June 25, 1963 G. D. VAN DYKE 3,094,784

DRAFTING INSTRUMENT

Filed Nov. 12, 1958

2 Sheets-Sheet 1

Fig. 2.

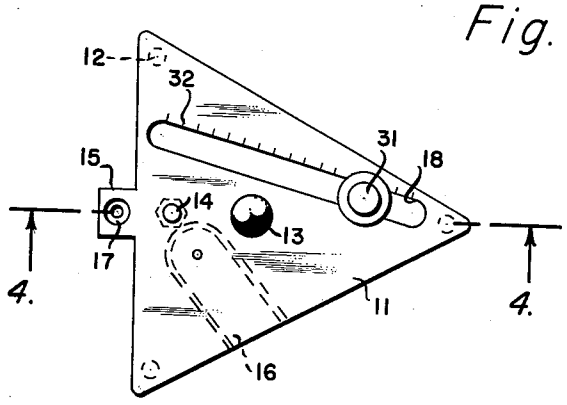


Fig. 1.

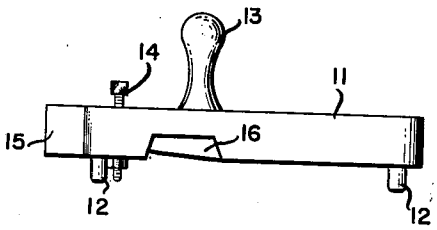


Fig. 3.

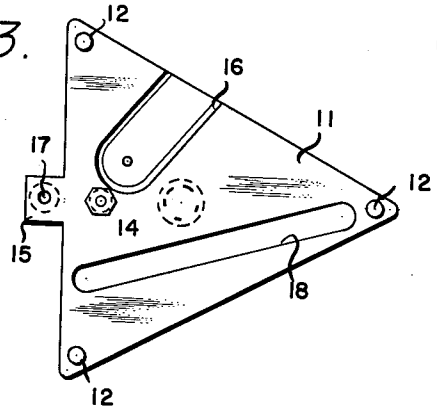
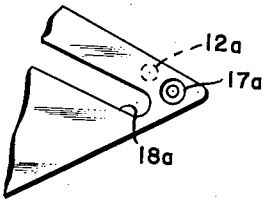


Fig. 4a.



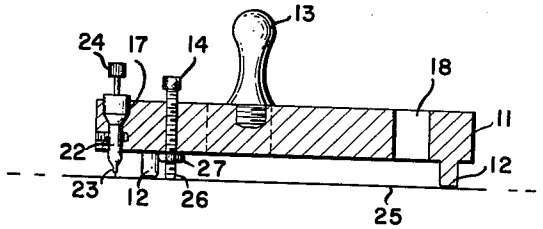


Fig. 4.

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Fig. 5.

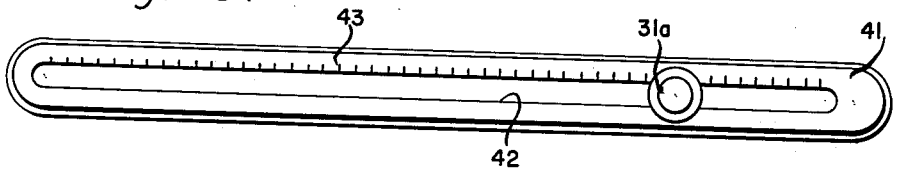


Fig. 6.

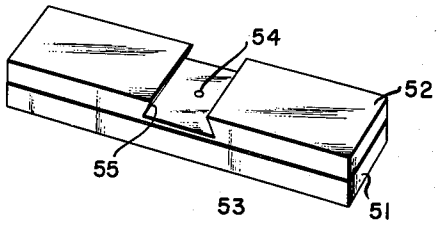
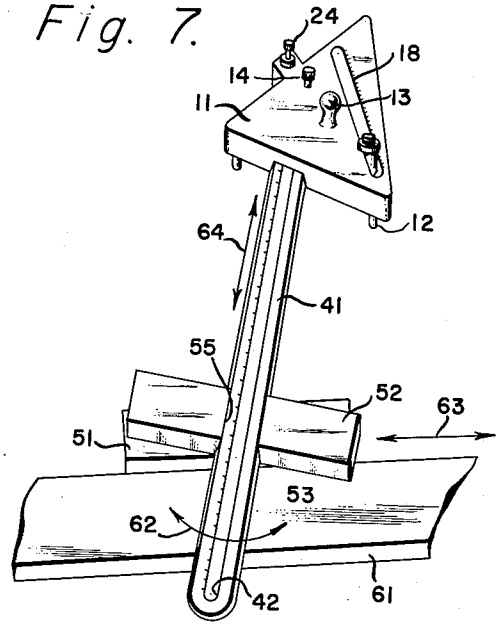


Fig. 7.



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United States Patent Office 3,094,784 Patented June 25, 1963

3,094,784

DRAFTING INSTRUMENT

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Filed Nov. 12, 1958, Ser. No. 773,360
4 Claims. (Cl. 33—26)

This invention relates to drafting instruments and more particularly to drafting instruments having universal application in their use.

It has long been known in the prior art that a draftsman must acquire and maintain a large number of drafting instruments in order to properly perform his job. When a draftsman is required to change from the drawing of straight lines to the drawing of circles or the like, he must change from a ruling pen to a compass. Furthermore, a different instrument must be used when making a pencil drawing as opposed to an inked drawing. The changing from one instrument to another which is required in the use of the conventional drafting instruments consumes a large amount of time and, as well, requires, particularly when inking, the cleaning of each instrument prior to the use of the next succeeding one. In addition to these time consuming steps when using the conventional drafting instruments, additional time is consumed in keeping the instruments sharp and otherwise in proper condition for usage.

When utilizing the presently accepted drafting instruments, it is well known that the width of the line being constructed may vary depending upon the pressure being applied by the draftsman upon the pen and the angle at which the pen is being held. These variations, in turn, cause unwanted errors to creep into drawings which are required to be accurate.

As a result of the foregoing, there has in the past been many attempts to produce a drafitng instrument which would be utilized in order to aleviate the necessity of using the standard drafting instruments.

The drafting instruments which have been produced in the past have, however, as a rule, been limited to instruments designed for special applications. For the most part, such instruments have been quite complex in structure and, because of the complexity, require precise adjustments before each use. These precise adjustments, in turn, consume a large amount of the time thus, in effect, nullifying some of the reasons for their original design. Where attempts have been made to construct drafting instruments having relatively universal application in the art of drafting, the instruments have, as a rule, been constructed with many movable parts. The large number of movable parts has caused the instruments to be extremely expensive to manufacture and has limited the accuracy of the drawings made by them.

Those drafting instruments which have been constructed and which have proven relatively successful have, for the most part, been a protractor-compass combination which could be utilized for drawing straight lines or, in a limited way, circles or segments thereof. These instruments, however, have proven to be somewhat unwieldy in their usage and have found little favor with the practitioners in the art.

Accordingly, it is an object of the present invention to provide a drafting instrument having relatively universal application.

It is another object of the present invention to provide

a universal drafting instrument which is exceedingly simple in structure and which has substantially no moving parts.

It is still another object of the present invention to provide a universal drafting instrument which provides extreme accuracy in drafting.

It is yet another object of the present invention to provide a single drafting instrument which is capable of replacing the presently accepted drafting instruments in the form of pens and compasses.

It is a further object of the present invention to provide a universal drafting instrument which is simple to manufacture and which is extremely rugged and durable.

A drafting instrument in accordance with the present invention includes a plate member having support members and a marking implement affixed thereto.

Other and more specific objects of the present invention will become apparent from a consideration of the following description taken in conjunction with the accompanying drawings which are presented by way of example only and in which like or similar parts are represented by the same numeral throughout, and in which:

FIG. 1 is a side view of the basic element of the universal drafting instrument of the present invention;

FIG. 2 is a top view of the drafting instrument as illustrated in FIG. 1;

FIG. 3 is a bottom view of the drafting instrument as illustrated in FIG. 1;

FIG. 4 is a cross-sectional view of the drafting instrument taken about lines 4—4 as shown in FIG. 2;

FIG. 4A is a fragmentary view of an alternative arrangement of the drafting instrument of the present invention;

FIGS. 5 and 6 illustrate additional units which may be attached to the drafting instrument as illustrated in FIGS. 1 through 4; and

FIG. 7 illustrates additional usages to which the drafting instrument of the present invention may be put when used in conjunction with the elements of FIGS. 5 and 6.

Referring now to the drawings and more particularly to FIGS. 1 through 4 thereof, the basic element of the universal drafting instrument of the present invention is illustrated.

There is shown a plate member **11** having support members **12** affixed thereto. In the presently preferred embodiment of the present invention, three support members are illustrated as being an integral part of the plate member **11**. It is to be expressly understood that the support members may be removable or adjustable if desired, and they may vary in number depending upon their size and configuration.

A handle or knob **13** is also affixed to plate member **11**. The knob **13** may be removed if desired when the drafting instrument is being utilized drawing straight lines or for use with a T-square, triangles and the like. However, when the drafting instrument is being utilized to construct circles or segments thereof, the knob **13** is, in some cases, useful. An adjusting element **14** is also provided. The use of the adjusting element **14** will be more fully explained below.

A protrusion **15** is provided as an integral part of plate member **11**. Protrusion **15** is utilized to hold a marking implement as will be more fully explained below. As is

illustrated in FIG. 2, the protrusion **15** has provided therein an opening **17**. Opening **17** is utilized to accept a marking implement.

A slot **18**, as illustrated more clearly in FIGS. 2 and 3, is provided in plate member **11** and extends through the thickness dimension thereof. As illustrated, the slot **18** extends substantially along the length of plate member **11**. The application of slot **18** to the utilization of the drafting instrument of this invention will be more fully explained thereinafter.

A recess **16** is provided in plate member **11** so that an extension or adaptor may be attached to the plate member **11** as will be discussed below.

Referring now more particularly to FIG. 4, marking implement **21** is illustrated in the form of an inking pen which may be utilized in the preferred embodiment of the drafting instrument of the present invention. Although an inking pen is shown, it should be understood that it may be replaced with a pencil at will. As is illustrated, a reservoir **22** is placed within opening **17** and is adjusted by raising or lowering it to such a position that the tip **23** of the reservoir **22** is just above a plane **25** taken by connecting the ends of support members **12**. Plane **25** may be viewed as a sheet of drawing paper. A pen **24** is then placed within reservoir **22** so that it extends through the reservoir and will contact the surface of the drawing paper.

It is well known in the drafting art that the surface texture of the drawing paper which is to be utilized varies substantially from type to type. Since the pen **24**, which is utilized with the drafting instrument of the present invention, has a relatively fine point, it will from time to time become necessary to adjust the amount of pressure which will be exerted by pen **24** upon the paper. If the paper is relatively coarse, a greater amount of pressure should be exerted by pen **24** upon it. As finer paper is used, less pressure will be required in order to obtain a continuous marking.

Adjusting element **14** is provided in order to allow this adjustment. As illustrated in FIG. 4, adjusting element **14** may be moved up or down in such a manner that the tip **26** thereof will contact the drawing paper **25**. A slight turn of the adjusting element **14** will, very slightly, raise the tip of the pen **24** so that it exerts less pressure on the drawing paper **25**. Adjusting element **14** may be machined in such a manner that it will be substantially self-locking or, if desired, a locking nut **27** may be provided thereon to maintain adjusting element **14** fixed rigidly in place after it is set in the desired position.

In actual operation, the universal drafting instrument, as illustrated in FIG. 1 through 4, may be used to construct straight lines or other figures in the same manner as any standard ruling pen.

If accurate straight lines are to be constructed by the drafting instrument of the present invention, it may be used by placing support members **12** against a straight edge, such as a T-square, and then adjusting the drafting instrument and the T-square in such a manner that the tip of pen **24** rests upon the line to be constructed. The drafting instrument may then be drawn along the edge of the straight edge by keeping the support members **12** gently but firmly against the straight edge.

No pressure need be applied to plate member **11** to cause the desired line to be constructed. The only pressure needed to construct an even line is that applied by the pen point upon the surface of the paper. If pressure is applied to the plate member **11**, it will be transmitted to support members **12** instead of pen **24** and, therefore, will not affect the line width. Furthermore, since plate member **11** is evenly supported upon support members **12**, the pen point cannot be tilted during use to deleteriously affect line width or damage the pen point.

As can be readily seen, since the pen **24** projects perpendicularly from plate member **11**, the beginning and end portions of any line which is constructed may be easily and accurately controlled with a minimum of effort as compared to the standard drafting instruments.

It should be pointed out that the drafting instrument of the present invention may be used for lettering, such as Le Roy lettering or the like, by merely attaching an extender thereto which is adapted for use with the standard lettering guide.

During the construction of straight lines or letters, as hereinabove described, the knob **13** may be removed if desired. It has been found, however, in actual practice that knob **13** does not interfere with the usuage of the drafting instrument for lettering or constructing of straight lines.

In utilizing the drafting instrument of the present invention for constructing circles or segments thereof, a pivot member **31** may be inserted in slot **18**, as illustrated in FIG. 2. The pivot member **31** is moved along slot **18** until it is the distance from pen **24** which is desired as the radius of the circle or segment to be constructed. The tip of pivot member **31** is then placed upon the center point of the circle or segment to be constructed and the entire drafting instrument is pivoted about pivot member **31**, thus causing pen **24** to inscribe the circle or segment thereof.

Pivot member **31** may be constructed so as to be two pieces which are fastened together within slot **18** so as to provide a pointed end which contacts the surface of the drawing paper at the desired spot. In the alternative, pivot member **31** may have a spring loaded retractable needle-like point which is brought into contact with the surface of the drawing paper by pressing the top of pivot member **31**. Other variations may be made to pivot member **31** while remaining within the scope of the present invention.

In order to provide an accurate measurement of the radius which is desired, a scale **32** may be inscribed directly upon plate member **11** or, if desired, a groove can be provided about slot **18** into which various inserts bearing scales may be placed in order to obtain the accuracy desired for any particular job. The scale **32** is calibrated in such a manner that the distance between pen **24** and pivot member **31**, and thus the radius of the circle or segment, may be directly read therefrom.

In the presently preferred embodiment of the invention, as illustrated in FIGS. 1 through 3, the radius of circle which may be obtained is approximately ⅜ inch. If an instrument which will inscribe circles having a smaller radius is desired, the marking implement **21** may, in the alternative, be placed in the corner of the triangle opposite its present position. This may be done, as illustrated in FIG. 4A, by providing an opening **17A** in this portion of plate member **11** which will accept the reservoir **22** and the pen **24**. In this manner, circles having a radius of as small as approximately 1/16 inch may be inscribed. In the presently preferred embodiment of the present invention as illustrated in FIGS. 1 through 4, circles having a maximum radius of approximately 1 and ⅝ inches may be inscribed. This maximum may, of course, be increased merely by increasing the dimensions of plate member **11**, if desired. The drafting instrument, as illustrated in FIGS. 1 through 4, however, will for the most part be capable of inscribing circles of the radius usually desired for most drafting jobs. In some instances, however, it has been found that circles having much larger radii are desirable. When circles having radii larger than that which is capable with the drafting instrument, as illustrated in FIGS. 1 through 4, are desired, extension member or adaptor **41** as shown in FIG. 8 may be utilized as follows. The extension member **41** may be inserted into recess **16** of plate member **11**. Recess **16** may be machined so that it provides a perfect fit for adaptor **41**, such as by a V-shaped portion in each side of the recess, and thereby holds it rigidly in place, or in the alternative, other provisions may be made for retaining extension member **41** rigidly affixed to the plate

member 11. This may be accomplished by providing a screw for holding adaptor 41 affixed to plate member 11, or alternatively, a snap element may be provided upon adaptor 41 and a socket therefor within recess 16 of plate member 11. Adaptor 41 has a pivot member 31A, which may be the same pivot member shown at 31 in FIG. 2, which is movable within opening 42 in extension member 41 similar to the use of pivot member 31 in slot 18.

In operation, extension member 41 is placed within recess 16 of plate member 11 as illustrated in FIG. 7. Pivot member 31A is adjusted along the length of extension member 41 until the desired radius of the circle to be inscribed is accomplished. Thereafter, gentle pressure is applied to pivot member 31 to hold it in place and the entire drafting instrument is then moved about pivot member 31A to inscribe the circle or segment thereof as desired. As illustrated with respect to slot 18 in plate member 11, a scale may be provided along the length of extension member 41, as illustrated at 43, such that a direct reading of the radius of the circle to be inscribed may be obtained therefrom.

The extension member 41, as illustrated in FIG. 5, may be constructed to have any desired length in order to obtain circles having any desired radius. In the alternative, a series of extension members of the general configuration as shown in FIG. 5 may be constructed to have different lengths so as to accomplish the result of being capable of inscribing circles of any length.

It has been found desirable in some instances to be able to construct a square, parallelagram or other four-sided figure having opposite parallel sides. By utilizing the additional extension member, as illustrated in FIG. 6, this may be readily accomplished without removing the drafting instrument of the present invention from the drawing paper. As illustrated in FIG. 6, a pair of blocks 51 and 52 of substantially the same dimensions are provided. Block 52 has a recess 53 provided therein which is of such a dimension as to receive the extension member illustrated in FIG. 5. Recess 53 has the sides thereof tapered as shown at 55 to retain the extension member firmly in place. In the alternative, a keeper or the like may be provided to fit within the extension member slot to retain it in place within recess 53. A mating or pivot pin 54 is provided so that blocks 51 and 52 will be properly aligned when brought together. The mating or pivot pin 54 is preferably located at the center of blocks 51 and 52 and will also act as a pivoting point therefor. Extension member 41, as illustrated in FIG. 5, with pivot member 31A removed therefrom, is inserted within recess 53 and held in place by a retaining member 55, as shown in FIG. 7, which fits within opening 42 of extension member 41.

In actual operation the four-sided figure above referred to may be constructed as follows. Block 51 is placed against a straight edge 61. Block 52 is rotated upon block 51 and about pivot pin 54 as illustrated by arrow 62 until the desired angle is achieved. This angle will be determined by the acute angles of the desired geometric figure to be constructed. If desired, a protractor may be added as an integral part of block 51 and a pointer provided on block 52 to enable the draftsman to read directly the angle the extension member 41 makes with the straight edge 61. If the figure to be constructed is a square or a rectangle having four 90-degree angles, blocks 51 and 52 would not be rotated.

The mating surfaces of blocks 51 and 52 are preferably machined to have a relatively smooth finish such as a mirror finish. This will cause the surface tension between the mating surfaces of the blocks 51 and 52 to retain them in a fixed position until substantial pressure is applied thereto to cause them to move upon each other and about pivot pin 54. With the blocks, the extension member and the drafting instrument assembled and placed in an abutting relationship with the straight edge 61, as illustrated in FIG. 7, the desired four-sided figure may be constructed as follows. The entire assembly may be moved along straight edge 61 as illustrated by arrow 63 until the desired length of one side of the figure has been obtained. At this point the drafting instrument and extension member 41 will be moved laterally to block 52 by causing adaptor member 41 to slide in recess 53 of block 52, as illustrated by arrow 64. When the desired length of this side of the figure has been achieved, the entire assembly will then be returned along straight edge 61 a sufficient distance to equal the opposing side already constructed. The drafting instrument and extension member 41 will then be returned by sliding extension member 41 in recess 53 of block 52 back to the starting point.

There has thus been described a drafting instrument which is exceedingly simple and rugged in construction, requiring no maintenance, and which may be utilized in lieu of the presently accepted drafting instruments recognized in the drafting art at the present time.

What is claimed is:

1. A drafting instrument for constructing straight and arcuate lines comprising: a flat plate member defining an elongated slot therethrough for receiving a slidably adjustable pivot member; a plurality of support members affixed to and extending from one surface of said flat plate member for slidably supporting said drafting instrument upon a work piece, each of said support members being of a length to hold said plate member away from said work piece by an amount sufficient to permit contact between two of said support members and a straight edge during the time said drafting instrument is being used to construct straight lines; said one surface defining a recess therein for receiving an elongated extension member; marking means affixed to said flat plate member adjacent one end of said elongated slot; and an elongated flat extension member defining a slot therethrough along the length thereof and being disposed within said recess and detachably affixed to said flat plate member.

2. A drafting instrument in accordance with claim 1 in which said flat plate member is a substantially triangular shaped metallic plate including a protrusion formed integrally therewith and extending from approximately the center of one side thereof for receiving said marking means.

3. A drafting instrument in accordance with claim 2 in which said elongated slot extends along another side of said triangular plate and terminates at one end adjacent said protrusion, and said recess extends inwardly from the remaining side of said triangular plate and termniates adjacent said protrusion.

4. A drafting instrument for constructing straight and arcuate lines comprising: a flat plate member; a plurality of support members affixed to and extending from one surface of said flat plate member for slidably supporting said drafting instrument upon a work piece, each of said support members being of a length to hold said plate member away from said work piece by an amount sufficient to permit contact between two of said support members and a straight edge during the time said drafting instrument is being used to construct straight lines; said one surface defining a recess therein for receiving an elongated extension member; marking means affixed to said flat plate member and extending from said one surface thereof; an elongated flat extension member defining a slot therethrough along the length thereof and being disposed within said recess and detachably affixed to said flat plate member; first and second pivotally connected juxtaposed members, said second member defining a recess extending across one surface thereof for receiving said extension member, whereby said extension member may be moved within said recess across said members and said flat plate member may be moved arcuately about said pivotal connection, said first member having a straight edge surface for engagement with a straight edge whereby said drafting

instrument can be moved to construct straight lines parallel to said straight edge and straight lines angularly displaced from said straight edge, the angle of displacement being determined by the arcuate position of said second member with respect to said first member.

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