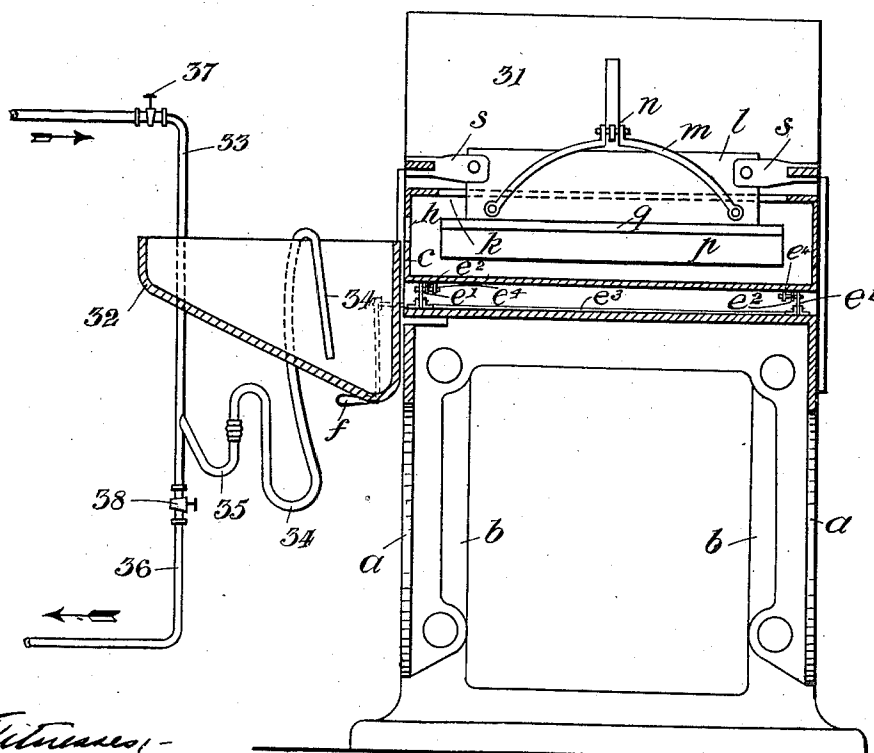
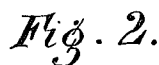


E. ALBERT.
ETCHING MACHINE.
APPLICATION FILED JAN. 20, 1911.

Fig. 1.



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1,013,717.

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2 SHEETS-SHEET 2.

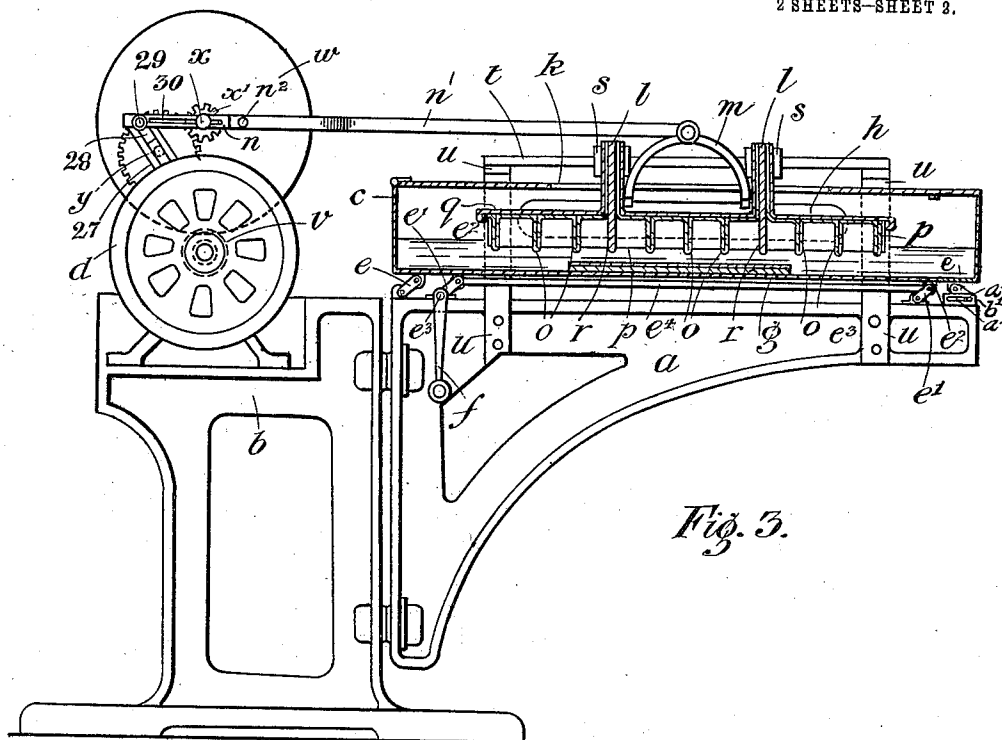


Fig. 3.

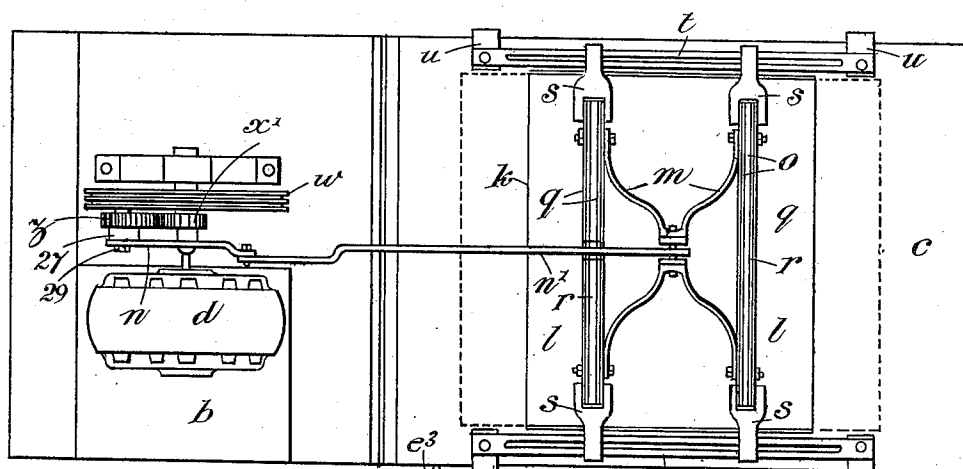


Fig. 4.

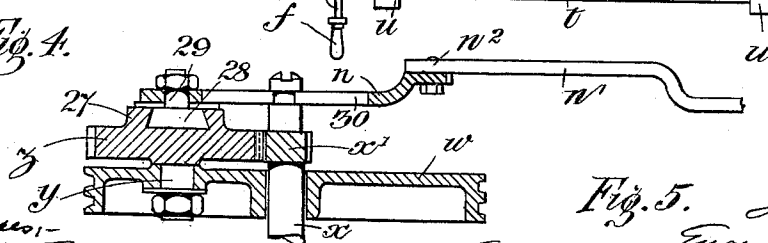


Fig. 5. Inventor:
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UNITED STATES PATENT OFFICE.

EUGEN ALBERT, OF MUNICH, GERMANY.

ETCHING-MACHINE.

1,013,717.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed January 20, 1911. Serial No. 603,740.

To all whom it may concern:

Be it known that I, EUGEN ALBERT, a subject of the Emperor of Germany, residing at Munich, in Germany, have invented certain new and useful Improvements in Etching-Machines, of which the following is a specification.

My invention relates to improvements in etching machines of the type set forth in my American Patent No. 928923. In a machine of this kind an immersed stirring device,—which hereafter I call the etching paddle—has been reciprocated backward and forward just above the plate to be etched, which lies face upward in the bottom of the etching bath tub. Heretofore the reciprocation of the etching paddle has been between fixed limits, but the bath tub has been moved so that the actual limits with regard to the plate have varied.

The object of this invention is to construct an etching machine in which the effect of variable reciprocation is produced more efficiently, and in which the construction of the apparatus is simplified and improved.

By the use of the improved machine, an etching rich in tone is rapidly effected, and without the necessity for "touching up" which has often been required heretofore.

The invention consists in the first place in the use of a revolving sliding crank mechanism for the driving of the etching paddle so that it receives different lengths of travel varying periodically from the smallest to the greatest amount of movement, and further in the combination of this construction with the other parts of the apparatus to form a more efficient and convenient machine.

The accompanying drawings illustrate a preferred form of the invention.

Figure 1 is a view of the etching machine in side elevation, Fig. 2 is a transverse section, Fig. 3 is a side view partly in section, Fig. 4 is a plan of the machine with the water tank and pipe system omitted, and Fig. 5 is an enlarged view of the revolving sliding crank mechanism.

Referring to the drawings, the etching bath tub *c* is attached to the part *a* of the framework, which latter consists of the two parts *a* and *b*, and the electric motor *d* mounted on the part *b*, drives the revolving crank mechanism, which will be more fully explained hereafter.

The etching bath tub *c* is attached to the frame *a* by means of four links *e* and can be moved into its working position by means of the elevating cranks *e'* connected by rods *e''* and provided at their free ends with rollers *e'''*; the elevating cranks are worked by the hand crank *f*, which latter is attached to one of the spindles *e'''* of the elevating cranks *e'*, after the plate *g* to be etched has been placed in the bath tub *c* through one of the side openings *h*; in order that the links *e* shall allow the bath tub *c* to rise, the right hand bottom brackets *b'* on the framework *a* are provided with slots *a'* in which are slidably mounted pins *a''* to which the links *e* are attached so as to allow the bath tub to rise and fall the distance required.

Naturally the opening for the entrance and exit of the plate to be etched, can be placed at the back of the etching bath tub if required, care being taken that a spray board, trap door, or the like be provided so that the etching liquid does not splash out during the movement of the etching paddle.

A part of the cover of the etching bath tub *c* is removed to form the opening *k*, and this space serves as an outlet for the cross-bars *l* of the etching paddle, which receives movement from the crank disk *w* through the medium of the cross-head *m*, to which the sliding crank *n* is connected by the connecting rod *n'*.

The etching paddle consists of a square inverted box constructed of rolled aluminum and comprises outer top sheets *q* and sides *p*. Depending from the top sheets *q* are ribs *o* formed by double folds in a sheet of aluminum, which has its free ends overlapped by the top sheets. The outer top sheets are turned upwardly as are also the

sheets from which the ribs *o* are formed to provide spaces for receiving the cross plates *r* and form cross bars as indicated at *l*. In this manner not only does the etching paddle become a structure of great strength, this being due to its construction out of rolled aluminium, as compared with the cast aluminium, used up to the present for this purpose, but it has the advantage of greater endurance against the attack of the etching liquid. Also repairs are more easily effected than when a cast etching paddle is used.

In order to guide the etching paddle during its movement in a horizontal direction, guide pieces *s* are joined to the cross-bars *l*, which work on the rails *t*, at the side of the lid opening *h* the rails being carried by stands *u* fixed to the frame *a*.

The revolving sliding crank mechanism for driving the etching paddle consists of a disk *w* driven from an electric motor *d* by means of friction wheels *v* or the like; said disk is carried by the fixed axle *x* so as to turn thereon. The pivot *x* is provided with a spur wheel *x'* which meshes with the planet wheel *z* supported on the disk *w*, by the pivot *y*, so as to revolve. This planet wheel is formed on the side away from the disk *w* into a guide 27 of swallow-tailed form in cross section, in which a slide 28 is mounted so that its position may be altered. The slide is provided with a pivot 29, on which works the sliding crank rod *n*, with the crank pin *n*² which slides by means of a slot 30 on the fixed axle *x*, and the connecting rod *n'* connects the pin *n*² with the crosshead *m* and so reciprocates the paddle. A cover 31 covers usually the whole apparatus. By this means, a varying reciprocating motion can be given to the etching paddle, and moreover the limits of movement can be altered by varying the position of the pivot 29 of the crank rod *n*, in the slide 27.

On one side of the frame *a* a water tank 32 is provided, of which the top edge is equal in height to the lower edge of the opening *h* of the etching bath tub *c*. This tank serves for washing the plates after the etching and can be supplied with water from the pipe 33 by means of a hose 34, which is attached to the knee joint 35 of the drain pipe 36. In order that the pipe system 33 may be fixed direct on to the pipe 35, there are provided on each side of the knee joints, taps 37, and 38. If the tap 37 is opened and 38 closed, then the tank 32 is filled. If on the other hand the tap 37 be shut and the tap 38 opened, then if the hose 34 is placed in the tank 32, the contents of the tank will be conducted to the drain pipe 36 by siphon action. In the same manner the etching bath tub *c* can also be emptied.

The improved etching machine, apart

from better and quicker etching than those used up to the present, offers the advantages of greater simplicity in construction and management, more especially in the points that only one central driving mechanism is used for the driving of the etching paddle, and that parts of the machine itself need no longer be moved for the insertion and removal of the plates.

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

1. In an etching machine, the combination with a bath tub having a reciprocating paddle, of means for imparting a rectilinear motion to same with a varying length of travel which periodically repeats itself, substantially as and for the purpose set forth.

2. The combination in an etching machine of a bath tub having a reciprocating paddle, and means for varying the motion of the said paddle consisting of a fixed central pivot, a fixed pinion thereon, a rotating disk on the pivot, a planet wheel meshing with the pinion, a pivot support for the planet wheel on the rotating disk, a slotted link pivoted at one end to the planet wheel, said slotted portion adapted to slide on an extension of the fixed central pivot, a connecting rod between the slotted link and the crosshead of the paddle, and means for rotating the disk on the central pivot, substantially as described.

3. The combination in an etching machine of a bath tub having a reciprocating paddle, and means for varying the motion of the said paddle consisting of a fixed central pivot, a fixed pinion thereon, a rotating disk on the pivot, a planet wheel meshing with the pinion, a pivot support for the planet wheel on the rotating disk, a slotted link pivoted at one end to the planet wheel, said slotted portion adapted to slide on an extension of the fixed central pivot, a slide on the planet wheel for the support of the slotted link pivot, means for securing the said support at any position in the said slide, a connecting rod between the slotted link and the crosshead of the paddle, and means for rotating the disk on the central pivot, substantially as set forth.

4. In an etching machine, a reciprocating paddle consisting of rows of corrugated sheets with angular uprights coöperating with rows of flat top plates having angular uprights, ends on the top plates overlapping the free ends of the corrugated sheets, cross plates coöperating with the uprights to form supports for the guide runners, guide runners attached thereto, and a crosshead also attached thereto, substantially as described.

5. The combination in an etching machine, of a framework having guide rails carrying the reciprocating paddle, a bath

tub with a partially open top, crank and link mechanism by which the said bath tub is supported on the framework, driving means giving a varying motion to a slotted link, and a connecting rod connecting such
5 slotted link with the crosshead of the reciprocating paddle, substantially as set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

EUGEN ALBERT.

Witnesses:

A. V. W. COTTER,
MATHILDE R. HELD.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
