C. F. MOSES.

EXPANSIBLE MOLD.

APPLICATION FILED APR. 20, 1909.

989,994. **Patented Apr. 18, 1911.**

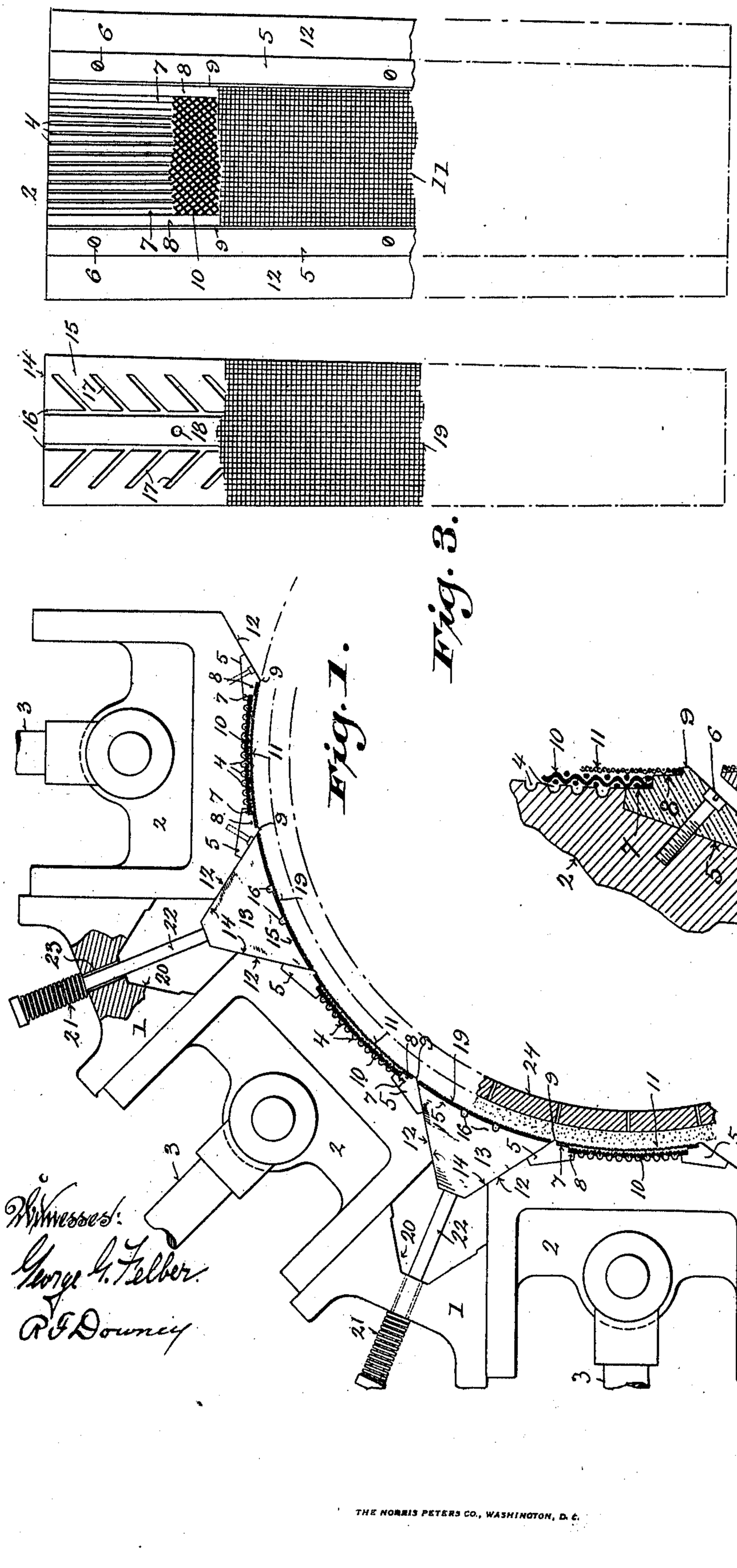

Fig. 4.

Fig. 3.

Fig. 1.

Fig. 2.

Witnesses:
George A. Felber.
R. F. Downey

Inventor
Charles F. Moses.
By Upshur & Young
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES F. MOSES, OF SHEBOYGAN, WISCONSIN.

EXPANSIBLE MOLD.

989,994. Specification of Letters Patent. **Patented Apr. 18, 1911.**

Application filed April 20, 1909. Serial No. 491,080.

To all whom it may concern:

Be it known that I, CHARLES F. MOSES, a citizen of the United States, and resident of Sheboygan, in the county of Sheboygan and State of Wisconsin, have invented certain new and useful Improvements in Expansible Molds; and I do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention is to provide simple, durable, effective, expansible and contractible molds for use in connection with machines for making cellulose vessels, the invention being particularly applicable to that class of machines as disclosed in Letters-Patent No. 828,472 for improvements in apparatus for making cellulose vessels, granted to W. Glader, August 14, 1906.

The invention consists in various details of construction and combination of parts as hereinafter fully set forth with reference to the accompanying drawings and subsequently claimed.

In the drawings: Figure 1 represents a plan view of a portion of a mold embodying the features of my invention, parts being broken away and in section to better illustrate certain structural features; Fig. 2, an enlarged detail sectional view, in plan, of a corner of the respective mold-members, and Figs. 3 and 4, face views of the same with parts broken away to better show the invention.

Referring by characters to the drawings, 1 indicates a series of radially disposed fixed columns having oppositely disposed parallel faces constituting ways, between which are fitted power-driven slidable forming-staves 2, the staves being positively actuated back and forth from a common center, by means of strap-carrying pitmen 3 in wrist-connection with said staves. The straps of the pitmen 3 are engaged by a series of fixed eccentrics, which eccentrics are rotated simultaneously to impart motion to the staves, through said pitmen, the straps and eccentrics being not shown for the reason that they form no part of my invention.

The inner or working-faces of the power-driven staves 2 are concaved to form segments of a circle, the faces being provided with longitudinal grooves 4 constituting drains. For economy in manufacture, it is desirable to mold the power-driven staves of soft cast metal, though in some instances these staves may be made of steel. It is essential however that there should be steel-surfaces for the purpose of soldering wire-mesh strainer-cloth to the working-faces of said staves. Hence in the illustration of my present invention I have shown the staves routed longitudinally at either side of the corrugated face to form seats for steel-reinforcing strips 5, which strips are secured by countersunk screws 6 to the bodies of said staves. A face 7 of each of the strips corresponds to the concaved face of the stave and forms a continuation of said concave face for a distance approximately half the width of the strip, at which point said face terminates with an abrupt rise and continues upon a higher relative plane to form a seat 8 terminating in another abrupt rise at a slight distance from the edge of the aforesaid strip-face, whereby a narrow bead 9 is formed. The lower faces 7 of the strips constitute seats for the abutting edges of a meshed-wire screen 10, which screen is fitted over the corrugated surface of the staves and is soldered to its edges. The exterior surface of the screen is arranged flush with the face of the seats 8 of the strips, for the purpose of forming an uninterrupted backing for a layer of fine meshed-wire screen 11, which screen extends across the entire working-faces of the staves between the beads 9 of said strips, this screen 11 being also soldered at its edges to the aforesaid seats 8, in such manner that the meshes of the screen are only closed adjacent to the beads, whereby the greater area of drain-surface is had therebetween.

Each of the power-driven staves 2, from the outer edge of its bead 9 are beveled rearwardly to constitute seats 12 for follower staves 13, which staves are interposed between the staves 2 and have rearwardly extending beveled faces 14 corresponding to and adapted to engage the adjacent seats 12 of said staves 2. The working-faces 15 of the follower-staves are concaved in cross-section and provided with longitudinal grooves 16, which grooves are intersected by series of downwardly inclined oblique branches 17, whereby the entire working-faces of the staves are effectively drained, there being two or more apertures 18 passing through the bodies of said staves to carry off the waste. A screen 19 of fine wire-mesh is secured to the working-surface of

each of the follower-staves, being soldered thereto at its edges which intersect the beveled faces 14 of said staves.

Each of the columns 1 is alined with and rearward of a follower-stave, as shown, these columns being formed with longitudinal recesses 20 having inwardly inclined faces corresponding to the faces 14 of said staves, which staves are adapted to rest within the recesses when the mold is expanded. The follower-staves are arranged to be retracted by coil-springs 21 which springs surround rods 22 extending from said staves, and are under compression between the heads of their respective rods and the rear walls of the columns, the rods being loosely fitted through apertures 23 in said wall and extended beyond the same for the purpose of receiving the springs. While I have shown coil-springs for retracting the follower-staves, it is understood this retraction in some instances may be positively accomplished by various well known mechanical movements, it being important however that the follower-staves have a limited amount of side-play in order that self-adjustment relative to the power-driven staves is accomplished, provision for which in this instance is made through the loose-fit between the rods 22 and column apertures through which they pass.

As shown in Fig. 1 of the drawings, molds of the class to which my invention relates are provided with a perforated hollow plunger 24, a portion of which only is illustrated. This plunger is vertically movable, and in operation is lowered to the plane of the mold, the members of which are then in their expanded position forming a circular space between their working-faces and the plunger for the reception of cellulose pulp. In the aforesaid position, owing to the bevel contact-faces of the members, the follower-staves recede a greater distance than the power-driven staves, the former being nested within the columns and exposing a portion of the bevel faces of said power-driven staves to the pulp. The power-driven staves are now forced inwardly to compress the pulp, their bevel-faces at the same time causing the follower-staves to be drawn forward, which latter staves move at an initially greater speed owing to this wedging or cam action between the opposing actuating surface. At the time the power-driven staves have reached the limit of their inward movement, the follower-staves have been brought to a position in which their concaved working-faces are flush with those of said driven staves, and the combined members thus assume a working-contour describing an unbroken circular surface, which surface has compressed the outer face of the pulp to a desired degree for strength and thickness of the finished product. The excess moisture of the pulp during the process of compression passes through the screens and is drained off through the grooves in the several staves, particular attention being called to the fact that all of the surface of the vessel is equally compressed leaving the finished article scored by the mesh of the screens except at the points where the beads 9 extend, which beads form smooth narrow longitudinal lines at equal distances throughout the diameter of said vessel.

Owing to the uninterrupted beveled contact faces between the hollow and driven staves, the pulp is drawn to the finishing diameter in a clean uninterrupted mass, a result which cannot be obtained by the structure disclosed in the hereinbefore mentioned patent, in which patent the undercut dovetail connecting joints between staves choke up with pulp and thereby prevent a perfect closure of the members and also form an imperfectly compressed ridge or seam at this point, whereby the finished article contains longitudinal ribs. It is also apparent that by constituting the staves with beveled contact-faces, whereby the follower staves are forced forward, that the members are at all times free to impart a final compression to the pulp, which compression is only limited to the stroke of the eccentrics that serve as drivers for the power-actuated staves. This result is not attained in the structure disclosed in the before mentioned patent, the staves of which automatically lock each other at a predetermined point, which point will vary in proportion to the amount of pulp that may be lodged within the dovetailed-joints preventing the machine from closing and thereby vary the density and thickness of the vessels. By providing the follower-staves in loose shackle-connection with relation to the fixed columns, the said staves are free to automatically adjust themselves to any inequalities of fit relative to the driven staves and thereby form a perfect and practically pulp-tight joint therebetween under all conditions.

While I have shown and described the steel strips as having a certain specific structure for convenience of attaching the screens, it should be understood that in some instances said structure may be varied in details of form for accomplishing the desired result.

I claim:

1. A cellulose-pulp mold comprising series of radially disposed power-driven staves having convexed working-faces, outwardly flared beveled faces intersecting the working-faces of the driven-staves, whereby obtuse-angles are formed at their intersecting points, fixed guides for said driven staves, follower-staves fitted between the beveled faces of the aforesaid driven-staves, con-

vexed working-faces and outwardly converging beveled faces intersecting the working-faces of the follower-staves, the working-faces and beveled-faces thereof being arranged to coincide with the corresponding faces of said driven-staves, retracting means in connection with the follower-staves, coarse woven-wire backing screens secured to the working-faces of the driven-staves, and fine woven-wire screen covers fitted over the coarse screen aforesaid and working-faces of the follower-staves.

2. In an expansible and contractible mold for forming cellulose vessels, a power-driven stave having a fixed guide, a depressed convexed working-surface extending longitudinally of the stave, a coarse woven-wire screen fitted over the depressed working-surface and in solder-connection therewith, a cover-screen of fine mesh fitted over the first named screen and in solder-connection with said depressed surface of the stave, whereby a flush convex surface is formed, and oppositely disposed outwardly flared uninterrupted beveled faces extending from the working-surface of the aforesaid stave.

3. In an expansible and contractible mold for forming cellulose vessels, a power-driven stave having a fixed guide, a depressed convex working-surface extending longitudinally of the stave, a coarse woven-wire screen fitted over the depressed working-surface and in solder-connection therewith, a cover-screen of fine mesh fitted over the first named screen and in solder-connection with said depressed surface of the stave, whereby a flush convex surface is formed, oppositely disposed outwardly flared uninterrupted beveled faces extending from the working-surface of the aforesaid stave, and longitudinal drain-grooves in the aforesaid depressed convex working-surface.

4. In an expansible and contractible mold for forming cellulose vessels, a power-driven stave having a longitudinal inner working-surface, strips secured to the opposite edges of the working-surface, parallel seats upon different planes formed in the strips, and layers of woven-wire soldered to the strip seats, the layers being mounted one upon the other.

5. In an expansible and contractible mold for forming cellulose vessels, a power-driven stave having a longitudinal inner working-surface, strips secured to the opposite edges of the working-surface, and a cover of screening-material in solder-connection with the strips.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

CHARLES F. MOSES.

Witnesses:
GEO. W. YOUNG,
GEORGE G. FELBER.