S. WHEELER.

PROCESS AND APPARATUS FOR MOLDING PAPER-PULP.

No. 190,654. Patented May 8, 1877.

Fig 1

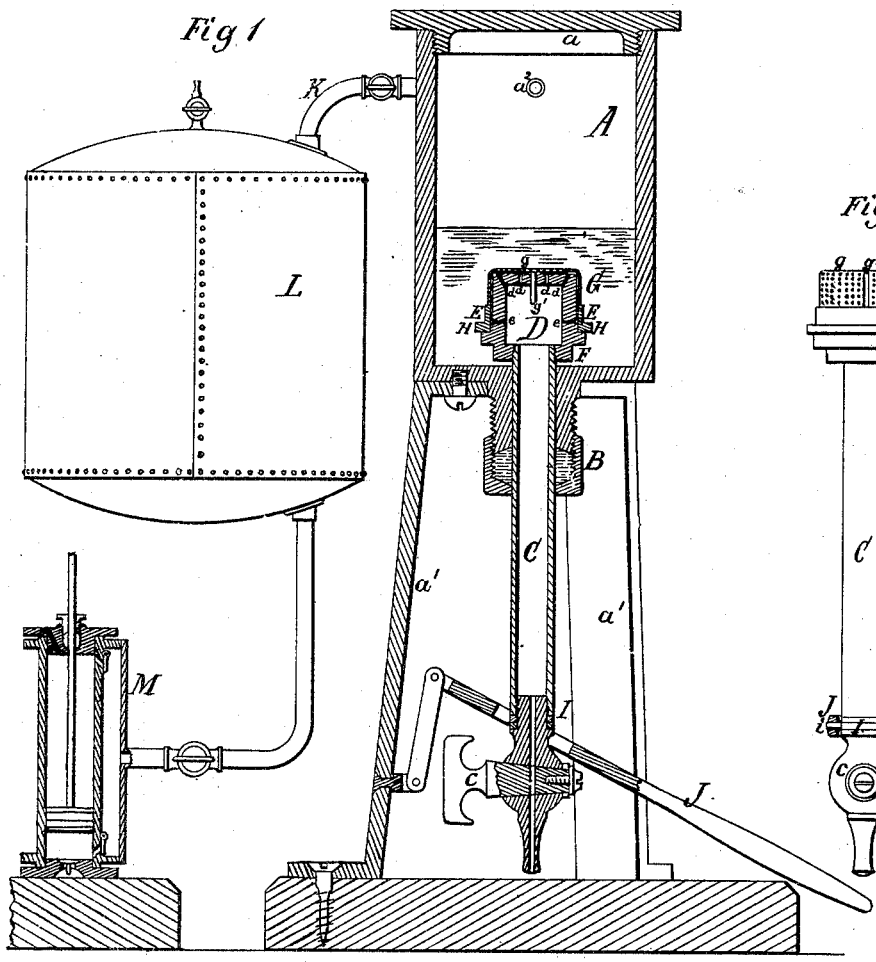


Fig 2.

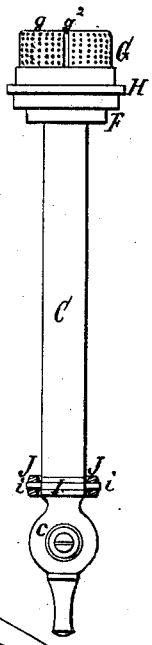


Fig 4.

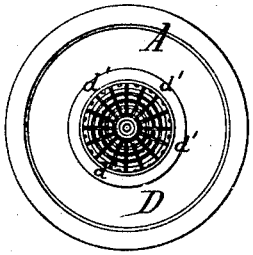


Fig 3.

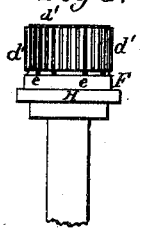


Fig 6

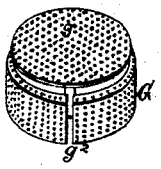
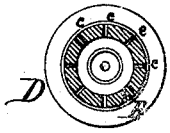


Fig 5.



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UNITED STATES PATENT OFFICE.

SETH WHEELER, OF ALBANY, NEW YORK.

IMPROVEMENT IN PROCESSES AND APPARATUS FOR MOLDING PAPER-PULP.

Specification forming part of Letters Patent No. **190,654**, dated May 8, 1877; application filed February 28, 1876.

To all whom it may concern:

Be it known that I, SETH WHEELER, of Albany, in the county of Albany and State of New York, have invented a new and useful Improvement in Machines for Making Boxes and other Articles of Paper or other Pulp, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical central section of my improved machine. Fig. 2 is a side view of the head on which the box is formed, with its fixed connections. Fig. 3 is a side view of the head proper. Fig. 4 is a top view of the pulp-cylinder and the mold-head, the cap of the cylinder being removed. Fig. 5 is a horizontal section through the said mold-head, and Fig. 6 is a perspective view of the removable perforated covering of the said mold-head.

My invention relates to the use of gas, steam, or other flowing powerful pressing agent within a reservoir, for producing a rapid formation of pulp about a form or forms inclosed within such reservoir, in contradistinction to the use of gas, air, steam, or other analogous agent for creating a vacuum, and thereby effecting a deposit of the pulp, and also in contradistinction to the use of solid male and female dies for pressing articles of pulp into different forms, and, likewise, in contradistinction to the use of gas, air, steam, or other agents for drying articles which have been previously formed or partly formed by ordinary atmospheric pressure or dies, or by a vacuum produced in any known manner.

The nature of my invention consists in a machine for making boxes or other articles of paper-pulp, having a forming and pressure reservoir or chamber which is in communication with air, gas, or steam compressing apparatus, whereby the pulp forming a box or other article is at once rapidly brought into shape about a form or forms within the reservoir by the direct action upon the pulp of the agent employed to produce the pressure.

It consists, second, in the combination, with the forming and pressure reservoir, of a perforated hollow mold or form of cylindrical or taper shape, which form is made of stout wire-gauze or perforated sheet metal, in one piece, if of tapering form, or with a perforated removable sectional and expansible cap, if of cylindrical form.

It consists, third, in the combination of the forming and pressure reservoir, the hollow mold or form and its stem, and a drip and pressure-regulating cock.

It consists, fourth, in the combination of the pressure and forming reservoir, made with a drying-chamber above the pressing position of the form, and the hollow perforated form or forms, made adjustable within the reservoir, for the purpose of drying or partially drying the article above the mass of pulp within the pressing-chamber immediately after it is formed therein.

The object of my invention is to make boxes or other receptacles of any shape, from paper or other pulp, very rapidly and accurately, and to have this operation performed by the simplest kind of machinery.

In the drawings, A represents a cylinder or other vessel, closed by a tightly-fitting cap, *a*, and supported by legs a^1, or in any other convenient way.

At the bottom the vessel A is provided with a stuffing-box, B, through which a hollow stem or pipe, C, is passed. The upper end of the said pipe C is provided with a hollow head, D, which is perforated at *d* and grooved at *d'*, the grooves *d'* being straight or circular, or of other suitable shape, and effecting a surface communication with the said perforations *d*, and with the interior of the head D. The said grooves *d'* are connected at their lower ends by a circular horizontal groove, E, of larger dimensions, from which connection with the interior of the head D is made by grooves *e*.

Below the groove E the head D is provided with a step, F, upon which a loose collar, H, rests.

The head D has a removable perforated covering, G, made of stiff material, (metal preferred,) when the articles being made have vertical sides. This covering is closely and finely perforated, so as to act on the pulp as a sieve. The top *g* of this covering G is a separate piece, held in position by a shank, g^1, which is inserted into the mold-head D.

The covering G is split at g^2, so that it may be easily removed from the head D, or out of

the finished box. The loose collar H covers the groove E, and extends some distance above it, so as to prevent the pulp from having any access to it, and also serves as a means to slip the box off the form or mold.

The lower part of the pipe C is provided with a stop-cock, *c*, and a fixed ring, I, having horizontal journals *i*, with which a forked or other shaped lever, J, is connected for the purpose of operating the mold-head D.

For the admission of compressed air the vessel A is provided with a collared opening, a^2, around which is fastened a pipe, K, communicating with a reservoir, L.

The reservoir may be supplied by a force-pump, M, or any other suitable power mechanism. In certain cases the reservoir may be dispensed with, and the machine may be supplied directly from the force-pump, and the air or gas compressed within the cylinder A.

The cap G may be made of one or more pieces, according to the intricate nature and requirements of the different patterns.

In the accompanying drawings and description the simplest form of my invention is shown. The pulp-cylinder may be a large tank or vat, and a number of forms or heads corresponding to the one shown, only varying from it in shape, placed in this vat.

The top of the vat may be arranged to be opened automatically; so, also, may the cocks of the several forms be connected and opened and closed automatically and at one operation, and all the forms or heads may be connected and raised and lowered automatically.

The articles molded may also be lifted off the forms together automatically.

The steam, water, air, or other power may be applied to a moving piston so arranged within the pulp-chamber that the air within the chamber is compressed to the degree desired, and the pulp, by means of this compressed air, forced against and shaped upon the forms or heads; or water and pulp may, under high pressure, be forced together into the mold-chamber, and by pressure the articles of pulp will be formed upon the molds, and when thus formed can be lifted out of the mold-chamber and dried.

In manufacturing pulp boxes by the old process of exhaustion, or with a pressure not greater than that of the atmosphere, the process is very slow and imperfect, and if the operation is continued long enough to obtain articles of desired thickness and strength, the surface thereof is very rough and uneven.

In my process the articles may be formed either on the exterior or interior of a form or head.

Operation: The operator elevates the head D, by means of the lever J, to the proper starting position, and places the perforated coverings upon it. The vessel A is supplied with pulp, say, to one-half or two-thirds its capacity. He now closes the cylinder with the cover *a*; then admits through the opening a^2 compressed air or gas; then lowers the head D into the pulp, as shown in Fig. 1, and opens the cock *c*. The pulp is immediately forced against the cap G of the head D, and the pulp nearest thereto is drained of water through the perforations of the said cap, and collected in the grooves *d'*, which grooves it follows, partly to the perforations *d*, and partly to the groove E and the perforations *e*, to be finally collected in the hollow part of the head D, and from there to be conducted, through the pipe C and the cock *c*, out of the machine.

When the pulp has formed around the cap in proper consistency and thickness, the mold-head D is raised above the surface of the remaining pulp, and allowed to remain until it is comparatively free from water, and packed to the proper solidity by the pressure of the surrounding air.

At this stage of the operation the circulation of strong currents of compressed air through the hollow form or head and its hollow tube greatly facilitates the drying of the molded articles, as the moisture is carried off rapidly through the tube and its cock.

The supply of compressed air is shut off when the articles are dry enough to be removed, and the lid *a* is opened, and the cap G slipped off the head D. The pulp pattern or box which has formed around the outside of the said parts is now freed from the cap G and handed over to the finishers, who subject it to the treatment necessary for its final appearance; or it may be subjected to a further drying and hardening process before the cap G is removed, depending upon the shape of the article, finish, and character.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The process herein described of making hollow articles of pulp, consisting in immersing forms or molds in pulp under pressure, and rapidly removing these forms from the pulp into an air-chamber above for removal of moisture, substantially as set forth.

2. The combination of the forming and pressure reservoir, the hollow form and its stem, and a drip and pressure-regulating cock, substantially as described.

3. The combination of the pressure and forming reservoir, the upper part being made to serve as a drying-chamber above the pulp taking position of the form, and the hollow perforated form, made adjustable within the reservoir, for the purpose of drying, or partially drying, the articles in the pressing-chamber, substantially as described.

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