(No Model.)

W. L. CHASE.

Method of and Apparatus for Forming Articles from Pulp.

No. 240,091. **Patented April 12, 1881.**

Fig. 1.

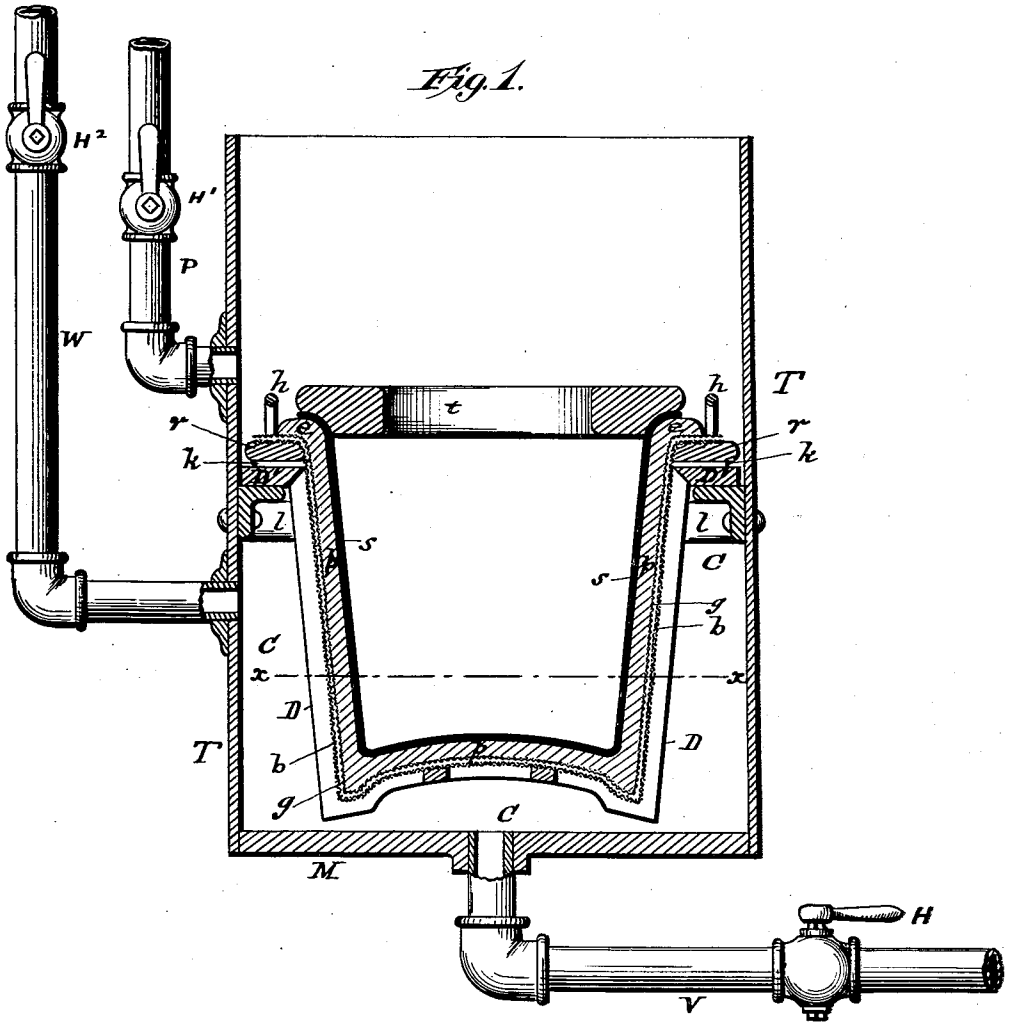
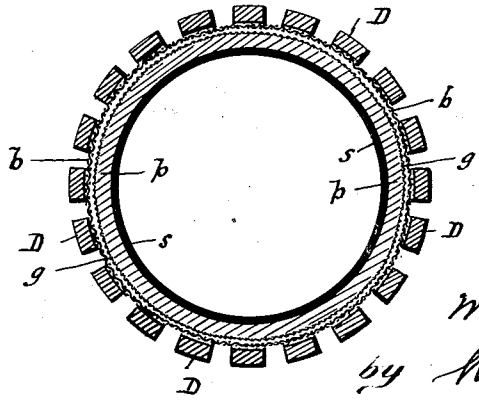


Fig. 2.



Witnesses.
Robert Everett.
A. C. Lane.

Inventor.
Wm. L. Chase
by W. Bailey
his Atty.

UNITED STATES PATENT OFFICE.

WILLIAM L. CHASE, OF PORTLAND, MAINE.

METHOD OF AND APPARATUS FOR FORMING ARTICLES FROM PULP.

SPECIFICATION forming part of Letters Patent No. 240,091, dated April 12, 1881.

Application filed March 16, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM L. CHASE, of Portland, Cumberland county, Maine, have invented certain new and useful Improvements in the Method of and Apparatus for Forming Articles from Pulp, of which the following is a specification.

My improvements, while directed mainly to producing hollow articles from pulp, are applicable to some extent to the manufacture of pulp articles generally.

The improvements are directed to facilitating the removal of the formed article from the apparatus, to preventing premature and irregular deposit upon the wire former of the pulp, and to smoothing the exposed surface of the formed article, this being done under my invention in the same apparatus in which the article is formed, the forming and smoothing steps taking place in one continuous operation.

I will first describe one form of apparatus adapted to be used under my invention, and will then describe the process by the aid of which my improvements can be carried out, and will then describe my improved process of making a pail or other paper-pulp article. The apparatus represented in the drawings is the preferred form of apparatus. I do not, however, desire to be understood as restricting myself to that particular structure.

Figure 1 is a vertical central section of the apparatus, and Fig. 2 is a transverse section of the diaphragm and wire former on line *x x*, Fig. 1.

The apparatus in this instance is arranged for forming pails or other similar hollow articles.

T is a galvanized-iron or other forming-vessel, to the bottom M of which is attached the pipe V, leading to a vacuum-pump, connection with the pump being made and closed by means of the cock or valve H.

D is a cast-metal diaphragm, composed of longitudinal and circular bars, with spaces between, whose interior is of the same general shape as the exterior of the article to be produced.

l is a ledge within the forming-vessel T, upon which rests the imperforate flange D′ of the diaphragm D, making therewith an air-tight joint.

Fitting closely in the diaphragm D is a removable wire basket or former, composed of, first, a heavy wire screen, *b*, covering the inner surface of the diaphragm and fastened at its top to the metal ring *r*; and, second, a light inner wire-cloth lining, *g*, of sufficient fineness to prevent the escape of particles of pulp through it, the whole making a firm portable basket or former, the inside of which is exactly the shape of the desired pail or other article.

h h are handles fixed to the ring *r*, to facilitate removing and handling the basket.

k is a rubber or other packing ring or gasket set upon the flange D′, so as to interpose between the latter and the ring *r* when the wire basket or former is in place.

s is a flexible bag or smoother, and *t* a ring used to clamp the smoother.

P is a pipe provided with a cock and valve, H′, for the admission of fluid pulp to the forming-vessel.

W is a pipe provided with a cock or valve, H^2, for the admission of water to the forming-vessel.

The process of forming a pail or other hollow article in this apparatus is as follows: The cock H is closed and water admitted to the forming-vessel up nearly to the level of the ledge *l* through the pipe W. The inner basket or former is now placed in position in the diaphragm, as shown, and sufficient fluid pulp admitted to the forming-vessel through the pipe P to make a pail or other article of the desired thickness, which quantity is determined by trial. The packing-ring *k* makes an air-tight joint between the diaphragm D and the ring *r* of the basket or former. The cock H is now opened, and obviously the only escape for the water contained with the pulp in the forming-vessel is through the wire basket or former and the diaphragm, the result being that the pulp is deposited in a film all over fine-wire lining *g*, as shown at *p*. When by the action of the air-pump the fluid pulp has been drawn down to about the level of the ring *r* in the forming-vessel, it is sometimes expedient to remove the remaining pulp by a dipper constructed for the purpose. The object of this is to secure a deposit more even in thickness at top and bottom of an article. Before the film of pulp *p* has dried out too much, the flexible bag or smoother is low-

ered into the article and the ring *t* pressed down upon its turned edge *e* sufficiently to make an air-tight joint, by which means (the pump continuing to operate) the pressure of the atmosphere nearly is exerted upon the inner surface of the flexible bag, thereby forcing the bag against and imparting a smooth surface to one side or face of the moist pulp article. The cock H is now closed and the flexible bag and ring are readily removed. By making air communication with the chamber below through the top of the film of pulp, or by other suitable means, the vacuum in chamber C is destroyed, and the wire basket containing the pail or other article can be taken out. The basket, after being removed, is rapped lightly about upon its sides and bottom to loosen the film of pulp from the wire lining, and the former or basket is then inverted, and the article which it contains is deposited upon or in a zinc or other form or block suitable to keep it in shape during the operation of drying.

Having described the process and the apparatus by the aid of which the same can be carried out, I proceed to point out the features which constitute my improvements. These are as follows:

First, the removable wire basket or former, in connection with its supporting-diaphragm. By making the basket so that it can readily be applied to and removed from the diaphragm I facilitate the operation of detaching and removing the pulp article from the basket, and prevent liability of the article being torn or injured during its removal from the basket. When the basket is a fixture it is difficult to get at the lower part of the pulp article so as to detach it from the wire lining, and in attempting this the article is frequently injured. This improvement is applicable to the manufacture of other than hollow articles, all that is needed being simply to modify the shape of the diaphragm and wire former, retaining the feature of a fixed diaphragm, in combination with a removable former, which makes an air-tight joint with the diaphragm. The device can be used for making any flat or solid article, such as board, boot and shoe soles and heels, pail-covers, and dishes, and for extracting water from pulp for shipment.

Second, the admission of water to the forming-vessel previously to the admission of pulp. I have found in practice that if pulp be admitted alone the water therein naturally flows through the wire former to fill the chamber C beneath the diaphragm, with the effect of depositing pulp in irregular and unformed patches on the wire lining. The result of this is always to give a rough and uneven surface to the article. By admitting water, however, so as to fill the chamber C before admitting any pulp to the vessel, this difficulty is entirely obviated.

Third, the use of the flexible bag in order to smooth the one surface of the article. I am aware that it is not a new idea to use such a bag for this purpose; but I am not aware that it has ever been used on the moist pulp article in the forming-vessel in the manner hereinbefore described.

In previous applications of the flexible bag to pressing and smoothing articles, the article has usually been put in a suitable mold, and air, water, or other fluid has been forced into the interior of the bag by a pump or equivalent means, this step being conducted as a separate operation from the forming of the article, and in an apparatus separate from that in which the article is formed. By my method the forming and the finishing by pressure are accomplished with one handling of the article, without the delay attending a distinct and separate operation, and without the expense of the presses and pumps usually employed, the pressure of the atmosphere exercised upon the bag when applied to the moist pulp article in the forming-vessel giving equally as good results as a pressure of several hundred pounds upon the bag when applied to a partially dried or dampened article.

Having described my improvements, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for forming pulp articles, the combination of a former-supporting diaphragm, a wire former removable therefrom, and a packing-ring or its equivalent, which makes an air-tight joint between said parts, substantially as hereinbefore set forth.

2. The improvement in the art of forming articles from pulp, which consists in admitting water to the forming-vessel previously to the admission of the fluid pulp thereto, substantially as and for the purposes hereinbefore set forth.

3. The improvement in the art of forming articles from pulp, which consists in forming the article and smoothing or pressing one side of it at one continuous operation, the smoothing operation taking place in the same vessel in which the article is formed, substantially as hereinbefore set forth.

4. The method of forming and smoothing hollow articles of pulp, which consists in first forming the article, and then, while the article is still moist and in the former, applying thereto a flexible bag, making an air-tight joint at top with the article, which bag is pressed against the exposed face of the article by exhausting the air from the other side of the former, substantially as hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 16th day of March, 1881.

WM. L. CHASE.

Witnesses:
E. A. DICK,
N. C. LANE.