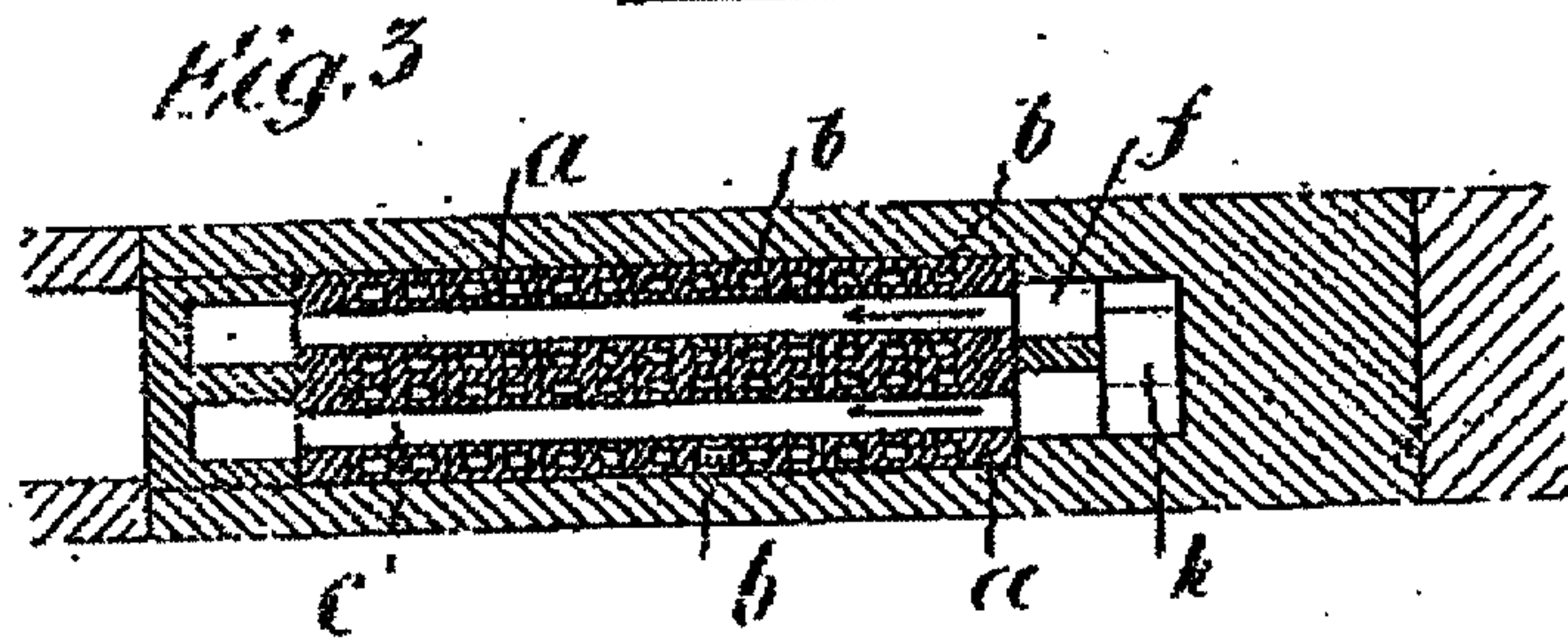
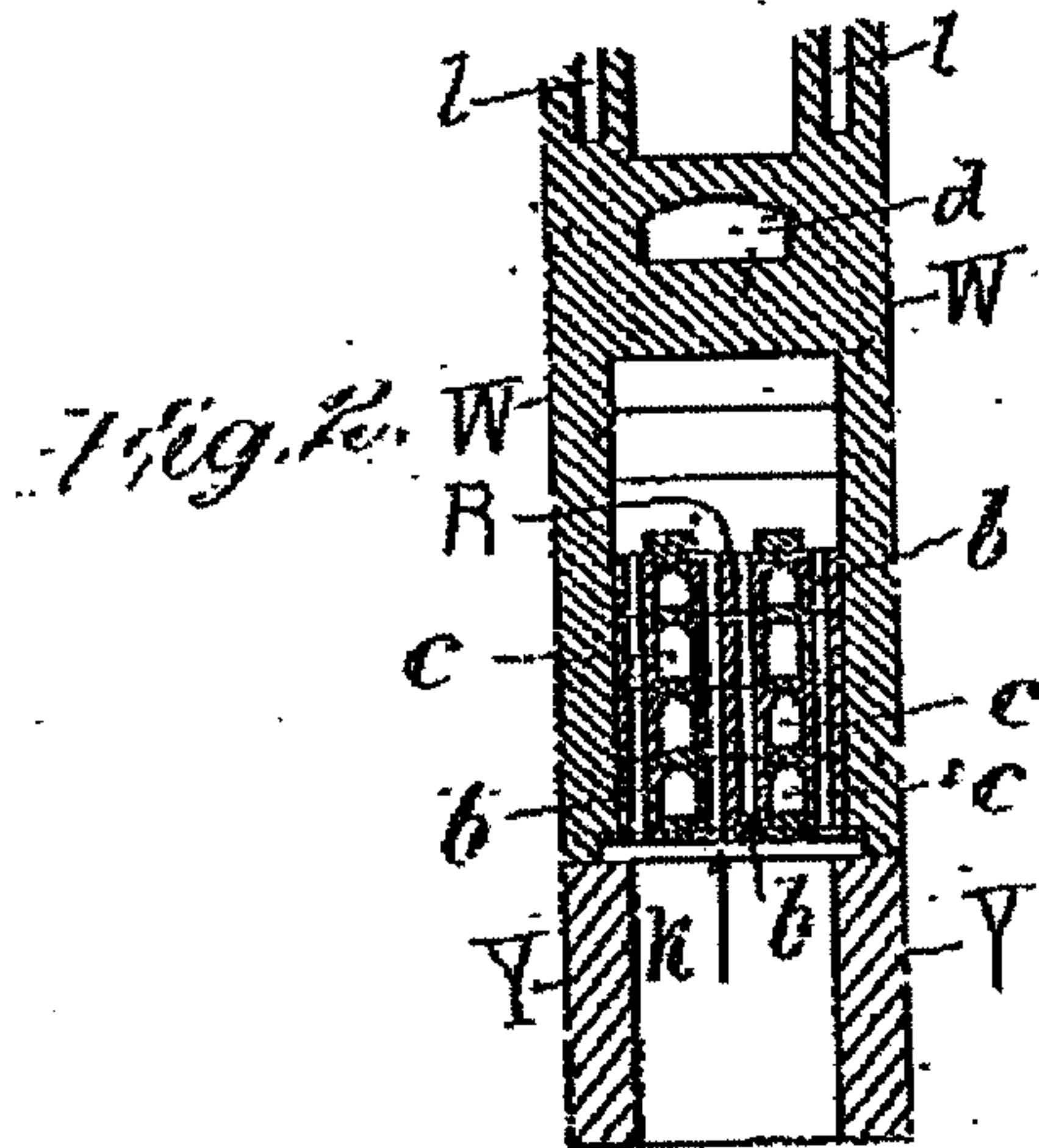
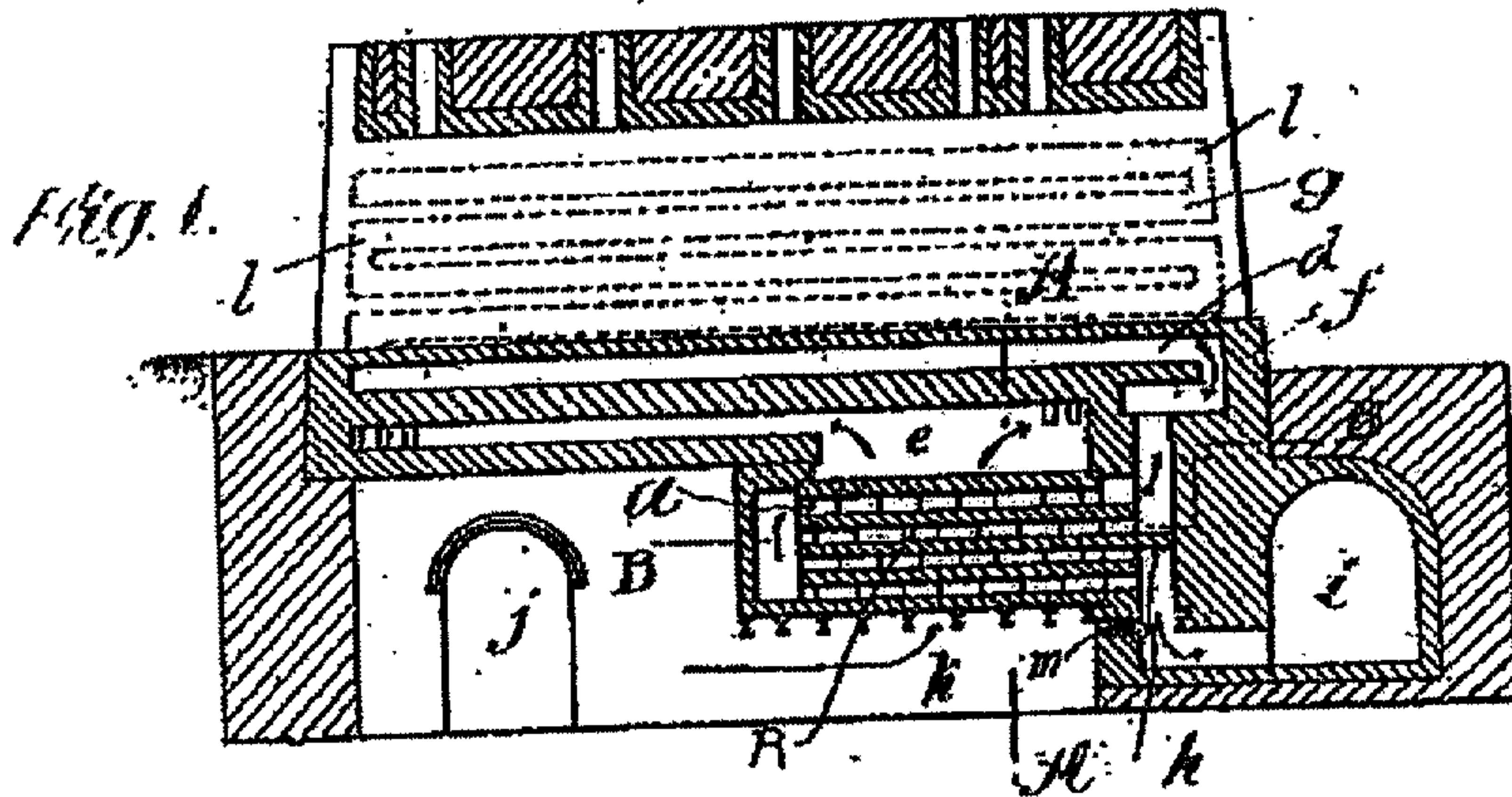


E. SOLVAY.
 CONTINUOUS HEAT INTERCHANGING ARRANGEMENT FOR COKE OVENS.
 APPLICATION FILED JUNE 4, 1907.

914,525.

Patented Mar. 9, 1909.



Witnesses:
 Ernest Solway
 Clark & Collins

Inventor
 Ernest Solway
 By his Attorney
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UNITED STATES PATENT OFFICE.

ERNEST SOLVAY, OF BRUSSELS, BELGIUM.

CONTINUOUS HEAT-INTERCHANGING ARRANGEMENT FOR COKE-OVENS.

No. 914,525.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed June 6, 1907. Serial No. 377,539.

To all whom it may concern:

Be it known that I, ERNEST SOLVAY, a subject of the King of the Belgians, residing at Brussels, Belgium, have invented new and useful Improvements in Continuous Heat-Interchanging Arrangements for Coke-Ovens, of which the following is a specification.

My invention relates to that type of apparatus in which the air which supplies the oxygen for the combustion of the burning gas used to heat the retort or oven is continuously heated by the interchange of the heat of the products of combustion through intervening walls of their respective passages, as distinguished from that using an arrangement of the Siemens type, with regenerators into which are passed alternately the hot gases of combustion, and the air to be heated.

My invention consists in the combination and arrangement of parts hereinafter shown and described, to the end of improved results in operation, as well as increased durability of the apparatus, and economy in construction and making repairs.

The invention will be best understood by reference to the accompanying drawings, in which;

Figure 1 shows in vertical longitudinal section, a coking chamber or oven and its heat interchanger. Fig. 2 is a vertical section of the heat interchanger, the sides and the lower part of the coking chamber, on the line A, A, Fig. 1, and Fig. 3 is a longitudinal section on the line B, B, Fig. 1.

The side walls W, W of the oven, which also form the division walls of the oven block, are maintained below the floor of the oven, so as to form below the oven an open space K within which is located the heat interchanger R, independently supported upon the same foundations Y, Y which support the walls.

In the brick-work immediately below the oven is located a horizontal flue of considerable size, called the "sole flue" d, which extends the length of the oven, into which are discharged the hot, spent gases of combustion; and between this and the top of the heat interchanger is an inclosed open space e, extending the length of the sole flue, and parallel therewith, into which is discharged the air heated by its passage through the interchanger R, and from which the heated air passes to the combustion flues

within the oven walls. Below this space e is located the heat interchanger R, which is structurally independent of the oven or coking chamber g although supported on the same foundations which carry the oven walls. It consists essentially of a series of rows of refractory bricks a, which are hollow or perforated in one direction, and put together end to end so as to form continuous conduits in the interior of the bricks as at b, the spaces between the various rows forming flues c at right angles to these conduits, having no connecting opening to said conduits.

The discharge flue f for the spent gases of combustion from the sole flue is provided with a central partition h so arranged that these gases are caused to first pass in subdivided form through one-half of the interchanger in one direction, and then through the other half in the reverse direction, and thence by passage i to the chimney, or to boilers, in case the gases are required to generate steam. The air enters by the opening j, passing from space k below the interchanger to the space e above the same and thence to the combustion flues l l in the walls of the coking chamber g. The incoming cool air is in one series of passages of the heat interchanger, and the hot spent gases are in adjacent, but entirely separate, series of passages, the heat of the spent gases being transmitted to the incoming air in the adjacent passages continuously through the intervening flue walls. The operation of the heat interchanger as a preheater of the air can be discontinued merely by shunting the hot gas past the heat interchanger by any means externally or internally to the oven structure. This in no way interferes with the coking process in the oven, merely requiring more gas to be burned in the oven flues when maintaining the heats with cool air. If desired a damper m may be located in the flue f, as shown, to control the flow of the spent gases. Thus, the interchanger, being most accessible for repairs, not only may be entirely taken out and replaced without interfering with the oven structure, but also without interfering with the coking process; moreover, being structurally independent, it can expand and contract without affecting the oven structure and without injury to itself.

In the operation of the interchanger, the incoming coldest air traverses the lower tile passages in thin layers adjacent to and across the direction of the coldest outgoing spent

gases; also the hottest incoming air traverses the upper tile passages in thin layers adjacent to and across the direction of the hottest outgoing spent gases. This permits a maximum efficiency of heat exchange or recovery by the interchanger in contrast to the poor heat recovery by systems where all, or a portion, of the gases and the air are traveling in the same direction. The delivery of the highly heated air from the interchanger into the space above in proximity to the hot spent gases in the sole flue maintains a uniformly high temperature at this point, preserving high heats in the bottom of the coking chamber. Thus, not only is the air most completely heated; but the oven charge completely coked.

By means of the arrangement herein shown and described, the air is very completely heated, and better results in coking are obtained, together with a larger yield of surplus gas, than by any means heretofore known to me; advantages which will be readily appreciated by those skilled in the art.

I have described herein a single coke oven, with its interchanger and connections, but it will be understood that in practice such oven forms one unit of a block of ovens, each additional unit of which is formed by the construction of a single wall, with an additional interchanger located and constructed in the manner shown herein.

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

1. In a coke oven arrangement, the combination of a coke oven, having its side walls extended downward, so as to form an open space below the oven, combustion flues in the side walls of the oven, a heat interchanger structurally independent of the oven, located in said open space, and independently supported by the same foundations as the extended side walls, a sole flue for the reception of the spent gases of combustion, extending horizontally below the floor of the oven, an inclosed hot air space between said sole flue and the interchanger, and communicating with the combustion flues, and a discharge flue from the sole flue, having a cen-

trally located partition, whereby the spent gases of combustion are caused to pass through one-half of the interchanger in one direction, and through the other half of the interchanger to the outlet, in the reverse direction and means for admitting heat to the heat interchanger below the same, substantially as and for the purposes set forth.

2. In a coke oven arrangement, the combination of a coking chamber, having side walls extended downward below the floor thereof, a heat interchanger located below said chamber and between said walls, and independently supported by the same foundations, an inclosed space for the reception of heated air, located immediately above the interchanger, a sole flue for the reception of the gases of combustion, located between said coking chamber and said hot air space and a flue leading from the sole flue to the interchanger, and means for admitting air to the lower part of the interchanger, substantially as set forth.

3. In a coke oven arrangement, the combination with a heat interchanger located below, and structurally independent of the oven, and independently supported on the same foundations as the walls of the oven structure, said interchanger being formed of superposed hollow bricks, so arranged that the hollow interiors of the bricks form a series of flues running in one direction and spaces between said bricks form a series of flues running at right angles to the first mentioned flues, and a spent gas flue arranged to feed the spent gases of combustion to the interchanger, a partition in said flue for causing said gases to pass through a portion of the interchanger in one direction, and through other portions of the interchanger to the outlet in the reverse direction, substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature in presence of two subscribing witnesses.

ERNEST SOLVAY.

Witnesses:

F. FORSTENHOFF,
A. AULLUAPHY.