

June 26, 1934.

P. E. WINNERTZ

1,964,709

MANUFACTURING HOLLOW PAPER BODIES

Filed Aug. 17, 1929

2 Sheets-Sheet 1

Fig. 1.

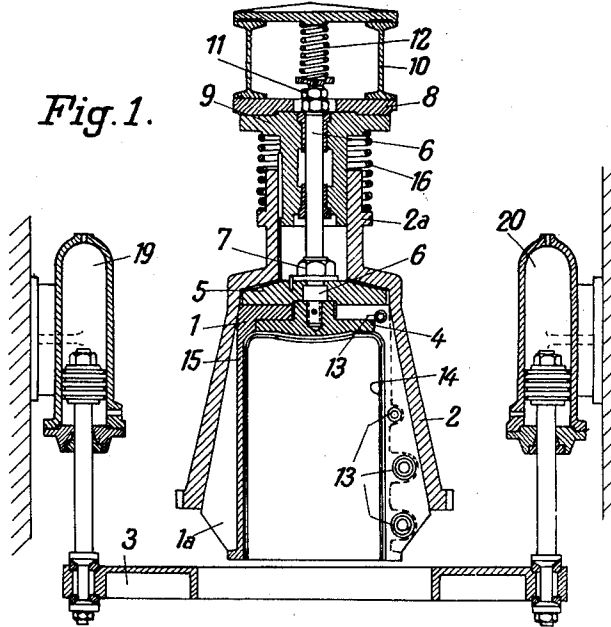
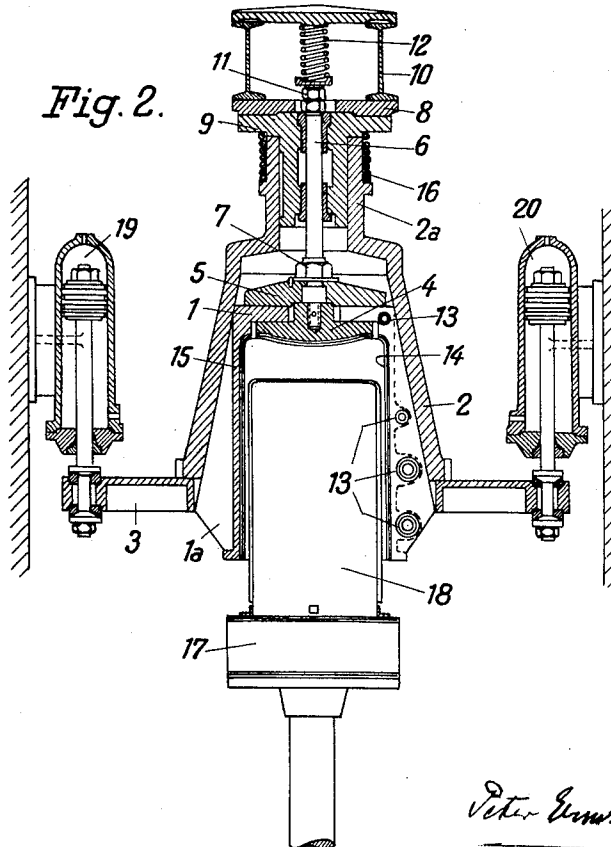


Fig. 2.



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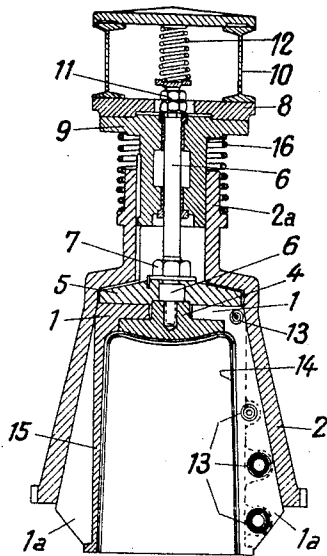


Fig. 3.

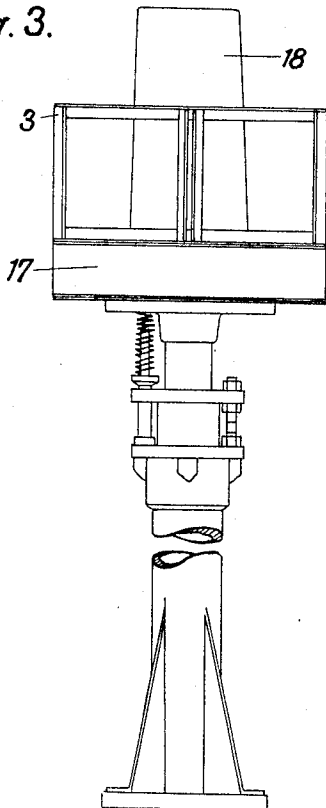
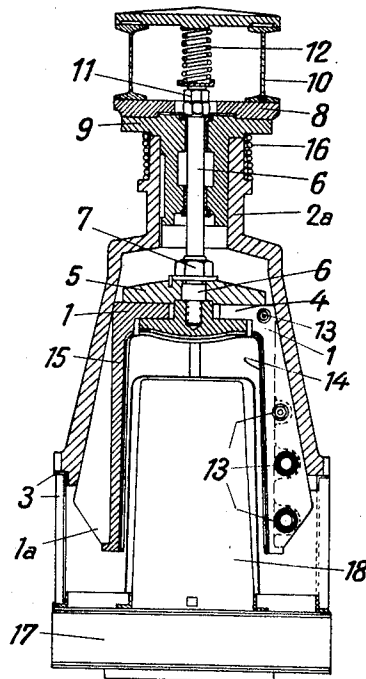
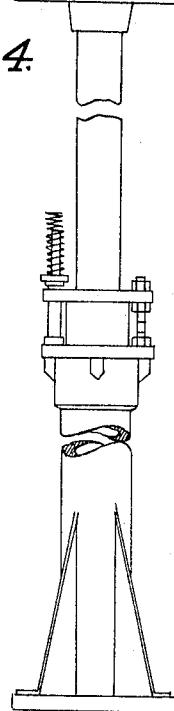


Fig. 4.



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UNITED STATES PATENT OFFICE

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MANUFACTURING HOLLOW PAPER BODIES

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Application August 17, 1929, Serial No. 386,639
In Germany May 22, 1929

1 Claim. (Cl. 18—16)

This invention relates to the art of manufacturing hollow paper bodies by a couching or suction process and in particular to a novel construction of couching or shaping mould to be employed in connection with the process referred to. In its broad aspects this mould according to my invention is provided with a movable outer shell or casing which absorbs and resists the pressure and which is raised by a lifting device for the purpose of receiving therein the material of the paper body, said shell or casing cooperating with a sectional interior body the several sections of which are adapted to be spread and expanded by spring action.

The invention will be described by reference to the accompanying drawings showing by way of exemplification an embodiment of the principles of the invention in Figure 1 in vertical cross section and in combination with the elevating means. Figure 2 is a sectional view similar to Figure 1 and with a withdrawing plunger partly inserted in the hollow paper body. Figure 3 shows diagrammatically in section the combination with elevating means particularly adapted for conical hollow paper bodies. Figure 4 is a section through the mould according to Figure 3 with withdrawing plunger partially inserted in the hollow paper body.

The main parts of the device according to this invention are the expansible, four-sectional interior body 1, the movable outer shell 2 and the elevating means 3. The expansible interior body 1 is provided with the outer ribs 1^a cast in one piece therewith and which in their entirety constitute a conical guiding surface for the outer casing 2, the angle of said cone being somewhat larger than about twice the angle corresponding to the particular material to be operated upon. The interior member 1 is composed of four sections which are adapted to be suspended from and supported upon the closing head 4 and are displaceably arranged between this head and the plate 5. The closing head 4 is screw threadedly secured to a bolt or knob 6 carrying a nut 7 by means of which the plate 5 is secured to the closing head 4 and the bolt 6. The couching mould is attached by the intermediary of a gasket, washer or the like 8 and the head piece 9 to the supporting member 10 which serves for the movement of the mould. The head piece 9 has a bore for the reception and guiding of the bolt 6 which is forced against the head piece 9 by a spiral spring 12. The inside of the expansible interior body 1 in the sectional faces of which the expanding springs

13 are disposed is made up of sieve-like sheets of metal 14, at the rear of which grooves 15 are provided for the discharge of the liberated water. The sieve-like members of sheet-metal 14 constitute a lining which acts like the known ordinary perforated mould.

The expansible interior body 1 is contained in an outer shell or casing 2, the neck-like extension 2^a of which is adapted to be guided and displaced upon the neck of the head piece 9. Between the head piece 9 and the guiding neck 2^a of the outer shell 2 a helical compressive spring 16 is inserted by means of which the outer shell 2 is pressed firmly against the interior body 1.

In order to produce the expansion of the interior body 1 and the withdrawal of the drained hollow paper body contained therein, the withdrawing plunger 18 which is mounted upon the elevating stripping table 17 is first introduced to a certain depth into the hollow paper body contained within the body 1 (Figure 2). As soon as the required depth has been reached, the lifting plate 3 is operated by the two hydraulic cylinders 19 and 20 causing the outer shell 2 to be lifted and the helical compressive spring 16 to be compressed thereby, while the raising of the interior body 1 is prevented by the correspondingly adjusted spring 12. The said spiral springs 12 and 16 also operate as buffers or shock absorbing means for the straining and pressing moulds.

Upon the raising of the outer shell 2 the expansible sections of the interior body 1 are spread out by the expansion springs 13, while the hollow paper body to be withdrawn is retained by the withdrawing plunger 18 which is deeply inserted therein, so that it is prevented from being taken up at one side only, but is loosened on all sides.

The table 17 with the withdrawing plunger 18 and with the paper hollow body loosely disposed thereon is now lowered and the outer shell or casing will have to remain during this descent in its elevated position, until the withdrawing plunger has almost or completely left the inner mold 1. Thereupon the raising device 3 is dropped by the operation of the two hydraulic cylinders 19 and 20, which causes the outer shell 2 to be again firmly pressed upon the inner body 1 and to enclose the same. The couching mould is then ready for a new operation.

The paper pulp is introduced into the apparatus by depositing a paragon or ball of the pulp upon the top of the plunger 18, when the plunger is at the lowest position.

In accordance with the modification of Figures 3 and 4 which is particularly adapted for the withdrawal of conical hollow paper bodies the elevating device 3 may consist of an ordinary frame or skeleton-body which is mounted on the table 17 upon which the withdrawing plunger 16 is arranged in such a manner that it will become engaged with the hollow paper body disposed in the interior body 1 and to be withdrawn and to be inserted therein to a certain depth, before the elevating means 3 is in position to lift the outer shell 2. By the lowering of the table 17 the lifting frame 3 is detached from the outer shell 2.

The arrangement may also be reversed by providing for the lowering of the couching mould, while the table 17 is stationary without thereby deviating from the principle of the lifting of the exterior shell or casing 2, as set forth with reference to the embodiments hereinbefore described. In the modification mentioned the couching mold will then slip over the withdrawing plunger 18 until the latter projects to a certain depth into the hollow paper body contained in the interior member 1 and to be withdrawn, and until the outer shell 2 has reached the hydraulically movable or frame-like elevating means 3, the further steps of operation proceeding in the manner described.

Among some of the most important advantages accomplished by the novel couching and withdrawing means the following may be mentioned:—

1. The individual spreading members of the interior body 1 are firmly pressed and locked to each other by the weight of the outer shell 2, assisted by the pressure produced by the spiral spring 16, so that the sectional joints are tightly closed and no air gaps can be formed between the several expanding sections, which might interfere with the quality of the couching product.

2. The withdrawing plunger 18 can be inserted very far into the hollow paper body contained in

the interior of the inner body 2, and by this means a reliable loosening and detaching of the hollow paper body may be produced upon the detaching of the expanding sections of the mould or upon the dropping thereof without any risk of injuring the paper body.

3. As a result of the resilient mounting of the inner body 1 and the spring-acting arrangement of the outer shell 2 the shocks are neutralized liable to occur during the operation upon the raising of the straining and pressing moulds against the couching moulds, so that the working moulds are not unduly strained.

While in describing the invention reference has been made by way of illustration to particular exemplifications, it is to be understood that the invention is not limited to these constructions and that various changes may be made in the general arrangement and construction of its parts without departing from the invention, and within the scope of the appended claim.

I claim:—

Apparatus for forming pulp bodies by couching process comprising a stripping table, a plunger mounted thereon, a vertically movable elevator having an opening adapted to receive said plunger, an outer shell having an end adapted to rest upon the elevator and surround the opening thereof, said shell having an upwardly extending neck a head piece slidably received in said neck, a compression spring interposed between the head piece and the neck, a support for the head piece, a bolt slidable in the head piece, a plate carried at the lower end of the bolt and housed in the outer shell, a compression spring carried by the support and exerting pressure upon said bolt, a closing head carried by the plate, body sections housed in the shell and having end portions held between the closing head and the plate and compression springs located between the body sections.

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