Sept. 5, 1933. B. T. ANDREN 1,925,087

DRAWING TABLE

Filed Nov. 30, 1931 2 Sheets-Sheet 1

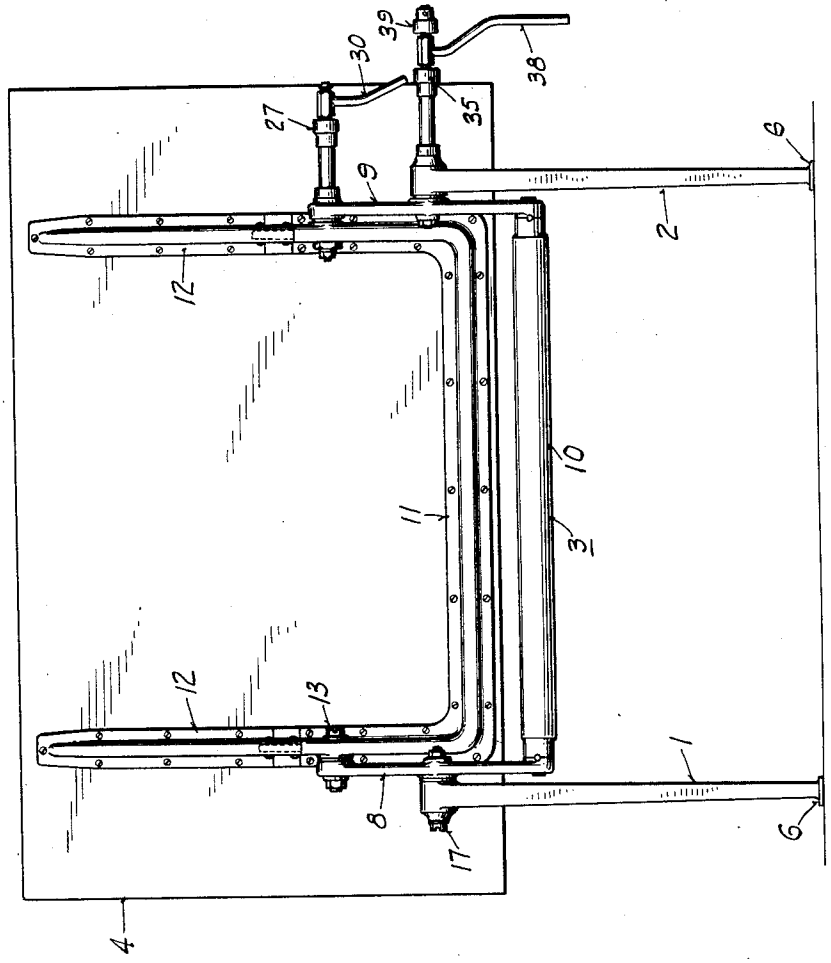


FIG. 2.

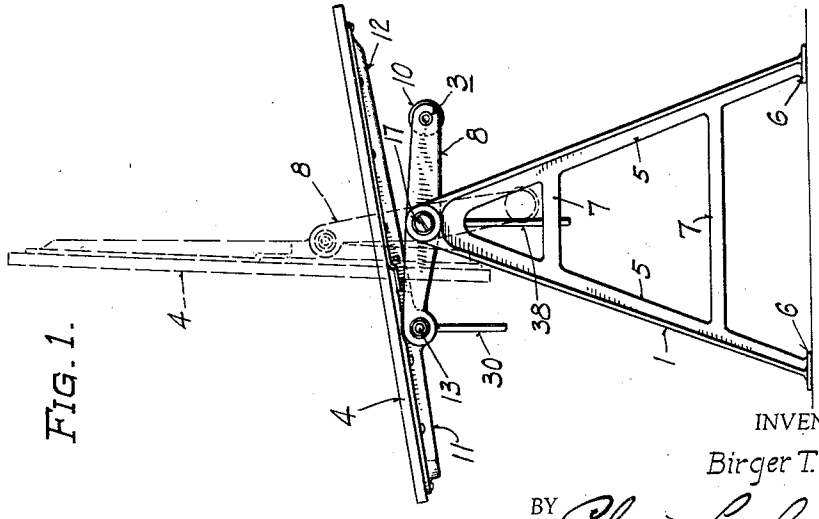


FIG. 1.

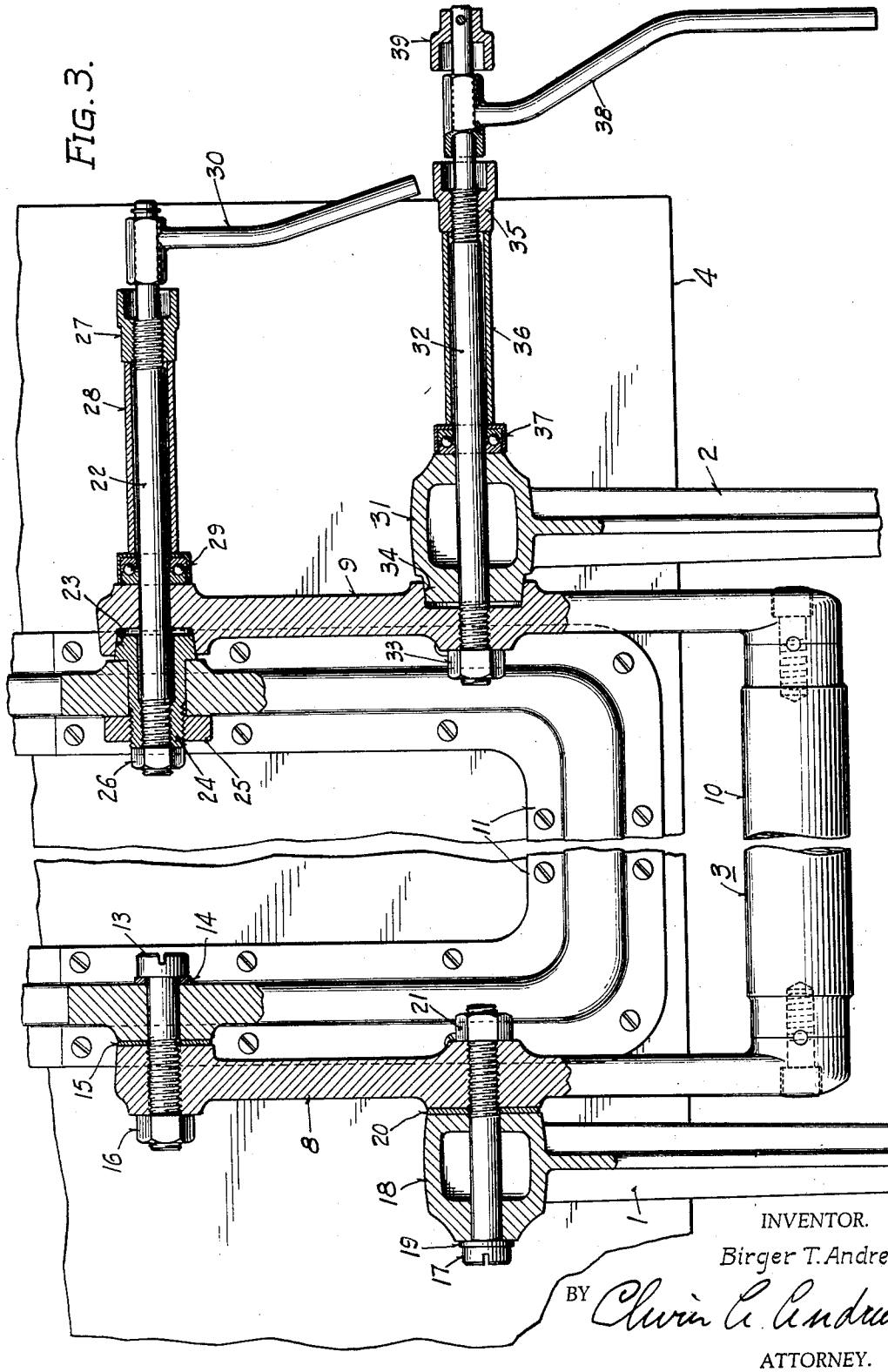
INVENTOR.
Birger T. Andren
BY Elvin A. Andren
ATTORNEY.

Sept. 5, 1933. B. T. ANDREN 1,925,087

DRAWING TABLE

Filed Nov. 30, 1931 2 Sheets-Sheet 2

FIG. 3.



INVENTOR.
Birger T. Andren
BY Clivin C. Andren
ATTORNEY.

Patented Sept. 5, 1933

1,925,087

UNITED STATES PATENT OFFICE

1,925,087

DRAWING TABLE

Birger T. Andren, Milwaukee, Wis., assignor to A. O. Smith Corporation, Milwaukee, Wis., a corporation of New York

Application November 30, 1931
Serial No. 577,983

18 Claims. (Cl. 45—110)

This invention relates, generally, to drafting tables and particularly to tables of the type in which the table top may be tilted and adjusted vertically.

A general object of the invention is to provide a drafting table that is of simple and sturdy construction and that may be conveniently adjusted angularly and vertically.

Another object of the invention is to provide a drafting table having a table top that is reenforced against torsional stresses.

Another object of the invention is to provide a supporting frame for a drafting table that will readily adapt itself to the contour of the floor on which it is placed.

A further object of the invention is to provide a drafting table, the table top of which is so pivoted and counter-weighted that it is substantially balanced about its pivot axes in such manner as to be readily tilted or otherwise adjusted.

In accordance with the present invention, a drafting table is provided with a table top, or drawing board, reenforced by a U-shaped bracket extending lengthwise of and fastened on the under surface of the table top near its lower edge. The reenforced table top is pivotally mounted on a supporting frame to tilt about an axis in the lower portion thereof, the reenforcing bracket being of such weight that the board is substantially balanced about the pivot axis. The frame is in turn pivoted on a pair of supporting pedestals and counter-weighted in such manner that the weight of the table top is substantially balanced to permit it to be readily adjusted vertically.

The pivotal connection between the frame and one pedestal and the connection between the frame and one side of the bracket are provided with frictional joints that prevent movement of the table top under the influence of gravity. The joint between the frame and the other pedestal and between the frame and the other side of the bracket are each provided with clamping means for locking the table top in working position. The frame and the reenforcing bracket are of such rigid construction that they prevent movement or distortion of the table top when clamped at one end only. The frictional connections at the other end of the table function merely to support that end of the table top.

The stated and other objects may be achieved by the specific structure described in this specification and illustrated in the drawings annexed hereto, of which:

Figure 1 is a view in end elevation of a drafting table embodying the invention;

Fig. 2 is a view in rear elevation of the drafting table showing the supporting frame and adjusting mechanism; and

Fig. 3 is a view, partly in rear elevation and partly in section with portions of the table top and supporting framework broken away, showing on an enlarged scale the details of the adjusting mechanism.

Referring particularly to Figs. 1 and 2 of the drawings, the drafting table there shown to illustrate the invention comprises, in general, two pedestals 1 and 2 supporting a frame 3 on which is carried a drafting board or table top 4.

As illustrated by the solid line and broken line representations in Fig. 1, the table top 4 may be adjusted to various angular and vertical positions to suit the draftsman. In order that the table may rest evenly on the floor upon which it may be placed, the pedestals 1 and 2 are each independently pivoted to the frame 3 to enable them to turn relative to each other and thus conform to the contour of the floor surface. The pedestals each comprise essentially two struts or legs 5 that are provided at their lower ends with feet 6, the legs being suitably spread to provide stability and converging toward the top. Suitable cross braces or tie rods 7 connect the two legs 5 of each pedestal to constitute a rigidly braced A-structure.

The frame 3 of the structure comprises two arms 8 and 9 similar to each other and each pivoted at its mid-portion to one of the pedestals. The two arms are connected together by a longitudinally extending torsion member 10 fastened to or formed integrally with each of the arms 8 and 9 at one end thereof in such manner that the arms are rigidly held and prevented from moving relative to each other.

At their other ends, the arms 8 and 9 are pivotally connected to a bracket 11 on the table top 4 in such manner that the table top may be tilted about the ends of the arms or moved in vertical direction by turning the arms about their pivotal connections on the pedestals to move the ends of the arms upwardly or downwardly. To facilitate vertical adjustment of the table top 4, the torsion shaft 10 is made sufficiently heavy to substantially counter-balance the weight of the table top and its reenforcing bracket 11.

As shown in Fig. 2, the reenforcing bracket 11 is of substantially U-shape with a horizontal portion extending along the lower surface of the table top 4 near its lower edge and with vertical or

side portions extending upward therefrom near the ends of the table top. As shown, the ends of the arms 8 and 9 are pivoted to the upper ends of the reenforcing member 11 at a position below the middle of the table top.

As shown in Fig. 1, the pivot axis is disposed at a distance about one-third the width of the table top from its lower edge and in position to support the table top beneath the portion thereof which receives the greatest load. Further, the position of the pivot axes is so placed to bring the center of the table top over the center of the pedestals 1 and 2 to thus provide a stable structure. The reenforcing bracket 11 is of such weight and is so proportioned that it constitutes a counter-weight for the table top 4 to substantially balance it about the pivot axis through the ends of the arms 8 and 9. Further, the bracket 11 is of such rigid construction that it effectively prevents warping or distortion of the table top 4. To assist in bracing the table top, cleats 12 of relatively light metal pieces extend upwardly from each end of the bracket 11 nearly to the top edge of the top 4 and are securely fastened to the table top and to the bracket by screws or other well known fastening means.

To provide some resistance to tilting of the table top 4 when it is not held rigidly in position, the pivot joint between one end of the bracket 11 and the arm 8 is provided with frictional means. As shown in Fig. 3, the frictional pivot joint comprises a bolt or shaft 13 that is journaled in the upper end of the bracket 11 and that has screw threaded engagement with the end of the arm 8. Between the head of the bolt and one side of the bracket is a brass washer 14 and between the other side of the bracket and the side of the arm 8 is interposed a washer 15 of leather or other suitable frictional material. The bolt 13 may be screwed into the arm 8 and against the washer 14 to compress the leather washer 15 between the bracket and the arm, thus setting up the required degree of frictional resistance, after which the bolt may be locked in position by tightening a lock nut 16 at the outer end thereof.

To provide similar resistance to vertical movement of the table top, frictional means is also provided in the joint between the arm 8 and the pedestal 1. As shown in Fig. 3, the arm 8 is pivotally connected at its mid-portion to the top of the pedestal 1 by means of a bolt or shaft 17 passing through and rotatable within a bearing 18 on the pedestal and having screw threaded engagement with the arm 8. A brass washer 19 is disposed beneath the head of the bolt 17 and a suitable frictional washer 20 of leather is interposed between the inner side of the bearing 18 and the adjacent side of the arm 8. The degree of frictional resistance of this joint may be adjusted by tightening or loosening the bolt 17 in the arm 8 to alter the degree of compression of the washer 20 and the adjustment may be locked by a lock nut 21 on the end of the bolt 17.

The degree of frictional resistance exerted by the washers 15 and 20 is ordinarily so adjusted that the table top 4 may be moved manually to any desired position, but will remain in the adjusted position unless force is exerted upon it.

To retain the table top 4 rigidly in its adjusted position and to resist such loads as may be imposed upon it in its normal use, the pivotal connections between the table top and the arm 9 and between the arm 9 and the pedestal 2 are provided with clamping means.

As shown in Fig. 3, the pivotal connection at the upper end of the arm 9 comprises a shaft 22 that is journaled in the arm 9 and secured in the end of the bracket 11. In coaxial relation to the journal for the shaft 22 in the arm 9 is formed a counter-sunk frusto-conical seat 23 tapered inwardly and opening toward the bracket 11. The seat 23 is disposed to be engaged by a complementary frusto-conical surface at the end of a sleeve 24 that is fitted in an opening through the bracket 11. The sleeve 24 is held rigidly in place in the bracket by a suitable nut 25 threaded on its inner end and the sleeve is internally threaded for receiving the threaded end of the shaft 22 which is locked in position by a lock nut 26.

At its other end, the shaft 22 is threaded to receive a nut 27 that may be tightened against a sleeve 28 and an anti-friction thrust bearing 29 to draw the conical surface of the sleeve 24 into the seat 23, thus locking or clamping the bracket 11 to the arm 9. For operating the nut 27, a suitable wrench 30 is journaled on the shaft 22 in such manner that it may be engaged with the nut 27 to turn it when it is desired to clamp or unclamp the table top relative to the arm 9. A suitable enlargement at the end of the shaft 22 serves to prevent the wrench 30 from being removed. The bracket 11 is of such rigid construction that when it is clamped to the arm 9, there is no tendency for the table top to become twisted or otherwise distorted.

For locking the table top in adjusted position in vertical direction, means are provided for clamping the arm 9 to the pedestal 2. As shown in Fig. 3, the upper end of the pedestal 2 is provided with a journal bearing 31 in which is journaled a shaft 32 that is threaded through the mid-portion of the arm 9 and locked thereto by a lock nut 33. The inner end of the bearing 31 on the pedestal 2 is of frusto-conical shape disposed to fit into a complementary seat 34 in the arm 9. For forcing the conical end of the bearing 31 into the seat 34, the shaft 32 is threaded near its other end to receive a nut 35 that may be turned to exert pressure upon a sleeve 36 which engages a thrust-bearing 37 pressing against the end of the bearing 31. For turning the nut 35, a suitable wrench 38 is journaled on the end of the shaft 32 in such manner that it may be readily engaged with the nut 35. The wrench 38 is retained on the shaft 32 by a nut or socket 39 secured to the end of the shaft.

To change the adjustment of the table top 4, the nut 27 may be loosened by the wrench 30 and the nut 35 may be loosened by the wrench 38 to release the clamps. The wrench 38 may then be engaged with the nut 39 on the shaft 32 whereupon the shaft may be turned to move the arms 8 and 9 for adjusting the vertical position of the table top. Subsequently or simultaneously the table top may be tilted about the axis through the ends of the arms 8 and 9 to the desired angular position. The frictional connections on the arm 8 will hold the table top in position while the clamps on the arm 9 are being tightened to lock it against accidental displacement. After the clamps have been tightened, the pedestal 2 and the arm 9 will resist all torsional forces acting on the table top, the frame 3 and the bracket 11 being of such rigidity as to prevent distortion of the table top. The pedestal 1, that is frictionally pivoted to the frame 3, does not resist torsional stresses tending to turn it relative to the frame and consequently it is free to turn relative to the pedestal 2 in such manner that all

four feet 6 of the drafting table will rest evenly on the floor.

Although I have shown and described only one embodiment of the invention, various changes may be made in the details of construction herein set forth without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A drafting table comprising a table top, a reenforcing bracket secured to the under surface of the table top near the bottom edge thereof, and a supporting frame pivotally connected to the table top at a position about one-third of the height of the table top from its lower edge, said reenforcing bracket serving as a counterweight to substantially balance the table top about the pivot axis.

2. A drafting table comprising a table top, a U-shaped reenforcing bracket secured to the under surface of the table top with the horizontal portion near the bottom edge thereof, and a supporting frame pivotally connected to the sides of the U-shaped bracket at a position about one-third of the height of the table top from its lower edge, said horizontal portion of the reenforcing bracket serving as a counter-weight to substantially balance the table top about the pivot axis.

3. A drafting table comprising a table top, a rigid U-shaped bracket fastened to the under surface of the table top to prevent it from twisting, a rigid U-shaped frame journaled at its ends to the respective ends of the bracket, means for clamping one end of the bracket to the frame, pedestals journaled on the frame, and means for clamping one pedestal to the frame, whereby the table top may be rigidly clamped in working position.

4. A drafting table comprising a rigid U-shaped frame, a rigid U-shaped table supporting bracket pivoted at its ends to the respective ends of the frame, a table top carried by the bracket in such manner that the table top and the bracket are balanced upon the pivot axis, and a pair of pedestals journaled to the sides of the frame in such manner that the table top bracket and frame are balanced upon the pedestals.

5. A drafting table comprising a rigid U-shaped frame, a rigid U-shaped table supporting bracket pivoted at its ends to the respective ends of the frame, a table top carried by the bracket in such manner that the table top and the bracket are balanced upon the pivot axis, a pair of pedestals journaled to the sides of the frame in such manner that the table top bracket and frame are balanced upon the pedestals, and clamping means for clamping the bracket to the frame and for clamping the frame to one of the pedestals.

6. A drafting table comprising a table top, a U-shaped reenforcing member extending along and secured to the lower surface of the table top near its lower edge and ends, said reenforcing member being so proportioned that the center of gravity of the reenforced table top occurs between the middle of the top and its lower edge, and a supporting structure pivotally connected to the reenforcing member on an axis extending longitudinally of the table top substantially through the center of gravity.

7. A drafting table comprising a table top, a longitudinal reenforcing member secured to the under surface of the table top near its lower edge, lateral reenforcing members at the ends of the longitudinal member extending therefrom along the lower surface of the table top near its ends, said reenforcing members being so proportioned that the center of gravity of the reenforced table top occurs about one-third the width of the top from its lower edge, and a supporting frame pivotally connected to the lateral reenforcing members on an axis extending longitudinally of the table top substantially through the center of gravity.

8. A drafting table comprising supporting pedestals, a frame mounted on the pedestals, a table top carried by the frame, shafts connected to the frame and journaled in the pedestals, a lever journaled on one shaft, a nut on the end of the shaft for retaining the lever thereon and adapted to be engaged by the lever for moving the frame and the table top relative to the pedestals, and a clamping nut disposed concentric with the shaft and adapted to be engaged by the lever for clamping the frame to one of the pedestals.

9. A drafting table comprising two supporting pedestals, a table top carried by the pedestals, a shaft connected to the table top and journaled in the top of one of the pedestals, a lever journaled on the end of the shaft, a nut on the end of the shaft for retaining the lever thereon and adapted to be engaged by the lever for moving the table top relative to the pedestals, and a clamping nut disposed concentric with the shaft and adapted to be engaged by the lever for clamping the table top to one of the pedestals.

10. A drafting table comprising a rigid frame, a table top pivotally mounted on the frame, pedestals disposed to support the frame and pivotally connected thereto, a shaft on the frame extending through one pedestal, a clamping nut disposed concentric with the shaft for clamping the frame to the pedestal, a wrench journaled on the shaft to engage the clamping nut, and a nut at the end of the shaft adapted to be engaged by the wrench to turn the shaft for raising or lowering the table top.

11. A drafting table comprising a table top, a reenforcing bracket fastened to the under surface of the table top extending lengthwise thereof near its lower edge and turned upward along the under surface thereof near its ends, and a supporting frame pivotally connected to the upper ends of the reenforcing bracket.

12. A drafting table comprising a table top, a U-shaped reenforcing bracket extending lengthwise of, fastened to the under surface of the table top near its lower edge and turned upward near its ends to a point substantially one-third the width of the top from its lower edge, a supporting frame pivotally connected to the upper ends of the reenforcing bracket, and reenforcing cleats connected to and extending upwardly from the ends of the bracket to reenforce the table top against torsional strain.

13. A drafting table comprising a table top, an integral reenforcing bracket and counterweight fastened to the under surface of the table top extending lengthwise thereof near its lower edge and turned upwardly along the under surface thereof near its ends to a point substantially one-third the width of the top from its lower edge, and a supporting frame pivotally connected to the upper ends of the reenforcing bracket.

14. A drafting table comprising a table top, an integral reenforcing bracket and counterweight fastened to the under surface of the table top extending lengthwise thereof near its lower edge and turned upwardly along the under surface thereof near its ends to a point substantially one-third the width of the top from its lower

edge, a supporting frame pivotally connected to the upper ends of the reenforcing bracket, and reenforcing cleats connected to and extending upwardly from the ends of the bracket to reenforce the table top against torsional strain.

15. A drafting table comprising a table top, a U-shaped reenforcing bracket fastened to the under surface of the table top near its lower edge, arms pivotally connected at their ends to the ends of the reenforcing bracket, supporting pedestals pivoted to the arms at their mid-portions, a torsion resisting counter-weight connected to the arms at their other ends to resist relative movement between them, a friction coupling between one pedestal and the arm connected to it, and a clamping coupling between the other pedestal and the arm connected to it.

16. A drafting table comprising supporting pedestals, a frame pivotally mounted on the pedestals, a table top pivotally mounted on the frame at a position below its mid-portion, and a U-shaped reenforcing member having upwardly extending arms and a connecting horizontal member attached to the back of the table top with the horizontal member between the pivot axis and the lower edge thereof, said U-shaped member being so proportioned that it serves also as a counter-weight balancing the table top about its pivot axis.

17. A drafting table comprising a table top, an integral reenforcing bracket and counter-weight fastened to the under surface of the table top extending lengthwise thereof near its lower edge and turned upward near its ends, arms pivotally connected at their ends to each end of the bracket, adjustable frictional means in the pivot connection between one arm and the bracket, clamping means disposed to clamp the other arm to the bracket, a torsion resisting counter-weight connected to the other ends of the arms to prevent relative movement between them, supporting pedestals pivoted to the arms at their mid-portions, adjustable frictional means in the pivot connection between one arm and the corresponding pedestal, and clamping means disposed to clamp the other arm to its pedestal.

18. A drafting table comprising a table top, an integral reenforcing bracket and counter-weight fastened to the under surface of the table top extending lengthwise thereof near its lower edge and turned upwardly along the under surface thereof near its ends to a position substantially one-third the distance from the bottom edge to the top thereof, an arm pivotally connected at one end to one of the upper ends of the bracket, adjustable frictional means in the connection between the arm and the bracket, a similar arm pivoted at one end to the other end of the reenforcing bracket, clamping means disposed to clamp the second arm to the bracket, a torsion resisting counter-weight connected to the other ends of both arms to prevent relative angular movement between them, a supporting pedestal pivoted to one of the arms at its mid-portion, an adjustable friction device in the pivot joint between the arm and the pedestal, a second pedestal pivotally connected to the mid-portion of the other arm, and a clamping device for clamping the arm to the second pedestal.

BIRGER T. ANDREN.