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APPARATUS FOR PREVENTING OFF-SETTING IN PRINTING MACHINES

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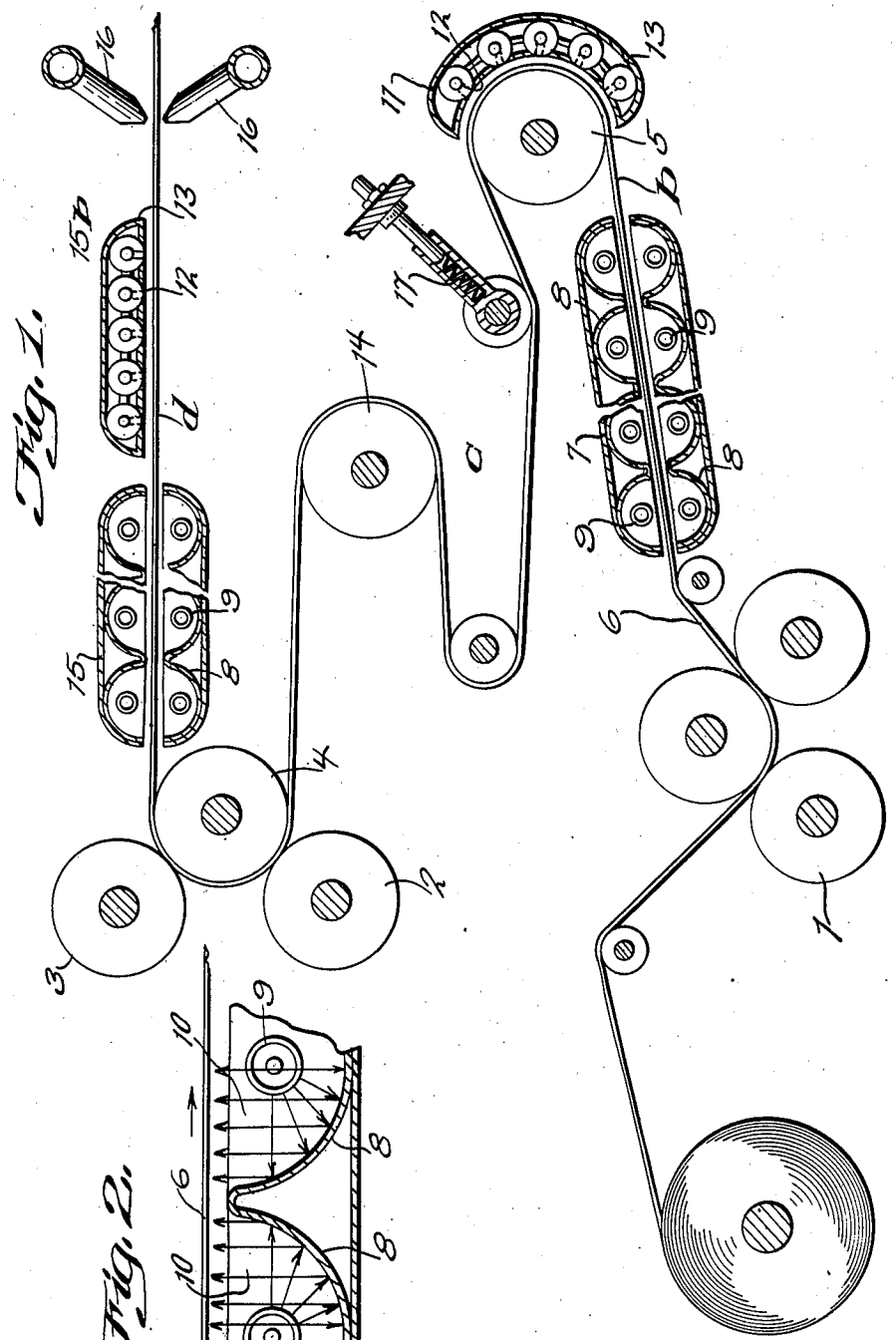


Fig. 1.

Fig. 2.

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APPARATUS FOR PREVENTING OFFSETTING IN PRINTING MACHINES

Application filed May 30, 1930. Serial No. 457,609.

This invention relates to an apparatus for preventing offset in printing machines and has for its primary object the design and corelation of various devices or mechanisms to improve the operation of printing in such a way that offsetting is avoided or minimized without requiring the use of an offset web or any special covering on the impression surface and without requiring the use of slip sheets while at the same time assuring delivery of the finished sheets in their most perfect condition.

Another object of the invention relates to an arrangement of devices for preventing offset of the freshly printed sides of a paper web traveling between plate and packing cylinders, accomplishing this desired objective by superficially oxidizing the ink on the freshly printed side of the web by direct application of heat as the web leaves the complementary plate and packing cylinders and then subjecting the superficially oxidized ink to the action of ozone for completing the treatment of the ink, a cooling device being arranged between the first set of printing rolls and the second set of printing rolls to cool the paper prior to the printing operation of the second set of printing rolls.

Another object of the invention relates to an apparatus arranged to treat printing ink by a mechanical and chemical action for setting and conditioning ink to enable the same to stand the stresses to which it is subjected during the various machine operations thereby eliminating offsetting.

A further object of the invention relates to the direct application of radiant heat to the freshly printed web of paper previous to its passage to a position to be subjected to the direct application of ozone, the former application partially oxidizing the ink and further making the same more receptive to the ozone which accomplishes the final drying of the ink.

A feature of my invention resides in the use of radiant heaters in a predetermined relation to the printed web of paper and in predetermined relation to the ozonator and also in a predetermined relation with the printed web of paper so that the ozonator and radiant heaters may cofunction to properly treat the ink in a relatively brief period.

Another feature of my invention resides in the interpositioning of a cooling device between the first and second sets of printing rolls so that the printed web of paper treated as set forth above will be cooled before passage through the second set of printing rolls.

Besides the above the invention is distinguished in the use of radiant heaters with ozone, the former capable of giving the paper a flash heat to the required degree enabling the ozonator to properly perform its action upon the ink.

With these and other objects in view the invention will be better understood from the following detailed description taken in connection with the accompanying drawing wherein:

Figure 1 is a diagrammatic view of my invention.

Figure 2 is a sectional view through one of the radiant heaters.

I am aware of the fact that a freshly printed web of paper has heretofore been subject to application of heat and cold and therefore I wish to state that basically my invention resides in the use of a plurality of devices in a novel arrangement whereby the freshly printed web of paper will be first subjected to heat, then ozone, and finally cold for the proper conditioning thereof to prevent offset.

My invention also relates basically to the design and arrangement of companion devices whereby radiated heat may be directly projected on to the rapidly traveling paper web to bring the same instantly to the required temperature which action partially oxidizes the ink and conditions the same to be more receptive to the action of an ozone treatment that takes place in a predetermined time relation with the application of the radiant heat. Solely for the purpose of illustration I have shown diagrammatically a novel arrangement of devices whereby the above objectives can be acomplished. Referring to the drawing numeral 1 designates the lower set of printing rolls and the numeral 2 the upper set of printing rolls of a printing machine each set consisting of the plate cyl-

inder 3 and packing cylinder 4. As is well known in the art an offset sheet roll 5 is arranged in cooperative relation with the sets of printing rolls and this offset roll is utilized to advantage in my invention although I wish to stress the fact that the usual offset sheet passing around this roll 5 is eliminated.

Positioned in a predetermined relation with the reach B of the freshly printed web of paper 6 is a group of radiant heaters which may be of any required number depending upon the effect to be accomplished. As is well known each radiant heater consists of a parabolical reflector 8 and an electric heat coil 9 arranged at the proper focus point so that the reflected rays of heat indicated at 10 will parallel each other and move at right angles to the web of paper 6 thereby instantly driving the heat into the freshly printed ink and onto the surface of the paper to raise the same to the required temperature. I have found from actual practice that this flash heat treatment is such that I am able to obtain the necessary high temperature within the ink and on the surface of the paper without destroying the inherent properties of the paper. It is also well known in the art that radiant heat assures proper concentration of the heat rays upon the object treated and by constructing the heater, as an electrical type the temperature may be actually controlled which in itself is a very important feature insofar as the treating of ink on rapidly traveling paper is concerned. I also wish to call attention to the fact that with the use of radiant heaters the paper web may be instantly heated without scorching as the paper does not come in contact with a heated object.

Arrangement in a predetermined relation to the radiant heaters and encircling the offset roll 5 to minimize space and to increase the effectiveness of the device I arranged an ozonator 11 which may be of any suitable construction but is illustrated as a plurality of nozzles 12 arranged to directly project ozone onto the web of paper as the same passes from its treatment by the radiant heaters. To keep the nozzles 12 cool the same may be arranged within a water cooled jacket 13.

I have found from actual experience that it is important to remove a certain amount of heat from the web of paper before passing through the second set of printing rolls and to accomplish this desired result I arranged a cold roll 14 between the two sets of printing rolls so that when the reach C passes from the roll 5 it will pass around the cold roll 14 and be cooled. It is understood that the roll 14 may contain a cooling medium such as water.

The reach D of the paper web after being printed, through its passage between the printing rolls 2 is subject to the treatment of a group of radiant heaters 15 and if found advantageous in practice another ozonator may be associated therewith to increase the rapidity of drying of the ink. It may also be advantageous in practice to provide water sprays 16 for treatment of the web after the final printing operation as set forth in my co-pending application filed January 12, 1929, Serial No. 332,082, the present invention being a development of devices for carrying out the method set forth in this co-pending application.

In the operation of my invention the freshly printed web of paper as leaving the printing rolls is subject to a flash heat treatment by the radiant heaters 7 which brings the web of paper and the ink thereupon to the required temperature and condition to enable the ozone that is projected on to the web of paper by the ozonator 11 to finally and instantly dry the ink accomplishing this desired objective instantaneously in view of the rapidity in which modern types of printing presses operate. As the web of paper leaves the ozonator it is subjected to the action of the roll 14 which cools the web of paper as it passes into operative relation with the printing rolls 2. As the web leaves the printing rolls 2 it is again subjected to a heat treatment by the radiant heater 15 and as heretofore stated ozone may be also utilized to expedite the action.

It may be found advantageous in practice to interposition a spring operated takeup roll 17 to act directly upon the web of paper to compensate for variations in length during the various treatments of the paper web.

It is of course to be understood that various other designs of devices may be utilized and these devices may be arranged in other relations than illustrated and therefore I do not desire to be limited in protection in any manner whatsoever except as set forth in the following claims.

What I claim is:

1. An apparatus for preventing offset of printing presses comprising means for subjecting freshly printed web of paper during its travel from one set of printing rolls to the other set of printing rolls to quick successive treatments of heat and cold and means for subjecting the printed web of paper to ozone at a point between the heat and cold treatment.

2. An apparatus for preventing offset of printing machines consisting of a group of radiant heaters, having a predetermined relation with a freshly printed web of paper to heat the same, an ozonator arranged in a predetermined relation with the freshly printed web of paper and the heaters to subject the web to ozone directly after passage from said heaters, and means for directly cooling the paper web as it leaves the ozonator.

3. An apparatus for preventing offset in printing machines comprising radiant heat-

ers for projecting heat on to the web of paper as it leaves the first set of printing rolls, an ozonator for projecting ozone on to the web of paper as it leaves said heaters, and means for directly cooling the web of paper as it leaves the ozonator on its passage to the second set of printing rolls of a printing machine and a second group of radiant heaters for projecting heat on to the web as it leaves the second set of printing rolls.

4. An apparatus for preventing offset in printing machines comprising a heat creating means, an ozone generating means and a cold creating means arranged in a predetermined relation for subjecting freshly printed webs of paper to heat, ozone and cold treatments in quick succession.

In witness whereof I have hereunto set my hand.

THOMAS F. PINDER.