Sept. 18, 1945. E. G. GRUBBS 2,385,073

PHOTO ENGRAVER'S PLATE COOLER

Filed June 27, 1944

Fig. 1.

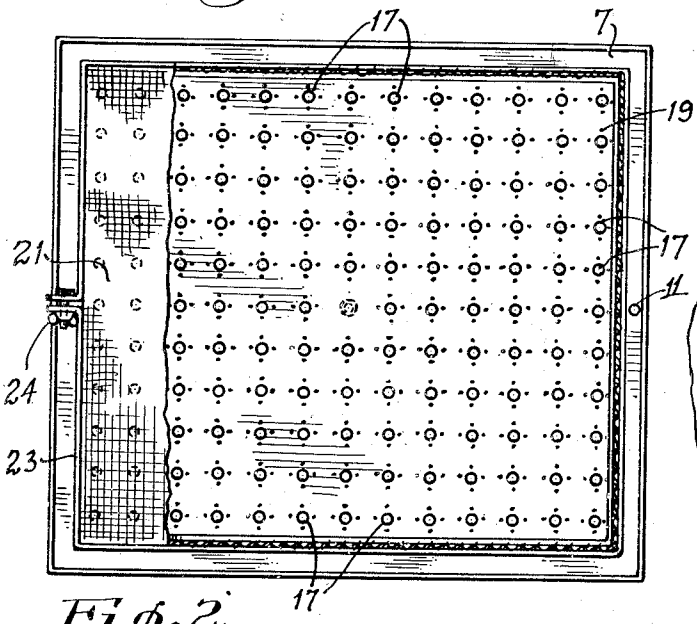


Fig. 3.

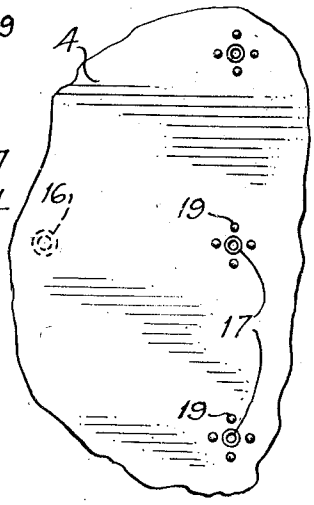
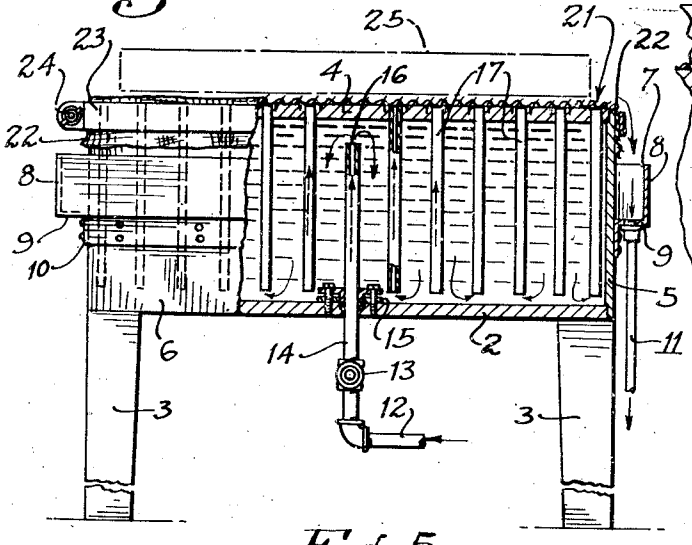


Fig. 2.



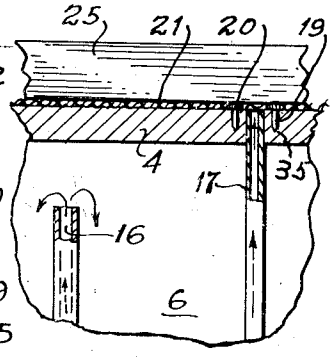
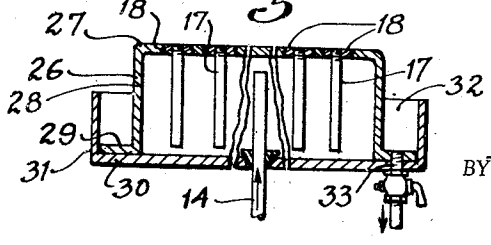


Fig. 4.

Fig. 5.



INVENTOR.
Edward G. Grubbs
BY W. E. Williams
ATTORNEY.

Patented Sept. 18, 1945 2,385,073

UNITED STATES PATENT OFFICE

2,385,073

PHOTOENGRAVER'S PLATE COOLER

Edward Graney Grubbs, Los Angeles, Calif.

Application June 27, 1944, Serial No. 542,417

4 Claims. (Cl. 62—11)

My invention relates to a photo engraving plate cooler, a time saving apparatus in that art. Not only is my apparatus a time saver but its use prevents the warping of these plates while they are being cooled in the ordinary process of photo engraving.

In the processes used in making photo engraved plates the metal which composes the plates gets quite hot and they must be cooled before other work can be done upon them. The cooling methods commonly used are slow and result frequently in warping and distortion of the plates during the cooling process, because certain areas of the plates are cooled more quickly than are some of the others.

With my invention plates can be cooled uniformly and very quickly and at the same time avoid this warping and distortion of the plates.

It is a common practice to place the hot plates on some flat surface bed which may or may not be cooled by a water bath underneath or by other cooling means.

Difficulties are encountered in obtaining a uniform temperature over the entire surfaces of the cooling surface bed, regardless of how that cooling surface bed is made or of the materials of which it is composed.

When the flat bed surface of a cooling device is cooled by a circulation of water, it is relatively difficult to have such water content of uniform cooling temperature, and thereby prevent one region from having a variation of temperature from other regions of the cooling bed.

With my invention I obtain a uniformity of cooling of the plates with substantially a uniform temperature over the entire cooling bed area.

An object of my invention is to provide a cooling bed which is provided with water circulating means for cooling the bed uniformly throughout the entire area covered by the entire plate which is to be cooled.

Another object of the invention is to provide a water circulation that will furnish a water cooling surface which is contacted by a body of water which is substantially uniform in its temperature throughout the body of the water.

Another object of the invention is provided by means for distributing at the same time cooling water of a uniform temperature to all areas of the plate which is to be cooled.

Other objects of the invention relate to the details of the construction and the shapes of the parts of my apparatus as will be set out herein.

Reference will be had to the accompanying drawing in which parts are broken away for clearness of illustration.

Fig. 1 is a plan view of my invention.

Fig. 2 is a vertical elevation, likewise with parts broken away for clearness of illustration.

Fig. 3 is a plan view of part of the cooling bed plate of my invention.

Fig. 4 is a vertical sectional view of a part of the bed plate on which there is mounted an engraver's plate in the act of being cooled.

Fig. 5 is a vertical section on a smaller scale through the cooling box of my invention, and shows a modified form of the box.

In the construction of my photo engraver's plate cooler I prefer to provide a rectangularly shaped water box, or other shapes may be used as desired. Normally this water box will be provided with a base plate 2 mounted on legs 3 or supported in any other suitable manner on the base plate 2.

The top of my box is provided with the cooling plate or bed 4. The ends of these plates 2 and 4 are covered by vertical plates 5 and their sides are covered by side plates, 6, thus forming a complete and closed box.

The connections of the side and end plates 5 and 6 with the plates 2 and 4 may be made in any suitable manner or the box itself be made in any desired form for enclosure of the mass of the water underneath the top bed plate 4.

This box may be made in any suitable manner as a complete box open at the top or the bottom and having the other plate put upon the box as a cover.

Extending around the entire middle portion of this box as above described, there is a trough 7 provided with a vertical side wall 8, a bottom 9 and with a downward projecting flange 10, which flange is riveted tightly to the side and end walls of the box. At any suitable location there is fixed into this trough 7 a discharge waste pipe 11.

The interior of the water box is filled with water by the pipe 12 coming from any suitable source of water supply of substantially uniform temperature. In this pipe 12 there is a control valve 13 connected to a vertical pipe 14 which is passed through the bottom of the box 2 and leakage is prevented from the box around the side of the pipe by a gland 15.

The top of the pipe 14 ends at 16 a short distance below the bed plate 4, as will be seen by Figs. 2 and 4.

Into the body of the plate 4 by any suitable means there are fastened numerous small pipes

17 secured into the plate 4 by swaged frictional contact in holes of the plate 4, or these pipes may be threaded on their ends and screwed into holes in the plate 4, or the pipes 17 may be fastened in any suitable manner into threaded bushings 18 which may be screwed into threaded holes in the bed plate 4, see Fig. 5.

On the bed plate 4 at the location of each pipe 17 where it enters the plate 4 there are provided around this discharge end of the pipe 17, four or more small raised knobs 19 which stand up slightly above the nozzle end of the pipe 17. The raised knobs 19 may be of any suitable construction integral with the plate 4 or they may be produced by round headed brads or small nails 35, see Fig. 4.

On the top of the bed plate 4 I stretch a piece of cloth of any suitable type having a character somewhat like burlap, which is indicated by 21 having its edges overlapping the bed plate 4 as indicated by the skirt 22, see Fig. 2. The cloth 21 is clamped in place by a clamping band 23 which extends around the bed plate 4 and clamps the cloth 21 in place when tightened by means of the clamp screw 24.

The plate to be cooled is indicated by 25 in Fig. 4 and is dotted in outline in Fig. 2.

A modified form of the box, as previously mentioned, is shown in smaller scale by Fig. 5 in which there is made an integral form box 26 having the bottom portion 27 and side walls 28 and the top opening of the box is provided with side flanges 29.

In this Fig. 5 that sort of a box is inverted and is fitted down into its cover 30 which is also shown as being inverted. The cover 30 is provided with side flanges 31 which, as is shown in Fig. 5, provide a trough 32 for collecting the discharge water which is passed out through a pipe 33 of similar character to that of pipe 11 of Fig. 2.

In the embodiment shown in Fig. 5 the pipes or tubes 17 are each first screwed into a threaded bushing 18 as previously mentioned and in this form the tubes or pipes 17 may be inserted from the outside of the box whereas in the form shown in Fig. 2 the pipes or tubes 17 are inserted into the said plate 4 before the box is completed. In Fig. 5 the same sort of a pipe 14 is used for the inflow of the cooling water to the bottom of the bed or cooling plate 4.

The water which is used for cooling purposes flows through the pipe 14 into the interior of my box and is dicharged into the upper region of the box. This causes a dispersal of the water throughout the entire box. This provides as it were, a uniform mixture of the water which then enters the bottoms of the pipes 17, all of which receive water from the lower regions of the water body. The water flows upward through the pipes 17 and discharges around the top ends of the pipes 17 under the cloth 21. The little knobs 19 stand up a bit above the top surface of the plate 4 around the ends of the pipes 17 and thus, as it were, facilitate the flow of the water more or less uniformly around each pipe end or nozzle under the cloth 21.

Thus there is produced a moving body of water of uniform temperature which spreads entirely over the top of the cloth 21 in contact with the surface of the plate 25, which results in a quick cooling of the plate in every region of its exposure with no tendency to distort or warp the plate by unequal contraction.

A further advantage of cooling the plates by this method is the prevention of water from splashing on to the top part of the photo plate during the process of cooling.

The construction of my device as shown and described, provides for the entry of the fresh cooling water to be delivered in the upper top region of the water in the enclosed chamber by means of the pipe 14, which then causes the newly introduced water to intermingle in the general body of the water, directly underneath bed plate 4.

Further, water varies somewhat as to its density and weight in relation to its temperature. If there is no active circulation in the water chamber, the top region of the water chamber in contact with the underside of the bed plate 4 might become considerably hotter than the lower regions in which the water might be denser and cooler than the water in the upper regions nearer the bed plate 4.

Furthermore, due to the arrangement of the tubes 17, they receive water from the lower cooler regions of the water box and conduct it to and through the upper surface of the bed plate.

This prevents, as it were, an inactive volume of water up next to the bottom of the bed plate from becoming continuously heated from the heat that is radiated from the bottom of the bed plate 4.

It is surprising, but true, that my arrangement of having the entering cooling water enter at the top of the body of water in my water chamber and discharge from the bottom of the water in my chamber to the cooling bed plate 4, does produce a commercial advantage not generally obtained in this art.

What I claim is:

1. In an apparatus of the class described, a cooling bed plate, a series of holes located equidistant from each other and extending vertically through the said plate, a series of small pipes fixed in said holes and extending downwardly from the underside of said cooling plate, a water chamber confined beneath the said cooling bed plate and into which extend the above mentioned pipes as fixed into the said cooling bed plate, means for forcing water into the said chamber and out through the pipes which are fixed into the bottom of the said cooling bed plate.

2. In an apparatus of the class described, a cooling bed plate, a series of vertical holes through the said cooling bed plate, a series of pipes extending below the said cooling bed plate and fixed into the said holes in the said cooling bed plate, a water chamber holding water underneath the said cooling bed plate and into which the said tubes fixed into the said cooling bed plate extend downward having their lower ends open to the bottom region of the said water in the said chamber.

3. In an apparatus of the class described, a cooling bed plate, a chamber for holding water underneath said bed plate and in contact therewith, said bed plate provided with a series of holes extending through the body of the bed plate and spaced equal distances from each other over the surface of the said bed plate, a series of pipes fixed into said holes in said bed plate and extending downwardly from the bottom of said bed plate into the region of the bottom of the said chamber for delivering water from the bottom region of the water chamber to the top of the said bed plate, a water supply pipe for the said chamber delivering water in the said chamber and having its discharge nozzle in the upper

region of said chamber below the bottom of the said bed plate.

4. In an apparatus of the class described, a cooling bed plate, a series of holes through the body thereof spaced equal distances over the plate, a series of bushings secured in the said holes, a series of pipes fixed into the said bushings and extending downwardly from the bottom of the said cooling bed plate, a water chamber located underneath the said bed plate and means for forcing water into contact with the bottom of the said bed plate and through the said tubes to the top of the said bed plate.

EDWARD GRANEY GRUBBS