No. 647,334. Patented Apr. 10, 1900.

F. SHUMAN.

PROCESS OF MAKING ROLLS.

(Application filed July 21, 1897.)

(No Model.)

FIG. 1.

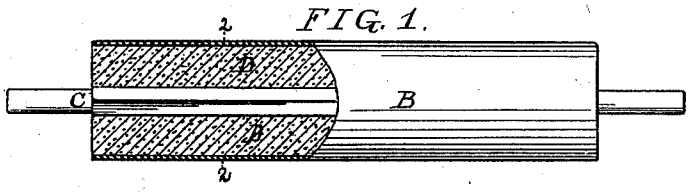


FIG. 3.

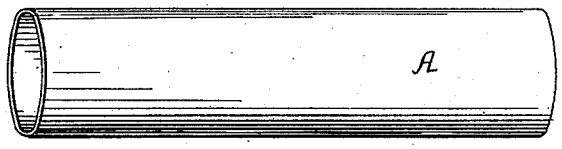


FIG. 2.

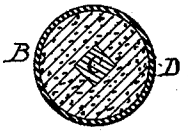


FIG. 5

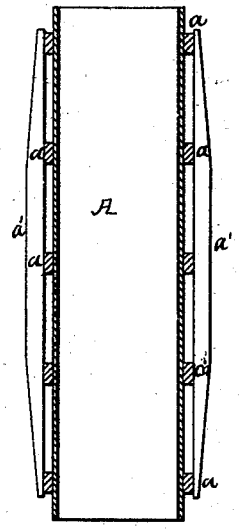


FIG. 9.

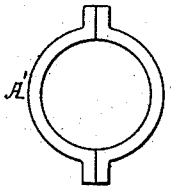


FIG. 8.

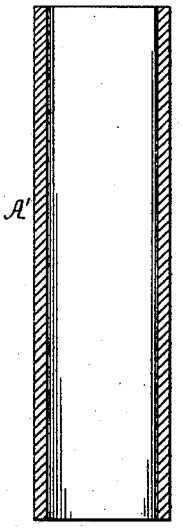


FIG. 6.

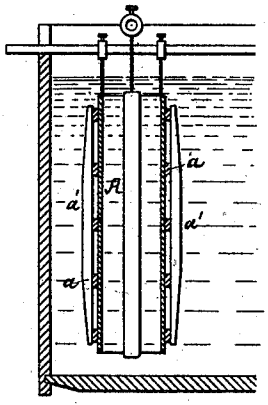


FIG. 4.

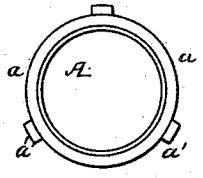
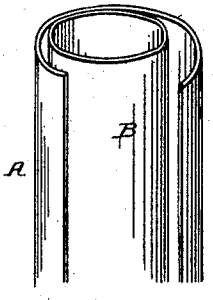


FIG. 7.



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UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF MAKING ROLLS.

SPECIFICATION forming part of Letters Patent No. 647,334, dated April 10, 1900.

Application filed July 21, 1897. Serial No. 645,391. (No model.)

To all whom it may concern:

Be it known that I, FRANK SHUMAN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in the Manufacture of Rolls, of which the following is a specification.

The object of my invention is to manufacture rolls which can be engraved for calico and paper printing and for embossing and which can be used plain for calendering and other work requiring a smooth roll.

In the accompanying drawings, Figure 1 is a side view, partly in section, of my improved roll. Fig. 2 is a section on the line 2 2, Fig. 1. Fig. 3 is a view of a paper tube used in manufacturing my improved roll. Figs. 4 and 5 are views showing the method of bracing the tube so as to make it perfectly true. Fig. 6 is a view illustrating the method of electroplating the inner portion of the tube. Fig. 7 is a view showing the method of removing the paper tube from the metallic shell, and Figs. 8 and 9 are views of a metallic mold which may be substituted for the paper mold shown in Figs. 3, 4, and 5.

Heretofore rolls of the character referred to were usually made of solid copper and were very expensive owing to the amount of copper used. By my invention I dispense with the solid copper roll and gain the same result by a very light copper or other metallic shell formed by electroplating a mold. This shell I mount on a spindle and fill the space between the spindle and the shell with a cheap material—such as plaster-of-paris, cement, or metal—which is poured into the space when melted. As soon as the filling material becomes set a rigid roll is obtained which can be turned down and polished and which is a substitute for the ordinary solid copper roll. This roll after being turned true can be suitably engraved in the ordinary manner, if necessary.

In carrying out the process I preferably make a paper tube A of the proper diameter in any of the ways common in manufacturing paper tubing and reinforce this tube with metallic bands *a*, as indicated in Figs. 4 and 5, and longitudinal bars *a'*, so as to make the structure perfectly rigid. I then soak the paper tube in paraffin or equivalent material and coat the inside with graphite or other conducting material. I then connect the graphited portion of the tube with the cathode-terminal and place within the tube an anode which is connected with the positive pole of the dynamo or battery.

The action of the electric current will deposit upon the graphite-coated tube a film of copper which can be increased to the desired thickness to form the shell B. When this shell is of the proper thickness, the tube and shell are removed from the bath, the retaining-rings and bars detached, and the paper tube A split, as shown in Fig. 7, so as to release the metallic shell B. This shell, as before remarked, is placed centrally upon the mandrel C, and the space between the mandrel and the shell is filled with suitable material D, either plaster-of-paris, cement, or molten metal. This material acts not only as a means of securing the shell rigidly to the mandrel, but also as a backing for the shell. The roll thus formed can be mounted in a lathe and the surface turned true and polished and, if necessary, suitably engraved.

In some instances instead of using the paper tube shown in Fig. 3 I may use a metallic shell made in two or more parts, as shown in Figs. 8 and 9. In this case I turn the inside of the metallic shell true and then cover the inside with a thin film of paraffin-wax or equivalent material. This paraffin surface is then dusted with a suitable conductor, such as graphite, and, as shown in Fig. 6, the tube thus formed is hung in an acid-copper bath and an anode suspended therein and suitably connected with a battery or dynamo, and the action of the electric current is such as to electroplate the inside of the tube to the proper thickness. The parts of the tube can then be detached and the electroplated shell removed.

In some instances I may substitute a thin metallic tube for the paper tube, reinforcing it in the manner described above, and electroplate this tube without its being coated with wax or graphite. In this case the thin metallic tube would have to be turned off and discarded. In some instances to prevent the loss of this metallic tube it can be waxed on the inside and coated with graphite, as in the case of the paper tube. The thin metallic shell can then be stripped off and again used.

It will thus be seen that I am enabled to make a very cheap copper roll with a true surface and which will withstand the pressure required and which can be readily polished or engraved, the same as the ordinary solid copper roll.

I claim as my invention—

The process herein described of manufacturing rolls, said process consisting in first making a mold of a paper tube, reinforcing said tube with metallic bands, said bands being further braced by longitudinal bars, submerging such structure in a bath of paraffin or equivalent material whereby the paper tube may be saturated by the same, coating the inner surface of the tube with graphite or equivalent material, submerging the mold thus formed with its supporting-frame in an electroplating-bath, connecting a cathode to the surface coated with graphite, placing an anode within the tube whereby the inner portion of the tube is coated with the metallic deposit, removing the structure from the bath when a metallic coating of sufficient thickness has been deposited on the inner surface of the paper tube, splitting the paper tube so as to release the metallic shell thus formed, backing said shell, and finally turning it true, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK SHUMAN.

Witnesses:

WILL. A. BARR,

JOS. H. KLEIN.