Feb. 7, 1939. A. H. GAEBEL 2,146,255

PHOTOGRAPH PRINT DRYING APPARATUS

Filed Aug. 19, 1936

Fig. 1,

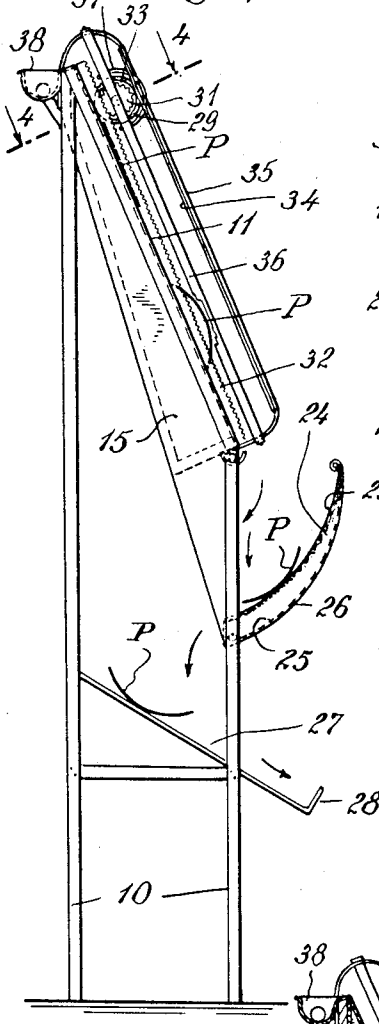


Fig. 2,

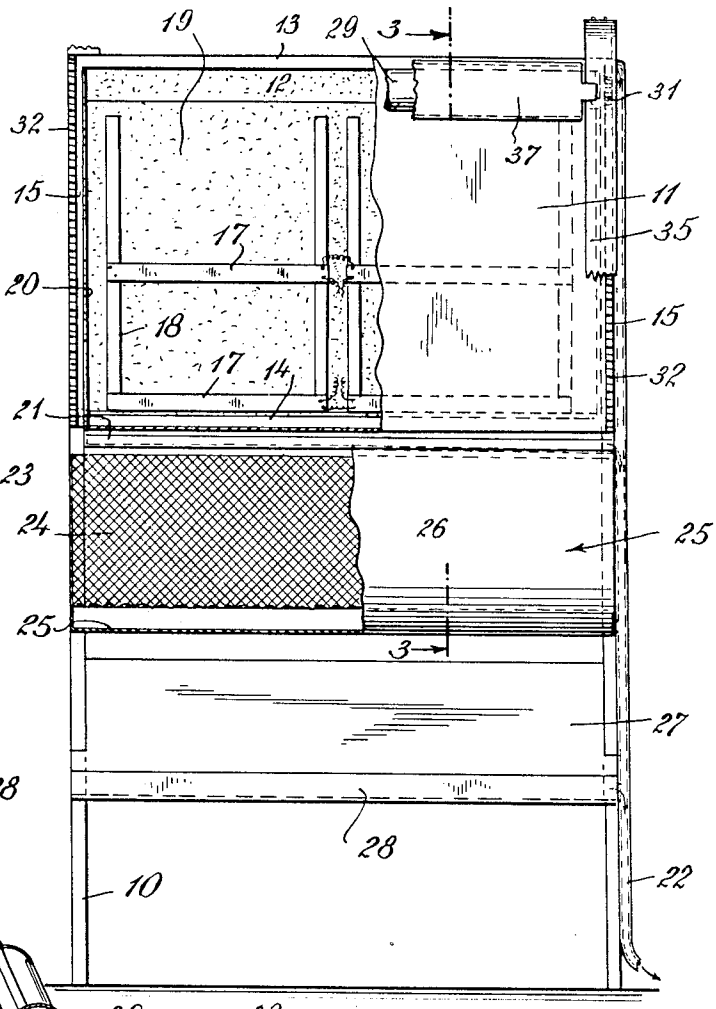


Fig. 3,

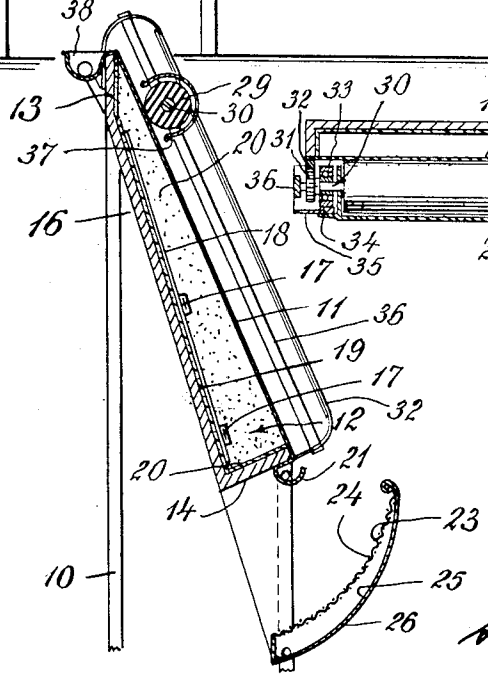
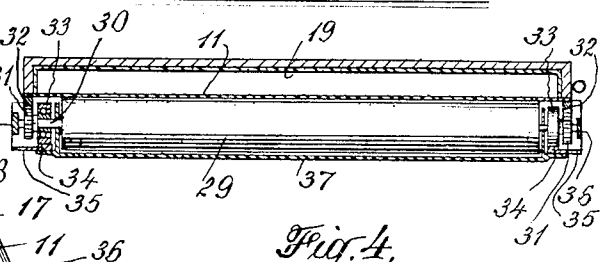


Fig. 4,



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PHOTOGRAPH PRINT DRYING APPARATUS

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12 Claims. (Cl. 34—26)

This invention relates to photographic print drying apparatus and has particular reference to improvments in the hot table type of photographic print drying apparatus, especially adapted for drying prints having a glossy finish, although the invention is not limited to that use.

The print drying tables for glossy finish photographs in current use comprise a horizontal metal plate heated from below to which the wet photographic prints are adhered face downwardly by means of the sticky emulsion surface thereof. When the print is dry so that it no longer adheres, the paper of which it is made usually causes it to curl away from the surface of the table, although some forms of print papers do not curl in this way. In either case, the prints require the attention of an attendant to remove them from the table after they have dried in order to prevent them from burning or becoming heat-discolored. Also, these forms of drying tables occupy a great deal more space than their use warrants.

In accordance with the present invention a photographic print drying apparatus is provided, which is particularly adapted for drying glossy finish photograph prints and which takes advantage of the self-releasing action of a dried print to automatically discharge the prints from the drying surface to a point where they are not in the path of water which is squeegeed from other prints subsequently placed upon the surface to dry.

More particularly, the invention includes a heated surface, preferably a smooth-surfaced plate of heat-conducting metal, inclined at a high angle of between 60° and the vertical, preferably approximately 70°. Located behind this plate are electric heating elements enclosed in an enclosed air housing, which is so shaped as to uniformly distribute the heat over the area of the drying plate despite the high angle of elevation thereof. Immediately below the lower edge of the plate is a trough which slopes in the opposite direction from the plate so as to invert and receive the photographs as they fall by gravity from the surface of the plate upon their release therefrom when dried and which is so shaped as to inturn eject the prints by gravity to a tray beneath the apparatus. A gutter along the lower edge of the plate catches the water squeegeed from the prints, and the trough is preferably a screen through which any water falls, so that water does not collect therein to wet the prints discharged from the plate. A gear-driven squeegee roller preferably extends across the plate and may be drawn over wet prints placed thereon to adhere the same to the plate.

It will be seen that with the photographic print drying apparatus of this invention, the prints to be dried stick to the smooth surface of the plate because of the stickiness of the wet surface of the print paper. As the print is dried, it either snaps away from the plate, owing to the curling tendency of the paper, or simply loosens and slides by gravity into the trough, being turned over because of the trough inclination to fall face upwardly. It then slides by gravity into a tray, face upwardly, and from which it may be removed for use.

For a more complete understanding of the invention, reference may be had to the accompanying drawing, in which:

Figure 1 is an end elevation of the new photographic print drying apparatus of this invention;

Fig. 2 is a front elevation of the same showing a portion of the drying plate and print-receiving trough broken away;

Fig. 3 is an enlarged transverse section through the plate housing and print-receiving trough as seen along the line 3—3 of Fig. 2; and

Fig. 4 is a section along line 4—4 of Fig. 1 showing the construction of the squeegee roller.

Referring to Fig. 1 of the drawing, numeral 10 designates a framing which may be made of conventional angle iron or the like. This framing supports at a high angle of elevation between 60° and the vertical, such as at an average angle of 70°, a sheet metal plate 11, which is preferably of copper or other good-heat-conducting material, either highly polished or chromium plated on its outer surface. As is shown especially in Fig. 3, the plate 11 serves as a closure for a housing 12, comprising upper and lower panels 13 and 14, respectively, end panels 15, and a rear panel 16, these panels and the plate 11 cooperating to form a closed air space 16. It will be observed that the depth of this air space tapers from bottom to top, being relatively shallow at the top and relatively deep along the bottom edge of the plate 11.

Located within the housing 12 are heating elements 17, which are preferably of the electrical-resistance type, supported on a metal frame 18 secured to the rear panel 16 of the housing 12 over a heat insulating sheet 19, such as asbestos, or the like. The upper panel 13, the lower panel 14, and the end panels 15 are also preferably lined with heat-insulating sheets 20 similar to sheet 19, so as to confine the heat emanating from resistance elements 17 to the plate 11. Although

four resistance elements 17 are illustrated, it is to be understood that any number may be employed, depending upon requirements. It is also to be observed that the elements 17 are located more nearly toward the lower edge of the housing 12 in the deeper portion of air space 16 for a purpose to be described. Other heating means may be employed with equal facility.

Located immediately beneath the lower edge of plate 11, and preferably consisting of an upwardly turned extension thereof, is a gutter 21 discharging into a down pipe 22 secured to the framing 10. Also located beneath the lower edge of plate 11 but spaced therefrom is a trough 23 formed of wire mesh 24 and extending the entire length of the plate 11. Immediately beneath the wire mesh 24 of trough 25 is a curved plate 26 serving as a gutter for collecting and discharging water to pipe 22. The direction of inclination of trough 25 is opposite to the direction of inclination of plate 11 and is approximately 45°, although that angle also varies according to requirements.

Immediately below the lower or discharge edge of trough 24 and supported on framing 10 is a tray 27 having a lip 28 at its front edge and inclined slightly in a direction opposite to the direction of inclination of trough 25.

In using the new apparatus, a photographic print P' or other moist sheet material to be dried is placed face downwardly on the surface of plate 11 and adhered thereto by pressing, for example, with a squeegee. Especially with moist glossy photographic prints, the sticky emulsion surface adheres readily to the surface of the plate 11. The heat emanating from the heating elements 17 within housing 12 uniformly heats the air in the space 16, but because of the high angle of inclination of the plate 11 and the tendency of heat to travel upwardly, it has been found necessary in order to secure uniform heating of plate 11, to compensate for these conditions by making the housing 12 deeper at the lower edge and tapering it upwardly. The heat is applied to plate 11 in accordance with requirements in order to secure uniform heating thereof over its entire surface. The positioning of heating elements 17 toward the lower portion of the housing 12 contributes to this effect. This effect may also be obtained by increasing the heating capacity of heating elements 17 from top to bottom instead of concentrating heating elements of the same heating capacity toward the bottom.

As the prints P are dried by the heat of surface 11 they release themselves, owing to the removal of the moisture which renders them adhesive, and with some types of photograph paper which has a tendency to curl, this effect is accomplished by a sudden curling or snapping away of the print, somewhat as illustrated in Fig. 1. The inclination of the plate 11 is such that the dried prints fall or slide downwardly over its surface into the trough 25, the inclination of which causes the prints to fall therein in an inverted position, that is to say, face upwardly. The inclination of the trough 25 is preferably such that the prints continue to slide by gravity into the tray 27 below while in the face upward position so that the attendant can, merely by glancing at the prints, select them in the order of interest or requirements without turning them over.

Inasmuch as moist prints are frequently applied to the plate 11 while other prints are being discharged into trough 25, it is desirable to provide a gutter 21 for catching the water discharged by the squeegee operation, and further, inasmuch as in handling the wet prints water frequently drips down in front of the machine instead of falling on plate 11 for accumulation in gutter 21, the trough 24 is made of mesh screen backed by a gutter 26 for catching the water. In this way no water can accumulate in the trough 23 for moistening dry prints. The inclination of trough 23 effects the gravity discharge of the dry prints therefrom to tray 27 where they are out of the zone where they might be spattered by water.

Instead of using the ordinary hand squeegee, a squeegee roller 29 may be located permanently on the plate. This roller preferably extends across the plate 11 and is formed of metal so as not to be injured by the heat of plate 11. As shown especially in Fig. 4, secured on the ends of the shaft 30 of roller 29 are spur pinions 31, which engage racks 32 extending along the lateral edges of plate 11. A roller bearing 33 near each end of shaft 30 engages the under surface of a rail 34 carried by housing 35 for each pinion, this housing being spring strap material for pressing the roller resiliently against the plate 11. Side rails 36 engage the ends of shaft 30 and center the roller 29. A hood 37 covers the roller 29 and protects the user against injury.

A gutter 38, similar to front gutter 21 extends along the upper edge of the plate 11 to catch any water raised by squeegee roller 29, which, held by the resiliency of housings 35, may be left in the upper position indicated in Figs. 1 and 3. The gutter 38 discharges into pipe 22. In use, the roller 29 is moved up and down over the plate 11 to stick the prints thereon, the movement of the roller causing gears 31 to roll on racks 32 and thus rotate the roller 29.

Although a preferred embodiment of the invention has been illustrated and described herein, it is to be understood that the invention is not limited thereby, but is susceptible of changes in form and detail within its scope. For example, although the surface 11 has been described as a metal plate, it may be made of other material and be otherwise heated. Also the inclination of the plate 11 depends largely upon the sheet material or the like which is being treated thereon, the inclination being such in each case as to secure free movement by gravity of the dried prints or sheet material therefrom. Thus, in some instances it may be desirable to arrange the plate vertically and in some instances at a relatively low angle, such as 45° or the like. In either case, the housing 12 may be mounted on legs as illustrated or suspended from the wall or ceiling depending upon requirements.

Also instead of employing heat-insulating rear sheet 19, an equivalent heat-reflecting sheet of polished metal or metal-coated sheet material may be substituted for reflecting the heat toward the rear surface of the plate 11. A thermostat may also be employed for controlling the heat of plate 11 or within the housing 12.

I claim:

1. In a photographic print drying apparatus, the combination of a plate, means supporting said plate at a high angle of inclination, means heating said plate, and a print-receiving trough mounted on said supporting means beneath the lower edge of said plate, whereby moist prints adhered to said plate fall by gravity into said trough out of contact with said plate upon release from said plate by drying.

2. In a photographic print drying apparatus,

the combination of a plate, means supporting said plate at a high angle of inclination, means heating said plate, and a trough mounted on said supporting means beneath the lower edge of said plate and inclined in a direction opposite to the inclination of said plate, whereby moist prints adhered to said plate fall by gravity upon release by drying into said trough and are turned over by the inclination thereof.

3. In a photographic print drying apparatus, the combination of a plate, means supporting said plate at a high angle of inclination, means heating said plate, a trough mounted on said supporting means beneath the lower edge of said plate and inclined in a direction opposite to the inclination of said plate, and a tray mounted on said supporting means beneath the lower edge of said trough, whereby moist prints adhered to said plate fall by gravity upon release by drying into said trough in an inverted position and are discharged therefrom by gravity into said tray.

4. In a photographic print drying apparatus, the combination of a plate, means supporting said plate at a high angle of inclination, a trough mounted on said supporting means beneath the lower edge of said plate, and a gutter mounted on said supporting means beneath the lower edge of said plate between the latter and said trough, said trough being adapted to receive the prints released from adhesion to said plate upon drying and said gutter intercepting the water discharged from said plate.

5. In a photographic print drying apparatus, the combination of an upwardly-extending plate, a support therefor, means heating said plate substantially uniformly over its outer surface, and a print-receiving trough mounted on said support beneath the lower edge of said plate, whereby moist prints adhered to said plate fall by gravity into said trough out of contact with said plate upon release from said plate by drying.

6. In a photographic print drying apparatus, the combination of an upwardly-extending plate, a support therefor, means behind said plate for heating it substantially uniformly over its outer surface, a trough mounted on said support beneath the lower edge of said plate, said trough comprising apertured material, and a gutter mounted on said support beneath said apertures for receiving water discharging through said apertured material.

7. In a photographic print drying apparatus, the combination of an upwardly extending plate, a support therefor, means heating said plate, and a trough mounted on said support beneath the lower edge of said plate for catching dried prints discharging from said plate, said trough having a screen over its upper surface upon which the prints fall and being inclined at an angle to discharge the prints by gravity.

8. In a photographic print drying apparatus, the combination of a plate, means fixedly supporting said plate at a high angle of inclination, an enclosed housing mounted on said supporting means behind said plate, means for heating the air in said housing, said housing tapering in depth from bottom to top to compensate for the tendency of heat to rise, whereby the plate is uniformly heated to dry moist photographic prints adhered thereto and discharged by gravity therefrom upon release from said surface by drying, and a trough on said supporting means beneath the lower edge of said plate for receiving prints discharged by gravity from said plate and for retaining them out of contact with said plate.

9. An upwardly-extending heat-conducting plate, an upwardly tapering housing enclosing the rear surface of said plate, heating elements for heating the air therein, the greater volume of hot air being toward the bottom of the housing to compensate for the tendency of heat to travel upwardly, a trough beneath the lower edge of said plate for catching in an inverted position the dried prints discharged by gravity from said plate, said trough being inclined to discharge said prints by gravity, and a tray beneath said trough for receiving the prints discharged therefrom.

10. In a photographic print drying apparatus, the combination of a fixed plate on which wet prints are placed, a squeegee roller on the plate for adhering the prints to the plate, and means responsive to movement of the roller for positively rotating the same when moved relatively to the plate.

11. In a photographic print drying apparatus, the combination of a plate on which wet prints are placed, a squeegee roller on the plate for adhering the prints to the plate, a rack on the plate, a gear on the roller, and means for resiliently urging the roller against the plate, whereby movement of the roller causes the gear and rack to roll the roller resiliently over the surface of the plate.

12. In a photographic print drying apparatus, the combination of a fixed, substantially vertically arranged heat-conducting plate, a support therefor, a substantially enclosed housing behind the plate of which the latter forms the front wall, heating means within the lower part of the housing, heat-reflecting means in the housing for reflecting the heat against the rear surface of said plate, and a trough on the support beneath the lower edge of said plate for receiving prints discharged by gravity from said plate and for retaining them out of contact with said plate.

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