

(Model.)

2 Sheets—Sheet 1.

J. E. MILLER.

Glass Engraving Machine.

No. 239,263.

Patented March 22, 1881.

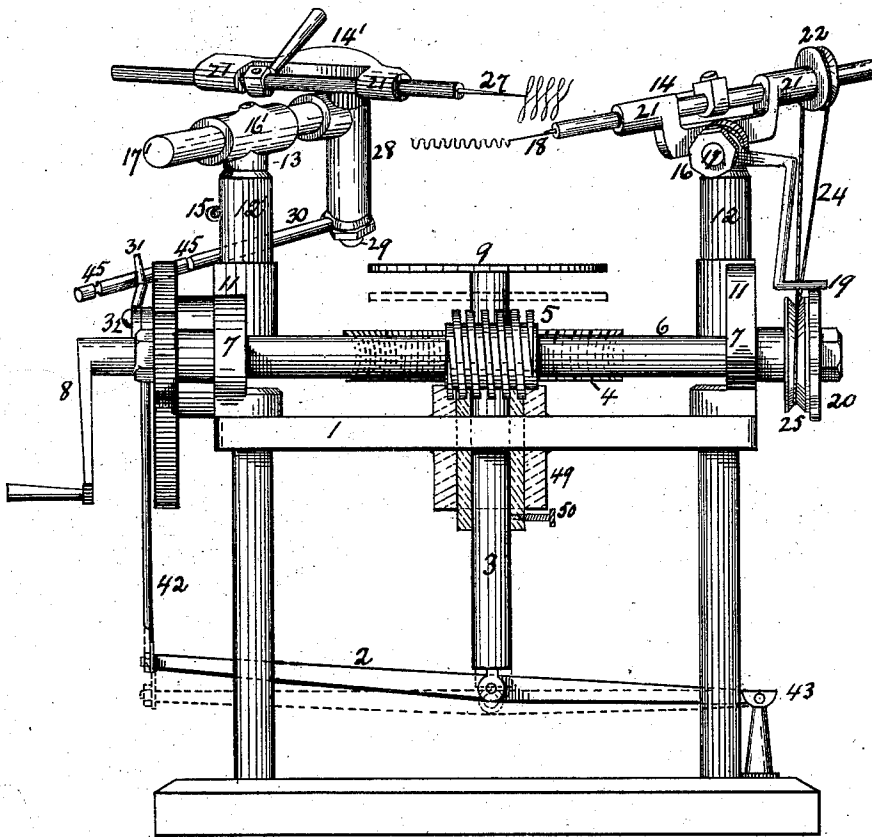


Fig. 1.

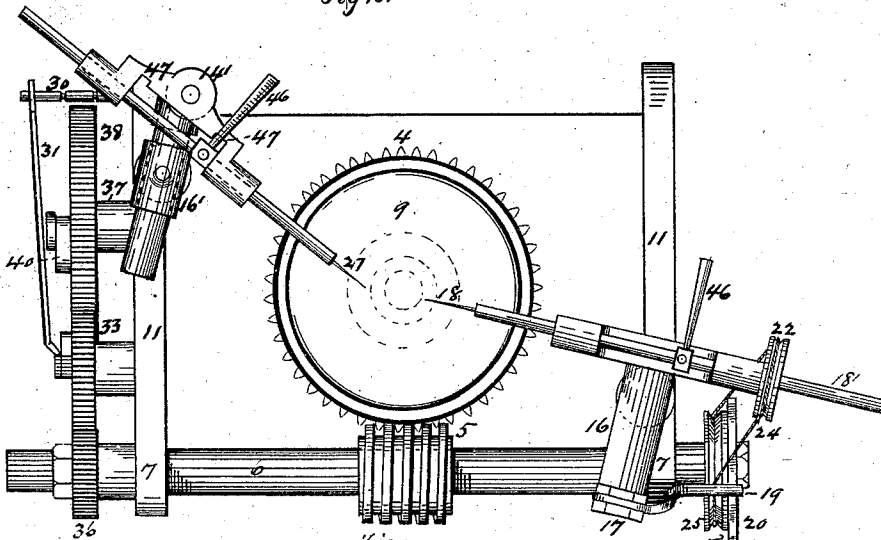


Fig. 2.

Witnesses.

Wm H Smith

R C Wrenshaw

Inventor.

J. Ernest Miller

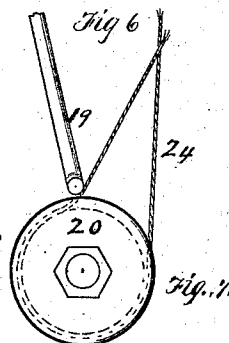
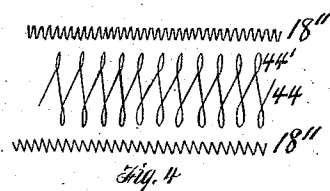
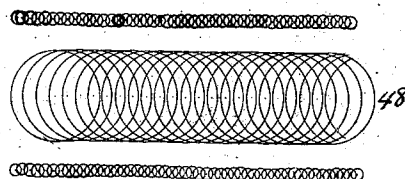
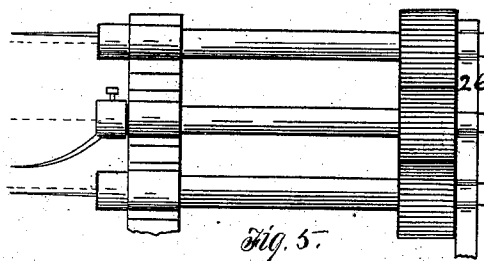
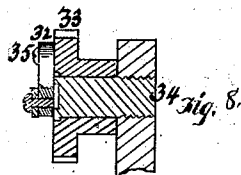
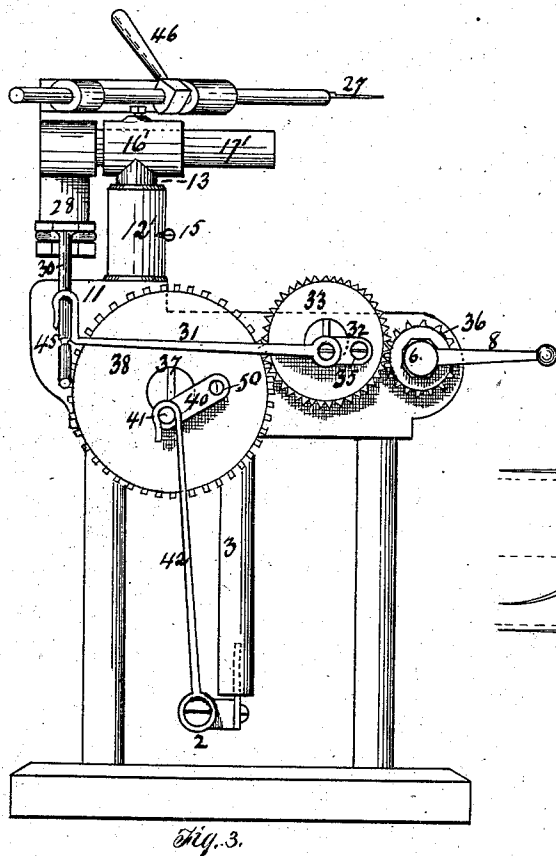
by his atty

Chas Wrenshaw

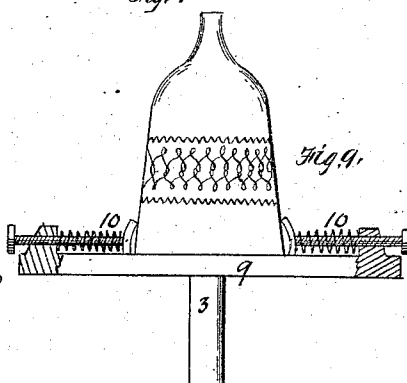
(Model.)

2 Sheets—Sheet 2.

J. E. MILLER.
Glass Engraving Machine.
No. 239,263. Patented March 22, 1881.



Witnesses,
Jno K Smith
R. O. W. Smith



Inventor,
J. Ernest Miller
by his atty
Baker & Co.

UNITED STATES PATENT OFFICE.

JOHN ERNEST MILLER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO
GEORGE DUNCAN & SONS, OF SAME PLACE.

GLASS-ENGRAVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 239,263, dated March 22, 1881.

Application filed July 14, 1880. (Model.)

To all whom it may concern:

Be it known that I, JOHN ERNEST MILLER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Glass-Engraving Machines; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a plan view. Fig. 3 is an end view, showing one of the engraving-tools and the devices for moving the same. Fig. 4 is a diagram of the engraving-lines made by the machine shown in Figs. 1 and 2. Fig. 5 is a view of another attachment for the machine. Fig. 6 is a diagram of the lines produced by the tools of Fig. 5. Fig. 7 is a face view of the cam 20 of Fig. 1. Fig. 8 is a sectional view of the gear-wheel 33. Fig. 9 is a side view of the chuck, showing how the article is placed thereon.

Like letters of reference indicate like parts in each.

Glassware has heretofore been ornamented, among other ways, by the process known as "etching," which consists in covering the surface of the article with a "stop-out," or composition of beeswax and other substances, such composition being well known to those skilled in the art, and then scratching off or removing a portion of the stop-out by tracing the design upon it, and finally dipping the article in acid, which, acting upon the exposed portion, produces the design intended. The acid is then neutralized by dipping the article in a bath of alkaline solution.

The operation of forming the figure or design upon the coated article has generally been done by hand, and such work has involved, necessarily, a large amount of skill, and is slow and tedious, and consequently very expensive. Certain machines have been devised for tracing lines upon the coated article; but their usefulness has been limited, owing to the extreme difficulty of obtaining a nice adjustment of the engraving-tools with relation to the article, and also of obtaining more than a very limited number of movements of said tools.

My invention consists of an improvement of

this class of machines, whereby I am enabled to multiply the movements indefinitely, and always to secure an equable pressure of the engraving-tools upon the coated surface of the article. Its main features consist of a rotating head or chuck, in which the article is secured and centered in any desired manner, which head or chuck, by means of a simple attachment, may be given a vertically-reciprocating motion, for purposes hereinafter described, in combination with one or more oscillating tool-carriers designed to carry and operate, either by a vertical, spiral, or other oscillation, one or more engraving-tools, said engraving-tools being held against the article, either by their own gravity or by the light pressure of a spring, as will hereinafter more fully appear.

To enable others skilled in the art to make and use my invention, I will now describe its construction and mode of operation.

In a suitable frame or bed, 1, and stepped upon a lever, 2, is a vertical shaft, 3, upon which is keyed a gear-wheel or pinion, 4, operated by means of a spiral gear, 5, mounted on the shaft 6, which extends along and works in suitable journals, 7, at the side of the machine. This shaft 6, constituting the power-shaft of the machine, receives its power from a suitable crank, 8, pulley, or other power device. Its rotation causes the vertical shaft 3 to be turned by the spiral pinion 5 and shaft 6. On the upper end of the shaft 3 is a head or chuck, 9, upon which I have shown, in Fig. 9, adjustable spring-clamps 10, for centering and holding the article under the action of the engraving-tool.

At the ends of the bed 1 are vertical sides 11, upon which are two or more tool-standards, 12, which are of tubular form, and in their central cavities are placed the stems 13, which sustain the tool-carriers 14, said stems being adjustable by means of set-screws 15, working through the sides of the tubular standards against them.

On the top of the stems 13 are hollow cross-heads 16', in which are the lateral shafts 17' of the tool-carriers, the latter being mounted on the ends of said shaft.

Two tools are shown in Figs. 1 and 2, one of which, 18, forms the scalloped or wavy line

18". (Shown in Fig. 4 of the drawings.) This tool 18 slides in bearings 21 in the tool-carriers, and obtains an oscillating movement, by means of the arm or pawl 19, which is rigidly attached to the shaft 17, bearing upon the eccentric surface of the cam 20, mounted upon one end of the power-shaft 6. The eccentricity of the cam 20 causes the end of the engraving-tool 18 to work up and down in a vertical line, and as the tool presses against the surface of the article while it rotates on the head 9 the effect of this vertical oscillation of the tool is progressive around the entire circumference of the article, and produces the wavy line 18".

By setting the point of the engraving-tool a little off the center, and providing the shaft 18' with a pulley, 22, and causing the said shaft 18' to rotate in its bearing 21 by a belt, 24, extending to the pulley 25, placed on the power-shaft 6, by the side of the cam 21, a series of circles, or a spiral line, such as is shown in Fig. 6 of the drawings, will be struck upon the surface of the article as it rotates on chuck.

By increasing the number of engraving-tools in the tool-carrier a series of circles may be formed upon the article, varying in size, if desired, by varying the distance of the engraving-points from the center of the shaft upon which they are mounted. This construction is shown in Fig. 5 of the drawings, in which there are three engraving-tools mounted on the same carrier, and connected together and operated by gear-wheels, said gear-wheels being mounted on the shaft by means of a feather and spline, and all three designed to be operated by a single belt and pulley on one shaft, extending beyond the bearing 26.

By having two or more points on the same engraving-tool any desired number of intersecting circles may be traced, as illustrated by the pattern 48 of Fig. 6. The same effect of a number of duplicate intersecting lines may be obtained in the other designs by multiplying the points.

At the other end of the bed, and mounted in the tool-standard 12', is another form of engraving-tool, 27, having a different movement.

On the end of the shaft 17' is a tubular sleeve, 28, in which is a second shaft, 29, upon the upper end of which is mounted a tool-carrier, 14'. On the lower end of the oscillating shaft 29, and rigidly secured thereto, is an arm or crank, 30, and hooked onto this arm or crank is a link, 31, which extends and is pivoted to a crank, 32, upon the face of the gear-wheel 33, mounted on the shaft 34 at the end of the machine. The crank 32 is fastened to the gear-wheel 33 by a screw-bolt, 35, off the center. The gear-wheel 33 is operated by a pinion, 36, mounted on the power-shaft 6, and the action of the device thus described has the effect of imparting a lateral oscillation to the engraving-tool 27. Mounted on the shaft 37, at the same end of the machine, is a large gear-wheel, 38, which meshes into the gear-wheel 33. Upon the face of the large gear-wheel 38, at the side

of the center, is a crank, 40, having a wrist-pin, 41, on which is hung or hooked a vertical link or rod, 42, which at its lower end is pivoted to and sustains the lever 2, upon which the vertical shaft 3 of the rotating head 9 is stepped or rests. The lever 2 is pivoted upon a suitable fulcrum, 43, at or near the other end of the machine. The effect of this organized connection is to cause the rotating head or disk 9 to have a vertical as well as a rotary movement on its shaft, and the vertical and rotary movements which are thus communicated to the article placed upon the head, operating in connection with the lateral or horizontal oscillation of the engraving-tool 27, has the effect of producing a diagonal double-looped line, 44, such as is shown in Fig. 4 of the drawings.

The crank or arm 30, which communicates the lateral oscillation to the tool 27, is grooved or notched, as at 45, in a number of places, so that the link 31 may be hooked on it at any desired distance from the shaft 29 to suit the adjustment of the engraving-tool to or from the center of the head.

The tool-carrier 14' may be fitted with a number of tools, in the same manner as described in relation to Fig. 5, but without the rotating devices, as they are not necessary in producing this design. Thus simple and multiple figures may be produced at pleasure. The heads or tool-carriers in every instance are detachable, and may be replaced with others, to suit the special work to be done.

The engraving-tools, as before mentioned, bear against the article, either by their own gravity or by the light pressure of a spring mounted upon them, and they are fitted with suitable handles, 46, by which they may be drawn back at will, and retained in such position by turning the handles into suitable notches, 47, formed in the head. The construction last described, by which a vertical reciprocating movement of the head or chuck 9 is obtained, may be used in connection with any movement of the tools.

When it is desired to make simple waving, looped, or spiral lines around the article, the shaft 3 is disconnected from the lever 2 and set at any desired height in the sleeve 49 by means of the set-screw 50.

The vertical movement of the head or chuck 9 may be lengthened or shortened by lengthening or shortening the attachment of the link 42 to the large gear-wheel 38, which is done by loosening the bolt 50 and then turning the crank-arm 40 nearer to or farther from the center. The crank 32 is adjustable in the same way.

When it is desirable to make the diagonal pattern 44 without the loops 44', the crank 32 is shortened.

The wavy lines 18" of Fig. 4 are made on the article by a separate operation from that which forms the diagonal line 44. The reason for this is, that the said lines 18" cannot be formed when the head or chuck 9 has a vertical reciprocating motion.

Other tool-standards, 12, may be mounted upon the machine, and by suitable power-connection thereto other tools having different movements may be attached and used upon the same machine.

By changing the point of the tools, or giving the lever slightly different movements, or the cams different shapes, or using different-sized gear-wheel, an endless variety of designs may be produced upon the article.

The lateral oscillation of the engraving-tool is necessary to make looped figures, as the tool must be given a greater speed than that of the article to produce such effect.

Experience with the use of this machine has demonstrated the fact that after traversing the whole circumference of the article the engraving-tool will connect the end of the lines perfectly, and that in the continued rotation of the article the tools will traverse the same lines formerly traveled by them. The operation of the machine is extremely rapid, and by it I am enabled to accomplish, with the utmost precision and great economy, work which has been done heretofore successfully only by hand and at great cost.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in an engraving-machine, of a vertically-oscillating rotating head with a laterally-oscillating engraving tool or tools, substantially as and for the purpose described.

2. The combination, in an engraving-machine, of a rotating head and two or more ro-

tating engraving-tools, substantially as and for the purpose described.

3. A pivoted engraving-tool connected to and oscillated by a pivoted crank, the movement of which is lengthened or shortened by setting the fulcrum farther from or nearer to the center, substantially as and for the purpose described.

4. In a machine of the class specified, the combination, with the shaft of the rotating head or chuck 9, of a fulcrumed lever on which said shaft is stepped, a gear-wheel which receives its motion from the power-shaft, and a link for connecting the lever and gear-wheel, substantially as and for the purpose specified.

5. In a machine of the class specified, the combination, with the tool-standard and tool-carrier, of the shaft 17', having a tubular sleeve, 28, the oscillating shaft 29, provided with crank-arm 30, link 31, and gear-wheel 33, provided with crank 32, substantially as and for the purpose specified.

6. In a machine of the class specified, the combination, with the tool-carrier 14, having lateral shaft 17 and pawl 19, of the stem 13, provided with a tubular cross-head, 16, and a cam, 20, mounted on the power-shaft, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand.

J. ERNEST MILLER.

Witnesses:

T. B. KERR,
J. A. CARLIN.