

R. R. PAGE.
ETCHING APPARATUS.
APPLICATION FILED APR. 30, 1919.

1,340,975.

Patented May 25, 1920.
2 SHEETS—SHEET 1.

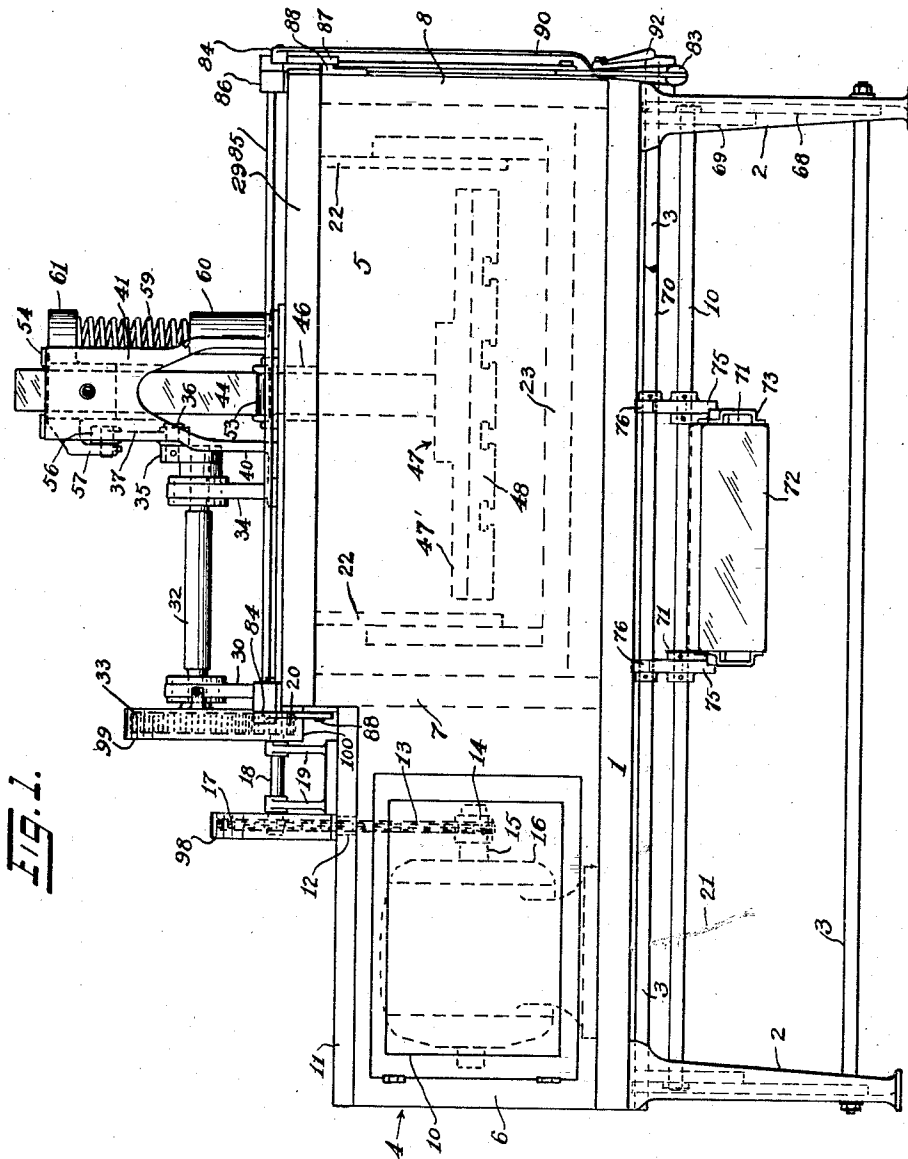


FIG. 1.

Witnesses:
W. Whitman
H. D. Penney

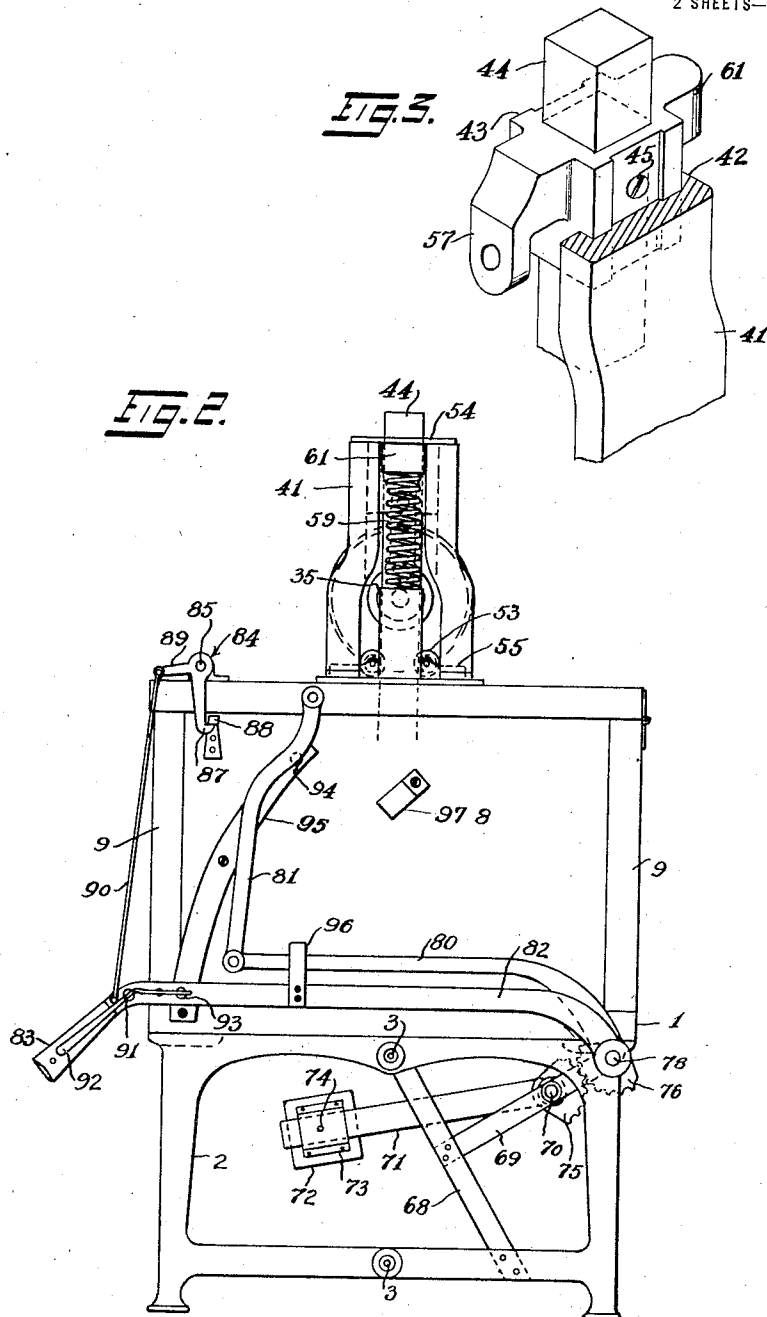
Inventor:
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By his Atty, *V. H. Richard*

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UNITED STATES PATENT OFFICE.

ROBERT R. PAGE, OF BROOKLYN, NEW YORK.

ETCHING APPARATUS.

1,340,975.

Specification of Letters Patent.

Patented May 25, 1920.

Application filed April 30, 1919. Serial No. 293,735.

To all whom it may concern:

Be it known that I, ROBERT R. PAGE, a citizen of the United States, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Etching Apparatus, of which the following is a specification.

This invention relates to etching apparatus for dipping sensitized plates into a bath of reagents in a process of preparing metallic and grained plates for printing; and the invention relates more particularly to improvements on the apparatus shown and described in my United States Patent No. 1,152,435, issued September 7, 1915, for etching apparatus.

Objects of the invention are to provide improved means for opening and closing the apparatus for the attaching of the plates to the plate support; to provide improved means for counterbalancing the cover when opened; to provide improved actuatable means on the cover for reciprocating the movable plate support; and to provide improved connecting means for connecting the actuatable means on the cover with power in order to operate said actuatable means by such power.

These and other features, capabilities and advantages of the invention will appear from the subjoined detailed description of one specific embodiment thereof illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of the apparatus.

Fig. 2, is an end elevation of the same with the cover in closed position; and

Fig. 3 is a perspective view of a detail.

In the embodiment shown, there is provided a platform 1 supported by two brackets, 2, 2, secured to the platform 1 at each end thereof, which brackets are secured to one another by tie rods 3, 3, one connecting the upper ends of the brackets 2 and the other connecting the lower ends of such brackets. The platform 1 forms the base for two housings, the motor housing 4, and the etching chamber housing 5.

The motor housing 4, is shown at the left hand side of Fig. 1, and comprises a left hand end wall 6 and a right hand end wall 7 which wall 7 is also the left hand end wall of the etching chamber housing 5. The wall 7 it will be noticed is of slightly greater altitude than the wall 6, and corresponds in height to the right hand end wall 8 of the

housing 5 for the etching chamber which is at the right hand end of the platform 1. The housings 4 and 5 have common rear and front walls 9, which walls 9 are of slightly greater altitude where they inclose the housing 5. The front wall 9 is provided with a screen door 10 at the left hand side thereof and permits access to the interior of the motor housing 4, this screen door being of such fabrication that it will permit circulation of air to the motor and yet prevent dust from passing therethrough. The housing 4 is provided with a rigid roof member 11 having an opening 12 there- through for the passage of the chain drive 13 passing around the sprocket wheel 14 on the shaft 15 of the motor 16 positioned in the housing 4, and also passing around the gear 17 mounted on the shaft 18 journaled in the bracket 19 positioned on the roof member 11 of the housing 4, the shaft 18 having a spur gear 20 at one end thereof which is adjacent to the wall 7. The motor 16 can be supplied with current from any suitable source of supply by means of the mains 21.

The etching chamber in the housing 5 is equipped with soap stone walls 22 and floor 23 for withstanding the corrosive effects of the chemical action to take place therein, but these are described in detail in said patent and need not be further mentioned here. The cover 29 is hinged to the rear wall 9 and extends completely across the upper edge of the front wall 9 and the upper edges of the end walls 7 and 8. At the left end of the cover 29 there is positioned a bearing bracket 30 in the upper end of which is journaled a shaft 32 having fixed thereto at one end a gear 33 which is in mesh with the spur gear 20 on the shaft 18 when the cover is in closed position. The matter thus far described is shown in said patent.

The other end of the shaft 32 is disposed in the bearing bracket 34 and has fixed thereto a crank 35 having a stud 36 disposed in its right hand face to which is pivotally connected a link 37.

A pair of brackets 40 disposed substantially in the middle of the cover 29, have upwardly extending portions 41 each formed into a box-shaped guide 42 (Fig. 3). Between such box-shaped guides reciprocates a head block 43 having a central squared opening in which is received the upper end of the squared plunger rod 44 which is held

fixed in place by the screw 45. The cover 29 is provided with an opening 46 through which the plunger rod 44 is disposed to reciprocate the latter being additionally
5 guided by guide rollers 53 mounted in brackets 54 on both sides of the opening 46.

At the bottom end of the plunger rod 44 is secured a metallic plate supporting member 47 comprising an upper backing member 47' and a lower attaching member 48, provided with horizontal dovetail slots 51 by means of which the metallic plates to be etched can be secured in place as described in said patent.

15 The guides 42 are held in proper spaced relation by straps 54 secured to the tops thereof. The guides 42 and the rollers 53 hold the supporting member against any rotation about the axis of the plunger 44, making other guide means for the support-
20 ing member unnecessary.

The plunger 44 is shown in the present instance reciprocated by means of the link 37, the upper end 56 of which is pivotally
25 connected to the inner face of a projection 57 integral with the head block 43.

A spring 59 compressed between a support 60 on the cover 29 and an extension 61 on the block 43 tends to counterbalance
30 wholly or partly the weight of the rod 44 and supporting member 46.

When it is desired to remove from the etching chamber the metallic plate that has been treated, the plunger rod 44 is first
35 raised to its upper-most position so that the crank 35 will be on the dead center and the supporting member held raised by said crank and the spring 59.

For raising the cover 29, an efficient arrangement has been provided. Along the lower rear edge of the platform 1, and secured in the brackets 2, 2, there is provided an operating shaft 78 on which is fixed a forwardly extending rock lever 80, (Fig. 2)
45 pivotally connected by a link 81 to one lateral edge of the cover 29.

For counterbalancing the weight of the cover 29 when raised, the following novel means is provided: Secured to upper and
50 lower parts of each bracket 2 is a diagonal support 68 to which is secured the lower end of a shaft support 69 having its upper end loosely receiving and supported by the shaft 78.

55 Between the shaft supports 69 there is loosely supported the supporting shaft 70 on which are fixed the supporting levers 71 carrying at their free ends the counterweight 72 secured to said levers by means of pocket-plates 73 secured to the ends of the counterweight and receiving the ends of the supporting levers fixed therein by means of a bolt or the like 74. Adjacent to the inner end of each lever 71 there is fixed,
60 on the supporting shaft, a toothed sector 75

meshing with a similar drive sector 76 fixed on the operating shaft 78.

From the foregoing it will be seen that as the cover 29 is raised the counterweight will be lowered, thus effectually counter-
70 balancing the weight of the cover and making the cover easily raised in the manner described in said patent and presently to be explained. It is noted that the counterweight is under the housing and entirely
75 out of the way, being located in the space comprised within the confines of the support for the apparatus.

On the right hand side of the lever 80 adjacent to the wall 8, there is fixed to the
80 shaft 78 a hand lever 82 having a handle 83 at its front end. By raising this handle 83, the shaft 78 will be turned, by which means the lever 80 and the links 81 will raise the cover 29.
85

For locking the cover 29 in closed position, there are provided latches 84 disposed at each end of the cover 29 and pivotally mounted on the shaft 85 (Fig. 1.) mounted in bearings 86 disposed on the front upper
90 end of the cover 29, each of the latches 84 having a depending hook portion 87 (Fig. 2) to engage a lug 88 one disposed on each of the walls 7 and 8 respectively outside of the etching chamber. The latch 84 adjacent to
95 the wall 8 has in addition a forwardly extending portion 89 at the free end of which it is connected by a link 90 with the handle 83. Thus when the handle 83 is raised to raise the cover, it will thrust upwardly the
100 extension 89 thereby rocking the shaft 85 which in turn withdraws the latches 84 out of engagement with the lugs 88 to release the cover 32.

For locking the lever 82 in its lower portion, there is provided a lever 91 fulcrumed on the handle 83 having a handle portion 92 to be grasped simultaneously with the handle 83, and a pin 93 at its other end which extends through an opening in the lever 82.
105 In the path of movement of this pin 93, there are provided two pin openings being formed in a curved plate 95 attached to the wall 8, one of the pin openings 94 being provided at the upper end of the plate 95 to be
115 engaged by the pin 93 when the lever 82 is in raised position or open position of the cover 29. This lever 91 is pressed so that its pin normally extends outwardly but will be retracted when the handle portion 92 is
120 pressed toward the handle portion 83. To serve as a guide for maintaining the lever 82 adjacent to the wall 8 so as to insure engagement of the pin 93 in the pin opening 94 at the upper end of the plate 95, there is provided a laterally extending portion 96 on the lever 82 which is adapted to glide under and be positioned under the offset portion 97 secured to the wall 8 when the lever 82 is in raised position. This laterally extending
125 130

portion 96 incidentally also serves to guide the lever 80 adjacent to the wall 8.

As shown in Fig. 1, the gear 17 is provided with a suitable hood 98 attached to the roof member 11, and the gear 33 fixed to move with the cover 29 is provided with a suitable hood 99 which has a downwardly and outwardly extending portion 100 to cover the spur gear 20 when the cover 29 is in lower or closed position, but which outwardly extending portion 100 of the hood 99 permits the hood to be raised with the cover 29.

The operation of the apparatus and process is as follows: The etching chamber is filled with liquid to a suitable height, while the cover 29 is in an open or raised position, the plunger rod 44 being maintained in raised position by the link 37 on the dead center and the spring 59; the metallic plates to be treated are attached to the attaching member 48. There-upon the cover is lowered into closed position, the gear 33 connected therewith having in the meantime come into mesh with the spur gear 20, and thereupon the power turned on. The supporting plate 48 is sufficiently spaced from the walls 22 to permit the plate at its upper limit to clear the walls when the hinged cover is being opened or closed. Through the train of gears and lever bracket connection with the plunger rod 44, the plunger rod 44 will be reciprocated up and down so that the plate will be immersed into the liquid in the etching chamber or come into contact with such liquid and be removed therefrom, and this operation be repeated with the lowering and raising of the plunger rod 44.

I claim as my invention:

1. In an apparatus of the character described, the combination of a chamber; a cover hinged over said chamber; guide means carried by said cover; a supporting means guided by said guide means; a driving crank; a link connecting said crank and supporting means; and a supporting plate fixed on said supporting means in said chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the plate is held at its upper limit by the placing of the crank at its upper dead center.

2. In an apparatus of the character described, the combination of a chamber; a roof cover hinged over said chamber; guide means above said cover, a rod guided in said guide means; a driving crank; a link connecting and connected to said rod and crank only; and a horizontal supporting plate fixed on the lower end of said rod in said chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the plate is held in its upper limit by placing the crank at its upper dead center.

3. In an apparatus of the character de-

scribed, the combination of a chamber; a roof cover hinged over said chamber; guide means above said cover; a rod guided in said guide means; a spring tending to raise said rod to its upmost limit; a driving crank; a link connecting and connected to said rod and crank only; and a horizontal supporting plate fixed on the lower end of said rod in said chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the plate is locked at its upper limit by placing the crank at its upper dead center.

4. In an apparatus of the character described, the combination of a chamber; a roof cover hinged over said chamber; guide means above said cover; a rod guided in said guide means; guide rollers rotatably mounted on said cover at both sides of said rod for additionally guiding the rod; a driving crank; a link connecting said rod and crank; and a horizontal supporting plate fixed on the lower end of said rod in said chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the head block is at its upper dead center.

5. In an apparatus of the character described, the combination of a chamber; a roof cover hinged over said chamber; guide means above said cover; a rod guided in said guide means; a spring tending to raise said rod to its upmost limit; a driving crank; a link connecting said rod and crank; and a horizontal supporting plate fixed on the lower end of said rod in said etching chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the head block is at its upper dead center.

6. In an apparatus of the character described, the combination of an etching chamber; a roof cover hinged over said etching chamber; guide means on said cover; a head block in said guide means and having a projection and an extension; a spring compressed beneath said extension; a driving shaft provided with a crank; a link pivotally connected to said projection and crank; a plunger rod fixed in said head block and passing through said cover; roller brackets on both sides of said rod; rollers mounted in said brackets and engaging said rod; and a horizontal supporting plate fixed on the lower end of said rod in said etching chamber spaced sufficiently from the walls to permit the opening of the cover when the head block is at its upper dead center.

7. In an apparatus of the character described, the combination of a housing providing an etching chamber; a roof cover hinged at the edge over said etching chamber and having an intra-marginal opening therein; guide means above said opening; a

head block in said guide means and having a central squared opening, a projection at one end and an extension at the other; a spring support under said extension; a spring compressed between said support and extension; a shaft; a crank fixed on said shaft; a link pivotally connected to said projection and said crank; means for driving said shaft; a squared plunger rod fixed in said squared opening and passing through said intra-marginal opening; and a support on said rod chamber.

8. In an apparatus of the character described, the combination of a housing providing an etching chamber; a roof cover hinged at the edge over said etching chamber and having an intra-marginal opening therein; guide means above said opening; a head block in said guide means and having a central squared opening, a projection at one end and an extension at the other; a spring support under said extension; a spring compressed between said support and extension; a shaft; a crank fixed on said shaft; a link pivotally connected to said projection and said crank; means for driving said shaft; a squared plunger rod fixed in said squared opening and passing through said intra-marginal opening; roller brackets on both sides of said central opening; rollers mounted in said roller brackets and engaging said rod; and a horizontal supporting plate fixed on the lower end of said rod in said etching chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the head block is at its upper dead center.

9. In an apparatus of the character described, the combination of a housing provided with a motor chamber and an etching chamber; a roof cover hinged at the rear edge over said etching chamber and having a central opening therein; a pair of brackets mounted on said cover adjacent to said opening and having their upper parts co-operating to form a box-shaped guide; a head block in said guide and having a central squared opening; a projection at one end and an extension at the other; a spring support under said extension; a spring compressed between said support and extension; a pair of bearing brackets on said cover; a shaft mounted in said brackets; a crank fixed on the inner end of said shaft; a link pivotally connected to said projection and the outer end of said crank; a driven gear on the outer end of said shaft; a motor in said motor housing; a gear operatively connected with said motor and engaging the underside of said driven gear when said cover is closed; a squared plunger rod fixed in said squared opening and passing through said central opening; roller brackets on both sides of said central opening; rollers mounted in said roller brackets and

engaging said rod; a horizontal supporting plate fixed on the lower end of said rod in said etching chamber out of contact with the walls and spaced sufficiently from said walls to permit the opening of the cover when the head block is at its upper dead center; and means for counterbalancing said cover and holding it open.

10. In an apparatus for etching metallic plates, in combination, an etching chamber, means for support of the etching chamber, a hinged cover for the etching chamber, guide means carried by said cover, a supporting member guided by said guide means, a driving crank, a link connecting said crank and said supporting member for reciprocation of the supporting member, plate-carrying means movable upwardly and downwardly by said supporting member and arranged in the etching chamber to permit raising of said cover when the plate-carrying means is at its upper limit and said crank is at its upper dead center, and a weight located in space comprised within the confines of the means of support for the etching chamber for counter-balancing said cover.

11. In an apparatus for etching metallic plates, in combination, an etching chamber, means for support of the etching chamber, a hinged cover for the etching chamber, guide means carried by said cover, a supporting member guided by said guide means, a driving crank, a link connecting said crank and said supporting member for reciprocation of the supporting member, plate-carrying means movable upwardly and downwardly by said supporting member and arranged in the etching chamber to permit raising of said cover when the plate-carrying means is at its upper limit and said crank is at its upper dead center, and a weight located under the etching chamber in space comprised within the confines of the means of support for the etching chamber for counter-balancing said cover and holding it open.

12. In an apparatus for etching metallic plates in combination, means of support for the apparatus, a main housing, an etching chamber comprised in the main housing, a hinged cover for the etching chamber, guide means carried by said cover, a supporting member guided by said guide means, a driving crank, a link connecting said crank and said supporting member for reciprocation of the supporting member, plate-carrying means movable upwardly and downwardly by said supporting member and arranged to permit raising of said cover when the plate-carrying member is at its upper limit and said crank is at its upper dead center, and a weight located under the etching chamber in space comprised within the confines of the means of support for the apparatus for counter-balancing said cover.

13. In an apparatus for etching metallic plates, in combination, means of support for the apparatus, a main housing, an etching chamber comprised in the main housing, a 5 hinged cover for the etching chamber, guide means carried by said cover, a supporting member guided by said means, a driving crank, a link connecting said crank and said supporting member for reciprocation 10 of the supporting member, plate-carrying means movable upwardly and downwardly by said supporting member and arranged to permit raising of said cover when the plate-carrying member is at its upper limit and said crank is at its upper dead center, and a 15 weight located under the etching chamber in space comprised within the confines of the means of support for the apparatus for counter-balancing said cover and holding it open.

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