

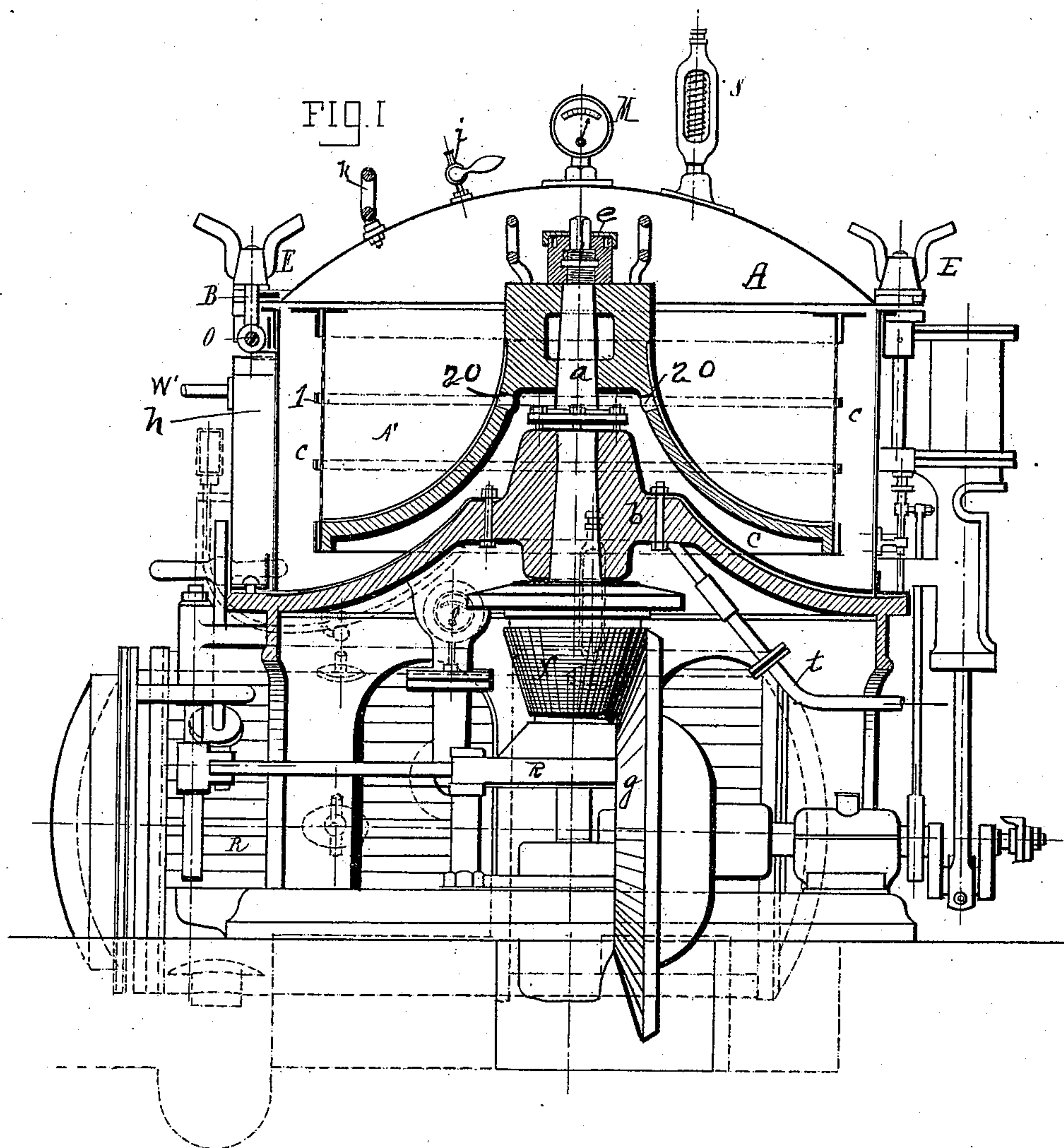
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8 Sheets—Sheet 1.

L. LABOIS.
APPARATUS FOR EXTRACTING SULPHUR.

No. 485,634.

Patented Nov. 8, 1892.



Witnesses:

E. B. Bolton

D. J. Jones

Inventor:

Lion Labois

By

Reinhardt R.

his Attorneys.

(No Model.)

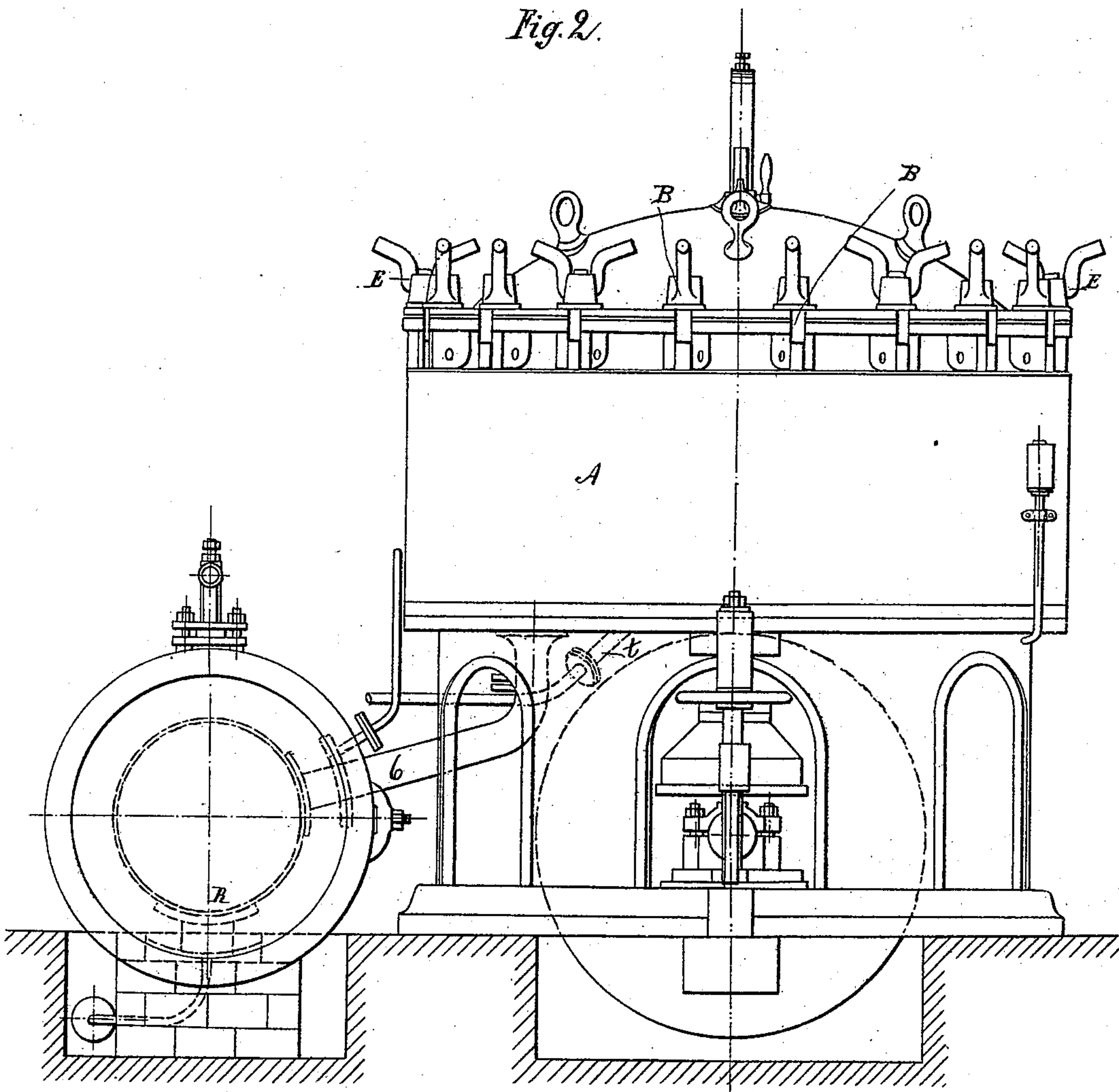
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Fig. 2.



Inventor:

Lion Labois

Witnesses:

E. B. Cotton

S. J. Jones

By

Richardson
his Attorneys.

(No Model.)

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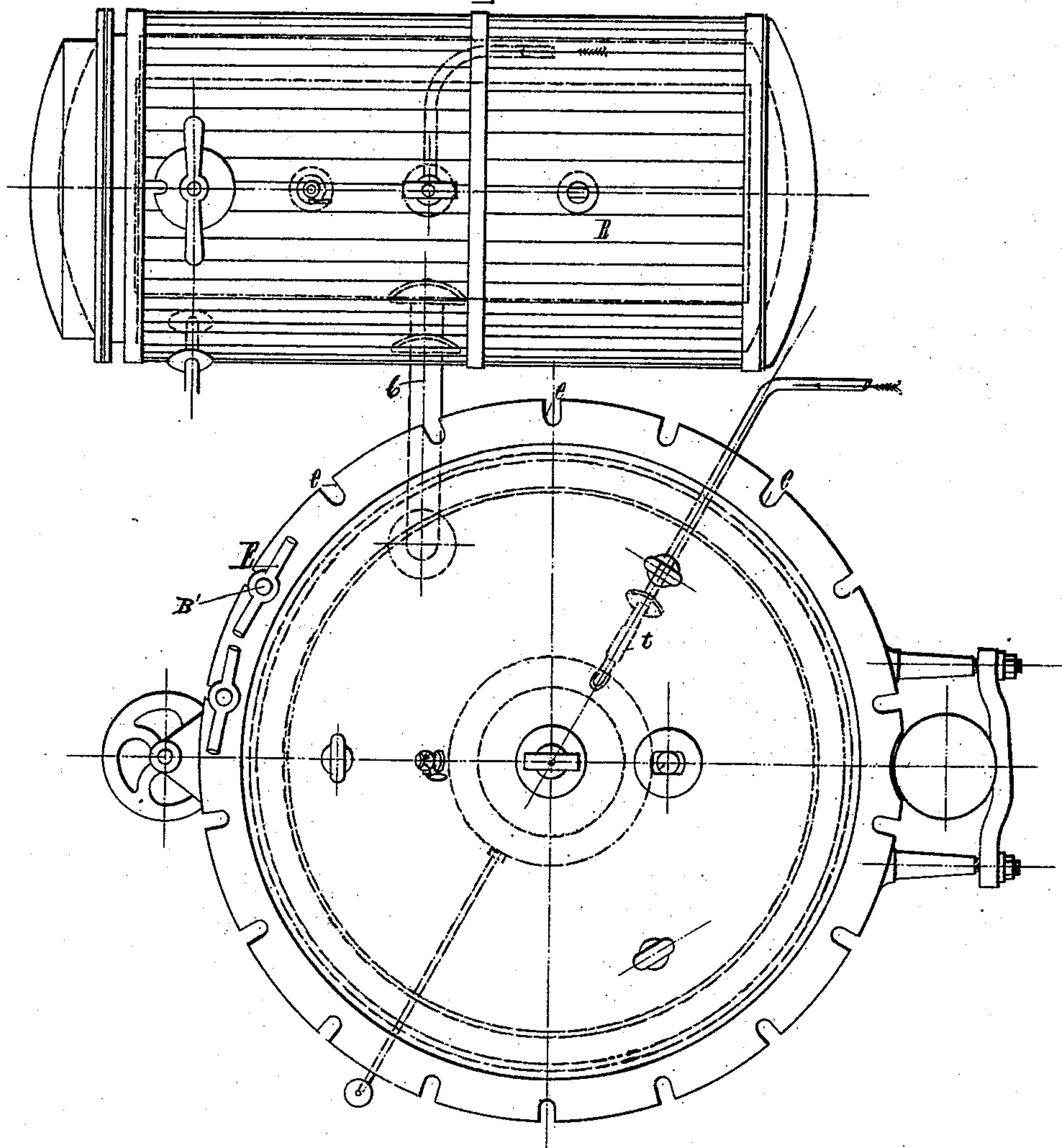
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Fig. 3



Witnesses:

E. R. Cotton
S. J. Jones

Inventor:

Lion Labois

BY

Reinhardt

his Attorneys.

(No Model.)

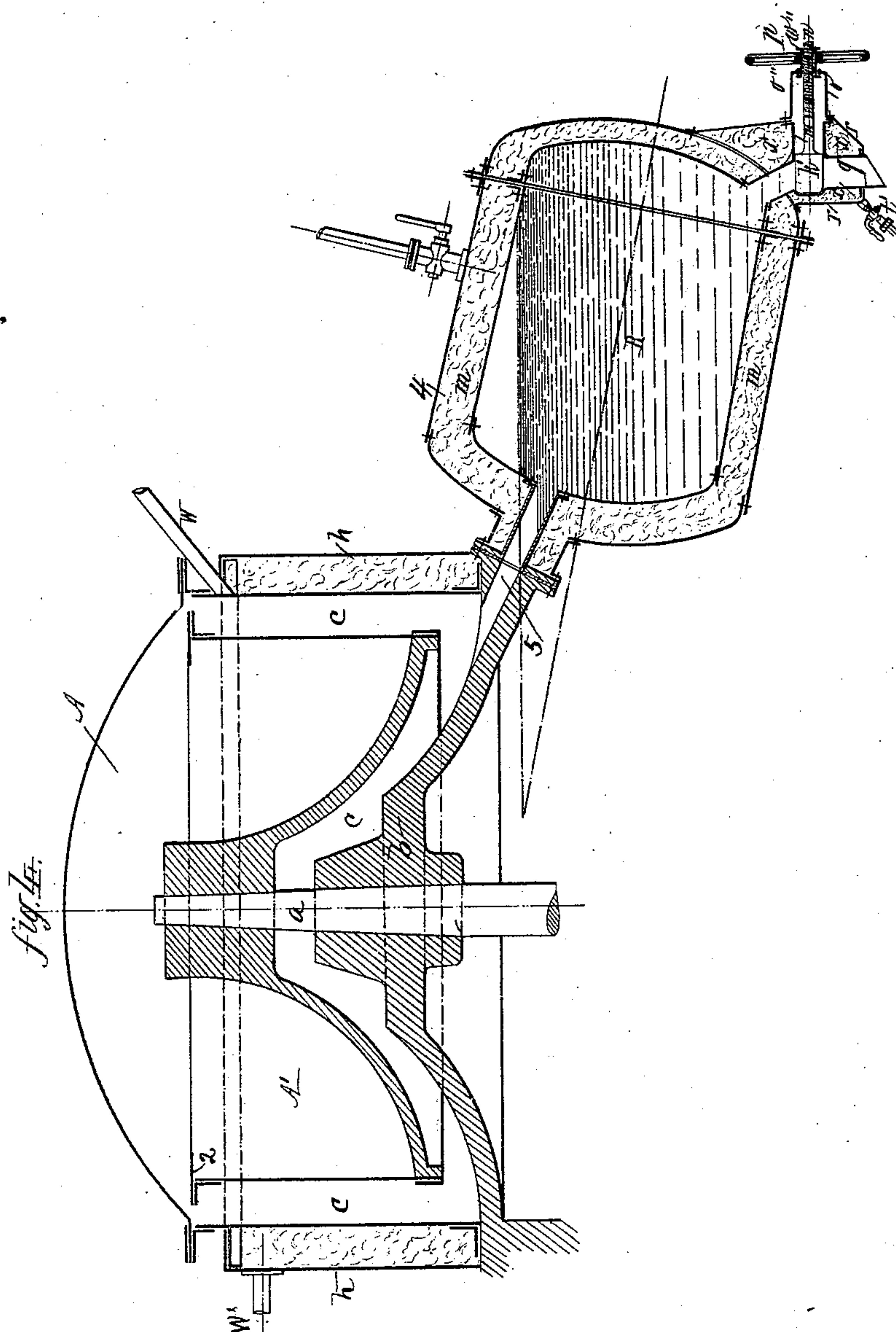
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Witnesses:

E. B. Bolton

S. A. Jones

Inventor:

Leon Labois

By

Leon Tabois
Reinhardt & R

his Attorneys.

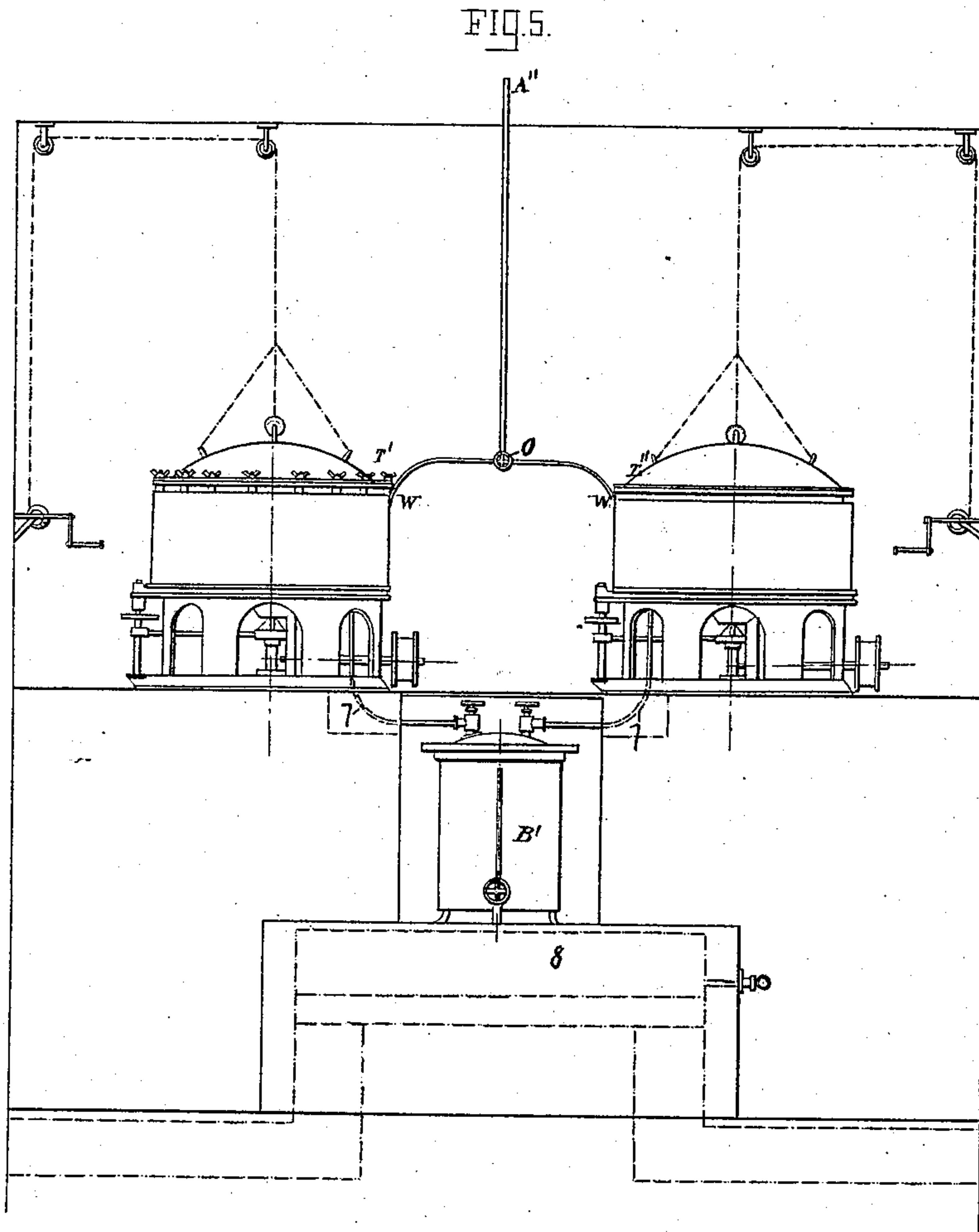
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Witnesses:
E. R. Rotton
D. J. Jones.

Inventor:
Leon Labois

By

Reinhardt & Co.
his Attorneys.

(No Model.)

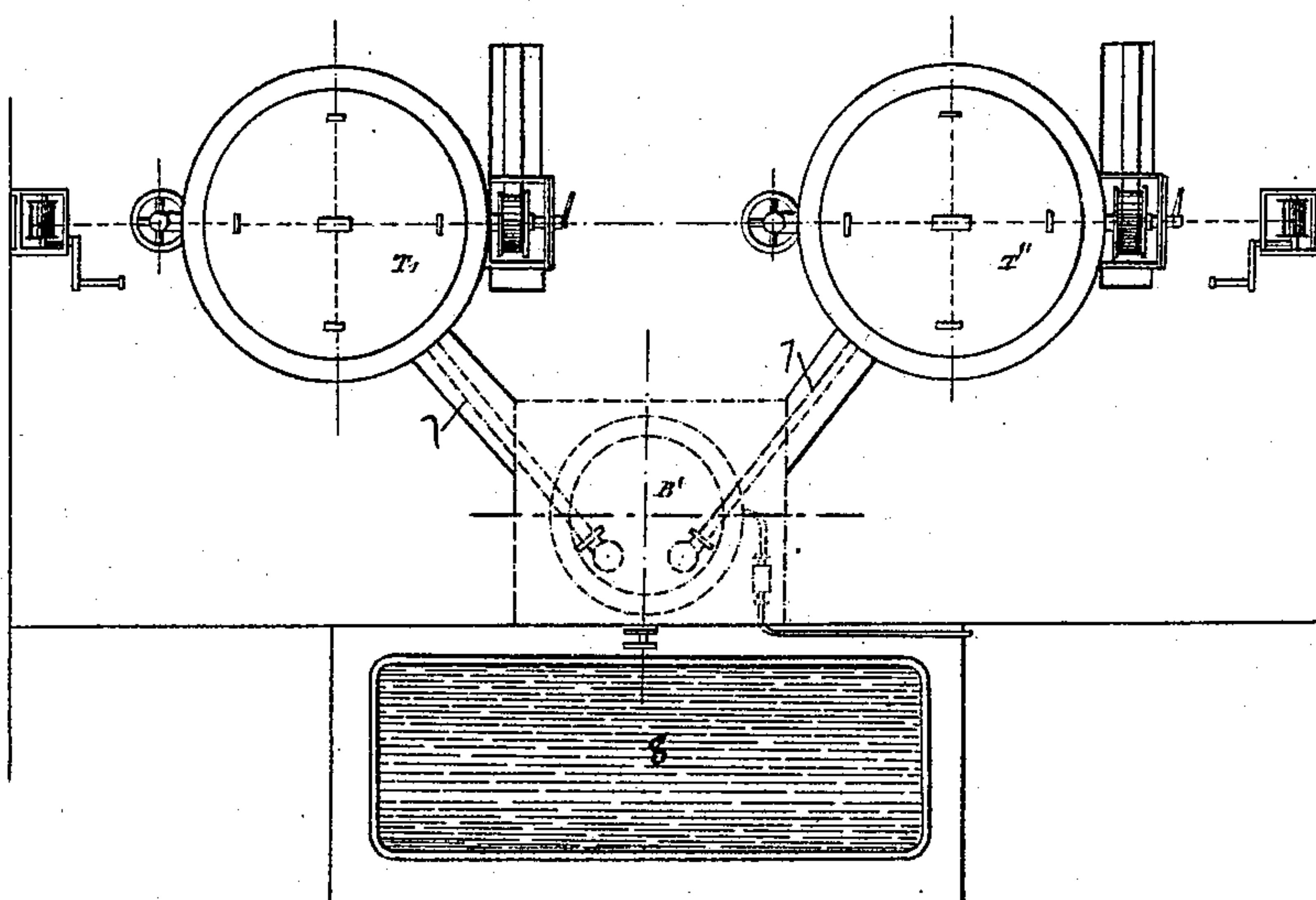
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FIG. 6.



Inventor:

Leon Labois

Witnesses:

E. B. Kotton

J. J. Jones.

By

Richard R.

his Attorneys.

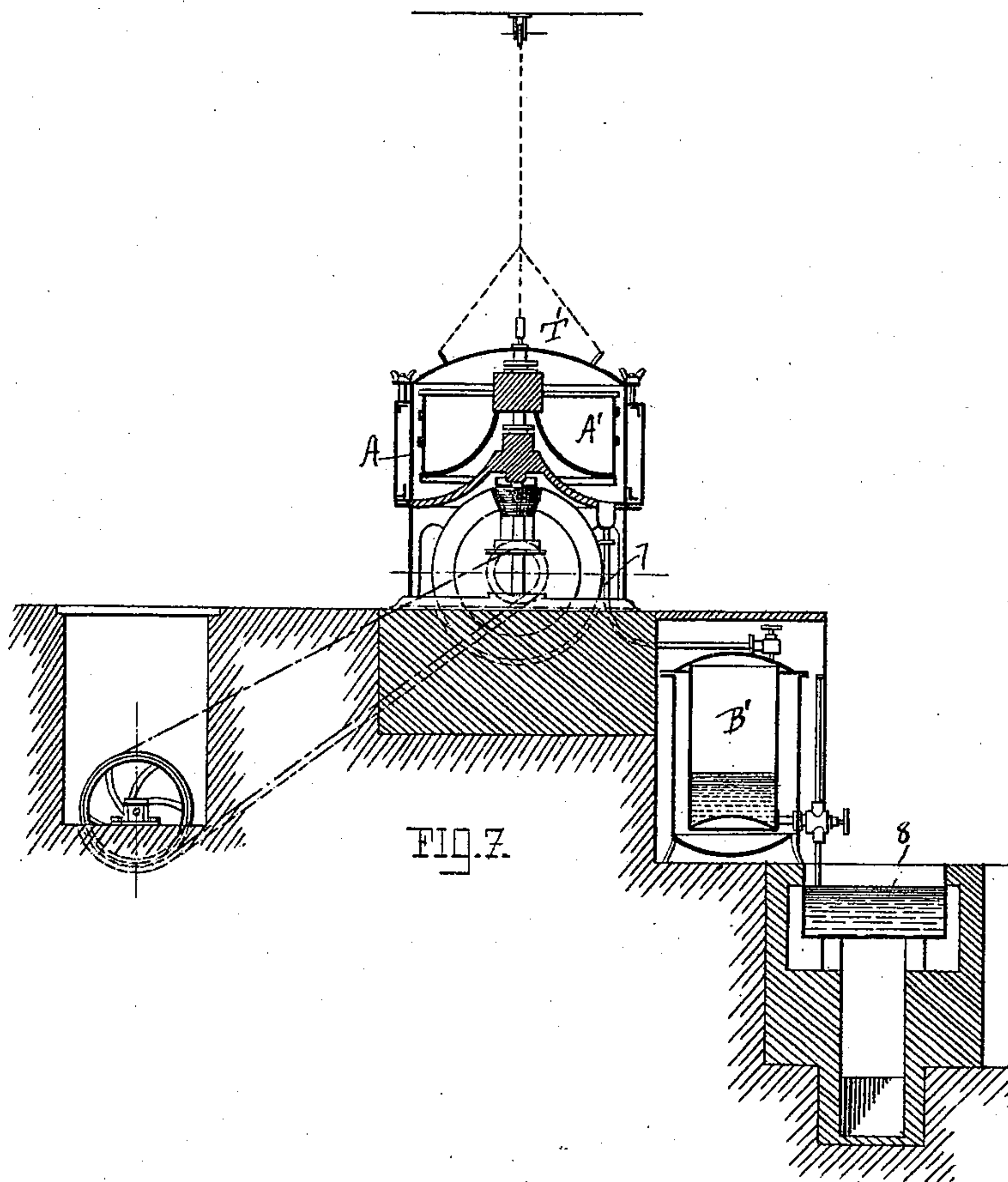
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Inventor:
Léon Labois

Witnesses:

E. B. Bolton
S. J. Jones.

By

Richard R.

his Attorneys

(No Model.)

8 Sheets—Sheet 8.

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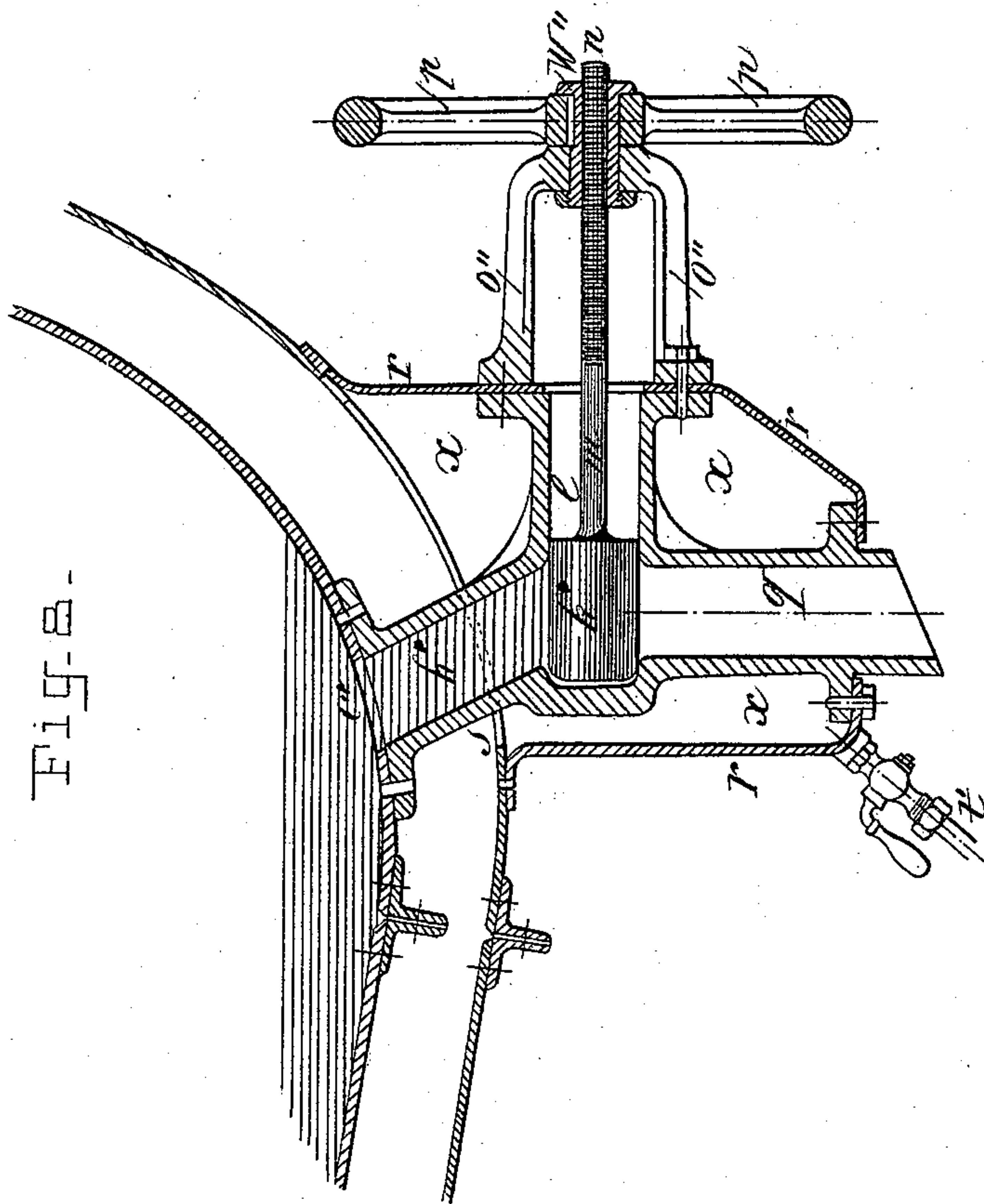


Fig. 2-

Witnesses:

C. B. Bolton

S. J. Jones.

Inventor:

Leon Labois

By

Reinhardt & Co.

his Attorneys.

UNITED STATES PATENT OFFICE.

LÉON LABOIS, OF PARIS, FRANCE.

APPARATUS FOR EXTRACTING SULPHUR.

SPECIFICATION forming part of Letters Patent No. 485,634, dated November 8, 1892.

Application filed July 11, 1891. Serial No. 399,258. (No model.) Patented in France May 6, 1890, No. 205,509.

To all whom it may concern:

Be it known that I, LÉON LABOIS, a citizen of the Republic of France, residing at Paris, France, have invented a new and Improved
5 Apparatus for Extracting Sulphur and other Substances, (this invention having been patented in France May 6, 1890, No. 205,509,) of which the following is a full, clear, and exact description.

10 The present invention relates to a new process of extracting by centrifugal force, with the aid of steam under pressure, substances which are susceptible of being separated in a liquid state by raising the temperature of
15 the gangue, minerals, or crude matters in general which inclose them.

Figure 1 is a vertical section through the rotation-axle of the centrifugal machine. Fig. 2 is an elevation thereof. Fig. 3 is a plan
20 view. Fig. 4 is a modification of Fig. 1, the drawing-off reservoir having a special arrangement. Figs. 5, 6, and 7 refer to the mounting of the two twin centrifugal machines placed on the same drawing-off reser-
25 voir and show, respectively, the front elevation, plan, and transverse vertical section; and Fig. 8 is a detailed sectional view illustrating the construction and arrangement of the
30 valve for effecting the extraction of the sulphur.

To show the object of my invention more clearly, I will take, for example, sulphur. If a mineral containing sulphur be heated to about 115°, the sulphur will melt. Then by
35 physical means—such as the pressure exercised by centrifugal force—the liquid sulphur can be separated from the gangue, which will remain in the basket of the separator. What has been said of the sulphur minerals applies
40 evidently to the industrial residues—of gas-factories, for instance—and to the crude sulphur, from which all the impurities could be extracted by the use of centrifugal force at an elevated temperature. My process evi-
45 dently permits of this treatment under the same conditions as for the sulphur for ozocerite or natural paraffines, designated under the name of “ozocerites.” In fact, the ozocerites which can be separated from the
50 gangue become liquid between 30° and 63°. It is the same for the treatment of heavy petroleum-oils, &c. In each of these cases it

suffices to grade the temperature, and thus two bodies may be separated whose boiling-points are near to one another.

I herein show the process and apparatus as applied to sulphur.

The tank or vat is shown at A and is of cylindrical form, preferably having an approximately-cone-shaped bottom *b*, forming a bearing for a rotating vertical shaft, and within
60 this vat or tank is a rotating perforated receptacle A', carried on the end of the shaft *a*, this receptacle being supported above the bottom *b* of the outer tank, thus providing a
65 steam-space entirely around the receptacle A', as shown at *c*, this space being in connection with a steam-supply through the pipe *t*, the steam passing into the chamber A' through the openings 20. The receptacle A'
70 may be driven by any suitable mechanism or by that shown. It is preferably supported upon the shaft *a*, of tapering form, from which it may be readily lifted by removing the nut *e*, which secures the receptacle to
75 the shaft, and the shaft is preferably rotated by the friction-cones *f g*, of compressed paper, driven from any source of power. The tank or vat is also provided with an outer jacket
80 *h*, Fig. 4, which may be filled with steam through the pipe W', and this steam may escape, to prevent rupture when the pressure is excessive, through the escape-pipe W. The
85 vapors and gases generated within the tank may escape through a valve or cock *i* in the cover, which may also be provided with suitable handles *k*, a manometer M, and a safety-valve S. The cover is held in place by bolts
90 B, pivoted on pins O and provided with clamping heads and arms E, these bolts fitting openings in the periphery of the cover and clamping the same in place. The parts may be strengthened in any suitable manner by bands 1, passing around the receptacle A', which is also provided with an overhanging
95 edge 2, and this upper edge is strengthened by an angle-iron extending outwardly and attached by its vertical flange to the receptacle. The tank may be further strengthened by cross-bars, as well as the receptacle, to prevent
100 displacement under the centrifugal action. The molten sulphur and the water of condensation are drawn off into a receiver R, which, as shown in Fig. 4, is jacketed by a casing 4,

forming a steam-space m around the receiver, and the jacket is provided with inlet and outlet cocks, as shown. The passage 5 between the bottom of the tank or vat and the receiver is for the greater part also jacketed so as to be under the warming action of the steam and thus prevent any fall in the temperature of the liquid passing from the tank to the receiver. The discharge-spout q of the receiver is also jacketed by a casing r , Fig. 8, a steam-space x being formed around it, and the passage is controlled by a valve k' , operated by a hand-wheel p on its stem m , the valve moving in a space l . A yoke o'' supports the end of the valve-stem, which is screw-threaded at n , passing through a sleeve W'' , which is rotated by the hand-wheel to cause the reciprocation of the valve-stem. A blow-off cock t' is provided for the casing r . The outlet-passage from the receiver to the valve k' is shown at h' , Fig. 8, the liquid sulphur being indicated at c'' .

In Figs. 1 and 3 the relative arrangement of the tank and receiver differs from that shown in Fig. 4 in that in the former figures the receiver is at a greater distance and is connected by a pipe 6, which is preferably jacketed. The cover may be conveniently manipulated by the lifting means shown in Fig. 5, which is of ordinary construction. Bags containing the material to be treated are placed within the receptacle so as to prevent displacement during operation, the bags consisting of simple linen cylinders having their extremities closed by a sliding cord, preferably, each cylinder having a ring adapted for engagement by a hook in the hands of the workman. These bags form filters, the centrifugal action driving the liquefied sulphur through the meshes and through the sides of the receptacle A' , from whence the liquid runs down the inclined bottom of the tank A into the receiver R . I may, to economize the process, use more than a single tank, as in Fig. 5, in which the receiver is shown at B' , and the pipe connections for the discharge

at 7 7, one tank being shown at T' and the second tank at T'' . The steam-jackets of the two tanks are connected by pipes $W W$, provided with an escape-pipe A , with a three-way cock O at the junction, whereby the steam from one may be transferred to the other or discharged through the pipe A'' . In this figure below the receiver B' is a large receiving-vat 8, which may be heated by steam, as described, for the other parts.

Fig. 6 shows a plan of the duplicated apparatus of Fig. 5, and Fig. 7 is a section of the same.

The operation will be conducted precisely in the same manner without regard to the character of the material treated, except as to the temperature required, this varying with the particular materials.

I claim—

1. In combination, the tank having a conical bottom, the revolving receptacle therein having a corresponding bottom, the latter being placed above the former to provide a space between the said bottoms, the said receptacle having perforated sides, and the steam-pipe extending into the tank and opening into the inclined space C between the conical bottoms, said receptacle having inlet-passages 20 at the upper part thereof, substantially as described.

2. The described apparatus, consisting of a tank, a centrifugal receptacle within the same, a receiver having a steam jacket, a jacketed discharge from the tank to the receiver, and a jacketed discharge from the receiver, said jackets of the discharge connections being connected with the jacket of the receiver and the valve extending through the jacket of the receiver-discharge, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LÉON LABOIS.

Witnesses:

ROBT. M. HOOPER,
JOSEPH FOURNIER.