Sept. 4, 1962 W. J. MISKELLA 3,052,037

VENTILATOR DRIER ATTACHMENT FOR ROTARY PRINTING PRESSES

Filed Jan. 19, 1959 2 Sheets-Sheet 1

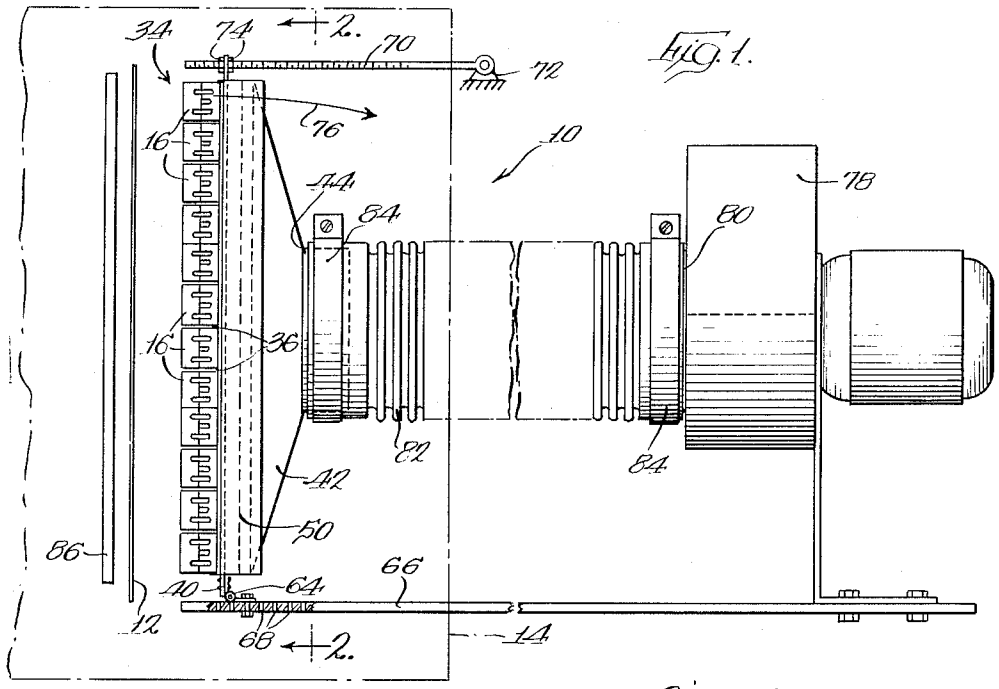


Fig. 1.

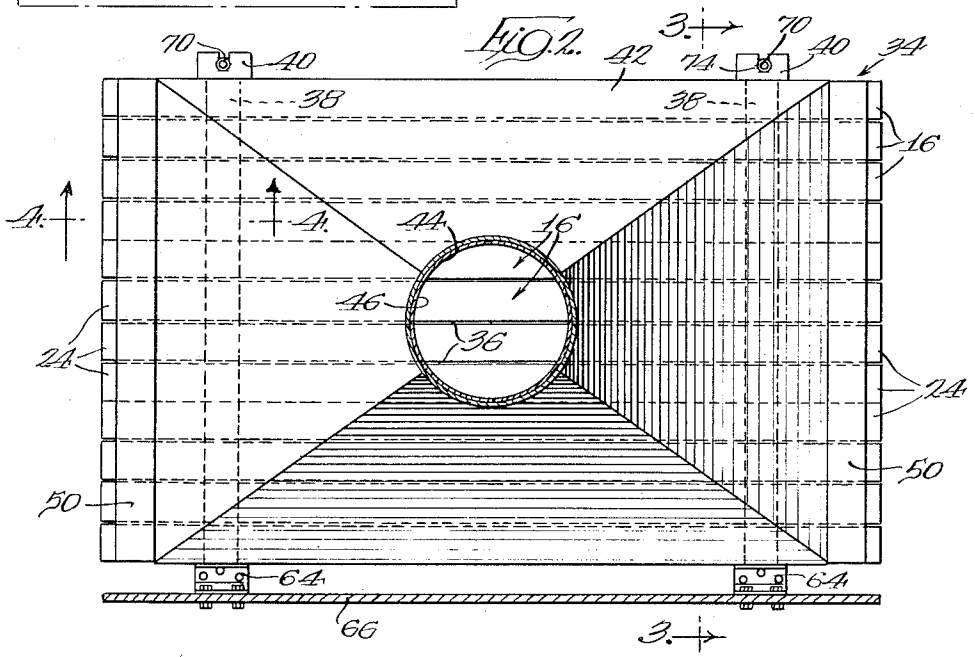


Fig. 2.

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Fig. 3

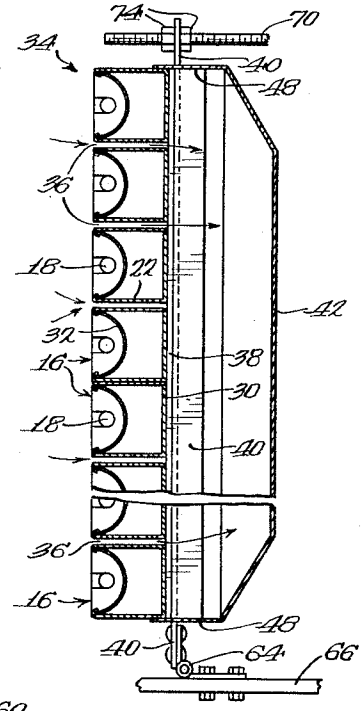
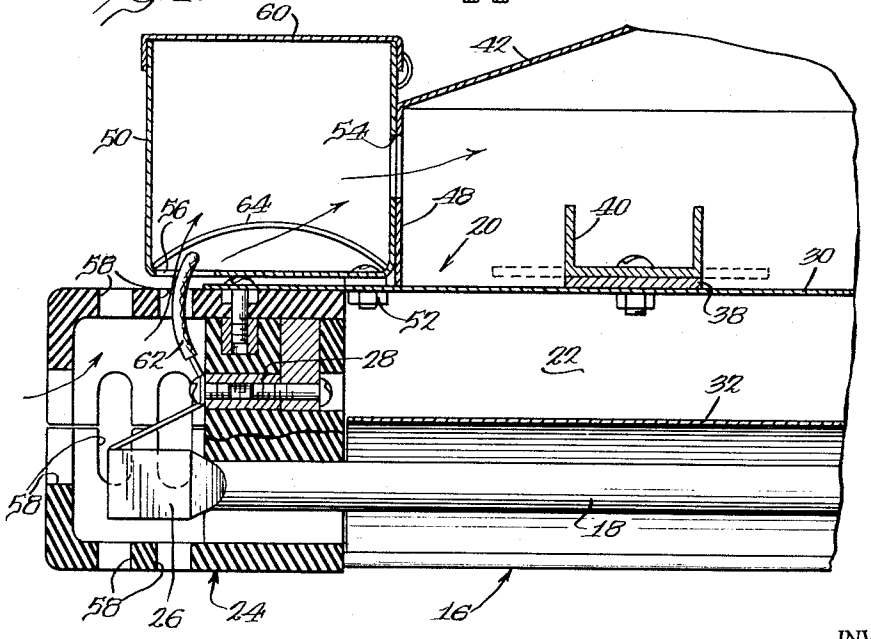


Fig. 4



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VENTILATOR DRIER ATTACHMENT FOR ROTARY PRINTING PRESSES

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5 Claims. (Cl. 34—72)

The present invention relates to the accelerated drying of a moving web and more particularly to high speed drying of printing ink on a rapidly moving web of paper in a rotary printing press.

One object of this invention is to provide for use with a rotary printing press, for example, a new and improved drier attachment of simple construction which operates with great efficiency not only effectively to dry a rapidly moving printed web, but also to collect and remove the volatilized ingredients of the ink.

Another object is to provide a new and improved drier attachment of the above character which produces an extremely intense emission of drying heat from a compact bank of electrical heat lamps constructed and arranged in relation to simple exhaust structure of the attachment in a manner that provides efficient and dependable cooling of the lamp structure by a single draft of fume scavenging air which collects and removes the vapors volatilized by the drying heat.

Another object is to provide an improved web drying attachment, as recited, which is inherently well adapted to be applied to a rotary printing press, for example, in a manner which provides a very efficient web drying and vapor removing action without substantially increasing the overall space required to accommodate the press.

Still another object is to provide a web drying attachment as set forth above which can be easily adjusted mechanically to vary the intensity of the drying heat applied to a web and which provides ready access to the lamp structure for servicing and to the web aligned with the drying attachment.

Other objects and advantages will become apparent from the following description of the form of the invention illustrated in the drawings, in which:

FIG. 1 is a side view of the drier attachment applied to a rotary printing press, indicated in phantom;

FIG. 2 is a sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a sectional view taken along the line 3—3 of FIG. 2; and

FIG. 4 is a fragmentary sectional view on an enlarged scale taken along the line 4—4 of FIG. 2.

The drier attachment **10** forming the illustrated embodiment of this invention is particularly well adapted for drying a rapidly moving printed web **12** in a rotary printing press **14**, indicated in phantom in FIG. 1.

Intense drying heat is applied to the web **12** by a bank of electrical heat emitting units **16**. Each heat unit **16** comprises an elongated infrared lamp tube **18** mounted in an elongated heat lamp holder **20** (FIG. 4) which preferably is similar in construction to the infrared lamp holder disclosed in the copending patent application of William J. Miskella, Serial No. 713,455, filed February 5, 1958. Since reference can be made to that application for a full disclosure of structural details, only the basic structure of each lamp holder 16 will be referred to here.

Each lamp holder **20** comprises a longitudinal housing **22** (FIGS. 3 and 4) extending between two ceramic terminal housings **24** at opposite ends of the holder. The longitudinal housing **22** is a generally square, U-shaped metal channel, preferably aluminum, open longitudinally along the forward side of the holder **20**. The forward

portion of the lamp housing **22** is traversed longitudinally by the infrared lamp tube **18** of the heat unit which extends into the two adjoining terminal housings **24** where terminals **26** (only one of which is shown in FIG. 4) on the tube are connected with terminal structure **28** in the respective terminal housings. Radiant heat from each lamp tube **18** is reflected out through the open side of the associated lamp housing **22** and away from the rear panel **30** (FIG. 4) of the housing **22** by a concave aluminum reflector **32** extending longitudinally through the housing **22** between the lamp tube and the rear housing panel, as shown in FIGS. 3 and 4.

The straight, elongated lamp units **16** thus formed are mounted in a bank **34** in which the lamp units are parallel to each other and spaced apart laterally to form between adjacent lamp units narrow air inlets or passages **36** through which fume scavenging air is drawn in a manner, to be described, which cools the adjacent lamp holder structure to maintain its operating temperature with desired operating limits.

The heat units **16** are supported in the bank **34** by two parallel mounting straps **38** extending transversely across the rear housing panels **30** of all the units **16** somewhat inwardly of the respective ends of the lamp housings **22**, as shown in FIGS. 2 to 4. The straps **38** are suitably secured to each housing panel **30**.

Support for the lamp bank **34** in its entirety is provided by a pair of U-shaped support channels **40** superimposed on the respective straps **38** and connected through the straps to the individual lamp housings **22**, as shown in FIGS. 3 and 4. Opposite ends of each support channel **40** protrude beyond the lamp bank **34** to connect with coacting support structure to be described presently.

Through design, the size and heating capacity of the lamp bank **34** can be adapted to the service in which it is to be used. The individual lamp units **16** of the exemplary construction illustrated are approximately two and one-half inches wide and two and one-half inches deep. They are spaced laterally approximately one-eighth inch from each other to provide air inlets **36** of that width through the lamp bank. The particular lamp bank **34** shown is rectangular in form (FIG. 3) and incorporates twelve lamp units approximately fifty inches long. The number and length of the lamp units **16** can be varied in different lamp banks.

The rear of the lamp bank **34** is substantially covered by a sheet metal draft hood **42** shaped generally as a truncated pyramid of four sides. A circular flange **44** on the small end of the hood **42** forms a single draft outlet **46** (FIG. 2) from the hood. The opposite or large end of the hood **42** terminates in a deep rectangular flange **48** (FIGS. 3 and 4) adapted to fit against the lamp bank **34**.

Along the opposite longitudinal sides of the lamp bank **34**, the extreme edge of the hood flange **48** closely overlaps the longitudinal housings **22** of the outermost lamp holders **20** as shown in FIG. 3. At opposite ends of the lamp bank **34**, the hood flange **48** abuts against the housing panels **30**, as shown in FIG. 4.

The draft hood **42** is supported on the lamp bank **34** by two wiring ducts or conduits **50** which also serve as intermediate passages for drawing ventilating air into the hood through the terminal housings **24** to cool the latter. As shown in FIGS. 2 to 4, the conduits **50** are substantially square in transverse section and extend transversely across opposite ends of the lamp bank **34** in overlying relation to the backs of the terminal housings **24**. Each conduit **50** is secured by bolts **52** or other suitable means to the adjacent ends of the longitudinal lamp housings **22** as shown in FIG. 4. Both conduits **50** abut flat against adjacent portions of the deep hood

flange 48 and are spot welded or otherwise secured to the flange to support the hood 42.

The interior of the hood 42 is connected with each conduit 50 through a series of longitudinally spaced air holes 54 extending through the hood side of the conduit and the contiguous portion of the flange 48 (FIG. 4).

Ventilating air is drawn into each conduit 50 through a longitudinally spaced series of inlet openings 56 in the conduit (FIG. 4) which communicate with the interior of the underlying terminal housings 24 through adjacent ones of a plurality of ventilating openings 58 into each housing (FIG. 4).

A swingable cover 60 on each conduit 50 provides access to wiring 62 in the conduit which connects with the terminal structure 28 in the adjacent terminal housings 24 (FIG. 4). The wiring 62 is retained in the forward portion of each duct or conduit 50 by spaced transverse retainers 64.

The entire structure supported on the two channels 40 is mounted on the rotary printing press 14 by simple support structure which provides for easy adjustment of the spacing from the web 12 of the normal working position of the drier structure (FIG. 1) and for ready movement of the drier structure away from its normal position to a servicing position which provides direct access to the heating units 16 and to the adjacent portion of the web 12. Thus, a pair of support hinges 64 are attached to corresponding ends of the respective channels 40 (FIGS. 1 and 2) and bolted to a support 66. Two series of bolt holes 68 in the support 66 provide for adjustment of the respective hinges 64 and the adjacent edge of the drier toward and away from the web 12.

The opposite ends of the channels 40 are flattened and bifurcated to receive two threaded sections of a pair of swingable support rods 70 extending toward the web 12 from pivotal anchors 72. A pair of lock nuts 74 (FIGS. 1 and 3) on each rod 70 clamp against opposite sides of the coacting channel 40. The position of the nuts 74 along the rods 70 determines the spacing of the adjacent edge of the lamp bank 34 from the web 12. Loosening of the nuts 74 and swinging of the rods 70 away from the channels 40 free the drier to swing away from its normal position in the direction of the arrow 76 in FIG. 1.

A single draft of fume scavenging and ventilating air is drawn through the hood 42 by a draft fan 78 having a draft inlet 80 connected to the draft outlet 46 of the hood 42 by a flexible, corrugated duct 82 secured to the hood and fan by clamp bands 84. The fan 78 can be mounted in any suitable location. As shown, it is mounted on the support 66.

The drier attachment thus formed is well adapted to be conveniently mounted in any position in a rotary printing press. As shown in FIG. 1, the lamp bank 34 is in a vertical position. However, it can be used just as well when positioned horizontally or at any desired angle. Moreover, two or more drier attachments can be mounted alongside each other as needed to provide any desired degree of drying and to dry webs wider than a single attachment.

After the drier attachment is mounted on a printing press or the like, the hinges 64 and the nuts 74 can be adjusted as described, to vary the spacing between the lamp bank 34 from the web 12 to provide web drying heat of the desired intensity on the web. This adjustment is facilitated by the ability of the flexible duct 82 to expand and contract axially.

Rapid drying of the web 12 is further aided by a heat reflector plate 86 located in spaced parallel relation to the side of the web opposite from the lamp bank 34.

The fumes of printing ink or other material vaporized by the heat from the lamp bank 34 are scavenged from the space between the lamp bank and the web 12 by the flow of scavenging air from this space into the hood 42 through the several air inlets 36 between the heating

units 16 and through the terminal housing openings 58. This flow of fume scavenging air through and around the heating units 16 prevents overheating of the terminal structure 28, lamp housings 22, and reflectors 32, thus assuring a long service life for the entire assembly.

The ventilating air and collected fumes are exhausted from the fan 78 through suitable exhaust structure (not shown).

Access to the heat units 16 for servicing and to the opposing portion of the web 12 is readily obtained by disconnecting the flexible duct 82 and swinging the hood and lamp bank assembly away from normal position in the manner described.

While I have shown a preferred embodiment of my invention, it will be apparent that variations and modifications thereof may be made without departing from the underlying principles and scope of the invention. I therefore desire, by the following claims, to include all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. For use with a printing press or the like, a fast drying and fume removing attachment comprising, in combination, a plurality of electric heat emitting units each housing a lamp of the infrared quartz tube type, means supporting said units in a bank in which the units are disposed in closely spaced relation to each other to define therebetween fume scavenging passages extending from the front side of the bank to an opposite back side thereof, vented ducts on the longitudinal extremes of said units, said lamps being oriented to emit heat from said front side of said bank, a draft hood mounted on said back side of said bank and communicating through said fume scavenging passages and also through said vented ducts providing a passage network to the back of said bank for withdrawing said fumes and preventing particles therein carried from depositing upon said lamps and adjacent portions of said bank, means on said draft hood defining a draft outlet therefrom, and fan means connected to said draft outlet to force withdrawal of the fumes and particles.

2. Radiant heat drying apparatus comprising, in combination, a series of elongated electrical heating lamps of the quartz tube type having end terminals, units supporting said lamps in a bank having a back thereof and in which the units are oriented to emit heat away from said back, vented end portions of said units containing terminal mountings for said lamps, said units being located by supporting means therefor in spaced generally parallel relation to each other and defining between them narrow fume scavenging and cooling air inlets extending through to the back of said bank, a draft hood secured to said back of said bank in covering relation to a major portion thereof to draw fume laden air through said inlets and said vented end portions, cooling the contents of the latter, means on said hood defining a draft outlet therefrom, a draft fan having a a suction inlet thereto, and a detachable flexible duct connecting said fan inlet with said draft hood outlet.

3. For drying a printed web or the like, rapid drying apparatus comprising, in combination, a plurality of elongated heat emitting quartz lamps, support units mounting said lamps in a bank in which the units are generally parallel and spaced apart to provide therebetween fume scavenging and cooling air inlets, said bank having a back, said units including reflector means arranged to reflect heat away from the back of said bank and outwardly from the bank, a draft hood mounted on said bank and covering a major portion of the back thereof, ducts secured to said units with apertures communicating with the side portions of said hood, vented end portions of said units providing openings into said ducts and communicating with said inlets to draw fume scavenging and heat unit cooling air therethrough, means

on said hood defining a draft connection thereto, and mounting means providing pivoting means for incrementally shifting said bank and attached hood into parallel or angular operative disposition with the printed web, and into an open servicing position affording access to said bank.

4. Apparatus for drying a movable web or the like and comprising, in combination, a plurality of elongated heat units each including a longitudinal housing, terminal housings at opposite ends of said longitudinal housing, an elongated electric heat lamp of the infrared quartz type extending between said terminal housings, a longitudinal reflector mounted in said longitudinal housing to reflect heat from the lamp away from the rear of the unit, support means connected to said heat units to support the latter in a bank in which the longitudinal housings of the units are parallel and spaced only slightly from each other to provide therebetween elongated fume scavenging and cooling air inlets, said terminal housings each defining terminal space therein and ventilating openings communicating with the terminal space, a pair of electric wiring and ventilating ducts disposed alongside the respective terminal housings of each of said units, electrical wiring extending through said ducts and connected into said terminal housings through the ventilating openings in each of said terminal housings, said bank having a back thereof, a draft hood secured to said bank and covering a major portion of the back thereof to communicate directly with each of said air inlets, means forming a draft connection to said hood, said conduit ducts and said hood being formed to connect the latter through said conduit ducts with ventilating openings in each of said terminal housings to draw cooling air through the latter into said hood.

5. Apparatus for drying a moving web or the like,

comprising in combination, a plurality of elongated heating units each including a pair of terminal housings at opposite ends of the unit, an elongated infrared quartz heating tube extending longitudinally between said terminal housings, and a reflective back portion, means supporting said heating units in a bank in which the units are generally parallel and spaced apart, yet in close disposition, to define between adjacent units fume scavenging and cooling air passages, said passages diverting the fumes and the deleterious matter thereby carried from coming into appreciable contact with said quartz tube and reflective back portions of said units, said terminal housings possessing ventilating openings therein communicating with said passages to permit a flow of cooling air through said passages and through said terminal housings, a draft hood covering a major portion of the back of said bank and communicating with said passages and ventilating openings of said terminal housings to draw cooling and fume scavenging air therethrough, and fan means connected to said draft hood to force circulation of the cooling and fume scavenging air.

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