

No. 710,101.

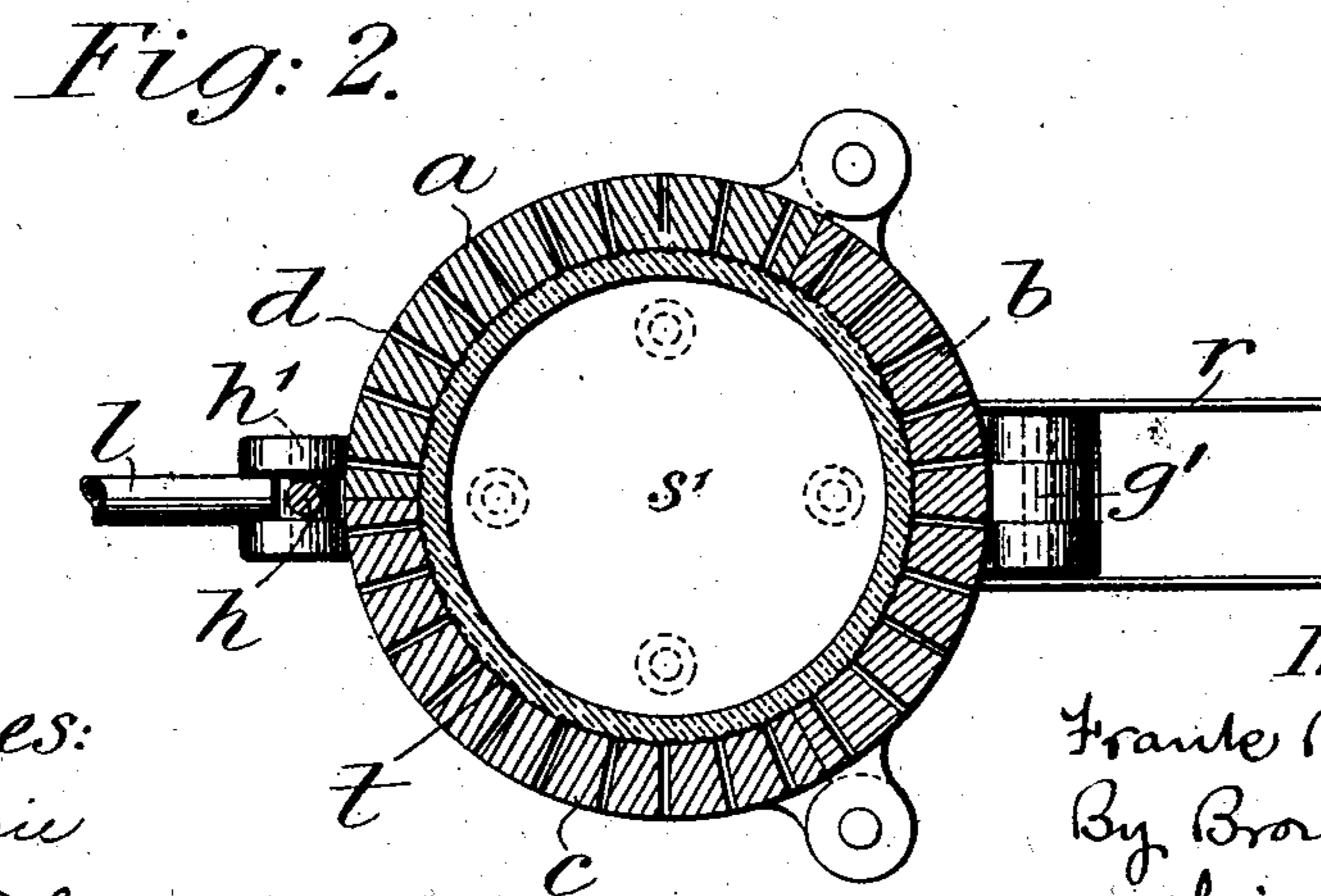
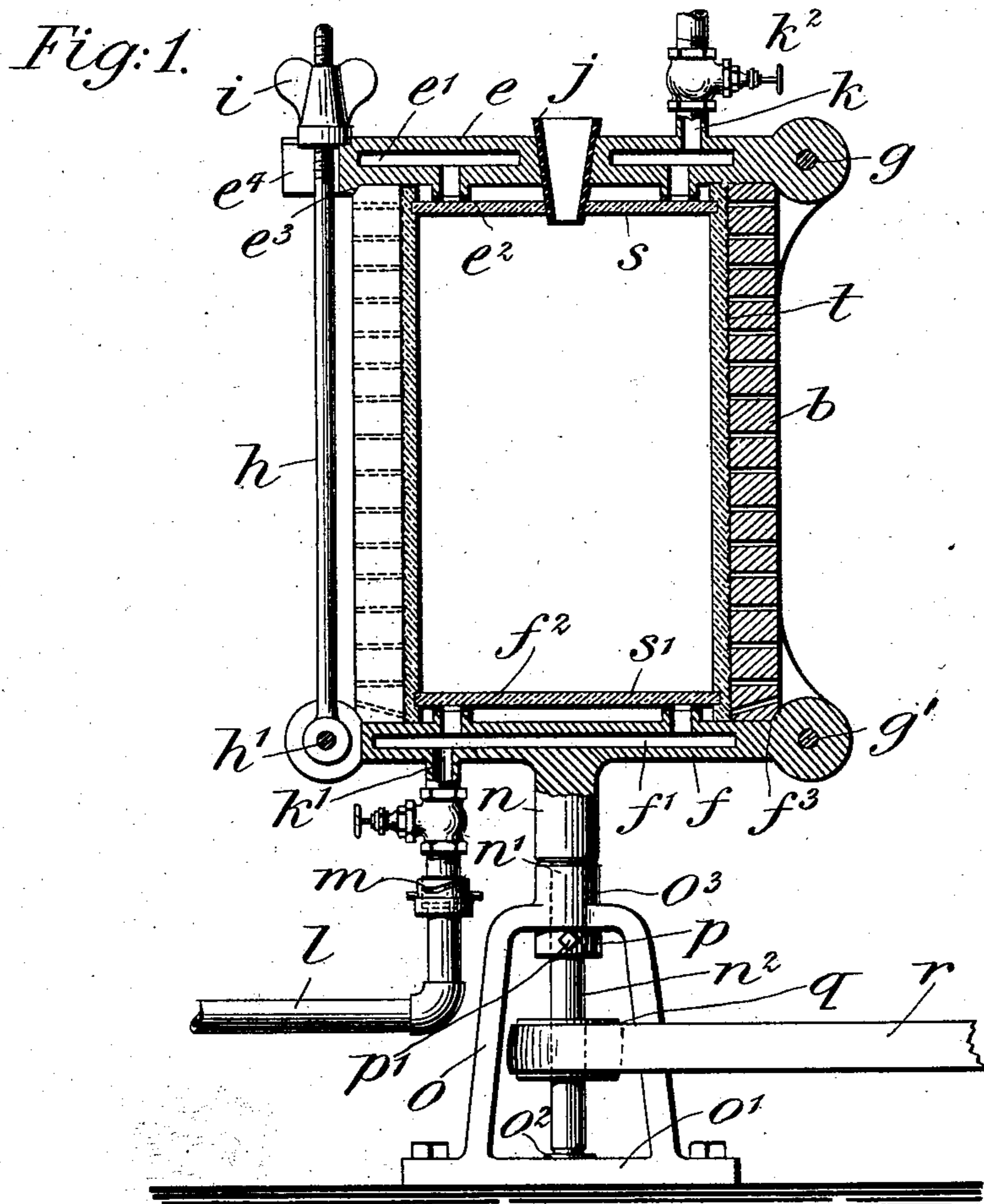
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F. B. HOWARD.

APPARATUS FOR THE MANUFACTURE OF CLOSED VESSELS FROM PULP.

(Application filed Jan. 16, 1902.)

(No Model.)



Witnesses:
J. A. Rennie
Henry Thorne.

Inventor:
Frank B. Howard
By Brown & Howard
his Attorneys

UNITED STATES PATENT OFFICE.

FRANK B. HOWARD, OF NEW YORK, N. Y., ASSIGNOR TO LAFLIN & RAND POWDER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

APPARATUS FOR THE MANUFACTURE OF CLOSED VESSELS FROM PULP.

SPECIFICATION forming part of Letters Patent No. 710,101, dated September 30, 1902.

Application filed January 16, 1902. Serial No. 90,027. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. HOWARD, a citizen of the United States, and a resident of the borough of Manhattan, in the city and State of New York, have invented a new and useful Apparatus for the Manufacture of Closed Vessels from Pulp, of which the following is a specification.

My invention relates to apparatus for the manufacture of closed vessels from pulp, with the object in view of providing effective means for molding the side walls or body of the vessel around the previously-formed heads.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 is a view of the apparatus in vertical section, and Fig. 2 is a transverse section of the same.

The side walls of the mold are formed in longitudinal sections, in the present instance each section forming one-third of the body of the mold. These sections are denoted by *a*, *b*, and *c*. Each of the sections is provided with manifold perforations *d*, and their meeting edges are so fitted as to form a liquid-tight joint when the parts are assembled for use. The heads of the mold are denoted by *e* and *f*. They are each provided with internal chambers, that within the head *e* being denoted by *e'* and that within the head *f* being denoted by *f'*. They are also provided with lugs or bosses extending inwardly from their inner faces, the number of such bosses on each head being in the present instance four. Those extending from the head *e* are denoted by *e²* and those extending from the head *f* are denoted by *f²*. The several bosses *e²* and *f²* are provided with passage-ways extending through them into communication with the chambers *e'* and *f'*, through which the chambers *e'* and *f'* communicate with the interior of the mold. The heads *e* and *f* are constructed to move into and out of engagement with the body-sections *a b c*, the means for such movement being provided for in the present instance by hinging the heads, as at *g g'*, to the section *b* of the body. The inner faces of the heads *e'* are provided with shallow recesses *e³* and *f³* for the reception of the opposite ends

of the body-sections to hold them in assembled adjustment, and the said heads *e* and *f* are arranged to be forced toward each other and released by means of a rod *h* and arranged at *h'* with its free end in position to swing into an open slot *e⁴* in the head *e*. A thumb-nut *i*, working on the threaded end of the rod *h*, serves to force the heads toward each other and hold the parts snugly in assembled adjustment. Communication between a vacuum apparatus of any well-known or approved form—for example, a vacuum-pump (not shown)—and the chambers *e'* and *f'* in the heads *e* and *f* is made through suitable pipes having a detachable connection with tubes *k k'*, carried the one by the head *e* and the other by the head *f*. The tubes *k k'* are each provided with a valve and valve-operating mechanism (indicated at *k²*) for the purpose of opening and closing communication between the vacuum apparatus and the chambers *e* and *f*, and the means for uncoupling the pipe *l*, leading to the vacuum apparatus, is shown at *m* and may be of any well-known or approved form, it being understood that a corresponding pipe and coupling is used in connection with the tube *k*. The mold is conveniently supported as a whole by means of a depending bearing *n*, shouldered at *n'* and extended in reduced form *n²* to the base *o'* of a support *o*, where it is stepped in a bearing-plate *o²*. The shoulder *n'* is intended to rest on the top of a socket-piece *o³* in the top of the support *o*, and the support of the mold is held against liability of jumping out of place by means of a collar *p*, fixed on the reduced portion *n²*, immediately below the socket-piece *o³*. The means here shown for fixing the collar *p* in position is a set-screw *p'*. The reduced portion *n²* of the mold-support and bearing is provided with a pulley *q* for receiving a belt *r*, leading to a suitable source of power. (Not shown.) The mold so mounted is in a position to be rapidly rotated for the purpose of using centrifugal force to drive the pulp toward the side walls of the mold. The heads of the vessel to be formed are denoted by *s s'*. They may consist of disks of paper cut from a sheet of paper or paper-board, or they may be of other suitable ma-

terial, as may be desired. They are held temporarily in position with their peripheries a short distance from the interior wall of the mold by means of a vacuum or partial vacuum formed in the chambers *e* and *f* in communication with the faces of the reduced heads *s s'* through the bosses *e²* and *f²*. These bosses *e²* and *f²* also serve the purpose of spacing the heads from the opposite ends of the mold a sufficient distance to permit the side walls of the pulp to be formed a short distance outside of the two heads as well as between them. The interior of the body of the mold is lined with wire-gauze *t*, and a hollow plug *j* extends through the head *e* of the mold and also through the head *s* of the vessel to be formed for the purpose of supplying pulp in suspension to the interior of the mold and for the further purpose of maintaining the filling or bung hole in the head *s* free from obstruction.

The operation of the apparatus is as follows: The tubes *k k'* having been connected with the vacuum appliance and the valves having been opened to connect the vacuum appliance with the chambers *e'* and *f'* in the heads, the said heads *s* and *s'* are placed in position, the one, *s'*, at the bottom of the mold on the bosses *f²* and the other in position on the bosses *e²*, while the head *e* is still swung open, where access to its under side may be readily had. The vacuum appliance is then operated to create a sufficient vacuum within the chambers *e'* and *f'* to hold the heads *s* and *s'* seated. The valves in the tubes *k k'* are then closed to maintain the vacuum, or the said valves may be closed after the heads are finally brought into engagement with the body of the mold. In any event the head *e* is swung into engagement with the body and locked in position by the thumb-nut *i*, and the pipes leading to the vacuum apparatus after the valves in the tubes *k k'* are closed are disconnected to leave the mold free to rotate. Pulp in suspension is then introduced through the hollow plug *j* either before or after the rotary movement is started, and the said pulp is thrown by the centrifugal force against the wall of the body of the mold until it has become deposited in sufficient thickness to form the walls of the vessel, the said

walls of pulp molding themselves around the peripheries of the heads *s s'*, as clearly indicated in Fig. 1, and overlapping both the outer and inner edges of the heads forming chimes. During the rotary movement of the mold the water escapes through the perforated body of the mold while the pulp itself is deposited in a dense layer along the interior of the side walls. When the walls of the vessel have been thus formed, the rotary movement of the mold is suspended and the mold opened and the formed vessel removed for purposes of drying.

What I claim is—

1. Apparatus for making closed vessels comprising a mold having its body portion perforated and its heads provided with vacuum-chambers in communication with the interior of the mold, means for placing the vacuum-chambers in communication with a vacuum appliance and means for rotating the mold, substantially as set forth.

2. The combination with a mold mounted to rotate and comprising a perforated body and heads each provided with a vacuum-chamber in communication with the interior of the mold, of means for connecting and disconnecting the said heads with a vacuum appliance, for holding previously-formed vessel-heads on the inner faces of the heads of the mold during the molding of the body portion, substantially as set forth.

3. The combination with a mold mounted to rotate and comprising a perforated body, and heads, each provided with a vacuum-chamber in communication with the interior of the mold of means for connecting and disconnecting the heads with a vacuum appliance, the said mold-heads being provided with inwardly-projecting bases to determine the height of chime and to receive previously-formed vessel-heads thereon during the molding of the body portion.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 2d day of January, 1902.

FRANK B. HOWARD.

Witnesses:

FREDK. HAYNES,
C. S. SUNDGREN.