3 Sheets—Sheet 1.

(No Model.)

C. SCHLIMP & R. HONZIK.

Kiln for Burning Brick, Pottery, &c.

No. 235,907. Patented Dec. 28, 1880.

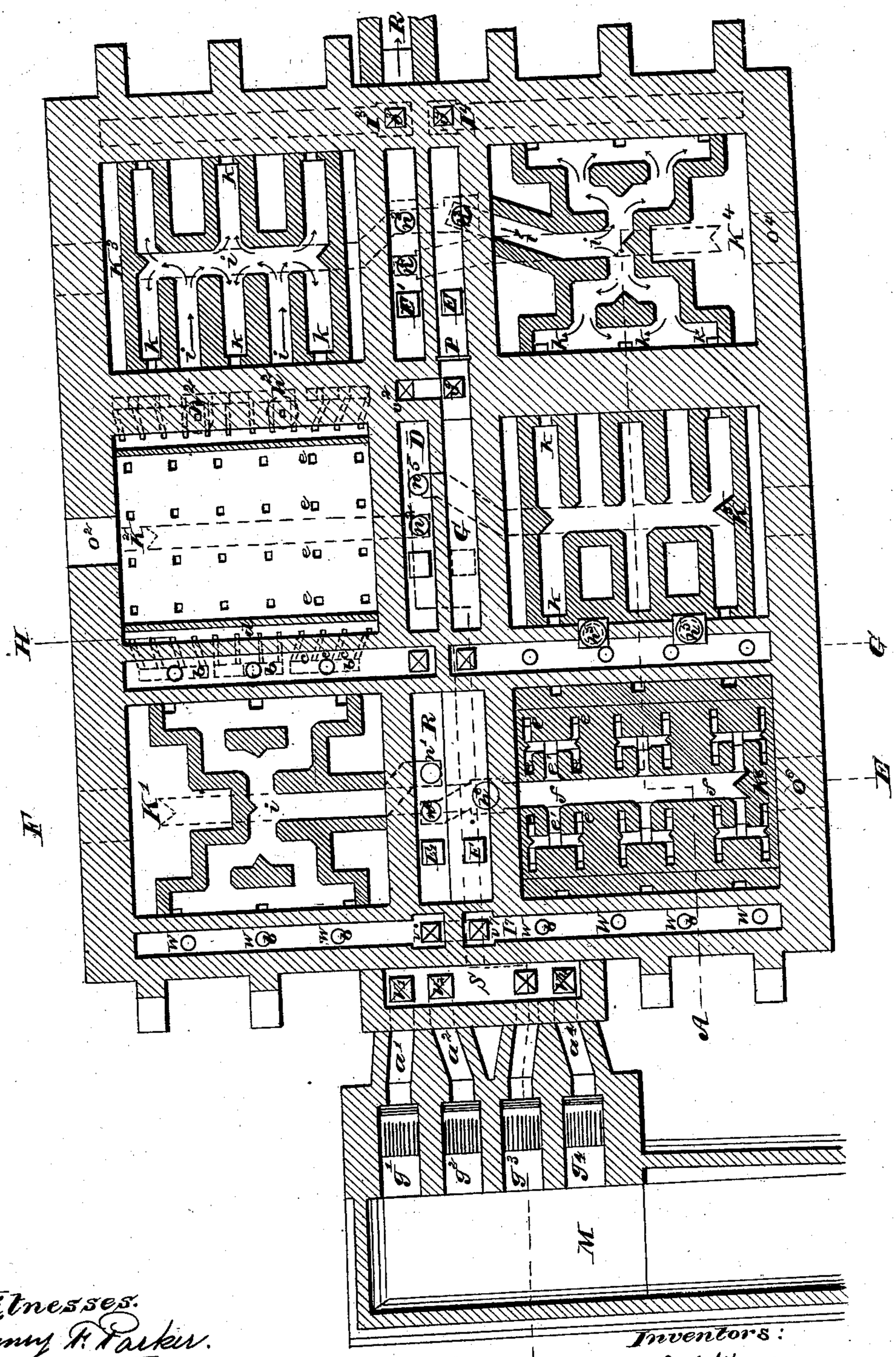

Fig. 1.

Witnesses.
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John C. Tainbridge.

Inventors:
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by their attorney
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(No Model.)

3 Sheets—Sheet 2.

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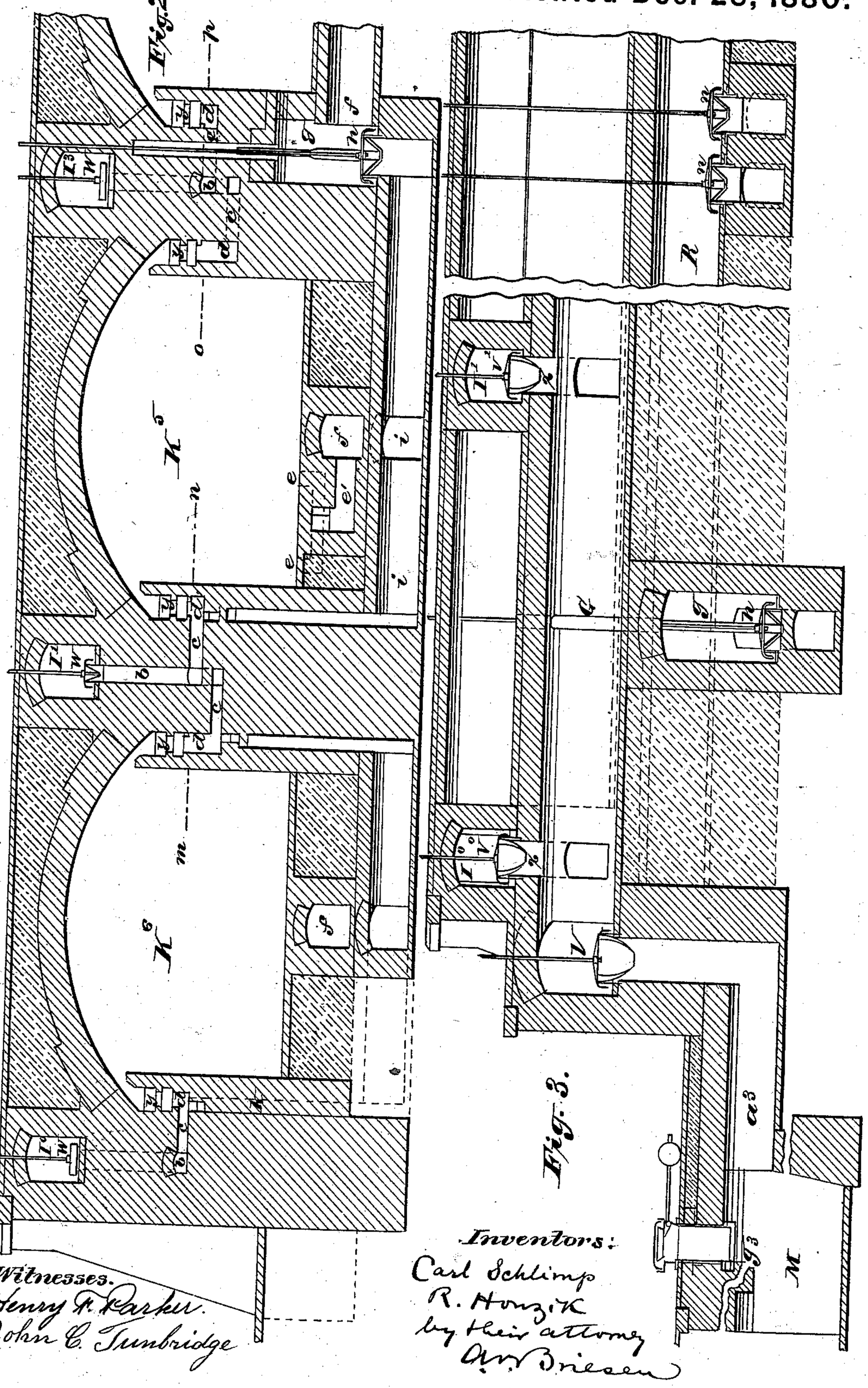

Witnesses.
Henry R. Parker.
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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

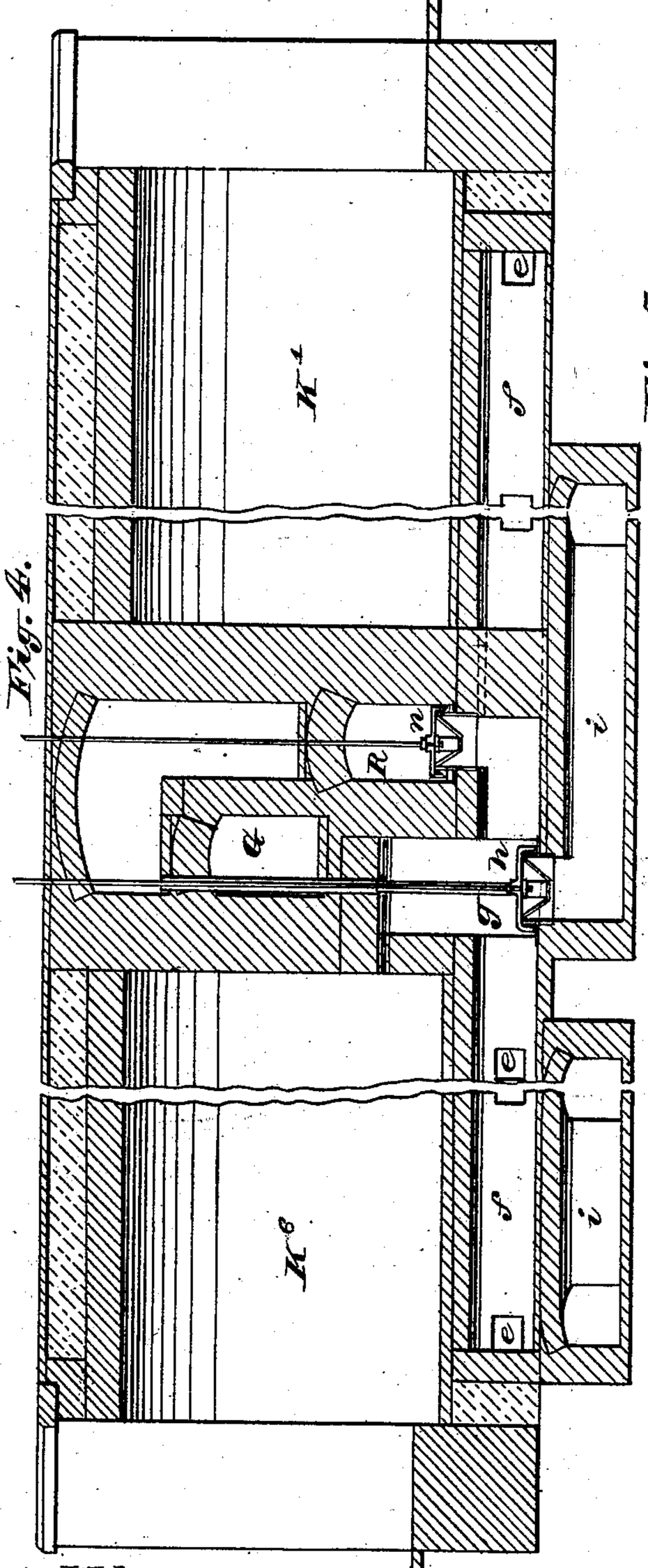
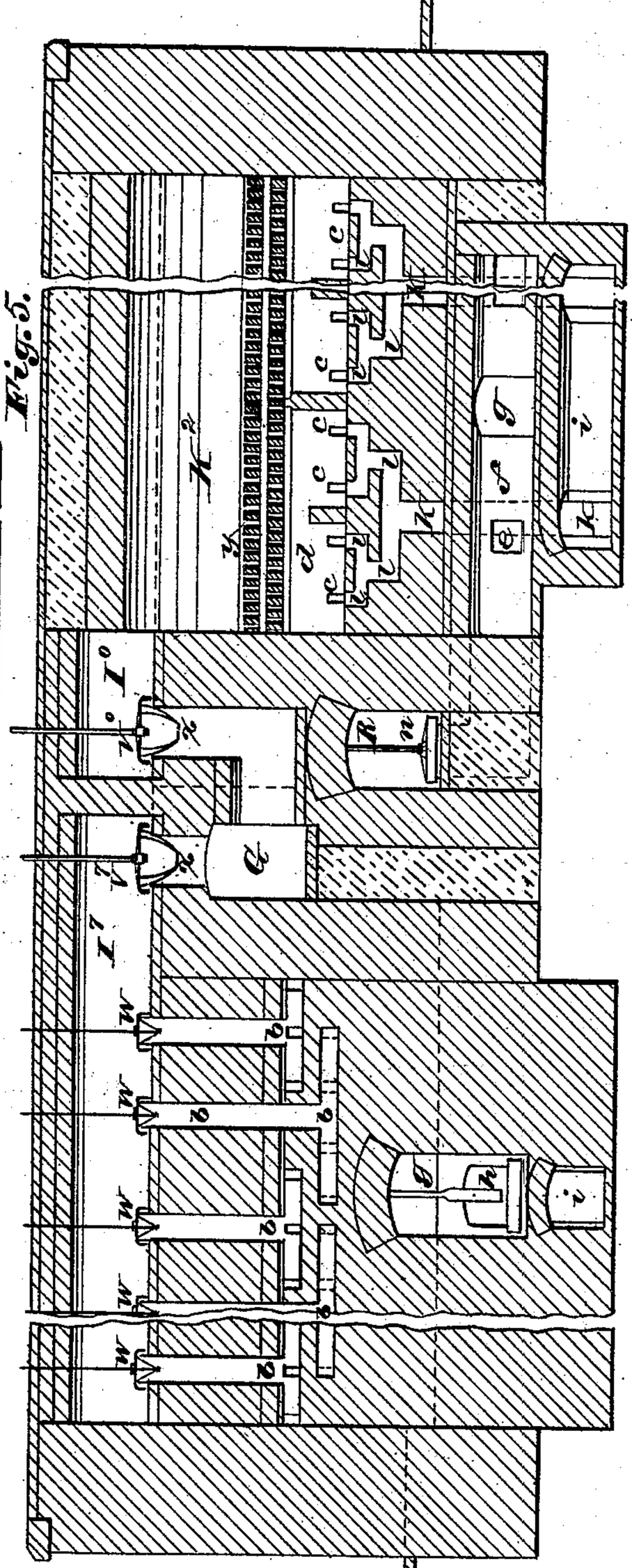


Fig. 5.



Witnesses.
Henry H. Parker.
John C. Tunbridge

Inventors:
Carl Schlimp
R. Honzik
by their attorney
A. V. Briesen

UNITED STATES PATENT OFFICE.

CARL SCHLIMP, OF VIENNA, AND RUDOLF HONZIK, OF SCHATTAU, AUSTRIA.

KILN FOR BURNING BRICK, POTTERY, &c.

SPECIFICATION forming part of Letters Patent No. 235,907, dated December 28, 1880.

Application filed September 16, 1880. (No model.)

To all whom it may concern:

Be it known that we, CARL SCHLIMP, residing at Vienna, in the Empire of Austria, and a subject of the Emperor of Austria, and RUDOLF HONZIK, residing at Schattau, in the Empire of Austria, and a subject of the Emperor of Austria, have invented an Improvement in Kilns for Burning Brick, Pottery, &c., of which the following is a specification.

Figure 1 is a horizontal section of our improved kiln. Fig. 2 is a vertical section, on an enlarged scale, taken on the plane of the line A B, Fig. 1. Fig. 3 is a vertical section taken on the plane of the line C D, Fig. 1. Fig. 4 is a vertical section taken on the plane of the line E F, Fig. 1; and Fig. 5 is a vertical section on the line G H, Fig. 1.

This invention relates to a new furnace or kiln for burning articles of pottery, earthenware, artificial basalt, and the like; and it consists in the peculiar arrangement of a series of connected chambers and of the draft-passages leading to and joining the same, all the parts being so arranged that the chambers can be heated by gas, which flows into the kiln in one direction, and is joined by currents of air flowing in the same direction, the products of combustion being carried from chamber to chamber, so that the heat in the several chambers is graduated to admit of a successive filling and emptying of the chambers, and of a consequent continuous use of the kiln, all as hereinafter more fully described.

In the drawings (particularly in Fig. 1) it is shown that the kiln is divided into series of chambers, six being shown in the drawings; but a greater number may be employed. These chambers are placed in two rows, the chambers K', K^2, and K^3 being in one row and the chambers K^4, K^5, and K^6 in another row, parallel to the first.

The gas for heating the chambers is supplied to a passage, G, which extends through the middle of the kiln, between the rows of chambers, and from which upright flues x lead into cross or transverse passages, (marked I^0, I', I^2, I^3, I^4, I^5, I^6, and I^7,) which passages are placed alongside of and between the chambers that are in each row, so that each of said chambers will be flanked by two such passages, as is clearly indicated in Fig. 2, which figure also shows that said passages I^0 I', &c., are on a level about with the top of each chamber. The openings leading from the passage G through the several flues x into said passages I^0 I', &c., can be closed by suitable valves or gates, which are marked v^0 v' v^2 v^3 v^4 v^5 v^6 v^7 in the drawings, and which can be opened from above, and serve to regulate the flow of gas to the several chambers.

From each passage I^0 I', &c., extend downward small tubular passages b, which terminate at their lower ends in branching horizontal passages c, that lead into the several chambers K^6 K^5, &c. Each passage b can be closed from above by a valve, w, so that the flow of gas from each channel or passage I^0 I', &c., into the chambers can again be regulated with great nicety. Those passages, I', I^2, I^5, and I^6, which are between two chambers supply the gas by alternate tubes b to the two chambers at their sides, as is clearly indicated in Fig. 2.

The horizontal channels c lead into the mixing-chambers d, which are galleries flanking the sides of the chambers K^6 K^5, &c., the upper walls of the galleries being made with small perforations, as shown at y in Fig. 5, so that many jets of gas will escape into each chamber through said openings y.

In the galleries d the entering gas meets the stream of hot air which enters the bottom of each gallery d through openings k and l, (see the lower part of Figs. 5 and 2,) and which, entering such gallery d through such passages k and l, has ample opportunity to mix within the perforated gallery thoroughly with the gas, so as to enable the gas to burn perfectly as it enters each of the chambers. The flame of the burning gas traverses the chamber from top to bottom with equal intensity, and passes off through openings e, that are in the bottom of each chamber and lead into a lower passage, f. From f the products of combustion are conducted into passages g, (see Fig. 5,) whence they flow into a still lower passage, i, the entrance to which is covered by an adjustable valve, h, and from the passage i they pass through and into the passages k, and thence into passages l, that join the gallery d of the next chamber, which chamber said pro-

ducts of combustion traverse from the upper to the lower end, thereby heating said chamber. In other words, by the arrangement just described the gas which enters one of the chambers K′, and which burns in said chamber, has its products of combustion carried thence into the chamber K^2, thence into K^3, &c., if desired, so that when they enter the third or fourth chamber they will still be warm enough to be useful in keeping the chamber warm for the finishing or gradual cooling operation; but whenever the products of combustion are to be finally discharged it is only necessary to open valves *n*, (see Fig. 5,) that cover branches of the passages *f*, and thereby allow the escape of the products of combustion into the passage R, that leads into the chimney.

The air needed to support combustion is carried into those chambers K′ K^2, &c., which are being filled with material to be burned through doors in the ends of said chambers; but these doors, as soon as the chambers are to be forewarmed, must be closed by masonry and remain closed until the contents of the chamber have been burned, or at least until the same are to be cooled. The cold air enters a chamber through the open door O^6, passes downward through the bottom openings, *e*, into the passage *f*, thence into the passage *i*, to the upright flues *k* of the next adjoining chambers, which it traverses from top to bottom, becoming gradually more and more heated, and reaches, finally, through the next series of channels *k*, in a very heated condition, the mixing-gallery *d* of the chamber, which is actually fired, and here becomes mixed with the generator-gas that enters said chamber, passing, together with said gas, through the perforations of the gallery *d*, and assisting, by being so thoroughly heated, in the thorough combustion of the gas. Thus it will be seen that the air passes through the furnace or kiln in the same direction as the gas, and that the opening of a chamber does not interfere with the proper function of the gas-chambers, but, on the contrary, insures the requisite supply of atmospheric air to the flames.

In order to more clearly define the operations of our kiln, we will now describe how the same is used, and assume that the chamber K′, Fig. 1, has just been fired, and that the firing therein has been completed, and that the gas-supply valves *w*, leading to K′, have, consequently, been closed. In this case the chamber K^2 has been warmed to a suitable degree by the products of combustion that have passed through it from K′ into K^3, so that the contents of the chamber K^2 are already in a red heat. Now, upon opening the gas-valves *v* and the smaller gas-valves *w*, that control the inflow of gas into the chamber K^2, the gas will be let into the galleries *d* of said chamber, and will there meet the hot air coming from the chamber K′, and become ignited into a violent flame at the entrance into the chamber K^2, which it will traverse from top to bottom. The discharge-openings *e* at the bottom of the chamber K^2 are so equally disposed as to insure the equal heating of the chamber and to prevent unequal drafts in different parts thereof. Through these discharge-openings the products of combustion pass to the channel *f* below. Now, in order not to waste the heat contained in the gases that enter this channel *f*, said gases are not allowed to escape into the chimney-flue R at once, but, on the contrary, they are conveyed by opening valves *h* into the passage *i* below, whence they reach the chamber K^3 through the proper passages *k l*, and serve to heat said chamber K^3. The heated gases then traverse the chamber K^3, escape from it through the openings *e*, and can now be conducted into the chamber K^4, if desired, which they serve to warm. From K^4 these gases, which by this time are considerably cooled, are allowed, after having traversed the chamber K^4, to escape into the chimney-flue R. The supply of air for maintaining combustion in the instance just given is insured by opening the door O^6 of the chamber K^6, which chamber contains pottery in process of cooling. The chimney-valve *n* beneath the chamber K^4 being open, a draft is created, which causes the air that enters the chamber K^6 to pass down through the openings *e* into the passage *f* below K^6, thence into the passage *i* below, and from said passage *i* into the chamber K′, through the vertical branches *k l* of said passage *i*. The air entering K′ becomes very much heated, and passes thence into the chamber K^2, where it assists combustion in manner already described.

The combustion is perfect, not only because of the high temperature of the air brought into contact with the gas, but also because of the thorough mixture of such air with the gas, for every gas-opening *c* corresponds with an air-opening, *l*, as is indicated on the right-hand side of Fig. 5, and such openings meet at the bottom of each gallery *d*, which gallery affords sufficient room for the gas to expand and to become thoroughly mixed with the air.

By means of the valves above mentioned the supply of gas and air and the passage of the products of combustion can be regulated with great nicety. By having a series of valves, *w*, regulating the supply of gas to each chamber, it is possible during the process of burning, when it appears that at one part of the chamber the goods are being overheated, to reduce the heat at that part by more or less closing the corresponding valve *w*.

The example above given assumes that the chamber K^6 is being cooled or filled, K′ just burned, K^2 in process of burning, K^3 and K^4 forewarmed, and K^5 just filled with goods.

It is better to arrange seven to eight chambers in a row, as thereby more time is given for cooling, and laborers are thereby not exposed to excessive heat in removing and replacing the goods.

The letter M in the drawings shows a part of the furnace for generating the gas—g', g^2,

and g^3 being the grates, and a' a^2, &c., passages that carry the gas into the passage G.

We claim—

1. In a kiln for burning articles of pottery and the like, the combination of the chamber K^6 with the gallery *d*, passages *c b*, valves *w*, passage I^7, valve v^7, and passage G, all of said passages regulating the supply of gas, and with the passages *k l*, which extend into the bottom of the chamber K^6 from one of the adjoining chambers, and with passages *e f*, that lead from the chamber K^6 into the other adjoining chamber, substantially as described.

2. The combination, in the wall of the chamber K^6, of the passages *k l* and passages *c* with the gallery *d*, all arranged so that the gas and air openings enter said gallery, substantially as described.

3. In a kiln for burning articles of pottery and the like, the burning-chamber K^6, combined and constructed with a gallery, *d*, having perforations *y*, said gallery communicating with the gas and air supply openings, and forming a mixing-space, substantially as described.

4. In a kiln for burning articles of pottery and the like, the combination of one burning-chamber having gas and air inlet openings at the upper part with lower discharge-openings, *e*, passage *f*, valve *h*, lower passage, *i*, upright passages *k l*, and with the adjoining burning-chamber, into which said passages *k l* conduct the products of combustion or air, substantially as herein shown and described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

CARL SCHLIMP.
RUDOLF HONZIK.

Witnesses:
C. O. PAGET,
EDW. C. V. RÜTI.