No. 764,164. PATENTED JULY 5, 1904.

W. G. THORPE & W. C. FISCHER.

ETCHING MACHINE.

APPLICATION FILED NOV. 30, 1903.

NO MODEL.

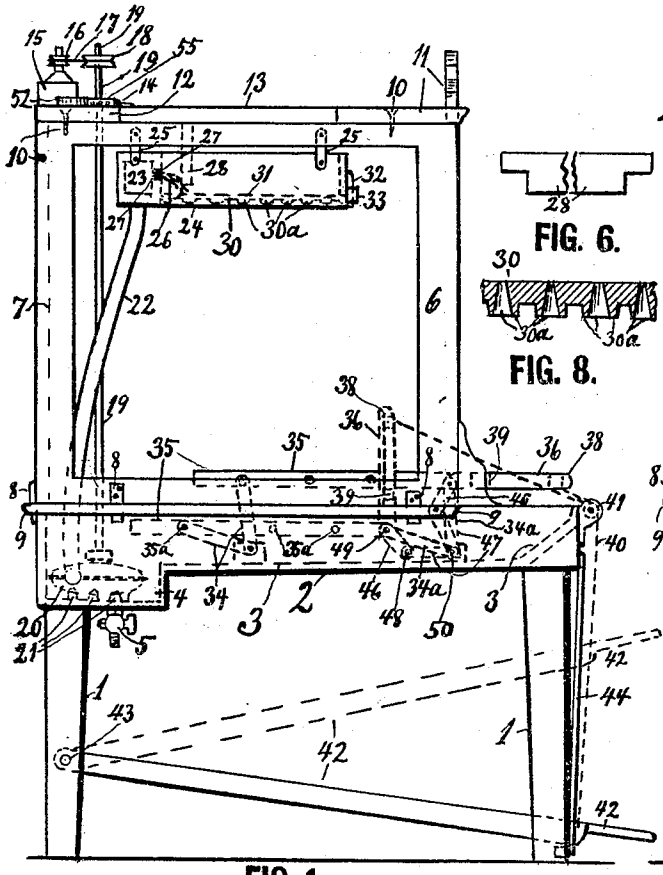


FIG. 1.

FIG. 6.

FIG. 8.

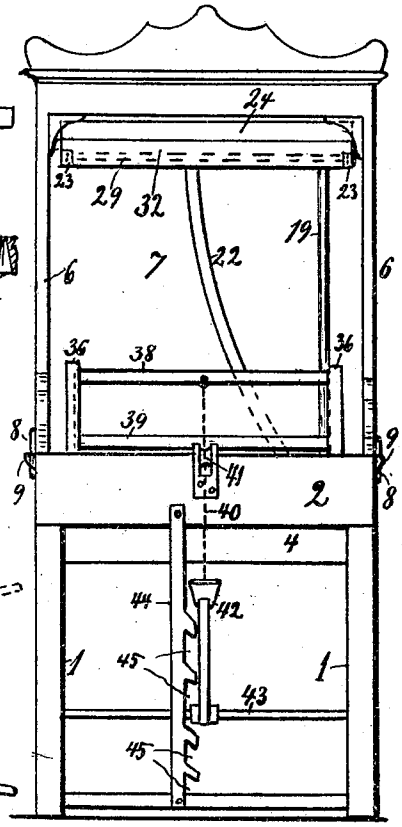


FIG. 2.

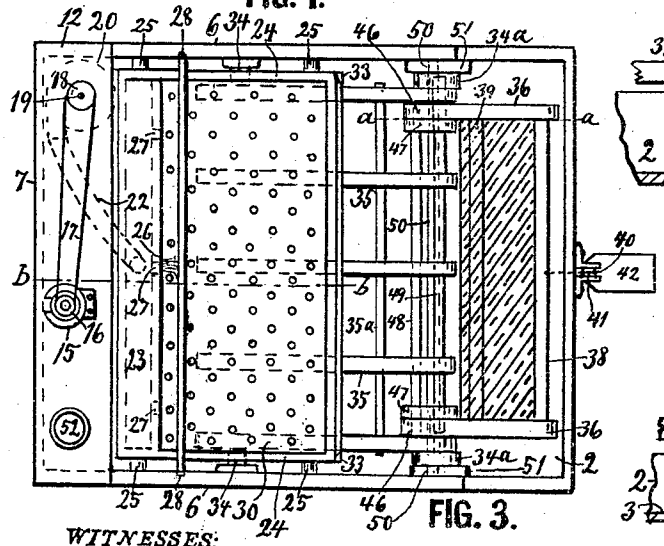


FIG. 3.

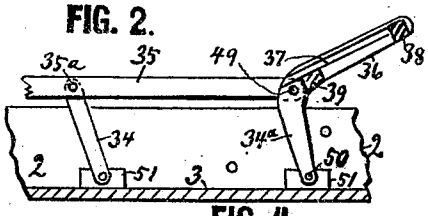


FIG. 4.

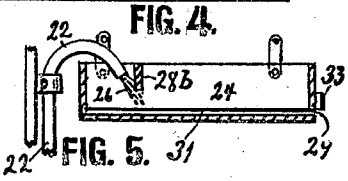


FIG. 5.

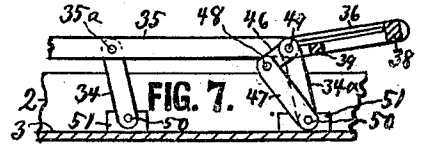


FIG. 7.

WITNESSES:

D. E. Carlsen.

E. C. Carlsen

INVENTORS:

Willard F. Thorpe.

Walter C. Fischer.

BY their ATTORNEY:

A. M. Carlsen.

No. 764,164. Patented July 5, 1904.

UNITED STATES PATENT OFFICE.

WILLARD G. THORPE AND WALTER C. FISCHER, OF ST. PAUL, MINNESOTA.

ETCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 764,164, dated July 5, 1904.

Application filed November 30, 1903. Serial No. 183,308. (No model.)

To all whom it may concern:

Be it known that we, WILLARD G. THORPE and WALTER C. FISCHER, citizens of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Etching-Machines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in etching-machines; and the objects of the invention are to provide a compact, effective, complete, and easily-operated etching-machine. These and other objects we attain by the novel construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of our complete machine. Fig. 2 is a general front view of the machine. Fig. 3 is a top view of Fig. 1, with the covering-lid 13 and top portion 11 removed. Fig. 4 is a sectional view about as on the line *a a* in Fig. 3, showing a modified form of certain parts. Fig. 5 is a sectional view about as on the line *b b* in Fig. 3, only through some of the upper parts near the top of the machine, showing a modification in the means distributing the acid upon the work. Fig. 6 is a detail front view of the board 28 in Figs. 1 and 3. Fig. 7 is about the same as Fig. 4, only that the mechanism is a little different, and is the same as in Figs. 1 and 3, where it is not so plainly seen. Fig. 8 is a vertical section through a portion of the bottom 30 in Figs. 1 and 3.

Referring to the drawings by reference-numerals, 1 designates suitable legs, upon which is supported a cabinet, made up of the box or tray 2, having a rearwardly-slanting bottom 3, formed at the rear part with a cavity or well 4, having a valve or cock 5, by which it is emptied and cleaned. Upon said box are mounted three glazed sashes or sections forming the sides 6 and the back 7 of the cabinet. These sections are provided with tenons 8, set into mortises in a molding 9 or other keepers provided upon the box 2, and the upper corners of the sections are secured together by screws 10 or other suitable means, permitting the cabinet to be easily knocked down for shipping. The cabinet further comprises a cover consisting of the screw-fastened sections 11 and 12 and the intermediate section 13, hinged at 14 to form a lid. The front of the cabinet is open.

Upon the rear top section 12 is mounted a small electric motor 15, having a pulley 16 and belt 17, driving a larger pulley 18, secured on a vertical shaft 19 of a centrifugal pump 20, which through its openings 21 draws the etching-fluid from the well 4 and drives it through a hose 22 up into the chamber 23 of the acid-distributer 24, which is a rectangular box suspended by four links 25 in the upper part of the cabinet, so that it may vibrate horizontally when one or more streams like 26 come out of the openings 27 in the front side of the chamber 23 and strike the board 28, which with its upper narrow ends (see Fig. 6) is fixed to the sides of the cabinet above the acid-distributer 24. Said box or distributer has in its front side a slit 29, through which a perforated bottom 30 is inserted into grooves 31, and the slit is then closed by dropping in front of it a strip 32, which rests with its ends partly in and partly upon hooks 33 provided near the corners of the box. By these means the bottom may be easily removed and a new or a more finely-perforated bottom replaced. Each perforation in said bottom is an inverted funnel terminating in a nipple 30^a.

In the main box 2 is pivotally supported on links 34 and 34^a an open frame 35, adapted to support the work to be etched. It is preferably made up of parallel flats trips 35 and round rods 35^a inserted transversely through the strips. Fixedly combined with the front links 34^a at almost right angles therewith is a glazed guard made up of the side arms 36, having grooves 37 for the glass, (see Figs. 4 and 7,) and two parallel bars 38 39, uniting the arms 36.

From the bar 38 extends a chain or cord 40

over a pulley 41 down to a pedal 42, pivoted at 43 or any other suitable point, and near said pedal is fixed a vertical rack 44, whose notches 45 will hold the pedal at different elevations, and thereby cause the frame 35 to occupy different positions and elevations.

In the operation of the machine it has already been stated how the etching fluid or acid is circulated by the pump up into the distributer 24 and evenly distributed downward therefrom by the perforated nipples 30^a of the bottom 30 and the vibration of the distributer. The plate or other work to be etched is placed upon the frame 35, while the latter is elevated to its upper and forward position in Fig. 1, with the guard 36 38 occupying a substantially horizontal position above the front part of the main tray. The pedal 42 is then released from the lowest of the notches 45 and allowed to rise, so that the frame 35, with the work on it, moves by its own weight and that of the work back and down into the lower position of 35 in Fig. 1, while the glazed guard 36 38 assumes a vertical position and prevents acid from splashing from the work and out through the open front of the cabinet. The operator may now watch his work both over and through the guard, and when he wants to give it a closer examination, brush it, turn it, or remove it he has no door to open, or any other part to operate by hand. With brush and other tools in his hands, he brings the work out upon the front end of the tray 2 and folds down the guard 36 38 by simply placing his foot on the pedal 42 and pressing it down to the desired position, where he by a side motion may lock it in a notch, or he may simply keep his foot on it till he is ready to let the work go back again in under the falling acid.

The regular cabinets are made large enough for etching any ordinary page of a newspaper; but in etching smaller plates it is not always desirable to let the plate go fully back and down into the cabinet, as it is an unnecessarily long stroke. Hence the various notches 45 are called into service to hold the pedal at different heights.

The simplest form of the front links 34^a and frame-arms 36 are shown in Fig. 4, where the arm and the link are made integral and secured on a pivot-rod 50 in blocks 51, secured in the tray 2, and on the round pivot-rod 49 in the frame 35; but as these parts are preferably made of wood and even then are affected by the acid it is desirable to avoid short cross-grains in the parts, as well as artificial bends of the wood. Hence we prefer the form shown in Figs. 1, 3, and 7, where the parts 34 and 36 are substantially straight and placed separately upon the pivot-rod 49 and kept in their fixed relative angular position by a link 47, having its lower end on the pivot-rod 50 and its upper end secured by an independent or special pivot-rod 48 to a short arm 46, formed at the end of the arm 36.

In Fig. 5 is shown how instead of using the acid-chamber 23 and fixed board 28 the acid may stream from the end of the hose 22 directly against a board 28^b, fixed in the acid-distributer 24, and thus cause the latter to vibrate between its own tendency to hang plumb and the tendency of the stream to displace it from its natural position. Such agitation or vibration prevents the acid, which is gathered by the perforated nipples of the bottom of the distributer into rows of streams through the perforations, from cutting lines into the work. The nipples 30^a of the bottom are to prevent the acid from flowing together below the bottom into a large stream, and the inverted-funnel shape of the perforations is to prevent lodging of dirt in the perforations.

52 is a ventilator for carrying off the odor of the acid from the cabinet. It may be extended to a chimney or other outlet into the open air.

The pump-shaft 19 has a roller-bearing 55 in the top of the cabinet. Its pulley 18 may be driven by a belt from other machinery; but an electric motor, mounted right upon the cabinet, makes this machine so complete that all it needs for operation is an electric wire, which can usually be found in any city or town large enough to have use for an etching-machine.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. An etching-machine comprising a box or tray, a cabinet mounted upon the greater rear portion of the box, and having an open front, a work-supporting frame mounted on links so as to move into and partly out of the cabinet and an upwardly-projecting guard at the front end of the work-supporting frame.

2. An etching-machine comprising a cabinet open at the front, a box or tray supporting the cabinet and projecting forwardly from under it, a work-supporting frame link-connected to the box so as to rise and fall and move in and out at the open front of the cabinet, a guard connected with and operated by the moving frame, so as to fall substantially horizontally and flush with the top of the frame when the latter is moved forward, and to stand about vertically upward when the frame is moved into tho cabinet.

3. In an etching-machine, the combination with a pivotally link-supported frame adapted to support the work operated on, of a rising and falling guard at the front of the moving frame and automatically operated by the frame, an acid-distributing vessel supported above the said frame, and foot-operated means for moving the frame in under and out of the falling acid by which the etching is done.

4. An etching-machine comprising an etch-

ing-cabinet with slanting bottom terminating in a well disposed inside the cabinet, work-supporting means upon the bottom, an acid-distributer in the upper part of the cabinet, a pump in the well and inside the cabinet and having its shaft extended upward through and above the top of the cabinet and there provided with a fixed pulley adapted to be operated by a belt or similar means.

5. In an etching-machine, the combination with an etching-cabinet having a depression or well in its bottom for the used acid to collect in, a work-supporting frame upon the bottom, an acid-distributer in the upper part of the cabinet, a centrifugal pump fixed in said well communicating with the distributer and having its shaft extended upward through a journal in the top of the cabinet, and above the latter provided with a fixed pulley; an electric motor fixed upon the cabinet and having a pulley and belt driven thereby and driving the pulley of the pump-shaft, said well and pump being disposed within the cabinet, substantially as and for the purpose set forth.

6. In an etching-machine, the combination with an elevated acid-distributer suspended so that it may vibrate horizontally, of a pump raising the acid from the bottom of the cabinet into said distributer, and a resisting-board for the stream of acid to act against and cause the distributer to vibrate as the acid enters it.

7. In an etching-machine, the combination with an elevated suspended acid-distributer of a pump drawing the used acid from a lower place and delivering it into the distributer, a resisting-board adjacent the stream of acid entering the distributer, for the stream to act on so as to cause the distributer to vibrate, and an acid-chamber having a plurality of outlets adjacent the resisting-board.

8. An etching-machine having an acid-distributing vessel with perforated bottom level at the top, said perforations being of an inverted-funnel shape.

9. An etching-machine having an acid-distributing vessel with perforated bottom level at the top, said perforations being of an inverted-funnel shape and terminating in nipples projecting from the lower side of the bottom.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLARD G. THORPE.
WALTER C. FISCHER.

Witnesses:
HARRY WEISS,
LOUIS ZAHONYI.