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R. A. LIENHARD.

ENGRAVING MACHINE.

APPLICATION FILED JUNE 21, 1905.

Fig. 1.

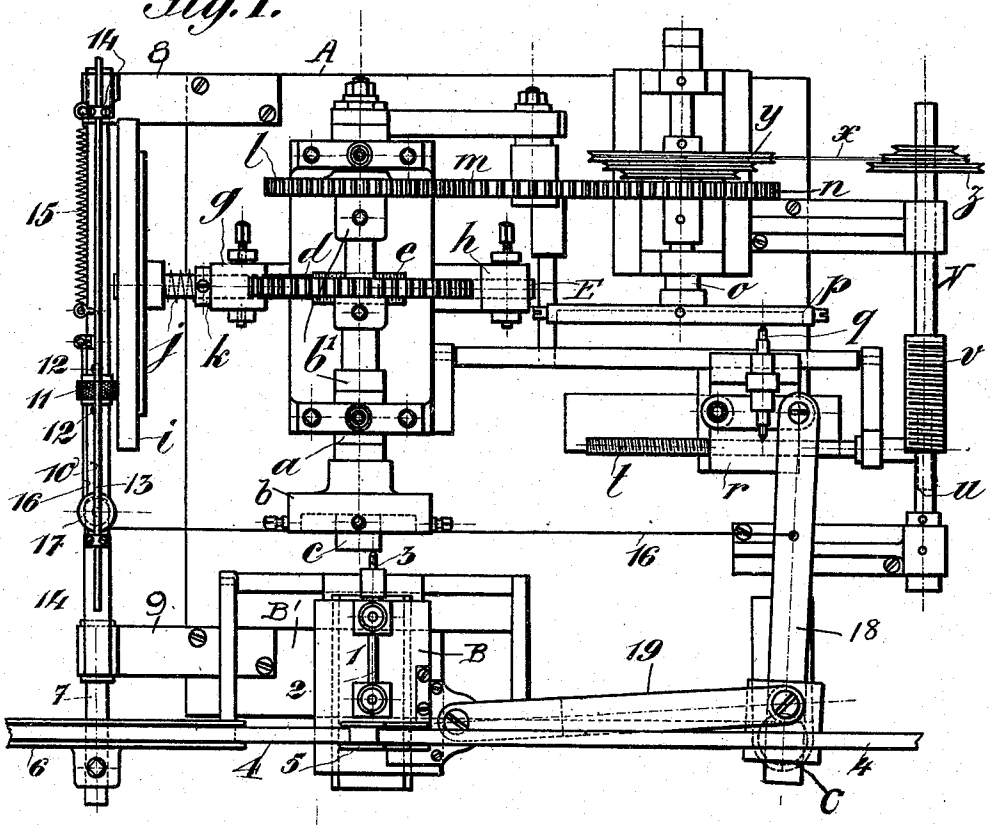
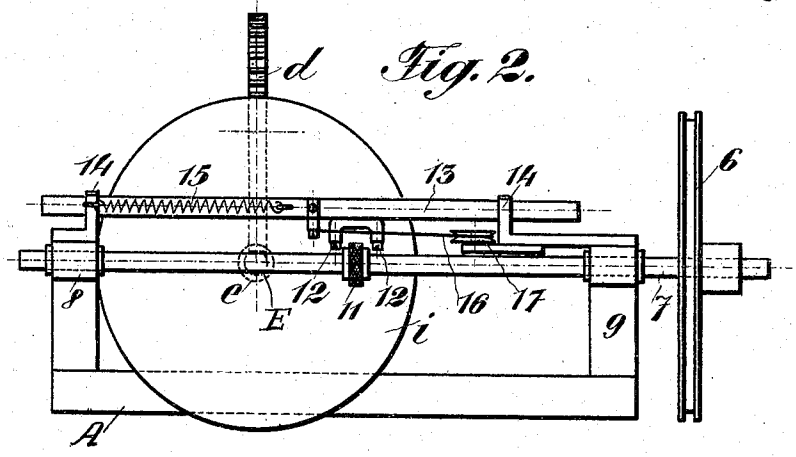


Fig. 2.



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ENGRAVING-MACHINE.

No. 840,570. Specification of Letters Patent. Patented Jan. 8, 1907.

Application filed June 21, 1905. Serial No. 266,357.

To all whom it may concern:

Be it known that I, ROBERT ALFRED LIENHARD, mechanic, a citizen of Switzerland, residing at La Chaux-de-Fonds, Canton of Neuchâtel, Switzerland, have invented new and useful Improvements in Engraving-Machines, of which the following is a specification.

The invention relates to machines for reproducing a pattern or model wherein the formation or design consists of lines formed on a flat face of a disk or like body adapted to be rotated and wherein a tracer-point traversing said lines is connected with a carving or forming tool in such a manner as to effect a reproduction of the design of the pattern upon a disk or the like adapted to be rotated at a prescribed rate of speed with respect to the speed of the pattern.

The invention has to do more especially with means whereby the speed of the pattern and disk may be varied in the reproducing operation.

One embodiment of my invention is shown in Figure 1, which is a plan view of the machine, Fig. 2 being an end elevation thereof.

First describing the specific construction shown, there is provided a base or bed plate A, having bearings 8 and 9 at one end, in which a main drive-shaft 7 is mounted. The shaft 7 carries a pulley 6, adapted to be driven by suitable belting operated from any convenient source of power. Shaft 7 carries a friction-wheel 11, which is longitudinally adjustable and non-rotatively mounted thereon. Supports 14, mounted upon bearings 8 and 9, support a carriage 13, which engages the friction-wheel 11 and moves the same longitudinally upon the shaft 7 by means of a yoke or fork 12. A contractile spring 15 is connected at one end with one of the supports 14 and at its opposite end with the carriage 13 and normally acts to draw the friction-wheel 11 in one direction, while a cord or cable 16, trained about a pulley 17, serves to move the friction-wheel 11 in an opposite direction, the operation of these oppositely-acting elements being hereinafter more fully explained.

A shaft E, rotatively mounted at right angles to the shaft 7 and so that its axis intersects the axis of said shaft, carries a friction-disk *i*, which is non-rotatively and longitudinally movable thereon. The shaft E is mounted in bearings *g* and *h*, which are supported on the bed-plate A, and is provided with a collar *k*, engaging the bearing *g* and serving to prevent longitudinal movement of the shaft E in one direction, movement thereof in an opposite direction being prevented by the operation of parts, as will hereinafter more fully appear. An expansively-acting spring *j* is interposed between the collar *k* and the hub of the friction-disk *i* and serves to maintain the latter in engagement with the friction-wheel 11. A worm *e*, formed upon shaft E, meshes with and drives a pinion *d*, fast upon the work-shaft *a*. A chuck *b*, non-rotatively mounted on the shaft *a*, carries the material or work upon which the pattern it to be reproduced. It will be obvious from the foregoing that motion is transmitted direct from the shaft 7 to the chuck *b* through the medium of the friction-disk *i*. The manner in which rotary movement is transmitted to the pattern will next be described.

The shaft *a*, which is mounted in bearings *b'*, carries a pinion *l*, which through the medium of the pinion *m* drives a pinion *n*, mounted on a pattern-shaft *o*. A chuck *p*, in which the pattern is rigidly mounted, is non-rotatively secured on shaft *o*. A variable-speed sheave *y*, mounted on shaft *o*, drives a like sheave *z* on shaft V through the medium of the belt *x*. Shaft V is provided with a worm *v*, meshing with a worm-wheel *u*, the latter being mounted upon a threaded shaft *t*. The shaft *t*, in connection with the gearing just described, operates a tracer-carriage *r* abreast of the pattern, the said carriage *r* carrying a tracing-pointer *q*, which directly engages the pattern and traces the lines thereof. A rotary cutter 3, mounted upon shaft 2, is driven by the belt 4 from the pulley 5, the engagement of the belt 4 with the pulley 5 being such as to permit movement of the latter as the cutting-tool 3 travels abreast of the block *c*, on which the design is reproduced. In order to move the cutter 3 abreast of the block *c*, I provide a cutter-carriage B, mounted to slide upon ways B'. Said carriage is connected by a lever 19 to a lever 18, the latter being pivotally mounted at C to any suitable stationary part of the machine.

It will be obvious from the foregoing that as the tracing-finger *q* is moved abreast of the pattern a movement in the same direction, but of less extent, is imparted to the carriage B and cutter 3 through the medium of the levers 18 and 19. One end of the cable 16, hereinbefore described, is connected with the

lever 18. As the pointer or tracer *q* moves from the periphery to the center of the pattern the cord permits a corresponding movement of the friction-wheel 11, by means of the spring 15, toward the center of the friction-disk *i*.

The operation of the machine is as follows: The pattern is secured in the chuck *p*, and the material on which the design is to be reproduced is secured in the chuck *b*. The tracer *q* is adjusted to occupy a position near the periphery of the pattern, and the parts are so adjusted that the cutting-tool 3 will be moved to a like position with respect to the block C, the friction-wheel 11 occupying a position near the periphery of the friction-disk *i*. As the operation proceeds the tracer *q* will, through the medium of the shaft *t*, be drawn across the face of the pattern and toward the center thereof, causing a movement in a like direction and of a like nature of the cutter 3. As the operation of reproducing the pattern proceeds the friction-wheel 11, through the inward movement of the lever 18 and cord 16, will be drawn toward the center of the disk *i*, imparting a variable and gradually-decreasing speed of rotation to the chucks *p* and *b*, the movement of the wheel 11, abreast of the disk *i* corresponding to the movement of the tracer *q* abreast of the pattern, such movement being continued until the friction-wheel 11 reaches the center of the disk *i*, whereupon the machine is automatically stopped.

Having now described my invention, I claim as new and wish to secure by Letters Patent—

A device of the class described comprising pattern and work shafts geared to rotate at prescribed rates of speed relative to each other, tracer and cutter carriages, a pivotally-mounted operating-lever for said tracer-carriage, a link connecting said lever with the cutter-carriage, means for reciprocating said tracer-carriage, a yieldingly-mounted friction-disk geared to said work-shaft, a constantly-driven friction-roller slidably mounted abreast of said disk, a carriage for sliding said roller, a contractile spring connecting said carriage with a stationary part of the machine, and a cable or the like connecting said carriage with said pivotally-mounted lever.

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

ROBERT ALFRED LIENHARD.

Witnesses:
ARMAND PERRCLET,
PHILIPPE BÉGUIN.