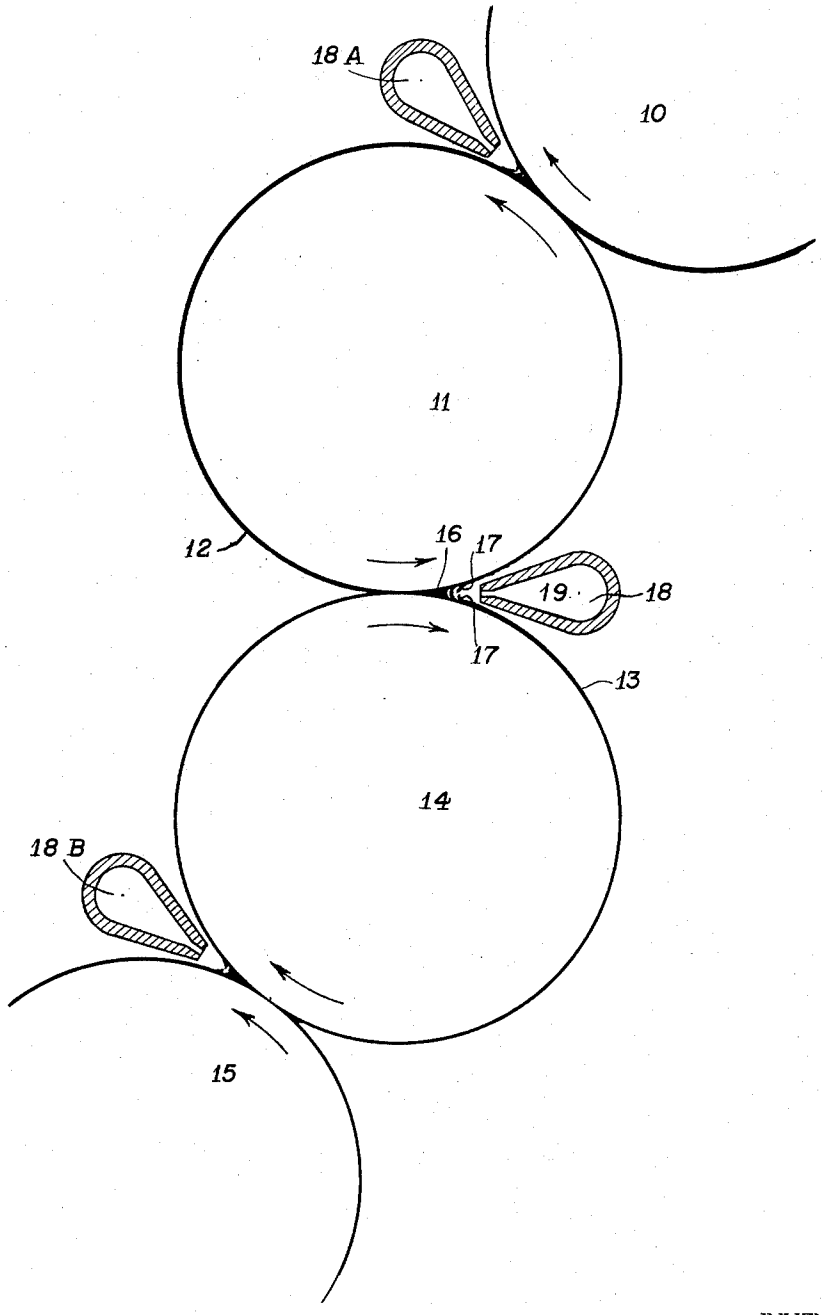
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METHOD OF CONTROLLING INK MISTING

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METHOD OF CONTROLLING INK MISTING

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2 Claims. (Cl. 101—349)

This invention relates to high speed printing using roller distribution systems, and has as its principal object the reduction of ink misting in such printing operations. It produces this effect by directing a stream of gas at high speed (from slightly over to 3 times the peripheral speed of the rollers) directly into the advancing nips of the roller couples about which misting occurs.

In typographic and lithographic printing, ink from a fountain is picked up by a roller, and is then passed from roller to roller, the ink film being thinned out and evenly distributed in the process, and finally the plate is inked by the last rollers in the system—the so-called form rollers. When presses are run at high speeds, the ink films, during transfers from roller to roller, are split with considerable force; and in this splitting operation, ink droplets are separated from the film as a fine mist. The amount of the mist formed varies with the speed of printing, the nature of the ink, the construction of the press, and with the ambient conditions. It gets worse as press speeds increase and ink viscosity decreases, so that in newspaper printing—where speeds are very high and viscosities are very low, and ink formulations favor misting—the problem is intensified. The mist is both annoying and dangerous. Much effort has been put into devices for overcoming misting (e. g.—devices for removing static charges enclosing the press and keeping it under light vacuum, and into ink formulations for minimizing misting. However, the problem still plagues the industry.

According to the present invention, I minimize misting in roller couples where it may occur, by discharging into the advancing nip between the rollers a current of gas—preferably air—at a velocity, when the gas current hits the nip, greater than the peripheral speed of the rollers, but not over 3 times as great. I believe the air acts like a knife to cut short the filaments which are drawn out between the two rollers; since the strings are shorter, there is less ink available to be spun off the press roller by centrifugal action.

The invention can be best understood by reference to the drawing, which is a schematic diagram of a roller couple equipped with a device for controlling misting.

The roller **11** picks up a film of ink **12** from a roller **10**, passing a portion of it on as a film of ink **13** to a roller **14**, which in turn passes it on to a roller **15**. At the nip **16**, the ink is drawn apart into strings **17** which split, part staying with the roller **11**, and part transferring to the roller **14**.

According to my invention, I blow a sheet of air directly into the advancing nip at a speed greater than the peripheral speed of the rollers, using a manifold **18** with a narrow slit **19**, using a sufficient air rate, vis-a-vis the size of the slit, to produce the desired velocity.

Similar jets (e. g.—18A—18B) are provided at each of the advancing nips on the press.

If the air rate is less than the peripheral speed of the rollers, no significant reduction in misting is obtained. Apparently the air current must cut into the ink curtain which cannot occur if it does not move fast enough.

For example, using a standard black news ink with a viscosity of about 4 to 5 poises (3.0 viscosity as measured on a Inkometer at 2,000 R. P. M.) on a press operating at 1,500 feet per minute, it is essential to get an air current into the nip at over 1,500 feet per minute. If the opening 19 is .005 inch in cross-section, and is set ½ inch away from the bite of the nip-air at 4 cubic feet/minute/foot of width will do an effective job—it passes through the orifice at 9,600 per minute, and hits the bite of the nip at between 1,500 and 4,500 feet per minute.

I have tested this device with inks ranging from thin black mineral oil news inks (viscosity about 4 to 5 poises), to heavy linseed oil inks with viscosities in excess of 100 poises, on high speed ink distribution system running at 1,000 to 1,500 feet per minute, using white paper to catch the mist, and measuring reflectance of the paper after a fixed time to measure misting. The ratios of increase in reflectance is about the same for heavy inks, such as litho ink, and for light inks such as black news ink. For example, one news black which misted very badly sprayed a piece of white paper held near the press so that in two minutes the paper had only 15% reflectance; on introducing my high speed air stream, under identical conditions, misting was so reduced that the paper showed 59% reflectance in the same period. With heavier inks, less misting occurs initially; but the improvement is the same—thus, a litho ink showed the reflectance increase from 26% to 73%.

Where one of the rollers of the couple oscillates across the press, and the other does not, I have observed that there is much less misting from the oscillating roller (43% reflectance) than from the other roller (13% reflectance). However, the air current reduces misting further on both rollers.

Care must be taken that the air current should not be so rapid that external eddy currents will be produced to cause so much turbulence in the nip as to entrance misting, rather than reduce it. Optimum results are obtained at about 1½ to 3 times the roller speed—above about 3 times the roller speed, the air current no longer retards misting, but stirs up the nip so that the retarding effect is lost and throwing may occur.

Care should be taken to direct the air stream directly at the nip, and not out along the rollers outside of the nip, where an air stream will have a harmful rather than a beneficial effect.

Obviously, the device may be used with other gases than air. It may be used, for example, in the practice of the invention of my co-pending application with Albert E. Gessler and William Van Kirk, Serial Number 549,349, filed November 28, 1955, to provide misting control in addition to the control of body therein provided. Other changes may be made without departing from the spirit of my invention, as set forth in the claims.

I claim:

1. The method of controlling ink misting occurring on a high speed roller couple in which ink is being transferred from one roller of the couple to the other, which comprises forcing into the advancing nip of the roller a stream of gas at a velocity, at the bite of the nip where the ink film separates, between somewhat greater than the peripheral speed of the rollers, and 3 times that speed.

2. The method of controlling ink misting occurring on a high speed roller couple in which a material is being transferred from one roller to a second roller, which comprises forcing into the advancing nip of the roller a stream of air at a velocity at the bite of the nip where the material separates between just over one, and three times the peripheral speed of the rollers.

No references cited.