

July 15, 1958

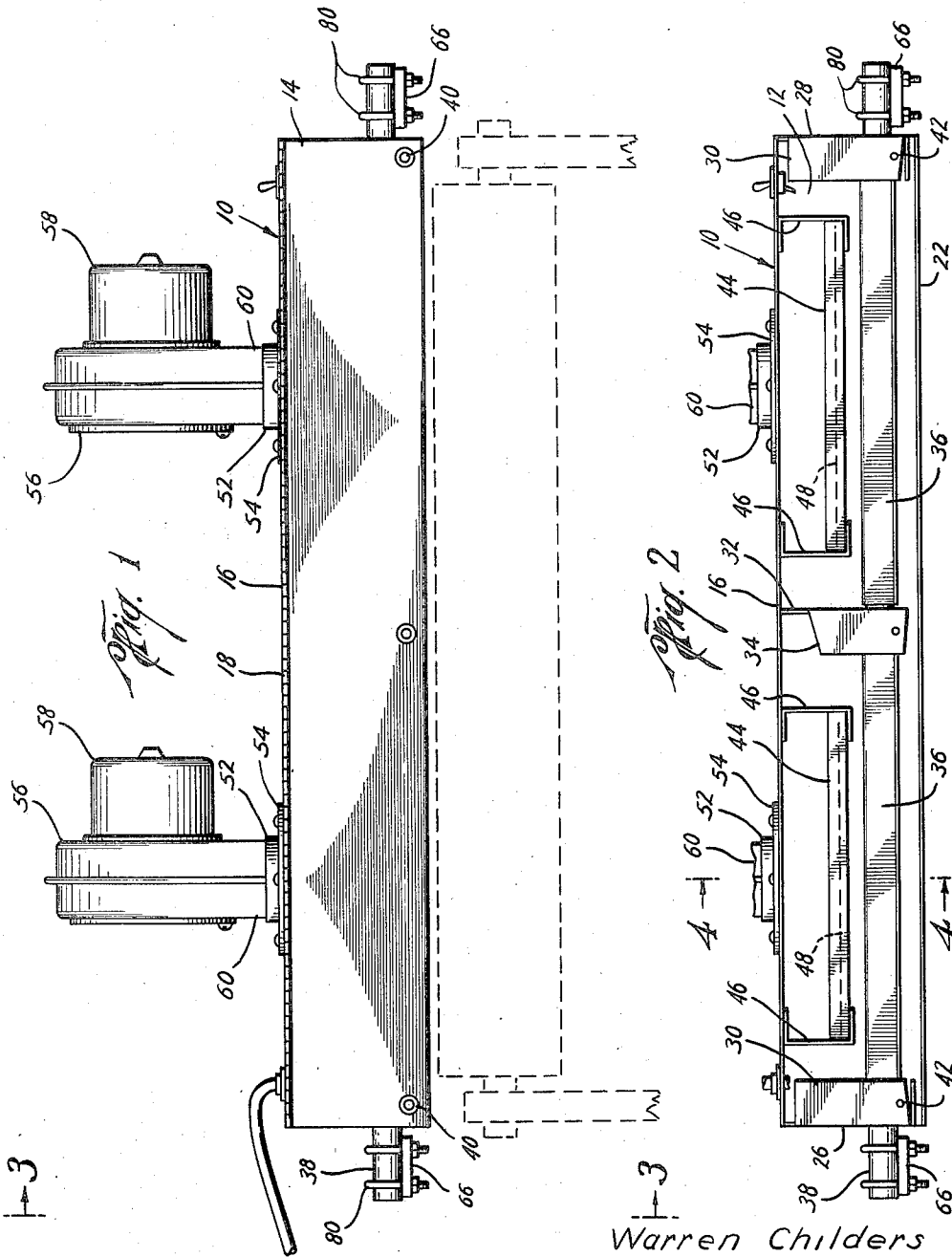
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INK CONDITIONING EQUIPMENT FOR ROTARY LITHOGRAPHIC PRESS

Filed Aug. 17, 1954

3 Sheets-Sheet 1



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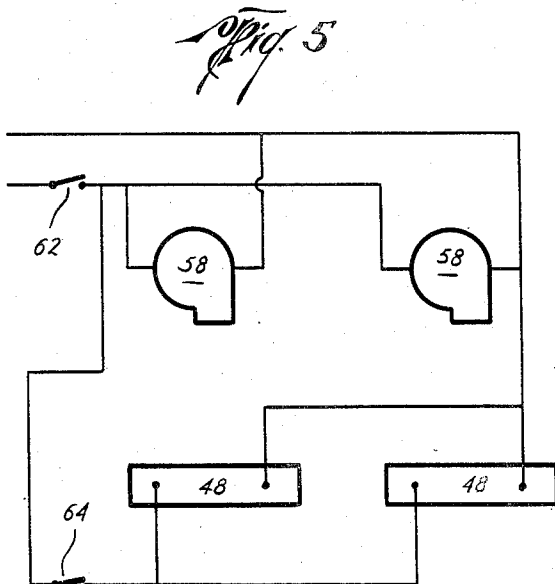
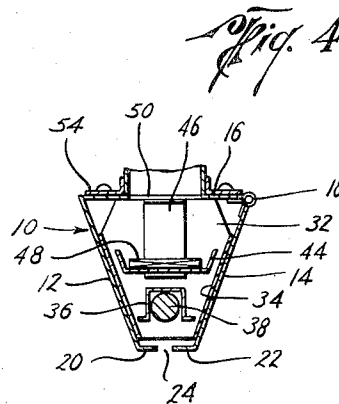
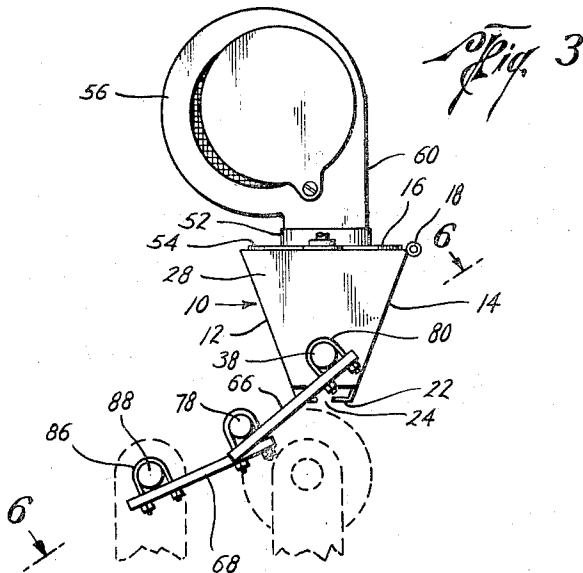
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INK CONDITIONING EQUIPMENT FOR ROTARY LITHOGRAPHIC PRESS

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3 Sheets-Sheet 2



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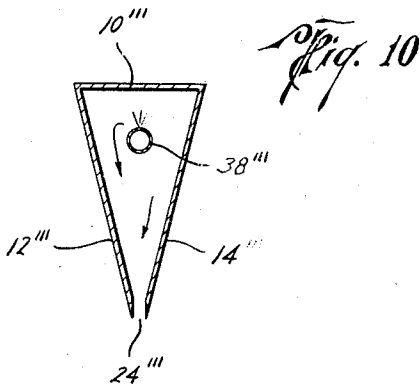
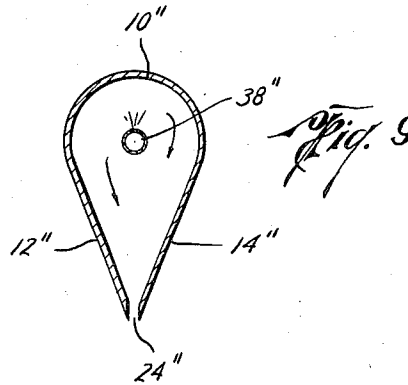
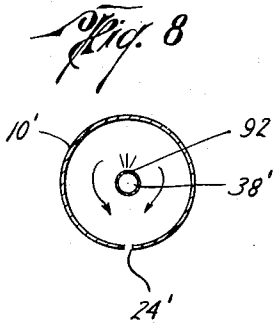
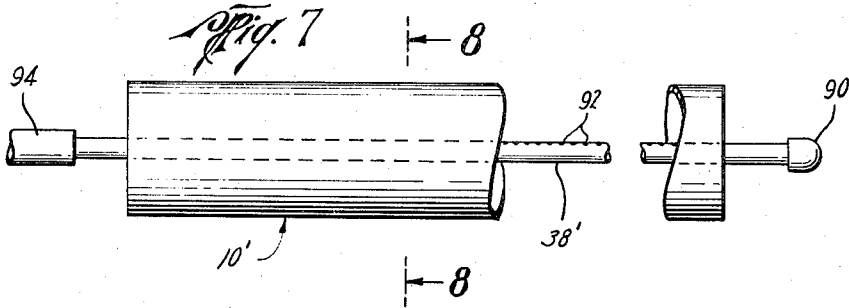
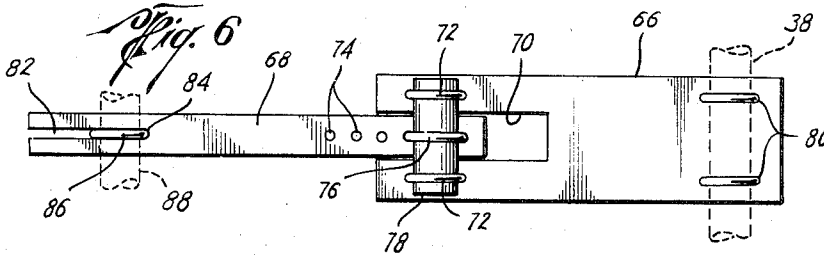
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INK CONDITIONING EQUIPMENT FOR ROTARY LITHOGRAPHIC PRESS

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3 Sheets-Sheet 3



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1

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INK CONDITIONING EQUIPMENT FOR ROTARY LITHOGRAPHIC PRESS

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Application August 17, 1954, Serial No. 450,507

5 Claims. (Cl. 101—141)

This invention relates to the art of lithographic printing and more particularly to ink conditioning equipment for use with the inking mechanism of lithographic presses.

In lithographic printing equipment of conventional design, ink is distributed from an ink reservoir to the printing plate through a system of inking rolls, which usually includes a train of transfer rolls, and a number of rolls which receive ink from the transfer rolls, and apply the ink to the printing plate. Means is also usually provided in printing equipment of this kind for distributing water from a water reservoir to the surface of the printing plate, the water and ink being successively applied to the plate in such a manner that a film of moisture is maintained on all non-printing surface portions of the plate, and ink is prevented from depositing upon such surface portions but is retained only on the ink-receptive or design carrying portions, from which the ink is transferred to the paper during the printing.

Printing equipment of this type, as heretofore constructed and operated, possesses the serious disadvantage that it is extremely difficult to maintain the proper amount of moisture on the plate, some of the moisture deposited thereon being taken up by the inking rolls and transferred to the inking system. In the event that insufficient moisture is maintained on the plate, the non-inking surface portions begin to retain ink so that the parts of the design which are to remain uninked become clouded, contrast is lost and the edges of the design lack sharpness. Under these conditions the operator will often attempt to overcome the difficulty by adding more water through the water distributing system, which results in the transfer of greater amounts of water from the plate into the inking system causing the formation of an emulsion on the inking rollers and making it necessary to shut down the press and clean the inking system before satisfactory operation can be restored.

The present invention has for its principal object the provision of means for removing water from the inking system of a lithographic press to prevent the accumulation of excess moisture in the ink.

Another object of the invention is to provide means for supplying heated air to the surface of a roll of the inking system of a press of the kind referred to, to evaporate water from the ink and maintain the inking system in a substantially moisture free condition.

A further object of the invention is the provision of means for distributing heated air uniformly throughout the surface of a roller of the inking system, in order to obtain uniform evaporation of moisture from the ink throughout the entire width of the inking mechanism.

Another object of the invention is to provide mechanism for supplying heated air to the surface of a roller of an inking system of the kind mentioned, which includes means for maintaining a blast of air at substantially constant pressure throughout the entire length of the roll whereby uneven drying is prevented.

2

A further object of the invention is the provision of an ink conditioning attachment for the inking systems of lithographic presses which can be positioned to remove moisture from a selected one of the ink rolls of such a system, and which embodies means for adjustably supporting the mechanism from the frame of the press, for adjustment to any desired distance and position relative to the selected roll.

Another object of the invention is to provide apparatus for delivering air to the surface of an inking roll of an inking system for lithographic presses, which apparatus embodies an elongated housing having a longitudinal slot through which air may be discharged and including means for maintaining a substantially constant pressure of air throughout the interior of the housing, whereby the air will be discharged uniformly throughout the length of the discharge opening, to secure uniform evaporation of moisture throughout the width of the inking system.

A still further object of the invention is the provision of an ink conditioning attachment for the inking system of a lithographic press which attachment is of simple design and rugged construction, capable of withstanding the hard usage and conditions of exposure to which equipment of this character is customarily subjected.

Numerous advantages may be gained by the employment of the ink conditioning equipment of the invention in connection with lithographic presses, among which are the following:

(1) Cleaner and sharper prints may be obtained, due to the fact that greater amounts of water may be applied to the plate than would otherwise be possible, without causing emulsification of the ink in the inking system or increasing the tendency of the ink to spread beyond the borders of the ink receptive surface portions of the plate.

(2) Stronger or darker prints having greater contrast may be obtained than would otherwise be possible, due to the maintenance of high transfer quality of the ink and the prevention of the dilution or emulsification of the ink by water entering the inking system from the plate.

(3) Large numbers of prints having substantially constant color value may be obtained.

(4) The adjustment of the ink and water applying systems is rendered simpler and less critical than has heretofore been possible due to the greater range in the application of water to the plate which can be made without affecting the condition of the ink.

(5) Longer plate life is obtainable than heretofore due to the reduction in the tendency for the plate to become sensitized and the consequent reduction of the cleaning or desensitizing operations which would otherwise be necessary.

The above and other important objects and advantages of the invention will best be understood from the following detailed description, constituting a specification of the same, when considered in conjunction with the annexed drawings, wherein—

Figure 1 is a side elevational view of a preferred form of the invention showing the same in operating position relative to a roll of an inking system;

Figure 2 is a view similar to that of Figure 1, showing the invention with one side wall of the housing removed to reveal the interior construction and arrangement of the parts;

Figure 3 is an end elevational view of the invention as illustrated in Figure 1;

Figure 4 is a cross-sectional view taken along line 4—4 of Figure 2, looking in the direction indicated by the arrows;

Figure 5 is a diagrammatic view illustrating the elec-

tric circuits of the heating and blower mechanism of the invention;

Figure 6 is a top plan view, on an enlarged scale, illustrating details of construction of a preferred form of adjustable supporting device of the invention by which the drying attachment is supported on a press;

Figure 7 is a side elevational view of a somewhat modified form of the invention;

Figure 8 is a cross-sectional view taken along the line 8—8 of Figure 7;

Figure 9 is a view similar to that of Figure 8, illustrating a modified form of the invention; and

Figure 10 is a view similar to that of Figure 8, illustrating a still further modification of the invention.

Referring now to the drawings in greater detail, the ink conditioning equipment of the invention as illustrated in Figures 1 to 4, comprises a housing, generally indicated at 10, which in the present illustration may be of generally trapezoidal shape in cross-section, having downwardly converging side walls 12 and 14 and a top wall 16. The side wall 14 may be suitably secured along its upper edge to one edge of the top wall as by means of a hinge 18, whereby the side wall 14 may be lifted up to open the housing. The side walls 12 and 14 are preferably formed along their lower edge portions with inturned flanged portions 20 and 22, respectively, extending throughout the lengths of the side walls and whose free edges are positioned in parallel spaced relation to form an elongated bottom discharge opening 24 in the bottom of the casing. The housing is also provided with end walls 26 and 28, each of which is formed with inwardly extending flanges such as those indicated at 30, along its edge portions, which underlie the end margins of the side and top walls.

The housing may be re-enforced on the interior by an intermediate inside wall 32, of similar shape to the end walls 26 and 28 and similarly formed with flanged edge portion such as that seen at 34 underlying the side and top walls.

Extending throughout the length of the interior of the housing inverted, channel shaped baffles 36 are supported, having out-turned longitudinal flanges whose edges are spaced somewhat inwardly from the side walls to permit the passage of air downwardly through the housing past the baffles and out through the discharge opening 24.

A supporting shaft 38 passes longitudinally through the housing and the intermediate wall 32 and beyond the end walls 26 and 28, which shaft lies within the baffles 36, and is suitably secured to the walls 26, 28 and 32, as by welding or otherwise.

The side wall 14 may be retained in closed condition by means of suitable fastenings, such as the screws 40 which pass through the side wall and are threaded into the openings 42 in the flanges 30 of the end walls 26 and 28.

Within the housing deflectors 44, of upwardly opening channel shape, are supported above the baffles 36 by means of end brackets 46, and electrical heating elements, of conventional design such as that indicated generally at 48 are positioned within the deflectors, as seen in Figure 4. The upturned sides of the deflectors 44 are spaced somewhat inwardly of the side walls of the housing to permit downflow of air past the deflectors.

Above each of the deflectors 44, the top wall 16 of the housing has an inlet opening 50 therethrough, one of which is shown in Figure 4, and a tubular connector member 52 having an external annular flange 54 is secured to the top wall about each inlet opening. Suitable blowers or fans of conventional design, such as those indicated at 56, which may be driven by electric motors 58, are connected with their discharge outlets 60 in communication with the inlet openings 50 of the housing, whereby air may be blown into the housing above the deflectors 44. It will be apparent that the

air thus entering the housing will be heated by the heating elements 48 and will flow downwardly about the deflectors 44, past the baffles 36 and will be discharged at a substantial uniform pressure from the bottom discharge opening throughout the entire length of the opening.

The operation of the equipment, constructed as described above, may be accomplished by the use of any suitable electrical system, one such arrangement being illustrated in Figure 5 of the drawings, wherein the blower motors 58 and the heating elements 48 are connected to a common source of electrical current. In this arrangement the switches 62 and 64 are so related that the motors must be in operation at all times when the heating elements 48 are on, but the heating elements may be turned off while the blowers are allowed to continue in operation, if desired.

For the purpose of supporting the equipment in proper position relative to one or more of the rolls of the inking system of a lithographic press, and to permit the adjustment of the equipment to any desired distance or angular relation to such rolls the invention also includes improved supporting means such as those illustrated in Figures 1, 2, 3, and 6. As best seen in Figure 6 each of the supporting devices of the invention comprises inter-fitting connector members 66 and 68, the member 66 having an end slot 70 at one end within which one end of the member 68 is moveably positioned. U-bolts 72 are attached to the member 66 on each side of the slot 70 thereof, and the member 68 is provided with a number of longitudinally spaced openings 74, for the reception of a U-bolt 76, whereby the position of the U-bolt 76 may be adjusted longitudinally of the member 68. The U-bolts 72 and 76 are adapted to be brought into registration to receive a pin 78, to form a hinged connection between the members 66 and 68 whereby their angular relation to each other may be adjusted. The member 66 is also provided with U-bolts 80 at the end opposite to the slot 70 through which an end of the support shaft 38 of the housing 10 may extend to secure the member 66 to the shaft. The member 68 also has an end slot 82 therein and spaced longitudinally from the inner end of the slot 82 an opening 84 is provided. A U-bolt 86 may be positioned with one leg extending through the opening 84 and the other leg through the slot 82. By placing the U-bolt 86 about a frame element of a press, such as the shaft 88 of the press, as illustrated in Figure 3, the bolt may be tightened to secure the member 68 to the press. By the provision of the end slot 82 and opening 84 in member 68 any size of U-bolt may be applied thereto to enable the member to be secured to any size of shaft upon which the equipment is to be supported. It will be apparent that by suitable adjustment of the U-bolt 76 in the openings 74, and by adjustment of the angular relation of the members 66 and 68, the housing 10 may be supported in any desired position relative to any one or more of the rolls of an inking system, thus permitting the equipment to be located for most efficient operation.

A somewhat modified form of the invention is illustrated in Figures 7 and 8 of the drawings, wherein a housing 10' of substantially cylindrical shape is provided, which has an elongated, longitudinally disposed discharge opening or slot 24' therein. The housing is closed at its ends and a tubular shaft 38' extends lengthwise through the housing and beyond the ends thereof, whereby the housing may be supported in the same manner and by similar means as previously described in connection with the housing 10.

The tubular shaft 38' is suitably closed at one end, as by means of a screw cap 90, and is provided within the housing with small openings, indicated at 92 which may be uniformly spaced longitudinally throughout the length of the housing and are preferably directed away from the discharge opening 24'.

5

The tubular shaft 38' may be connected by suitable means such as a hose 94 in communication with a source of air under pressure, such as the conventional air pressure system provided with various types of lithographic presses.

In the operation of this form of the invention the housing is supported with the opening 24' directed toward one or more of the rolls of an inking system in suitably spaced relation thereto, as in the previously described arrangement, and air is supplied to the tubular shaft 38', with or without heating. The openings 92 may be of relatively small size so that the pressure of air in the shaft 38' will be substantially constant throughout the length of the housing and due to the directing of the openings away from the discharge openings 24', the air will be discharged from the housing at a substantially constant pressure throughout the entire length of the opening 24.

A further modification of the invention is illustrated in Figure 9, wherein the housing 10'' is of rounded shape in cross-section having side wall portions 12'' and 14'' which converge at a relatively small angle. The housing has a discharge opening 24'' formed by the longitudinal edge portions of the converging side walls, and is provided with a tubular supporting and air delivering shaft 38'' similar to the shaft 38' and similarly positioned. This form of the invention is applied in the same manner as that previously described in connection with Figures 7 and 8, and possesses the added advantage that the sharply converging side walls, may be positioned in close places, such as between the rolls of inking systems of certain types, whereby the discharge opening 24'' may be positioned in a desired location with respect to one or more of the inking rolls of such a system.

A still further modification of the invention is illustrated in Figure 10, wherein the housing 10''' is somewhat similar to that illustrated in Figure 9, with similar converging side walls 12''' and 14''' whose longitudinal edge portions form a discharge opening 24'''. In this form of the invention the housing may have a flat top wall 16''', and is provided with a tubular supporting and air supply shaft 38'''. This form of the invention is supported and used in the same manner as described in connection with the modification illustrated in Figures 7, 8 and 9.

While the invention has been disclosed herein in connection with certain specific embodiments of same, it will be understood that these are intended by way of illustration only, and that numerous changes can be made in the construction and arrangement of the various parts, without departing from the spirit of the invention or the scope of the appended claims.

Having thus clearly shown and described the invention, what is claimed as new and desired to secure by Letters Patent is:

1. An ink conditioning device for use on lithographic presses comprising a housing having an air discharge outlet, a tubular shaft extending longitudinally through the housing and beyond the ends of the housing, means engageable with the shaft beyond the ends of the housing for supporting the shaft and housing with the outlet adjacent an inking roll of a lithographic press, said shaft having an opening within the housing in communication with the interior of the shaft and through which air may enter

6

the housing, said opening being positioned to direct the air entering the housing away from the outlet and said housing being shaped to divert the air entering the housing toward said outlet.

2. An ink conditioning device for use on lithographic presses comprising a housing having an air discharge outlet, a tubular shaft extending longitudinally through and beyond the ends of the housing, means engageable with the shaft beyond the ends of the housing for supporting the shaft and housing to position the outlet adjacent an inking roll of a lithographic press, said shaft having an opening within the housing in communication with the interior of the shaft and through which air may enter the housing, said opening being positioned to direct the air entering the housing away from said outlet.

3. An ink conditioning device for use on lithographic presses comprising a housing having an air discharge outlet, a tubular shaft extending through and beyond the ends of the housing, means engageable with the shaft beyond the ends of the housing for supporting the shaft and housing with the outlet adjacent an inking roll of a lithographic press, said shaft having a plurality of openings within the housing in communication with the interior of the shaft and through which air may enter the housing at uniformly spaced intervals throughout the length of the housing, said openings being positioned to direct the air entering the housing away from said outlet.

4. An ink conditioning device for use on lithographic presses comprising a housing having an air inlet and an air discharge outlet, means for supporting the housing with said outlet located adjacent an inking roll of a lithographic press, an air blower mounted on the housing and arranged to blow air into the housing through said inlet, first baffle means in the housing positioned in the path of the air entering the housing, an air heater in the housing located in the path of the air entering the housing, and second baffle means in the housing positioned between said first baffle means and said outlet.

5. An ink conditioning device for use on lithographic presses comprising a housing having top and bottom walls and side walls converging toward said bottom wall, said bottom wall having a longitudinal slot forming an air discharge outlet therein, means for supporting the housing with said outlet disposed parallel to and adjacent the surface of an inking roll of a lithographic press, said top wall having an inlet, means on the housing for introducing air into the housing through said inlet, and air deflecting means in the housing positioned to direct the air entering the housing upwardly toward said top wall and shaped to cooperate with said side walls to cause the air to move downwardly in the housing uniformly throughout the length of said outlet.

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