

(No Model.)

3 Sheets—Sheet 1.

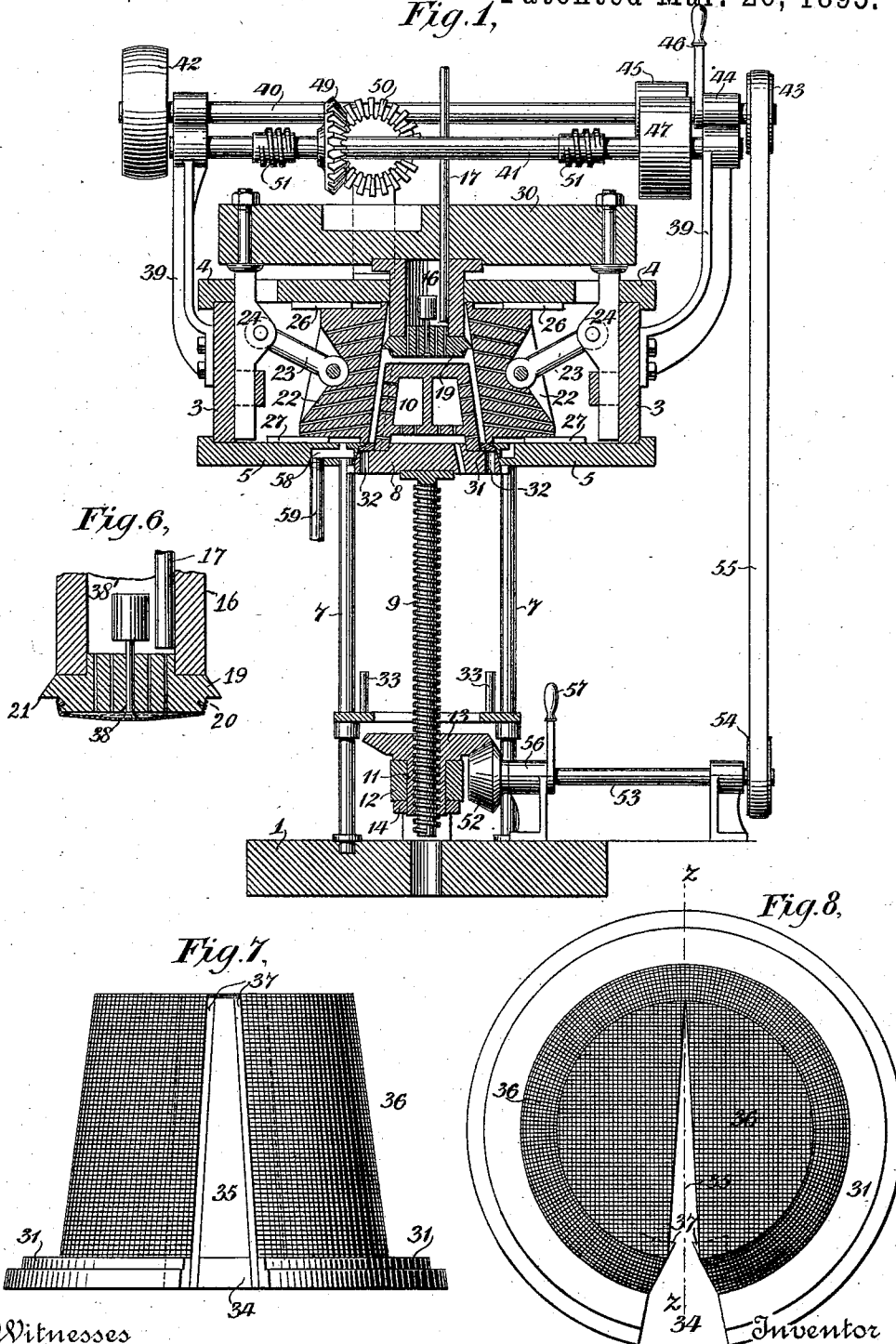
M. L. DEERING.

MACHINE FOR MOLDING HOLLOW WARE FROM PULP.

No. 536,189.

Patented Mar. 26, 1895.

Fig. 1,



Witnesses
Edward Thorpe.
James J. Wilson.

By his Attorney

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(No Model.)

3 Sheets—Sheet 2.

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Fig. 2,

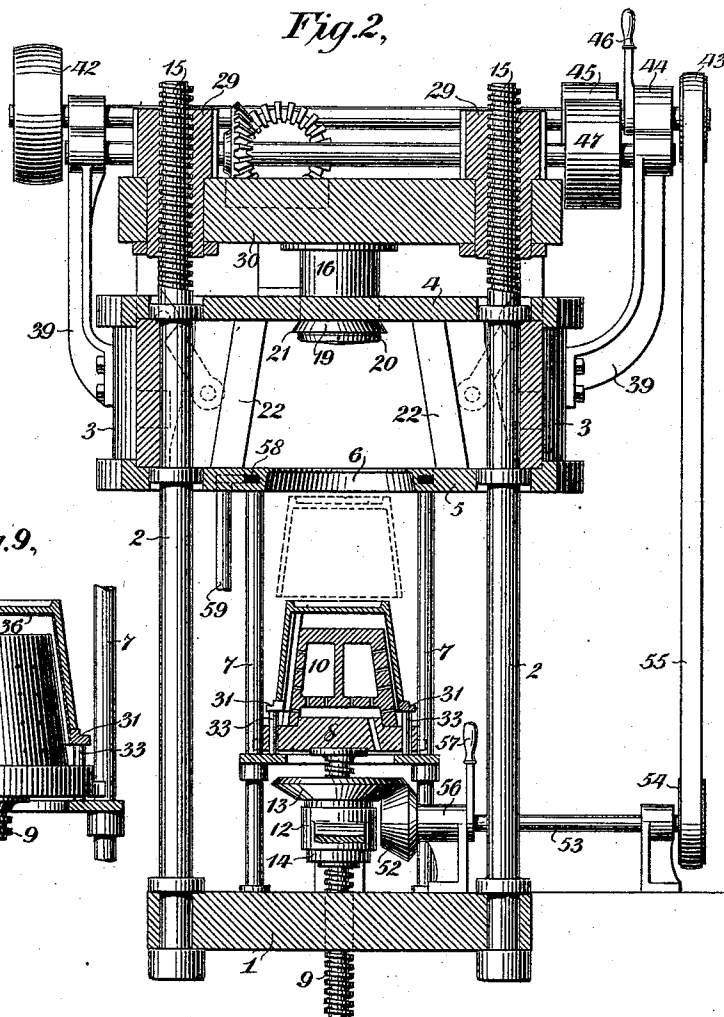


Fig. 9,

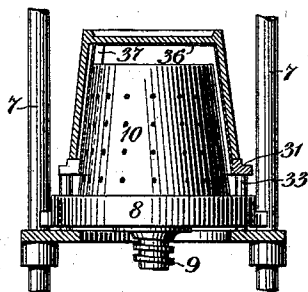


Fig. 5,

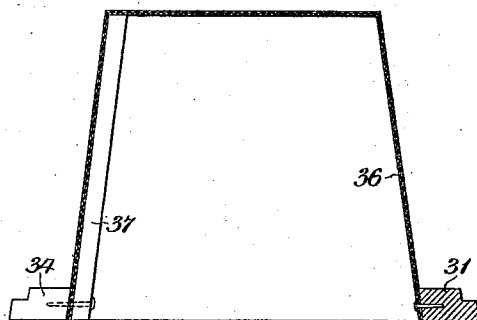
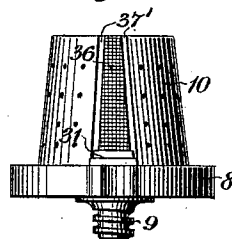


Fig. 10,



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(No Model.)

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Fig. 3,

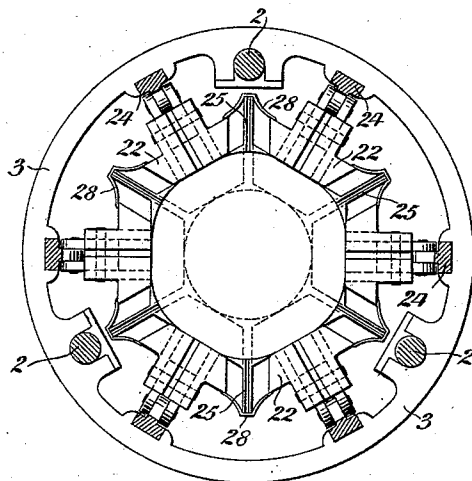
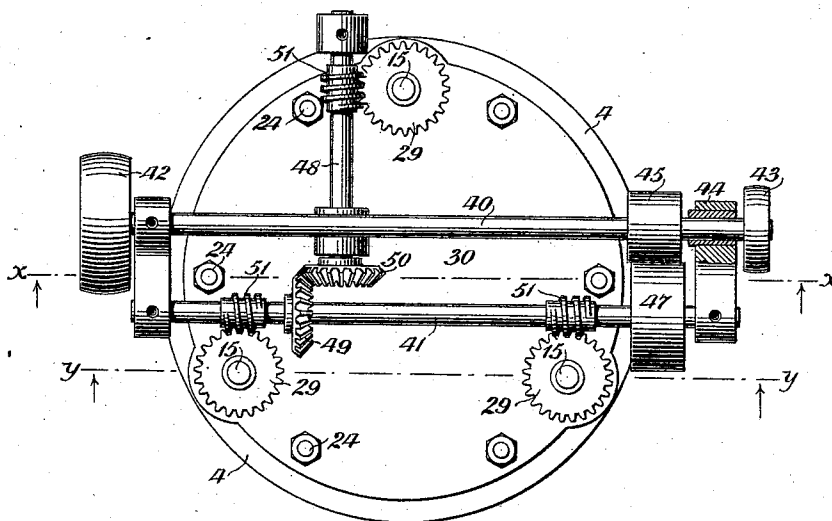


Fig. 4,



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UNITED STATES PATENT OFFICE.

MARK L. DEERING, OF BROOKLYN, NEW YORK.

MACHINE FOR MOLDING HOLLOW WARE FROM PULP.

SPECIFICATION forming part of Letters Patent No. 536,189, dated March 26, 1895.

Application filed March 17, 1892. Renewed August 17, 1894. Serial No. 520,617. (No model.)

To all whom it may concern:

Be it known that I, MARK L. DEERING, of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Machines for Molding Hollow Ware from Pulp, of which I declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to improvements in machines, in which a pail or other similar vessel, having its body and bottom united in a single mass, may be molded out of pulp, and the invention consists of a machine of which the various parts composing the mold, and the mechanism for operating them, are constructed, arranged and combined substantially as is herein described and claimed.

In the accompanying sheets of drawings, Figure 1 is a vertical section in a plane which cuts the top of the machine through the center, as in the line x, x , Fig. 4, viewed in the direction indicated by the arrows; Fig. 2, a vertical section mainly in the plane y, y , Fig. 4, viewed in the direction indicated by the arrows, but showing the former in the plane x, x ; Fig. 3, a top view with the top plate and parts above it removed; Fig. 4, a top view with all the parts in place; Fig. 5, an enlarged vertical section of the covering and ring on the former, in the plane z, z , Fig. 8; Fig. 6, an enlarged vertical section of the head. Figs. 7 and 8 are an enlarged elevation and top view respectively, of the detachable part of the covering and ring on the former; and Figs. 9 and 10 illustrate the attachment to the former of the covering, and the action thereof in loosening the pail.

Similar reference numbers designate like parts in the several views.

The invention herein described is supplemental to that patented in my Patent No. 455,097, dated June 30, 1891, and illustrates means whereby the head of the mold may be rendered movable, with the bottom stationary during the operation of forming the vessel, the contracting and expanding sections being adapted in this case to be actuated in connection with the head, and means to facilitate the removal of the newly-molded vessel from the machine. There is also a difference be-

tween these machines in respect to the mechanism for transmitting the operating power, which with the particular construction illustrated in this application is supplied to the machine by a belt and pulleys.

This machine has for a base the plate 1 which holds the lower ends of three columns, marked 2, on which is secured the hollow casting 3, as shown in Figs. 2 and 3 of the drawings. Against the top and bottom of the casting 3 are fastened plates 4 and 5, the bottom plate having a central opening 6. Two guides 7, 7 extend from the base to the plate 5, and between these guides is a plate or block 8 which has grooved ears in which the guides are received. This block is mounted on a screw 9 and on the top of the block is fixed the former 10. The screw 9 engages with a female screw 11, supported in a bracket 12 attached to the base, the female screw being held in the bracket by the beveled friction wheel at one end, and the collar 14 at the other, so that it can turn in the bracket, and in the base is a hole to allow the male screw to pass through the base.

From the upper ends of the columns 2 projects three screws 15, on each of which is a female screw 29 secured in a plate 30, so as to turn in the plate, and having a wide gear forming the head of the screw on the top of the plate. On the under side of the plate is a hub 16, which is inserted in an opening in the plate 4, and has at its lower end a plate 19 provided with a groove or rabbet 20 and a projecting edge 21, and a pipe 17 held in the plate 30 extends down within the hub close to the plate 19.

The former is adapted to enter the opening 6 in the plate 5, and to project above that plate as shown in Fig. 1. The system of contracting and expanding sections, 22 and 25, is arranged to surround the former when it is in that position, the sections being fitted to slide on radial guides 26 and 27 in or on the plates 4 and 5. Each of the sections 22 is connected by a link 23 with a sliding bar 24, held in a guide against the side of the casting 3, and extending upward to the plate 30, to which it is attached, the plate resting against shoulders on the slides, and each of the sections 25 overlaps the faces of the sections 22 adjacent to it and is provided with a stout

spring 28 which bears against the backs of the adjacent sections.

In order that the horizontal movement of the sections may equal the vertical movement of the slides, these parts and the links connecting them are arranged in relation to each other as follows: When the system of sections is expanded as indicated in Fig. 2, the longitudinal axis of each link and a vertical line passing through the pivot in the slide form an angle of less than forty-five degrees, and when the system of sections is contracted as indicated in Fig. 1, the axis of the link and a horizontal line passing through the pivot in the section form a similar angle. The axis of the link is therefore the hypotenuse of a right-angle triangle having the perpendicular passing through the pivot in the slide and the base passing through the pivot in the section, and as the sections are advanced the perpendicular of the triangle is shortened until it becomes of the same length as was the base at the beginning of the movement, and the base is lengthened until it equals the length which the perpendicular had at the beginning of the movement. It is evident that this arrangement will render the horizontal movement of the sections equal to the vertical movement of the slides, and of the head with which the slides are connected, so that a vessel may be formed in the mold having the same thickness on the sides as on the bottom, and with the density of the sides and bottom uniform.

The sections and former and plate 19 are grooved and perforated, and faced with a thin porous covering, made for example of layers of sheet brass, with a layer of wire gauze on the surface.

Around the base of the former is a ring 31, which lies on the block 8, and flush with the plate 5, when the former is in its highest position, and under the ring are holes 32, passing through the block, which are entered by pins 33 attached to the guides 7, 7 just before the former reaches its lowest position when it descends to allow the newly-molded vessel to be removed. These pins are fixed in a ring on the guides, and there may be of them any convenient number. A short section of the ring 31 is separable from the body of the ring, at a place marked 34, Figs. 7 and 8, and is permanently fastened to the block 8, or to the former. A strip of the porous covering 36 of the former, extending from the section just mentioned, of the ring, to the top and across the top of the former, tapering from one edge of the top to the other, as indicated at 35 in Figs. 7 and 8, and partly shown in Fig. 10 is permanently fastened to the former. The main portion of the covering is attached to the larger section of the ring 31 as shown in Fig. 5, and against the inside of this part of the covering, and of the ring, are riveted strips 37. In the side of the former are cut grooves 37' in which these strips are designed

to slide, the strips being dovetailed in the grooves.

The covering 38 on the plate 19 is attached around the edge to the plate and is made with a tendency to spring away from the plate slightly to the center, as represented in Fig. 6. This tendency may be increased by means of a weight 38', or by a supplemental spring behind the covering.

Against the sides of the casting 3 are bolted brackets 39, 39, which support two shafts 40 and 41. At the ends of the shaft 40 are fixed-pulleys 42 and 43, and a friction wheel 45 is keyed to the shaft near the bearing 44. This bearing has an eccentric bushing which may be turned by means of a handle 46. On the shaft 41 is also keyed a friction wheel 47, with which the wheel 45 is made to engage by the movement of the handle 46. A short transverse shaft 48 is mounted in bearings supported from the casting 3 and the plate 4, and bevel-gears 49 and 50 connect this shaft with the shaft 41. Worms 51 on the shaft 41, and the shaft 48, engage the gears which form the heads of the female screws 29.

Near the base of the machine is a beveled friction wheel 52, attached to a shaft 53, on which is a fixed-pulley 54, and a belt 55 extends to this pulley from the pulley 43 on the shaft 40. By means of an eccentric bushing in the bracket 56 and a handle 57 the wheel 52 may be connected with and disconnected from the beveled friction wheel 13 previously described.

The plate 5 is provided with a channel 58 to which the pulp is conducted under pressure through a pipe 59, and from which it issues into the mold through ports in the top of the plate.

The mold is filled when the former is within the opening 6 in the plate 5, with the ring 31 flush with the top of the plate, as shown in Fig. 1, and with the mold-sections retracted and the head elevated as shown in Fig. 2. Then by moving the handle 46, motion is imparted to the shaft 41 from the shaft 40, which is revolved continuously by a belt passing around the pulley 42, and thence to the shaft 48, so that the female screws 29 are turned by the worms 51, and the plate 30 is moved downward. By this means the head and sections are forced downward and inward together, and the pulp is compressed against the former into the form of a pail, as indicated in Fig. 1, the ring of pulp around the head above the plate 19 being cut off by the edge of that plate as the sections approach the head. The sections 25 are driven forward by the sections 22 bearing against the beveled surfaces of the sections 25, and the water squeezed out of the mold is carried away by pipes, that within the former finding an outlet through a duct in the block 8, and that in the head being pumped up through the pipe 17. As soon as the pail has been pressed the motion of the belt passing around the

pulley 42 is reversed, by shifting the belt for instance from the pulley that actuates it to another pulley running in the opposite direction, whereupon the head is raised and the mold-sections are retracted, those marked 25 being drawn back by the others acting against the springs 28.

The resistance of the pulp under pressure against the facing 38 of the head, forces the center of the facing up close to the plate 19 and renders the surface flat, as appears in Fig. 1, but the facing gradually assumes its normal condition with the upward movement of the head, and is therefore withdrawn from the pulp by degrees, the part adjacent to the edge being separated therefrom first, and the center finally.

The former with the newly molded pail upon it is lowered by means of the screw 9, and the mechanism connected therewith, the wheel 52 being brought into contact with the wheel 13 by moving the handle 57, so that the female screw 11 is turned and imparts a vertical movement to the screw 9. The block 8 descends around the pins 33, which enter the holes 32 in the block, and the tops of the pins meeting the ring 31 arrest the descent of the ring, or the main portion thereof, while the former proceeds downward a short distance farther, being partly drawn out of the ring and the covering attached thereto, as shown in Figs. 2 and 9. As the strips 37, fastened to the ring and covering, are pressed closer together in the converging slots in the former, the covering is contracted slightly and is thus loosened from the side and bottom of the pail, which may then be readily removed from the machine with the hands.

To prepare the mold for the next charge of pulp the former is elevated by the screw 9, and inserted again in the plate 5, and when the ring 31 meets that plate the covering is restored to the former, so that all parts of the covering lie against the surface of the former.

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

1. In a machine for molding hollow ware from pulp, the combination of the two fixed plates 4 and 5 each provided with a central opening, means whereby these plates are supported with an open space between the lower plate and the base, the head inserted in the opening in the plate 4 and adapted to slide therein, the system of contracting and expanding sections, mechanism whereby the sections and head are actuated simultaneously, the former with a projecting base adapted to fit the opening in the plate 5, and a lifting device whereby the former with the molded article upon it may be lowered into the open space below the mold, substantially as described.

2. In a machine for molding hollow ware from pulp, the combination of the two fixed plates 4 and 5 each provided with a central opening, the head inserted in the opening in

the plate 4 and adapted to slide therein, the system of contracting and expanding sections surrounding the space between the openings in the plates, mechanism whereby the sections and head are actuated simultaneously, the former adapted to be inserted in the opening 6 in the plate 5, a removable ring adapted to fit around the former and within the opening 6, and means whereby the former and ring may be withdrawn from that opening, substantially as described.

3. In a machine for molding hollow ware from pulp, the contracting and expanding mold composed of the combination of the two parallel fixed plates, the vertically movable head extending through one of these plates, the tapering former projecting from the other plate toward the head, and the system of movable sections arranged between the plates and around the former and having their faces inclined to the sides of the head and parallel to the sides of the former, in combination with mechanism whereby the sections and head are actuated simultaneously, substantially as described.

4. In a machine for molding hollow ware from pulp, the contracting and expanding mold composed of the combination with two parallel fixed plates, and the former projecting from one of them toward the other, of the system of movable sections between the plates, surrounding the former, and the vertically movable head extending through the plate 4 and provided with a projecting edge, substantially as described.

5. In a machine for molding hollow ware from pulp, the combination with two parallel fixed plates, and the former projecting from one of them toward the other, of the vertically movable head inserted in the plate 4, the system of sections surrounding the former, a series of bars extending above the plate 4 and adapted to actuate the sections, and means whereby these bars are connected by their upper ends with the head, substantially as described.

6. In a machine for molding hollow ware from pulp, the combination with two parallel fixed plates, and the former projecting from one of them toward the other, of the vertically movable head inserted in the plate 4, the system of sections surrounding the former, a series of bars extending above the plate 4 and adapted to actuate the sections, a plate or block above the plate 4, forming a common support for these bars and the head, and mechanism whereby a vertical movement is imparted to the uppermost plate, substantially as described.

7. In a machine for molding hollow ware from pulp, the combination with two parallel fixed plates, and the former projecting from one of them toward the other, of the vertically movable head inserted in the plate 4, the system of sections surrounding the former, a series of upright bars between the sections and frame, a series of links pivoted to the

bars and to the alternate sections, and means whereby the bars and the head are actuated simultaneously, substantially as described.

8. In a machine for molding hollow ware from pulp, the combination of the two parallel fixed plates, the former projecting from one of them toward the other, the vertically movable head inserted in the plate 4, a vertically movable support to which the head is attached, and mechanism adapted to be actuated by the vertical movement of said support and to transmit motion to the sections, substantially as described.

9. In a machine for molding hollow ware from pulp, the combination with two fixed plates and the former projecting from one of them toward the other, of a vertically movable plate or block 30, the head inserted in the plate 4 and attached to and supported by the plate 30, the contracting and expanding system of sections surrounding the former, and mechanism attached to the plate 30 whereby the sections are actuated simultaneously with the head, substantially as described.

10. In a machine for molding hollow ware from pulp, the combination of two fixed parallel plates, and the former projecting from one of them toward the other, of the head inserted in the plate 4 and adapted to slide vertically, a movable plate 30 to which the head is attached, the system of contracting and expanding sections surrounding the former, and a series of bars attached to the plate 30, and links extending from the bars to the sections, substantially as described.

11. In a machine for molding hollow ware from pulp, the combination of two parallel fixed plates, the former projecting from one of them toward the other, the vertically movable head inserted in the plate 4, the contracting and expanding system of sections surrounding the former, and mechanism whereby the horizontal movement of the sections and the vertical movement of the head are equalized, substantially as described.

12. In a machine for molding hollow ware from pulp, the combination of the two parallel fixed plates, the former projecting from one of them toward the other, the vertically movable head inserted in the plate 4, the contracting and expanding system of sections surrounding the former, and a system of bars and links and means for connecting the bars with the head, so arranged and secured together that the horizontal movement of the sections and the vertical movement of the

head are equalized thereby, substantially as described.

13. In a machine for molding hollow ware from pulp, the combination of two fixed parallel plates, the former projecting from one of them toward the other, the vertically movable head inserted in the plate 4, the contracting and expanding system of sections surrounding the former, a series of links each pivoted at its inner end to one of the sections and at its outer end to a slide having a vertical movement, and so arranged that the longitudinal axis of the link forms an angle of less than forty-five degrees with a vertical line when the sections are expanded, and a similar angle with a horizontal line when the sections are contracted, and means whereby the slide is connected with the head, substantially as described.

14. In a machine for molding hollow ware from pulp, the combination of a former having converging slots 37' in its side, the perforated covering 36 adapted to be contracted, and strips 37 attached to the covering and adapted to slide in the slots in the former, substantially as described.

15. In a machine for molding hollow ware from pulp, the combination of a former having converging slots 37' in its side, the perforated covering 36 and ring 31 fastened together and adapted to be contracted, and strips 37 attached thereto and fitted to slide in the slots in the former, substantially as described.

16. In a machine for molding hollow ware from pulp, the combination of the former having converging slots 37' in its side, the perforated covering 36 and ring 31 fastened together and adapted to be contracted, strips 37 attached thereto and fitted to slide in the slots in the former, and pins 33 whereby the ring is forced from its seat, substantially as described.

17. In a mold for forming hollow ware from pulp, the flexible head-covering 38 secured by the edge, and having a tendency to bulge in the center, substantially as described.

18. In a mold for forming hollow ware from pulp, the flexible head-covering secured by the edge, and adapted to bulge in the center, combined with means for producing pressure behind the covering.

MARK L. DEERING.

In presence of—

D. A. CARPENTER,
JAMES J. WILSON.