June 17, 1952 J. H. SCHMIDT 2,600,696

PLATE COOLER

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FIG. 1

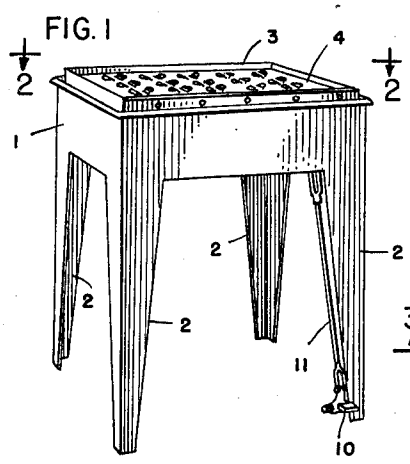


FIG. 2

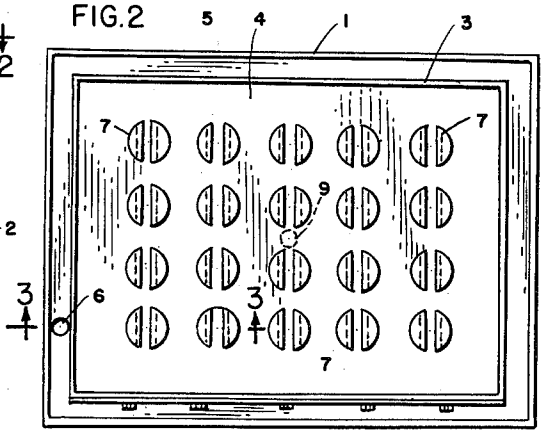


FIG. 3

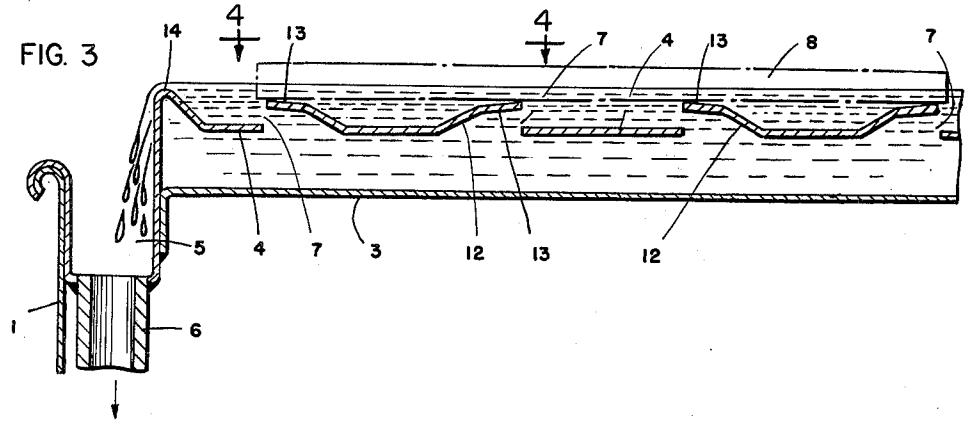
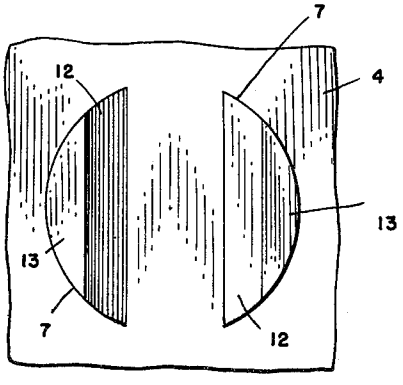


FIG. 4



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PLATE COOLER

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This invention relates to plate coolers such as are used by photo-engravers for cooling printing plates during the course of their being processed. Particularly this invention concerns the form and construction of the top surfaces of plate coolers, upon which the plate being cooled is rested while cool or cold water is directed against its bottom surface, and an improved arrangement for controlling the water flow thereover.

The main objects of this invention are to provide an improved plate cooler construction; to provide an improved form for the top surfaces of plate coolers upon which the plate is supported during the cooling operation; to provide an improved top for plate coolers whereby the flow of cooling water is more adequately controlled; to provide such a device wherein more uniform distribution of the cooling water over the bottom plate surface is obtained; to provide such a device in which the possibility of spouting onto the top surface of the plate or over the edge of the cooling table is obviated; and to provide a simplified plate cooler top construction which is less costly to manufacture and which requires no maintenance.

A specific embodiment of this invention is shown in the accompanying drawings in which:

Figure 1 is a perspective view of a plate cooler embodying the invention and showing a typical form of such devices.

Fig. 2 is a top plan view of the same showing the improved plate cooler top construction.

Fig. 3 is a fragmentary sectional view, as taken on line 3—3 of Fig. 2, showing the form and arrangement of the improved cooling water distributing outlets, and

Fig. 4 is a top plan view of one of the cooling water outlets as viewed from the line 4—4 of Fig. 3.

As shown in Fig. 1 a typical form of plate cooler comprises an open topped table frame 1, mounted on suitable legs 2, so as to be at a convenient working height, and adapted to receive and support a hollow box-like tank on receptacle 3, the top surface 4 of which is formed to support the plate to be cooled. Usually the tank 3 is of smaller dimensions, in the horizontal plane, than the top opening of the table frame 1, and the tank is centered in the table frame to provide a peripheral trough or channel 5, between the sides of the tank and the table frame, which trough is closed on its sides and bottom to receive and carry away water flowing over the margins of the surface 4 of the tank. A drain connection 6 is provided for the trough 5 and preferably

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the bottom of the trough is inclined toward the drain so that water will not stand in the trough. The construction of the table 1, the overflow drain trough 5, and the support for the tank 3 may be of any suitable form or arrangement and ordinarily a drain pipe, not shown, is provided between the drain 6 and a suitable place for waste.

The tank 3 is a hollow body closed on its sides and bottom, so as to be water tight, and its top wall 4 is provided with a plurality of spaced openings 7 through which water may flow to flood the top surface of the tank. The top of the tank is constructed to receive and support the plate 8 (Fig. 3) to be cooled and the cooling is effected by flooding the top surface of the tank with cold water which contacts the bottom of the plate 8.

A suitable water inlet 9 having a connection, not shown, to a suitable water supply, such as the city water mains, is provided at a central location in the bottom of the tank 3, and this water connection is controlled by a suitable valve, also not shown, which in turn is adapted and arranged to be operated by a foot pedal 10, mounted on one of the table legs 2 and connected to the valve by suitable linkage 11. Preferably the water supply valve is spring closed so that it may be opened by merely pressing the foot pedal 10, and automatically closed upon release of the foot pedal. Thus the operator's hands are free for manipulation of the plate being cooled and also the rate of water supply can be readily controlled by the amount of pressure exerted on the foot pedal.

The present invention particularly relates to the construction of the top wall 4 of the water tank 3, and to the form and disposition of the water outlets 7 therein. Heretofore, the tank tops were flat perforated plates covered with one or more thicknesses of burlap to prevent the water from spouting or spurting upwardly when the tank was subjected to pressure, as from the city water lines, the burlap covering causing the water to flood the tank top more or less uniformly for even contact with the bottom of the plate being cooled. This form of the plate cooler has the disadvantage of rapid wearing of the burlap covering which necessitates frequent and costly replacement. Also plate coolers have been made with a tank top of shingled overlapping plates extending transversely of the tank, from front to rear, and having openings at the overlapping sides of the plates which face from the center of the tank top toward the sides thereof. In this latter construction the water distribution across the bottom of the plate being cooled is uneven,

resulting in uneven cooling and buckling of the printing plate, and the shingled form of the tank top is very easily damaged during the placing of the printing plate thereon.

As shown in Figs. 2, 3 and 4 the improved tank top is formed with water discharge openings arranged in pairs and facing in opposite directions, and the pairs of openings are uniformly distributed over the surface of the tank top to provide substantially uniform distribution of the water issuing therefrom. Also, each pair of openings is formed to provide integral plate supports which project above the surface of the tank top and upon which the printing plate being cooled is rested during the cooling operation.

These openings, indicated generally by the numeral 7, are formed by punching or pressing oppositely directed or facing tongues, or rigid flaps 12, from the body of the tank top sheet 4, and forming the tongues so that the portions left connected to the top sheet are inclined upwardly therefrom. During the forming operation the free ends or tip portions 13 of the flaps or tongues are bent downwardly, relative to the respective inclined parts, so as to extend at only a slight upward angle relative to the plane of the tank top, with their tips at a predetermined distance above the plane of the tank top. Thus, the spaces or openings 7, around the margins of the flaps or tongues 12—13, are substantially horizontally opening slots through which the water, flowing from the interior of the tank 3, is discharged in horizontal streams or sheets which uniformly flood the top surface 4 of the tank 3 and which will not spout or shoot in an upward direction. Also the slightly inclined end tips 13 of the tongues or flaps provide a multiplicity of laterally spaced plate supports which firmly hold the plate being cooled above the surface of the tank top 4, with a minimum area of contact with the plate, so that the cooling water which floods the tank top and flows between and around the plate supports will evenly contact substantially the entire bottom surface of the plate. These plate supports are substantially rigid members and because of their number they hold the plate without bending.

The cooling water which issues from the horizontally opening slots 7, after flooding the top surface 4 of the tank, overflows into the peripheral trough 5 from which it may be drained off to waste through the connection 6. However, in order to assure uniform contact of the cooling water with the printing plate 8, the margins of the top sheet 4 of the tank 3 are formed upwardly, to a height slightly above the height of the tips of the tongues or flaps 13, to provide a peripheral rim-like dam or weir which will retard the overflow of cooling water sufficiently to allow the water flow across the tank top to be of a uniform depth over the entire area and above the tips of the tongues, as at 14 in Fig. 3. This assures immersion of the entire bottom surface of the plate being cooled.

In the form shown the tongues or flaps 12—13 are made with an annular die so that the cut edges or free margins of the tongues are somewhat semi-circular in shape. This results in the tip portions 13 of the tongues having a minimum of area that will contact the plate 8, as shown in Figs. 3 and 4, so that a maximum of the bottom area of the plate will be in contact with the cooling water. Also the tongues extend in a common direction parallel with one of the transverse directions of the tank top surface 4, so that the water flow across the plate 8 will be uniform and not turbulent.

In operation of the plate cooler, the plate to be cooled is set flatly upon the top surface of the tank 3, the plate resting upon the tips or margins 13 of the tongues or flaps. Then the operator opens the valve in the water supply line, by means of the foot pedal 10, causing water to flow into the tank 3 at its bottom. The tank is normally filled to the outlet openings 7 and the incoming water causes the tank to overflow through the openings 7. Such overflow is uniform through all of the openings because of the incoming water entering from below the quantity normally held by the tank and the water issues from beneath the tongues in flat streams or sheets flowing in the horizontal direction beneath the bottom of the plate. The flow of water is continued by operation of the foot pedal, until the plate is sufficiently cooled, after which the water valve is allowed to close by release of the foot pedal and the plate is removed. Because the water is flooded from the interior of the tank, in a horizontal direction through the openings 7, inadvertent opening of the supply valve will cause only an even horizontal flow across the tank top to the trough 5 and spurting, spouting, or overflow onto the floor is impossible.

The principal advantages of this invention reside in the simplified construction of the plate cooler top whereby the cost of upkeep and maintenance is obviated without sacrifice of safety, efficiency and uniformity of water distribution over the bottom surface of the plate being cooled; and in the improved form of the water outlets in the plate cooler top which make its manufacture more simple and cheap than the prior devices for the same purpose.

Other advantages reside in the sturdiness of the plate cooler top construction and in the firm level support for the plate that is provided by the improved form of the water outlets. And still further advantages are to be found in the arrangement for the cooling water distribution wherein the water flow is horizontal, parallel with the bottom surface of the plate being cooled, thereby obviating danger of spouting or splashing and at the same time maintaining uniformity of distribution over the entire bottom of the plate so that rapid cooling is obtained without danger of the plate buckling.

Although but one specific embodiment of this invention is herein shown and described it will be understood that details of the construction shown may be altered or omitted without departing from the spirit of this invention as defined by the following claims.

I claim:

1. A device of the class described comprising an enclosed water receptacle, a horizontal top for said receptacle having a plurality of openings spaced across its surface, and means to introduce water into said receptacle to overflow the same through said openings, each of said openings having an individual upwardly inclined overhanging tongue extending from the plane of said top and terminating in a less inclined end portion spaced a predetermined distance above the upper surface of said top, and the free margin of each of said tongues and the margin of its respective opening providing a horizontally directed water outlet from said receptacle, said openings being arranged in side by side pairs across the surface of said top, and the tongues of each pair of open-

ings extending in opposite directions from each other.

2. A device of the class described comprising an enclosed water receptacle, a horizontal top for said receptacle having a plurality of openings spaced across its surface, and means to introduce water into said receptacle to overflow the same through said openings, each of said openings having an individual upwardly inclined overhanging tongue extending from one margin of the opening and terminating in a tip end portion disposed substantially parallel with and spaced above the upper surface of said top, and each of said tongues and the opposite margin of its respective opening providing a horizontally directed water outlet from said receptacle, said openings being arranged in side by side pairs across the surface of said top, said tongues all extending parallel with a common transverse direction of said top, and the tongues of each pair of openings extending in opposite directions from each other, and an upwardly projecting marginal rim on said top having a predetermined greater height above the plane of said top than the tip portions of said tongues.

3. A device of the class described comprising an enclosed water receptacle, a horizontal top for said receptacle having a plurality of openings spaced across its surface, and means to introduce water into said receptacle to overflow the same through said openings, each of said openings having an individual upwardly inclined overhanging tongue struck from the body of said top and terminating in a less inclined end portion disposed substantially parallel with and spaced a predetermined distance above the upper surface of said top, each of said tongues and the margin of its respective opening providing a horizontally directed water outlet from said receptacle, and the end portions of said tongues providing a support for a plate to be cooled.

4. A device of the class described comprising an enclosed water receptacle, a horizontal top for said receptacle having a plurality of openings spaced across its surface, and means to introduce water into said receptacle to overflow the same through said openings, each of said openings having an individual upwardly inclined overhanging tongue integral with and struck from the body of said top when forming the opening and terminating in a tip end portion spaced a predetermined distance above the upper surface of said top, and each of said tongues and the margin of its respective opening providing a horizontally directed water outlet from said receptacle, said openings being arranged in side by side pairs across the surface of said top, and the tongues of each pair of openings extending in opposite directions from each other.

5. A device of the class described comprising an enclosed water receptacle having a substantially horizontal top wall and a plurality of outlet openings spaced over the area of its upper surface, and means to introduce water into said receptacle from below the top thereof to overflow from said receptacle through said outlet openings, each of said openings having an arcuate margin and an individual overhanging tongue struck from the body of and integral with said top wall, each said tongue being inclined upwardly from the plane of said top wall and terminating in a tip portion spaced above the plane of said top wall, and the margin of the free portion of each said tongue having substantially the same arcuate form as the respective opening.

6. A device of the class described comprising an enclosed water receptacle having a substantially horizontal top wall and a plurality of outlet openings spaced over the area of its upper surface, and means to introduce water into said receptacle from below the top thereof to overflow from said receptacle through said outlet openings, each of said openings having an arcuate margin and an overhanging tongue struck from the body of and integral with said top wall, each said tongue being inclined upwardly from the plane of said top wall and terminating in a tip portion spaced a predetermined distance above the plane of said top wall, said openings being arranged in pairs back to back with their arcuate margins on the circumference of a common circle, and the tongues of each pair of openings extending in diametrically opposite directions from each other and having their free edges substantially parallel with the circumference of said common circle.

7. A device of the class described comprising an enclosed water receptacle having a substantially horizontal top wall and a plurality of outlet openings spaced over the area of its upper surface, and means to introduce water into said receptacle from below the top thereof to overflow from said receptacle through said outlet openings, each of said openings having an arcuate margin and an overhanging tongue struck from the body of and integral with said top wall, each said tongue being inclined upwardly from the plane of said top wall and terminating in a tip portion spaced a predetermined distance above the plane of said top wall, said openings being arranged in pairs back to back with their arcuate margins on the circumference of a common circle, the tongues of each pair of openings extending in diametrically opposite directions from each other and having their free edges substantially parallel with the circumference of said common circle, and an upwardly projecting marginal rim on said top wall, the edge of said rim being at a slightly greater height above the plane of said top wall than tip portions of said tongues.

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