United States Patent

Hasbrouck et al.

[15] **3,687,088**

[45] **Aug. 29, 1972**

[54] **DRAFTING TABLE**

[72] Inventors: **Gene B. Hasbrouck,** Corry; **Alan L. Green,** Centerville, both of Pa.

[73] Assignee: **Corry Jamestown Corporation,** Corry, Pa.

[22] Filed: **May 9, 1969**

[21] Appl. No.: **823,452**

[52] **U.S. Cl.** **108/2,** 108/136, 108/148

[51] **Int. Cl.** **A47b 27/04**

[58] **Field of Search**.....108/2, 1, 6, 5, 10, 136, 148; 248/162, 140

[56] **References Cited**

UNITED STATES PATENTS

2,646,322	7/1953	Laxo	108/2
2,899,772	8/1959	Paulsen et al	108/5
2,998,672	9/1961	Sautereau	108/2
3,140,559	7/1964	Grow et al.	108/6
3,183,860	5/1965	Kritske	108/8
3,188,986	6/1965	La Vigne	108/136
3,213,809	10/1965	Kritske	108/2
3,244,465	4/1966	Ulrich et al.	108/2
3,273,517	9/1966	Amthor et al.	108/2
3,411,464	11/1968	MacKay	108/136

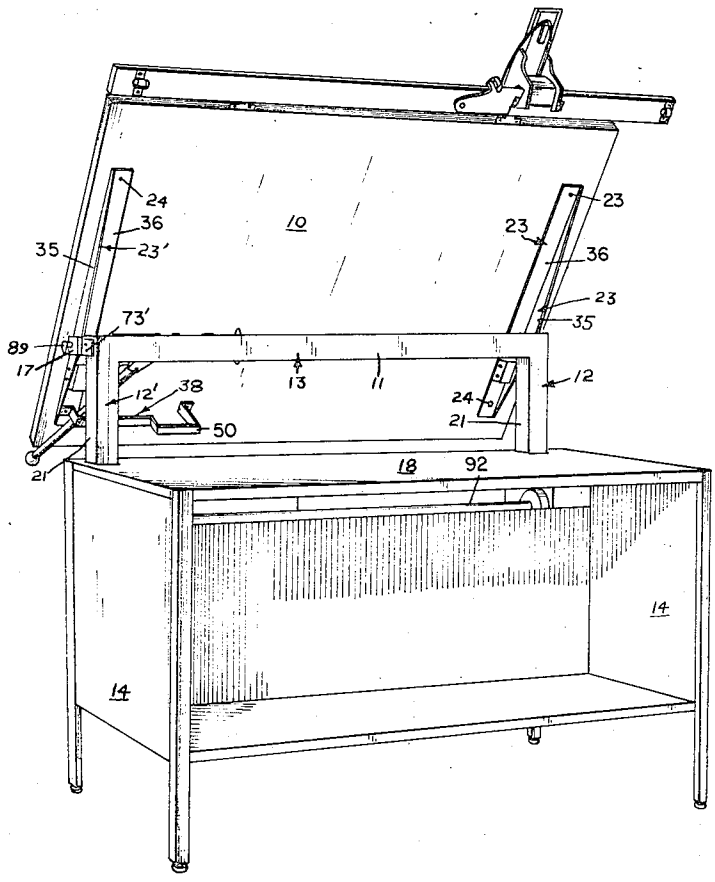
Primary Examiner—Francis K. Zugel

Attorney—Charles L. Lovercheck

[57] **ABSTRACT**

A drafting table having a tilting board, supported on a desk by columns that are adjustable vertically on the desk. The board may be tilted and locked in any angular position on the upper ends of the columns. A first locking mechanism is provided to lock the columns in any selected vertical position and a second locking mechanism is provided to lock the board at any selected angular position on the columns. The first and second locking mechanisms are so arranged that a single handle actuates both by an improved locking arrangement. The single handle unlocks the angular movement of the board when the handle is moved to a first position and relocks the board and unlocks the columns when the handle is moved to a second position. An energy cell is used in combination with the other apparatus to counterbalance the weight of the board and the columns. A leaf clutch and torsion spring arrangement is used to lock and counterbalance the board in tilting.

26 Claims, 17 Drawing Figures



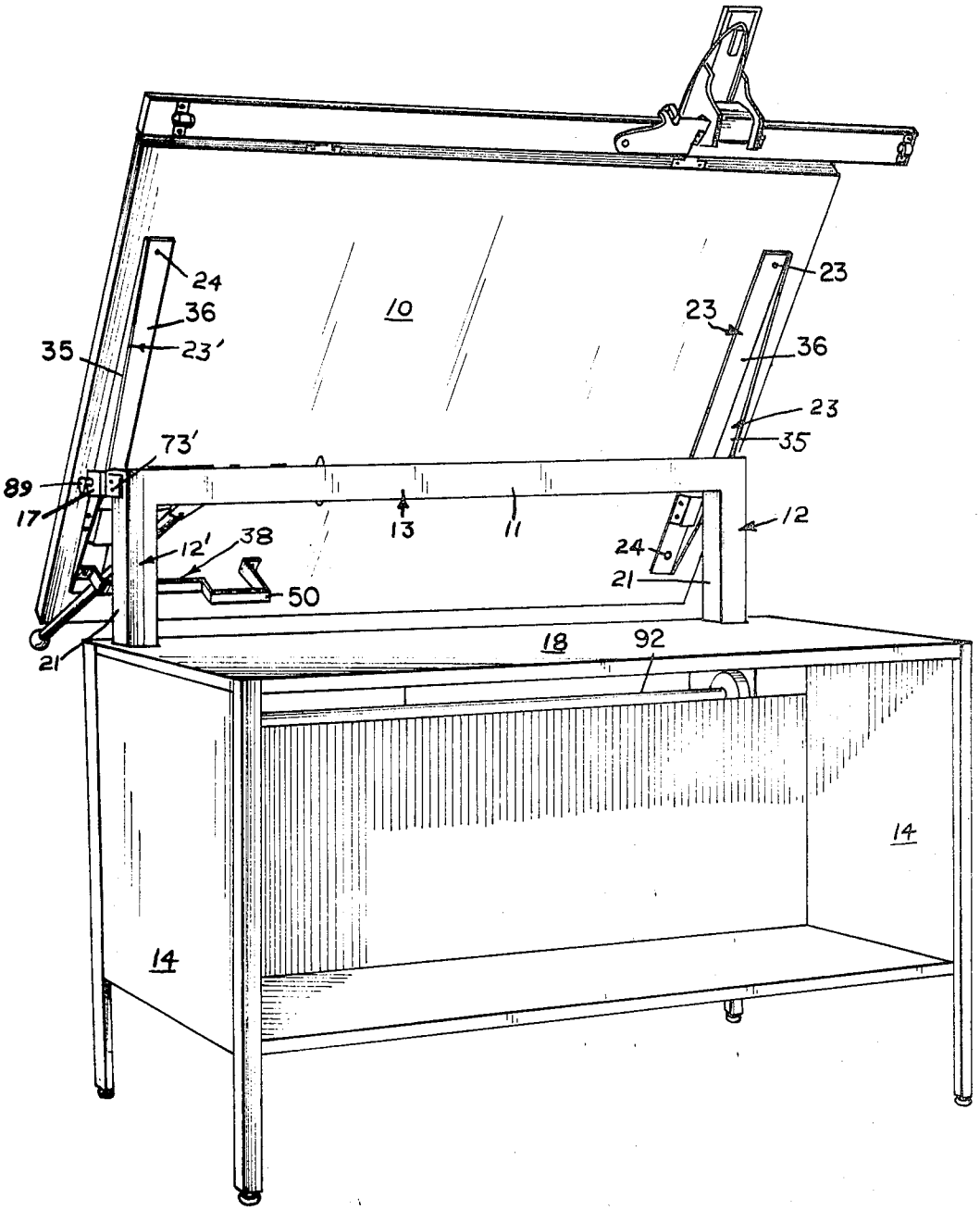


FIG. 1

INVENTOR.
GENE B. HASBROUCK
BY ALAN L. GREEN
Charles L. Loverecheck
attorney

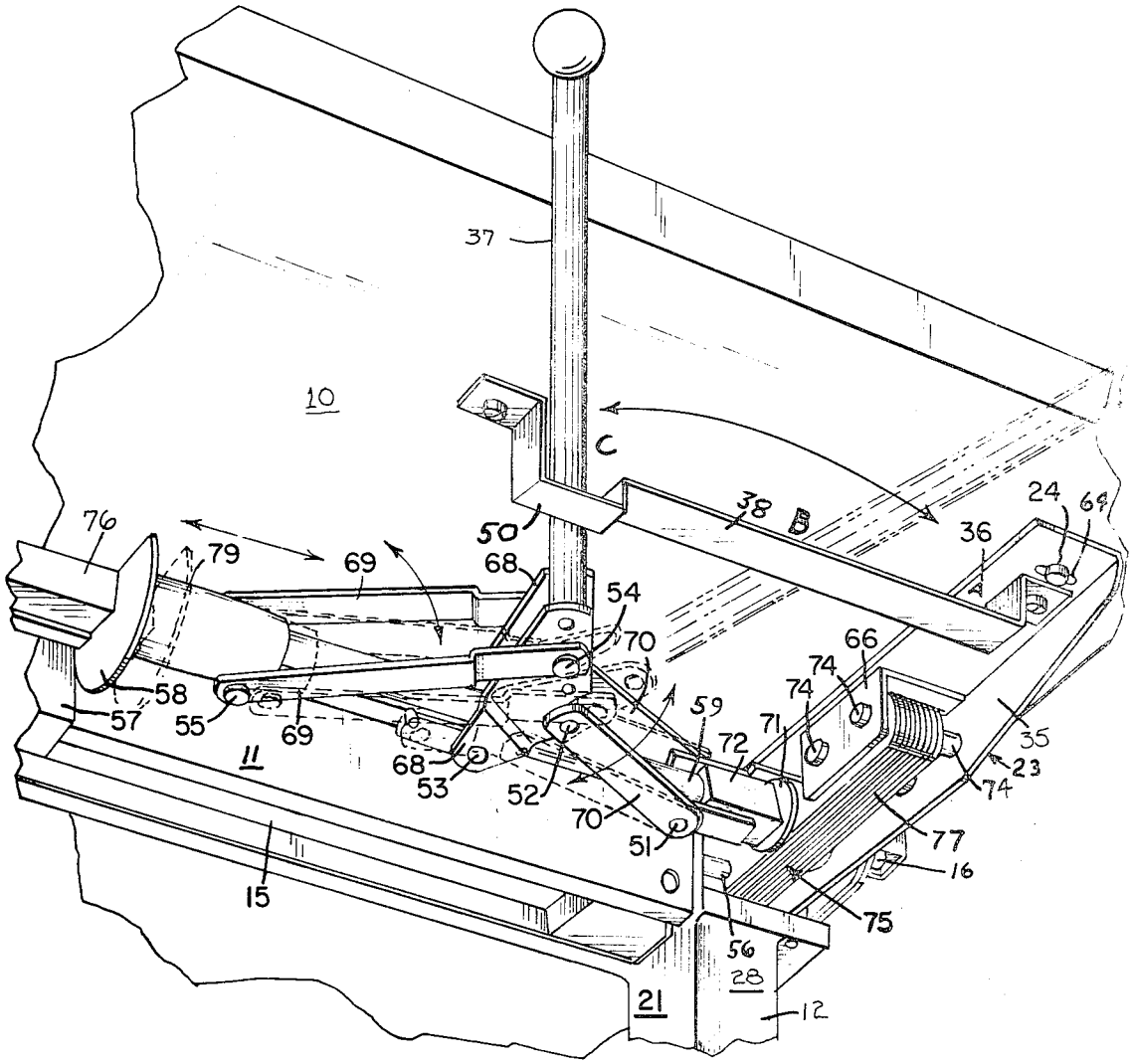


FIG. 2

INVENTOR.
GENE B. HASBROUCK
ALAN L. GREEN
BY
Charles L. Lovercheck
attorney

FIG. 4

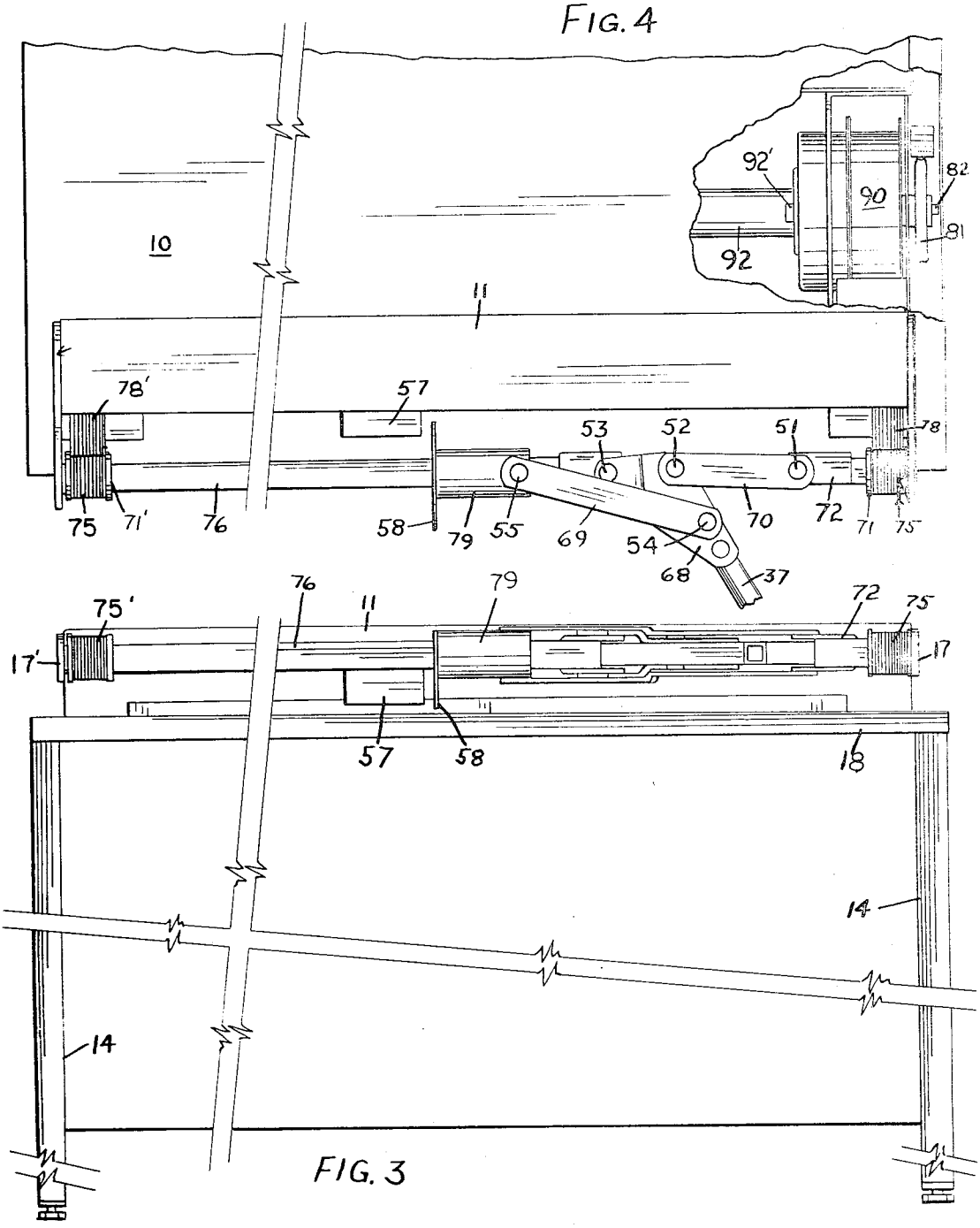


FIG. 3

INVENTOR
GENE B. HASBROUCK
ALAN L. GREEN
By Charles Lavecchia
attorney

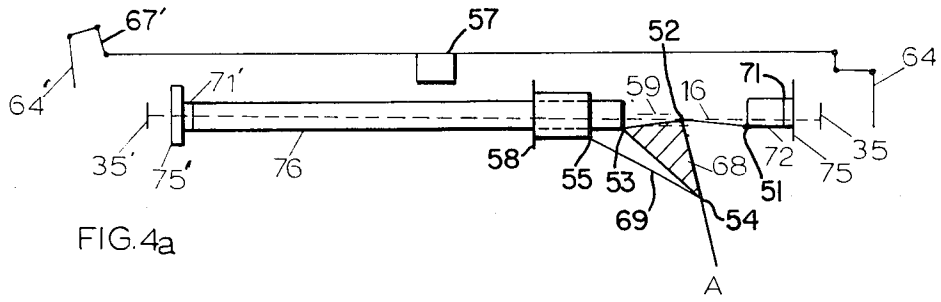


FIG. 4a

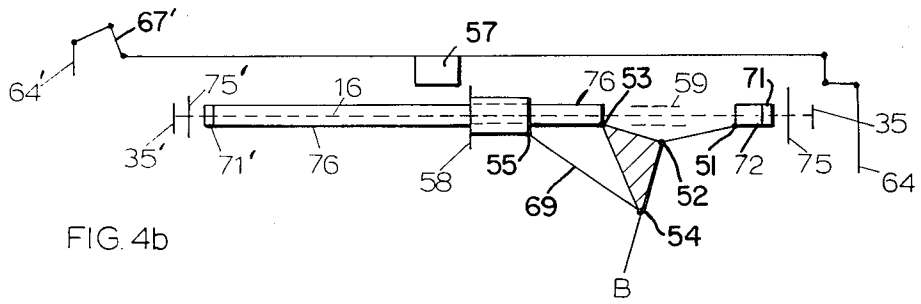


FIG. 4b

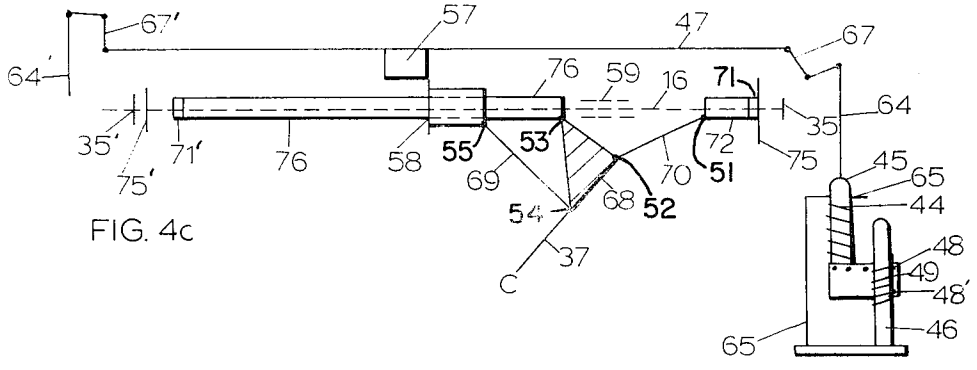


FIG. 4c

Inventor

GENE B. HASBROUCK

ALAN L. GREEN

By

Charles L. Lovercheck Attorney

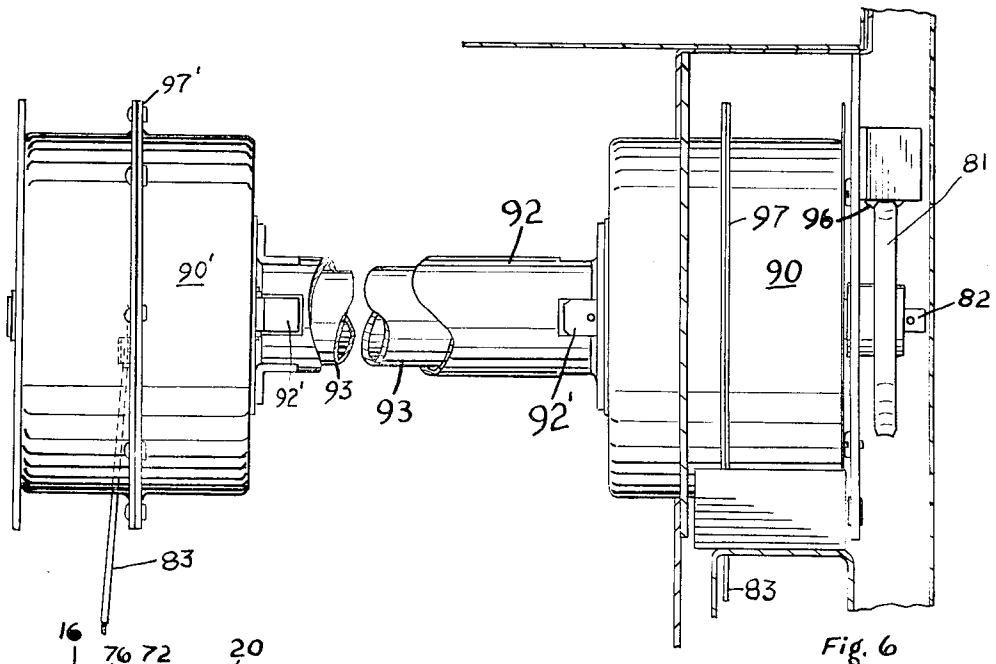


Fig. 6

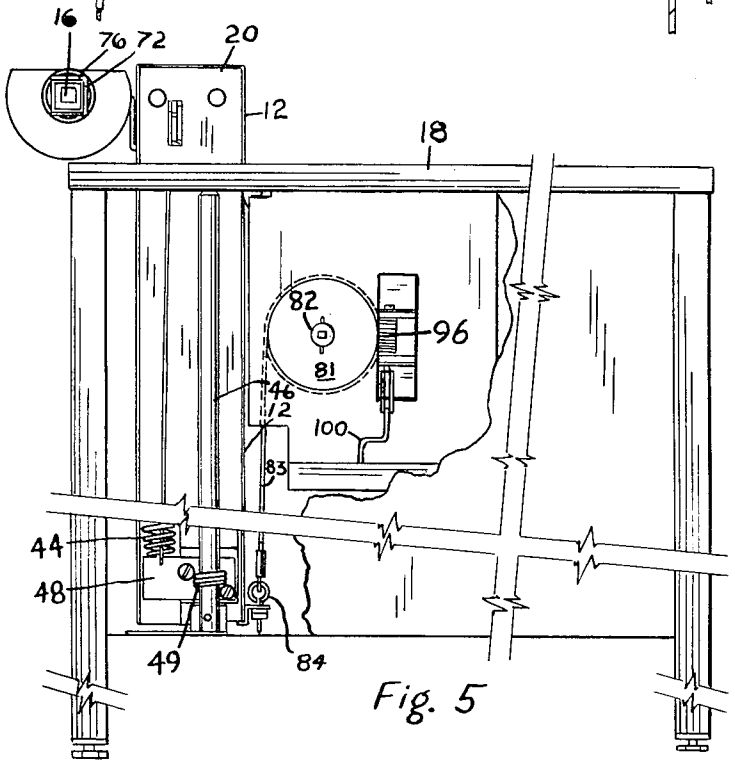


Fig. 5

INVENTOR
GENE B. HASBROUCK
ALAN L. GREEN

BY Charles L. Lovercheck
ATTORNEY

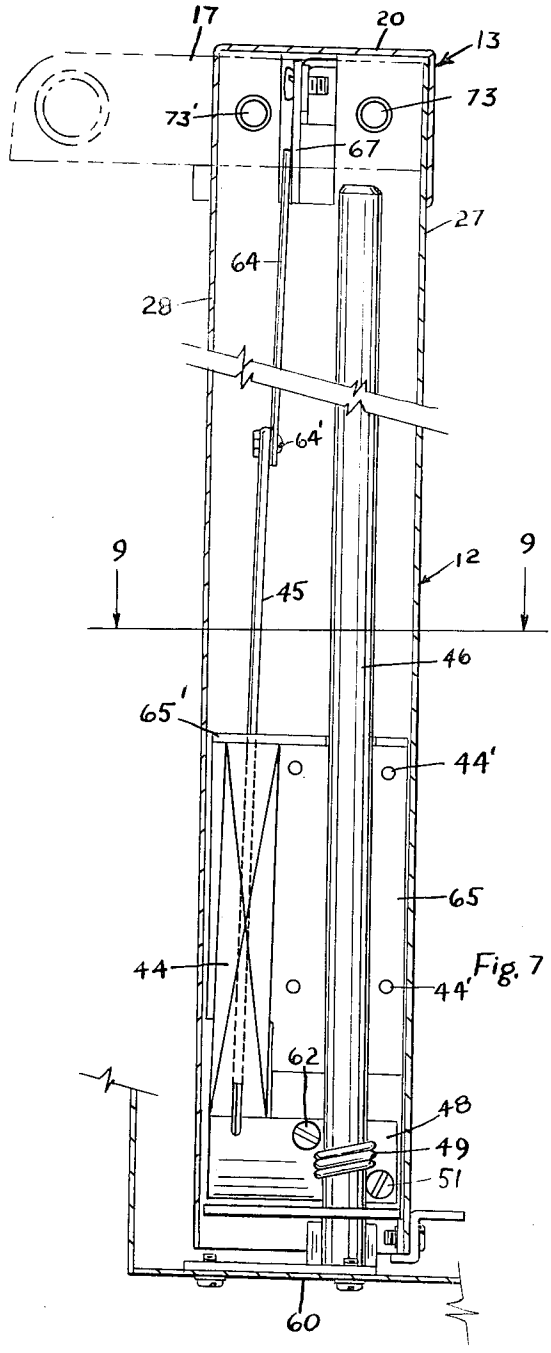


Fig. 7

INVENTOR
GENE B. HASBROUCK
ALAN L. GREEN

BY Charles L. Lovercheck
ATTORNEY

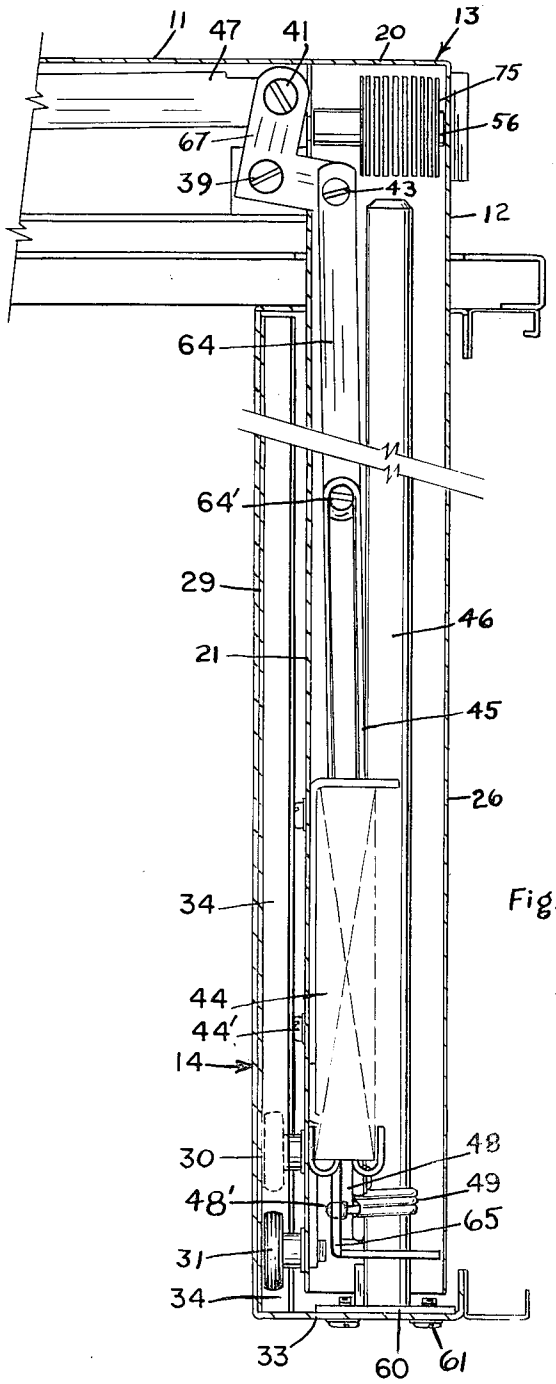


Fig. 8

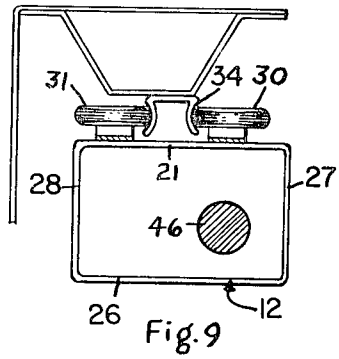


Fig. 9

INVENTOR
GENE B. HASBROUCK
ALAN L. GREEN

BY Charles L. Lovercheck
ATTORNEY

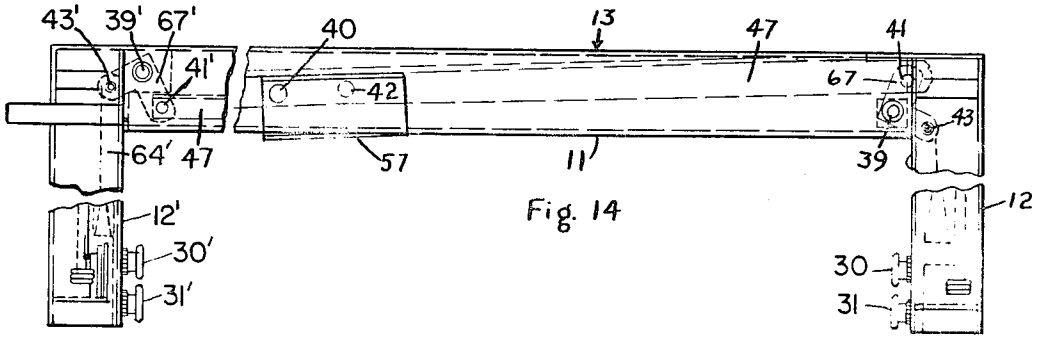


Fig. 14

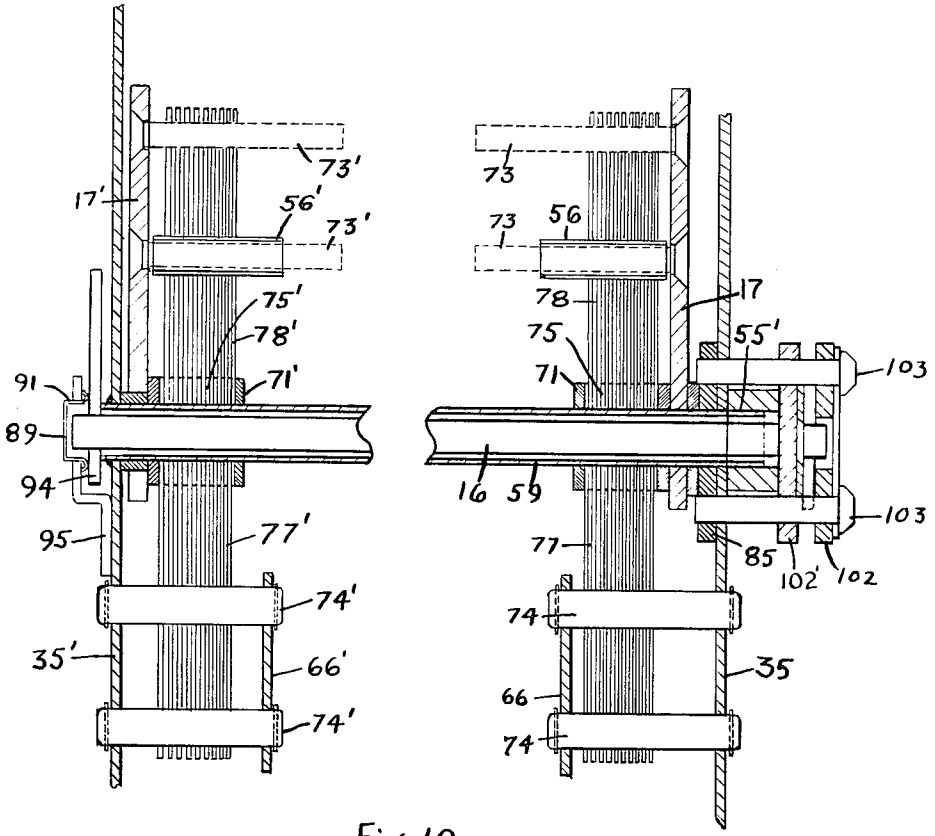


Fig. 10

Inventor
GENE B. HASBROUCK
ALAN L. GREEN

By Charles L. Lovercheck
Attorney

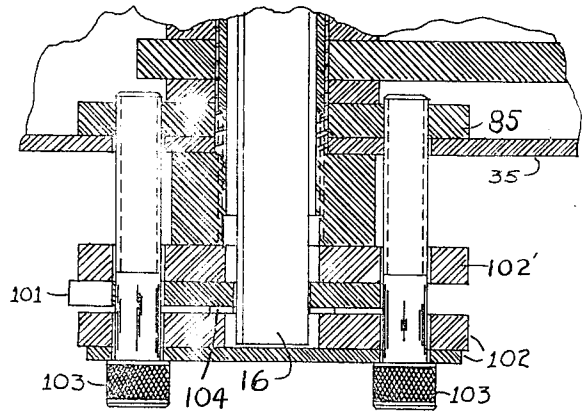


FIG. 11

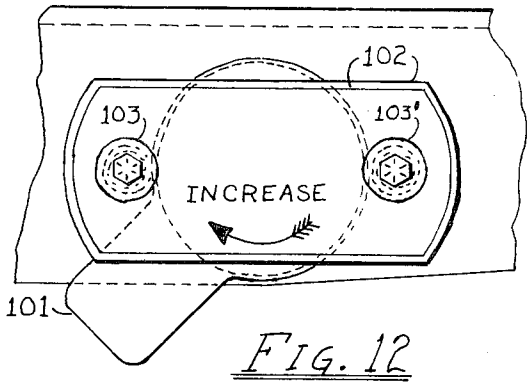


FIG. 12

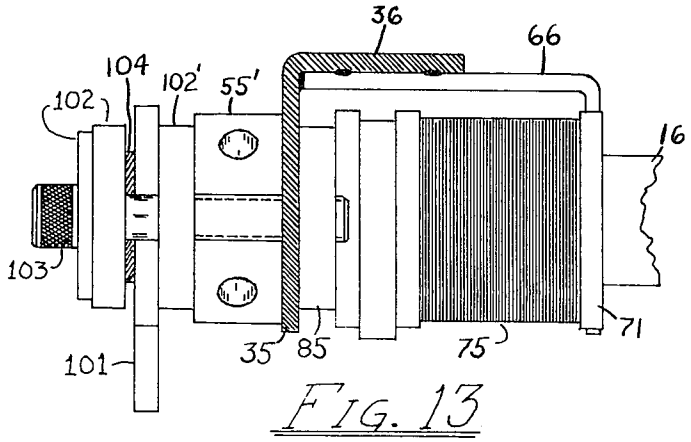


FIG. 13

INVENTOR
GENE B. HASBROUCK
ALAN L. GREEN

BY Charles L. Lovercheck

ATTORNEY

DRAFTING TABLE

DESCRIPTION OF PRIOR ART

The drafting table disclosed herein constitutes an improvement over U.S. Pat. No. 3,140,559 issued July 14, 1964 to H. N. Grow et al. and over Amthor U.S. Pat. No. 3,273,517 issued Sept. 20, 1966.

STATEMENT OF THE INVENTION

This invention relates to drafting boards and, more particularly, a drafting board with an improved counterbalance and lock mechanism by which the board is adjustable both in a vertical and in a tilted relation to a support.

CROSS REFERENCE TO OTHER PATENTS

This application contains claims which cover a drafting table wherein the drafting board is supported by a mechanism which will permit the board to be adjusted in selected tilted positions and another mechanism which will permit the board to be adjusted in selected vertical positions. Application, Ser. No. 823,451, contains a similar disclosure and claims drawn to he combination of a drafting table and a control to adjust the table in tilted positions. Application, Ser. No. 823,447, contains a similar disclosure and claims drawn to the combination of a drafting table and a control mechanism to control the board in selected vertical positions.

OBJECTS OF THE INVENTION

It is an object of the invention to provide an improved drafting board and actuating mechanism.

Another object it to provide a drafting board and control mechanism to control both elevation and tilt functions with a common lever.

Another object is to provide an improved drafting board and control for adjusting and locking the board in both tilted position and elevated position to accommodate the individual tastes of a draftsman.

Another object is to provide an improved combination suspension means for a drafting board for supporting the board in both tilting and elevation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the drafting board according to the invention.

FIG. 2 is an enlarged view of the handle and associated linkage for locking both the tilting mechanism and the elevation mechanism.

FIG. 3 is a rear view of the drafting board.

FIG. 4 is a view similar to FIG. 3, taken from another direction, with certain parts broken away.

FIG. 4*a* is a schematic view of the linkage in locked position for use.

FIG. 4*b* is a schematic view of the linkage with lever moved to adjust for tilt.

FIG. 4*c*, is a schematic view of the linkage with lever in position to adjust the board for elevation.

FIG. 5 is a side view of the desk with parts broken away to better show the vertical locking mechanism.

FIG. 6 is an enlarged partial cross sectional view showing the energy cells used to counterbalance the drafting board in elevation.

FIG. 7 is an enlarged longitudinal cross sectional view through one of the legs of the yoke showing the columns which enclose the locking mechanism for locking the board in vertical position.

FIG. 8 is a cross sectional view taken at right angles to the section of FIG. 7.

FIG. 9 is a cross sectional view taken on line 9—9 of FIG. 7.

FIG. 10 is an enlarged cross sectional view showing certain parts of the brake mechanism.

FIG. 11 and FIGS. 12 and 13 are views of the tilt counterbalance and brake mechanism for the table.

FIG. 14 is an enlarged view of the board supporting yoke.

DETAILED DESCRIPTION OF THE DRAWINGS

The drawings show a drafting board supported on a table. The drafting board is adjustable in elevation and may also be tilted about a horizontal axis.

The drafting board **10** is tiltably connected to the yoke **13** by a hinge connection made up of plates **17** which are fixed to the yoke **13** by cap screws **73** and support angles **23** which are fixed to the bottom of the board **10** by fasteners **24** and **24'**. Tube **59** acts as a hinge pin connecting the flanges **35** and **35'** of support angles **23** and **23'** to plates **17** and **17'**.

The yoke **13** is U-shaped, having the legs **12** and **12'** rigidly connected together by transverse member **11**. The legs are telescopically supported in the desk top **18**.

The drafting board **10**, yoke **13** and desk may be assembled and finished as indicated in FIG. **1** to make an attractive piece of office furniture which is very convenient due to the arrangement of all of the controls including lever **37** and crank **100**, all disposed at he right hand side of the drafting board.

A guard **38** is attached to the board **10** and lever **37** moves laterally in the guard. The guard **38** has an indent **50** in it in which the lever **37** is disposed when the table is in the vertical locked mode.

YOKE AND BOARD

The board is pivoted to the yoke **13** by pivot tube **59**.

The cross member **11** and legs **12** and **12'** of the yoke **13** may be made of sheet metal and the legs **12** and cross member **11** are formed into a square tube configuration. Cross member **11** has a transverse slot **15** extending from one side to the other. The slot **15** provides a path for pickup arm **57** to move. Pickup arm **57** is secured to angle bar **47** at points **40** and **42**. The cross member **11** contains he angle bar **47** which is connected to the elevation lock. Pickup arm **57** extends through slot **15**.

Brackets **17** and **17'** are fixed to the ends of cross member **11** by cap screws **73** and **73'** which extend through spacer bushings **56** and **56'** and are fixed to the cross member **11** of the yoke at each side at he upper ends of legs **12** and **12'**. Each bracket **17** and **17'** has a hole in it which receives pivot tube **59**.

Drafting board **10** has two support angles **23** and **23'** fixed to it. The angles **23** and **23'** have horizontal flanges **36** and **36'** respectively fixed to the board **10** and vertical flanges **35** and **35'** respectively by fasteners **24** and **24'** which extend in a plane parallel to the platelike brackets **17** and **17'**. Flanges **35** and **35'**

each have hole which is aligned with a hole in brackets 17 and 17'. Pivot tube 59 extends through the holes in brackets 17 and 17' and through the holes in flanges 35 and 35' and form a hinge pin for the board 10 to tilt about. The drafting board 10 is thus tiltably supported on the yoke 13.

TILT COUNTERBALANCE

The left hand end of pivot tube 59 is welded to vertical flange 35' of support angle 23'. The right hand end of tube 59 has a nut 55' threadably received on it. Thus the flanges 35 and 35' may be held from spreading apart and moving away from each other by pivot tube 59. The support angles 23 and 23' may be adjusted toward and away from each other by loosening the fasteners 24 by which the support angles 23 and 23' are held to board 10. Slots 64 will then allow support angles 23 and 23' to be moved laterally on board 10 to adjust the support angles relative to the two groups of brake leaves 75 and 75'.

Torsion bar 16 extends through pivot tube 59 and limit plate 94 is fixed to the left hand end of bar 16. Torsion lever 101 is fixed to the right hand end of torsion bar 16. Stop bracket 95 is welded to the vertical flange 35 at the left hand end of the board. A cap 89 is disposed in hole 91 in stop bracket 95. When the board 10 is tilted, lever 94 rotates with torsion bar 16 until it engages the stop bar. When the lever 94 engages the stop bar, further rotation of the left hand end of the torsion bar 16 relative to board 10 is stopped.

The right hand end of torsion bar 16 protrudes from the right hand end of the tube 59 and adjusting lever 101 is fixed to the right hand end of torsion bar 16. Two paced studs 103 extend through plates 102 and threadably engage plate 85 which is fixed to vertical flange 35. Thus, when the drafting board is swung toward a horizontal position, the right hand end of torsion bar 16 is forced by lever 101 to rotate with the board 10. The left hand end of torsion bar 16, however, is held from rotating by limit plate 94 and the stop bar. Lever 101 is sandwiched between plates 102 and 102'. Thus tilting the board twists torsion bar 16 and a counterbalancing force tending to urge the board 10 to a vertical position results. The counterbalance force can be increased by loosening studs 103 and rotating lever 101 clockwise, in the direction of the arrow (FIG. 12) and relocking the lever 101 in its new position by retightening studs 103. Lock washer 104 will prevent lever 101 from slipping. By thus adjusting the torsional force by means of lever 101, the board may be precisely counterbalanced so that very little manual force is required to move the board 10 to different tilted positions when the tilt lock is released.

TILT-LOCKING

The board 10 may be positively locked in any tilted position by the efficient locking mechanism which is provided.

The locking mechanism is made up of two groups of brake leaves 75 and 75', one of the groups of brake leaves disposed at each side of the table. The brake leaves are squeezed together by a toggle linkage to form a positive lock for the board.

The group of brake leaves 75 is provided at the right hand side of the table. Group 75' is provided at the left hand side of the table. Group 75 is made up of first leaves 77 which have spaced holes which loosely receive pins 74 that are fixed to vertical flange 35 at the right hand side of the table. Angle brackets 66 are fixed to horizontal flange 36 of angle 23 and the brake leaves 77 are received between angle brackets 66 and flanges 35. Angle bracket 66' is attached to flange 36'. Second leaves 78 are interleaved between first leaves 77 and are freely received on spacers 56 which are fixed to yoke 13 by cap screws 73. Second group 75' of brake leaves are made up of first leaves 77' and second leaves 78' interleaved with each other in the same manner as the leaves 77 and 78 of the first group 75. Leaves 77, 78, 77' and 78' have a large hole through which pivot tube 59 extends. Bracket 17' is fixed to legs 12' of yoke 13 and is supported by cap screws 73'. Cap screws 73' are threadably received in leg 12'. Similar capscrews attach bracket 17 to leg 12.

Leaves 77 and 78, as well as leaves 77' and 78', are free to float on their respective pins 74, 74' and sleeves 56 and 56' supported on cap screws 73 and 73' at each side of the table.

Square tubes 72 and 76 are telescopically received on pivot tube 59. Washers 71 and 71' are supported between the outer ends of square tubes 72 and 76 and the respective groups 75 and 75' of brake leaves. Links 70 are pivoted to the square tube 72 at 51. Crank links 68 are pivoted to square tube 76 at 53. Lever 73 is fixed to links 68. Links 68 are pivoted to links 70 at 52. Thus when lever 37 is in the position A shown in FIG. 4, the square tubes 72 and 76 will be moved outward from each other to their extreme outward position and they will exert a maximum clamping force on the brake leaves in groups 75 and 75', forcing their leaves into frictional engagement with each other in the group. This force may be increased by adjusting support angles 23 inward toward each other by sliding the support angles 23 and 23' on fasteners 24 in lots 64 and by loosening studs 103 and readjusting nut 55, then retightening studs 103.

ELEVATION LOCK

The drafting board is locked against movement in elevation as well as against tilting by the lever 37. When lever 37 is moved from position A to position B (FIGS. 2 and 4), the distance between points 53 and 51 is decreased and square tubes 72 and 76 move toward each other and release their force on the two groups of brake leaves 75 and 75' thus allowing the board 10 to tilt.

It will be seen that sleeve 79 is telescopically received on tube 76, and links 69 are pivoted to tubes 79 at 55 as well as to link 68 at 54. Flange 58 is fixed to sleeve 79. Therefore, when lever 37 is moved toward position C, sleeve 79 is moved toward the left and pickup arm flange 58 engages pickup lever 57. Further movement of lever 37 will cause a force by link 69 on flange 58 pickup 57. An equal and opposite reaction force will be exerted by link 70 on square sleeve 72. The reaction force will relock the group of brake plates 75 at the right hand side thereby relocking the board 10 against tilting. However, the group of brake plates 75' at the left hand side will remain unlocked. The force exerted by the single group of locked plates 75 at the right side of the table is sufficient to retain the board 10

in its tilted position while the operator is adjusting the board in elevation.

When lever 37 is in position C the elevation locking mechanism will be unlocked. This is accomplished by the force on pickup link 57 which is connected to the vertical locking mechanism through bar 47 and bell cranks 67 and 67'.

The elevation lock mechanism is basically a helical spring 49 in each leg 12 of yoke 13 which grips the vertically extending rods 46 and 46' which are fixed to the table base.

The legs 12 may be formed of sheet metal or other suitable material. The legs each have a top wall 20, side walls 21 and 26, and front and rear walls 27 and 28. The legs of the yoke 13 are slidable up and down in the table side panels 14. The vertically extending tracks 29 are supported at each side of the table and they provide guides for movement of legs 12. The tracks are in the form of a channel having each side leg of the channel bent to form grooves 34 for a wheel 30 and 31. Wheels 30 and 31 are fixed to the lower ends of legs 12 to roll in the grooves when board 10 is moved in elevation.

Each of side panels 14 has a bottom 33 which turns inward from sides 14. Lock rod 46 is fixed to plates 60 which is attached to bottom 33 by means of screws 61. Bracket 65 is in the form of a plate fixed to side wall 21 of leg 12 by screws 44'. Both the upper end and the lower end of bracket 65 are turned outward and the lower end has a hole in it through which rod 46 extends. Rock lever 48 is in the form of a plate pivoted to bracket 65 by rivet 48'. The helical spring 49 has eyelets formed on its ends which receive screws 62 and 51. The rod 46 passes through the helix of spring 49.

The upper end of compression spring 44 rests against the upper end 65' of bracket 65. The lower end of spring 44 rests against lever 48 urging lever 48 to pivot on rivet 48' thereby twisting spring 49 and causing spring 49 to grip rod 46. Spring hairpin link 45 has its lower end hooked under the lower end of spring 44 and is attached to connecting bar 64 by rivet 64'. Spring 44 is a helical compression spring. Hairpin link 45 extends through the inside of the helical spring 44 and pilots it thereby holding it in position.

Bell cranks 67 and 67' are pivoted to cross member 11 at 39 and 39' respectively. Bell cranks 67 are also pivoted to bars 64 and 64 at 43 and 43 and pivoted to angle bar 47 at 41 and 41' respectively.

Thus when lever 37 is moved to position C, flange 58 acting through pickup 57 will move angle bar 47 to the left rotating bell cranks 67 about their pivots 39 and lifting hairpin links 45. This will compress spring 44 and allow lever 48 to freely rotate and rotate spring 49 so that they can freely slide on rods 46. Thus the yoke 13 with board 10 on it can freely move up or down.

ELEVATION COUNTERBALANCE

The weight of the drafting board 10 and yoke 13 is counterbalanced in elevation by the mechanism made up to two energy cells, one located at each side of the table. (FIGS. 1, 4 and 6). Each energy cell is basically an outer drum 90 and an inner shaft 82 with a clock spring wrapped on the shaft and attached to the drum. The two energy cells, one at each side of the table, each have a drum 90 with an outer circumferential flange 97 to which an end of a cable 83 is attached. The lower end of each cable is attached to an eyebolt 84 in turn connected to a leg 12 of the yoke. Drums 90 are connected together to rotate as one by outer tube 92 which has notches in its end which receive lugs 92' on the inner ends of drums 90. Thus the drums 90 are restrained to rotate in unison by outer tube 92 and cables 83 are wrapped on drums 90 as the table is raised.

Inner tube 93 is attached to the spool connected to shaft 82 on which a clock spring is wound. The outer end of the clock spring is attached to the inner periphery of the drum 90. The spring may be tightened and thus more counterbalancing force applied to the yoke by tightening the springs.

Shaft 82 of the energy cell at the right hand side of the table is connected through inner tube 93 to the inner shaft in the energy cells at the left hand side of the table. By rotating crank 100 and its worm 96, worm gear 81 is rotated and by it, shaft 82 and the inner shafts of both energy cells and the tension on the spring inside the energy cells is thereby increased.

The board 10 and the yoke 13 can be levelled with respect to the base by adjusting the length of cables 83. This can be accomplished by adjusting the nuts on eye bolts 84.

It will be noted that handle 37, as well as crank 100, are both located at the right hand side of the table so that the operator has convenient access to them with his right hand. By adjusting the tension on the energy cells, the drafting board and yoke can be counterbalanced so that it can be moved to the desired height with a minimum of manual effort. By adjusting lever 101, the torsional force exerted by the torsion bar can be adjusted so that the board may be tilted with a minimum effort when the handle 37 is in position B. By moving lever 37 to position C into indent 50, the board is locked against tilting but is free to be moved vertically. Since both vertical and horizontal locks are actuated by a single lever 37, the operator may operate the lever 37 with one hand at the same time have the other hand free to move the board to desired position.

FIGS. 4*a*, 4*b* and 4*c* are schematic views that show the relative positions of the locking mechanisms and associated linkages which lock and unlock the board 10 so that it may be tilted and adjusted to the desired position and elevation.

The part of bellcrank 68 between pivot 52 and 53 may be considered to be a first link, link 70 as a second link, and link 69 as a third link. The tilt lock may be considered to be a first lock, the elevation lock may be considered to be the second lock.

When the operator desires to adjust the board 10 to a different tilted position, he moves the lever 37 to position B. In position B, the lever 37 moves the linkages to relock the brake on the right hand side of the table and unlock the tilt lock. In position B, pivots 51 and 53 move toward each other, causing the tubes 72 and 76 to move toward each other and away from brakes 75 and 75'. This causes the brakes to release and allows the table to tilt. However, at this point, the elevation lock remains locked.

When the lever 37 is moved toward position C, the flange 58 engages the pickup 57. Further movement of the lever 37 brings the member 71 into engagement with the brake 75 exerting a force which has a reaction on pickup 57. This moves the link 47 to the left and

rotates the bellcranks 67 about their pivot point which causes the links 64 and 64a to be lifted thereby lifting the links 48 about their pivot 48' and against the force of the compression spring 44. Thus the spring 49 releases its grip on the column 46 and the table may be adjusted in elevation while its tilting function is relocked. When the table is adjusted to the position desired, the operator will return the lever 37 to the A position, thus relocking the table against tilting and allowing the spring 44 to swing the lever 48 to the position to cause the spring 49 to again grip the column 46.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In combination a locking mechanism for a drafting board,
said drafting board being mounted on a support,
a means to adjust said board for tilting on said support and means to adjust said board vertically on said support,
said means to adjust said board for tilting comprising first lock means to lock said drafting board on said support in selected position against tilting,
second lock means to lock said drafting board in selected vertical position,
and a single handle connected to both said locking means for actuating both said locking means by movement of said handle,
said first lock means and said second lock means being locked when said handle is in a first position,
said first lock means being unlocked and said second lock means being locked when said handle is moved to a second position,
said first lock means being relocked and said second lock means being unlocked when said handle is in a third position.

2. The combination recited in claim 1 wherein said drafting board is supported on a first leg and a second leg,
transverse means fixing said legs together at their upper ends,
and counterbalance means for counterbalancing said drafting board in vertical position.

3. The combination recited in claim 1 wherein said counterbalance means comprises an energy cell at one side of said drafting board,
said energy cell having an outer drum,
a shaft and a spring connecting said shaft to said drum,
and cable means connected to said legs and to said drum.

4. A drafting table comprising
a support structure,
a drafting board,
first means attaching said drafting board to said support structure for tilting,
second means connecting said drafting board to said support structure for vertical movement whereby said drafting board can be moved up and down,
first locking means to lock said drafting board against tilting and second locking means to lock said drafting board against vertical movement,
and an actuating member connected to said first locking means and to said second locking means for actuating both said locking means locking said drafting board against tilting and against vertical movement,
said actuating member is movable to a first position to lock said drafting board against both tilting and vertical movement,
said actuating member is movable to a second position to unlock said tilting movement and to lock said vertical movement and to a third position to lock said drafting board against tilting and unlock said board for vertical movement.

5. A drafting table comprising a supporting structure,
a pair of spaced legs comprising a yoke mounted for vertical movement on said supporting structure,
a drafting board,
pivot means on each said leg supporting said drafting board on said yoke,
said first lock means comprising two interleaved groups of brake plates,
means securing the plates of one of said groups of said plates to said drafting board,
means securing the other plates of said group of said plates to the upper end of one of said legs,
a pivot tube extending through said groups of brake plates,
and actuating means for pressing said brake plates of both said groups together in tight frictional engagement to hold said drafting board in selected pivotal position relative to said leg,
said actuating means comprising a toggle linkage, including a first link and a second link, a third link attached to said toggle linkage,
said third link having means thereon connected to an elevation lock to actuate a second lock means to lock said legs against vertical movement,
a torsion rod extending through said pivot tube, one end of said torsion rod being fixed to said base, the other end of said torsion rod being fixed to said drafting board,
said first lock means and said second lock means being locked when said actuating means is in a first position,
said first lock being unlocked and said second lock being locked when said actuating means is in a second position
said first lock being relocked and said second lock being unlocked when said actuating means is in a third position.

6. The drafting board recited in claim 5 wherein said yoke comprises
a transverse member,
a first leg and a second fixed to said transverse member,
said legs being telescopically and slidably received in said base to raise and lower said board,
an elevation lock means to lock said legs in selected elevated position,
said actuating means comprising an angle bar in said transverse member of said yoke,
the outer ends of said transverse member being attached to said locking means,
a pickup arm fixed to said bar,
and means connected to said links to engage said pickup arm to actuate said elevation lock.

7. A drafting board comprising
a support member,

a first leg and a second leg spaced from each other, said spaced legs slidably supported on said support for vertical movement thereon,
a drafting board,
said drafting board being attached to an upper portion of said legs for tilting movement thereon,
two spaced support angle members attached to the lower side of said drafting board,
one flange of each said support angle extending generally perpendicular to said drafting board,
two groups of plates made up of a plurality of first brake plates and second brake plates disposed in parallel planes, one said group being disposed adjacent each said support angle,
first spaced pins fixed to said vertical flanges and extending through holes in said first brake plates,
two second groups of brake plates made up of first brake plates and second brake plates,
second pins fixed to said legs, said second pins extending through holes in said second brake plates,
a first bracket fixed to said first leg and a second bracket fixed to said second leg,
a tube extending through said brackets through said support angles and through both said first brake plates and through said second brake plates whereby said drafting board is tiltably supported on said legs,
said tube extending through said first plates and said second plates,
a first brake engaging member slidably supported on said tube and engaging said first brake plates,
a second brake engaging member slidably supported on said tube and engaging said second brake plates,
a lever,
a first link having its first end pivoted to said lever at a first pivot point and having its second end pivoted to said first brake engaging member,
said lever being swingably attached at a third pivot point to said second brake engaging member,
said first pivot point and said second pivot point being spaced from each other,
said lever being adapted to be swung from a first position to a second position whereby said first brake engaging means and said second brake engaging means are forced away from each other and said first brake plates and said second brake plates are squeezed together locking said drafting board against tilting,
said lever being swingable to a second position where said first pivot moves between said second pivot and said third pivot to a second position on the opposite side of said line through said second pivot and said third pivot whereby said first brake engaging member and said second brake engaging member are moved toward each other and said brake plates are allowed to move away from each other,
said lever being movable to a third position,
second locking means for locking said columns in adjusted vertical positions,
said second locking means having a member engagable by second lock actuating means on said lever whereby said second locking means is actuated when said lever is moved to said third position.

8. In combination, a drafting board and a support,
first means supporting said drafting board for tilting on said support,
second means supporting said drafting board for movement in elevation,
first lock means for locking said drafting board against tilting on said support,
second locking means for locking said drafting board against movement in elevation,
actuating means for said first lock means comprising a first link, a second link pivotally connected to said first link forming a toggle linkage,
said first link and said second link being connected to said first lock means at their distal ends,
a handle attached to said first link,
a third link, having a first end and a second end, said third link being connected to said first link at its said first end and connecting means connecting the said second end of said third link to said second lock means,
said third link being connected to said first link at a position between the connection of said second link to said first link and said handle.

9. The combination recited in claim **8** wherein said first locking means comprises interleaved plates at each side of said drafting board,
and said first link and said second link are adapted to force said plates together in frictional engagement with each other.

10. The combination recited in claim **8** wherein said second locking means comprises two spaced vertical extending rods fixed to said support,
two helical springs, one said helical spring disposed around each said rod,
two rock plates rotatably supported on said means supporting said drafting board for tilting,
each said helical spring having two ends, said two ends of each said spring being fixed to one of said rock plates,
said rock plates being connected to said connecting means.

11. The combination recited in claim **9** wherein said second locking means comprises two spaced vertical extending rods fixed to said support,
two helical springs, one said helical spring disposed around each said rod,
two rock plates rotatably supported on said means supporting said drafting board for tilting,
each said helical spring having two ends, said two ends of each said spring being fixed to one of said rock plates,
said rock plates being connected to said connecting means.

12. The combination recited in claim **10** wherein said connecting means comprises two bell cranks fixed to said support,
vertically extending means connecting said bell cranks to said rock plates,
a pickup member connected to said bell cranks,
and means connected to said third link adapted to engage said pickup member to move said bell cranks and thereby move said rock levers to move said helical springs out of binding engagement with said rods.

13. The combination recited in claim **12** wherein said means supporting said drafting board on said support comprises a tubular member supported on said support,

said first lock means comprising a first tubular member and a second tubular member telescopically supported on said tubular member, said first and second tubular members comprising said first lock means and said second lock means,

and a third tubular member slidably supported on said second tubular member, said third tubular member engaging said pickup member.

14. The combination recited in claim 13 wherein a compression spring is disposed in engagement with said rock levers urging said rock levers to urge said helical springs to bind on each said rod,

said compression spring being adapted to exert a force on said third link when said lever is moved to a position to move said first locking means toward each other whereby said first link and said third link co-act to lock said first locking means.

15. In combination, a drafting board and a support with a locking mechanism for locking two relatively swingable members together comprising

two spaced first members and two spaced second members, said first members being fixed to a drafting board, said second members being fixed to said support,

a first tubular member extending through said first members and said second members swingably connecting said first members and said second members together,

a first group of brake leaves and a second group of brake leaves, said groups of brake leaves each being made up of a plurality of first brake leaves and second brake leaves, said first brake leaves being loosely received on spaced first pins on said first members, said second brake leaves being loosely received on second pins on said second members, said tubular member extending through a hole in each of said brake leaves thereby connecting said first brake leaves to said second brake leaves,

a first square tube telescopically received on said first tubular member and disposed adjacent said first group of brake leaves,

a second square tube telescopically received on said first tubular member and disposed adjacent said second group of brake leaves,

means on said first square tube engaging said first brake leaves,

means on said second square tube engaging said second brake leaves,

a crank link pivoted at one end to means on said first square tube, a first link pivoted at one end to said second square tube and to said crank link,

said crank link being swingable to urge said brake leaves together to hold said first brake leaves in frictional engagement with each other,

a third square tube slidably supported on said second square tube,

a second link pivotably connected to said crank link at its first end and to said third square tube at its second end,

said first link being pivoted to said crank link between the pivotal connection of said crank link to said second tube and the pivotal connection of said second link,

said third square tube having means thereon adapted to engage a pickup member,

a handle fixed to said crank link,

said handle being swingable to a first position urging said first square tube and said second square tube from each other whereby said brake leaves of said first group and said brake leaves of said second group are each urged into frictional engagement with each other,

said handle being swingable to a second position whereby said leaves of said first group and said brake leaves of said second group can each swing relative to the other,

said handle being swingable to a third position whereby said second link forces said third square tube into engagement with said pickup member and a force is thereby exerted between said third tubular member and said first tubular member forcing said brake leaves of said first tubular member into frictional engagement.

16. The combination recited in claim 15 wherein a torsion bar is telescopically received in said first tubular member,

said torsion bar has a first end and a second end,

said first end of said torsion bar is fixed to said support,

said second end of said torsion bar is fixed to said drafting board.

17. The combination recited in claim 16 wherein said second end of said torsion bar has adjusting means connecting it to said drafting board whereby the torsional force counterbalancing said drafting board may be adjusted.

18. The combination recited in claim 17 wherein said support comprises

a yoke having a transverse member and two spaced vertically extending legs,

a disk member slidably supporting said legs,

a locking means for holding said yoke in predetermined vertical position,

a laterally extending bar on said transverse member,

a first bell crank and a second bell crank attached to each end of said transverse member,

a locking member on each said leg and attached to each said bell crank,

said pickup member being attached to said transverse bar.

19. The drafting table recited in claim 1 wherein said drafting board is attached to a yoke having a pair of spaced legs mounted on said supporting structure,

pivot means on each said leg supporting said drafting board on said yoke,

said means to adjust said board for tilting comprising a first group of brake plates and a second group of brake plates interleaved with said first group of brake plates,

means securing the plates of said first group of said plates to said drafting board,

means securing the plates of said second group of said plates to the upper end of one of said legs,

a pivot tube extending through said groups of brake plates,

said handle comprising actuating means for pressing said brake plates of both said groups together in tight frictional engagement with each other to hold said drafting board in selected pivotal position relative to said leg,

said actuating means further comprising a toggle linkage, including a first link swingably connected

to means engaging said first group of plates and a second link swingably connected to means engaging said second group of plates,

and said first and said second links being swingably connected together and an actuating handle fixed to said first link,

and means supporting said links to said pivot tube.

20. The drafting board recited in claim **19** wherein a torsion rod extending through said pivot tube, one end of said torsion rod being fixed to said yoke, the other end of said torsion rod being fixed to said drafting board.

21. The drafting board recited in claim **19** wherein said pivot means further comprises

spaced platelike brackets on said yoke, one at each side thereof,

a first flange and a second flange spaced from each other and fixed to said board and disposed in planes generally parallel to said brackets,

said first group of brake plates disposed ad-jacent said first flange,

said second group of brakes plates disposed adjacent said second flange,

said tube having a first end and a second end extending through said brackets and through said flanges and through said first group of brake plates and through said second group of brake plates,

said first end of said tube having a nut thereon abutting the outside surface of said first flange,

the said second end of said tube being fixed to said second flange.

22. The drafting board recited in claim **21** wherein said first flange has a first horizontal flange fixed thereto and said second flange has a second horizontal flange fixed thereto,

said horizontal flanges each having two laterally extending slots therein,

fastening means in said slots engaging said board holding said board to said horizontal flanges whereby said first and said second flanges may be adjusted toward and away from each other to adjust the outward movement of said brake leaves.

23. The drafting board recited in claim **22** wherein said actuating means further comprises a first outside sleeve telescopically supported on said tube adjacent said first group of brake leaves,

a second outside sleeve telescopically supported on said tube adjacent said second group of brake leaves,

said means supporting said first link and said second link on said pivot tube comprises said first link pivotally attached to said first outside sleeve,

said second link pivotally attached to said second outside sleeve,

said links being swingably connected together and handle means fixed to one said link.

24. The drafting board recited in claim **21** wherein a torsion bar extends through said first tube,

said torsion bar having a first end and a second end,

means fixing a first end of said torsion bar against rotation relative to said first flange,

means fixing said second end of said torsion bar against rotation relative to said second bracket whereby said torsion bar is twisted when said board is tilted from a horizontal position.

25. The combination recited in claim **1** wherein said means to adjust said board comprises

a first leg and a second leg spaced from each other, said spaced legs slidably supported on said support for vertical movement thereon,

said drafting board being attached to an upper portion of said legs for tilting movement thereon,

a first support angle and a second support angle spaced from each other and attached to the lower side of said drafting board,

one flange of each said support angle extending generally perpendicular to said drafting board,

a first group of plates made up of a plurality of first brake plates and a plurality of second brake plates,

a second group of brake plates made up of a plurality of third brake plates and a plurality of fourth brake plates disposed in parallel planes, one said group being disposed adjacent each said support angle,

first spaced pins fixed to said vertical flanges and extending through holes in said first brake leaves,

a first bracket fixed to said first leg and a second bracket fixed to said second leg,

second pins fixed to said brackets, said second pins extending through holes in said second brake leaves,

a tube extending through said brackets through said support angles and through both said first brake leaves and through said second brake leaves whereby said drafting board is tiltably supported on said legs,

a first brake engaging member slidably supported on said tube and engaging said first group of brake leaves,

a second brake engaging member slidably supported on said tube and engaging said second group of brake leaves,

a lever,

a first link having its first end pivoted to said lever at a first pivot point and having its second end pivoted to said first brake engaging member at a second pivot point,

said lever being swingably attached at a third pivot point to said second brake engaging member,

said first pivot point and said second pivot point being spaced from each other,

said lever being adapted to be swung from a first position to a second position whereby said first brake engaging means and said second brake engaging means are forced away from each other and said first brake leaves and said second brake leaves are squeezed together locking said drafting board against tilting,

said lever being swingable to a second position where said first pivot moves between said second pivot and said third pivot to a second position on the opposite side of said line through said second pivot and said third pivot whereby said first brake engaging member and said second brake engaging member are moved toward each other and said brake leaves are allowed to move away from each other,

said lever being movable to a third position whereby said brakes are locked.

26. The actuating mechanism recited in claim **25** wherein said support comprises a table structure,

a first anchor plate secured to a first end of said torsion rod and also being secured to said drafting board and a lever secured to a second end of said torsion rod and to one of said legs whereby when said lock means is released and said drafting board is moved toward a predetermined position, said torsion rod is rotatively twisted to counterbalance the weight of said drafting board.

* * * * *