No. 894,205. PATENTED JULY 28, 1908.

E. I. HORSMAN, JR.

MACHINE FOR MAKING DESIGNS.

APPLICATION FILED OCT. 21, 1907.

5 SHEETS—SHEET 1.

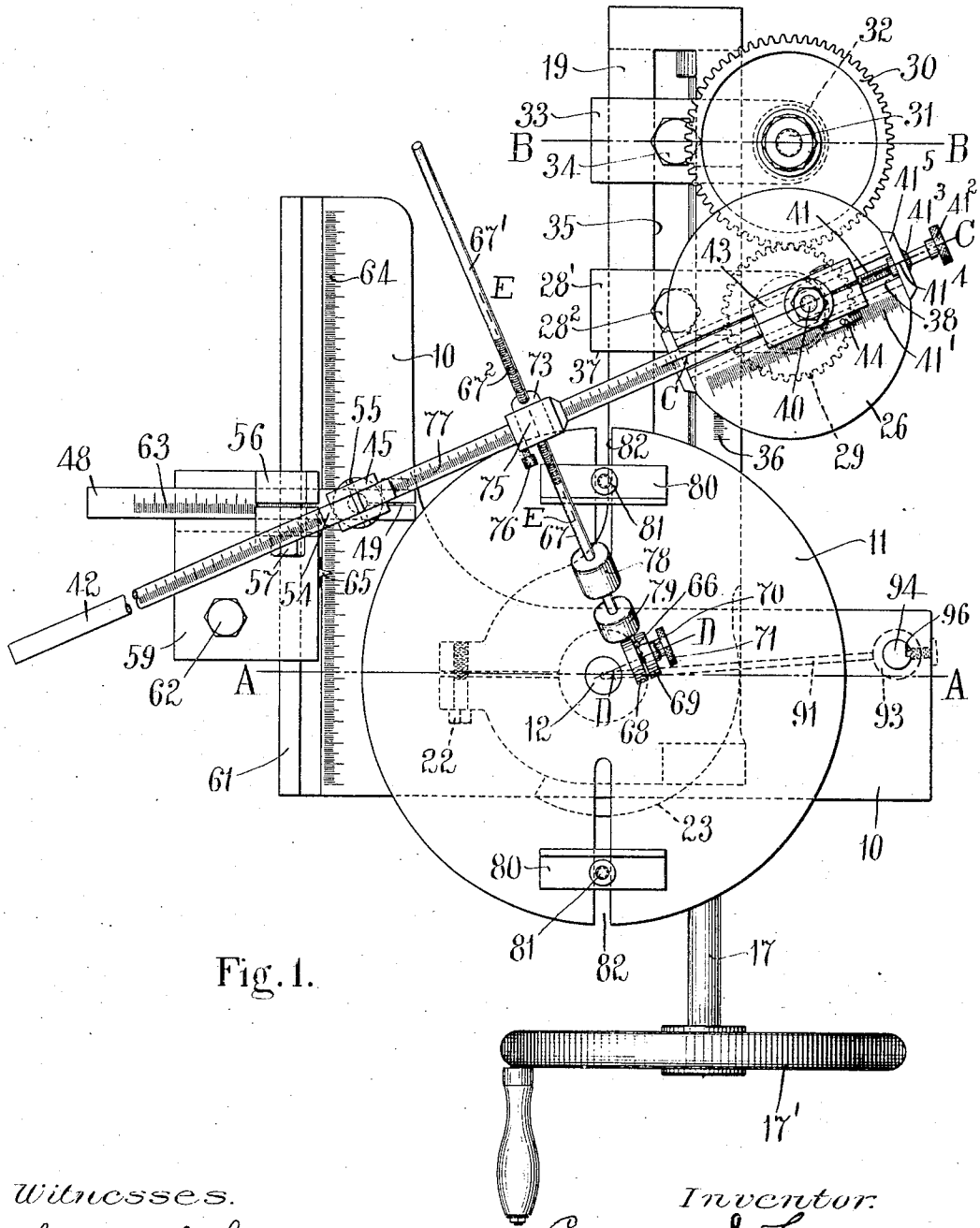


Fig. 1.

Witnesses.

Franklin & Low

Walter L. Pierce

Inventor:

Edward I. Horsman Jr.

by his attorney Charles D. Goodwin.

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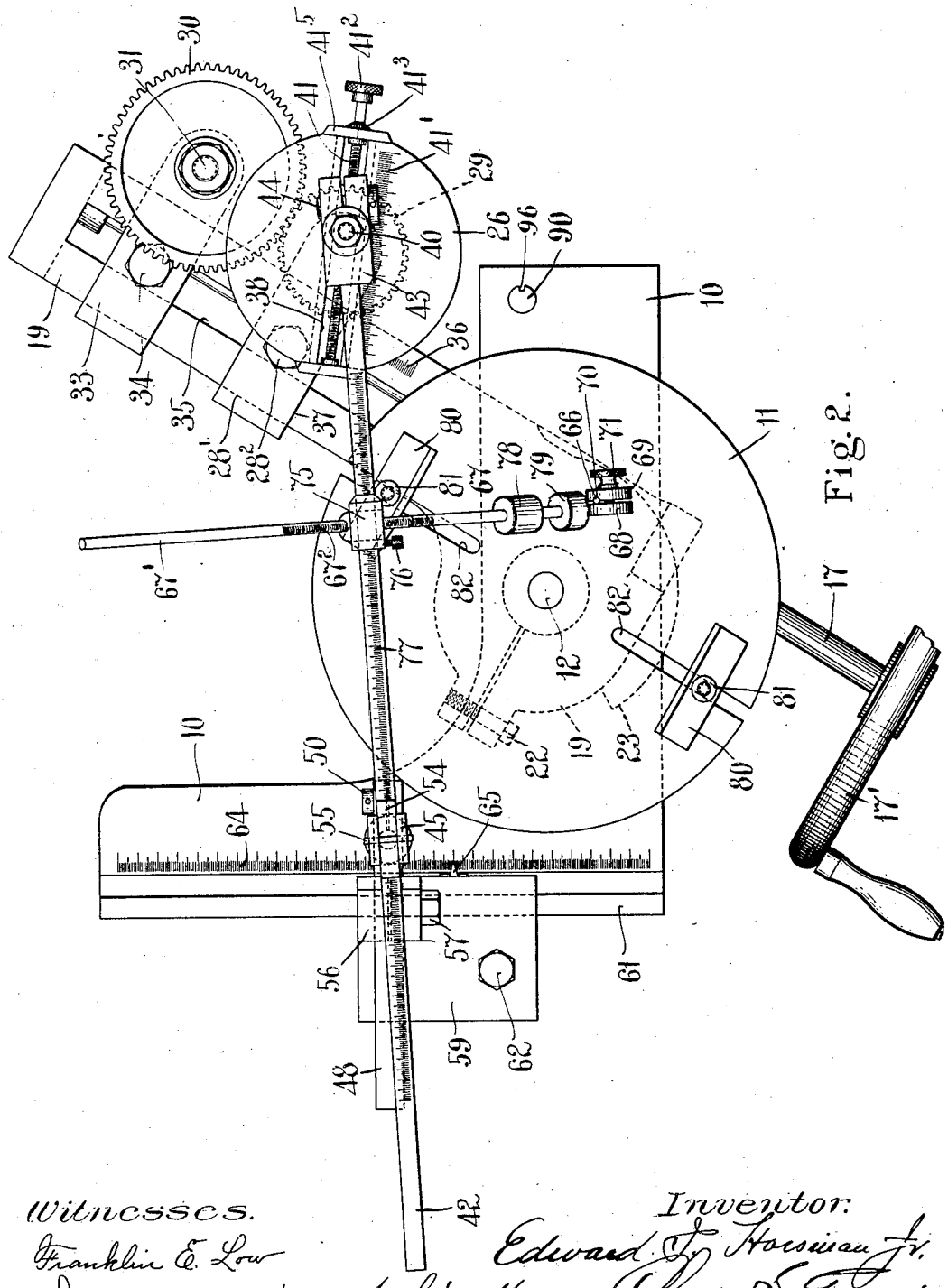


Fig. 2.

Witnesses.
Franklin E. Low
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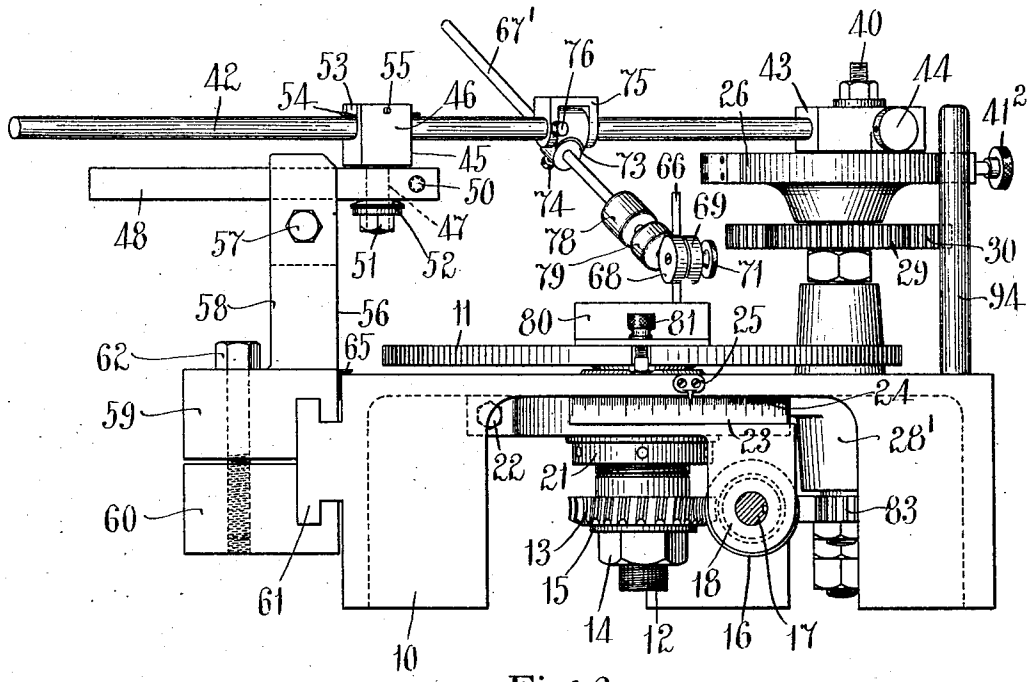


Fig. 3.

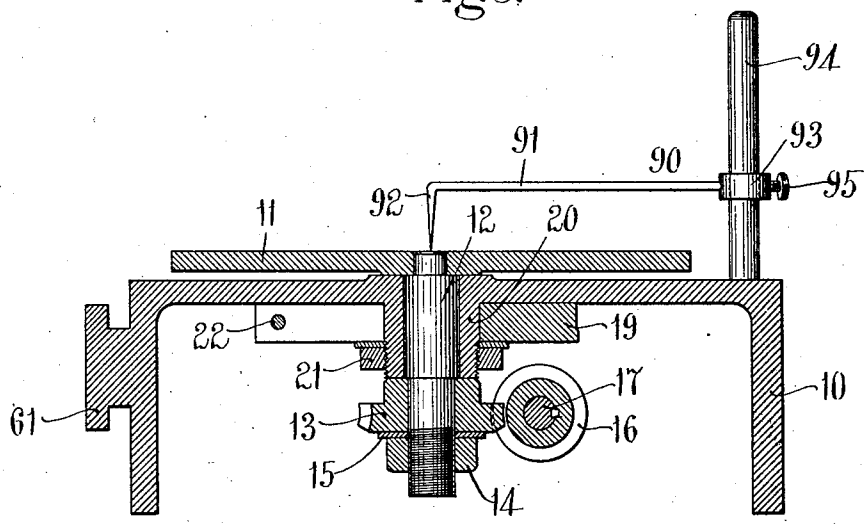


Fig. 4.

Witnesses.
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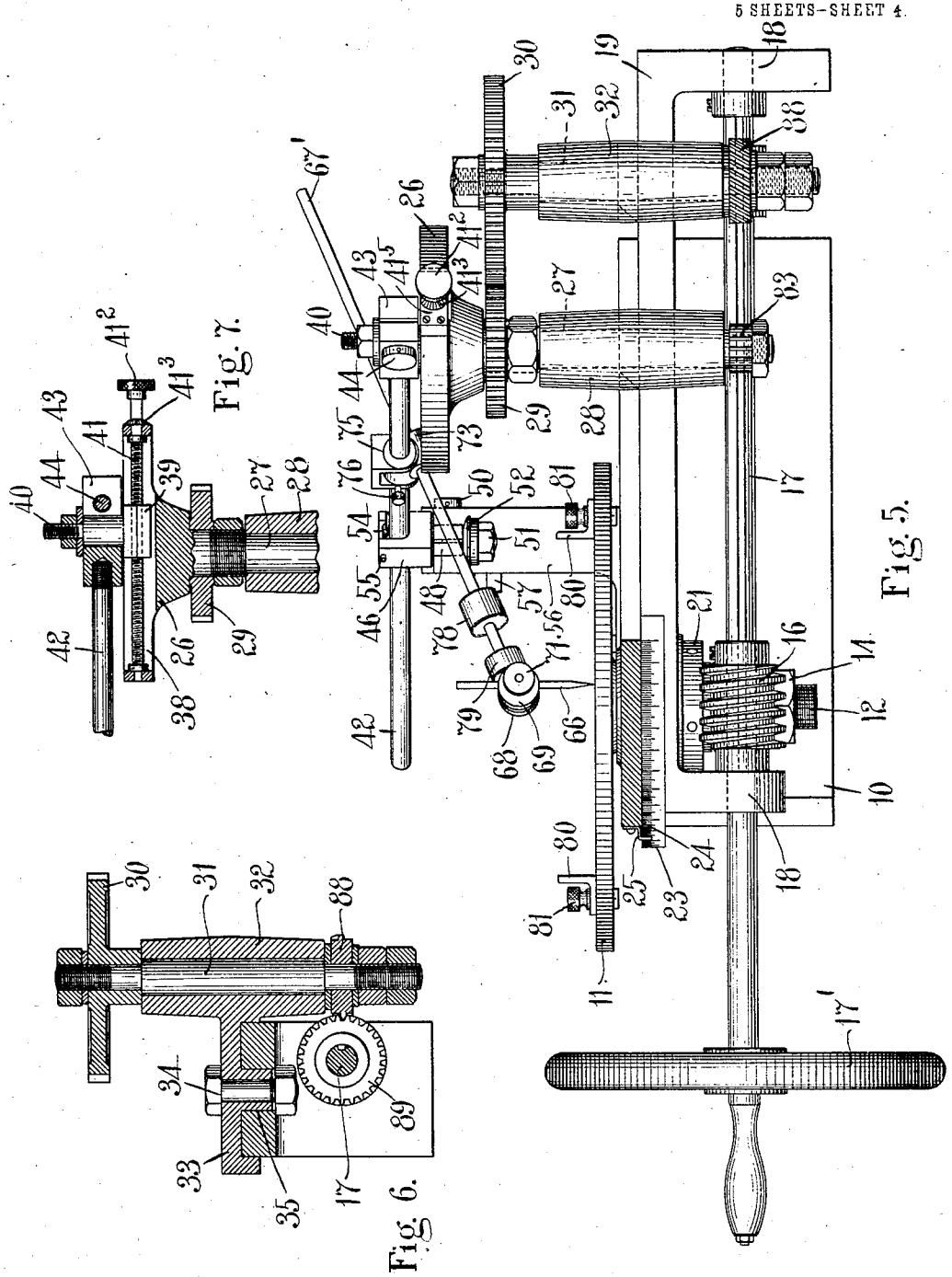


Fig. 5.

Fig. 7.

Fig. 6.

Witnesses.

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No. 894,205. PATENTED JULY 28, 1908.

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5 SHEETS—SHEET 5.

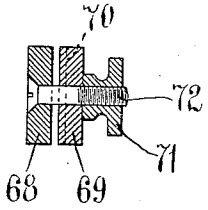


Fig. 8.

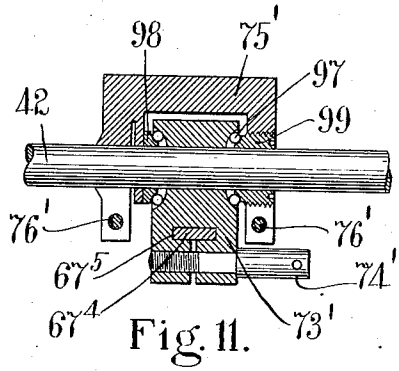


Fig. 11.

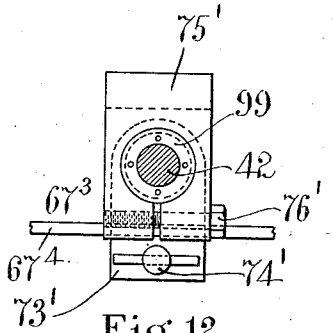


Fig. 12.

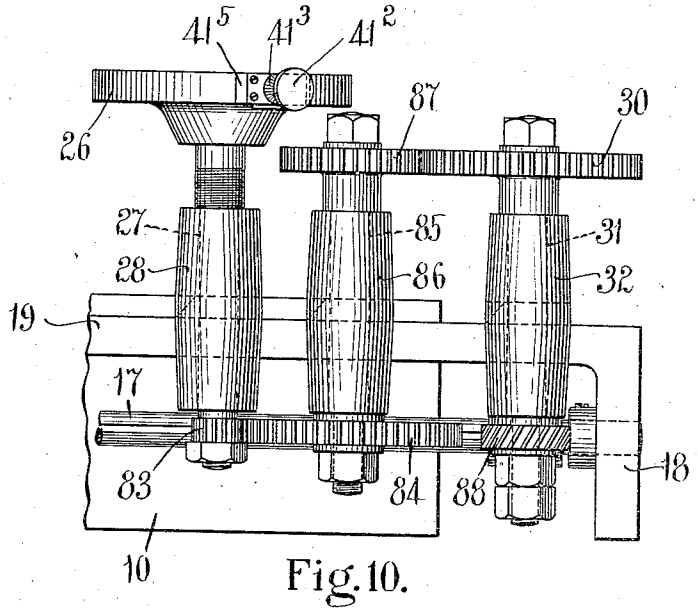


Fig. 10.

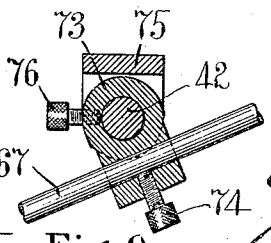


Fig. 9.

Witnesses.
Franklin E. Low.
Walter L. Pierce

Inventor:
Edward I. Horsman Jr.
by his attorney,
Charles S. Fowling.

UNITED STATES PATENT OFFICE.

EDWARD I. HORSMAN, JR., OF NEW YORK, N. Y., ASSIGNOR OF ONE-FOURTH TO FRANK M. CLARK, ONE-FOURTH TO BYRON S. COTES, AND ONE-FOURTH TO FRANK G. BALCOM, OF TILTON, NEW HAMPSHIRE, AND ONE-FOURTH TO CHARLES H. SOUTHARD, OF BALDWIN, NEW YORK.

MACHINE FOR MAKING DESIGNS.

No. 894,205. Specification of Letters Patent. Patented July 28, 1908.

Application filed October 21, 1907. Serial No. 398,332.

To all whom it may concern:

Be it known that I, EDWARD I. HORSMAN, Jr., a citizen of the United States, residing at New York, in the borough of Manhattan and State of New York, have invented new and useful Improvements in Machines for Making Designs, of which the following is a specification.

This invention relates to machines for making a large variety of designs, either upon paper or upon metal, stone or any desired material.

The machine is adapted to use either a pencil, stylus, or any desired marker or engraving tool in order to produce the desired design upon any suitable and desirable material.

The object of the invention is to provide a machine of the character set forth which, while being very accurate in its work, is easily adjusted to produce an innumerable number of designs, and the machine is so constructed that the same may be adjusted by the aid of certain graduations and scales so that after having once produced a certain design the parts of the machine can be set by means of these graduations to reproduce said design.

The invention consists in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims thereof.

Referring to the drawings: Figure 1 is a plan of my improved machine for making designs, with the carrier broken away to save space and the gage, for locating the center of the table, upon the material which is placed thereon, shown in dotted lines. Fig. 2 is a plan view of the same showing the parts in different positions relatively to each other from that which they occupy in Fig. 1. Fig. 3 is a front elevation of the machine when the parts are in the positions indicated in Fig. 1. Fig. 4 is a sectional elevation taken on line A—A of Fig. 1. Fig. 5 is a side elevation as viewed from the right of Fig. 1, with a portion of the frame in section. Fig. 6 is a sectional elevation taken on line B—B of Fig. 1. Fig. 7 is a sectional elevation taken on line C—C of Fig. 1. Fig. 8 is an enlarged sectional elevation taken on line D—D, Fig. 1. Fig. 9 is an enlarged sectional elevation taken on line E—E of Fig. 1. Fig. 10 is a detail right hand side elevation, similar to Fig. 5, illustrating a modified arrangement and combination of gearing for rotating the driver. Fig. 11 is a sectional elevation of a modified form of rocker-arm. Fig. 12 is a side elevation of the same.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 10 is a frame of suitable construction.

11 is the table upon which the paper, metal or other material is clamped preparatory to having a design inscribed or engraved thereon. The table 11 is fast to a vertical shaft 12 journaled to rotate in the frame 10. To the lower end of the driving shaft 12 is fastened a worm-gear 13, the same being held upon the shaft 12 by means of a nut 14 which has screw-threaded engagement with the shaft 12, a washer 15 being interposed between said nut and the lower face of the worm gear 13. Said worm-gear meshes into a worm 16 which is fastened to a shaft 17, said shaft being rotated by a hand-wheel 17′ and journaled to rotate in bearings 18, 18 in an auxiliary frame 19, said auxiliary frame being pivoted to a hub 20 extending downwardly from the frame 10 and screw-threaded to receive a nut 21 by which the auxiliary frame is held upon the hub 20.

The auxiliary frame 19 is adapted to be adjusted upon its pivot 20 to any desired position and is then locked in position and thus rigidly fastened to the frame 10 by a clamp-screw 22. The auxiliary frame 19 has a flange 23 formed thereon, the periphery of said flange being concentric with the median axial line of the table 11, and this flange has graduations 24, 24 thereon forming a scale and adjacent to this scale is an index finger 25 which is fastened to the frame 10 and projects downwardly therefrom adjacent to the graduations 24, so that the auxiliary frame can be adjusted by means of the graduations 24 and the index finger 25 to any desired position and then set in such position by tightening the clamp-screw 22.

A driver 26 consisting of a disk has a vertical shaft 27 integral with or rigidly affixed thereto and projecting downwardly therefrom into a bearing 28 upon a bracket 28′ adjustably fastened by means of a bolt 28^2 to the auxiliary frame 19. Said shaft 27 has a

gear 29 fast thereto and meshing into a gear 30 fast to a vertical shaft 31 adapted to rotate in a bearing 32 upon a bracket 33, said bracket being adjustable upon the auxiliary frame 19, and fastened thereto by means of a bolt 34 which projects through a slot 35 provided in said auxiliary frame. The bolt 28^2 also projects through said slot 35 and thus it will be evident that when desired the gears 29 and 30 may be changed for other gears having different relative diameters and the bracket 28′ adjusted toward or away from the bracket 33 to accommodate the variation in distance between the centers of the gears 29 and 30 caused by the aforesaid change in said gearing. The distance apart of these centers and, therefore, the change in relative diameters of the gears is indicated by graduations 36 upon the upper face of the auxiliary frame 19 and by the position of the front edge 37 of the bracket 28′ relatively to said graduations.

The driver disk 26 has a slot 38 extending across its upper face which constitutes a guide-way for the rectangular head of a crank-pin 40. Said crank-pin is adjusted longitudinally of the slot 38 and toward and away from the center of the disk 26 by means of an adjusting screw 41 which has bearings in plates on said disk and has screw-threaded engagement with the rectangular head 39 of said crank-pin. Graduations 41′ upon the upper face of the disk 26 enable the operator to determine the distance of the center of the crank-pin from the center of the disk by reading said graduations in connection with the left hand face (Fig. 1) of the block 43. The screw 41 is rotated by means of a thumb-disk 41^2 fast thereto and the adjustment of said crank-pin is still further subdivided by means of a graduated micrometer disk 41^3 which is fastened to the screw 41 and is read by means of an index mark 41^4 upon the plate 41^5.

The carrier 42, consisting preferably of a rod, has a block 43 fast to one end thereof and adapted to rotate upon the crank-pin 40, said block being split and provided with a clamp-screw 44 to take up any wear between the same and said crank-pin. The opposite end of the carrier rod 42 is arranged to slide in a guide 45. Said guide consists of a block 46 having a stem 47 extending downwardly therefrom through an arm 48. Said arm is split at 49 and provided with a clamp-screw 50 to take up any wear that may occur by reason of the stem 47 rocking in said arm 48. A nut 51 is screwed to the lower end of the stem 47 and interposed between said nut and the bottom of the arm 48 is a spring 52, whereby the block 46 is held downwardly upon the arm 48 with a spring pressure.

The carrier rod 42 is located in a groove 53 extending longitudinally along the top of the block 46 and a spring 54 bears against the top of the rod 42, said spring being held in position by a screw 55 which extends laterally across the block 46 above the spring and above the rod 42. Thus it will be seen that any wear upon the rod 42 or upon the block 46 in which it slides will be taken up by the spring 54 and by this construction the rod 42 will always slide freely in the block 46 and without lost motion therein, due to loose fits.

The arm 48 extends through a support 56, said support being split at its upper end and clamped to the arm 48 by a clamp-screw 57. The support 56 consists of a standard 58, a base 59 and a clamp-block 60. The base 59 and the clamp-block 60 are slidable upon a T-shaped way 61 upon the frame 10 and are clamped thereto by means of a clamp-screw 62 which has screw-threaded engagement with the clamp-block 60.

Graduations 63 are provided upon the arm 48, so that when said arm is moved relatively to the standard 58 it may be set in any desired position relatively thereto by means of the clamp-screw 57, when the proper graduation alines with the left hand face of the standard 58 (Figs. 1 and 3). Graduations 64 are also provided upon the upper face of the frame (Fig. 1) and an index finger 65 is fastened to the slidable base 59, so that by means of this index finger and its position relatively to the graduations 64, the base 59 and standard 58, together with the arm 48 and guide block supported thereon may be moved relatively to the table 11 and driver 26.

The marker 66, which may be either a pencil, pen, or stylus is clamped to the free end of a rocker-arm 67 which consists of a rod 67′ which terminates at its free end in a disk 68, the marker being clamped to the disk 68 by means of a collar 69 which, preferably, has a groove 70 extending across the inner face thereof to prevent the marker from rotating upon the disk 68. A clamp-nut 71 has screw-threaded engagement with a stud 72 fast to the disk 68, so that by tightening the nut 71 the collar 69 clamps the marker 66 against the disk 68. The object of this particular construction is to render it possible to set the marker at different angles to a vertical plane, if desired, or to set said marker in a vertical plane independent of the thickness of the piece which is to be marked or engraved upon.

The rod 67′ is slidable in a block 73 pivoted to the carrier rod 42 and is fastened thereto by means of a screw 74 (Fig. 3). Said block is prevented from moving longitudinally of the carrier 42 by a forked collar 75 which is fastened to the rod 42 by a set-screw 76. Graduations 77 are provided upon the rod 42, so that the relative position of the rocker-arm 67 to the guide 45, table 11, and driver 26 may be determined by setting the forked collar 75 with the left hand face thereof (Fig. 3) in alinement with the desired graduation.

In order to increase or diminish the pressure of the marker upon the surface upon which the design is to be traced weights 78, 79 are provided which are adjustable longitudinally upon the rod 67′.

The rocker-arm 67, as a whole, consists of the rod 67′, the block 73 and the disk 68, and as a whole is adapted to rock upon the carrier 42 by reason of the block 73 being loosely mounted upon said carrier rod and capable of rocking thereon. It will be understood that the forked collar 75 is rigidly fastened to the rod 42 by means of the screw 76 and prevents the rocker-arm from moving longitudinally of the rod 42 when said screw is set up. Thus it will be seen that the rocker-arm, being free to rock upon the carrier 42, is adapted to hold the marker in contact with the table 11 or with the paper or other material which is placed thereon for the purpose of having a design inscribed upon it.

The paper or other material which is to have the design inscribed thereon is clamped to the table 11 by clamp-plates 80, 80 and clamp-bolts 81, 81, said clamp-bolts extending through slots 82, 82 provided in said table.

The variation in number of rotations of the driver 26 as compared with the table 11 may be still further increased by the arrangement of gearing illustrated in Fig. 10, in which 26 is the driver and 83 is a gear fast to the lower end of the shaft 27. The gear 83 meshes into an intermediate gear 84 fast to an intermediate shaft 85 which rotates in bearings in a bracket 86, said bracket 86 being adjustably fastened to the auxiliary frame 19. The upper end of the shaft 85 has another gear 87 fast thereto which meshes into the gear 30 upon the shaft 31, said shaft being rotated in this form of my invention, as well as in the form hereinbefore described, by means of a spiral gear 88 fast to the lower end thereof and meshing into a spiral gear 89 fast to the shaft 17. By this arrangement of gearing and by interchanging the gears or by substituting gears of different diameters, it will be seen that a great variety of relative numbers of rotations may be imparted to the driver 26 and to the table 11.

In order to locate the center of the piece of paper or other material which may be clamped to the upper face of the table 11, a gage 90, illustrated in Fig. 4, is employed, said gage consisting of a rod 91 with its free end 92 bent downwardly and in alinement with the median axial line of the shaft 12. The rod 91 is fastened to a collar 93 which is adapted to slide upon a vertical rod 94 fast to the frame 10 and is held in position thereon by means of a set-screw 95, the inner end of which projects into a vertical slot 96 in the vertical rod 94. When said gage is not being used to locate the center of the table upon the piece of paper or other material upon which the design is to be inscribed, the set-screw 95 is loosened and the gage removed from the standard 94 or swung around out of engagement with the table 11 in order to clear the marker.

Having thus described in detail the machine of my invention, I will now proceed to describe the general operation thereof.

A piece of paper, wood, metal or other material upon which the design is to be inscribed is placed upon the table 11 and clamped thereon by means of the clamp-plates 80, 80 and clamp-bolts 81. Assuming the marker 66 to be clamped to the end of the rocker-arm 67 in the proper position, either vertically or at an angle to the upper face of the table 11, as may be desired, the operator rotates the handle 17′, thus rotating the shaft 17, the worm 16 and spiral gear 89 which are fastened to said shaft. The rotation of the worm 16 causes the worm gear 13 to rotate, thus rotating the shaft 12 and the table 11 with the paper thereon. The rotation of the spiral gear 89 causes the spiral gear 88 (Fig. 6) to be rotated, thus rotating the shaft 31 and the gear 30 fast thereto. The gear 30 by its rotation rotates the gear 29 and the driver 26 to which said gear is fastened. The rotation of the driver 26 rotates the crank pin 40 and imparts a reciprocatory movement to the carrier 42 which slides in the guide 45 and causes the same also to rock, together with its pivotal stem 47, on the arm 48. This movement of the carrier 42 causes the rocker-arm 67 to move the marker 66 in a series of curves over the surface of the table 11, which, it will be remembered, is rotating at the same time, so that said curves are described at different places upon the surface of the paper which is clamped to said table, said curves being arranged in series concentrically with said table. During this movement of the marker over the face of the table the rocker-arm 67 rocks upon the carrier rod 42, if the surface to be marked is uneven, convex or concave.

If desired, the marker may be brought at one end of the figure described by it upon the paper, to the center of the table 11 by adjusting said marker longitudinally of the carrier rod and by adjusting the carrier arm rod 67′ in the block 73 while the machine is stationary, and then setting the rocker-arm relatively to the carrier by tightening the set-screw 76 and also tightening the set-screw 74, so that the rod 67′ cannot slide in the block 73 while doing its work. The distance of the crank-pin 40 from the center of the driver 26 may be adjusted by rotating the screw 41 by means of the thumb disk 41^2 and the location of said crank-pin relatively to the center of the driver 26 may be read by means of the graduations 41′ and the left hand face of the block 43, said location of

the crank-pin being still further adjusted and its adjustment read by means of the micrometer graduations upon the disk 41^3. The location of the center of the driver 26 may be changed to any desired point by loosening the clamp-bolt 28^2 and moving the bracket 28′ longitudinally of the auxiliary frame 19 until the front face of said bracket alines with the desired graduation, when the bracket may be locked in position by tightening the clamp-bolt 28^2. The gear 30 is then moved to mesh with the gear 29 by loosening the clamp-bolt 34, moving the bracket 33 to the correct location upon the auxiliary frame 19 so that said gears shall properly mesh and then tightening the clamp-bolt 34 to hold the bracket 33 in position upon the auxiliary frame 19.

The graduations 77 upon the carrier rod 42 enable the rocker-arm 67 to be adjusted to any desired position relatively to the carrier and to the driver and table. The guide 45 may be adjusted in two directions at an angle to each other by moving the arm 48 in the support 56 and further by moving the support 56 upon the frame 10, as hereinbefore described. The graduations 63 enable the operator to read the adjustment of the arm 48 upon its support and the graduations 64 enable the operator to read the adjustment of the support upon the frame. Another change of relative location of the carrier, the guide, table and driver may be obtained by swinging the auxiliary frame 19 upon the shaft 12 to any desired position and then locking the same by means of the clamp-bolt 22 (Fig. 1), the extent of the location of said auxiliary frame and its driver being read from the index finger 25 and the graduations 24. Any change in the relative location of the guide 45, table 11 and driver 26 causes a great variation in the character of the figure which is inscribed upon the surface of the paper or plate. Any change in the position of the rocker-arm longitudinally of the carrier 42 will also cause a decided variation in the figures produced, and any variation in the location of the marker, by moving the same toward or away from the center of the table, will cause still other designs to be produced. Any variation in the relative sizes of the gears by which the driver 26 is rotated will also cause a decided variation in the figure which is produced, and by all of these different adjustments and changes of relative location an innumerable number of designs of great beauty and intricacy may be produced, and when a certain design is produced, by reading the different graduations and making a note of such readings, the same design may be reproduced whenever desired by setting the parts in accordance with said reading.

In cases where an engraving tool or stylus is used and in which considerable pressure is brought to bear upon the marker or stylus, in order to mark upon metal, stone, wood or the like, it is necessary that there should be considerable strength in the rocker-arm rod and also that the rocker-arm, as a whole, should be firmly supported upon the carrier, although free to swing with very little friction thereon, and to encompass these ends I utilize the construction illustrated in Figs. 11 and 12 in which the rocker-arm 67^3 consists of a rod 67^4 which is rectangular in cross section and is adapted to be adjusted in a slot 67^5 provided in the block 73′. The block 73′ is provided with conical recesses upon opposite sides thereof to receive balls 97 and these balls are adapted to roll upon cones 98 and 99 forming a roller bearing. The cone 98 is rigidly fastened to the forked collar 75′ and the cone 99 has screw-threaded engagement with said forked collar. Clamp-screws 76′, 76′ hold the forked collar 75′ in any desired position upon the carrier 42. A clamp-screw 74′ holds the rod 67^4 in any desired position to which it may be adjusted longitudinally thereof relatively to the block 73′, said block being split in order that the clamp-screw may force the opposite sides thereof against the rod 67^4 after said rod has been adjusted to the desired position.

Graduations are provided upon the rocker-arm rod 67^4 which correspond in function to the graduations 67^2 provided upon the rocker-arm rod 67′, viz, for enabling the rocker-arm rod to be set with the marker at any desired distance from the center of the table, or with the marker at any desired distance from the carrier, and as this distance is varied the position of the marker relatively to the table will be varied and, therefore, the figure which will be engraved upon the material clamped to said table will be varied in its design. The rod 67^4 terminates in a disk at its outer end, to which the marker is clamped by means of the screw and clamp-plate, as hereinbefore described with relation to the rod 67′, the disk 68 and the collar 69 with its stud 72 and clamp-nut 71.

It will be understood that the advantages secured by rotatably supporting the rocker arm on the carrier are as follows: If the surface of the paper or other material over which the stylus travels is uneven, or if it is convex or concave, the marker will follow such a surface and make a clear mark thereon by reason of the rocker-arm rocking slightly upon the carrier, the stylus thus being allowed to follow the surface upon which it is to mark and producing thereon a perfect line. Another and very important advantage secured by the construction hereinbefore set forth, whereby the rocker-arm may be rocked upon the carrier, is that if at any time, for any reason, the operator desires to remove the marker or stylus from contact with the surface upon which the

design is being transcribed, he may do so whether the machine is in operation or not, rendering it possible to obtain still further variations in the resulting designs transcribed by the marker or stylus.

Referring to the interchangeable gears, it has been found by calculation and practical experiment that certain combinations of the interchangeable gears produce perfect designs, that is, if the gear 29 on the driver shaft 27 has thirty-six teeth, it will, in combination with a gear 30 of a certain number of teeth on the shaft 31, always produce a design with foliations exactly corresponding in number to the teeth on the gear 30. Thus, if the gear 29 has thirty-six teeth and the gear 30 has sixty-two teeth the resulting design will have sixty-two foliations. If the gear 29 has thirty-six teeth and the gear 30 has ninety-eight teeth, then a design with ninety-eight foliations will be produced. This is a perfect ratio of rotation between the gears and will result in the stylus traversing again and again the same design, even after the design is completed. In cases where a graving tool is used this result is a very important one, as it enables the operator to engrave his work by repeated rotations as deep as he may desire.

As hereinbefore set forth, different gear combinations result in great complexity of designs requiring certain ratios of the gears and also requiring a very large number of rotations of the machine in order to complete the design.

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. In a machine for making designs, a rotary table, a carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and a rocker arm rotatably mounted on said carrier adapted to hold said marker in contact with said table and consisting of a rod, a clamp at the free end of said rod adapted to hold said marker, and a block to which said rod is fastened, said block being rotatable on said carrier.

2. In a machine for making designs, a rotary table, a carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and a rocker arm rotatably mounted on said carrier adapted to hold said marker in contact with said table and consisting of a rod, a clamp at the free end of said rod adapted to hold said marker, and a block to which said rod is fastened, said block being rotatable on said carrier.

3. In a machine for making designs, a rotary table, a carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and a rocker arm rotatably supported on said carrier and adapted to hold said marker in contact with said table, said arm being adjustable longitudinally thereof upon said carrier.

4. In a machine for making designs, a rotary table, a carrier, means to impart a gyratory movement to said carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and a rocker arm rotatably supported on said carrier and adapted to hold said marker in contact with said table, said rocker arm being adjustable laterally thereof upon said carrier.

5. In a machine for making designs, a rotary table, a carrier, means to impart a gyratory movement to said carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and a rocker arm rotatably supported on said carrier and adapted to hold said marker in contact with said table, said rocker arm being adjustable laterally thereof upon said carrier, said carrier being provided with graduations to indicate the extent of said adjustment.

6. In a machine for making curvilinear designs, a rotary table, a gyratory carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, a rocker arm rotatably connected to said carrier and adapted to hold said marker in contact with material held on said table, and a weight adjustably fastened to said rocker arm, whereby the pressure on said marker may be varied and said marker caused to engrave curvilinear designs on said material.

7. In a machine for making designs, a rotary table, a carrier, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and a rocker arm pivoted on said carrier and adapted to hold said marker in contact with said table, and consisting of a rod terminating at its free end in a disk, a collar having a groove in its face adjacent to said disk adapted to receive said marker, and means to clamp said collar to said disk.

8. A machine for making designs, comprising in its construction a rotary table, a marker, a rocker arm adapted to hold said marker in contact with said table, a carrier upon which said rocker arm is pivoted to swing vertically, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a rotary driver, a guide, one end of said carrier being pivotally connected to said driver, the other end of said carrier being adapted to slide in said guide, and means to rotate said table and driver, said driver being adapted to be adjusted to different positions relatively to said table and guide.

9. A machine for making designs compris-

ing in its construction a rotary table, a marker, a rocker-arm adapted to hold said marker in contact with said table, a carrier upon which said rocker-arm is pivoted, a rotary driver, a guide, one end of said carrier pivotally connected to said driver, the other end of said driver adapted to slide on said guide, and means to rotate said table and driver, said guide adapted to be adjusted to different positions relatively to said table and driver.

10. In a machine for making designs, a rotary table, a marker, a rocker arm adapted to hold said marker in contact with said table, a carrier upon which said rocker arm is pivoted to swing vertically, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a rotary driver, a guide, and a crank pin fast to said driver and pivotally connected to one end of said carrier, the opposite end of said carrier being adapted to slide in said guide.

11. In a machine for making designs, a rotary table, a marker, a rocker arm adapted to hold said marker in contact with said table, a carrier upon which said arm is pivoted to swing vertically, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a rotary disk, a guide, and a crank pin adjustably fastened to the face of said disk and pivotally connected to one end of said carrier, the opposite end of said carrier being adapted to slide in said guide.

12. In a machine for making designs, a rotary table, a marker, a rocker arm adapted to hold said marker in contact with said table, a carrier upon which said rocker arm is pivoted to swing vertically, means to hold said carrier against movement in a direction substantially perpendicular to the face of said table, a rotary disk, a guide, and a crank pin adjustably fastened to the face of said disk and pivotally connected to one end of said carrier, the opposite end of said carrier being adapted to slide in said guide, said disk being provided with graduations to indicate the position of said crank pin relatively thereto.

13. A machine for making designs comprising in its construction a rotary table, a marker, a holder adapted to hold said marker in contact with said table, a carrier for said holder, a rotary driver, a guide, one end of said carrier pivotally connected to said driver, the other end of said carrier adapted to slide on said guide, and means to rotate said table and driver, said driver adapted to be adjusted concentrically with relation to said table.

14. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide, said carrier pivoted at one end to said driver and adapted to slide on said guide, means to rotate said driver and table, and a pivoted frame on which said driver is rotatably supported.

15. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide, said carrier pivoted at one end to said driver and adapted to slide on said guide, means to rotate said driver and table, and a frame pivoted concentric with said table on which said driver is rotatably supported.

16. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide, said carrier pivoted at one end to said driver and adapted to slide on said guide, a frame pivoted concentric with said table and on which said driver is rotatably supported, a driving shaft journaled on said pivoted frame, gearing connecting said shaft and table, and gearing connecting said shaft and driver.

17. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide, said carrier pivoted at one end to said driver and adapted to slide on said guide, means to rotate said driver and table, and a pivoted frame on which said driver is rotatably supported, said driver adjustable on said frame relatively to said table.

18. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide, said carrier pivoted at one end to said driver and adapted to slide on said guide, means to rotate said driver and table, and a pivoted frame on which said driver is rotatably supported, said driver adjustable on said frame relatively to said table, and graduations on said frame to indicate the extent of said adjustment.

19. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide, said carrier pivoted at one end to said driver and adapted to slide on said guide, a frame pivoted concentric with said table and on which said driver is rotatably supported, a driving shaft journaled on said pivoted frame, gearing connecting said shaft and table and gearing connecting said shaft and driver, said gearing adapted to be interchanged with gearing of different relative diameters whereby the relative speed of rotation of said driver and table may be varied.

20. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary

driver, a swiveled guide, said carrier pivoted at one end to said driver and adapted to slide on said guide.

21. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, an arm adjustably fastened on a stationary support, and a guide swiveled on said arm, said carrier pivoted at one end to said driver and adapted to slide on said guide.

22. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, an arm fastened to a stationary support and adjustable thereon relatively to said driver and table, graduations to indicate the extent of said adjustment, and a guide swiveled on said arm, said carrier pivoted at one end to said driver and adapted to slide on said guide.

23. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, an arm fastened to a stationary support and adjustable thereon relatively to said driver and table, said support adjustable at an angle to the direction in which said arm is adapted to be adjusted, and a guide swiveled on said arm, said carrier pivoted at one end to said driver and adapted to slide on said guide.

24. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, an arm fastened to a stationary support and adjustable thereon relatively to said driver and table, said support adjustable at an angle to the direction in which said arm is adapted to be adjusted, graduations to indicate the extent of said adjustment, and a guide swiveled on said arm, said carrier pivoted at one end to said driver and adapted to slide on said guide.

25. In a machine for making designs, a rotary table, a marker, a holder for said marker, a carrier for said holder, a rotary driver, a guide adapted to rock about an axis substantially parallel to the axis of said driver, said carrier being pivoted at one end to said driver and adapted to slide on said guide, and means to clamp a piece of material to said table.

26. In a machine for making designs, a rotary table, a carrier, a marker, and a rocker-arm adapted to hold said marker in contact with said table and consisting of a rod, a block to which said rod is adjustably fastened, and a ball bearing on said carrier upon which said block is journaled.

27. In a machine for making designs, a rotary table, a carrier, a marker, a rocker-arm adapted to hold said marker in contact with said table and consisting of a rod, a block to which said rod is adjustably fastened a ball bearing on said carrier upon which said block is journaled, and a forked collar adapted to engage opposite sides of said block and adjustably fastened to said carrier.

28. In a machine for making designs, a rotary table, a carrier, a marker, a rocker-arm adapted to hold said marker in contact with said table and consisting of a rod, a block to which said rod is adjustably fastened, a forked collar arranged to straddle said block and adjustably fastened to said carrier, and a ball bearing on said carrier fast to said collar.

29. In a machine for making designs, a rotary table, a carrier, a marker, and a rocker-arm adapted to hold said marker in contact with said table and consisting of a rectangular rod, a block provided with a slot adapted to receive said rod, said block being split and having a clamp-screw adapted to clamp said rod thereto, a forked collar arranged to straddle said block and adjustably fastened to said carrier, and ball bearings on said carrier fast to said collar.

30. In a machine for making designs, a rotary table, a carrier, a marker, and a rocker-arm adapted to hold said marker in contact with said table and consisting of a rectangular rod, a block provided with a slot adapted to receive said rod, said block being split and having a clamp-screw adapted to clamp said rod thereto, said rod terminating at its free end in a disk, a collar having a groove in its face adjacent to said disk adapted to receive said marker, means to clamp said collar to said disk, a forked collar arranged to straddle said block and adjustably fastened to said carrier, and a ball bearing on said carrier fast to said collar.

31. In a machine for making designs, a rotary table, a carrier, a marker, an arm connecting said marker to said carrier arranged to swing about the axis of said carrier and adapted to hold said marker in contact with said table, means to impart a gyratory movement to said carrier, and means to hold said carrier against movement in a direction substantially perpendicular to the face of said table.

32. In a machine for making designs, a rotary table, a carrier, means to impart a gyratory movement to said carrier, means for holding said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, an arm connecting said marker to said carrier and arranged to swing about the axis of said carrier and adapted to hold said marker in contact with said table, and a clamp on said arm adapted to hold said marker.

33. In a machine for making designs, a rotary table, a carrier, means to impart a gyratory movement to said carrier, means to hold

said carrier against movement in a direction substantially perpendicular to the face of said table, a marker, and an arm adjustably connecting said marker to said carrier arranged to swing about the axis of said carrier and adapted to hold said marker in contact with said table.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDWARD I. HORSMAN, JR.

Witnesses:
FRANCES J. MULGANNON,
F. W. ELLIOTT.