

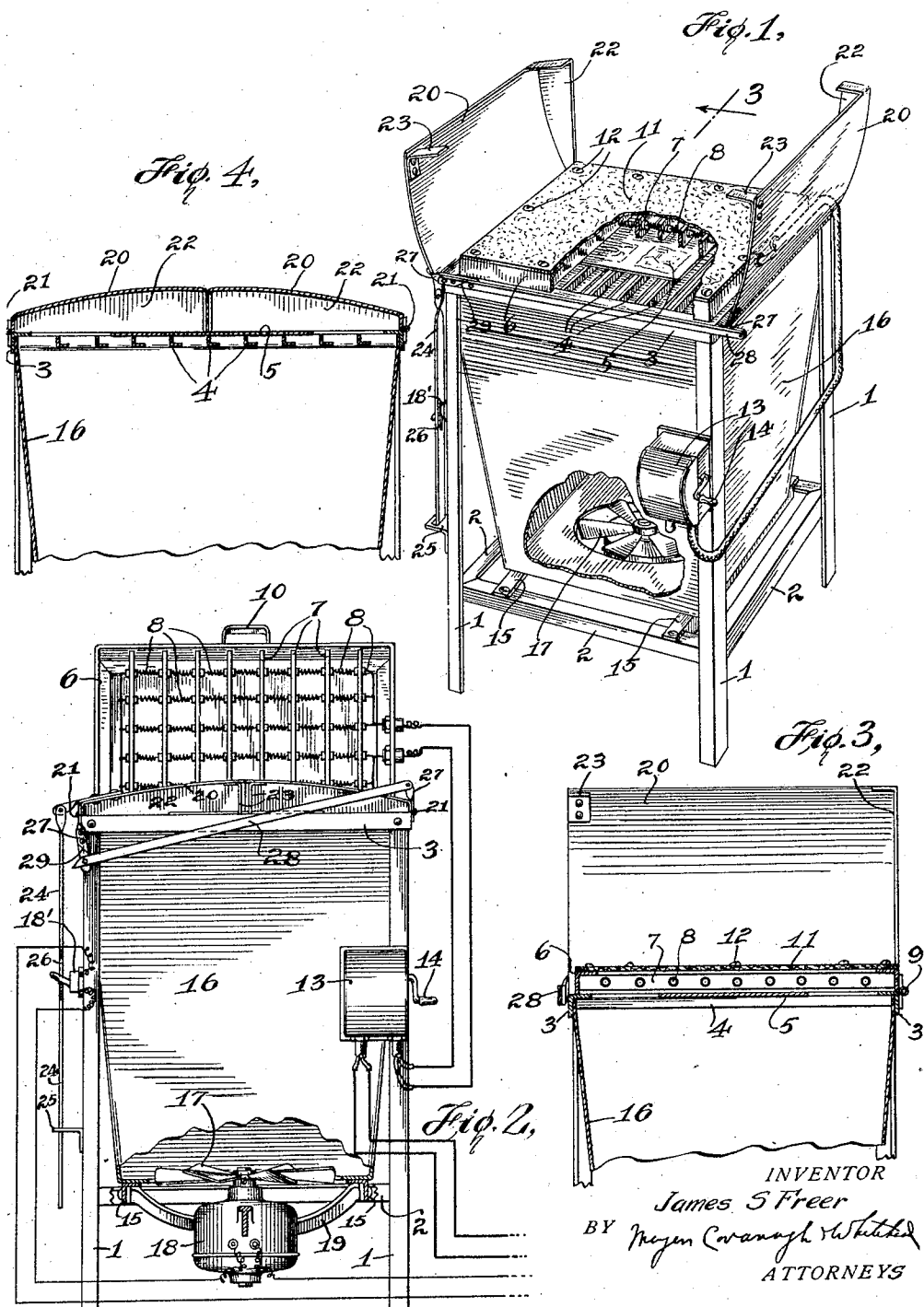
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APPARATUS FOR PREPARING PHOTOENGRAVING PLATES

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PREPARING PHOTOENGRAVING PLATES.

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To all whom it may concern:

Be it known that I, JAMES S. FREER, a citizen of the United States, and resident of Rutherford, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Preparing Photoengraving Plates, of which the following is a specification.

My invention relates to apparatus employed in etching, and especially adapted for use in connection with the photoengraving and allied processes.

A great variety of processes for preparing and etching metal plates are known, all of which include the application of an erosive resisting coating to one side of the plate. In many of these processes it is necessary to heat the coating after it has been applied to the plate to render it tacky, to bake or burn it in, or melt it, or to accomplish various other results according to the requirements of the particular process.

In Patent No. 1,373,658 issued to me April 5, 1921, there is disclosed a process in which the heat is applied directly to the resisting coating. Prior to the invention of said process it was the uniform practice to heat the coating to the necessary extent by placing the plate over a suitable stove or heater, the heat being transmitted through the plate to the coating. In such processes after the coating or resist has been heated to a suitable point, it is necessary to cool the plate before the process can be continued. This is accomplished either by permitting the plate to cool slowly in the open air, or by subjecting it to various cooling processes, usually including the application of water. The latter methods are objectionable, because they tend to buckle or warp the plate and the water must be removed from the plate before the next step of the process can be taken. Furthermore, the sudden cooling tends to draw the temper of the plate, thus materially reducing their usefulness. On the other hand the slow cooling of the plates wastes a great deal of valuable time.

In what is known as the dragon's blood process, the plate after exposure and rolling up is treated a number of times with a finely powdered resinous substance, such as dragon's blood. This substance when melted

has a strong affinity for the ink and permeates the inky emulsion, forming when cooled an acid-resisting substance generally referred to as the resist.

In the dragon's blood method the plate is ordinarily immersed in the acid bath a number of times, three or four being customary, and before each insertion in the bath the plate is treated with the dragon's blood powder by the method known as "powdering four ways". This method consists in applying the powder to the plate four or more successive times and in brushing it across the surface of the plate each time in a different direction, it being customary to apply the powder from left to right, from right to left, from bottom to top, and from top to bottom. After each application of the powder in a single direction the plate is heated so that the powder will melt against the sides of the lines in the direction in which it is brushed and the plate is then cooled to a working temperature. Consequently four separate heating and cooling steps are necessary between successive insertions in the acid bath. It will be evident, therefore, that in this process a single plate is often heated and cooled as many as seventeen times.

In the process of my said patent in which the heat is applied directly to the resist, the plate is not, as in the prior processes, heated to any considerable extent, and the disadvantages above pointed out of those processes are avoided.

The main object of the present invention is to provide convenient and suitable means for carrying out the process of said patent, and I have found that an electric heater is especially suitable for this purpose.

While in that process the plate is not substantially heated, and in fact is not heated to such an extent that it cannot be handled with the naked hand, it may be heated slightly above the temperature at which the dragon's blood powder can be applied; and a further object of my invention is to provide means by which the plate can be quickly cooled and the delay incident to allowing it to cool in the open air, where such cooling is found necessary, avoided.

In the drawings there is illustrated a

preferred embodiment of my invention comprising a suitable support having a grid for supporting the plate and an electric heater hingedly mounted on the frame and adapted to be lowered over the plate into heating relation therewith, and cooling means comprising a housing mounted on the supporting frame below the grid, a cover for the housing adapted to be lowered over the plate when the heater is raised, and a blower mounted in the housing.

In the drawings:—

Fig. 1 is a perspective view of the apparatus with the heater in the lowered position and the cover wings raised, with certain parts broken away,

Fig. 2 is a front view showing the heater raised and the cover wings lowered, the electrical connections being shown diagrammatically,

Fig. 3 is a vertical section through the upper part of the apparatus taken along the line 3—3 of Fig. 1, and

Fig. 4 is a vertical section through the upper part of the apparatus with the wings lowered, the line of section being at right angles to that of Fig. 3.

The supporting frame is formed of uprights 1 connected near their lower ends by bars 2 and at their upper ends by bars 3. Between the bars 3 are mounted bars 4, the upper edges of which are slightly below the upper surface of the bars 3. These bars 4 form a grid for supporting the plate 5.

An electric heater comprising a frame 6 between the sides of which extend bars 7 carrying resistance elements 8 is movably connected to the frame, as by a hinge 9. The front of the frame 6 is provided with a handle 10. A cover 11 formed of any suitable material, such as asbestos, is attached to the frame 6, as by screws 12. This cover directs the heat downwardly on the plate when the heater is lowered thereover. As the upper surface of the grid is below the surface of the bars 3, the bars 7 are spaced from the plate when the heater is lowered. The electric heating elements are connected to any suitable source of current, the conducting wires passing through a suitable switch 13 which may be of the enclosed type as shown. A handle for operating the switch is shown at 14.

Mounted between the upper bars 3 and bars 15 extending between two of the bars 2 is a housing or box-like structure 16 formed of any suitable material, such as sheet metal. The housing is opened at the top and has an opening in the bottom in which is mounted a blower 17 carried on the armature shaft of an electric motor 18 supported in a hanger 19 depending from the bars 15.

The motor 18 is connected to any suitable source of current, the conducting wires pass-

ing through a switch 18' which may be conveniently mounted on one of the uprights 1.

Connected to the bars 3 so as to be brought over the housing when the heater is raised is a cover, which as shown consists of two wings 20 hinged to the bars 3 at 21. These wings, which may be of any suitable material, such as sheet metal, are preferably curved as shown and provided at their rear ends with extensions 22 and at their front ends with supporting legs 23, so that when they are lowered the housing will be completely closed except for an opening under the front end of the wings.

A convenient means for starting the blower when the cover is lowered consists of a bar 24 pivotally connected to one of the cover members and passing through a guide 25 on one of the uprights 1, and having a slot 26 therein through which passes the handle of the switch. This slot is of such a length that the switch is closed as the cover reaches its lowest position, and opened as the cover is raised.

In order to cause the cover members to move together and to limit their outward movement, a strap 27 is attached to each of the cover members, and the ends of these straps are connected by a bar 28 pivotally attached thereto. One end of the bar 28 abuts against a shoulder 29 on one of the straps 27 when the cover members are fully opened.

In the operation of the device, the plate is placed on the grid with the resist-bearing side upward, and the heater lowered and the current turned on. After the resist has been sufficiently heated the cover is raised and the current turned off. The plate can be inspected from time to time by raising the heater to ascertain when the resist has been sufficiently heated, but the operator soon learns by experience how long a time will be necessary for this purpose.

If, when the heating operation is concluded, the plate should be too hot to permit the immediate application of the dragon's blood powder or other material, the cover is lowered and the blower started. The current of air directed against the lower surface of the plate will very quickly cool it sufficiently.

While I have shown a preferred embodiment of the invention, it is evident that many changes may be made therein without departing from the spirit of the invention as defined by the appended claims.

I claim:—

1. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a surface thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing mounted therein open at its upper end, a grid over said opening for support-

ing the plate with the resist-bearing side exposed, and an electric heater hingedly attached to one side of said frame and adapted to be lowered over said plate, whereby to
 5 apply heat directly to the exposed side thereof, the said grid being so located with reference to the frame that the plate is spaced from the heater when the latter is in lowered position.

10 2. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 15 mounted therein open at its upper end, a grid over said opening for supporting the plate with the resist-bearing side exposed, and an electric heater having a closed upper surface hingedly attached to the frame and
 20 adapted to be lowered over the plate, whereby said heater when lowered forms a cover for the housing and the heat is reflected against the exposed side of the plate.

25 3. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 30 mounted therein open at its upper end, a grid over said opening for supporting the plate with the resist-bearing side exposed, and an electric heater hingedly mounted on said support and comprising a frame and a
 35 series of spaced bars mounted thereon and having resistance elements mounted therebetween and a cover attached to the upper side of the frame, whereby when the heater is lowered it forms a closure for the housing
 40 and the heat is reflected against the exposed side of the plate.

4. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, means
 45 thereon for supporting the plate with the resist-bearing side exposed, means for applying heat to the exposed side, comprising an electric heater hingedly attached to one
 50 side of the frame and adapted to be lowered over the plate and means for applying a cooling element to the opposite side of the plate while resting on the grid when the heater is in raised position.

55 5. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 60 mounted therein open at its end, a grid over said opening for supporting the plate with the resist-bearing side exposed, means for applying heat to the exposed side, and means for applying a cooling element to the

opposite side of said plate while resting on the grid. 65

6. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 70 mounted therein open at its upper end, a grid over said opening for supporting the plate with the resist-bearing side exposed, a member hinged to said support having heating elements mounted therein, said
 75 member being adapted to be lowered over said plate whereby to apply heat directly to the exposed side thereof, and means for applying a cooling element to the opposite side of the plate while resting on the grid
 80 when said member is in raised position.

7. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 85 mounted therein open at its upper end, a grid over said opening for supporting the plate with the resist-bearing side exposed, means for applying heat to the exposed side, and means for applying a cooling element to the opposite side of the plate
 90 while resting on said grid.

8. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 95 mounted therein open at its upper end, a grid over said opening for supporting the plate with the resist-bearing side exposed, wings hingedly mounted on the side of the frame adapted to be folded over the plate,
 100 and means mounted in the housing for cooling the plate.

9. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing
 110 mounted therein open at its upper end, a grid over said opening for supporting the plate with the resist-bearing side exposed, wings hingedly mounted on the side of the frame adapted to be folded over the plate,
 115 and a blower mounted in the housing.

10. In an apparatus for use in treating etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist the combination of a frame, a housing
 120 mounted thereon and open at its upper end, a cover for said housing hingedly mounted on the frame and adapted to be moved to enclose said plate, and a blower in said
 125 housing.

11. In an apparatus for use in treating

etching plates composed of metal sheets with selected portions of a side thereof covered with an erosive resisting coating or resist, the combination of a frame, a housing 5 mounted thereon and open at its upper end, a cover for said housing adapted to be brought over said plate, a blower in said housing, a motor for driving said blower, and means connected to the cover for starting the motor by the closing of the cover. 10

Signed at New York city in the county of New York and State of New York this 21st day of February A. D. 1922.

JAMES S. FREER.