

W. S. MALLARD.
CURVE SCRIBER.

No. 576,349.

Patented Feb. 2, 1897.

Fig. 1.

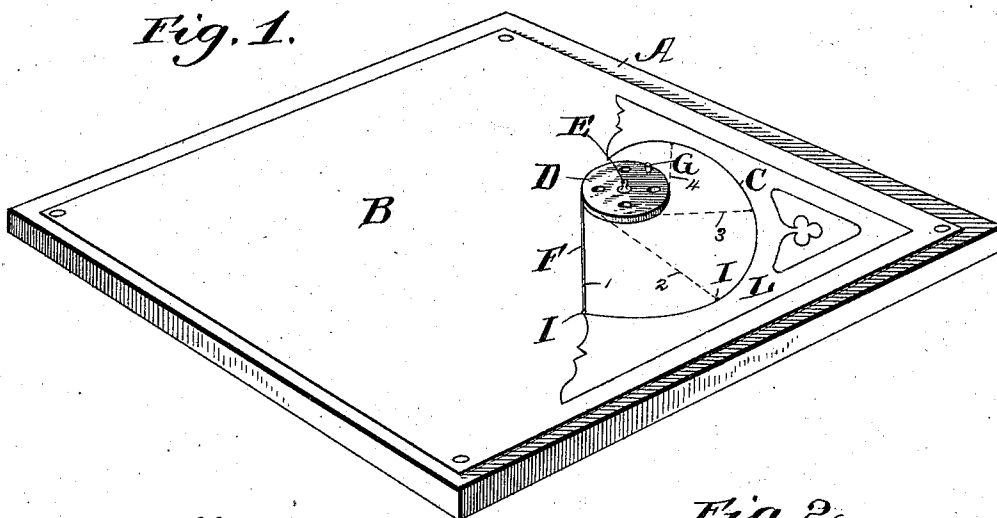


Fig. 4.

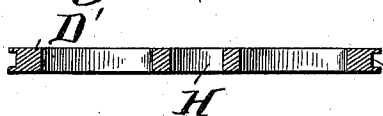


Fig. 2.

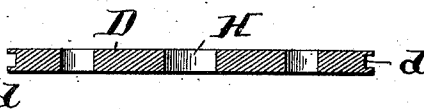


Fig. 5.

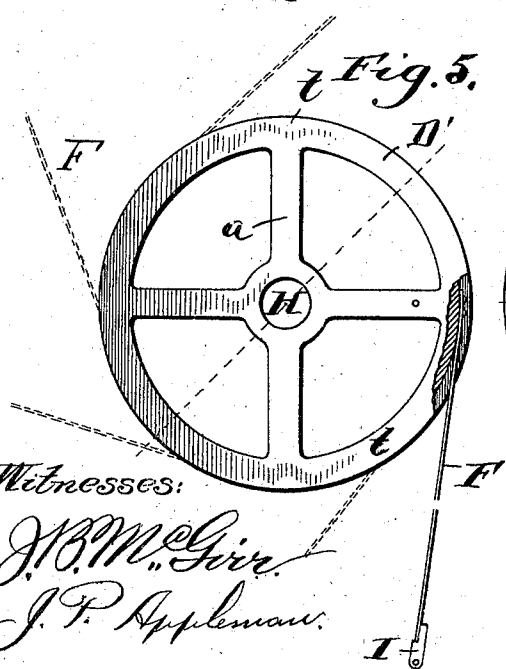
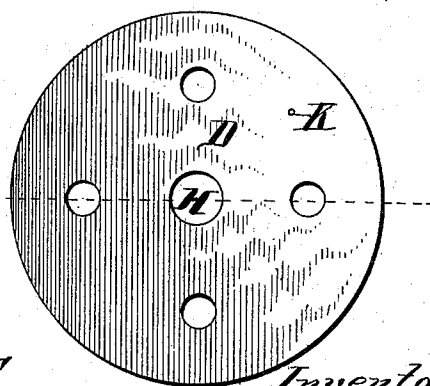


Fig. 3.



Witnesses:

J. B. M. Giv.
J. P. Appleman.

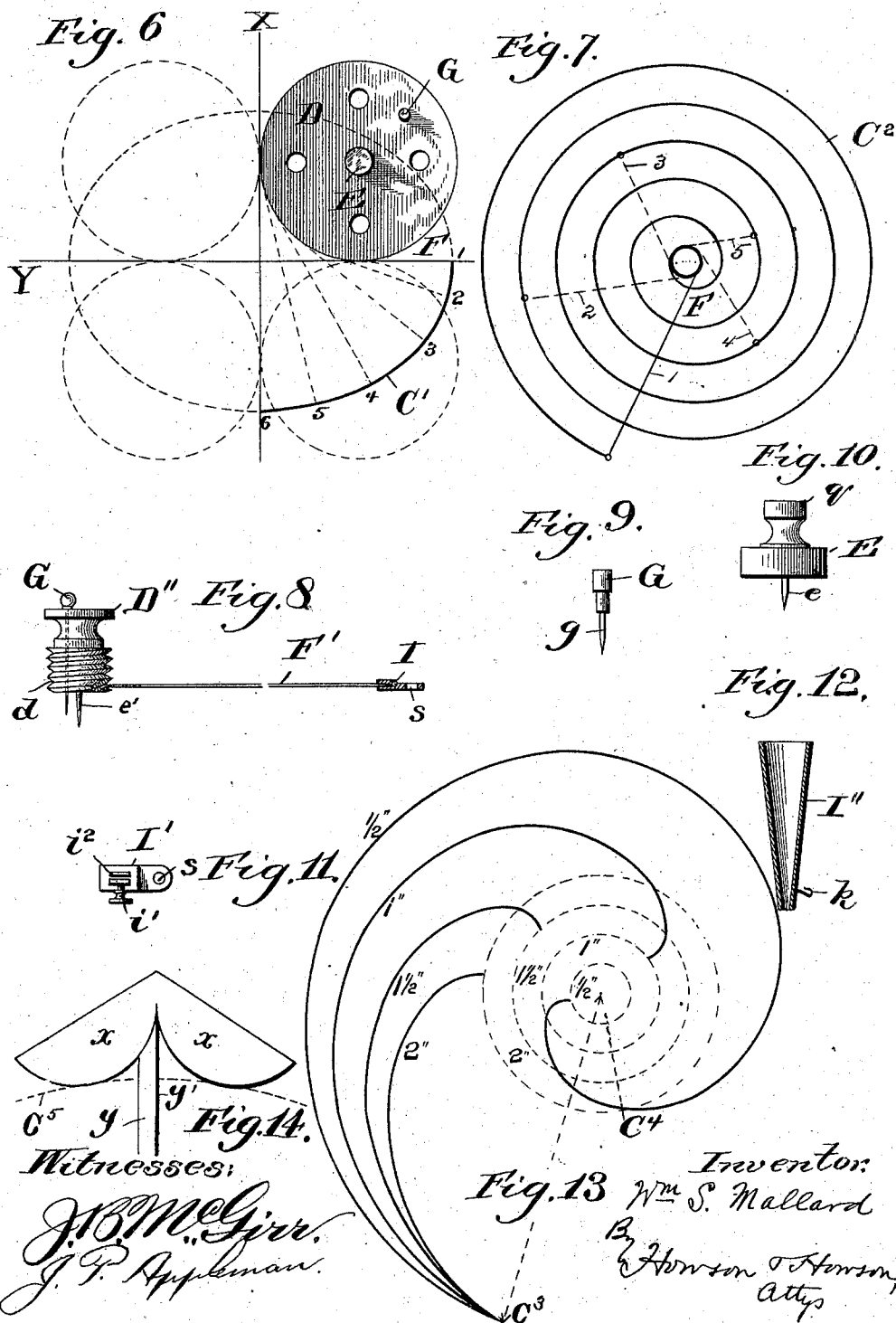
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UNITED STATES PATENT OFFICE.

WILLIAM S. MALLARD, OF DARIEN, GEORGIA.

CURVE-SCRIBER.

SPECIFICATION forming part of Letters Patent No. 576,349, dated February 2, 1897.

Application filed April 30, 1896. Serial No. 589,714. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. MALLARD, a citizen of the United States, residing in Darien, county of McIntosh, State of Georgia, have invented certain new and useful Improvements in Curve-Scribers, of which the following is a specification.

My invention relates to curve-scribers for the use of architects, carpenters, builders, draftsmen, and other workmen; and my object is to provide a device of this class in a convenient and inexpensive form by which curves having a constantly-varying radius of curvature can be quickly and readily plotted or transferred by a mechanical operation.

My invention is based generally upon the rule that the circumference of a circle is approximately equal to three times its diameter, derived from the mathematical formula $C = \pi D$, in which C represents the circumference, D the diameter, and π the constant, 3.1416. From this rule it will be seen that if a circular disk is provided with a string attached to its circumference and if the string is stretched taut from the point of attachment and is wrapped around the disk, held rigidly on a center, a point in the string distant from the disk the lineal measure of its circumference will move toward the center of the disk, as it is wound around the same, a distance equal to about the length of the circumference, and in traversing this distance the said point will describe a curve whose radius of curvature is caused to change constantly as the string is shortened in the winding around the disk.

In the drawings, where similar characters refer to the same or corresponding parts in all the views, Figure 1 is a perspective view of my invention applied to a plain board or table in position for describing a curve. Fig. 2 is a central vertical section of the directing-disk. Fig. 3 is a plan view of the same. Fig. 4 is a central vertical sectional view of a modified form of directing-disk. Fig. 5 is a top plan view of the same. Fig. 6 is a diagrammatic view showing the manner of drawing an ellipse with my invention. Fig. 7 is a similar view showing the manner of drawing a spiral. Fig. 8 is a side elevation of a modification. Fig. 9 is a detail of the binding-pin or thumb-tack. Fig. 10 is a detail in eleva-

tion of the center pin. Fig. 11 is a detail of the modified pencil-holder. Fig. 12 is another modification of the pencil-holder. Fig. 13 is a diagrammatic view of another form of curve described by my invention. Fig. 14 is a plan view of square for finding radii of curves.

Referring to the drawings, A indicates a plain board or table to which may be secured the paper or other material B upon which the curve is to be described.

In Fig. 1 a molding L is represented as being described by one form of my curve-scribers, which in the present instance consists, essentially, of a directrix in the form of a circular disk D, provided with a central aperture H, to which is adapted a centering-pin E, having a sharpened point e and a projecting hand-knob g , whereby the directrix may be secured upon any center desired or previously ascertained. This disk is also provided with an aperture K, in which may be inserted a thumb tack or pin G, the pointed end g of which enters the board or table, whereby the directing-disk is held rigidly in position, the thumb-tack G being located eccentrically on the disk, as shown.

Suitably secured to the periphery of the disk D is a band F, preferably of thin metal, capable of being wound closely around the circumference of the disk. This band may, if desired, be made of sheet-steel, brass, or any material rigid in the direction of the length, but capable of winding closely and easily around the circumference of the disk. The disk E may also be provided on its periphery with a groove d , so as to insure the paying of the wire or band against the circumference in the winding and to prevent the same from sliding upward or downward from any cause while being wound or unwound, as the case may be. It is manifest, however, that this groove is not essential to the practical embodiment of my invention, as the periphery of the disk may be plain, particularly where the band is of thin flat sheet metal instead of wire or other material of circular cross-section, although it will be found preferable in some cases to adopt such groove for the reasons stated.

Attached directly to the end of the wire or band is a pencil-holder I, provided with a perforation s , in which the point of the pencil,

pin, or pen is inserted and held. This pencil-holder may be of any suitable form, three different forms of which I have shown in Figs. 8, 11, and 12, that in Fig. 8 being simply in the form of a metal tip I, permanently secured to the end of the band and provided with a perforation *s*, while that in Fig. 11 is a similar tip I, having clamping-jaws *i*², provided with a set-screw *i* for the purpose of engaging the band or wire F at any point, being thus readily detachable and adapted to be applied in any position on the band or wire. It will thus be seen that the pencil or the holder therefor is carried directly by the wire independently of any other support.

In Fig. 12 the pencil-holder is in the form of a cone I', provided on its side with a projecting hook *k*, adapted to engage the wire or perforation therein at any point. Instead of the hook *k* on the side of the pencil-holder I' it is obvious that clamping-jaws may be applied thereto similar in construction to those shown attached to the tip I'.

The directing-disks are intended to be furnished in sets of varying diameters—for example, one, two, three, four, five inches, &c.—to accommodate varying radii of curvature; and with the larger disks I prefer to make the form shown in Fig. 5, where *t* indicates a ring provided with radial webs *a*, meeting at the center, where the center aperture H is formed, the disk D' thus constituted being preferably of cast metal. In the smaller forms the disk D may be made, if desired, of wood.

In Fig. 8 I have shown another modified form of disk D'', which consists of a cylindrical pin, provided with a spiral groove or thread *d* for guiding the wire F', and having a downwardly-projecting pointed pin *e'* for centering the same. A thumb-tack G' is in this construction passed through an aperture in the disk D'' to one side of the center for securing the same rigidly in position, as in the other constructions. This construction is particularly adapted for describing spirals and other curves of greater length and gradually-increasing radii of curvatures.

In order to enable those skilled in the art to understand the mode of operating my invention, I will now briefly refer to the manner in which the several different forms of curves shown in the drawings may be described.

Referring to Fig. 1 the curve C is described by placing the directrix D in position and stretching taut the band F, inserting the pencil or other marking instrument in the holder I and then winding the band F around the disk D, keeping the said band taut in its course of winding, during which movement the marking instrument traces or describes the curve C upon the paper, the different positions of the band, which approximately correspond to the radius of curvature of the curve at different points, being indicated by dotted lines 1 2 3.

In Fig. 6 I have shown the manner in which an ellipse may be drawn by the use of my

curve-scriber, in which it will be seen that in order to draw the ellipse two axes X and Y are drawn intersecting each other at right angles, and the disk D successively placed in the four quadrants. The circumference of the disk being tangent to the two axes, the band F, extending from the disk and coinciding with the axes in the extreme positions, is being swung, for example, from position 1 to position 6 in describing the lower quadrant C' of the ellipse, and the other three quadrants are described in a similar manner.

In Fig. 7 the spiral C² is traced by means of the small-sized disk, such as D'', the wire or band assuming successively the positions 1 2 3 4, and so on, as it is wound.

In Fig. 13 I have shown a series of curves, starting from the common point C³, each of different radii of curvature, which curves are described by using disks of different diameters, placed successively on the common center C⁴, the band on each being unwound until the point of the pencil can be started from C³, from which point the pencil is moved around the separate disks in succession until the band is wound so as to cause the pencil to approach the edge of the disk, thus forming the different curves.

Of course it is not necessary to start with the band F at its full length, as it is manifest that the band may be partially wound and a curve of greater or less length described, according to the length of winding or unwinding.

The disks are intended to be made so that a common center E may be used for various sizes, and when the radius of curvature is such as to necessitate the use of the smaller size, such as shown in Fig. 8, the center E' is preferably formed therewith.

It is the frequent practice of architects, when laying out work involving the use of irregular ornamental curves of the character generally defined herein, to give directions to builders to follow the design as closely as possible, and for want of proper means to transfer their curves to the work or pattern of working size the approximation frequently falls very perceptibly short of the design. By the use of my invention it is practicable to copy these curves on the larger scale without any material departure from the design, for it is only necessary for the architect to be supplied with a set of my scribers having the disks of smaller size, say, from one-eighth of an inch to three inches in diameter, while the builder or workman could be supplied with the larger size, say, from one inch to eight inches in diameter, and the scale used by the architect would be indicated on his drawing, each particular curve being designated by the diameter of disk used, so that it could be easily enlarged by the workman on laying out his work on wood, metal, &c.

When curves are to be transferred from copy, it is desirable to have some ready means of finding the radius at a given point, and I prefer to use for this purpose the square

shown in Fig. 14, where the two sides x of the square are formed by equal segments of a circle, the outer edges being the chords, and with the shank y , having one edge y' bisecting the angle. By placing this square on the curve C^5 , so as to have the two arcs of the segment tangent thereto, or as nearly so as possible, the edge y' will correspond with the radius along which the center for the directing-disk is located, its exact position being determined when the diameter of the disk used in describing the curve is given.

A set of my scribers may be composed of as many different sizes of directing members or disks as desired, each of which may be provided with a separate wire or band, though it is obvious that a single wire may suffice for a set, as well as a single set of center-pins, pencil-holders, or thumb-tacks, and in any case the whole outfit can be made very cheaply.

It is obvious that the wire and band may be used interchangeably, and the use of the word "wire" is to be understood as covering a band or string.

I have illustrated but a few of the many varieties of curves that may be described or laid out by my curve-scriber, and I believe they are sufficient to indicate the wide range of utility to which my invention is applicable.

I claim as my invention—

1. The herein-described curve-scriber consisting of a circular directing member adapted to be secured upon a center, having a band or wire attached thereto and a pencil carried directly by the wire, independently of any other support, substantially as described.

2. The herein-described curve-scriber consisting of a circular directing-disk, a band or wire attached thereto, and adapted to be wound around the disk, and a holder for a marking instrument secured directly to the wire, whereby the marking instrument is carried in said holder directly by the wire independently of any other support, substantially as described.

3. The herein-described curve-scriber, consisting of a circular directing-disk, a band or wire attached at one end to the periphery of the disk, and adapted to be wound around the disk, a holder for a marking instrument

secured to the said wire and adapted to be readily removed therefrom, substantially as described.

4. The herein-described curve-scriber, consisting of a directing-disk provided with a groove on its periphery, a wire or band attached at one end to said disk and adapted to be wound around the disk, the groove of which guides the said wire around the same, and a holder for a marking instrument secured directly to said wire independently of any other support, substantially as described.

5. The herein-described curve-scriber, consisting of a directing-disk, provided with a centering-pin, and having a perforation to one side of the center, a pin or tack adapted to pass through the said perforation, whereby the said disk may be rigidly held in position on the work, and a band or wire attached at one end to the periphery of the disk, and provided with means for holding a marking instrument, substantially as described.

6. The herein-described curve-scriber, consisting of a directing-disk provided with a central aperture, a pin adapted to pass through said aperture to center the disk, said disk being also provided with an aperture to one side of the center, and a pin or tack adapted to pass through said aperture into the work to hold the disk rigidly in position, a wire or band attached at one end thereof to the periphery of the disk, and a holder for a marking instrument provided with a clamp for removably securing it to said wire or band, substantially as described.

7. The herein-described curve-scriber, consisting of a circular directing member, a band or wire attached at one end to the periphery of the directing member, means for holding the disk rigidly in position on the work, a holder for a marking instrument provided with a clamping device for removably attaching the holder to the wire, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM S. MALLARD.

Witnesses:

B. YOUNG,
WM. MCW. YOUNG.