May 2, 1939. A. L. FREEDLANDER 2,156,385

PRINTING ROLL

Original Filed March 9, 1934

FIG. 1.

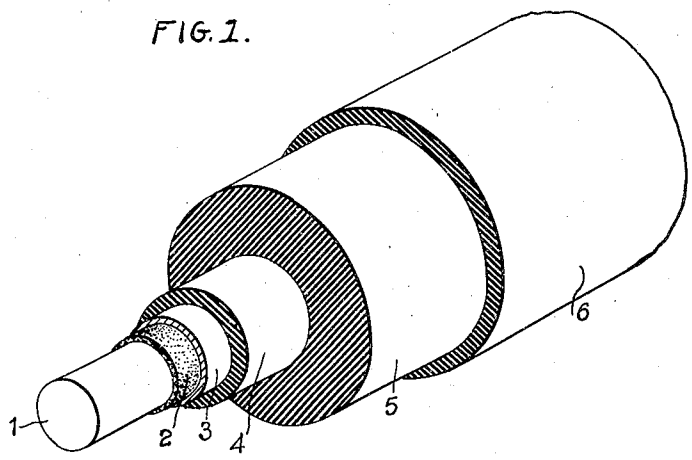
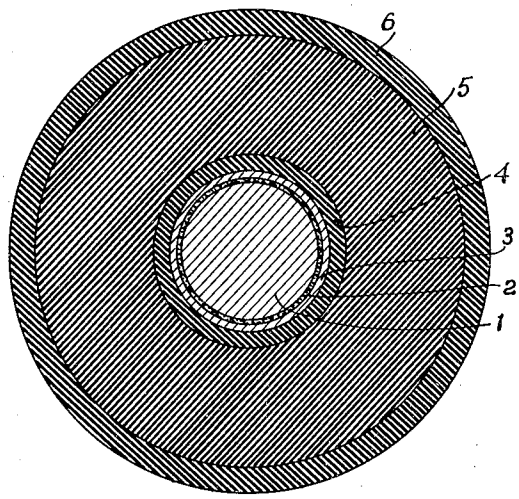


FIG. 2.



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2,156,385

PRINTING ROLL

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Original application March 9, 1934, Serial No. 714,838. Divided and this application October 14, 1935, Serial No. 44,825

2 Claims. (Cl. 91—67.8)

My invention relates to printing rollers.

It is the object of my invention to provide a printing roller that is resilient and that has a hard smooth impervious surface which is not affected by acids, inks, or any other conditions incident to printing.

It is my object to provide a surface that will not be affected by oils nor by changes of temperature and humidity.

It is a further object to provide a surface which has the function of evenly and satisfactorily spreading the ink materials.

It is my object to provide a soft inker roller having a hard impervious surface.

Driers and chemicals in ink cause a rubber roller to disintegrate in various ways. The driers cause the ink to dry or cake on the rollers. Frequently, the lint flying around in the press room tends to gather on the surface of the roller and increases this incrustation. Consequently, the rollers are washed after each run, usually with kerosene, gasoline, or benzol. All of these liquids are harmful to rubber but the washing operation is essential to printing.

If the rollers do not wash up quickly, they are defective because it means that the surface of the rollers is being attacked.

A satisfactory printing roller must be one that has the right amount of tack and retains it. This tack is essential to the successful operation of the printing roller. If there is too much tack, the result is a blurred printing accompanied by ink throwing. If there is not enough tack, the rollers do not hold the ink and the result of printing is also unsatisfactory. The roller surface must be tough enough because the rollers are pressed against the irregular metal surface of the type.

Colored inks usually contain the maximum of drying materials because they are used on a higher class of printing with the better grade of smoother and harder papers. In view of the increase in color printing, these driers are becoming of increasing destructive effect on the surface of rubber rollers heretofore employed and these driers destroy the important tack of the roller surface. The roller must be soft so as to accommodate the irregularities in the type, allow accurate adjustments and take up the load on the bearing supporting the axles of the rollers.

By the present invention not only is the surface secured with the proper amount of tack while maintaining a tough hard smooth finish required, but it is possible to replace the thin cover coating of this invention on the soft rubber core, thereby making it possible to renew the surface with the minimum of expense while preserving the maximum performance of the rollers.

It will be understood that these rollers are adaptable not only for the application of inks but also of printing varnishes and adaptable for use in graining machines in order to impart imitation grain effects on metal or cheaper woods giving the appearance of expensive woods. Such rollers are also applicable in such industries as the oil cloth, wax paper printing and allied industries.

This application is a division of my application filed March 9, 1934, Ser. No. 714,838.

Referring to the drawing:

Figure 1 is a perspective of the roller;

Figure 2 is a section on the line 2—2 of Figure 1.

Referring to the drawing in detail, 1 is a steel axle for the resulting printing roller which is to be manufactured by the hereinafter described process.

Assuming this axle has had dirt and grease removed from it and there is no composition on the surface of the axle, the ends of the axle are taped. The portion left exposed is that portion on which the roller is to be mounted. The taped portion is that portion which will be supported by the bearings in a printing machine in which the roller will be ultimately mounted. The untaped portion is subjected to sand blasting to give the metal a clean surface for adhesion to hard rubber. As an alternative to hard rubber adhesion, these metal axles or cores can be pickled or electrolytically cleaned and then brass or copper plated. In the latter event, the use of hard rubber would be eliminated and the soft rubber of the roller would be attached directly to the brass or copper plate.

Assuming that the metal rod is sand blasted, after sand blasting, the rods are wrapped in clean paper until ready to be cemented. They are maintained in a warm dry place until ready for the cementing operation.

The cement is made by dissolving hard rubber base stock in benzol in the proportion of one pound of hard rubber base stock to one gallon of benzol.

The metal axle or core is given two coatings of this cement. The cement is allowed to dry thoroughly before applying the hard rubber base stock.

In the drawing, 2 indicates the sand blasted surface and 3 the cement.

After the cement has thoroughly dried, the hard rubber base stock 4 is applied comprising two ply, which is wrapped around the core. This process is usually carried out in a roller-building machine so as to lay the stock evenly on the core and eliminate any trapped air. After applying the hard rubber to the metal axle, the surface of the hard rubber is treated with benzol, brushed and then allowed to dry.

Thereafter, the soft rubber base stock 5 is applied to the axle covered with the hard rubber. This stock is calendered single ply and is ap-

plied so that the calender grain is in the direction of the length of the roller. The sheets of calendered stock are preferably attached to each other with an eighth of an inch overlap. The roller is built up to the proper size allowing about one-half inch excess in diameter for sag, grinding and polishing. The edges of the roller are trimmed before curing and a single jacket liner wrapped around the roll. The building up of the soft base stock from the calendered sheets is best performed in a roller-building machine. The resulting product is submerged in a container of hot water under pressure and is kept there sufficiently long to effect a curing. The approximate temperature of the water is 250°–260°, and the pressure is 150–200 lbs. The approximate period of time for a roller to be kept in the water is 3–6 hours.

Now turning aside from the provision of the yielding base, we turn to the manufacture of the cover 6 for that base. The cover comprises a cover tube made from calendered stock of a material that is not affected by oil, acids or other similar materials. A variety of materials of varying compositions is available, whose properties for this purpose and in this combination have not hitherto been employed but can be employed when the principle is understood of their application and the method of their application is suitably taught as I set forth herein.

For instance, the material divinyl acetylene which results from the vinyl derivatives of acetylene is prepared by reacting acetylene in the presence of a non-alkali catalyst comprising cuprous chloride. A non-benzenoid polymer of acetylene having the empirical formula C_8H_8 may be employed. A pre-formed drying oil which is a liquid, non-volatile polymerization product of acetylene may be used. This rubber-like material may be referred to briefly as a class of material as a divinyl acetylene polymer. Isoprene on standing passes slowly into an elastic solid having the chemical composition and many of the chemical reactions of rubber but is resistant to the attack of oils and acids. I also desire to comprehend the use of polymethylene-sulfide, a polysulfide reaction product. I also comprehend the use of a plastic polymer chloroprene (reaction product of monovinylacetylene and hydrochlorid acid); or polychloroprene and polybromoprene.

After this stock is calendered two-ply .075 ga. finished thickness, the tube is made by cutting to the proper width and by making a butt splice. The spliced seam is protected by a small strip of frictioned fabric to prevent the seam from opening up when the tube is blown on to the mandrel. When the tube is thus made, it is mounted on a metal mandrel by being inflated and, while inflated, slipped on to the mandrel. The mandrel is sherardized or plated in any manner desired to give the surface desired. The inflation is effected by the use of compressed air. After the tube is mounted on the mandrel, it is wrapped down with one or more layers of wet jacket liner.

The cover tube thus prepared is suspended in hot water under pressure with the same proximate temperature and pressure as indicated heretofore for the curing of the roller.

The cured tube is thereafter removed from the mandrel and the outside surface, as the tube exists before removal from the mandrel, is sanded. Thereafter, two coats of low temperature curing cement are applied to the ground surface of the roller, the making of which has already been described. Similar coats of cement are applied to the sanded surface of the tube.

The sanded surface of the tube is now turned to become the inside of the tube. When the cement is sufficiently dry, the cover tube is blown on to the roller by compressed air which inflates it so that it can be slipped over the relatively soft rubber roller. This presents the outside of the cover tube with a mirror-like, tough, smooth surface on the outside. It was such surface that was in engagement with the mandrel on which the cover tube was cured. The cover is then cured to the base stock comprising the soft rubber roller in hot air under pressure for the necessary time. The ends of the cover are attached to the grooved ends of the core or soft rubber roller by means of cord and tape or cord, ink and oil-resisting flexible bands. The ends are trimmed and lacquered to give a finished appearance.

By the utilization of this oil-proof cover stock of the special compositions hereinbefore indicated, it is possible to get all the resiliency of rubber without the disadvantage of disintegration by inks or oil to which rubber is subject.

All the advantages of rubber with a tough, smooth impervious surface are secured on the cover together with the advantages of resiliency while at the same time, the disintegration of the cover does not occur as when made with rubber which is subjected to the oils, dryers, solvents and acids occurring in modern printing processes.

It will be understood that I comprehend within "non-rubber materials" both natural and synthetic materials and compounds which have the properties of resiliency, can have imparted to their surface an impervious condition and which are inert to inks, oils, dryers, solvents, acids and temperature and moisture conditions, particularly those conditions met in printing. The compounds mentioned for this purpose have peculiar properties not found in rubber of resisting over long periods the action of such material and conditions which would deteriorate rubber.

It will also be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

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

1. In combination in a printing roller, a metal supporting rod having a sand blasted surface; a hard rubber cover cemented thereto; a rubber base stock of relatively soft rubber cemented and vulcanized thereto; and a relatively thin flexible cover sleeve comprising a tube mounted on said soft rubber, said tube having an outer surface that is mirror-like, tough and smooth, and an inner surface that is relatively rough.

2. In a composite printing roller, a sand blasted axle, a cemented hard rubber sleeve mounted thereon, a relatively thick and soft rubber body mounted on the hard rubber sleeve and vulcanized thereto, the outer surface of said rubber having been ground to size to bring it to a predetermined diameter; and a relatively thin sleeve with an impervious outer surface and a relatively rough inner surface mounted on said rubber body and vulcanized thereto.

ABRAHAM L. FREEDLANDER.