(No Model.) 3 Sheets—Sheet 1.

H. CARMICHAEL.

APPARATUS FOR MAKING HOLLOW FIBER WARE.

No. 568,519. Patented Sept. 29, 1896.

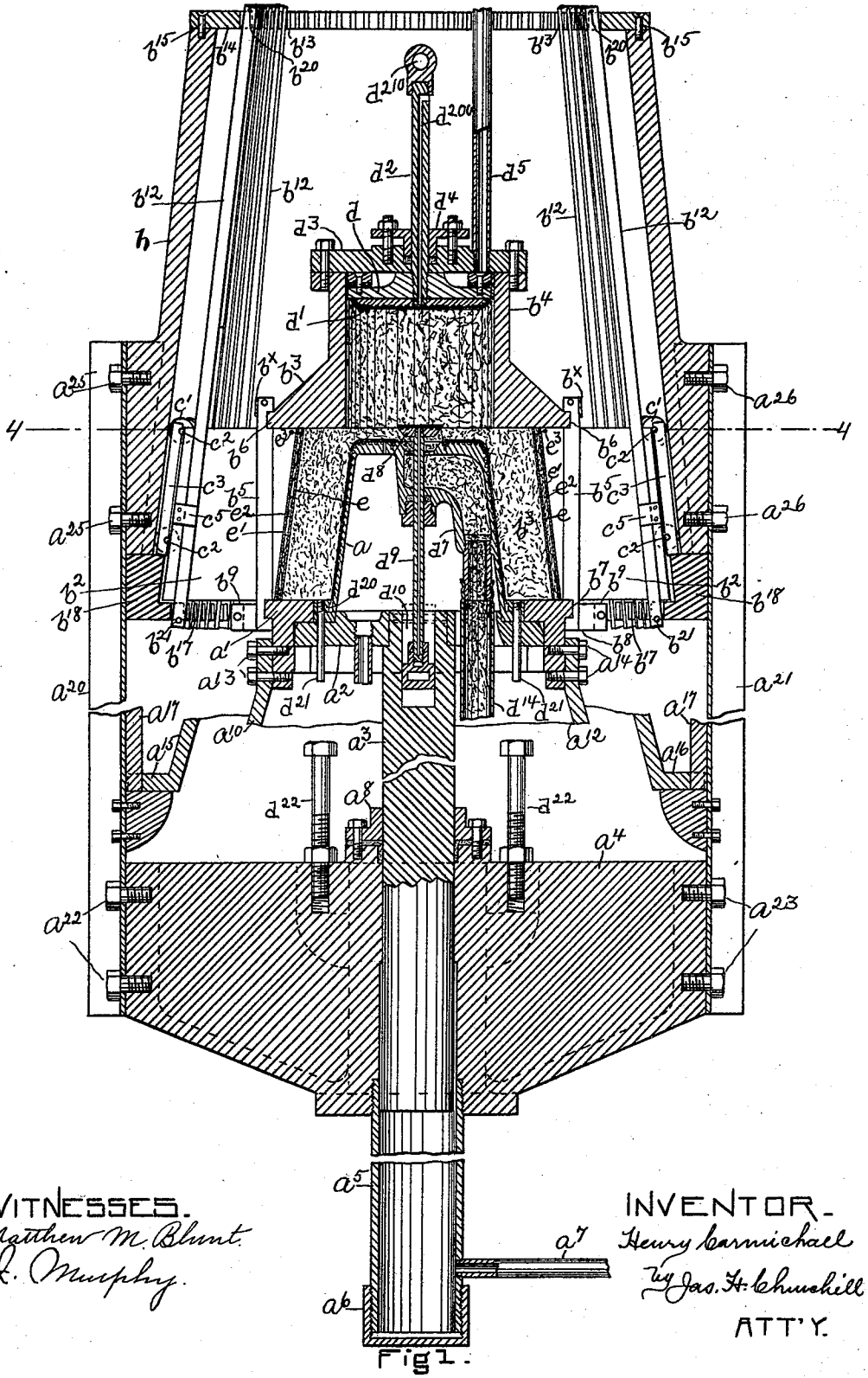

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Fig 1.

(No Model.) 3 Sheets—Sheet 2.

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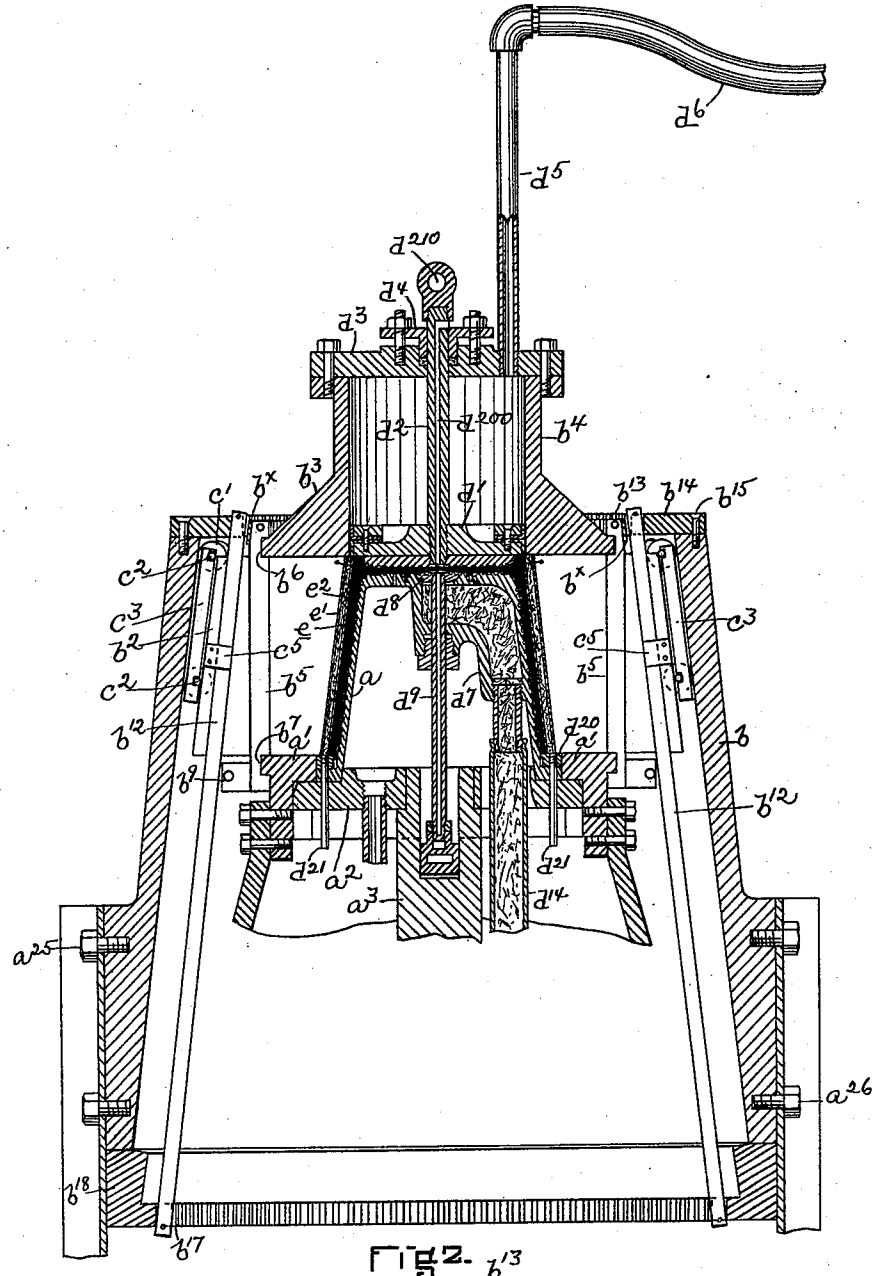

FIG. 2.

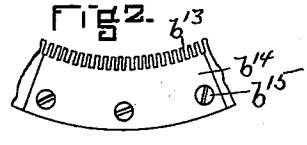

FIG. 3.

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(No Model.) 3 Sheets—Sheet 3.

H. CARMICHAEL.

APPARATUS FOR MAKING HOLLOW FIBER WARE.

No. 568,519. Patented Sept. 29, 1896.

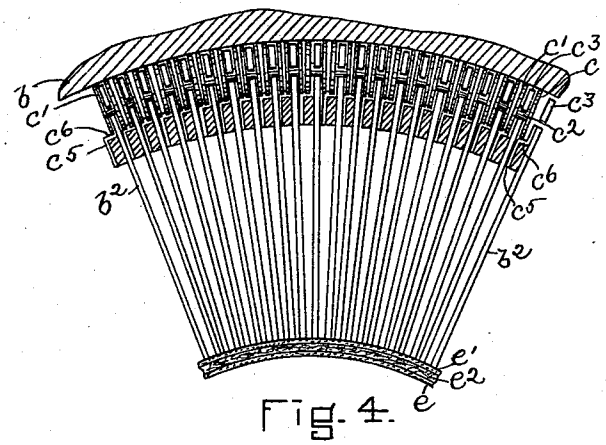

Fig. 4.

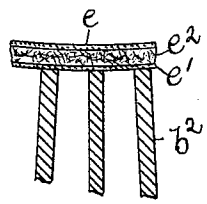

Fig. 5.

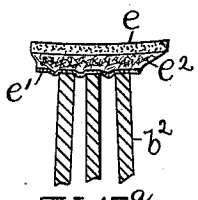

Fig. 5a.

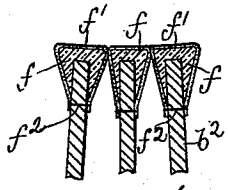

Fig. 6.

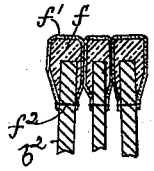

Fig. 6a.

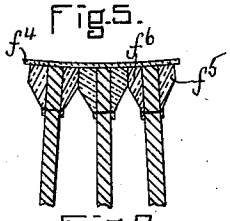

Fig. 7.

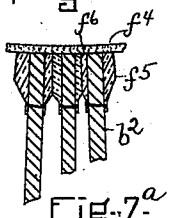

Fig. 7a.

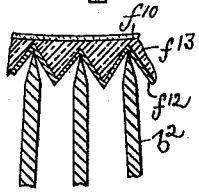

Fig. 8.

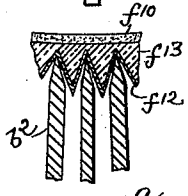

Fig. 8a.

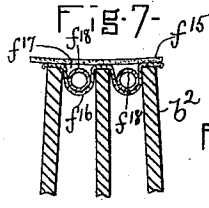

Fig. 9.

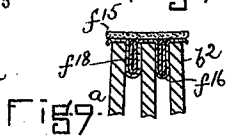

Fig. 9a.

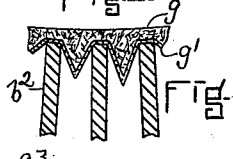

Fig. 10.

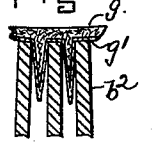

Fig. 10a.

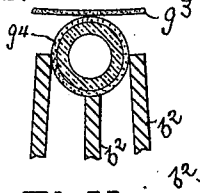

Fig. 11.

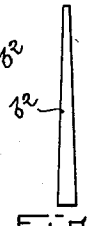

Fig. 12.

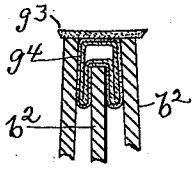

Fig. 11a.

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UNITED STATES PATENT OFFICE.

HENRY CARMICHAEL, OF MALDEN, MASSACHUSETTS.

APPARATUS FOR MAKING HOLLOW FIBER-WARE.

SPECIFICATION forming part of Letters Patent No. 568,519, dated September 29, 1896.

Application filed September 7, 1894. Serial No. 522,388. (No model.)

To all whom it may concern:

Be it known that I, HENRY CARMICHAEL, residing in Malden, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Apparatus for Making Hollow Fiber-Ware, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to an apparatus for the manufacture of hollow ware from fluid pulp. In the manufacture of fiber-ware of the class referred to it is essential for the proper felting of the fiber contained in the pulp that the water be expressed from the mass of fiber by an exterior compressor-wall, which contracts upon the fiber, giving solidity and form to the article. A radial and outward movement is not permissible, such a movement stretching the mass of fiber and disturbing the felting of the fiber, upon which the strength of the article largely depends. The contraction of the mass of fiber is considerable, and the radial inward movement in the production of pails and similar rounded ware involves the employment of a compressor-wall which is to a large extent contractile.

Prior to this present invention I am aware that a distended rubber bag or diaphragm in an apparatus for manufacturing hollow ware has been found to be a useful and practical expedient for the above purpose, as it permits of indefinite contraction and serves admirably for imparting a high degree of pressure to the fluid mass. Such an apparatus is defective or at least highly objectionable in that the rubber bag or diaphragm contracts unevenly, and the product produced in the apparatus is found to be of very unequal thickness, thus requiring the use of more fiber than is to remain in the finished article, which necessitates the employment of expensive finishing processes for removing the surplus material. The rubber-diaphragm machine or apparatus is further objectionable, owing to the fact that, the rubber bag or diaphragm being impermeable, surface drainage is confined to the former within the mass of fiber, and thus the time of pressing or forming the article is unduly prolonged, while the laying of the fiber is less perfect than it would be with double drainage, that is, drainage from both the interior and outer surfaces of the article.

I am also aware that mechanical machines have been made prior to this present invention in which is employed a compressor-wall formed by radially-moving sections provided at their inner edge with side flanges or lips, which overlap each other to break joints, and which, in the contraction of the area of the compressor-wall, slide by or over one another, but this construction, while providing for double drainage, has been found defective on account of the jointed or moving parts breaking the felting of the pulp comprising the outer surface of the article, thereby producing an imperfect article of fiber-ware. This mechanical construction is further objectionable in that the fine fiber works into the joints between the sections of the compressor-wall and easily and quickly injures the working parts of the apparatus. In mechanical machines of this class the compressor-wall is actuated by complicated toggle-joints or by the pressure of the sections sliding on a conical surface. In the toggle-jointed arrangement the pressure is unequal and in the arrangement of the sections sliding on the conical surface the friction is excessive. In the manufacture of a pail, for instance, the total lateral pressure upon the pulp should be about fifty thousand pounds in order to secure a useful effect, and in a machine employing sections which slide on a conical surface the frictional resistance of the sections would be about five tons, which is prohibitive on account of the wear of the parts and the waste of power. This excessive friction is avoided in the machine forming the subject of this invention in a manner as will be described.

I am also aware that it has been proposed to provide a machine or apparatus with a flexible metal jacket forming the compressor-wall, which jacket becomes corrugated as the wall is contracted, but this device admits of but a narrow movement under low pressure and is intended for making blanks, or the first stage of the process to be completed by another. Furthermore, the corrugations of the metal jacket impart to the outer surface of the pail or other article a corrugated struc-

ture, which would be objectionable in articles requiring a smooth exterior surface, and which would have to be removed to produce such smooth-finished exterior surface after the manner practiced with the rubber-diaphragm machines.

My present invention is more particularly an improvement upon the class of fiber-ware machines above referred to as "mechanical," that is, in which a mechanically-operated compressor-wall is employed, and it has for its object to provide a machine capable of producing hollow fiber-ware in such manner that the outer surface of the article formed by the compressor-wall shall approximate the outer surface of the finished article, thereby dispensing with expensive finishing processes, and which also preferably affords double drainage without danger of injury to the machine or apparatus. This result is accomplished, primarily, by the employment of a compressor-wall having an active member of suitable construction, as will be described, such as will permit the pulp-contacting surface of the said member in the contracted position of the compressor-wall to be substantially smooth, and which surface has no injurious effect upon the felting of the fiber comprising the outer surface of the article, yet which permits of double drainage.

In accordance with this invention the compressor-wall is composed of a plurality of plates, ribs, or wings adapted to converge with relation to a former upon which the article of fiber-ware is molded, the said wings having secured to them an active member composed of material capable of contraction in its own plane, so that when the said member acts upon the pulp it will contract, with its active surface in such shape as will form a substantially smooth exterior surface on the pulp article.

The plates, ribs, or wings referred to are designed to be operated with a minimum amount of friction, as will be described.

When it is desired to provide the article with an end or bottom, the apparatus may be provided with a plate, hereinafter referred to as the "chime-plate," which coöperates with the converging compressor-wall. The plates, ribs, or wings may and preferably will be given a converging movement by a system of antifriction bearings or devices, as will be described.

These and other features of this invention will be pointed out in the claims at the end of this specification.

Figure 1 is a vertical section of an apparatus for the manufacture of hollow fiber-ware embodying this invention, the drawing being broken out to enable the working parts to be fully shown, the former being shown in its normal or starting position; Fig. 2, a sectional detail of the upper portion of the machine shown in Fig. 1, with the operating parts in the position they occupy when the fiber article is finished; Fig. 3, a detail in plan view to be referred to; Fig. 4, a sectional detail on the line 4 4, Fig. 1, to more clearly show the compressor-wall; Fig. 5, a detail, on an enlarged scale, of a portion of the compressor-wall in its normal or uncontracted position; Fig. 5^a, a detail of the compressor-wall shown in Fig. 5 in its closed or contracted position; Figs. 6 to 11, modifications of the compressor-wall, shown in their open position; Figs. 6^a to 11^a, modifications showing the compressor-walls illustrated in Figs. 6 to 11 in their closed positions, and Fig. 12 a detail to be referred to.

In the present instance the invention is shown in a machine or apparatus adapted for the manufacture of pails from fiber-ware.

Referring to Fig. 1, a represents a mold or former upon which the pulp pail is made, the said former in practice being suitably attached to an annular base-plate or platen a', locked in any suitable manner to a head a^2 of a ram or piston a^3, extended through a suitable opening in a cross bar or frame a^4, having secured to or forming part of it a cylinder a^5, herein shown as closed at its lower end by a cap a^6 and provided with a fluid inlet and outlet a^7. The piston a^3 is extended through a suitable stuffing-box a^8, secured to the cross bar or frame a^4. The piston a^3 and the former a are designed to be raised by fluid admitted into the cylinder a^5, and in its forward or upward movement the said former is prevented from rotating, as herein shown, by means of suitable arms a^{10} a^{12}, secured, as by bolts a^{13} a^{14}, to the platen a' and provided at their lower end with extensions a^{15} a^{16}, which fit between two pairs of guide-bars a^{17}, attached to or forming part of the outside framework of the apparatus, which framework is herein shown as composed of bars or plates a^{20} a^{21}, secured at their lower ends, as by bolts a^{22} a^{23}, to the cross bar or frame a^4 and at their upper ends, as by bolts a^{25} a^{26}, to the bottom or base portion of a frustum-shaped structure b, which I will hereinafter refer to as the "conical hood."

In accordance with this invention the cone-shaped sides of the former a have coöperating with them a conical-shaped compressor-wall composed of a plurality of movable sections or wings b^2, provided with an active member capable of contracting in its own plane, that is, capable of contraction in such manner as will maintain that face or surface which acts directly upon the fluid pulp b^3 and herein designated the "active" surface substantially smooth in its contracted position.

The contractile member of the compressor-wall may be made in a variety of ways, as will be hereinafter more specifically referred to.

The wings or sections b^2 have a radial or converging movement with respect to the former a, and are guided in this radial movement by the lower platen a' and an upper platen, herein shown as an enlarged section b^3 of a chamber b^4, which is rigidly connected to the lower platen, preferably by tie-

bars b^5, herein shown as provided with notches at their opposite ends to fit over and embrace annular flanges b^6 b^7 on the upper platen or enlargement b^3 of the chamber b^4 and on the lower platen a'. The tie-bars b^5, preferably of metal, may and preferably will be removably secured at their upper and lower ends by means of annular bands or rings $b^\times$ b^8, preferably of metal, the upper portion of the tie-bars b^5 being beveled inwardly on their outer sides, as shown in Fig. 1, and the ring $b^\times$ being preferably made whole and driven over and upon the tie-bars, the ring b^8 for the best results being divided or made in two parts, each part being provided with ears b^9, which are adapted to be bolted or otherwise suitably secured together to form a completed ring or band. The tie-bars b^5 are preferably removably secured at their upper end by the ring $b^\times$, so that when the said ring is removed the tie-bars may be thrown back and the chime-plate cylinder removed for examination of the interior of the machine. It will thus be seen that the chamber b^4 is rigidly connected to the platen a' in such manner as to move with the same and be maintained in a constant or fixed position with relation thereto. The tie-bars b^5 are preferably alternately arranged with relation to the movable wings or sections b^2, that is, a tie-bar may be interposed vertically between adjacent wings or sections and assists in guiding the same in their radial movement. The movable wings or sections b^2 are preferably also separated at their outer ends or sides, that is, at the portion of the wings nearest the conical hood b, by guide-bars or strips b^{12}, extended the length of the hood and substantially parallel to the walls of the same, the said guide-bars for the best results having their upper ends inserted or fitted between teeth or fingers b^{13} of a preferably sectional ring or plate b^{14}, secured to the upper wall of the conical hood b, as by screws b^{15}, the said annular ring or plate being preferably made in sections to permit of the ready removal of one or more or any desired number of guide-bars b^{12} for repairs or other purposes. The guide-bars b^{12} may and preferably will have their lower ends extended between like teeth or fingers b^{17} on an annular ring b^{18}, located below the conical hood b and preferably made independent thereof and attached in any suitable manner to the outside supporting-framework, or it may be attached to the bottom of the conical hood b. The guide-bars b^{12} may and preferably will be held or secured at their upper and lower ends by studs or pins b^{20} b^{21}, inserted through suitable holes in the said bars, the said studs or pins lapping over two adjacent fingers on the rings b^{14} b^{18}; but instead of the particular manner of securing the said guide-bars any other desired or suitable means may be employed.

In order that the wings or sections b^2 comprising the compressor-wall may be moved toward the former with a minimum amount of friction, an antifriction-roller bearing is interposed between each of the said wings or sections and the inner surface of the conical hood, and for the best results I prefer to make the antifriction-roller bearing for each wing or section comprise an upper and lower member, each of which is preferably made as shown in Fig. 4 and consists of two flat disks or rolls c c', separated a distance substantially equal to the width of the sections or wings b^2 and connected by a shaft or arbor c^2, the said shaft or arbor of each member making contact with the rear edge of its coöperating wing or section b^2, the shafts c^2 of the members comprising the antifriction-roller bearing for each wing being preferably connected together by a spacing-bar c^3, slotted at its ends to partially embrace the arbors c^2 of the said members.

The rolls or disks c c' of each member of the antifriction-roller bearing are made sufficiently large to make contact with and roll upon the interior surface of the conical hood b.

On the upward movement of the sections or wings comprising the compressor-wall the friction between the rear edge of the wings and the arbors c^2 of the antifriction-rolls or disks is sufficient to carry the said rolls along with the wings or sections in their upward movement.

In the upward movement of the compressor-wall the wings comprising the said compressor-wall are moved radially toward the former a, and in order to withdraw the said wings on the downward movement of the compressor-wall I prefer to secure to the side of each wing a finger c^5, (see Figs. 1, 2, and 4,) which is suitably bent or shaped to partially embrace a guide rod or bar b^{12} and to form a shoulder c^6, which is adapted to bear against the rear edge or side of the guide-bar when the compressor-wall is returning to its normal position, that is, when the said wall is moving downward after the pail has been formed, the said shoulder, as it moves down the inclined guide-rod with which it coöperates, serving to move outwardly the wing or section b^2 to which it is secured.

The chamber b^4 contains within it a piston d, preferably provided with a foraminated face or surface d', by which exterior drainage may be obtained for the portion of the pulp within the cylinder, the said piston being shown as provided with a piston-rod d^2, extended through the head d^3 of the chamber b^4, and a suitable stuffing-box d^4, attached to said head. The chamber b^4 is provided with a fluid inlet and outlet pipe d^5, having connected to its upper end a hose or flexible pipe d^6, leading to the liquid supply, which latter is in practice controlled by suitable valves. (Not herein shown.)

In the present construction the former a is shown as provided with an interior wall or partition d^7, forming a pulp-inlet communicating with a suitable opening in the top of

the former, which opening is controlled by a valve d^8 on a stem d^9, extended through the partition d^7 and, as herein represented, having its lower end fitted into a socket or opening d^{10} in the upper end of the piston a^3. The valve-stem d^9 is designed to be suitably connected to suitable mechanism (not herein shown) by which the said stem and its valve may be positively raised and lowered at predetermined intervals, and thereby control the admission of fluid pulp through the said valve into the chamber b^4 and the annular space between the former a and the active surface of the compressor-wall. The fluid-inlet passage of the valve may be connected in suitable manner, as by a pipe d^{14}, to a suitable pump or apparatus (not shown) for supplying the pulp to the machine.

The former, as herein shown, supports an annular strip d^{20}, provided with depending pins d^{21}, extended down through suitable holes in the head a^2 of the piston a^3, and adapted to engage suitable uprights d^{22}, herein shown as threaded bolts, extended into threaded sockets in the cross bar or frame a^4, the said pins being adapted on the descent of the platen and former to strike the uprights d^{22} and be lifted thereby, so as to force the completed or finished pail from the former a.

As represented in Fig. 1, the operating parts of the apparatus are in what may be regarded as the normal or starting position, with the exception that the valve d^8 is shown open, the chamber b^4 and the annular space between the former and the active surface of the compressor-wall being filled with fluid pulp.

By an inspection of Figs. 1 and 2 it will be seen that when the piston a^3 is acted upon by fluid pulp admitted into the cylinder a^5 the platen a', the former a, carried thereby, the chamber b^4, rigidly attached to the platen, and the wings or sections b^2 of the compressor-wall will be moved upward within the conical hood b. On the upward movement of the parts just referred to the wings b^2 of the compressor-wall will be forced inward toward the former a, thereby pressing the fluid pulp in the annular space between the active member of the compressor-wall and the said former, and in order that the fluid pulp in the said annular space may be compressed into approximately the condition it is desired the finished article should have, without injurious action to the outer surface of the fiber, that is, without disturbing the felting of the outer surface of the fiber, the active member of the compressor-wall may and preferably will be constructed of such material as will permit of the contraction of the said active member in its own plane, whereby the annular portion of the pail or other article may be of substantially uniform thickness when completed in the apparatus and its outer surface may be substantially smooth, compact, and unbroken. The active member referred to may and preferably will be made after the manner shown in Figs. 1, 2, 4, 5, and 5^a, but I do not desire to limit my invention in this respect, as the active member of the compressor-wall may be made of other material and in other forms, such, for instance, as shown in Figs. 6 to 11, inclusive.

Referring to Figs. 5 and 5^a, the active member therein shown may be supposed to be composed of an outer strip or lining e of textile material, an inner strip e' of like material, and an interposed body e^2 of felt. The inner lining e' may and preferably will be made up in conical sections sewed or otherwise fastened together into approximately the shape of the space between the former a and the compressor-wall, and the said inner lining thus made may be secured to the wings in any suitable or desired manner, as, for instance, by rows of stitchings extended through suitable holes e^3 at the top and bottom of the front edge of each wing, as clearly shown in Fig. 1. The outer lining e, which constitutes the contacting surface of the active member, may and preferably will be made up in conical sections similar to the lining e', and the felt e^2 may also be made up into similar sections, and the parts comprising the active member of the compressor-wall may be all secured together in any suitable manner, as by the same threads or stitches which secure the inner lining e' to the wings comprising the compressor-wall.

The active member of the compressor-wall is practically continuous and of such nature that when the wings or sections are moved toward the former the said active surface is capable of contracting in its own plane, so that the part or face of the active member which contacts with the pulp fiber is maintained smooth or substantially smooth, in contradistinction to substantially deep or marked bends or corrugations, and as a result the exterior surface of the body of the pail or other article is made smooth or minutely ribbed and of substantially uniform thickness, and the felting of the fiber composing the said exterior surface is in no way injured or destroyed, and the said exterior surface may and preferably will be left in this condition in the finished article, but if desired any slight or minute ribs or projections may be removed by a buffing-wheel and a perfectly smooth exterior surface obtained with a minimum loss of material and with a minimum expenditure of time and labor.

I may prefer to employ an active member for the compressor-wall, made as shown in Figs. 1, 5, and 5^a, but I do not desire to limit this invention in this respect, as an efficient active member, capable of contracting so as to preserve a substantially smooth pulp-contacting surface, may be made in other forms.

In Figs. 6 and 6^a one such modified active member is shown, it being made up of substantially wedge-shaped strips f of solid rubber fitted over the inner ends or edges of the

wings b^2, and each rubber strip being provided with a facing or covering f' of textile material fastened to the wings b^2, as by stitches f^2, extended through suitable holes in the said wings, or, if desired, the textile material f' may be dispensed with and the rubber strips fastened to the wings by twine wound about each strip and inserted through a row of holes at the edge of each wing, but I prefer to use the cloth facing f'. Fig. 6 shows the normal shape of the rubber strips, and Fig. 6^a the shape of the same when compressed, that is, when the wings are in their converged position. In both cases it will be noticed that the pulp-contacting surface of the active member of the compressor-wall remains smooth or substantially so.

In Figs. 7 and 7^a the active member of the compressor-wall is shown as composed of a continuous lining f^4 of textile material and pieces f^5 f^6 of rubber secured to the opposite side of each wing b^2. The rubber pieces f^5 f^6 may be bound or sewed to the wings, as is also the textile lining f^4.

In Figs. 8 and 8^a the active member of the compressor-wall is represented as composed of a continuous lining f^{10} of textile material, a corrugated metal jacket f^{12}, and an interposed corrugated layer or filling f^{13} of felt or like material. These parts may be sewed or otherwise secured to the wings.

In Figs. 9 and 9^a the active member is represented as composed of a lining f^{15} of textile material, a corrugated or looped lining f^{16} of textile material forming, with the lining f^{15}, pockets or wells f^{17} between adjacent wings b^2, and into which are placed hollow rubber tubes f^{18}. These parts may also be sewed to the wings.

In Figs. 10 and 10^a the active member is represented as composed of a continuous strip g of felt, corrugated on its rear side to fit between the wings, and a jacket g', which may be of metal or textile material.

In Figs. 11 and 11^a the active member is represented as composed of a lining g^3 of textile material and a substantially large pneumatic tube g^4, fitted between every other wing, the said tube being closed at its ends. The alternate wings with which a pneumatic tube coöperates are made smaller or narrower than the remaining wings, and in order that the distance between the adjacent wings may be substantially the same at the top and bottom of the wings when a conical article is to be formed the front faces or sides of the wings are made tapering from the bottom to the top, as shown in Fig. 12.

In the various modified forms of active members of the compressor-wall herein shown and described it will be noticed that they are all capable of contraction, so that the shape, form, or contour of the pulp-contacting face or active surface of the said member is approximately smooth in the contracted position of the said active member, which is a very essential feature of this invention, and by the phrase "active surface capable of contraction in its own plane" I desire to be understood as meaning a surface capable of being foreshortened or contracted, so as to have in its contracted position a substantially smooth contour or shape capable of producing a substantially smooth exterior surface on the pulp article requiring no expensive finishing process and avoiding waste of stock, in contradistinction to a corrugated surface producing marked or substantially large or thick ribs on the exterior surface of the article.

In operating the machine I prefer to allow the chime-plate to nearly reach the end of its movement before the converging movement of the compressor-wall is commenced.

In the manufacture of burial-caskets and other articles of oblong or other forms the compressor-wall having its active contractile member will be operated after the manner herein shown, the conical hood b being changed in form to correspond to the form of the article desired, and when the article to be formed has flat sides with rounded ends, as, for instance, a burial-casket, the wings acting upon the flat sides may become one piece coöperating with the independent radially-moving wings which form the rounded ends.

The chime-plate piston-rod d^2 may be provided with a drainage-outlet passage d^{200} and the weight of the chime-plate chamber b^4 and platen a' may be wholly or partially counterbalanced by a suitable weight, (not shown,) but which is connected by a rope or chain to the eye d^{210} of the rod d^2.

In operation the molded article is loosened from the former by the pins d^{21} striking the upright rods d^{22}, and at such time the former will have been carried down below the base-plate a' a suitable distance to permit ready removal of the article from the former, the head a^2 of the piston having been unlocked from the platen or base-plate by the operator after the manner now commonly practiced with fiber-ware-forming machines.

I claim—

1. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, and a compressor-wall composed of converging sections movable with relation to the said former to compress the fluid pulp and provided with an active member in contact with the converging sections and compressible on itself and thereby capable of contraction in its own plane and forming an endless facing for the compressor-wall in both its uncontracted and contracted positions, whereby disruptive action of the compressor-wall upon the pulp is avoided, for the purpose specified.

2. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, and a compressor-wall composed of conver-

ging sections movable with relation to the said former to compress the fluid pulp and provided with an active member in contact with the converging sections and compressible on itself and thereby capable of contraction in its own plane, and having its pulp-contacting surface composed of non-metallic material forming an endless surface or facing for the compressor-wall in both its uncontracted and contracted positions, substantially as described.

3. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, and a compressor-wall movable inwardly with relation to said former to compress the fluid pulp and composed of independent sections or wings, and a substantially continuous active member secured to said wings and having its pulp-contacting surface of non-metallic material, for the purpose specified.

4. In a machine for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, and a compressor-wall composed of converging sections movable vertically with the former and inwardly with relation thereto to compress the fluid pulp, and an active member for said compressor-wall in contact with the converging sections and compressible on itself and forming an endless facing for the compressor-wall in both its uncontracted and contracted positions, and means to effect the inward movement of the compressor-wall as the latter is moved vertically, substantially as described.

5. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, a compressor-wall coöperating therewith and comprising sections or wings, a converging hood or frame, antifriction-roller bearings for the compressor-wall coöperating with the said wing, guide bars or rods, and means carried by said wings and engaging said guide-bars to effect the movement of the wings away from the former, for the purpose specified.

6. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, a platen, a piston to move said former and platen, a chime-plate chamber, a chime-plate piston therein, tie-bars connecting the chime-plate chamber to the said platen and detachable therefrom, a compressor-wall composed of sections or wings adapted to move toward the former between the said platen and chime-plate chamber, an active member for said compressor-wall capable of contraction in its own plane, a hood or frame to effect the movement of the said wings toward the former, antifriction-roller bearings interposed between said hood or frame and the said wings, guide-bars for said wings, and devices on the wings engaging said guide-bars, for the purpose specified.

7. In a machine for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, a compressor-wall composed of converging sections movable vertically with the former, and inwardly with relation thereto to compress the fluid pulp, a permeable active member for said compressor-wall compressible on itself and forming an endless facing for the compressor-wall in both its uncontracted and contracted positions, a chime-plate piston movable toward the former and coöperating with the active member of the compressor-wall, and means to effect the inward movement of the compressor-wall as the latter is moved vertically, substantially as described.

8. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, and a sectional compressor-wall movable with relation to the said former and provided with an active member of textile material forming a substantially continuous facing for the compressor-wall in both its contracted and uncontracted positions.

9. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a lower platen, an upper platen, and a plurality of tie-bars joining the said platens and separated from one another for the passage for sections of a compressor-wall, a former interposed between the said platens, and a compressor-wall composed of sections movable toward the said former between the said tie-bars and the said platens, substantially as described.

10. In a machine or apparatus for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a lower platen, an upper platen, and metallic connections joining said upper and lower platens and detachably secured thereto, a former interposed between the said platens, and a compressor-wall coöperating with the said former and composed of sections movable between the said metallic connections and the said platens, substantially as described.

11. In a machine or apparatus, for manufacturing hollow fiber-ware, the combination of the following instrumentalities, viz: a former, a mechanical compressor-wall coöperating therewith, a converging hood or frame, an antifriction-roller bearing interposed between said hood and compressor-wall, and comprising two members, each provided with an arbor, and a spacing-bar connecting the arbors of the said members, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY CARMICHAEL.

Witnesses:
JAS. H. CHURCHILL,
J. MURPHY.