

H. G. LAYNG.
 APPARATUS FOR UTILIZING THE WASTE HEAT OF KILNS.
 APPLICATION FILED JUNE 4, 1908.

951,191.

Patented Mar. 8, 1910.

2 SHEETS—SHEET 1.

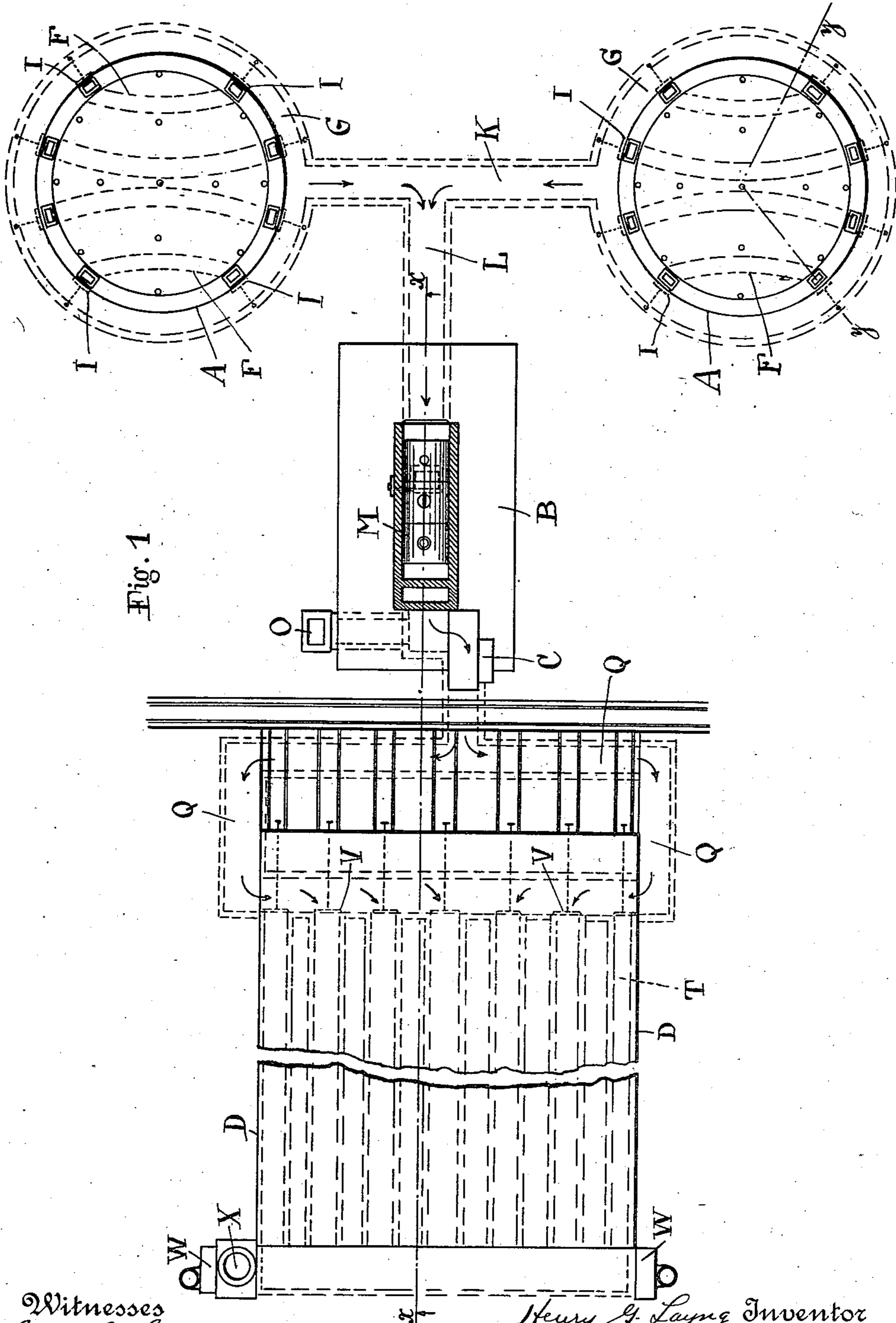


Fig. 1

Witnesses
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Herbert Morris

Henry G. Layng Inventor
 By his Attorneys *Ramey & Ogden*

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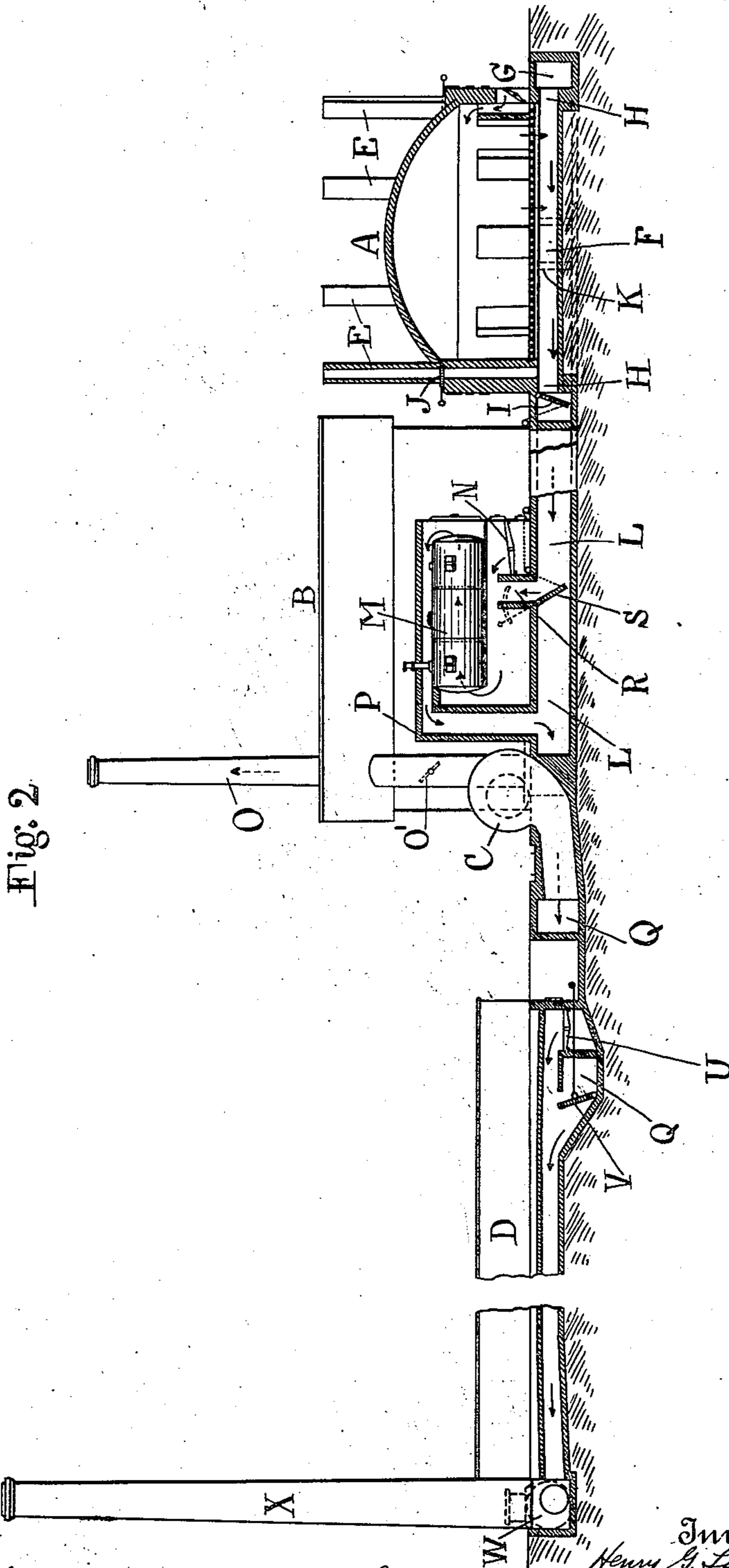


Fig. 2.

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UNITED STATES PATENT OFFICE.

HENRY G. LAYNG, OF NEW YORK, N. Y.

APPARATUS FOR UTILIZING THE WASTE HEAT OF KILNS.

951,191.

Specification of Letters Patent.

Patented Mar. 8, 1910.

Application filed June 4, 1908. Serial No. 436,602.

To all whom it may concern:

Be it known that I, HENRY G. LAYNG, a citizen of the United States, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Apparatus for Utilizing the Waste Heat of Kilns, of which the following is a specification, accompanied by drawings.

This invention relates to improvements in apparatus for utilizing the waste heat of kilns, more particularly to apparatus utilizing both kiln burning and waste heat to make steam and thereafter dry brick or other clay products. I am not to be understood as limiting the invention to these purposes, because it may be used in any connection in which it is found applicable.

Ordinarily in the art of making bricks or other clay products, the kiln heat, both burning and waste, is not utilized outside of the kiln itself, except occasionally for the purpose of drying the clay products.

The object of my invention is to utilize the heat of the kiln, both burning and waste, to generate the steam to make the bricks and afterward to dry the same.

According to my invention, I can either use the products of combustion from the boiler for drying the clay products, or I can use the products of combustion of the kiln or I can use both together.

Further objects of my invention will hereinafter appear, and to these ends the invention consists of the system substantially as hereinafter fully described and claimed in this specification and shown in the accompanying drawings, in which—

Figure 1 is a plan view partly in horizontal section of apparatus embodying the system; and Fig. 2 is a longitudinal sectional view on the lines *x, x* and *y, y* of Fig 1.

Referring to the drawings, A represents a kiln, B represents the steam boiler in any suitable style, C is a fan of any suitable design to suck and impel hot gas, as for instance, a booster fan, and D is a drier.

The kiln A may be any kind of a kiln, as a down draft, up draft or continuous kiln, and I have shown by way of example a down draft kiln.

I provide means for conducting the products of combustion from the base or bases of the stacks E or from the ends of the flues F where they connect with the stacks. For this purpose I have shown an outer flue G

around the kiln, with which the bases of the stacks communicate through the openings H, controlled by dampers I, and the stacks are provided with the usual dampers J. By leaving dampers I closed the kiln will operate in the usual way, but by closing the stack dampers J and opening the dampers I, the gases may be conducted through flues K and L to the boiler.

The boiler B may be of any style or type of a boiler, shown in this instance as a return tubular boiler having the shell M, the grate N, and the stack O provided with damper O'. The flue P communicates with the stack O or fan C, or leads directly to the flues Q, if the fan is omitted.

According to my invention, the hot gases from the kiln are led beneath the boiler by flue R at a point back or on the sides of the grate bars, so that the heated gases from the kiln will not pass through or over the grate N to the exclusion of air or other gases for combustion on the grate. A suitable damper S is provided for controlling the flues L and S, whereby the kiln gases may be conducted to the boiler or directly to the drier. According to this construction, the kiln gases may be utilized for first heating the boiler, or else they may be led past the boiler to the drier or the stack.

D is any suitable direct or waste heat drier, for utilizing either kiln heats, or boiler heats, or both. The gases are introduced back or beside the grate bars U in the drier, through the flues or chambers Q, or in a waste heat drier the gases would be led directly through the ware in the drier. The grates U are to regenerate or add to the heat in the gases and obtain the air for combustion directly from the outside with the fuel on the grate bars. The dampers V control the outlets to the flues Q and serve to regulate flow of the gases and thereby control the temperature of the gases for the drier.

The fans W and the stack X are provided to suck all gases from the kiln, the boiler, and the drier grates, and provide an accelerated draft for the entire apparatus, or any part of it.

In the operation of the apparatus, first the boiler fire is started, to get steam for the plant. A part of this steam is used to operate the fan C and the fans W. The damper O' in stack O is closed and the boiler fire furnishes the heat for the drier. When the

kiln is started, the damper S is opened as shown in Fig. 2, and the burning and waste gases from the kiln are drawn through the boiler and drier, by means of flues P and Q. In order to obtain the gases from the kiln, the stack dampers J are closed and dampers I opened. The arrangement of dampers throughout the apparatus is such that any desired part may be utilized, from one flue in the kiln to the whole apparatus. The dampers and fires are also so arranged that the necessary heat may be obtained to make steam or to operate the drier, and this can be regulated exactly as desired. When the kiln is starting up the heat is carried over to the boiler and helps out the boiler fire, and also the drier fires. When the kiln has been burned the heat in the hot bricks of the kiln is utilized in the same way, thereby cutting down the time of the kilns and utilizing all the heat. The boiler fire will also supply heat for the drier at all times.

I claim and desire to obtain by Letters Patent the following:

1. Apparatus for utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler chamber, and means for directing the gases from the kiln through the boiler or directly to the drier at will.

2. A system of utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler, means for directing the gases from the kiln through the boiler or directly to the drier at will, and means for drawing the heated gases through the drier.

3. Apparatus for utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler chamber, means for directing the gases from the kiln through the boiler or directly to the drier at will, and means for drawing the heated gases through the boiler.

4. Apparatus for utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler chamber, means for directing the gases from the kiln through the boiler or directly to the drier at will, means for drawing the heated gases through the boiler and means for drawing the heated gases through the drier.

5. Apparatus for utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler chamber, means for directing the gases from the kiln through the boiler or directly to the drier at will, an auxiliary grate or firebox in the heating passageway leading to the drier, and means for leading the heated gases from the boiler or kiln through said passageway independently of said auxiliary grate or firebox.

6. Apparatus for utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler, means for directing the gases from the kiln through the boiler or directly to the drier at will, an auxiliary grate or firebox in the heating passageway leading to the drier, means for leading the heated gases from the boiler or kiln through said passageway independently of said auxiliary grate or firebox, and means for drawing the heated gases through the drier.

7. Apparatus for utilizing the waste heat of kilns, comprising in combination, a kiln having an exit passageway for the heated gases, a boiler provided with a firebox or furnace, and having communication with said exit passageway of the kiln independently of said firebox or furnace, a drier provided with a heating passageway leading thereto having communication with the kiln and with the outlet of the boiler, means for directing the gases from the kiln through the boiler or directly to the drier at will, an auxiliary grate or firebox in the heating

passageway leading to the drier, means for
leading the heated gases from the boiler or
kiln through said passageway independently
of said auxiliary grate or firebox, means for
5 drawing the heated gases through the boiler,
and means for drawing the heated gases
through the drier.

In testimony whereof I have signed this
specification in the presence of two sub-
scribing witnesses, June 1, 1908.

HENRY G. LAYNG.

Witnesses:

E. VAN ZANDT,
E. P. LA GAY.