

No. 762,578.

PATENTED JUNE 14, 1904.

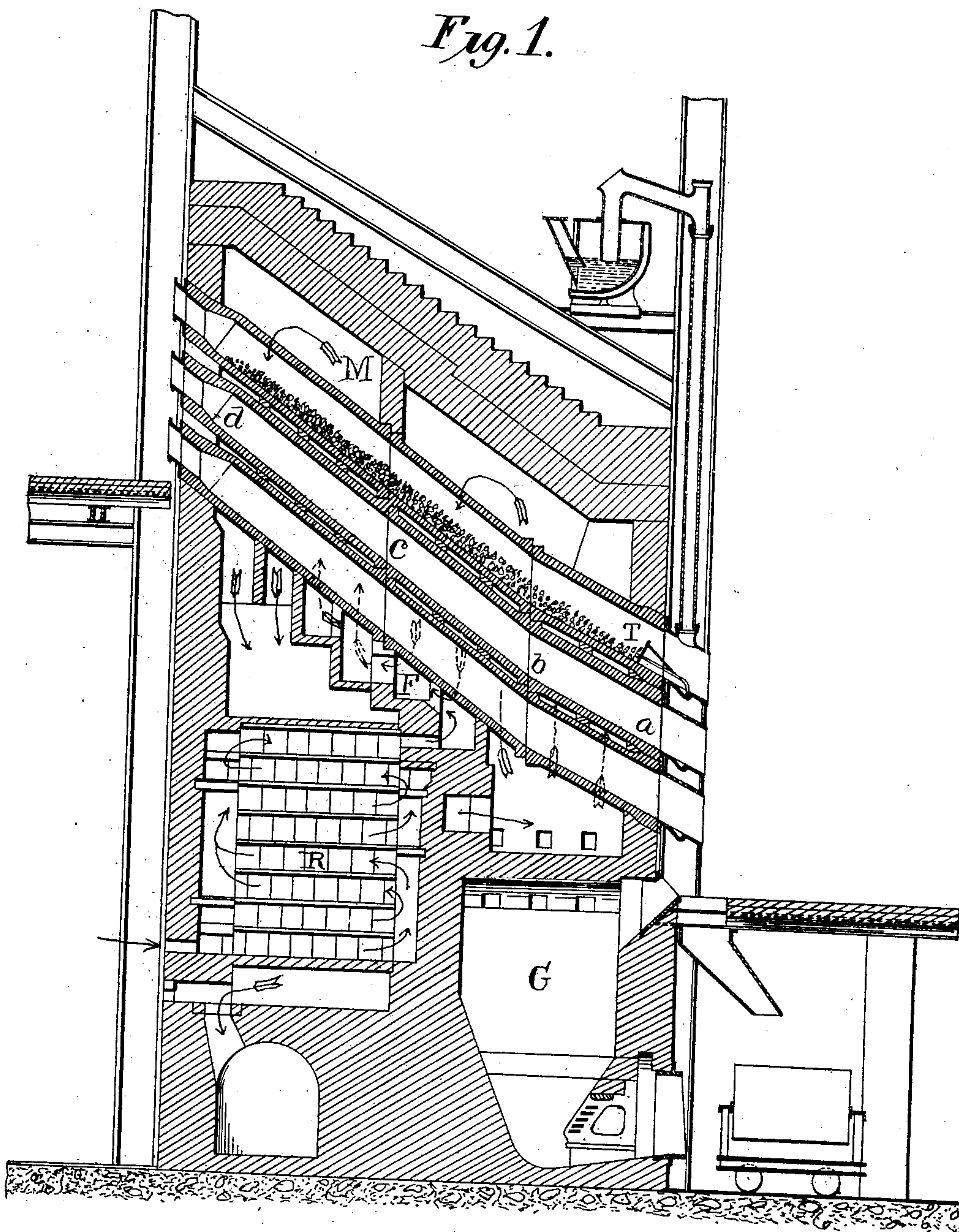
E. DERVAL.  
REGENERATIVE GAS FURNACE.

APPLICATION FILED OCT. 20, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

*Fig. 1.*



Witnesses  
Ch. Lyddane  
Wm. Heyner.

Inventor  
Eugène Derval  
by J. Brashers, Atty.

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2 SHEETS—SHEET 2.

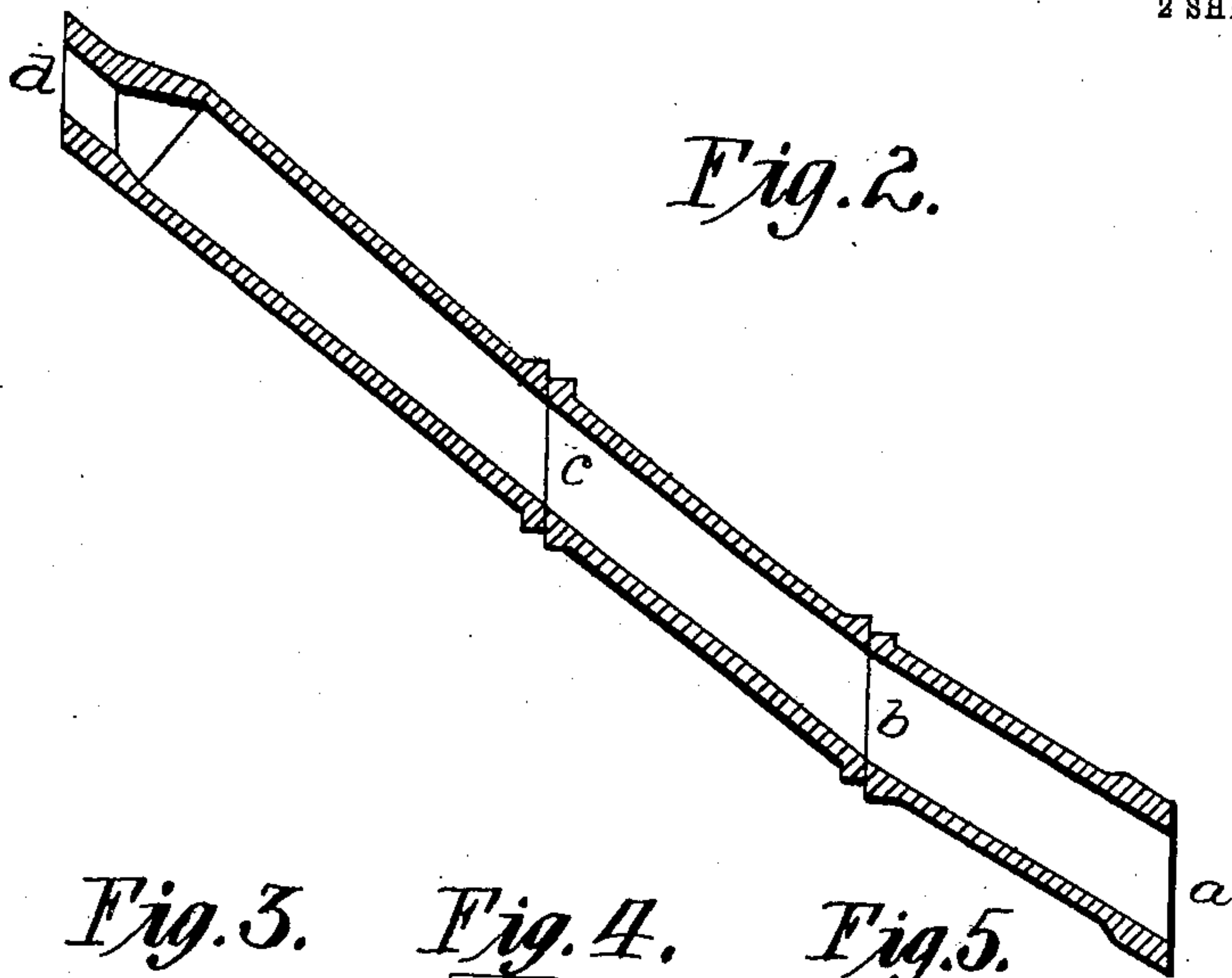


Fig. 3.



Fig. 4.



Fig. 5.

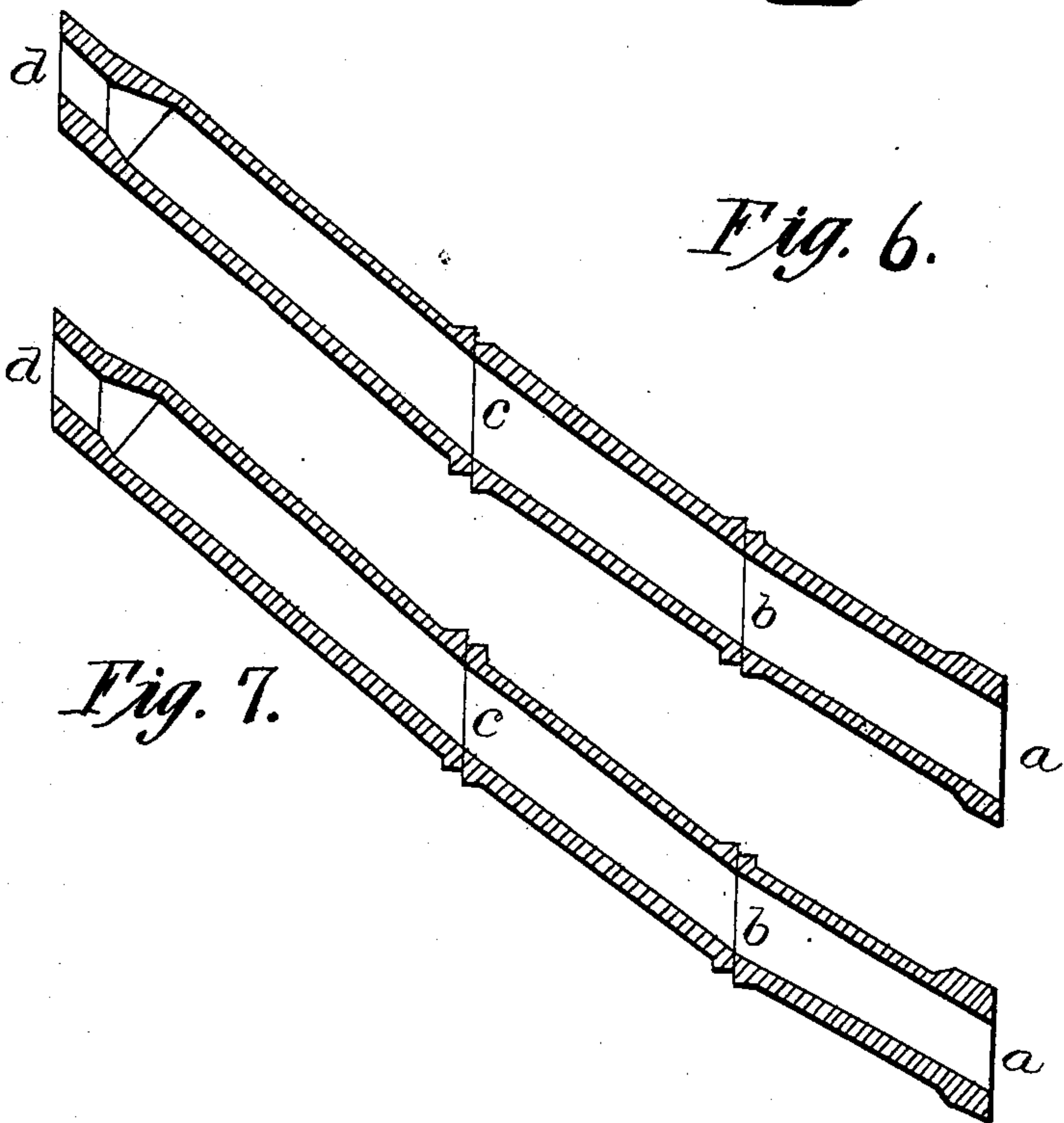


Fig. 7.

Witnesses  
Chas. Lyddane.  
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# UNITED STATES PATENT OFFICE.

EUGÈNE DERVAL, OF PARIS, FRANCE.

## REGENERATIVE GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 762,578, dated June 14, 1904.

Application filed October 20, 1902. Serial No. 127,980. (No model.)

*To all whom it may concern:*

Be it known that I, EUGÈNE DERVAL, a citizen of the Republic of France, and a resident of Paris, France, have invented certain new and useful Improvements in Regenerative Gas-Furnaces, of which the following is a specification.

My invention relates to regenerative gas-furnaces having inclined retorts.

One of the chief objections to the use of inclined retorts for the manufacture of illuminating gas is the impossibility of giving to the retorts such an inclination as will allow of the retorts being charged to a uniform thickness and at the same time allow of the automatic discharge of the coke.

With good charging apparatus the charging of the retorts is generally effected tolerably well with the inclinations varying from twenty-nine degrees to thirty-four degrees, according to the nature of the coal and its degree of humidity; but if it is desired to increase the angle of inclination in order to facilitate the discharge of the coke the coal accumulates against the stopping-plate placed at the lower end of the retort and sometimes passes over the said plate into the cast-iron mouthpiece. With inclinations to the horizontal exceeding thirty-four degrees the distillation is often incomplete at the lower end of the retort, partly in consequence of the greater thickness of the layer of coal at that point than at other parts of the retort, partly in consequence of the cooling produced by the gas escaping from the retort, and partly in consequence of the comparatively low temperature of the retort at the place where the stopper-plate is situated and by reason of other circumstances. This incomplete distillation of the coal at the lower end of the retorts renders the work of the stokers very severe, for they are obliged to withdraw with a hook the burning coal, which prevents the coke from sliding down. Further, the coke when withdrawn is fouled by its mixture with the incompletely-distilled coal and with the liquid tar, which always accumulates more or less at the bottom of the mouthpieces. It is also seldom that the coke will slide of itself out of the retort, it being generally necessary to put

the mass of coke in motion by pushing it down from above, and the workman who does this is exposed to the flames and sparks that issue from the upper openings of the retort.

As the most suitable inclination to be given to the retorts varies with the nature of the coal, there arise great difficulties in the charging and discharging of the retorts when different kinds of coal are used. My invention enables these inconveniences to be obviated.

It consists, primarily, in diminishing the inclination of the end of the retort at which the coke is discharged and in increasing the inclination at the end at which the coal is introduced, so that the general mass of the coke puts itself in motion immediately the coke at the lower end of the retort has been withdrawn by a hook.

In the accompanying drawings, Figure 1 is a vertical sectional view of a furnace equipped with retorts constructed in accordance with my invention, the sectional plane cutting through a tier of retorts longitudinally. Fig. 2 is a sectional view, on an enlarged scale, of one of the retorts removed from the furnace. Fig. 3 is a view in elevation of the upper end of the upper section of the retort. Figs. 4 and 5 are views in front elevation of the lower ends of the two lower sections of the retort at the points *b* and *a*, respectively. Fig. 6 is a vertical longitudinal sectional view of a retort of a slightly-modified form, all of the sections being inclined at slightly-different angles; and Fig. 7 is a similar view of a retort of further modified form, the sections being slightly curved.

It will be readily understood that in consequence of the slight inclination of the lower part *a b* of the retort the thickness of the layer of coal will diminish toward the stopper-plate *T*, which will enable the distillation of the coal at the lower end of the retort to be more completely effected.

As regards the distillation of the coal at the point *b*, where the layer of coal is thickest, it may be made as complete there as at other parts by increasing the temperature of the furnace at that point. This may be done by arranging the furnace as shown in Fig. 1, in which the arrows show that the gas issuing



from the gas-producer G is partly burned by a first admission of hot air at the lowest part of the retorts, so that it is easy to obtain at that point as high a temperature as may be desired. The furnace-gases are afterward brought under the retorts by a wall M, reaching to the arch of the furnace or retort-bench, and are reheated toward the middle of their course at the point F by a second admission of hot air, which completes the combustion of the furnace-gases before they reach the generator R. These two admissions of hot air are regulated once for all by the registers for the admission of cold air to the generator R. The arrangement of the furnace so as to effect this double combustion of the furnace-gases may be varied in many ways to effect the same result.

The inclinations of twenty-eight degrees and thirty-six degrees indicated in the drawings for the upper and lower parts of the retorts, respectively, are those that I have found to be most suitable; but they may obviously be varied within certain limits according to the nature of the coal employed and the mode of charging the retort. In principle the inclination of the parts *a b* should be such as will not prevent the sliding down of the coke contained in the more inclined part of the retort when once such coke has been set in motion, but should be slight enough to form a sort of brake which will prevent a too rapid descent of the coke, which might be inconvenient, especially when a hot-coke conveyer and quencher are employed for the removal of the hot coke.

It will be readily understood that the double inclination of the retorts will not prevent the employment of certain other well-known improvements already made in connection with inclined retorts in view of facilitating

the sliding out of the coke—such as the fan shape and the lateral inclination of the sides of the retorts, for example.

Figs. 3, 4, and 5 of the drawings show the cross-sectional form of the retort at the points *d*, *b*, and *a* and the form given to the three lengths of which it is composed. The second length *d c* may have an inclination intermediate between that of the lengths *a b*, respectively, as shown in Fig. 6, and instead of making the lengths straight any of them may be in a curved shape, as shown in Fig. 7, so that when the lengths are put together the retort or part thereof will have a curved or partly-curved shape approximating, more or less, the polygonal shape produced by the connection together of several straight lengths set at various inclinations. Any one or two of the sections may be curved, with the other section or sections straight, if desired.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a gas-furnace, an inclined retort composed of sections, each of which is at an angle to the horizontal less than the next adjoining section above, substantially as described.

2. In a gas-furnace, an inclined retort composed of sections, one of which is curved, substantially as described.

3. In a gas-furnace, an inclined retort composed of curved sections arranged to cause the inclination of the lower section to the horizontal to be less than that of the adjacent section above, substantially as described.

In testimony whereof I affix my signature.

EUGÈNE DERVAL.

In presence of—

EDWARD P. MACLEAN,  
J. ALLISON BOWEN.