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PAPER TUBE FOR FORMING CONCRETE COLUMNS AND THE
LIKE HAVING AN OVERLAPPED INNER PLY
WITH A COATING MATERIAL THEREON
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Fig. 1

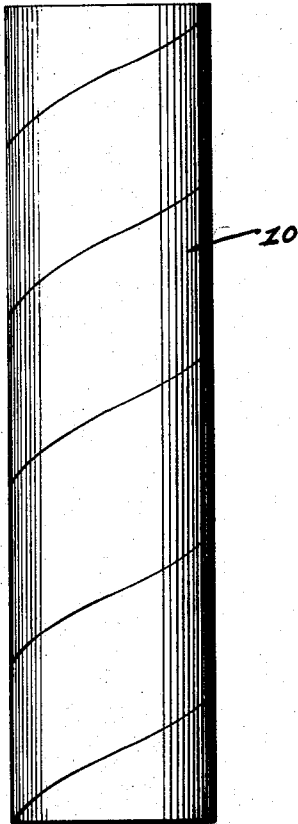


Fig. 2

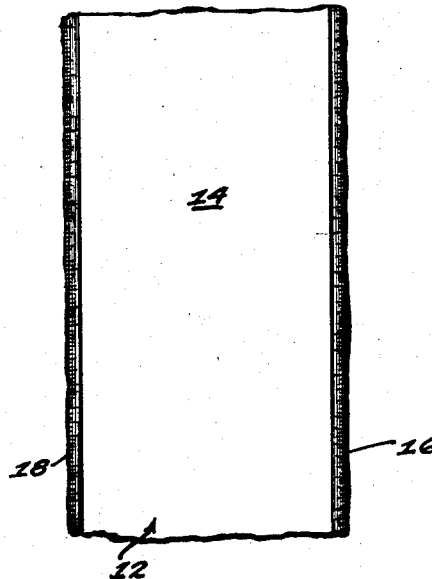
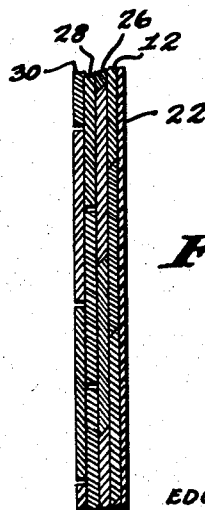


Fig. 3



Fig. 4



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PAPER TUBE FOR FORMING CONCRETE COLUMNS AND THE LIKE HAVING AN OVERLAPPED INNER PLY WITH A COATING MATERIAL THEREON

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2 Claims. (Cl. 25-118)

This invention relates to paper forms for use in molding concrete pillars and columns and the like and more particularly to a paper tube having the innermost ply thereof arranged with beveled edges that are overlapped so as to form a smooth interior surface, and having this interior surface coated with a suitable material characterized by the quality of forming a continuous film that will not adhere to concrete and being flexible, water-proof, abrasion resistant, and relatively tough.

U.S. Patent No. 2,677,165, issued May 4, 1954, discloses a spirally wound paper tube having butt joints with the inner surface of the paper tube lined with a polyethylene film. The use of butt joints on the innermost ply of a paper tube presents gaps or voids between adjacent edges of the ply since the edges are not always perfectly butted and when concrete is poured in the paper tube, the concrete will fill the gaps and water will leak between the edges of the innermost ply and be absorbed by the paper tube. The water absorbed by the paper tube at the gaps causes the paper tube to expand and this oftentimes results in a deformed surface on the finished concrete surface. In addition the completed concrete column will usually have a land or projection at the gaps between the adjacent edges of the innermost ply and this will require sanding or other suitable finishing in order to produce a smooth surface on the finished concrete column.

According to the present invention a paper tube is formed having an inner ply with overlapped beveled edges to which a coating material is applied thereby presenting a smooth interior surface that will not adhere to concrete poured within the paper tube. The paper strip forming the innermost ply is beveled on the outer surface at both edges thereof by suitable means such as a belt having a rough surface contacting the edges of the paper strip. The paper strip is spirally wound to form the inner ply and when wound, one outer beveled edge of the paper strip will overlap and contact a smooth unbeveled inner edge, and both the smooth edges on the inner side of the paper strip will face inwardly while the beveled edges on the outer side will face outwardly away from the inner portion of the paper tube. A smooth interior surface having smooth edges exposed to the inner surface of the paper tube is formed thereby presenting an unusually smooth seam where the edge portions of the strip overlap. A coating material that will not adhere to concrete is then applied to the interior surface and a smooth continuous inner liner is formed thereby.

The present invention is described in further detail below in connection with the accompanying drawings, in which:

Fig. 1 is an elevation view of a tubular concrete form embodying the present invention;

Fig. 2 is a plan view of the outer surface of the innermost ply;

Fig. 3 is a cross sectional view of the innermost ply shown in Fig. 2; and

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Fig. 4 is a fragmentary sectional view of the tube shown in Fig. 1.

Referring now in detail to the drawings and more particularly at first to Fig. 1, a paper tube adapted for forming concrete columns and the like is shown indicated generally by the numeral 10.

Fig. 2 discloses a paper strip forming the inner ply of the paper tube 10 and indicated by the numeral 12 with the outer surface 14 beveled at the outer edges 16, 18. The beveled edges 16, 18 can be formed by various means, however one particular means which has been found to work most effectively is a moving belt having a rough outer surface that contacts the edges of the paper strip thereby forming beveled edges.

The beveled edges 16, 18 of the paper strip 12 leave protruding fibers which are not desired on the interior of the paper tube since the protruding fibers will leave a rough exposed surface and absorb any material that is applied interiorly of the paper tube. Even though the beveled edges are overlapped, if either of the bevels faces inwardly a small portion of the bevel will be exposed since the bevels are not perfectly formed. Therefore, it is advantageous to have beveled edges 16, 18 facing outwardly away from the interior of the paper tube.

To form the inner ply of the paper tube 10 so that beveled edges 16, 18 face outwardly, the beveled edges 16, 18 are arranged at different angles to the outer surface 14 of paper strip 12, as shown in Fig. 3. The paper strip 12 is next spirally wound with a suitable adhesive, such as a polyvinyl acetate emulsion, applied to one of the edges, and beveled edge 18 is disposed facing outwardly in fact-to-face contact with smooth inner surface 20 of paper strip 12 adjacent the beveled edge 16. In order for a smooth, tight seam to be formed the beveled edge 16 is distorted, as shown by the dotted lines in Figure 3, by the winding of the paper strips on a mandrel, and no portion of the beveled edges 16, 18 is exposed to the interior of paper tube 10, thereby giving a smooth inner surface.

It is understood that the innermost ply of the paper tube 10 can be arranged in a different manner to form the outwardly facing overlapped beveled edges, the above being only one arrangement of the invention.

If an innermost ply of less than .025 inch in thickness is used in paper tube 10, it has been found advantageous to form the ply adjacent the innermost ply with overlapped beveled edges. This is advantageous since if a ply having butt joints is disposed adjacent the innermost ply, the pressure created by the concrete poured within the column will push the innermost ply outwardly into the void or open joint formed between the edges of the adjacent ply and will cause the innermost ply to be deformed. By having two overlapped inner plies forming a total thickness of more than 0.25 inch, a sufficient thickness of paper material is obtained to withstand the pressure created by the concrete.

Referring to Figure 4, a coating material is shown forming an inner liner 22 that is arranged on the inner surface of overlapped beveled edged inner ply 12 with the adjacent ply 26 also having overlapped beveled edges, and plies 28, 30 being spirally wound with butt joints.

The coating material is applied interiorly of the paper tube 10 usually after the spiral winding of the paper strips. Various methods can be used in the application of this coating and one method which has been found to operate most effectively is by spraying the coating material on the interior of the paper tube 10 by suitable means such as a spray gun. Any desired thickness or quantity of coating material can be provided by spraying with a spray gun as the spray gun can be conveyed back and forth within the paper tube 10 as many times as necessary to obtain the desired thickness.

In some instances, it may be beneficial to apply a coating material to the paper strips before the winding thereof but due to the overlapping of the beveled edges of the innermost paper strip, the coating material would have to be beveled, and any glue applied to the edge of the paper strip would be difficult to adhere to the coating material. A smooth seam would therefore be difficult to obtain when applying the coating material before the winding of the paper strips.

The coating material can be of many different materials, such as plasticized nitrocellulose or a plastic emulsion, but it must have certain necessary qualities. The most important quality is that the coating material must have no affinity for concrete poured within the paper tube form as the stripping of the paper tube from the finished concrete column will be hampered if the concrete has a tendency to adhere to the paper tube and in addition, portions of the interior of the paper tube will remain on the finished concrete structure thereby presenting an unsightly appearance that has to be removed.

Another important quality is that the liner must form a continuous film that completely lines the interior of the paper tube form. The continuous film must have no openings therein and must present a smooth interior uniform surface at every point along the interior surface of the paper tube.

In addition, a relatively flexible coating material for forming inner liner 22 must be used since the transportation of the paper tube 10 will subject the coating material to shocks and impacts. Also, when concrete is poured within the paper tube, the concrete will frictionally contact inner liner 20 and if the liner is brittle, it will be subject to cracking or chipping.

Since it is possible for water to seep into the paper tube at the joints thereof and cause the paper tube to swell, it is a requisite that the coating material be waterproof so as to prevent any water from leaking through the coating material and seeping in the seams formed at the overlapped portions of the paper strip.

After the concrete poured into the paper tube form has set, stripping of the paper tube 10 is accomplished by unwrapping the individual plies or by slitting the

paper tube longitudinally. A finished concrete column is thereby formed that has no lands or projections thereon and has an unusually smooth surface.

The present invention has been described above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

We claim:

1. A multiple ply paper tube adapted for use as a mold for forming concrete columns with a smooth continuous surface free of projections and the like comprising a plurality of inner plies of spirally wound paper strips and a ply outwardly adjacent said inner plies, said outwardly adjacent ply being a spirally wound paper strip with its leading edge abutting the trailing edge of its preceding spiral convolution thereby forming a butt joint, each said inner strip having a smooth inner face and an outer face at which both edges are beveled, each said inner strip being spirally wound with the leading beveled edge thereof overlapping the trailing beveled edge of the preceding spiral convolution, said overlapping leading beveled edges being distorted to lay on said trailing beveled edges without distortion of the trailing beveled edges, the inner face of the innermost of said inner strips thereby presenting a continuous smooth interiorly exposed mold surface, the plurality of inner strips being of a sufficient total thickness to prevent deformation of the innermost strip along the butt joint of said outwardly adjacent strip when under pressure from concrete in the mold.

2. A multiple ply paper tube as defined in claim 1 and further characterized in that the total thickness of said inner strips is at least .025 inch.

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