

March 31, 1925.

1,531,955

H. W. KINGMAN

ETCHING MACHINE

Filed May 26, 1924

2 Sheets-Sheet 1

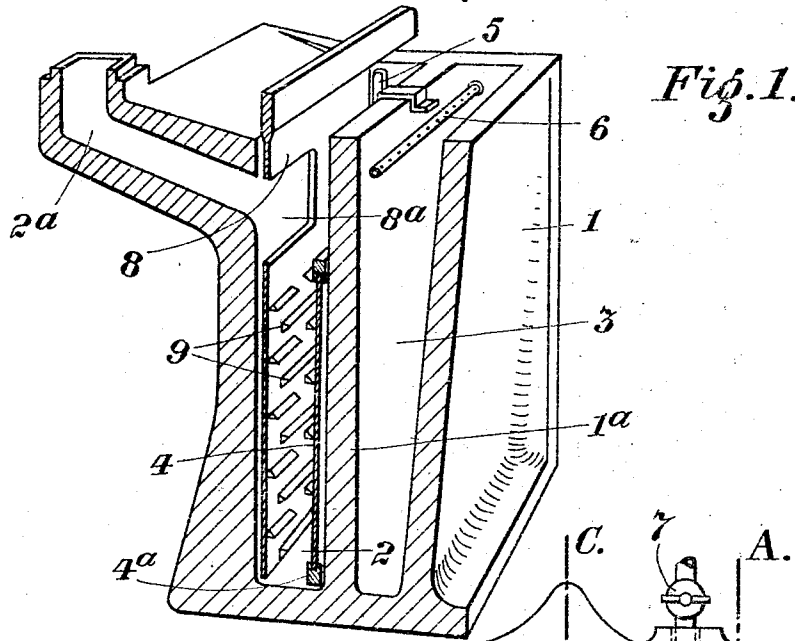
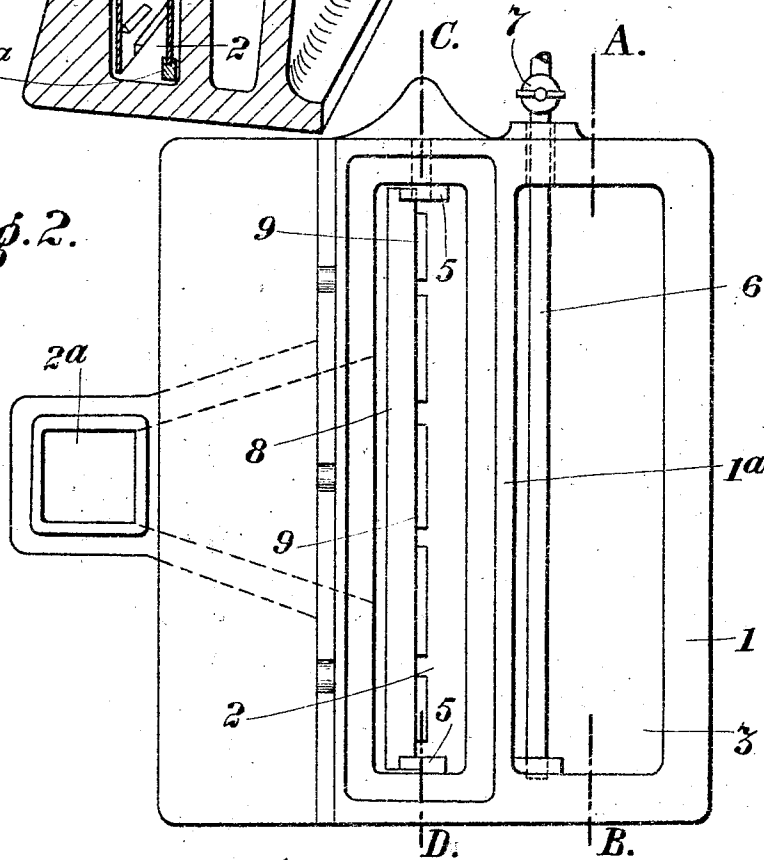


Fig. 1.

Fig. 2.



WITNESSES:
Agnes Morrison Watts
G. Marshall Mackenzie

Harry Walter Kingman INVENTOR
per H. J. Impalud ATTORNEY

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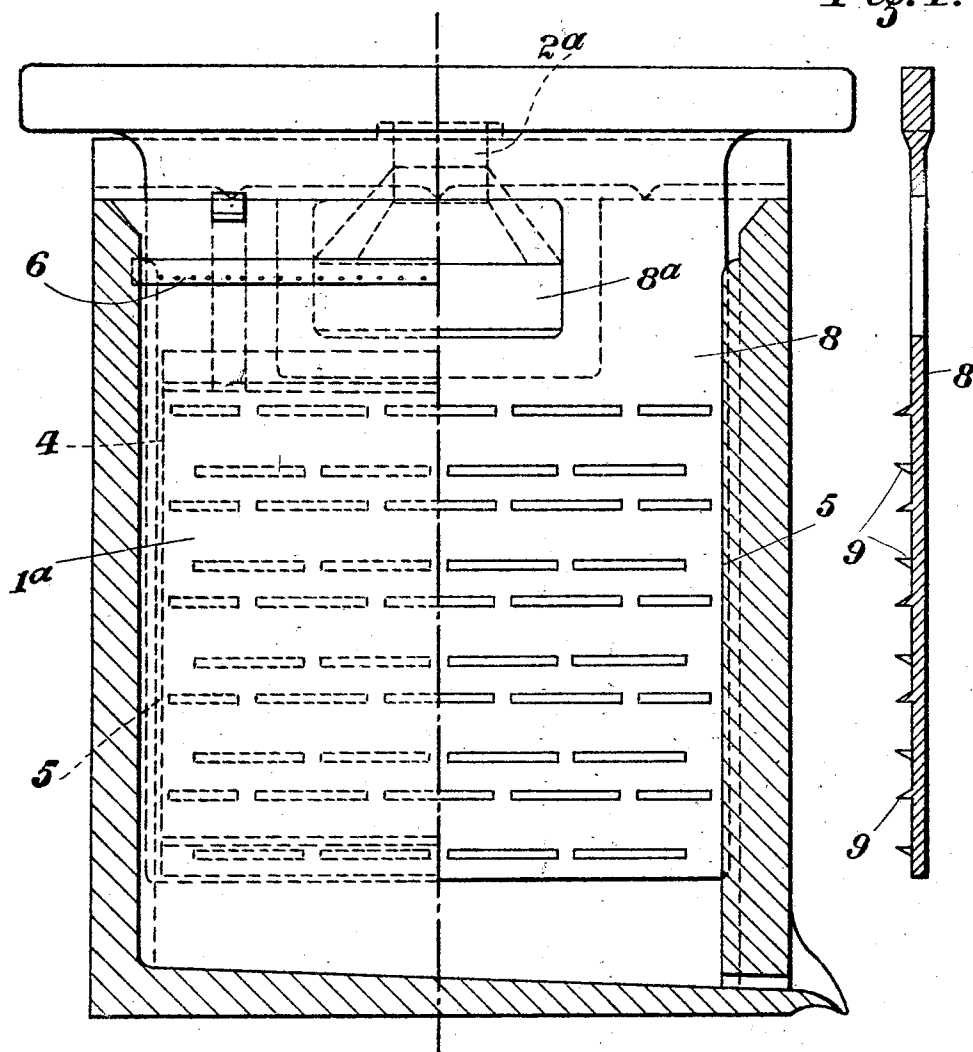
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2 Sheets-Sheet 2

Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

HARRY WALTER KINGMAN, OF BELFAST, IRELAND, ASSIGNOR OF ONE-HALF TO
W. & G. BAIRD LIMITED, OF BELFAST, IRELAND.

ETCHING MACHINE.

Application filed May 26, 1924. Serial No. 715,908.

To all whom it may concern:

Be it known that I, HARRY WALTER KINGMAN, of Low-Wood, Shore Road, Belfast, Ireland, a subject of the King of Great Britain and Ireland, have invented certain new and useful Improvements Relating to Etching Machines, of which the following is a specification.

This invention relates to machines for etching zinc, copper or other metal plates. Hitherto it has been usual, in etching machines, for the etching solution to be sprayed against the plate to be etched by means of revolving paddles or an air blast, or for the solution to be agitated by a reciprocating device to stimulate its action.

According to this invention there is provided in an etching apparatus having a bath of etching fluid in which a plate to be etched is immersed substantially vertically, an agitating device having a series of blades, said agitating device being adapted to be reciprocated vertically in the fluid, whereby the fluid is caused to impinge against the plate to be etched. The blades are preferably shaped and disposed as hereinafter described.

The accompanying drawings illustrate an example of an etching machine in accordance with the invention.

In the drawings:

Fig. 1 is an isometric cross sectional elevation through the centre of the machine.

Fig. 2 is a plan view of the machine.

Fig. 3 is a sectional elevation of the machine, the portion to the left of the centre line being a section on the line AB, Fig. 2, the portion to the right of the centre line being a section on the line CD, Fig. 2.

Fig. 4 is a detached end elevation showing the blades and their support.

Referring now to the drawings, the numeral 1 denotes an outer casing of substantially rectangular horizontal cross section decreasing from top to bottom and divided into two compartments 2 and 3 by a vertical partition 1^a, the compartment 2 being adapted to contain the etching fluid and compartment 3 being provided with means for washing the etched plate. A fume vent or shaft 2^a leads from the compartment 2. To carry the plate 4 which is to be treated, a plate holder 4^a is provided which is adapted to be suspended from the top of the parti-

tion 1^a. Vertical ridges 5 are formed on the ends of the compartment 2 between which and the side wall of the compartment the plate holder 4^a is located while a device for agitating the etching fluid to stimulate its action is located between the ridges 5 and the other side wall. The washing arrangement aforementioned comprises a water pipe 6 led into the compartment 3, the said pipe being controlled by a cock 7 and being perforated to form a water spray.

The agitating device comprises a flat carrier 8 having an orifice 8^a and a series of blades 9 mounted on one of its plane faces. The blades are of right-angled triangular cross-section and they are arranged in parallel rows with the inclined surfaces of the blades in alternate rows facing in opposite directions as shown in Fig. 4, wherein the blades are also mounted in staggered formation.

The agitating device is adapted to be reciprocated in a plane parallel to the plane of the plate to be etched in the guiding grooves formed therefor by the ridges 5, the reciprocating motion being derived from any convenient mechanical device, either manually or power operated.

In operation, the compartment 2 is filled with etching fluid to a level determined by the size of the plate to be etched. The said plate is placed in the plate-holder 4^a, the holder slipped into the guiding grooves on the right of the ridges 5 as seen in Fig. 2, and the plate immersed in the fluid. The agitator is then reciprocated in the pair of guiding grooves on the left of the ridges 5 as seen in Fig. 2, and, owing to the inclination of the faces of the blades of the said agitator waves of fluid are impelled against the plate, which is thereby etched.

In virtue of the fact that the plate is placed in the etching fluid in a vertical position, the particles of material eroded by the action of the fluid fall off the plate immediately they are formed and do not clog the grooves or lines etched in the plate and thus retard further action. Further the direct impingement of the fluid against the plate causes rapid and uniform chemical action in much the same way as when the fluid is sprayed against the plate, a process which has been heretofore proposed.

By operating the agitator at different

speeds, a plate may be etched with greater or less contrast, whilst all detail can be kept and delicate shades and tones preserved.

Having now fully described my invention what I claim and desire to secure by Letters Patent is:—

1. In an etching apparatus having a bath of etching fluid in which a plate to be etched is immersed substantially vertically, an agitating device having a series of blades, said agitating device being adapted to be reciprocated vertically in the fluid whereby the fluid is caused to impinge against the plate.

2. In an etching apparatus having a bath of etching fluid in which a plate to be etched is immersed substantially vertically, an agitating device adapted to be reciprocated vertically in the fluid and comprising a

plate like carrier and bevelled or inclined blades mounted thereon.

3. In an etching apparatus having a bath of etching fluid in which a plate to be etched is immersed substantially vertically, an agitating device adapted to be reciprocated vertically in the fluid and comprising a plate like carrier and bevelled or inclined blades mounted thereon, the bevelling or inclination in successive rows being alternately on the upper and lower faces of said blades.

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

HARRY WALTER KINGMAN.

Witnesses:

ANDREW HAMILTON,
JOHN HERBERT HUNTER.