(No Model.)

S. H. JOHNSON & C. C. HUTCHINSON.

CONSTRUCTION OF FILTER PRESSES.

No. 419,775. Patented Jan. 21, 1890.

Fig. 1.

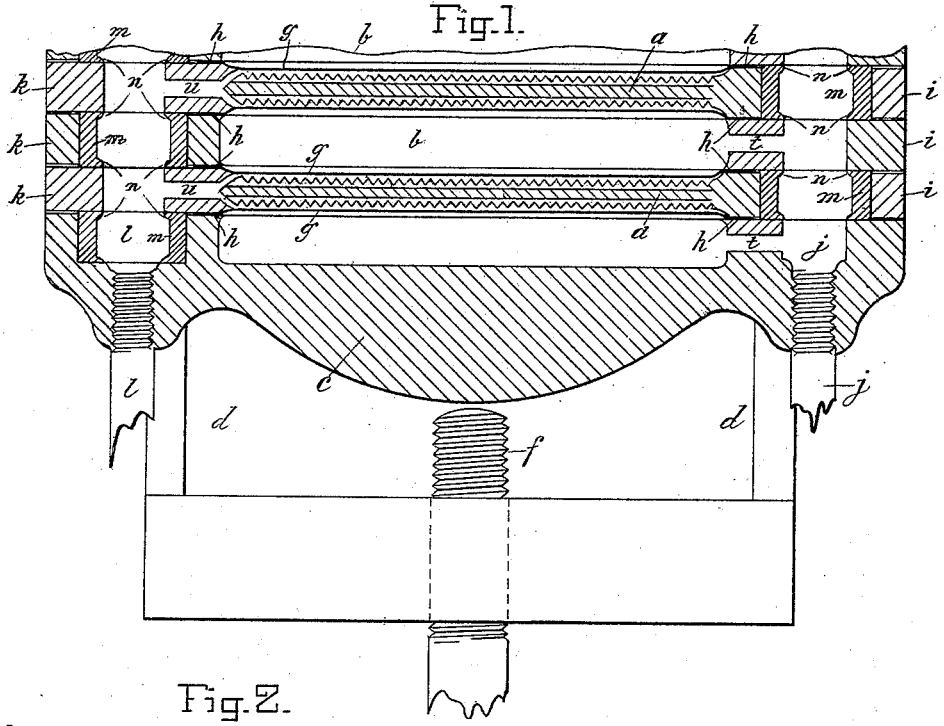


Fig. 2.

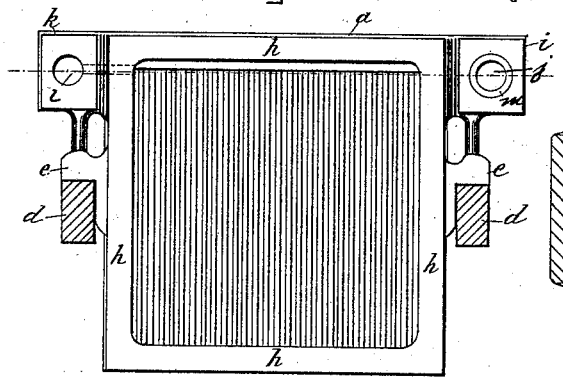
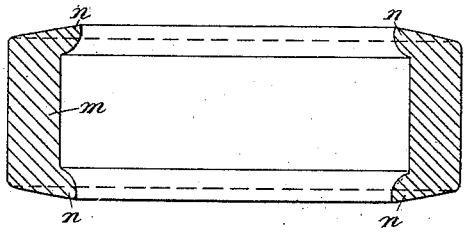


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

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CONSTRUCTION OF FILTER-PRESSES.

SPECIFICATION forming part of Letters Patent No. 419,775, dated January 21, 1890.

Application filed May 13, 1889. Serial No. 310,570. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL HENRY JOHNSON and CHRISTOPHER CLARKE HUTCHINSON, citizens of Great Britain, residing at Stratford, in the county of Essex, England, have invented certain new and useful Improvements in the Construction of Filter-Presses; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention has for its object improvements in the construction of filter-presses, to facilitate the putting on and removal of cloths on same, and to secure tight joints in the inlet, outlet, and washing passages; and it more particularly applies to the form or construction of filter-presses wherein these passages are carried in projections from the chamber clear of the filtering-cloths. Filter-presses with these external passages have hitherto been made in either of two ways: First, the joint-surfaces of the projecting lugs carrying the openings which form the passages have been surfaced in the same plane as the joints round the rims of the filtering-chambers which joint on the filtering-cloths, and in order to make up the space occupied by the filtering-cloths and joint the projecting lugs to one another when the machine is screwed up for work, it has been necessary to provide short sleeves made of the same kind of cloth as the filter-cloth in use, such sleeves covering the joint-surfaces and having openings corresponding to the passages therein. The second plan is to form recesses in the joint-surfaces round the openings in the lugs and fitting into these recesses elastic rings, so as to form the joints between the respective lugs when the machine is screwed up. It will be obvious from the above description that the joints in all these passages require to be made by the direct pressure of the screw which forces the chambers together. Now these systems are subject to inconveniences in consequence of the same pressure being required to make the joints on the lugs as is necessary for securing tight joints round the margins of the chambers, so that when alterations in thickness of the cloths used for filtering occur, which inevitably take place either from the effect of the material being worked in the machine consolidating in the pores of the cloths or from other causes, the unequal resistance occasioned thereby at the different joint-surfaces on the chamber occasions constant leakage either from the chambers or between the lugs forming the passages. Now these inconveniences we take care to avoid by using the main screw of the machine for the purpose of making the joints round the respective chambers only, the tightness of the joints on the various inlet and outlet passages in the projecting lugs not depending on the pressure of the main screw, but on the internal pressure of the liquid in them when the machine is at work, and this we accomplish by fixing in the hole of every alternate lug an elastic packing-ring having two projecting lips thereon, which, under the hydraulic pressure at which the filter is working, is pressed against the planed surfaces of the adjoining lugs. By this means we avoid undue pressure at any of the joints of the external passages, the function of the screw being only to bring the yielding lips of the joint-rings into gentle pressure with the surfaces of the lugs, depending for tightness altogether on the hydraulic pressure. By this means perfectly-tight joints can be obtained, even with varying thicknesses of cloth, and a considerable economy of time is effected in working filter-presses of this type. The form we prefer to give these hydraulic joint-rings is shown in the accompanying drawings, in which—

Figure 1 shows a horizontal section through the inlet and outlet passages of a series of plates or filtering-diaphragms, distance-frames, and a follower, and plan of part of the frame and screws of a plate and frame press packed with hydraulic-joint rings according to our invention. Fig. 2 is a side elevation of one of the filtering-diaphragms with one of the packing-rings in the inlet-passage and a cross-section of the beams of the supporting-frame; and Fig. 3 is a horizontal section

through one of the packing-rings on an enlarged scale.

a represents the filtering-diaphragms; *b*, the distance-frames; *c*, the follower; *d*, beams of the frame on which the diaphragms and distance-frames rest by their bearing-brackets *e*, to be clamped together between the follower *c* and the head of the press (not shown) by the screw *f*; and *g* represents the filtering-cloths clamped between the joint-surfaces of the plates at *h*, to be supported on the faces of the filtering-diaphragms for the passage of the liquid through them.

The projections of the plates for the inlet-passage *j* at one side of the press are represented at *i*, and the corresponding projections *k* of the other side have the outlet-passage *l* formed in them.

m represents the elastic hydraulic packing-rings that we employ for packing the joints of these inlet and outlet passages independently of the clamping of the filtering-cloths between the plates by the screw, and so that said joints make no interference with and are not affected by the joints of the plates, however much the thickness of the filtering-cloths may vary. These packing-rings have slightly-conical ends with internal flanges or lips *n*, normally expanded relatively to the rest, as clearly shown in Fig. 3. The center opening through these rings is same size as the openings *o* through the distance-frames *c* on the inlet side and the corresponding openings *b* through the diaphragms on the discharging side of the press, and they are placed in the larger openings *p* in the diaphragm on the one side and in the distance-frames *c* on the other side, so that their flanges *n* have bearing against the surfaces of the projections of the adjacent plates, and thus pack the joints by the effect of the pressure of the liquid on them.

When it is not desired to draw off the filtrate in a closed passage, the packings are not required on the discharge side. When the press is made with washing-passages for introducing liquid on the other side of the cloths, as they sometimes are for washing out the press, these packings will be used in the same way in such passages. Short lengths of elastic tube having the two ends projecting into the openings in the adjoining plates would also accomplish a similar result; but we do not find this arrangement so convenient or practical as that above described. The liquid enters the filtering-chambers through the branch inlets *t* from the main inlet *j*, and when the closed outlet-passage *l* is used the filtrate escapes from said chambers thereto through the branches *u*.

We claim as our invention—

The combination, with the diaphragms and distance-frames of filtering-presses having alternately larger and smaller openings in the projections for the feed and delivery passages, either or both, of the elastic packing-rings having the inwardly-projecting lips or flanges and placed in the larger openings, so that said flanges come into gentle contact with the joint-surfaces of the adjoining lugs having the smaller openings, and thus contrived so that the pressure due to the working of the machine becomes the effective agent in securing the tightness of these joints, while the tightness of the joints of the filtering-chamber is independently effected by the press-screw, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

SAMUEL HENRY JOHNSON.
CHRISTOPHER CLARKE HUTCHINSON.

Witnesses to the signature of Mr. Johnson:
T. F. BARNES,
W. J. NORWOOD.

Witnesses to the signature of Mr. Hutchinson:
T. F. BARNES,
HERBERT E. DALE.