March 19, 1929. J. OLSON 1,705,780

METHOD OF MAKING COMPOSITION TUBS

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Fig. 1.

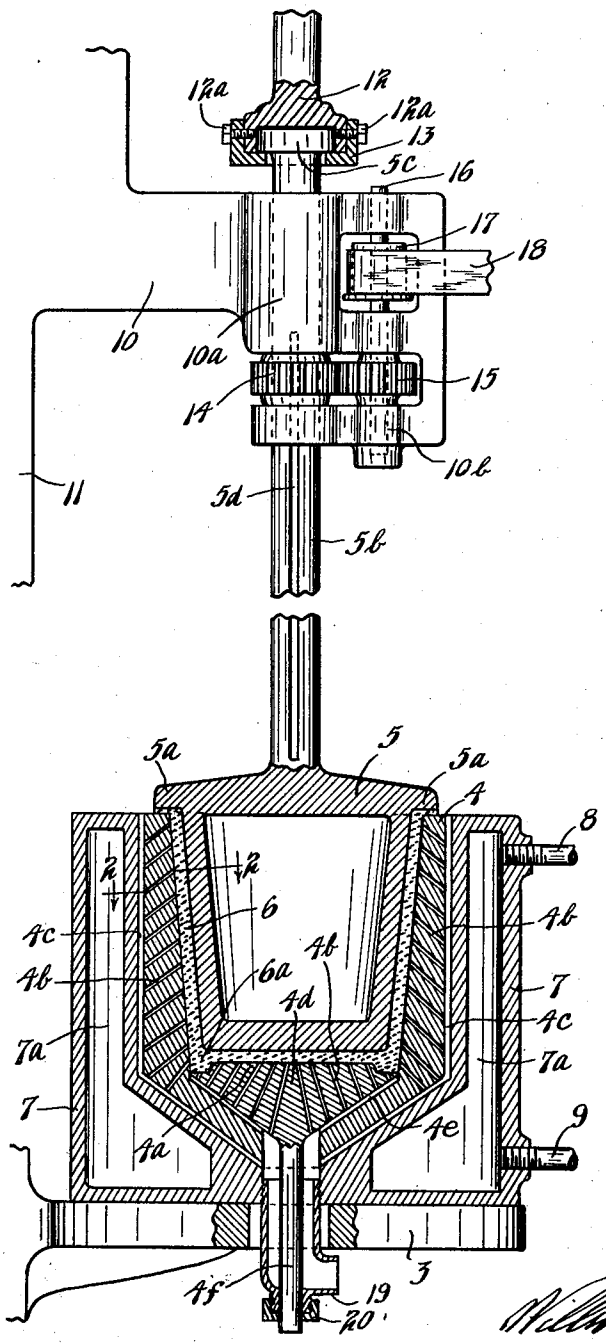
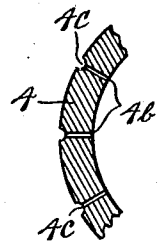


Fig. 2.



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METHOD OF MAKING COMPOSITION TUBS.

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This invention relates to a composition container and particularly to such a container as a small tub such as used in packing and shipping butter and similar materials. Butter tubs are now used in large numbers and these tubs are as a rule made of wood and usually of a plurality of staves held together by hoops.

It is an object of this invention to provide a container such as a small tub made from a composition of materials including wood pulp and casein in suitable proportions, said tub being formed under pressure whereby a rigid, solid and durable article is produced.

It is a further object of the invention to provide such a container or tub of composition material including wood pulp and casein, which tub is formed in dies under very great pressure, the resulting article then being dipped in a chemical such as formaldehyde whereby said chemical acts on the casein and produces a water proof article.

It is still another object of the invention to provide a novel method of forming a container such as a tub, which consists in mixing fibrous material such as wood pulp in different proportions with casein, pressing the material in dies to form the article under great pressure whereby the casein is caused to permeate the fibrous material, which dies preferably are heated, and in dipping the article so formed in a chemical such as formaldehyde whereby the casein is chemically acted upon and rendered water proof.

It is still another object of the invention to produce a one-piece tub of a fibrous composition material including casein, which tub preferably is heated to render the same water proof.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawings, in which like reference characters refer to similar parts throughout the several views and in which:—

Fig. 1 is a view partly in side elevation and partly in vertical section of the apparatus used in producing the article and carrying out the method; and

Fig. 2 is a horizontal section on line 2—2 of Fig. 1.

In making the container or tub a fibrous material is used, and while various materials may be employed, one material which has been found to be very suitable is wood pulp. This pulp is formed by grinding up ordinary wood into comparatively fine form. This ground wood pulp is then mixed with water and with casein in certain definite proportions. While these proportions may vary somewhat in practice, it has been found that by mixing one pound of pulp with one ounce of casein and the necessary water to form a substance of semi-fluid or plastic consistency gives very good results. The casein acts as a lubricant and gives the mixture a great capacity to flow.

The material so mixed is then pressed to form between dies. While various types of apparatus might be used for this purpose, one suitable type of apparatus is that illustrated in the drawings. This apparatus comprises a frame having a supporting platform or shelf 3 on which is supported a female die 4 and a male die 5. The female die 4 is shown as having a frusto-conical recess or chamber therein with a central projection 4^a at its bottom, thus forming an annular groove at the outside and bottom of said chamber adapted to form a projection 6^a around the bottom and exterior of the tub 6 which is shown between the dies 4 and 5 in Fig. 1. The die 4 has a multiplicity of small holes or passages 4^b extending outwardly from the chamber therein which are arranged in vertical rows, the passages in each row communicating with a groove 4^c extending vertically or longitudinally at the exterior of the die 4. The bottom portion of the die 4 is formed as a separate piece 4^d and this piece also has a plurality of holes or passages 4^b extending downwardly therethrough arranged in radial rows, the passages in each row communicating with grooves 4^e extending radially at the bottom or exterior of the member 4^d. Member 4^d is carried on a plunger 4^f which extends down centrally through an opening formed in the bottom of the member 4. The member 4^d normally rests in a chamber formed at the bottom of the member 4. The die 4 is surrounded by a casing 7 of general cylindrical shape having spaced walls to form a chamber 7^a therein and inlet and outlet steam pipes 8 and 9 respectively are shown extending through the wall of the member 7 and in the chamber 7^a by means of which said member may be heated to thus heat the die 4. The casing 7 has a cylindrical chamber formed centrally thereof with a conical lower portion which receives and supports the die 4, and said chamber 7 rests upon the platform 3.

The male die 5 is of frusto-conical shape adapted to extend into the chamber in the die 4 and to have its walls substantially parallel to the walls of said chamber and spaced therefrom. The die 5 has a flange 5^a extending over the top of the die 4 and said die 5 is carried on a vertically extending plunger 5^b. The plunger 5^b extends through a bearing 10^a formed in an arm 10 projecting from a frame 11 which preferably will form part of the machine frame comprising a platform 3.

The top of the plunger 5^b has an enlarged head 5^c received in a recess in the bottom of a vertically reciprocating member or plunger 12, said head 5^c being held in said recess by a coupling collar 13 secured to the member 12 by the circumferentially spaced screws 12^a. The member 12 is adapted to be reciprocated by any suitable means and to apply great pressure to the plunger 5^b. The plunger 5^b also has a keyway or spline 5^d therein adapted to receive a key carried in the gear 14 which gears meshes with a gear 15 secured to a shaft 16. Gears 14 and 15 are received between the bearing 10^a and an arm projecting therefrom and a lower arm 10^b also forming bearings for the plunger 5^b and the shaft 16. The shaft 16 carries a pulley 17 disposed in an opening in the arm 10, which pulley is adapted to be driven by a belt 18 connected to some suitable driving means.

The casing 7 has a pipe 19 threaded into the central opening therethrough which has a projecting boss through which passes the plunger 4^f. A packing nut 20 is placed on this boss on the pipe 19, and pipe 19 is adapted to be connected to some suitable pump or suction means.

The plastic composition prepared as above set forth is either heated or cold placed in the die 4 when the die 5 is elevated above the die 4. The plunger 5^b and the die 5 are then pressed down by means of the member 12 and the material is pressed into the shape of the tub as shown in Fig. 1. The apparatus is designed to place a pressure of from 25 to 400 tons per square foot on the material between the dies. This pressure causes the casein to intimately and thoroughly permeate the wood pulp with which it is mixed and the moisture or water in the material is expressed out through the small openings 4^b. The pipe 19 may be connected to a suction means such as a pump and suction applied to the grooves 4^c and 4^e. This will act to draw the moisture or water through the holes 4^b so that all moisture and water is quickly drawn from the composition material or tub. The die 4 may also be heated while the material is being thus compressed. Enough material is placed in the die so that the flange 5^a can substantially engage the top of die 4 and the material will be distributed so as to form a unitary and perfect container or tub. When the die 5 has been brought substantially to its lowest position, the die can be rotated through its plunger 5^b and the gears 14 and 15 which will be driven through the pulley 17 and the belt 18. This gives a smooth and very finished surface to the inside of the tub. After this operation the die 5 is again raised to be well above the die 4. The member 4^d is then elevated slightly to move the container or tub 6 upward in the die 4. The pressure on the material has caused the same to be extremely solid and hard, so that the tub can now be readily lifted from the die 4. The casein which has permeated the pulp acts as a binder, so that the resulting tub has great strength. After the tub is removed from the apparatus, the same is dipped in a suitable chemical such as formaldehyde. This chemical acts on the casein to form a waterproof substance. The treatment by this formaldehyde also results in the production of a completely sterilized container. The containers or tubs are now allowed to stand for a suitable period and are then ready for the final operations. These operations consist in placing the metal hoops about the bottom corner of the tub and in providing suitable coverings. The bottom hoop is provided to protect the bottom corner of the tub when in use and if desired, one or more intermediate hoops may be placed about the tub, one of which preferably will have means for connection to the cover, for holding the latter in place.

From the above description it is seen that applicant has provided a simple and efficient method of producing a composition tub and has also produced a simple one-piece composition tub. The article has been made and tested in actual use and found to be very efficient for the purpose intended. The same is hard, strong and durable and makes an excellent container for packing and shipping butter and similar materials. The surface of the container is hard, sterile, and waterproof and does not absorb moisture, grease or odors from the material. The containers are much simpler and can be produced much more inexpensively than the wooden tubs which have heretofore been commonly used.

It will, of course, be understood that various changes may be made in the form, details, arrangements and proportions of the article and apparatus used, and in the steps and sequence of steps of the method, without departing from the scope of applicant's invention, which, generally stated, consists in the method and apparatus and article disclosed and defined in the appended claims.

What is claimed is:—

1. The method of making a composition container or tub which consists in mixing merely wood pulp and casein in definite proportions together with water, to make a plastic mass, then pressing said material between dies under very high pressure whereby the casein is caused to permeate the wood pulp

and a unitary rigid article is produced and relatively moving said dies and article at high speed to finish said article.

2. The method of making a composition container or tub which consists in mixing wood pulp and casein substantially in the proportions of one pound of pulp to one ounce of casein, with sufficient water to make a plastic mass, then pressing said material between dies under 25 tons or more pressure per square foot whereby the casein is caused to thoroughly permeate the wood pulp and a solid homogeneous and rigid article is produced.

3. The method of making a composition container or tub which consists in mixing wood pulp and casein in definite proportions together with water, to make a plastic mass, then pressing said material between dies under very high pressure whereby the casein is caused to permeate the wood pulp and a unitary rigid article is produced, then dipping said article in formaldehyde whereby said formaldehyde acts on the casein to produce a waterproof or insoluble coating on said article.

4. The method of making a composition container or tub which consists in mixing wood pulp and casein substantially in the proportions of one pound of pulp to one ounce of casein, with sufficient water to make a plastic mass, then pressing said material between dies under 25 tons or more pressure per square foot whereby the casein is caused to thoroughly permeate the wood pulp and a solid and rigid article is produced, then dipping said article in formaldehyde whereby said formaldehyde acts on the casein to produce a waterproof coating on said article.

5. The method of making a composition container or tub which consists in mixing wood pulp and casein substantially in the proportions of one pound of pulp to one ounce of casein, with sufficient water to make a plastic mass, then pressing said material between inner and outer dies under 25 tons or more pressure per square foot whereby the casein is caused to thoroughly permeate the wood pulp, then rotating said inner die and afterwards removing said tub from said dies.

6. The method of making a composition container or tub which consists in mixing wood pulp and casein substantially in the proportions of one pound of pulp to one ounce of casein, with sufficient water to make a plastic mass, then pressing said material between heated perforated dies under from 25 to 400 tons pressure per square foot to express the water therefrom, whereby the casein is caused to thoroughly permeate the wood pulp, and then dipping the resulting article in formaldehyde whereby said formaldehyde acts on the casein to produce a waterproof substance.

7. The method of making a composition container or tub which consists in mixing with water, wood pulp and a relatively small proportion of casein to make a plastic mass, then pressing said mass between perforated dies under very high pressure, whereby some of the water is expressed the casein is caused to permeate the wood pulp and a unitary rigid article is produced.

8. A method of making a composition tub which consists in mixing wood pulp, water and a relatively small proportion of casein, to make a plastic mass, pressing said means between inner and outer dies, one of which is perforated, under high pressure to form said tub, heating said dies and rotating said inner die to give a smooth finish to the inner side of said article.

In testimony whereof I affix my signature.

JOHN OLSON.