

W. HASENBACH.

APPARATUS FOR MAKING SULFURIC ANHYDRID.

(Application filed May 4, 1899.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

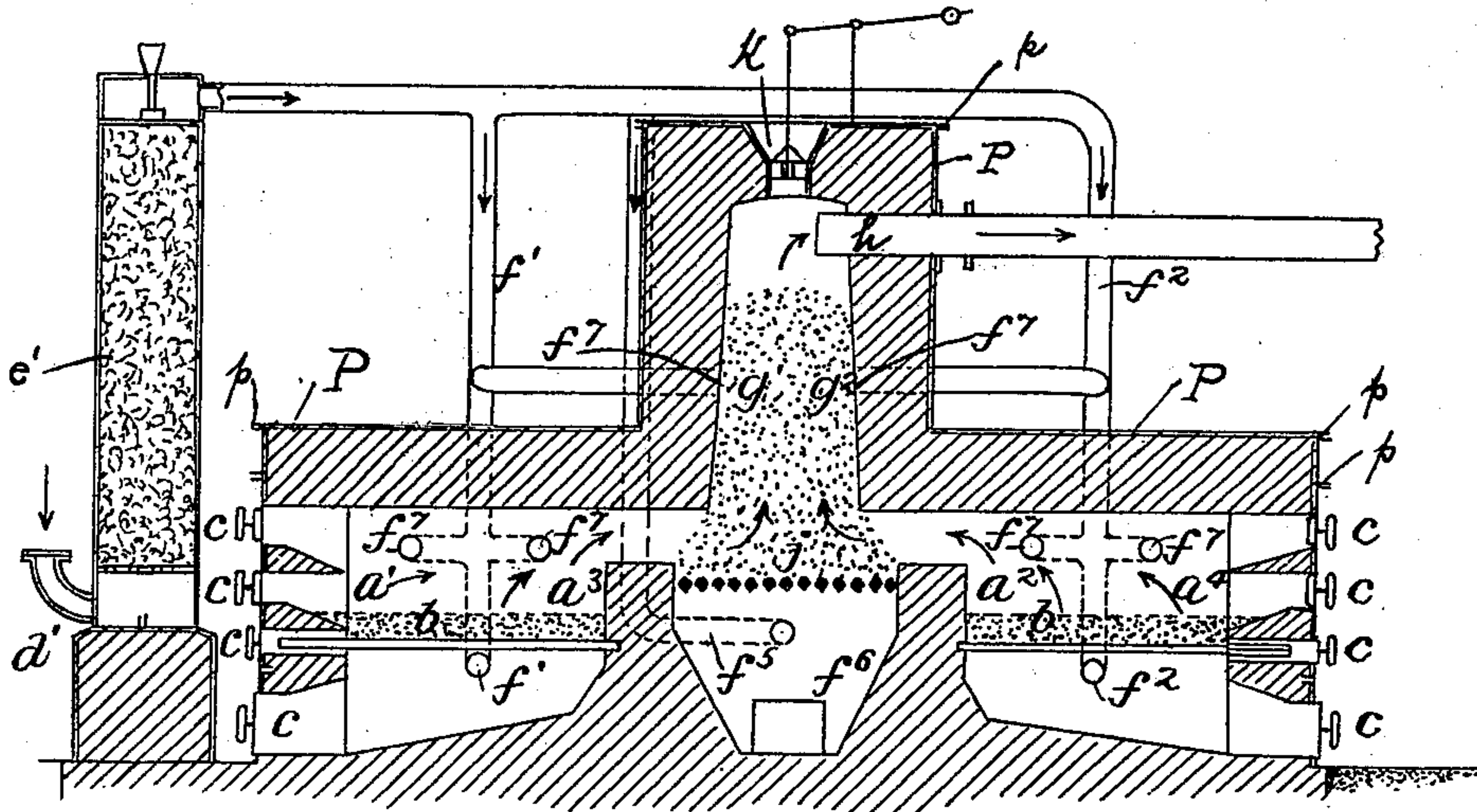
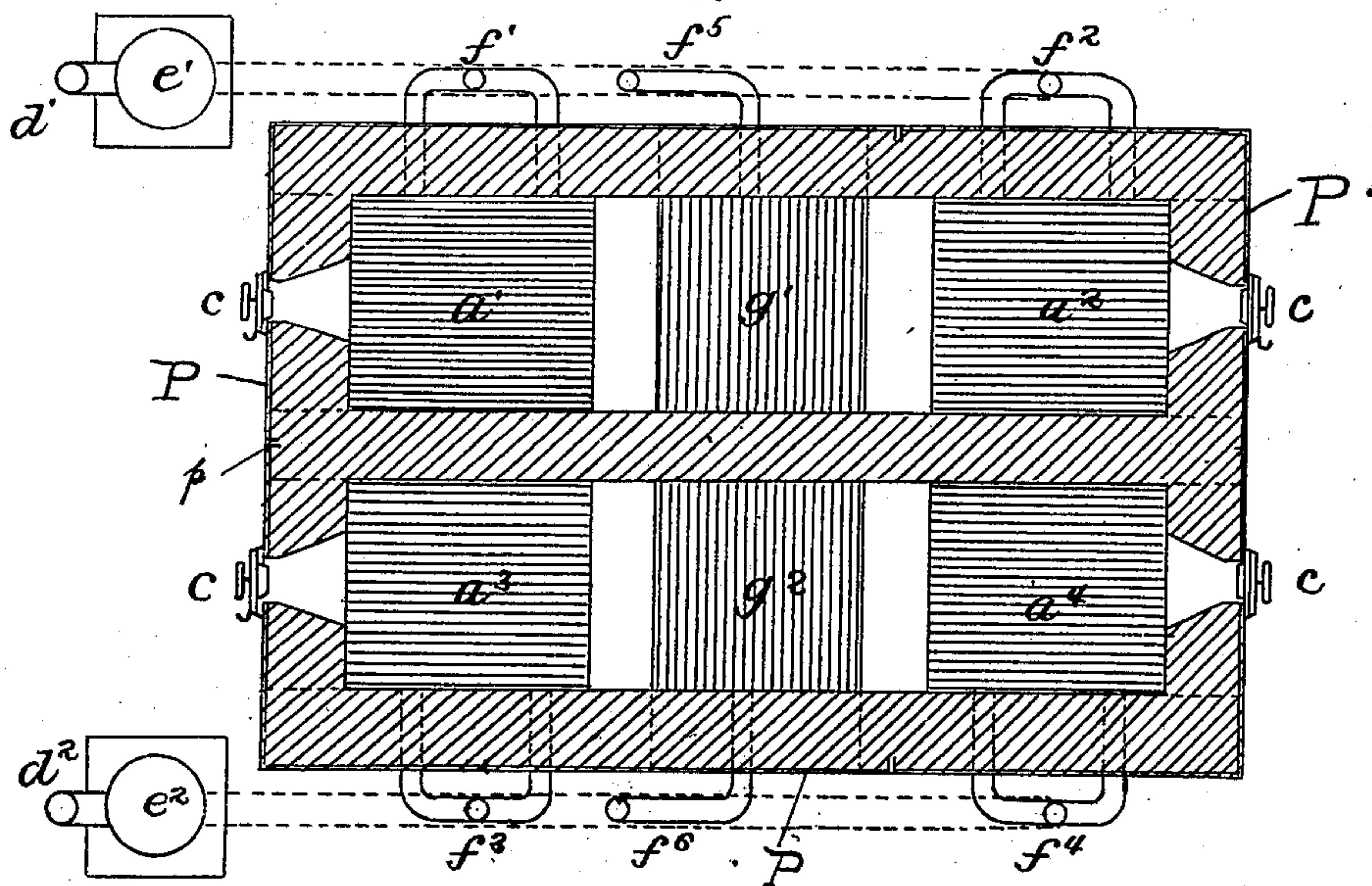


Fig. 2.



Witnesses

J. G. Hinkel

Arthur A. Fisher

Inventor
Nickel Hasebach
 by *Inter & Seeman*
 Attorneys

No. 670,559.

Patented Mar. 26, 1901.

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Fig. 3.

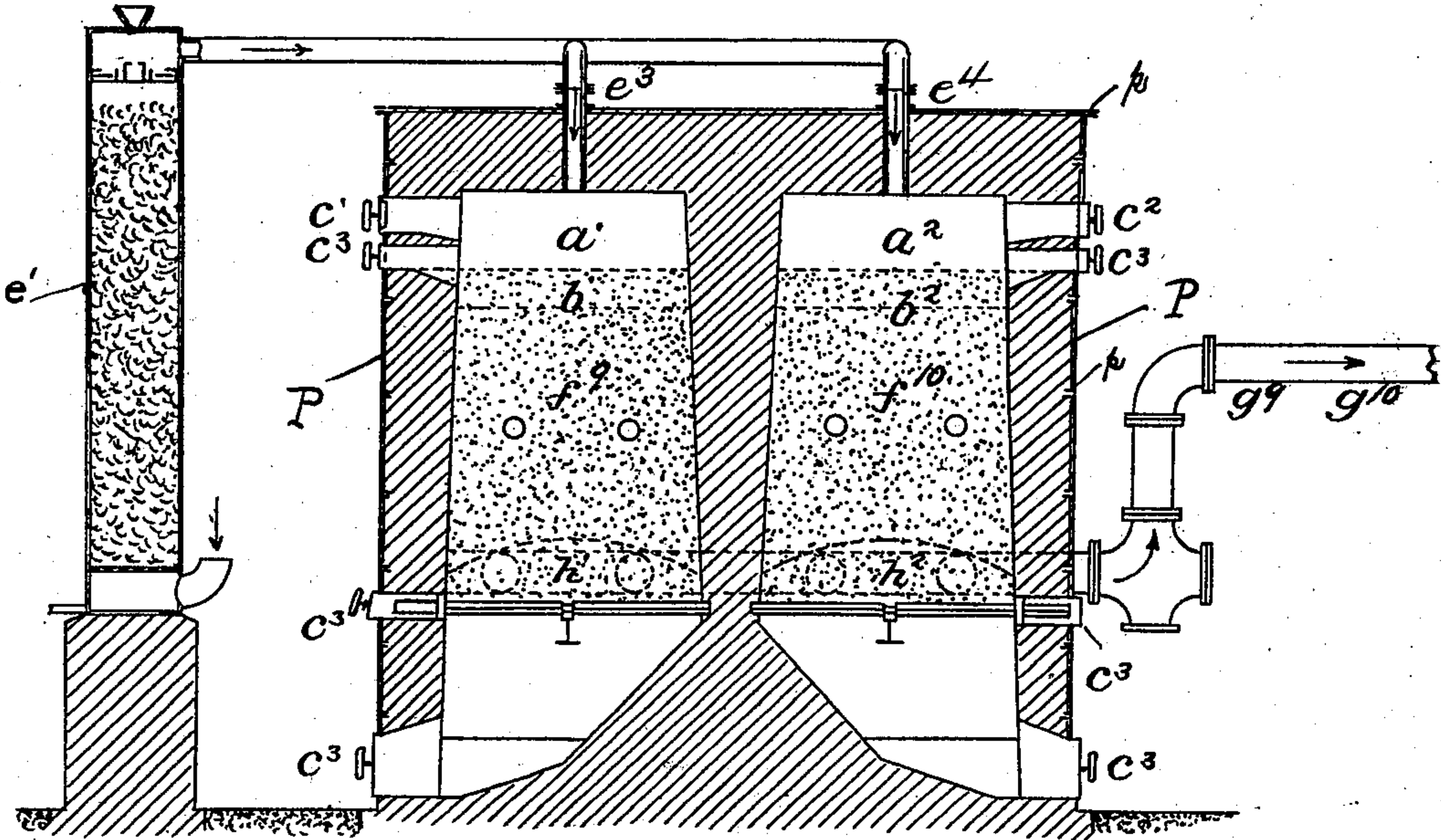
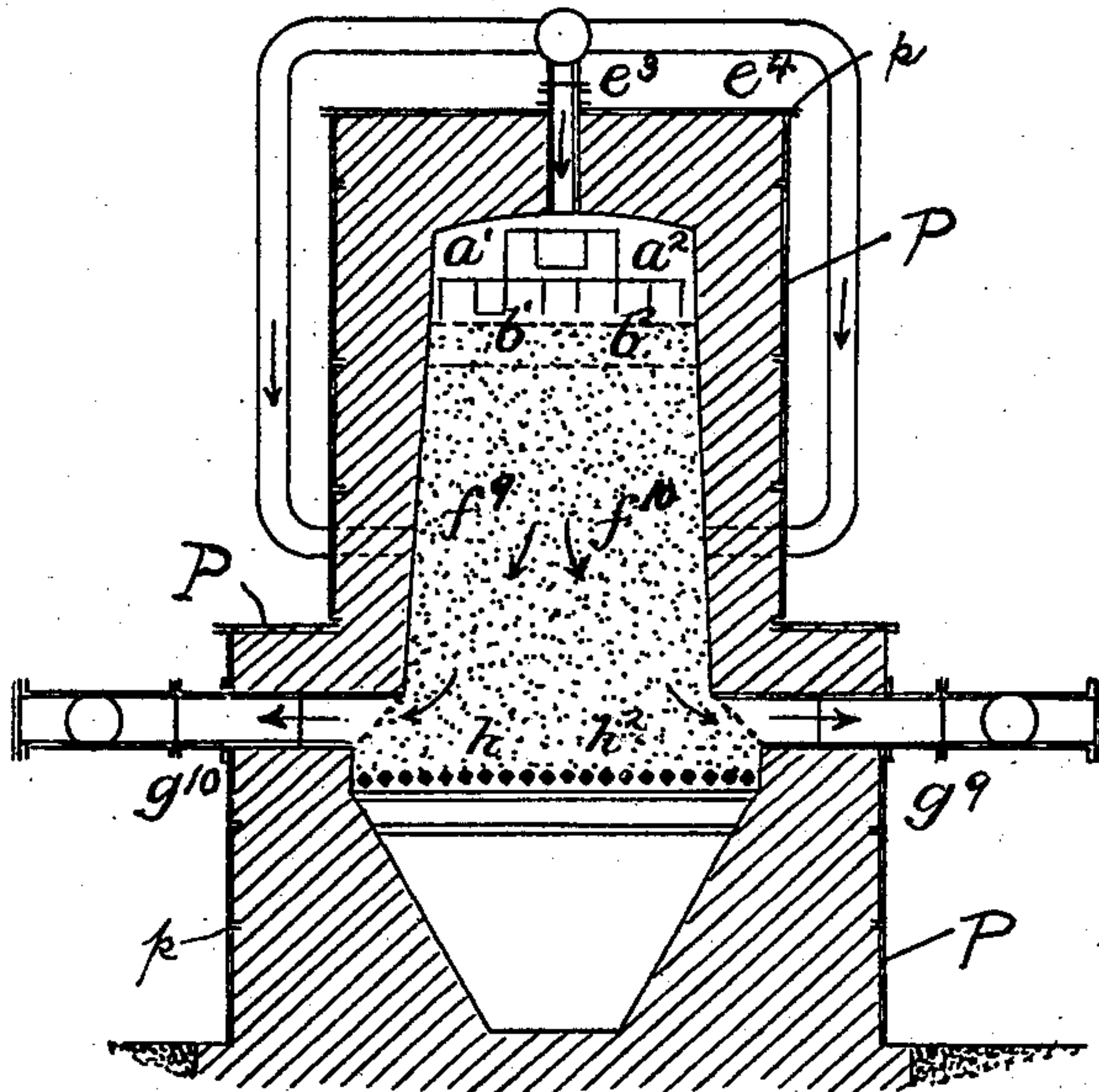


Fig. 4.



Witnesses
J. G. Hinkel
Arthur A. Fisher

Inventor
Wilhelm Hasenbach
by *Irwin Freeman*
Attorneys

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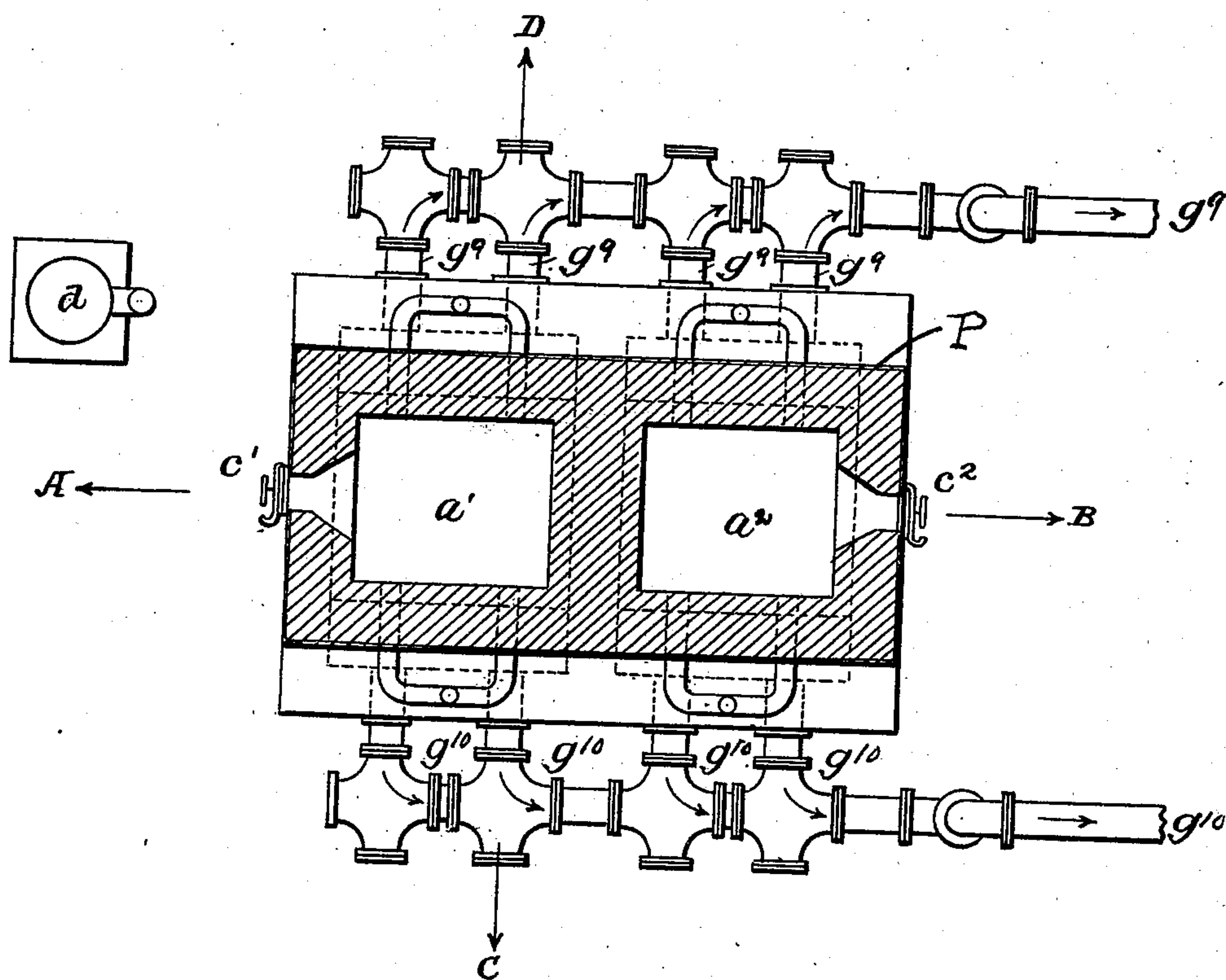
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3 Sheets—Sheet 3.

Fig. 5.



Witnesses
J. G. Hinkel
Arthur A. Fisher

Inventor
Wilhelm Hasenbach
by J. A. & F. A.
Attorneys

UNITED STATES PATENT OFFICE.

WILHELM HASENBACH, OF MANNHEIM, GERMANY, ASSIGNOR TO VEREIN CHEMISCHER FABRIKEN, OF SAME PLACE.

APPARATUS FOR MAKING SULFURIC ANHYDRID.

SPECIFICATION forming part of Letters Patent No. 670,559, dated March 26, 1901.

Application filed May 4, 1899. Serial No. 715,621. (No model.)

To all whom it may concern:

Be it known that I, WILHELM HASENBACH, a subject of the Emperor of Germany, and a resident of Mannheim, Germany, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a specification.

This invention has for its object to provide an improved roasting-furnace more especially intended for use in roasting pyrites or the like for the direct production of sulfuric anhydrid from the evolved gases, and I will describe it in that connection.

In a furnace according to this invention the air necessary for roasting the materials (which I will refer to as "pyrites") is first passed through an apparatus wherein it is dried by means of concentrated sulfuric acid and is then conducted to the roasting chamber or chambers, and the gases issuing from the said roasting chamber or chambers are passed through a space or spaces containing contact material, which space or spaces may be situated either above or below the pyrites to be roasted, the said gases traversing it either in the upward or in the downward direction and maintaining the contact material at the requisite temperature. Access of external undried air is, as far as possible, prevented by providing the necessary apertures with means by which they can be closed air-tightly, and the structure as a whole is protected by armor-
ing, preferably consisting of iron plates P, (shown in section,) having lugs or projections p for securing the plates to the furnace-walls and to each other.

In the accompanying drawings two forms of the improved furnace are represented by way of example.

Figure 1 is a vertical section, and Fig. 2 is a horizontal section, of one arrangement. The roaster-gases are generated in the roasting-chambers $a' a^2 a^3 a^4$. The closing doors (indicated at C) of all the working apertures are provided with devices by which they can be tightly closed. These may be screws and bars resembling those of retort-lids, the joints being packed with asbestos cardboard pressed against the faced surfaces when the said screws are tightened up. The air requisite for roasting enters sulfuric-acid-drying tow-

ers $e' e^2$ at $d' d^2$, and after passing through them the said air is conducted by the pipes $f' f^2 f^3 f^4$ to underneath the bars of the roasting-chambers. A pipe connection f^5 serves to conduct air into the space f^6 , under the vertical chambers $g' g^2$, so that dried air can be admitted into these spaces and chambers when desired. In a similar way, if desired, an increased air-supply can be delivered to above the burning pyrites. The roaster-gases from the chambers $a' a^2 a^3 a^4$ enter the chambers $g' g^2$, which contain contact material, which may be the burnt ore. The heat of the said gases being sufficient to maintain the said contact material at a red heat, as the gases pass through these chambers $g' g^2$ the reaction whereby the sulfurous acid is converted into sulfuric anhydrid takes place. The roaster-gases having undergone the reaction are conducted through the pipes h to the condensers or absorbers, wherein the sulfuric anhydrid which has formed is absorbed by concentrated sulfuric acid. The entire furnace is cased with iron armor, (shown as plates P,) so as to prevent access of air through the structure thereof, notwithstanding the powerful resistance offered to the passage of the gases by the contact material in the chambers $g' g^2$. Fresh contact material is admitted through the charging device k , the spent material being removed by the revolving grates j . For the purpose of further rarefying the gases which successively undergo reaction through the agency of air a sufficient number of apertures, such as f^7 , may be provided in the chamber wherein the roasting is started or the reaction takes place. Such air should preferably pass through a preliminary heater before entering the apparatus.

Figs. 3, 4, and 5 show in vertical sections at right angles to each other and in sectional plan another form of the apparatus wherein the reaction-chamber is situated below the pyrites to be roasted, the roaster-gases traversing it in a downward direction. $a' a^2$ are the roasting-chambers, and $b' b^2$ the layers of pyrites to be roasted. $c' c^2 c^3$ are the charging and working orifices, fitted with devices for tightly closing them, as aforesaid. The layers of pyrites in this form of apparatus

burn downwardly. The air required for roasting and for rarefying the gases after passing through the sulfuric-acid-drying tower e' is conducted to the roasting-chambers through
 5 pipes $e^3 e^4$. The roaster-gases generated from the roasting pyrites pass through the layers $f^9 f^{10}$ of burnt ore or other contact substance wherein the reaction takes place and are conducted through the pipes $g^9 g^{10}$ to the con-
 10 densers or absorbers. In proportion as fresh pyrites are admitted through the charging-orifices $c' c^2$ the waste material which has been used up is removed by the rotary grates $h' h^2$. This apparatus is fitted and has the
 15 outer structure covered with armoring like that first described.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, I
 20 declare that what I claim is—

1. In an apparatus for the production of sulfuric anhydrid, the combination of a furnace in which the pyrites are roasted, an air-drying chamber, pipe connections leading
 25 from the said chamber to supply air to the furnace, a reaction-chamber communicating with the furnace and having contact material therein, a discharge-pipe leading from the reaction-chamber, and means to exclude air,
 30 other than what passes through the drying-chamber, from the furnace and reaction-chamber during the operation, substantially as set forth.

2. In an apparatus for the production of

sulfuric anhydrid, the combination of a fur- 35
 nace in which the pyrites are roasted, an air-drying chamber, pipe connections leading from said chamber to supply air to the furnace, a reaction-chamber communicating with
 40 the furnace and into which the evolved gases pass, said chamber having contact material therein, pipe connections leading from the drying-chamber to supply air to the reaction-chamber, and a delivery-pipe leading from
 45 the reaction-chamber, substantially as set forth.

3. In an apparatus for the production of sulfuric anhydrid, the combination with a furnace, in which the pyrites are roasted, having working apertures, air-tight closures for
 50 said apertures, an air-drying chamber, pipe connections leading from said chamber to the furnace, a reaction-chamber communicating with the furnace and having contact material therein, said reaction-chamber having work-
 55 ing apertures, air-tight closures for said apertures, a delivery-pipe leading from the reaction-chamber, and an air-excluding armoring on the exterior surface of the furnace and reaction-chamber, substantially as set forth. 60

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

WILHELM HASENBACH.

Witnesses:

COURTRO,
 A. BHÜLE.