

No. 741,413.

PATENTED OCT. 13, 1903.

C. J. REED.
COMPOSITE METAL ROLL.
APPLICATION FILED APR. 4, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 1.

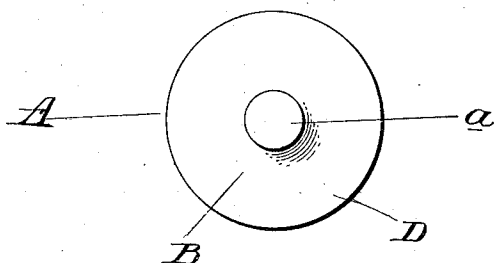


FIG. 2.

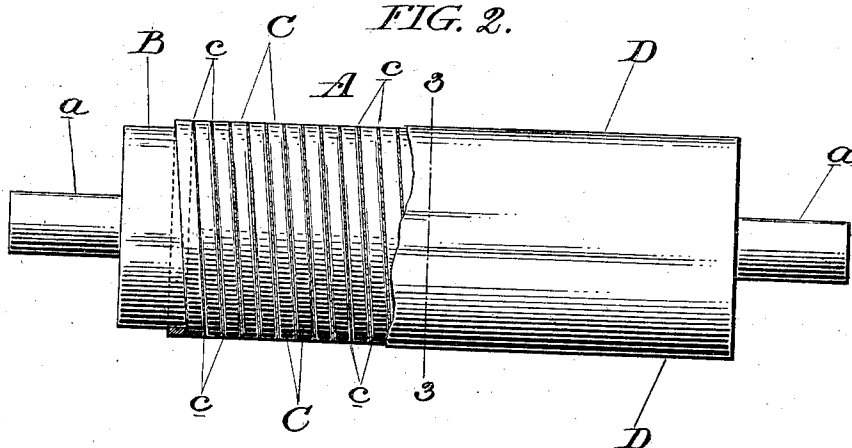
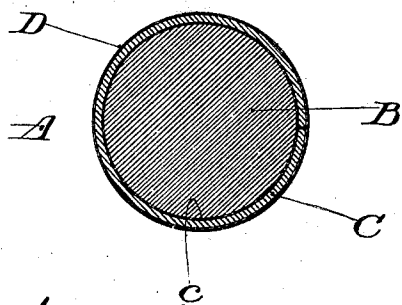


FIG. 3.



WITNESSES:
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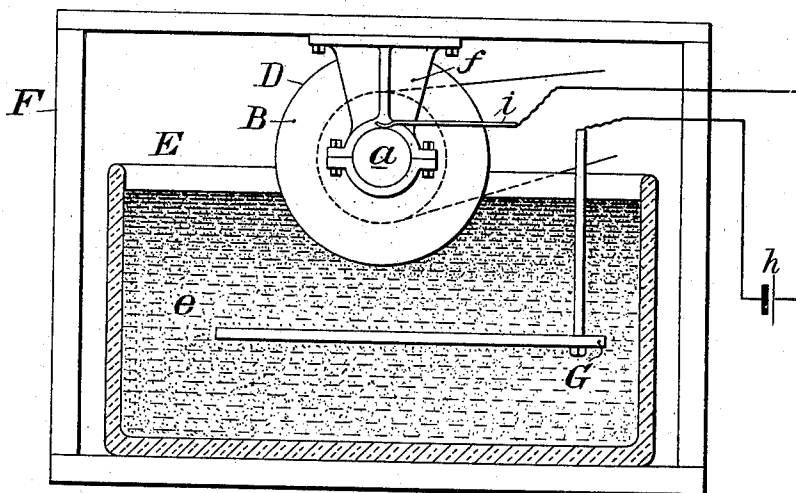
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NO MODEL.

2 SHEETS—SHEET 2.

FIG. 4.



WITNESSES:

C. L. Belcher
B. B. Hines.

INVENTOR

Charles J. Reed
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UNITED STATES PATENT OFFICE.

CHARLES J. REED, OF PHILADELPHIA, PENNSYLVANIA.

COMPOSITE METAL ROLL.

SPECIFICATION forming part of Letters Patent No. 741,413, dated October 13, 1903.

Application filed April 4, 1902. Serial No. 101,344. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. REED, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Composite Metal Rolls, of which the following is a specification.

My invention relates to composite metal rolls for use in the manufacture of paper and analogous operations which require rolls having hard, smooth, and substantially non-corrodible surfaces.

The object of my invention is to provide a roll of the character above indicated which may be readily and inexpensively manufactured and which may be durable in service and have a smooth, non-porous, cylindrical surface.

Rolls for the uses above indicated have usually been made by forcing tubes of cast brass or bronze over cast-iron drums; but such process of manufacture is expensive and the resulting product is more or less porous or spongy and for that reason unsatisfactory, whereas a roll constructed in accordance with my invention has a perfectly uniform, non-porous, and tough surface and is comparatively inexpensive.

A roll having the structural features of my invention may be made as follows: A drum of base, corrodible metal—such, for example, as cast-iron—is provided with a coating of a solder which is an easily-fusible alloy, and over this coating is placed a covering of rolled or drawn substantially non-corrodible metal, such as copper, nickel, or brass, or some other suitable alloy. A close union between this covering and the body of the roll is then effected by applying sufficient heat to melt the solder, and, finally, a layer of similar or harder metal or alloy is electrolytically deposited upon said covering. In some cases I find it advantageous to electrolytically deposit an additional or third coating. For example, it is for some purposes advantageous to construct a roll of one layer of copper soldered to the cast-iron drum, electrolytically deposit a layer of tough copper upon the first copper layer, and, finally, electrolytically deposit a layer of nickel upon the second layer of copper.

In the accompanying drawings, Figure 1 is

an end view of a completed roll constructed in accordance with my invention. Fig. 2 is a side elevation of a roll, portions of the coverings of which have been removed. Fig. 3 is a cross-section of the completed roll, taken on line 3 3 of Fig. 2. Fig. 4 is a view, partially in end elevation and partially in section, of one form of suitable apparatus for plating and polishing rolls.

The specific method of manufacture which will now be described in connection with a description of the product of the method is susceptible of certain modifications which will be understood by those skilled in the art without specifically illustrating them.

The drum B, which may be of cast-iron or other inexpensive base metal, is mounted upon a shaft *a* or formed with trunnions and is first coated with solder, preferably by rotating it in a molten mixture of tin and lead of about equal proportions, a suitable cleaning-flux—such, for example, as chlorid of zinc—being applied to the surface of the drum in order to insure the adherence of the solder. When the surface is thoroughly coated, the excess of solder may be wiped off and the cylinder allowed to cool sufficiently to permit the remaining solder *c* to solidify. The cylindrical surface of the cylinder is then provided with a covering of brass, copper, or other suitable non-corrodible metal by winding thereon a wire or ribbon C of such material, preferably of rectangular cross-section, in the form of a helix, the wire or ribbon being first tinned or coated with solder and closely wound and tightly drawn until it forms a compact continuous surface over the cylindrical part of the drum. The drum and its covering may then be heated until the solder melts and unites the covering closely to the drum.

It would be feasible and within my invention to heat the wire or ribbon locally as it is wound on the drum sufficiently to melt the solder at the point of contact between it and the drum, thus insuring adherence between the covering and the drum without subsequent heating, and it would also be possible to wind the wire or ribbon so closely and securely as to permit of omitting the coating of solder. The covered drum may then be turned to form a true cylinder that is concentric with the shaft and trimmed to the proper

dimensions. The covered drum is then electroplated with a suitable metal or alloy—such, for example, as copper, nickel or brass—and the surface ground or polished either simultaneously with the plating process or intermittingly.

In Fig. 4 I have shown a tank E, filled with a mixture *e* of liquid electrolyte and a granular non-conducting substance, such as sand, and a frame F, having bearings *f*, in which the drum-shaft or trunnions *a* are mounted at such height that the drum dips into the mixture *e*, and is therefore plated and polished simultaneously. The anode G is connected to one pole of a source *h* of electrical energy, and the circuit is completed by means of a suitable contact-brush *i*, which may bear upon either the shaft *a* or the end of the drum. When a sufficient thickness of coating has been applied electrolytically, the drum may be further polished and finished, if necessary, to present the appearance indicated at D, and it is then ready for service, or it may be provided with an additional covering of electrolytically-deposited metal either like or unlike that previously deposited.

If found desirable, the ends of the roll may be protected during the plating operation by means of headings of wax or other similar material in a manner well known to those skilled in the art.

Instead of providing the drum with a heli-

cally-wound covering of wire or ribbon the coating may be applied in the form of separate strips, rings, or tubes of metal, which may be soldered to the drum, as above specified.

My invention is obviously susceptible of various modifications as regards the composition and form of materials employed and is not limited to any specific method of manufacture, except as limitations may be expressly set forth in the claims.

I claim as my invention—

1. A metal roll consisting of a drum of base or corrodible metal, a covering of less corrodible metal mechanically wound on and soldered thereto, and a covering of metal electrolytically deposited on the mechanically-applied covering.

2. A metal roll comprising a drum of corrodible metal, a covering of less corrodible metal wound thereon in a continuous helix and soldered thereto.

3. A metal roll comprising a drum of corrodible metal, a covering of less corrodible metal wound thereon in a continuous helix and a covering electrolytically deposited on the helix.

In testimony whereof I have hereunto subscribed my name this 27th day of March, 1902.

CHARLES J. REED.

Witnesses:

ROBT. B. FLETCHER,
THOMAS B. SMITH.