No. 644,124. Patented Feb. 27, 1900.

W. E. BRADLEY.

FILTER PRESS.

(Application filed Nov. 6, 1899.)

(No Model.) 3 Sheets—Sheet 1.

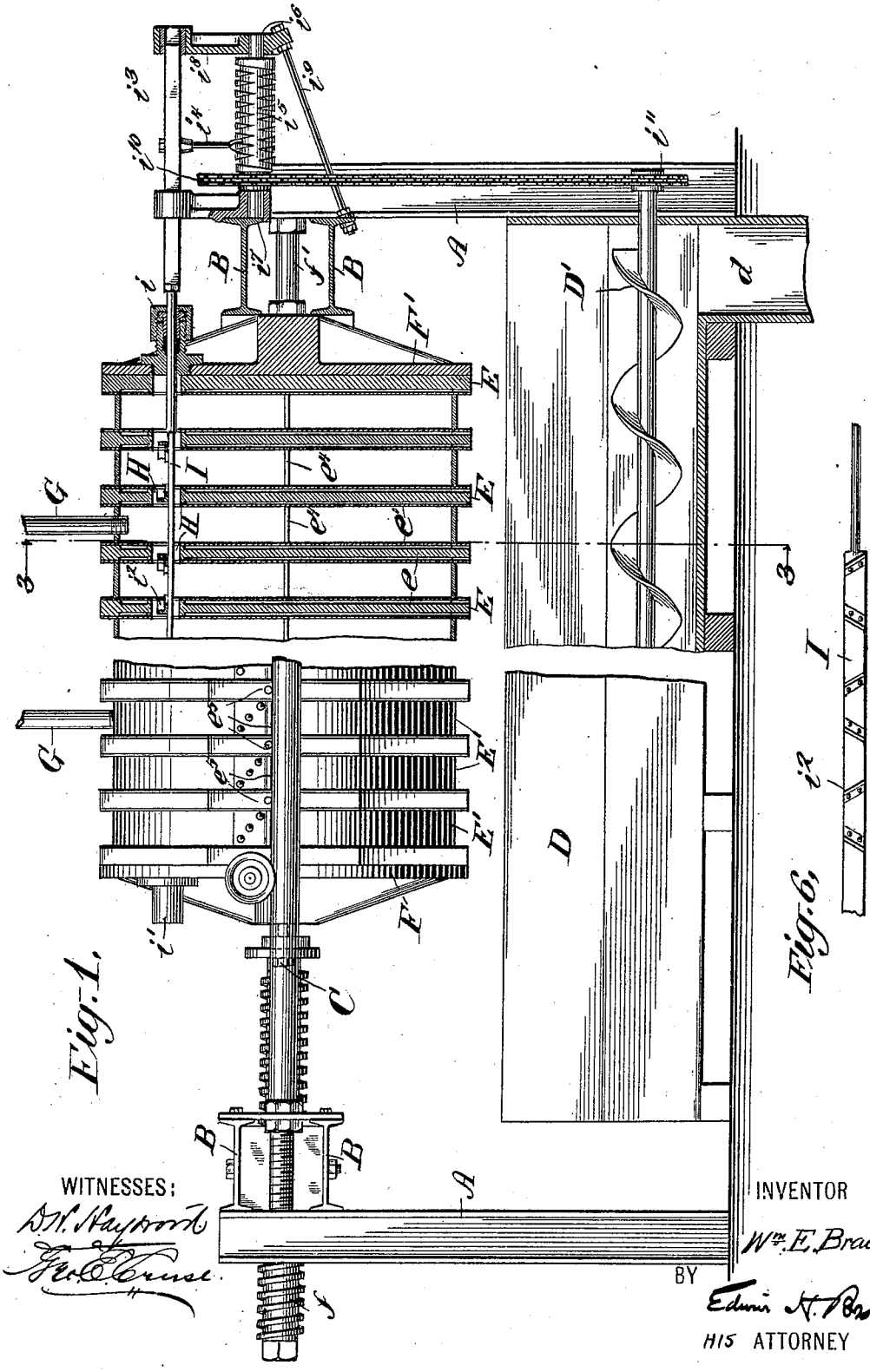


Fig. 1.

Fig. 6.

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Fig. 3.

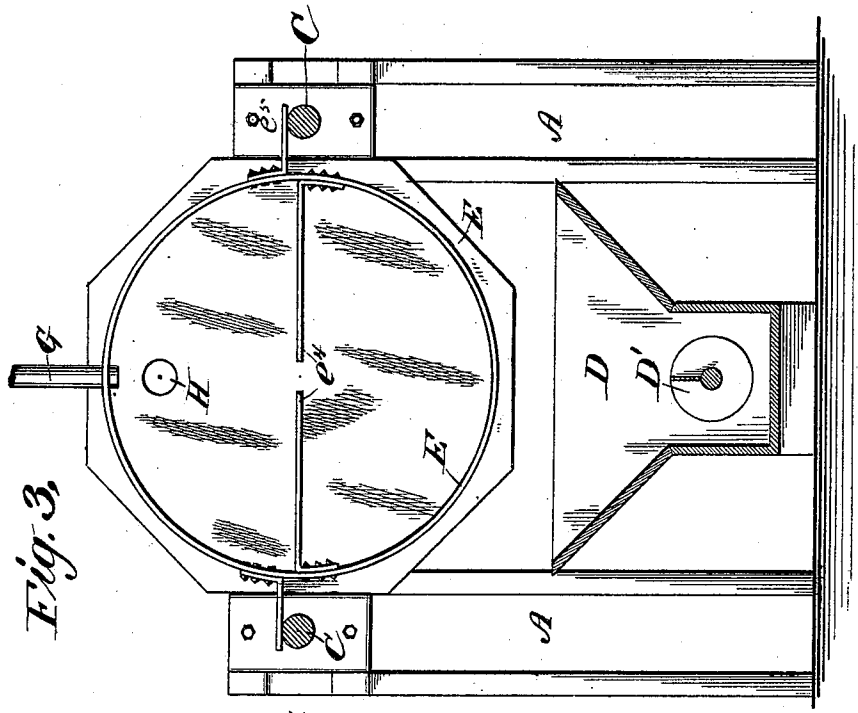
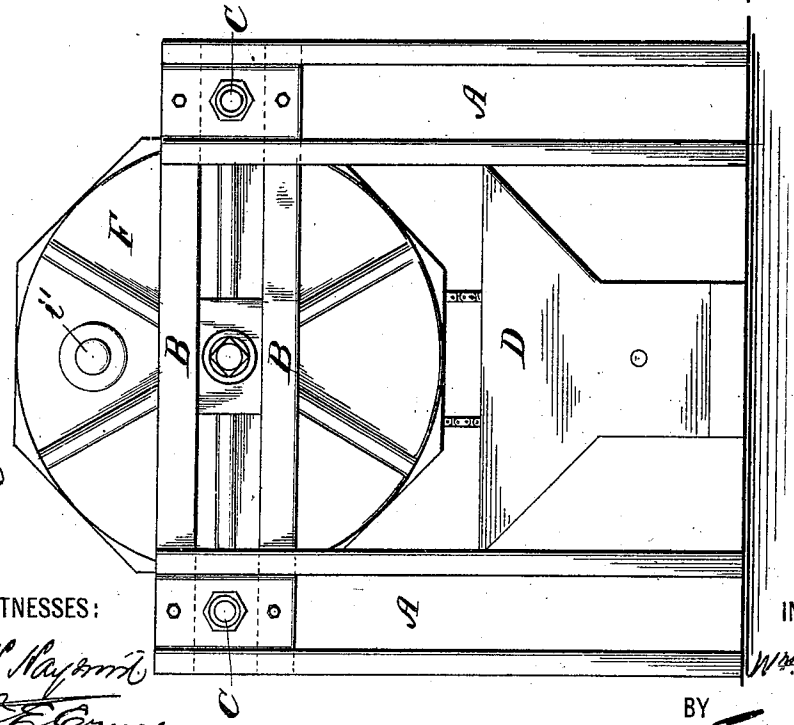


Fig. 2.



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Fig. 3.

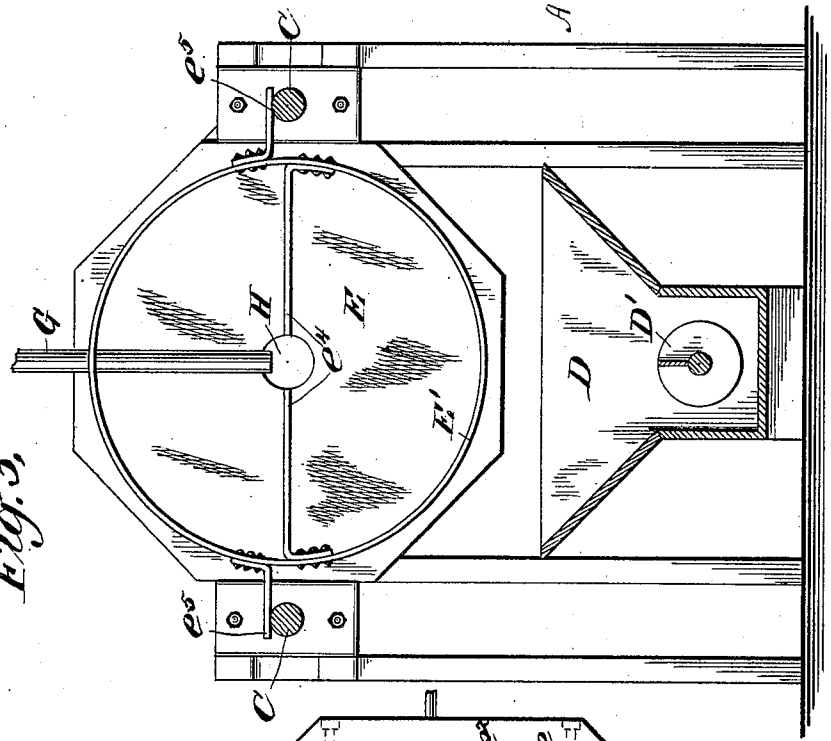
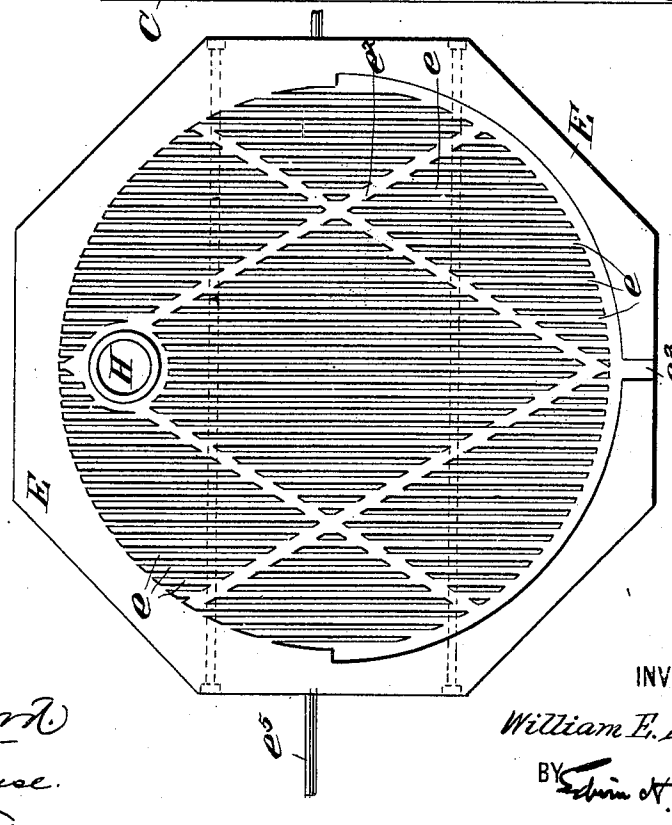


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM E. BRADLEY, OF FRANKFORT, KENTUCKY.

FILTER-PRESS.

SPECIFICATION forming part of Letters Patent No. 644,124, dated February 27, 1900.

Application filed November 6, 1899. Serial No. 735,892. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. BRADLEY, a citizen of the United States, residing at Frankfort, in the county of Franklin and State of Kentucky, have invented certain new and useful Improvements in Filter-Presses, of which the following is a specification.

My invention relates to filter-presses of that type which comprise a series of cells and intermediate filter-plates, the cells serving to hold the solid matter and the filter-plates to drain and carry off the liquid. I will describe such a filter-press embodying my invention, and then point out the novel features thereof in the claims.

In the drawings, Figure 1 is a view, partly in elevation and partly in longitudinal section, of a filter-press embodying my invention. Fig. 2 is an end view thereof. Fig. 3 is a cross-sectional view taken on the line 3 3 of Fig. 1. Fig. 4 is a view in elevation of one of the filtering-plates. Fig. 5 is a cross-sectional view, similar to Fig. 3, but showing a modification. Fig. 6 is a detail view.

Similar letters of reference designate corresponding parts in all of the figures.

A represents suitable vertical supports, B cross-beams between the supports, and C parallel rods extending between the cross-beams or the supports A, on which the several parts of the press proper are supported.

D represents a trough located beneath the press, into which the solid material therefrom is dropped.

D′ represents a screw conveyer working in said trough for conducting any material therein to an outlet *d*.

The filter-press comprises a plurality of filter-plates E and rings E′, which, in connection with the plates E, form cells for the filtrated matter. The filter-plates E are provided with grooves *e* on its opposite faces and with filtering-cloths *e′*, which cover the grooves *e*. Larger and intersecting grooves e^2 are also provided on each face in order that the plates may be drained quickly. An outlet e^3 is provided at the bottom of each plate. The rings E′ are of metal and of any desired width, and they are provided with a plate or strip or plates or strips e^4 of the same width or substantially the same width as the rings. These plates are secured to the inner peripheries of the rings and extend radially inward, and they are adapted to bear against adjacent faces of the filter-plates to brace them. It will be understood that I do not limit myself to having the plates extend in radial directions, as they may extend in non-radial directions. The several plates and rings are removable from the press, and when in position in the press they are supported by arms e^5, which rest on the rods C. When in position, they are clamped together by the heads F F′, each of which may be provided with a filtering-plate E. The heads F F′ are also supported by the rods C, and one of the heads F is movable longitudinally of the rods.

f represents a screw for forcing the head F toward the head F′, the latter being suitably braced by rods *f′* and the beam B.

The material to be filtered is pumped into the press or otherwise introduced therein under pressure through a plurality of supply-pipes G. As shown, the several pipes enter and are connected with some of the rings E′. The material entering the cells formed by the rings to which the supply-pipes are connected escapes from these cells into the adjoining cells through openings H, one of which openings being provided in each filtering-plate. It will be noticed that the opening H in each plate is at the top thereof and near the end of the supply-pipe. The advantage of this arrangement is twofold—first, by having the opening near the periphery of the plate the strength of the plate is not impaired to any extent, and, second, that the material to be filtered entering the press does not have to pass through the solid matter already pressed. A modification of this arrangement is shown in Fig. 5, and both of the hereinbefore-mentioned advantages will be obtained in this form. In this modification the opening H in each plate is provided at the center thereof and the several supply-pipes are extended into the cells, so that their ends will be near the openings H or in line therewith. With this arrangement the entering material will not have to pass through a mass of solid material and in the process of filtering the solid matter will form around the openings, and thus the great strain of the filtrate on the filtering-plates will be equalized and the consequent breakage of the plates avoided.

In either case the several openings H in the plates will have to be kept open. This may be accomplished by the following means: I represents a metal bar or rod having a packed bearing i in the head F′ and a suitable bearing i' in the head F. This bar or rod extends through the openings H, and at those parts of the bar or rod which are within the opening H angle-irons i^2 or other devices are secured to the bar or rod. Preferably the angle-irons i^2 will be inclined relatively to each other and to the bar. The bar I is also adapted to be reciprocated longitudinally, and this may be accomplished by any suitable means. The means shown in the drawings are as follows: An extension i^3 of the bar I carries a nut i^4, which works on a right-and-left screw carried by a stub-shaft i^5. This shaft is suitably mounted in bearings i^6 i^7, one of which is carried by one of the cross-beams B and the other by a bracket i^8, supported by rods i^9. A sprocket or gear i^{10} is fixed on this shaft i^5 and is connected by an endless chain or other belt to a sprocket i^{11}, fixed on the shaft of the conveyer D′. As the shaft i^5 is rotated the nut will be moved back and forth, and with it the bar I, thereby enabling the angle-irons i^2 to keep the openings H open.

What I claim as new is—

1. In a filter-press, the combination of a series of cells, filtering-plates intermediate said cells, each of which is provided with an opening, and a plurality of supply-pipes connected with said cells, said supply-pipes having their discharge ends adjacent the openings in the filter-plates of the cells to which they are connected.

2. In a filter-press, the combination of a series of cells, filtering-plates intermediate said cells each of which plates is provided with an opening, a plurality of supply-pipes connected with said cells, said supply-pipes having their discharge ends adjacent the openings in the filter-plates of the cells to which they are connected, and means for keeping said openings clear or free of material.

3. In a filter-press, the combination of a series of cells, filtering-plates intermediate said cells each of which plates is provided with an opening, a plurality of supply-pipes connected with said cells, said supply-pipes having their discharge ends adjacent the openings in the filter-plates of the cells to which they are connected, and means for keeping said openings clear or free of material, said means comprising a reciprocating bar to which are connected a number of angle-bars.

4. In a filter-press, in combination with apertured filtering-plates, a clearing device for said apertures comprising a bar which is adapted to be reciprocated and which extends through said openings and projections on said bar which move in and out of said openings when the bar is reciprocated.

5. In a filter-press, the combination of a series of cells, filtering-plates intermediate said cells, each of which is provided with an opening near its periphery, and a plurality of supply-pipes connected with said cells and having their discharge ends adjacent the openings in the filtering-plates adjacent the cells to which said pipes are connected.

6. In a filter-press, the combination of a series of rings, filtering-plates intermediate said rings, and plates secured within said rings, said plates being adapted to abut against and brace adjacent filtering-plates.

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

WILLIAM E. BRADLEY.

Witnesses:

ERNEST W. ZOELLER,

WILLIAM H. JEFFRIES.