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By their Attorney,

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UNITED STATES PATENT OFFICE.

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ETCHING-MACHINE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, ROBERT R. PAGE, a citizen of the United States, residing at New York, in the county of New York and State of New York, and FRANK J. BLACK, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Etching-Machines, of which the following is a specification.

This invention has for its object to provide an improved form of etching machine, in which the plate is supported so as to be moved up and down in the bath, and then can be brought upward adjacent the under side of the cover, and the latter swung to open position and inclined backward, both to facilitate a very quick inspection of the plate, and to readily permit the same to be washed off by a hose or the like, without being disconnected from the carrier on the cover.

A further object is to provide means for moving the plate up and down in the bath by operative means carried entirely by and upon the top of the cover.

In the accompanying drawing representing one embodiment of our invention, Figure 1, is a side elevation, partly in section, to show the interior, Fig. 2 is an end elevation, partly broken to show the interior of the receptacle; and Fig. 3 is a fragmentary plan view showing the operating means. Fig. 4 is a bottom view of the plunger, slightly reduced, showing the plate gripping means, the portion of the receptacle and the guides being shown in dotted lines.

The device is shown as comprising a tank or receptacle 5 having a lid or cover 6 hinged thereto along the edge 7 at the top of the tank. The tank and lid are preferably made of wood, and contain a lining 8 of an acid resistant material such as hard rubber. It will be seen that the cover can swing entirely open, and drop down at an angle of about forty-five degrees, as shown in Fig. 2. It may be supported in this position by one or more brackets 9.

In the cover is an opening 10 at the central portion, in which reciprocates a plunger 12. Suitable means are provided on top of the cover for reciprocating this plunger, and to the lower end of the plunger that is inside of the box when the cover is closed,

is secured a carrier for the plate to be etched, or treated in a bath of liquid B in the receptacle 5. As shown, a cross-bar 14 is secured on the lower end of the plunger, provided with adjustable screws 15, 15 slidable along the bar in a groove 14, which have nuts 16, 16 and washers 3, 3, forming grooves for engaging the plate, the screws being adjustable for different widths of plate. Preferably another similar bar 17 is secured on the plunger extending at right angles to the said bar. Obviously, when the upper end of the plunger 12 is reciprocated the plate will move up and down in the bath in the receptacle. Guides 18 and 19 are secured on two opposite sides of the tank in which slide gibbs 20 and 21 at the extremities of the bar 14, these guides prevent the corner of the plunger from scraping the sides of the receptacle and maintain the plate and its holder in rectangular alignment with the sides of the said receptacle.

The means for reciprocating the plunger are preferably mounted on the cover, and are shown as comprising a crank 22 journaled in a bracket 23 at one edge of the cover, with which crank is connected an arm 24 having a handle 25, by which the crank can be rotated. On a post 26 is pivoted a lever 27 having a wide slotted end 28, into which projects a pin 29 on the crank 22, by which means the lever is reciprocated from the handle. The other end of the lever has a slot 2 through which projects the plunger 12. This end also has a transverse opening 30 into which is inserted a pin 31, that is shown as passing through an opening 32 in the plunger 12. Hence by turning the handle 25 the plunger will be reciprocated. But upon withdrawing the pin the plunger can be elevated to a place near the under face of the lid, as indicated in Fig. 2, and secured in this position by the pin 31 being passed through a hole 34 in the plunger. The plunger being connected to the lever in its upper position the lid can be swung open to the position of Fig. 2, and the plate inserted. Then the lid is closed and the plunger lowered to the position of Fig. 1, and the pin replaced. The handle is then turned and the plate will be reciprocated while immersed in the bath. To inspect the plate it is only necessary to draw the plunger up to its upper position and secure it by the pin, and then swing the lid

back to the open position of Fig. 2. This can be done readily without removing the plate from the plate carrier. When it is found that the plate is sufficiently etched, it can be washed in the open position of the lid, by merely running water from a hose, and the lid and carrier also washed, permitting the removal of the plate without the operator getting acid on his hands.

10 It has been found by this apparatus that the process of etching can be accomplished in much less time than formerly, where it took ten to twelve minutes for the compound to sufficiently cut in the plate, by
15 this apparatus the time can be reduced to about two minutes. And it is not necessary to remove the plate from its holder for washing, but this can be done by merely turning on the hose.

20 Having thus described our invention, we claim:

1. An etching machine as described, comprised of a tank or receptacle having a cover hinged thereto, a plunger having plate
25 gripping means and guiding members oppositely arranged thereon, said receptacle having a pair of oppositely located vertically arranged guides thereon, said guides adapted to receive said plunger guiding
30 means, said cover being so mounted as to permit inversion of the plate for inspection and washing exteriorly of the tank without removing the plate from the plate gripping means.

35 2. In an etching machine, comprised of a receptacle, a hinged cover thereon, a vertically operated plunger provided with an adjustable plate gripping means, said plunger being removably mounted upon said
40 cover, said plate gripping means comprised of a groove in said plunger, adjustable plate holding means fitting in said groove and slidable therein whereby various sized plates may be adjustably held, guiding members
45 oppositely arranged on said plunger, and side guides in said receptacle for engaging said plunger guiding members.

3. In an etching machine, the combination
50 of a receptacle, a lid hinged at the top of the receptacle, a plunger reciprocating in an opening in the lid, guiding members on said plunger, an adjustable plate carrier on the plunger arranged to move a plate up and
55 down in the bath in the receptacle when the plunger is reciprocated, a pair of side guides interiorly arranged in said receptacle to guide said plunger, and operating means carried by the lid outside of the receptacle for reciprocating the plunger to move the
60 plate up and down in the bath in the receptacle.

4. In an etching machine, the combination
65 of a receptacle, a lid hinged at the top of the receptacle, a plunger reciprocating in an opening in the lid, guiding members on said

plunger, an adjustable plate carrier on the plunger arranged to move a plate up and down in the bath in the receptacle when the plunger is reciprocated, said guiding means on said plunger adapted to fit into a pair of
70 oppositely located vertically arranged guide-ways, and operating means carried by the lid outside of the receptacle for causing said reciprocation of the plunger, the said plunger being adjustably connected with the oper-
75 ating means to permit its being shifted upward near the lower face of the lid, whereby the lid can be swung entirely open and the plate supported on top of the said lid when the same is in its inverted position.

5. In an etching machine, the combination
80 of a receptacle, a lid hinged at the top of the receptacle, a plunger reciprocating in an opening in the lid, guiding members on said plunger, an adjustable plate carrier on the plunger arranged to carry a plate up
85 and down in the bath in the receptacle when the plunger is reciprocated, vertical guide-ways in said receptacle, said guide-ways adapted to slidably receive the said plunger
90 guiding members, operating means carried by the lid outside of the receptacle for causing said reciprocation of the plunger, the same being adjustably connected with the
95 operating means to permit its being shifted near the lower face of the lid, whereby the lid can be swung entirely open and the plate supported on top of the lid when the same is in the inverted position, and lid support-
100 ing means attached to the side of the receptacle.

6. In an etching machine, the combination
105 of a receptacle, a lid hinged at the top of the receptacle, an opening in said lid, a plunger reciprocating in said opening, a pair of guiding members on said plunger, an adjustable plate carrier on the plunger arranged to carry a plate up and down in the
110 bath in the receptacle during said reciprocation, operating means carried by the lid outside of the receptacle for causing said reciprocation of said plunger, the receptacle having guide members on opposite sides for the plate carrier, and side guides vertically
115 arranged in said receptacle so constructed as to permit the exit and reentry of said plunger.

7. In an etching machine, the combination
120 of a receptacle, a lid hinged at the top of the receptacle, an opening in said lid, a plunger reciprocating in said opening, a pair of guiding members on said plunger, an adjustable plate carrier on the plunger arranged to move a plate up and down in the
125 bath in the receptacle during the said reciprocation, a crank member rotatably mounted on the lid, a handle for turning the crank member, a lever having one end connected with the plunger whereby turning of the crank will cause the said reciprocation
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of the said plunger, the same being adjust-
ably connected with the lever to permit its
being shifted upward near the lower face
of the said lid whereby the lid can be swung
5 entirely open and the plate supported on top
of the lid when the same is in the inverted
position, and guides oppositely arranged in
the interior of said receptacle to guide said
plunger and maintain the same in parallel
10 alinement with the sides of said receptacle
and arranged to permit the removal and re-

entry of said plunger in said parallel aline-
ment.

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