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EVAPORATOR HEATER UNIT FOR GASEOUS DEVELOPING CHAMBERS

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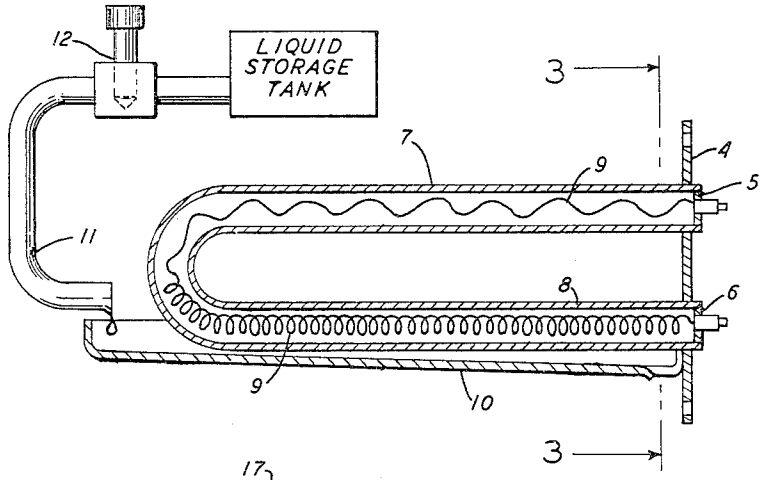


FIG. 1

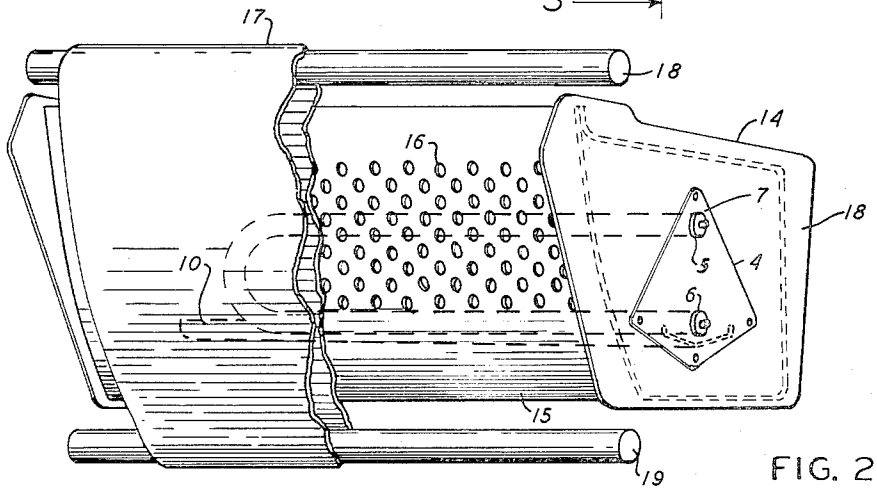


FIG. 2

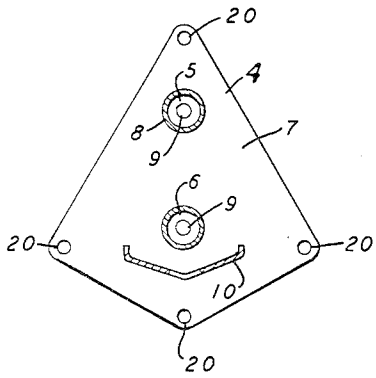


FIG. 3

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EVAPORATOR HEATER UNIT FOR GASEOUS DEVELOPING CHAMBERS

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4 Claims. (Cl. 219—38)

This invention relates to diazotype printing apparatus and, more particularly, to an electrical heater and superheater assembly for such apparatus.

In the above type of printing apparatus, the diazo coated sheet material, after exposure to light, is subjected to the vapors of a developing agent, such as aqua ammonia. The vapors are generated in a confined space generally referred to as the developing tank or chamber. The latter may take various shapes but generally it is an longated metal box, on side of which is perforated and curved. Against this side the exposed sheet material is placed by means of a flexible belt called the sealing sleeve and carried past the wall for development. Inside the developing chamber an electrical heating element is provided for evaporating the developing liquid which is fed in small, measured quantities into a tray or trough.

The present invention is concerned chiefly with the heating element and has for its primary object the improvement in the construction and physical arrangement thereof.

A particular feature of the invention is that a single heating element of special construction is provided which will perform not only the evaporating function but also will serve to superheat the gaseous atmosphere. This function has heretofore been performed by two or more separate heating units.

Another feature of the invention is that the heating element construction permits quick assembly and replacement.

A particular advantage of the construction herein described is that dual temperature heating in the developing chamber may be obtained with but a single heating element, requiring only one electrical terminal connection.

Another advantage residing in the construction herein presented is that the heater as well as the evaporator tray are made into a unitary structure being attached to a single support. In this manner, close tolerances can be maintained for mass production.

Other objects, features and advantages will be apparent from the following description of the invention, defined in particularity in the appended claims, and taken in connection with the accompanying drawing in which:

Fig. 1 is a front elevational view in cross section of the heating element and evaporator tray construction;

Fig. 2 is a perspective view of the developing tank with the heating element and tray assembly placed therein; and

Fig. 3 is a section taken along line 3—3 of Fig. 1.

Referring to Figs. 1 and 3, the vertically extending wall plate 4 is apertured to receive the terminal ends 5 and 6 of an electrical heating element 7. This element is preferably of the type consisting of a metal sheath 8 housing the electrical resistance wire 9. The electrical heating element is bent back and forms a U-shaped structure, one portion of which is near the bottom and the other toward the top with respect to placement in the developing tank.

It should be noted that the resistance wire of the heating element in the bottom portion is shown having a far

larger number of loops than in the top portion. The purpose of this will be explained later.

Underneath the lower heating element is placed a tray 10 which is formed as a trough and is supported also by the wall plate 4.

Various means may be used to supply developing liquid to reach the tray. In Fig. 1 this is schematically indicated by the pipe 11 which connects to a liquid storage tank through a valve 12. Generally, the liquid feed is so adjusted that a certain number of drops reach the tank within an allotted time, depending upon the speed of operation and other factors.

In Fig. 2, it is seen that the developing tank 14 forms a closed chamber having a front wall 15 which has a large number of perforations 16 to permit the vapors to reach the sheet material which will be placed thereagainst. The perforated wall of the tank 14 is sealed by a flexible belt 17 which, by frictional contact, moves the sheet material past this wall. The belt 17 (often termed the sealing sleeve) may be moved by means of the rollers 18 and 19 in a well-known manner.

As can be observed, the heating element 7 and the tray 10 are both mounted on the wall plate 4. The entire assembly will fit through a suitable aperture in the side wall 18 of the developing tank 14 so that the heating element extends along the length within the developing tank.

It was mentioned that the heating element 7 is in two portions. Of these, the lower portion is electrically so constructed as to have a higher heat dissipation, for example, by having a larger amount of resistance wire. On the other hand, the top portion need have less heat dissipation and this may be obtained by having a lesser amount of resistance wire. The eleemnt 7, of which the two portions are, in effect, in series when connected to a current supply source will produce unequal heating, the current being the same in both portions.

The larger amount of heat developed in the bottom portion is utilized to evaporate the liquid in the tray 10, the latter being in close proximity to this portion of the heating element 7. The upper portion, placed at some distance in the vertical direction, is utilized to superheat the gaseous atmosphere produced by the evaporation of the developing liquid. In this manner, a superheated atmosphere is created in the tank and condensation is minimized.

The simplicity of construction is manifest from the drawings. The heater and tray assembly may be replaced in the tank 14 whenever replacement is needed with the minimum of time delay since it is held only by suitable screws which fit the mounting holes 20 of the wall plate 4. Since the evaporator tray is part of this assembly, being welded to the wall plate 4, the distance between it and the lower portion of the heating element 7 can be properly dimensioned to obtain the highest efficiency of evaporation and the same efficiency will be had whenever one assembly is replaced by another unit in the machine.

I claim:

1. An electric heater assembly for evaporation of volatile material in a confined space and for superheating the gaseous atmosphere in said space particularly for developing chambers in diazotype printing apparatus, comprising a wall plate adapted to be mounted on the side wall of a developing chamber, a U-shaped electric heating element having terminal ends mounted in said plate and adapted to be housed in said chamber, one portion of said heating element having higher heat dissipation than the other portion under unit current flow in said element.

2. An electric heater assembly in accordance with claim 1 wherein said higher heat dissipating portion of said element is below said other portion and above a tray accommodating the liquid to be evaporated.

3. An electric heater assembly in accordance with claim 1 wherein said assembly is in a closed chamber having a perforated wall for exuding the gas generated, said element extending within said chamber and along the length of said wall, the lower heat dissipating portion thereof being near the top of said chamber and the higher heat dissipating portion near the bottom thereof.

4. An electric heater assembly in accordance with claim 1 wherein said wall plate supports a tray shaped as a trough directly under said heating element.

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