwardly inclined position as shown in Figure 2. If the cover is thus tilted far enough, each of the pawls 36 on the opposite sides of the top box engages behind a tooth 43 or 44 of its adjacent ratchet wheel 34 (see Figures 4 and 5) thus supporting the links 31 in selected elevated position. The cover will remain in said rearwardly-upwardly inclined position by reason of the frictional engagement of the rawhide washers 30 between the brackets 27 and links 31. However, if it is desired to utilize the desk top for reading or writing, the cover is manually lowered at its rearward edge to a rearwardly-downwardly inclined position as shown in dotted lines, or as shown in broken lines, in Figure 1. Rubber insets 45 in the cover 18 silence the contact of the cover with the rear wall 14 of the top box which rear wall 14 supports the rearward edge of the cover when it is thus adjusted for reading or writing. A book support 46 is desirably provided at the rear edge of the cover 18.

During raising movement of the rearward edge of the cover 18, the pawls 36 continuously point in a forwardly direction (to the left as viewed in Figures 4 and 5) so that they are in position to engage the teeth 43 or 44 of the ratchet wheels 34.

When it is desired to return the cover 18 to its normal horizontal position, the cover is lifted at

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its rearward edge as far as it will go whereupon the pawls 36, being urged at all times toward the ratchet wheels 34, fall into voids 47 in the ratchet wheels 34. The cover may then be lowered to horizontal position, during which movement the angle of the pawls 36 is reversed so that they point in a rearwardly direction and thus ride freely over the teeth 44 and 43 of the ratchet wheels 34. When the cover 18 has reached its fully lowered horizontal position, the pawls 36 fall into other voids 48 in the ratchet wheels 34, so that when the cover is again raised the pawls will again point forwardly and thus be in position to engage the teeth 43 and 44 of the ratchet wheels 34.

As here shown, the ratchet wheels 34 have two teeth each, 43 and 44, which provide for rearward-downward adjustment of the top in the two positions indicated in dotted lines and in broken lines in Figure 1. These positions are 10 degree inclination for writing, and 20 degree inclination for reading, it having been determined that these positions are ideal for the purposes intended. Obviously, however the ratchet wheels 34 might be provided with only one tooth each for one position of rearward-downward inclination, of the cover 18 or with many teeth each to provide many positions of rearward-downward inclination of the cover 18.

In the modified form of the invention shown in Figures 8-10 the hinge member 19 of the former disclosure has been omitted. As shown in Figures 8-10 the pivotal association of the front edge of the cover with the upper front edge of the top box, is accomplished by means of spring clips 49 attached as by wood screws 50 to the underside of the front marginal edge of the cover 51. These spring clips 49 pivotally engage the curled upper front edge 52 of the top box 53 during movement of the cover 51 from its horizontal position to a rearwardly-upwardly inclined position as shown in dotted lines in Figure 8. The cover 51 is supported in such rearwardly-upwardly inclined position by means of pivotally connected links 54 having their lower ends connected to ratchet and pawl supporting mechanism identical to that previously described. When the cover 51 is manually swung downwardly at its rearward edge, the spring clips 49 disengage from the curled upper front edge of the top box to permit such movement of the cover to a position for reading or writing, in which position the cover is maintained by frictional engagement of the rubber insets 45 with the curled upper rearward edge of the top box, said rubber insets 45 thus serving as frictional stop means for preventing forward or rearward movements, and consequent lowering movement, of the cover. When the cover is thereafter lowered to its horizontal position, the spring clips 49 again engage the curled upper front edge of the top box.

It will thus be seen that the invention provides a simple, quiet and efficient mechanism whereby a box-type desk top may be provided with a cover which is conveniently adjustable to facilitate reading and writing, and while but several specific embodiments of the invention have been herein shown and described, it will be understood that the invention is not to be limited to or by details of the constructions shown and that the invention includes all other means for attaining the specific objects which may fall within the scope of the following claims.

I claim:

1. In a desk structure of the character described: an upwardly open top box and a cover

therefor; means for mounting the cover on the top box whereby the front edge of the cover is pivotally associated with the upper front edge of the top box to permit swinging movement of the cover to a rearwardly-upwardly inclined elevated position; means for pivotally supporting the cover intermediate its front and rear edges when elevated as aforesaid, said last-mentioned means comprising a toothed wheel rotatably mounted on the top box, a link pivotally connected to the cover intermediate its front and rear edges and having an eccentric pivotal connection with the toothed wheel, and a pawl reciprocally mounted on the top box and adapted to engage behind a tooth of the wheel to restrain the wheel against rotating movement in a direction for lowering the cover; said front edge of the cover being dissociable from the upper front edge of the top box to permit swinging movement of the cover about its pivotal connection to said link to a rearwardly-downwardly inclined elevated position; stop means preventing forward or rearward and consequent lowering movements of the cover when in said rearwardly-downwardly inclined elevated position; and means for disengaging the pawl from said tooth to permit lowering movement of the cover.

2. In a desk structure of the character described: an upwardly open top box and a cover therefor; means for mounting the cover on the top box whereby the front edge of the cover is pivotally associated with the upper front edge of the top box to permit swinging movement of the cover to selected rearwardly-upwardly inclined positions; means for pivotally supporting the cover intermediate its front and rear edges when elevated as aforesaid to a selected position, said last-mentioned means comprising a ratchet wheel rotatably mounted on the top box, a link pivotally connected to the cover intermediate its front and rear edges and having an eccentric pivotal connection with the ratchet wheel, and a pawl reciprocally mounted on the top box and adapted to engage behind a tooth of the ratchet wheel to restrain the wheel against rotating movement in a direction for lowering the cover; said front edge of the cover being dissociable from the upper front edge of the top box to permit swinging movement of the cover about its pivotal connection to said link to a rearwardly-downwardly inclined elevated position; stop means preventing forward or rearward and consequent lowering movements of the cover when in said rearwardly-downwardly inclined elevated position; and means for disengaging the pawl from said tooth to permit lowering movement of the cover.

3. In a desk structure of the character described: an upwardly open top box and a cover therefor; means for mounting the cover on the top box whereby the front edge of the cover is pivotally associated with the upper front edge of the top box to permit swinging movement of the cover to selected rearwardly-upwardly inclined positions; means for pivotally supporting the cover intermediate its front and rear edges when elevated as aforesaid to a selected position, said last-mentioned means comprising ratchet wheels rotatably mounted on the opposite inner sides respectively of the top box, links pivotally connected to the cover at opposite sides thereof and intermediate the cover's front and rear edges, said links having eccentric pivotal connections with said ratchet wheels respectively, and pawls reciprocally mounted adjacent the opposite inner sides of the top box and adapted to engage behind

corresponding teeth of the ratchet wheels respectively to restrain the wheels against rotating movement in a direction for lowering the cover; said front edge of the cover being dissociable from the upper front edge of the top box to permit swinging movement of the cover about its pivotal connections to said links to a rearwardly-downwardly inclined elevated position; stop means preventing forward or rearward and consequent lowering movements of the cover when in said rearwardly-downwardly inclined elevated position; and means for disengaging the pawls from said ratchet wheels to permit lowering movement of the cover.

4. In a desk structure of the class described: an upwardly open top box and a cover therefor; a hinge member having its forward end mounted at the front of the top box swingably about a horizontal axis and having its rearward end connected to the cover intermediate the latter's front and rear edges swingably about a second horizontal axis, said hinge member and cover being swingable in unison about the first-mentioned axis to a rearwardly-upwardly inclined elevated position; means for supporting the cover at the second-mentioned axis when elevated as aforesaid, said means comprising a toothed wheel rotatably mounted on the top box, a link pivotally connected to the cover and the hinge member at said second-mentioned axis and having an eccentric pivotal connection with the toothed wheel, and a pawl reciprocally mounted on the top box and adapted to engage behind a tooth of the wheel to restrain the wheel against rotating movement in a direction for lowering the cover, said cover being then swingable about the second-mentioned axis to a rearwardly-downwardly inclined elevated position; and means for disengaging the pawl from said tooth to permit lowering movement of the cover.

5. In a desk structure of the class described: an upwardly open top box and a cover therefor; a hinge member having its forward end mounted at the front of the top box swingably about a horizontal axis and having its rearward end connected to the cover intermediate the latter's front and rear edges swingably about a second horizontal axis, said hinge member and a cover being swingable in unison about the first-mentioned axis to selected rearwardly-upwardly inclined elevated positions; means for supporting the cover at the second-mentioned axis when elevated as aforesaid to a selected position, said means comprising a ratchet wheel rotatably mounted on the top box, a link pivotally connected to the cover and the hinge member at said second-mentioned axis and having an eccentric pivotal connection with the ratchet, and a pawl reciprocally mounted on the top box and adapted to engage behind a tooth of the ratchet wheel to restrain the wheel against rotating movement in a direction for lowering the cover, said cover being then swingable about the second-mentioned axis to a rearwardly-downwardly inclined elevated position; and means for disengaging the pawl from said tooth to permit lowering movement of the cover.

6. In a desk structure of the class described: an upwardly open top box and a cover therefor; a hinge member having its forward end mounted at the front of the top box swingably about a horizontal axis and having its rearward end connected to the cover intermediate the latter's front and rear edges swingably about a second horizontal axis, said hinge member and cover

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being swingable in unison about the first-mentioned axis to selected rearwardly-upwardly inclined elevated positions; means for supporting the cover at the second-mentioned axis when elevated as aforesaid to a selected position, said means comprising ratchet wheels rotatably mounted on the inner opposite sides respectively of the top box, links pivotally connected to the cover and the hinge member at the second-mentioned axis and at the opposite sides respectively thereof, said links having eccentric pivotal connections with said ratchet wheels respectively, and pawls reciprocally mounted adjacent the opposite inner sides of the top box and adapted to engage behind corresponding teeth of the ratchet wheels respectively to restrain the wheels against rotating movement in a direction for lowering the cover, said cover being then swingable

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about the second-mentioned axis to a rearwardly-downwardly inclined elevated position; and means for disengaging the pawls from said ratchet wheels to permit lowering movement of the cover.

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