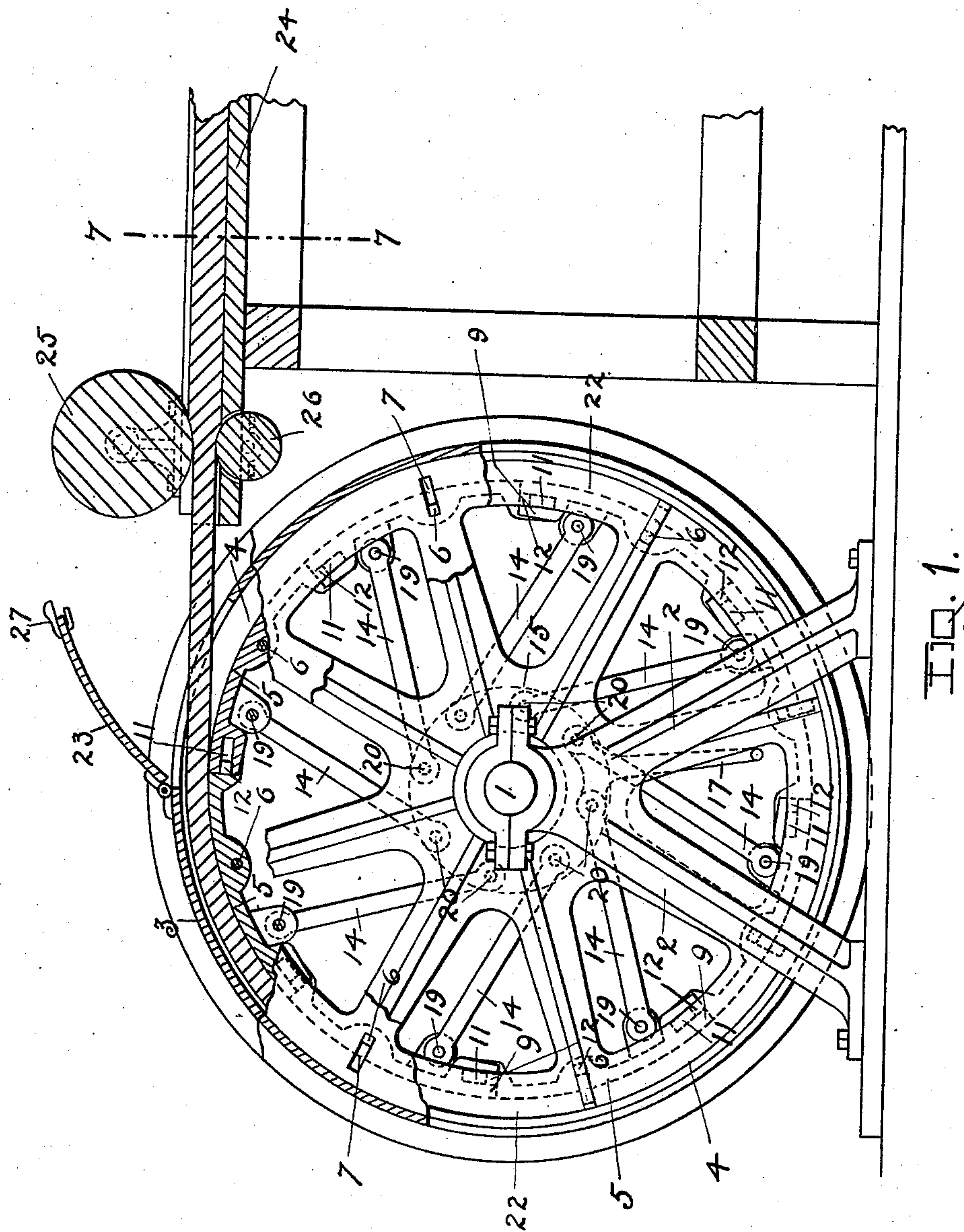


C. L. WELLS & C. R. REYNOLDS.  
 APPARATUS FOR EXPRESSING MOISTURE AND FORMING FABRICATED SHEETS.  
 APPLICATION FILED APR. 11, 1907. RENEWED JAN. 8, 1908.

996,819.

Patented July 4, 1911.

4 SHEETS—SHEET 1.



WITNESSES  
 J. W. Donsbach  
 E. M. O'Reilly.

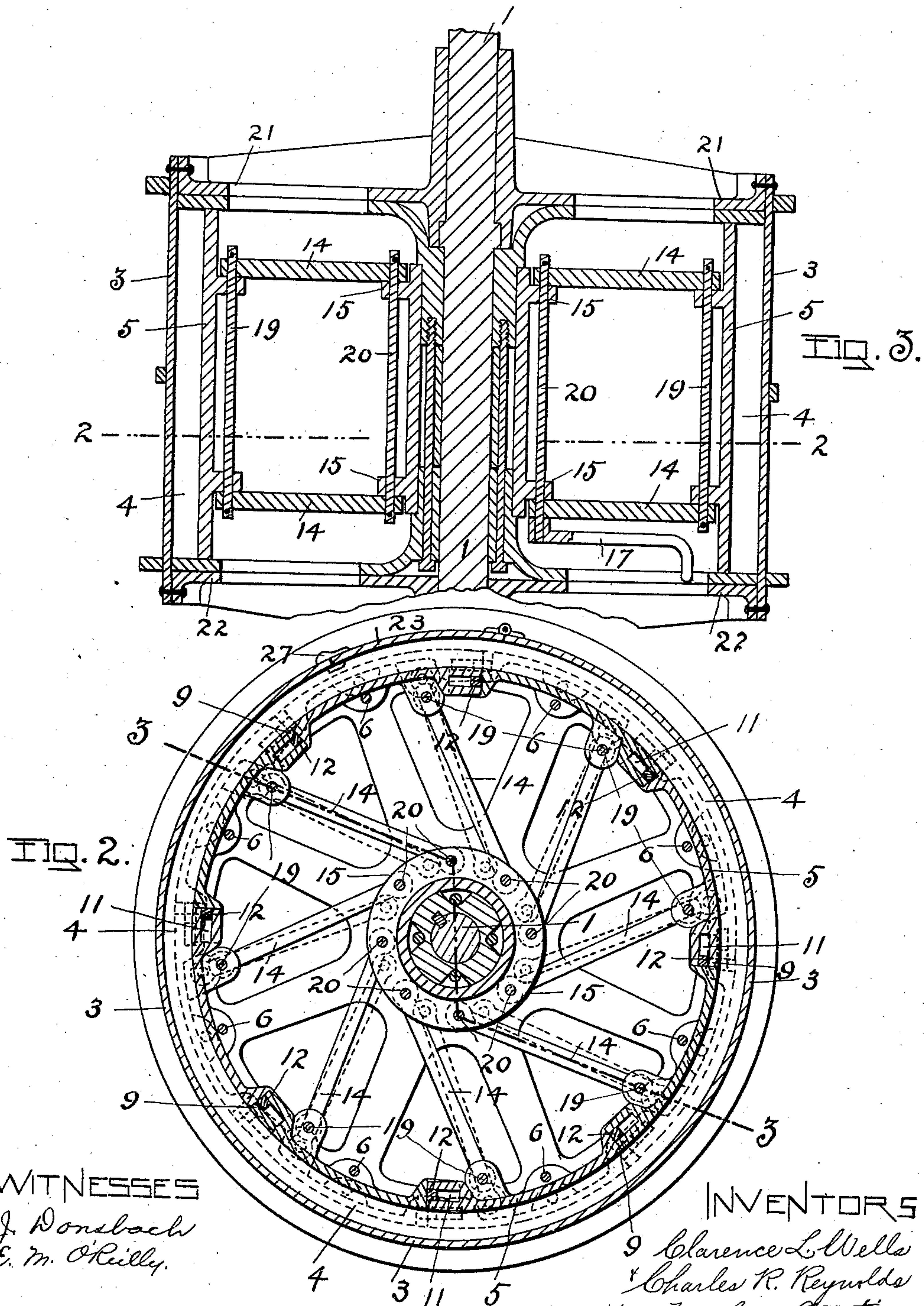
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4 SHEETS-SHEET 2.



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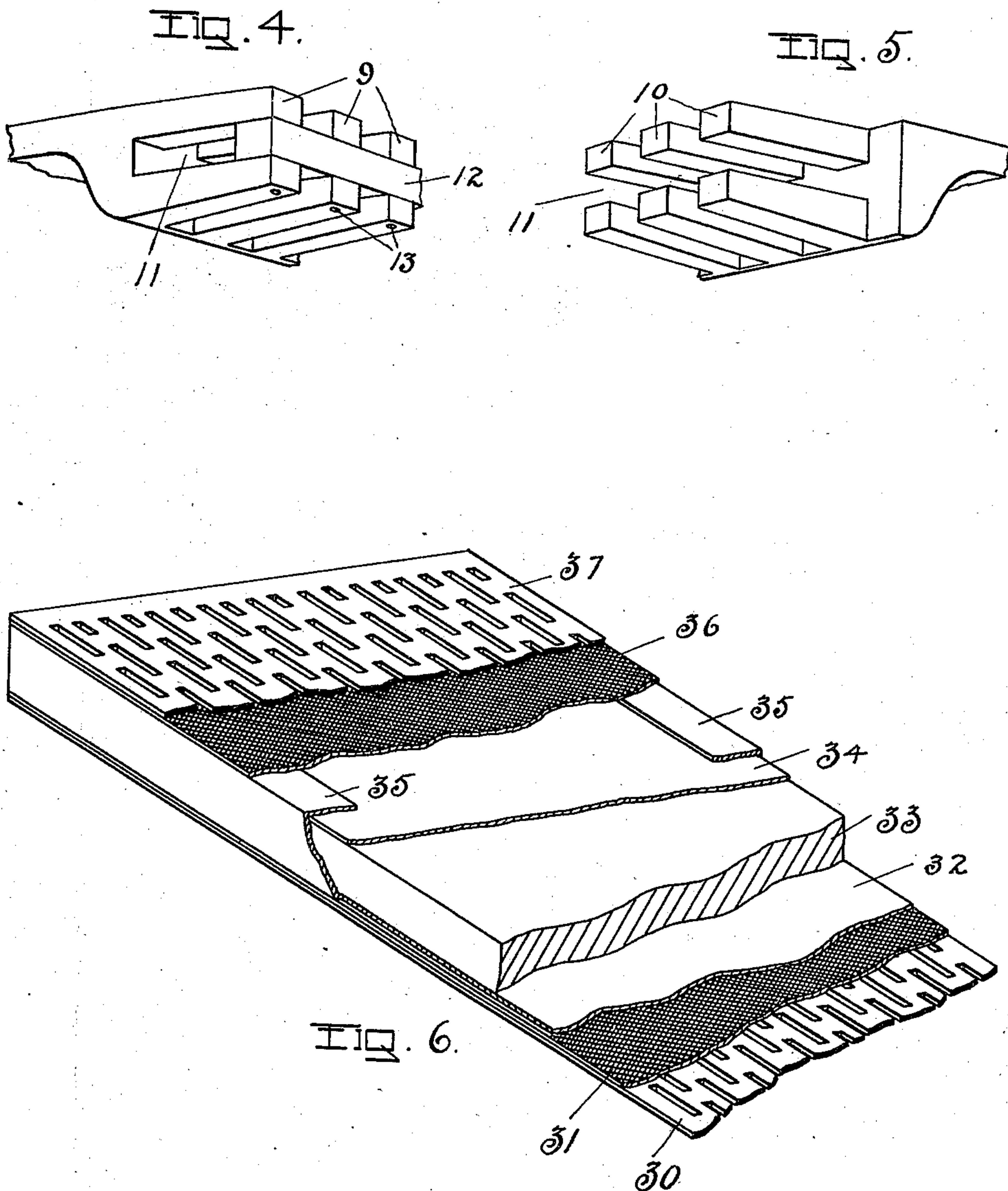


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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

FIG. 8.

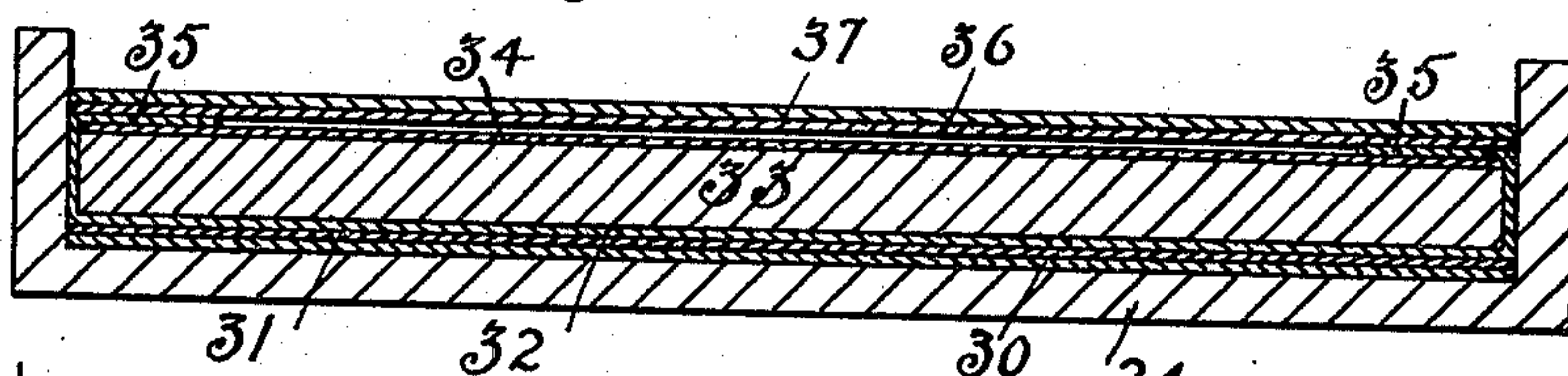
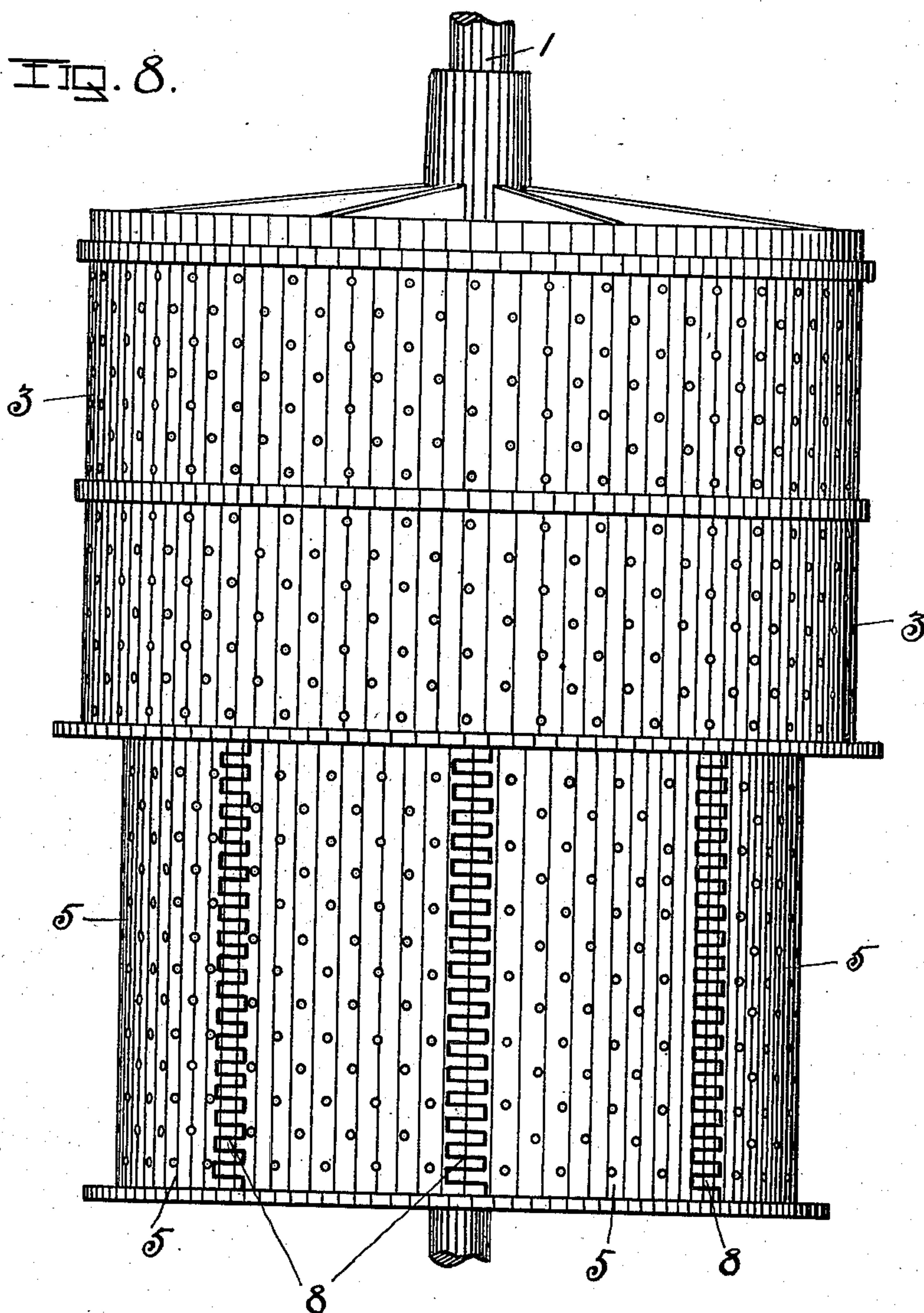


FIG. 7.

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# UNITED STATES PATENT OFFICE.

CLARENCE L. WELLS, OF TROY, AND CHARLES R. REYNOLDS, OF NASSAU, NEW YORK,  
ASSIGNORS TO FIBER PRODUCTS COMPANY, A CORPORATION OF NEW YORK.

APPARATUS FOR EXPRESSING MOISTURE AND FORMING FABRICATED SHEETS.

996,819.

Specification of Letters Patent.

Patented July 4, 1911.

Application filed April 11, 1907, Serial No. 367,535. Renewed January 8, 1908. Serial No. 409,857.

*To all whom it may concern:*

Be it known that we, CLARENCE L. WELLS, residing at Troy, county of Rensselaer, and State of New York, and CHARLES R. REYNOLDS, residing at Nassau, county of Rensselaer, and State of New York, both citizens of the United States, have invented certain new and useful Improvements in Apparatus for Expressing Moisture and Forming Fabricated Sheets, of which the following is a specification.

Our invention has special reference to centrifugal machines for exuding moisture from fibrous stock, such for instance as disintegrated leather stock in the manufacture of artificial leather, although various of its principles are in no way limited to this use.

Heretofore machines of this class have generally been constructed with a series of separate boxes or compartments on or in the rotary member, in which boxes the stock is placed to be subjected to the centrifugal action, this construction resulting in the formation of a number of comparatively small sheets.

A leading object of our invention is to produce a machine by which a sheet of artificial leather or other material may be formed of a size equal to the entire circumference of the rotary drum or of any desired portion thereof, thereby producing much larger sheets and increasing the field of usefulness of the product. We attain this end by constructing the drum with a continuous peripheral chamber for the stock which preferably, though not necessarily, extends over its entire periphery and of which one wall, preferably the inner wall, is relatively movable under centrifugal action to express the moisture. This enables us to produce a sheet of from eighteen to twenty feet in length if desired, without constructing the drum beyond reasonable limits of size. Preferably this relatively movable wall is composed of a number of arc-shaped segments the contiguous edges whereof are spliced together by inter-engaging tongues, allowing independence of movement so that the wall may enlarge and contract in the operation of the machine and yet present a continuous or unbroken surface to the stock.

A further object of the invention is to insure the formation of a compact, uniform sheet of artificial leather or other felted or matted material. This end we attain by in-

closing the stock in a pervious envelop and subjecting the stock thus inclosed to a moisture exuding influence which is preferably that incident to the operation of our improved machine, whereby the stock is deprived of moisture and compressed, between the walls of the envelop, into a compact sheet, the surfaces of which correspond to the interior surfaces of the envelop.

Our invention involves various other features of importance and all will be fully set forth hereinafter and particularly pointed out in the claims.

For the purpose of a detailed description of the invention, reference is had to the accompanying drawings showing one of the various manners in which the principles of our invention may be embodied; in which drawings,

Figure 1 is a side elevation of the machine with parts broken away and other parts in section; Fig. 2 is a vertical section on the line 2—2 of Fig. 3; Fig. 3 is a sectional plan on the irregular line 3—3 of Fig. 2; Figs. 4 and 5 are perspective views of the tongued edges of the sections of the compression wall; Fig. 6 is a sectional perspective of one form of the envelop; Fig. 7 is a cross section of the envelop and its contents, this view showing the trough through which the envelop and stock may be led to the machine; and Fig. 8 is a plan view showing a possible adjustment of the machine by which to facilitate the admission of the stock.

The apparatus has a main shaft 1 rotatably supported in bearings 2 and adapted to be driven by any desired means. The character of the driving means is not essential and such means are not illustrated in the drawings.

According to the construction shown here two drums are mounted on the shaft 1, one drum inclosing the other and the inner drum being fast to the shaft and provided with the aforesaid movable peripheral wall.

As shown best in Figs. 2 and 3, the outer drum has two heads 21 and 22, the hubs 21<sup>a</sup> and 22<sup>a</sup> of which are loosely mounted on the shaft 1, the hub 21<sup>a</sup> engaging a collar or bead 1<sup>a</sup> on the shaft 1 to prevent the hub from sliding farther inward on the shaft. The head 22 and hub 22<sup>a</sup> are, however, slidable on the shaft when released from the head 21 in a manner and for purpose which



will hereinafter appear. The heads 21 and 22 are flanged at their edges and are fastened by rivets or other means to the circular reticulated peripheral wall 3 of the outer drum.

3<sup>a</sup> indicates straps or hooks which encircle the periphery of the outer drum to resist the strains imposed thereon in operation. The outer wall 3 has an opening therein which may be used for charging the apparatus and this has a door 23 fitted with a latch 27 by which it may be removably fastened.

The inner drum is formed of two heads 38 which fit closely yet removably against the heads of the outer drum and have hubs 38<sup>a</sup> encircling the shaft 1. Between the hubs 38<sup>a</sup> a distance piece 38<sup>b</sup> is keyed on the shaft 1 and the same is grooved longitudinally to receive tie bolts 39 which extend between the hubs 38<sup>a</sup> and in this manner the hubs and their attached heads are firmly drawn together and fastened to the shaft.

The expansible and contractible peripheral wall of the inner drum is composed of reticulated sections 5 of arc-shaped or segmental form and provided as shown best in Figs. 4 and 5 with double tongued edges 9 and 10 respectively. The tongues of one section are staggered with respect to the tongues of the adjacent sections so that the two sets of tongues may match into each other forming a joint between the sections which enables them to approach or separate freely. For supporting the sections on each other, we provide bars 12 secured by rivets 13 between the longitudinal rows of fingers on one edge of each section and loosely embraced by the rows of fingers on the adjacent edge of the contiguous section. By this construction the wall may expand or contract concentrically of the drum, the interengaging fingers connecting the sections of the wall and at the same time preserving an essentially smooth outer surface thereon.

Mounted loosely on the hubs 38<sup>a</sup> is a sleeve 15 having at its ends flanges or lugs 15<sup>a</sup> in which are fitted rods 20 parallel with the shaft 1. To these rods are pivoted links 14 disposed tangentially of the drum and pivoted at their outer ends to the ends of rods 19 secured in lugs projecting from the inner surface of the sections 5 of the peripheral wall of the inner drum intermediate the longitudinal edges of said sections. A handle 17 is secured in any suitable manner to the sleeve 15 or to its rods 20 and by means of which the sleeve may be manually rotated on the hubs 38<sup>a</sup> to throw the links 14 so that the sections 5 of the expansible wall may be moved inward or outward at will. To guide the sections 5 of the said wall in this movement, they are provided intermediate their longitudinal edges with

rods 6 the ends of which project beyond the side edges of the peripheral wall and are guided in radial slots 7 in the heads 38 of the inner drum.

In the operation of the apparatus as thus far described the door 23 should be opened and the handle 17 rocked to turn the sleeve 15 in such direction as will draw inward on the links 14 and contract the peripheral wall of the inner drum this enlarging the annular chamber 4 sufficiently to allow the stock to be introduced into such chamber in a continuous length as indicated at 33<sup>a</sup> in Fig. 1. For this purpose the shaft 1 may be rotated slowly carrying the inner drum with it and drawing in the stock while the outer drum is held stationary. When the stock is completely entered into the chamber 4, the door 23 should be closed and locked and the movement of the handle 17 reversed to expand the wall 5 and press the stock between this wall and the outer wall 3. The shaft 1 should again be rotated, this time rapidly and the friction between the stock 33<sup>a</sup> and the two walls 3 and 4 will cause the outer drum to rotate with the other parts. As centrifugal force is generated, the moisture is thrown from the pulp and this force serves also to expand the wall 5 against the pulp, which wall then exerts a pressure on the pulp reinforcing the centrifugal action. In this manner the moisture is effectually excluded and the fibrous stock is compressed into a closely matted or felted fabric. The product may be withdrawn from the machine upon stopping its rotation and opening the door 23. If desired, to facilitate this operation, the handle 17 may be operated to contract the wall 5 and the shaft 1 may be again slowly rotated as the product is withdrawn.

If it is not desired to employ the door 23, the inner drum may be withdrawn axially from the outer drum as illustrated in Fig. 8, and the stock carried around the inner drum after which the drum may be returned to its normal position. In this event the stock is withdrawn by a mere reversal of the above described operation. To allow this axial movement of the inner drum, the fastenings connecting the head 23 of the outer drum with the wall 3 thereof should be released and said head 23 drawn out on the shaft 1 with the inner drum and its connections. For this purpose the key fastening the distance piece 38<sup>b</sup> to turn with the shaft 1, is arranged not to obstruct the sliding motion of the drum. However, we desire it understood that the details of construction concerned with this method of operation are not important and we are in no sense limited thereto.

In the manufacture of sheets of artificial leather and other material from fibrous stock, we prefer to inclose the plastic stock



in a pervious envelop in which the stock is compressed for the double purpose of matting or felting together the fibers and excluding the moisture. Preferably the envelop containing the stock is charged into the machine in the manner before described and the envelop thus serves to confine and mold the stock so that the product takes the cross sectional form of the envelop. In this manner not only do we provide for the easy handling of the stock when plastic and facilitate its introduction into the machine, but we produce a smooth regular sheet of artificial leather or other material.

The form and structure of the envelop is in no way essential to our invention, but we prefer to construct the same as shown in Fig. 6 in which 33 indicates the stock; 32 and 34 layers of a pervious woven fabric the edges 35 of one of which are wrapped around the edges of the stock; 31 and 36 layers of wire gauze; and 30 and 37 are layers of reticulated metal. This envelop is possessed of sufficient stiffness and at the same time it is flexible and completely pervious.

Having thus described the preferred embodiment of our invention, what we claim as new and desire to secure by Letters Patent of the United States is:

1. A centrifugal machine having continuous annular walls opposing each other and forming a continuous annular chamber, one of said walls having a normally closed opening therethrough for the admission of the material to be treated to the chamber.

2. A centrifugal machine having continuous annular walls opposing each other and forming a continuous annular chamber concentric to the center of rotation of the machine for the reception of the material to be treated, one of said walls having an opening for the entry of said material and a closure for said opening.

3. A rotating centrifugal machine having opposing arc-shaped walls of which one is movable under and by reason of centrifugal force toward the other to compress the stock between the two walls, said movable wall being composed of a plurality of independent sections.

4. A rotating centrifugal machine having opposing arc-shaped walls of which one is movable under and by reason of centrifugal force toward the other to compress the stock between the two walls, said movable wall being composed of a plurality of independent sections with interengaging tongues.

5. A rotating centrifugal machine having opposing annular walls of which one is movable under and by reason of centrifugal force toward the other to compress the stock between the two walls, said movable wall being composed of a plurality of independent sections.

6. A rotating centrifugal machine having opposing annular walls of which one is movable under and by reason of centrifugal force toward the other to compress the stock between the two walls, said movable wall being composed of a plurality of independent sections with interengaging tongues.

7. A rotating centrifugal machine having opposing walls of which one is formed of separate sections and is movable under and by reason of centrifugal force toward the other to compress the stock.

8. A rotating centrifugal machine having opposing walls of which one is formed of separate sections with interengaging tongues and is movable under and by reasons of centrifugal force toward the other to compress the stock.

9. A rotating centrifugal machine for expressing moisture having a curved chamber, one continuous expressing wall of which is formed of a plurality of separate or independently movable sections.

10. A rotating centrifugal machine for expressing moisture having an expressing wall subject to centrifugal influence and formed of separate or independent sections with inter-engaging tongues to allow independent movement without breaking the smooth surface presented by the wall.

11. A rotating centrifugal machine for expressing moisture having an expressing wall subject to centrifugal influence and formed of separate or independent sections and actuating links joined respectively to the sections of said walls.

12. A rotating centrifugal machine having two opposing annular walls concentric to the center of rotation of which walls the inner is formed of separate or independent sections and is expansible under and by reason of centrifugal force toward the outer wall to compress the stock between the two walls.

13. A rotating centrifugal machine, having opposing annular walls concentric to the center of rotation of which walls one is actuated by centrifugal force and is formed of separate or independent sections, whereby it is expansible and contractible toward and from the other to compress the stock between the two walls.

14. A rotating centrifugal machine having a rotary shaft, a drum fastened thereto and provided with a movable peripheral wall, a drum loose on the shaft and inclosing the first drum, a member arranged to rock around the axis of the drive shaft and a connection between said member and the movable wall of the first drum.

15. A rotating centrifugal machine having a rotary drive shaft, a drum fastened thereto and provided with a movable peripheral wall, a drum loose on the shaft and inclosing the first drum, a member arranged



to rock around the axis of the drive shaft, and a tangential link pivoted to said member and to the said movable wall.

16. A rotating centrifugal machine having a rotary drive shaft, a drum fastened thereto and provided with a movable peripheral wall, a drum loose on the shaft and inclosing the first drum, a sleeve arranged to turn around the axis of the shaft and tangential links pivoted to the sleeve and to the movable wall of the first drum.

17. A rotating centrifugal machine for expressing moisture having a movable expressing wall subject to centrifugal influence and formed of sections having limited independent movement, and actuating links pivoted to said sections intermediate their edges.

18. A machine for expressing moisture having an expressing wall movable by centrifugal force formed of sections having limited independent movement, actuating links pivoted to said sections intermediate their edges, guide rods attached to said sections intermediate their edges and means in which the ends of the guide rods are slidably fitted.

19. A machine for expressing moisture having a movable expressing wall formed of sections having limited independent movement, actuating links pivoted to said sections intermediate their edges, the contiguous edges of the sections having each two rows of tongues and a bar fastened between the rows of tongues at one edge of each section, the tongues of the adjacent edges of the contiguous sections straddling the bar for the purpose specified.

20. A machine for expressing moisture having a movable expressing wall formed of sections having limited independent movement, actuating links pivoted to said sections intermediate their edges, guide rods attached to said sections intermediate their edges, means in which the ends of the guides are slidably fitted, the contiguous edges of the sections having each two rows of tongues and a bar fastened between the rows of tongues at one edge of each section, the tongues of the adjacent edges of the contiguous sections straddling the bar for the purpose specified.

21. A machine for expressing moisture having an expressing wall formed of a num-

ber of independent sections the contiguous edges whereof have each two rows of tongues and a bar fastened between the rows of tongues at one edge of each section the rows of tongues of the adjacent edges of the contiguous sections straddling the bar, for the purpose specified.

22. A rotating centrifugal machine having a rotary drive shaft, an outer drum loose thereon, an inner drum having heads with hubs mounted on the shaft, a distance piece keyed on the shaft between the hubs, tie bolts connecting the hubs, and a movable peripheral wall for the inner drum.

23. A rotating centrifugal machine having a rotary drive shaft, an outer drum loose thereon, an inner drum having heads with hubs mounted on the shaft, a distance piece keyed on the shaft between the hubs, tie bolts connecting the hubs, a movable peripheral wall for the inner drum, a sleeve loose on the hubs of the inner drum, and connections between the sleeve and said movable wall of the inner drum.

24. A rotating centrifugal machine having opposing arc-shaped walls of which one is movable under and by reason of centrifugal force toward the other to compress the stock between the two walls, and means for moving one of said walls axially to admit of the introduction and removal of the stock.

25. A rotating centrifugal machine having opposing annular walls of which one is movable under and by reason of centrifugal force toward the other to compress the stock between the two walls, and means for moving one of said walls axially to admit of the introduction and removal of the stock.

26. A rotating centrifugal machine having two drums, the one inclosing the other and one of said drums having a peripheral wall movable under and by reason of centrifugal force to compress the stock, and means for moving one of said drums axially to admit of the introduction and removal of the stock.

In testimony whereof, we have hereunto set our hands this 9th day of April, 1907.

CLARENCE L. WELLS.  
CHARLES R. REYNOLDS.

Witnesses:

J. DONSBACH,  
E. M. O'REILLY.