No. 610,596. Patented Sept. 13, 1898.

R. AYMER & D. J. NEVILL.

FILTER FRAME.

Application filed Jan. 20, 1898.

(No Model.)

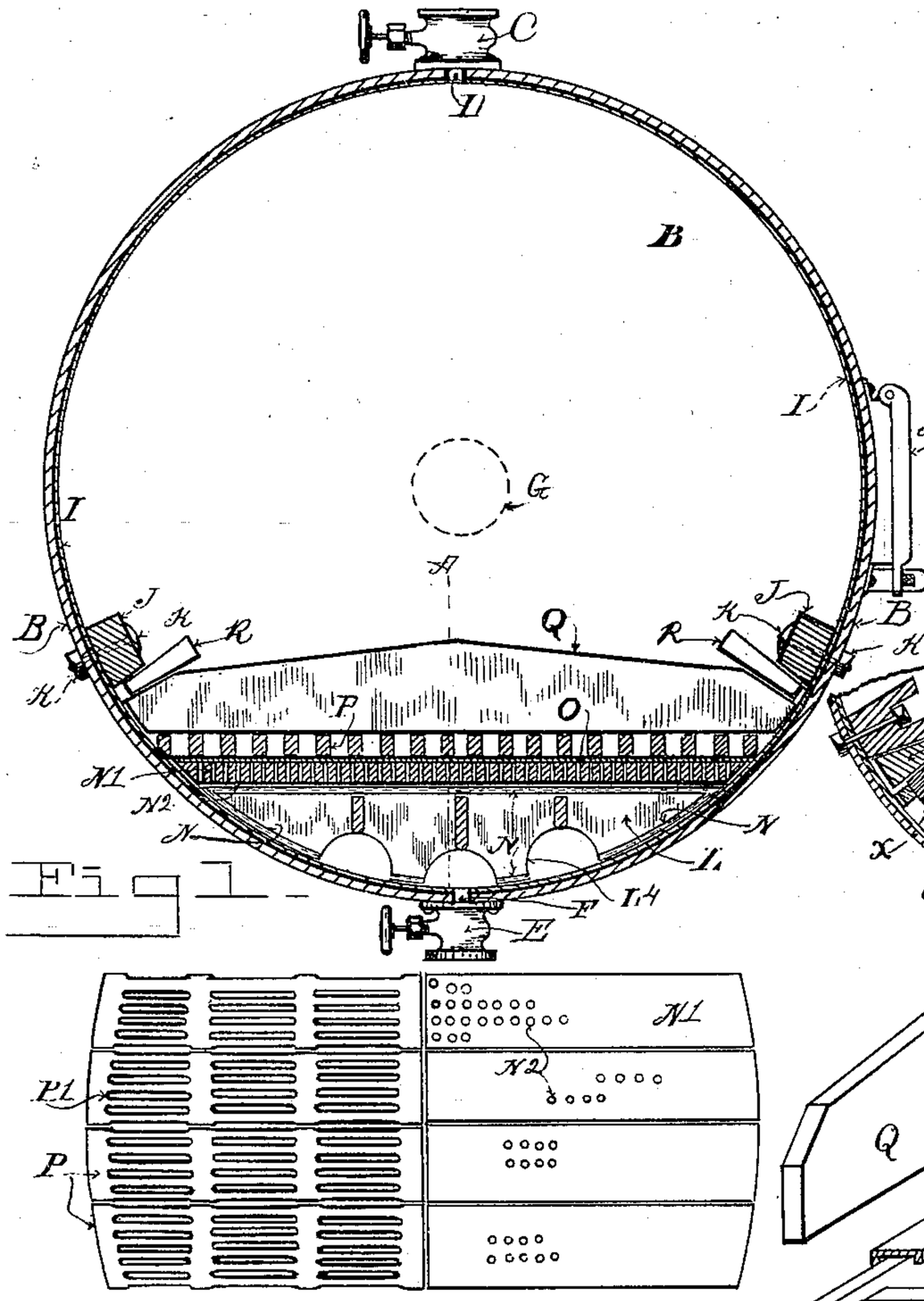

Fig 1.

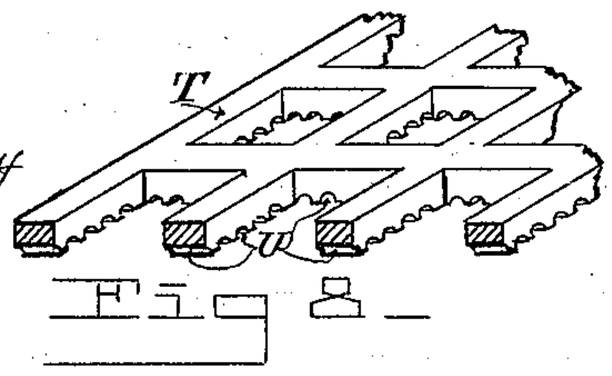

Fig 8.

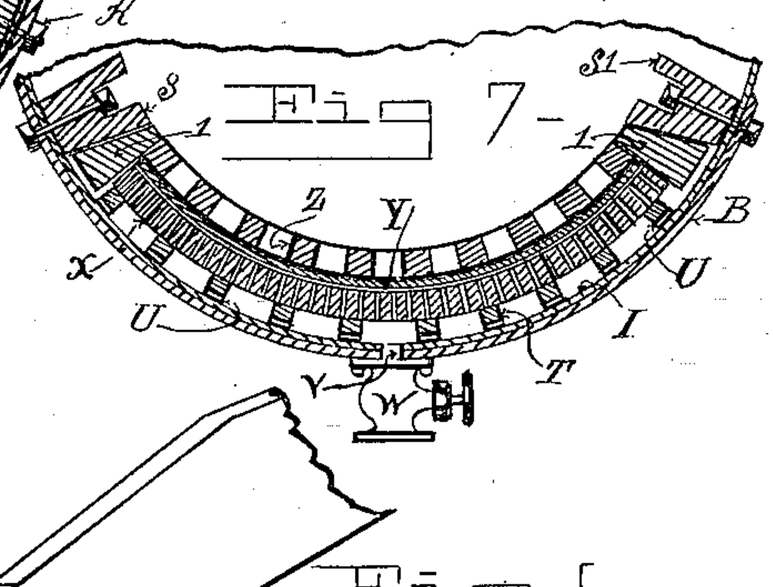

Fig 7.

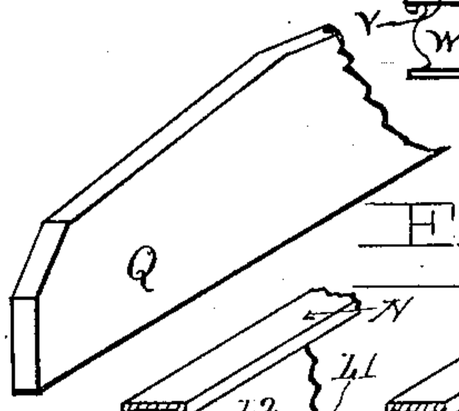

Fig 6.

Fig 3.

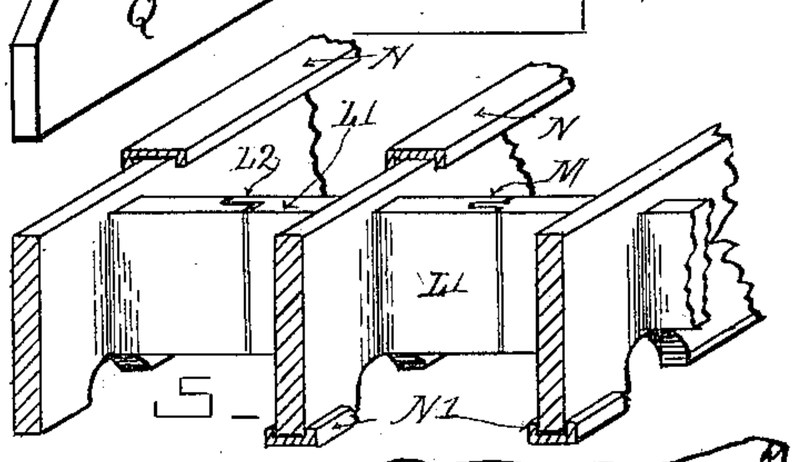

Fig 4.

Fig 5.

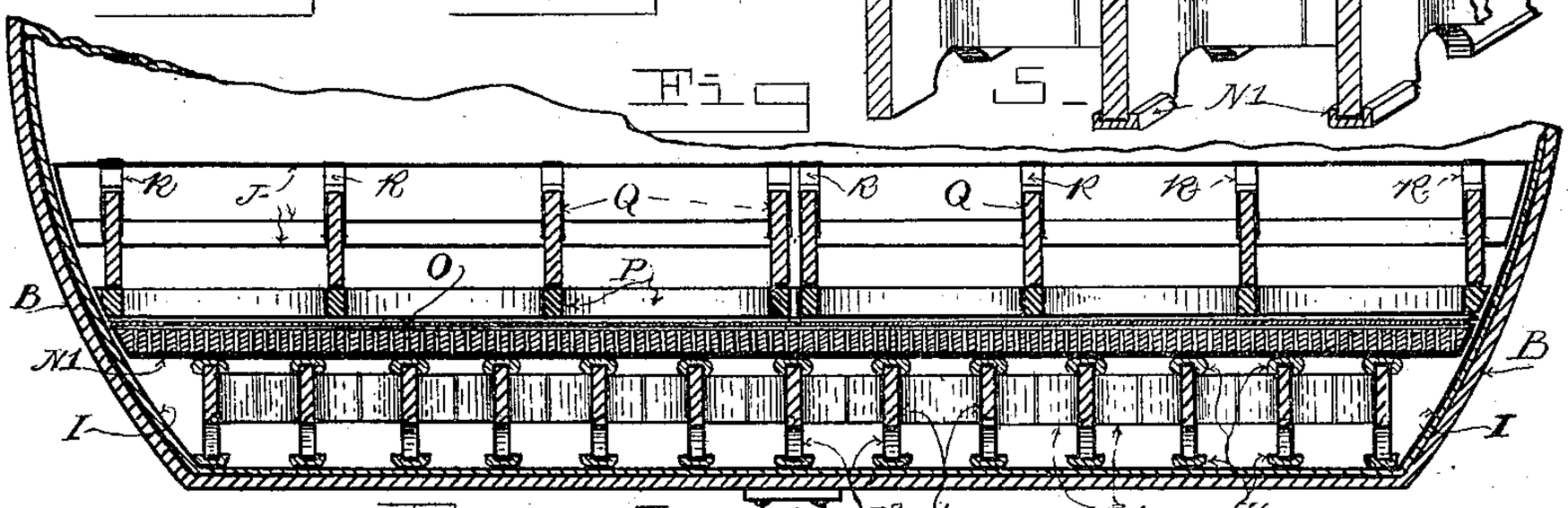

Fig 2.

Witnesses
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UNITED STATES PATENT OFFICE.

ROBERT AYMER, OF COLORADO CITY, AND DAVID J. NEVILL, OF DENVER, COLORADO.

FILTER-FRAME.

SPECIFICATION forming part of Letters Patent No. 610,596, dated September 13, 1898.

Application filed January 20, 1898. Serial No. 667,320. (No model.)

To all whom it may concern:

Be it known that we, ROBERT AYMER, a citizen of the United States of America, residing at Colorado City, in the county of El Paso, and DAVID J. NEVILL, a citizen of Great Britain, residing at Denver, in the county of Arapahoe, State of Colorado, have invented certain new and useful Improvements in Filter-Frames; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in filter-barrels for filtering solutions containing precious metals, and particularly for use in the chlorination process of treating ores.

The objects of our invention are, first, to provide a filter-frame constructed of glass or any acid-resisting material, such as porcelain; second, to provide a filter-frame constructed of glass or porcelain and adapted to be removably secured in a rotatable filtering-barrel, and, third, to provide a strong and simply-constructed glass filter-frame that can be placed in the filter-barrel and removed therefrom at the will of the operator through a manhole.

We attain these objects by the mechanism illustrated and described in the accompanying drawings, in which—

Figure 1 represents a transverse cross-section of a filter-barrel with a filter and filter-frame arranged therein embodying our invention. Fig. 2 is a longitudinal cross-section through line A of Fig. 1 and a fragment of Fig. 1. Fig. 3 is a plan view of the grating. Fig. 4 is a plan view of the filter-bed. Fig. 5 is a perspective view of the supporting-framework of the filter-bed. Fig. 6 is a perspective view of a fragment of one of the binding-ribs. Fig. 7 is a section through a filter-barrel, showing a modified arrangement of the filter-frame; and Fig. 8 is a perspective view of the supporting-mat of the filter-bed of Fig. 7.

Similar letters of reference refer to similar parts throughout the several views.

Referring to Fig. 1, B designates an iron barrel, usually from three to six feet in diameter and from six to ten feet long.

C is a valve controlling the inlet-passage D.

E is a valve controlling the outlet-passage F.

G is a trunnion, one being placed at each end of the barrel concentric with its axis.

H is a manhole for entrance to the barrel.

I designates a lining, of lead, which we place entirely over the inner periphery of the barrel.

J is a cleat, of glass or porcelain, lead or wood, bolted lengthwise of the barrel to its sides by bolts K.

Transversely across the bottom of the barrel we arrange a plurality of supporting-beams L, which are constructed of glass. These beams we preferably make independent of one another. Each beam, however, is provided with laterally-extending wings L′, with rabbeted terminal ends L^2 or with a groove in the end of one lateral extension and a tongue in the opposite direction, as illustrated in Fig. 5 at M. This makes each beam independent of the others and enables the sections to be taken out of the filter-barrel or inserted through the manhole and also enables a frame to be made of various widths for different-sized filter-barrels. Through the lower edge of the beams we form several semicircular notches L^3, which form passages along the bottom of the filter-barrel for the filtered solutions to the outlet-passage. Upon the top and bottom edges of each beam we place a rubber strip N, which acts as a yielding seat for the beams and prevents rapid wear of the edges of the beams as well as of the lead lining. These beams extend entirely across the bottom of the filter-barrel. Upon the top of these beams we place a glass bed-plate N′, which extends entirely across the bottom of the barrel and is fitted quite snugly to its sides. This glass bed-plate is full of

small holes N² of about three-eighths of an inch in diameter and placed as close together as the strength of the material will allow with the duty to be performed and the weights to be borne. This filter-bed is made in sections of suitable size for easy admittance to the barrel through the manhole, and it acts as a support for the filter O, which is composed of a piece of asbestos cloth or burlap, or it may consist of a finely-perforated lead plate or of any other suitable filtering material. This filter extends completely across the barrel and closely against the sides of the barrel. Upon the top of this filter we place a grating P, also of glass. This grating comprises a slab of glass with its surface thickly perforated with elongated holes P′, as shown in Fig. 3. The grating is made in sections, and each section is made small enough to pass through the manhole, and the grating extends entirely over the filtering material and fits against all sides of the barrel and prevents the filtering material's frictional contact with the ore. In order to bind the several parts of the filtering-frame together, we place a number of glass deck-beams Q over the grating, spacing them a short distance apart, and slope their top edges to extend under the cleats and leave a space in which is fitted a wedge R, by which the several parts are wedged tightly against the barrel. The several parts of the filter-frame are thus keyed rigidly to the barrel and are wedged tightly together, and there is no danger of their displacement and disarrangement as the barrel rotates.

In Fig. 7 we illustrate a modified arrangement of the filtering device and of the use and adaptability of glass as a material for a filter-frame of this form of construction as well as of any adapted for a filter-frame. In this arrangement S and S′ are cleats of glass similar to those shown in Fig. 1. They are also bolted to the barrel. The bolt-heads are recessed into the glass and may be covered and protected from the action of the acids by filling the recesses with a suitable cement. T designates a bed-mat, preferably of rubber, although this plate could also be made of glass, if desired. This bed-mat is of equal thickness, perforated evenly throughout its surface to allow the filtered solutions to pass to the lining of the barrel, and in order to allow the solution to flow under the mat we form the side of it that lies against the lead lining with corrugations U, as shown in Fig. 8. By this arrangement the filtering solution has free passages to the discharge-outlet V, which is controlled by a valve W. Upon this rubber mat we place a perforated glass bed-plate X, which is curved to fit the curve of the barrel and bear evenly on the mat. Over the surface of the glass bed-plate we place a filtering-diaphragm Y and upon this a grating Z, curving it to lie flat and rest evenly over the surface of the filtering material. We then drive wedges *l* between the cleats and the ends of the glass perforated bed-plate and the grating, which key and wedge the filter-frame against the lining of the barrel. In this arrangement the deck-beams are dispensed with. The filter-barrels are mounted on trunnions or rings and are arranged to be rotated. They are charged with ore-pulp and sulfuric acid, chlorid of lime, and water, and then rotated with the charge from three to four hours. The inlet-valve is then connected to a supply of air or water under pressure, and the metallic solution is forced through the filter and its frame and discharges through the outlet-valve. The acids attack and destroy all iron, wood, and many other materials. Rubber and lead will, however, withstand their action, but are too expensive to construct the entire filter-frame of. Glass is by far the best material, as it is capable of being molded accurately in the various parts of the filter-frame and is much cheaper than either lead or rubber, as rubber, if used, must be pure.

While we have shown two slightly-different arrangements of filter-frames constructed of glass, we do not wish to be limited to the use of glass or porcelain or a vitreous material or to any particular character of construction of filter-frame or arrangement, but claim the right to the exclusive use of material of this character, and especially of glass, with any form of construction, although preferably with the construction and arrangement of filter-frame shown. We preferably use glass, as it is cheaper than porcelain and is the better material of the two.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with the filtering-barrel, of a frame composed of independent glass beams fitting a segment of the inside of a filter-barrel having laterally-extending wings with rabbeted ends or tongues and grooves interlocking with one another and having through their lower edges passages for the filtering medium and a rubber cushion on each edge of each beam of said frame, with a glass perforated bed-plate resting on said glass frame, a filtering-diaphragm of any suitable material resting on said glass bed-plate, a glass grating resting on said filtering medium and means for removably securing the several parts in operative relation in said barrel, substantially as described.

2. In a filter-barrel, the combination of a rubber grating having a corrugated surface in contact with the curved inner lining and periphery of said filter-barrel adapted to allow the filtering solutions to run along and down the lining of said barrel, a perforated bed-plate of glass or porcelain curved concentric with the inner periphery of said barrel and

resting on said rubber grating, a filtering medium on said glass bed-plate, a curved glass grating resting on said filtering medium, two oppositely-disposed cleats secured lengthwise of said barrel to its inner periphery adjacent to the ends of said curved glass bed-plate and grating and wedge-keys between said ends and said cleats adapted to key said members against the barrel, substantially as described.

In testimony whereof we affix our signatures in presence of witnesses.

ROBERT AYMER.
DAVID J. NEVILL.

Witnesses:
C. A. SHEETZ,
C. W. BLANEY.
BESSIE THOMPSON,
MELVIN E. PETERS.