

No. 768,309.

PATENTED AUG. 23, 1904.

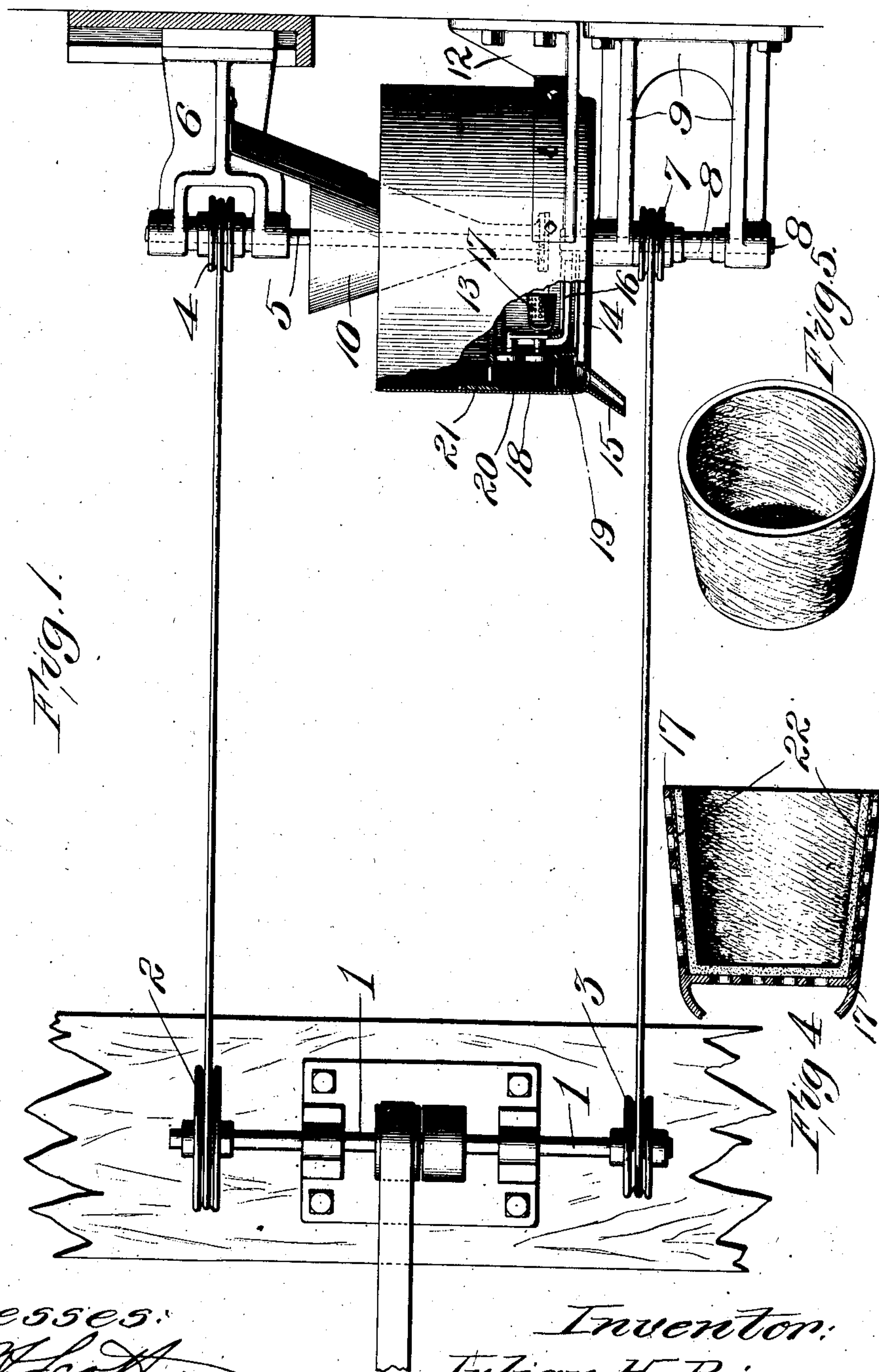
J. H. RIVERS.

APPARATUS FOR FORMING HOLLOW PULP ARTICLES.

APPLICATION FILED FEB. 6, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
 J. H. Scott
 Ralph Kaelin

Inventor:
Julian H. Rivers,
by Bakerwell Cornwall
Attys.

No. 768,309.

PATENTED AUG. 23, 1904.

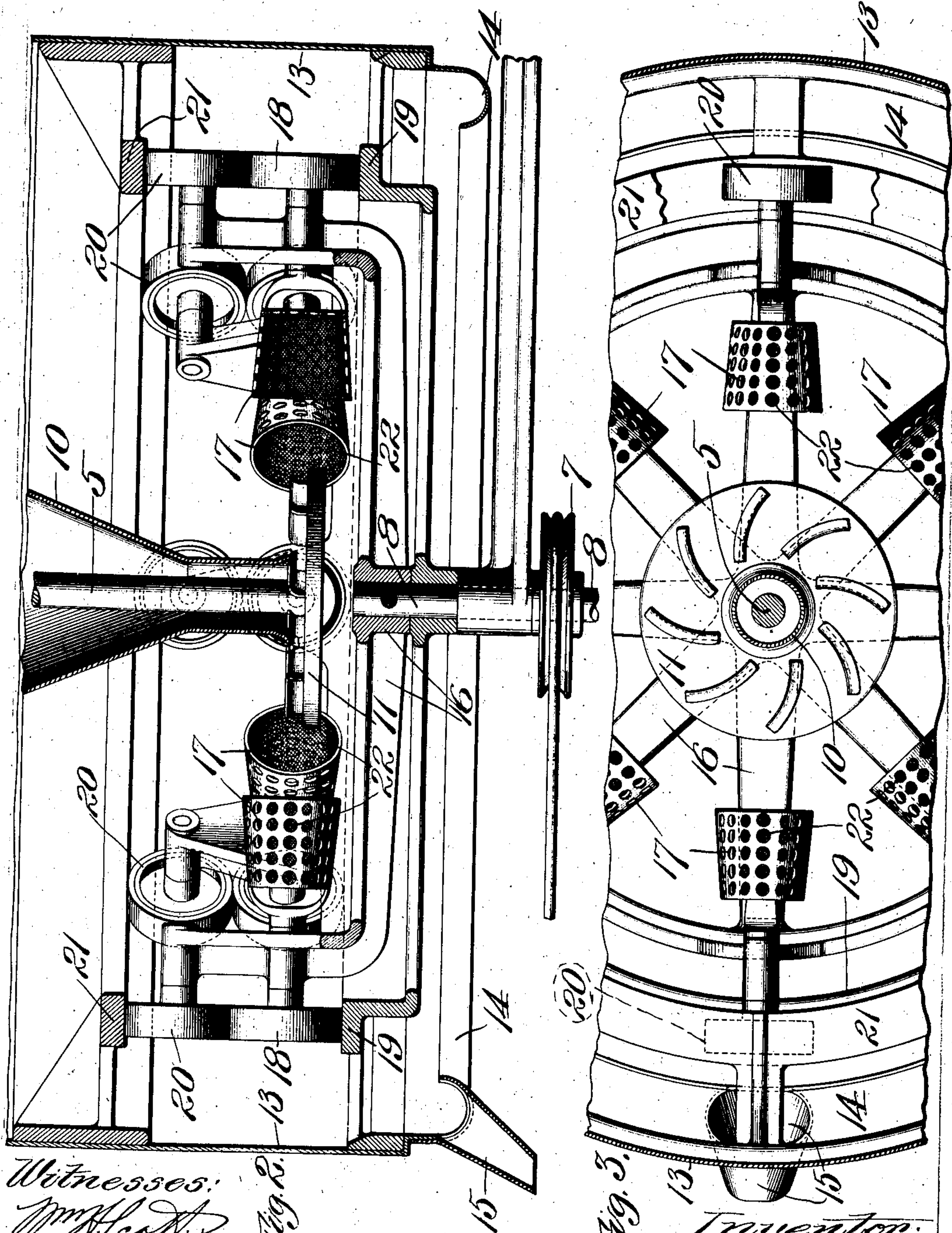
J. H. RIVERS.

APPARATUS FOR FORMING HOLLOW PULP ARTICLES.

APPLICATION FILED FEB. 6, 1904.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses:
J. H. Rivers
Ralph Ketch

Inventor:
Julian H. Rivers,
by Bakewell Cornwall
Attys.

UNITED STATES PATENT OFFICE.

JULIAN H. RIVERS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO UNITED STATES FIBER STOPPER COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF SOUTH DAKOTA.

APPARATUS FOR FORMING HOLLOW PULP ARTICLES.

SPECIFICATION forming part of Letters Patent No. 768,309, dated August 23, 1904.

Application filed February 6, 1904. Serial No. 192,375. (No model.)

To all whom it may concern:

Be it known that I, JULIAN H. RIVERS, a citizen of the United States, residing at the city of St. Louis, State of Missouri, have invented a certain new and useful Improvement in Apparatus for Forming Hollow Pulp Articles, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevational view, partly in section, of my improved apparatus. Fig. 2 is a vertical sectional view. Fig. 3 is a top plan view, partly broken away. Fig. 4 is a detail view of a formed hollow article in its mold, and Fig. 5 is a detail view of an article formed by my improved apparatus.

This invention relates to a new and useful improvement in apparatus for forming hollow pulp articles, such as buckets, or other articles where it is desired to have a bottom wall or flange integral with the side walls.

The objects of this invention are to utilize the action of centrifugal force as a factor in determining the position of the fibers entering into the construction of the article, said force so disposing and compacting the fibers that a solid compact article composed of layers or strata of interwoven fibers is produced.

Another object is to simplify the mechanism and so dispose and arrange the parts that a number of articles can be produced simultaneously, all of said articles possessing similar properties and characteristics.

I do not in this application claim the process or the article, the same forming the subject-matter of companion applications filed by me of even date herewith and serially numbered 192,376 and 192,377.

In the drawings, 1 is a driven shaft having pulleys 2 and 3 of different diameters mounted thereon, the larger of which, 2, is belted to a pulley 4 on shaft 5, mounted in a bracket 6, while the smaller, 3, is belted to a pulley 7 on a shaft 8, mounted in a stationary bracket 9. Bracket 6 carries a funnel 10, into which the

pulp-water is poured, said pulp-water being delivered from said funnel upon a winged disk 11, carried by the lower end of the rotating shaft 5. The pulp-water is thrown off by centrifugal force from this disk in the form of a spray.

12 is a bracket carrying a shell 13, around the lower inner edge of which shell is arranged a conduit 14 for delivering the waste to a conducting-off spout 15.

16 is a spider-frame on the upper end of shaft 8, which frame carries bearings in horizontal alinement with the disk 11. In these bearings are mounted molds 17, the bottoms and side walls of which are perforated, the open side of the mold (in the form of an open-ended cylinder or frustum) being presented toward the feeding device. The mold is carried by a shaft mounted in a bearing in the spider-frame, and on the opposite (outer) end of this shaft is arranged a roller 18, which rides upon a track-ring 19, carried by the casing 13.

To insure roller 18 engaging the track-ring and causing its carried mold to rotate during the operation of the device, I arrange a companion roller 20 in the spider-frame for each roller 18 and provide an upper track-ring 21 for engaging the rollers 20, said upper track-ring being also supported by the casing 13.

In operation removable pieces of gauze 22 are preferably introduced in the mold to preserve a smooth outer surface on the finished article and to enable it to be easily removed from the mold.

Pulp-water being delivered upon the rotating disk 11 will be thrown outwardly by centrifugal force in the form of a spray. The frame 16 causes the molds to travel around the feeding device, during which the rollers 18 impart rotation to said molds, so as to bring the entire inner surface of the mold in the path of the spray. Upon striking the face of the mold the fibers of the pulp are caught and the water by centrifugal action is forced out. The fibers are separately deposited and are capable of being influenced so far as their position in the mold is con-

cerned by the forces acting upon them. First, they are forcibly projected by the feeding device and lie in various directions in transit; second, upon striking the side wall of the mold centrifugal action due to the rotation of the frame 16 tends to straighten the fibers and cause them to lie in a direction from the open to the closed end of the mold, and, third, the rotation of the mold occasioned by roller 18 sets up a force acting at an angle to the second force above mentioned, and the influence of this third force is to cause the fibers to lie in a circumferential direction. The resultant position of the fibers is determined by the combined value of these forces, which value can be changed or modified to suit conditions or effects desired by changing the relative speeds, first, of the disk 11, second, of the frame 16, third, of the mold 17. With relation to the action of the above-mentioned forces on the fibers deposited upon the bottom of the mold the first (projectile) force tends to lay the fibers flat irrespective of direction, the second force is compactive, and the third causes the fibers to lie in spiral lines. All of these forces act simultaneously, and in some positions assumed by the fibers the third force is neutralized; but many fibers are so received as to be influenced thereby, as the finished article shows the fibers chiefly spirally disposed in the bottom wall and chiefly helically disposed in the side walls.

If desired to line the interior surface of the article, I may spray liquid self-hardening cement upon the fibers after the article is finished, the forces herein referred to causing such substance to penetrate into the walls of the article, or the liquid cement may be added with the fibers, in which event the facing will be blended, the fibrous walls being relatively soft on the exterior and gradually hardening to the cementitious facing.

I am aware that minor changes in the construction, arrangement, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. In an apparatus of the character described, the combination of means for feeding the pulp-water in the form of a spray, and a traveling rotatable mold; substantially as described.

2. In an apparatus of the character described, the combination of centrally-located means for feeding the pulp-water, and a rotating mold revolving around said feeding-point; substantially as described.

3. In an apparatus of the character described, the combination of a centrifugal pulp-water-feeding device, and a traveling rotatable mold; substantially as described.

4. In an apparatus of the character described, the combination of a centrifugal pulp-water-feeding device, and a series of rotating molds traveling around said feeding device; substantially as described.

5. In an apparatus of the character described, the combination of means for projecting the pulp-water in the form of a spray, and a mold having an open side presented toward the spray; substantially as described.

6. In an apparatus of the character described, the combination of means for projecting the pulp-water in the form of a spray, a mold having an open side through which the pulp-water is projected in the mold, and means for rotating said mold; substantially as described.

7. In an apparatus of the character described, the combination of means for projecting the pulp-water in the form of a spray, a mold having an open side through which the pulp-water is projected in the mold, means for rotating said mold, and means for causing the travel of said mold; substantially as described.

8. In an apparatus of the character described, the combination of a centrally-located spraying device, a rotating frame, a track-ring, rollers on the frame riding upon said track-ring, and molds carried by the frame and rotatable with said rollers; substantially as described.

9. In an apparatus of the character described, the combination of a centrally-located spraying device, a rotatable frame, an upper and a lower track-ring, rollers mounted in pairs in the frame and engaging said track-rings respectively, and molds carried by the track-ring and rotatable with said rollers; substantially as described.

10. In an apparatus of the character described, the combination of a shell having a conduit at its bottom to carry off waste, of an axially-arranged centrifugal feeding device, an axially-arranged spider-frame, means for rotating the feeding device and frame, a series of molds having perforated side walls and bottoms rotatable in said frame, and means for rotating said molds; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 6th day of January, 1904.

JULIAN H. RIVERS.

Witnesses:

F. R. CORNWALL,
GEORGE BAKEWELL.