

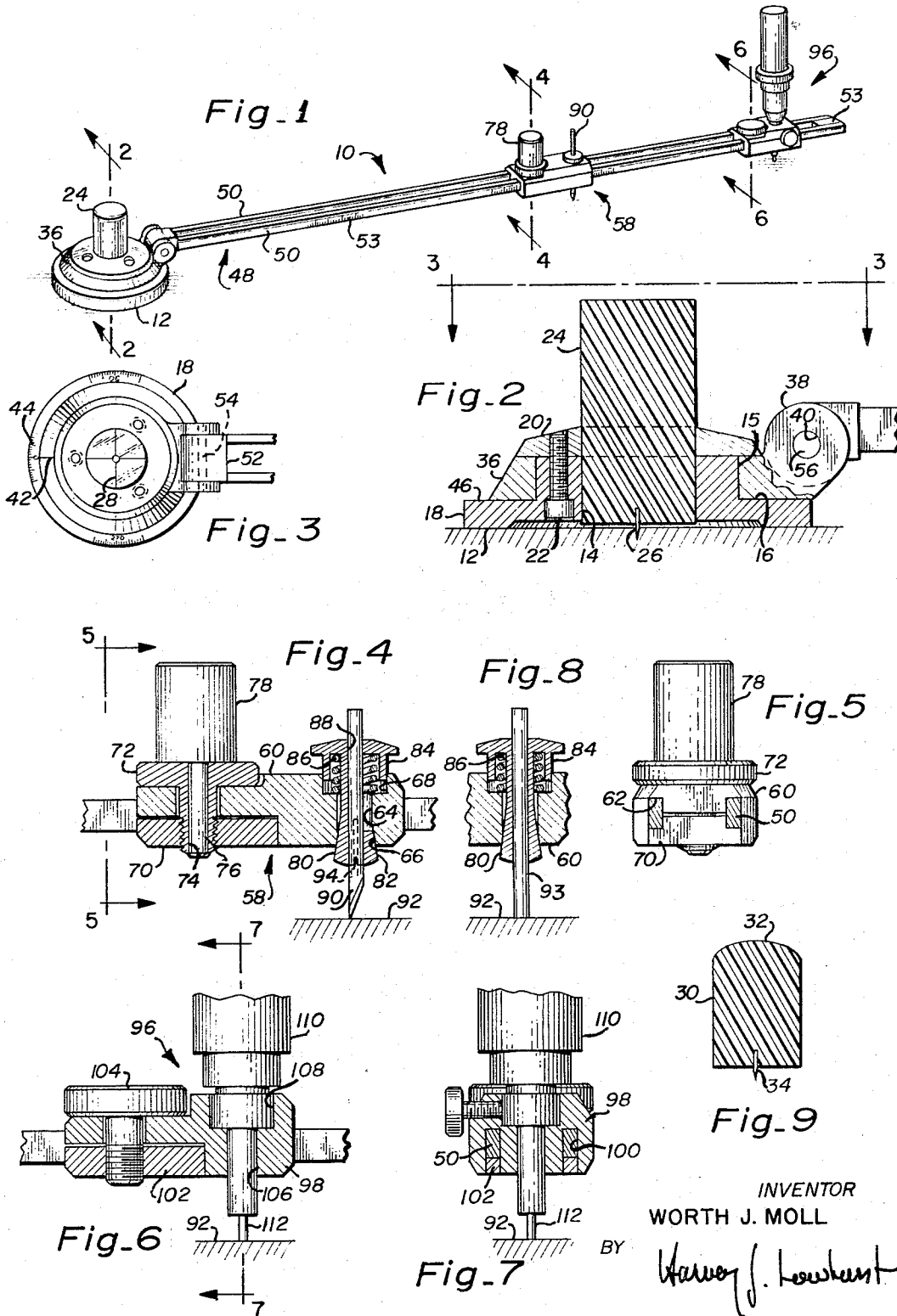
Dec. 20, 1966

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3,292,262

BEAM COMPASS

Filed Aug. 18, 1965



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3,292,262

BEAM COMPASS

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Filed Aug. 18, 1965, Ser. No. 480,657

13 Claims. (Cl. 33—27)

This invention relates to improvements in drawing instruments, and more particularly, but not by way of limitation, to an improved beam compass which is adapted to be used to very accurately inscribe, in ink or pencil, arcs or circles on a drawing. The beam compass of this invention is very stable in use and, although simple in construction, possesses great utility.

It has been known in the past to provide drawing instruments for inscribing circles or arcs on a drawing board. A common beam compass used heretofore includes a beam or bar on which are adjustably mounted a center point and an inscribing member. The center or anchor pin (needle point) and the inscribing member are generally similar except that the center point carries a pointed steel pin and the inscribing member carries a pencil or soapstone. Another beam compass used in the past included a base having suction cups thereon to detachably secure the base to the surface on which the arc or circle is to be drawn, an arm rotatable about the center point of the base and a chalk holder slidably positioned on the arm for inscribing circles on a blackboard.

These devices have been unsatisfactory in several respects: For example, they allowed only a very imperfect view of the point of the positioning needle or the exact location where the point was to be anchored resulting in inaccurate placement of the positioning needle. Once anchored, the prior art compasses were unstable and had to be hand held in a vertical position to prevent "boring in" during rotation of the beam. Also, these prior art beam compasses did not provide for the inscribing member to remain in a fixed vertical position during rotation thereof causing problems during an inking procedure. It was also difficult, in the use of these devices, to accurately determine the angle of the arc inscribed and the radius of the arc. Further, the type of beam compass commonly used in the past had no provision for using a large reservoir Leroy type inking pen, which use is especially desirable in conjunction with a pen unit carried by the arm member.

The present invention contemplates a novel beam compass which includes a base member provided with a central bore and having an annular groove formed, concentrically with the bore, in its outer periphery. A transparent viewing cylinder, positioned in the bore, extends upwardly so that it may be grasped by a user of the compass and used as a base grip. The cylinder is provided with perpendicularly disposed cross lines and a downwardly extending centrally disposed needle member for lightly engaging the surface of the drawing. A ring member is rotatably disposed in the annular groove and has an arm member which includes two spaced parallel radially extending arm members which are pivotally secured to it. Slidably positioned on the arm members is a carriage which includes locking means for fixedly positioning the carriage on the arm members in a predetermined radial position. The carriage is provided with a vertically extending bore for receiving a drawing lead or a knife and for rigidly holding the same in a vertical position during use of the compass.

Also slidably positioned on the arm member is an inking carriage that may be locked in a predetermined radial position and which is provided with a vertically extending bore for receiving a large reservoir inking pen. For inking purposes, a spacer rod may be held in the carriage instead of a pencil to support the arm members above the drawing surfaces. The base of the compass is also

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provided with degree markings which may be used in cooperation with an index mark on the ring member to accurately determine the arc through which the ring member and the attached pencil and ink carriage carrying the arm member is moved. Graduations are also provided on the arm so that the radius of a circle or arc to be inscribed by the pencil or inking pen may be easily and accurately set. The upper surface of the viewing cylinder may be provided with a convex lens surface for magnified viewing of the cross hairs and the drawing surface for easier positioning the needle point carried by the cylinder.

Accordingly, it is an object of the present invention to provide an improved beam compass which is more stable and rigid in use.

It is another object of the invention to provide a beam compass which accurately inscribes arcs or circles with respect to a center point.

Another object of this invention is to provide a beam compass which may use a large reservoir inking pen.

Another object of this invention is to provide a beam compass which permits accurate positioning of the compass point with respect to the indicated point on a drawing media about which arcs or circles are to be inscribed.

A further object of this invention is to accurately control the distance of the compass arm of a beam compass above the drawing surface.

A still further object of this invention is to provide a beam compass which may be used to inscribe exceptionally large radii.

A still further object of the present invention is to provide a novel beam compass which permits the easy and accurate determination of the angles of arcs and the radii of circles drawn by it.

Another object of the present invention is to provide a beam compass which may be used to inscribe a complete circle without reversing the position of the hands of the user.

Still another object of the invention is to maintain the lead or inking pen carried by the compass in a true vertical position.

Yet another object of the invention is to provide a beam compass which does not injure the surface of a drawing during its use.

Another object of the invention is to provide a beam compass which permits an ink and pen carriage carrying the arm member to move away from the drawing surface without disturbing the orientation of the beam compass center.

Still another object of the invention is to support a knife in a rigid vertical position for cutting arcs or circles.

A still further object of the invention is to provide an improved beam compass which is simple and rugged in construction, economical to build, and which has a long service life.

Further objects and advantages of the present invention will become apparent to those skilled in the art to which the invention pertains as the ensuing description proceeds.

The features of novelty that are considered characteristic of this invention are set forth with particularity in the appended claims. The organization and method of operation of the invention itself will best be understood from the following description when read in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view of a beam compass constructed in accordance with an illustrative embodiment of this invention;

FIGURE 2 is an enlarged fragmentary vertical section taken along lines 2—2 in FIGURE 1.

FIGURE 3 is a fragmentary enlarged top plan view of the beam compass illustrated in FIGURE 1.

FIGURE 4 is an enlarged fragmentary vertical section taken along lines 4—4 in FIGURE 1;

FIGURE 5 is a vertical section taken along lines 5—5 in FIGURE 4;

FIGURE 6 is an enlarged fragmentary vertical section taken along lines 6—6 in FIGURE 1;

FIGURE 7 is a vertical section taken along lines 7—7 in FIGURE 6;

FIGURE 8 is an enlarged fragmentary vertical section of a modified form of the invention; and

FIGURE 9 is an enlarged fragmentary section of another modified form of the invention.

Referring to the drawings in detail, and particularly FIGURES 1-7, reference character 10 generally designates one embodiment of a beam compass constructed in accordance with this invention. Compass 10 includes a base member 12 having a vertically extending central bore 14 and a reduced diameter boss 15 defining an annular end face 16 or shelf, concentric with bore 14. Base member 12 is generally of cylindrical configuration as shown by lower body portion 18. Base member 12 carries an upper plate member 20 which is secured thereto in any suitable manner such as by bolts 22. Bore 14 extends through the upper plate member 20. Upper plate member 20 and lower body portion 18 define a U-shaped recess therebetween.

A transparent viewing cylinder 24 is disposed in the bore 14 and extends vertically from base 12 so that it may be used as a hand grip during operation of compass 10. Viewing cylinder 24 is provided, in its lower end portion, with a centrally disposed and downwardly directed needle point 26 which is concentric with bore 14 and defines the axial center of beam compass 10. The bottom surface of viewing cylinder 24 is further provided with a pair of perpendicularly disposed guide lines 28 (cross hairs) such as scribing or the like. Guide lines 28 are used as guides to position needle point 26 over the center point on the drawing or board about which a circle or arc is to be drawn by indicating the position of the needle point which, of course, corresponds to the point of intersection of the guide lines. Cylinder 24 may be composed of any suitable material such as glass, or a transparent plastic such as Lucite plastic.

A useful modification of viewing cylinder 24 is shown in FIGURE 9 which illustrates a viewing cylinder 30 whose upper end face 32 is formed with a convex curvature to effect a magnification of the cross hairs disposed on the lower surface for easier viewing of their point of intersection at which the needle point 34 is placed.

An annular ring member 36 is disposed in the U-shaped groove formed about boss 15 on base 12 for rotation therein. Ring member 36 is provided with a pair of pivot brackets 38 which include an aligned bore 40 to provide a pivot point in a manner which will hereinafter be set forth more fully. The ring member 36 is also provided with an index point 42 which cooperates with degree indicia 44 formed on the upper surface 46 of the lower body flange 18. Thus, a user of beam compass 10, by observing index point 42 and degree indicia 44, may easily determine the angle through which the beam compass is rotated.

Compass 10 is provided with an arm member 48 which includes a pair of spaced parallel arms 50 which are secured together at each end by connecting members 52 and 53. Connecting member 52 is provided with a transversely extending annular bore 54. A suitable pin 56 is passed through the bore 54 of connecting member 52 and bore 40 of pivot arms 38 so as to pivotally attach arm 48 to ring member 36. By using two parallel arms 50, the rigidity of the arm member 48 is increased and a double track is provided for pen and ink units, as will be hereinafter set forth. Markers 50 are provided with length graduations 53 so that the radii of arcs and circles inscribed by the compass 10 may be easily and accurately determined. It will be apparent to one skilled in the art that, during use of compass 10 or during storage thereof, arm member 48 may be raised by pivoting with respect

to the base 12. If desired, the arm member 48 may be replaced with longer arm members (not shown) for drawing exceptionally large radii.

A carriage 58 is slidably positioned on the arm member 48. Carriage 58 includes, as best seen in FIGURES 4 and 5, an upper body 60 which is provided with a pair of longitudinally extending grooves 62 which receive arms 50, and a vertically extending bore 64 which has a downwardly flaring mouth 66 and an upper enlarged portion 68 for a purpose which will hereinafter be set forth more clearly.

A locking means is provided for securing carriage 58 to the arm member 48 in a predetermined position. This locking means may take the form of a lower locking plate 70 which is clamped to the under side of the body 60 by a bolt member 72 so as to lockingly engage arms 50 of the arm member 48. Bolt member 72 is provided with a vertically extending bore 74 for receiving the downwardly extending shaft member 76 of a cylindrical member 78. Cylindrical member 78 provides a freely rotatable hand grip for the arm member 48 so that the arm member may be easily rotated about the base member 12.

The carriage 58 includes a means for rigidly positioning a tool such as a drawing lead 90 in a vertical position. The means may be a collet member 80 having an inwardly tapering lower portion 82 for engaging flaring mouth 66 of body 60 and an upper spaced sleeve portion 84. Upper sleeve portion 84 cooperates with a suitable spring 86 to urge tapered portion 82 upwardly against flaring mouth 66.

Collet member 80 is provided with a vertically extending bore 88 for receiving a suitable drawing lead 90 whose lower end is positioned to engage a drawing surface 92. Collet member 80 is provided with a plurality of vertically extending slots 94 which enable the lower collet portion to be flexed inwardly by the upward urge of spring 86 and thereby grip drawing lead 90 tightly. If desired, drawing lead 90 may be replaced by a knife blade, also generally indicated by the reference character 90, for cutting circles or arcs in a work piece.

It may be desirable at times, and particularly during inking, to space arm member 48 a predetermined distance from the drawing surface 92. This is readily accomplished by substituting a spacer rod 93 for drawing lead 90, as shown in FIGURE 8.

The arm member 48 may also carry an inking carriage 96 as shown in FIGURES 6 and 7. Inking carriage 96 includes a main body 98 which is provided with a pair of spaced parallel grooves 100 for receiving the arms 50 of the arm member 48. A locking plate 102 cooperates with a suitable bolt 104 to lock the carriage 96 in a predetermined radial position. Body 98 is provided with a vertically extending bore 106 which has an enlarged upper portion 108. Bore 106 receives a large reservoir inking pen 110 which, since the details of which form no part of the present invention, is not shown more specifically. The type of inking pen shown in the drawings, and which is preferred in the practice of this invention, is the commercially available Leroy inking pen. Pen 110 is provided with a pen point 112 which engages the drawing surface 92 for applying ink thereto.

In use, base 12 of the beam compass 10 is positioned so that the needle point 26 of the viewing cylinder 24 lightly engages the drawing surface 92. The base 12 is oriented with respect to the center lines of the drawing media illustrated on the drawing surface 92, if any, and then, by grasping the base grip 24 with one hand and arm grip 78 with the other hand, it is possible to inscribe either an arc or a circle without changing the position of the hands. Whether lead 90 carried by carriage 58 or inking pen 110 carried by carriage 96 is utilized is entirely at the discretion of the user and either or both may be used. The angle and the radius of an arc or circle struck

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by use of the compass is readily determined by reference to the index mark 42 and the degree indicia 44.

From the foregoing, it will be apparent that the present invention provides a novel beam compass which is more stable and rigid in use than beam compasses heretofore obtainable thereby attaining a greater accuracy. This novel beam compass permits an easy and accurate determination of the center of arcs and circles to be drawn since the center may be viewed directly through the viewing cylinder which also provides a base grip for the compass. The two parallel arms of the arm member provide a great rigidity and permit the use of an inking carriage and a drawing lead carriage simultaneously. These carriages hold the lead or the inking pen firmly in a vertical position for more accurate drawing. The lead held by the drawing lead carriage may be replaced by a spacing rod if it is so desired in order to space the inking pen point from the drawing surface a predetermined distance.

It is also apparent that the novel beam compass, by virtue of the particular arrangement of the base and the viewing cylinder, precludes injury to the drawing surface during use since the center point provided by the center needle point only lightly engages the drawing surface, and the base provides the means for maintaining the center point in a fixed position during use without tipping.

It is further apparent that the present invention permits the arm member to be lifted from the drawing surface without disturbing the orientation of the compass by means of the pivot connection to the ring member rotatably disposed on the base. This feature also permits the compass to be easily stored. Further, by the provision of degree indicia on the base and distance indicia on the arm member, it is possible to easily and accurately determine the angle and radius of arcs drawn by the compass. Finally, it will be apparent that the present invention provides a novel beam compass which is simple and rugged in construction, which may be economically manufactured, and which has a long service life.

Changes may be made in the combination and arrangement of parts or elements as heretofore set forth in the specification and shown in the drawings, it being understood that changes may be made in the precise embodiment disclosed without departing from the spirit and scope of the invention as defined in the following claims.

What is claimed is:

1. A beam compass comprising:

- a base provided with a surface engaging face, said base also including an upstanding boss having a bore therethrough and a shelf extending outwardly therefrom in spaced relation to said surface engaging face;
- a ring member surrounding said boss and rotatably supported in a horizontal plane on said shelf;
- an annular plate member having a bore therethrough removably attached to the top surface of said boss, said plate member extending outwardly from said boss and extending over said ring member thereby confining said ring member on said shelf, the bore in said plate member being in substantial alignment with the bore in said boss;
- a solid transparent viewing cylinder snugly positioned in the bore of said boss and extending upwardly through the bore in said plate member, said cylinder having a centrally disposed needle point which extends downwardly from its lower end portion of engagement with a working surface;
- an arm member pivotally secured to said ring member; and
- carriage means slidably positioned on said arm member, said carriage means including clamping means for clamping said carriage means on said arm member and further including holding means for engaging a tool in a vertical position.

2. A beam compass in accordance with claim 1 in which a handle means is rotatably secured to said car-

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riage means by which said arm member is rotated about said base.

3. A beam compass in accordance with claim 1 in which said base is provided with azimuth degree markings and in which said ring member is provided with an index mark for cooperating with degree markings on said base to indicate the angle through which said ring member and the attached arm member is rotated.

4. A beam compass comprising:

- a base having a central bore and an annular groove formed in its outer periphery concentrically with said bore;
- a transparent viewing cylinder positioned in said bore and extending upwardly from said base for use as a base grip by a user of the beam compass, said cylinder being provided with a centrally disposed needle point which extends downwardly from its lower end for engagement with a drawing surface;
- a ring member rotatably disposed in said annular groove;
- an arm member, including two spaced parallel arms, pivotally secured to said ring member for rotation about said base;
- a first carriage slidably positioned on said arm member and including a bolt which cooperates with a locking plate to lock said first carriage on said arm member in a selected radial position; said first carriage also including a spring biased collet member for removably positioning a drawing lead in a rigid vertical position; and
- a second carriage slidably positioned on said arm and including a bolt which cooperates with a locking plate to lock said second carriage on said arm member in a selected radial position, said second carriage also being provided with a vertically extending bore for receiving a large reservoir inking pen.

5. A beam compass in accordance with claim 4 further including a handle which is rotatably secured to one of said carriages for rotating said arm member around said base.

6. A beam compass in accordance with claim 4 further including azimuth degree indicia on said base and an index mark on said ring member for indicating the angular position of said arm member with respect to said base.

7. A beam compass in accordance with claim 1 further including radial distance indicia along said arm member and an index mark on said carriage means for indicating the radial distance of the engaged tool from the center of said base.

8. A beam compass comprising:

- a circular base having a central bore and an annular groove formed in its outer periphery concentrically with said bore;
- a transparent viewing cylinder vertically disposed in said bore and extending upwardly from said base for use as a base grip by a user of the compass, said cylinder being provided with a centrally disposed needle point which extends downwardly from its lower end portion for engagement with a drawing surface and which defines the center point of the compass, said cylinder also including vertically viewable cross hairs which intersect at said center point;
- a ring member rotatably disposed in said annular groove;
- an arm member, including a pair of parallel arms, pivotally secured at one end to said ring member for rotation about said center point;
- a carriage slidably positioned on said arm member, said carriage including a hollow bolt and a locking plate for cooperating with said bolt for locking said carriage on said arm member in a selected radial position, said carriage further including a vertical bore and a spring biased collet member in said last mentioned bore for removably holding a drawing lead in a rigid vertical position;
- a handle grip rotatably disposed within said hollow

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bolt for rotating said arm member in a horizontal plane about said center point; and
 a further carriage slidably positioned on said arm member and including a bolt and a locking plate for cooperating with said bolt to lock said further carriage on said arm member in a selected radial position, said further carriage also including a vertically extending bore for receiving a large reservoir inking pen.

9. A beam compass in accordance with claim 8 further including azimuth degree indicia on said base and an index mark on said ring member for cooperating with said degree indicia to indicate angular positioning of said arm member.

10. A beam compass in accordance with claim 8 further including radial distance indicia on said arm member and an index mark on at least one of said carriages to indicate the radial distance of the drawing lead or inking pen from said center point.

11. A beam compass in accordance with claim 1 in which the upper end portion of said viewing cylinder is shaped to conform to a convex lens surface for magnifying the image viewed through said cylinder.

12. A beam compass in accordance with claim 8 in which said collet member removably holds a spacer rod for spacing said arm member a predetermined distance above a drawing surface.

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13. A beam compass in accordance with claim 8 in which said collet member removably holds a knife blade for cutting arcs or circles in a drawing surface.

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