

UNITED STATES PATENT OFFICE.

LEON FEVAL, OF NEWARK, NEW JERSEY, ASSIGNOR TO TRANSPARENT CELLULOSE PRODUCTS COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

PROCESS OF MAKING TUBULAR ARTICLES.

SPECIFICATION forming part of Letters Patent No. 759,978, dated May 17, 1904.

Application filed July 6, 1903. Serial No. 164,354. (No specimens.)

To all whom it may concern:

Be it known that I, LEON FEVAL, a citizen of the Republic of France, residing at Newark, in the county of Essex, State of New Jersey, have invented a certain new and useful Improvement in Processes of Making Tubular Articles, of which the following is a description.

My invention relates to improvements in the process of manufacturing seamless tubular articles, more particularly seamless tubes of a pyroxylin composition, such as is described in my Patent No. 706,541 of August 12, 1902.

In the patent above referred to I described the process of making articles of a pyroxylin composition, in which a non-collapsible former, usually of glass, is dipped into the pyroxylin solution one or more times, according to the thickness of the tube desired, and dried after each dipping. After the proper thickness of the material is deposited and dried upon the former it is placed in boiling water or in an atmosphere of wet steam for a sufficient length of time to cause the coating to loosen upon the former, when the pyroxylin coating can be removed from the former. The effect of the heat and moisture is to disengage the pyroxylin coating from the former and to permit it to be slipped therefrom.

The object of the present invention is to avoid the step of subjecting the former and the article to the effect of heat and moisture, which is a matter of some inconvenience and waste of time.

Another object of the invention is to expedite the removal of articles with thick walls, which can be removed from the former with less time than is required by the process disclosed in the patent before referred to.

I have found that by preliminarily coating the former with a material which shrinks or contracts upon drying and which is neutral or has no appreciable action on pyroxylin and subsequently dipping it in the pyroxylin solution the pyroxylin coating when dried may be removed from the former without the use of heat or moisture. The operation is facilitated by allowing the preliminary coating to

become partially dry before being dipped into the pyroxylin solution, and the tube is removed with greater ease if it is taken off the former before it is entirely dry and while it is yet soft.

In carrying out my process I first coat the former with a material which will shrink or contract upon drying and which is in solution or other moist condition. The former may be of glass, wood, metal, or any other material and is made seamless and non-collapsible. Any material which possesses the property of contracting or shrinking upon drying and is neutral or has no appreciable action on pyroxylin and which is in a liquid or semiliquid condition, may be used for the preliminary coating; but I prefer to employ a solution of a silicate, preferably the silicate of sodium; but the silicate of potassium may be used, if desired. This solution is preferably a sixty-per-cent. solution, and the former is coated with it by being dipped therein one or more times, so that a sufficient coating will be deposited thereon. The thickness of this coating depends largely upon its character and upon the thickness of the pyroxylin coating and is to be determined by experiment. Instead of a solution of a silicate a solution of gelatin or of gelatin and sugar or of gelatin, sugar, and a gum or gums which are soluble in water may be used; but the removal of the pyroxylin coating is accomplished by some difficulties in this case. It is of course understood that the material which forms the preliminary coating should be of such a nature that it will not combine with the pyroxylin solution and cause it to stick to the former. Having coated the former with a preliminary coating, the latter is preferably partially dried, and it is then dipped one or more times into the solution of pyroxylin until a coating of the desired thickness is formed upon the preliminary coating. By partially drying the preliminary coating before the former is dipped into the pyroxylin solution it will become entirely dry before the pyroxylin coating becomes sufficiently solid to be removed and all chances of sticking will be avoided.

The pyroxylin solution can be made after the same formula as set out in my patent previously referred to, or it may be modified in proportion of the constituent parts, or to it
 5 can be added gums or any other material desired, as gum-camphor, naphthalene, &c.; but it is to be understood that the peculiarities of the pyroxylin solution do not form a part of the invention, and they may be modified as much
 10 as necessary without departing from the spirit thereof. After a coating of sufficient thickness has been produced and is allowed to harden sufficiently to be handled it is readily removed from the former. The action of re-
 15 moving the coating from the former is greatly facilitated if it be done while the pyroxylin is yet soft and before it has entirely hardened.

I have found in the course of some experiments that the pyroxylin solution has practi-
 20 cally no adhesive power upon a former coated with either of the silicates of sodium or potassium and that the article is removed with the greatest facility. I have also found that it is possible to make and remove articles having
 25 thick walls with much greater ease than is possible by the process disclosed in my prior patent.

What I claim is—

1. The process of making hollow articles
 30 from a pyroxylin composition, which consists in coating a non-collapsible former with a material which will contract upon drying, and which has no appreciable adhesive effect with pyroxylin, then dipping the coated former
 35 into the pyroxylin solution to form a coating of pyroxylin thereon, then drying the coatings, whereby the preliminary coating will contract to a greater extent than the pyroxylin coating, and finally removing the pyroxy-
 40 lin coating from the former.

2. The process of making hollow articles from a pyroxylin composition, which consists in coating a non-collapsible former with a solu-
 45 tion of a silicate, then dipping the coated former into the pyroxylin solution to form a

coating of pyroxylin thereon, then drying the coatings, whereby the preliminary coating will contract to a greater extent than the pyroxylin coating, and finally removing the pyroxy-
 50 lin coating from the former.

3. The process of making hollow articles from a pyroxylin composition, which consists in coating a non-collapsible former with a solu-
 55 tion of the silicate of sodium, then dipping the coated former into the pyroxylin solution to form a coating of pyroxylin thereon, then drying the coatings, whereby the preliminary coating will contract to a greater extent than the pyroxylin coating, and finally removing
 60 the pyroxylin coating from the former.

4. The process of making hollow articles from a pyroxylin composition, which consists in coating a non-collapsible former with a
 65 sixty-per-cent. solution of the silicate of sodium, then dipping the coated former into the pyroxylin solution to form a coating of pyroxylin thereon, then drying the coatings, whereby the preliminary coating will contract to a greater extent than the pyroxylin coating,
 70 and finally removing the pyroxylin coating from the former.

5. The process of making hollow articles from a pyroxylin composition, which consists in coating a non-collapsible former with a solu-
 75 tion of a material which will contract upon drying, and which has no appreciable adhesive effect with pyroxylin, then in partially drying such solution, then dipping the coated former into the pyroxylin solution to
 80 form a coating of pyroxylin thereon, then drying the coatings, whereby the preliminary coating will contract to a greater extent than the pyroxylin coating, and finally removing the pyroxylin coating from the former.

This specification signed and witnessed this
 85 19th day of June, 1903.

LEON FEVAL.

Witnesses:

JNO. ROBT. TAYLOR,
 LEONARD H. DYER.