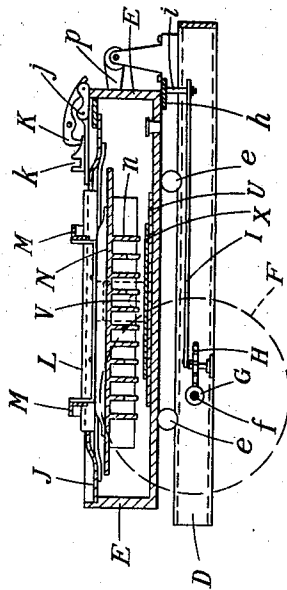
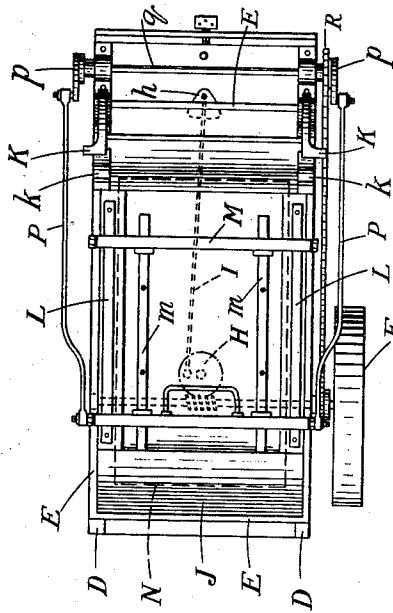
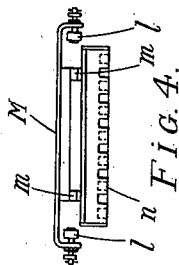
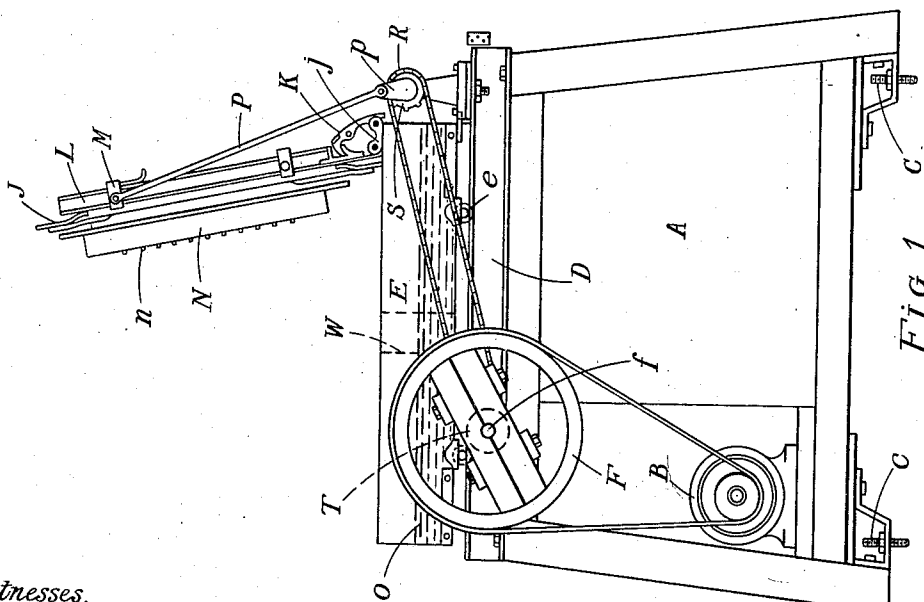


APPLICATION FILED NOV. 29, 1907.

Patented July 27, 1909.



Eugen Albert per Sydney E. Page.
Inventor. Attorney.

UNITED STATES PATENT OFFICE.

EUGEN ALBERT, OF MUNICH, GERMANY.

ETCHING-MACHINE.

No. 928,923.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed November 29, 1907. Serial No. 404,380.

To all whom it may concern:

Be it known that I, EUGEN ALBERT, a subject of the Emperor of Germany, residing at Schwabingerlandstrasse 55, in Munich, Germany, have invented certain new and useful Improvements in Etching-Machines, of which the following is a specification.

My invention relates to improvements in apparatus for etching plates.

The primary object of my improvement is to provide an effective and expeditious etching machine.

Another object is to construct a machine which causes a maximum number of the atoms of the etching liquid to come into contact with the surface of the plate in a short time; and a further object is to enable the plate to be readily inspected during the progress of the work.

These and other objects I attain by the novel construction and arrangement of parts illustrated in the accompanying drawings, in which:—

Figure 1, is a side elevation showing the complete machine. Fig. 2, is a longitudinal sectional view of the operative parts of the machine. Fig. 3, is a plan view of the top of the apparatus. Fig. 4, is an end elevation of a stirring device with recessed ribs. Fig. 5, shows the ends of the ribs in plan, and Fig. 6, shows in plan view another form of stirring device.

A is a stand upon which the etching bath is mounted; it may conveniently inclose a motor such as B for the driving of the machine, and it is provided with set screws C C by which the level of the liquid in the bath may be adjusted to the horizontal.

Upon the top of the stand A two channel irons D are fixed and the bath E is mounted to reciprocate thereon on the rollers *e, e*. The shaft *f* carrying the pulley wheel F is also supported in bearings on the channel irons D, and midway between the channel irons operates by the worm G the worm wheel H which slowly reciprocates the connecting rod I carrying the pin *i* which connects to the lug *h* on the bath E, the bath E is thus caused to move slowly backward and forward. Upon the top of the bath a cover J is hinged at *j*; it is open in its middle portion and its sides are furnished with an iron track L upon which run the rollers *l* carried

at the ends of the cross bars M which are attached to ribs *m* on the back of the stirring device N; the stirrer N is provided with projecting ribs *n* which dip into the etching liquid O. The end roller pivot *l* is extended outward on each side of the bath and is reciprocated through the medium of connecting rods P; motion is given to the connecting rods P by cranks *p*, on the shaft *q* which is rotated in turn by a chain R connecting sprocket wheels S and T on the said shaft *q* and the driving shaft *f* respectively. The plate X to be etched is laid upon a wooden bed U which is provided with side pieces V, recesses W being made in the sides of the bath for their accommodation and in order that the bed U shall be kept at the bottom of the bath when the stirrer is working projections on the cover press down the side pieces V. By quickly reciprocating the stirrer N and slowly reciprocating the bath itself a succession of small movements is imparted to the etching liquid O over the surface of the plate X and the etching rapidly accomplished; a foam producing substance such as *Radix Quilaja Saponaria* may be added to the liquid to effect better cleaning of the recesses in the plate and solid particles may be introduced into the liquid to effect removal of the oxid by mechanical rubbing against the surfaces. In order that the progress of the work may be examined, as soon as the cover J is raised the wooden bed U is released and floats to the top of the liquid carrying the plate X with it. Hooks K are provided which catching into the recesses *k* hold the cover open during examination or for other operations to the bath.

An ice tank and a jacket may be formed in connection with the bath for the purpose of keeping it at the requisite temperature.

It will be understood that the machine may be driven either by hand, or by power with a belt, or the like.

The ribs of the stirring device may be either flat plates as shown in Fig. 2, or they may have staggered recesses cut from their edges as shown in Fig. 4; or the stirring device may be composed of prongs as shown in plan in Fig. 5, the object of staggering the recesses between the prongs being to direct the liquid in varying directions over the surface of the plate.

I claim as my invention:—

1. In an etching machine, a bath containing etching liquid, a stirring device having rigid projections thereon mounted so that the
5 ends of the projections can reciprocate clear of but in close proximity to the surface of the plate to be etched, means for imparting a small but rapid reciprocating movement to the stirring device, and means for imparting
10 a slow reciprocating movement to the bath.

2. In an etching machine, a bath containing etching liquid a stirring device having ribs or prongs thereon mounted so that the
15 ends of the ribs or prongs can reciprocate in close proximity to the surface of the plate to be etched, means for imparting a small but rapid reciprocating movement to the stirring device, a floating bed as a support for the
20 plate to be etched, side pieces connected thereto located in recesses in the sides of the bath, a cover to the bath, and projections on the cover of the bath cooperating with the side pieces to sink the floating bed when the
25 cover is closed, substantially as described.

3. In an etching machine, a bath containing etching liquid a stirring device having ribs or prongs thereon mounted so that the
30 ends of the ribs or prongs can reciprocate in close proximity to the surface of the plate to be etched, means for imparting a small but rapid reciprocating movement to the stirring device, means for imparting a slow reciprocating movement to the bath, a float-
35 ing bed as a support for the plate to be etched, side pieces connected thereto located in recesses in the sides of the bath, a cover to the bath, and projections on the cover of the bath cooperating with the side pieces to
40 sink the floating bed when the cover is closed, substantially as described.

4. In an etching machine, a bath containing etching liquid a cover hinged thereto having its central portion cut away, a mov-
45 able stirring device substantially closing the open central part of the cover, tracks on the sides of the cover, rollers running thereon, means passing through the central opening of the cover for connecting the movable
50 stirring device with the rollers, and means for imparting a small but rapid reciprocating movement to the stirring device.

5. In an etching machine a bath containing etching liquid, a cover hinged thereto
55 having its central portion cut away, a movable stirring device substantially closing the open central part of the cover, tracks on the sides of the cover, rollers running thereon means passing through the central opening
60 of the cover for connecting the movable stirring device with the rollers, means for imparting a small but rapid reciprocating movement to the stirring device, and means for imparting a slow reciprocating move-
65 ment to the bath.

6. In an etching machine, a bath contain-
ing etching liquid, a stirring device having
rigid ribs or prongs thereon mounted so that
the ends of the ribs or prongs can recipro- 70
cate clear of but in close proximity to the
surface of the plate to be etched, a shaft
mounted beyond one end of the bath, cranks
at each end of said shaft, connecting rods
connecting the cranks with the stirring de- 75
vice, a driving shaft sprocket wheels on the
crank shaft and on the driving shaft, a chain
connecting the sprocket wheels, and means
for operating the driving shaft, substantially
as described.

7. In an etching machine, a bath contain- 80
ing etching liquid, a stirring device having
rigid ribs or prongs thereon mounted so that
the ends of the ribs or prongs can recipro-
cate clear of but in close proximity to the
surface of the plate to be etched, a shaft 85
mounted beyond one end of the bath cranks
at each end of said shaft, connecting rods
connecting the cranks with the stirring de-
vice, a driving shaft sprocket wheels on the
crank shaft and on the driving shaft, a chain 90
connecting the sprocket wheels means for
operating the driving shaft, a worm on the
driving shaft, a worm wheel meshing with
same mounted on the framework of the ma-
chine a crank pin on same, and a connecting 95
rod connecting the crank pin with a pin on
the etching bath, substantially as described.

8. In an etching machine, a bath contain-
ing etching liquid, a cover hinged thereto, a
stirring device having ribs or prongs thereon 100
mounted so that the ends of the ribs or
prongs can reciprocate in close proximity to
the surface of the plate to be etched, a float-
ing bed as a support for the plate to be
etched, side pieces connected thereto located 105
in recesses in the sides of the bath, projec-
tions on the cover of the bath cooperating
with the side pieces to sink the floating bed
when the cover is closed, a shaft mounted
beyond one end of the bath, cranks at each 110
end of said shaft connecting rods connecting
the cranks with the stirring device, a driv-
ing shaft and sprocket wheels on the crank
shaft and on the driving shaft.

9. In an etching machine, a bath contain- 115
ing etching liquid, a cover hinged thereto,
a stirring device having ribs or prongs
thereon mounted so that the ends of the ribs
or prongs can reciprocate in close proximity
to the surface of the plate to be etched, a 120
floating bed as a support for the plate to be
etched, side pieces connected thereto located
in recesses in the sides of the bath, projec-
tions on the cover of the bath cooperating
with the side pieces to sink the floating bed 125
when the cover is closed, a shaft mounted
beyond one end of the bath, cranks at each
end of said shaft connecting rods con-
necting the cranks with the stirring device,
a driving shaft sprocket wheels on the crank 130

shaft and on the driving shaft, a worm on the driving shaft, a worm wheel meshing with same mounted on the framework of the machine a crank pin on same, and a connecting rod connecting the crank pin with a pin on the etching bath, substantially as described.

10. In an etching machine, a bath containing etching liquid, a cover hinged thereto having its central portion cut away, a movable stirring device substantially closing the open central part of the cover and having ribs or prongs thereon the extremities of which are in close proximity to the surface of the plate to be etched, tracks on the sides of the cover, rollers running thereon, cross-bars attached to ribs on the back of the stirring device and carrying the said rollers, a shaft mounted beyond one end of the bath, cranks at each end of said shaft, connecting rods connecting the cranks with pins projecting from a cross-bar on the stirring device, a driving shaft sprocket wheels on the crank shaft and on the driving shaft, a chain connecting the sprocket wheels, and means for operating the driving shaft, substantially as described.

11. In an etching machine, a bath containing etching liquid, a cover hinged thereto having its central portion cut away, a movable stirring device substantially closing the open central part of the cover and having ribs or prongs thereon the extremities of which are in close proximity to the surface of the plate to be etched, tracks on the sides of the cover, rollers running thereon, cross-bars attached to ribs on the back of the stirring device and carrying the said rollers, a shaft mounted beyond one end of the bath, cranks at each end of said shaft, connecting rods connecting the cranks with pins pro-

jecting from a cross-bar on the stirring device, a driving shaft sprocket wheels on the crank shaft and on the driving shaft, a chain connecting the sprocket wheels means for operating the driving shaft, a worm on the driving shaft, a worm wheel meshing with same mounted on the framework of the machine, a crank pin on same, and a connecting rod connecting the crank pin with a pin on the etching bath, substantially as described.

12. In an etching apparatus or the like, the combination of a receptacle for the etching bath, means therein to hold a plate to be etched, an agitator having ribs adapted to reciprocate in the bath over the plate, and means to change constantly the zone of reciprocation of the agitator.

13. In an etching apparatus or the like, the combination of means to hold or contain a plate to be etched an agitator for the etching bath, means to drive the agitator, and means to effect an additional relative movement between the plate holding or containing means and the agitator as the latter is being driven.

14. In an etching apparatus or the like, the combination of means to hold or contain a plate to be etched, an agitator for the etching bath, means to reciprocate the agitator, and means to effect an additional relative movement between the plate holding or containing means and the agitator as the latter is being reciprocated.

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

EUGEN ALBERT.

Witnesses:

LOUIS F. MUELLER,
MATHILDE K. HELD.