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DRAFTING MACHINE

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FIG. 1.

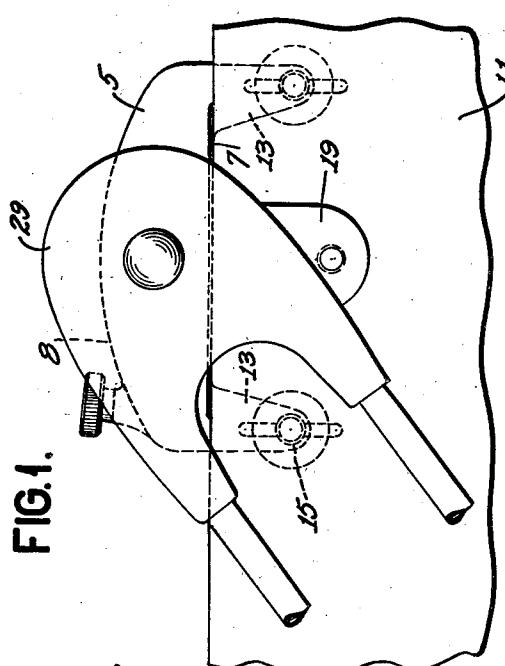


FIG. 2.

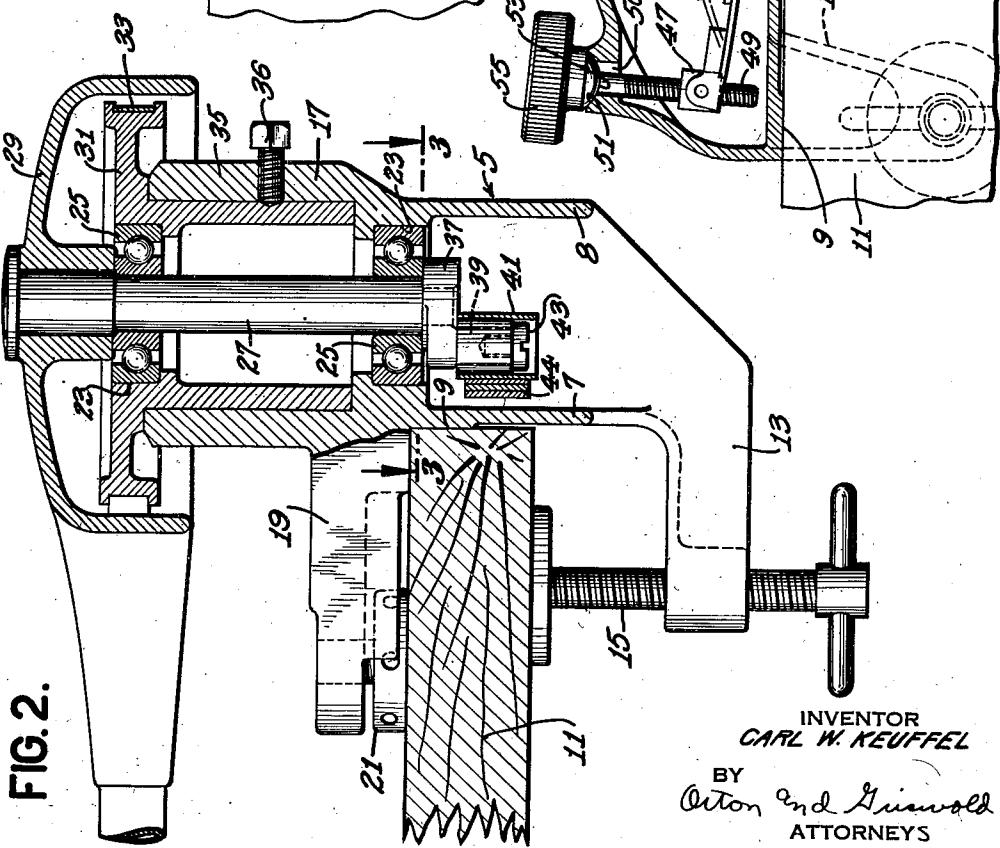
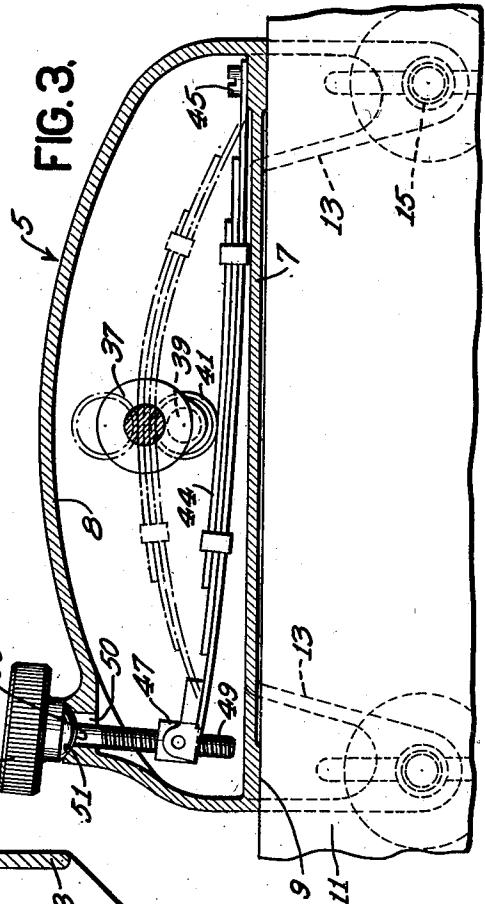


FIG. 3.



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DRAFTING MACHINE

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13 Claims. (Cl. 33—79)

This invention relates generally to parallel motion drafting devices of the kind in which the several tools which the draftsman handles most frequently are embodied, in principle, in one unit to obviate the necessity of a draftsman reaching about for a required tool and thereby enabling the draftsman to keep his attention concentrated directly upon the drawing.

Drafting devices of this character are common in which adjacent ends of two arms are pivoted together, the free end of one arm being secured to the remote side of a drafting board while the free end of the other arm is provided with a head comprising a protractor and straight edges which are in fixed angular relation to move about the center of the protractor as an axis. Where a drafting device of this character is used upon a drawing board which is disposed in an inclined plane, the weight of the free arm and the head is likely to cause the angle between the two arms to become more obtuse and the head and straight edges will not remain at the desired place on the board unless the draftsman holds them at that point. A counterweight has heretofore been proposed as an expedient to counterbalance the drafting device.

One object of the present invention is the provision of power storing devices between the anchor and the arm pivoted thereto.

An important object of this invention is to provide a counterbalanced drafting machine which will afford no obstruction to the movement of the scales and the like of the drafting machine.

A further object resides in providing a counterbalance for a drafting machine positioned below the plane of the drawing surface.

Another object of the invention is a drafting device of the character described wherein the counterbalancing devices are contained entirely within the anchor.

It is also an object of the invention to provide ready adjusting means for the tension of spring means counterbalancing the drafting machine.

The invention also seeks counterbalancing devices which are practical from the standpoint of ease and simplicity of manufacture and durability and practicability in use.

These and other objects of the invention and the means for their attainment will be more apparent from the following detailed description, taken in connection with the accompanying drawing illustrating one embodiment by which the invention may be realized and in which:

Figure 1 is a view looking from above and showing the anchor of a drafting device and a

fragmentary portion of the arm pivoted thereto;

Figure 2 is a vertical sectional view showing the anchor of this invention; and

Figure 3 is a transverse sectional view taken in the plane indicated by the line 3—3 of Figure 2 and looking in the direction of the arrows.

The anchor of this invention comprises an elongated housing 5 comprising a straight wall 7 and an outwardly curved wall 8 defining a housing open at the bottom, the wall 7 having a plane surface 9 for engagement with the remote side of a drafting table 11. The housing 5 is shown as elongated and is provided at each end with a bracket 13 in which is rotatably mounted a clamping screw 15 of any desired or common shape. Above the housing 5 and preferably centrally thereof is, conveniently, a generally cylindrical or tubular portion 17, shown as comprising a portion 19, extending forwardly and intermediate the brackets 13, adapted to rest upon the table 11 and, with the clamping screws 15, clamp the anchor to the side of the table. Any convenient form of adjusting device, such as indicated at 21, may be utilized to level the instrument with respect to this table 11.

The housing 5 is provided with a cylindrical surface 23 adapted to receive anti-friction devices 25 for a pivot pin 27 on which is fixedly mounted the end 29 of one arm of the drafting device of this invention. A pulley 31 for the endless band 33 is formed with a downwardly extending sleeve 35 which fits within the cylindrical portion 17 of the anchor and serves, by means of screw 36, to secure the pulley 31 rigidly with the anchor 17, the shaft 27 at its upper end being similarly positioned by anti-friction devices 25 seated in the fixed pulley 31.

The counterbalancing means contemplated by this invention is illustrated as a leaf spring 40 against which an eccentrically mounted member 42 on the end of the shaft 27 bears. In the illustrated embodiment, a plate or disc 37 is carried on the lower end of the shaft 27 and to the lower surface of the disc 37 and in spaced relation to the axis of the shaft is secured a pin 39 to which a roller 41 is secured as by the screw 43. At one end of, and within the housing 5, and conveniently to the front wall 7 thereof, is secured one end of a leaf spring 44, as by the screw 45. If desired, this leaf spring 44 may be made up of a plurality of leaves, as shown.

The other end of the leaf spring is movable in order to control the tension of the spring and cause it to bear against the roller 41. In the illustrated embodiment, I provide the free end

of the leaf spring 44 with a pivoted adjusting nut 47 threaded on a screw 49 passing through an aperture 50 in the wall 8. The aperture 50 is preferably of a diameter greater than the diameter of the screw 49 and at its outer end terminates in a curvilinear or semi-spherical surface 51 against which a cooperating or semi-spherical surface 53 of the knurled head 55 of the screw bears.

Thus, by rotating the head of the screw, the nut 47 is caused to travel upwardly, say, toward the head until the spring is placed under the desired degree of tension and would normally occupy a position such, for instance, as that indicated in dotted lines in Figure 3. As the arm 39 assumes a position substantially perpendicular to the wall 7, the roller 41 places the spring under compression deflecting it, say, to the position shown in full lines in Figure 3. Since the center of eccentricity of the pin 39 (and roller 41) is on a line parallel to the axis of the arm 29, the maximum force of the spring 44 (and maximum deflection) occurs when the arm 29 is perpendicular to the side of the drawing board along which the wall 7 lies. The spring, however, exerts no effective force because it presses radially toward the axis of pivot pin 27. As the arm 29 is moved in either direction from the just mentioned perpendicular position, the spring 44 exerts an effective turning moment of a gradually decreasing force and gradually increasing moment arm sufficient to counterbalance the weight of the arm in all working positions.

It will thus be seen that the entire counterbalancing device is contained within an element of the anchor. The shape of the spring is such that its maximum strength can be utilized and it is not likely to lose its resiliency or stretch. Moreover, the device, as a whole, is compact as compared with the counterweighted counterbalancing devices heretofore proposed. Should the spring weaken in any way or should the weight of the instrument be increased or decreased, the necessary changes may be made in the operative effect of the counterbalancing device by adjusting the tension on the spring in a simple and convenient manner.

Various modifications will occur to those skilled in the art in the composition, configuration and disposition of the component elements going to make up the invention as a whole, as well as in the various uses to which the invention may be put, and no limitation is intended by the phraseology of the foregoing description or illustrations in the accompanying drawing except as indicated in the appended claims.

What is claimed is:

1. In a drafting machine, in combination, an anchor, a pivot pin rotatable thereon, an arm fixed to the pin to rotate therewith, a pulley fixed to the anchor and within the arm, an eccentric carried by the pin, a leaf spring one end of which is secured to the anchor and intermediate the ends of which the eccentric engages and means to adjust the position of the other end of the spring.

2. In a drafting machine, in combination, an anchor, a pivot pin rotatable thereon, an arm fixed to the pin to rotate therewith, a pulley fixed to the anchor and within the arm, an eccentric carried by the pin, a leaf spring one end of which is secured to the anchor and intermediate the ends of which the eccentric engages and means to adjust the position of the other end of the spring comprising an adjusting screw.

3. In a drafting machine, in combination, an

anchor, a pivot pin rotatable thereon, an arm fixed to the pin to rotate therewith, a pulley fixed to the anchor and within the arm, an eccentric carried by the pin, a leaf spring one end of which

5 is secured to the anchor and intermediate the ends of which the eccentric engages and means to adjust the position of the other end of the spring comprising a nut on the other end of the spring and an adjusting screw carried by the anchor and threaded in the nut.

4. In a drafting machine, in combination, an anchor, a pivot pin rotatable thereon, an arm fixed to the pin to rotate therewith, a pulley fixed to the anchor and within the arm, an eccentric 15 carried by the pin, a leaf spring one end of which is secured to the anchor and intermediate the ends of which the eccentric engages and means to adjust the position of the other end of the spring comprising a nut on the other end of the 20 spring and an adjusting screw passing through an oversize hole in the anchor and threaded in the nut, said anchor being formed with a spherical bearing surface and the head of the screw being formed with a surface complementary thereto.

5. In a drafting machine, the combination with means having a drawing surface, of at least one arm and an anchor, a pivot pin by which the arm is pivotally mounted on the anchor, said pivot pin 30 extending below the drawing surface, a leaf spring carried by the anchor and an eccentric carried by the pin and engaging the leaf spring intermediate its ends.

6. In a drafting machine, in combination, an anchor, a pivot pin rotatable thereon, an arm fixed to the pin to rotate therewith, a pulley fixed to the anchor and within the arm, an eccentric carried by the pin and a leaf spring one end of which is secured to the anchor and intermediate 40 the ends of which the eccentric engages.

7. In a drafting machine, an anchor comprising a housing formed with a tubular portion, a sleeve entering the tubular portion and formed with a pulley, a pivot pin rotatably mounted 45 within the sleeve and clamping means to secure the housing to a drawing board.

8. In a drafting machine, an anchor comprising a housing formed with a wall adapted to engage the side of a drawing board and a portion 50 to rest on the surface of the drawing board and a tubular portion, a sleeve entering the tubular portion and formed with a pulley, means to secure the sleeve in the housing, a pivot pin rotatably mounted within the sleeve, a drafting machine arm carried by the pivot pin and clamping screw means carried by the housing and adapted to coact with the first mentioned portion to engage the drawing board.

9. In a drafting machine, an anchor comprising a housing formed with a tubular portion, a sleeve entering the tubular portion and formed with a pulley, means to secure the sleeve in the housing, a pivot pin rotatably mounted within the sleeve, a drafting machine arm carried by the pivot pin, counterbalancing means between the pivot pin and the wall of the housing and clamping means to secure the housing to a drawing board.

10. In a drafting machine, in combination, an anchor, a pivot pin rotatable thereon, an arm carried by the pivot pin to turn therewith, a leaf spring carried by the anchor below the plane of a drawing surface, said pivot pin extending through the plane of the drawing surface, an eccentric carried by the pin at a point below the

plane of the drawing surface and engaging the spring and means to adjust the tension of the spring.

11. In a drafting machine, an anchor provided with a surface to engage the top surface of a drawing board and having a downwardly extending member, an arm pivoted on said anchor above said anchor surface, eccentric means, means carried by the arm and supporting the eccentric means below the plane of the said anchor surface and power storing means supported by said downwardly extending portion disposed below the said anchor surface and engageable by the eccentric means to counterbalance the arm.

12. In a drafting machine, an anchor provided with a surface to engage the top surface of a drawing board and having a downwardly extending member, an arm pivoted on said anchor above said anchor surface, eccentric means, means carried by the arm and supporting the eccentric means below the plane of the said anchor surface and power storing means supported by said

10 15 downwardly extending portion disposed below the said anchor surface and engageable by the eccentric means which will exert no turning moment when the said arm is in one position and a counterbalancing moment when said arm is moved in either direction from said one position.

13. In a drafting machine wherein at least one arm is movable over the drawing surface of a drawing board, an anchor adapted to be removably secured to the drawing board provided with a surface to engage the drawing surface of a drawing board and having a downwardly extending member, a pivot pin rotatable on the anchor and on which the arm is fixed, said pivot pin extending through the plane of the said anchor surface, power storing means, means supporting the power storing on said anchor below the plane of said anchor surface and an eccentric carried by the pin at a point thereon below the plane of said anchor surface and engaging the power storing means to counterbalance the arm.

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