Dec. 28, 1943. H. A. EGGERSS 2,337,981

METHOD OF COATING FIBER CONTAINERS

Filed Jan. 16, 1942 2 Sheets-Sheet 1

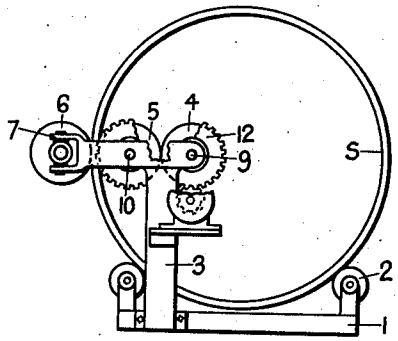

Fig. 1

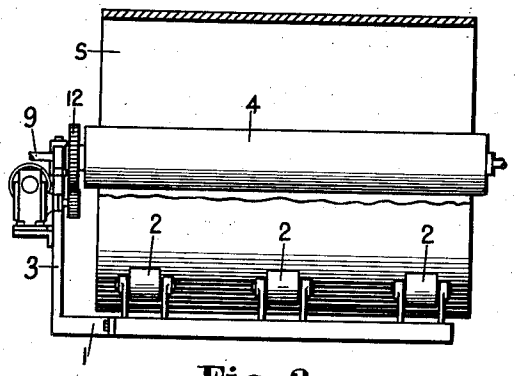

Fig. 2

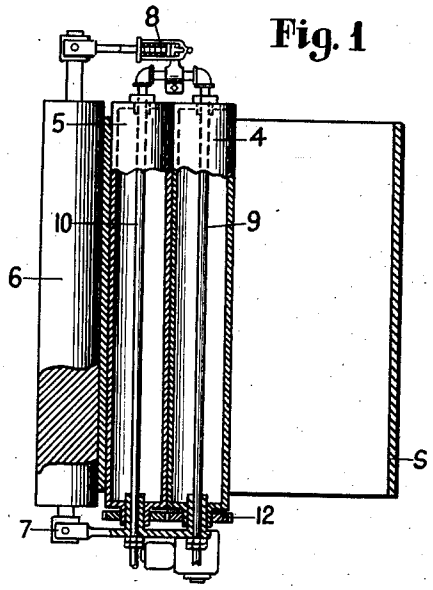

Fig. 3

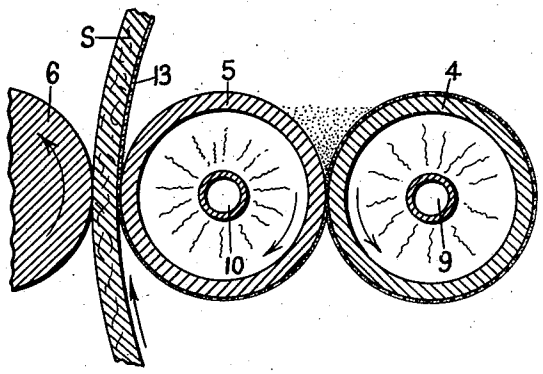

Fig. 4

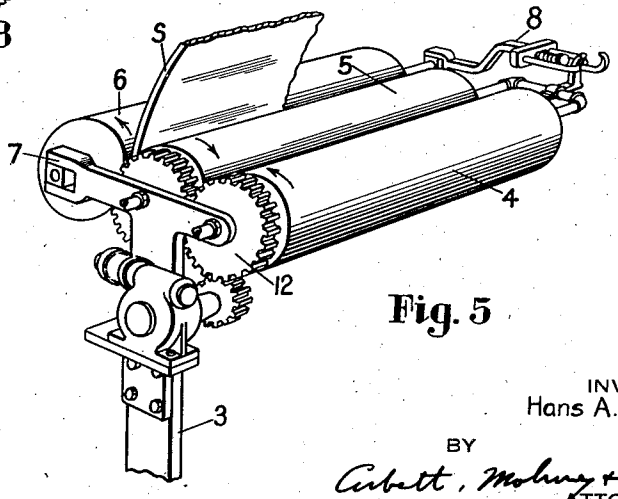

Fig. 5

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METHOD OF COATING FIBER CONTAINERS

Filed Jan. 16, 1942 2 Sheets-Sheet 2

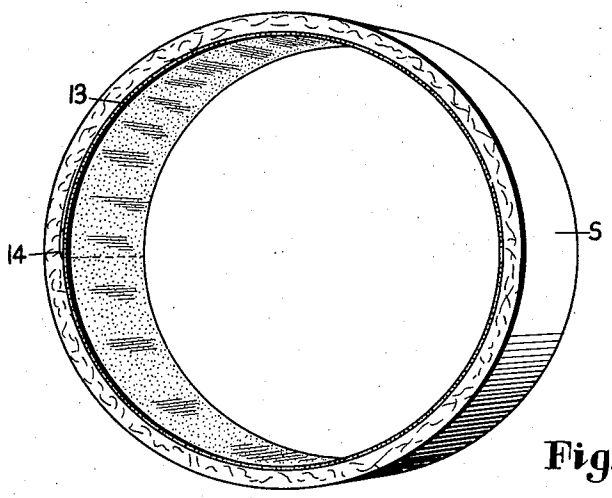

Fig. 6

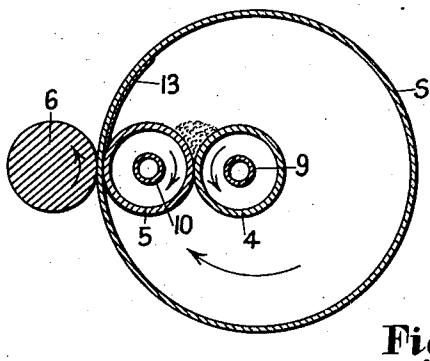

Fig. 7

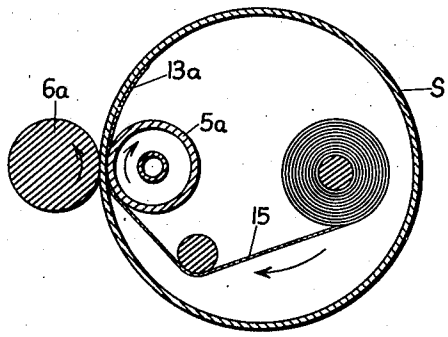

Fig. 8

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UNITED STATES PATENT OFFICE

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METHOD OF COATING FIBER CONTAINERS

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Application January 16, 1942, Serial No. 427,036

6 Claims. (Cl. 117—95)

My invention relates to a method of coating fiber containers. It has to do, more particularly, with a method for providing a protective thermoplastic resin coating on the inside of fiber containers.

The cylindrical body of fiber containers which have wide commercial use is formed by convolutely or spirally winding heavy paper in overlapping layers on a mandrel, the layers being glued or otherwise secured together. It has been customary to provide a protecting liner for a cylindrical container of this type. At present, one method of fabricating a lined container is to provide an inner liner sheet which has been precoated with a thermoplastic resin. Obviously, whether this liner paper is applied lap or butt seam, the edge of the paper is exposed. It has been customary to seal this seam by means of tape but usually this is the weakest point in the protecting seal of the container since the method of joining this tape to the coating makes it weaker than the original film, whether adhesive is used on the tape or whether other methods are employed. Another method of producing a protecting film on the interior of a fiber container consists in coating the inside of the completed drum with a solution containing a suitable resin and then evaporating the solvent. This method does result in a coating over the seam of the liner paper, but entails all the operations necessary to remove the solvent from the drum, which normally are difficult operations, particularly if organic solvents are employed. Also in this latter method of coating, it is difficult to produce an unbroken film since the exposed edge of the sheet acts like a wick and soaks up the coating material rather than allowing it to be deposited on the surface.

One of the objects of my invention is to provide a method of applying a film or coating on the interior of a fiber container after it has been formed and in such a manner that there will be no seam in the protective coating.

Another object of my invention is to provide a method of applying a protective coating on the interior of a fiber container in such a manner that there will be no danger of the coating peeling.

Another object of my invention is to provide a simple, effective and economical method for applying a coating of thermoplastic resin to the interior surface of a fiber container.

In its preferred form my invention contemplates applying a continuous film without seams as a protecting coating on the interior of a container shell. This film is applied by a calendering operation. The film is preferably formed by the use of a thermoplastic resin which is applied to heated calendering rolls which transfer the thermoplastic material to the surface of the container while simultaneously calendering the thermoplastic material into the material of the container. In the case of a cylindrical container shell, the calendering rolls will operate inside and outside of the shell and will simultaneously produce relative rotation of the shell so that the entire surface thereof will be covered with a continuous film.

In the accompanying drawings, I have illustrated one form of apparatus which may be used in performing my method. In these figures, similar characters of reference designate corresponding parts, and

Figure 1 is an end view of the apparatus showing a cylindrical container shell in position.

Figure 2 is a front view of the apparatus with the container shell broken away for clarity.

Figure 3 is a top plan view, partly broken away, of the apparatus.

Figure 4 is a vertical sectional view taken through the calendering rolls and illustrating how they act.

Figure 5 is a perspective view of the apparatus.

Figure 6 is a perspective view of a portion of the shell showing the coating applied to the interior thereof.

Figure 7 is a diagrammatic view illustrating the method where a mass of the thermoplastic material is employed.

Figure 8 is a similar view showing how a sheet or strip of the thermoplastic resin may be employed.

With reference to the drawings, I have illustrated one form of calendering apparatus which may be employed with my process. However, it is to be understood that the form shown is merely one example and that the apparatus may take various forms.

The apparatus may constitute a base 1 having a cradle formed by rollers 2 adapted to support the cylindrical container shell S. The base 1 supports a standard 3 which supports on its upper end for rotation rolls 4, 5 and 6. The roll 6 is hinged to the standard at one end, as indicated at 7, so that it may be swung outwardly to permit positioning of the shell S between the rolls 5 and 6. Suitable locking means 8 may be provided at its opposite ends for holding the

roll 6 in its operative position. The rolls 4 and 5 may be hollow and may be heated by centrally disposed steam pipes 9 and 10. The rolls 4 and 5 may be driven by a set of gears 12 towards each other as indicated in Figure 5. It will be apparent that when the roll 5 is driven the shell S will rotate on its cradle and will be moved continuously between the rolls 5 and 6 as illustrated in Figure 4.

The container may be formed of spirally wound paper as previously described, although my method is applicable to other types of containers. As the rolls are rotated, the thermoplastic material is fed down between heated rolls 4 and 5, by any suitable means (not shown), forming a film on roll 5 which is applied to and calendered into the inner surface of a fiber material forming a continuous coating or film 13. This film will cover the end 14 of the paper which forms the shell. Thus, a continuous film without seams will be produced. Since a thermoplastic resin is used, it will become sufficiently hard as soon as the shell of the container cools to the proper extent. Then the shell may be subjected to suitable operations to apply a bottom thereto. The thickness of the film may be varied by varying the time of calendering and the amount of pressure exerted by rolls 5 and 6.

The thermoplastic resin employed may be in powdered form which is placed together with a sufficient amount of plasticizer into a heated mixer which thoroughly mixes the resin and plasticizer in a single semi-viscous mass. This mass could then be placed between heated malaxating rolls which would thoroughly mix the material and bring it up to the molten plastic consistency suitable for use on the calendering rolls. This material may be placed directly on the rolls as shown in Figure 7. The material could then be calendered upon the container shell as a continuous film. Any temperature may be employed in the calendering operation which will render the film sufficiently plastic to be calendered. This temperature will depend upon the particular type of thermoplastic resin employed.

In Figure 8 I illustrate a modification of my invention. In this instance thermoplastic resin in the form of a strip 15 is employed. This strip is passed between a heated calendering roll 5*a* and a pressure roll 6*a*. The continuous strip will be calendered onto the surface of the container as before. The strip 15 may be cut after one end of the film 13*a* has overlapped the other. However, there will be no joint between the overlapping portions because of the calendering operation. The film will be continuous as before.

It will be apparent from the above description that I have provided a method of applying a protective film or coating on the interior of a fiber container after the container has been formed in such a manner that there will be no seams in the protective coating. The coating is applied in such a manner that there will be no danger of it peeling. My method is simple, effective and economical to perform.

It is to be understood that although I describe my method as being employed for coating the interior of a fiber container, it may be used for coating the exterior surface thereof if desired.

Having thus described my invention, what I claim is:

1. The method of applying a protective coating to the surface of a fiber container of cylindrical form which comprises rotating the container about its axis with calendering rolls operating on the interior and exterior surfaces thereof and applying a film of thermoplastic resin to one of said rolls which will transmit it to said surface.

2. The method of applying a protective coating to the surface of a fiber body of tubular form which comprises rotating the body about its axis while simultaneously calendering a film of thermoplastic resin on said surface under heat and pressure.

3. A method according to claim 2 wherein the film is applied to the inner surface of said body.

4. The method of applying a protective coating to the surface of a fiber body of tubular form which comprises rotating the body about its axis while simultaneously applying a film of thermoplastic resin on said surface under heat and pressure.

5. A method according to claim 4 wherein the film is applied to the inner surface of said body.

6. The method of applying a protective coating to the interior surface of a tubular body having a seam extending longitudinally of said surface which comprises rotating said body about its axis and simultaneously calendering a continuous film on said inner surface and over said seam by means of heat and pressure.

HANS A. EGGERSS.