No. 760,793. PATENTED MAY 24, 1904.

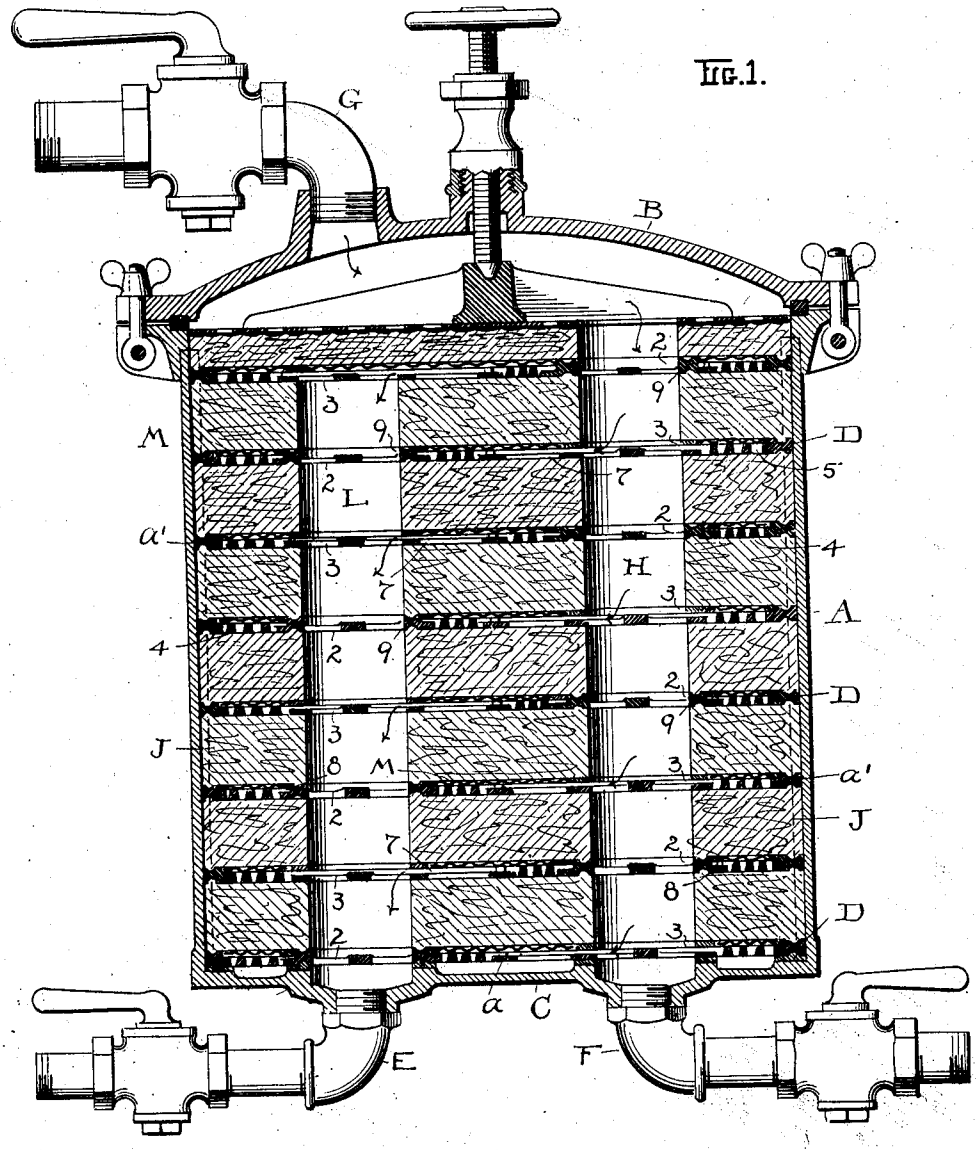
W. B. KLEIN.

FILTER.

APPLICATION FILED JUNE 15, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

FIG. 1.



ATTEST.

R. B. Moses

R. Zbornik

INVENTOR.

William B. Klein

BY H. J. Fisher

ATTY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 760,793. PATENTED MAY 24, 1904.

W. B. KLEIN.

FILTER.

APPLICATION FILED JUNE 15, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

FIG. 2.

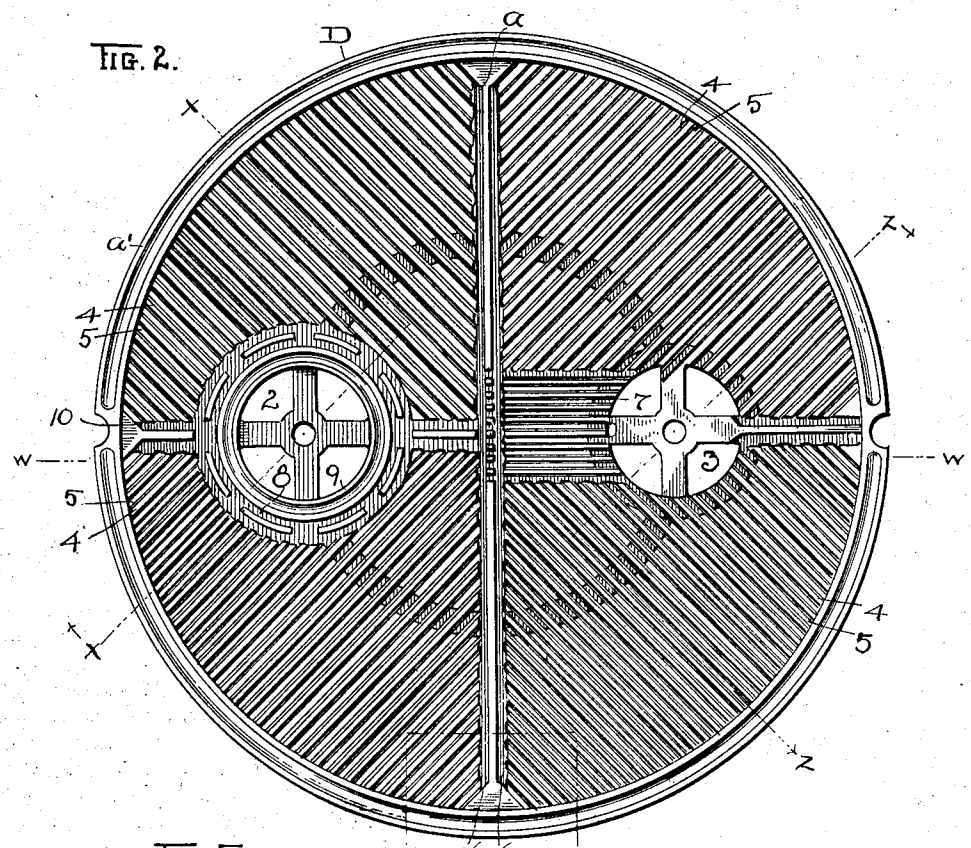


FIG. 5.

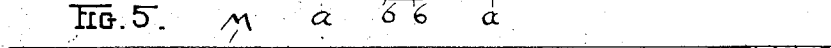


FIG. 3.

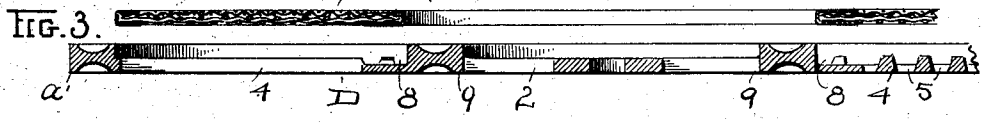


FIG. 4.

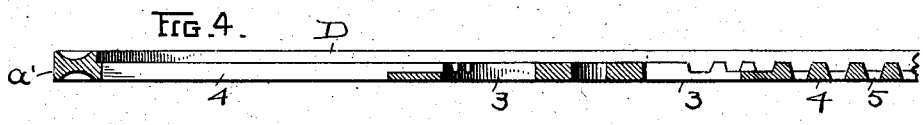
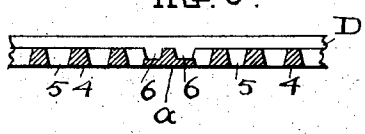


FIG. 6.



ATTEST.

R. B. Moses

R. Ehrnik.

INVENTOR.

William B. Klein

BY H. T. Fisher

ATTY

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 760,793. Patented May 24, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM B. KLEIN, OF CLEVELAND, OHIO.

FILTER.

SPECIFICATION forming part of Letters Patent No. 760,793, dated May 24, 1904.

Application filed June 15, 1903. Serial No. 161,465. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. KLEIN, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Filters; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to liquid-filters; and the invention consists in the construction and combination of parts substantially as shown and described, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional elevation of my new filter. Fig. 2 is a plan view of one of the filtering-plates. Fig. 3 is an enlarged cross-section of the plate on line *x x*, Fig. 2. Fig. 4 is an enlarged cross-section on line *z z*, Fig. 2. Fig. 5 is a cross-section of a portion of the wire mesh, and Fig. 6 is a cross-section on line *a a*, Fig. 2.

A represents the cylinder or casing of the filter, and B the cover therefor, removably fastened down and packed about the edge of the cylinder, so as to be perfectly fluid-tight.

C is the bottom of the cylinder or casing, which is provided with one opening for outlet-pipe E and another opening for water-inlet pipe F, while the cover B has an opening for liquid-supply pipe G. The outlet-opening and the water-supply opening are alike and interchangeable, so that either may be for water according to the last plate used on top—that is, if hole 3 were to come where top hole 2 is now column H would become the beer-outlet.

Internally the filter is provided with a succession of filter-plates D, all of which are exactly alike and arranged one immediately over the other and separated substantially as shown. Intermediate of these plates I pack the filtering material or media J, which may be of any suitable depth, but usually of less depth relatively than herein shown between plates D, and said material may be packed or built up in the filter or compressed in cakes or layers and placed therein. Each plate D is provided with two relatively large openings 2 and 3, respectively, and the said plates are so arranged in respect to each other in the casing from top to bottom that the holes or openings 2 and 3 alternate and that hole 2 of one plate will come over hole 3 of another plate, practically as shown. Together the two sets of holes, with like holes through the filtering mass, constitute two open columns or passages running the entire depth of the filter, top to bottom. It will be seen also that plate D is a grated plate and that it has practically four equal subdivisions or quarters, in which the main ribs or bars 4 run divergently from the median bar or web *a* across the center of the plate between holes 2 and 3. Channels 5 separate the respective ribs 4 over the entire surface of the plate, and said plate is flush over its bottom side, while its top side has a varied construction, as this is its working side. The chief idea of this variance or peculiarity of construction is to promote distribution of the beer or liquid evenly as possible to all parts of the plate or filter. Hence the different lines of distribution for the liquid along channels 5 and the several other channels—as, for example, the side channels 6 in web *a*, from which most of the longer channels lead. Then, again, there are a number of parallel short channels 7 between opening 3 and web *a*, and there are circular channels 8 about the raised wall 9 of opening 2, communicating with the channels 5, running from about said opening 2. A web 10 also connects opening 2 with rim *a'* of the plate on the other side. Rim *a'* of the plate is shown as standing higher than ribs 4, as is also rim or wall 9 about opening 2, and these rims have each one or more depressions or grooves in their top surface, with which filtering material will pack and prevent creeping of the unfiltered beer over said rims before undergoing satisfactory filtration, especially as to rim 9 about hole 2.

By the construction of plates as thus shown and described the said plates contain filtered and unfiltered beer successively and the openings 2 and 3 become inlet and outlet openings alternately. Thus in Fig. 1 the beer enters from above through elbow G and passes down

through opening 2. It cannot pass laterally through said opening into the otherwise open channels 5 between the variously-disposed ribs 4, constituting the body of the plate, because wall 9 about opening 2 prevents such passage. It follows also that liquid running in through opening 2 can only get out by traversing a portion of the filtering mass either about said opening 2, in order to reach the channels of the same plate next behind wall or rim 9 at this entrance-point, or by going down to opening 3 in plate D and following the channels therein leading over toward the opening 2 of said plate; but once here the beer cannot pass out through wall 9 and so has to seek outlet through the filtering material about said wall above and below. The same experience recurs at each and all of the several plates from top to bottom, and the beer which enters channels 5 around wall 9 of each alternate plate top to bottom, beginning with the top plate of the series here shown, must pass through the filtering mass above and below said wall; but once it enters channels 5 by this route it has comparatively free passage thence to outlet-passage 3 along the channels leading thence, as shown. A closely-woven wire mesh M is laid over the top of each plate D and serves as a filtering-screen and guard for keeping the filtering material out of the liquid-channels.

The water connection F below is for the purpose of cleansing the filter by a flow of water through the same after it has been packed and made for use, and it serves to wash all the loose fibers and sediment from the outlet or beer side of the filter, so that when beer or other liquid goes through the filter it will come clear at the start.

What I claim is—

1. As a new article of manufacture, a filter-plate of a grated pattern having variously-disposed channels adapted to distribute liquid to all parts of the plate and provided with separate inlet and outlet openings through the plate, one of said openings having a close wall about the same and the other directly open to said liquid-distributing channels, substantially as described.

2. A grated plate for liquid-filters having a transverse web and divergent ribs and intervening liquid-channels running from said web to the rim of the plate, and two openings down through the plate, one of said openings closed to said channels and the other open thereto about its edge, substantially as described.

3. The plate substantially as shown, having alternate ribs and channels and two circular openings through the same, and one of said openings having a wall about the same extending above the plane of said ribs, substantially as described.

4. A filter-plate of the grated variety, the said plate having a rim and two circular openings and ribs between the rim and openings, the bottom surface of said plate being flush, and the top surface of said ribs on one plane and the top surface of said rim and the wall about one of said openings on a higher plane, substantially as described.

5. The filter-casing and the plates therein and filtering material between the plates, said plates having each a walled opening and a plain opening, and the said openings alternating one over another with the different plates, substantially as described.

6. The casing and the plates and filtering material alternating therein, said plates and material having corresponding openings down through the same, whereby inlet and outlet passages are produced from top to bottom of the filter, the said plates having alternate ribs and channels and one opening of each plate having a wall about the same higher than said ribs and the other opening exposed directly to said channels, substantially as described.

Witness my hand to the foregoing specification this 1st day of June, 1903.

WILLIAM B. KLEIN.

Witnesses:
R. B. MOSER,
R. ZBORNIK.