United States Patent [19]

Ross

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[54] PERSPECTIVE DRAFTING MACHINE

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[52] **U.S. Cl.** **33/77**

[51] **Int. Cl.** **B43l 13/14**

[58] **Field of Search** 33/77

[56] **References Cited**

UNITED STATES PATENTS

3,343,267 9/1967 Wolf 33/77

FOREIGN PATENTS OR APPLICATIONS

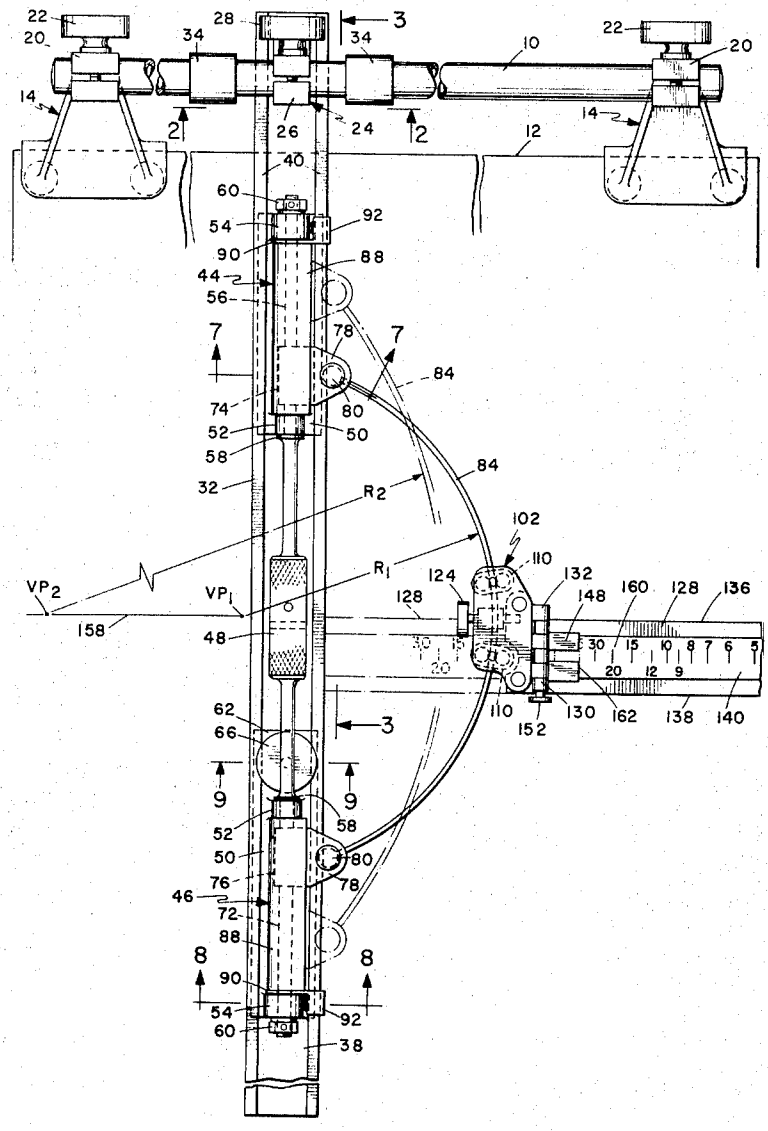
33,255 6/1908 Austria 33/77

Primary Examiner—Harry N. Haroian
Attorney—Carl R. Brown et al.

[57] **ABSTRACT**

A perspective drafting machine which can be set at any position on a drawing board and adjusted to any selected horizon line. The straight edge or scale is carried on a travelling head which moves along an arcuate guide beam, the radius of the arc being easily adjustable to provide the required vanishing point in the perspective. Means is provided on the scale for setting the radius quickly and accurately. The arcuate guide beam is mounted on a carriage which moves along a track, and the entire beam, head and scale assembly can be swung to either side of the track to provide vanishing points toward opposite sides of the board, without losing any settings.

9 Claims, 9 Drawing Figures



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SHEET 1 OF 2

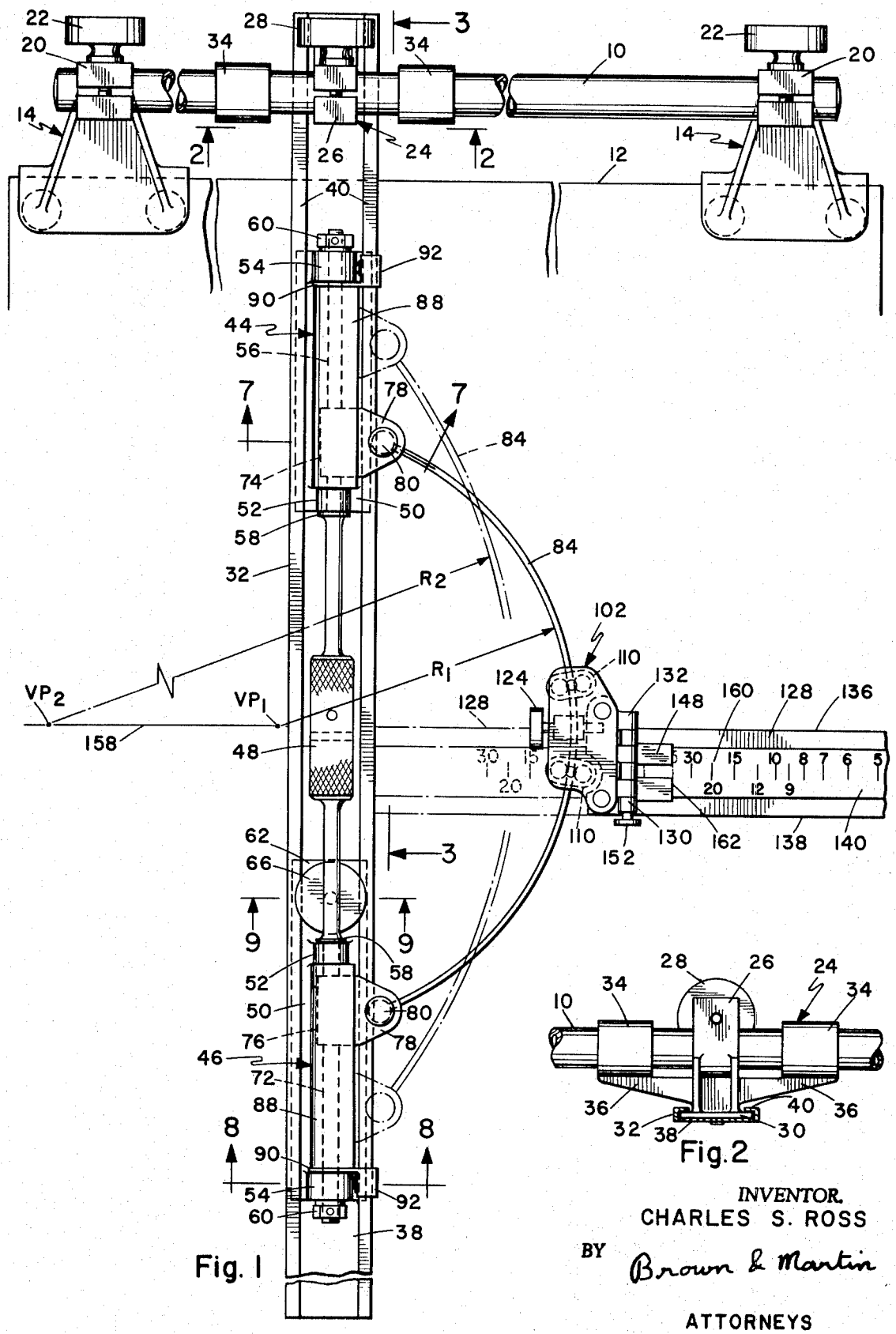


Fig. 1

Fig. 2

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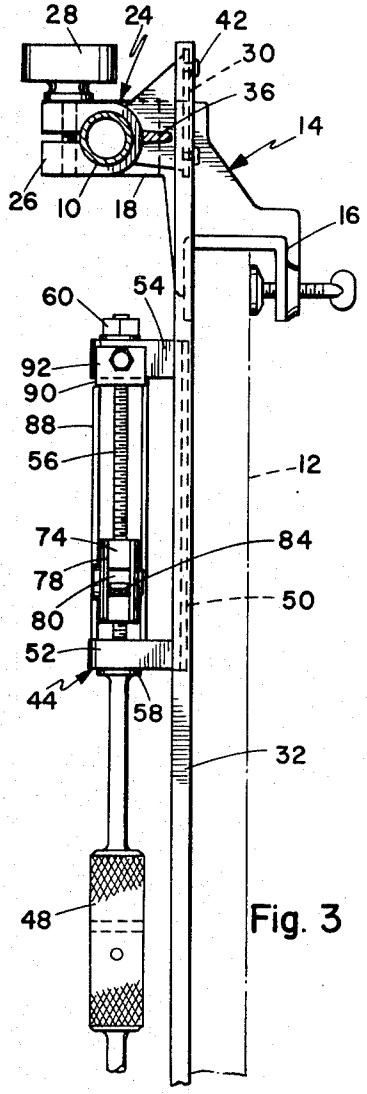


Fig. 3

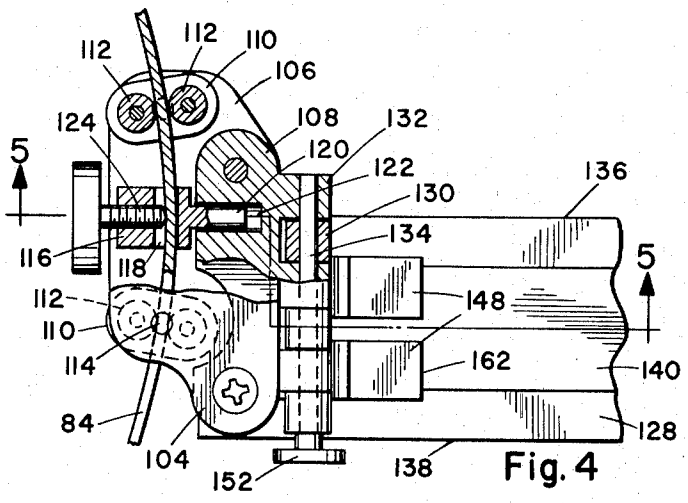


Fig. 4

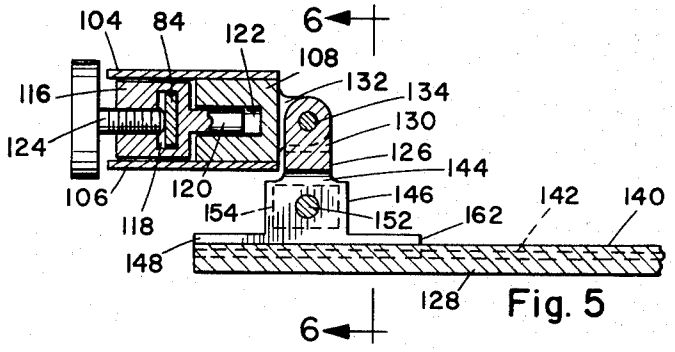


Fig. 5

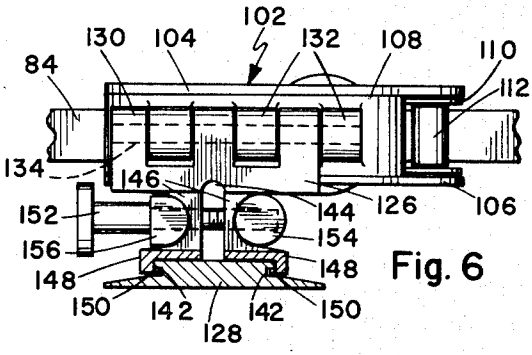


Fig. 6

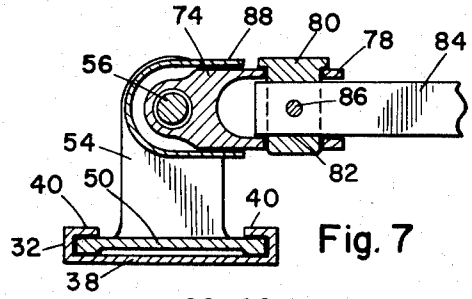


Fig. 7

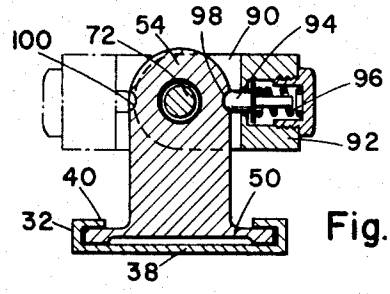


Fig. 8

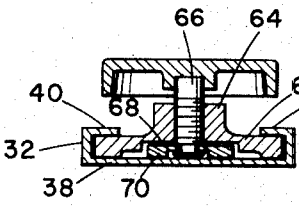


Fig. 9

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PERSPECTIVE DRAFTING MACHINE

BACKGROUND OF THE INVENTION

Perspective drafting machines previously available have either been unnecessarily complex, or very simple but with limited ability. The complex types usually involve an arrangement of cords and pulleys or hinged linkages, which are difficult to set up properly, are difficult to use and are not particularly accurate unless used by a highly skilled operator.

The simple types, such as the Anderson board, have an arcuate guide either attached to or incorporated in the board at one or more edges. A special T-square is moved along the arcuate guide and so swings with reference to a vanishing point at the center of radius of the arc, which is fixed. This type of board has a very limited useful work area and the drawing sheet must be adjusted to the horizon line. Different arcs can be used for the guides at different edges of the board, or interchangeable guides may be used, but the arrangement is still very limited and it is often necessary to realign the drawing sheet when making changes.

SUMMARY OF THE INVENTION

The perspective drafting machine described herein is attached to one edge of a conventional drawing board by simple clamp means and has a rail along which a guide track is adjusted to a suitable position. In normal use the rail would extend across the top of the board with the guide track vertical across the board, but other arrangements could be used depending on the drawing to be made. The straight edge or scale is carried by a travelling head which is movable along an arcuate guide beam, the beam being mounted between end portions of a carriage which is adjustable along the guide track to set the desired horizon line. A simple turnbuckle type mechanism is used to adjust the radius of arc of the beam and so adjust the vanishing point as required, a series of markings on the scale allowing accurate setting of the arc against a reference on the travelling head. All adjustable parts can be locked or will remain in place once the settings are made.

The arcuate beam is hinged to swing to either side of the guide track, together with the head and scale, so that vanishing points can be set up at both sides of the board. By making the rail substantially the full length of the board and so providing for maximum adjustment of the guide track, a very large portion of the board is available as useful work area.

The primary object of this invention, therefore, is to provide a new and improved perspective drafting machine.

Another object of this invention is to provide a new and improved perspective drafting machine for attachment to a conventional drawing board, the machine being adjustable to set the reference horizon line and vanishing points at any desired positions.

Another object of this invention is to provide a new and improved perspective drafting machine on which the vanishing points can be adjusted quickly on a marked scale.

A further object of this invention is to provide a new and improved drafting machine which allows maximum use of the drawing board surface as useful work area, and causes a minimum of obstruction in the work area.

Other objects and many advantages of this invention will be more apparent upon a reading of the following detailed description and an examination of the drawings wherein like reference numerals refer to like parts throughout and in which:

FIG. 1 is a top plan view of the complete drafting machine.

FIG. 2 is a sectional view taken on line 2—2 of FIG. 1.

FIG. 3 is a sectional view taken on line 3—3 of FIG. 1.

FIG. 4 is an enlarged plan view, partially cut away, of the travelling head assembly.

FIG. 5 is a sectional view taken on line 5—5 of FIG. 4.

FIG. 6 is a sectional view taken on line 6—6 of FIG. 5.

FIG. 7 is an enlarged sectional view taken on line 7—7 of FIG. 1.

FIG. 8 is an enlarged sectional view taken on line 8—8 of FIG. 1.

FIG. 9 is an enlarged sectional view taken on line 9—9 of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The drafting machine has an elongated rigid rail **10**, which is secured to one edge of a drawing board **12** by a pair of support brackets **14**. Each support bracket comprises a C-clamp **16**, or similar securing means, with an upwardly extending post **18** having a split upper clamp portion **20**, in which the rail **10** is secured by a clamp screw **22**. Slidably mounted on the rail **10** is a locating bracket **24**, having a split block portion **26** which is locked to the rail by a clamp screw **28**. Fixed to the underside of block portion **26** is a flat plate-like shoe **30**, on which guide track **32** is secured, perpendicular to rail **10**. The locating bracket is stabilized by a pair of sleeves **34** sliding on rail **10** and fixed on opposite sides of block portion **26** by reinforcing webs **36**.

Guide track **32** is an elongated rigid channel member with a base plate **38** and inwardly turned opposed flanges **40**, the shoe **30** being a close fit in the channel and being secured by screws **42**, or other suitable means.

Slidably mounted in guide track **32** is a carriage composed of a pair of carriage units **44** and **46**, connected by a turnbuckle **48** to move together. Carriage unit **44** has an elongated shoe **50**, which is a close sliding fit in the guide track, the shoe having upright posts **52** and **54** at opposite ends. Turnbuckle **48** has a threaded end portion **56** which is journalled between the posts **52** and **54**, the carriage unit being held from axial motion by a flange **58** bearing against post **52** at the inner end of the threaded portion, and a retaining nut **60** secured on the outer end of the threaded portion.

Except for one feature, the carriage unit **46** is similar to carriage unit **44** and the parts are correspondingly numbered. The different feature is an extension **62** of shoe **50** beyond the post **52**, the extension having a boss **64** through which a lock screw **66** is threaded. In the underside of extension **62** is a cavity **68**, in which is a pad **70** attached to lock screw **66**, as in FIG. **9**. When the lock screw is tightened, pad **70** is clamped against base plate **38** and the complete carriage assembly is locked in place in the guide track.

The threaded end portion 72 of turnbuckle 48 which is journalled in carriage unit 46, is threaded oppositely to end 56. Mounted on the threaded ends are oppositely threaded, but otherwise similar nut blocks 74 and 76, each having an extended fork 78, and through each fork is fitted a trunnion pin 80 with a diametrical slot 82. Extending between the trunnion pins 80 is an arcuate beam 84, of spring steel or similar material, each end of the beam being secured in the slot 82 of the respective trunnion pin by a retaining pin 86, as in FIG. 7. By rotating turnbuckle 48, the spacing between nut blocks 74 and 76 is changed and the radius of arcuate beam 84 is varied. In the full line position in FIG. 1, the arcuate beam has a small radius R1, with an effective vanishing point at VP1. In the broken line position the radius R2 is much greater, and the effective vanishing point VP2 would actually be well beyond the edge of the drawing. The arcuate beam is bowed under bending stress at all times and, even with the small cross section shown, maintains a true arc with considerable rigidity.

As the turnbuckle is adjusted, the nut block 74 is preventing from turning by a guide channel 88 of U-shaped cross section, in which the nut block slides. The guide channel fits between posts 52 and 54 and at the post 54, is secured to an arm 90 which is rotatable about threaded end 56. On the end of arm 90 is a detent block 92 in which is a detent pin 94, biased by a spring 96 to seat in a socket 98 in post 54, as in FIG. 8. Identical guide channel and detent structure is used on carriage unit 46. With the detents engaged, the arcuate beam 84 is held parallel to the drawing board surface. Each post 64 has a second socket 100 diametrically opposite socket 98. The complete assembly of guide channels, nut blocks and arcuate beam can thus be swung upwardly and over to the other side of the guide track 32, the arcuate beam being held parallel to the drawing surface on either side.

Mounted on the arcuate beam 84 is a travelling head 102, comprising an upper plate 104 and a lower plate 106 secured to a spacer block 108. Pivotally mounted between plates 104 and 106 are two spaced cages 110, each containing a pair of rollers 112. The arcuate beam 84 passes between the rollers in each cage, the rollers being accurately spaced so that the head 102 has a stable four point rolling contact on the beam. The pivotal mounting of cages 110 on pivot pins 114 accommodates the changes in the radius of the beam.

Between cages 110 is a clamp block 116, having a slot 118 through which the beam 84 passes. The clamp block 116 has a retaining pin 120 which is slidable in a socket 122 in spacer block 108, in a direction radial to the arcuate beam. A clamp screw 124 is threaded through clamp block 116 to bear against beam 84 in the slot 118, and clamp the head 102 in place on the beam when required.

Attached to the head 102 is a shoe 126, on which is mounted the straight edge or scale 128. Shoe 126 has upwardly extending hinge lugs 130 which interfit with corresponding hinge lugs 132 projecting from spacer block 108. The hinge pin 134 joining the hinge is parallel to a tangent to the arcuate beam 84, which enables the shoe to be suspended vertically from the head on either side of guide track 32. Scale 128 is an elongated rigid member with parallel guide edges 136 and 138, and a wide raised rib 140 extending longitudinally along the upper center of the member. The sides of rib 140 are undercut to provide opposed channels 142. The lower portion of shoe 126 is divided by a vertical slot 144 into two legs 146, and on the bottom of each leg is a clamp bar 148 which rests on top of rib 140 and has an inwardly turned flange 150 fitting into the respective channel 142, as in FIG. 6. A clamp screw 152 extends through the legs 146 into a nut 154, and bears against a pad 156 on the side opposite the nut to apply clamping pressure and cause clamp bars 148 to grip the scale. The hinge and shoe structure is offset on head 102, so that guide edge 136 of scale 128 is radial to the center of radius of the arcuate beam 84 and provides the horizon line reference.

In setting up the drafting machine, the guide track 32 is moved to a convenient position and locked by clamp screw 28. The carriage assembly is then adjusted to set the horizon line and locked by lock screw 66. As indicated in FIG. 1, the horizon line 158 is horizontal, but can be at any desired angle to suit a particular perspective view. The vanishing point is then determined and turnbuckle 48 is rotated to set the arcuate beam 84 at the appropriate radius. This setting is greatly simplified by the use of radius markings 160 on the scale 128. With clamp screw 152 loosened, the scale is slid to rest against the side of guide track 32, as in the broken line position in FIG. 1. The turnbuckle is then adjusted until the end face 162 of clamp bars 148, which is the reference line, is at the mark indicating the required radius, the scale being held in contact with the guide track while making the adjustment. Scale 128 is then returned to normal position clear of the guide track and locked in place. When the head 102 is moved along beam 84, the projection of any line drawn along guide edge 136 will pass through the selected vanishing point.

To set up another vanishing point at the other side of the board, for two point perspective, the arcuate beam and head assembly is lifted and swung over to the other side of guide track 32, which is moved along rail 10 to the required location. Shoe 126 is swung down below the head and the scale 128 is moved to extend in the other direction. If a different radius to the vanishing point is required, this can either be set before reversing the assembly, or both ends of the scale could be provided with radius markings 160 to facilitate set up on either side.

Lines parallel to, but above or below the horizon line, are drawn by locking head 102 so that guide edge 136 is on the horizon line, then releasing the carriage lock screw 60, so that the carriage can slide in the guide track 32. Verticals are drawn using conventional drafting triangles against the scale guide edge.

The simple compact structure of the machine does not obstruct the drawing area, and almost the entire board is available as useful work area, since the guide track can be positioned very close to the ends of the board.

Having described my invention, I now claim:

1. A perspective drafting machine, comprising:

a rigid elongated rail having means for attachment to an edge of a drawing board;

an elongated guide track attached perpendicularly to said rail and being longitudinally adjustable thereon;

a carriage slidably mounted in said guide track, with means for locking the carriage in a selected position;

an arcuate beam hinged to said carriage to swing to either side of said guide track;

a head unit mounted to move along said arcuate beam;

an elongated scale attached to said head unit and having a drawing guide edge;

and means on said carriage for varying the radius of said arcuate beam.

2. A perspective drafting machine according to claim 1, wherein said last mentioned means includes a turnbuckle having oppositely threaded end portions at opposite ends of said carriage, and a nut block on each of said threaded end portions, said arcuate beam being pivotally attached to and extending between said nut blocks.

3. A perspective drafting machine according to claim 2, wherein said arcuate beam is pivotal with said turnbuckle, to swing to positions on either side of said guide track, and detent means on said carriage for holding said beam substantially parallel to the drawing board surface in either position.

4. A perspective drafting machine according to claim 3, wherein said head unit has a roller means engaging and rolling on said arcuate beam, and clamp means for clamping the head unit at selected positions along said beam.

5. A perspective drafting machine according to claim 4, wherein said roller means comprises pairs of rollers straddling said arcuate beam, each pair of rollers having a mounting cage pivotally mounted in said head unit to adjust to changes in radius of said arcuate beam.

6. A perspective drafting machine according to claim 1 wherein said head unit has a shoe pivotally attached thereto to depend from the head unit on either side of said guide track, said scale being secured to the lower portion of said shoe, with said drawing guide edge substantially radial to said arcuate beam.

7. A perspective drafting machine according to claim 6, wherein said scale has a longitudinal raised rib, said shoe having clamp bar portions straddling and engaging said rib, and releasable clamp means interconnecting said clamp bar portions.

8. A perspective drafting machine according to claim 7, and including setting means on said scale for indicating the radius of curvature of said arcuate beam.

9. A perspective drafting machine according to claim 8, wherein said setting means comprises radius markings on said scale, at least one of said clamp bars having a reference end face for reading against said markings, when the end of said scale normally held in said shoe is abutting said guide track.

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