

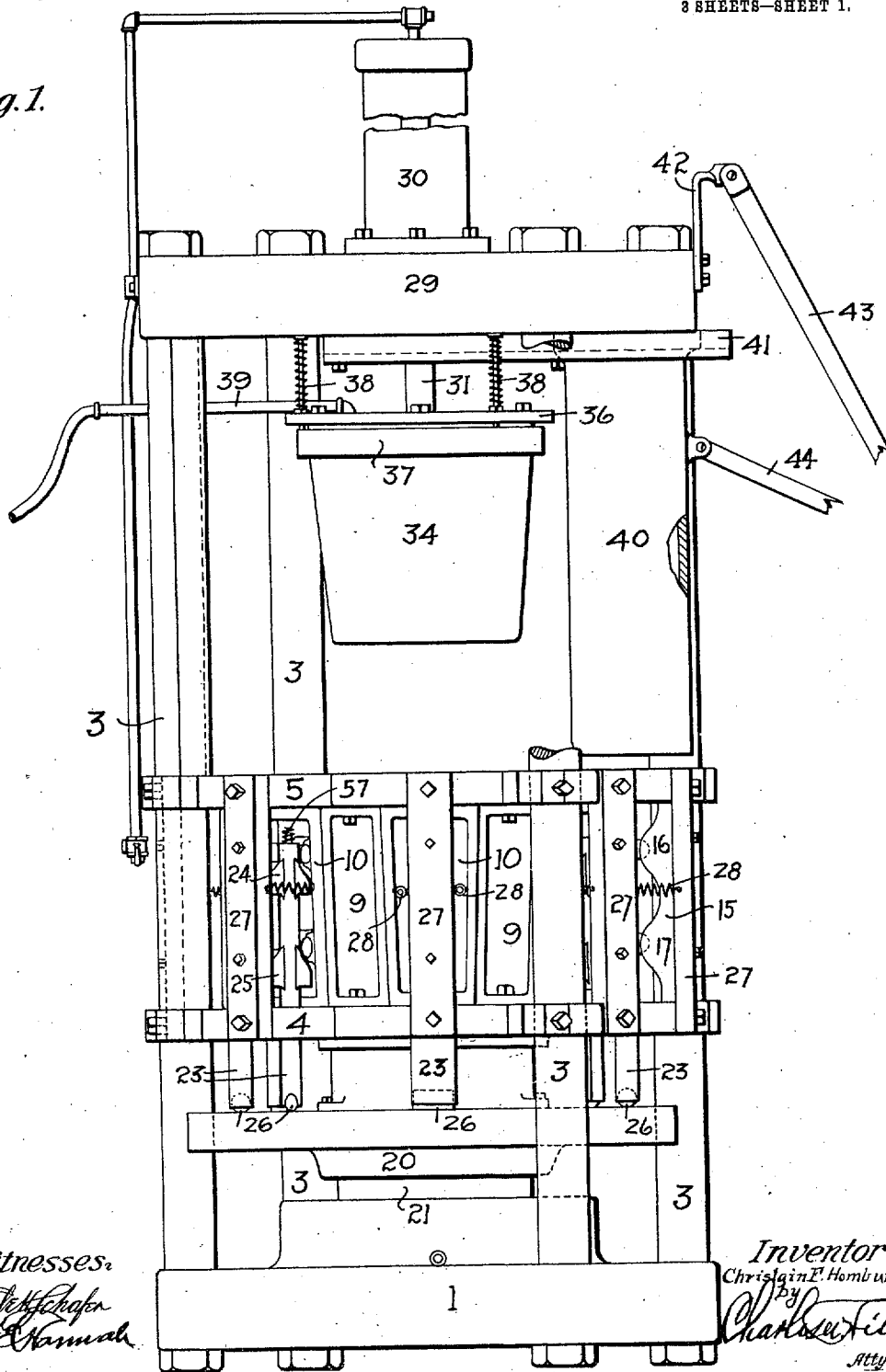
C. F. HOMBURG.
 APPARATUS FOR FORMING RECEPTACLES FROM PULP.
 APPLICATION FILED SEPT. 5, 1907.

954,962.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Charles F. Homburg
Charles F. Homburg

Inventor
 Charles F. Homburg
 by *Charles F. Homburg*
 Atty.

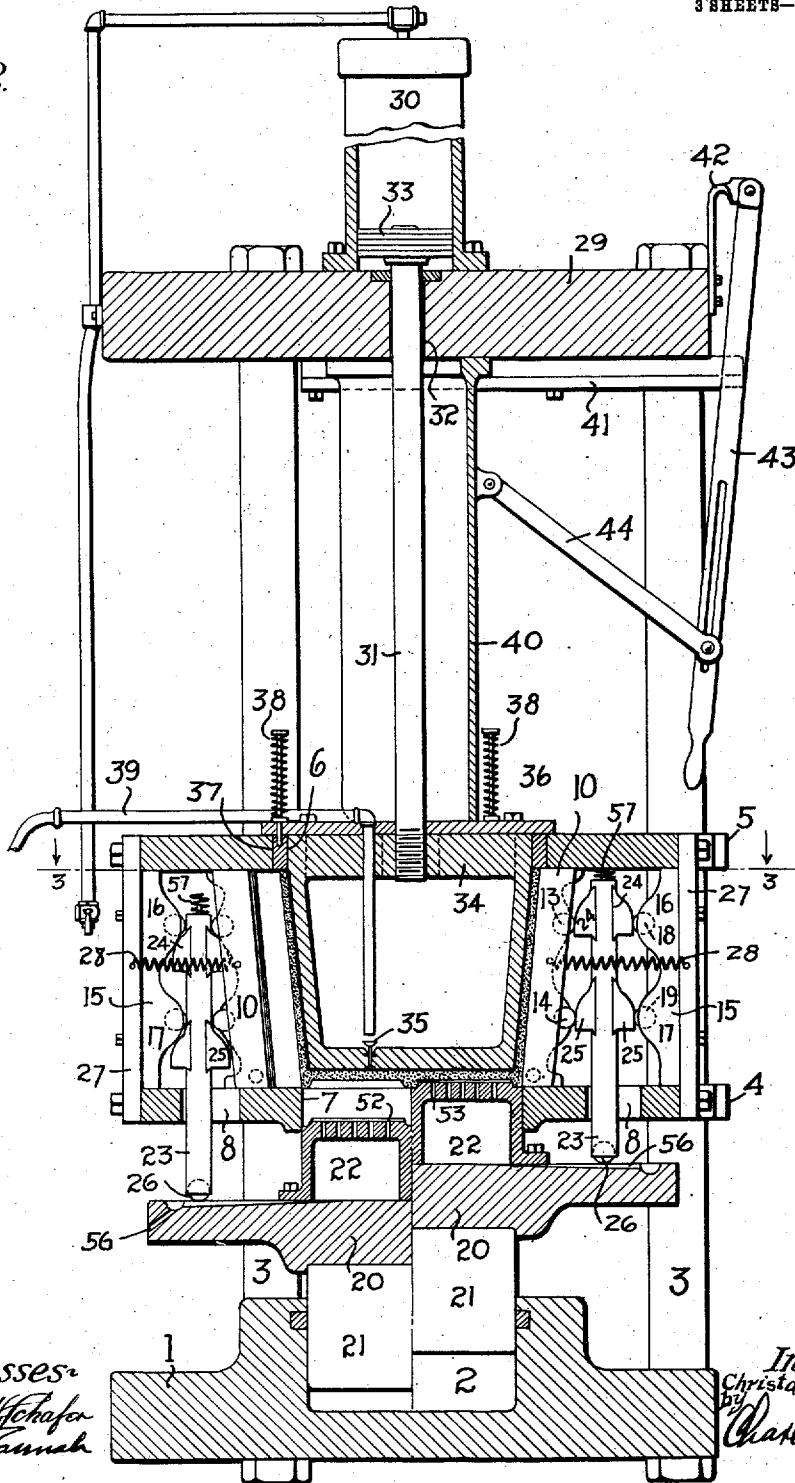
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3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Walter Schaefer
W. H. Kammak

Inventor
 Christian F. Homburg
 by *Charles W. Cole*
 atty.

C. F. HOMBURG.
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3 SHEETS—SHEET 3.

Fig. 3.

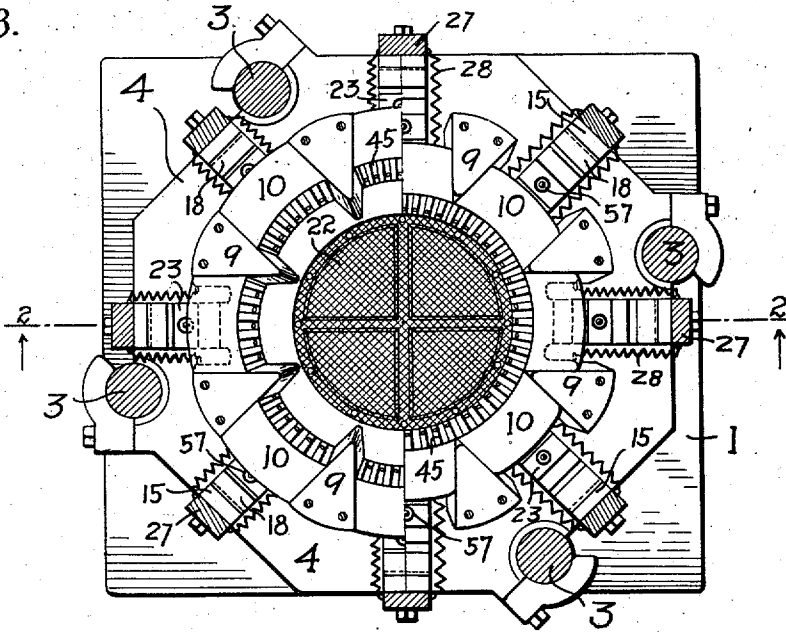


Fig. 4.

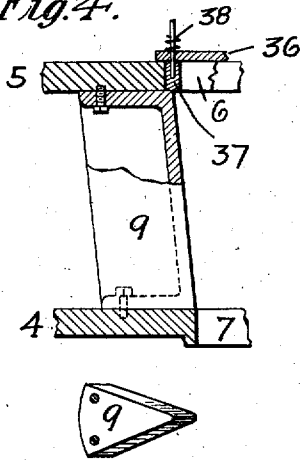


Fig. 5.

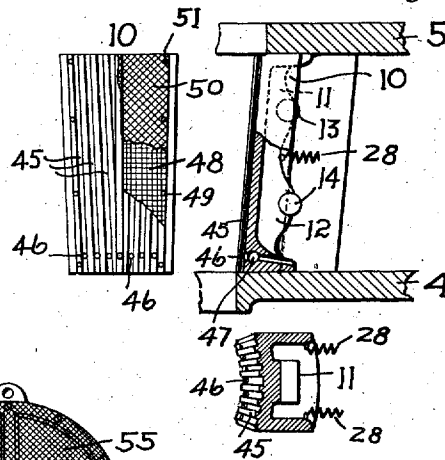
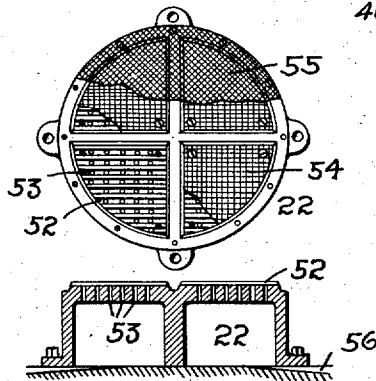


Fig. 6.



Witnesses:
Carl H. Schafer
R. H. H. H. H.

Inventor:
 Christian Homburg.

Charles H. H. H.

UNITED STATES PATENT OFFICE.

CHRISTAIN F. HOMBURG, OF CHICAGO, ILLINOIS, ASSIGNOR TO CELLULOSE PACKAGE MANUFACTURING CO., A CORPORATION OF ILLINOIS.

APPARATUS FOR FORMING RECEPTACLES FROM PULP.

954,962.

Specification of Letters Patent.

Patented Apr. 12, 1910.

Application filed September 5, 1907. Serial No. 391,488.

To all whom it may concern:

Be it known that I, CHRISTAIN F. HOMBURG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Apparatus for Forming Receptacles from Pulp, of which the following is a specification.

This invention relates to an apparatus for forming receptacles from pulp, and the object is to provide a machine of this character which has a minimum number of movable parts, thus making it possible to form receptacles very rapidly.

A further object of the invention is to provide a drainage system by which the water in the pulp can be easily and quickly drained or discharged during the formation of a receptacle, thus enabling the use of pulp containing much less moisture than was heretofore necessary.

In the accompanying drawings, Figure 1 is a side elevation of my improved apparatus for forming receptacles from pulp, showing the table, carrying the bottom forming die, in its lowered position and the cone in its raised position; Fig. 2 is a vertical section of same taken on line 2 2 of Fig. 3, showing the table and cams in their lowered and raised positions, and the segments in their extended and compressed positions. Also the cone is shown in its lower position; Fig. 3 is a cross-section taken on line 3 3 of Fig. 2, showing the segments in their extended and compressed positions, with the cone removed; Fig. 4 is a detail view of one of the guide blocks; Fig. 5 is a detail view of one of the segments; and Fig. 6 is a plan and section of the bottom forming die.

The reference numeral 1 indicates the base of the machine, which is provided with the cylindrical opening 2, extending part way through said base. Standards 3 are rigidly secured to the base 1. Intermediate of the standards 3 is secured the lower stationary plate 4 and the upper stationary plate 5. The upper plate is provided with opening 6, and the lower plate is provided with opening 7. The lower plate is also provided with a series of openings 8. Disposed between the upper plate 5 and the lower plate 4 are a series of wedge-shaped guide blocks 9, which taper inwardly and are arranged around the openings intermediate of the up-

per and lower plates. Disposed between the guide blocks 9 are the segments 10. When the guide blocks 9 and the segments 10 are arranged in position between the upper and lower plates, the same form a circular mold. The segments 10 are so arranged between the guide blocks 9, that same can be moved inwardly and outwardly.

Cams 11 and 12 are formed on the rear surface of the segments 10 and rolls 13 and 14 are secured therein. The rolls are adapted to be loosely mounted in said cams. Directly behind the segments 10 are secured the stationary cam bars 15, these cam bars are rigidly secured to the upper plate 5 and the lower plate 4. The cam bars 15 are provided with cams 16 and 17 which are in direct alinement with the cams 11 and 12 on segments 10. Rolls 18 and 19 are rotatably mounted in cams 16 and 17. A movable table 20 is adapted to rest upon the upper end of hydraulic cylinder 21, this table has rigidly secured on its upper surface bottom forming die 22. The upper portion of this die extends into opening 7 in plate 4. A plurality of movable cam bars 23, provided with the oppositely-disposed cams 24 and 25, are arranged to come in contact with the cams formed on the segments 10 and the stationary cam bar 15. The lower ends of cam bars 23 extend through openings 8, in lower plate 4, and are provided with the rolls 26, which rest upon the upper surface of table 20.

A plurality of braces 27 connect the upper plate 5 and the lower plate 4. The purposes of these braces are to rigidly hold the said plates in position. Springs 28 are secured to the braces 27 and are connected to the segments 10, their purpose being to normally hold the segments 10 in their extended position. When the table 20 is moved upward the cams on the movable cam bar 23, will engage the cams on the stationary cam bar 15 and the cams on the segments 10, thus moving said segments inwardly. Simultaneously with the inward movement of the segments, the bottom forming die will move upwardly.

To the upper end of the standards 3 is rigidly secured the plate 29. A cylinder 30, preferably operated by hydraulic power, is secured on the upper surface of the plate 29. A piston rod 31 extends through opening 32, in plate 29, one end of this rod is secured to piston 33, which operates in cyl-

inder 30, and the opposite end thereof is secured to a die 34 shaped like the frustum of a cone. Said die 34 is hollow and tapers slightly toward the bottom. A valve 35 is formed in the bottom of this die, this valve is held in its closed position by gravity. A disk 36 is secured to the upper end of die 34, which has, on the under surface thereof, stripping ring 37. This ring is held in its normal position by means of the tension spring 38. Air pipe 39 extends into die 34.

A semi-circular brace 40, whose upper end is secured in guideways 41, extends from plate 29 to disk 36. A brace 42 is secured to plate 29 and the upper end of lever 43 is adapted to be secured thereto. This lever is connected to the brace 40 by means of link 44, and by means of this lever brace 40 may be moved off of disk 36.

The inner surface of the segments 10 are provided with a series of longitudinal grooves or channels 45, and in the lower end of each channel, and extending through the segments, are the openings 46; these openings are all connected by one common duct 47, which extends horizontally through the lower end of segment 10. A coarse wire screen 48 is secured over the inner surface of the segments 10, by means of screws or bolts 49, and a wire screen 50, preferably of a finer mesh, is adapted to be secured over the screen 48, to the segment 10, by means of the bolts or screws 51. The purpose of the channels 45, openings 46 and ducts 47, are to afford a proper system of drainage when the water is pressed out of the pulp during the operation of forming a receptacle, and the wire screens prevent particles of the pulp from lodging in the channels or openings during said compressing operation. A series of channels 52 are formed on the upper surface of bottom forming die 22, and a plurality of openings 53 extend through the upper surface of said die. A coarse screen 54 is secured upon the upper surface of the die 22, and a screen 55 of finer mesh secured over the coarse screen. The water compressed out of the pulp will be forced through the openings 53 in the die 22 and escapes through groove 56.

Assuming the die 34 to be in its raised position, as shown in Fig. 1 of the drawings, and the segments 10 in their extended position and the bottom forming die 22 in its lowered position, the operation of the machine is as follows: The pulp is fed into the mold, formed by the segments and bottom forming die, in any suitable manner. The brace 40 being removed from the disk 36, the die 34 is allowed to pass into the mold containing the pulp, the brace 40 is then pushed inwardly and allowed to rest upon disk 36, this rigidly locks die 34 in its downward position. Hydraulic pressure is then applied through cylinder 21, which will

move the table 20 upward. This pushes cam bar 23 upward, and by reason of the cam action said segments will be moved inwardly thus compressing the pulp in the mold against the die 34. Simultaneously with the inward movement of the segments, the die 22 will be moved upward, this will compress the pulp in the mold against the bottom of die 34. The water pressed out of the pulp will flow into the channels 45 and through the duct 47 and out through openings 46. If it were not for the numerous channels and openings through which the water can freely pass, the operation of forming a receptacle would be considerably delayed, and the receptacle might be unevenly compressed, but when the water can pass away freely all liability of uneven compression is obviated and the receptacle can be quickly and easily formed. A further advantage of providing a proper system of drainage is that the receptacle, when formed, will contain less moisture, which is an item of considerable importance in the formation of receptacles from pulp. When the hydraulic pressure is released table 20 will move downwardly and the bottom forming die 22 and cam bars 23 will, consequently, also be lowered. The springs 57 on the upper end of cam bars 23 will assist to force said bars downward quickly, and the springs 28 will then draw the segments outwardly and away from the receptacle compressed around the die 34. The receptacle formed will adhere to said die, and by removing brace 40 from disk 36, and applying hydraulic pressure to piston 33, the die may be raised upward out of the mold. When the springs 38 strike plate 29 the stripping ring 37 will force the receptacle from the die. To force a small quantity of air through air pipe 39, into die 34 will greatly facilitate the operation of removing the receptacle therefrom.

I claim as my invention, and desire to secure by Letters Patent—

1. An apparatus for forming a receptacle from pulp, comprising a base, standards secured thereon, upper and lower plates, provided with openings intermediate thereof, secured to said standards, a plurality of guide blocks disposed between said upper and lower plates and around the openings intermediate of said upper and lower plates, a plurality of segments disposed between said upper and lower plates and between said guide blocks, cams formed on the outer sides of said segments, stationary cam bars, movable cam bars, provided with oppositely-disposed cams, adapted to engage the cams on the segments and the stationary cam bars, a table, a bottom forming die carried thereby, means for raising said table and moving the die upwardly and the segments inwardly.

2. An apparatus for forming a receptacle from pulp, comprising a base, standards se-

cured thereon, upper and lower plates, secured to said standards and provided with openings, a plurality of guide blocks disposed between said upper and lower plates and around the openings, a plurality of segments disposed between said upper and lower plates and between said guide blocks, cams formed on the rear sides of said segments, stationary cam bars, movable cam bars, provided with oppositely-disposed cams, adapted to engage the cams on the segments and the stationary cam bars, a table, a bottom forming die carried thereby, a die adapted to be lowered into the mold formed by the segments and bottom forming die, a brace operated by a lever adapted to lock said cone rigidly in said mold and means for moving the table and bottom forming die upwardly and the segments inwardly and outwardly.

3. An apparatus for forming a receptacle from pulp, comprising a base, standards secured thereon, a plate secured to the upper end of said standards, upper and lower plates, provided with openings, a plurality of wedge shaped guide blocks disposed at predetermined intervals between said upper and lower plates and arranged around the openings therein, a plurality of segments disposed between the upper and lower plates and between said guide blocks, channels formed on the inner surface of said segments, openings extending from the lower ends of said channels and passing through said segments, said openings being connected by a duct, screens secured over said channels and openings, cams formed on the rear sides of said segments, stationary cam bars, movable cam bars, provided with oppositely-disposed cams, adapted to engage the cams on the segments and stationary cam bars, a table, a bottom forming die carried thereby, a die adapted to be lowered into the mold formed by the segments and bottom forming die, means for locking said die rigidly in said mold, and means for moving the bottom forming die upward and the segments inwardly and outwardly.

4. An apparatus for forming a receptacle from pulp comprising a base, standards secured thereto, upper and lower plates provided with openings, a plurality of wedge shaped guide blocks disposed between said upper and lower plates and arranged around the openings therein, a plurality of segments disposed between the upper and lower plates and between said guide blocks, and operable therebetween, channels formed on the inner surface of the segments, openings extending from the lower ends of said channels and communicating with a duct, affording proper drainage for the water compressed from the pulp, screens protecting said channels and openings, cams formed on the rear ends of said segments, stationary cam bars, movable cam bars, provided with

oppositely-disposed cam, adapted to engage the cams on the segments and stationary cam bars, a table, a bottom forming die carried thereby, a die adapted to be lowered into the mold formed by the segments and bottom forming die, means for locking said die rigidly in said mold, means for raising and lowering said die, and means for moving the bottom forming die upwardly and downwardly and the segments inwardly and outwardly.

5. An apparatus for forming a receptacle from pulp, comprising a base, standards secured thereto, upper and lower plates secured to said standards provided with openings, a plurality of wedge shaped guide blocks disposed between said upper and lower plates and arranged around the openings in said plates, a plurality of segments disposed between the upper and lower plates and between said guide blocks, said segments operable by cam action, channels formed on the inner surface of the segments, openings extending from the lower ends of said channels and communicating with a duct, affording proper drainage for the water compressed out of the pulp, screens protecting said channels and openings, a table, a bottom forming die carried thereby, an inner die operated vertically, adapted to fit into the mold formed by the segments and bottom forming die, means for locking said die rigidly in said mold, and means for moving the bottom forming die upwardly and downwardly and the segments inwardly and outwardly.

6. In a pulp receptacle forming machine a hollow inner forming die, coaxing adjustable dies adapted to form a receptacle between the same and inner forming die and adapted to move outwardly from the inner die when the receptacle is formed, means bearing on the top of the receptacle, mechanism for actuating the same to remove the receptacle from the inner die, means for admitting compressed fluid into the hollow forming die and a valve for admitting the compressed fluid to aid in loosening the receptacle from the inner die.

7. In a pulp receptacle forming machine an inner die, a frame comprising parallel apertured plates, means for rigidly connecting the plates, guides, die sections between the dies and positioned around the apertures in the plates, springs secured to the sections and to the rigid connecting means normally holding the die sections retracted, an adjustable table, a bottom die carried thereby, cams secured to the die sections, rigid cams disposed oppositely from the cams on the die sections, vertically adjustable cam bars loosely supported on the table, and unconnected with the cams and oppositely disposed cams secured to each bar each adapted to engage one cam on the appropriate

ate die section and the rigid cam opposite therefrom.

8. In a pulp receptacle forming machine an inner die, a frame comprising parallel 5 apertured plates, means for rigidly connecting the plates, guides, sections between the guides and positioned around the apertures in the plates, each having an inner face shaped to afford with the adjacent sections 10 a die and each section having an upper and a lower cam on its outer face, springs secured to the sections and to the rigid connecting means normally holding the die sections retracted, an adjustable table, a bottom 15 die carried thereby, rigid cams opposite the upper and lower cams on each die section, vertically adjustable cams between each section and the rigid cams and loosely supported on the table adapted to contact the 20 appropriate cams on the sections and rigid cams for forcing the sections inwardly.

9. In a pulp receptacle forming machine an inner die, a frame comprising parallel 25 apertured plates, means for rigidly connecting the plates, guides, die sections between the guides and positioned around the apertures in the plates, springs secured to the sections and to the rigid connecting means normally holding the die sections retracted, 30 an adjustable table, a bottom die carried thereby, cams on the die sections and on the rigid connecting means, cams therebetween unsecured to, but actuated by the adjustable table, means for permitting escape of fluid 35 from the pulp as the receptacle is being formed and means aided by fluid pressure for removing the receptacle after the same is formed from the inner die.

10. In a machine for forming pulp receptacles an inner forming die, die sections arranged to move horizontally, means for normally holding the same retracted, cams on 40 each die section, a rigid cam oppositely disposed from each cam on the die sections, reciprocating cam bars provided with cams, 45 one for each section, means for reciprocating the cam bars to adjust the die sections and a bottom forming die provided with apertures.

50. 11. In a machine for forming pulp receptacles an inner forming die, adjustable sections adapted to afford an outer forming die, cams on said sections, loosely supported

cams adapted to engage the same, means for simultaneously actuating the cams thereby 55 adjusting the sections to compress pulp between the same and inner forming die, means for automatically releasing said sections after the receptacle is formed and pneumatic means for aiding in releasing the re- 60 ceptacle after it is formed.

12. In a machine for forming pulp receptacles an inner forming die, adjustable sections adapted to afford an outer forming die, each section grooved longitudinally and 65 provided with an aperture at the bottom of each groove, coarse and fine screens secured to each section, cams on said sections, cams adapted to engage the same, means for simultaneously actuating the cams thereby ad- 70 justing the sections to compress pulp between the same and inner forming die, means for automatically releasing said sections after the receptacle is formed, a die for shaping the bottom of the receptacle, 75 means for actuating the same, said die adapted to return to normal position by gravity and the bottom die provided with grooves and apertures for permitting escape of water while the receptacle is being 80 formed.

13. In a pulp receptacle forming machine a hollow inner forming die, means adapted to be adjusted onto and off of the same to rigidly hold the die in forming position, 85 means for admitting air pressure into the die, means for admitting the compressed air through the bottom of the hollow die, coacting movable dies adapted to compress pulp between the same and inner die to form a 90 receptacle, means for withdrawing the coacting dies from the inner die, said coacting dies provided with apertures and passages for escape of fluid while the receptacle is being formed, means for preventing the 95 pulp from clogging the apertures and passages and means for automatically removing the receptacle when formed, from the machine.

In testimony whereof I have hereunto 100 subscribed my name in the presence of two subscribing witnesses.

CHRISTAIN F. HOMBURG.

Witnesses:

CHARLES W. HILLS,
K. E. HANNAH.