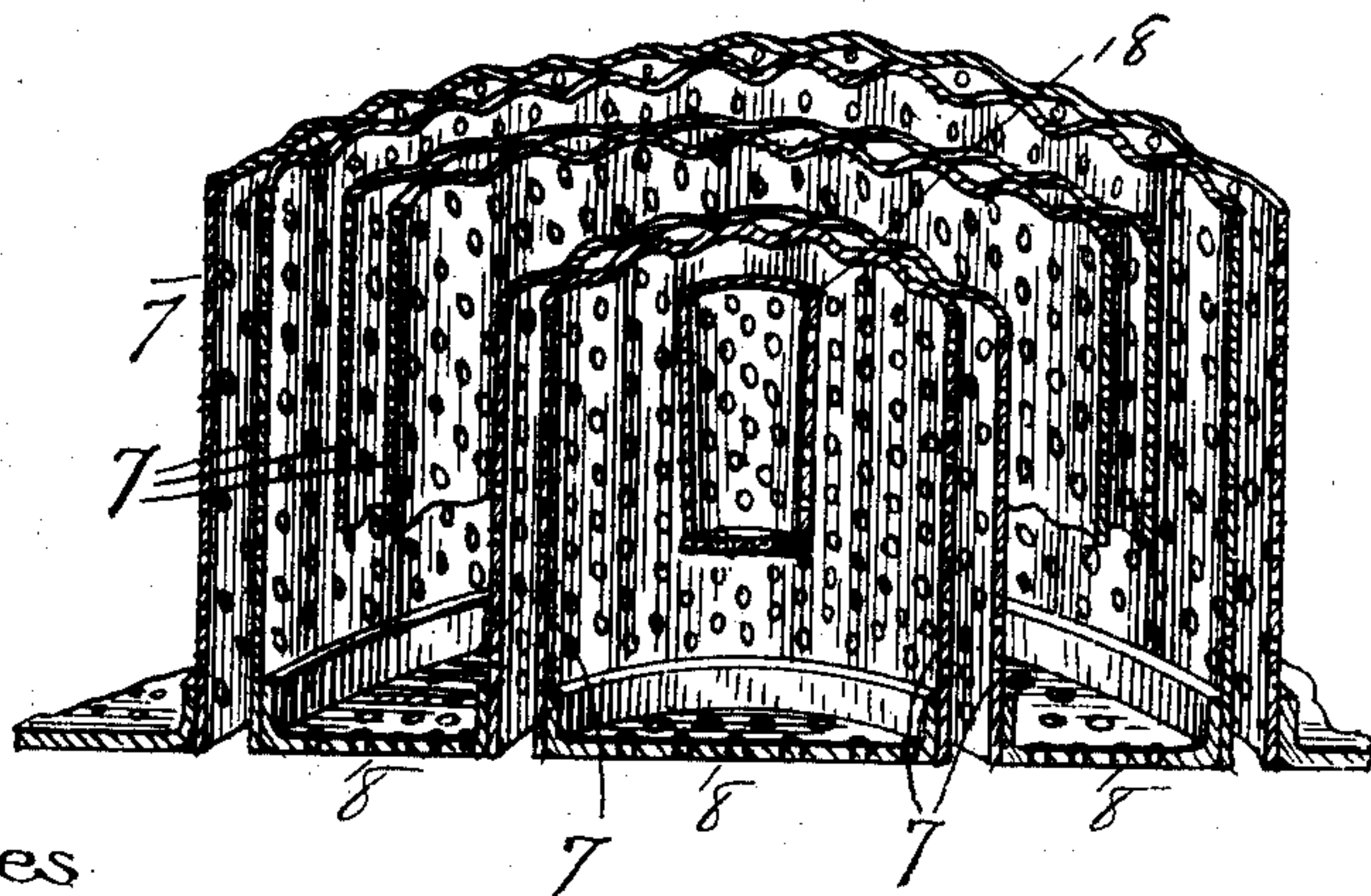
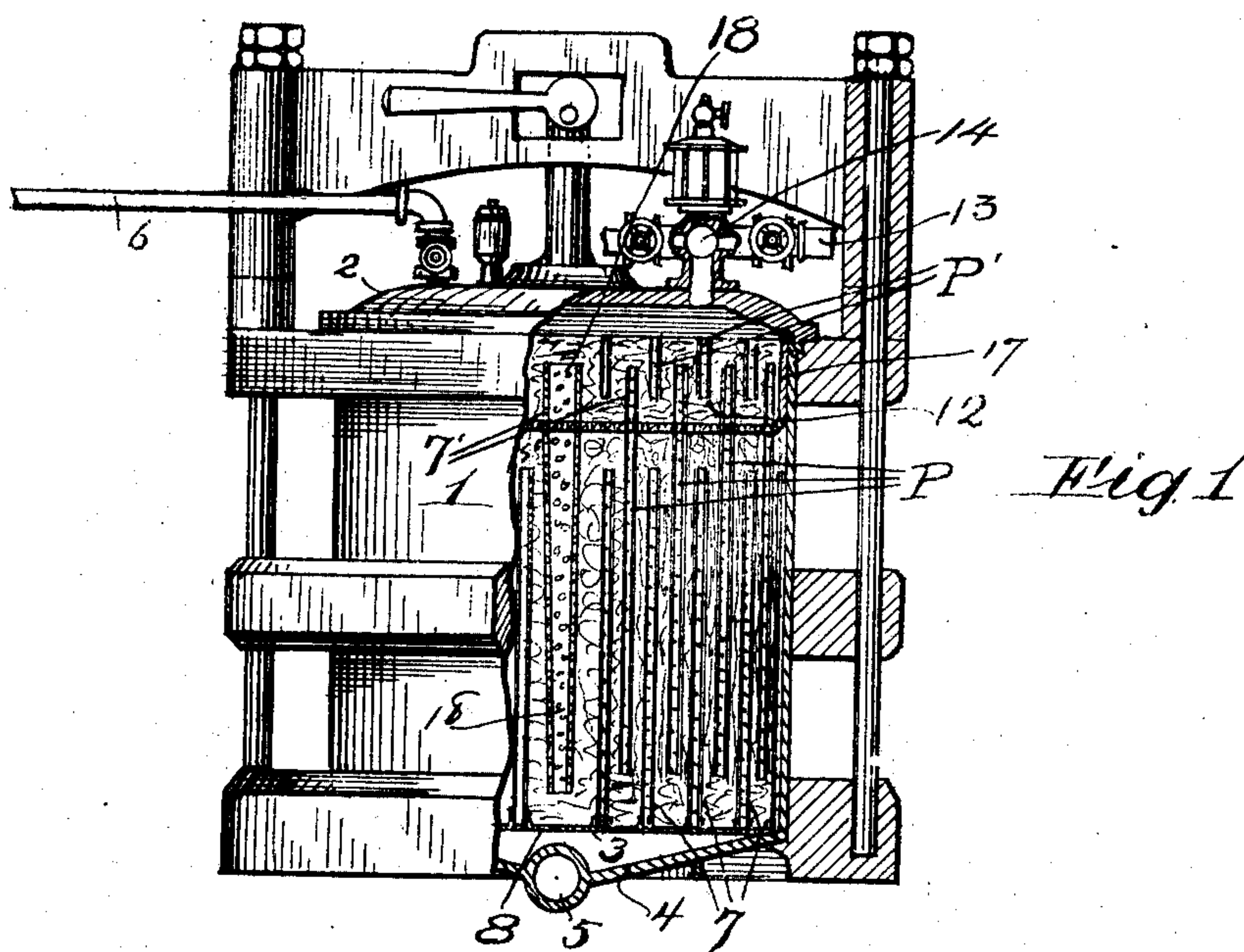


No. 879,197.

PATENTED FEB. 18, 1908.

B. F. SCHIRMER.
FILTER.

APPLICATION FILED SEPT. 18, 1905.



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FILTER.

No. 879,197.

Specification of Letters Patent.

Patented Feb. 18, 1908.

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To all whom it may concern:

Be it known that I, BALDWIN F. SCHIRMER, a citizen of the United States, and resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Filters, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

The objects of the invention are to provide a new and improved device for compressing filter mass or fiber or any soft or compressible material such as pulp or fruit, for the purpose of forcing liquid therethrough or for expressing liquid contained therein, or for compacting the material itself, without the aid of any pressure mechanism. I accomplish these objects by means of a fluid compressing agency and a suitable containing vessel and by means of the circulating passages arranged to enter the mass to be operated upon whereby the compressing agency is introduced with great thoroughness to all portions of an increased surface of the mass treated and an even distribution of pressure is obtained.

I exemplify the invention and the means by which these results are obtained in the device hereinafter described, shown in the accompanying drawings and pointed out in the claims.

In the accompanying drawings Figure 1 is a vertical central section of the device, showing a receptacle and upper and lower filters, and annular and tubular passages through which the pressure fluid is introduced to the treated mass in the filters, and through which the fluids contained therein are expressed; Fig. 2 is a perspective view of broken portions of the annular plates and central tube forming the circulating filter passages, and the bottom plate to which some of them are attached.

In these views 1 is a receptacle having a close cover 2 and inner perforated bottom 3 upon which the mass of material to be treated rests. A bottom 4 slopes centrally toward the outlet opening 5.

A conducting or inlet pipe 6 is inserted at the top of the chamber through which the compressing agency is admitted to the chamber below. This agency is of a fluid character such as a gas under pressure, water or easily vaporized fluids, or spirits and is em-

ployed wholly without mechanical pressure devices of any character.

The pressing or fluid extracting agency enters the chamber from a suitable pressure tank or agency such as a pump under pressure. To obtain a complete and perfect application of the fluid throughout the mass to be treated and to insure that no portion thereof is omitted in the treatment annular perforated plates 7 are inserted in vertically concentric pairs at intervals in the mass of material about a central perforated tube. Annular concentric horizontal perforated plates 8 connect the lower pairs upper pairs of loose annular plates P are then set into the pulp or filter mass, between the lower pairs of plates, and rest upon the mass, and do not extend as far as the bottom plate 8. A central tube, preferably tapering, is then inserted in a similar manner in the central opening formed by the inner plates 7. The substances treated are dense enough to support these loose plates. These plates form annular passages between them which alternately open at the top of the filter to admit the pressure fluid to the interior of the mass, or open at the bottom to discharge the filtered or extracted fluids. These concentric passages formed by the perforated plates do not have any connection with each other, but overlap, so that the fluid passing from one passage to another will traverse a very thin sheet of filter mass, or by its pressure will compress and pack the material and extract the juices or fluids therefrom with greater ease and speed on account of the short distance traversed. A perforated tube 18 fills the central space. At the bottom of the receptacle is shown a discharge pipe 5, provided with a cock or valve, by means of which the filtered or extracted fluid is drawn away.

In use, it will be seen that the greatly increased areas of surface upon which the fluid pressure can act and the unusual area of and facility for discharge increase the flow without decreasing the utility of the device, and the natural gravity of the fluids contained in the mass facilitate their extraction.

The perforated vertical plates are corrugated preferably so that the inwardly extending corrugations only touch, thus forming vertical cells or passages through which the pressing fluid enters.

It has been found that by saturating filter

mass or anything to be compressed or packed, and having a vent below slightly open, mass or pulp, fruit or similar substances, can be compressed and the juice or
5 fluid extracted therefrom with great rapidity, cheaply, and with practically no waste.

This filtering process can be employed with a single or double filter, for instance in Fig. 1 an upper filter 12 can be added at
10 pleasure having similar overlapping passages formed by corrugated walls 7' and P', perforated to permit the fluid to pass through and arranged to admit the pressure fluid to every part of the mass, these rest upon the
15 perforated plate 16, turned upward at its edges at 17. This serves as a primary filter and is sometimes coarser and looser in arrangement, or with some substances such as fruit pulp, can be used as a pressure or pack-
20 ing chamber, the lower chamber being employed to give unusual purity to the extracted juices. This upper filter can be removed readily and the lower filter only employed, and no plate then rests upon the
25 filter mass.

In Fig. 1 at the right of the cover is seen the large inlet pipe 13 for the material to be treated and at 14 is an opening of still larger size through which by reversing the direc-
30 tion of flow of the pressure fluid, and attaching the fluid inlet pipe to the outlet opening, all the filter mass and waste pulp or other filter contents can be washed out. This is a great economy alone, since the time and

labor wasted in removing the wet contents of the filter are considerable.

Having described the invention what I claim as new and desire to secure by Letters Patent is:

In a filter for the purpose described, a receptacle, a perforated inner bottom therefor, an inlet pipe for filter mass or other substance to be treated, an inlet pipe for fluid under pressure, a concentric series of perforated filter plates, secured to said perforated bottom plate and projecting longitudinally into said mass, each pair forming a longitudinal passage between its members, similar pairs of plates alternating with the aforesaid pairs of plates, and loosely inserted
40 in said mass with their extremities at a higher level than the extremities of the fixed plates, a transverse perforated removable plate above said loose filter plates, having upwardly turned sides, a concentric series of
45 pairs of perforated filter plates thereon adapted to extend into the said filter mass, and concentric pairs of loose filter plates inserted in said mass and having their extremities arranged at a higher level than the extremities
50 of the filter plates on said transverse plate, substantially as described.

In testimony whereof I hereunto set my hand this 24th day of August 1905.

BALDWIN F. SCHIRMER.

Witnesses:

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