Aug. 9, 1927. 1,638,566

H. R. CONGDON

POWDERING MACHINE

Original Filed July 15, 1924 2 Sheets-Sheet 1

Fig. 1.

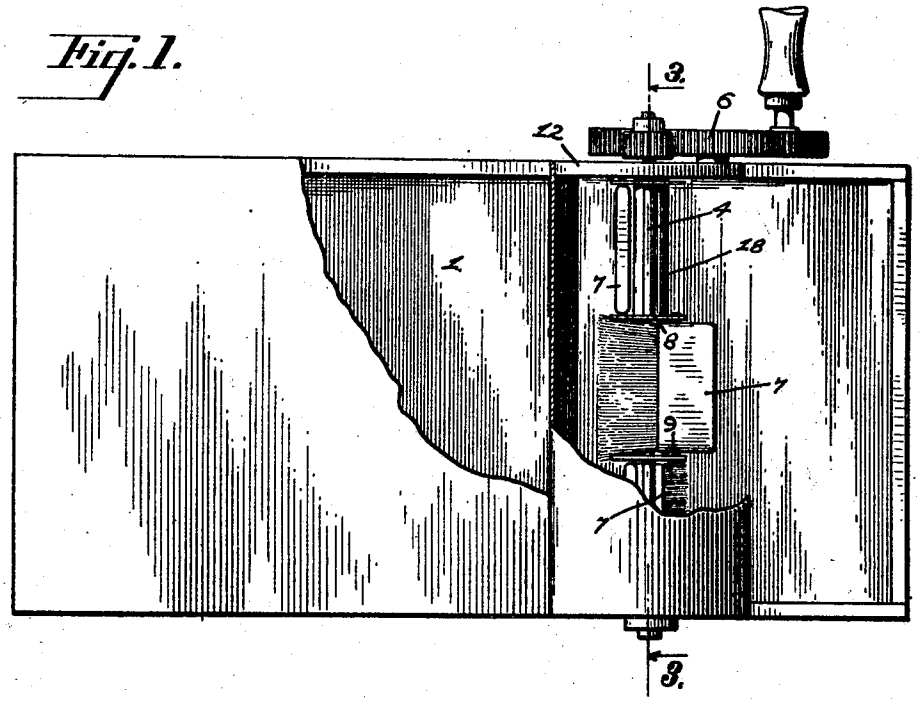
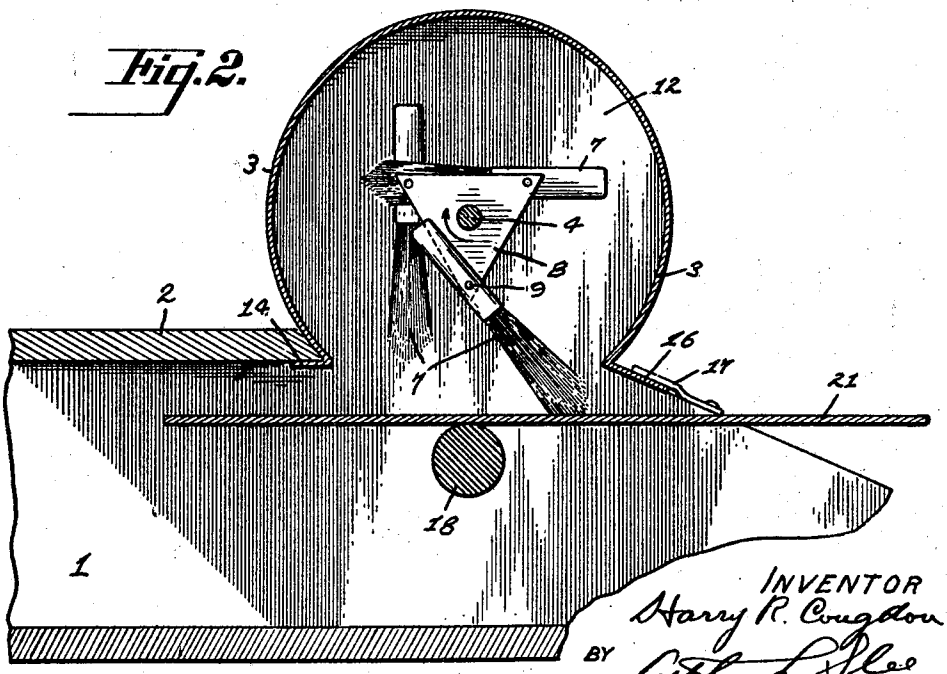


Fig. 2.



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Fig. 3.

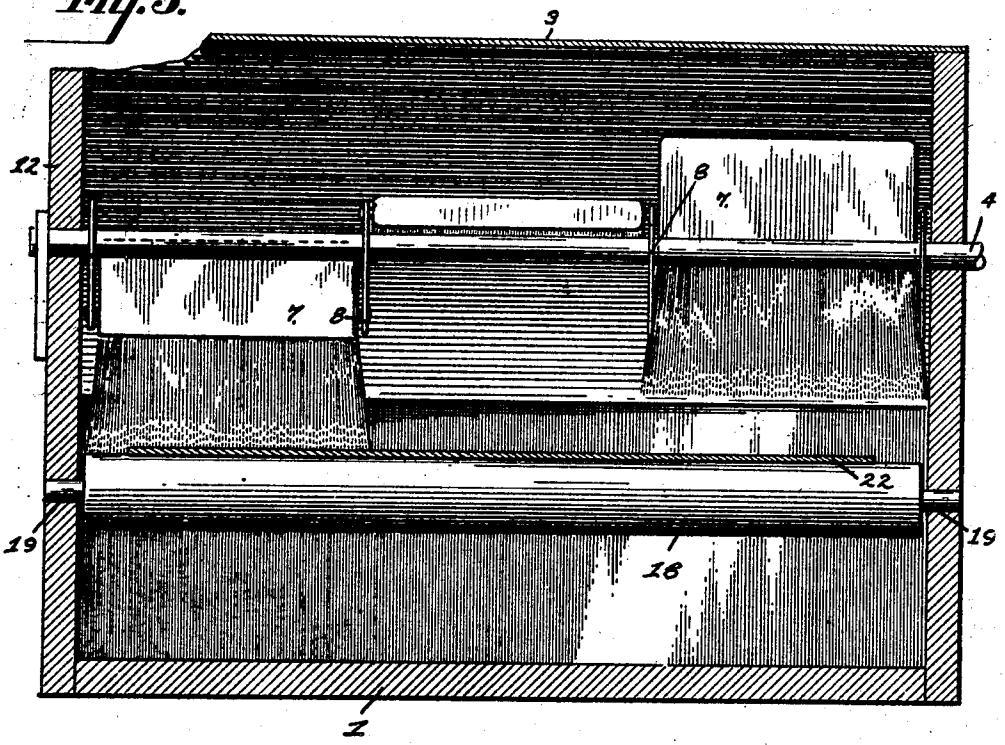


Fig. 4.

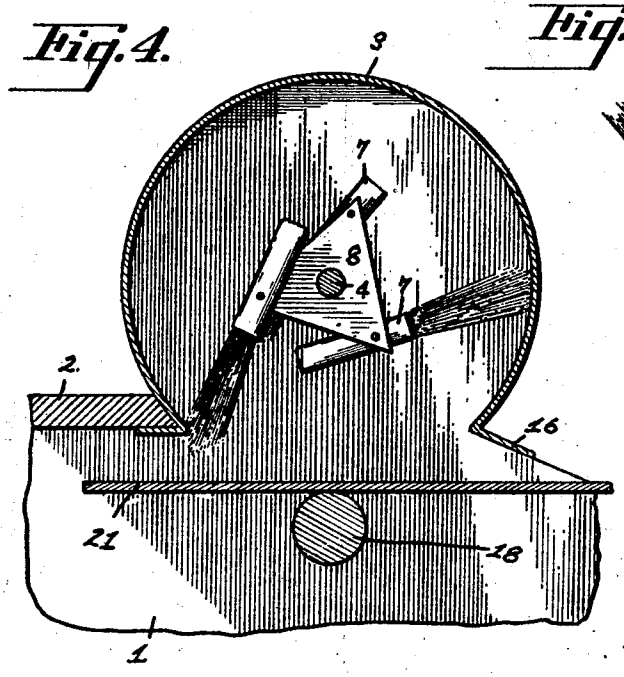
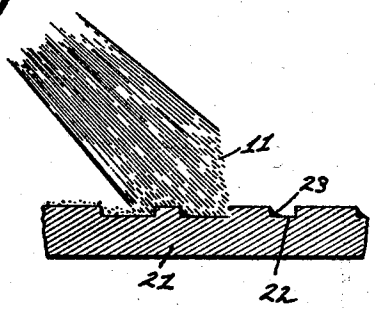


Fig. 5.



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Patented Aug. 9, 1927. 1,638,566

UNITED STATES PATENT OFFICE.

HARRY R. CONGDON, OF SAN FRANCISCO, CALIFORNIA.

POWDERING MACHINE.

Application filed July 15, 1924, Serial No. 726,185. Renewed April 22, 1927.

My invention relates to improvements in machines for powdering plates preparatory to the etching process in preparing zinc cuts and the like for printing purposes.

In preparing zinc cuts and the like, zinc plates, bearing the device to be printed, are etched with acid to cut away the surface of the metal from those portions of the plate which are not to receive ink for printing, the portions of the plate which are to receive ink being protected from the acid by an acid proof coating. As is well known in the art, a protective coating placed only upon the surface of the plate allows the acid to undercut the coated portions of the surface with the result that the edges of the unetched metal break down and cause an imperfect cut to be produced. To avoid this undercutting, the plate, after being partially etched, is powdered with a suitable etching powder which is brushed to fill in the edges of the depression etched into the surface of the plate. The etching powder is of a character such that when subjected to heat the powder melts, or, as commonly termed, is "burnt in" to form an acid proof coating upon the surfaces covered with the powder. The plate is then further etched to deepen the depressions. If necessary the plate is again powdered and etched to still further deepen the depressions, the process being repeated until the desired depth has been attained.

Common practice heretofore has been to apply and brush the powder into the corners of the depressions manually by means of a brush moved back and forth across the surface of the plate in all directions to brush the powder into the corners of the depressions and to remove surplus powder from the plate. At best this is a slow and tedious process depending for its effectiveness upon the care and skill of the workman. My present invention is therefore directed to a powdering machine for carrying out the above described powdering process, the primary object being to provide an improved device whereby plates may be quickly and efficiently powdered.

Another object of my invention is to provide an improved machine which will back the etching powder uniformly to the correct degree within the corners of the etched depressions in the plate.

A further object is to provide a device wherein a plurality of revolving brushes are counterbalanced to obtain a lightness of stroke adapted to effectively bank the powder and to prevent the displacement of the banked powder by further movement of the brushes.

Another object is to provide an improved device of the character described wherein the brushes are automatically dusted after each stroke to remove excess powder, thereby increasing the effectiveness of the machine and increasing the life of the brushes.

A further object is to provide a machine adapted to insure the correct positioning of the brushes and plate with respect to each other whereby a uniform operation will be obtained at all times.

I accomplish these and other objects by means of the device disclosed in the drawings forming a part of the present specification wherein like characters of reference are used to designate similar parts throughout said specification and drawings and in which,

Fig. 1 is a broken plan view of my improved powdering machine.

Fig. 2 is a broken longitudinal vertical section of the forward part of the housing, shown upon a somewhat larger scale.

Fig. 3 is a broken transverse vertical section taken upon the line 3—3 of Fig. 1 in the direction indicated.

Fig. 4 is a broken longitudinal sectional view showing the manner in which the brushes are dusted.

Fig. 5 is an enlarged sectional detail showing the manner in which the powder is banked into the corners of the depressions.

Referring to the drawings the numeral 1 is used to designate in general a housing consisting of a box like base open at the forward end thereof and provided with removable cover portions 2 and 3.

A shaft 4 is mounted within the forward portion of the housing 1, one end of said shaft extending outwardly from the side of the housing and arranged to be connected to a suitable actuating means such as a driving gear 6 whereby the shaft may be rotated.

A plurality of brushes 7 are pivotally mounted in connection with the shaft 4, said brushes being mounted between triangular mounting elements 8 secured in spaced relation upon the shaft. Each brush 7 is mounted upon pins 9 positioned so as to sub-

stantially balance the brush upon the pivot pins, a slight preponderance of weight being provided upon the end carrying the bristles 11 so that the bristles will normally be downwardly disposed. The elements 8 receive the shaft 4 at their approximate centers so that the points of the triangular elements are equally spaced from the shaft and the brushes mounted successively between the points in such manner that each brush is supported at an angle of approximately 120° from the other brushes with respect to the shaft 4 so that the several brushes substantially counterbalance each other.

The shaft 4 is mounted between upwardly disposed extensions 12 formed upon the forward ends of the side portions of the housing 1, said extensions being substantially circular in shape and adapted to close the ends of the cover portion 3 which is shaped to fit around the circular portions of the extensions and enclose the brushes 7 within the housing. The cover portion 3 is provided with a rearward disposed flange 14 adapted to be engaged under the forward end of the cover portion 2. A forwardly disposed flange 16 is formed upon the opposite edge of the cover portion 3 to partially close the form of the housing, said flange 16 being engaged at its ends by suitable fastening elements 17 whereby the cover may be detachably held upon the housing.

A roller 18 is mounted across the forward portion of the housing 1 below the shaft 4 and brushes 7, said roller being freely rotatable within bearings 19 formed in the side members of the housing 1. The roller is positioned to support and guide a plate 21 within the path of the revolving brushes 7 and is spaced a sufficient distance below the shaft 4 to cause the brushes to be dragged at an angle across the surface of the plate when said brushes are carried therepast by the rotation of the shaft 4. The edges of the brushes 7 are preferably beveled at an angle such that as the brush is moved across the plate a substantially flat brush surface, tapering off to a fine sharp point, will be presented to the surface of the plate.

In operation, the shaft 4 is rotated, either manually or by suitable application of power, and the brushes revolved within the housing. A plate 21 upon which a suitable quantity of etching powder has been sprinkled, is then inserted into the front of the housing, the end of the plate being caused to rest upon the roller 18. The plate 21 is then moved inwardly into the housing, the bristles 11 of the revolving brushes 7 being dragged over the surface of the plate and sweeping the powder into the edges of depressions 22, and banking the powder against the sides of the raised portions as at 23. The excess powder is swept toward the back of the plate. The plate is now withdrawn from the housing, the return movement of the plate causing the plate to be again swept by the brushes and the excess powder banked against the edges of the raised portions of the plate to fill in any low places which may have been left by the first sweeping, and the excess powder swept off from the plate. The plate is now turned and again inserted so that the brushes will sweep the plate in the opposite direction, after which the plate is moved into the housing first from one side and then from the other so that the plate will be swept from all four directions and the powder banked within all the corners of the depressions in the plate. The plate is now heated to "burn in" the powder and the plate is etched in the usual manner, after which the treatment is repeated as many times as is necessary to complete the etching of the plate as in the ordinary practice.

By causing the powder to be swept and banked into the corners of the depressions by the rapidly revolving brushes which are held in accurately spaced relation to the plate throughout the operation the powder is very quickly and evenly applied and the etching thus materially facilitated.

The brushes 7 are mounted in counterbalanced position upon the pivot pins 9 so that the bristles will rest lightly against the surface of the plate 21, the counterbalancing of the brush permitting the slightest pressure to swing the brush upon its mounting and the bristles to ride over the surface of the plate with the lightest possible pressure. This is important as a more rigid mounting of the brushes, or a mounting even permitting the full weight of the brush to rest upon the plate would result in sweeping the powder entirely out of the depressions without banking the required amount against the edges of the raised portions of the plate. By my counterbalanced mounting, only the slight excess of weight carried upon the bristle end of the brush is carried by the plate. By arranging a plurality of brushes 120° apart the entire assembly of brushes is balanced with respect to the shaft 4 so that the shaft will rotate freely and cause a uniform action entirely across the width of the plate.

As the brushes 7 are moved away from the plate 21 the centrifugal force causes the bristles to be swung rearward against the edge of the cover portion 3 as best shown in Fig. 4 of the drawings. As the bristles 11 strike the edge of the cover any excess powder clinging to the brush will be dusted off and fall upon the rearward portion of the plate or into the housing 1, thereby keeping the brushes clean and preventing a deposit of powder from being placed upon the for-

ward portion of the plate when the brush again engages the plate. In the ordinary manual powdering of plates the brush must be frequently struck against the work table or other object to expel the powder from the brush. This treatment quickly damages the brush and replacement must be made at frequent intervals. By expelling the powder by light strokes during each revolution of the brushes the brushes are kept clean at all times, thereby maintaining the effectiveness of the brushes and materially increasing the life of the brushes.

From the above description it will be seen that I have provided a new and improved means for powdering plates preparatory to etching. While I have shown and described one particular structure as embodying the principle of the invention, I do not desire to restrict myself to the specific structure shown as the number and the form and arrangement of parts may be modified in a great many ways without departing from the spirit of my invention, but wish, rather, to avail myself of all modifications which may fall within the scope of the appended claims.

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

1. A powdering machine comprising a housing; a brush pivotally mounted upon one axis and revolvable within the housing about a different axis; and means for guiding a plate within the path of the brush whereby etching powder may be banked within depressions upon the surface of the plate preparatory to etching.

2. A machine for powdering plates, preparatory for etching, comprising a housing; a counterbalanced brush pivotally mounted upon one axis and revolvable within the housing about a different axis; and means for guiding a plate within the path of the brush whereby etching powder may be banked within depressions upon the surface of the plate.

3. A machine for powdering plates, preparatory for etching, comprising a housing; a plurality of counterbalanced brushes pivotally swung upon separate axes and arranged to be revolved within the housing about a common axis; and means for guiding a plate within the path of the brush whereby etching powder may be banked within depressions upon the surface of the plate.

4. A machine for powdering plates, preparatory for etching, comprising a housing; a plurality of counterbalanced brushes rotatably pivotally swung upon separate axes and arranged to be revolved within the housing about a common axis; means for revolving the brushes; and means for guiding a plate within the path of the brushes whereby etching powder may be banked within depressions upon the surface of the plate.

5. A machine for powdering plates, preparatory for etching comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of brushes pivotally connected upon the shaft and adapted to be revolved by said shaft; and means for guiding a plate within the path of the brushes whereby etching powder may be banked within depressions upon the surface of the plate.

6. A machine for powdering plates, preparatory for etching; comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of counterbalanced brushes pivotally connected upon the shaft and adapted to be revolved by said shaft, said brushes being positioned to counterbalance each other with respect to the shaft; means for rotating the shaft and brushes; and means for guiding a plate within the path of the brushes whereby etching powder may be banked within depressions upon the surface of the plate.

7. A machine for powdering plates, preparatory for etching, comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of counterbalanced brushes pivotally connected upon the shaft and adapted to be revolved by said shaft; means for guiding a plate within the path of the rotating brushes whereby etching powder may be banked within depressions upon the surface of the plate; and a detachable cover enclosing the brushes, said cover being provided with an edge adapted to be struck by the bristles of the brushes when said brushes are moved away from the plate for displacing excess powder from the brushes.

8. A machine for powdering plates, preparatory for etching, comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of brushes pivotally mounted upon the shaft; means for rotating the shaft and the brushes; and a roller mounted below the shaft to support and guide a plate within the path of the brushes whereby etching powder may be banked within depressions upon the surface of the plate.

9. A machine for powdering plates, preparatory for etching, comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of mounting elements secured in spaced relation upon the shafts; a plurality of brushes pivotally mounted between adjacent mounting elements and adapted to be revolved within the housing, said brushes being counterbalanced with respect to their pivot mountings and arranged to counterbalance each other with respect to the shaft; and a roller mounted below the shaft to support and guide a plate

within the path of the brushes whereby etching powder may be banked within recesses in the surface of the plate.

10. A machine for powdering plates, preparatory for etching, comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of mounting elements secured in spaced relation upon the shaft; a plurality of brushes pivotally mounted between the mounting elements in spaced relation to the shaft; means for rotating the shaft to revolve the brushes within the housing; and a roller mounted below the shaft to support and guide a plate within the path of the brushes, said brushes being dragged at an angle across the surface of the plate to bank etching powder into the edges of depressions formed in the surface of the plate.

11. A machine for powdering plates, preparatory for etching, comprising a housing; a shaft mounted within the forward portion of the housing; a plurality of brushes pivotally mounted in connection with the shaft; means for rotating the shaft to revolve the brushes within the housing; a roller mounted below the shaft to support and guide a plate within the path of the brushes, said brushes being dragged at an angle across the surface of the plate to bank etching powder into the edges of depressions formed in the surface of the plate; and a cover enclosing the brushes and provided with an edge adapted to be struck by the bristles of the brushes as the same are moved away from the plate for displacing excess powder from the brushes.

In witness whereof I hereunto set my signature.

HARRY R. CONGDON.