

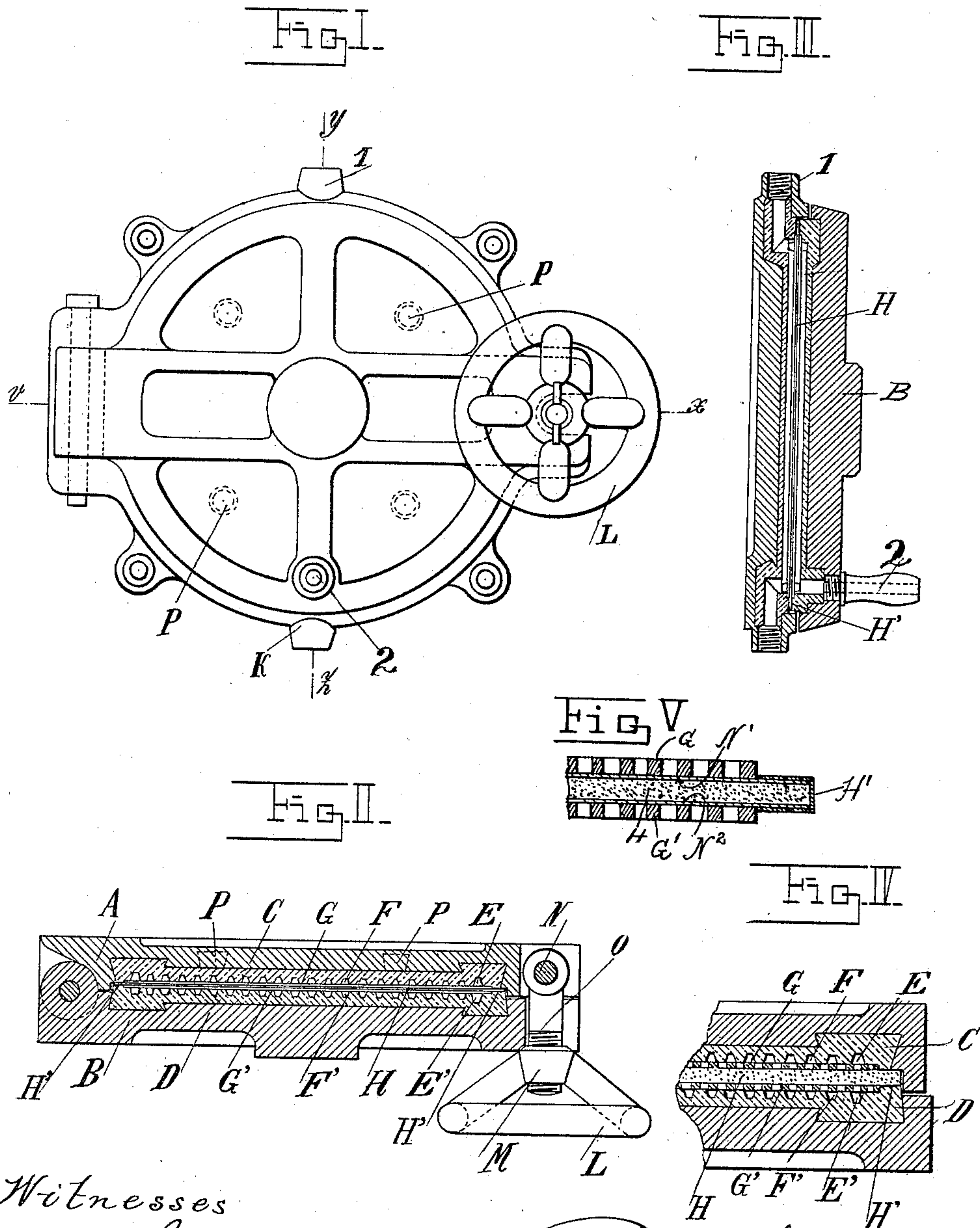
No. 612,832.

Patented Oct. 25, 1898.

P. DAME & H. POTTEVIN.  
FILTER.

(Application filed Dec. 28, 1897.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

PAUL DAME AND HENRI POTTEVIN, OF PARIS, FRANCE, ASSIGNORS TO  
THEMSELVES AND ALBERT PIAT.

## FILTER.

SPECIFICATION forming part of Letters Patent No. 612,832, dated October 25, 1898.

Application filed December 28, 1897. Serial No. 663,917. (No model.) Patented in France January 15, 1895, No. 244,353, March 10, 1897, No. 264,850, and August 10, 1897, No. 269,508.

*To all whom it may concern:*

Be it known that we, PAUL DAME and HENRI POTTEVIN, of Paris, France, have invented new and useful Improvements in Filtering  
5 Plates and Apparatus, which are fully set forth in the following specification, and for which we have obtained patents in France, No. 244,353, dated January 15, 1895, No. 264,850, dated March 10, 1897, and No. 269,508,  
10 dated August 10, 1897.

Our object is to improve the apparatus or means employed in filtering liquids, to remove from the said liquids the micro-organisms contained therein in suspension, and to  
15 prevent the said micro-organisms from breeding in or on the actual filter-plate. The filter-plates or the layers employed heretofore (where they have consisted of felt, tissues or fabrics, fibers, porcelain, stoneware, or even  
20 of cellulose) have not given the results which it is necessary to realize in the interests of public health and for insuring the good quality and the preservation of liquids.

We have first sought to manufacture a filter-plate having a variable degree of porosity  
25 and which would be at the same time unchangeable, unbreakable, and indeformable, and which should also be, if required, absorbent and sterilizing while filtering. It should  
30 also be capable of being made at a low cost, so that it can be replaced without great expense as soon as it should be supposed that its operation is becoming less efficient, and it should have such a perfect filtering action  
35 that said filtration could be considered as equal of itself to actual sterilization. Finally, it should be capable of allowing of a simple and easy construction of filters, whether for household use or for use on a commercial scale.

40 Figures 1, 2, and 3 are respectively an elevation and two sections, on the lines *v x* and *y z*, of a small filter for domestic use constructed according to this invention and provided with one of our filtering-plates. Fig.  
45 4 is a detail view showing, on a larger scale, the position and the form of the impervious peripheral joint or packing. Fig. 5 is an enlarged view of a portion of a filtering-plate, clearly showing the construction thereof.

Our filter-plate, which forms the especial  
50 subject of this invention, is made of pure cellulose of a special kind produced from flax or hemp. In the case of filters for commercial use having a large volume of delivery a certain quantity of cellulose of another kind  
55 may be added to this cellulose of flax or hemp with the object of increasing to a greater or less degree the filtering faculty or filtering power of the plate. To this pure cellulose  
60 and according to the nature of the liquid to be filtered we add before pouring the paste into the molds an insoluble, antiseptic, or absorbent product, such as hereinafter specified,  
which aids said paste in sterilizing or clarifying the liquid to be filtered. These insoluble  
65 substances, when water is the liquid to be filtered, are simply neutral and help by their presence to increase the degree of porosity of the plate. This is also effected by the sterilizing or clarifying materials.  
70

In the manufacture of our plates we start with tow as the raw material from which our new cellulose is to be produced. We divide the tow very finely after treating it with acid and washing in alkaline water. It is then  
75 washed in and diluted with pure water, and the mixture thus produced is then formed into a paste or pulp in any suitable manner, preferably in a paper-pulp engine. The paste or pulp may then be molded into plates of the  
80 desired shape and dried in any suitable manner, contracting considerably and assuming a uniformly fine homogeneous texture, with a fracture of a compact appearance similar to that of ivory or "corozo." Plates thus  
85 formed possess the property of preserving their homogeneity and texture while wet and after use for a long period, and in contradistinction to plates of ordinary manufacture swell but little, if any, and consequently their  
90 pores do not close up. To further increase the porosity of the plates with the object of increasing the amount and the duration of their delivery, we may incorporate with the material of which they are formed while in a  
95 pasty condition an insoluble powder, preferably an antiseptic body or an antimicrobial substance, such as animal or vegetable black,



tar, or asphalts. In filtering wines, beers, and ciders, however, a neutral substance—such as kaolin or china-clay, pumice-stone, or infusorial earth—should be employed. The  
 5 porosity of the plate may be still further increased by incorporating with the plate in the course of manufacture a sheet of fabric, which acts to prevent or diminish the contraction of the cellulose, thus forming a less  
 10 compact plate. This sheet of paper is preferably incorporated in the surface of the plate through which the filtered liquid emerges. After manufacture of the plate another sheet of paper or filtering-tissue is applied to the  
 15 other surface or face of the plate. The plates having thus been formed, their edges and a portion of the opposite faces thereof adjacent to the edges are covered by a thin band of india-rubber, which serves as a packing to  
 20 form a tight joint when the plate is placed in the filtering apparatus. Instead of a separate band we may employ a layer or coating of a supple and impervious material, such as collodion, india-rubber, or gutta-percha. With  
 25 the object of giving greater thickness to the joint cork in a state of fine subdivision can be incorporated with said materials. This layer is applied by immersing the edge of the plate in a bath of the desired material and  
 30 afterward drying the same.

The apparatus forming part of our invention will be fully understood by reference to the accompanying drawings.

In said drawings, A and B are two frames, 35 of cast-iron, forming the bottom and the cover of a household filter. The bottom frame A is generally fixed to the wall and to the discharge-pipe. The other frame serves as a cover and is hinged to the bottom plate.

40 C and D are internal packings of tin. This metal is run into recesses formed in the frames and into dovetailed grooves formed in the bottom of said recesses, the tin hardening in said grooves acting to secure the packings to  
 45 the frames. The faces of the tin packings are formed with circular grooves E E', respectively, around their edges and with small vertical grooves F F', respectively, terminating in said circular grooves, and along which  
 50 grooves E E' and F F' the liquid flows from tubular union or inlet 1 to tubular union or outlet 2.

K is a tubular union for emptying the filter.

The filter-plate H, made of finely-divided  
 55 flax or hemp, as hereinbefore described, is surrounded in a permanent manner with its impervious peripheral packing H', and it is engaged and held between the straining-disks G and G', which serve to support the same and  
 60 which retain the grosser impurities. These disks G and G' hold between them tightly the plate H and can be made of filter-stoneware, but are generally of perforated sheet metal or of a metallic cloth, and they are  
 65 covered with "gummed taffetas." The tightening action of the two cast-iron frames A and B upon the edges of the plate is effected by

means of the screw hand-wheel L, screwing on the end of the bolt M. This bolt is adapted to swing on pivot N and to be inserted in the  
 70 notch O. By means of these arrangements the filter can be rapidly opened, inspected, and cleaned, and the plate H, provided with its adhering joint or packing H', can be readily inserted and the apparatus closed again. 75

To produce a filter of great filtering power for use on a commercial scale, it is sufficient to provide plates of large dimensions provided with their peripheral joint large enough to obviate the risk of being broken and thick 80 enough and of suitable number in sliding frames prepared in the same manner as the frames A and B and arranged after the manner of a filter-press, the whole combined and operating in the same manner as in the case 85 of the frames A and B of the domestic filter illustrated in Figs. 1, 2, 3, and 4.

N<sup>2</sup> and N' are sheets of felting paper or tissue, the former being incorporated in and the latter applied to the plate H, as already 90 described. The liquid to be filtered passes first through sheet N', then through plate H, and finally through sheet N<sup>2</sup>.

The plates, having been prepared as hereinbefore described, are placed with their pack- 95 ings, from which they must not be separated any more, in a stove and heated to 170°. Then they are inclosed hermetically in bags or impervious envelops.

We claim— 100

1. A filter-plate composed of a compact mass of finely-divided cellulose of flax or hemp, as set forth.

2. A filter-plate composed of a mixture of cellulose of flax or hemp and an insoluble 105 neutral material, such as specified, and serving to increase the porosity of the plate, formed into a compact mass, substantially as described.

3. A filter-plate composed of a mixture of 110 cellulose of flax or hemp, and an insoluble neutral material, such as specified, serving to increase the porosity of the plate, and a packing band or layer of impervious material, such as rubber, inclosing the edge of the plate, 115 substantially as described.

4. A filter-plate composed of a compact mass of finely-divided cellulose of flax or hemp having incorporated therewith in the course of manufacture a sheet of filtering paper or fabric of less contractibility than the finely-divided cellulose, for the purpose hereinbefore 120 specified.

5. A filter-plate composed of a compact mass of finely-divided cellulose of flax or hemp having incorporated therewith on one face in the course of manufacture a sheet of filtering paper or fabric of less contractibility than the finely-divided cellulose, and having a sheet of filtering paper or tissue applied to its other 125 face, substantially as described.

6. A filter consisting of two plates or frames hinged together and having ridged or grooved inner faces, a filtering - diaphragm tightly



clamped between said plates, said frames being provided with an inlet and an outlet for the liquid to be filtered communicating with the grooves in the faces of the plates on opposite sides of said diaphragm, substantially as described.

7. A filter consisting of two plates or frames having ridged and grooved adjacent faces, means for clamping said frames together, a filtering-diaphragm, and disks of reticulated material, such as specified, on opposite sides of said diaphragm, the diaphragm and

disks being clamped between the ridged and grooved surfaces of the plates, substantially as described.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

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HENRI POTTEVIN.

Witnesses:

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