2 Sheets—Sheet 1.

F. RAFFINETTI, J. AUSTIN, & E. GANDOLFO.

Kiln for Burning Brick, Pottery, &c.

No. 224,352. **Patented Feb. 10, 1880.**

Fig. I.

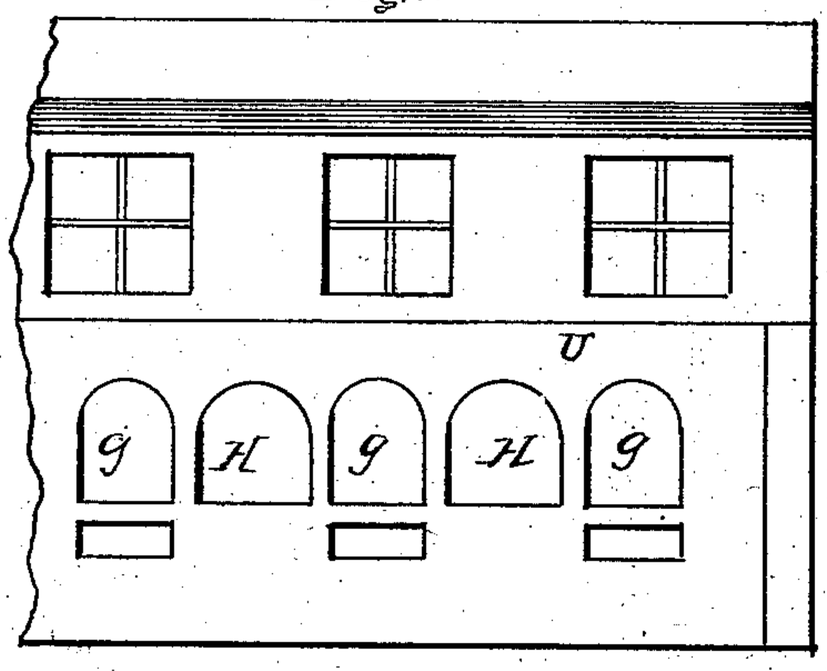


Fig. III.

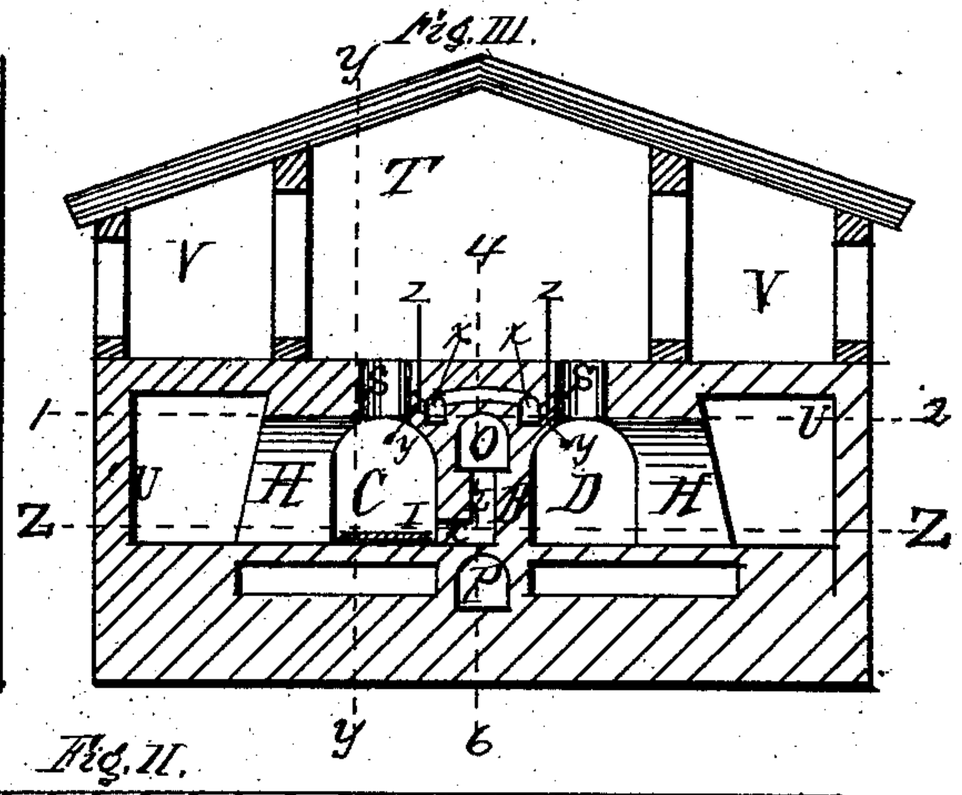


Fig. II.

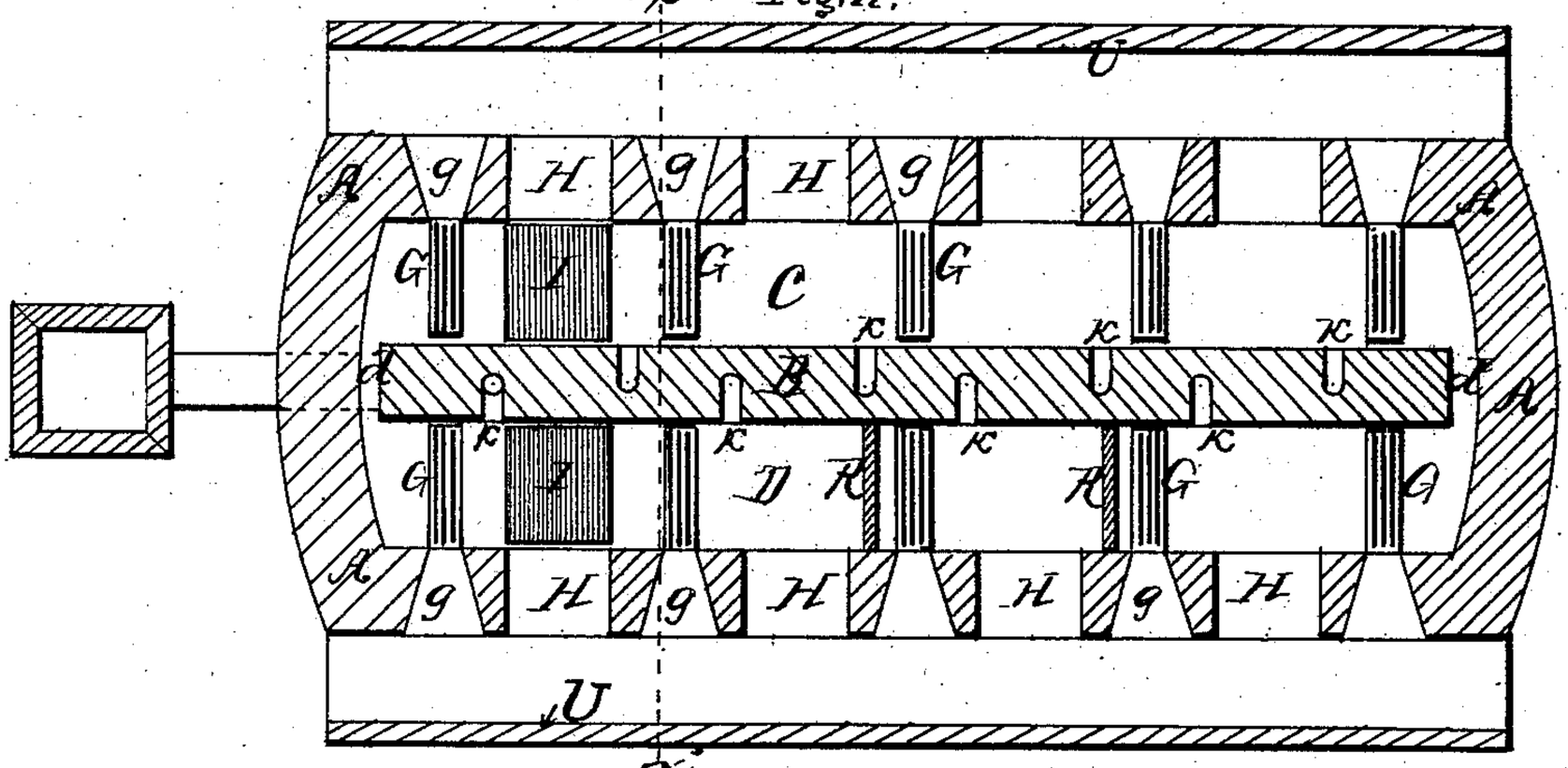
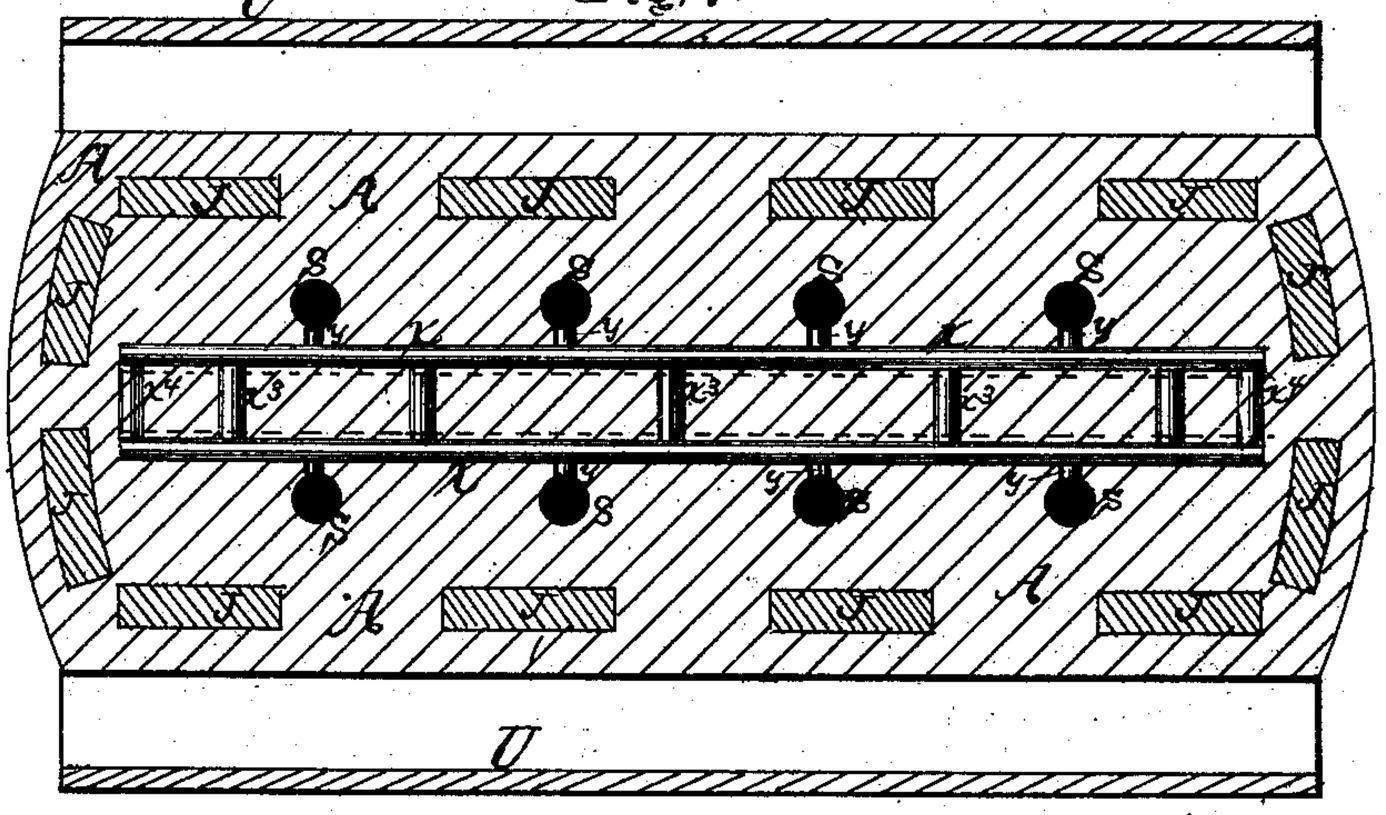


Fig. V.



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2 Sheets—Sheet 2.

F. RAFFINETTI, J. AUSTIN, & E. GANDOLFO.

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No. 224,352. **Patented Feb. 10, 1880.**

Fig. 4.

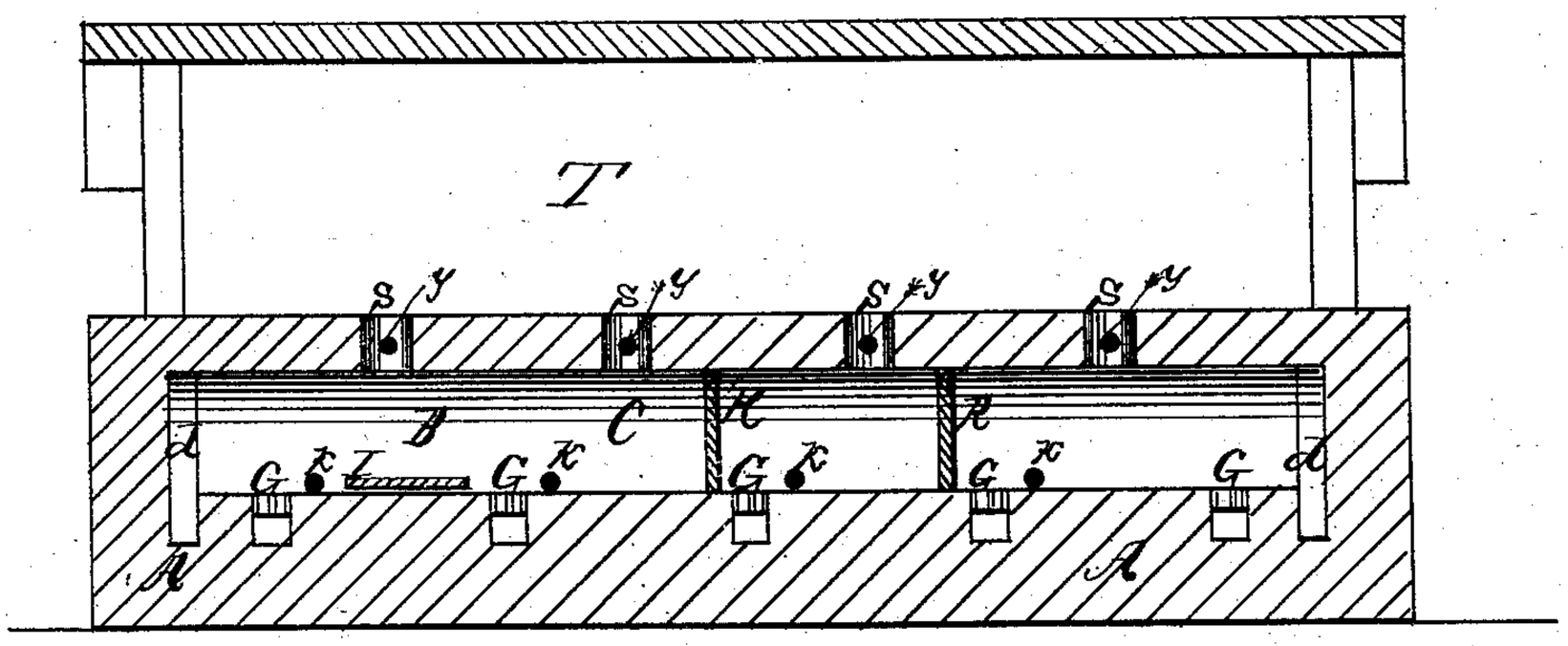
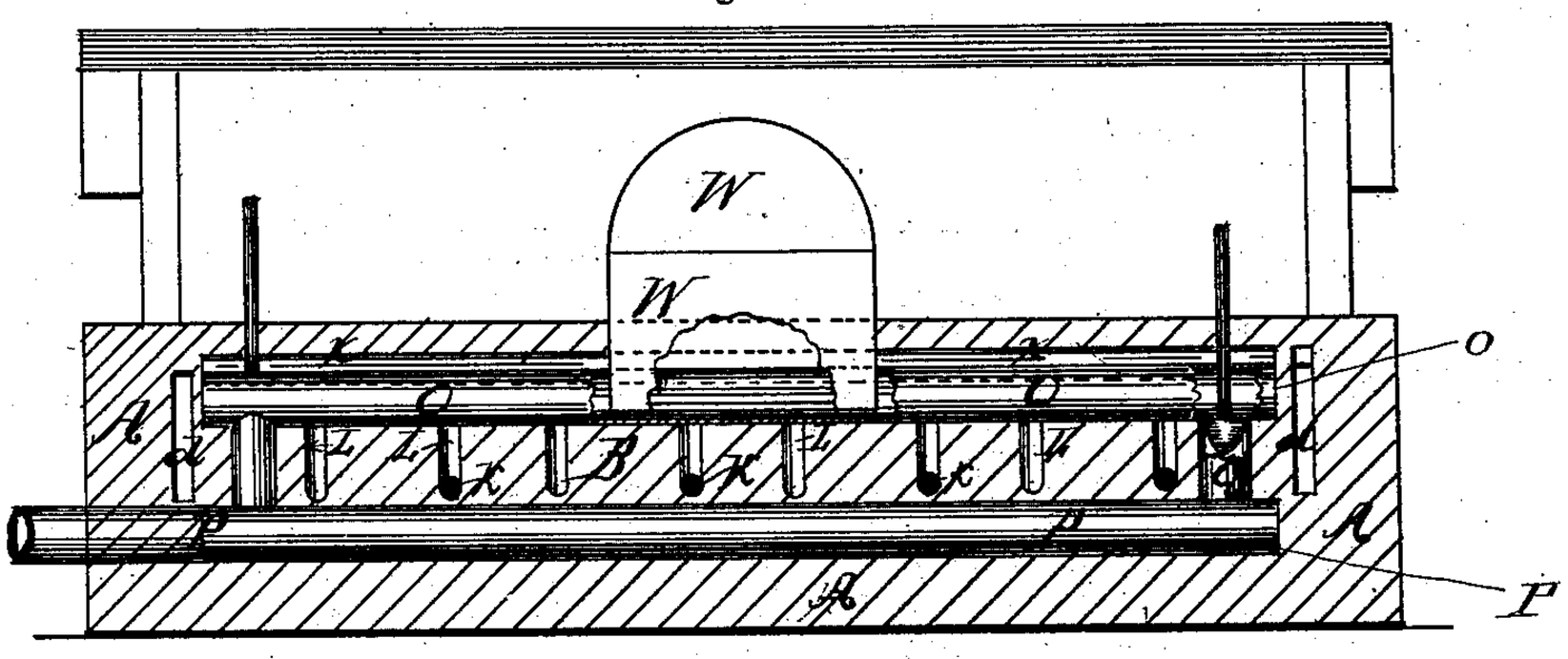


Fig. VI.



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UNITED STATES PATENT OFFICE.

FRANCIS RAFFINETTI, OF GENOA, ITALY, AND JAMES AUSTIN AND EMANUEL GANDOLFO, OF NEW YORK, N. Y.

KILN FOR BURNING BRICK, POTTERY, &c.

SPECIFICATION forming part of Letters Patent No. 224,352, dated February 10, 1880.

Application filed October 14, 1879.

To all whom it may concern:

Be it known that we, FRANCIS RAFFINETTI, of the city of Genoa, Province of Genoa, Kingdom of Italy, and JAMES AUSTIN and EMANUEL GANDOLFO, both of the city, county, and State of New York, have invented a new and useful Improvement in Kilns; and we do hereby declare that the following is an exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The object is to so construct a kiln that the machinery required for molding, &c., can be placed in close proximity thereto, and to provide auxiliary drums and the proper connecting-tubes in order to raise or reduce the temperature of the kiln.

Referring to the drawings, Figure I is a side view. Fig. II is a sectional plan taken on line *z z*, Fig. III. Fig. III is a sectional view of the same on line *x x*, Fig. II. Fig. IV is a sectional view on line *y y*, Fig. III. Fig. V is a sectional view on line 1 2, Fig. III. Fig. VI is a sectional view on line 4 6, Fig. 3.

Letter A represents the outer wall of the kiln. B is a division-wall, which divides the interior of the kiln into two compartments, C D, which are closed at the top, as shown in Fig. IV.

d d are spaces between the outer walls, A, and the division-wall B, in order to allow the products of combustion to circulate through both sides of the kiln.

G G are fire-places, where the fires to heat the kiln are built. There may be any number of them. They extend into the compartments nearly to the division-wall. *g g* are doors communicating with the fire-places, fitted with valves, dampers, &c., required for regulating the force of the fires. Under each fire-place there is an ash-pit. Between these fire-places is the floor of the kiln, upon which are placed the substances to be burned. H H are doors for inserting and removing the said substances.

I is a movable platform, placed on the floor of the kiln just behind the doors H. The object of this platform is to facilitate the removal or introduction of the materials.

The outer wall, A, is provided with cavities or hollow spaces J, which are filled with non-conductive material.

The products of combustion, after leaving the fire-places and circulating throughout the ovens or compartments, pass through openings K into a conduit, L, built in the division-wall B. From this conduit the products of combustion pass into horizontal drum O, built in the division-wall and running lengthwise of the same.

The number of the openings K is to be according to the size of the kiln.

After the products of combustion have circulated through the drum O they are allowed to pass into another drum, P, through the pipe Q, also built in the division-wall B underneath the drum O, and running parallel with it. From this drum P the products of combustion pass out into the chimney.

The pipes Q are provided with valves or dampers, in order to govern or regulate the amount of heat that is to escape from the drum O, and consequently from the ovens or compartments.

When it is required to burn simultaneously certain goods longer or by different degrees of temperature, a portion of the kiln is divided into one or more special compartments, as the case may require, by means of iron plates R, placed on either side of the openings or doors H H. (See Fig. II.) These plates are of an especial pattern, so that they can be put in and out of position at option. By means of these plates two or more fire-places can be inclosed, so as to make them independent of the other parts of the kiln, allowing thus to be heated up to the temperature required without interfering with the temperature of the rest of the kiln.

In case the circumstances make it necessary to have the kiln divided into such special compartments as are pointed out above for considerable length of time, or permanently, for considerations of economy or otherwise, the iron plates referred to above can be substituted with brick walls in order to obtain the same results as specified above.

In the vaults over the fire-places and compartments are openings S, acting as ventilating-shafts when so required, to let the radi-

ant heat pass into the drying-room T, immediately above the kiln. They are also used for the introduction of the goods or substances that are to be burned after they have been dried in the aforesaid drying-room.

On the top of the drum O, and at about the middle of the kiln, is set a tubular boiler, W, the flues of which are in connection with the drum, so that the water in said boiler is heated by the products of combustion passing through said flues. In this way a steam motive power is produced and utilized for the molding, moving, &c., of the goods manufactured.

The works can be lighted, if required, by fixing vertical retorts in the openings or ventilating-shafts S, referred to above, in the vaults over the fire-places or compartments, and with petroleum, tar, or other matter containing hydrogen in great quantities, and illuminating-gas is produced without interfering with the working of the kiln, since the said openings S are used as ventilating shafts or inlets for the substances or goods to be burned successively in relation to the order in which the fires are made and kept up. Any suitable device can be applied for testing the temperature of the oven, and in this instance it may be found that pyroscopes fixed to the doors of the fire-places answer the purpose the best.

x x are two auxiliary drums built in the division-wall, and running parallelly with the drums O and P. The ends of these drums are connected, as shown, by tube x^4. The drums are joined in center or at intervals by tubes x^3. The openings S over the ovens of compartments are joined to the said auxiliary drums by pipes *y y*, through which the heat can be made to pass from the ovens into the drums *x x'*. The tubes *y y* are provided with a valve or lock, Z, for the purpose of letting into or shutting off from the auxiliary drums *x x* the radiant heat of the vaults or ovens.

The object of these auxiliary drums is, first, to regulate the heat in the ovens or compartments; second, to cause a rapid cooling off of the compartments and of the substances therein when they are ready to be extracted; third, to enable the action of the kiln to be either continuous or intermittent; fourth, to cause the suspension of the action of the kiln at night, if required, without causing injury to the substances in process of burning.

The above advantages are secured by opening the damper Z, which allows the heat in the ovens to pass into the auxiliary drums. This heat can either be kept in said drums or, if required, thrown back into the oven; or it can be allowed to pass through the auxiliary drums into the ovens on the other sides, and thence into the chimney through the drums O and P.

Over the ovens or compartments is reared a housed-in room, T, which is intended for a drying-room, receiving the heat for that purpose from the kiln below, as pointed out above.

The kiln is surrounded with guards U U, standing some distance from the outer walls of the kiln, so as to leave a passage. The object of these guards is to shelter the firemen and others addicted to the works, and also to protect the kiln from the effects of atmospheric air and dampness. Above these guards and passages are reared two or more rooms, V, in which can be arranged such machinery as is required generally for the manufacture of clay and earthenware goods.

Having thus described our invention, we desire to claim—

1. In a heating and baking kiln, the outer wall, A, provided with the upright cavities J, and with the interior or middle wall, B, forming the housing or frame of the kiln, the two being separated from each other by the flues *d d*, substantially as shown, and for the purpose set forth.

2. The guards U U, in combination with the wall A, for the purpose of protecting the workmen and interrupting the severe drafts of air, substantially as set forth.

3. The auxiliary drum *x x'*, having the tubes x^3 and *y y*, in combination with the openings S S in the top of the compartments C D, substantially as and for the purpose set forth.

4. The kiln having the exterior wall, A, provided with the guards U U and openings H *g*, the interior wall, B, having the tubes O P and auxiliary drum *x x*, the fire-places G G, the movable frames or platforms I, the division-plates R, the proper dome, the drying and machinery rooms, located above the heating parts and connected therewith by means of the tubes S S, as shown and described.

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