Dec. 26, 1939. G. C. LOPEZ 2,184,718

DRAFTING APPARATUS

Filed June 28, 1938

FIG. 1

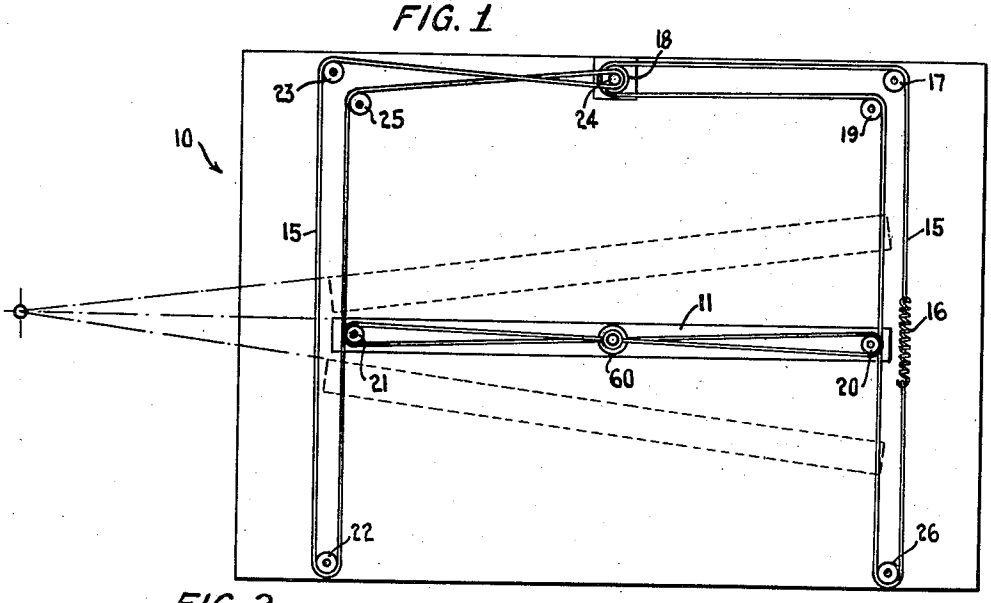


FIG. 2

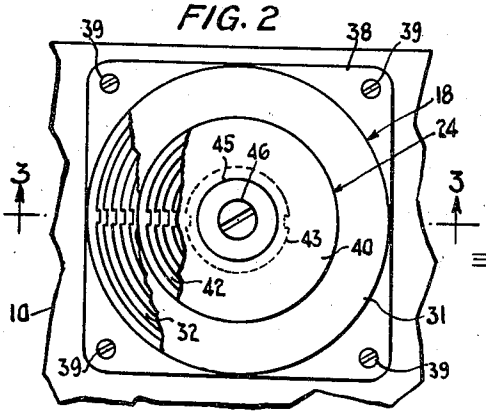


FIG. 7

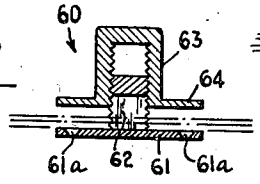


FIG. 6

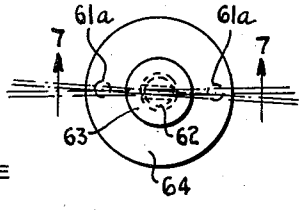


FIG. 3

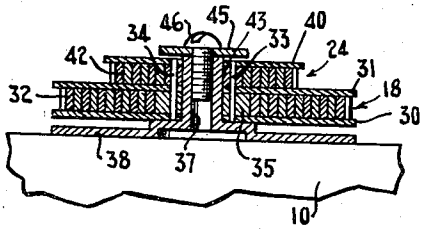


FIG. 4

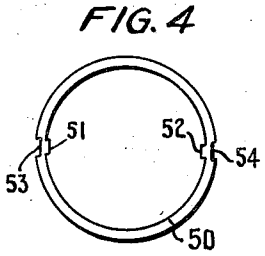
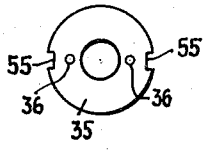


FIG. 5



GUILLERMO CASTRO LOPEZ
INVENTOR

BY Victor J. Evans & Co.
ATTORNEYS

Patented Dec. 26, 1939 2,184,718

UNITED STATES PATENT OFFICE

2,184,718

DRAFTING APPARATUS

Guillermo Castro Lopez, New York, N. Y.

Application June 28, 1938, Serial No. 216,335

1 Claim. (Cl. 33—77)

This invention relates to improvements in drafting apparatus and more particularly to a new and improved means for guiding a straight-edge across a drawing board in making perspective drawings.

It is among the more important objects of the present invention to provide a new and improved straight-edge guide for facilitating motion of a straight-edge across a drawing board, wherein means are included for moving the opposite ends of the straight-edge in the same direction but at different rates of movement, whereby drawing of perspective views is at least materially facilitated.

Another object of the present invention is to provide a straight-edge guide which, while permitting free and unlimited motion of a straight-edge across a drawing board or the like, will also include means for causing relative movement of one end of the straight-edge, whereby the drawing of horizontal perspective lines converging toward a vanishing point external from the drawing board will be facilitated.

Another object of this invention is to provide a straight-edge guide of the type hereinbefore referred to wherein means are included for, upon occasion, causing the device to function as a so-called parallel straight-edge and, upon other occasions, for causing the straight-edge to function as a perspective straight-edge, that is to say, to move as though pivoted at a vanishing point exterior relative to the drawing board.

One of the important advantages of the novel straight-edge guiding mechanism according to the present invention is that it comprises relatively few parts, all of which are simple but rugged of construction, whereby the initial cost of the device is diminished inasmuch as the elements are suited to the requirements of mass production, and cost of up-keep or replacement of the parts during use at least largely is minimized.

Among the features of the straight-edge guide according to this invention are that it easily can be mounted upon conventional types of drawing boards without necessitating any substantial change in the drawing board itself and without appreciably diminishing the useful area of the board.

Another feature of the straight-edge guide mechanism according to the present invention is that it can be adjusted to permit drawing of perspective views having vanishing points at different external locations relative to the drawing board.

A still further feature of the device according to this invention is that the horizontal axis intercepting the vanishing point can be moved vertically by simple adjustment of the perspective straight-edge whereby the lines of the perspective view appear to converge toward an external vanishing point which can be at substantially any point within the vertical limits of the drawing board.

Other objects, advantages and features of the device according to the present invention will be apparent to those skilled in the art during the course of the following description.

Regarded in certain of its broader aspects, the present invention consists of a drawing straight-edge guide comprising an axially fixedly supported freely rotatable pulley wheel having two peripheral grooves of different radius formed thereon, a drawing straight-edge having a first flexible element attached to one end thereof and received in one of said grooves in said pulley whereby movement of said straight-edge produces rotation of said pulley, and a second flexible element attached to the opposite end of said straight-edge, received in the other of said grooves in said pulley whereby motion of the straight-edge end attached to said first element produces motion, in the same direction but at a different rate, of the opposite straight-edge end.

In order to facilitate a fuller and more complete understanding of the present invention, a specific embodiment thereof will be hereinafter described, it being clearly understood, however, that the illustrated embodiment is given solely by way of example and is non-limitative upon the scope of the present invention, except as expressed in the subjoined claim.

Referring now to the drawing.

Figure 1 is substantially a top plan view of a drawing board provided with a straight-edge guiding device according to the present invention.

Figure 2 is essentially a fragmentary top plan view with parts broken away for clearness of the adjustable pulley mechanism forming a part of the device according to the present invention.

Figure 3 is essentially a vertical sectional view of Figure 2, taken along the line 3—3.

Figure 4 is substantially a top plan view of one of the concentric rings forming a part of the pulley illustrated in Figures 2 and 3.

Figure 5 is essentially a top plan view of another part of the pulley mechanism.

Figure 6 is essentially a top plan view of the flexible element stopping member, and

Figure 7 is essentially a vertical sectional view if Figure 6, taken along the line 7—7.

Referring now particularly to Figure 1, it will be noted that a drawing board generally designated by the numeral 10, is provided with a straight-edge 11 slidable across the surface of said board and guided by flexible elements generally designated by the numeral 15 substantially as shown. It is to be noted that the flexible elements 15 comprise a cord, wire, cable or the like, attached at one end of the resilient helical spring 16 and passing around, in succession, the pulleys 17, 18, 19, 20, 21, 22, 23, 24, 25 and 26, and attached at the free end thereof to the opposite end of the spring 16, substantially as shown in Figure 1. It will be understood that the pulleys 17, 19, 22, 23, 25 and 26 are freely rotatably mounted on portions of the drawing board 10 but that the axes of movement thereof are relatively fixed. It will also be understood that the pulleys 26 and 21 in reality each comprises a pair of pulleys freely independently rotatable and mounted upon end portions of the straight-edge 11, the axes of rotation of said pulleys being fixedly positioned relative to said straight-edge.

Reference is now made to Figures 2, 3, 4 and 5, wherein details of the pulleys 18 and 24 are best illustrated. It will be noted that the pulley 18 comprises a pair of plates 30 and 31, substantially circular in cross sectional outline and maintained in spaced essentially parallel relationship by rings 32 positioned therebetween as will be hereinafter described. Pins 33 and 34, essentially fixedly mounted in the disc 30 and extending through openings formed in the disc 31, serve to inhibit relative rotation of the discs 30 and 31 and to maintain same in a preselected relationship.

An annular block 35 best illustrated in Figure 5, is positioned between the discs 30 and 31 and is provided with openings 36 formed therein adapted to receive the pins 34 and 35. The discs 30 and 31 are freely rotatably mounted on the upright bearing standard 37 attached to a mounting plate 38 secured to a portion of the drawing board 10. It will be noted that fastening means 39 are provided, engaging with openings formed in the plate 38 for holding same in relatively fixed position upon the surface of the drawing board. The pulley 24 comprises the plate 31 hereinbefore described and the plate 40, maintained in spaced essentially parallel relationship by annular members 42 positioned therebetween. It will be noted that the pins 33 and 34 extend through openings formed in the plate or disc 40, whereby rotative motion of any one of the discs 30, 31 and 40 relative to the other discs is precluded. An inner annular member 43 is positioned between the discs 31 and 40 and is provided with openings to receive the pins 33 and 34 in substantially the same manner as the member 35 hereinbefore described, it being understood, however, that the member 43, although similar in outline is somewhat smaller in size. The pulleys 18 and 24, as hereinbefore mentioned, are freely rotatably mounted on the upright bearing standard 37, being retained in position thereon by means including a washer 45 held in position by a screw 46 whereby rotative motion of the pulleys is not inhibited, although axial movement thereof is precluded.

The effective diameters of the pulleys 18 and 24 can be varied by addition or removal of the annular members 32 and 42 respectively. A representative annular member is illustrated in Figure 4 and comprises a ring 50, having diametrically, inwardly radially extending, projecting portions 51 and 52 and peripheral indentations 53 and 54 formed on the outer edge thereof and positioned diametrically with respect to each other, the indentations 53 and 54 being adapted to receive projecting formations on an adjoining ring, whereby the rings can be arranged concentric relative to each other in a manner such that rotation of the outer-most ring is transmitted through the interlocking projections and indentations, to the inner-most ring. The projections on the inner-most ring engage with indentations formed in the members 35 and 43 hereinbefore described, the indentations in the member 35 being illustrated in Figure 5 and designated by the numeral 55. It will be evident then that a wire, cord, cable or similar flexible element resting against peripheral portions of the rings 32, will be adapted to cause rotative motion of the pulley 18 with concomitant and corresponding motion of the pulley 24 transmittable through the annular members 42. The arrangement of the annular members 32 and 42 will be well understood from a consideration of Figure 3 and the broken away parts of Figure 2.

With the flexible elements essentially as shown in Figure 1, and the pulleys all freely mounted as hereinbefore mentioned, it will be evident that the guiding flexible elements will produce uniform motion at both ends of the straight-edge 11, that is to say, motion in the same direction and at the same rate of travel, accordingly, the straight-edge 11 functions, under these conditions, as a parallel straight-edge.

A clamping member generally designated by the numeral 60, is mounted in the straight-edge 11 between the pulleys 20 and 21, substantially as shown in Figure 1, whereby flexible elements passing over said pulleys extend through portions of said clamping member. Reference is now made to Figures 1 and 7, wherein the clamping member is best illustrated. The clamping member 60 comprises a base plate 61, attached to a portion of the straight-edge 11 by suitable fastening means engaging with openings 61*a* formed therein and carrying a threaded standard 62 receivable in and carrying an internally threaded cap 63, substantially as shown in Figure 7. It will be noted that the cap 63 is provided with flanged edge portions 64 for facilitating pressing against parts of the flexible guide members as will be hereinafter described. An axially extending slot-like opening formed in the threaded standard 62, is adapted to receive crossed flexible guide elements therein, substantially as indicated in Figure 6, whereby rotation of the cap 63 advancing same along the standard 62 presses the flanged edge portions 64 of the cap 63 against the crossed flexible elements thereby holding same in fixed position with respect to each other and to the straight-edge.

It will be noted that when the clamping device 60 is actuated to engage with and hold portions of the flexible elements 15, the pulleys 20 and 21 are rendered substantially ineffectual, that is to say, the portions of the flexible elements passing over said pulleys do not move and the pulleys do not rotate. It will be evident, inasmuch as the rate of rotation of the pulley 24 is directly proportional to the rate of motion of the straight-edge end portion adjacent the pulley 21, with the rate of motion of the straight-edge end portion adjacent the pulley 20 will be proportional to the rate of travel of the flexible element 15 upon the pulley 18. Accordingly the rate of motion of the end portions of the straight-edge 11 adjacent the pulleys 20 and 21 will be proportional to the ratio of the radii of the pulleys 18 and

24 respectively and, except when the radii of said pulleys are equal, one end of the straight-edge will move at a different rate than will the opposite end of said straight-edge, accordingly motion of the straight-edge 11, when the clamp 60 is engaged with portions of the flexible elements 15, will resemble the motion of a straight-edge pivoted at an external point relative to the board, that is to say, the straight-edge will function as a perspective drawing edge with a vanishing point external to the drawing board.

It also will be evident that if it is desired to have the vanishing point of the perspective drawing appear from the opposite side of the drawing board, the flexible elements on the pulleys 18 and 24 can be interchanged whereby the device will function as if the straight-edge 11 were pivoted at an opening to the right of the drawing board 10 instead of to the left thereof as illustrated in Figure 1. It further will be apparent to those skilled in the art, that certain portions of the flexible elements 15 and several of the portions can be dispensed with by use of weights attached to free end portions of the flexible elements depending from side portions of the drawing board.

It is to be understood that this improvement is capable of extended application and is not confined to the exact showing of the drawing nor to the precise construction described and, therefore, such changes and modifications may be made therein as do not affect the spirit of the invention nor exceed the scope thereof as expressed in the appended claim.

What is claimed as new is:

In a drafting apparatus of the type including a sliding straight edge having a flexible element attached to each end thereof, the flexible elements being associated by a differential pulley whereby the ends of the straight edge, when moved, travel in a common direction but at different rates; an improved differential pulley comprising an upwardly extending firmly mounted standard presenting a pulley shaft; a plurality of freely rotatable essentially circular plates on said shaft; means for spacing said plates with respect to each other and for holding same in cooperative relation, said means comprising washers interposed between said plates and screws passing through said plates and said washers, engaging with the plates to hold plates and washers in fixed relationship; a plurality of interengaging rings, interlocking with cutaway formations in said washers and positionable between said plates to provide a pair of pulleys each of variable radius; and means for retaining said pulleys upon said shaft without inhibiting free rotation thereof.

GUILLERMO CASTRO LOPEZ.