J. G. V. LANG.

MANUFACTURE OF PAPER BOTTLES.

APPLICATION FILED MAY 1, 1916.

1,415,100.

Patented May 9, 1922.

Fig 2.



Fig 1.

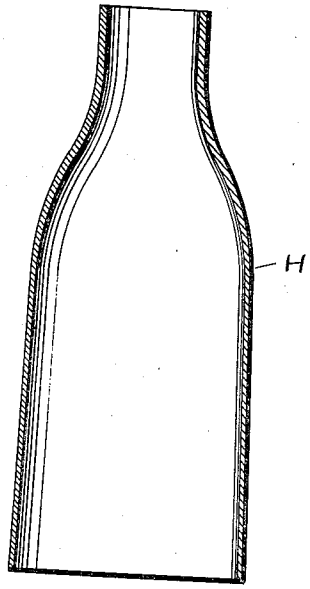
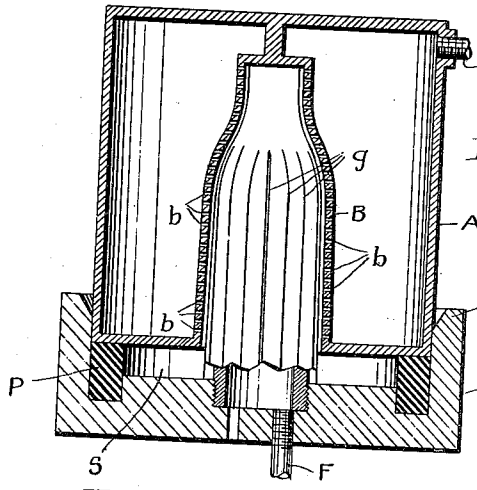


Fig 6.



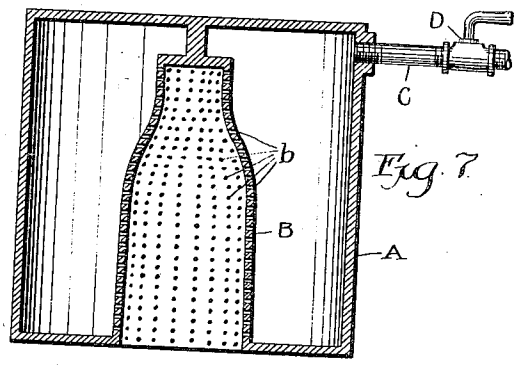


Fig 7.

Fig 3.



Fig 4.

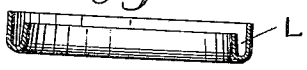
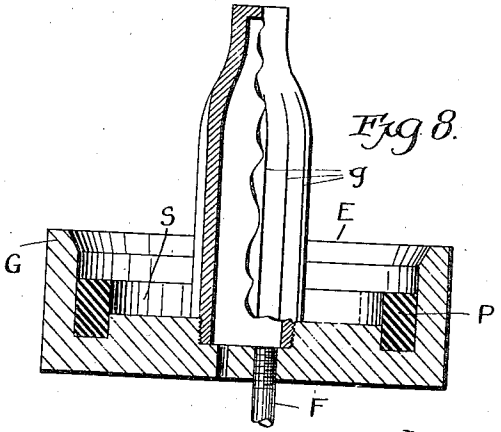


Fig 5.



Fig 8.



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MANUFACTURE OF PAPER BOTTLES.

1,415,100. Specification of Letters Patent. Patented May 9, 1922.

Application filed May 1, 1916. Serial No. 94,587.

To all whom it may concern:

Be it known that I, JOHAN GUSTAF V. LANG, a citizen of the United States, and a resident of the borough of Manhattan, city of New York, county and State of New York, have invented certain new and useful Improvements Relating to the Manufacture of Paper Bottles, of which the following is a specification.

My invention relates to vessels made of fibrous material. It has been found that for many purposes the use or non-use of such a vessel depends on whether it can be given a true bottle form. Furthermore it has been found that the crating, carting and shipping charge on a complete bottle is quite a large proportion of its cost due to the great bulk as compared with the weight.

Endeavors have been made to overcome these drawbacks by making the bottles collapsible or sending them in parts to be assembled by the users, but these methods, as hitherto practiced, are not practicable because of the necessity of the users having to waterproof the bottles after they have been shaped or assembled, as the strain in folding and unfolding makes any previous waterproofing too unreliable for practical use.

My invention has for its object to produce a vessel of substantially true bottle form and in such a way that the parts do not have to be subjected to any folding and unfolding operation or to any other operation likely to strain the material constituting the body so as to impair the waterproofing thereof. The bottle parts as constructed by me can be assembled by a simple machine without the use of glue or paste, a consideration of utmost importance since the use of either glue or paste is prohibitive for hygienic reasons unless the bottle is waterproofed after it is assembled so that the glue or paste becomes covered and thus a direct contact with the contents of the bottle be prevented. If desired the body can be made with a reinforced neck portion.

In the practical realization of the invention I propose to make the bottle in two parts, one in the form of a body having a substantially cylindrical lower portion and a tapering upper or neck portion—providing a bottle-shaped wall—the other in the form of a flanged bottom member. The body I propose to make by molding pulp preferably by a method involving the sucking of pulp on a perforated form from which it can be loosened by air pressure. By slightly coning the portions of the wall, which in an ordinary glass bottle are truly cylindrical, viz, the lower portion of the body, the thin substantially cylindrical bottle-shaped walls can easily be closely nested after they have been dried and waterproofed. The waterproofing of such a body member or tube— open at both ends—can naturally be accomplished in a far simpler manner and with simpler apparatus than the water proofing of an assembled bottle.

In the accompanying drawings which form a part of this specification,

Figure 1 shows in cross-sectional elevation a bottle body which is made by the molding process above referred to.

Figure 2 shows in cross-sectional elevation a metallic ring which can be employed to reinforce or stiffen the upper end of the bottle.

Figure 3 is a cross-sectional elevation of a flange member which can be used as the bottom member of the bottle.

Figure 4 shows in cross-sectional elevation a metallic ring that is U-shaped in cross section and which is employed for securing the bottom shown in Figure 3 in place in the lower portion of the body.

Figure 5 shows in cross-sectional elevation another form of bottle bottom that can be employed.

Figure 6 shows in cross-sectional elevation a complete molding and forming device that can be employed in the making of bottle bodies from pulp.

Figure 7 is an elevation of a perforated forming member or molding member which can be employed in the forming of bottle bodies from wood pulp. The member shown in Figure 7 is the outer member of the device shown in Figure 6.

Figure 8 shows in elevation, mostly in section, the inner forming member of the device shown in Figure 6.

The member shown in Figure 7 comprises an outer air-tight casing A and an outer molding portion B within which a bottle body is formed. The outer molding member B has numerous holes or perforations as *b*, *b*, *b*, and air is sucked from the interior

of the outer or air-tight casing A through the pipe C which is controlled by the valve D. When a bottle body is to be made the member shown in Figure 7 and which is hereinafter frequently referred to as the molding member is dipped into a bath containing the pulp. The valve D is opened and a vacuum is applied so as to suck the air and liquid from the interior of the casing A, thus causing the pulp to be drawn or sucked against the inner portion of the perforated form or molding portion B, resulting in a bottle body formation on the interior of the form. The bottle formation member is now lifted from the bath and the inner or hot drying mold E, as it may be called, shown in Figure 8, is inserted within the bottle body formation that is adhering to the interior of the outer perforated form B. The vacuum is preferably maintained within the chamber or casing A while the inner member occupies the position shown in Figure 6, and the result is the air pressure on the interior and exterior of the material deposited on the perforated form is reduced below normal and, consequently, when air at atmospheric pressure is allowed to enter the casing A there will be exerted an unbalanced pressure on the deposited material in a manner tending to force the deposited material away from the perforations.

In order that the vacuum created between the deposited material on the one hand and the drying mold on the other may be more effective a space S is provided from which the air is sucked when the parts occupy the position shown in Figure 6 while the vacuum is being maintained within the casing A. In order to eliminate leakage of air into this spacing a packing, such as P, may be provided between the inner and outer members A and E. The guide-portions G ensure the proper position of the members A and E relatively to each other as they are being assembled. The inner or drying mold E is of such shape that it can press the deposited material between it and the perforated form and for this reason the drying mold E may also be properly referred to as the pressing mold. This member E is of such a shape and size that it will maintain the deposited material thereupon in proper form and size during the drying operation. Small slits or grooves *g* may be provided in the exterior of the pressing mold which slits or grooves communicate with the space S whereby the vacuum existing in the space S will be affected on all the portions of the body engaged by said pressing mold, thus assisting in the releasing of the deposited material from the perforated mold. The mold E is heated in any suitable manner as by means of steam supplied through the pipe F. When the bottle body form is in a dry condition it is ready for the application of any water-proofing treatment or other treatment to which it is to be subjected. The drying or pressing mold E will not be likely to adhere to the exterior thereof as the latter has practically a smooth exterior. The resulting bottle body is designated as H and is shown in Figure 1. In this figure it will be observed that the lower portion of the body while substantially cylindrical in form tapers slightly whereby the nesting of the bottle bodies can be effected for the purpose of shipment. Such being the case the bottle bodies can be readily treated with the waterproofing material prior to being nested and prior to being shipped to the desired locality. If desired the neck portion can be made thicker for the purpose of reinforcement and strength by depositing a greater amount of pulp in the neck portion of the outer mold than in the cylindrical portion. This deposit can be regulated as by varying the size or number of perforations *b* in the outer mold. The bottom—M or M′—of the bottle can either be made by the same process as the body or it may be punched and drawn from suitable paper. It can either be given a single downward flange as M shown in Figure 3 or a double flange as M′ shown in Figure 5; that is one turn back upon itself so as to form a U-shaped groove in which the lower edge of the bottle body will fit. In the case of the former shape I use a metal ring L shown in Figure 4, U-shaped in cross-section and the legs of which embrace the bottom portion of the bottle body and the flange of the bottom. By squeezing the legs together by suitable machines which either press the outer leg or expand the inner leg, or which combine these two actions, it is possible not only to lock the bottom in place and make the joint mechanically perfect, but also to make the joint water-tight without the use of any glue or paste. In connection with the double flange bottom M′ it is necessary to use a waterproofing which can be made more or less pliable, plastic and if possible adhesive under the action of heat since it is impossible to rely on mechanical means pure and simple, except in the case of a U-shaped metal ring, to produce a reliable water-tight joint without the help of a plastic waterproofing material. In case the bottom M′ shown in Figure 5 is employed I propose to heat the bottom edge of the wall by allowing it to stand on a hot-plate before assembling. The bottom body is then pushed into the U-shaped flange of the double flanged bottom, the flanges of which are then squeezed together. A simple metal ring on the outside or one on the outside and one on the inside will add to the strength.

In Figure 2 a ring N is shown which can be employed to reinforce or strengthen the throat or neck portion of the bottle. This

ring can be applied by the method described in connection with the ring 4 shown in Figure 4.

What I claim is:

1. As an article of manufacture, a bottle comprising three essential parts designed for storage or transportation in unassembled form, consisting of a body member made of paper having a contracted upper portion forming the neck of the bottle and a body portion open at the bottom and slightly tapering from the bottom to the point where the body contracts to form the neck, whereby any number of such body members may be inserted into one another for nesting, a bottom member having a flange adapted for insertion into the bottom end of the bottle body and said flange being slightly conic, thereby permitting nesting of such bottom members, and a metal ring U-shaped in cross-section for overlapping and binding the lower end of the body and bottom flange when the parts are assembled.

2. As an article of manufacture, a bottle comprising three essential parts designed for storage or transportation in unassembled form, consisting of a body member made of paper having a contracted upper portion forming the neck of the bottle and a body portion open at the bottom and slightly tapering from the bottom to the point where the body contracts to form the neck, whereby any number of such body members may be inserted into one another for nesting, a bottom member also made of paper and having a flange adapted for insertion into the bottom end of the bottle body and said flange being slightly conic, thereby permitting nesting of such bottom members, and both said body and bottom members being treated with waterproofing material, and a metal ring U-shaped in cross-section for overlapping and binding the lower end of the body and bottom flange when the parts are assembled.

3. As an article of manufacture, a bottle comprising three essential parts designed for storage or transportation in unassembled form, consisting of a body member moulded into form from paper pulp and having a contracted upper portion forming the neck of the bottle and a body portion open at the bottom and slightly tapering from the bottom to the point where the body contracts to form the neck, whereby any number of such body members may be inserted into one another for nesting, a bottom member having a flange adapted for insertion into the bottom end of the bottle body and said flange being slightly conic, thereby permitting nesting of such bottom members, and a metal ring U-shaped in cross-section for overlapping and binding the lower end of the body and bottom flange when the parts are assembled.

4. As an article of manufacture, a bottle comprising three essential parts designed for storage or transportation in unassembled form, consisting of a body member moulded into form from paper pulp and having a contracted upper portion forming the neck of the bottle and a body portion open at the bottom and slightly tapering from the bottom to the point where the body contracts to form the neck, whereby any number of such body members may be inserted into one another for nesting, a bottom member also moulded into form from paper pulp and having a flange adapted for insertion into the bottom end of the bottle body and said flange being slightly conic, thereby permitting nesting of such bottom members, and a metal ring U-shaped in cross-section for overlapping and binding the lower end of the body and bottom flange when the parts are assembled.

5. As an article of manufacture, a bottle comprising three essential parts designed for storage or transportation in unassembled form, consisting of a body member moulded into form from paper pulp and having a contracted upper portion forming the neck of the bottle and a body portion open at the bottom and slightly tapering from the bottom to the point where the body contracts to form the neck, whereby any number of such body members may be inserted into one another for nesting, a bottom member having a flange adapted for insertion into the bottom end of the bottle body and said flange being slightly conic, thereby permitting nesting of such bottom members, and both said body and bottom members being treated with water-proofing material, and a metal ring U-shaped in cross-section for overlapping and binding the lower end of the body and bottom flange when the parts are assembled.

This specification signed and witnessed the 28″ day of April, A. D., 1916.

JOHAN GUSTAF V. LANG.

Signed in the presence of:

G. McGRAUN,

M. F. KEATING.