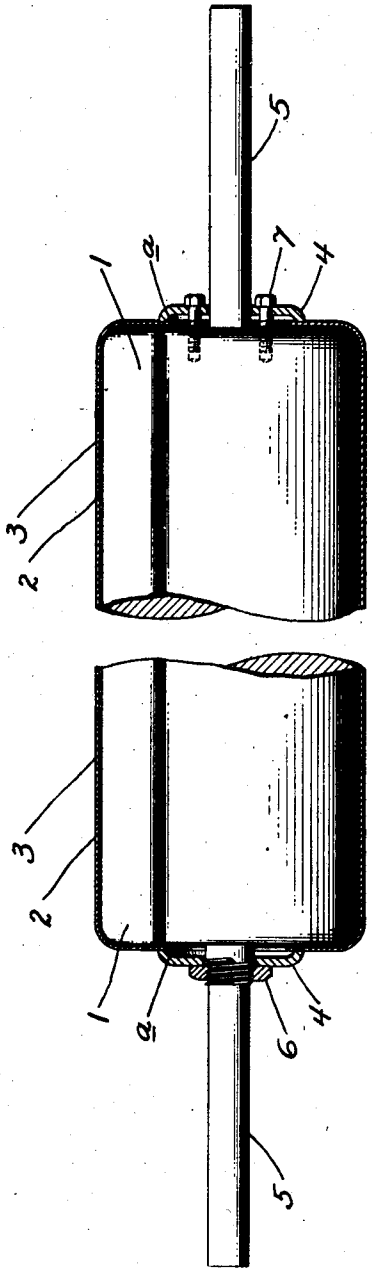
Nov. 10, 1931. E. S. BALLARD 1,831,645

PRINTING FORM AND METHOD OF MAKING SAME

Filed Sept. 28, 1927



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Patented Nov. 10, 1931 1,831,645

UNITED STATES PATENT OFFICE

ERNEST S. BALLARD, OF BERKELEY, CALIFORNIA, ASSIGNOR TO BALLARD PROCESS CO., OF SAN FRANCISCO, CALIFORNIA, A COPARTNERSHIP CONSISTING OF RUSSELL B. LEECH, OF SAN FRANCISCO, CALIFORNIA, AND COLVIN M. REED, OF BURLINGAME, CALIFORNIA

PRINTING FORM AND METHOD OF MAKING SAME

Application filed September 28, 1927. Serial No. 222,505.

This invention relates to printing forms for rotary photogravure and like processes, and to a novel method of producing such forms or surfaces.

In a reissued Patent No. 17,179, granted January 1st, 1929, I disclose a novel printing form for rotary photogravure uses, in which a thin shell or coating of metal, such as copper, suitable for receiving the images to be printed, is applied by electro-deposition to the surface of a cylinder, in such a manner that the copper shell can be readily stripped from the cylinder after it has served its purpose. In this prior application the copper shell was allowed to unite with the cylinder at the ends thereof, for the purpose of forming a seal, and to insure retention of the shell thereon. For this reason, in stripping the shell away from the cylinder it was necessary to place the cylinder in a lathe to remove that part of the shell at the ends thereof where the seal had been formed.

One of the objects of the present invention is to apply this shell to the cylinder in such a manner that there will be no adherence whatever between the shell and the cylindrical base, but at the same time to make proper provision for forming a seal between the shell and the cylinder, so as to insure retention of the shell thereon and to prevent ink from getting between the cylinder and the thin shell during use. A further object is to simplify and improve the method whereby the copper shell is prevented from adhering to the cylinder, which cylinder is usually of copper. In said prior application I made use of an intermediate layer or coating of metal of low melting point, to prevent adhesion of the copper shell to the cylinder; whereas in the present application this intermediate layer or coating consists of nickel, which is more readily applied to the cylinder, and forms a harder surface, and one less liable to become damaged in the handling of the cylinder before the copper shell is deposited thereon.

In the accompanying drawing I show a cylinder (partly in section) constructed in accordance with the present invention, the end at the right-hand side illustrating one form of locking and sealing means for the copper shell, and the end at the left-hand side illustrating a modification thereof.

The cylinder as herein shown comprises a base or core 1, which is usually of copper. On the surface of this cylindrical base is an isolating layer 2, of nickel, and over the isolating layer 2, deposited thereon by electro-deposition, is the final surface or shell 3 of copper, upon which the images to be printed are formed.

This intermediate layer 2 of nickel may be applied to the cylinder by the ordinary nickel-plating process, in the cases where a relatively thick deposit is required; but in instances where the diameter of the cylinder closely approximates the desired final diameter, it is desirable to make use of a very thin layer of nickel, and this can be accomplished by employing a solution of double sulphate of nickel and ammonium and sodium thio-sulphate, in about equal proportions. This may be applied by swabbing the cylinder, or by immersing it in the solution. When the nickel solution comes in contact with the copper cylinder, there is an immediate reaction which reduces the nickel in the solution to metallic form and causes it to cling tenaciously to the copper cylinder in an extremely thin layer. As soon as the copper cylinder is completely covered with this nickel solution, the reaction ceases, thus insuring an absolutely uniform layer of nickel of extreme thinness.

The cylinder thus treated is thereafter placed in a copper-plating solution, and the final layer or shell 3 of copper is applied thereto by electro-deposition. This shell 3 of copper will not unite with the cylindrical base, owing to the presence of the coating 2 of nickel. Unlike the method disclosed in the said prior application, wherein a copper shell was permitted to unite with the cylinder along a narrow band at each end thereof at which points the isolating layer was omitted, I herein show the isolating layer 2 extending throughout the full length of the cylinder and for a short distance inwardly at each end thereof. The copper shell 3 is extended over each end of the cylinder for a

short distance, as indicated at *a*, but is kept out of contact with the cylinder proper or base 1. To form a seal between the copper shell and cylinder, whereby to prevent ink from creeping therebetween, and to insure retention of the shell on the cylinder, I make use of mechanical devices consisting of a dish-like plate 4 fitting over the shaft 5 of the cylinder and pressed into contact with the edges of the outer shell 3. This dish-like sealing plate may be pressed into intimate contact with the shell 3 by a nut 6 threaded onto the shaft 5, as shown at the left-hand end of the cylinder; or, in lieu thereof, stud bolts 7 screwed into the end of the cylinder, as shown at the right-hand side, may be employed. There should be a sufficiently close fit between the central opening in the plate 4 and the shaft 5 to prevent ink from creeping underneath the plate, at the center thereof. These retaining plates 4 can be quickly applied and removed from the cylinder; and on account of their use, the copper shell 3 need not be united at any point with the cylinder 1. Thus, this shell, after serving its purpose, can be easily stripped from the cylinder base without resorting to lathe- or machine-work at any point, and the cylinder thereupon is in condition for re-use.

The use of nickel as the isolating layer or coating, as herein disclosed possesses the advantage of cheapness, and makes it possible to utilize an extremely thin coating or layer for this purpose. It moreover insures a hard and durable surface, and one of uniform thickness throughout. Uniformity in diameter of these cylinders, as employed in the rotary photogravure process, is of the utmost importance.

Variations in the details of the method and structure as herein disclosed may be employed, without departing from the spirit of my invention, as set forth in the appended claims.

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

1. The method of producing printing forms for photogravure and like processes, which consists of coating a copper cylinder with a solution of sulphate of nickel and sodium thiosulphate, whereby the nickel in solution is reduced to metallic form upon contact with the copper cylinder, and thereafter subjecting the nickel-coated cylinder to an electro-deposition of copper for the purposes mentioned.

2. The method of producing printing forms for photogravure and like processes, which consists of subjecting a cylinder to an electro-deposition of copper to form a copper shell thereon, said cylinder having upon its surface where the copper shell is formed a coating of material with which copper will not unite, and thereafter forming a seal and lock between the copper shell and cylinder at the ends thereof.

3. A printing form for use in photogravure and like processes, comprising a cylindrical base having on its surface a coating of metal with which copper will not unite, a thin copper shell electro-chemically deposited on said cylinder and not united therewith, with means at each end of the cylinder forming a removable lock and seal between the copper shell and cylinder.

4. The method of producing printing forms for use in photogravure and like processes, which consists in coating a metallic cylinder with a layer of metal to which electro-deposited copper will not permanently adhere from end to end of said cylinder, thereafter applying a layer of copper extending from end to end of said cylinder thereto by electro-deposition in such manner that the copper shell will not adhere at any point between said ends to the cylinder and may be readily stripped away after use, and securing said layer of non-adherent copper to the ends of said cylinder.

5. The method of producing printing forms for use in photogravure and like processes, which consists in coating a metallic cylinder with a layer of metal to which electro-deposited copper will not permanently adhere over the surface of the cylinder from end to end and around the ends thereof, thereafter applying a layer of copper thereto by electro-deposition on said cylindrical surfaces and on said ends in such manner that the copper shell will not adhere to the cylinder and may be readily stripped away after use, and immovably securing the layer of copper where it laps said ends.

6. A printing form for photogravure and like purposes, comprising a cylindrical base, a coating of metal of a character that will not permanently unite with copper electro-deposited thereon applied to said cylindrical base from end to end thereof and around the ends thereof, a thin outer shell of copper overlying the coated cylindrical base including said ends, said shell serving to receive the images to be printed, and being applied so that it is removable from the cylinder by stripping, and means for securing said shell against the cylinder ends.

ERNEST S. BALLARD.

CERTIFICATE OF CORRECTION.

Patent No. 1,831,645. Granted November 10, 1931, to

ERNEST S. BALLARD.

It is hereby certified that the above numbered patent was erroneously issued to "Ballard Process Co., of San Francisco, California, a copartnership consisting of Russell B. Leech, of San Francisco, California, and Colvin M. Reed, of Burlingame, California", whereas said patent should have been issued to Standard Process Corporation, of Chicago, Illinois, a corporation of Delaware, as assignee by mesne assignments, as shown by the records of assignments in this office; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of December, A. D. 1931.

M. J. Moore,
Acting Commissioner of Patents.

(Seal)