June 16, 1936. J. G. GOEDIKE 2,043,995

METHOD OF AND MEANS FOR DAMPENING PRINTING SURFACES OF PLANOGRAPHIC AND ANALOGOUS PRESSES

Filed Sept. 12, 1932 5 Sheets-Sheet 1

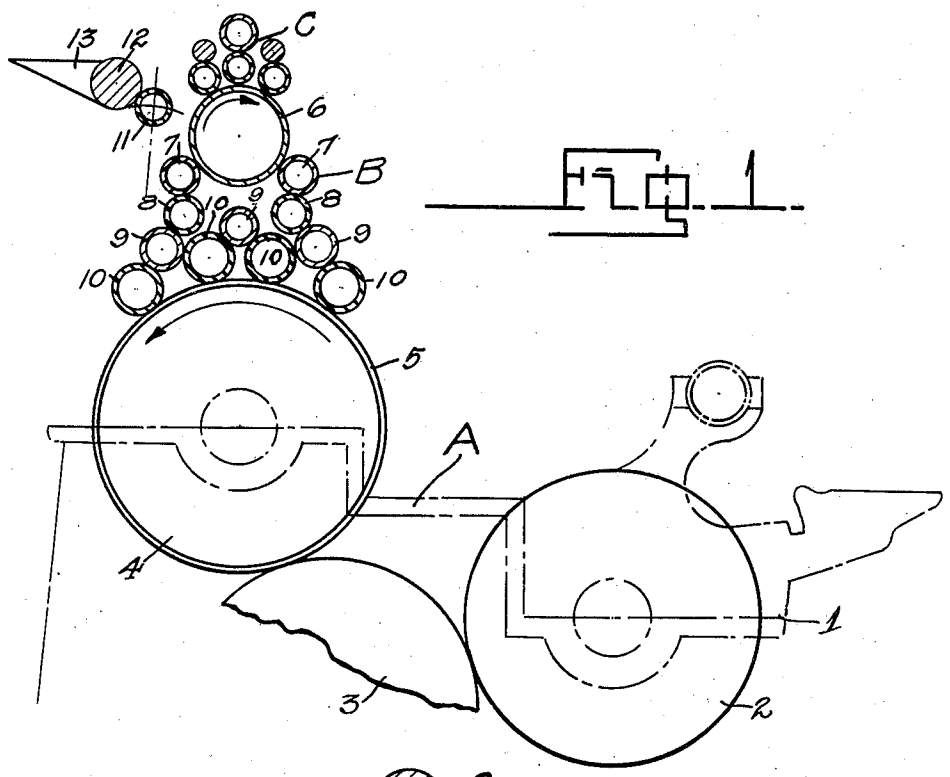


Fig. 1

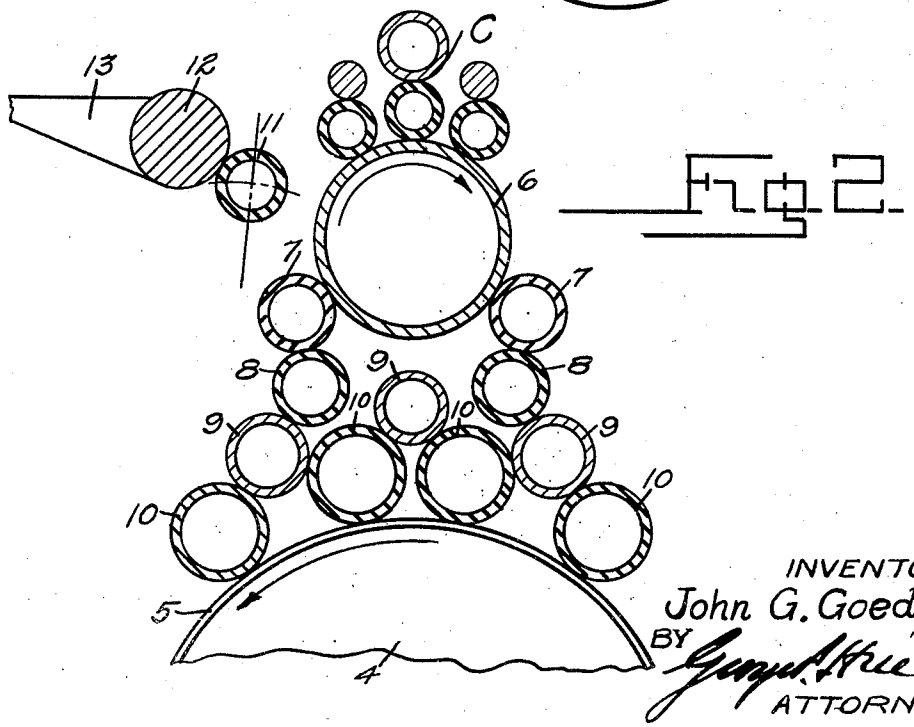


Fig. 2

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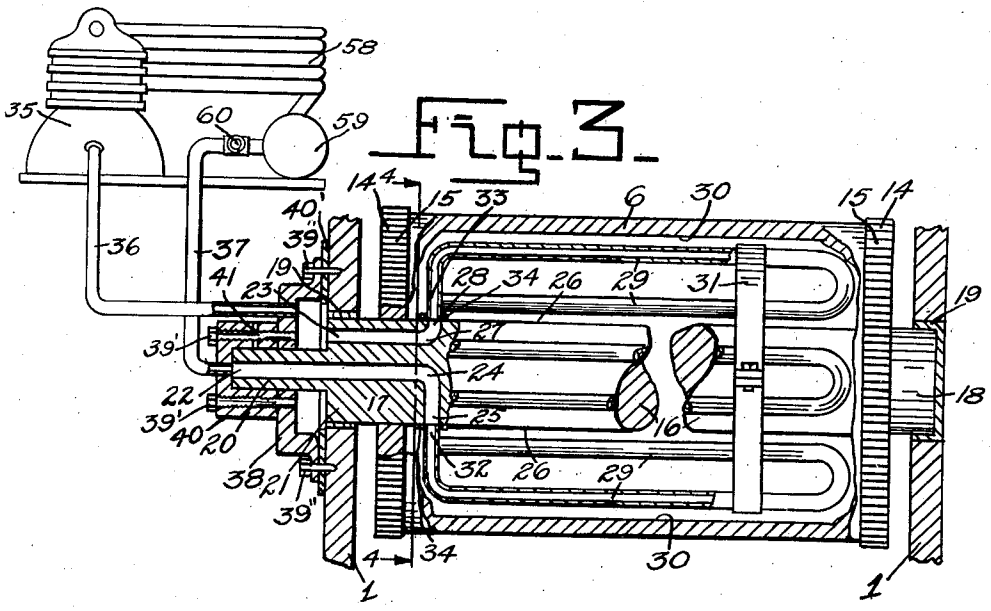


Fig. 3

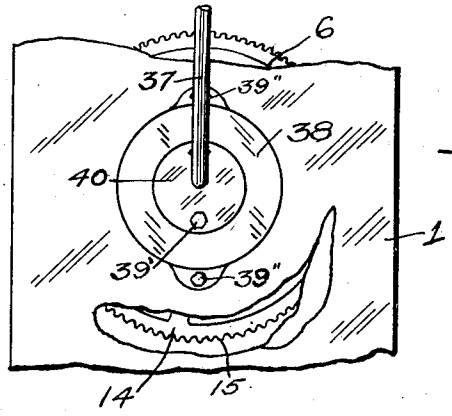


Fig. 4

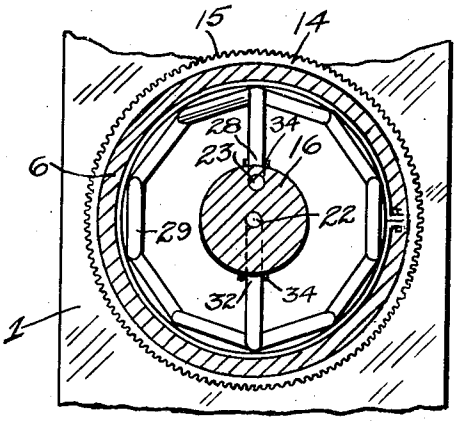


Fig. 5

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METHOD OF AND MEANS FOR DAMPENING PRINTING SURFACES OF PLANOGRAPHIC AND ANALOGOUS PRESSES

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FIG. 6

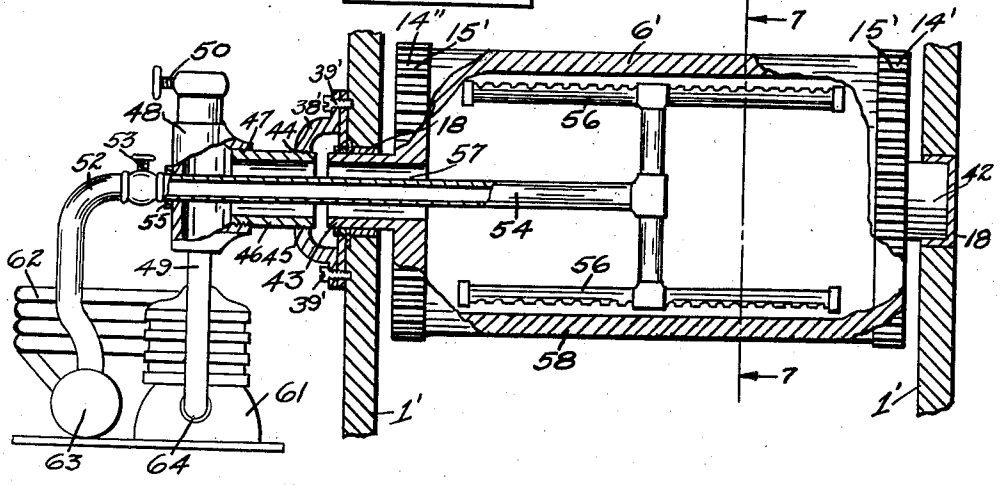
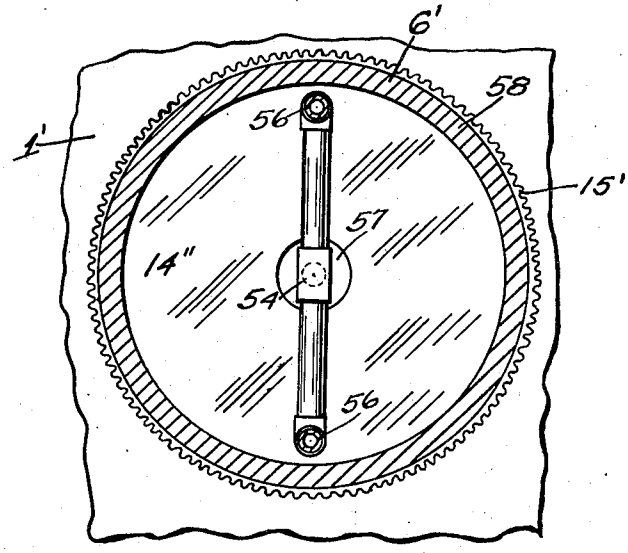


FIG. 7



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Filed Sept. 12, 1932 5 Sheets-Sheet 4

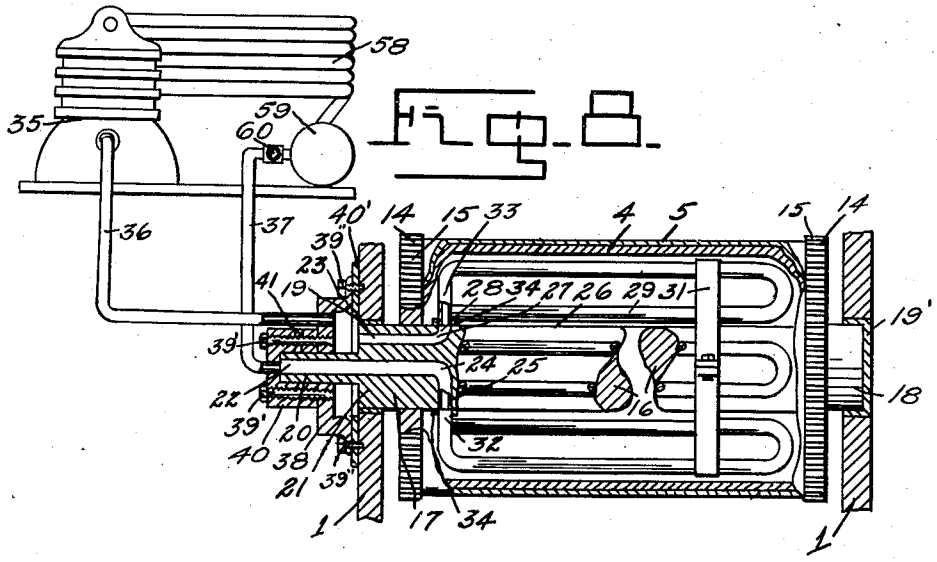


Fig. 8.

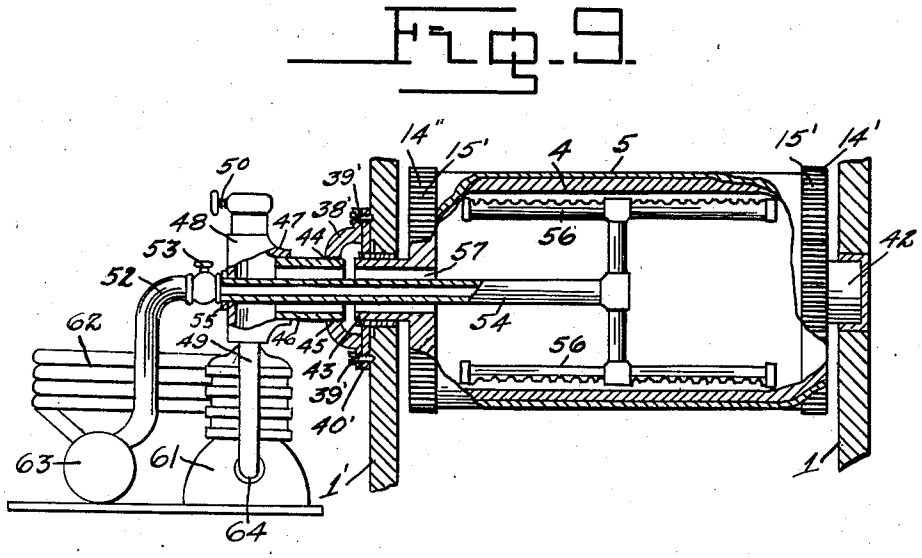


Fig. 9.

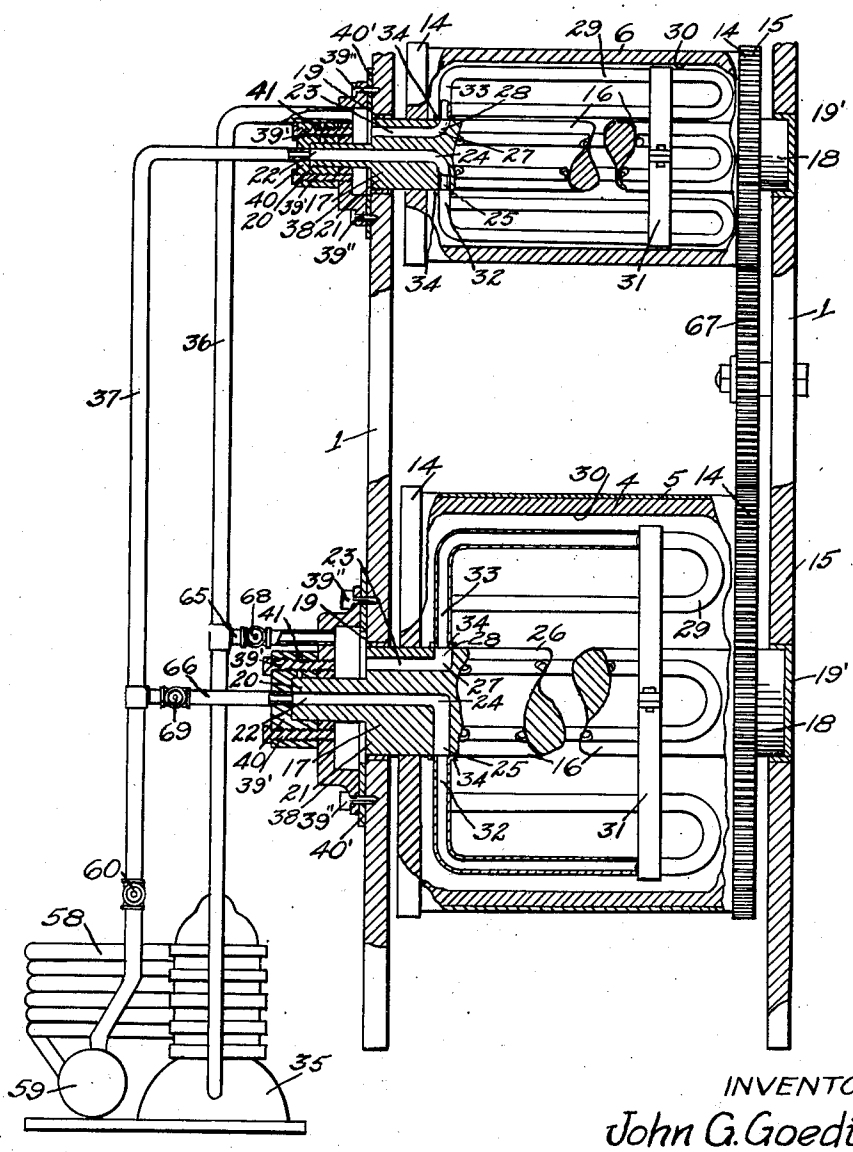
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Filed Sept. 12, 1932 5 Sheets-Sheet 5

Fig. 10



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Patented June 16, 1936 2,043,995

UNITED STATES PATENT OFFICE

2,043,995

METHOD OF AND MEANS FOR DAMPENING PRINTING SURFACES OF PLANOGRAPHIC AND ANALOGOUS PRESSES

John G. Goedike, San Antonio, Tex.

Application September 12, 1932, Serial No. 632,734

14 Claims. (Cl. 101—130)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a method of and means for dampening printing surfaces of planographic presses for use in offset planographic and analogous printing operations, and has for its primary object the provisions of a method and apparatus whereby a planographic plate carrying the design to be printed is dampened by moisture produced on the ink distributing drum and transmitted to the planographic plate with the ink by the ink distributing and form roller system, the ink distributing drum being dampened by a process of condensation of moisture which is induced on the drum by the chilling thereof. The amount of moisture to be condensed on the ink distributing drum for the purpose of transmitting it to the plate on the plate cylinder is influenced by the degree of humidity contained in the surrounding atmosphere and is controlled by the temperature to which the ink distributing drum is lowered.

Another object of my invention is to provide a method and apparatus whereby if desired the plate i. e. printing surface of a planographic or analogous press may be dampened not only by moisture transmitted from the ink distributing drum by the ink distributing and form roller system of the press, but by additional moisture produced by a process of condensation applied to the plate cylinder itself, preferably similar to the schemes disclosed in my applications, Nos. 490,311 and 530,584, filed October 21, 1930 and April 16, 1931, respectively.

Another object of my invention is to provide a cooling means which may be in the form of a cooling element or coil which forms the low pressure or cooling side of a refrigeration system, or the cooling means may be adapted to inject a refrigerating medium such as methyl-chloride into the ink distributing drum of planographic presses, the said cooling means being adapted to be positioned within the drum to chill the same in order to induce a condensation of moisture on the exterior surface thereof, the moisture thus induced on the ink distributing drum being used for dampening the plate cylinder of the press on which the planographic plate containing the design to be printed is mounted.

Heretofore the method of dampening the plate cylinders of planographic or analogous presses consisted in the use of dampening roller systems fed from a water fountain or by spraying warm, moist air or steam on the planographic plate which had been cooled, the rollers used in the dampening roller systems consisting of hollow tube stock covered with several layers of flannel with an outside covering of molleton or cotton material. In revolving against the surface of the plate these rollers have never touched the plates equally at all points with the result that dampening has been variable and unsatisfactory. When a plate which had been cooled was dampened by means of spraying warm, moist air or steam thereon, a condition arose that prevented the proper inking of the plate. This condition is caused by the rapid change in temperature by the heat of the steam or warm moist air coming into contact with the cool plate causing a separation of the ink which usually had a high setting point thereby producing a dirty impression as compared to the impressions which may be produced by my method of dampening.

I furthermore discovered that, if the plate cylinders of lithographic and analogous presses, on which the lithographic plates containing the designs to be printed are mounted, are dampened by a process of condensation of moisture which is induced by the chilling of the plate cylinders, such as is disclosed in my applications Nos. 490,311 and 530,584 filed October 21, 1930 and April 16, 1931, respectively, a great improvement over the impressions heretofore made from lithographic and analogous presses is obtained.

I have also discovered that, if an ink distributing drum of planographic and analogous presses is dampened by a process of condensation of moisture which is induced by the chilling of the drum, and that, if this moisture which is induced on the drum is transferred to the plate cylinder of the press on which the planographic plate containing the design to be printed is mounted, the printing surfaces of planographic presses may be dampened without the necessity of employing my method and apparatus as disclosed in the applications above referred to. However, if desired and in order to provide an auxiliary moisture supply in addition to the moisture supplied from the ink distributing drum, the printing surface on the planographic plate cylinder of the press may also be dampened by a condensation of moisture as disclosed in my previous applications pointed out above.

This invention therefore is primarily directed to a method and apparatus for dampening the ink distributing drum of planographic and analogous presses by a process of condensation of moisture which is induced on the ink distribut-

ing drum by the chilling thereof, the moisture thus induced on the ink distributing drum being transferred to the printing surface by the ink distributing and form roller system. If found desirable, in order to provide moisture in addition to that transferred from the ink distributing drum to the printing surface, the plate cylinder itself might be subjected to the cooling process as pointed out hereinabove so that moisture will be condensed direct on the printing surface also.

The cooling means being adapted to chill or lower the temperature of the ink distributing drum, or the ink distributing drum and the planographic plate cylinder, close to the freezing point of water (32° F.) or in other words substantially below the dew point of the normally surrounding atmosphere, say 40° F. for causing a condensation of moisture to be formed on the ink distributing drum, or said drum and plate cylinder for the dampening thereof. The moisture thus induced on the ink distributing drum being adapted to be transmitted by the inking roller system of the press with ink provided thereon to the plate cylinder in infinite number of tiny globules which in effect constitute a film of moisture covering the ink. During the entire operation the moisture thus induced on the ink distributing drum is adapted to cover the ink on the inking roller system without in any way interfering with the ink distribution from the inking roller system to the planographic plate cylinder.

By chilling the ink distributing drum of planographic presses for inducing a condensation of moisture thereon which is transmitted to the plate cylinder of the press by the inking roller system for dampening the plate cylinder, in addition to dampening the plate cylinders by a process of condensation of moisture which is induced by the chilling thereof the moisture thus provided for dampening the plate cylinder may be more varied in amount than if the ink distributing drum only is chilled. This variation in the amount of moisture supply for dampening the plate cylinder would be for obtaining the best results from the materials in use and to vary the moisture supply for working qualities when necessary for other purposes which would become apparent.

In order that my invention may be readily understood reference is had to the accompanying drawings in which corresponding parts are indicated by like reference characters and in which

Fig. 1 is a diagrammatical view partly in section of a planographic or analogous press to which my invention is to be applied;

Fig. 2 is an enlarged diagrammatical sectional view of the inking mechanism of the press;

Fig. 3 is a vertical sectional view of my improved dampening apparatus applied to the ink distributing drum or plate cylinder of a planographic or analogous press;

Fig. 4 is a sectional end view taken on line 4—4 of Fig. 3;

Fig. 5 is an end view taken from the left-hand side of Fig. 3 with a portion of my invention removed therefrom;

Fig. 6 is a side elevation of a modified form of my improved dampening apparatus applied to the ink distributing drum or plate cylinder of a planographic or analogous press;

Fig. 7 is an enlarged cross sectional view thereof taken on line 7—7 of Fig. 6;

Fig. 8 is a vertical sectional view partly in elevation of my improved dampening apparatus applied to the plate cylinder of a planographic press;

Fig. 9 is a vertical sectional view of my modified form of dampening apparatus applied thereto, and

Fig. 10 is a sectional elevation showing the general arrangement of a printing member and ink distributing drum in combination to which a refrigerating system is applied.

In the illustrated embodiment characterized my invention A indicates generally a planographic or analogous press comprising a frame 1 on which is mounted an impression cylinder 2, a blanklet cylinder 3, a plate cylinder 4 on which is mounted a planographic plate 5 containing the design to be printed and to which my improved dampening apparatus for dampening the plate cylinder as described in my applications Nos. 490,311 and 530,584 filed October 21, 1930 and April 16, 1931, respectively, may be applied if desired and an ink distributing system indicated generally by B. The ink distributing system B including an ink distributing drum 6 to which my present invention is to be applied.

The ink on the ink distributing drum 6 is conveyed to the planographic plate cylinder 4 by means of ductor roller 7, riders 8, steel vibrators 9, and form rollers 10. Ductor roller 11 carries ink from an ink fountain roller 12 of the ink fountain 13 to the ink distributing drum 6. Mounted on top of the ink distributing drum 6 are other conventional rollers indicated by C of the ink distributing system.

A preferred form of my improved dampening apparatus is illustrated in Figures 3, 4, 5 and 9 of the drawings and comprises a hollow ink distributing drum 6 of a planographic or analogous press which is closed at each end by heads 14. The heads 14 of the ink distributing drum 6 are provided with circumferentially arranged gear teeth 15 for rotating the ink distributing drum 6; these gear teeth 15 are adapted to intermesh by other gearing of the press (not shown). Said heads are rigidly mounted on shaft 16 to rotate therewith. The ends 17 and 18 of the shaft 16 provide journals which are mounted in the bearings 19 and 19' formed in the frame 1 of any suitable planographic press. The end 17 of the shaft 16 is provided with a reduced end portion 20 forming a shoulder 21 and contains independent conduits or channels 22 and 23 which form portions of an intake and exhaust passage way respectively. The intake channel 22 extends longitudinally from the outer end of the reduced end portion 20 through the central axis thereof to a point 24 on the shaft 16 within the ink distributing drum 6 where it extends radially to 25 of the outer surface 26 of the shaft 16. The exhaust channel 23 extends longitudinally from the shoulder 21 formed by the reduced end portion 20 to a point 27 within the ink distributing drum 6 where it also extends radially to 28 of the outside surface 26 of the shaft 16.

Within the ink distributing drum 6 and rotatable therewith is a distributing system comprising a tubular element 29 mounted closely adjacent the inner surface 30 of the ink distributing drum 6 and provided with a clamping attachment 31 which is circumferentially arranged around the tubular element 29 for holding it in place. The ends 32 and 33 of the tubular element 29 are connected to the inner ends 25 and 28 of the intake and exhaust channels 22 and 23

respectively to form a leak-proof joint 34 by being welded thereto. The tubular element 29 forms a low pressure or cooling side of a closed refrigerating system indicated generally by 35 for the purpose of chilling the ink distributing drum 6 to cause a condensation of moisture to form on the exterior surface of the ink distributing drum for the dampening thereof when in operation.

The high pressure side of the refrigerating system comprises a compressor 35, condenser 58, a liquid receiver 59 and an expansion valve 60 which are connected in communication with the device 29 of my invention by means of a conduit 37. The spent refrigerant after passing through the device 29 is returned to the compressor 35 of the refrigerating system by a conduit 36. This connection is specifically made as follows: Adjacent the end 17 of the shaft 16 is a housing 38 which is attached to the outside frame 1 of the press by any suitable means such as bolts 39 and is joined to the external stationary conduit 36 which passes through the frame thereof for making a conducting passage between the conduit 36 and the internal rotary conduit 23, a similar connection is made between the external stationary intake conduit 37 and the internal rotary conduit 22 by means of a fluid tight joint formed in any suitable manner as by means of another housing in the form of a cap 40 which is secured in place by any suitable means such as bolts 39'. Any suitable leak preventing means such as a resilient washer 40' may be inserted between the frame 1 and housing 38 as shown. A hole 41 may be provided for permitting the reduced end portion 20 of the shaft 16 to be lubricated.

In chilling the ink distributing drum 6 for causing the dampening thereof by inducing a condensation of moisture thereon the compressor 35 forces the refrigerant under a high pressure in a gaseous form into the condenser 58 which changes the gas into a liquid by giving up its heat to the medium about the condenser, the refrigerant flowing from the condenser 58 into the liquid receiver 59 where it is conducted therefrom by the stationary intake conduit 37 through the cap 40 and through the rotatable intake channel 22 provided in the end 17 of the shaft 16 from where it enters the end 32 of the rotatable tubular element 29.

The tubular element 29 constitutes the cooling element or evaporator and forms the low pressure side of the refrigerating system. The refrigerant in the cooling element or evaporator 29 is changed back into a gaseous form by the evaporator absorbing the heat from the ink distributing drum 6 which reduces the temperature thereof below the dew point to cause a condensation of the moisture to form on the exterior surface thereof.

The ink distributing drum 6 when rotated by the gears 15 rotates the shaft 16 and the tubular element 29 attached thereto thereby keeping the exterior surface of the ink distributing drum chilled at all points as near as practical below the dew point of the atmosphere the temperature of which, for instance, is above substantially 60° F. to cause a condensation of moisture to form on the exterior surface of the ink distributing drum 6 for providing a dampened surface thereon. The refrigerant finally works its way through the inner end 33 of the rotatable exhaust tubular element where it enters the inner end 26 of the rotatable exhaust channel 23 and leaves at the other end thereof emptying into the housing 38 to be discharged into the stationary exhaust conduit 36 which draws the refrigerant from the housing 38 creating a vacuum therein thereby causing the spent refrigerant to flow from the rotatable exhaust channel 23 into the stuffing box 38 and be conducted back into the compressor 35 of the refrigerating system by means of the stationary conduit 36.

The modified form of my improved dampening apparatus is illustrated in Figs. 6 and 7 of the drawings and comprises the ink distributing drum 6' which is closed at one end by head 14' containing a journal 42, while the other end of the ink distributing drum 6' is provided with a head 14'' containing a hollow channel 43 the purpose of which will hereinafter be described. The journals 42 and 43 are mounted in bearings 18, formed in the frame 1', that is to say, that the outer end of each journal 42 and 43 extends through and snugly fits in the adjacent part of the frame 1'. Adjacent the hollow journal 43 and inclosing the outer end thereof is a housing 38' which is attached to the outside of the frame 1' by any suitable means such as bolts 39'. Any suitable leak preventing means such as a resilient washer may be inserted between the frame 1' and the stuffing box 38' as shown.

The housing 38' is provided with a screw threaded opening 44 which is of substantially the same diameter as the opening in the hollow journal 43. This opening 44 of the stuffing box 38' engages the screw threaded end 45 of an exhaust or overflow pipe 46, the other end 47 of the exhaust or overflow pipe 46 being connected to a T 48. The T 48 is threadedly connected to the compressor 61 of a conventional cooling system by means of a pipe 49. The T 48 may be also connected to a source of warming medium by means of the valve 50. The compressor 61 of the cooling system is connected to one end of the condenser 62, the other end of condenser 62 being connected to a liquid receiver 63. The cooling medium is constrained in its motion from the receiver 63 to the ink distributing drum 6' by means of the piping 52, expansion or control valve 53, and inlet piping 54. The inlet piping 54 penetrates the T 48 and forms a leak-proof joint therewith by being welded thereto as at 55 the said piping 54 continues on through exhaust or overflow pipe 46, stuffing box 38' and journal 43 into the cylindrical ink distributing drum 6' where it branches into spray pipes 56 for directing the cooling fluid closely adjacent the inner surface of the rotatable ink distributing drum 6'. The external diameter of the inlet piping 54 is small enough to form a return passage way 57 between itself and juxtaposed constraining walls.

In chilling the ink distributing drum 6' for causing the dampening thereof by inducing a condensation of moisture thereon the compressor 61 forces the cooling medium or refrigerant under a high pressure into the condenser 62. The cooling medium or refrigerant then flows from the condenser into the liquid receiver 63 from where it is conducted by the piping 52 through the expansion or control valve 53 and inlet piping 54 into the interior of the ink distributing drum 6'. The ink distributing drum 6' when rotated by the gears 15' keeps the cooling medium stirred and distributed around its interior to chill the ink distributing drum 6' below the dew point of the normally surrounding atmosphere and causes a condensation of the moisture to be formed on the exterior surface 58 thereby providing a dampened surface.

The cooling medium finally works its way back through the passageway 57, that is the space around the inlet piping 54 of the hollow journal 43, through the stuffing box 38' into the exhaust or overflow pipe 46 and from there into the T 48. The cooling medium then flows through the piping 49 and enters the suction port 64 of the compressor 61 of the refrigerating system.

The moisture thus induced on the ink distributing drum by my improved dampening apparatus is transferred with ink contained on the ink distributing drum to the plate cylinder 4 of the press A by means of the ink distributing roller system of the press, including the form rollers 10 which are in contact with the plate cylinder 4 thereby providing a sufficient supply of moisture for dampening the plate cylinder 4 under normal conditions.

The plate cylinder 4 of the press on which is mounted the planographic plate 5 containing the design to be printed is made in the same manner as the ink distributing drums 6 or 6' except for the planographic plate 5 as illustrated in Figs. 8 and 9 of the drawing and may be dampened by the same method and apparatus as described above for dampening the ink distributing drum which is illustrated in Figs. 3 to 7 inclusive of the drawings and as disclosed in my applications Nos. 490,311 and 530,584 filed October 21, 1930 and April 16, 1931, respectively.

In Fig. 10 I have illustrated a modified form of my invention according to which a refrigerating system is associated with the ink distributing drum 6 as well as the plate cylinder 4 of a printing press. It will be seen that the general structure of the means whereby the plate cylinder 4 and the inking drum 6 are cooled for condensing moisture on their surfaces comprises similar elements, said means including cooling elements 29, which constitute the low pressure side of a closed refrigerating system, one of the cooling elements being mounted in the inking drum 6 and another mounted in the plate cylinder 4 in the same manner as heretofore disclosed. The high pressure side of the refrigerating system is connected in communication with the cooling element 29 of the ink distributing drum 6 by a conduit 37 leading from the liquid receiver 59 of the refrigerant system to the intake of said cooling element and the cooling element 29 of the plate cylinder 4 is connected in communication with the conduit 37 by a branch conduit 66 leading from said conduit 37 to the intake of the cooling 29 of the plate cylinder, thus also connecting the cooling element of the plate cylinder in communication with the high pressure side of the refrigerating system. The spent refrigerant after passing through the cooling element 29 of the ink distributing drum 6, and plate cylinder 4 is returned to the compressor 35 of the refrigerating system by means of the conduit 36 and branch conduit 65, leading from the housing 38 provided on the end of the shaft 16 of the ink distributing drum and plate cylinder.

Preferably the inking drum 6 is driven from the gear 15 on the plate cylinder 4 through the intermediary of a gear 67 meshing with a gear 14 on the ink drum 6. As heretofore indicated, it might be preferable under certain conditions to produce a film of moisture on the surface of the ink distributing drum only 6 instead of on both the ink distributing drum and plate cylinder. In order to accomplish this, I preferably provide valves 68 and 69 as illustrated for disconnecting the plate cylinder 4 from said system.

When the ink distributing drum is dampened by a process of condensation of moisture in combination with the dampened plate cylinder 4, the moisture produced on the plate cylinder 4 combined with the moisture on the ink distributing drum which is fed to the dampened plate cylinder 4 by the ink distributing roller system including the form rollers 10, permits planographic printing without the necessity of creating excessive moisture on the surface of the plate cylinder 4, and permits the temperature of the plate to be varied for varying the moisture supply when desired, depending on the working qualities of the ink together with other factors.

It will thus be seen that I have provided a highly novel, simple and efficient method and apparatus for dampening a printing surface by condensing moisture on the ink distributing drum of a planographic or analogous press. According to my invention I have also provided auxiliary means whereby it is possible, when desired, to produce additional moisture on the printing surface itself by subjecting the plate cylinder to a cooling process similar to that applied in connection with the ink distributing drum. The said method and apparatus being well adapted for all the purposes designated by my refrigerating system employing compression, vacuum, absorption, or any other type and which will permit the use of any refrigerant such as air, ammonia, methylchloride, sulfur-dioxide, and various other refrigerants.

Even though I have herein shown and described my apparatus for carrying out the process as comprising certain structural elements it is nevertheless to be understood that changes may be made therein without departing from the spirit or scope of my invention.

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

1. In a printing press, the combination of a printing member, inking mechanism including an ink distributing drum, means associated with said drum for controlling the temperature of its surface in order to condense moisture thereon and means for transferring the moisture from the distributing drum to the printing member.

2. In a printing press, the combination of a printing member, inking mechanism including an ink distributing drum, and means associated with said printing member and drum for controlling the temperature of their surfaces in order to condense moisture thereon.

3. In a printing press, the combination of a printing member, inking mechanism including an ink distributing drum, and means associated with said printing member and drum for reducing the temperature of their surfaces to a desired dew point in order to condense moisture thereon.

4. In a printing press, the combination of a printing member, inking mechanism including an ink distributing drum, a refrigerating system associated with said drum for controlling the temperature of its surface in order to condense moisture thereon and means for transferring the moisture from the ink distributing drum to said printing member.

5. In a printing press, the combination of inking mechanism including an ink distributing drum, and a refrigerating system associated with said drum for controlling the temperature of its surface in order to condense moisture thereon, said ink distributing drum forming the low pressure end of said refrigerating system.

6. In a printing press, the combination of inking mechanism including an ink distributing

drum, and a refrigerating system associated with said drum for reducing the temperature of its surface to a desired dew point in order to condense moisture thereon, said ink distributing drum forming the low pressure end of said refrigerating system.

7. In a printing press, the combination of a printing member, inking mechanism including an ink distributing drum, and a refrigerating system associated with said printing member and drum for controlling the temperature of their surfaces in order to condense moisture thereon.

8. In a printing press, the combination of a printing member, inking mechanism including an ink distributing drum, and a refrigerating system associated with said printing member and drum for controlling the temperature of their surfaces in order to condense moisture thereon, said printing member and ink distributing drum forming the low pressure end of said refrigerating system.

9. An apparatus for dampening the printing surface of planographic and analogous printing members, comprising an ink distributing drum having ink provided thereon, means for controlling the temperature of the surface of said drum to condense moisture thereon, and means for transmitting the moisture so produced, together with a film of ink from said drum to said printing surface and applying said moisture to the non-design portions thereof, said means comprising ink rollers, including ink distributing and form rollers.

10. An apparatus for dampening the printing surface of planographic and analogous printing members, comprising an ink distributing drum having ink provided thereon, means on said drum for controlling the temperature of the surface thereof to condense moisture thereon, ink distributing and form rollers for transmitting the said moisture with a film of ink from said drum to said printing member and applying said moisture to the non-design portions thereof, and means for controlling the temperature of said printing surface for condensing moisture thereon.

11. An apparatus for dampening the printing surface of planographic and analogous printing members comprising an ink distributing drum having ink provided thereon, a refrigerating system associated with said drum for controlling the temperature of the surface thereof to condense moisture thereon and ink distributing and form rollers for transmitting the moisture so produced, together with a film of ink from said drum to said printing surface.

12. An apparatus for dampening the printing surface of planographic and analogous printing members, comprising an ink distributing drum having ink provided thereon, a cooling element within said drum for controlling the temperature of the surface thereof to condense moisture thereon, said cooling element comprising the low pressure side of a closed refrigerating system, ink distributing and form rollers for transmitting the said moisture with a film of ink from said drum to said printing member and applying said moisture to the non-design portions thereof and refrigerating means for controlling the temperature of said printing surface for condensing additional moisture thereon.

13. The method of inking printing surfaces of planographic and analogous printing members, which consists in circulating a refrigerant within the interior of an ink distributing drum to thereby condense moisture on the surface of said drum, transmitting the moisture so produced together with a film of ink, from said drum to said printing surface, whereby an ink repelling coating of moisture will be applied to the non-design portions of a printing surface, and ink will be applied to the design portions of said surface.

14. The method of inking printing surfaces of planographic and analogous printing members, which consists in circulating a refrigerant within the interior of an ink distributing drum to thereby condense moisture on the surface of said drum, transmitting the moisture, together with a film of ink, from said drum to said printing surfaces, whereby an ink repelling coating of moisture will be applied to the non-design portions of the printing surfaces and ink will be applied to the design portions of said surfaces and circulating a refrigerant within the interior of a carrier for said printing surfaces to thereby condense additional moisture on said surfaces.

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