United States Patent [19]

Cowley

[11] **3,874,309**

[45] **Apr. 1, 1975**

[54] **ARTICULATED COLUMN DRAFTING TABLE**

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[22] Filed: **May 1, 1974**

[21] Appl. No.: **465,835**

[52] **U.S. Cl.** **108/2**, 403/117, 403/62

[51] **Int. Cl.** **A47f 5/12**

[58] **Field of Search** 108/1, 2, 4-6; 403/62, 113, 117

[56] **References Cited**

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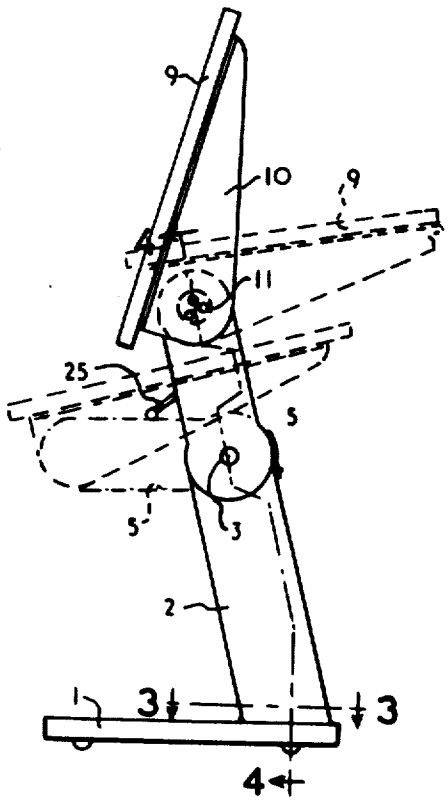
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Primary Examiner—James C. Mitchell
Attorney, Agent, or Firm—W. Irwin Haskett

[57] **ABSTRACT**

An articulated column drafting table having a forwardly inclined hinged column rising from the apex of a V-shaped base with the spread of its arms to the front and a drawing board tiltingly mounted on the upper end of said articulated column characterized by an improved board tilting and column hinging mechanism that allows a wide angle range for hinging of the upper limb of the articulated column and for tilting of the drawing board on the free end of the upper limb. The hinging of the upper limb of the articulated column from upright to lowered position and the tilting of the board from vertical to horizontal position under the influence of separate and independent counterbalancing means, with individual tension adjustments, allows each to rest in a state of static equilibrium at any point in its turning angle range when in unlocked position. Both the hinging column limb and the tilting drawing board are releasably locked in securely fixed position on the actuation of a single locking device. The tilting drawing board and the column hinging limb are each turnable through a selected predetermined arc of approximately ninety degrees and have positive stops at both ends of the respective permitted turning arcs.

8 Claims, 12 Drawing Figures



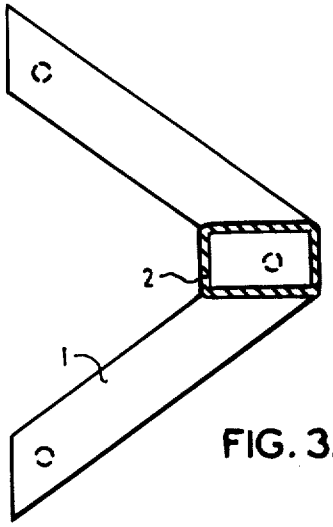
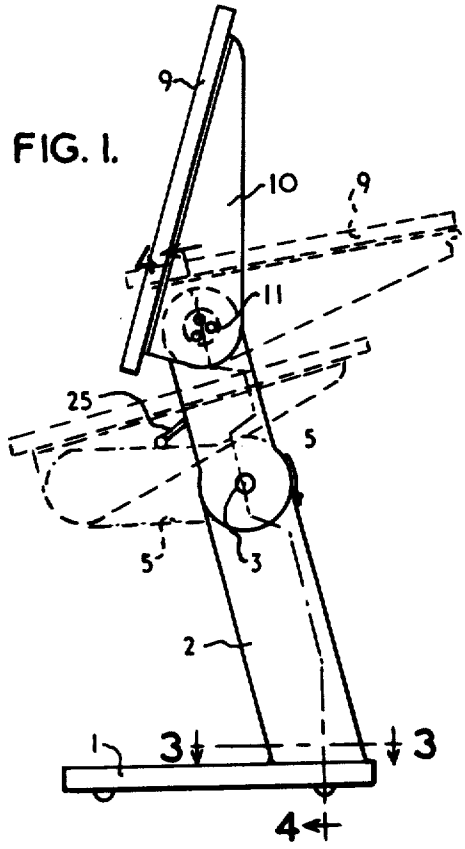


FIG. 3.

FIG. 1.



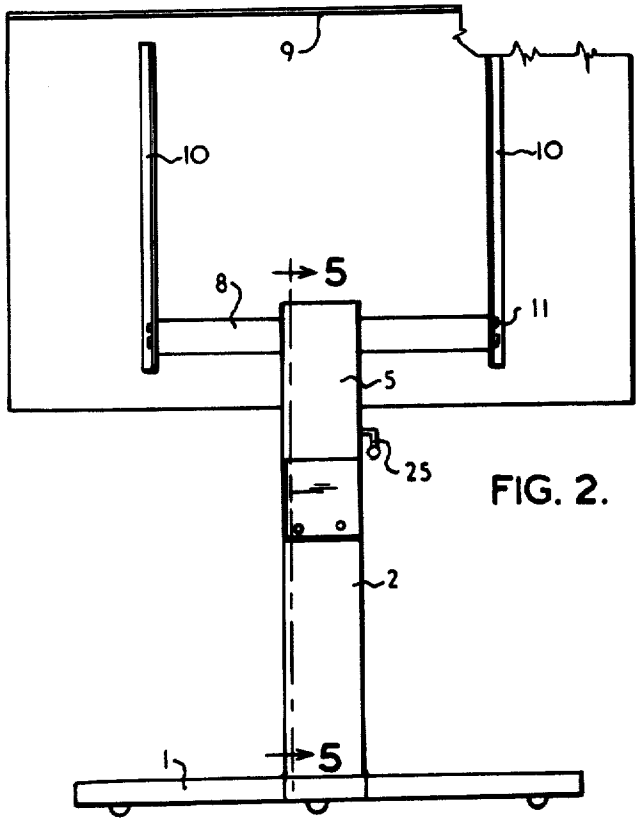


FIG. 2.

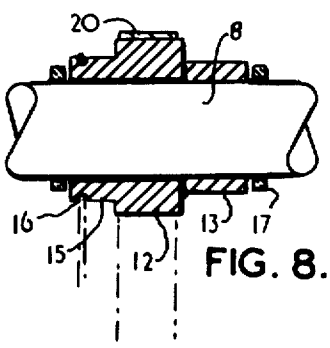


FIG. 8.

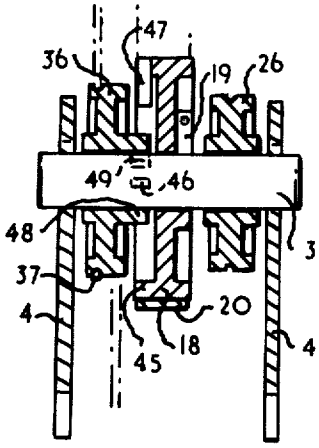


FIG. 9.

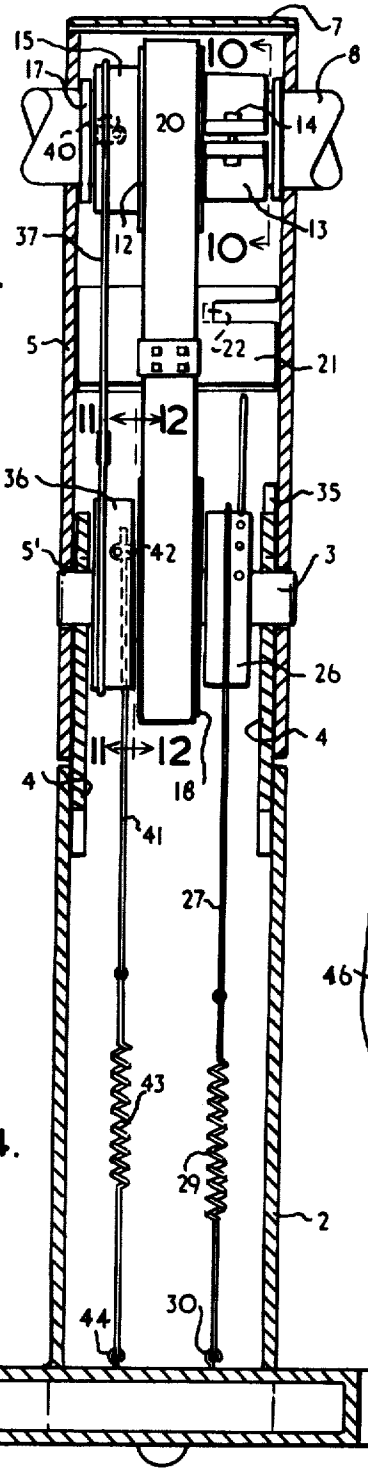


FIG. 4.

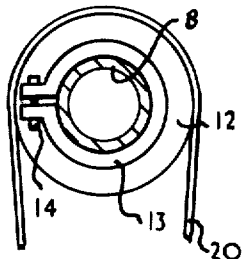


FIG. 10

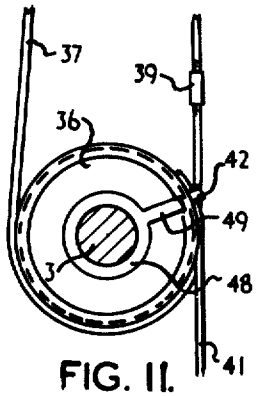


FIG. 11.

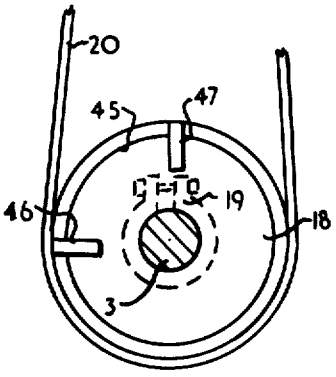


FIG. 12.

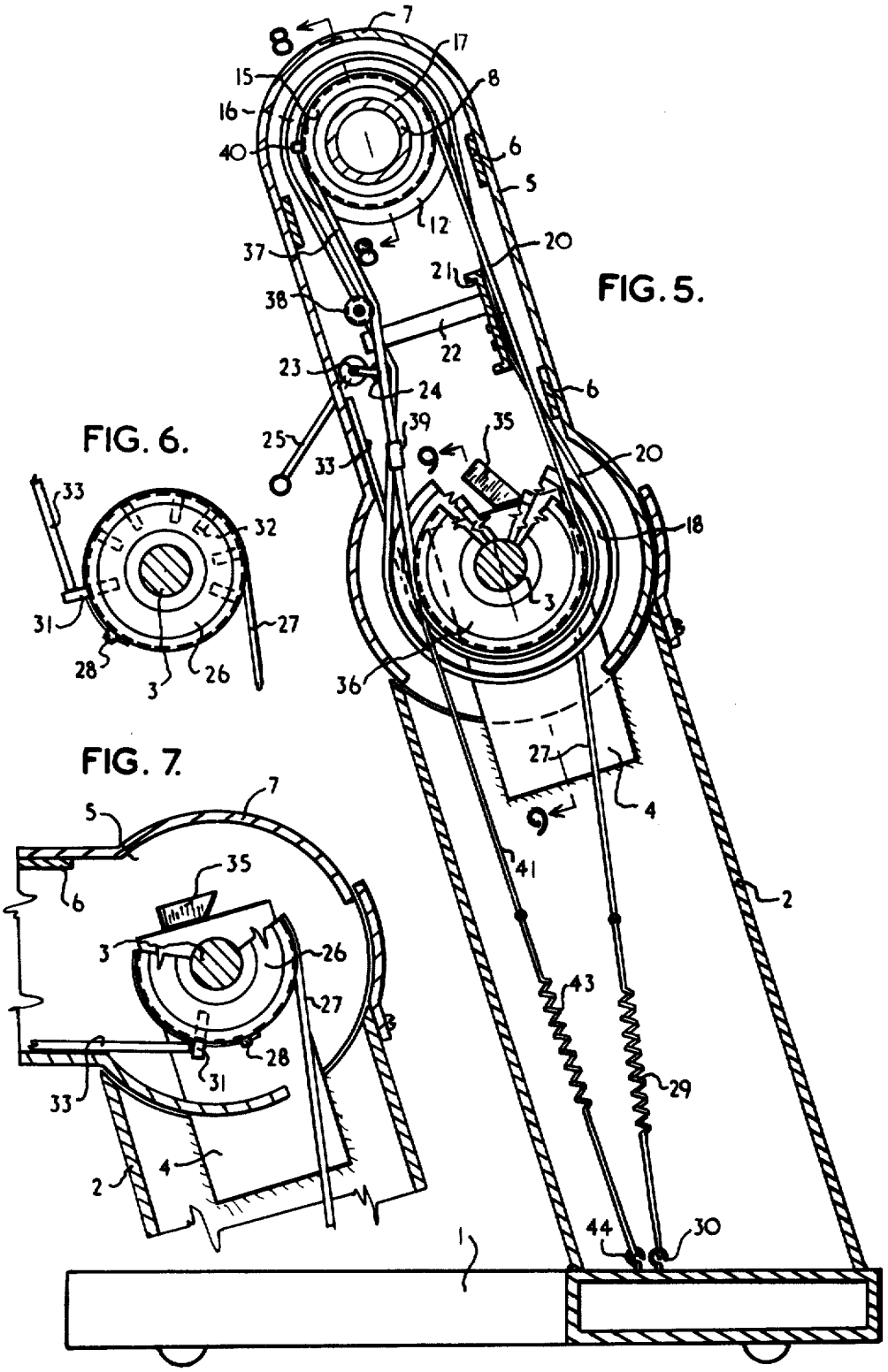


FIG. 5.

FIG. 6.

FIG. 7.

ARTICULATED COLUMN DRAFTING TABLE

BACKGROUND OF THE INVENTION

This invention relates to an articulated column drafting table and particularly to improvements in the column hinging and drawing board tilting mechanism, being a further development in the drafting table shown in my copending U.S. application, Ser. No. 383,347, filed July 17, 1973.

Heretofore I have disclosed drafting tables of simple compact design embodying a drawing board tiltingly mounted on the upper end of a forwardly inclined post rising from the apex of a V-shaped base arranged with the spread of its arms to the front, such a structure providing a convenient work facility and excellent stability. In this application, the hinging action between the lower trunk portion and the upper limb or column extension of the forwardly leaning articulated column and the tilting action of the drawing board mounted on the upper end of the column extension are substantially improved over my earlier articulated column units as a result of improved mechanism for the articulated knee of the column and the tilting of the drawing board respectively.

OBJECTS OF THE INVENTION

It is an object of this invention to provide an articulated column drafting table having improved board tilting and column hinging mechanism.

Another object of the invention is to provide a drafting table of the character described wherein the drawing board mounted on the upper end of the column extension is tiltable through a specific arc with tilt-limiting stops at both ends thereof and is counterbalanced in static equilibrium at all points within that arc.

A further object is the provision of a drafting table of the character described wherein the upper limb or extension column is hingeable on the articulated column axis within the limits of a predetermined arc with positive hinge-limiting stops at both ends of the predetermined hinging arc and is suspended in static equilibrium at all points in its allowed hinging range by an individual and independent counterbalancing mechanism.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the claims hereunto appended.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings:

FIG. **1** is a side elevation of the improved articulated column drafting table;

FIG. **2** is a rear elevation thereof;

FIG. **3** is a horizontal, transverse section on line **3—3** of FIG. **1**;

FIG. **4** is an enlarged, vertical, transverse section as taken on the indirect line **4—4** of FIG. **1**, with parts in elevation;

FIG. **5** is a similarly enlarged, vertical, longitudinal section on line **5—5** of FIG. **2**;

FIG. **6** is a detail of the column extension counterbalance wheel;

FIG. **7** is a sectional view, similar to FIG. **5** of the top of the hinge pivot area, with some foreground components removed, showing the column extension rotated to its lower limit position.

FIG. **8** is a sectional detail of the drawing board tilting control mechanism taken on line **8—8** of FIG. **5**;

FIG. **9** is a sectional detail of the mechanism on the column hinge pivot, taken on line **9—9** of FIG. **5**;

FIG. **10** is a sectional end view of the drawing board tilting axis and its control mechanism, as seen on line **10—10** of FIG. **4**;

FIG. **11** is a sectional elevation on the column hinge pivot showing the inside face of the cable pulley, as seen on line **11—11** of FIG. **4**; and

FIG. **12** is a similar sectional elevation of the outer face of the fixed brake drum, as seen on line **12—12** of FIG. **4**.

DETAILED DESCRIPTION OF THE INVENTION

General Assembly

As will be seen by referring to FIGS. **1** to **5** inclusive, the drafting table base **1** is a horizontal V with the spread of the arms toward the front. The articulated column trunk **2** is of hollow rectangular form rising from the apex of the V base at a forwardly inclined angle from the vertical. At the open upper end of said trunk a transverse pivot pin **3** is supported near its opposite ends by rectangular plates **4** welded to opposite side walls of the hollow trunk **2**, said pin fixedly secured to said plates and projecting therebeyond serves as the articulated column's axis on which the upper limb or column extension **5** hinges. This upper limb **5** is here shown as fabricated of a pair of spaced opposite sides joined by cross bars **6** that support a two-piece cover **7**. The lower ends of the opposite sides of the column extension **5**, disposed outside the rectangular plates **4**, and coplanar with the walls of the trunk **2** as seen in FIG. **4**, are apertured as at **5'** to accommodate and turn on the respective projecting ends of the pivot pin **3**.

Extending transversely through the upper end of the articulated limb or column extension **5** is a rotatable elongated cylindrical tube **8** that parallels the articulated column pivot pin **3** and provides the axis on which the drawing board tilts. A spaced parallel pair of triangular brackets **10** secured on the rear face of the drawing board **9** are attached at a point near the forward lower edge of the board as by bolts **11** to opposite ends of the tube **8**.

Locking Brake

On this transverse tube **8**, within the sides of the upper limb **5** an annular brake drum **12** having an integral split sleeve clamp **13** on one side is secured in non-rotatable relation by bolt **14**. On the side of the drum remote from the sleeve clamp **13** a coaxial extension **15** has a circumferential groove **16** to serve as a cable pulley, to be later described. The releasable clamp **13** allows the composite drum unit to be secured on the tube **8** in the selected circumferential setting. A nylon washer **17** is provided on the tube between each end of the drum unit **12** and the adjacent inside face of the limb **5**.

On the fixed pivot pin **3**, in vertical registry with the brake drum **12** clamped on the drawing board tube **8**, a brake drum wheel **18** is secured in selected rotative position by an integral sleeve clamp **19**. Encircling the drums **12** and **18** is a normally loose, friction gripping brake belt **20**, held against travel by attachment of the rear reach thereof to a fixed bracket **21** secured between the sides of the limb **5** and having a finger **22** extending across the limb to serve as an edge guide to the opposite reach of the belt. A manually operable locking device **23** of bell-crank form journalled by an offsetting portion in the side wall of the limb **5**, has a brake belt-engaging roller **24** on its short lever arm that bears against the brake belt **20** at a point approximately opposite the belt bracket **21** when the external lever **25** is actuated to lock the articulated upper limb **5** from hinging and the drawing board **9** from tilting, on account of the said lower drum **18** being securely clamped on the non-rotatable pivot pin **3**.

Articulated Upper Limb Counterbalance and Hinging Limit Stop

To counterbalance the hingeable upper limb **5** of the articulated column together with the load of the tiltable drawing board **9** mounted on its upper end, a grooved pulley **26** is rotatably mounted on the pivot pin **3** with a cable **27** extending from the rear side, over the top thereof and terminally secured thereto by a clip **28**, the cable being under tension of a retractile coil spring **29** connected to an anchor bolt **30** in the base **1**. A spoke **31** projects radially from the pulley **26** being removably positioned in a chosen socket **32**, a number of which are spaced circumferentially around said pulley. A projecting abutment **33** secured on the upper limb **5** engages this spoke **31** as the articulated limb is hinged causing the pulley to rotate against the action of the spring **29**. As will be clearly seen, the tension of the spring may be adjusted by moving the spoke **31** to another radial socket if a change in the loading of the limb and drawing board should occur.

Not only is it desirable to provide a knee action or hinging movement of wide scope for the upper limb of this articulated single column drafting table through a substantial permitted hinging arc and to assure its constant counterbalancing as by running the cable **27** around the circumference of pulley **26** so that it operates on uniform leverage at a fixed radius and by allowing for ready adjustment of the spring tension if needed but special attention has been given to limiting the hinging of the limb to a predetermined arc and providing positive stops at both ends of the permitted hinging arc. To this end a substantial steel block **35** of quadrangular shape is welded on the inside of the wall of limb **5** above the pin **3**, having two angularly related sides alternatively engageable with the upper side of the welded plate **4** that serves as an anvil when the limb reaches fully upright position and when it reaches fully lowered position. In the present structure, because the articulated column is inclined forwardly the "fully upright position" is not an absolutely vertical one - and furthermore "fully lowered position" may or may not be truly horizontal. In any case, depending on the chosen angle of the two angularly related, anvil contacting sides of the quadrangular stop block **35**, the articulated limb **5** may swing through the permitted arc and be positively arrested by the stops at both ends thereof.

Tilting Drawing Board Counterbalance and Tilt-Limiting Stops

On the pivot pin **3**, and on the side of the clamped brake drum **18** remote from the grooved pulley **26**, a special grooved cable pulley **36** is rotatably mounted in alignment with the grooved coaxial extension **15** of the upper brake drum **12** on tube **8**. An endless cable **37** extends around the grooved extension **15** and the grooved pulley **36**, being deflected inwardly by an idling wheel **38** and carries a tensioning turn buckle **39**. The upper loop of the cable is fastened to the grooved extension **15** by a holding clip **40**. Because the upper brake drum **12** with its extension **15** is securely clamped on the rotatable drawing board tube **8**, the tilting of the board causes the grooved pulley **36** to turn in the same direction as the grooved extension **15** which action is counterbalanced by a cable **41** attached by anchor clip **42** to the pulley **36** spaced inwardly from the endless cable **37** and passing part way around the pulley descends in the column trunk to connect with a tension spring **43** secured by an anchor bolt **44** in the base **1**. Because the drawing board **9** tilts rearwardly, while the articulated limb **5** hinges forwardly, it will be noted that the board's counterbalance cable **41** reaches up and around the forward side of pulley **36**, whereas the limb counterbalancing cable **27** extended over its grooved pulley **26** from the rear side. To increase the tension on counterbalance spring **43**, the cable **41** may be shortened at its clip anchored end.

As it is desired that the drawing board be tiltable from substantially vertical position to substantially horizontal position, in whatever angular setting of the hingeable upper limb may be chosen, the tilting of the board is limited to an arc of approximately ninety degrees. If, however, this permitted tilting arc is related to the upper limb or column extension **5** it will be seen that if the limb is hinged down forwardly into horizontal position as seen in dotted line in FIG. **1**, and the drawing board **9** is then tilted rearwardly to superpose it in horizontal position, the upward hinging of the limb to near vertical position would result in the drawing board being suspended downwardly on the rear side of the column and if tilted through a permitted arc of ninety degrees would only swing up to near horizontal position and could not be elevated to near vertical position as seen in solid line. Likewise, if this same limb-related, limited arc were applied to the vertical position of the board as seen in solid line in FIG. **1** to allow it to teeter rearwardly to horizontal position, then when the limb **5** was hinged downwardly to extend forward horizontally, the drawing board would be substantially upside down and could not be tilted as far as upright position and be prevented from being further tilted rearwardly into horizontal working position. Accordingly, to limit the tilting of the drawing board from the vertical to horizontal position, in whatever angular setting of the hinged column limb **5** may be chosen, a novel and effective mechanism relating the tilting board tube **8** to the fixed column trunk **2** or its pivot pin **3** is provided that compensates for the hinging of the articulated column limb **5**. From a projecting circumferential flange **45** on the side of brake drum wheel **18** facing the special grooved pulley **36** two inwardly extending radial lugs **46** and **47** are disposed at an angle of ninety degrees to each other to serve as stops and on a widened hub **48** on the confronting inner side of the

pulley **36** a radial fin **49** is provided that turns within the over-hanging flange **45** of drum wheel **18** and contacts the adjacent faces of stop lugs **46** and **47** that lie in its path.

It will be seen that when the column limb is in upright position the drawing board can tilt from vertical to horizontal position as the fin **49** of pulley **36** travels from stop lug **46** to stop lug **47**; while when the limb **5** is hinged forwardly into horizontal position the fin is brought back into engagement with the first stop lug **46** and is free to travel through its ninety degree angle as before. However, if the board is in horizontal position on the horizontal limb and the column extension is raised, it will result in the fixed lug acting on the fin of the rotatable pulley to turn the upper tube **8** so that the drawing board cannot go beyond the horizontal to decline rearwardly.

Thus it will be seen that an articulated column drafting table is provided with improved hinging, tilting, turn control, counterbalancing and locking mechanism to satisfy the requirements thereof but it is to be understood that variation may be made to the size, shape and arrangement of parts shown and described herein without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A drafting table having a forwardly inclined articulated column rising from the apex of a horizontal V-shaped base with the spread of its arms to the front and a drawing board tiltingly mounted on the top end of the column's upper limb

characterized by individual and independent counterbalance means for the upper limb of the articulated column and the tiltable drawing board on the top end thereof respectively;

means to limit the arc through which the upper limb of the articulated column may hinge; separate means to limit the arc through which said drawing board may tilt; and

a common locking device for releasably holding the hingeable limb and the tiltable drawing board in any desired position within their respective permitted turning arcs.

2. The device according to claim **1**, wherein separate means are provided for adjusting the respective independent counterbalance means of said hingeable upper limb and said tiltable drawing board as varying conditions may require.

3. The device according to claim **1**, wherein the arc limiting means through which the drawing board may turn can be accorded a predetermined setting and be subsequently adjusted to another setting.

4. The device according to claim **1**, wherein the counterbalance means for the hingeable upper limb of said articulated column includes a transverse pivot pin fixedly supported by said column and on which the upper limb hinges, a grooved wheel rotatable thereon, a spoke extending radially therefrom, a projecting abutment secured on the limb engageable with said spoke causing said wheel to turn when the limb is hinged downwardly, a cable secured to the circumference of said wheel and running over the top of said wheel and down the side remote from said spoke and a tension spring biased between said cable and the drafting table base.

5. The device according to claim **1**, wherein the counterbalance means for the tiltable drawing board includes a transverse pivot pin fixedly supported by said column and on which said upper limb hinges, a grooved pulley rotatable thereon, a transversely disposed tube rotatably carried by the upper end of said limb on which tube the drawing board is mounted, an annular member with a coaxial grooved part secured against rotation on said tube in line with said grooved pulley, an endless cable extending around said grooved part and said grooved pulley and secured to the former, a counterbalance cable terminally secured to said pulley and passing over the top of the pulley and a tension spring biased between said counterbalance cable and the drafting table base.

6. The device according to claim **4**, wherein means to limit the arc through which the upper limb of said articulated column may hinge includes an anvil part on the column above said pivot pin and a quadrangular stop block mounted on said limb having two angularly related sides alternatively engageable with said anvil part when the limb is hinged to one end or the other of its permitted turning arc.

7. The device according to claim **5**, wherein the means to limit the arc through which the drawing board may tilt includes a wheel secured against rotation on said pivot pin, a pair of inwardly extending radial lugs on said wheel disposed at an angle of approximately ninety degrees to each other, and a radial fin projecting from said grooved pulley engageable with the adjacent faces of said radial lugs that lie in its path and serve as positive stops to limit the tilting of the drawing board to the permitted arc.

8. The device according to claim **1**, wherein said common locking device includes a transverse pin fixedly supported by said column and on which the upper limb hinges, a brake drum wheel secured thereon against rotation, a transverse tube rotatably mounted in the upper end of said limb by which the drawing board is carried, a brake drum clamped securely on said tube, a normally loose brake belt encircling said brake drum wheel and said brake drum, means attaching said belt to said limb to hold it against travel, and a manually operable locking member operating on said belt to tighten it on said brake drum wheel and brake drum respectively in friction gripping relation.

* * * * *