Feb. 18, 1930. A. HOLMSTROM 1,747,168

ADJUSTABLE SPRAYING DEVICE FOR ETCHING MACHINES

Filed July 2, 1927 3 Sheets-Sheet 1

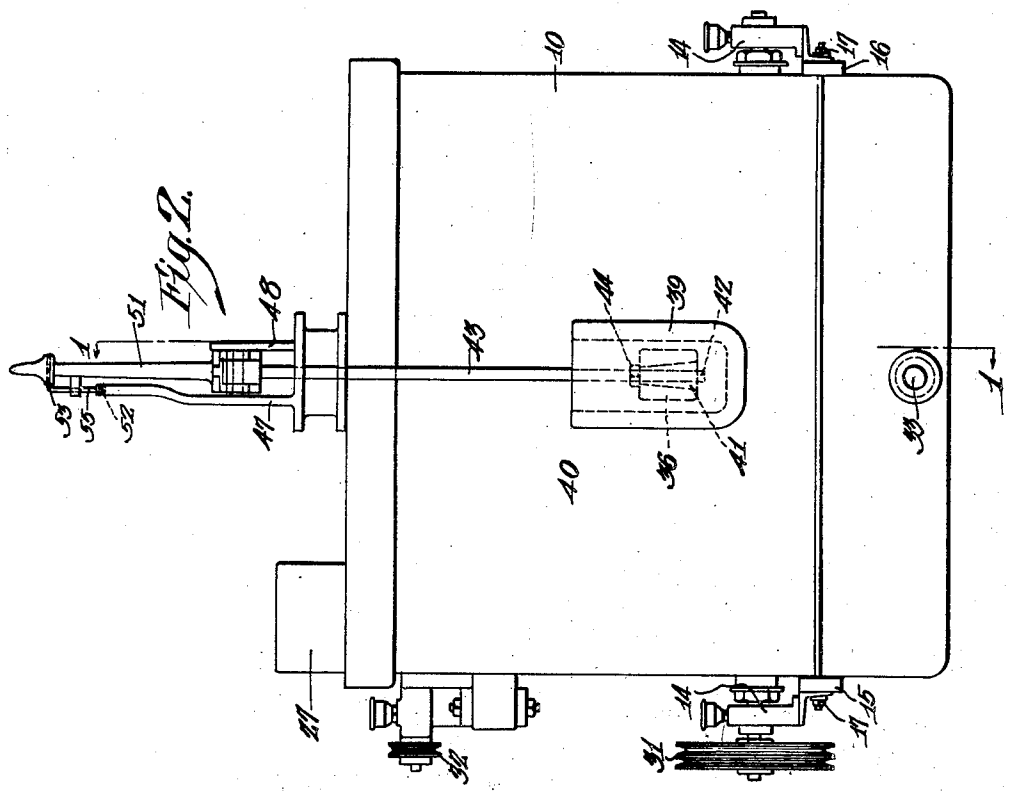


Fig. 2.

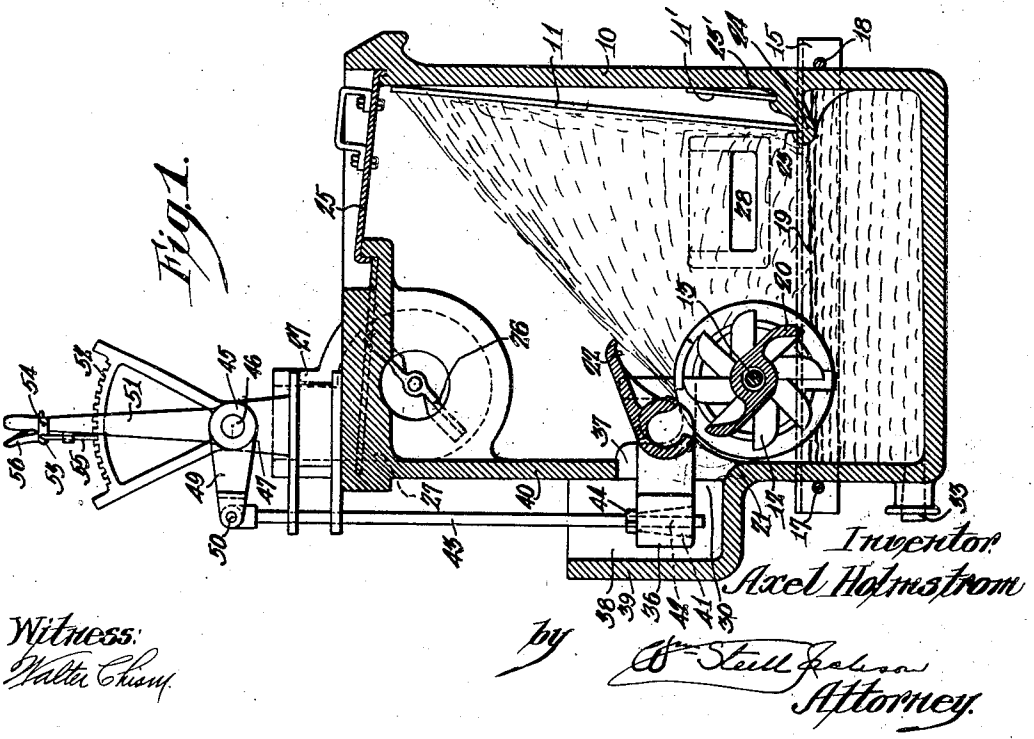


Fig. 1.

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Feb. 18, 1930. A. HOLMSTROM 1,747,168

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Filed July 2, 1927 3 Sheets-Sheet 2

Fig. 4.

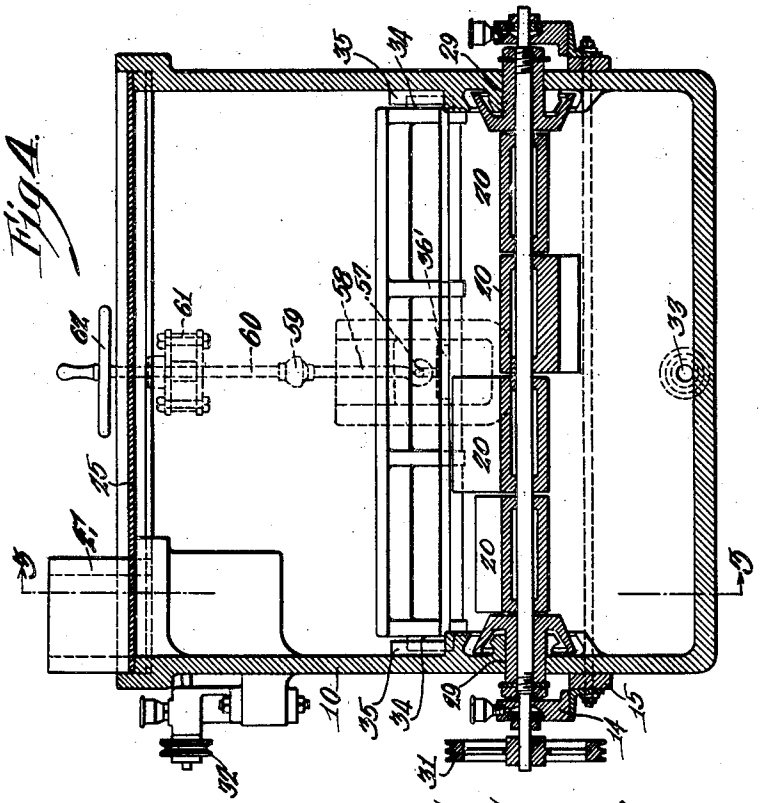
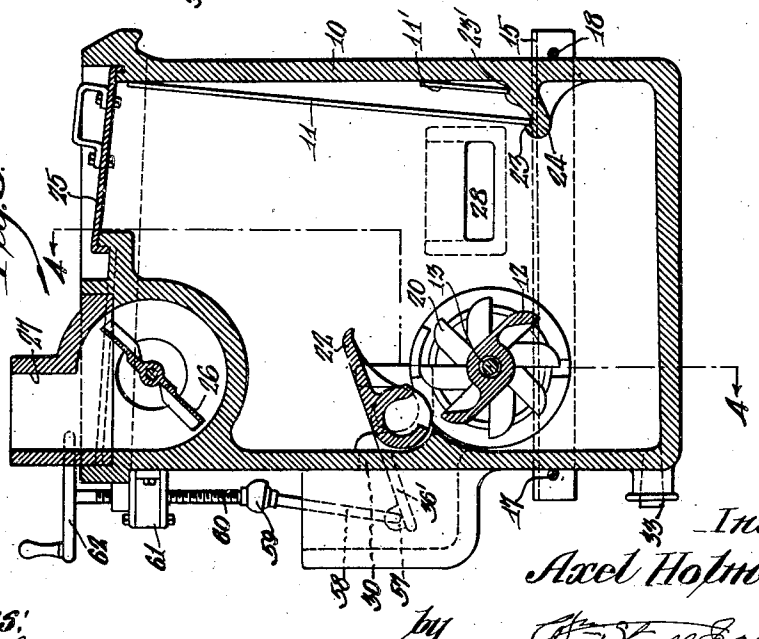


Fig. 5.



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Feb. 18, 1930. A. HOLMSTROM 1,747,168

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Filed July 2, 1927 3 Sheets-Sheet 3

Fig. 6.

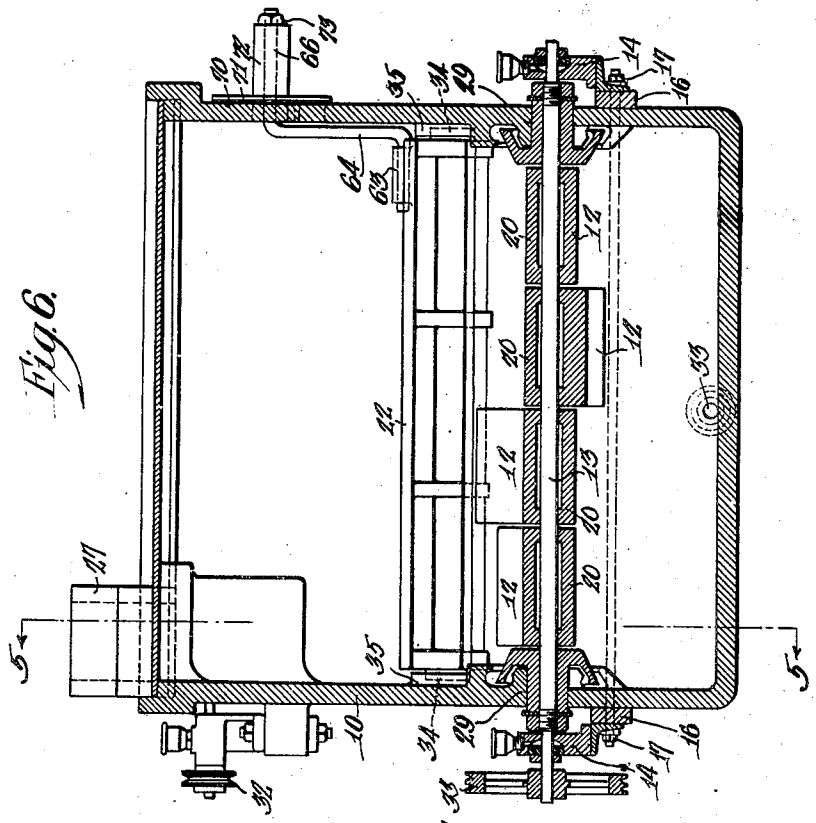
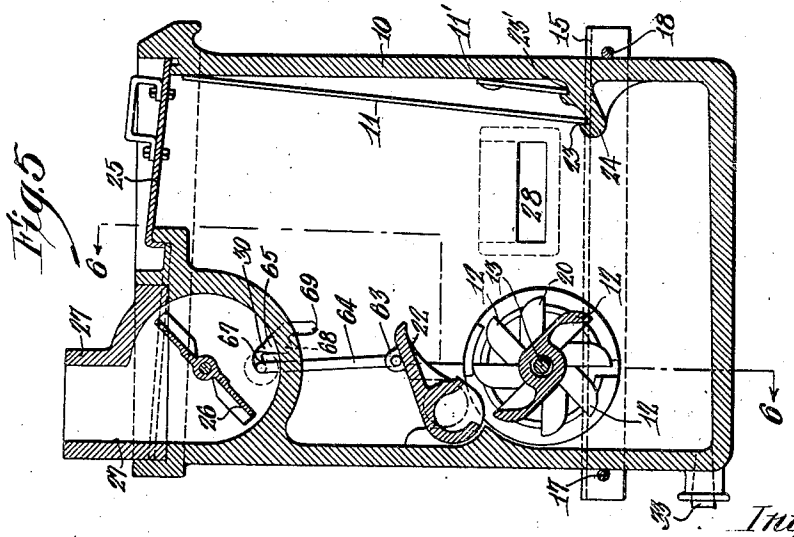


Fig. 5



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Patented Feb. 18, 1930 1,747,168

UNITED STATES PATENT OFFICE

AXEL HOLMSTROM, OF MONTE CARLO, MONACO

ADJUSTABLE SPRAYING DEVICE FOR ETCHING MACHINES

Application filed July 2, 1927. Serial No. 203,026.

My invention relates to etching machines, and more particularly to etching machines in which the etching acid is sprayed upon the plates to be etched by means of a revolving paddle.

The main purpose of my invention is to direct the spray of etching acid variantly according to the variant sizes of the plates to be etched or to spray upon a part only of the same plate, preferably using an adjustable baffle.

A further purpose is to direct the spray of etching acid by an angularly adjustable and acid resistant preferably stoneware mounted inside an etching chamber, with an adjustment thereof outside of the chamber.

I have preferred to illustrate my invention by three forms only of the many in which it may appear, selecting these because they are practical, efficient and inexpensive and at the same time well illustrate the principles of my invention.

Figure 1 is a vertical, transverse section of a machine embodying my invention, being a section taken upon the line 1—1 of Figure 2.

Figure 2 is a left end elevation of Figure 1.

Figure 3 is a vertical section corresponding generally to Figure 1, showing a different form, and is a section taken upon the line 3—3 of Figure 4 looking in the direction of the arrows.

Figure 4 is a longitudinal vertical section taken upon the line 4—4 of Figure 3 looking in the direction of the arrows.

Figure 5 is a vertical sectional elevation corresponding generally to Figures 1 and 3 but showing a third form, and is a section upon the line 5—5 of Figure 6 looking in the direction of the arrows.

Figure 6 is a longitudinal, sectional elevation upon the line 6—6 of Figure 5.

Like numerals refer to like parts in all figures.

Describing in illustration and not in limitation and referring to the drawings:—

In etching devices of this character the acid within a stoneware box 10 is thrown upon the plates 11 or 11′ by means of a stoneware paddle 12 mounted upon a shaft 13 that is protected from the acid by being covered with rubber or other protective coating. The bearings 14 of the shaft are placed outside of the box to be away from the acid, the shaft extending clear through the box and having a bearing at each end.

The bearings are suitably supported upon wooden beams 15 and 16 clamped to place against opposite sides of the box by suitable tie bolts 17 and 18.

The level 19 of the etching liquor within the stoneware is well below the shaft, and the revolving blades 20 of the paddle dip into the liquor, pick it up and cast it into a baffle space 21 and past a directing baffle 22 against the plates 11, 11′. The plates are set in upwardly directed grooves 23 or 23′ along an inwardly projecting downwardly sloping shelf 24 upon the opposite side of the box.

My invention relates principally to the baffle structure for variantly directing the spray of etching liquor.

The box has a removable cover 25 and is operated at pressure slightly below atmosphere to prevent acid fumes from escaping into the room.

A fan 26 inside an inlet portion 27 of a waste flue not shown continuously exhausts the box to the waste flue. Fresh air from the room thus flows continuously into the box at any or all of the other openings to be drawn away with the acid fumes by fan 26. The several openings are located at the side at 28, at 29 to pass the shaft of the paddle 12, at 30 to pass an adjustment connection to the baffle, and at the cover 25.

The shaft of the paddle carries a double grooved pulley 31 for belt drive at one groove and operative belt connection to a pulley 32 upon the shaft of the fan, at the other groove.

A drain plug is shown at 33.

I mount the baffle 22 as a rocking member angularly adjustable to variantly direct the spray, and make it of acid resistant material—preferably stoneware.

Horizontally projecting trunnion ends 34 of the baffle are supported in bearings 35 upon opposite ends of the box. These bear-

ings are preferably integral with the stoneware box and are shown as inwardly directed flanges around the lower portions of the trunnion.

One or both of the bearings 35 should be open at the top to permit easy insertion of the baffle member.

The trunnion ends of the baffle are at the rear side of the baffle so that the baffle tends to tip downward and forward by its own weight.

In the form of Figures 1 and 2, the baffle member is cast with an operating arm 36, which extends rearwardly through an opening 37 in the back of the box, into an open compartment 38.

The compartment 38 catches and returns to the box any acid running back from the wet baffle and dripping from the arm 36. The compartment is open at the top and its wall 39 is preferably integral with rear wall 40 of the box.

The arm 36 has a downwardly flaring perforation 41 which receives the lower threaded end 42 of an operating rod 43. An adjustable nut 44 on the lower end of the rod seats upon the upper side of the arm around the perforation and limits upward movement of the arm and downward movement of the baffle.

A rocker arm 45 pivotally mounted at 46 between standards 47 and 48 upon the top of the box vertically positions the rod, having one arm 49 pivotally connected at 50 to the upper end of the rod and the other arm 51 forming an operating handle.

The handle is adapted to be set to different positions along a toothed sector 52 carried by the standard 47. A suitable lock member 53 pivoted at 54 to the upper end of the handle has a lock element 55 adapted to mesh between different teeth of the sector, and a release element 56.

The baffle member tends to rock forward and is prevented from its forward movement by engagement between its arm 36 and the nut 44 of the rod 43. The baffle member is set to different positions by changing the setting of the handle along its sector.

In the form shown in Figures 3 and 4 the crank arm 36′ of the rocker member is supplied with an eye 57 on the upper side of its rearward end, and a hook member 58 hooks in the eye and extends upwardly to make swivel connection at 59 with the lower end of a shaft 60 threaded through a supporting nut member 61 fastened to the upper portion of the box.

The baffle member is set to different positions changing the vertical position of the shaft 60 by means of a hand wheel 62 at its upper end.

In the form shown in Figures 5 and 6 the central crank 36 is dispensed with, and the upper side of the rocking baffle, is supplied with an eye 63 near its outer edge and at one end of the baffle.

A lifting rod 64 suitably protected with rubber or other coating from the acid, hooks into the eye 63 and extends upwardly to an opening 65, where it bends through the side wall of the box and outwardly to present a handle 66 outside the box.

The opening 65 is provided with a number of steps (three shown) 67, 68 and 69 of progressively different height for use in changing the position of the baffle member, each step being adapted to seat the handle 66. When the handle is in the upper step 67 the baffle is in its highest position and correspondingly when in its lowest step 69 is in its lowest position.

The opening 65 is preferably closed by a suitable gasket 70 and supporting flange 71, sleeve 72 and nut 73 all upon the handle 66.

The baffle member is set to position to best direct the spray over the surface of the plate. If the plate be a large one as 11 of Figure 5 the baffle will be placed in its highest position and the spray is directed in a wide stream over the whole plate, from the top of the plate downwardly.

For a small plate, however, such as 11′ the baffle will be placed at its low position, concentrating the spray to the smaller plate, from the top of the plate downwardly.

The stream of spray is directed over the whole plate, but the baffle concentrates the stream to a considerable extent at the top of the plate whence it runs down over the lower portions, and during the etching operation the whole plate surface is covered with a downwardly flowing stream of etching acid.

It will be evident that alteration of the position of the baffle will not only alter the intensity of concentration of the acid upon a given plate surface or portion of a plate surface but will also correspondingly affect the speed of removal of the products of the etching process and the extent of oxidation of any etching fluids used both within the space provided by the baffle and in the path between the baffle and the plate.

In addition to effects of adjustment from the standpoint of altering the speed or range of etching there is a considerable advantage from the adjustment of the baffle arising from what might be called the by-product advantage of lowering the upper range of travel of the sprayed fluid. This lies in the fact that the unit can effectively be shut down notwithstanding the paddle continues to rotate. One utility of this appears in applicant's later filed copending application 258,237 for etching machines, filed March 1, 1928, in which a battery of units is shown operating from the same shaft. One of these units may be operating upon a plate requiring deep etching such as line etching, taking say 20 minutes, during which time quite a

number of plates can be etched in one of the other machines. If it be not necessary to shut down the system, nor even the individual unit, considerable time will be saved.

Even with single units the needs in re-etching may be much more closely approximated if, for the very short time required, it be not necessary to slow down the motor to stop the paddle or to start the motor within this re-etching process.

In specific cases it may be advantageous to move the position of the baffle during the spraying operation, rocking it up and down. Usually, however, this will not be necessary, the baffle being set to position according to the size of the plate, and directing the spray over the whole plate but principally toward the top of the plate.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a machine for etching plates, a box adapted to contain etching liquor and plates of variant sizes along one side of the box above the liquor, a paddle in the box adapted to dip into and throw the liquor, and a movable baffle in the box adapted to variantly direct the thrown liquor from the paddle to a plate in combination with an adjustment for the baffle whereby the etching fluid may be scattered over a large surface or may be scattered upon the lower part of the surface to intensify the etching action.

2. In a machine for etching plates, a box adapted to contain etching liquor and plates of variant sizes along one side of the box above the liquor, a paddle in the box adapted to dip into and throw the liquor, and a baffle in the box adapted to variantly direct the thrown liquor from the paddle to a plate in combination with an adjustment for the baffle operative from outside the box whereby the etching fluid may be scattered over a large surface or may be scattered upon the lower part of the surface to intensify the etching action.

3. In an etching machine, an angularly adjustable acid resistant baffle in combination with an etching chamber within which the baffle operates and means for throwing an etching liquor against the baffle adapting to variantly disperse finely divided acid upon the plate to be etched whereby the etching fluid may be scattered over a large surface or may be scattered upon the lower part of the surface to intensify the etching action.

4. In an etching machine, a pottery etching chamber having a lateral opening, a pottery baffle pivotally mounted inside the chamber, means for throwing etching liquor against the baffle and means for angularly adjusting the baffle through the opening so as variantly to disperse finely divided acid upon the plate according to the angular adjustment of the baffle whereby the etching fluid may be scattered over a large surface or may be scattered upon the lower part of the surface to intensify the etching action.

5. In a machine for etching plates a box adapted to contain etching liquor and plates to be etched along one side of the box above the liquor, a paddle in the box adapted to dip into and throw the liquor, a movable baffle in the box adapted to variantly direct the thrown liquor received from the paddle and means for moving the baffle to cut off an upper range of liquor throw otherwise reached by the liquor.

6. In an etching machine, a pottery etching chamber, having a lateral opening, a pottery baffle having opposite trunnion ends pivotally supported by opposite walls of the chamber, a forwardly directed baffle and a rearwardly directed arm through the opening, in combination with means for directing etching spray against the baffle and an adjustment for the arm with respect to angular position.

7. In an etching machine, a pottery etching chamber, having a lateral opening and an external wall about the opening open at the top, a pottery baffle having opposite trunnion ends pivotally supported by opposite walls of the chamber, a forwardly directed baffle and a rearwardly directed arm through the opening and connections through the open top for angular adjustment of the arm.

8. In an etching machine, a pottery etching chamber having an external pocket at the rear end thereof opening thereinto, a forwardly weighted baffle horizontally pivotally supported inside the chamber and having an operating arm extending into the pocket downwardly recessed near its outer end, an operating rod having a lower end in the recess and engaging the arm at the recess to prevent upward movement of the arm from forward tilting of the baffle, and a vertical adjustment of the rod outside of the box.

9. In an etching machine, acid resistant walls forming an etching chamber having a lateral opening and external walls about the opening open at the top, a forwardly directed baffle of acid resistant material having opposite trunnion ends pivotally supported by opposite walls of the chamber, and means for lifting the baffle, comprising a rearward extension from the baffle, a lifting rod connected therewith and a lever for lifting the rod adapted to be latched in variant positions.

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