June 17, 1930. A. D. FISHER 1,763,885

GEOMETRIC SCRIBING MACHINE

Filed Jan. 9, 1928

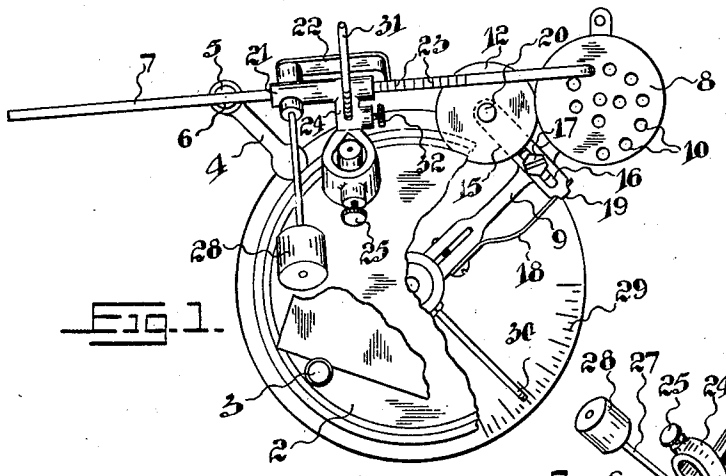


Fig. 1.

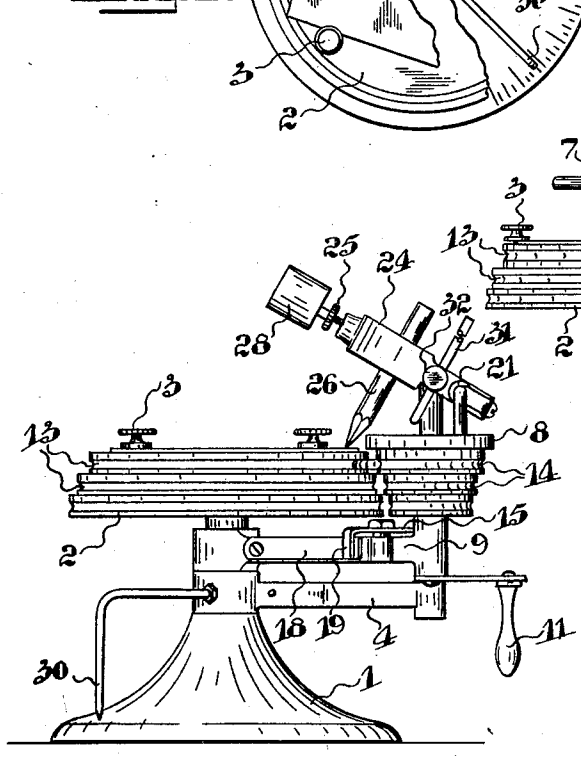


Fig. 2.

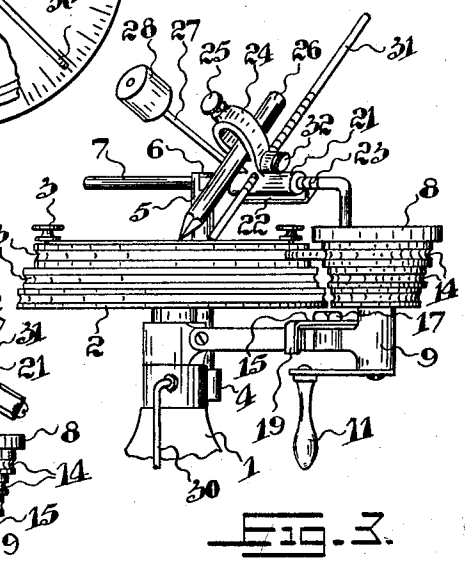


Fig. 3.

INVENTOR

A. D. Fisher

BY J. Edward Marbee

ATTY.

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UNITED STATES PATENT OFFICE

ALEXANDER D. FISHER, OF TORONTO, ONTARIO, CANADA, ASSIGNOR TO THE DESIGN-O-GRAPH LIMITED OF TORONTO, CANADA

GEOMETRIC SCRIBING MACHINE

Application filed January 9, 1928. Serial No. 245,407.

This invention relates to devices for scribing curves, and my object is to devise apparatus of this nature particularly adapted for use as a toy and which will produce a great variety of patterns by the repetition of curves.

I attain my object by means of the construction which may be briefly described as follows: A rotary table is provided adapted to carry sheets of paper on which the curves are to be scribed. A crank disk is geared to the table, and has one end of a bar eccentrically connected therewith. This bar is slidably and rockably supported on a fulcrum spaced from the centre of the table and carries a scribing point adapted to engage the upper surface of the table or of a sheet of paper secured thereon. Various adjustments are provided whereby the patterns produced are varied at will by the user.

The invention is illustrated in the accompanying drawings in which

Fig. 1 is a plan view, partly broken away, of an instrument constructed in accordance with my invention;

Fig. 2 a side elevation of the same; and

Fig. 3 a side elevation of part of the same showing certain of the parts in different positions.

In the drawings like numerals of reference indicate corresponding parts in the different figures.

1 is a base on which the table 2 is mounted to rotate. This table is provided with clamping screws 3, by means of which sheets of paper may be secured to the upper surface of the table. An arm 4 is mounted on the base to swing concentric with the table. The fulcrum post 5 is carried at the outer end of this arm, the post being rotatable on a vertical axis. This post is provided with a notch 6 adapted to slidably receive the bar 7. The other end of this bar is adapted for pivotal engagement with the crank disk 8, which is mounted to rotate on a vertical axis at the outer end of an arm 9 connected with the base 1.

The bar 7 is shown as formed with a bent end adapted to be received in any one of a series of holes 10 formed in the upper surface of the disk 8. Any desired throw within the limits of adjustment may be thus imparted to the end of the bar 7 when the crank disk is rotated. A crank handle 11 is provided, by means of which the disk may be rotated.

The crank disk and table require to be simultaneously rotated. For this purpose I show the rotary table as driven from the crank disk by means of the rotary idler 12 mounted, as hereinafter described, and preferably adapted to engage in the grooves 13, 14 formed in the rim of the table and crank disk, as shown. It is preferable that the rate of movement of the table relative to the crank disk should be capable of variation. I therefore provide both the table and the crank disk with a plurality of grooves 13 and 14 of different diameters, so that by shifting the position of the idler the rate of drive may be varied as desired. The grooves thus form grooved stepped pulleys any complementary pair of which may be connected by the idler.

While any suitable device may be employed to carry the idler and shift its position, I show a simple and effective construction for this purpose. The idler 12 is journalled at one end of an arm 15. The arm is formed with a longitudinal slot 16, so that it is longitudinally slidable on a headed pin 17 connected with the arm 9. A bent spring 18 is secured at one end to the arm 9 and at its other end engages behind the downwardly bent end 19 of the arm 15. The spring thus tends to draw the idler into close contact with the pair of grooves with which it may be engaged. At the same time, by pressing on the end of the arm 15 the idler may be disengaged. It is then free to be moved up or

down on the pivot 20 on which it is mounted. After it has been moved to a fresh position, the spring 18 will re-engage it with the grooves in the table and crank disk opposite which it has been positioned.

The bar 7 is adapted to carry a scribing point for co-operation with a sheet of paper secured to the rotary table. This scribing point is preferably so carried that its position longitudinally of the bar may be varied, and also its distance from the bar. I show for this purpose a slide 21 adapted to both slide and rock on the bar. A spring dog 22 is secured to the slide and is adapted to engage in any one of the series of circumferential grooves 23 formed on the bar 7. An arm 24 extends from the slide and is provided at its outer end with a clamp 25, by means of which a pen or pencil 26 may be secured to the arm to serve as a scribing point. An arm 27 extends out from the slide 21 and is provided with a removable weight 28. The weight is used to give the necessary pressure when a pencil is being used as the scribing point. If a fountain pen is used, the weight is unnecessary and may be removed.

It is apparent from the above description that the scribing point is readily adjustable longitudinally of the bar, while its distance from the bar may be varied by varying the extent of its projection from the clamp 25.

In addition to the adjustments already described a further adjustment is obtained by swinging the arm 4 about the axis of the rotary table.

The device is used by first clamping a sheet of paper to the upper surface of the table and securing in position a pen or pencil as a scribing point. The crank handle 8 is then rotated, the result being the formation of a curved line, which is continually repeated to form a pattern, the precise nature of which depends on the adjustments that have been made. For example, the point of connection of the bar with the crank disk may be varied; the position of the scribing point longitudinally of the bar 7 may be varied; the distance of the scribing point from the bar 7 may be varied; the relative position of the fulcrum 5 and axes of the rotary table and crank disk may be varied; and finally, the relative speed of rotation of the crank disk and rotary table may be varied.

It is desirable, if possible, to keep a record of the various adjustments in order that any pattern produced may be repeated whenever desired. This may be done by keeping a record of the particular hole 10 in the crank disk with which the bar 7 is connected; by keeping a record of the particular groove 23 in the bar 7 with which the dog 22 is engaged; by keeping a record of the position of the arm 4; and by keeping a record of the extension of the scribing point from the clamp.

Special provision is desirable to facilitate keeping record of the last two adjustments. I therefore provide the post 1 with a scale 29, with which co-operates an index finger 30 connected with the arm 4.

To determine the position of the scribing point I provide a gauge rod 31 suitable scaled, as shown, which slides through a hole in the arm 24, and which may be clamped therein by means of the set screw 32. After a pattern has been scribed, the gauge rod may be slipped into place and its position noted. When it is desired to again set the scribing point in the same position, the gauge rod is passed through the arm until it is in the original position as indicated by the scale. It is then clamped in place and the arm lowered until the end of the gauge contacts with the table. If the scribing point be now inserted in place and position with its point in engagement with the table, it will then occupy the original position and may be clamped in place.

What I claim as my invention is:

1. A geometric scribing machine comprising a rotary table; a crank disk; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from the centre of the table slidably and rockably supporting the said bar; a scribing point carried by the said bar adapted to engage the upper surface of the table; and a variable speed drive between the table and crank disk comprising stepped friction pulleys connected with the table and with the crank disk, and an idler friction disk adjustably mounted for engagement with any two complementary friction pulleys.

2. A geometric scribing machine comprising a rotary table; a crank disk; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from the centre of the table slidably and rockably supporting the said bar; a scribing point carried by the said bar adapted to engage the upper surface of said table; and a variable speed drive between the table and crank disk comprising stepped friction pulleys connected with the table and with the crank disk, an idler friction disk; an arm adjustable longitudinally of itself on a stationary part of the apparatus; a pivot carried by said arm parallel to the axes of the pulleys on which pivot the idler is slidable to bring it into position for engagement with any two complementary pulleys.

3. A geometric scribing machine comprising a rotary table; a crank disk; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from

the centre of the table slidably and rockably supporting the said bar; a scribing point carried by the said bar adapted to engage the upper surface of the table; and a drive connection between the table and crank disk comprising an idler directly geared to the crank disk and the table whereby the table rotates in the same direction as the crank disk.

4. A geometric scribing machine comprising a rotary table; a crank disk geared to the table; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from the centre of the table slidably and rockably supporting the said bar; a scribing point carried by the said bar adapted to engage the upper surface of the table; an arm pivoted concentric with the table and carrying the fulcrum aforesaid at its outer end, whereby the relative positions of the centers of the table, crank disk, and fulcrum may be varied in a horizontal plane.

5. A geometric scribing machine comprising a rotary table; a crank disk geared to the table; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from the centre of the table slidably and rockably supporting the said bar; a slide movable longitudinally of and rockable on the bar; a spring dog secured to the slide, the bar being provided with grooves engageably by the dog to releasably hold the slide in an adjusted position longitudinally of the bar; a scribing point: and a clamp on the slide adapted to hold the scribing point with its axis at a permanently fixed angle to the bar, the distance beween the operative end of the point and the bar being variable by adjusting the scribing point in the clamp.

6. A geometric scribing machine comprising a rotary table; a crank disk geared to the table; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from the centre of the table slidably and rockably supporting the said bar; a slide adjustable longitudinally of and rockable on the bar; a scribing point; a clamp on the slide adapted to hold the scribing point with its axis at a permanently fixed angle to the bar, the distance between the operative end of the point and the bar being variable by adjusting the scribing point in the clamp; and a gauge rod slidable through the slide adapted to contact with the table, whereby a setting of the scribing point may be gauged for record.

7. A geometric scribing machine comprising a rotary table; a crank disk geared to the table; a bar substantially parallel to the surface of the table having a pivotal connection with the disk eccentric thereto; a fulcrum spaced from the centre of the table slidably and rockably supporting the said bar; a slide adjustable longitudinally of and rockable on the bar; a scribing point; a clamp on the slide adapted to hold the scribing point with its axis at a permanently fixed angle to the bar, the distance between the operative end of the point and the bar being variable by adjusting the scribing point in the clamp; an arm extending from the slide; and a weight adjustable along the arm to vary the pressure of the scribing point on the table.

Signed at Toronto, Canada, this 23rd day of December, 1927.

ALEXANDER D. FISHER.