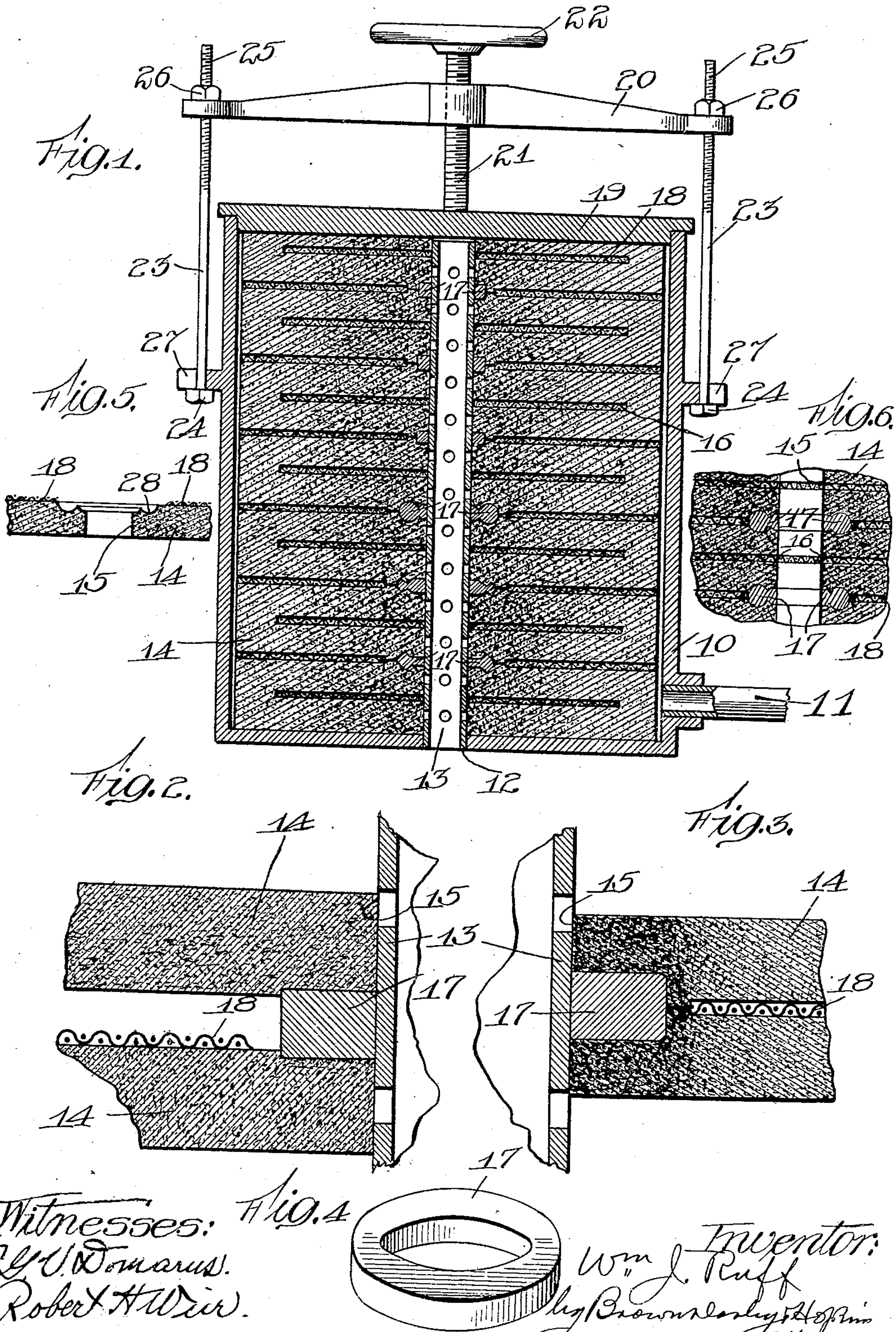


W. J. RUFF.
 FILTER PLATE LOCK.
 APPLICATION FILED MAY 17, 1908.

904,649.

Patented Nov. 24, 1908.



Witnesses:
 S. U. Domanus.
 Robert H. Wier.

Inventor:
 Wm. J. Ruff
 by Brown & Sons
 Attys.

UNITED STATES PATENT OFFICE.

WILLIAM J. RUFF, OF QUINCY, ILLINOIS, ASSIGNOR OF ONE-HALF TO CHARLES E. FELT, OF CHICAGO, ILLINOIS.

FILTER-PLATE LOCK.

No. 904,649.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WILLIAM J. RUFF, a citizen of the United States, residing at Quincy, in the county of Adams and State of Illinois, have invented certain new and useful Improvements in Filter-Plate Locks, of which the following is a full, clear, and exact specification.

Heretofore in the construction of filters, especially filters employing a plurality of superposed filter plates, the adjacent plates have generally been constructed with grooves or provided with other means, such as metallic fasteners, for securing the same together, to produce a tight joint. Considerable difficulty has been experienced in assembling these plates in that the grooves or cooperating fastening devices do not match, and the locking means have a tendency to creep or slip with relation to the plates, thereby producing an unsatisfactory joint, besides permitting the liquid to pass directly through the joints between the plates.

To overcome these difficulties and very serious defects is one of the primary objects of this invention.

A further object is to construct an improved device of this character in which the filter plates are constructed of a uniform thickness and are secured together by a locking device interposed between the adjacent faces of the filter plates, and which is adapted to be embedded or compressed into the faces thereof, thereby preventing the lock from slipping or creeping.

A further object is to provide an improved filter plate lock which is constructed of a suitable material adapted to be embedded in the adjacent faces of the plates to compress the plates, and which is adapted to be expanded by the liquid to compress the contiguous portions of the plates to a greater density, thereby preventing the liquid from passing directly through the joints between the plates and forcing the same through the body of the plates.

A further object is to construct an improved filter of this character which will be effective, simple, and cheap in construction, easy to assemble, and from which the parts may be readily removed for cleaning or for any other purpose.

To the attainment of these ends and the accomplishment of other new and useful ob-

jects, as will appear, the invention consists in the features of novelty in the construction, combination, and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing illustrating an exemplification of the invention, in which,

Figure 1 is a longitudinal sectional view of a filter constructed in accordance with the principles of this invention. Fig. 2 is an enlarged detail view of a portion of two filter plates, and the locking ring in position, and before being compressed within the filter chamber. Fig. 3 is a view similar to Fig. 2 showing the relative position of the plates and locking ring after being compressed within the filter chamber. Fig. 4 is a detail perspective view of one form of plate locking ring. Fig. 5 is a detail sectional view of a portion of one of the filter rings showing a modification. Fig. 6 is a detail sectional view illustrating the assembling of the plates without the use of a central tube.

Referring more particularly to the drawing and in which the same reference numerals designate similar parts throughout the several views, the numeral 10 designates a filter chamber of any suitable size, shape and material, provided with an inlet pipe 11, preferably near the base, and an outlet passage 12, in the bottom thereof.

If desired, a perforated tube or pipe 13 may be centrally disposed within and extend substantially the entire length of the chamber, with one end thereof secured within the opening 12 in the base of the chamber. This tube or pipe 13 is not absolutely necessary, although it is preferable to use the same, but forms no part of the invention. The filter plates or disks 14 are constructed of any suitable material, such as pulp or the like, adapted to be molded or formed into suitable shape and compressed to the desired density. Each of these plates or disks are of a size and configuration to fit the chamber or receptacle 10 into which they are inserted, and are provided with a central aperture 15, of a suitable size. A plate 16, of any suitable material, such as perforated metal or wire gauze, and provided with a central aperture, is preferably embedded in the center of each of the filter plates or disks 14, with the aperture therein registering with the

aperture in the filter plates, and with its periphery preferably terminating somewhat short of the periphery of the filter plate. Suitable rings 17 are provided for securing and locking the filter plates with reference to each other, and for the purpose of producing a tight filter joint. These rings may be constructed in any desired manner, and of any suitable material, but preferably of the same material as the filter plates or disks 14, but compressed to a greater density, or any other material which will expand when the liquid comes in contact therewith. They may be of any desired or suitable shape, regular or irregular throughout, as shown in Fig. 1, and either dry or possessing a suitable amount of moisture.

This improved filter is assembled in the following manner: A filter plate or disk 14 is placed within and upon the bottom of the chamber 10. If the tube 13 is used, the plate is placed so that the tube will pass through the central opening 15 therein, but if not, the opening 15 will register with the outlet opening 12 in the bottom of the chamber. A locking ring 17 is then placed over the tube 13 and upon the top of the filter plate or disk 14, with its opening registering with the opening in the filter plate or disk. If desired, a plate or screen 18 having a central opening or aperture of a diameter greater than the peripheral diameter of the ring 17, may next be placed over the tube and upon the filter plate or disk 14. A second filter plate or disk is then superposed upon the first plate or disk, then a second ring, and plate, and so on until the chamber 10 has been filled to such an extent that the top of the uppermost disk or plate 14 is adjacent the top of the chamber. A suitable cover or lid 19 is provided, a portion of which is adapted to enter the chamber and with its peripheral edge resting upon the edge of the chamber.

Any suitable means may be employed for compressing the filter plates or disks 14 into the chamber and for holding the cover or lid in position. A simple and efficient means for accomplishing this end, but to which this invention is not to be limited, comprises a bar 20 provided with a centrally disposed threaded aperture through which a screw 21 passes vertically, and said screw is provided with an operating handle or wheel 22. Bolts or rods 23, provided with a head 24, and a screw-threaded extremity 25, and adapted to pass loosely through the ends of the bar 20, and 26 are nuts adapted to engage the threaded extremities and rest upon the top of the bar for supporting the bolts 23, in relation thereto. The heads of these rods or bolts 23 are adapted to removably engage suitable ears or projections 27 on the chamber 10. When in position the end of

the screw 21 rests upon the lid or cover 19, and when the heads 24 of the rods engage the ears or projections 27, the nuts 26 may be adjusted and the bar 20 will be supported in position as will be seen.

By operating the handle or wheel 22, the screw 21 will advance, thereby forcing the cover 19 down upon the top of the chamber 10, thus compressing the filter plates or disks 14, forcing them into the chamber and tightly against each other. The rings 17 being of a greater density than the density of the plates or disks 14, will resist the compression thus caused to a greater extent, and will embed themselves in the adjacent faces of the filter plates or disks, thereby compressing the said plates to a greater density at these points. Thus it will be seen that the filter plates are positively locked together, and that the degree of density to which the adjacent portions of the filter disks are compressed may be regulated according to the thickness of and the density to which the rings are themselves compressed before assembling.

In the modification shown in Fig. 5, the filter disk or plate 14 is provided with a molded or recessed portion 28 around the aperture 15 therein, of a shape to conform to one-half of the configuration of the ring to be used. These forms of disks or plates are assembled in the same manner as the uniform plates or disks, but in this instance the locking ring rests within the recess 28 and projects above the face of the plate or disk to engage the adjacent face of the next superposed plate or disk. Thus assembled the liquid enters the pipe 11, under pressure, and percolates through the filter plates or disks 14, plates or screens 16—18, and into the pipe 17, and out through the opening 12. The liquid coming in contact with the rings 17 will cause the same to swell or expand and thereby tending to cause the plates to be compressed to a greater density at that point, and said rings will be prevented from slipping in one direction by the filter plates or disks 14 into which they are embedded upon three sides, and in the other direction by means of the tube 13, which they surround. Thus it will be seen that as the filter plates are of greater density at their central point, surrounding the apertures 15, through which the liquid passes, a positive lock will be formed which is impervious to everything except the liquid. This will prevent the escape of yeast or any of the germs, and will also serve as a means to cause the entering liquid to flow through that portion of the entire filter which is less dense.

It is to be understood that it is not desired to be limited to the exact details of construction nor the arrangement of the sev-

eral parts, as numerous changes may be made therein without departing from the spirit of the invention.

What is claimed as new is:—

- 5 1. In a filter the combination of superposed filter plates, and interposed independent locking members embedded into the adjacent faces of the plates, said locking members being adapted to be expanded by the
10 liquid to compress the contiguous portions of the plates to a greater density.
2. In a filter the combination of superposed filter plates provided with registering apertures, independent locking rings of filter
15 material between the plates, surrounding the aperture and adapted to be embedded into the adjacent faces of the plates to compress the contiguous portions of the plates, said rings being adapted to be expanded by the
20 liquid to compress the said contiguous portions of the plate to a greater density.
3. In a filter the combination of a plurality of superposed filter plates and interposed independent locking rings supported
25 by and compressed into the faces of adjacent plates.
4. In a filter press the combination of a plurality of superposed filter plates and independent interposed locking rings constructed of filter mass, compressed into the
30 adjacent faces of the plates.
5. In a filter press the combination of a plurality of superposed filter plates, and interposed independent locking members constructed of filter mass of a greater density
35 than the plates and compressed into the adjacent faces of the plates.
6. In a filter press the combination of a plurality of superposed filter plates and independent interposed locking members supported by and embedded into the faces of
40 adjacent plates to compress the plates to a greater density at the part adjacent the locking members.
7. In a filter press the combination of a plurality of superposed filter plates, and independent interposed locking members constructed of filter mass compressed to a
45 greater density than the density of the plate, said members being embedded into the adjacent faces of the plates to compress said plates to a greater density at the part surrounding the locking member.
50
8. In a filter press, the combination of a plurality of superposed filter plates each provided with a central aperture, independent locking rings interposed between the plates and surrounding the apertures therein, said rings being embedded into the adjacent faces
55 of the plates to compress the portion of the plate surrounding the aperture to a greater

density and adapted to be expanded to compress the adjacent portion of the plate to a greater density.

9. In a filter press the combination of a plurality of superposed filter plates, each provided with an aperture, independent locking rings constructed of filter mass compressed to a greater density than the density of the plates, said rings being interposed between the plates and surrounding the aperture and embedded into the adjacent faces of the plates to compress the plates to a greater density adjacent the aperture. 70

10. In a filter press the combination of a filter chamber, a plurality of superposed filter plates within the chamber, independent locking members interposed between the plates and means for compressing the filter plates to cause the locking members to embed themselves into the adjacent faces of the plates said members being adapted to be expanded after being embedded in the plates. 80

11. In a filter press the combination of a filter chamber, a plurality of superposed filter plates within the chamber and provided with registering apertures, independent locking rings interposed between and supported by the plates, said rings surrounding the apertures in the plates, and means for compressing the plates to cause the rings to embed themselves into the adjacent faces of the plates adjacent the aperture. 85 90

12. In a filter press the combination of a filter chamber, a plurality of superposed filter plates provided with registering apertures, independent locking rings constructed of filter mass compressed to a greater density than the plate, said rings being interposed between the plates and surrounding the apertures, and means for compressing the plates to cause the rings to embed themselves in the adjacent faces of the plates. 100

13. In a filter press the combination of a chamber, a plurality of superposed filter plates, independent locking means interposed between and supported by the plates, and means for embedding the locking means in the faces of adjacent plates, for compressing the portion of each of the plates surrounding the locking means to a greater density than the density of the remaining portion of the plates. 105 110

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 8th day of May A. D. 1906. 115

WILLIAM J. RUFF.

Witnesses:

GERHARD G. ARENDS,
HENRY DAMHORST.