

F. J. COLLIN.
HORIZONTAL COKE OVEN.

No. 538,898.

Patented May 7, 1895.

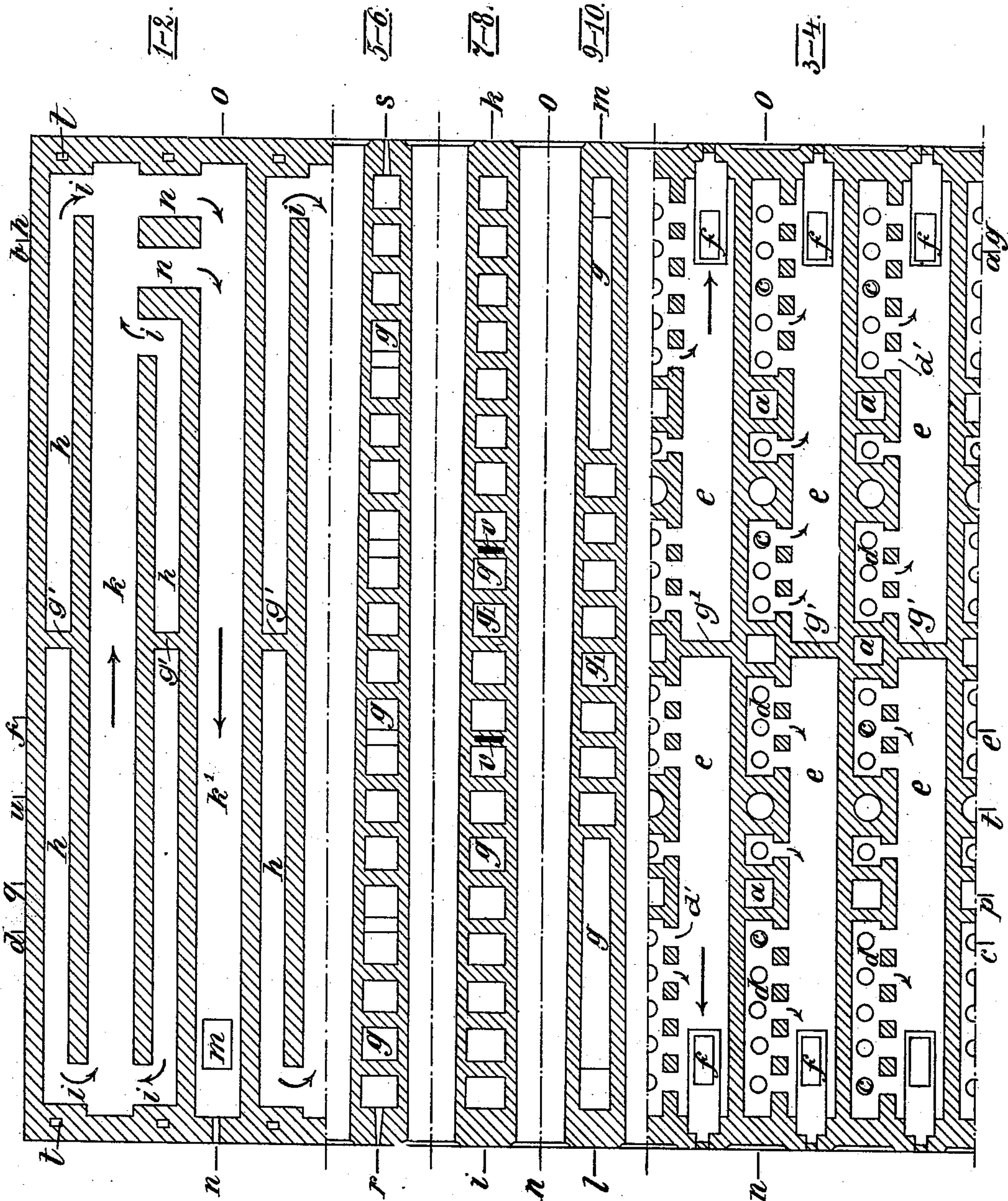


Fig. 1.

WITNESSES.

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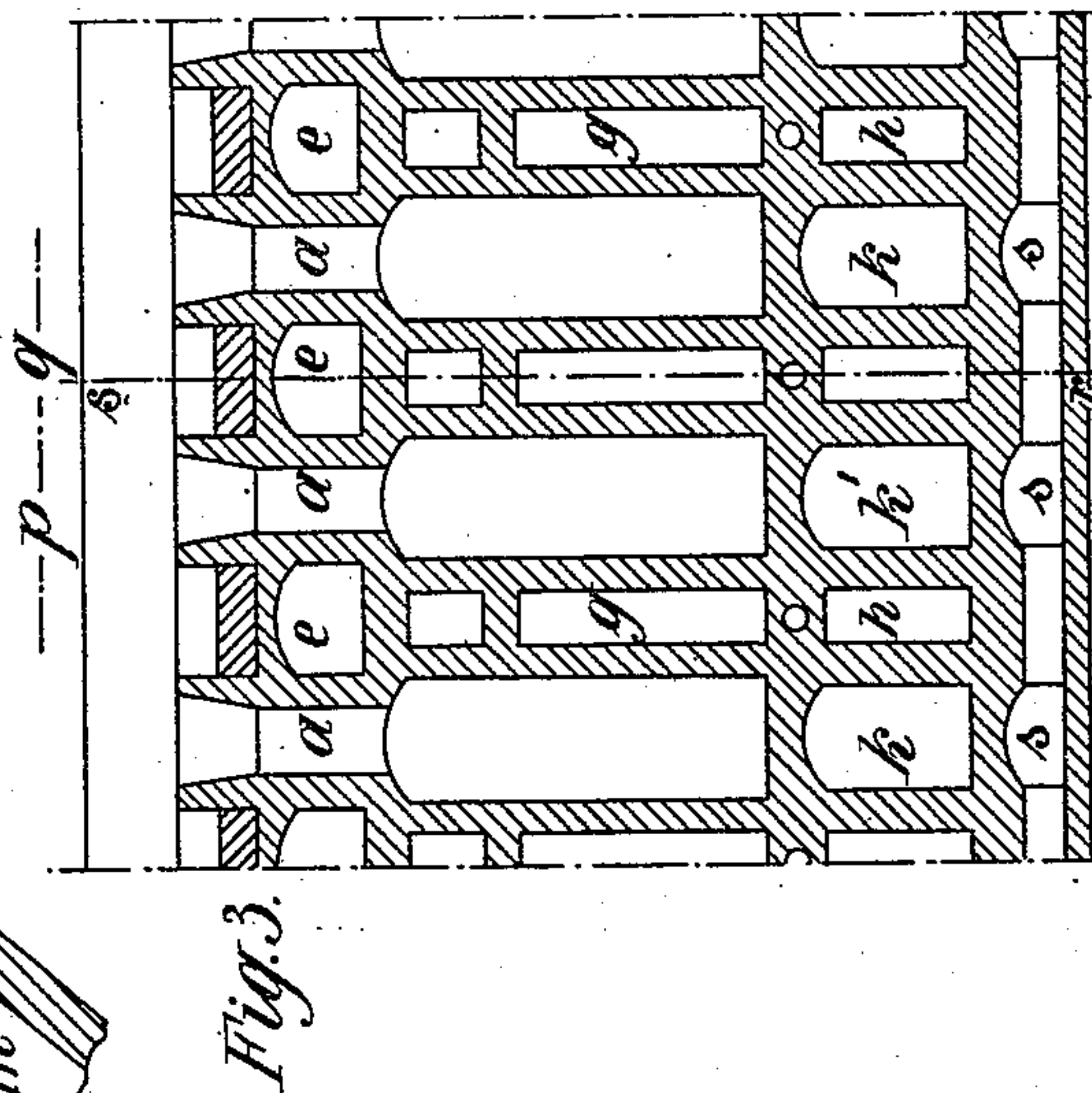
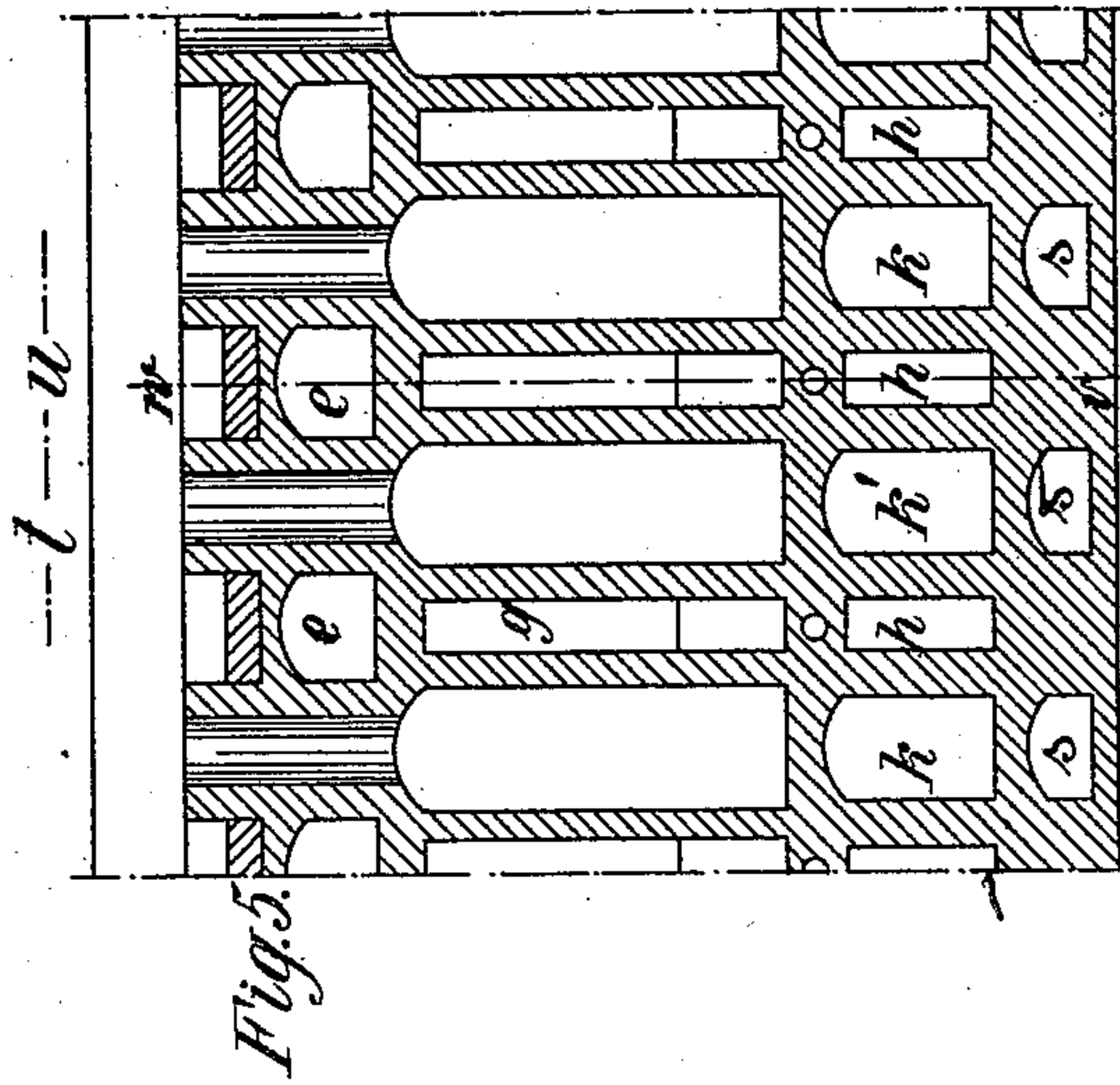
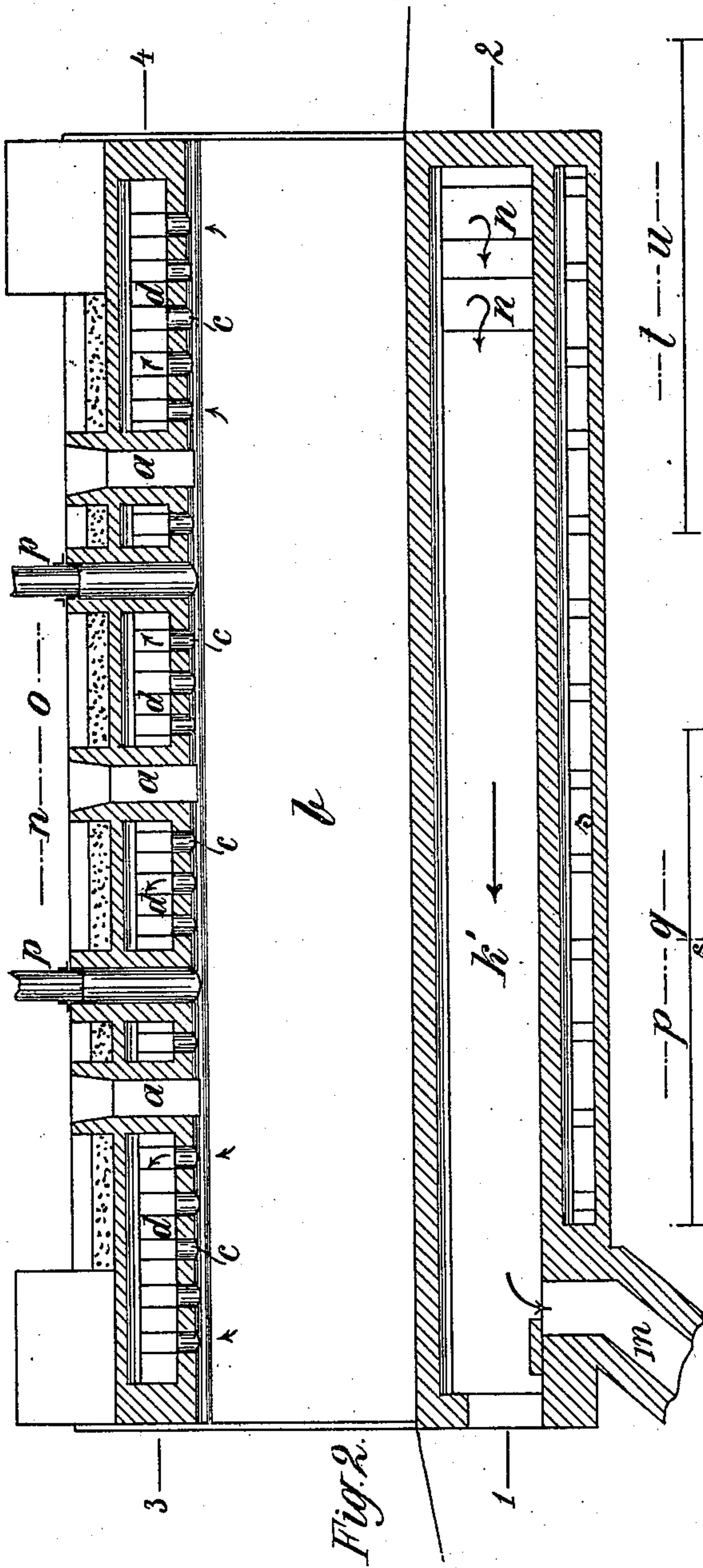
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WITNESSES.

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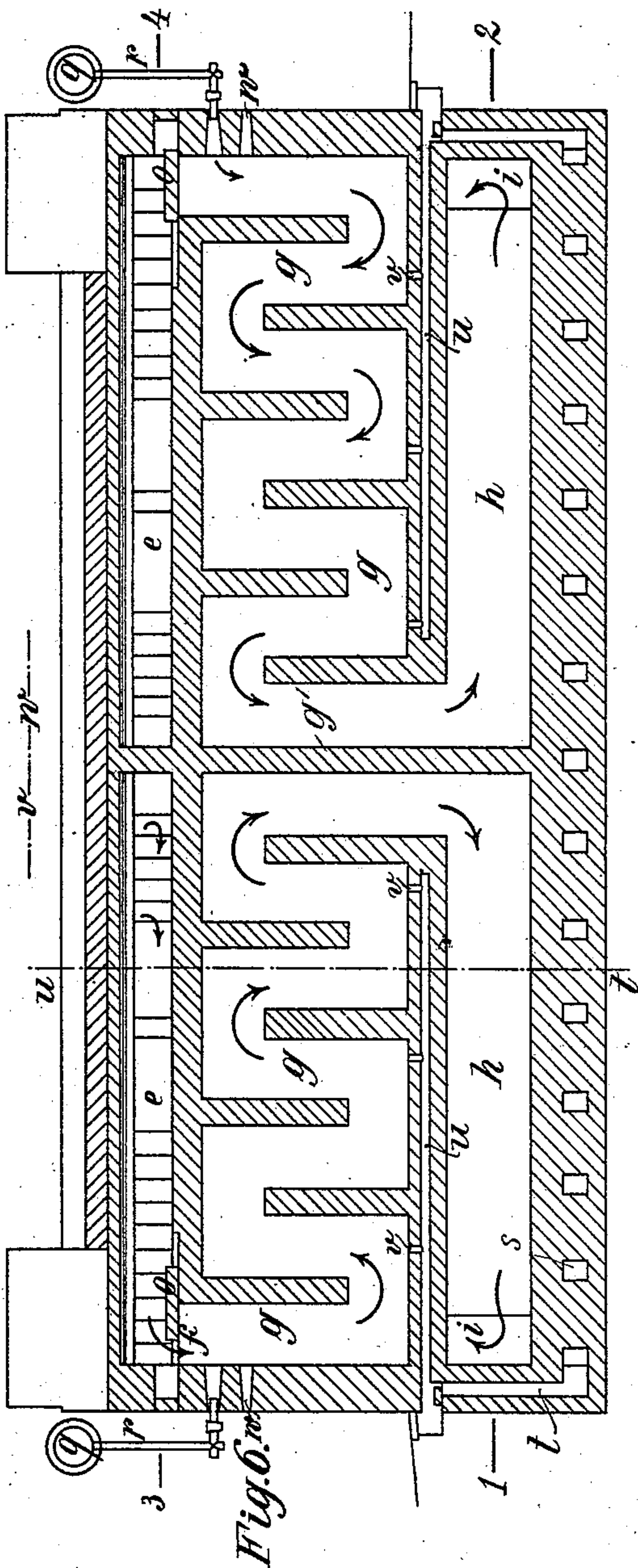
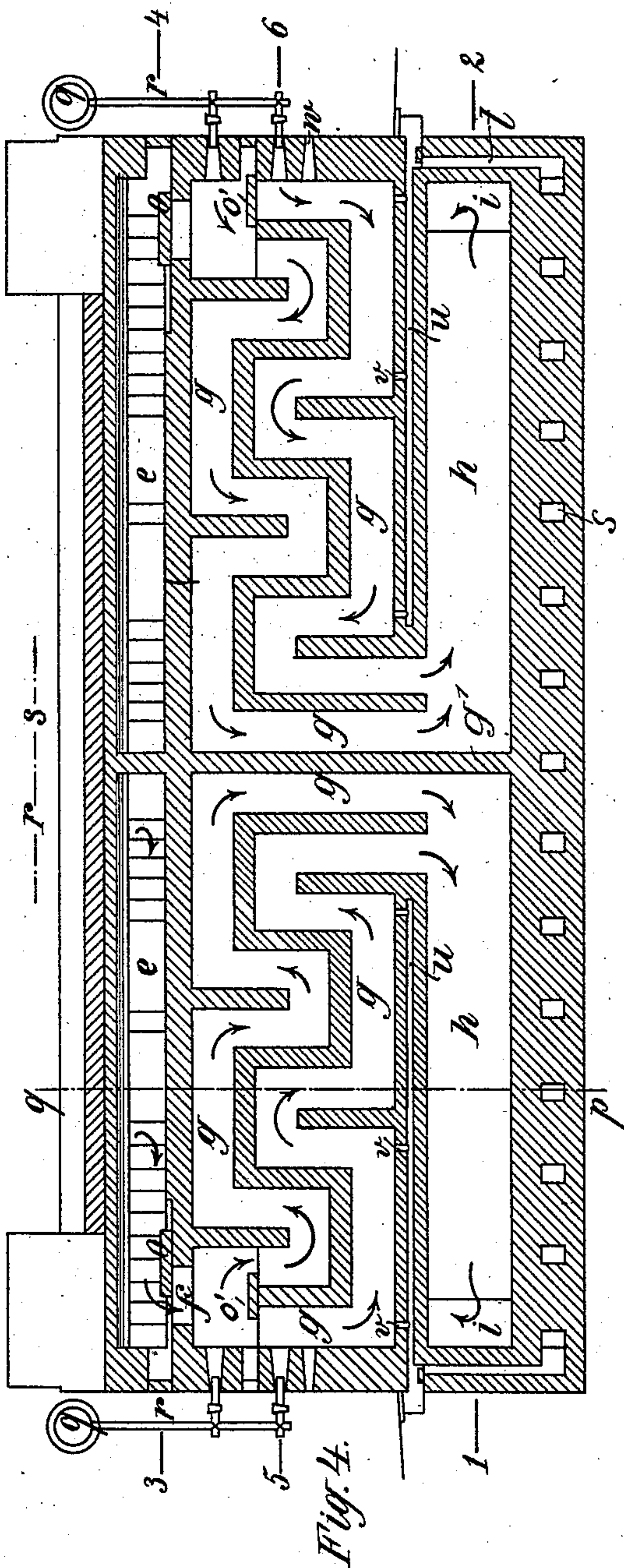
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6 Sheets—Sheet 4.

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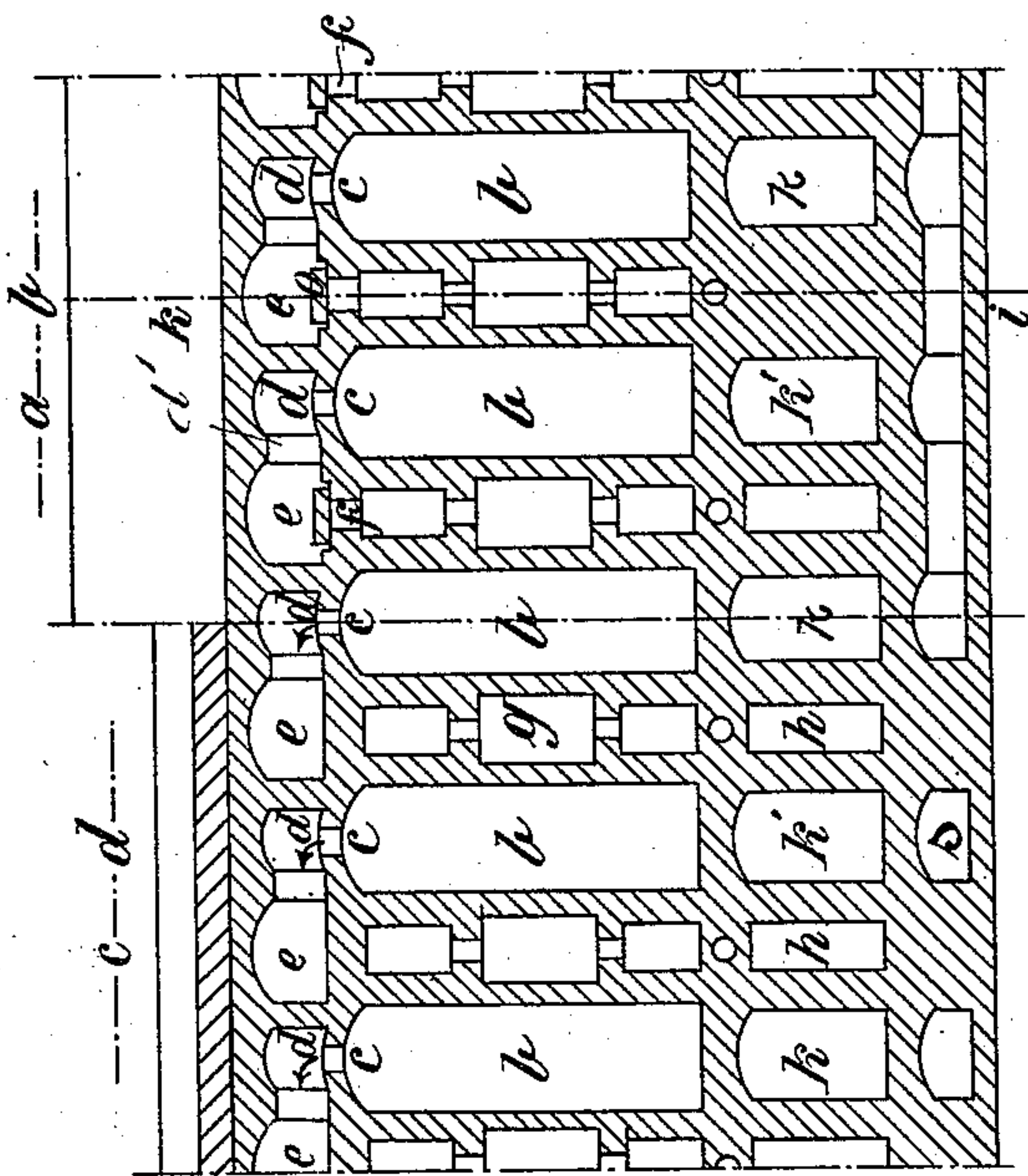


Fig. 7.

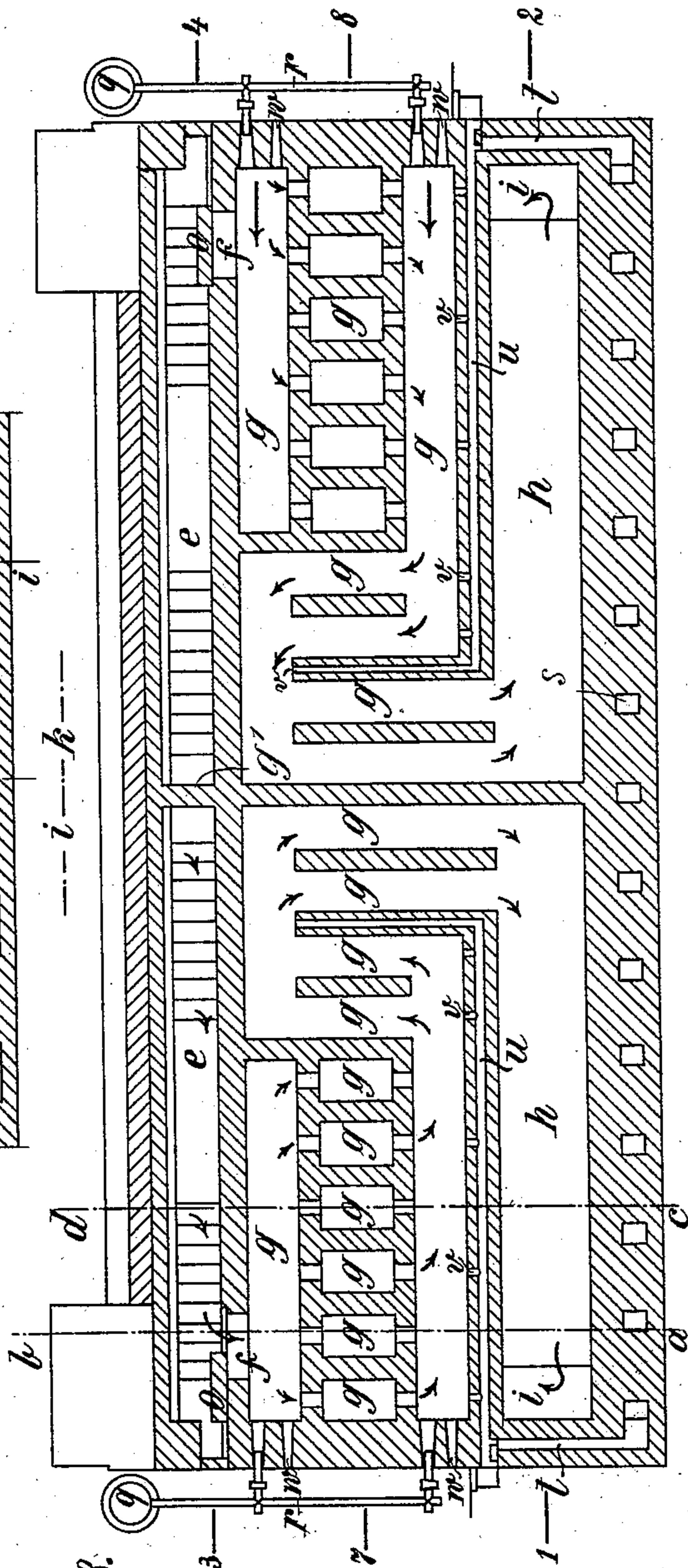


Fig. 8.

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(No Model.)

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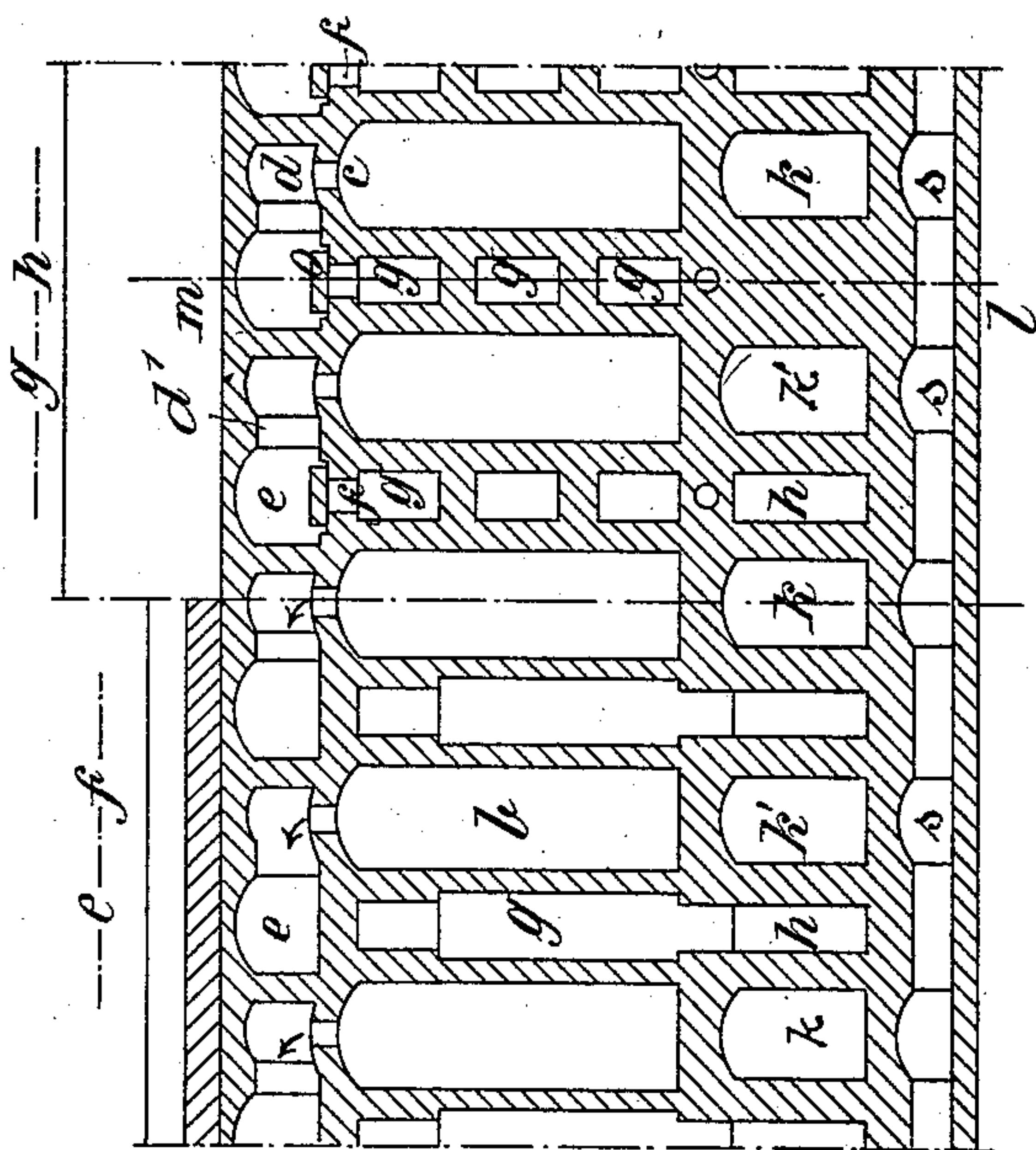


Fig. 9.

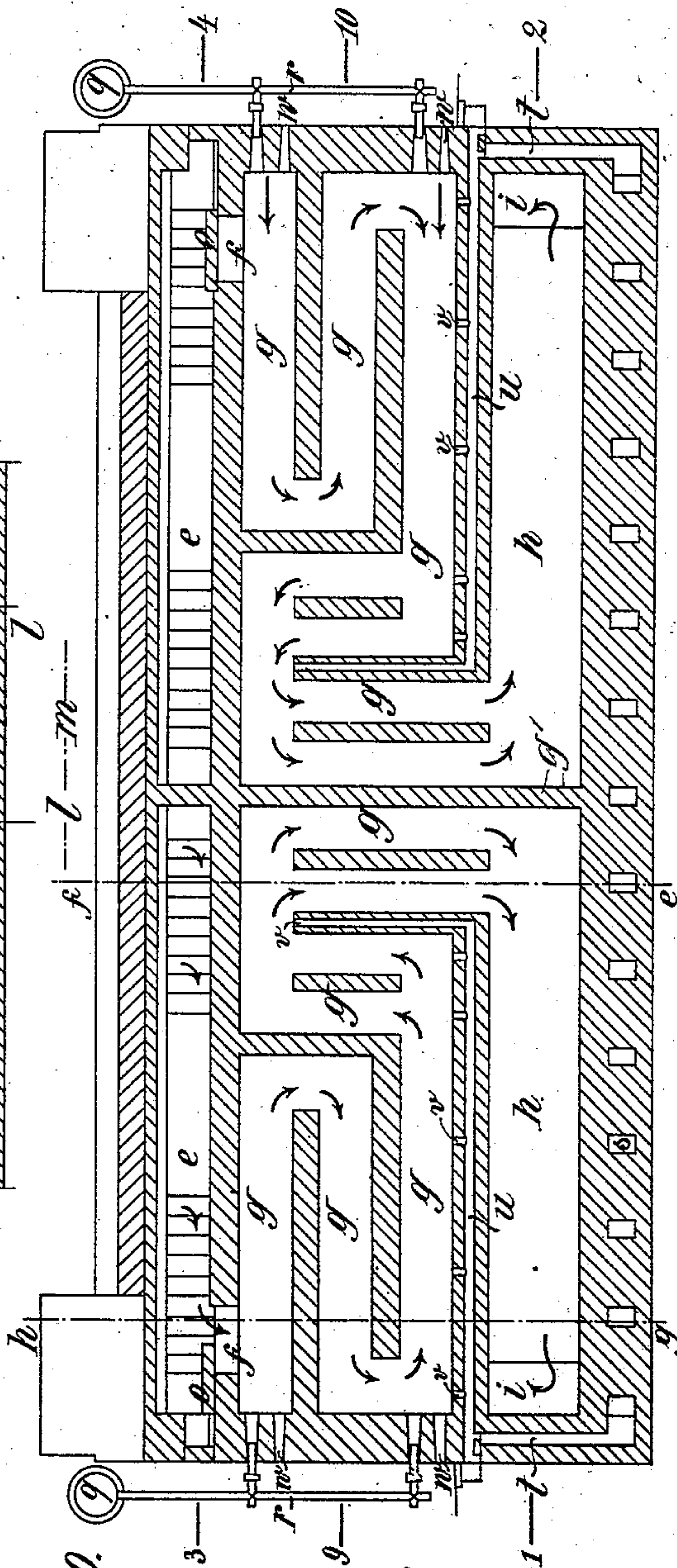


Fig. 10.

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(No Model.)

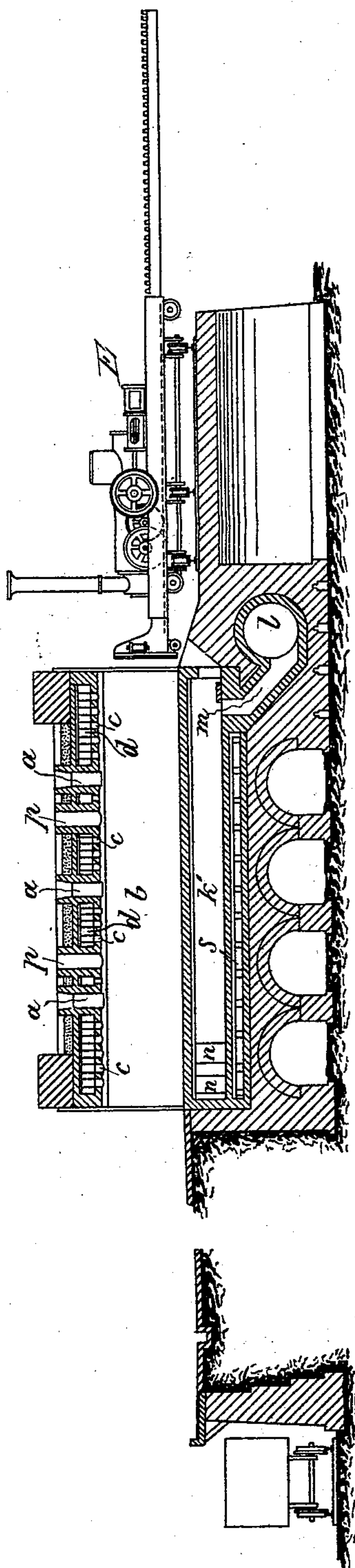
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Fig. 11



WITNESSES.
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UNITED STATES PATENT OFFICE.

FRANZ JOSEPH COLLIN, OF DORTMUND, GERMANY.

HORIZONTAL COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 538,898, dated May 7, 1895.

Application filed July 19, 1894. Serial No. 517,990. (No model.)

To all whom it may concern:

Be it known that I, FRANZ JOSEPH COLLIN, a subject of the King of the Belgians, residing at Dortmund, in the Kingdom of Prussia, Germany, have invented new and useful Improvements in or Relating to Horizontal Coke-Ovens, of which the following is a specification.

The construction of coke ovens hereinafter described has for its purpose a very hot working of the ovens, whereby it is rendered possible to coke not only bituminous coal, but also coal containing small quantities of gas and incapable of satisfactory baking. Furthermore, the passages for the gas and the heating channels are so arranged, that the escaping gases can be used for heating the boilers, and the extraction of products can be effected in the most simple manner.

The particular arrangement of the gas passages which forms the leading feature of this invention is hereinafter described and claimed.

In the accompanying drawings, which illustrate a coke-oven constructed according to my invention, Figure 1 shows five plan views of the oven, taken, respectively, on line 1 2, Figs. 2, 4, 6, 8, and 10, on line 3 4, Figs. 2, 3, 6, 8, and 10, on line 5 6, Fig. 4, on line 7 8, Fig. 8, and on line 9 10, Fig. 10. Fig. 2 is a longitudinal section on line *n o*, Fig. 1. Fig. 3 is a section on line *p q*, Fig. 4. Fig. 4 is a longitudinal section of the oven-wall on line *r s*, Fig. 3. Fig. 5 is a section on line *t u*, Fig. 6. Fig. 6 is a longitudinal section of the oven-wall on line *v w*, Fig. 5, and shows a different arrangement of sinuous channels *g* from that represented in Fig. 4. Fig. 7 shows two sections on lines *a b* and *c d*, Fig. 8. Fig. 8 is a longitudinal section of the oven-wall on line *i k*, Fig. 7, showing another construction of the sinuous channels *g*. Fig. 9 shows two sections on lines *e f* and *g h*, Fig. 10. Fig. 10 is a longitudinal section of the oven-wall on line *l m*, Fig. 9, and illustrates a further different arrangement of the sinuous channels *g*. Fig. 11 is a section of the whole oven in combination with a coke-discharging machine, (pushing engine.)

The improved coke oven comprises a series of juxtaposed horizontal chambers or ovens proper *b*, which are provided with charging

orifices *a* (Figs. 1, 2, and 3). The ends of the ovens or chambers *b* may be tightly closed by means of vertically movable doors connected to hoisting cables (not shown) or in any other suitable manner. The top walls of the chambers *b* are provided with outlets *c* (Figs. 1, 2, 7, and 11) above which are arranged longitudinal channels *d* provided with lateral openings or slots *d'* (Figs. 7 and 9) leading into longitudinal passages *e* extending between the channels *d* (Figs. 1 and 3 to 10). At the ends of the structure are provided openings *f* leading downward from the passages *e* into sinuous channels *g* arranged in the side walls of the chambers *b*. The openings *f* may be closed by means of dampers *o*. At approximately the center of each side wall in the same longitudinal plane with the channels *g* is a partition *g'*, and the channels *g* extend vertically along the said partition and connect with horizontal flues *h* disposed longitudinally of the side wall near the bottom thereof beneath the plane of the ovens.

Lateral openings *i*, located at the ends of the side walls, lead from the flues *h* into bottom channels *k* and *k'* respectively, the channels *k'* communicating with the take-up flue *l* by means of passages *m* (Fig. 11), while each channel *k* connects with the adjacent channel *k'* through the medium of passages *n* (Figs. 1 and 2). The partition *g'* also extends into the passages *e* to divide each of them into two parts, as shown. The channels *k* and *k'* are arranged directly beneath the ovens and alternate with each other.

In the bottom of the oven are arranged air channels *s* extending cross-wise of each other, below the flues *h*, *k* and *k'*. At the ends of the oven vertical passages *t* (Figs. 1, 4, 6, 8 and 10) lead upward from the air channels *s* into horizontal channels *u* located between the flues *h* and channels *g*. The channels *u* are provided with perforations or orifices adapted to discharge heated air into the channels *g*. A further supply of air may be admitted into the channels *g* if required, through holes *w* (Figs. 4, 6, 8 and 10) which also serve as sights to watch the effect of the heating process. In the top of the chambers *b* I also provide pipes *p* (Fig. 2) which are connected with a distilling apparatus (not shown), and the latter is again connected with pipes *q*

(Figs. 4, 6, 8 and 10) from which tubes *r* lead into the channels *g* at the ends of the oven.

At one end of the oven I provide a coke-discharging apparatus (a pushing engine) E running on rails as shown in Fig. 11.

The apparatus may be operated in two different manners, according as to whether or not it is desired to recover the by-products by distillation. When the by-products are to be recovered, the dampers *o* are closed. The retorts or ovens *b* are charged with coal through the openings *a*, and under the influence of the heat produced by the combustion of gases in the channels *g*, as will be described presently, the coal in the ovens *b* gives off gases which pass up through the pipes *p* into the still (not shown) where the contents of ammonia and tar are obtained in the usual manner. The purified gases are returned to the oven through the pipes *q* and tubes *r*, and then travel through the sinuous channels *g*, where they are ignited by contact with the hot walls of the oven, the combustion gases passing out through the flues *h* and openings *i* into the channels *k* and *k'* respectively, and finally through the passages *m* into the take-up flue *l*. The air required for combustion is supplied through the channels *s*, *t*, *u*, and orifices *v*, and gets heated while traveling through the said channels, whereby a better combustion is obtained, and the walls of the combustion chamber, *i. e.*, the channels and flues *g*, *h*, and *j*, *k'*, are kept comparatively cool. If required air may be admitted through the openings *w* to secure a partial combustion of the gases before they mix with the hot air. When the operation is completed in one of the retorts or ovens *b* the doors at the ends of the said oven are opened, and the coke is removed by means of the pushing engine E.

It will be observed (see particularly the upper section of Fig. 1) that the combustion gases from each oven or retort do not travel to the take-up flue *l* directly under the same retort, but are caused to pass under the adjacent retort, that is, the combustion gases issuing from the flues *h* pass first into one of the channels *k* and then into the channel *k'* located under the adjacent oven *b*. The result of this arrangement is to keep a freshly charged oven heated by the heat evolved in the adjacent oven, since two adjacent ovens are never emptied in immediate succession. The production of gas and coke is a continuous one, and the combustion gases collected in the take-up flue *l* may be conducted to the boiler and to the chimney.

When it is not desired to purify the gas evolved from the coal, with a view to obtaining by-products by distillation, the dampers *o* are opened, and the gas is caused to pass up through the outlets *c* into the channels *d* and thence through the slots *d'* into the passages *e*. From the latter the gas passes down into the sinuous channels *g*. The further course of the gas is exactly the same that I have described above.

The condition of the gas can be readily ascertained through the sight holes *w*, and the attendant may regulate the quantity of gas admitted into the channels *g* by means of the dampers *o*, so as to entirely avoid the danger of fusion which might result from a surplus of gas, or too hot a gas current. I consider this a great advantage of my invention.

Various constructions of the sinuous channels *g* may be adopted. In Fig. 4 I have shown two sets of superposed channels communicating at their inner and their outer ends. I have also shown dampers *o'* at the outer ends of the channels, permitting the inlet to either of the superposed channels to be entirely or partly closed. In Fig. 6 a single set of sinuous channels *g* is represented, and the dampers *o'* have been omitted. In Fig. 8, the channels *g* consist of two superposed flues connected by means of vertical passages having enlarged portions, and the inner ends of the lower flues are connected to upward passages which in turn communicate with downward passages disposed adjacent to the central partition *g'*. The orifices *v* discharge air partly into the lower portion of the channels *g*, and partly into the upper portion of the same, adjacent to the central partition. As shown in Fig. 10, the sinuous channels *g* are produced by horizontal partitions in the outer part of the side walls, and vertical partitions in the central part of the said walls. The arrangement of the orifices *v* is the same as in Fig. 8.

What I claim, and desire to secure by Letters Patent, is—

1. A coke oven provided with essentially horizontal chambers or ovens, channels arranged directly above the said chambers and communicating therewith, longitudinal passages extending between the said channels and communicating therewith, said passages being divided into two parts at approximately the center of the oven, sinuous channels arranged in the side walls of the oven and connected to the said passages at the ends of the oven, essentially horizontal flues located below the said sinuous channels and communicating therewith at the central portion of the oven, and bottom channels connected to the said flues and of which each two communicate with each other so as to cause the gases from either of the ovens or chambers connected to the said channels, to pass successively under each of the ovens through the said two bottom channels, one of each two bottom channels being connected with a smoke flue, substantially as and for the purpose set forth.

2. A coke oven provided with essentially horizontal chambers or ovens, channels arranged directly above the said chambers and communicating therewith, longitudinal passages extending between the said channels and communicating therewith, said passages being divided into two parts at approximately the center of the oven, sinuous channels ar-

5 ranged in the side walls of the oven and connected to the said passages at the ends of the oven, dampers arranged at the points where the said passages communicate with the sinu-
10 ous channels, longitudinal flues located in the side walls below the said sinuous channels and communicating therewith at the central portion of the oven, and bottom channels arranged between the said flues in the bottom
15 walls of the ovens and connected to the said flues at the ends of the oven, each two of the said bottom channels communicating with each other so as to cause the gases from either of the ovens or chambers connected to the
20 said channels, to pass successively under each of the ovens through the said two bottom channels, one of each two bottom channels being connected with a smoke flue, substantially as and for the purpose set forth.

3. A coke oven provided with a series of

juxtaposited essentially horizontal chambers or ovens, channels arranged in the bottom walls of the said chambers and connected with the chambers so as to receive the gases therefrom, each two of the said bottom channels communicating with each other so as to cause the gases from either of the ovens or chambers connected to the said channels, to pass successively under each of the ovens through the said two bottom channels, one of each two bottom channels being connected with a smoke flue, substantially as and for the purpose set forth.

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

FRANZ JOSEPH COLLIN.

Witnesses:

FRANZ WEINDORF,

ALBERT KLINGHAMMER.