3 Sheets—Sheet 1

E. ALLEN.

ENGRAVING MACHINE.

No. 2,912. Patented Jan. 16, 1843.

Fig. 2

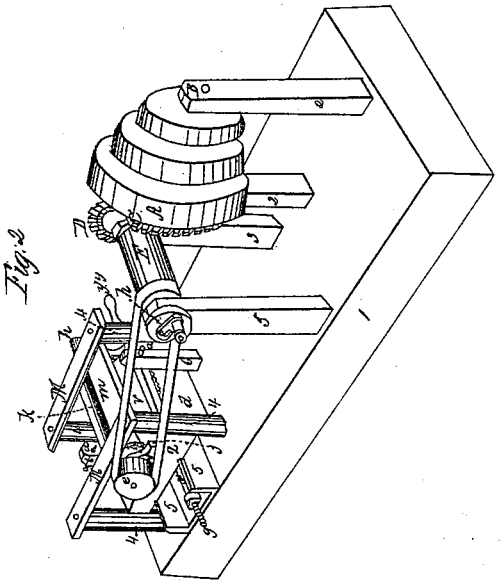


Fig. 4

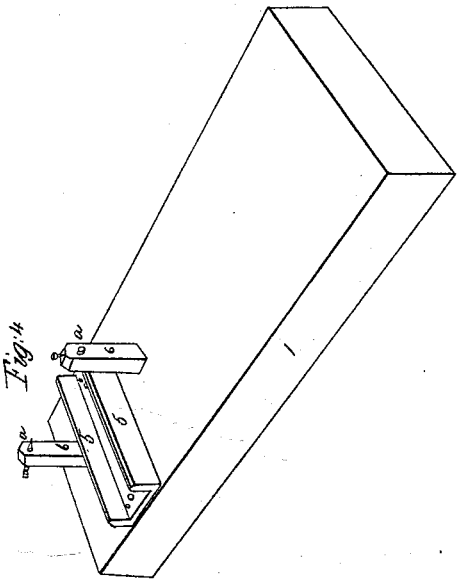


Fig. 1

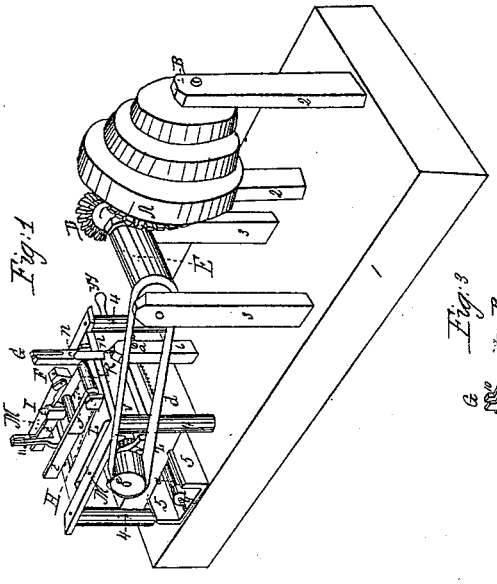
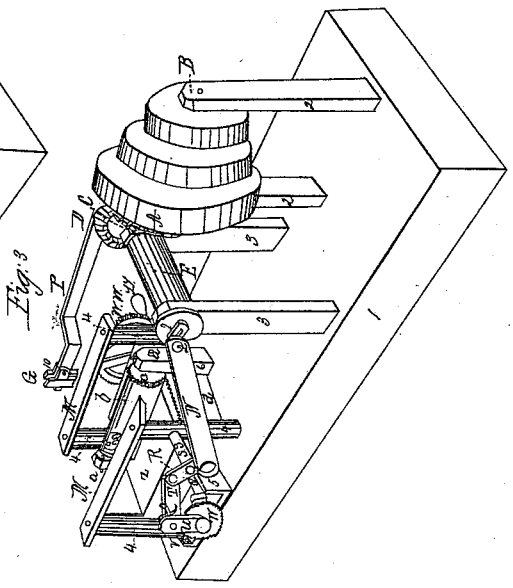


Fig. 3



Witness:
W. Greaby

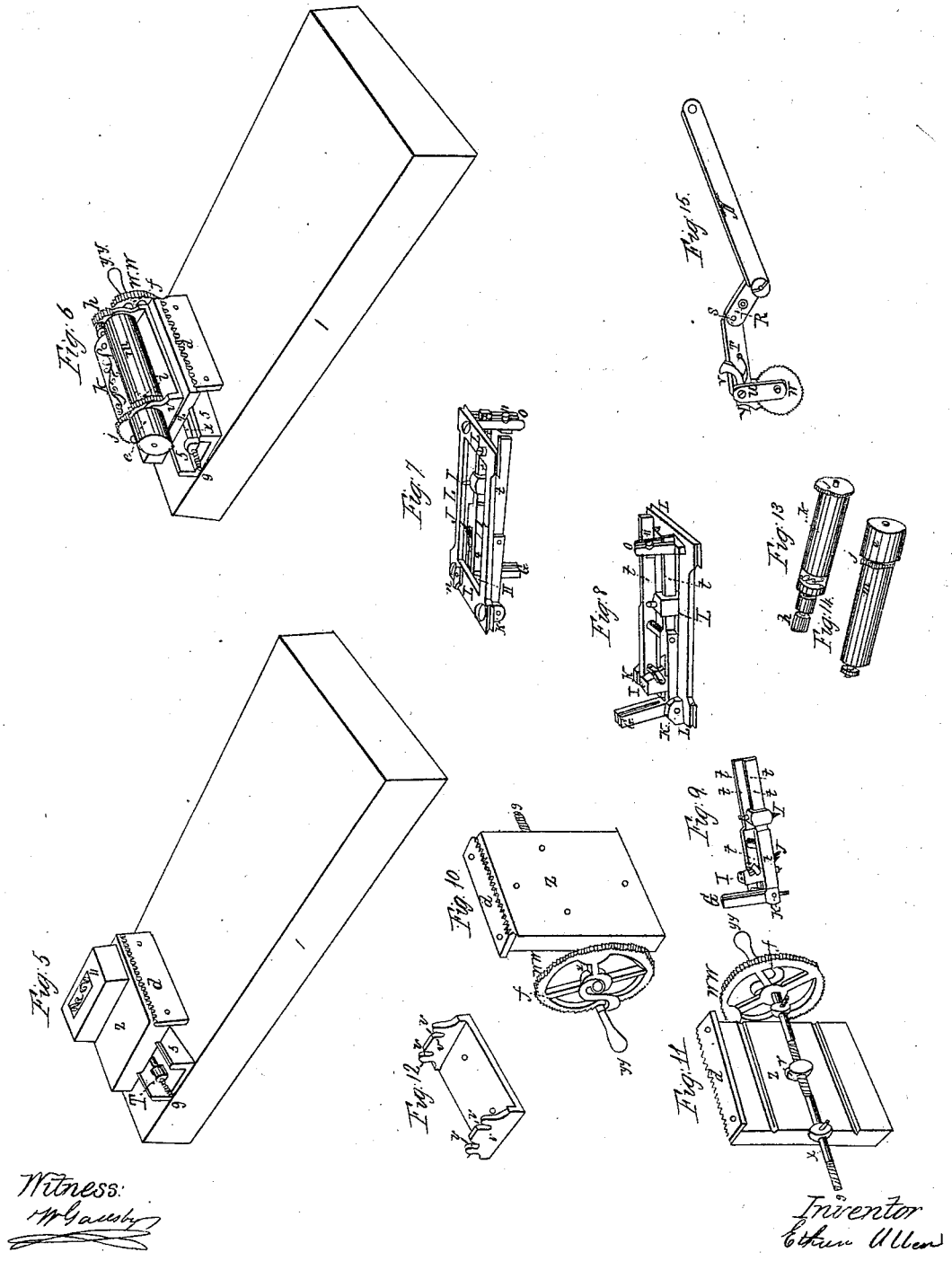
Inventor:
Ethan Allen

3 Sheets—Sheet 2.

E. ALLEN.

ENGRAVING MACHINE.

No. 2,912. Patented Jan. 16, 1843.



Witness:
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Inventor
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3 Sheets—Sheet 3.

E. ALLEN.

ENGRAVING MACHINE.

No. 2,912. Patented Jan. 16, 1843.

Fig. 16

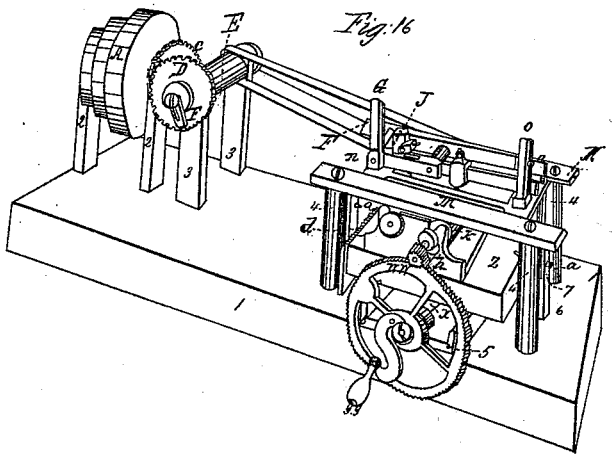
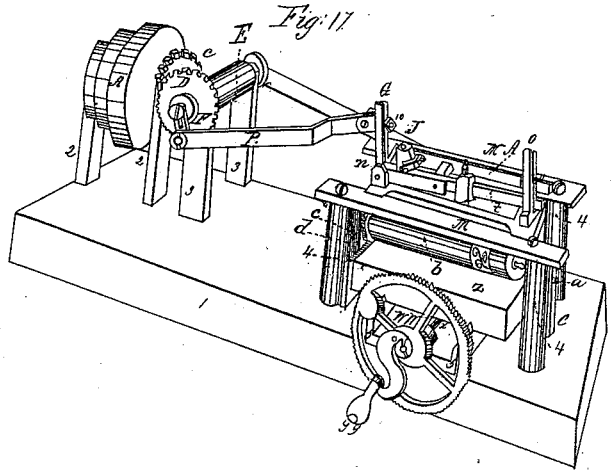


Fig. 17



Witness:
W. Gaskey

Inventor:
Ethan Allen

UNITED STATES PATENT OFFICE.

ETHAN ALLEN, OF NORWICH, CONNECTICUT.

MACHINE FOR ENGRAVING.

Specification of Letters Patent No. 2,912, dated January 16, 1843.

To all whom it may concern:

Be it known that I, ETHAN ALLEN, late of Grafton, in the county of Worcester, and Commonwealth of Massachusetts, now resident in Norwich, in the county of New London and State of Connecticut, manufacturer of firearms, have invented a new and useful Machine for Engraving, called "Allen's New Engraving-Machine," of which the following is a full and correct description.

The bottom of the machine is made of an oblong rectangular plate of metal, which may be firmly secured to a bench or other support, by means of screws passing through holes perforated for the purpose of receiving them, or secured by any other convenient fastening. This is represented in the several figures of the annexed drawings, and is marked thereon (1.) At one end of the bottom plate, on its upper surface, are set two upright studs or posts (2, 2). These support a pulley (A,) which revolves on an axis B parallel with the longest line of the machine. To this pulley the moving power is applied. For the convenience of description, the end on which this pulley is set may be called the back, and the opposite end the front of the machine. On the end of the shaft of this pulley toward the front, is a bevel gear wheel (*c*) revolving with it, and working into another bevel gear wheel (D) which revolves on a shaft (E) placed at right angles with the first gear (C) across the bottom plate, and supported by two short upright studs or posts (3, 3,) at each end. To the end of the shaft (E) is fixed by a screw a crank (F). This may be made solid, or made of a flat piece of metal, with a mortise or slot cut through it, so as permits it to slide along the head of the screw, and admit of adjusting the length of its motion at pleasure. An arm (P,) is fixed to this crank (F) extending toward the front of the machine, and is pushed onward and drawn back again as the crank (F) revolves. This arm is bent at right angles, near the middle of its length, so that the end extended toward the front may cut in a line with the bevel gear D, behind it. This front end of the arm is provided with a notch or screw and nut (10) by which it may be connected with the engraving slide.

The engraving slide, articularly delineated in Figure 7 and Fig. 8 of the drawings annexed, is an oblong frame, formed by four bars of metal. The back and front bars, (L, L,) have grooves cut in each end fitting the edges of the ways on each side (M, M) on which the slide travels backward and forward. On the upper surface of the engraving slide frame, are two levers (*t t*) formed of small bars of metal and of equal length with the frame. They are firmly fixed at the back part to an axis (K) which turns so far as to admit of the levers rising and falling, on bearings set into the engraving frame. Upon this axis or shaft is permanently fixed a short stud or post, upright, having a perpendicular slot or mortise cut about half way down its length to receive the head of the arm P. This is called the guide and is marked G. Behind it, a spring (*n*) is attached to the back bar of the engraving frame. This spring presses against the guide and serves to keep the levers down. Directly opposite to the guide there is set in the front bar of the engraving frame, another short post or stud (O) having a slot or mortise cut nearly through its whole length. In this mortise one of the levers rests. The upward and downward motion of the levers is regulated by it. At the top of the mortise is a screw and nut (11) which may be adjusted so as to prevent the lever being carried too high. Through one of the levers is cut a slot or mortise near the back end. Through this is placed the grooves (J). The graver is made tapering on one side from the head downward toward the edge. It is set in a groove cut in a small square holder (*f*) which rests on the mortise of the lever and can be slided upon it. It is placed sloping so as to be inclined backward from the direction of the forward motion, so that the edge cuts the metal before the head comes over the point where the edge has worked. In front of the groove in the holder, is a clasp through which a screw is passed to fasten the graver in its place. Above the head of the graver, is another screw passing through the top of the holder, and directly over the groove. When this is turned down it presses the graver on the metal to be engraved, and serves to adjust the tool to the nature of the work to be executed. The holder may be moved backward and forward, in the mortise through the lever, and may be confined to its sides by a screw. In front of the graver (J,) is a pointer of metal (I) which is made round, resembling the common tracing pencil. This is set into

a small square block of metal with a mortise adapted to receive one of the levers, upon which it is fitted, and can slide, or be fixed by a screw.

The engraving frame rests on metallic ways, M M fixed horizontally on each side, whose edges are made to fit the grooves in the ends of the bars of the frame. These ways are supported by short studs or posts (4, 4, 4, 4) set into the bottom plate (1) of the machine.

The arm P is attached to the guide (G) by a notch or screw and nut or other convenient fastening (10). When the crank (F) revolves it propels the arm P, forward, carrying the engraving frame with it and again bringing it back, thus moving the graver and the pointer over the surfaces of the figure to be copied or the metal to be engraved.

On that end of the shaft (E) opposite to that where the crank F is attached, is another crank (2) moving an arm (N) on the other side of the machine. This arm (N) extends forward, and is fastened to one arm of a short lever (R) being near the center on a bearing (S, S) set into one of the back posts supporting the ways (M M). From the other end or arm of this lever (R) is extended forward a second arm (T). The arm T, reaches a guide (U) and is fastened to it by a pin. Directly under it is a ratchet wheel W on whose axis the guides moves backward and forward with the motion of the arm. There is a catch V connected with the arm T, and hung upon the same pin, having a spring pressing it down on the ratchet wheel, which it pushes forward as the crank revolves.

The ratchet wheel (W,) is attached to a shaft (X) which passes across the bottom of the machine horizontally, for the purpose of giving a lateral motion to a sliding frame L which holds the metal to be engraved. This slide (L) is placed directly under the engraving frame and occupies the space below it, between the posts (4, 4, 4, 4) on which rest the ways, (M, M). It is nearly square and made of metal of sufficient thickness to sustain considerable weight and pressure. Across the bottom plate of the machine, two ways or plates of metal are set perpendicularly (5, 5,) figured in No. 4 and No. 3. The slide L, travels laterally on these ways having grooves cut in the under surface to guide its motion upon them. A shaft (X) to which is attached a ratchet wheel on the end below the catch, passes under the slide (L) and is hung to it by bearings. On the middle part of this shaft is cut a screw working through a nut (Fig. 11,) permanently fixed to the under surface of the slide (L,) which gives to the slide, when turned, a regular lateral motion from side to side of the machine. On the end of the shaft opposite to that on which is fixed the ratchet (W,) is another wheel of larger diameter than the first (W, W) which is provided with a crank or handle (Y, Y,) and which serves when turned to drawback the slide L. On the edge of the slide is fixed a rack (d) with the teeth upward, and extending along the slide in a direction across the machine.

On the upper surface of the slide L, are screwed the pattern to be copied and the metal to be engraved, the former directly below the pointer, the latter exactly beneath the graver. The pointer is brought down to the face of the pattern and the graver adjusted to the surface of the metal to be cut. When the machine is set in motion, the engraving frame is slided rapidly forward and back; the point follows accurately the lines of the pattern as it passes over the elevated parts it raises the graver by the lever to which it is fastened, and as it sinks into the depression the levers are pressed down by the spring (n). The graver, thus regulated cuts an exact copy of the original over which the point is carried. When the engraving frame is drawn back by the crank, the pattern and metal are carried onward so as to be ready for a new stroke of the graver. By means of the catch (V) and the ratchet wheel (w) the shaft X is turned and screws the slide L regularly on toward the side of the machine. When it has advanced far enough to complete the work required, the slide L may be returned to its plane, by turning with the crank or handle (Y, Y,) the wheel (W, W).

Such is the construction of the machine when intended to be used for engraving flat surfaces. The arrangement is different when a round body is to be engraved.

Directly beneath the engraving frame, are placed two studs or short posts, (C, C,) having centers (a, a) one on each side of the slide (L), in such position that an arbor, (b, b,) laid lengthwise of the machine and over the slide shall be exactly under the pointer and graver. On the end of the arbor b, is a gear wheel c, which works into the rack (d), fixed on the edge or side of the slide, and which turns the arbor as the slide is moved laterally. On this arbor, the pattern and metal to be engraved are fastened by screws or in any other convenient manner. The machine being set in motion, a copy of the original is produced, by a process similar to that before described. The pointer, follows the traces of the pattern, as it is slided forward and back in the engraving frame, and the rotary motion of the arbor constantly presents a new line of surface to be cut until the work is completed.

When a roll, or cylinder, or similar surface is to be engraved the construction of the machine is different. The arbor (b) last men-

tioned is taken out—each of the arms of the cranks, as well that which moves the engraving frame (F) as that (2) which pushes the ratchet wheel (*w*) are thrown off. An iron frame represented in Fig. 12, having a flat bottom with bearing cut or raised at each end to receive the shafts of two cylinders (*v*, *v*, *v*, *v*,) is firmly screwed to the upper surface of the slide L. The cylinder to be engraved (*m*) is placed in this frame in a direction across the machine. On the outside of the frame (*v*) last mentioned, on the end of this cylinder, is a pulley, *e*. A belt passes over this pulley and around the shaft E, and gives motion to the cylinder (*m*) near this pulley, on the shaft of the cylinder (*m*) but within the frame (*v*, *v*, *v*, *v*,) is a gear wheel. In the same frame, parallel with the cylinder to be engraved (*m*), is another cylinder (*k*) having upon its shaft the pattern to be copied. The shaft of this pattern cylinder (*k*) at the end next to the belted pulley, has a gear wheel opposite to that on the cylinder (*m*) to be engraved, which works into the teeth of the wheel upon that cylinder (*m*) and thus both revolve together. On the other end of the pattern cylinder is a pinion wheel, *k*, gearing into the teeth on the wheel (W, W,) outside of the frame (*v v v v*). The wheel W, W, being on the axis of the lower slide L when turned, moves that slide laterally. The graver is pressed down by the spring (*n*) attached to the back bar of the engraving frame. When the machine is put in motion the graver remains stationary—the two cylinders (*m*,) (*k*) revolves by means of their gears—the pinion on the end of the pattern cylinder (*k*) by turning the wheel (W W,) on the axis of the shaft X X passing under the slide L, makes this slide move toward the side of the machine laterally. The pointer follows the pattern, and rises and falls, moving the levers of the engraving frame and regulating the graver. When the slide L, has been carried sufficiently forward toward the side, it may be brought back by turning the handle of the wheel W W, attached to its axis.

The proportions of the machine may be varied at pleasure, to suit the various uses to which it can be applied. And its several parts may be constructed of iron or steel, or other material according to the degree of strength and durability required. Instead of having the graver pass over the object to be engraved, by means of the sliding motion of the engraving frame the object to be engraved may be made to pass over or under the graver when it is stationary, except so far as the motion of the levers upward and downward, is concerned, by merely changing the position of the tool and work.

The advantages of this machine are that it furnishes engravings with greater speed and more economy than they can be produced in any other mode known to the inventor, and that the work is cheaper and more perfect than when done by other machinery or by hand.

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

The mode of engraving on flat, round, or cylindrical surface, by means of a graver moving in a sliding frame regulated by a point tracing a pattern, or by means of making the surface to be engraved revolve or pass under a graver whose motion is regulated by a point tracing the lines of a pattern, in the manner described in the foregoing specification, and by machinery constructed on the same principles as that therein mentioned and delineated in the annexed drawing.

In testimony whereof, I, the said Ethan Allen hereunto subscribe my hand in the presence of the witnesses whose names are hereunto written on this thirteenth day of Oct. A. D. 1842.

ETHAN ALLEN.

Signed in our presence:
CHARLES THURBER,
LUCINDA A. THURBER.