No. 865,884. PATENTED SEPT. 10, 1907.

F. J. M. GERLAND.

PROCESS AND APPARATUS FOR ETCHING PLATES.

APPLICATION FILED JAN. 4, 1907.

Fig. 1.

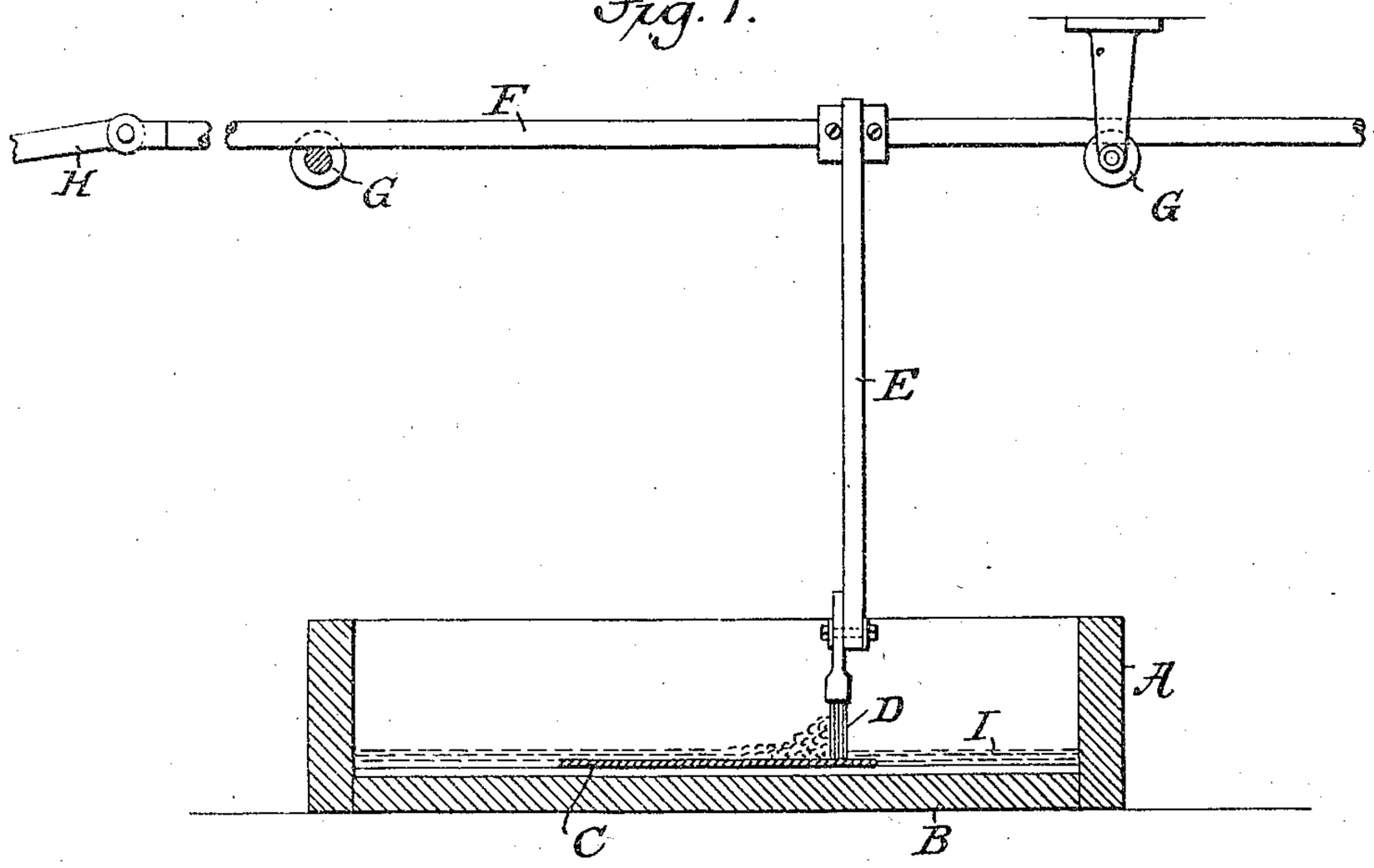
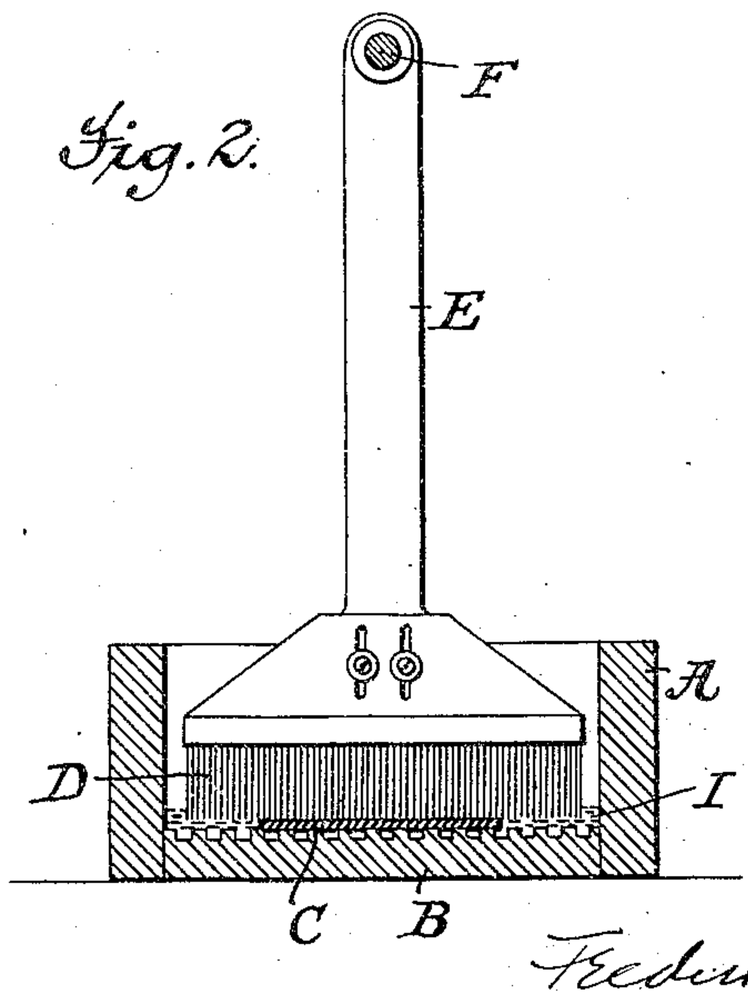


Fig. 2.



Witnesses:

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PROCESS AND APPARATUS FOR ETCHING PLATES.

No. 865,884. Specification of Letters Patent. Patented Sept. 10, 1907.

Application filed January 4, 1907. Serial No. 350,848.

To all whom it may concern:

Be it known that I, FREDERICK J. M. GERLAND, a citizen of the United States, residing at Sea Cliff, county of Nassau, State of New York, have invented certain new and useful Improvements in Processes and Apparatus for Etching Plates, of which the following is a specification.

The present invention relates to a novel process and apparatus for etching the surfaces of plates and particularly those employed in producing photo-engraved half-tone and other lined plates.

Heretofore etched plates have been produced by immersing the plate in a slowly rocking acid bath whereby the acid was caused to flow back and forth over the surface of the plate, and during this rocking motion the attendant brushed the surface of the plate at intervals by means of a hand applied brush. In practicing this old method it was necessary during the progress of etching to from time to time strengthen the said bath by the addition of fresh acid; it was necessary that the attendant should apply the brush by hand to the surface of the plate while the plate was being tipped first in one direction and then in the opposite direction and in doing so and in watching the progress of the etching necessarily projected his face over the acid bath and thus inhaled the injurious acid fumes. The periods when the plate should be brushed for the removal of the accumulated oxid was left entirely to the judgment and careful watching of the attendant and wholly to his skill in attempting to evenly manipulate the brush uniformly and with gentle pressure equally over the entire surface of the plate while is was constantly changing its inclination. The method was slow, profligate of the acid and owing to the entire dependency upon the skill and judgment of the attendant it often happened that muddy plates were produced by reason of the non-uniform brushing, and furthermore there was constant danger of undercutting from the harsh application of the brush repeated over the same portions of the plate.

The objects of the present improvements are to wholly overcome the disadvantages incident to the old method and to render the etching process more certain and regular; to eliminate entirely, the personal equation of the attendant, in judgment, attention and skill; to produce a cleaner, deeper and more evenly etched surface, in much faster time and with less expenditure of acid.

In practicing the improved process the plate to be etched is placed face uppermost on the grooved bottom of a horizontal, stationary wooden tank or open box, sufficient properly diluted etching acid being supplied to the tank to cover the plate to the desired depth. The acid is then regularly moved back and forth over the plate and forcibly agitated by the action of a suitable soft bristle brush which sweeps the acid forcibly in front of it over the plate whose upper surface it is at the same time gently and evenly touching and brushing.

The brush is both mechanically supported and mechanically moved so that the ends of its bristles touch and move over the entire surface with delicate and exactly even pressure; that is to say, the plane of movement of the brush is exactly parallel with the plane of the surface of the plate and the brush is adjusted to touch all parts of the surface while in motion with precisely the same pressure, and its movement, preferably a reciprocatory movement through the liquid and against and along the whole surface of the plate is regular and uniform. The brush should be slightly longer than the width of the plate's surface so that no portion thereof in covering the entire surface need be brushed more than other portions.

The agitation of the acid in the improved process is entirely dissimilar to the gentle back and forth flow of the acid in the rocking bath of the old method, in that the forcible agitation caused by the brush moving with uniform motion through the liquid brings about a deep and violently disturbed or churned up wave extending in front of and in immediate contact with the brush entirely across and progressing equally along and over the entire surface of the plate, with the result that the acid is thoroughly stirred and aerated and the oxid is brushed off as quickly as it forms on the plate or is not permitted to accumulate because of the constant and uniform application of the brush and the violent agitation of the acid and with the additional result that the oxid is dissipated and the bath rendered entirely free of the oxid and its serviceableness or life is materially increased. The regular mechanical application of the brush in the present process is also wholly dissimilar to the hand application in the old method, in that no part of the surface of the plate receives the brush either less or more times than any other part of the surface and furthermore all parts are touched exactly alike and with the same uniform pressure.

By reason of the improvement the attendant is not subjected to the injurious fumes rising from the etching bath neither are the fumes, apparently, so noticeable; so too it is possible to time the etching of each plate and know with certainty upon the lapse of a stated time that the plate is suitably etched.

A convenient and simple form of apparatus with which to practice the improved process is illustrated in the accompanying drawing; the figures 1 and 2 indicating by longitudinal and cross sectional elevations a practical application of the process.

In the views, the stationary horizontal tank or box A containing the etching acid I is formed with a grooved bottom B on which rests the plate C to be

etched. The brush D is adjustably secured to the end of a vertical rod E the upper end of which is rigidly attached to a reciprocating bar F mounted to move in a right line and parallel with the surface of the plate on grooved guiding and supporting wheels or rollers G. Back and forth horizontal movement may be imparted to the bar and through it to the brush in the acid bath by any convenient power communicated through a suitable connecting rod H pivoted to one end of the bar. The brush may be adjusted up or down on the rod E to vary its pressure upon the plate and to compensate for its wear.

Other forms of apparatus and manner of mounting and moving the brush may of course be used without departing from the invention.

What is claimed is:

1. The hereindescribed etching process, which consists in immersing the plate in a bath of etching acid and agitating the acid by the act of the uniform movement of a brush in brushing the plate.

2. The hereindescribed etching process, which consists in immersing the plate in a bath of etching acid and subjecting the plate to the constant action of a brush uniformly applied and thereby agitating the acid.

3. An etching apparatus comprising a tank for the acid, a brush extending therein, a right line support for the brush and means for reciprocating it back and forth through the acid in the tank.

4. An etching apparatus comprising a tank for the acid, a vertically adjustable brush extending therein, a right line support for the brush and means for moving the brush forward and backward through the acid in the tank.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this 12 day of December 1906.

FREDERICK J. M. GERLAND.

Witnesses:
C. MEDEROZ,
EDWARD EARL.