W. B. FENN.

REINFORCED RECEPTACLE, TUBE, OR THE LIKE AND PROCESS OF MAKING THE SAME.

APPLICATION FILED DEC. 6, 1917.

1,312,780.

Patented Aug. 12, 1919.

Fig. 1

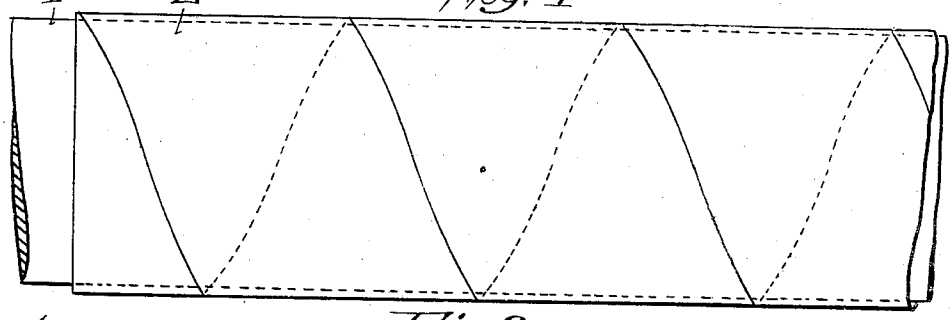


Fig. 2.

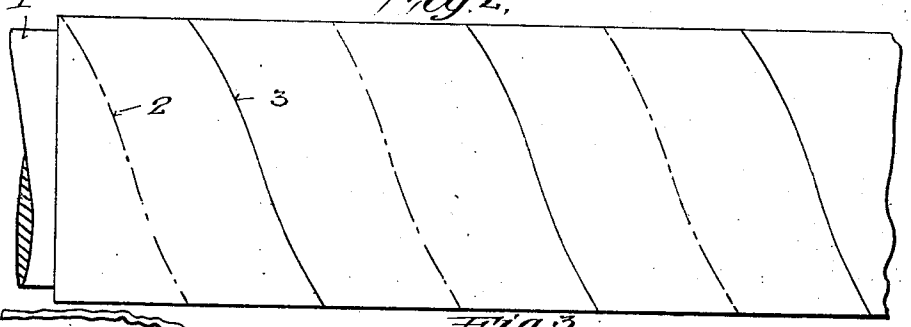
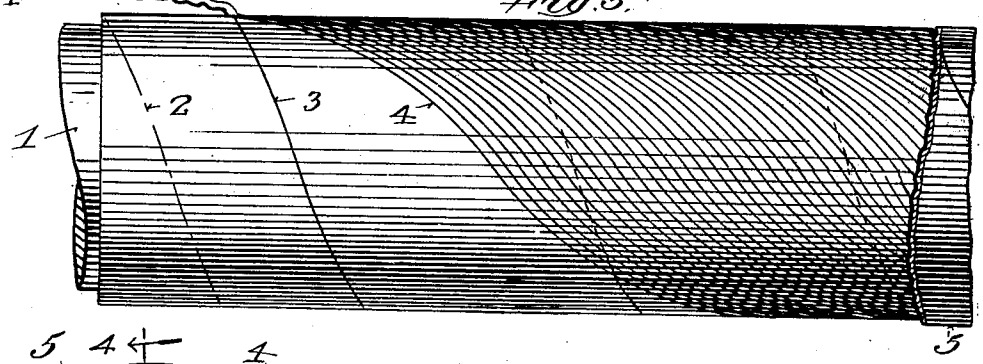


Fig. 3.



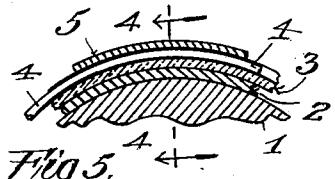


Fig. 5.

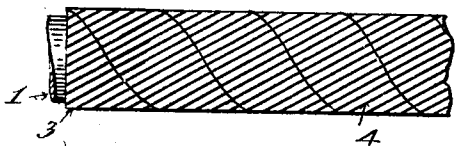


Fig. 6.

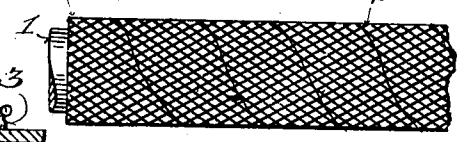


Fig. 7.

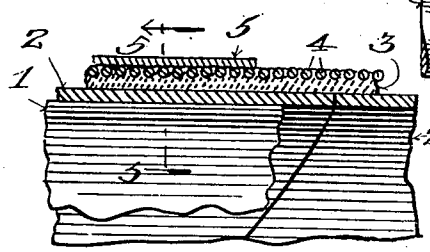


Fig. 4.

Inventor:
William B. Fenn
by his atty Samuel S. Darby

UNITED STATES PATENT OFFICE.

WILLIAM B. FENN, OF NEW YORK, N. Y.

REINFORCED RECEPTACLE, TUBE, OR THE LIKE AND PROCESS OF MAKING THE SAME.

1,312,780. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed December 6, 1917. Serial No. 205,741.

To all whom it may concern:

Be it known that I, WILLIAM B. FENN, a citizen of the United States, residing at New York, in the county and State of New York, have made a certain new and useful Invention in Reinforced Receptacles, Tubes, or the like and Processes of Making the Same, of which the following is a specification.

This invention relates to receptacles, tubes, conduits, or the like, and to the process of making the same.

The object of the invention is to provide a tube, conduit, receptacle, or the like, of non-metallic substance, which is strong, and durable, economical of manufacture and efficient for the purposes for which such articles are applied.

A further object of the invention is to provide a novel, efficient and economical process of manufacturing tubes, receptacles, or the like.

Further objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, together with the process employed in connection therewith, all as will be more fully hereinafter set forth as shown by the accompanying drawing and finally pointed out in the appended claims.

Referring to the drawing:—

Figure 1 is a view of a portion of a mandrel on which has been applied the first layer of a tube.

Fig. 2 is a similar view, showing the second layer applied thereon.

Fig. 3 is a similar view showing the reinforcing elements applied thereon, the broken end of the same being shown with an outer surface layer, the whole constituting a three-ply tube.

Fig. 4 as a sectional view of the mandrel with the layers applied thereon.

Fig. 5 is a sectional view taken on the line 5—5 Fig. 4 and looking in the direction of the arrows.

Fig. 6 is a diagrammatic view of a modified construction.

Fig. 7 is a similar view of a further modified construction.

The same part is designated by the same reference numeral wherever it occurs throughout the several views.

It is among the special purposes of my present invention to provide a construction of tube, conduit, or the like, which may be used for any purpose for which tubes, conduits, or the like, are used, or which may be cut up into desired lengths and provided with caps, or the like to form in the usual well known manner, receptacles, cans, carriers, or similar articles.

It is a further special purpose of my invention to provide articles of this nature of non-metallic substance and to reinforce the same so that the strength of a metallic article is secured at a great decrease in the cost of the materials employed, due to their non-metallic composition, thus enabling a cheap, water-proof, strong, durable, non-metallic article to take the place of the present expensive metallic article.

While I will now describe my invention as applied to a three-ply conduit or tube, or the like, as illustrative of my invention, I wish it to be understood that I am not to be limited in this respect, as one or any number of plys may be employed in accordance with the use to which the finished product is to be put. As is customary in the manufacture of tubes of this nature, the tube of my invention is wound upon a mandrel indicated at 1 at any desired pitch. The inner surface or what I will term the first-ply 2 is wound upon the mandrel in this manner with the edges of the strip of the first-ply abutting against each other, as shown.

This strip of first-ply may be of any desired material, preferably of a fibrous material, and it may or may not be water-proofed, impregnated with wax, etc., as desired. Likewise the width of the strip of the first-ply may be of any desired size, depending entirely upon the requirements and the will of the manufacturer. After the first-ply has been wound on the mandrel, the second-ply consisting of a strip, preferably, though not necessarily, of the same width as the first-ply strip, and made of wood pulp or other similarly soft, pliable material, is wound around the first-ply at preferably, though not necessarily, at the same pitch as the first-ply or inner layer with the abutting edges of the soft wood pulp strip positioned at a point intermediate the abutting edges of the inner surface or first-ply strip, as clearly shown at 11

three in Fig. 2. One or more, and preferably a great number of reinforcing strips 4 are then wound under tension around the second-ply or wood pulp strip. Although I am not to be limited to the specific form shown, I find it preferable where a three-ply inch strip of first and second ply is employed to use a number of reinforcing elements 4 positioned at approximately an eighth of an inch apart. The reinforcing elements 4 may be of any desired material, such as wire, strips of tin, or the like. I find it preferable to employ round wire, either copper, iron or steel, for this purpose. The wire may be wound on the second-ply or wood pulp strip under any suitable or desired tension, preferably of sufficient tension to cause the same to sink into the wood pulp, at least to point flush with the surface thereof, as shown best in Figs. 4 and 5. The wire may be wound upon the 2nd-ply or wood pulp strip at any desired pitch, preferably at a pitch varying with the pitch of the second-ply or wood pulp strip. For example, in Fig. 3, the pitch reinforcing wires 4 may be acute relative to the pitch of the first and second plies, thus insuring a proper reinforcing at the abutting edges of the plies. If desired, however, the wires may be wound on the second-ply or wood pulp strip in a direction reverse to the pitch of the wood pulp strip and first-ply, as shown in Fig. 6. Likewise, if desired, the reinforcing wires 4 may be run in both directions to effectively form a reinforcing mesh throughout the length of the tube without the disadvantages encountered in the use of a wire mesh in the first instance such as the cost of construction of the same and the necessity for treating the same to retain it in its meshed position. If desired, and as shown, an outer surface or the third-ply 5 may then be wound around the reinforced wood pulp or second-ply with the abutting edges thereof preferably in alinement with the abutting edges of the first-ply 2 and preferably of the same width of strip and of the same pitch on the mandrel. The outer surface or third-ply 5, if desired, may be waterproofed in any suitable manner in accordance with the purpose for which the completed tube is constructed. It is the general practice in the construction of articles of this nature to make the same of an endless length to be cut off in the desired sizes in accordance with the purposes for which the articles are to be employed. Receptacles, cans, or the like, are constructed in a similar manner, cut off into the desired sizes and provided with caps of any desired construction, which may be secured to the top and bottom of the tube in the usual or any well known manner.

Having now set forth the objects and nature of my invention, what I claim as new and useful and of my own invention and desire to secure by Letters Patent is:—

1. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a reinforcing element under a tension sufficient to partially embed the same in said strip.

2. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a reinforcing element under tension sufficient to partially embed the same in said strip and at a pitch different from the pitch of said strip.

3. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a plurality of reinforcing elements under a tension sufficient to partially embed the same in said strip.

4. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a plurality of reinforcing elements under a tension sufficient to partially embed the same in said strip and at a pitch different from the pitch of said strip.

5. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a wire under a tension sufficient to partially embed the same in said strip.

6. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a wire under a tension sufficient to partially embed the same in said strip and at a pitch different from the pitch of said strip.

7. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a plurality of wires under a tension sufficient to partially embed the same in said strip.

8. The method which consists in winding upon a mandrel a strip of non-metallic material at a predetermined pitch, then winding around said strip a plurality of wires under a tension sufficient to partially embed the same in said strip and at a pitch different from the pitch of said strip.

9. The method of constructing multi-ply tubing which consists in winding upon a mandrel a plurality of strips, one over the other at a predetermined pitch, and winding upon one of said strips a reinforcing element under a tension sufficient to partially embed the same in said strip.

10. The method of constructing multi-ply tubing which consists in winding upon a

mandrel a plurality of strips, one over the other at a predetermined pitch, and winding upon one of said strips a reinforcing element under a tension sufficient to partially embed the same in said strip, and at a pitch different from the pitch of said strip.

11. The method of constructing multi-ply tubing, which consists in winding upon a mandrel a plurality of strips one over the other at a predetermined pitch, and winding upon one of said strips, a plurality of reinforcing elements under a tension sufficient to partially embed the same in said strip.

12. The method of constructing multi-ply tubing, which consists in winding upon a mandrel a plurality of strips, one over the other at a predetermined pitch, and winding upon one of said strips, a plurality of reinforcing elements under a tension sufficient to partially embed the same in said strip and at a pitch different from the pitch of said strip.

13. The method of constructing multi-ply tubing which consists in winding upon a mandrel, a plurality of strips, one over the other at a predetermined pitch, and winding upon one of said strips a wire under a tension sufficient to partially embed the same in said strip.

14. The method of constructing multi-ply tubing which consists in winding upon a mandrel, a plurality of strips, one over the other at a predetermined pitch, and winding upon one of said strips a wire under a tension sufficient to partially embed the same in said strip, and at a pitch different from the pitch of said strip.

15. The method of constructing multi-ply tubing which consists in winding upon a mandrel a plurality of strips one over the other at a predetermined pitch, and winding upon one of said strips a plurality of wires under a tension sufficient to partially embed the same in said strip

16. The method of constructing multi-ply tubing which consists in winding upon a mandrel a plurality of strips one over the other at a predetermined pitch, and winding upon one of said strips a plurality of wires under a tension sufficient to partially embed the same in said strip and at pitch different from the pitch of said strip.

17. The method of constructing multi-ply tubing which consists in winding an inner layer strip upon a mandrel at a predetermined pitch, then winding a second layer over the inner layer at approximately the same pitch then winding over said second layer a reinforcing element under a tension sufficient to partially embed the same in said second layer, and finally winding an outer layer strip over the other two layers.

18. The method of constructing multi-ply tubing which consists in winding an inner layer strip upon a mandrel at a predetermined pitch, then winding a second layer over the inner layer at approximately the same pitch, then winding over said second layer, a plurality of reinforcing elements under a tension sufficient to partially embed the same in said second layer, and at a pitch different from the pitch of said layers, and finally winding an outer layer strip over the other two layers.

19. A tube comprising an inner wall spirally wound fibrous material surrounded by a body of spirally wound relatively soft material with a reinforcing element partially embedded therein spirally extending around the same at an acute pitch, and an outer layer of spirally wound fibrous material.

20. A tube comprising an inner wall spirally wound fibrous material surrounded by a body of spirally wound relatively soft material with a plurality of substantially parallel reinforcing elements partially embedded therein spirally extending around the same at an acute pitch, and an outer layer of spirally wound fibrous material.

21. A tube comprising an inner wall, spirally wound fibrous material surrounded by a body of spirally wound relatively soft material with a wire partially embedded therein spirally extending around the same at an acute pitch, and an outer layer of spirally wound fibrous material.

22. A tube comprising an inner wall spirally wound fibrous material surrounded by a body of spirally wound relatively soft material with a plurality of substantially parallel wires partially embedded therein spirally extending around the same at an acute pitch, and an outer layer of spirally wound fibrous material.

In testimony whereof I have hereunto set my hand on this 5th day of December, A. D., 1917.

WILLIAM B. FENN.