ADJUSTABLE SUPPORT FOR DRAFTING TABLE

Fig. 1

Fig. 2

Fig. 3

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ADJUSTABLE SUPPORT FOR DRAFTING TABLE

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Filed Oct. 16, 1958, Ser. No. 767,713
7 Claims. (Cl. 45—131)

This invention relates to novel and useful improvements in drafting tables and particularly to a drafting table which is vertically adjustable to different work levels.

An important object of this invention is to provide an adjustable drafting board support including a pair of vertically swingable links for elevating and lowering the board and an improved arrangement for countering the board to apply a substantially uniform lift to the board in all operative positions thereof.

Another object of this invention is to provide an adjustable drafting board support including a pair of vertically pivoted links for elevating and lowering the board and having a novel countering arrangement which is adjustable to accommodate different work loads on the board.

Still another object of this invention is to provide an improved apparatus for locking the drafting board in any preselected adjusted position thereof.

These, together with various ancillary objects and advantages of this invention will be more readily appreciated as the same becomes better understood by reference to the following detailed description when taken in connection with the accompanying drawings wherein:

Fig. 1 is a fragmentary perspective view of the drafting table with parts broken away to illustrate details of construction;

Fig. 2 is an enlarged fragmentary view of the apparatus for adjustably connecting the countering spring to the elevating and lowering links;

Fig. 3 is an enlarged fragmentary sectional view taken on the plane 3—3 of Fig. 2;

Fig. 4 is a fragmentary side elevational view of the table with the side panel removed and illustrating the drafting board in its raised position;

Fig. 5 is an enlarged fragmentary horizontal sectional view illustrating the locking mechanism for the table; and

Fig. 6 is an enlarged fragmentary sectional view taken on the plane 6—6 of Fig. 5.

The drafting table in general includes a base having upstanding side panels 10, a top 11 extending between the side panels and one or more shelves 12 disposed below the top 11. Support legs 13 are provided at the lower ends of the side panels 10 to support the same in spaced relation to the floor. The drafting board 15 is mounted on the base for vertical adjustment with respect thereto and also for limited lateral tilting movement and, as shown herein, the drafting board includes a sheet metal top 16 having a depending peripheral flange 17. A plurality of longitudinally extending reinforcing channels 18 are affixed, as by welding, to the underside of the top 16 to rigidly the same. The channel members are attached to angle iron cross members 19 at opposite sides of the base, which cross members are pivotally mounted by means of generally triangularly shaped brackets 21 on the vertically adjustable support posts 22. The brackets 21 are pivotally attached to the posts by means of fasteners 23 and a locking mechanism, including an arcuate bar 25 and a locking block 26 to be described more fully hereinafter, is provided for locking the drafting board in any preselected inclined position. As best shown in Fig. 4, each arcuate bar 25 is terminally attached by fasteners 27 and 28 to the post 22 and the locking block 26 is supported in the bracket 21 and receives the arcuate bar 25.

The post 22 is conveniently formed in two telescoping sections 22a and 22b, of channel shaped configuration, and which are secured together by fasteners 29. A channel shaped tie rail 31 extends between the lower sections 22a of the support posts to rigidly interconnect the same and the lower sections are vertically adjustable supported on upper and lower links 32 and 33 attached to the base.

In particular, the upper and lower links are attached to an upright frame including generally L-shaped top and bottom members 35 and 36 having one flange thereof secured to the side panels 10 of the base. A first upright rail 39 extends between the top and bottom members 35 and 36 adjacent one end thereof and has one flange 39a disposed adjacent the side panels 10 and a second flange 39b spaced laterally from the side panels to receive the links 32 and 33 therebetween. The upper links 32 at opposite sides of the base are pivotally mounted on the flange 39b by means of a rigid rod 41 which is secured thereto, as by welding, and extends therebetween to cause the upper links to move in unison with each other. The lower links 33 are pivotally supported on the flange 39b by bolts 42. A second upright rail 43 extends between the top and bottom members 35 and 36 adjacent the other end thereof and has a first flange 43a laterally offset from the panel 10 to receive the links 32 and 33 therebetween and a second flange 43b which is laterally offset from the first flange in a direction away from the panels 10. The free ends of the links 32 and 33 are pivotally connected by means of fasteners 45 and 46 to the lower section 22b of the respective support post. A channel shaped cross rail 48 extends between the upright rails 43 at opposite sides of the base and underlies the top 11 thereof to support the same as is clearly shown in Fig. 4.

In accordance with the present invention, an improved springtype counterbalance is provided for the drafting board 15 to facilitate elevating and lowering the board. In general, the spring is operatively connected to the upright frame on the base and to the lower link and is so arranged as to maintain a substantially constant lift on the drafting board as the same is elevated, notwithstanding the decrease in tension in the spring as the table moves upwardly. In addition, provision is made for adjusting the weight which the countering spring will support so as to accommodate additional equipment such as a drafting machine carried by the board 15.

An elongated coil type tension spring 51 is provided and has a rod 52 threaded to a fitting 53 at the upper end thereof. The rod extends through an opening 54 in the top member 35 and is supported thereon by means of a ball member 56 non-rotatably attached to the upper end of the rod to permit limited swiveling movement of the spring. The rod 52 is threadable into the fitting 53 on the spring to permit initial adjustment of the spring tension. The lower end of the spring 51 has the rod 52 thereon which is operatively connected to the lower link 33 to normally urge the same to its raised position shown in solid lines in Fig. 4.

As is apparent, when the links move from their lowered position shown in Fig. 1 and also in phantom in Fig. 4, to the raised position shown in solid lines in Fig. 4, the length of the spring 51 decreases. In order to compensate for this decrease in spring tension as the
board is moved toward its raised position, an arm 61 is attached to the lower link 33 at a point spaced from the pivot point 42 thereof, which arm extends downwardly below the lower link an appreciable distance. As shown herein, the length of the arm 61 is approximately equal to the spacing between the arm and the pivot point 42 of the lower link. The hook 58 on the lower end of the arm 61 is attached to the free end of the arm 61. When the link 33 is in its lowered position shown in Fig. 1 and in phantom in Fig. 4, the spring 51 crosses the lower link at a point spaced relatively closely to the pivot point 42 of the lower link. As the lower link moves upwardly, the point at which the spring 51 crosses the lower link 33 moves outwardly away from the pivot point 42 thereof and thus increases the effective distance between the spring and the pivot point of the lower link. Thus, while the force or tension exerted by the spring 51 decreases as the link 33 moves upwardly, the effective distance between the spring 51 and the pivot point of the lower link is increased so as to thereby compensate for the decrease in spring tension and maintain a substantially uniform lift on the drafting board.

In order to accommodate different weights on the drafting board, as may be caused by the mounting of a drafting machine thereon, provision is made for adjusting the point of attachment of the lower rod to move in a direction longitudinally of the lower link to thereby increase the effective distance between the spring and the pivot point of the lower link, in all operative positions of the latter. As shown herein, the arm 61 is made channel shaped in cross-section and has flanges 61a along opposite sides thereof. A lead screw 67 is rotatably supported in the flanges 61a and extends generally parallel to the lower arm 33. The lead screw has a socketed head 68 on one end to enable turning of a screw with a suitable wrench, and nuts 69 are provided on the other end of the screw to retain the same in assembled relation on the arm. A follower comprising a plate 71 having laterally extending ears 72 is mounted on the screw 67 and moves therealong as the screw is rotated. A guide slot 73 is formed in the arm in parallel relation to the screw 67 and a guide block 74 is slidably supported in the slot and attached to the plate 71 of the follower by means of a socketed screw 76. An opening 77 is provided in the guide block for receiving the hook 58 of the spring whereby adjustment of the follower along the arm effects adjustment of the lower end of the spring 51. As is indicated, the socketed screw 67 is turned by rotating the lead screw 67 to adjust the follower, and the screw 76 is thereafter tightened to clamp the guide block 74 in its adjusted position on the arm.

The drafting board 15 is locked in any preselected vertically adjusted position thereof by means of a locking rod 81 which is swingably attached by a fastener 82 to the upper link 32. The locking rod extends downwardly from the upper link alongside the upright rail 53 and through a locking block 84 mounted on that rail. More particularly, a tubular sleeve 85 is rotatably supported in the leg 435 of the upright rail 43 and is constrained against axial movement by a collar 86 secured to the sleeve by a set screw 87. The sleeve has diametrically opposed slots 88 (see Figs. 5 and 6) which open at one end thereof and loosely receive an elongated flat locking block 84. The locking block is retained in assembled relation on the sleeve by a pin 89 attached to the sleeve and which loosely extends through an opening 91 in the block to permit limited lateral shifting of the block relative to the sleeve.

The block 84 has an enlarged opening 92 having a diametrical extension to the rod 81 and which slideably receives the same. Semi-circular recesses are formed at diametrically opposed sides of the opening 92 to form cups or points 93 which are arranged to engage the rod 81 when the clock is tilted to lock the rod against movement. The locking blocks at opposite sides of the base are interconnected by a tube 95 and a pin 96 extends through the sleeve and tube 95 to secure the same in assembled relation. A lever 98, herein shown of a foot operated type, is attached to the tube 95 to permit manual release of the locking blocks 84. The locking block 96 is provided on the accurate bar 25 for the table tilt mechanism is of the same construction and further detailed construction is deemed unnecessary.

From the foregoing it is apparent that the counter-balancing mechanism is arranged to maintain a substantially constant lift for the drafting board so that the same can be moved from its lowered position to its raised position with very little effort. Moreover, the counter-balancing can be adjusted by shifting the point of attachment of the lower end of the spring 51 in a direction parallel to the link 33 so as to accommodate different loads on the drafting table. Since the locking blocks 84 and 26 are mounted for limited lateral movement, these blocks can shift and prevent binding between the respective rods and the locking blocks due to slight misalignment, therebetween. When released, the blocks are tilted and the cups or points 93 engage the respective rods to lock the same against movement.

I claim:

1. In a drafting table including a base having an upright frame section, a drawing board, a parallellogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to move the links swing respectively downwardly and upwardly, said means including an arm attached to the lower link and extending downwardly therefrom, and means attaching the lower end of said spring to said arm at an adjustable pivot, thereby permitting the longitudinal axis of said lower link sufficient to cause the pivot of said spring to swing crosswise relative to said lower link shifting away from the pivot of the lower link on said support as the link swings upwardly an amount to substantially compensate for the decrease in spring tension as the spring contracts.

2. In a drafting table including a base having an upright frame section, a drawing board, a parallellogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to move the links swing respectively downwardly and upwardly, said means including an arm attached to the lower link and extending downwardly therefrom, and means attaching the lower end of said spring to said arm at an adjustable pivot, thereby permitting the longitudinal axis of said lower link sufficient to cause the pivot of said spring to swing crosswise relative to said lower link shifting away from the pivot of the lower link on said support as the link swings upwardly an amount to substantially compensate for the decrease in spring tension as the spring contracts.
3. In a drafting table including a base having an upright frame section, a drawing board, a parallelogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position, means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to elonogate and contract the spring as the links swing respectively downwardly and upwardly, said means including an arm attached to the lower link and extending downwardly therefrom, and means attaching the lower end of said spring to said arm for adjustment with respect thereto along a path parallel to and laterally offset an appreciable distance below said lower link.

4. In a drafting table including a base having an upright frame section, a drawing board, a parallelogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position, means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to elonogate and contract the spring as the links swing respectively downwardly and upwardly, said means including an arm attached to the lower link and extending downwardly therefrom, a lead screw mounted on said arm and paralleling said lower link, a follower on said screw movable parallel to said lower link as the screw is rotated, and means attaching the lower end of said spring to said follower for movement therewith.

5. In a drafting table including a base having an upright frame section, a drawing board, a parallelogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position, means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to elongate and contract the spring as the links swing respectively downwardly and upwardly, said last mentioned means including a lead screw paralleling said lower link, a follower on said screw movable parallel to said lower link as the screw is rotated, and means attaching the lower end of said spring to said follower for movement therewith.

6. In a drafting table including a base having an upright frame section, a drawing board, a parallelogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position, means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to elongate and contract the spring as the links swing respectively downwardly and upwardly, said means including an arm attaching said lower link and extending downwardly therefrom, flanges along opposite sides of said arm extending transversely thereto, a lead screw supported in said flanges for rotation about an axis parallel to and laterally offset below said lower link, said arm having a guide slot therein paralleling said lower link, a follower mounted on said screw and extending through said slot, and means attaching the lower end of said spring to said follower for movement therewith.

7. In a drafting table including a base having an upright frame section, a drawing board, a parallelogram type linkage for supporting the board on the base for vertical adjustment with respect thereto comprising upper and lower parallel links mounted on said upright frame section for vertical pivotal movement relative thereto, a post pivotally attached to the free ends of said links to remain upright as said links swing from an upper to a lower position, means attaching said drafting board to said post, a tension spring for counterbalancing said board, said tension spring having the upper end thereof attached to said upright frame section and extending downwardly therefrom generally crosswise of said links, and means operatively connecting the lower end of said spring to said lower link to elongate and contract the spring as the links swing respectively downwardly and upwardly, said means including an arm attached to the lower link and extending downwardly therefrom, flanges along opposite sides of said arm extending transversely thereto, a lead screw supported in said flanges for rotation about an axis parallel to and externally offset below said lower link, said arm having a guide slot therein paralleling said lower link, a follower mounted on said screw and disposed at one side of said arm, a guide block disposed on the other side of said arm, and a locking screw extending through said follower and said slot and into said block for attaching the block to the follower and for selectively locking the block to the arm, and means attaching the lower end of said spring to said block.

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