Sept. 10, 1929. J. T. PRATT 1,728,168

PROCESS OF MAKING RESISTANT PLATED TUBING

Filed Oct. 12, 1925

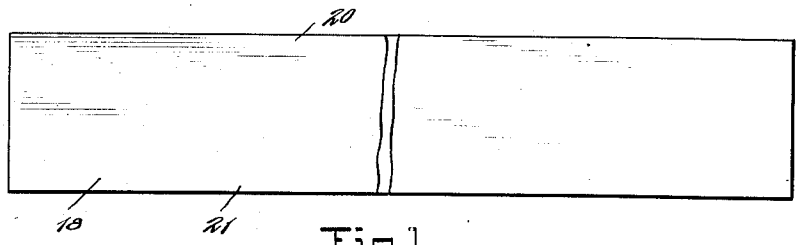


Fig. 1.

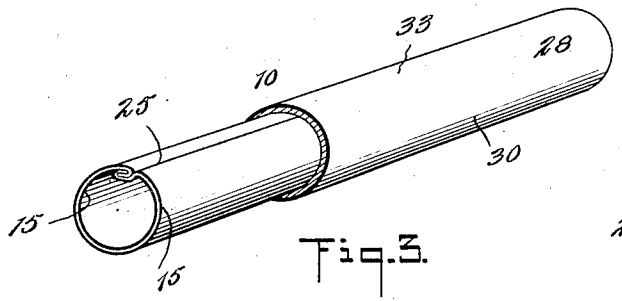
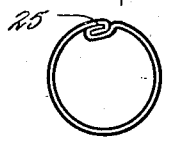


Fig. 3.

Fig. 2.



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UNITED STATES PATENT OFFICE

JOHN T. PRATT, OF NEW YORK, N. Y.; HAROLD I. PRATT AND RUTH BAKER PRATT EXECUTORS OF SAID JOHN T. PRATT, DECEASED.

PROCESS OF MAKING RESISTANT PLATED TUBING.

Application filed October 12, 1925. Serial No. 62,172.

This invention relates to a process of producing tubing which is resistant to corrosion and to attack by most acids, and aims to provide improvements therein.

Plating with chromium, particularly when a uniform relatively thin coat of a mirror-like quality is desired, lies within rather narrow limits of current density, temperature, concentration, etc., and success is much a matter of initiating the plating under uniform conditions, and continuing them. The plating of the inside of tubes or pipe, where these are of small diameter and long is hardly a practical procedure, at this stage of the art, at least. Nevertheless there is an insistent demand for such tubes or pipe for a variety of uses, such as in heating, refrigerating, sterilizing, etc. apparatus for food stuffs, acid solutions, and other solutions where great purity of the product is to be preserved, condensers, etc.

The present invention meets this want, and provides as a new article of manufacture an improved pipe or tube having a protecting plate of chromium on the inside thereof, and further provides an improved method of manufacturing such tubes.

Several embodiments of the article of the invention and illustrations thereof in several stages of the process of manufacture, are shown in the accompanying drawings, wherein—

Fig. 1 is a view of a plated sheet to be formed into a tube;

Fig. 2 is an end view of a tube formed by rolling or bending the sheet, Fig. 1, and by joining the edges with a lock seam.

Fig. 3 is a perspective view of a tube especially adapted to standing internal pressures.

Referring to said drawings, numeral 10 designates a tube of relatively small diameter (¼″ to 1″ diameter for example) and relatively long (½ to 10 feet for example) composed of a metal such as steel or low-carbon iron, or any other suitable foundation metal plated on one or both sides with a plate 15 of chromium. This plating may be effected by the method disclosed in the patent to Fink #1,581,188, April 20, 1926, or by any other suitable process.

Referring to Figs. 1–3 inclusive, the tube 10 is conveniently formed of a sheet of metal 18, plated on one or two sides with a plate 15 of chromium of .001 inch thickness, for example. The plated sheet is then rolled or bent into tubular form, as shown in Fig. 2, and the ends or edges 20, 21 of the sheet are joined in any suitable manner to hold the tube in shape, and also to make a tight joint where the edges are joined. The said edges 20, 21 are conveniently joined by a flat lock seam 25, as shown in Figs. 2 and 3.

The tube 10 may be conveniently provided with means 28 for relieving the joint 25 from strain, especially where the internal pressures are considerable and where the sheet 18 is of light gauge metal. The means 28 is conveniently a drawn, extruded or welded tube 30 of relatively great strength and well adapted to bear the stresses transmitted from the inner tube 10. The tube 28 is preferably of a metal having the same coefficient of expansion as said tube 10. Both tubes may be of the same foundation metal, and both may be plated, one internally and the other externally (as indicated at 15, 33) with a resistant coating, as chromium, to provide a tube which is resistant to corrosive, acid attack, etc., exteriorly and interiorly.

The plate of chromium may be applied in a manner to avoid so-called pin-holes, or subsequently treated to eliminate pin-holes, according to any suitable method, instances of which are disclosed in the applications of Fink and Eldridge, Serial No. 45,693, filed July 23, 1925; Serial No. 45,109, filed July 21, 1925; Serial No. 45,110, filed July 21, 1925; Serial No. 49,751, filed August 12, 1925; Serial No. 45,111, filed July 21, 1925; and others about to be filed.

The heat treatment of the chromium plate can be carried out either before or after the formation of the sheet into a tube. The heat treatment can also be carried on in such a way as to develop the oxid protective coating set forth in the applications of Fink and Eldridge, Serial No. 45,109 filed July 21, 1925, Serial No. 62,167 filed October 12, 1925, and others.

The ends of the two concentric tubes 10 and

30 may be joined to make a tight joint, as by a weld joint, and the whole plated, to provide a composite tube covered on all exposed surfaces by a protecting coat of chromium, and sealed at the joint between the two tubes.

The process may be carried out by other modes of procedure than those specifically described.

The process herein described may be used for producing tubes provided with interior protective coatings of other metals than chromium.

What is claimed is:—

1. A process of making tubes having an inside plating of chromium, comprising making the tubes of two components, one a light sheet metal lining part, and the other an external seamless strain-sustaining part, chromium plating said lining part in sheet form, after plating forming said plated sheet into tube form with the chromium plate exposed at the inside of said tube to resist the action of corrosive agents to which the inside of said tube may be exposed, and surrounding said lining part by said strain-bearing part, whereby there is obtained a tube protected on its inner face against corrosion and of strength substantially equal to an ordinary welded or extruded tube having the same diameter and thickness of wall as said composite tube.

2. A method of making tubes coated internally with a resistant metal which can only be applied as a coating by electroplating, comprising first electrodepositing the resistant metal on a sheet of metal, forming said sheet metal into tubular form with its electroplated surface inwards, and joining the edges of the sheet by a lock joint, and surrounding said electroplated tube with a circumferentially rigid tube adapted to sustain internal pressure above the ability of said lock-joint to sustain such internal pressure, and thereby limiting the strain on said lock-joint, and obtaining the effect of an interiorly plated tube having resistance to internal pressure substantially equal to the tensile strength of the metal of which the outer tube is composed.

In witness whereof, I have hereunto signed my name.

JOHN T. PRATT.