

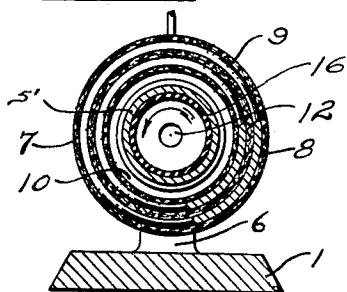
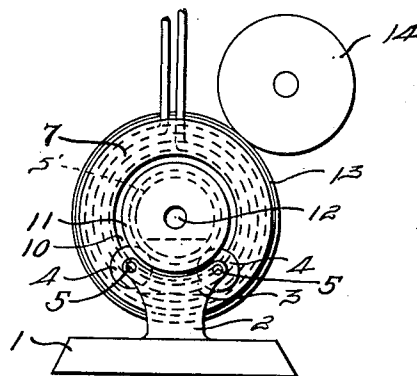
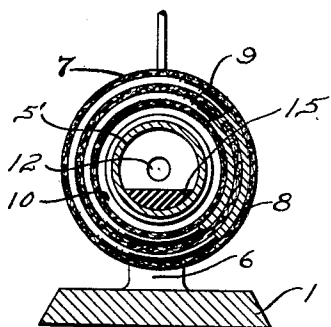
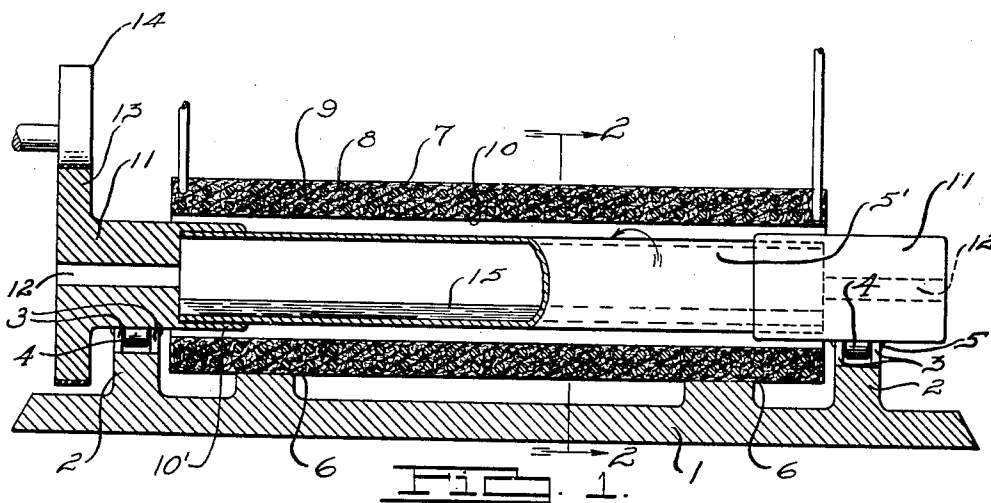
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METHOD OF INTERNALLY COATING HOLLOW ARTICLES

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METHOD OF INTERNALLY COATING
HOLLOW ARTICLES

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1 Claim. (Cl. 219—47)

This invention relates to an improved method and apparatus for forming protective coatings on the internal surfaces of hollow articles, such as pipes, containers and the like which are formed of metal having a substantial magnetic permeability.

The main objects of the invention are to provide apparatus of this kind which is particularly adapted for applying coatings of any type that require the application of heat; to provide improved means for heating the article, both during the application of coating material on its internal surfaces and after the coating material is applied thereon; to provide means of this kind which includes apparatus for generating an alternating magnetic field around the article so as to inductively heat the latter; and to provide apparatus for turning the article while it is being inductively heated so as to form coatings of uniform thickness throughout the entirety of its internal surface.

Further objects of the invention are to provide an improved method by which successive adjacent sections of an article of limited area are repeatedly brought into contact with a liquid charge of coating material while the article is heated; to provide a method for internally coating articles which is particularly adapted to build up successive layers of rubber to the form of an integral coating of substantial thickness; and to provide a method of this kind during which each layer is partially dried or cured before the next succeeding layer of the coating material is applied.

An illustrative embodiment of the invention is shown in the accompanying drawing, in which:

Fig. 1 is a central vertical section illustrating apparatus, suitable for conducting my improved internal coating method.

Fig. 2 is a transverse vertical section taken on the line 2—2 of Fig. 1.

Fig. 3 is a right end elevation of the apparatus shown in Fig. 1.

Fig. 4 is a section similar to Fig. 2, but showing a substantially completely formed internal coating.

In the form shown, our improved internal coating apparatus includes a base or bed portion 1 having upright supports 2 near its respectively opposite ends on which are formed, spaced flanges 3. Rotatably mounted on the front and rear extremities of the flanges 3 are rollers 4 which have pins 5 that are journaled in apertures formed in the flanges 3. The peripheries of the rollers 4 of each support are spaced apart sufficiently to permit extensions on a tubular member or pipe 5'

to be partially received between and rotatably supported by the rollers.

Mounted between the supports 2, on seats 6 that are formed integral with the base 1, is an induction coil 7 which includes a body portion 8 of electrical and heat insulating material, such as asbestos, in which convolutions 9 of wire are embedded. The coil 7 is connected in a circuit having a source of alternating current of substantially low voltage and moderate frequency. When a circuit of 440 volts and 180 cycles is employed, an alternating field of sufficient strength to heat the pipe 5' is developed in the central passage 10 through which the pipe extends. The metal of the pipe serves as a core, and is inductively heated.

The respectively opposite ends of the pipe 5' are closed by cylindrical members or caps 11 in which are formed end recesses 10' for receiving the end portions of the pipe 5', and vent openings 12. The cylindrical members 11 are seated upon the rollers 4 and one member, shown on the left end of the pipe 5', is provided with a concentric friction drum 13 which contacts with a driving drum 14 by which the pipe is rotated.

With the above apparatus, coatings comprising compositions of any type which require the application of heat in drying or solidifying, such as paint, enamel, rubber and the like, may be rapidly formed on the inner surface of a pipe or other hollow article.

In the form illustrated, the pipe 5' is partially filled with an uncured rubber composition 15 in liquid state which, due to its inertia, collects at the lower extremity of the pipe and tends to remain in the position shown in Fig. 2 during rotation. As the pipe is turned upon the rollers 4, successive areas of its internal surface are brought in contact with the charge of liquid rubber composition and they are then moved out of the charge. The heat induced in the metal of the pipe 5' drives off the solvent from the films of the rubber composition when the successive areas of the pipe are out of contact with the charge 15. In this manner successive layers of film-like thickness are built up on the inner surface of the pipe and they are partially solidified or cured as they are applied so as to provide an integral coating 16 of substantial thickness. Rotation of the pipe may be continued after all of the charge of liquefied rubber has been distributed upon the internal surfaces of the pipe and after the volatile constituent of the charge has been completely vaporized so as to continue the curing of the rubber to any desired degree.

With this method, a coating of substantially uniform thickness is rapidly formed on the internal surfaces of a hollow article. The film-like layers of rubber which make up the integral coating are partially cured and dried during their successive formation and as a result, the coating is uniformly cured throughout its thickness.

Although but one specific embodiment of this invention has herein been shown and described, it will be understood that various changes in the size, shape and arrangement of parts may be made without departing from the spirit of our invention and it is not our intention to limit its scope other than by the terms of the appended claim.

What we claim is:

The method of forming a rubber coating on the interior surfaces of a hollow article comprising metal having a high magnetic permeability which

consists in conditioning said article for holding a deposit of liquid in contacting relation with only a limited portion of the interior surface thereof, rotatably supporting said article within an induction coil with its axis of rotation disposed substantially horizontally, providing a deposit of liquefied uncured rubber composition having a volatile solvent in the lower extremity of said article, and energizing said coil for inductively heating said article and simultaneously rotating the latter at a speed under that required to overcome the inertia tending to retain said deposit at the lower extremity of said article so as to alternately apply successive film-like layers of said coating composition on adjacent portions of the interior of said article and subject said layers to heat while removed from said deposit.

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