

No. 654,307.

Patented July 24, 1900.

E. COPPÉE.
COKE OVEN.

(Application filed Sept. 25, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

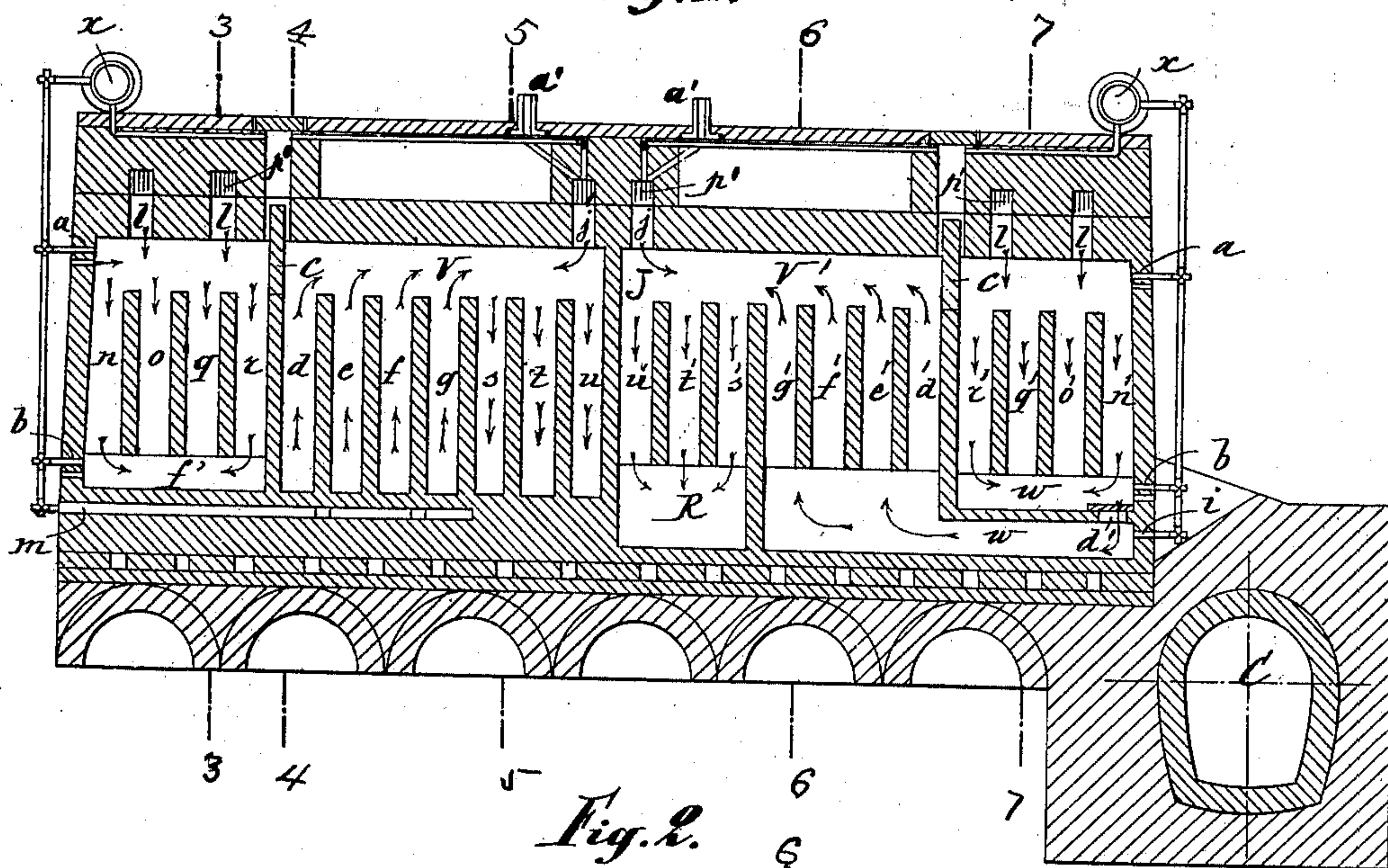
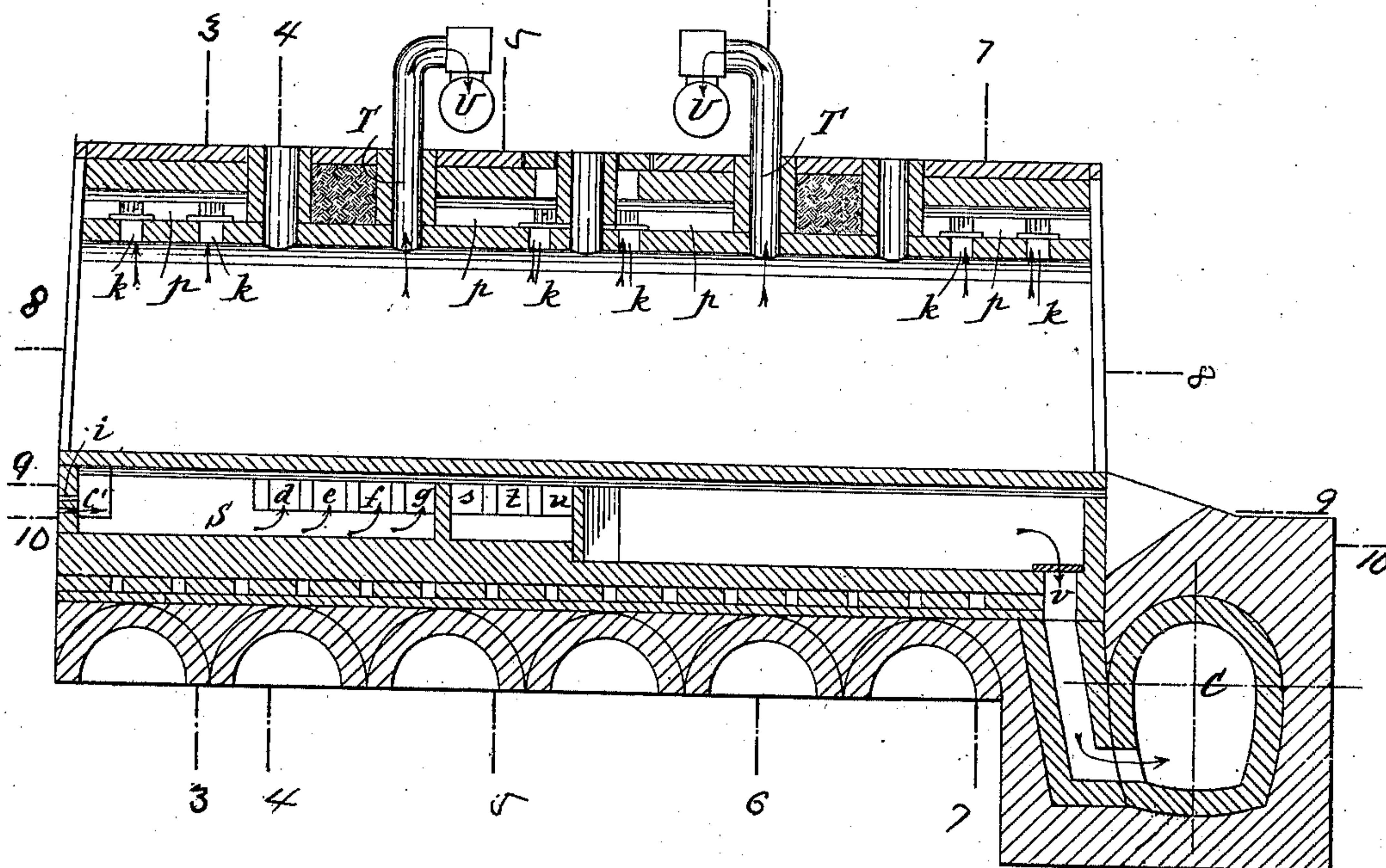


Fig. 2.



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2 Sheets—Sheet 2.

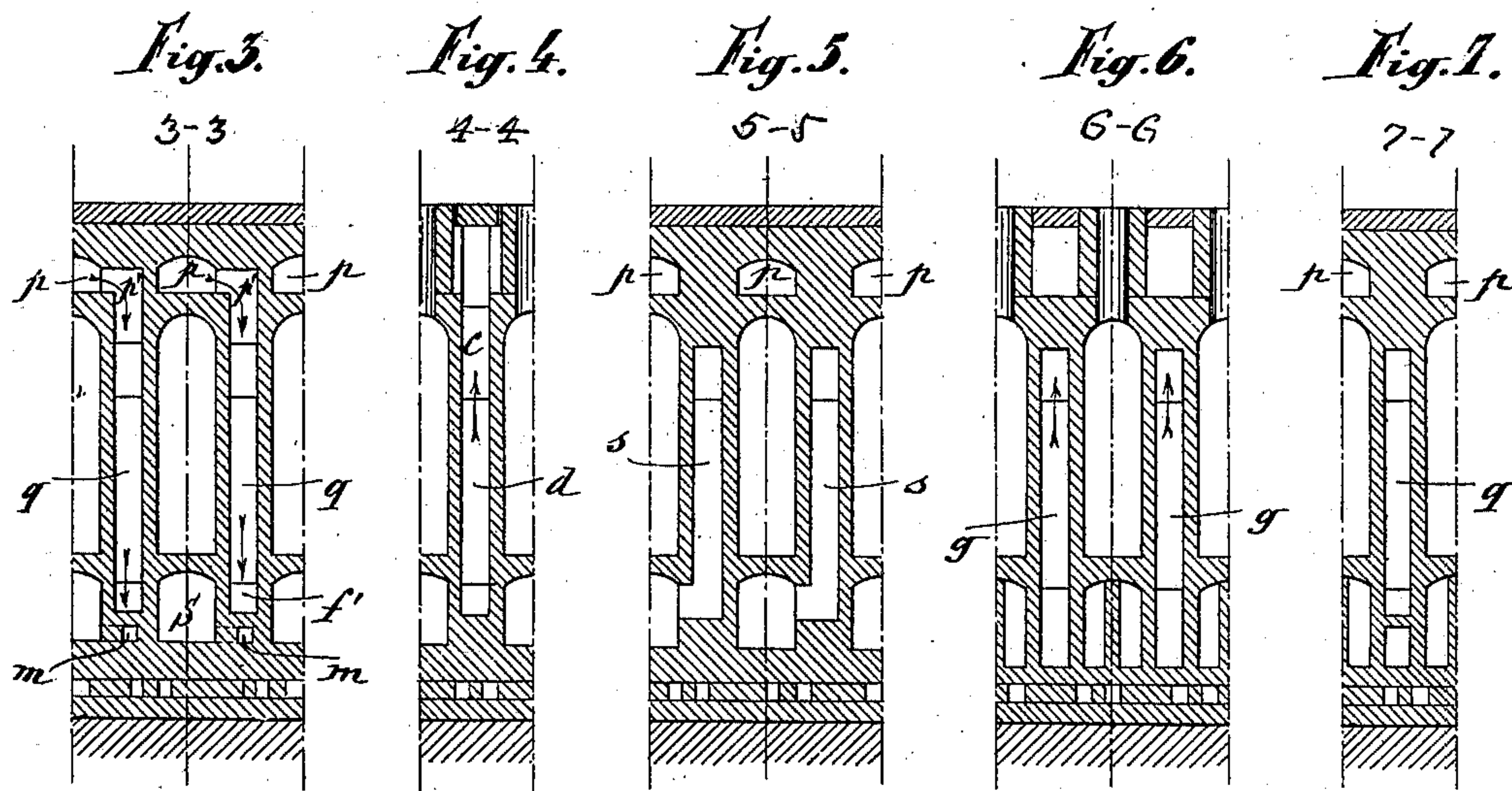


Fig. 8.
8-8

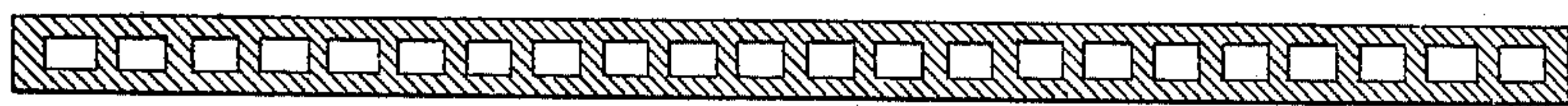


Fig. 9.
9-9

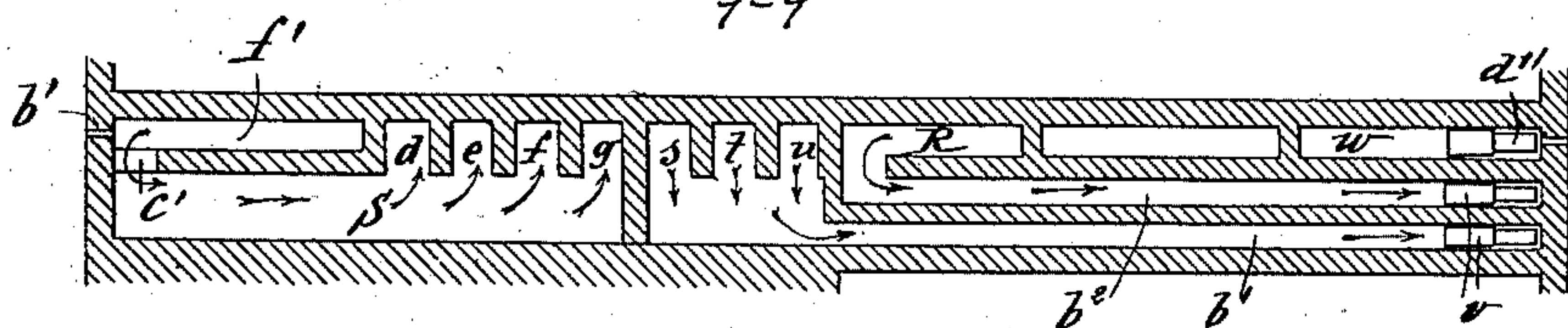
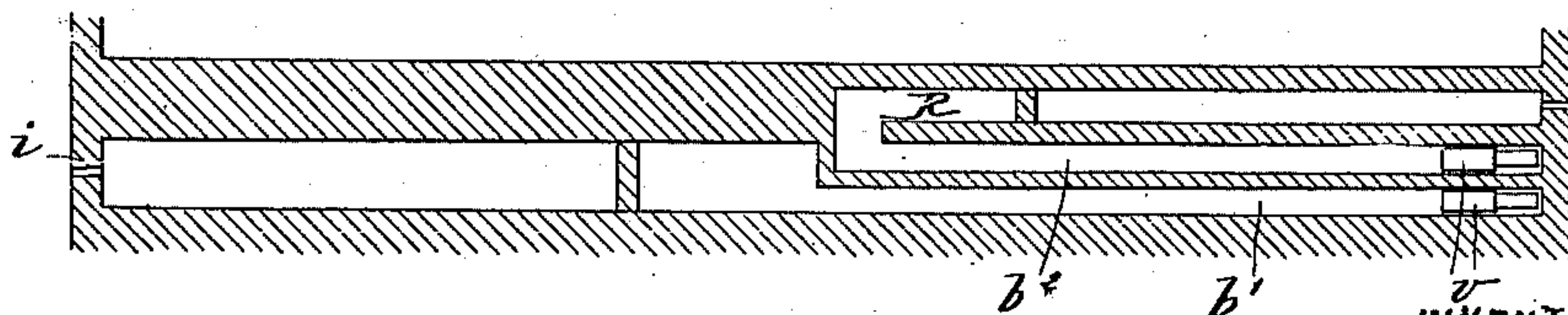


Fig. 10.
10-10



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UNITED STATES PATENT OFFICE.

EVENCE COPPÉE, OF BRUSSELS, BELGIUM.

COKE-OVEN.

SPECIFICATION forming part of Letters Patent No. 654,307, dated July 24, 1900.

Application filed September 25, 1899. Serial No. 731,806. (No model.)

To all whom it may concern:

Be it known that I, EVENCE COPPÉE, industrial, a subject of the King of Belgium, and a resident of 71 Boulevard d'Onderlecht, Brussels, Belgium, have invented a certain new Coke-Oven (system Evence Coppée) with or without Recovery of the By-Products, of which the following is a specification.

The object of my invention is to provide an oven in which the gases may be introduced into the lower parts thereof and principally under the bottom of the oven-chamber, so that the greatest heat may be produced in these lower parts and the heat in the upper parts will not be great enough to decompose the light oils which are evolved from the coal in the oven. I also aim to distribute the inlets for the gases and air, so as to have uniform heat in the middle and at the ends of the oven. Further, I aim to provide means for dividing and controlling the draft in the flues of the oven and to separately regulate the draft of the gases and of the air introduced at the front and at the back of the oven into these flues.

In the accompanying drawings, Figure 1 is a vertical longitudinal section through the flue-chambers. Fig. 2 is a similar view through the oven-chamber. Fig. 3 is a partial transverse sectional view on line 3 3 of Figs. 1 and 2, showing one oven-chamber complete and one-half portion of an oven-chamber on each side thereof with the intermediate flues. Fig. 4 is a partial transverse sectional view on line 4 4 of Figs. 1 and 2, showing one-half of two oven-chambers with a flue between. Fig. 5 is a partial sectional view on line 5 5 of Figs. 1 and 2, similar to Fig. 3. Fig. 6 is a partial sectional view similar to Fig. 3 on line 6 6 of Figs. 1 and 2. Fig. 7 is a partial cross-sectional view, similar to Fig. 4, on lines 7 7 of Figs. 1 and 2. Fig. 8 is a partial or detail horizontal sectional view on line 8 8 of Fig. 2. Fig. 9 is a horizontal sectional view on the line 9 9 of Fig. 2. Fig. 10 is a similar view on line 10 10 of Fig. 2.

The gases evolved from the coals in the oven-chambers pass from the upper part of the oven through six openings *k* into the four chambers *p*, whence they descend by way of four openings *l* and two openings *j*, passing for that purpose through the horizontal ports

p', Figs. 1 and 3. The gases descending by way of two openings *l*, arranged at the front end of the furnace, continue their descent through four vertical flues *n o q r* to a chamber *f'*, Figs. 1, 3, and 9, and from this chamber the gases pass by the opening *c'* into chamber *S*, which is, as shown in Figs. 2 and 3, located beneath the floor of the oven. The floor of the oven is heated by these gases, and said gases then ascend by four vertical flues *d e f g*. At the back of the oven the gases issuing from the two openings *l'* descend by four vertical flues *n' o' q' r'* into a chamber *w*. This chamber is divided into a lower and an upper part, and from the upper part the gases pass by way of the valve *d''* into the lower part of this chamber, and thence the gases rise through the vertical flues *d' e' f' g'*, similar to those before described. The gases issuing from the two openings *j* at the center of the oven descend on each side of a central partition *J*, which separates the flues into two series, one at the front and one at the back of the oven, said flues being located in the walls between the oven-chambers and comprising the vertical flues already mentioned and also the descending vertical flues *s t u* and *s' t' u'*. The gases descending through the flue *j* on the rear side of the partition *J* mix with the gases ascending through the flues *d' e' f' g'* and then descend through vertical flues *s' t' u'* into a chamber *R*, thus passing under the rear part of the oven-floor, so as to heat the same, the chamber *R* discharging into a flue *b²* under the rear floor of the oven-chamber, which flue also aids in the heating action. The gases issuing from the flue *j'* on the front side of the partition *J* mix with the gases rising from the flues *d e f g*, and the mixed gases then descend through the flues *s t u*, Figs. 1 and 9, into a horizontal flue *b'* at the rear of the oven and extending parallel with the flue *b²*, before mentioned. The gases passing through the flues *b²* and *b'* proceed to the flues *v*, which are provided with valves, and thence into the collecting-channel *C* and to the vertical chimney. The two valves in the flues *v* are intended to regulate the draft in said flues, one serving for the fluids discharged from the front portion of the oven-flues and the other serving to regulate the draft from the other series of oven-flues. By the arrangement de-

scribed the heat is uniformly distributed throughout the oven.

The foregoing description relates to an oven in which no provision is made for the recovery of the by-products, and I will now describe the same oven adapted to work with recovery of said by-products.

As shown in Fig. 2, openings *k* lead from the top of the oven-chamber, said openings being controlled by valves. These valves prevent the passage of the gases from the oven-chambers to the flues in the walls of the oven. Pipes T T extend from the upper part of the oven to conduits U, arranged above the oven, through which the gases are conveyed to a condensing apparatus, and from this apparatus the gases return by conduits *x*, Fig. 1, placed above the oven. From these distributing-pipe branches extend, so as to discharge the gases into the flues at various points, as shown at *a b j i*, suitable stop-cocks being arranged to regulate the quantity of gas discharged.

First action: The introduction of a small portion of gas, as well as of the air necessary for its combustion, is effected at *a*. In the front half of the oven the gases descend through the four vertical flues *n o q r* and pass by way of opening *c'* into the chamber S under the floor of the oven, where these gases meet the gases introduced directly into the chamber S by the opening *i*. After having taken a sufficient quantity of air, which is introduced by flue *m*, the mixture ascends through the vertical flues *d e f g* to the space V, located above the vertical flues. Here the gases meet the fresh supply introduced through the opening *j*, to which air is supplied by the air-inlet *a'*. The gaseous mixture then descends through the vertical flues *s t u* into the flue *b'*, extending under the floor of the oven, and thence through the flue *v* into the collecting-channel C. At the rear half of the oven the gases introduced at *a* descend by the vertical flues *n' o' q' r'* into the upper part of the chamber *w*, which is divided by a horizontal partition. From the upper part of the chamber the gases pass by the valve-opening *d'* into the lower part, where they meet the gases introduced at *i* into the lower part. The gaseous mixture ascends through the flues *d' e' f' g'* to the space V, where a further mixture is effected with the gases introduced through the port *j'*, and the final mixture then passes through the flues *s' t' u'* into the chamber R under the floor of the oven and thence through the flue *b'* under the floor of the oven to the flue *v* and thence to the collecting-channel.

Second action: In this second operation the partitions *c*, Fig. 1, which divide the descending flues *n o q r* and *n' o' q' r'* from the ascending flues *d e f g* and *d' e' f' g'*, are removed. In front of the oven the introduction of the gases and air for combustion takes place at *b* into the chamber *f'*, from

whence the gases ascend from flues *n o q r* to the space above said flues, where a mixture is effected with the gases rising through the flues *d e f g*, which gases have been introduced at *i*, Fig. 2, at the front of the oven. The gases introduced at *i* ascend through the vertical flues *d e f g* after having received the necessary air for their combustion through the flue *m*. The mixture of gases from the points of supply *b* and *i* now meet the gases introduced at *j*, which latter gases have been supplied with air for combustion through the air-inlet *a*. This final mixture now descends by the vertical flues *s t u*, Figs. 1, 2, and 9, below the floor of the oven, from whence they pass through the horizontal flue *b'* to the collecting-channel C.

At the rear of the oven the gases are introduced at *b* below the vertical flues and into the upper part of the chamber *w*, the valve being held up at the opening *d'*. The gases ascend through the flues *o' p' q' r'*. The gases introduced at *i*, with air for their combustion, pass into the lower part of the chamber *w* and ascend into the flues *d' e' f' g'* to mix with the gases introduced at *b* in the space V'. The mixture of gases supplied at the points *b* and *i* at the rear of the oven next meet the mixture of gases and air introduced at *j'*, and this final mixture then descends through the vertical flues *s' t' u'* to the chamber R and thence by way of flue *b'* to the collecting-channel.

To sum up, I consider as new and claim by patent-right—

In combination, in a coke-oven, the oven-chamber, the openings *k* leading from the upper part thereof and at different points along the oven, the series of chambers *p* with which the openings *k* connect, the openings *l, l*, near the front and rear of the oven leading from the end chambers *p* and the openings *j, j*, leading from the middle chambers *p*, said openings *l* and *j* leading to the flues, which comprise the vertical series of flues for the ascending and descending currents, said flues being distributed along the oven from front to rear and adapted to heat the front, rear and middle of the oven, the passages under the sole of the oven and with which the vertical flues connect, means for introducing gas into the lower passages so that the greatest heat may be generated in the lower parts of the oven, a series of exhaust-flues having dampers and communicating with the flues at the different parts along the oven, the dampers for the openings *k* and a condensing apparatus connected with the oven, substantially as described.

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

EVENCE COPPÉE.

Witnesses:

CH. KENOTTE,
T. BRISBANT.