



B. KREISCHER.

Brick Kiln.

No. 93,891.

Patented Aug. 17, 1869.

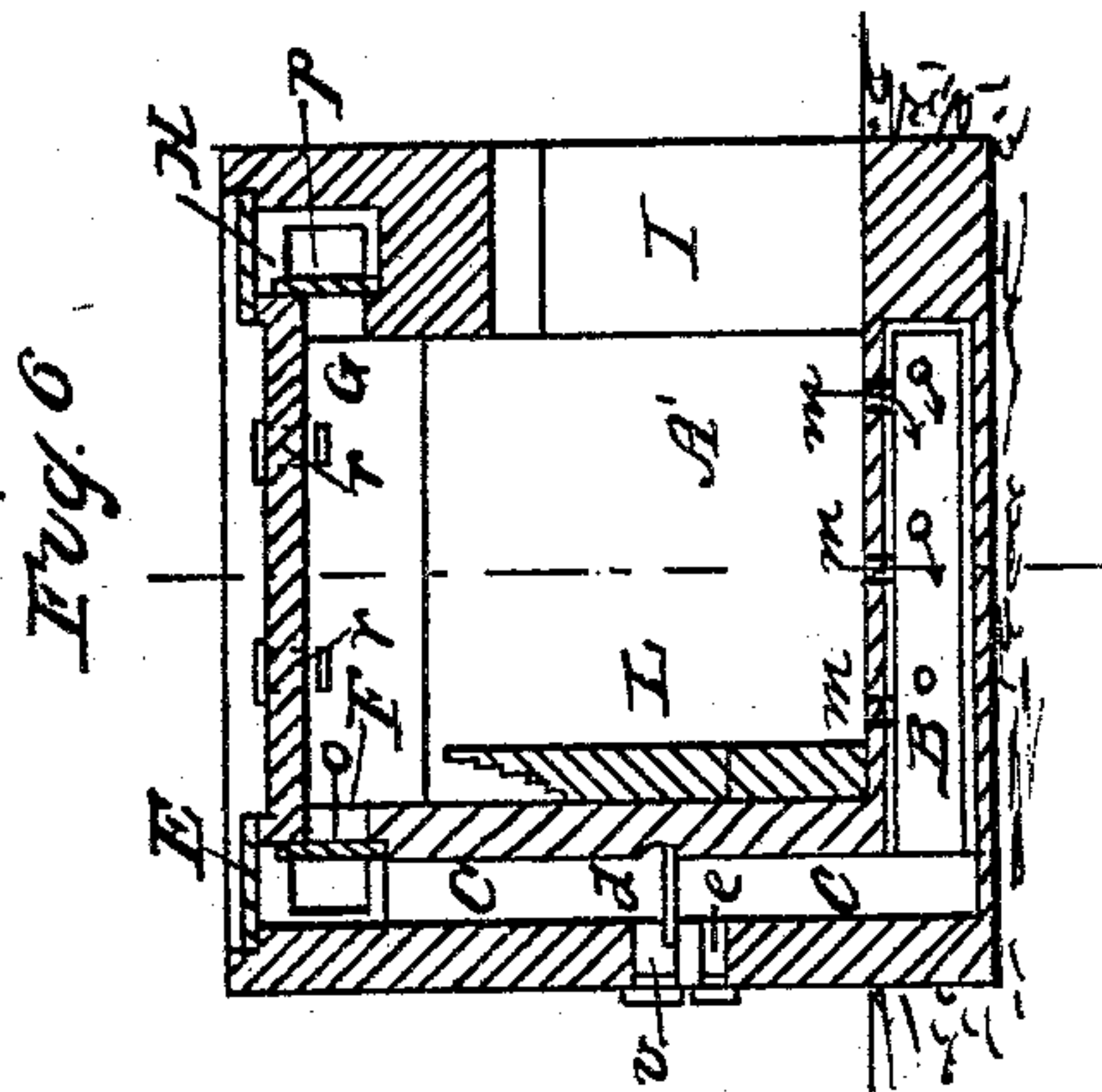
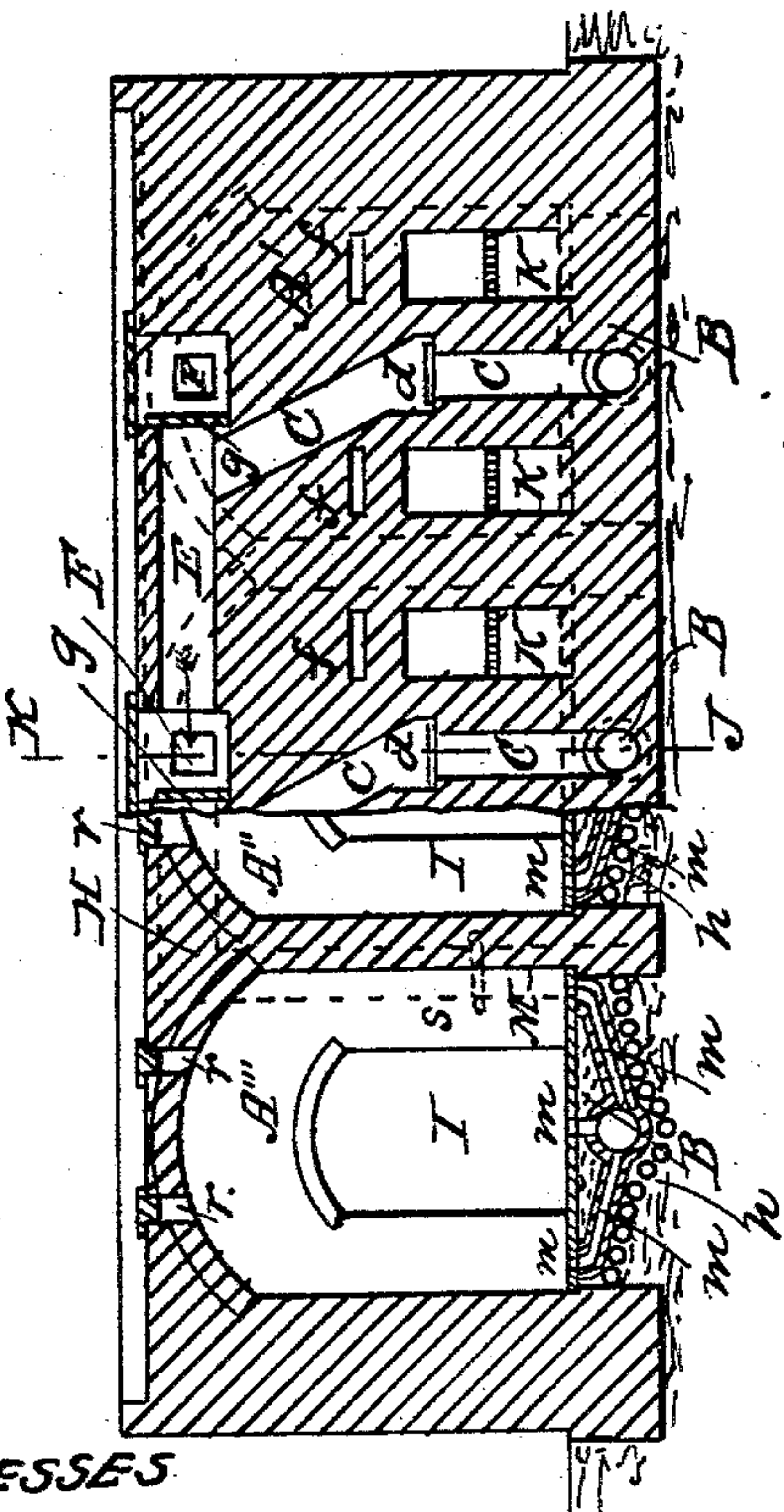


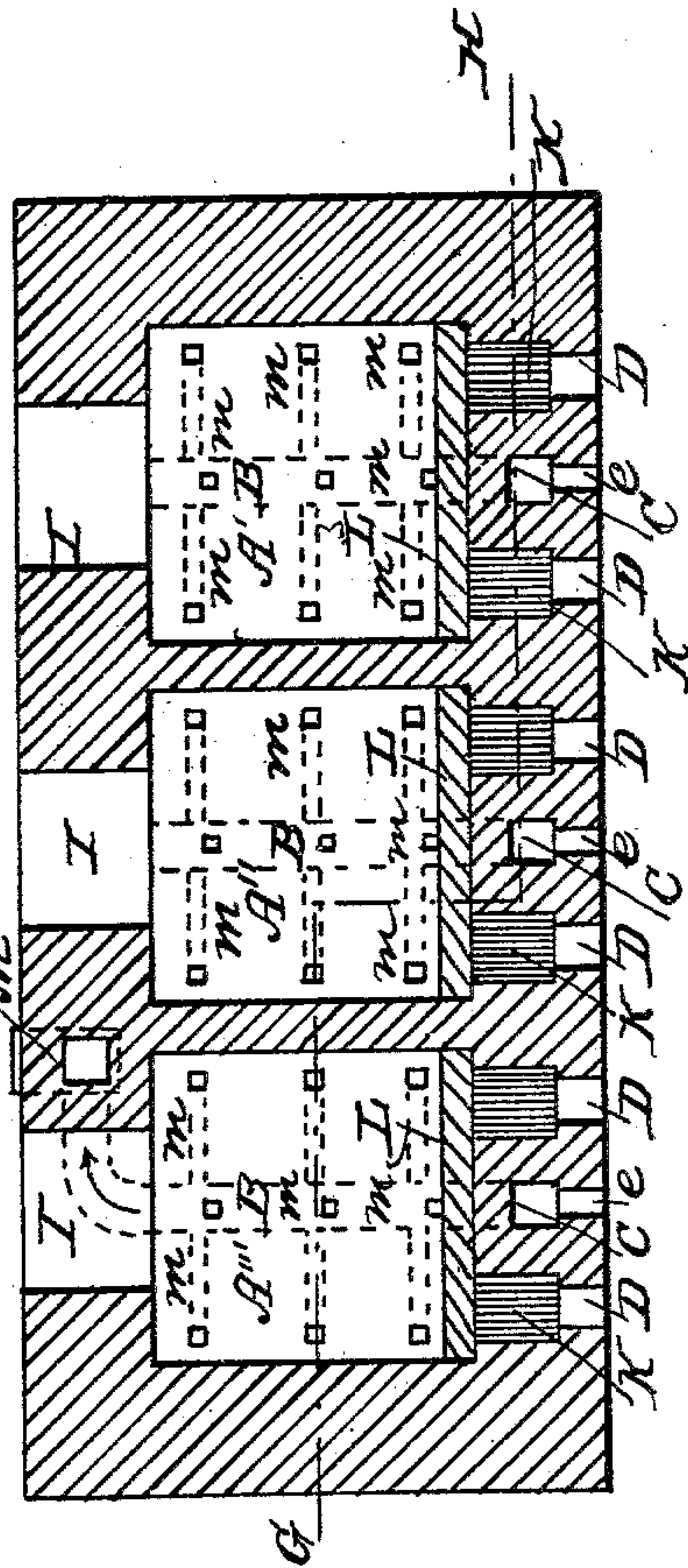
Fig. 5



WITNESSES

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Fig. 4



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN BURNING-KILNS.

Specification forming part of Letters Patent No. 93,891, dated August 17, 1869.

*To all whom it may concern:*

Be it known that I, BALTHASAR KREISCHER, of the city, county, and State of New York, have invented a new and useful Improvement in Burning-Kilns; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which drawings—

Figure I represents a front view of this invention. Fig. II is a transverse section of the same, the plane of section being indicated by the line A B, Fig. I. Fig. III is a longitudinal section of the same, taken in the plane indicated by the line C D, Fig. II. Fig. IV is a sectional plan or top view of the same, the line E F, Fig. II, indicating the plane of section. Fig. V is a sectional elevation of the same, the plane of section being indicated by the line G H, Fig. IV. Fig. VI is a transverse section of the same, the line I K, Fig. V, indicating the plane of section.

Similar letters indicate corresponding parts.

This invention relates to a kiln for burning brick, lime, cement, or other material, said kiln being constructed with a series of distinct compartments or burning-chambers, so arranged that each of the burning-chambers can be used separate or in combination with one or more of the other burning-chambers, according to the quantity of bricks or other material to be burned. This object is attained by the arrangement of a bottom flue, situated under each burning-chamber and communicating with the interior of the chamber by a series of lateral channels or branch flues, in combination with a top flue, which communicates with the smoke-stack, and also with the remaining burning-chambers, in such a manner that the heated products of combustion rising from the fire-place or fire-places, after having passed through the material contained in the first burning-chamber, can be made to pass directly to the smoke-stack, or through a second, third, &c., burning-chamber, as may be required. If the fire is raised in the fire place or places of the second, third, or last burning-chamber in the kiln, the heated products of combustion can be made to pass through the preceding burning chamber or

chambers by means of a return-flue and suitable dampers.

My present invention also relates to the arrangement of a supplementary arch over each fire-place in such a manner that the arch, situated directly over the fire-place and exposed to the direct action of the fire, can be readily renewed whenever it becomes necessary without disturbing the brick-work above said arch; and, furthermore, an air-channel is formed between the two arches to admit a supply of oxygen to the gases rising from the fire-place, thereby insuring a perfect combustion of said gases.

In the drawings, the letters A' A'' A''' designate a series of chambers, situated side by side, and inclosed by the common brick wall constituting my kiln. The number of these burning-chambers may be increased to any desired extent. Each of these chambers is provided with a doorway, I, through which the material to be burned is to be introduced, and which can be closed by suitable doors or by temporary brick walls while the kiln is in operation.

Opposite the doorways I are the fire-places D D, one or more in each burning-chamber, and these fire-places are separated from the interior of the burning-chambers by means of bridge-walls L, which protect the material to be burned against the direct action of the intense heat of the fire, and also serve to prevent the fuel from coming in immediate contact with the material to be burned. These bridge-walls are built up permanently to the height of the grates of the fire-places, their upper portions being built up temporarily of green bricks every time the kiln is "set" or charged.

The floor of each burning-chamber is provided with a number of holes and channels, *m m*, which communicate with a main flue, B, situated under the floor of each burning-chamber. This flue communicates with an upright flue, C, and through it with the horizontal top flue, E, that extends throughout the entire length of the kiln, and connects with the smoke-stack. The top flue, E, communicates with the interior of each compartment by openings F, situated directly below the crown of the kiln, and the communication between the top flue, E, and openings F can be opened or closed



by means of dampers *g*. The upright flues *C* communicate by apertures *e* with the external atmosphere, and the passage of the air or gases through said flues is governed by means of dampers *d*, as will be presently more fully explained.

The floor of the kiln is isolated from the ground by a series of pipes or flues, *h h*, built up of masonry or constructed in any other desirable manner, below the central flue, *B*, and its branches. These flues or pipes extend at one end into the ash-pit, and at their opposite ends they communicate with the external atmosphere through channels *l*, (see Fig. II,) so that a continuous supply of air will pass through them. This air in passing through the flues *h* is heated, and a draft of heated air is thus produced under the grate; and, furthermore, by said flues the heat from the kiln is prevented from passing off down into the ground, and the moisture from the ground is prevented from being drawn up into the kiln and from interfering with its correct operation. A second flue, *H*, extends parallel to the flue *E* throughout the entire length of the kiln, near its top, and it is provided with openings *G G*, leading into the several burning-chambers near their tops, and controlled by dampers *p p*. The flue *H*, which may be properly termed the "return-flue," connects with the bottom flue, *B*, of the last burning-chamber in the kiln by a flue, *M*. (See Fig. IV.) The object and operation of this return-flue will be presently explained. The arch or crown of the kiln is provided with apertures *r r*, for the double purpose of observing the fire in the several chambers and of cooling down the kiln when the operation of burning has been completed.

The fire-places are constructed as follows: Each fire-place is provided with a throat, *D*, through which the fuel is introduced. This throat is surmounted by an arch, *q*, and at a short distance above this arch is a supplementary arch, *n*, which supports the whole weight of the upper part of the side wall, so that if the arch *q*, which is exposed to the direct action of the heat, should require to be repaired, this operation can be readily performed without interfering with the side wall of the kiln. Between the arches *q* and *n* is an air-channel, *f*, which extends into the burning-chamber at a point on a level, or nearly so, with the top of the bridge-wall *L*, which serves to separate the burning-chamber from the fire-place, and compels the heated gases and products of combustion to rise up, as shown in Fig. II, before they are permitted to come in contact with the material to be burned. The bridge-wall, therefore, protects said material against an injurious heat, and it also prevents the fuel from dropping among the material to be burned. The channel *f* is open at both ends, and the air passing up through it protects the supplementary arch *n* against the injurious influence of the heat, and it also serves

to support the combustion of the gases rising from the fire-place.

The operation of my kiln is as follows: After the several burning-chambers, *A' A'' A'''*, of the kiln have been charged with green brick, or other material to be burned, the doorways *I* and all the apertures *i*, *k*, *e*, and *D* are closed. The damper *g* of the top flue, *E*, in the burning-chamber *A'* is also closed, and the dampers *g g* of the burning-chambers *A'' A'''* are opened, while the dampers *o* of the openings *F* in all the chambers are closed. A fire is then built in the fire-places of the chamber *A'*, and the heated gases and products of combustion, together with the moisture of the green material, pass off through the channels *m*, bottom flue, *B*, and flue *C* into the top flue, *E*, and directly out through the smoke-stack. When the green material in the chamber *A'* is thoroughly steamed off, the damper *g* of the top flue, *E*, in the chamber *A''* is closed, and the damper *o* of the opening *F* in this chamber opened. The products of combustion from the chamber *A'* are thereby caused to pass from the top flue, *E*, down into the chamber *A''*, and through the green material contained therein, carrying the moisture off to the smoke-stack. Then the damper *g* of the top flue in the chamber *A'''* is closed, and the damper *o* of the opening *F* in said chamber opened, and the heat is passed through the green material contained in this chamber, and so on through any number of burning-chambers. In the meantime the material in the first chamber, *A'*, is burned, and as the burning progresses fires are built in the fire-places of the chambers *A'' A'''*, and so on to the last. By the time the fires are lighted in the last chamber of the series, the burning of the material in the first chamber is completed, and this chamber is emptied and recharged with green material. Then the damper *d* (see Figs. V and VI) of the flue *C* in the last chamber, *A'''*, is closed, the dampers *s* (see Fig. IV) of the vertical flue *M* and the damper *p* of the return-flue *H* in the chamber *A'* are opened. The heat from chamber *A'''* is thereby compelled to ascend through the flue *M* to the return-flue *H*, and it passes through the opening *G* down into the chamber *A'*, and out through the channels *m*, bottom flue, *B*, and top flue, *F*, to the smoke-stack. The green material in the chamber *A'* is thus dried by the waste heat of the last compartment, and the operation of the kiln is rendered continuous. When the material in one of the chambers has been burned, and is to be cooled off, then the stopper closing the opening *e*, Fig. VI, is removed, the holes *r* in the top of the chamber are opened, the damper *d* in flue *C* is closed, and the external air passes in through the aperture *e*, flue *C*, bottom flue, *B*, and channels *m*, and out through the holes *r* in the top; or it may be made to pass out through the opening *F* into the top flue, *E*, and through this flue into the next chamber.



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

1. The bottom flue, B, with its branches *m*, in combination with a burning-chamber, A', of a kiln, and with the upright flue C, top flue, E, and dampers *g d*, substantially in the manner shown and described.

2. The openings F F, at the top of each burning-chamber, in combination with the top flue, E, and dampers *o g*, substantially as set forth.

3. The return-flue H, with openings G and dampers *p*, in combination with flue M and damper *s*, and with a series of burning-chambers, A' A'' A''', substantially as described.

4. The apertures *e* and *r*, in combination with flues C and B, and channels *m*, leading into the burning-chamber of a kiln, to provide

for a circulation of cold air through the material in the kiln, substantially as set forth.

5. The arrangement of pipes or channels *h l*, extending through under the bottom of the burning-chamber, and into the ash-pit to prevent radiation of heat into the ground, and to supply the fire with a current of heated air, substantially as described.

6. The supplementary arch *n* and air-channel *f*, in combination with the main arch *q* of the fire-place of a kiln, substantially in the manner set forth.

This specification signed by me this 27th day of May, 1869.

BALTHASAR KREISCHER.

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.