

No. 744,761.

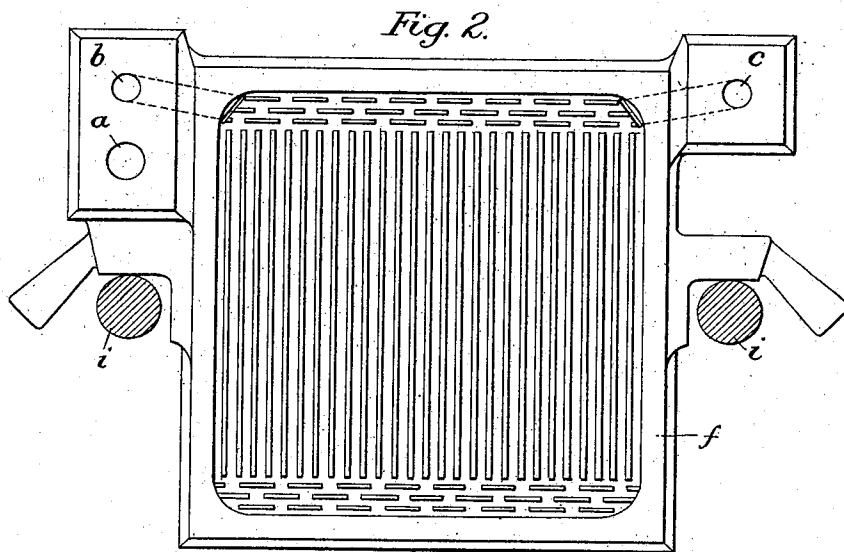
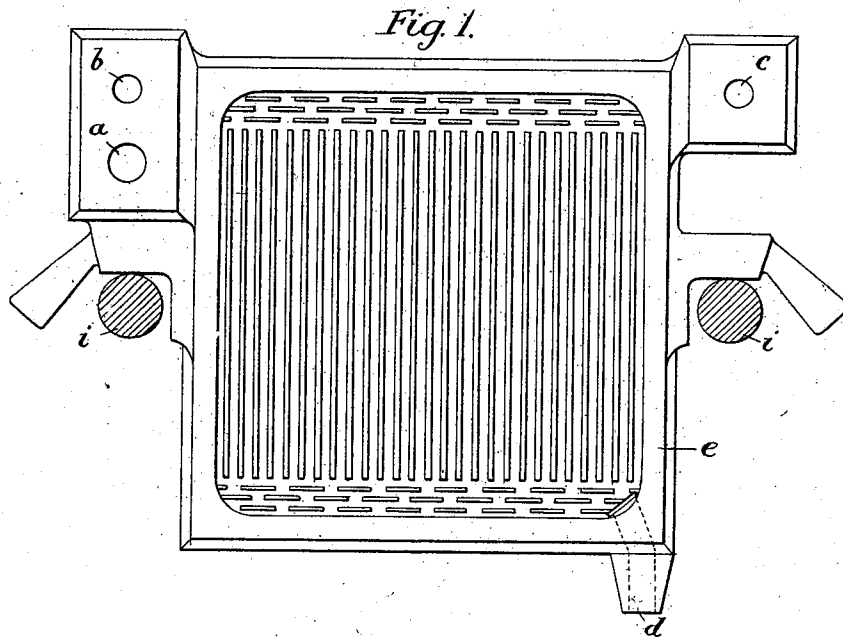
PATENTED NOV. 24, 1903.

A. JAMES.
FILTER PRESS.

APPLICATION FILED APR. 3, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:
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W. R. Berry

INVENTOR:
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Attorney.

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2 SHEETS—SHEET 2.

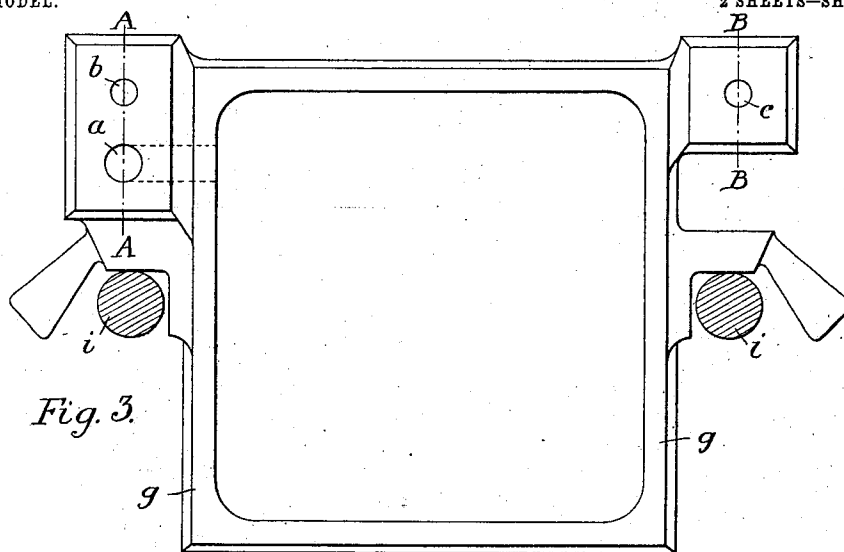


Fig. 3.

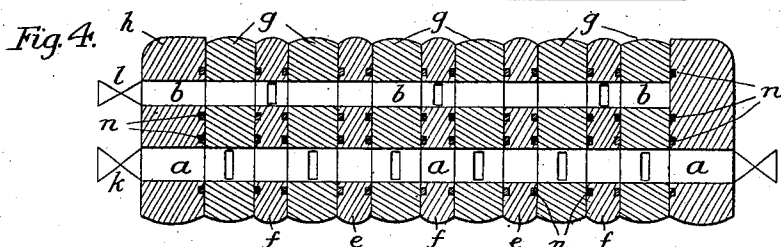


Fig. 4.

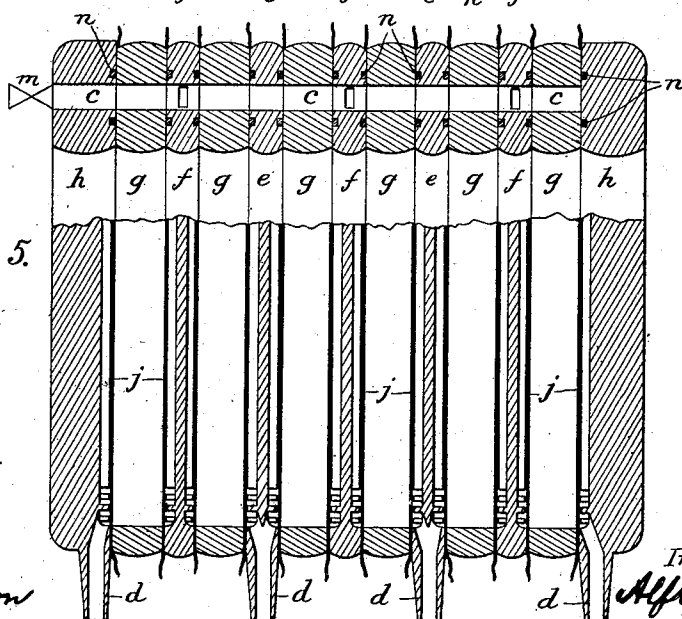


Fig. 5.

Witnesses:
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UNITED STATES PATENT OFFICE.

ALFRED JAMES, OF LONDON, ENGLAND.

FILTER-PRESS.

SPECIFICATION forming part of Letters Patent No. 744,761, dated November 24, 1903.

Application filed April 3, 1903. Serial No. 150,927. (No model.)

To all whom it may concern:

Be it known that I, ALFRED JAMES, a subject of the King of Great Britain, residing at 56 New Broad street, in the city of London, England, have invented a new and useful Improved Filter-Press, of which the following is a specification.

My invention relates to the use of filter-presses for separating solid matter from solutions in which the former may be contained and also to the washing out from the cakes of such solid matter in the press the solution remaining as moisture therein and replacing same by fresh water or other liquid or air.

In the present method of using such filter-presses where these are provided with washing apparatus either a large number of cocks is provided, at least half of which require to be shut off at each operation and which are, moreover, liable to get out of order and to cause endless worry, or holes are made inside the presses for the conveyance of solids and liquids, which render necessary the cutting of the cloths and cause considerable wear and tear of these, in addition to the trouble of fitting on the cloths at each operation. An attempt has also been made to use filter-presses with ports outside the cloths; but in this case instead of the wash solutions being conveyed diagonally through the cakes, thus causing perfect extraction, their shortest direction is across the cake, thus washing a portion of this only; or if the ports are placed at the bottom these project and are inconvenient, as the plates containing the cakes cannot be lifted out of the press without considerable twisting, which is not only inconvenient and expensive, but is liable to cause the loss of the cake. To overcome these objections, I provide special plates, as illustrated on the accompanying drawings, Figure 1 being a front elevation of a "filtering-plate" and Fig. 2 of a "washing-plate." Fig. 3 is a front elevation of one of the frames; Fig. 4, a vertical section of the press on the line A A, Fig. 3, through the ports through which the pulp and washing-water, respectively, enter the press; and Fig. 5 is a vertical section, partly on line B B, Fig. 3.

a is the feed-port, provided on each plate *e* and frame *g*, but having connection to the frame *g* only. Through this the pulp is

forced and is retained in the frame by the protection of a filter-cloth *j* or other pervious material hung over the frame or plate. The plate *e f* supports the cloth but allows the solution to permeate this and conducts it along the channels, in the case of the filtering-plate *e* to the channel *d* and in the case of the washing-plate *f* to the channel *c*. The channel *d* is separate and on the filtering-plates *e* only. The channel *c* is continuous on all plates and frames and has a connection to the interior of the washing-plate *f* only.

In working this press the end frame *h* thereof is made similar to one side of the plate *e*, (shown in Fig. 1)—that is, a low-pressure or filtering plate with the ever open outlet *d*. Next this is put a frame *g* and after this a high-pressure or washing plate *f*, then another frame *g*, and then a low-pressure or filtering plate *e*, and so on, as shown in Figs. 4 and 5. The pulp to be filtered enters each frame *g* at port *a* and the solid matter fills this frame, forming a cake therein, and the solution escapes through the filter-cloth or other medium fitted on the plates *e* and *f*. The solution filtered through on the high-pressure or washing plates *f* escapes by the continuous channel *c*. The filtrate from the low-pressure or filtering plates *e* escapes by the separate outlets *d*. When the press is full, the pulp is turned off at port *a* by means of a cock (indicated diagrammatically at *k*) and the washing liquid is fed through port *b*, which is controlled by the cock indicated diagrammatically at *l*. So soon as the liquid commences to flow through channel *c*, thus indicating all the air has been expelled from the ribs of the plates *e f*, a valve (indicated diagrammatically at *m*) at the end of this channel is closed, so that the high-pressure or washing plates *f* can no longer be used as filtering-channels, but only as the entrance-channels, for the distribution of the washing-water, whereby the solution is forced from the ribs of the washing-plate *f* in a double diagonal direction through the cake of filter-pressed matter, the displaced moisture of which is expelled through channel *d*, which always remains open. It will thus be noticed that the path of least resistance is from the rear left-hand top corner of one plate to the front right-hand

bottom corner of the other plate, which is the longest distance to be traveled through the cake, and it thus insures perfect washing of all its portions. The cocks and valves above referred may be of any well-known construction, and consequently do not require specific illustration, but are simply indicated diagrammatically at the positions they occupy. If desired, compressed air may now be blown through the cakes in a similar manner or through port *a*, and this will be found to expel a considerable portion of the moisture remaining from the wash. The joints of the ports are made by recessed rubber rings *n*, which automatically close perfectly tight on the shutting up of the press.

In order to provide for the easy withdrawal of the frames with their contents from the press, so as in no way to disturb the pressed cakes, I provide the port *d* in such a position as in no way to project sidewise beneath the side bars *i* of the press, and yet also to in no way interfere with the hanging of the cloths or the efficient closing of the bottom of the press by forming this of a taper-shaped projection in the position shown, having no connection with any similar outlets on similar plates. The frames can thus be taken out of the press by a direct vertical movement, no twisting, shaking, or bending being necessary.

I wish it to be understood that I do not claim the use of continuous ports closed with one valve or separate ports for the flow of expressed original solution and of subsequent washings or of the combination of continuous passages for the admission of the original liquid and of washing liquid while the outlet-orifice is provided on that side of the ele-

ments which is opposite to the filter-ports; but what I seek to protect is the precise combination of ports and channels, &c., shown in the accompanying illustrations, in which there are no internal ports or channels requiring holes or other special preparation or fitting of the filter-cloths and in which there are no separate cocks to either the filtrate or washing outlets and in which, moreover, the most direct line of transit of washing solution is as shown and in which the filtrate-outlet is so placed as not to interfere with the convenient withdrawing of the frames and plates, all as shown.

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

In a washing filter-press, a series of alternating filtering-plates, frame-plates and washing-plates, with suitable filtering-cloths, having continuous passages at top on one side in said plates for the admission of the liquid to be filtered and the washing liquid respectively, the first-named passage communicating with the frame-plate cavities only, the last-named passage communicating with the washing-plates only, a continuous efflux-passage at top on the opposite side communicating with the washing-plates only, and outlet-orifices on the filtering-plates at bottom, diagonally opposite to the filter ports or passages, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALFRED JAMES.

Witnesses:

W. J. TERRY,
JOSEPH LAKE.