May 20, 1947. W. C. DORSCH 2,420,739

DRYING UNIT USING STEAM JETS

Filed Oct. 25, 1945

Fig. 1

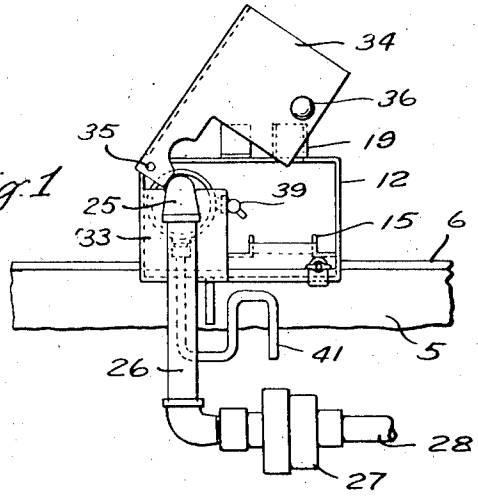


Fig. 2.

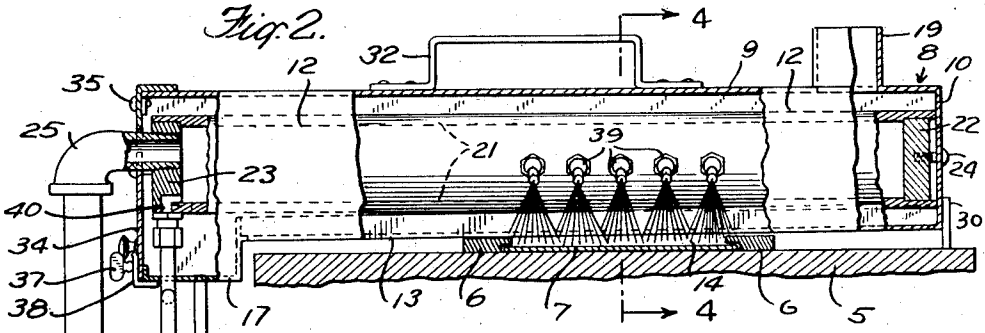


Fig. 3.

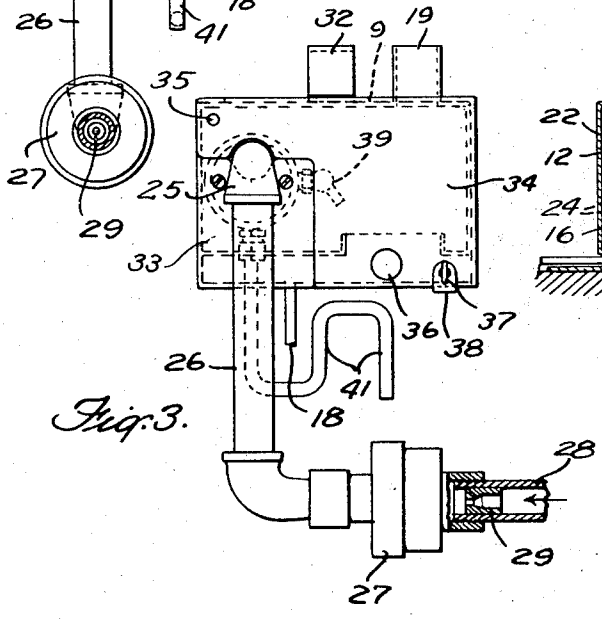
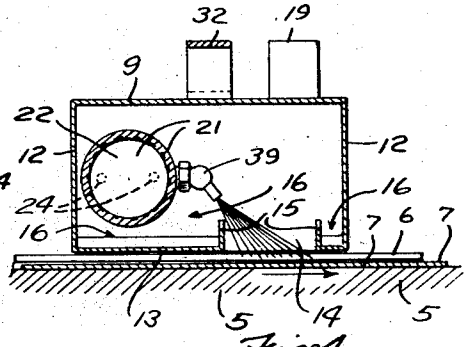


Fig. 4.



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DRYING UNIT USING STEAM JETS

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1 Claim. (Cl. 34—155)

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This invention relates to steam driers such as are employed for drying steam-set ink, and it has for its object to provide a novel and improved drier of this type.

Another object of the invention is to construct a steam drier of the foregoing type in a simple, compact unit which may be mounted in any convenient location and adapted to a variety of different uses.

Another object is to provide a self-contained steam drier which may be mounted on a platform, printing bed or the like and swiveled into and out of operating position thereon to permit examination of the work, and in which the parts of the drier itself are readily accessible for inspection, adjustment or repair.

Still another object is to provide a drier of the type specified having novel and improved details of construction and features of operation, including special means for trapping and removing condensed steam to prevent deleterious wetting of the inked material which is being dried.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

A typical illustration of an important use to which the invention may be put is in the manufacture of paper discs or caps for milk bottles. In practice, a continuous paper web is run through a printing press which prints a multiplicity of identical cap designs thereon, and subsequently the web passes under a series of punches which punch out the individual caps containing the previously printed designs, advertising matter or the like. The ink printed on the web must be dried before the individual caps are blanked out and stacked, and, by using a suitable steam-set ink, drying may be accomplished by the apparatus of the present invention immediately after the printing operation.

In the preferred form disclosed herein for purposes of illustration, the drier of the present invention comprises a casing which may be swiveled on a flat bed or table upon which the web travels from the printing press, permitting the apparatus to be moved as a unit into and out of operating position on the bed. The bottom of the casing has an opening which spans the path of the traveling web, and steam nozzles within the casing direct jets of steam through this opening onto the web, while condensate dripping from the nozzles is trapped and removed to prevent undue wetting of the web.

Novel means are also provided for removing condensate from inside the pipe supplying steam

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to the nozzles, for venting excess steam from the drier casing, and for permitting ready inspection of the interior of the casing without interrupting the drying operation.

Although the novel features which are characteristic of this invention are set forth more in detail in the claim appended hereto, the nature and scope of the invention may be better understood by referring to the following description, taken in connection with the accompanying drawing forming a part thereof, in which a specific embodiment has been set forth for purposes of illustration.

In the drawings:

Fig. 1 is an end elevation of the device;

Fig. 2 is a longitudinal side view, mostly in section, of a steam drier embodying the invention;

Fig. 3 is an end view similar to Fig. 1 showing the end cover in closed position; and

Fig. 4 is a transverse section taken on the line 4—4 of Fig. 2.

In the following description certain specific terms are used for convenience in referring to the various details of the invention. These terms, however, are to be interpreted as broadly as the state of the art will permit.

In the drawing, the drier of the present invention is shown mounted on a flat bed or table 5 containing spaced parallel tracks 6 which guide a paper web 7 in its travel over the bed 5.

The web 7 is drawn continuously over the bed 5 by any suitable mechanism, not shown; and, just before it passes into the drier, the web is imprinted with a steam-set ink in any desired design, printing, advertising matter, or the like, which is then quickly dried by passage through the steam drier, as will now be described.

The drier comprises an elongated rectangular casing 8 having a top wall 9, an end wall 10, side walls 12, and a bottom wall 13. The bottom wall 13 has a rectangular opening 14 spanning the tracks 6 which guide the web 7 through the drier and the longitudinal edges of the material bordering the opening 14 are raised to provide ledges 15 which form troughs 16 for trapping condensed steam, as hereinafter more fully described. The water thus trapped in the troughs 16 flows into a well 17 formed in the bottom 13 of the casing and is discharged through a drain pipe 18. A steam vent 19 is formed in the top wall 9 adjacent the end wall 10 of the casing. If desired, all of the parts of the casing 8 thus far described may be stamped from a single piece of sheet metal.

Extending longitudinally through the casing 8 is a steam pipe 21 having its ends stoppered by

internal plugs 22 and 23, respectively. The plug 22 at the righthand end of Fig. 2 is secured as by screw 24 to the end wall 10 of casing 8. The plug 23 at the left of Fig. 2 is threaded to the pipe elbow 25 of steam supply pipe 26 which, in turn, is connected by swivel joint 27 to the steam line 28 containing a steam pressure reduction valve 29.

The end wall 10 of the casing 8 has a depending leg 30 which rests on the bed 5 when the casing is in the horizontal operative position shown in Fig. 2. However, by grasping a handle 32 on the top wall 9, the entire drier casing may be turned about the swivel joint 27 and thus raised off the bed 5 to permit inspection of the underlying web 7 as well as of the drier itself.

In order to permit ready inspection of the interior of the drier casing 8 the end wall of the casing adjacent pipe elbow 25 is constructed in two sections, comprising a plate 33 which is fixed to casing 8 and pipe elbow 25, and a plate or door 34 which is swiveled at 35 to the casing and is adapted to be raised as shown in Fig. 1 to expose the interior of the casing. The door 34 has a handle or knob 36 for actuating it, and the door may be clamped in closed position by a wing bolt 37 which is threaded in a clip 38 secured to the lower end of the casing to receive the lower edge of the door when closed.

The elongated steam pipe 21 in casing 8 has a series of spaced steam nozzles 39 which are pointed downwardly at an angle to direct jets of steam into the opening 14 in the bottom 13 of casing 8 and upon the web 7 which traverses this opening as previously described. The nozzles 39 overlie the adjacent ledge 15 in bottom wall 13 just within the area of the trough 16 formed by said ledge, so that condensed steam dripping from the nozzle will be caught in the trough 16 and discharged through the well 17 and drain pipe 18.

Condensate from within the steam pipe 21 is discharged through a port 40 into a suitable gooseneck 41 which contains water under a sufficient head to prevent the escape of steam at the low pressure to which it is reduced by the valve 29.

It will be evident from the foregoing description that with the drier in the operative position shown in Fig. 2, the web 7, imprinted with ink of the type capable of being dried by steam, passes continuously beneath the opening 14 in the bottom 13 of the drier casing 8, and that jets of steam from the nozzles 39 impinge upon the imprinted face of the web 7 with the result that the ink is quickly dried.

Condensate dripping from the nozzles 39 is collected in the trough 16 and discharged through well 17 and drain pipe 18, while condensate from

within the steam pipe 21 is discharged through port 40 and gooseneck 41, as previously described. The operator, by raising the swiveled door 34, may inspect the interior of the drier casing without interrupting the operation, and thus determine, for example, if all of the nozzles 39 are functioning properly. At the conclusion of a run, or whenever further inspection or adjustment may be desirable, the operator may grasp the handle 32 and raise the entire drier about the swivel joint 27 and off the bed 5.

Although a specific embodiment has been shown and described herein for purposes of illustration, it will be evident to those skilled in the art that the invention is capable of various modifications and adaptations within the scope of the appended claim.

What is claimed is:

The combination with a bed adapted to support a traveling web imprinted with steam-set ink, of a steam drier comprising a casing having closed top, side and end walls and a bottom wall having an opening therein, means supporting said casing with said opening extending across said web and an upturned flange around said opening forming a trough, a steam pipe in said casing displaced to one side of said opening and having a plurality of nozzles positioned to discharge jets of steam in a downwardly inclined direction through said opening onto said web, said trough extending beneath the ends of said nozzles to catch condensate dripping therefrom, a drain communicating with said trough to discharge said condensate, and a second drain connected to said steam pipe to collect and discharge condensate from the inside of said pipe having means forming a liquid seal to prevent escape of steam therethrough.

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