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PROCESS OF PRODUCING MOLDED OBJECTS AND APPARATUS FOR USE IN CONNECTION THEREWITH.

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1,342,184. Patented June 1, 1920.

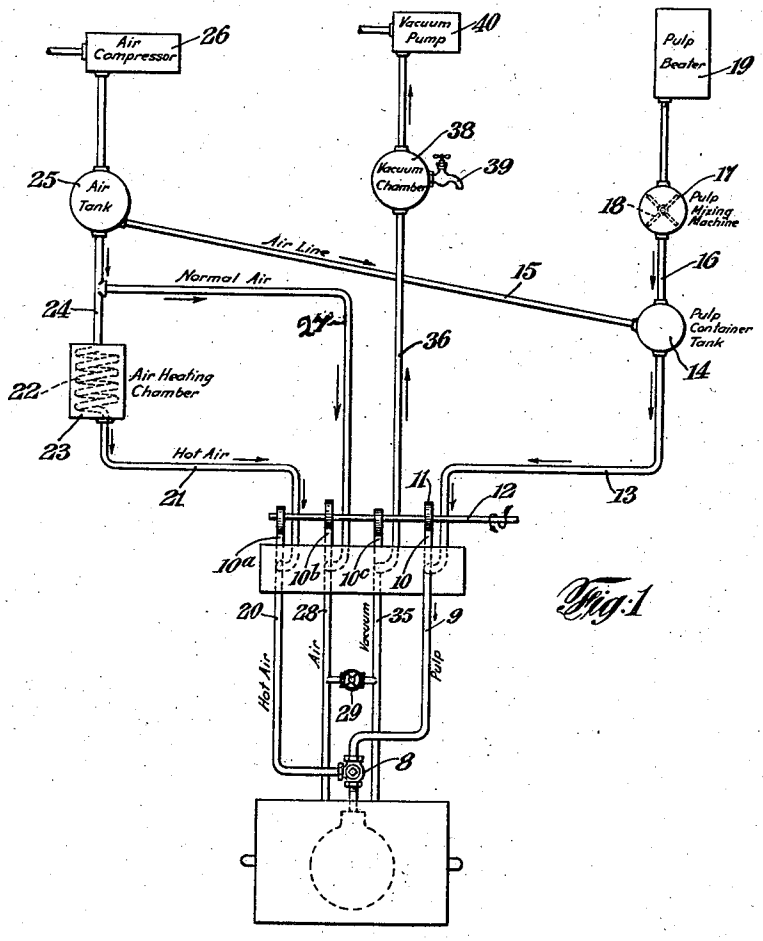
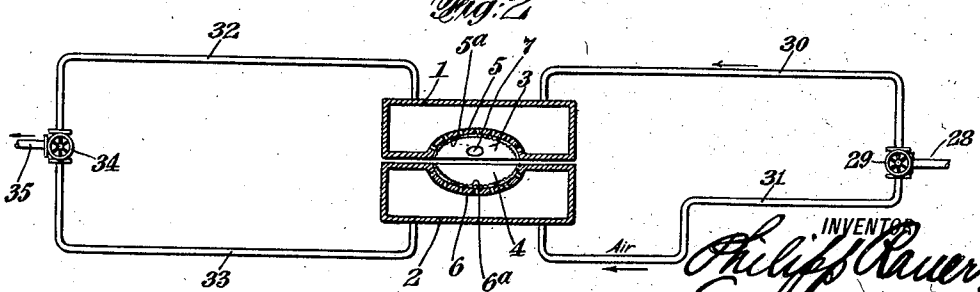


Fig:1

Fig:2



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PROCESS OF PRODUCING MOLDED OBJECTS AND APPARATUS FOR USE IN CONNECTION THEREWITH.

1,342,184. Specification of Letters Patent. Patented June 1, 1920.

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To all whom it may concern:

Be it known that I, PHILIPP RAUER, of New York, in the county of New York, and in the State of New York, have invented a certain new and useful Improvement in Processes of Producing Molded Objects and Apparatus for Use in Connection Therewith, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates particularly to a process of producing objects by molding the same out of finely divided materials, but it relates more especially to the molding of such objects from paper pulp and apparatus for use in connection therewith.

The object of my invention is to provide a process and apparatus for use in connection with the same, by means of which objects of various intricate shapes may be readily molded out of finely divided materials, especially paper pulp, in an advantageous and economical manner.

The object of my invention is, furthermore, to provide a process of this character and apparatus therefor, by means of which the objects may be readily molded without manual manipulation of the materials from which the objects are being molded and so that, in effect, the said objects may be molded substantially automatically.

Still another object of my invention is to provide means by which hollow objects may be molded.

Further objects of my invention will appear from the detailed description thereof contained hereinafter.

While my invention is capable of being carried out in many different ways, for the purpose of illustration I shall describe only one way of carrying out the same hereinafter, and while I may use in connection therewith many different types of apparatus, for the purpose of illustration I have shown only one form of apparatus for use in carrying out the same in the accompanying drawings, in which—

Figure 1 is a diagrammatic plan view of an apparatus of the above character; and

Fig. 2 is a diagrammatic representation showing the mold in vertical section.

In the drawings, I have shown a mold comprised of a hollow upper portion 1 and a hollow lower portion 2, having provided in the inner faces thereof complementary molding cavities or recesses 3 and 4, bounded by perforated walls 5 and 6, covered by wire screens or perforated metal plates 5^a and 6^a, respectively. The cavities 3 and 4 are adapted to be supplied with pulp carried by a body of water by means of an inlet 7, which is controlled by a three-way valve 8, adapted to be supplied with pulp by a pipe 9, in which is a plunger valve 10, which is operated by a cam 11 on a shaft 12, adapted to be constantly rotated from any suitable source of power. The plunger valve 10, when in the right position, conveys pulp to the pipe 9 from a pipe 13, leading from a pulp supply tank 14, supplied with compressed air by means of a pipe 15, and supplied with pulp by means of a pipe 16, which delivers the pulp from a pulp mixing tank 17, having stirrer arms 18. The pulp is supplied to the mixing tank 17 from a pulp beater tank 19 which may be of any suitable type. The three-way valve 8 is arranged either to supply the cavities 3 and 4 with pulp from pipe 9 or a current of hot air at 150° to 180° F. from a pipe 20 in which is also a plunger valve 10^a, similar in operation to valve 10. Said valve controls the supply of hot air from a pipe 21, provided with a coil 22, located in a heating chamber 23, supplied with compressed air by a pipe 24 from a tank 25 containing air under a pressure of about 20 pounds per square inch connected with an air compressor 26. The pipe 15 leads from the tank 25 to the tank 14. Furthermore, from the pipe 24, a branch air pipe 27 for cold air leads to a plunger valve 10^b, similar to valve 10, which again controls the entry of the said air to a pipe 28, communicating with a valve 29, to supply the air by means of pipes 30 and 31 to the two hollow portions of the mold 1 and 2.

A vacuum may be applied to the two hollow portions of the mold 1 and 2 by means of pipes 32 and 33, controlled by a valve 34, and which lead to a pipe 35, also controlled by a plunger valve 10^c, similar to valve 10, and which pipe 35 has a vacuum applied thereto by means of a pipe 36, leading to a vacuum chamber 38, having a draw-

off cock 39 for accumulated water, and which chamber is connected with a vacuum pump 40.

In the operation of my invention, if it is desired, for example, to mold the head of a doll from paper pulp, paper pulp is introduced into the beater 19 with the desired amount of water, and this is conveyed to the mixing tank 17, and thence to the pulp supply tank 14, where the compressed air from the pipe 15 forces the same forwardly through the pipe 13, and, when the pulp control plunger valve 10 is in the right position, as determined by the cam 11, through the pipe 9 and the three-way valve 8 into the cavities 3 and 4 in the interior of the mold portions 1 and 2. At the same time, a vacuum will be applied outside of the perforated walls 5 and 6 by means of the pipes 32 and 33, the pipe 35, valve 10^c, the pipe 36, the vacuum chamber 38 and the vacuum pump 40. The pulp will be continually fed in this manner, while, at the same time, the water is withdrawn through the perforated walls 5 and 6 by means of the vacuum applied through the pipes 32 and 33, so that in this way the fibers of the pulp will accumulate on the screens 5^a and 6^a to the desired depth. When this has occurred, the cam 11 controlling the plunger valve 10 will have moved in such position as to cut off the supply of pulp through the pipe 9 and the cam controlling the hot air plunger valve 10^a will substitute for the same a current of hot air through the pipe 20, which hot air will pass through the body of the pulp deposited on the screens 5^a and 6^a and be withdrawn through the pipes 32 and 33, until the body of pulp on the screens 5^a and 6^a has become sufficiently dried. When this has occurred, the cam controlling the hot air plunger valve 10^a will have been moved into such a position as to cut off the supply of hot air by means of the pipe 20. Another cam controlling the compressed air plunger valve 10^b then opens the same and admits a body of compressed air through the pipes 27, 28, 30 and 31, so that, when the parts of the mold 1 and 2 are separated, said compressed air will force the molded object away from the perforated walls 5 and 6 and thus release it from the mold.

The molding operation may then be repeated as many times as desired to mold the desired number of objects.

The molded object may be then finished in any desired manner, as by painting, enameling, coating or coloring, according to the wishes of the manufacturer.

It will be understood, of course, that other mold portions may be substituted for the portions 1 and 2 to mold objects of different shapes, and, in fact, for any shape desired.

While I have described my invention above in detail, I wish it to be understood that many changes may be made therein without departing from the spirit of the invention.

I claim:

1. The process which comprises depositing a body of solid material from a fluid carrier upon the interior of a perforated molding wall while withdrawing the fluid carrier through said wall by means of a vacuum until the desired thickness of the molded object has been obtained, then discontinuing the supply of molding materials and supplying instead a current of heated air, and then applying compressed air to the exterior of the molded object to remove the same from the mold.

2. In combination, a separable mold having perforated molding walls, means for supplying to the interior thereof solid materials carried by a fluid, means for applying a vacuum for withdrawing the fluid carrier through the perforated walls, means for supplying heated air in the place of the molding materials, and means for applying compressed air in the place of the vacuum.

3. In combination, a separable mold having perforated molding walls, means for supplying to the interior thereof while the mold is not separated solid materials carried by a fluid, means for applying a vacuum for withdrawing the fluid carrier through the perforated walls, and timed valve apparatus for operating said means in succession.

4. In combination, a separable mold having perforated molding walls, means for supplying to the interior thereof solid materials carried by a fluid, means for applying a vacuum for withdrawing the fluid carrier through the perforated walls, means for supplying heated air in the place of the molding materials, and timed valve apparatus for operating said means in succession.

5. In combination, a separable mold having perforated molding walls, means for supplying to the interior thereof while the mold is not separated solid materials carried by a fluid, means for applying a vacuum for withdrawing the fluid carrier through the perforated walls, means for applying compressed air in the place of the vacuum, and timed valve apparatus for operating said means in succession.

6. In combination, a separable mold having perforated molding walls, means for supplying to the interior thereof solid materials carried by a fluid, means for applying a vacuum for withdrawing the fluid carrier through the perforated walls, means for supplying heated air in the place of the molding materials, means for applying compressed air in the place of the vacuum, and timed valve apparatus for operating said means in succession.

7. In combination, a mold, an air-supply apparatus, means for delivering a supply of

hot air and a supply of cold air, a vacuum apparatus, an apparatus for supplying water carrying paper pulp, a timed valve and connections for applying in succession from the timed valve a supply of molding materials together with a vacuum, then heated air together with a vacuum, and then compressed air alone.

8. In combination, a mold, an air-supply apparatus, means for delivering a supply of hot air and a supply of cold air, a vacuum apparatus, an apparatus for supplying water carrying paper pulp, a timed valve and connections for applying in succession from the timed valve a supply of molding materials together with a vacuum, then heated air together with a vacuum, and then compressed air alone, said pulp-supplying apparatus being provided with a supply of compressed air from the compressed air supplying apparatus.

In testimony that I claim the foregoing I have hereunto set my hand.

PHILIPP RAUER.