C. N. WENDELGASS.

ETCHING MACHINE.

APPLICATION FILED JAN. 13, 1916.

1,254,751.

Patented Jan. 29, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

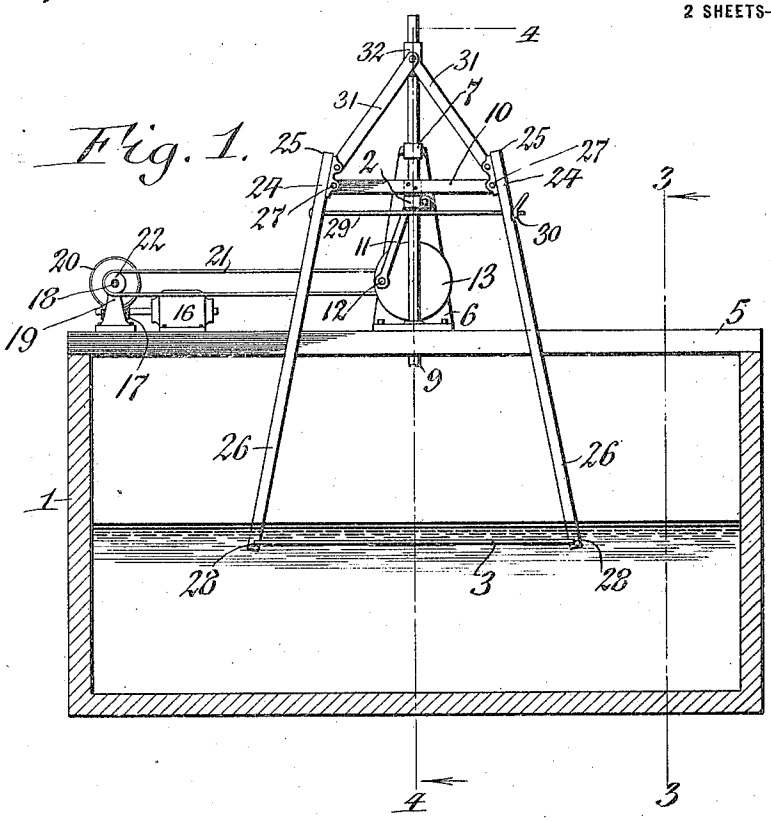
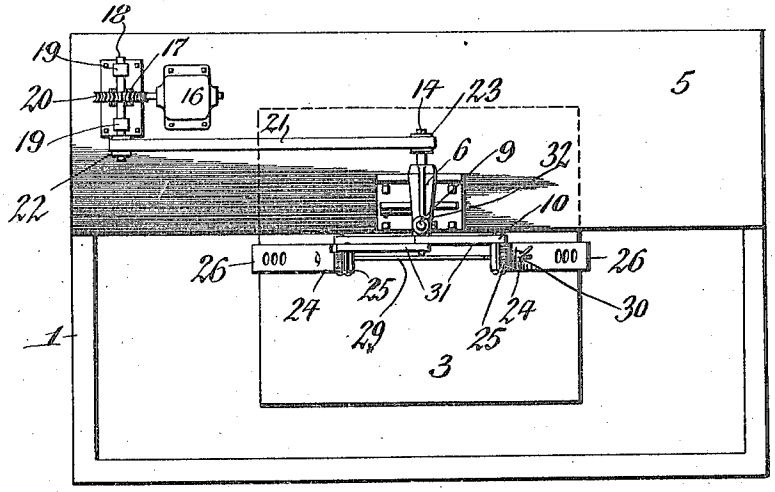


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

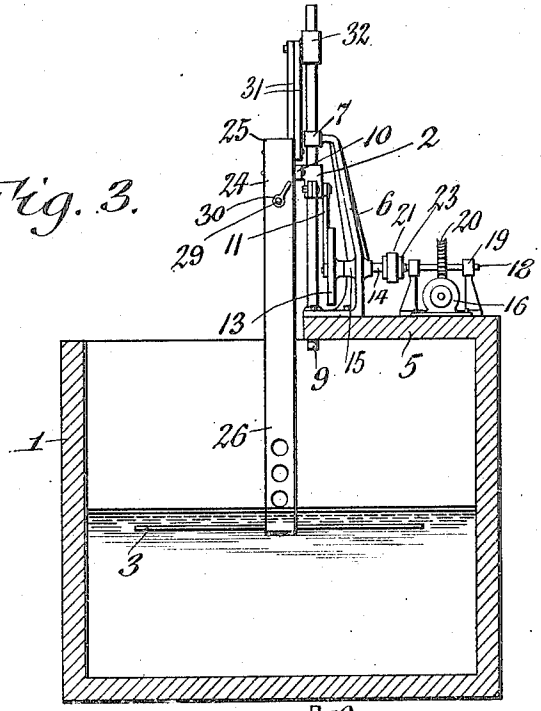


Fig. 5.

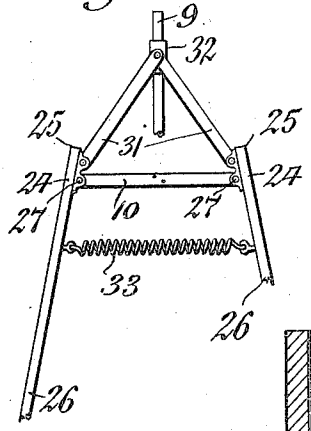
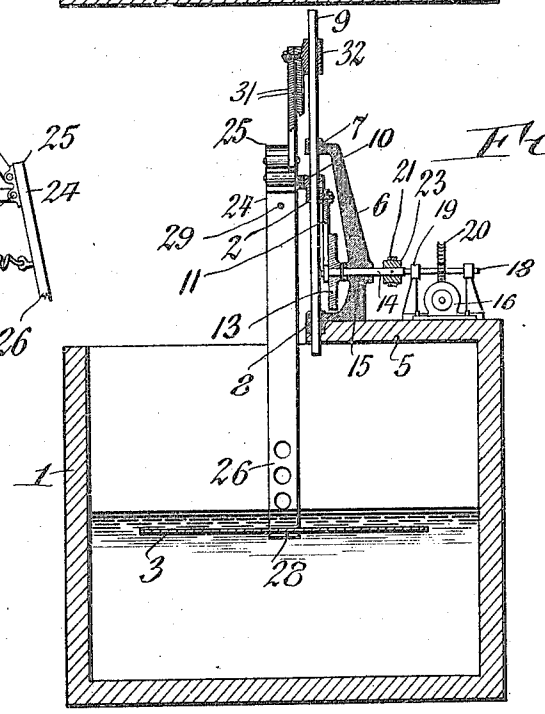


Fig. 4.



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ETCHING-MACHINE.

1,254,751. Specification of Letters Patent. Patented Jan. 29, 1918.

Application filed January 13, 1916. Serial No. 71,853.

To all whom it may concern:

Be it known that I, CHARLES N. WENDELGASS, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Etching-Machines, of which the following is a specification.

This invention relates more particularly to a machine for etching plates for printing purposes although the same may also be used for etching other plates or articles.

The object of this invention is to provide an etching machine for this purpose which permits etching plates of various sizes to be operated upon, which is simple in construction and capable of being readily fitted to the ordinary band-etching tanks commonly in use; which is rapid and even in its operation and which may be produced at comparatively low cost.

In the accompanying drawings:

Figure 1 is a front view of the etching machine with the tank in section. Fig. 2 is a top plan view of the same. Figs. 3 and 4 are vertical transverse sections taken on the correspondingly numbered lines in Fig. 1. Fig. 5 is a fragmentary front elevation of the etching machine showing a modified means for holding the etching plate.

Similar characters of reference indicate corresponding parts throughout the several views.

The ordinary etching operation consists of manually rocking the plate which is to be etched in an acid solution for a considerable length of time, which results in the accumulation of solid matter and dead solution next to the surface to be etched, this dead solution intermixing but slowly with the more remote and more active solution. This latter, being of lighter density, tends to constantly float on top of the solution, thereby preventing it from readily acting on the immersed plate. It is desirable to bring the plate in contact with the topmost layers of liquid so as to increase the speed of the etching operation and also to enable the solution to be completely consumed. It is also desirable to create a general agitation so as to prevent a local flow back and forth of one small current of solution and also to more effectively and rapidly rinse off the solid matter from the etched surface by an alternate increase of pressure and then a partial vacuum on the surface of the plate. Such results are accomplished in the machine which embodies my invention and which is constructed as follows:—

1 indicates a vat or tank made of any suitable material and adapted to contain an acid etching or treating solution. 3 indicates a plate or other article which is to be acted upon by the etching solution in the customary and well known manner for etching the same. This plate is preferably, though not necessarily, supported in a horizontal position with the surface to be etched facing downwardly.

Across the top of the tank is arranged a transverse platform 5 extending forwardly about half way from the rear of said tank. Extending upwardly from the front part of said platform is a vertical bracket or standard 6 secured to the platform and provided at its upper and lower extremities with the vertical guiding eyes 7 and 8 positioned one above the other. Mounted to reciprocate vertically on said standard is a slide or carriage which may be variously constructed but which preferably comprises a vertical rod 9 guided in the eyes 7, 8, and a cross head 10 arranged horizontally on this rod between the guide eyes.

This carriage may be caused to reciprocate vertically in any suitable manner but as shown is effected as follows:

On the slide rod is secured a clamping sleeve 2 which is pivotally connected with the upper end of a connecting rod or link 11 the lower end of which is pivoted to the wrist pin 12 of a crank wheel 13. The latter is secured to a transverse crank shaft 14 journaled horizontally in a bearing 15 in the standard. This shaft may be driven in any suitable manner, for instance, by the means which are shown in the drawings and which comprise an electric motor 16 mounted on the platform and having its shaft provided with a worm 17, a counter shaft 18 journaled in bearings 19 on the platform and provided with a worm wheel 20 meshing with the worm 17, and a belt 21 passing around a driving pulley 22 on the countershaft and a driven pulley 23 on the crank shaft 14.

24, 24 represent two upright supporting levers which are pivoted between their upper and lower arms 25, 26 to opposite ends of the cross heads 10 of the carriage by pivot pins 27 or other suitable means.

The lower arms of the supporting levers are provided on the lower ends of their inner

sides with notches or seats 28 which are adapted to receive the opposite transverse edges of the plate to be etched. To firmly clamp the plate between the lower arms of the supporting levers and also to take care of the various sizes of plates, a horizontal clamping bolt 29 is provided which passes transversely through both lower arms of the supporting levers a short distance below the cross head, so that by turning the nut 30 at one end of the bolt, the distance between the lower extremities of the supporting levers may be adapted to suit plates varying in length.

Means for centralizing the plate in the tank irrespective of the distance between the lower supporting arms are also provided, the means for this purpose being constructed as follows:

To the upper arms of its supporting levers are pivoted two upwardly and inwardly-extending centering links 31. Arranged on the upper end of the slide rod 9 is a centering sleeve 32 to which the upper ends of both centering links are pivoted. By this means the levers are caused to move in unison toward and from a center between the same during which the sleeve 32 slides vertically on the slide rod and thereby causes the lower supporting arms to always hold a plate in central position between the levers regardless of the length of the same.

To prevent any of the acid from splashing out of the tank when the same is too shallow or the liquid level too high, a suitable hood may be provided and so constructed as to be readily removable when a plate is to be clamped between the supporting levers or to be removed from the same.

Instead of adjustably connecting the supporting levers by means of the clamping bolt 29, the lower arms of these levers may be connected by a spring 33, as shown in Fig. 5, which causes the lower arms of the supporting levers to grip the plate between them and also compensates for different sizes of plates which are being treated.

In the operation of this machine, the plate supported by the levers is raised out of and lowered into the acid solution continuously and for a sufficient length of time to thoroughly etch the same the required extent. By this means the etching operation is accomplished more effectively, uniformly and expeditiously and the acid solution is also agitated so that the same is of like strength throughout.

I claim as my invention:

1. A plate etching machine, comprising a treating tank adapted to contain an etching-solution, a vertically-reciprocating member, a cross head secured to said reciprocating member, a plurality of depending supporting arms pivoted to said cross head, and means for moving said arms toward each other for causing the same to engage opposite edges of said plate.

2. A plate etching machine, comprising a tank adapted to contain an etching-solution, a vertically-reciprocating slide, two levers pivoted on said slide and having arms movable vertically in said solution and adapted to support a plate to be etched, and means for compelling said arms to move in unison toward and from each other.

3. A plate etching machine, comprising a tank adapted to contain an etching-solution, a vertically-reciprocating slide, two levers pivoted on said slide and each having a lower arm and an upper arm, the lower arms of both levers being adapted to receive the plate to be etched between them, a sleeve movable vertically on said slide between said levers, and links connecting said sleeve with the arms of said levers.

4. A plate etching machine, comprising a tank adapted to contain an etching solution, a vertically reciprocating slide, two levers pivoted on said slide and each having a lower arm and an upper arm, the lower arms of both levers being adapted to receive the plate to be etched between them, a sleeve movable vertically on said slide between said levers, links connecting said sleeve with the arms of said levers, and means for pressing the lower arms of said levers against opposite edges of said plate.

5. A plate etching machine, comprising a tank adapted to contain an etching-solution, a vertically-reciprocating slide, two levers pivoted on said slide and each having a lower arm and an upper arm, the lower arms of both levers being adapted to receive the plate to be etched between them, a sleeve movable vertically on said slide between said levers, links connecting said sleeve with the arms of said levers, and a clamping bolt connecting said levers and operating to press the lower arms thereof against opposite edges of said plate.

6. A machine for etching plates, comprising a tank adapted to contain an etching solution, a vertically-reciprocating carriage, and a pair of arms pivotally mounted on said carriage and provided at the opposing sides of their lower ends with notches adapted to receive opposite edges of a plate and to move the same vertically in the solution of said tank.

CHARLES N. WENDELGASS.

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