No. 889,341. PATENTED JUNE 2, 1908.

F. SHUMAN.

ROLL AND PROCESS OF MAKING SAME.

APPLICATION FILED JULY 20, 1897.

FIG. 1.

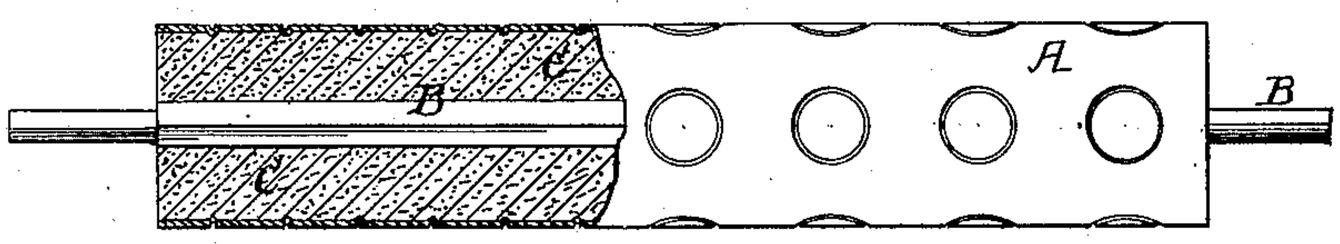


FIG. 2.

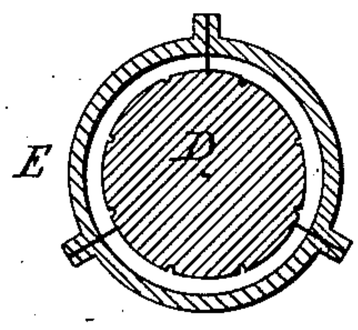


FIG. 3.

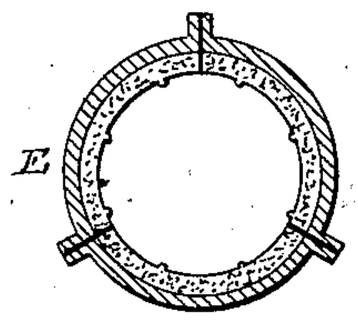


FIG. 4.

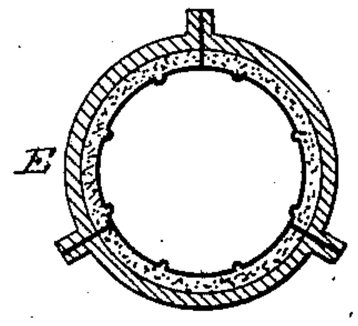


FIG. 5.

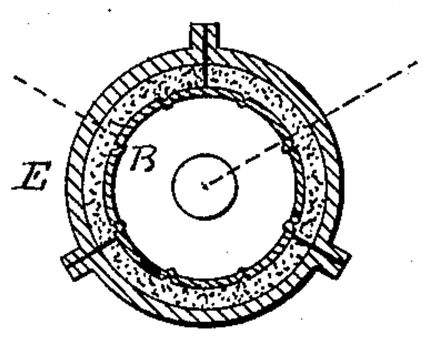


FIG 6.

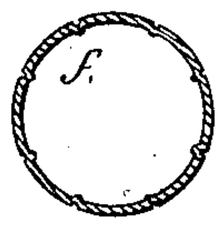


FIG. 7.

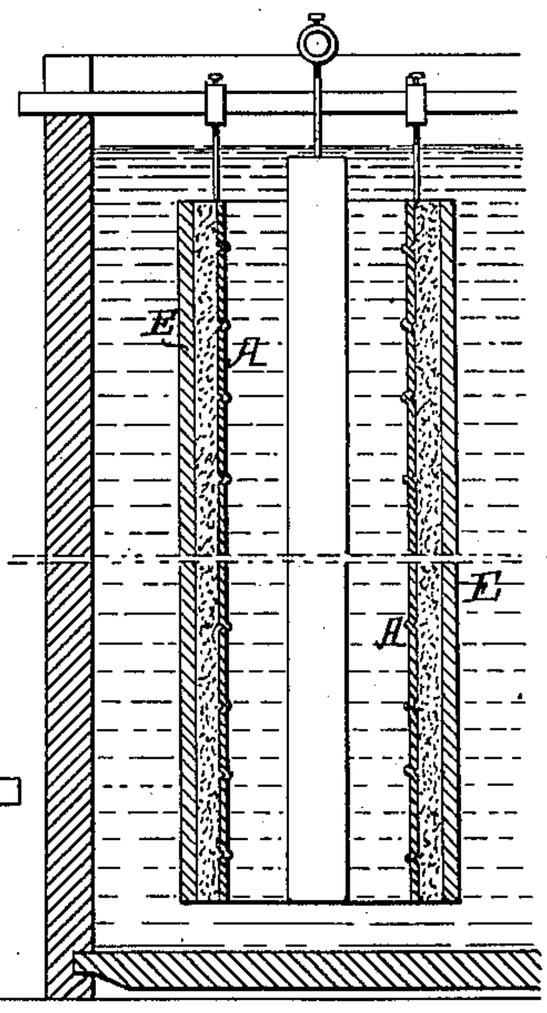


FIG. 8.

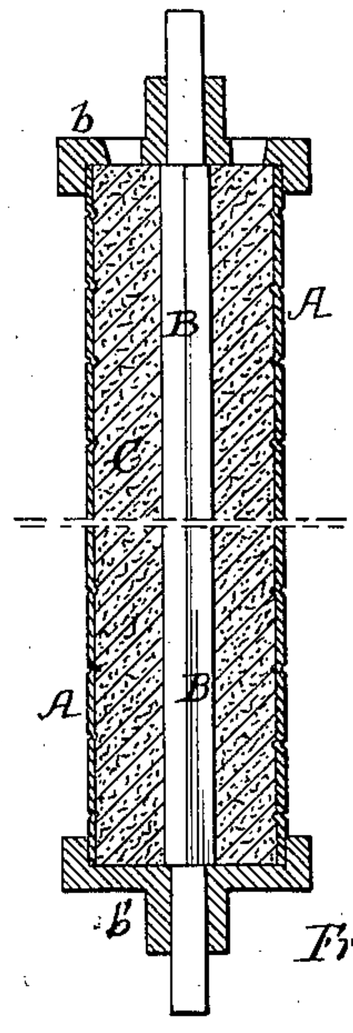


FIG. 9.

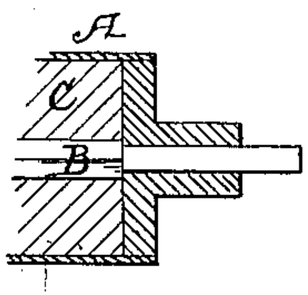
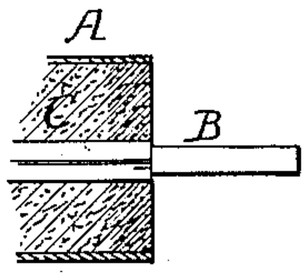


FIG. 10.



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by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

FRANK SHUMAN, OF PHILADELPHIA, PENNSYLVANIA.

ROLL AND PROCESS OF MAKING SAME.

No. 889,341. Specification of Letters Patent. Patented June 2, 1908.

Application filed July 20, 1897. Serial No. 645,260.

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 Rolls and Processes of Making Same, of which the following is a specification.

My invention relates to certain improvements in the manufacture of rolls especially adapted for use in printing, embossing or calendering. Rolls for this class of work are now invariably made of copper and are usually solid and very expensive, not only on account of the copper used, but owing to the fact that each roll has to be separately engraved.

The object of my invention is to dispense with the use of solid copper rolls and the costly engraving process, and to substitute therefor a thin copper cylinder having the engraving formed thereon by electro-plating, as fully described hereafter, reference being had to the accompanying drawings, in which:—

Figure 1, is a side view partly in section illustrating a printing roll made in accordance with my invention; Figs. 2, 3, 4 and 5, are views in section illustrating the process of making one of these rolls; Fig. 6, is a sectional view through one of the tubes before being mounted to form a roll; Fig. 7, is a vertical sectional view of Fig. 5, illustrating the electro-plating process; Fig. 8, is a vertical sectional view illustrating one method of filling the roll; Fig. 9, is a view showing a metallic head forming part of the roll; and Fig. 10, is a view showing a hard cement as a substitute for the metallic head.

The roll consists essentially of a cylindrical shell A which is made by electro plating, the design on the shell being also formed by electro-plating, a spindle B centrally located within the shell and filling material C between the shell and the mandrel. This filling material not only acts as a backing for the thin metallic shell, but also acts as a means for securing the shell to the mandrel. The mandrel may be square as shown in the drawings, or may be otherwise shaped or provided with projections or depressions which will lock with the filling material so that the shell and mandrel will be secured together as a unit. The filling material I prefer to use is plaster of paris or a composition of which plaster of paris is a base, but the shell may have a metallic or cement filling without departing from my invention.

The process of manufacturing the roll is as follows:—I first engrave the design on a pattern D, Fig. 2, this pattern may be made of soft metal, or a composition such as sealing wax, any material capable of being engraved or impressed may be used for this pattern. The pattern is mounted centrally in a box E which, in the present instance, is made in three sections so that it can be readily removed from the pattern, and mounted between the sections are thin sheets of zinc or other metal which extend to the pattern. When wax, plaster of paris or other material under pressure or vacuum is poured in the space between the pattern and the box it will be divided into three sections by the sheets of zinc, and when the material is set or cooled the box is uncoupled and the sections removed from the pattern and rearranged without the pattern, as in Fig. 3, they form a mold; the inner surfaces of the sections are dusted on the inside with graphite or other conducting material. The mold is then suspended within a tank containing an electrolyte, the cathode terminal is connected to the dusted surface of the mold and the anode is inserted in the mold, as shown in Figs. 5 and 7. The terminals are then connected to a battery or dynamo and by the action of the electric current the surface of the mold is electro-plated to the thickness desired, forming a cylinder with a design thereon, as shown in Fig. 6. In order to protect the exterior of the mold I preferably coat it with paraffin or other suitable material.

By making the roll as described above I am enabled to use the fine or smooth surface of the plating on the periphery of the roll and the coarse surface on the inside, which acts as a means to lock the shell to the filling material, as it will be understood that the electro deposited metal is practically without grain at the surface next to the mold and coarse on the opposite side.

After the cylinder is removed from the mold it is mounted on the mandrel B between two removable heads *b b'*; as in Fig. 8, the lower one of these heads is solid while the upper head has two perforations, one forming the pouring opening and the other for the escape of air. The filling material is then poured into the space between the mandrel and the shell and after the material has set the heads are removed and the roll is then ready for use. If an extra strong roll is de-

sired then the heads may form the permanent part of the roll as shown in Fig. 9, the heads in this instance fitting within the shell, or in some cases where a fragile filling is used a hard cement head may be formed on each end of the roll, as shown in Fig. 10.

While I prefer to form the design pattern by electro-plating, a perfectly plain roll may be formed in the manner described and then after being mounted a design can be cut thereon in the ordinary manner, or the roll may be suitably planished for use in calendering, etc.

In some instances the mandrel may be made removable when it is wished to use a series of rolls with a single mandrel.

It will thus be seen that by my invention I can produce a printing, embossing or calendering roll very cheaply, which will do the work of a more expensive roll and on which can be formed the design without resorting to the expensive engraving process for each roll as one pattern will answer for any number of rolls.

It will be understood that in all wall paper, oil cloth and calico printing establishments large quantities of these rolls are made and stored away until used, consequently considerable money is locked up in material that cannot be used except at intervals.

By the use of my improved roll the expensive rolls are discarded and new rolls can be made when wanted by simply keeping on hand the original pattern roll which need not be made of copper.

I claim as my invention:—

1. The combination in a roll for printing or other purposes, of the central mandrel, a metallic shell surrounding said mandrel, annular disks or shoulders forming heads for the finished roll carried by said mandrel, and a plaster composition filling material interposed between the mandrel, said heads and the shell, said filling material serving as a solid backing for the shell and as a means of keying the shell to the mandrel, substantially as described.

2. The combination in a roll for printing or other purposes, of the central mandrel, an embossed shell formed by electro-plating, said mandrel having at its ends annular disks or shoulders forming heads for the finished roll, and a plastic filling material interposed between the shell and the mandrel, said filling material serving as a solid backing for the shell of the roll and also as a means of securing the shell to the mandrel, one of said heads having openings for the introduction of said filling material, substantially as described.

3. The process herein described of making rolls, said process consisting in first making a pattern core with a design thereon, mounting said pattern in a casing made in two or more sections, with plates between the sections extending to said pattern, pouring wax or equivalent material between the casing and the pattern to form a mold, detaching the sections of the casing with the mold thereon, removing the pattern, reassembling the sections, coating the inner surface of the mold with plumbago, electro-plating the said surface to form a shell of electro-plated metal with the design thereon, and finally filling said shell with a backing material, substantially as set forth.

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.