

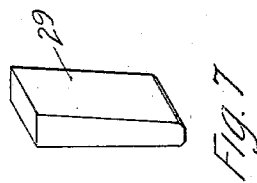
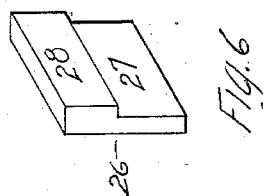
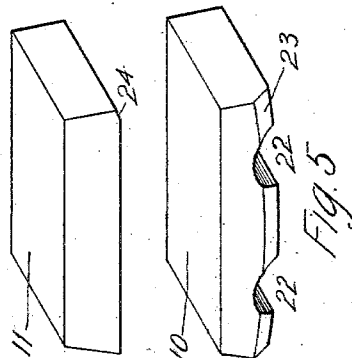
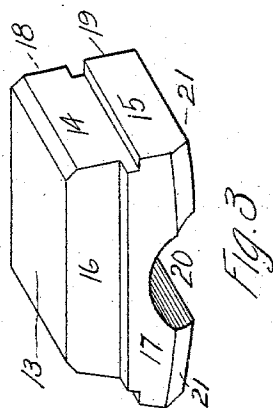
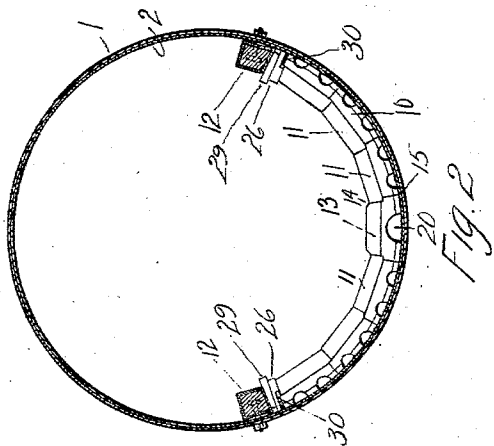
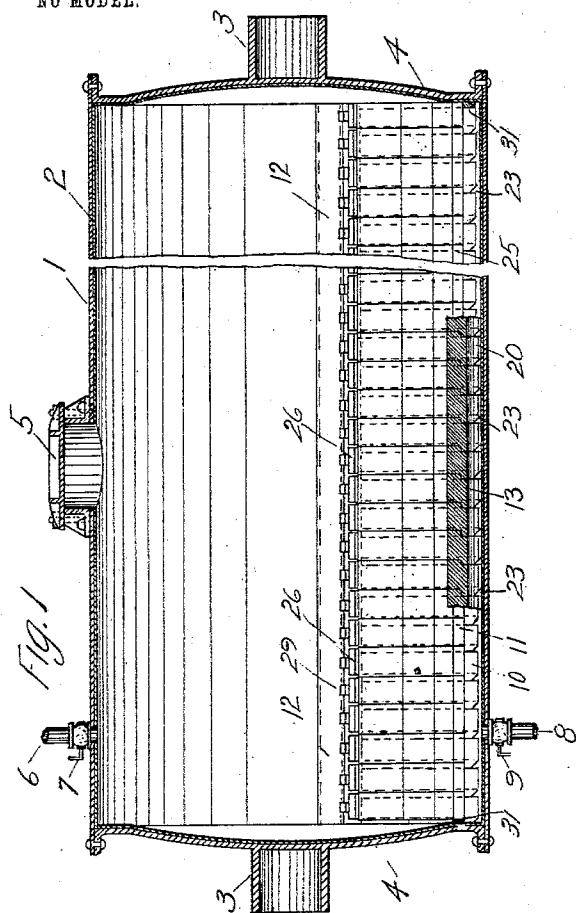
No. 740,193.

PATENTED SEPT. 29, 1903.

E. D. SLOAN.
BARREL FILTER.

APPLICATION FILED FEB. 17, 1903.

NO MODEL.



WITNESSES
E. A. Lee
E. C. Johnson

Edward D. Sloan
INVENTOR
Johnson & Johnson
BY his ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD D. SLOAN, OF DENVER, COLORADO.

BARREL-FILTER.

SPECIFICATION forming part of Letters Patent No. 740,193, dated September 29, 1908.

Application filed February 17, 1903. Serial No. 143,802. (No model.)

To all whom it may concern:

Be it known that I, EDWARD D. SLOAN, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Barrel-Filters, of which the following is a specification.

My invention relates to filters for chlorination-barrels, and has for its object to provide an improved, simplified, and cheap construction of such filters.

To these ends it consists in the various features of construction and arrangement of parts hereinafter more particularly described.

Referring to the drawings, Figure 1 is a central vertical longitudinal section of a chlorination-barrel, showing the key-blocks of the arched filter-bed removed for a distance from each end and a few in section in the middle of the barrel. Fig. 2 is a vertical transverse section of the same. Fig. 3 is an isometric perspective of the filter key-block. Fig. 4 is an isometric perspective of one of the filter-bed blocks of the top layer. Fig. 5 is an isometric perspective of one of the filter-bed blocks of the bottom layer. Fig. 6 is an isometric perspective of one of the wedge-blocks. Fig. 7 is an isometric perspective of one of the key-wedges.

The chlorination-barrel 1 is preferably made of metal and is lined on the inside with some acid-resisting material 2, such as lead. It is supported upon the end trunnions 3, which, as here shown, are cast integral with the barrel-heads 4, and is provided with means (not shown in the drawings) for rotating it upon its trunnions. A manhole 5 is provided for the ingress of the pulp and discharge of the tailings.

In the top of the barrel is a water-inlet pipe 6, provided with a cock 7, and in the bottom of the barrel is a pipe 8, provided with a cock 9, for the discharge of the filtered solution.

My improved filter comprises a bottom layer 10 and a top layer 11 of porous blocks arranged along the "bottom" of the barrel between two longitudinal side rails 12 and circumferentially in an arch on either side of a median row of key-blocks 13. The key-blocks 13, as seen in Fig. 3, are of oblong dimensions and convex on their bottom from end to end, so as to conform to the inner cir-

cumference of the barrel. The upper portion 14 of each end surface is cut away, leaving the lower portion 15 protruding, so that when the filter-blocks are arranged with their ends abutting against the ends of the key-blocks the top layer of filter-blocks 11 will reach over the abutting edges of the bottom layer of filter-blocks 10 and the lower protruding surface 15 of the key-block (see Fig. 2) and break the joint for a purpose presently explained. The upper portion 16 of one side surface is cut away, leaving the lower portion 17 protruding, and the upper portion 18 of the end surface is cut away, leaving the lower portion 19 protruding, so that when the blocks are laid side to side along a median longitudinal line at the bottom of the barrel the protruding portion of one block will fit into the cut-away portion of the next adjacent block, and thus break the joints between the key-blocks. A central transverse groove or channel 20 is cut into the bottom of each key-block, and when the blocks are arranged in a row, as stated, these grooves will meet and form a central longitudinal channel, from the bottom of which the filtered solution is discharged through the pipe 8. One of the bottom side edges of each key-block, preferably that side which protrudes at its lower portion, is beveled to form transverse channels 21, leading into the central or main longitudinal channel 20 from the channels 23, hereinafter described, beneath the filter-beds on either side of the row of key-blocks.

The filter-blocks 10, Fig. 5, which form the bottom layer, are of the general shape and size of common building-brick. They are flat on top; but their bottom is convex from end to end, so as to conform to the inner circumference of the barrel against which they are laid. Two parallel transverse grooves or gutters 22 are formed in the bottom of the blocks and one longitudinal bottom edge 23 is beveled, so that when the blocks are laid end to end between the side rails 12 and the key-blocks 13 and side by side between the ends or heads of the barrel these grooves 22 will meet and form the side longitudinal channels, and the beveled edges 23 will meet from block to block in the endwise rows and also meet the transverse channel formed by the beveled bottom edge of the abutting key-block forming trans-

verse channels 23, intersecting the side longitudinal channels and leading into the main central longitudinal channel.

The filter-blocks 11, which form the top layer of the filter, are of the general shape and size of the blocks of the lower layer and are perfectly flat on the top and for nearly the whole surface of the bottom. At one end the bottom surface is slightly beveled at 24 for a purpose presently explained. In laying the blocks of this top layer it is essential that they break the joints of the bottom layer, and for this purpose the upper portion of each key-block is cut in, as before stated, so as to allow the ends of the abutting top blocks to extend over and break the joint between the key-block and the bottom blocks. The top and bottom blocks are of the same size, so that when the second top block is laid endwise between the key-blocks and side rail one end will extend over and break the joint between the two bottom blocks below, and so on, the top blocks extending over the joints of the bottom blocks.

The beveling of the bottom of the top block at 24 at one end allows the blocks of the top layer to lie flat upon the blocks of the bottom layer even though the blocks are arranged as an arch around the inner circumference of the barrel.

To break the joints between the sides of the blocks of the bottom layer, the blocks of the top layers are laid or arranged so that on one side they extend over the joints between the bottom layer blocks, as shown in Fig. 1, wherein the dotted lines 25 represent the joints between the blocks of the bottom layer.

The ends of the key-blocks and the blocks of the top and bottom layers of the filter-bed are slightly beveled or inclined inward toward their top to conform to any given radii of a cross-section of the filter-barrel, so that the joints between the ends of the blocks may fit tight.

To hold the filter in place between the side rails 12, a wedge-block 26, Fig. 6, is placed between the side rail and the abutting ends of the transverse rows of filter-blocks 10 and 11, the lower reduced part 27 of the wedge-block bearing against the end of the adjacent blocks 10 in the bottom layer and the thick portion 28 of the wedge-block bearing against the ends of the adjacent blocks 11 of the top layer. Between these wedge-blocks 26 and the side rail 12 a wedge 29 is interposed and driven so as to bind and hold the blocks of the filter firmly against the barrel. The wedges, wedge-blocks, and end packing-strips may be made of hard wood and boiled in paraffin or oil or if greater permanence is desired may be covered with lead, like the side rails 12.

A rubber packing-strip 30, Fig. 2, is interposed between the wedge-blocks 26 and the ends of the filter-blocks 10, so as to seal the ends of the transverse channels 23, formed by the beveled bottom side edge of the filter-blocks 10.

To prevent endwise displacement of the filter-bed and also to seal the ends of the side longitudinal channels, I provide a packing 31, preferably composed of wooden strips, which at one end of the barrel is placed between the end wall or head of the barrel and the sides of the blocks 10 of the bottom layer and at the other end of the barrel is placed between the end wall or head of the barrel and the sides of the blocks 11 of the top layer. By thus placing the packing-strips 31 against the sides of the blocks of the top layer at one end of the barrel and against the sides of the bottom layer blocks at the other end of the barrel the side joints of the top and bottom layer blocks are broken.

The blocks of the filter-bed may be made of any material which is sufficiently porous to allow the ready passage therethrough of the solution and at the same time resist the action of the chemicals of the solution. Common brick, lava stone, or tile are very satisfactory.

Not only is the solution filtered through the individual filter-blocks, but it is also very effectively filtered by passing through the many joints made between said blocks, and by using comparatively small blocks I secure the advantage of the great number of joints, which are themselves filtering-passages.

In operating under one well-known process the ore, chemicals, and water being introduced into the barrel through the manhole and all the openings tightly closed the barrel is then revolved on its trunnions until its contents is thoroughly mixed. It is then stopped at such a position that its filter-bed is down. The stop-cock 9 is then opened, and the solution is forced by gravity or by reason of pressure caused by water being forced into the barrel through valved cock 6, Fig. 1, through the pores of the filter-blocks and also through the joints between them and in so passing through is thoroughly filtered, the clear liquid finding its way through the many channels heretofore described into the main or central longitudinal channel 20 and thence out through the discharge-pipe 8. This operation is continued until there is no trace of values in the filtered solution, when the barrel is turned, with the manhole down, through which the valueless tailings are discharged, and the barrel is ready for another charge.

I claim—

1. In a barrel-filter, the combination with the barrel, of a partial lining of porous filter-blocks fitting closely together and having grooves formed on their under sides which interconnect from block to block and form drain-channels; means for sealing said drain-channels from the inner space of the barrel, and a discharge-port leading from the drains out of the barrel, substantially as described.

2. In a barrel-filter, the combination with the barrel, of two superposed layers of porous blocks arranged along the bottom and

from end to end of the barrel and circumferentially in an arch on either side of a median row of porous key-blocks, so that the interstices between the blocks of the lower layer are broken by the blocks of the upper layer.

3. A barrel-filter comprising, a layer of porous blocks lying against the inner side of the barrel, drains or channels formed in the under sides of the blocks and lying next the barrel and intersecting and interconnecting from block to block and sealed against the interior space of the barrel and a discharge port from said drains or channels, substantially as described.

4. The combination with a filter-barrel having diametrically-opposed ingress and discharge openings, of a filter interposed between said openings comprising a layer of closely-abutting porous blocks having grooves on one side which meet from block to block to form a chamber between the filter and discharge side of the barrel, substantially as described.

5. A barrel-filter comprising a longitudinal transversely-arched layer of a multiple of closely-abutting porous blocks having grooves which meet from block to block on the outer circumference of the arched layer, substantially as described.

6. In a barrel-filter comprising a longitudinal transversely-arched layer of a multiple of closely-abutting porous blocks having surface grooves which meet from block to block on the greater circumference of the arched layer, key-blocks of said arch of oblong dimensions, concave on their bottom from end to end, the upper portion of each end cut away leaving the lower portion protruding,

the upper portion of one and the lower portion of the other side surface cut away leaving the lower and upper portions respectively protruding, one bottom side edge beveled and a transverse groove in its concave bottom, substantially as described.

7. In a barrel-filter comprising a longitudinal transversely-arched layer of a multiple of closely-abutting porous blocks having surface grooves which meet from block to block on the greater circumference of the arched layer, the side arch-block being of oblong dimensions, flat on top, convex from end to end on the bottom, one bottom side edge beveled and transverse grooves in its convex bottom, substantially as described.

8. In a barrel-filter comprising a longitudinal transversely-arched double layer of a multiple of closely-abutting porous blocks the blocks of one layer having surface grooves which meet from block to block on the greater circumference of the arched double layer, the blocks of the other layer which form the lesser circumference of the arch being of oblong dimensions, flat on top and flat for nearly the whole surface of the bottom and beveled at one bottom end edge, substantially as described and for the purpose stated.

9. A barrel-filter composed of grooved interlocking blocks of porous brick, tile or lava stone capable of resisting the action of acid solutions, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD D. SLOAN.

Witnesses:

EDWIN N. HAWKINS,
M. LAWS.