May 27, 1969 E. VANDENBERG 3,446,142

DRYING DEVICE FOR A PRINTING PRESS

Filed June 9, 1966 Sheet 1 of 2

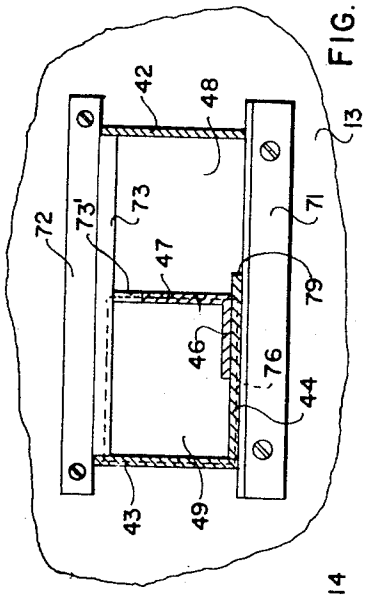


FIG. 9

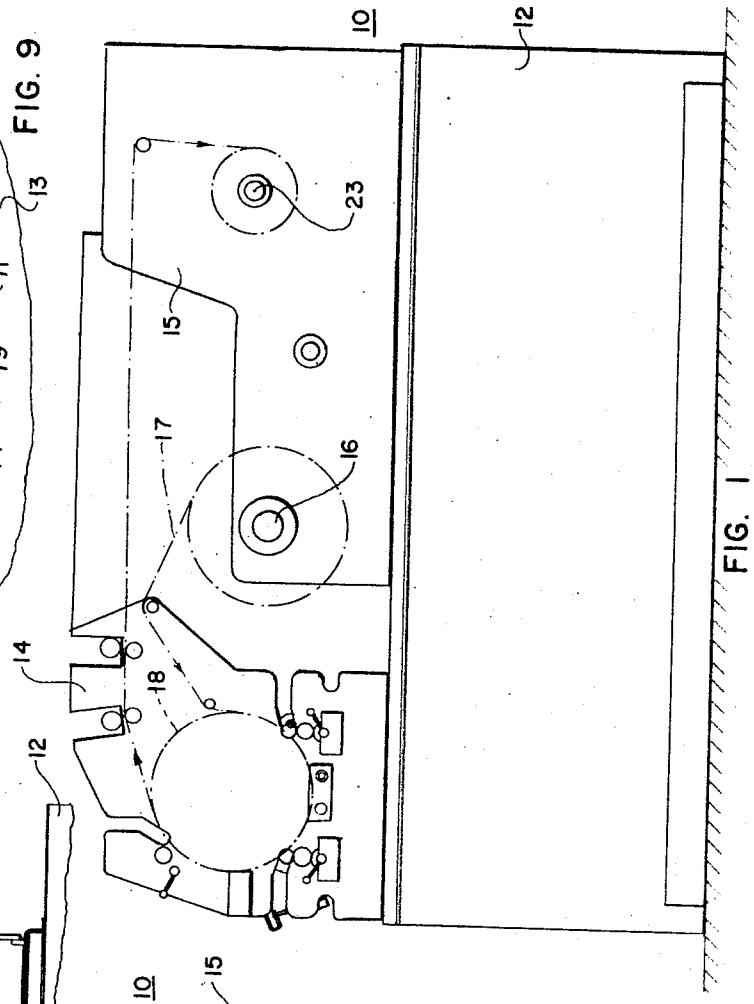


FIG. 1

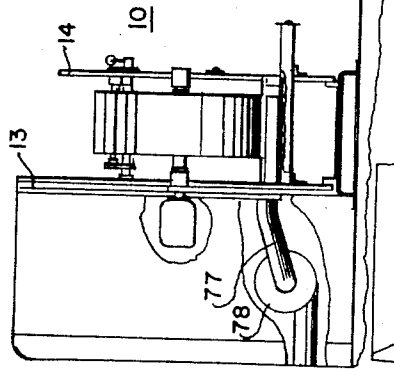


FIG. 3

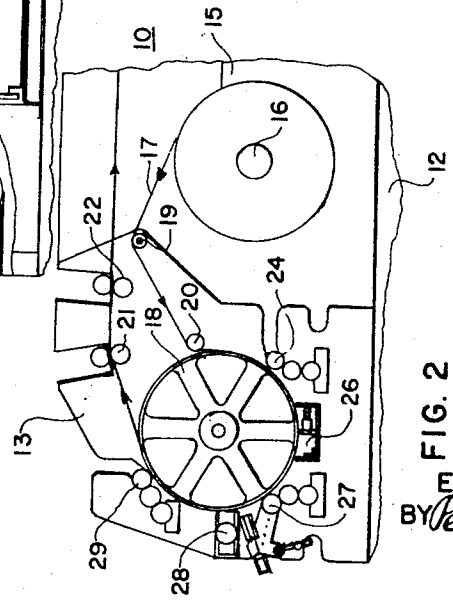


FIG. 2

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FIG. 6

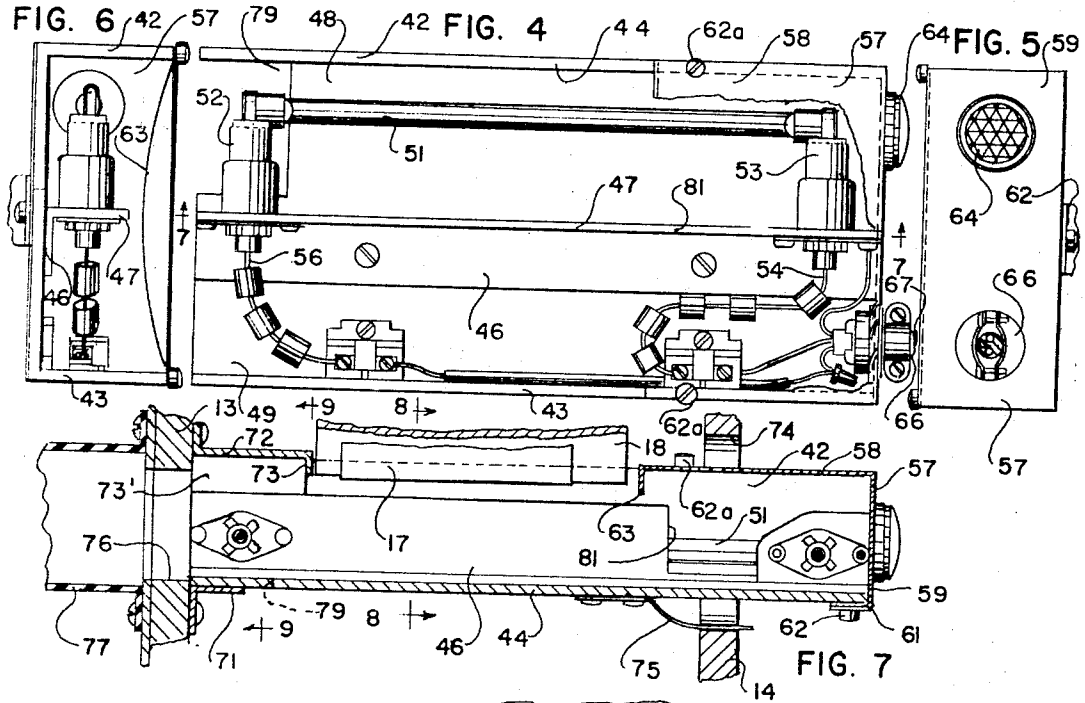


FIG. 4

FIG. 5

FIG. 7

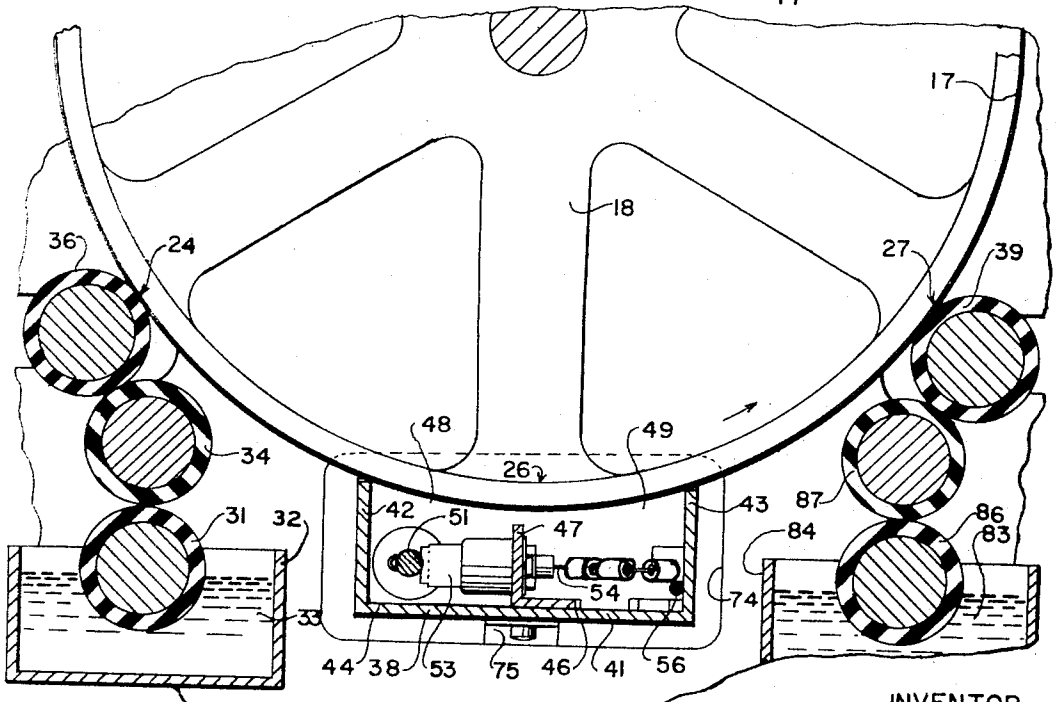


FIG. 8

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DRYING DEVICE FOR A PRINTING PRESS

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U.S. Cl. 101—178 5 Claims

ABSTRACT OF THE DISCLOSURE

An ink drying device for a printing press including a body provided with channels along which air is drawn crosswise of a printed web, there being a heating rod in one of the channels for heating the web and the air as the air is drawn across the web.

This invention relates to a printing machine. More particularly, this invention relates to a printing machine having a drying device for rapidly drying ink on a web between steps of a printing process.

In continuous printing machines, a web can pass over a back-up or impression cylinder against which the web is held during printing, there being several stages of printing circumferentially arranged around the cylinder. Between stages, ink from one printing stage must be dried sufficiently to prevent smudging at a subsequent printing stage. An object of this invention is to provide a drying device which channels heated air across the face of a freshly printed web on an impression cylinder to dry the ink.

A further object of this invention is to provide such a drying device in which the air is caused to pass and repass crosswise of the web as the air is heated and as the air dries the ink.

A further object of this invention is to provide such a drying device which includes a housing having a pair of parallel channels both extending crosswise of the path of the web and in which there is a heating element in a first one of the channels which heats air and also heats the web and ink on the web as air is drawn along the first channel and a second channel along which the heated air is drawn crosswise of the web a second time to dry the ink on the web.

The above and other objects and features of the invention will be apparent to those skilled in the art to which this invention pertains from the following detailed description and the drawings, in which:

FIG. 1 is a view in front elevation of a label printing machine including a drying device constructed in accordance with an embodiment of this invention, a web being shown in association therewith in dot-dash lines;

FIG. 2 is a fragmentary view in front elevation of the machine illustrated in FIG. 1, a front panel thereof and associated portions being removed to reveal internal construction.

FIG. 3 is a view in end elevation of the machine illustrated in FIGS. 1 and 2, parts being broken away to reveal details of construction;

FIG. 4 is a plan view of a drying assembly forming a part of the machine illustrated in FIGS. 1–3, inclusive;

FIG. 5 is a view in front elevation of the drying assembly shown in FIG. 4;

FIG. 6 is a view in rear elevation of the drying assembly shown in FIGS. 4 and 5;

FIG. 7 is a view in section taken on the line 7—7 in FIG. 4, associated portions of the printing machine being shown in association with the drying assembly;

FIG. 8 is a view in section taken on the line 8—8 in FIG. 7; and

FIG. 9 is a view in section taken on the line 9—9 in FIG. 7.

In the following detailed description and the drawings, like reference characters indicate like parts.

In FIGS. 1–3 inclusive is shown a label printing machine **10** which includes a stand **12** and frame plates **13**, **14** and **15**, which are mounted on the stand **12**. A web feeding roll **16** is mounted on the frame plate **15**. A web **17** runs from the roll **16** to a central impression cylinder **18** around which the web passes. The web passes over guide rolls **19** and **20** on its way to the central impression cylinder and around appropriate exit guide rolls **21** and **22** after leaving the cylinder **18**. The various rolls and the cylinder **18** are rotatably mounted in the frame plates. The printed web finally passes to a wind-up roll **23** (FIG. 1) where the printed web is collected. As the web passes over the impression cylinder **18**, it advances past a first printing station **24** (FIG. 2), a first drying station **26**, a second printing station **27**, a second drying station **28** and a third printing station **29**. Details of construction of the first drying station and the first and second printing stations are shown in FIGS. 4–8 inclusive. The web reaches the first drying station after passing the first printing station. At the first printing station **24**, an ink pick-up roll **31** runs in a trough **32** of ink **33**. Ink from the pick-up roll **31** is transferred by an intermediate roll **34** to a printing roll **36** bearing appropriate indicia which is printed on the web. The various rolls and the cylinder **18** are driven by appropriate drive mechanism, not shown in detail, the impression cylinder **18** being driven in a counter-clockwise direction, as shown in FIG. 8.

When the first stage of printing has been accomplished by the printing roll **36**, the web passes over a drying housing **38** at the first drying station where the ink on the web is dried previous to passing to a printing roll **39** at the second printing station **27**. The drying housing **38** includes a channel-shaped body **41** having flanges **42** and **43** which approach closely to the web **17** on the cylinder **18** and a base **44**. An angle frame **46** is attached to the base **44** with an upright flange **47** thereof extending upwardly from the base **44** parallel to and spaced between the flanges **42** and **43**, as shown in FIG. 8. The upright flange **47** also approaches the web **17** on the impression cylinder but can be somewhat further spaced therefrom than the flanges **42** and **43** of the body **41**. The upright flange **47** divides the interior of the body **41** into two channels **48** and **49**, both extending transversely of the web **17**. An electrical heating unit **51** is mounted in and extends substantially the length of the channel **48**. The heating unit is supported on insulated fittings **52** and **53** mounted on the upright flange **47**. Electric leads **54** and **56** for directing current to the heating unit **51**, are located in the channel **49**.

The right-hand end of the body **41** is closed by a generally angle-shaped closure member **57** (FIGS. 4 to 7 inclusive) which includes a horizontal main plate portion **58** and an upright end plate portion **59**. A flange **61** (FIG. 7) on the underside of the end plate portion **59** underlies and is attached to the base **44** of the body **41** by a fastener **62**. In addition, the main portion **58** can be attached to the flanges **42** and **43** by fasteners **62***a*. As shown in FIG. 7, a flange **63** on the main plate portion **58** extends downwardly adjacent the impression cylinder **18**. A glass bullseye **64** mounted in the closure member **57** is illuminated by the heating unit **51** and indicates when the unit is hot. A fitting **66** mounted on the closure member **57** supports a cable **67** which is connected to the leads **54** and **56** and through which electric energy is supplied.

The inner end of the body **41** is supported on an angle bracket **71** mounted on the frame plate **13**. A guide

bracket **72** is attached to the frame plate **13** spaced above the angle bracket **71**. A downwardly extending tongue **73**, which is a part of the guide bracket **72** fits between the flanges **42** and **43** to center the body on the angle bracket **71**. The tongue **73** is also closely spaced from the impression cylinder **18** as shown in FIG. 7. A downwardly extending flange **73'** on the guide bracket **72** extends downwardly therefrom to adjacent the upper edge of the upright flange **47** of the body **41**.

As shown in FIGS. 7 and 8, the body extends through an opening **74** in the frame plate **14** and is supported therein by a spring plate **75** which is attached to the base **44**.

When the body **41** is in position as shown in FIGS. 7 and 9, the channel **49** communicates with an opening **76** in the frame plate **13**. A conduit **77** communicates therewith. As shown in FIG. 3, the conduit **77** is connected to a blower **78** which draws air through the conduit **77** from the interior of the body **41**.

As shown in FIGS. 4 and 9, the base **44** is cut away to form an opening **79** adjacent the frame plate **13** through which air enters the body **41** at the channel **48**. The air travels along the channel **48** to the front end of the body **41** where the upright flange **47** is cut away at **81** to form a passageway between the channels. As the air is drawn along the channel **48**, the air is heated by the heating unit **51**, and in addition, radiant energy from the heating unit **51**, heats ink on the web **17**. As the air passes along the channel **49** back crosswise of the web a second time, the heated air completes the drying of the ink on the web carried by the impression cylinder. As the air is drawn crosswise of the web for the first time in the channel **48**, the air is heated by the heating unit **51**. Then, the heated air is drawn crosswise of the web a second time in the channel **49**. The flanges **42** and **43** and the flange **63** and the tongue **73** form an enclosed space inside the body **41** surrounding the portion of the web **17** and the impression cylinder **18** at the first drying station **26**. Then, the web passes to the second printing station **27** (FIG. 8) where the second stage of printing is effected. Ink is transported to the printing roll **39** from a source of ink **83** in a trough **84** by means of an ink pick-up roll **86** and a transfer roll **87**.

The ink drying device illustrated in the drawings and described above is subject to structural modification without departing from the spirit and scope of the appended claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with an impression cylinder, means for directing a web to pass around a face of said cylinder, and means for printing said web, of an ink drying device which comprises a hollow body, spaced flanges on said body terminating adjacent and extending transversely of the web carrying face of the cylinder at a position subsequent to the printing means, means in said body adjacent opposite sides of said cylinder closing ends of said body whereby the body substantially encloses a portion of periphery of the cylinder subsequent to the printing means, means in the body extending transversely of the web and dividing the body into two channels extending transversely of the web, means for providing communication between the channels at one side of the cylinder, means at the opposite side of the cylinder for permitting air to enter one of the channels and leave the other channel, an elongated heating rod in one of the channels parallel to, adjacent and spaced from the web carrying face, and means for driving air along the rod and along the channels back and forth crosswise of the web to dry ink thereon, the web being exposed to the heating rod so that ink on the web is heated thereby.

2. A combination as in claim **1** which includes a second means for printing the web as the web passes around the impression cylinder after passing the drying device.

3. A combination as in claim **1** in which the heating rod is located in the one of the channels through which the air passes first.

4. A combination as in claim **1** in which the means for driving air along the channels includes suction means connected to one of the channels.

5. An ink drying device for a printing press having an impression cylinder which comprises a hollow body, spaced flanges on said body, means for supporting the body with the flanges terminating adjacent and extending transversely of the cylinder, spaced means in said body spanning the flanges and adapted to close ends of said body adjacent opposite sides of the cylinder whereby the body substantially encloses a portion of periphery of the cylinder, means in the body extending transversely of the cylinder and dividing the body into two channels extending transversely of the cylinder, an elongated heating rod in one of said channels for extending parallel to, adjacent and spaced from the cylinder for heating air therein and for heating ink on a web carried by the cylinder, means for providing communication between the channels at one side of the cylinder, means at the opposite side of the cylinder for permitting air to enter and leave the body, and means for driving air along the channels back and forth crosswise of the web to dry ink thereon.

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34—41; 101—416