

(No Model.)

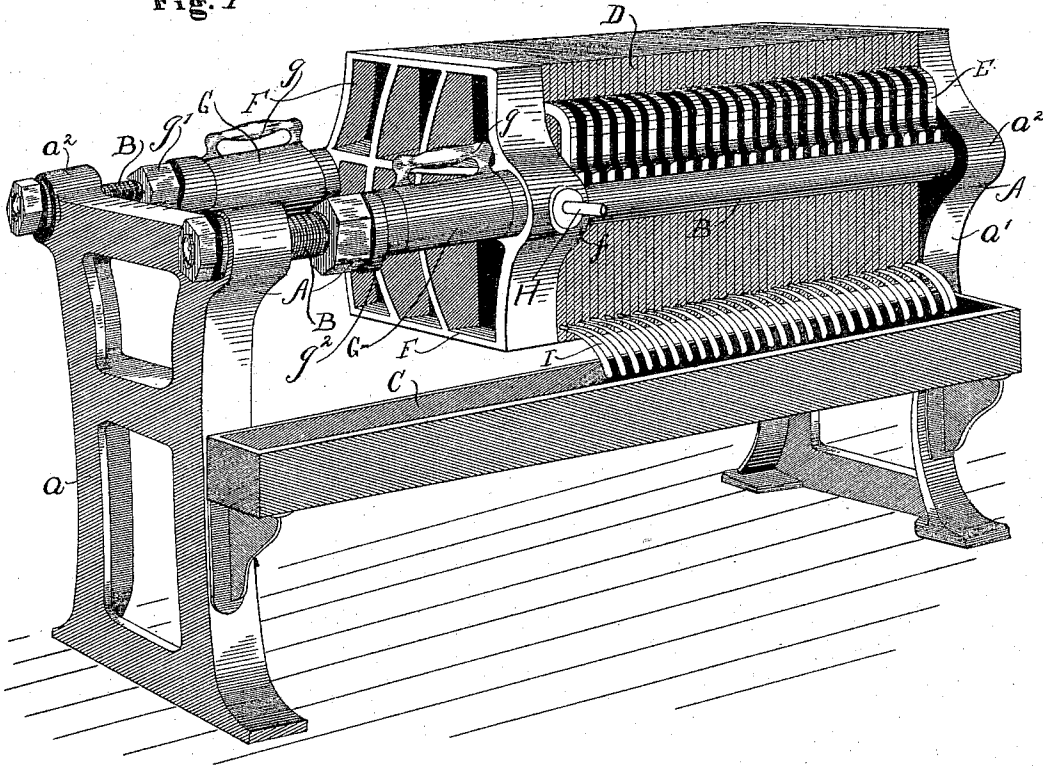
3 Sheets—Sheet 1.

B. E. SPERRY.
FILTER PRESS.

No. 580,431.

Patented Apr. 13, 1897.

Fig. 1



Witnesses

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Fig. 2.

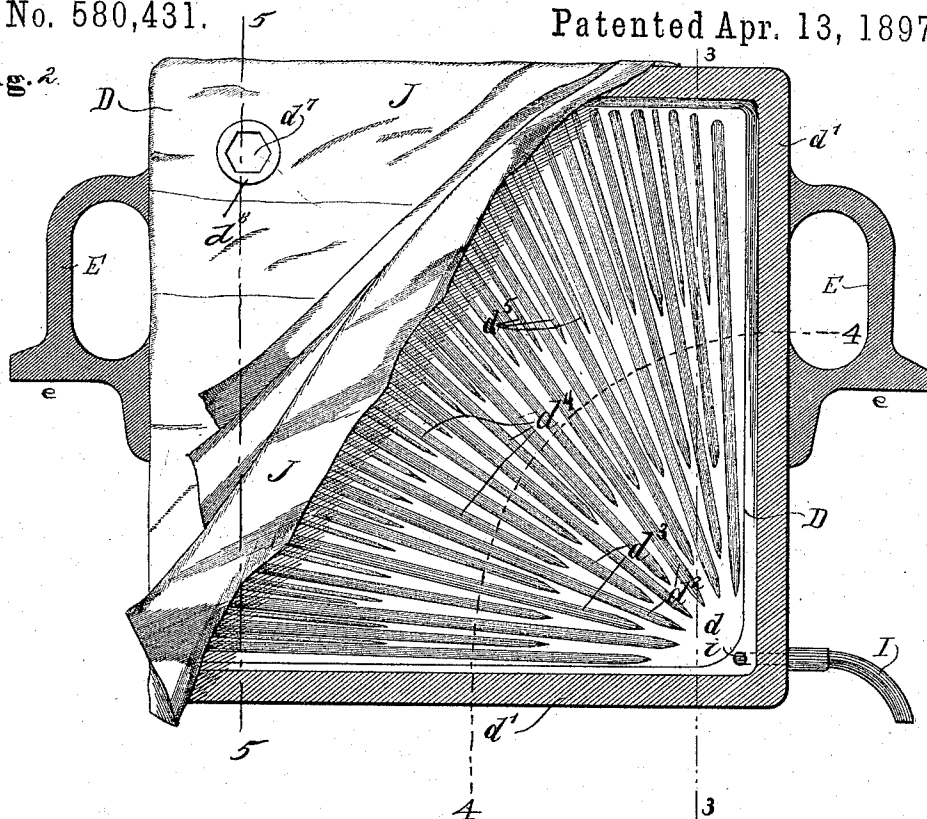
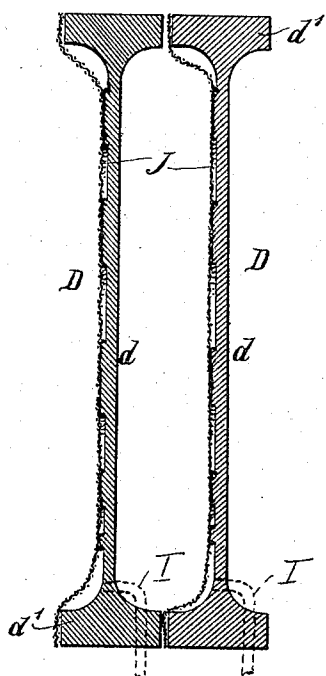


Fig. 3.



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Fig. 6.

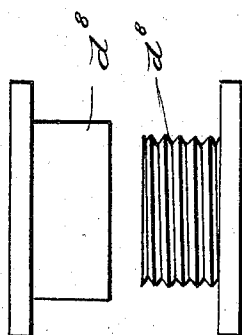


Fig. 4.

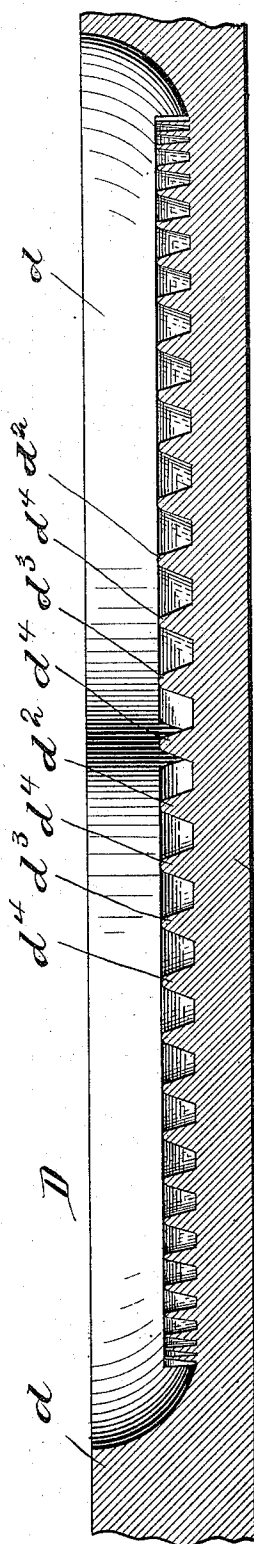
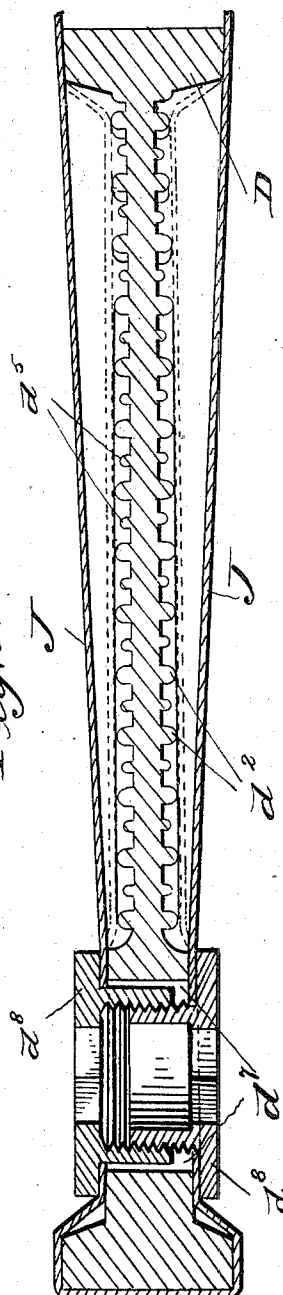


Fig. 5.



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UNITED STATES PATENT OFFICE.

BARTON E. SPERRY, OF BATAVIA, ILLINOIS.

FILTER-PRESS.

SPECIFICATION forming part of Letters Patent No. 580,431, dated April 13, 1897.

Application filed July 22, 1895. Serial No. 556,799. (No model.)

To all whom it may concern:

Be it known that I, BARTON E. SPERRY, a citizen of the United States, residing at Batavia, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Filter-Presses, which are fully set forth in the following specification, reference being had to the accompanying drawings, in which—

10 Figure 1 represents a perspective view of a filter-press embodying my invention; Fig. 2, a side elevation of one of the removable plates of the press; Fig. 3, a detail vertical section of two such press-plates detached, 15 taken on the line 3 3 of Fig. 2. Fig. 4 is a vertical section on the line 4 4 of Fig. 2. Fig. 5 is a sectional view on line 5 5 of Fig. 1, showing the manner of securing the filtering-cloth at the inlet-apertures in the press-plates. Fig. 6 is a detail view of the clamp- 20 ing-nuts which hold the cloth at the inlet-apertures.

The invention relates to certain improvements in the construction of the press-plates 25 in filter-presses, a well-known structure in general features.

The invention consists in a certain arrangement of the grooves of the press-plates and the contour of the ribs and intervening 30 grooves.

The construction and operation of a press-filter embodying the invention will now be described in detail with reference to the accompanying drawings, and the specific improvements which are believed to be new and which it is desired to secure by Letters Patent will then be more definitely pointed 35 out in claims.

In the drawings, A represents the main or supporting frame of the filter-press, which 40 consists of two uprights or standards a a' , connected at their upper ends by large strong rods or shafts B. At the front of this frame there is a receptacle or trough C, secured to the two end pieces about half-way their 45 length. The portion of the end upright a' above this trough is of about the same size as the press-plates, while the standard a at the other end is of different dimensions and 50 somewhat different in form, but both are pro-

vided with edge enlargements a^2 , in which the rods are mounted.

A series of press-plates D are loosely mounted on the rods B. In general features these plates are of ordinary construction. 55 As shown in the drawings, they are of rectangular form, with a comparatively thin body d and surrounding edges d' of much greater thickness. The grooves or channels formed between the raised ribs d^2 (shown by the 60 shaded parts in Fig. 2) all center at the lower front corner of the press-plate and radiate from this point in all directions across the plate; but in order to supply a number of grooves required for the practical operation 65 of the device ribs of gradually-shortened length are provided between the full-length ribs d^2 , as of course the entire face of the plate cannot be covered by a single set of radial ribs centering at one point. The first 70 section of ribs shortened from the main ones d^2 is indicated by d^3 , the next section by d^4 , and the third, as shown in the drawings, by d^5 , all indicated in Fig. 2, though of course the number of these gradually-shortened 75 sections will depend upon the size of the plate. The form of these ribs is of considerable importance in the working of the filter. By their relative height as compared with the spaces between them they hold the filter-cloth away from the face of the plate proper 80 and so permit of a free circulation of water between the ribs. By their curved upper edges, where they contact with the cloth, they prevent the frequent wearing out of the 85 filter-cloths, which has in filters as hitherto constructed been a serious defect.

On each of the side edges of the plates there are provided projecting brackets E of such width as to form means by which the plates are 90 supported on the two side rods. For this purpose the lower portions of the brackets are somewhat extended outward and provided with a straight horizontal edge e , as seen in Fig. 2, which is intended to rest upon the side 95 rods, respectively, to support the plates in regular and uniform arrangement for operation, but at the same time providing for their ready removal.

A movable follower F is mounted loosely on 100

the side rods nearer to the shorter than the longer or higher standard of the main frame. The contour of this follower, so far as the body is concerned, conforms to the contour of the press-plates, but on each side there are outward projections *f*, through which the side rods pass loosely, and the follower is therefore adjustable back and forth on these rods. The press-plates are arranged in the space between the high end standard of the main frame and this follower, as seen in Fig. 1, and devices suitable for the purpose are applied to the ends of the side rods outside of the follower, by means of which the latter may be forced up with required power against the front or inner end of the series of press-plates. As seen in the drawings, the devices for this purpose consist of short tubular collars *G*, mounted on the side rods just outside the follower and provided with handles *g*, whereby they may be adjusted. The projecting extremities of the side supporting-rods are threaded, as seen in Fig. 1, and nuts *g'* are applied thereto, which are adapted to be turned up against the outer ends of the tubular collars, thereby setting them up firmly against the follower. Preferably washers *g*² are arranged on the rods between the outer ends of the collars and the nuts.

For the admission of the liquid to be filtered there is a tube *H*, set in the front edge of the follower and extending inward to the space between the face of the latter and the front side or face of the adjacent press-plate. At the rear upper corner of the press-plate there is provided an aperture *d'*, by means of which the spaces between the face of the follower and the adjacent plate and between the successive adjacent plates are connected. A discharge-spout *I* is connected to each plate by means of an aperture *i* at the front lower corner thereof quite close to the radial point of the ribs and grooves. This spout or short discharge-pipe is preferably curved and is arranged so that its entrance into one of the spaces between two adjacent press-plates will be at the back of each plate, and obviously, therefore, the discharge-aperture connects with the like space in the front of each plate, and these discharge-pipes are preferably bent or curved downward to facilitate the discharge of the filtered liquid into the side trough below, as indicated in Fig. 1.

Strainers *J*, of any ordinary and suitable material, are provided for application to the front face of each press-plate, the edges of these strainers being located between the edges of contacting flanges on adjacent press-plates, in which position they are firmly secured by the pressure brought on said plates, as described above. Said strainers *J* are firmly secured at the edges of the apertures *d'*, which form communicating passages through the press-plates *D* by means of the threaded flanged nuts *d*³, said nuts, as clearly shown in Fig. 5, firmly clamping the filtering fabric

or strainer *J* to the press-plate. The nuts *d*³ are provided with angular inner peripheries, as shown, to permit the insertion of a wrench or tool to turn them. As usual, the body of each strainer inside the contacting edges of adjacent plates is slightly larger than the channeled body of the plate, so that there may be a movement of the strainer-body against the face of the plate by the pressure of the liquid forced into the filter.

It will be understood that the liquid to be filtered is first delivered under pressure into the space between the face of the follower and the adjacent or front face of the first press-plate, and this entrance is in front of the strainer applied to the said press-plate. The pressure upon the liquid will force this strainer inward against the front face of the press-plate, the contour of the strainer under this action being indicated in Fig. 3, and as this space is filled with the liquid the pressure drives the pure liquid through the strainer into the channels or grooves in the face of the plate, along which it runs to the discharge-opening in the lower corner of the latter and escapes through the spouts into the trough. Obviously there must be means for connecting the spaces between adjacent press-plates, so that they may be filled in succession with the liquid entering the filter, and the same pressure brought to bear upon the liquid in each space. For this purpose the aperture *d'* is provided in the upper rear corner of each plate, passing through the strainer in front thereof and the plate itself, as indicated in Fig. 2, the strainer being clamped to the plate about said aperture *d'*, as hereinbefore described and as shown in Fig. 5. This connecting-aperture is very much larger than the discharge-opening at the opposite corner of the plate, and the normal supply of liquid to the press is considerably greater than the possible discharge through one of the outlet-spouts. The liquid will therefore be forced into the filter more rapidly than it can be discharged therefrom at any one space, and so the latter will gradually fill with liquid notwithstanding the said discharge, and when the connecting-aperture in the upper corner of the press-plate is reached the unstrained liquid will pass through into the next space, when the same operation will follow, and so on to the outer plate of the series. Now, obviously, under this pressure each strainer will be forced up against the adjacent or front face of each plate and bent into the channels or grooves in the latter.

The mounting and securing of the press-plates in the machine have been described above. Whenever it is desired to remove the said plates, the devices by means of which the follower is pressed up against them are adjusted to release this pressure and permit the follower to move outward slightly, when of course the press-plates may be quickly and readily lifted from their supports. The ar-

5 rangement of the conducting grooves or channels formed in the faces of the press-plates radially from the discharge-aperture in each plate provides passages from the strained liquid to the discharge-aperture more direct and more readily followed than in any previous construction of which I am aware.

10 There may be changes in some of the specific devices herein shown and described or modifications thereof without losing the important results specified as obtained by this invention, and such modifications are intended to be included in the present invention so long as the operation and result remain substantially the same as herein set forth.

15 Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent, is—

20 1. In a filter-press, a press-plate constructed with ribs and grooves radially arranged with reference to one of the lower corners of the plate, substantially as described.

25 2. In a filter-press, a press-plate constructed with ribs and grooves radially arranged with reference to one of the lower corners of the plate, a strainer arranged in front of the plate, and a discharge-spout connecting with the space between the strainer and said front face of the plate, but located in rear of the latter, substantially as described.

30 3. In a filter-press, the press-plates D provided with flat surfaces, upon which are mounted raised ribs d^2 , d^3 , &c., greater in height than the distance between them and rounded upon their upper edges, substantially as shown and described.

4. In a filter-press, the press-plates D, provided with radially-arranged ribs and grooves, a strainer located in front of the respective plates, a discharge-pipe connecting with the space between the strainer and front face of the plate and passing outward at the rear edge of said plate, and an aperture in the opposite upper corner of the plate and strainer, for connecting the chambers or spaces between adjacent plates respectively, substantially as described.

5. In a filter-press, the rectangular, vertical filter-plates D provided with flat surfaces, two or more series of ribs d^2 , d^3 , &c., mounted on the front surfaces of the said plates, arranged radially with respect of one of the lower corners of the said plates, the alternate ribs of the several series being of varying lengths, the height of the said ribs being greater than the spaces between them, and their upper surfaces being rounded; a discharge-opening at that lower corner of each plate from which the ribs radiate, connecting with the ribbed surface of the plate; an aperture through the diagonally opposite upper corner of the plate; a filter-cloth between each pair of adjacent plates, adapted to rest on the rounded upper edges of the ribs and provided with an opening connecting with the upper aperture of that filter-plate upon which it rests, substantially as described.

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