Jan. 19, 1932. T. F. PINDER 1,842,195

METHOD AND APPARATUS FOR PREVENTING OFFSETTING IN PRINTING

Filed May 30, 1930

Fig. 1.

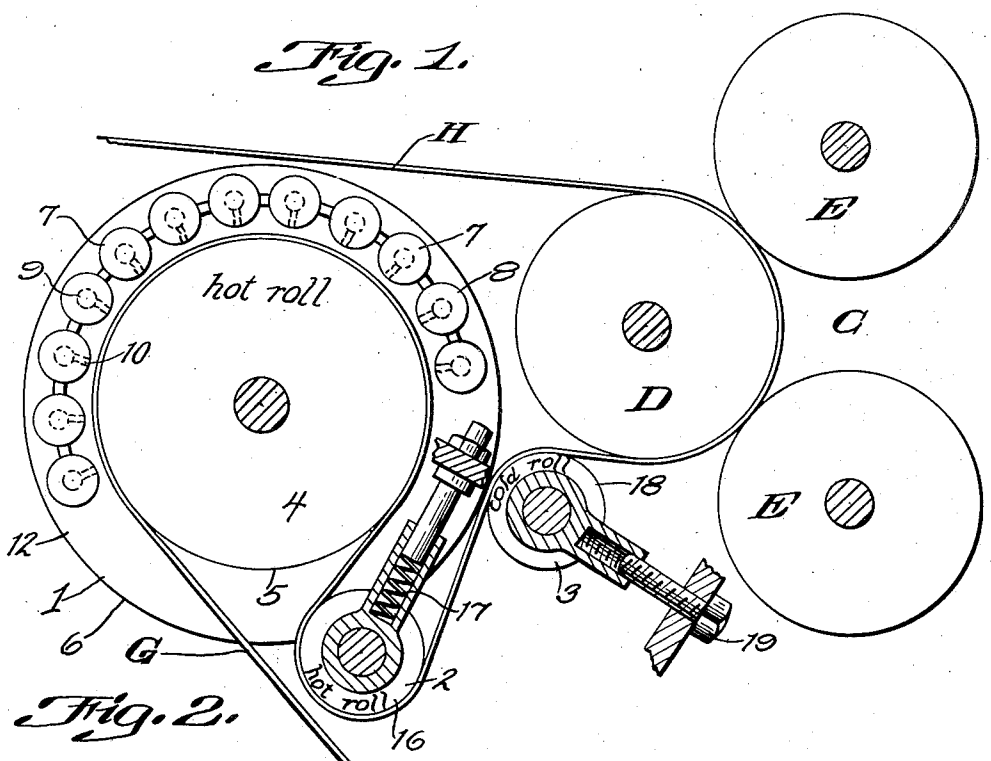


Fig. 2.

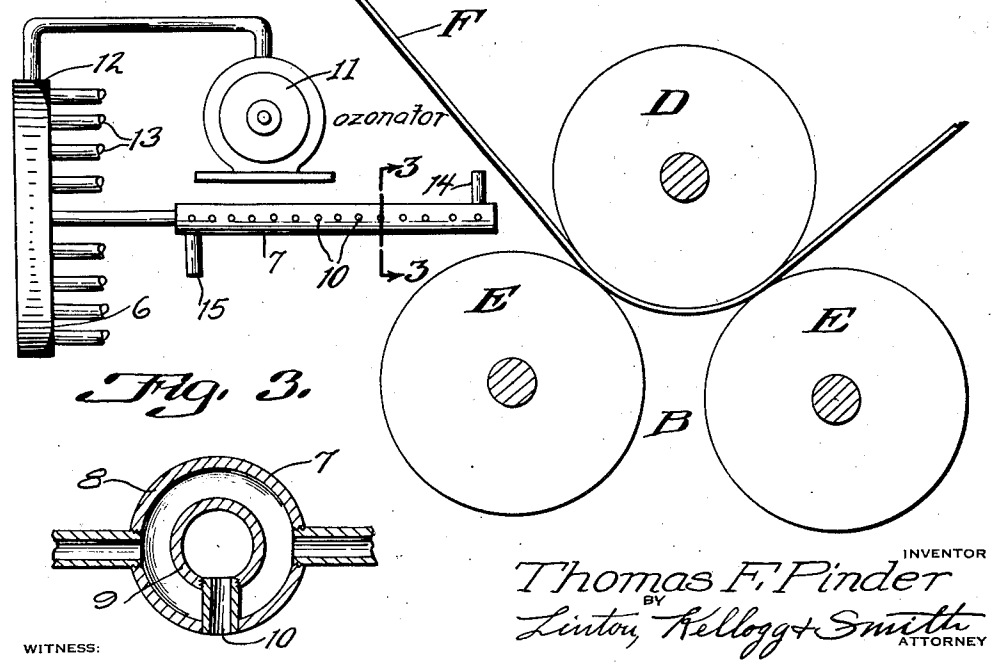


Fig. 3.

WITNESS:

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Patented Jan. 19, 1932

1,842,195

UNITED STATES PATENT OFFICE

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METHOD AND APPARATUS FOR PREVENTING OFFSETTING IN PRINTING

Application filed May 30, 1930. Serial No. 457,608.

The principal object of the present invention is 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 packing cylinder.

Another object of the invention resides in the development of an apparatus that may be interposed between the companion printing mechanisms of a printing press for subjecting a printed web of paper in its passage from one printing mechanism to the other, to an application of heat and chilled ozone, a device being arranged to subject the printing web of paper to a second application of heat if so desired.

Another object of the invention resides in the subjecting of a freshly printed web of paper to a simultaneous application of heat and ozone the latter chilled to a predetermined degree to assure the effective application of the ozone to the web of paper when the latter is in a heated condition.

A still further object of the invention resides in the conditioning of stock ink to enable the same to be more receptive to the treatment of heat and ozone after a printing operation for accomplishing instantaneous solidification of the ink.

A feature of the invention resides in the inclusion of a cooling system in the apparatus whereby the temperature of the ozone will be kept down to insure the proper density thereof when subjected to heat.

Still another feature of the invention resides in a design of apparatus that will prevent heating of the ozone in the application thereof to the paper to a degree that will destroy the effectiveness of the ozone.

Generally stated, the invention comprises a method and apparatus for preventing offsetting by subjecting a traveling web of paper having freshly printed preconditioned ink thereon, first to a simultaneous application of heat and chilled ozone, second, to a second application of heat and finally to a cold treatment thereby accomplishing an instantaneous solidification of the printing ink and the proper conditioning of the printed web of paper as it passes into engagement with the final set of printing mechanism for a final printing operation.

With the above objectives in view and others that are obvious from a detailed consideration of the invention the method and apparatus will be better understood from a detailed consideration of the specification and accompanying drawings wherein—

Figure 1 is a diagrammatic view of one embodiment of the invention.

Figure 2 is a side elevation of one of the projectors of the ozonator.

Figure 3 is a cross sectional view on the line 3—3 Figure 2.

Referring to the drawings in detail the letter B designates the lower printing mechanism and the letter C the upper printing mechanism of a printing press, each of which consists of a packing cylinder D and companion printing rolls E.

The web of paper F passes directly from the lower printing mechanism to the upper printing mechanism and associated with the reach G of the paper web extending from the lower printing mechanism to the upper printing mechanism, I associate my invention. At this time I wish to call attention to the fact that the reach H leaving the upper printing mechanism will have associated therewith a duplication of my apparatus to be described, for subjecting the reach H to a treating action as leaving the upper printing mechanism. As the companion apparatuses are similar I will limit my description to one for the sake of clearness.

My invention consists basically of a treating apparatus 1, a heating device 2, and a cooling device 3 arranged in a predetermined corelation to first subject the reach G to a simultaneous application of heat and chilled ozone, secondly, to a second heat application, and finally to a cooling operation.

The treating apparatus 1 consists of a hollow drum 4 having its interior heated in any well known manner and the periphery 5 this drum has passed there around the reach G, so as to make perfect contact therewith and be subject to the heat of the drum.

Directly associated with the drum is a special design of ozonator 6, consisting of a plu-

rality of ozone projectors 7 arranged concentrically of the drum 4 so as to directly project ozone onto the web of paper as the same passes around the drum and is directly heated thereby. Each projector consists of a jacket 8 enclosing a nozzle 9 provided with a plurality of outlets 10 extending through the jacket 8 so as to directly project ozone onto the heated web of paper.

An ozone generator 11 is connected to a distributing head 12 that communicates with a plurality of nozzles by means of the distributing pipes 13.

I have found from extensive experiments conducted that heat destroys the effectiveness of ozone in the treating of ink and to overcome this objection I have included a cooling system for cooling the ozone previous to its projection onto the heated paper and as the paper is heated to a predetermined high degree to assure proper density thereof and effective action on the ink that has been properly conditioned by the application of heat.

To accomplish this desired result the jacket 8 is arranged in communication with an intake pipe 14 and an outlet pipe 15 by means of which a cooling fluid may be circulated around the nozzle 9.

Directly associated with the drum 4 is the heating device 2 directly subjecting the web of paper to a second heat treatment as it leaves the drum 4 and this heating device may be in the form of a drum 16 heated in any suitable manner.

I have found it of advantage to provide the bearings of this drum 16 with takeup springs 17 so that the drum may take up any variations in the web of paper.

The cooling device 3 is also illustrated as a drum 18 the interior of which may be cooled in any well known manner and thus drum is provided with adjustable bearings adjusted by the screw 18 for insuring proper registering during the printing operations.

I have also found from extensive experiments conducted that it is absolutely necessary to accomplish practically an instantaneous solidification of the ink due to the rapidity of operation of the modern type of printing machines. To accomplish this desired result it is of material advantage that the body of the ink be immediately subjected throughout to the application of heat and ozone in a minimum amount of time. I have found that this can be expedited by conditioning the stock ink to a predetermined degree that is to say treating stock ink to make the same more receptive to the treatment of my heat and ozone apparatus. One manner of accomplishing this is to partially polymerize the stock ink, such as processing the same until the ink sets on glass in one minute when subjected to a temperature of approximately 212 degrees in ordinary atmosphere. Conditioning the ink as set forth and heating the drum 4 to a degree of 175 to 275 Fahrenheit and heating the drum 16 to a degree of 300 to 400 Fahrenheit enables practically instantaneous solidification of the freshly printed ink when passing from the printing operations.

Altho the ink may be first heated, then subjected to chilled ozone, I have found it of advantage to accomplish these actions simultaneously as it is very important that the temperature of the paper and ink thereof be raised to a relatively high degree and while at this temperature be instantly subject to the ozone treatment. As heat destroys the effectiveness of ozone it is readily understood that it is very important to keep the temperature of ozone down even though it is directly subjected to heat confined within the paper web and that generated by the drum 4. This I effectively accomplish by incorporating in my invention a cooling system for the ozone.

In concluding I wish to stress the importance of time in the use of an offsetting apparatus with the rapid types of printing presses now in use and although heat and ozone have heretofore been utilized for treating inks the time element is so important that this ordinary treatment is not practical. Preconditioning of stock ink, the chilling of ozone as applied, and the design and corelation of the component parts of the invention are important features contributing to the commercial success of my apparatus for preventing offsetting.

Of course it to be understood that other designs of apparatuses and devices may be utilized for carrying out my method and the various apparatuses and devices may be arranged in other relations with each other and with parts of printing presses 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. A method of preventing offsetting in printing presses which consists of subjecting ink which has been partially polymerized to the application of heat and chilled ozone.

2. A method of preventing offsetting in printing presses which consists in subjecting ink which has been processed to set in one minute on a glass plate at 212 degrees in ordinary temperature subject to the application of heat and chilled ozone and finally subjecting the printed web of paper to a second application of heat and a cooling treatment.

3. A method of preventing offsetting in printing presses which consists in treating stock printing ink to condition the same for instantaneous solidification when subject to heat and ozone.

4. A method of preventing offsetting in printing presses which consists in the processing of stock ink to condition the same to set in a predetermined time interval and

treating such conditioned ink with an application of heat and ozone.

5. A method of preventing offsetting in printing presses which consists in the processing of stock ink to condition the same to set one minute on glass when subject to approximately 212 degrees Fahrenheit and treating such conditioned ink with an application of heat and ozone and then a final treatment of heat.

6. A method of preventing offsetting in printing presses which consists in treating stock ink before a printing operation to polymerization and subject such conditioned ink after a printing operation to a simultaneous application of heat and chilled ozone.

7. A method of preventing offsetting in printing presses which consists in treating stock ink before a printing operation to a polymerization and then subject such conditioned ink after a printing operation to a simultaneous application of heat and chilled ozone and immediately thereafter to a second application of heat.

8. In combination with the companion printing mechanisms of a printing machine an apparatus interposed therebetween whereby a printing web of paper in passing from one printing mechanism to other printing mechanism will be subject to an application of heat and chilled ozone.

9. In combination with the companion printing mechanisms of a printing machine an apparatus interposed therebetween whereby a printed web of paper in passing from one mechanism to other mechanism will be subject to an application of heat and chilled ozone and a second application of heat.

10. In combination with the companion printing mechanism of a printing machine an apparatus interposed therebetween whereby a printed web of paper in passing from one mechanism to other mechanism will be subject to an application of heat and chilled ozone and a second application of heat, and means for cooling the web of paper as it passes into engagement with the printing mechanism for the final printing operation.

11. In combination with the upper and lower packing cylinders of a printing press, offset preventing mechanism co-operatively associated with the web of paper passing from one packing cylinder to the other for subjecting freshly printed ink first to a simultaneous treatment of heat and chilled ozone, secondly, to a second treatment of heat and, thirdly, to a cooling treatment.

12. In combination with the upper packing cylinder and lower packing cylinder of a printing press, mechanism associated therewith for preventing offsetting consisting of an apparatus for simultaneously subjecting a printing web of paper in its passage from one cylinder to the other to the treatment of heat and chilled ozone, a device for subjecting the web of paper to a second heating treatment as leaving said apparatus, and means for cooling the web of paper as it passes into engagement with the upper packing cylinder.

13. An apparatus for preventing offsetting in printing presses comprising a heated drum, an ozonator for projecting ozone towards the periphery of said drum, and means for cooling the ozone as created by the ozonator.

14. An apparatus for preventing offsetting in printing presses comprising a heated drum, an ozonator for projecting ozone towards the periphery of said drum, and means for cooling the ozone as created by the ozonator and a heating device directly related with said drum to heat a web of paper as passing from said drum.

In witness whereof I have hereunto set my hand.

THOMAS F. PINDER.