

No. 881,451.

PATENTED MAR. 10, 1908.

M. ALTOLAGUIRRE & J. ZUBILLAGA.

APPARATUS FOR REMOVING FOREIGN SUBSTANCES FROM LIQUIDS.

APPLICATION FILED SEPT. 30, 1907.

2 SHEETS—SHEET 1.

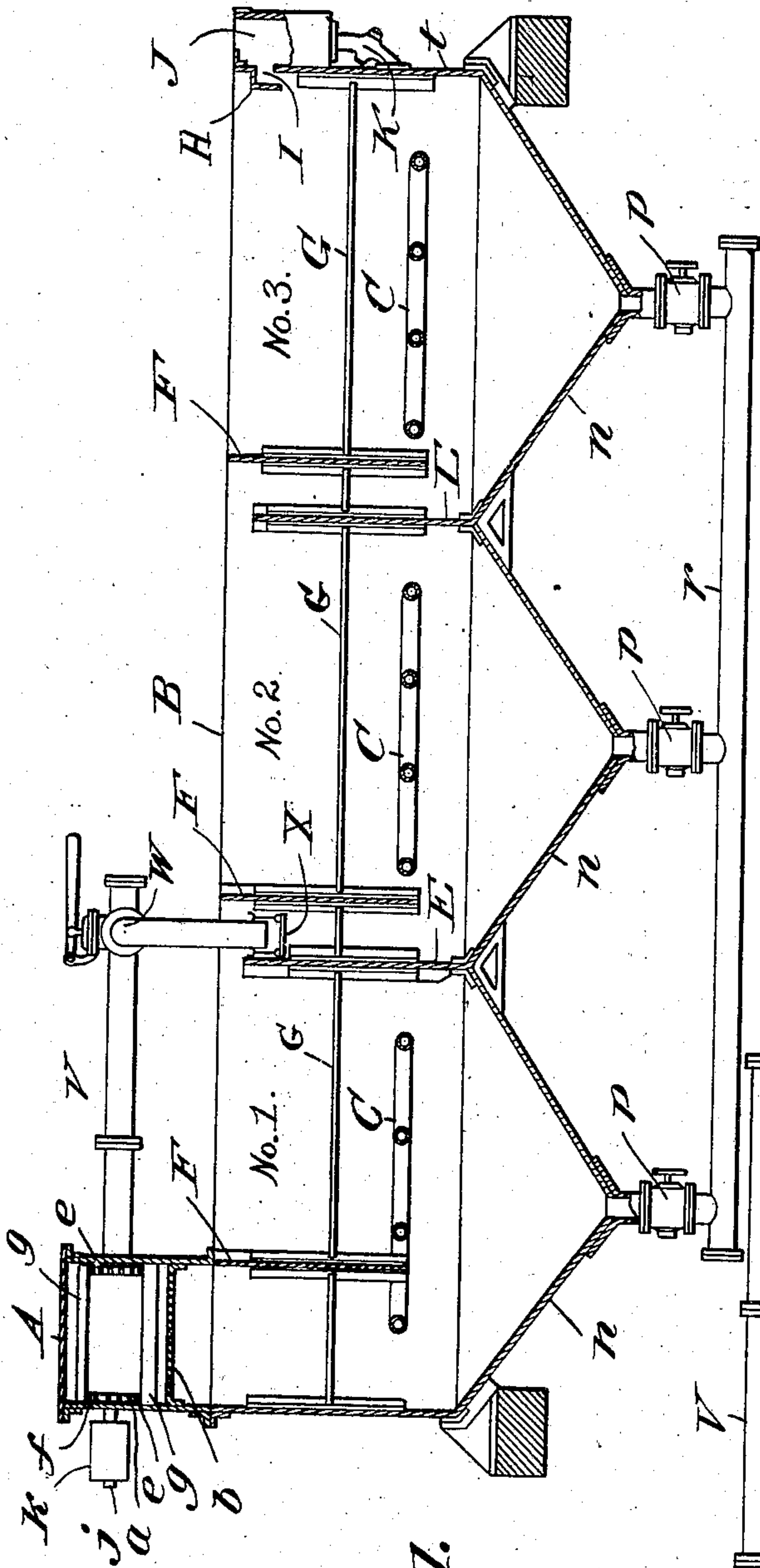


Fig. 1.

WITNESSES

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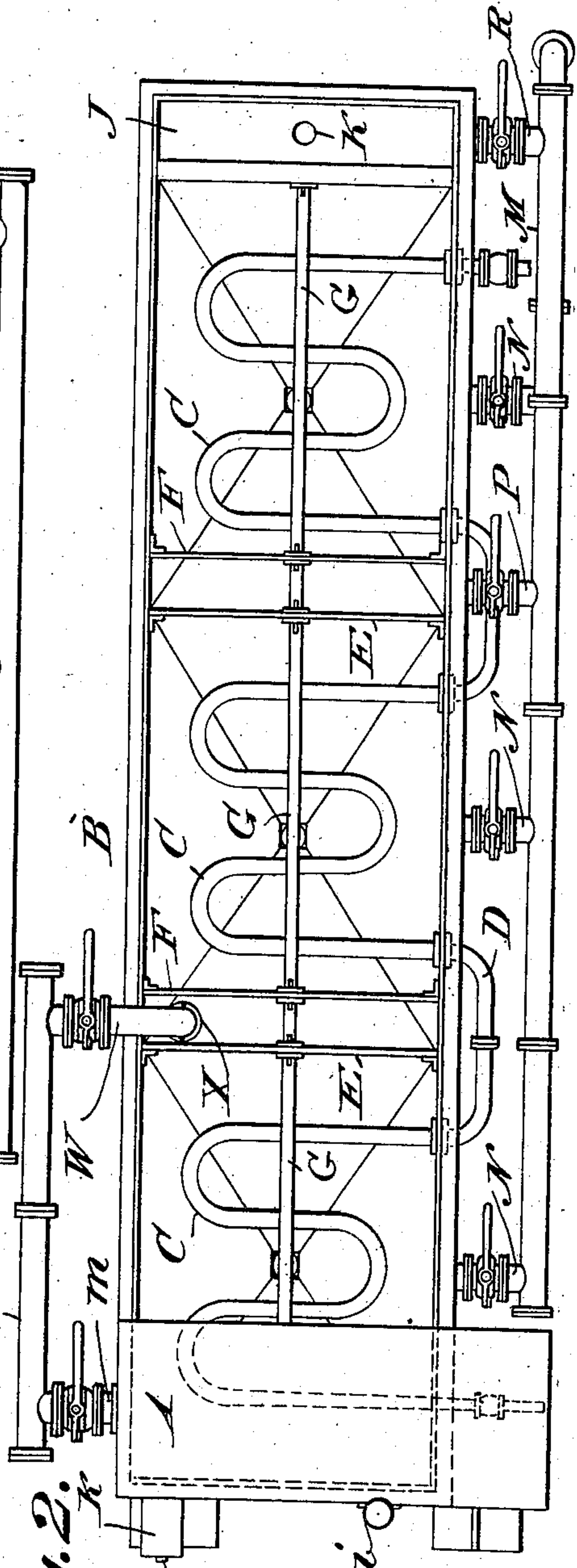


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

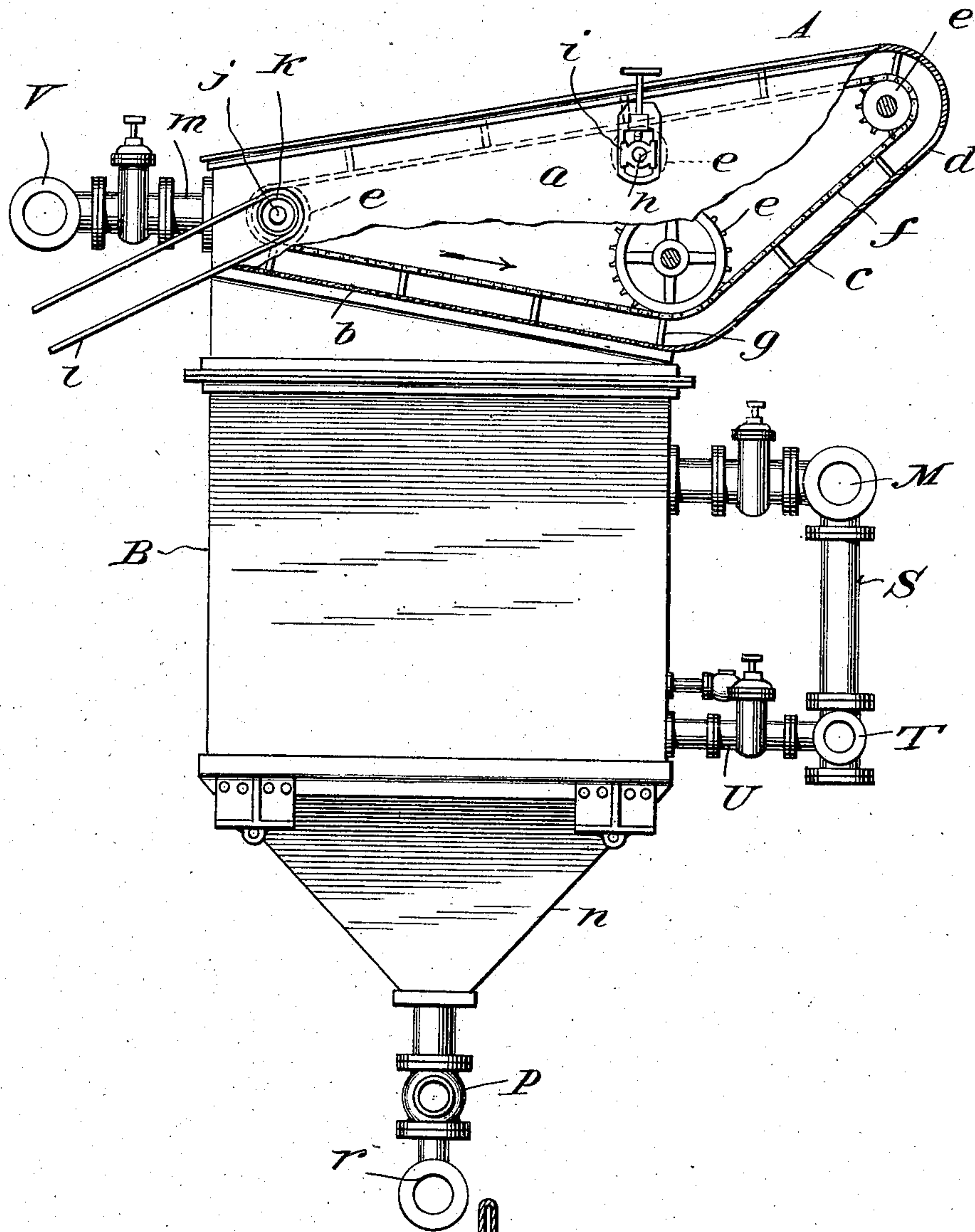
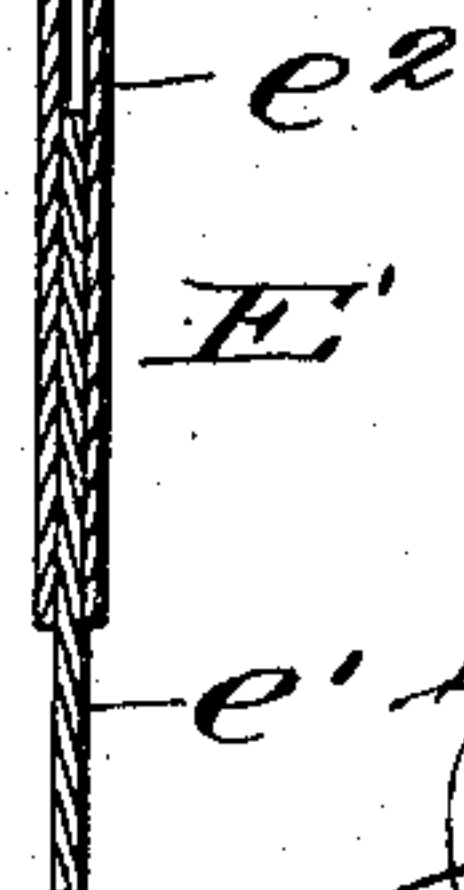


Fig. 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR REMOVING FOREIGN SUBSTANCES FROM LIQUIDS.

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Specification of Letters Patent.

Patented March 10, 1908.

Application filed September 30, 1907. Serial No. 395,154.

To all whom it may concern:

Be it known that we, MARTIN ALTOLAGUIRRE and JOAQUIN ZUBILLAGA, citizens of the United States, residing at Vedado, Cuba, have invented new and useful Improvements in Apparatus for Removing Foreign Substances from Liquids, of which the following is a specification.

Our invention pertains to apparatus for removing foreign substances from liquids; and it contemplates the provision of a clarifying apparatus designed more particularly for use in a sugar house and constructed with a view of operating continuously and economically furnishing a steady supply of thoroughly cleared juice.

With the foregoing in mind, the invention will be fully understood from the following description and claims when the same are read in connection with the drawings, accompanying and forming part of this specification, in which:

Figure 1 is a longitudinal vertical section of the apparatus constituting the best embodiment of our invention of which we are cognizant. Fig. 2 is a plan view of the apparatus. Fig. 3 is an enlarged end elevation of the apparatus with some of the parts in section. Fig. 4 is a detail sectional view illustrating a modified type of partition hereinafter referred to in detail.

Referring by letter and numerals to the said drawings, and more particularly to Figs. 1 to 3 thereof: A is the strainer, and B, the decanting tank of the apparatus. The strainer is disposed transversely of the tank, Figs. 2 and 3, and is made up of a casing *a* having an inclined foraminated bottom wall *b*, Fig. 3, and also having an imperforate wall *c* inclined upward from the lower end of the wall *b* to a discharge opening *d*, sprocket wheels *e* mounted in the casing *a*, and sprocket belts *f* arranged on the said wheels *e* and carrying blades *g* disposed to travel over the foraminated wall *b* and the imperforate wall *c*. The shaft *h* carrying two of the wheels *e* is mounted in bearings *i* equipped with means whereby they may be adjusted and adjustably fixed to regulate the tightness of the endless carrier formed by the belts *f* and blades *g*; and the shaft *j* carrying two other of the wheels *e* is provided outside of the casing *a* with a pulley *k* designed to receive a band *l* connected with a motor (not shown) for driving the mentioned endless carrier. Cane juice is supplied to the end of

the casing *a* above the high end of the foraminated wall *b* through a pipe, and while the juice passes through the apertures in the wall *b*, the endless carrier which is continuously moved in the direction of the arrow, Fig. 3, serves to move the woody and other large particles received on the wall *b* with the juice along the said wall *b* and up the imperforate wall *c* to the opening *d* where said particles are discharged from our apparatus.

The cane juice is received from the apertures in the wall *b* of the strainer A in compartment No. 1 of the decanting tank B, which tank B also preferably comprises two other compartments designated No. 2 and No. 3, respectively. Each of the said compartments is provided with a bottom *n*, of the shape of an inverted cone, and a depending valved pipe *p*, and the several pipes *p* are connected to a main *r* which is designed when any one of the mentioned valves is opened for the cleaning of its complementary compartment, to conduct the coagulum and other sediment deposited in the bottom of the compartment to a suitable point of discharge.

At about the proportional height illustrated in each of the compartments of the tank is arranged a worm of pipe C. These worms C are connected together through exterior pipe portions D, Fig. 2, and are designed to be connected with a source of steam supply, this latter with a view of constantly heating the contents of the compartments to as high a temperature as possible without boiling said contents.

The compartments No. 1, No. 2 and No. 3 are separated by transverse partition walls E which extend upward to points adjacent to the top of the decanting tank, and each compartment is provided with a transverse wall F which extends downward from the top of the decanting tank about the proportional distance illustrated. The wall F in compartment No. 1 serves in combination with the outer end wall of said compartment to form a vertical passage disposed under the separator A, while the walls F in the compartments No. 2 and No. 3 serve in combination with the adjacent partition walls F to form similar though preferably narrower vertical passages, all as clearly illustrated in Fig. 1. The several walls E and F are preferably, though not necessarily, braced by longitudinal bars G, as shown in Figs. 1 and 2. The compartment No. 3 has

the upper edge of its outer end wall *t* disposed about the distance shown below the top of the tank, and said compartment is provided at a slight distance back of the said wall *t* with an upper transverse deflecting wall *H*. Between the walls *t* and *H* an opening *I* is formed which extends the full width of the tank and is designed to enable the juice to pass out of compartment No. 3 at a point below the surface of the juice contained in said compartment. The juice passing from compartment No. 3 through opening *I* is received in a receptacle *J* from whence it passes through a pipe *K*. The outlet *I* is only used when all of the three compartments are working, and when one of the compartments is occupied as presently described the discharge of liquid is made through the longitudinal pipe *M*. This pipe *M* is connected through valved pipes *N* with the three compartments, through a valved pipe *P* with the before mentioned vertical passage of compartment No. 3, and through a valved pipe *R* with the receptacle *J*; and it is also connected at its forward end through a leg *S*, Fig. 3, with a lower longitudinal pipe *T* which rests under the pipe *M* and is connected through valved pipes *U*, one of which is shown in Fig. 3, with the three compartments. By virtue of this latter provision it will be apparent that in emptying one of the compartments the clear liquid or juice may be drawn out of the compartment at a point above the deposited mud or sediment. The before mentioned pipe *m* is valved, Figs. 2 and 3, and is a branch of a juice supply pipe *V*. This juice supply pipe is provided with another valved branch pipe *W* which leads inward and downward into the vertical space of compartment No. 2 and is there provided with a suspended device *X* which is designed to deflect the juice horizontally as the same leaves the pipe *W*, this with a view of preventing too violent agitation of the liquid in compartment No. 2. In the practical operation of our novel apparatus, the cane juice heated to the coagulating point is supplied to the pipe *V* and passes through the strainer *A* in the manner and for the purpose before pointed out in detail. From the foraminated bottom *b* of the separator, the juice passes to the vertical passage of compartment No. 1. When compartment No. 1 is filled, the juice passes over the upper edge of the first partition *E*, and when compartment No. 2 is filled the juice passes over the second partition *E*. On the filling of compartment No. 3 the juice passes through the opening *I* into the receptacle *J* and out of said receptacle through the pipe *K*. The juice in passing from one compartment to the next moves in a thin film or layer over the partition walls, and deposits in its path all of the coagulum and this latter is received in the bottoms of the compart-

ments to be removed at intervals in the manner before described. Only the clear and crystalline juice will pass through the opening *I* of compartment No. 3 in the manner before described.

As will be observed, the apparatus is so constructed that any one of its compartments may be cleaned without stopping its work. When it is desired to clean compartment No. 3 for instance it is simply necessary to open the valve in that pipe *N* between compartment No. 2 and the main pipe *M*, since then the juice will pass from said compartment No. 2 through the mentioned pipe *N* and out through the main pipe *M*.

With a view of preventing radiation of vapors from the surface of the liquid in the tank *B*, the tank may, when deemed expedient, be made with covers movable on hinges and adapted to be easily handled. These covers, however, form no part of our invention, and we have therefore regarded it as unnecessary to illustrate the same.

When desired in lieu of the partitions *E* shown in Figs. 1 and 2, partitions *E'*, one of which is shown in Fig. 4, may be employed. The said partition *E'* comprises a fixed major portion *e'* and a piece *e''* that is adjustable up and down on the major portion and is, by preference, adjustably fixed thereto by frictional contact. The adjustability of the piece *e''* permits of the overflow point from one compartment to the next being raised or lowered and also renders it easy to place the overflow point at a perfect level which it would be difficult to do were said point fixed.

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

1. In an apparatus for the purpose described, a tank comprising compartments separated by partitions that terminate in a plane below the top of the tank, walls extending from the top of the tank down in the compartments thereof and arranged in combination with walls of the compartments to form vertical spaces in communication at their lower ends with the interiors of the compartments; the outer end wall of one end compartment terminating in a plane below the top of the tank, a wall *H* arranged in said end compartment a slight distance from the said end wall and extending downward to a plane below the upper edge thereof, and a receptacle arranged to receive from the opening between the said walls and having a discharge pipe.

2. In an apparatus for the purpose described, a tank comprising compartments separated by partitions that terminate in a plane below the top of the tank, walls extending from the top of the tank down in the compartments thereof and arranged in combination with walls of the compartments to

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end compartment terminating in a plane
5 below the top of the tank, a wall H arranged
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from the said end wall and extending down-
ward to a plane below the upper edge thereof,
a receptacle arranged to receive from the
10 opening between the said walls and having a
discharge pipe, a lower longitudinally dis-
posed pipe arranged outside the tank and
connected through valved pipes with the
compartments, an upper longitudinally dis-
15 posed pipe arranged outside of the tank and
connected through valved pipes with the

compartments, through a valved pipe with
the vertical passage of the said end com-
partment and through a valved pipe with the
receptacle which receives from said end com- 20
partment and also connected at one end
through a leg with the lower longitudinal
pipe, and heating worms connected together
and arranged in the compartments.

In testimony whereof we have hereunto 25
set our hands in presence of two subscribing
witnesses.

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JOAQUIN ZUBILLAGA.

Witnesses:

VICTOR NAMANA,
A. ROGERS.