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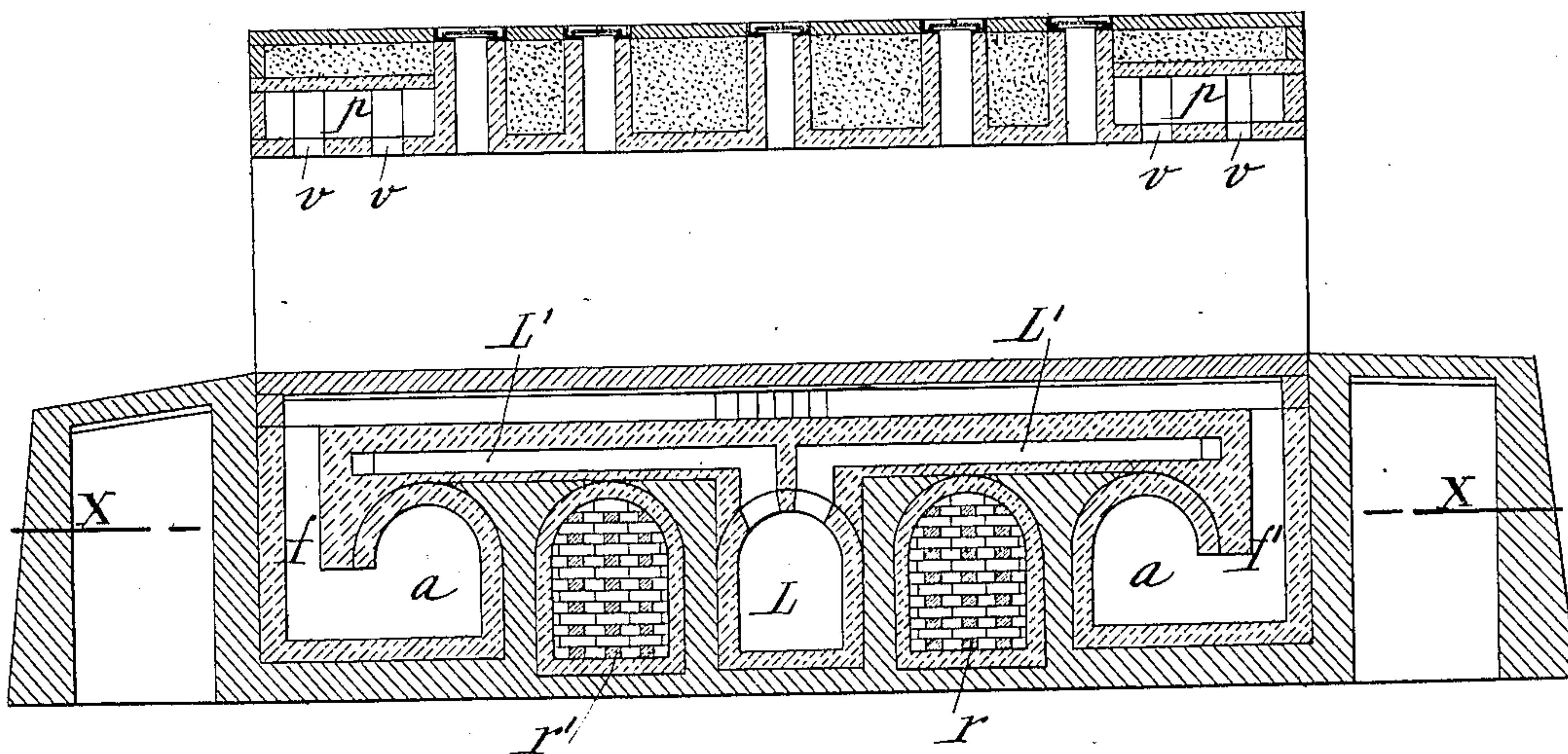
PATENTED JAN. 7, 1908.

E. COPPÉE.  
REGENERATIVE COKE OVEN.

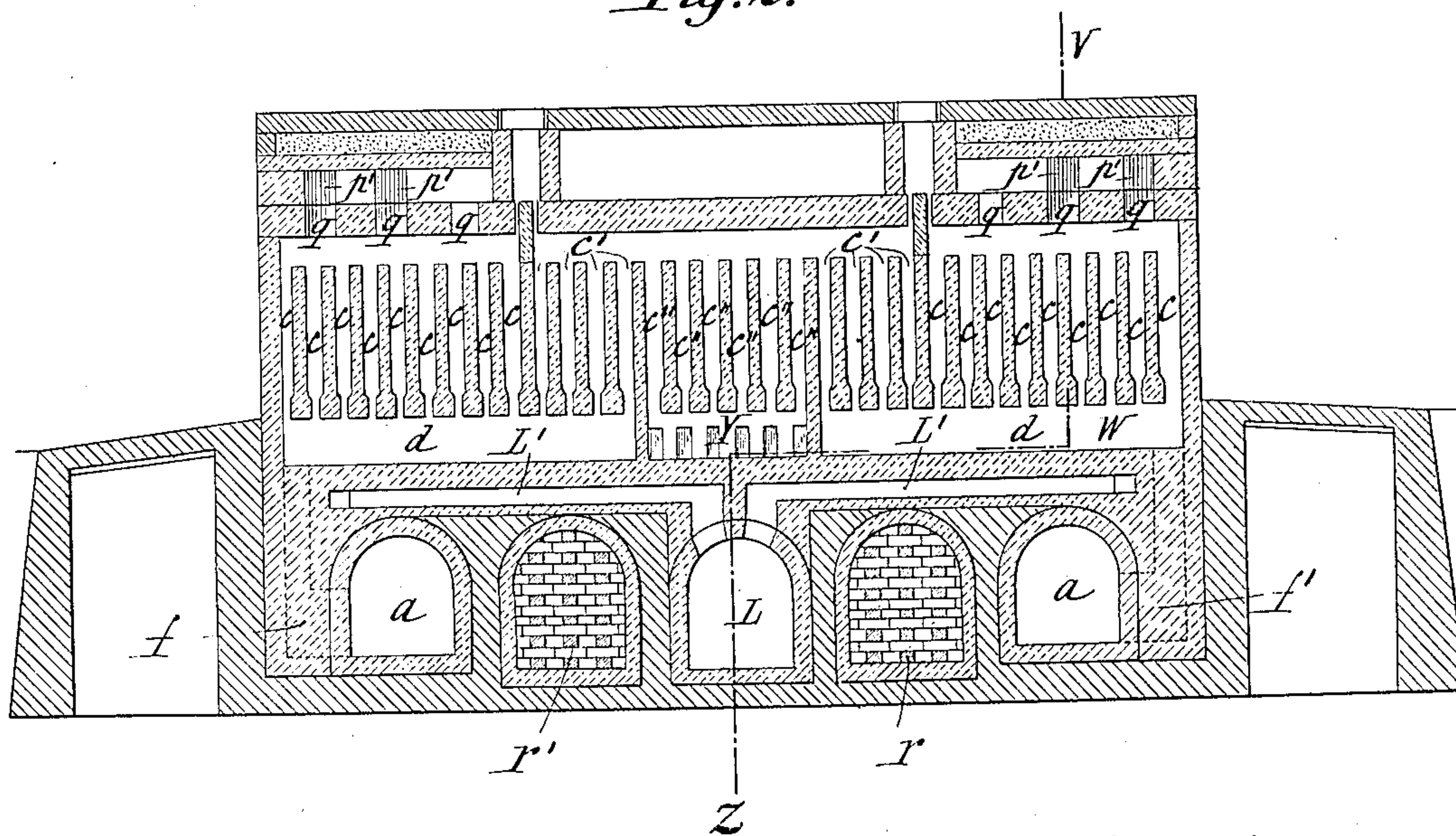
APPLICATION FILED AUG. 16, 1905.

3 SHEETS—SHEET 1.

*Fig. 1.*



*Fig. 2.*



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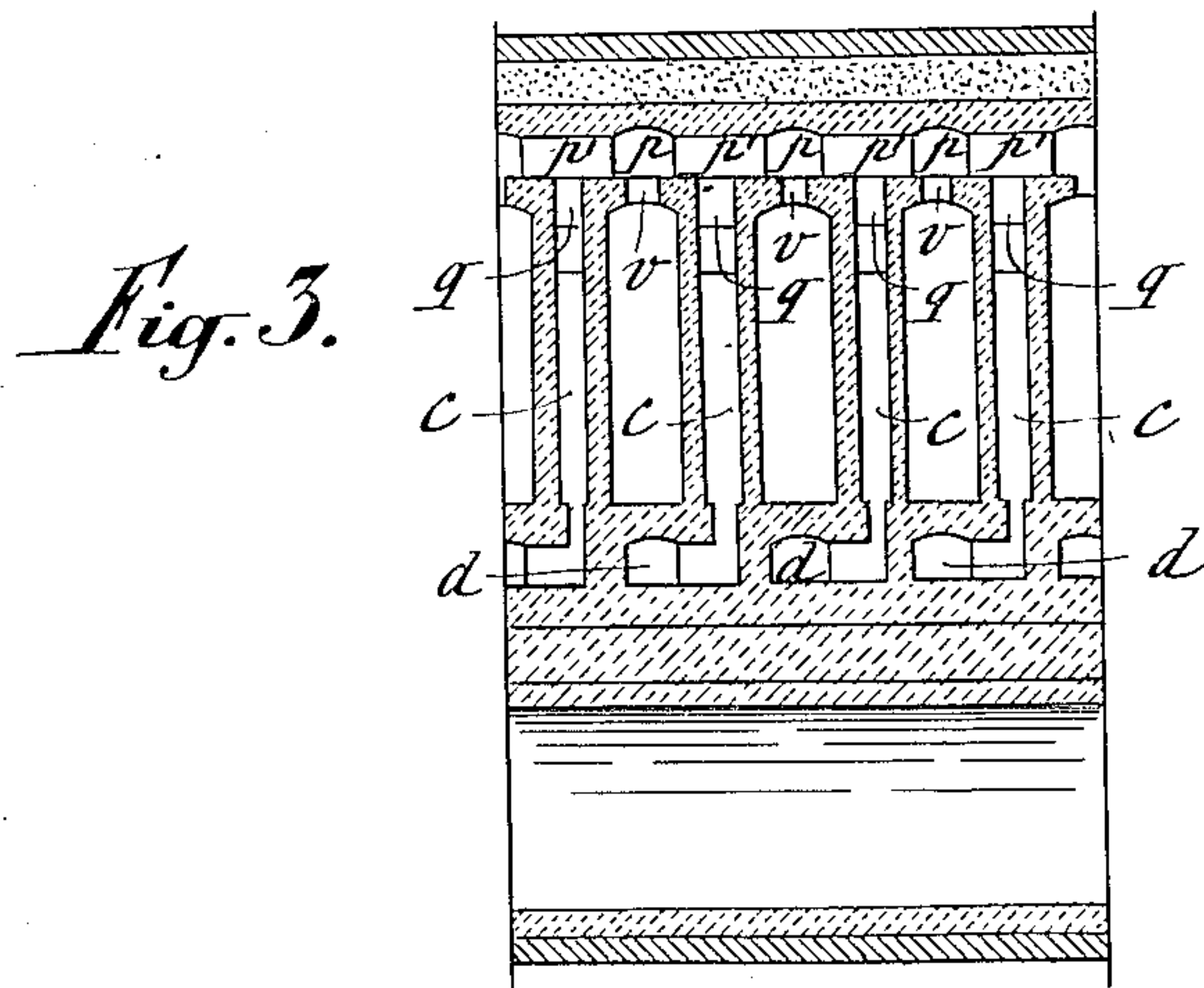
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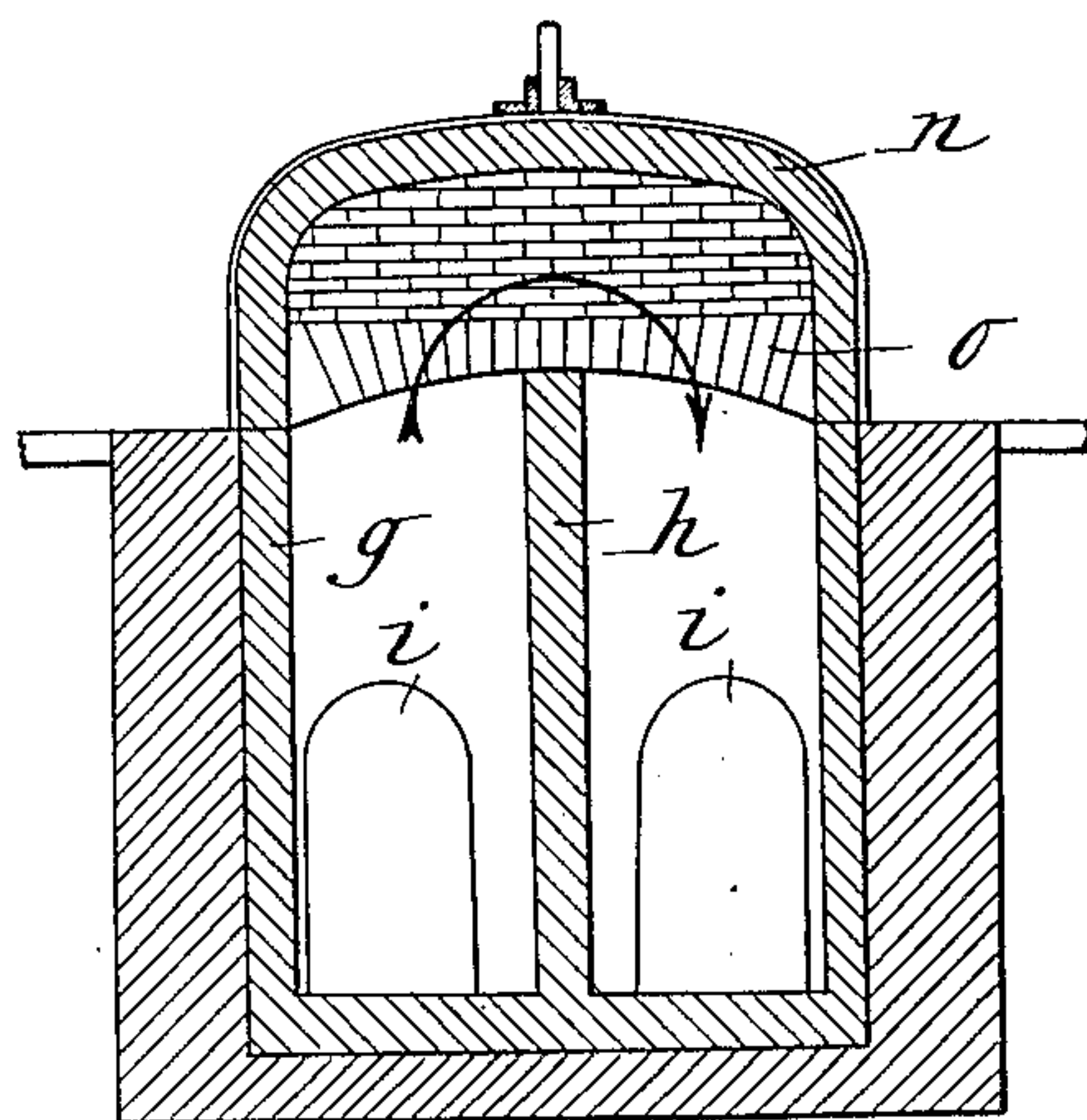
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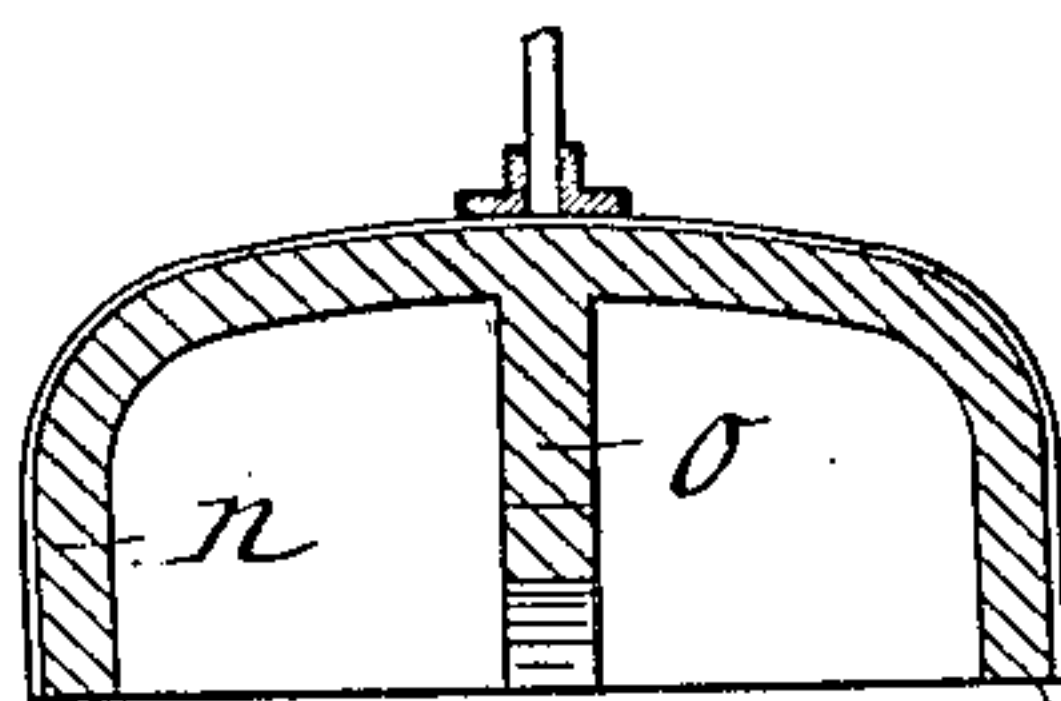
3 SHEETS—SHEET 2.



*Fig. 5.*



*Fig. 6.*



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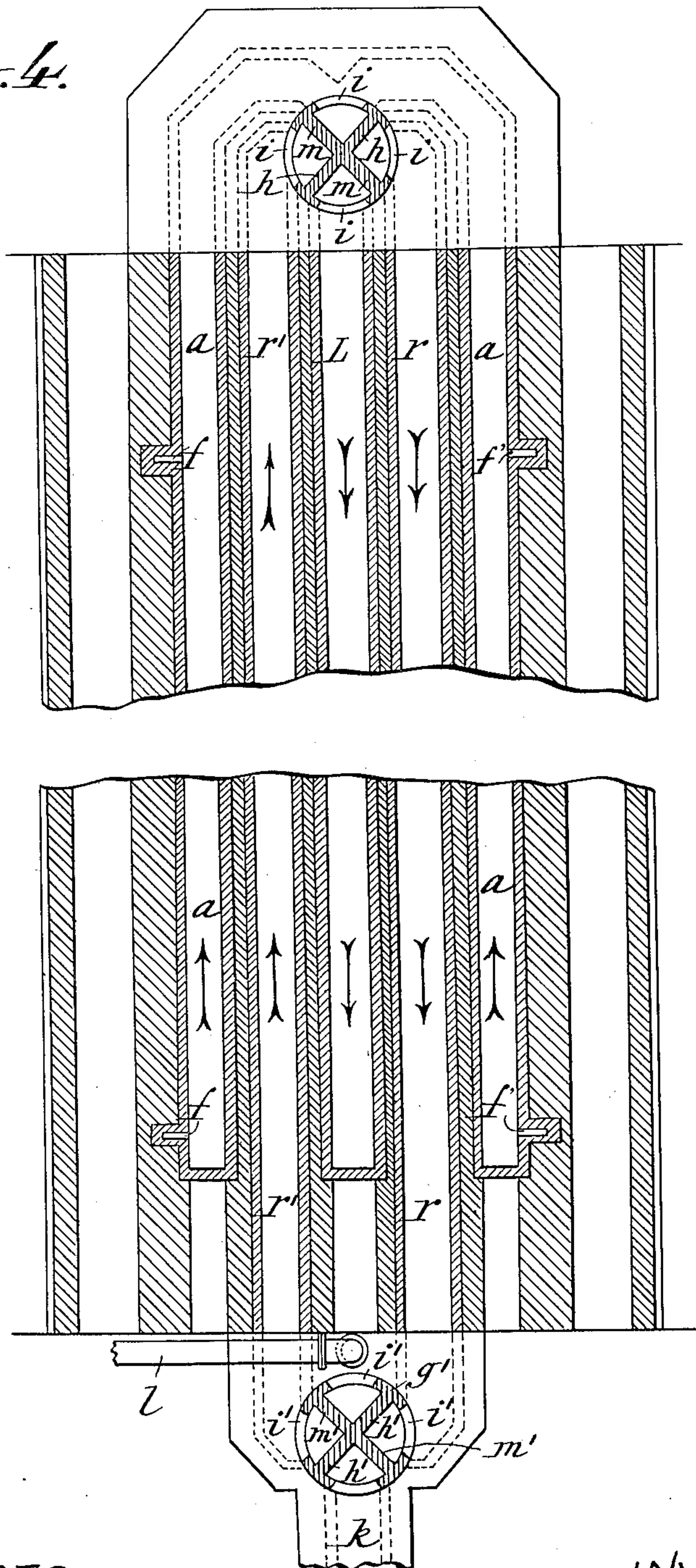
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## REGENERATIVE COKE OVEN.

APPLICATION FILED AUG. 15, 1905.

3 SHEETS—SHEET 3.

*Fig. 4.*



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# UNITED STATES PATENT OFFICE.

EVENCE COPPÉE, OF BRUSSELS, BELGIUM.

## REGENERATIVE COKE-OVEN.

No. 875,896.

Specification of Letters Patent.

Patented Jan. 7, 1908.

Application filed August 15, 1905. Serial No. 274,316.

*To all whom it may concern:*

Be it known that I, EVENCE COPPÉE, a subject to the King of Belgium, and resident of 71 Boulevard d'Anderlecht, Brussels, Belgium, engineer, have invented certain new and useful Improvements in Regenerative Coke-Ovens, of which the following is a specification.

This invention relates to an improved construction of coke ovens with regenerative action, which offers all the advantages of similar known constructions, while doing away with the inconvenience resulting from the reversal of the currents of the combustible gases and flames whereby only half of the ovens are heated at one time alternately; in other words, the improved construction realizes all the advantages of the regenerative system, while allowing all the ovens to be heated simultaneously along their entire length and in a continuous manner, without requiring to change the direction of the currents. For this purpose, on the one hand, all the products of combustion of the battery are brought to one and the same point whence they are directed at will to the one or the other of two regenerators, whence they pass to the boilers, while on the other hand, the air necessary for the combustion, after having been heated in the one regenerator, is conveyed simultaneously to all the combustion chambers of all the ovens of the battery.

On the accompanying drawings are shown by way of example, one form of construction of the coke ovens according to my present invention.

Figure 1 is a vertical longitudinal section through one of the ovens of the battery. Fig. 2 is a longitudinal section across the side wall. Fig. 3 is a transverse section on line V W Y Z of Fig. 2. Fig. 4 is a horizontal section to a smaller scale on line x x of Fig. 1. Figs. 5 and 6 are detail sections to a larger scale.

The passage of the gases in the various canals of the sidewalls shows nothing particular; it is, in every respect similar to that followed by the gases in other well known systems of coke furnaces with vertical canals and especially in the system described in Coppee's United States patent 794662. As a matter of fact the gas evolved from the coal passes in the upper part of the oven through the four openings *v*, the gases thus enter the chambers *p*, whence they pass into the side-wall by the four chambers *p'*, and then pass-

ing through the openings *q* descend into the partition by 18 flues *c* of which 9 are in front and 9 behind. The gases thus arrive in the chambers *d* to ascend eight flues *c'* four of which are in front and four behind. The two currents of gas thus reunited then descend by six flues *c''* and pass beneath the floor where they depart by flues *f* in the front half and by flues *f'* in the rear half to the collecting channels *a*, the latter extend along the entire length of the battery and open at the front of the same (to the right hand at Fig. 4) into a special apparatus shown in vertical section at Fig. 5. This apparatus is composed of a cylindrical pit *g* divided into four chambers by means of two vertical partitions *h* and *m*, each of which chambers has an opening *i*. This pit is inclosed at top by means of a movable cap *n*, shown separately in section at Fig. 6, and which is provided with a diametrical partition *o*. This apparatus causes the hot gases to pass either into the regenerator *r* or into the regenerator *r'*, according as the cap *n* occupies the position in which the partition *o* coincides with the partition *m*, or that in which it coincides with the partition *h*. The regenerators *r* and *r'* have, as usual, a filling of refractory bricks arranged in the known manner.

After having passed through the regenerator the gases issue at the opposite extremity of the battery into a second pit *g'* which is also divided into four chambers by means of two vertical partitions *h'* and *m'*, each of which chambers has an opening *i'*; the pit *g'* is also inclosed at top by means of a revolving cap with a diametrical partition. From the pit *g'* the gases pass into a flue *k* leading to the steam boilers or other apparatus where they are to be utilized. The gases take the following course: The gases pass through the longitudinal canals "*a*", as indicated by the arrows, and arrive at the first apparatus "*g*". They enter through "*i*" into the compartment of this well which is connected with the said canals, and ascend again as far as to the top of the well. If the position of the bell is such that the diametral partition "*o*" is placed over the partition "*m*" of the well, then the gases pass above the partition "*h*", come down again through the adjacent compartment and reach from there the regenerator "*r*". They pass through the latter in the direction indicated in the drawing by the arrow and arrive at the second apparatus "*g'*" into which they enter



through that compartment connected with the regenerator "r". They rise in the said compartment as far as to the upper part of the well and, owing to the position occupied  
 5 by the bell whose diametrical partition is in this case placed on the partition *h'*, they pass into the adjacent compartment which communicates with canal "*k*" running to the boilers, etc. The preceding explanation  
 10 applies to one of the positions of the bell; it may be easy to infer therefrom the corresponding course, when the bell is in its second position.

The air necessary for the combustion of  
 15 the combustible gases produced in the coke ovens is conveyed through a pipe *l* into the second half of the pit *g'* and passes to the regenerator which for the time being does not have the combustion gases passing  
 20 through it. After having been heated in the regenerator the air passes to the pit *g* from which it passes to the hot air channel *L* whence it rises into the flues *L'* (Fig. 1) which direct it towards the front and the back ends  
 25 of the several ovens and whence it is distributed to all the combustion chambers. Slides are provided for regulating the supply of hot air.

When the caps *n* occupy the positions in  
 30 which their partitions *o* are situated respectively upon the partitions *m* and *h'* of the pits *g* and *g'* the products of combustion which pass from the flues *a* are conveyed by the cap *n* into the regenerator *r* and thence  
 35 to the boilers, while the air passes from the supply pipe *l* to the regenerator *r'* and thence through the cap *n* to the channel *L* and thence to the several combustion chambers, the direction of flow of gases and air being  
 40 indicated by arrows in Fig. 4.

When the air, conveyed to the regenerator *r'*, has taken up all the heat which was stored therein, the caps *n* are turned through 90° so that their partitions *o* are situated respec-  
 45 tively upon the partitions *h* and *m'*. The combustion gases will then be sent to the regenerator *r'* and thence to the boilers while the air passes to the regenerator *r*, where it is heated and whence it passes through the  
 50 channel *L* to the ovens. The caps *n* are operated simultaneously by means of any suitable known arrangement of mechanism with transmission gear, which is not shown on the drawing.

55 Having now described my invention and in what manner the same is to performed,

what I claim as new and desire to secure by Letters Patent is:

1. Regenerating coke-furnaces, without reversing of the current of flames, in which  
 60 the furnaces are heated simultaneously all over their length in a continuous manner, the series of furnaces comprising five longitudinal canals of which the two outer ones "*a*" receive the gases of combustion from  
 65 the furnaces, while the central canal "*L*" serves to feed to the furnaces the air required for the combustion; the two remaining canals "*r r'*" forming regenerators, a well of four chambers with which the canals communi-  
 70 cate, a bell surmounting said well and which causes, at will, the canals "*a*" to communicate with any one of the regenerators and the canal "*L*" with the other regenerator, a second well communicating with the two re-  
 75 generators at the rear of the furnaces and which causes to communicate, at will, any one of the regenerators with canals leading to boilers, and the other regenerator with the conduit for letting-in cold air. 80

2. In regenerative coke ovens of the kind herein referred to, a battery of coking chambers, having five channels located there-  
 below, said channels extending longitudi-  
 85 nally of the battery, of which the two outer ones *a* receive the combustion gases from the ovens, the middle one *L* serves to convey the heated air required for combustion to the ovens, while the two intermediate channels *r r'* constitute regenerators for alternately  
 90 taking up heat from the combustion gases and imparting the same to the air supply, a reversing valve chamber with four compartments with which said channels communi-  
 95 cate by means of which while the one channel *a* is made to communicate with one of the regenerators, the air channel *L* is made to communicate with the other regenerator, a second reversing valve chamber with four compartments communicating with the other  
 100 end of the channels whereby the one regenerator is made to communicate with a flue leading to boilers, while the other regenerator is made to communicate with the atmosphere substantially as described. 105

In witness whereof I have hereunto set my hand in presence of two witnesses.

EVENCE COPPÉE.

Witnesses:

ED. THIRIONET,  
 J. LOFFIN.