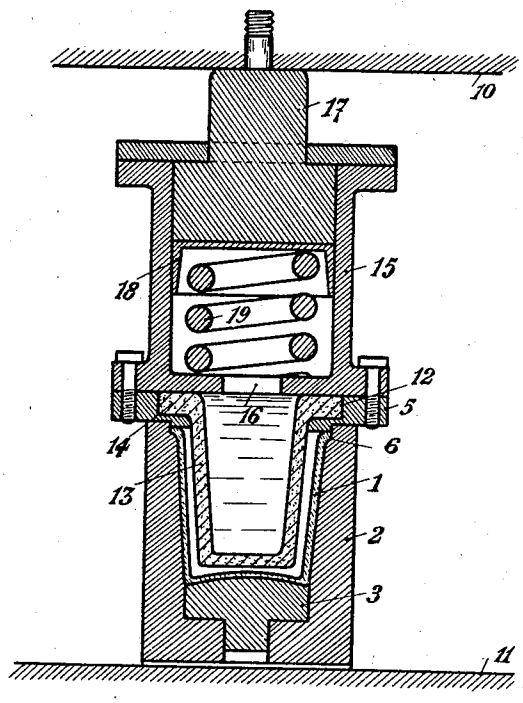
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APPARATUS FOR FINISHING HOLLOW ARTICLES PRODUCED DIRECTLY FROM PAPER PULP

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APPARATUS FOR FINISHING HOLLOW ARTICLES PRODUCED DIRECTLY FROM PAPER PULP

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2 Claims. (Cl. 92—60)

The present invention relates to the finishing of hollow articles or containers produced directly from paper pulp in the fluid state and particularly to finishing the articles produced by the apparatus disclosed in co-pending application Serial No. 72,124, dated April 1, 1936 (case A). The principal objects of the invention are to perform a glazing or calendering in a simple and effective manner and to produce a finish and appearance which are comparable with those obtained when the articles are produced by other processes.

Hollow articles produced directly from paper pulp according to the apparatus in the above-mentioned co-pending application after ejection from the mould are dried. Similar hollow articles of the same material but manufactured according to other processes dry in the mould prior to ejection. Such moulded articles when dry have surfaces which do not present the desirable appearance of those of similar articles made of primary materials, such for example as cardboard. In other words, the surfaces are rough and matted.

It is an object of the present invention so to treat the surfaces of such dried hollow articles produced from paper pulp that they are smooth and glazed. Such object is attained by subjecting the surfaces to a pressure which may extend to 800 kgs. per sq. cm. This further compacts the material and obviates any necessity for impregnation with paraffin wax or otherwise.

It previously has been proposed to utilize the properties of a diaphragm or rubber bag expanded by pneumatic or hydraulic means to cause sheet-like material operated upon directly by the diaphragm or the bag to be forced into contact with the interior surface or surfaces of a mould or matrix to take up the shape thereof. Further, it has been proposed to utilize such an expansible bag structure co-operating with a mould of foraminous material to mould paper pulp in the fluid state into hollow articles.

According to the present invention, the rough-surfaced dry hollow articles made from paper pulp are subjected to a finishing action by being located in a finishing matrix or mould which engages their outer surfaces and by having inserted into the interior thereof an expansible water bag containing water adapted to have pressure applied thereto by movable piston means to expand the water bag and so to subject the dried material of the container to an intense pressure. This material thus is gripped between the water bag and the containing mould by an intense pressure, the operation serving to impart the desired finish and appearance to the surfaces of the container.

For the insertion of the water bag into the hollow article and for the subsequent pressure-protruding movement of the piston, the mould or matrix and cylinder with piston and water bag assembly are located between the co-acting parts of an hydraulic press.

Upon the actuation of this latter after loading the matrix with an article to be finished, in the first place the water bag is inserted into the article and subsequently the piston is moved to cause the expansion action of the water bag to give the desired result.

In order that the nature of the invention may be more clearly understood, reference will now be made to the single accompanying figure, illustrating one embodiment of the invention.

The arrangement illustrated employs a water-bag 13 and is placed between the plates 10 and 11 of a hydraulic press. It comprises a matrix or mould 2 with a movable bottom 3 to receive the pot or like article 1 to be treated. Above this matrix or mould is placed a ring 5 which is arranged to roll over the edge of the pot. For this purpose the matrix 2 comprises a circular rounded groove 6 in which the formation of the edge of the pot is performed. This ring 5 is provided with an internal groove 12 for the purpose of receiving the circular edge 14 of the water-bag 13 formed of expansible material such as rubber. On the said ring is also mounted the body of the cylinder 15 of a pump provided with an aperture 16 opening into the said water-bag 13. In the said cylinder a piston 17 can be displaced, said piston being provided with a packing ring 18 and being fixed to the movable plate 10 of the press. A spring 19 tends constantly to lift the piston.

The operation is as follows:—

The pot 1 to be treated is first placed in the matrix or mould 2 and then the press is operated to produce the descent of the water-bag 13 and of the cylinder 15. In the first place, the ring 5 commences to roll the edge of the pot 1 over outwardly into the circular groove 6 and then presses it against the upper part of the matrix or mould 2. At this moment the piston 17 descends slowly, exerting a pressure on the water in the water-bag. The latter expands little by little and presses against the pot, whereby the material of the latter is calendered against the walls of the mould 2. When the hydraulic pressure is released, the spring 19 returns the piston

17 upwardly and the water-bag again takes its original position, permitting the removal of the article after the plates 10 and 11 have been separated a sufficient distance to remove the water bag 13 from the article 1.

It will readily be understood that the apparatus described for calendering one article at a time can comprise any number of moulds, permitting the calendering of several articles at the same time.

The invention is not limited to the precise forms or details of construction described and shown, as these may be varied to suit particular cases.

What we claim and desire to secure by Letters Patent of the United States of America is:—

1. Apparatus for imparting a finish to the surfaces of dry hollow articles produced directly from fluid paper pulp, comprising a matrix having an interior shape substantially conformable to the exterior surfaces of the said article, an hydraulic press comprising two pressure-exerting plates upon the lower of which the matrix is disposed, a piston attached to the upper pressure plate and subject to the movements of said plate, a cylinder in which the piston works and dependent from the said piston, an apertured flange at the lower end of the cylinder, a helical compression spring in the space between the piston and the said flange, an expansible water-bag secured to the lower end of the cylinder beneath the flange and in liquid-tight communication with the interior space thereof containing the compression spring through the aperture in the flange, said expansible water-bag being shaped for ready insertion into the hollow article, and water in said bag subject to pressure when the piston moves downwardly in the cylinder against the action of the compression spring and under the continued approach of the plates of the hydraulic press, for the purposes set forth.

2. Apparatus for imparting a finish to the surfaces of dry hollow articles produced directly from fluid paper pulp, comprising a matrix having an interior shape substantially conformable to the exterior surfaces of the said article, an hydraulic press comprising two pressure-exerting plates upon the lower of which the matrix is disposed, a piston attached to the upper pressure plate and subject to the movements of said plate, a cylinder in which the piston works and dependent from the said piston, an apertured flange at the lower end of the cylinder, a helical compression spring in the space between the piston and the said flange, a ring secured to the lower end of the cylinder and adapted to seat on the upper end of the matrix containing the dry hollow article, an inwardly extending flange to said ring adapted to project over the upper portion of the hollow interior of the matrix, a rounded groove at the upper end of the matrix to come immediately below said inwardly extending flange, an expansible water-bag secured between the said inwardly extending flange of the ring and the flange at the lower end of the cylinder and in liquid-tight communication with the interior space thereof containing the compression spring through the aperture in the flange, said expansible water-bag being shaped for ready insertion into the hollow article, and water in said bag subject to pressure when the piston moves downwardly in the cylinder against the action of the compression spring and under the continued approach of the plates of the hydraulic press, for the purposes set forth.

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