Feb. 12, 1946. T. J. BEREGH 2,394,656

APPARATUS FOR OPPOSING OFFSET AND ELIMINATING STATIC IN PRINTING

Filed Oct. 2, 1940

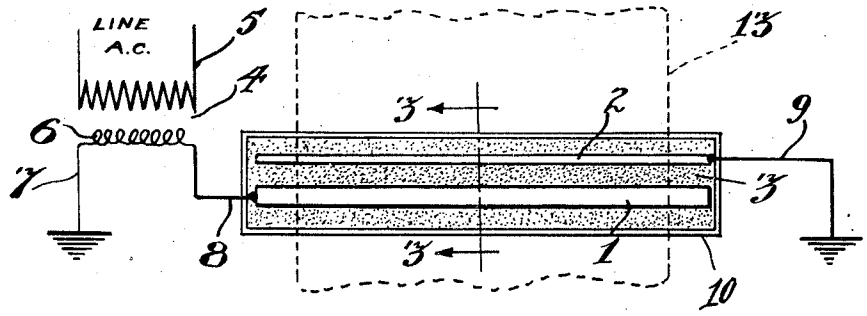


Fig. 1.

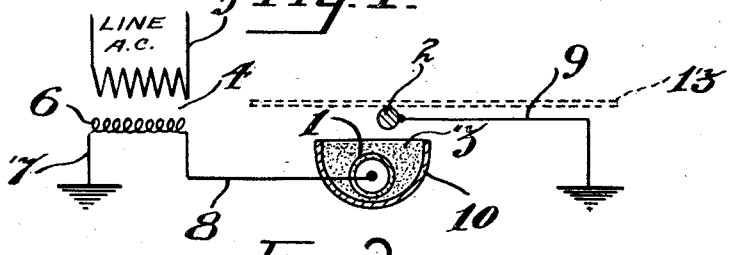
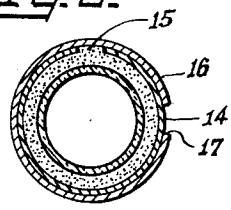


Fig. 2.

Fig. 6.



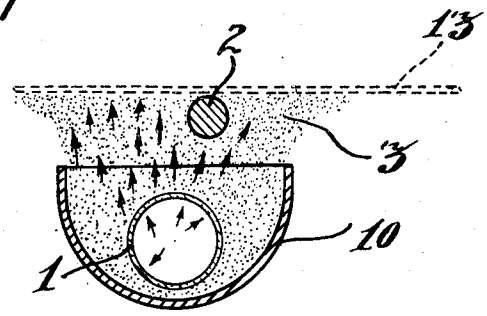


Fig. 3.

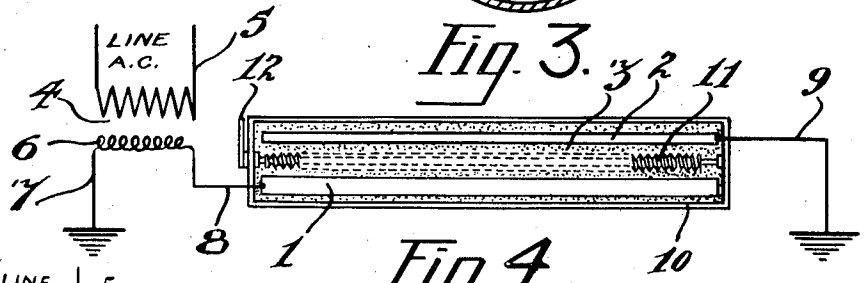


Fig. 4.

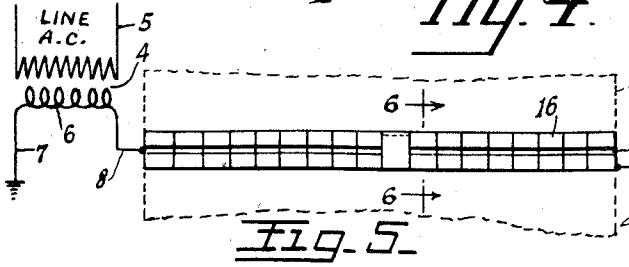


Fig. 5.

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2,394,656

APPARATUS FOR OPPOSING OFFSET AND ELIMINATING STATIC IN PRINTING

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Application October 2, 1940, Serial No. 359,302

1 Claim. (Cl. 101—416)

This invention relates to the method and apparatus for opposing offset in printing. Likewise and at the same time, the method and device is used for the elimination of static electricity from the sheets or web as they are passed through the printing press.

As is well known in the printing trade, it is necessary to provide some means of preventing the offset impression of the wet ink from a previous sheet or web to the back of the on-coming sheet or web, when they are stacked at the end of the printing operation. This has been attempted by several methods, the most important of which is the spraying method, wherein a liquid containing certain powder is deposited by an air spraying device upon the wet sheets or web as they are delivered by the press. Another method has used certain gases which are passed over the wet ink for the purposes of drying the ink more rapidly than it would be dried in the air alone.

As a separate device, there have been a number of brush type static collectors which are either charged or merely grounded electrically, which take away or discharge the static electricity carried by the sheet or web from the printing press.

The present invention accomplishes both of these results in a very simple manner, and eliminates the use of liquids which are uncertain and often do as much damage as the wet ink itself.

The plan includes the depositing of particles of powder on parts of the printed sheet or web which may offset, or on the whole sheet, by means of high tension electric current which jumps from the high tension side, which is preferably a gas tube, such as a mercury vapor tube, extending transversely across the full width of the paper, and a grounded conductor placed parallel to the high tension tube and nearer to the sheet or web of paper than the tube itself. The powder is supplied by mechanical means or otherwise to the space between the high tension tube and the grounded conductor. When the high tension current is turned on, electrons are emitted which charge the individual particles of powder and cause them to jump to the grounded conductor or rod, over which the paper passes. Some of the powder particles will of course be deposited upon the rod, but a sufficient amount passes by the rod and is deposited on the paper. The purpose of the particles of powder is not only to dry the ink, but is more for the formation of an actual mechanical separation between the two sheets or webs. The coating of powder particles is so thin, that it can hardly be observed on the printed sheet or web, but is in just sufficient quantity to separate the freshly printed side of the sheet or web from the on-coming sheet or web on the printing press.

It is preferred that the paper run directly over or under the grounded conductor, in close proximity thereto, or the grounded conductor may pass over or under the paper.

In order that the invention may be more fully understood, reference is made to the accompanying drawing, in which:

Figure 1 is a diagrammatic plan view showing the relative arrangement of the parts as well as the electrical connections thereto.

Figure 2 is a diagrammatic view showing the parts in elevation and their preferred positions in operation.

Figure 3 is an enlarged view taken on the line 3—3 in Figure 1, showing the operation of the electric current in depositing the powder particles on the paper.

Figure 4 is a plan view showing a mechanical arrangement for distributing the powder particles along the discharge tube and ground connection.

Figure 5 is a plan view similar to Figure 1, but shows a modified form of powder distributor.

Figure 6 is a section taken on the line 6—6 in Figure 5.

Similar reference numerals refer to similar parts throughout the drawing.

In the drawing, 1 is a high tension element which is preferably a gas tube, such as a mercury vapor tube, or any other type of high tension element. 2 is a metallic tube. 3 is a suitable powder; 4 is a transformer having a primary circuit 5 connected to an alternating current source; 6 is the high tension transformer secondary. 7 is a ground connection from the high tension transformer to perhaps the bed of a printing press. 8 is a conductor connecting the other end of the high tension side of the transformer to the high tension tube 1. 9 is a ground connection connecting the discharge tube 2 to the ground, which may be the frame of a printing press. Illustratively, the invention is put into practice by using a fluorescent coated tube filled with argon and mercury vapor and operating at approximately 10,000 volts and 20 to 30 milliamperes, such tubes commonly being used for ozonizing.

Referring to Figures 2, 3, and 4, 10 is the container or tube for holding the powder near the high tension tube. 11 is a mechanical screw mounted within the container 10, and adapted to be rotated by a suitable mechanical connection 12 which contacts a moving element (not shown)

on the printing press itself. 13 is a sheet or web of paper which is feeding through the press.

Referring to Figure 1, it will be noted that the source of alternating current entering through the primary 5, which is a part of the transformer 4, induces a high tension electric current in the secondary 6. This current flows through the conductor 8 and energizes the tube 1. The energizing of tube 1 sets up a flow of electrons which are emitted to charge the powder which causes it to be carried toward the ground rod 2. The sheet or web of paper 13 is being moved across the ground rod 2 and preferably in close proximity thereto, and in doing so, a considerable amount of powder particles pass by the rod and surfaces the paper.

The same arrangement is shown in Figure 2, but in a sectional end elevation, and in this view a container 10 is provided for holding the powder.

Figure 3 shows an enlarged section of the container, tube, rod and paper shown in Figure 2, but has been provided with arrows to show the direction of flow of powder particles when energized.

Referring to Figure 4, the same device is set forth as in Figures 1, 2 and 3, except that an additional mechanical means is provided in the form of a feed screw and this agitates the powder so as to permit it to more readily pick up the electrons and then discharge uniformly throughout the length of the trough, consequently throughout the full width of the paper.

It is not always necessary to powder the entire surface of the sheet, as the offset condition usually is at some one particular point on the printed sheet; for instance, where several different colors of ink have been applied to the surface, the one over the other. This makes a particularly wet spot, which is not absorbed by the paper and does not readily dry and is therefore carried onto the on-coming sheet and makes an impression thereon. If the powder mechanism is so designed as to powder this one spot, the entire sheet need not be covered.

In Figure 6 a modified form of tube is shown, wherein the trough 10, shown in Figures 1, 2, 3 and 4, is replaced by a tube 14 which is slotted at 15 throughout its entire length. Around this tube and covering the slot 15 are placed a plurality of bands 16, which in turn are slotted at 17 in the same direction as the tube. These bands may be turned to form an open port when the slot in the band is adjacent the slot in the tube. Obviously, in this manner the powder will be distributed from the tube through the limited and selected port, where it can be applied to the wet spot on the sheet or web which is causing the offset printing. It has been found by actual test, that when the tube is made in the manner described and shown in Figures 5 and 6, that no discharge bar, such as 2 shown in Figures 1, 2, 3, and 4, is required, the upper edge of the tube itself acts as a sufficient discharge point to cause the electrons to carry the powder from the tube through the distributing port. The same electrical connections are used as previously described. A principal value of this modified arrangement is that the powder may be deposited on a limited surface on the paper, whereby a saving of powder is effected, and the spreading of powder over the press and through the air in the printing room is avoided.

As is well known in the art of electronics, it would be possible to control the amount of powder particles flowing by the use of a grid positioned between the high tension tube 1 and the ground rod 2. Applicant merely mentions this but does not show it in the drawing, as he considers this to be an old expedient in the art of electrical control, and has not found it necessary in the complete operation of his device.

In the construction shown in Figures 5 and 6, it is of course to be understood that the tube 14 as well as the band 16 are made of metal or other electrical conductor, and that these tubes and bands, being placed in close proximity to the sheet or web of paper, act as a static eliminator in that the static in the sheet or web of paper is grounded or neutralized through the electric charge on the tube 14 and the bands 16. Also, the coating of charged powder particles helps to disperse the static electricity in the printed sheet or web of paper.

Having described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

Apparatus for opposing offset in printing, comprising means holding a supply of a powder to be electro-deposited upon the printed sheet or web, a high tension element for energizing the powder, said holding means including means to hold the powder in close proximity to the high tension element, and separably controllable ports for distribution of the powder in the said means.

THEODORE JOHN BEREGH.