(No Model.)

C. H. LAND.

KILN FOR BURNING DECORATED CHINA, &c.

No. 547,646. Patented Oct. 8, 1895.

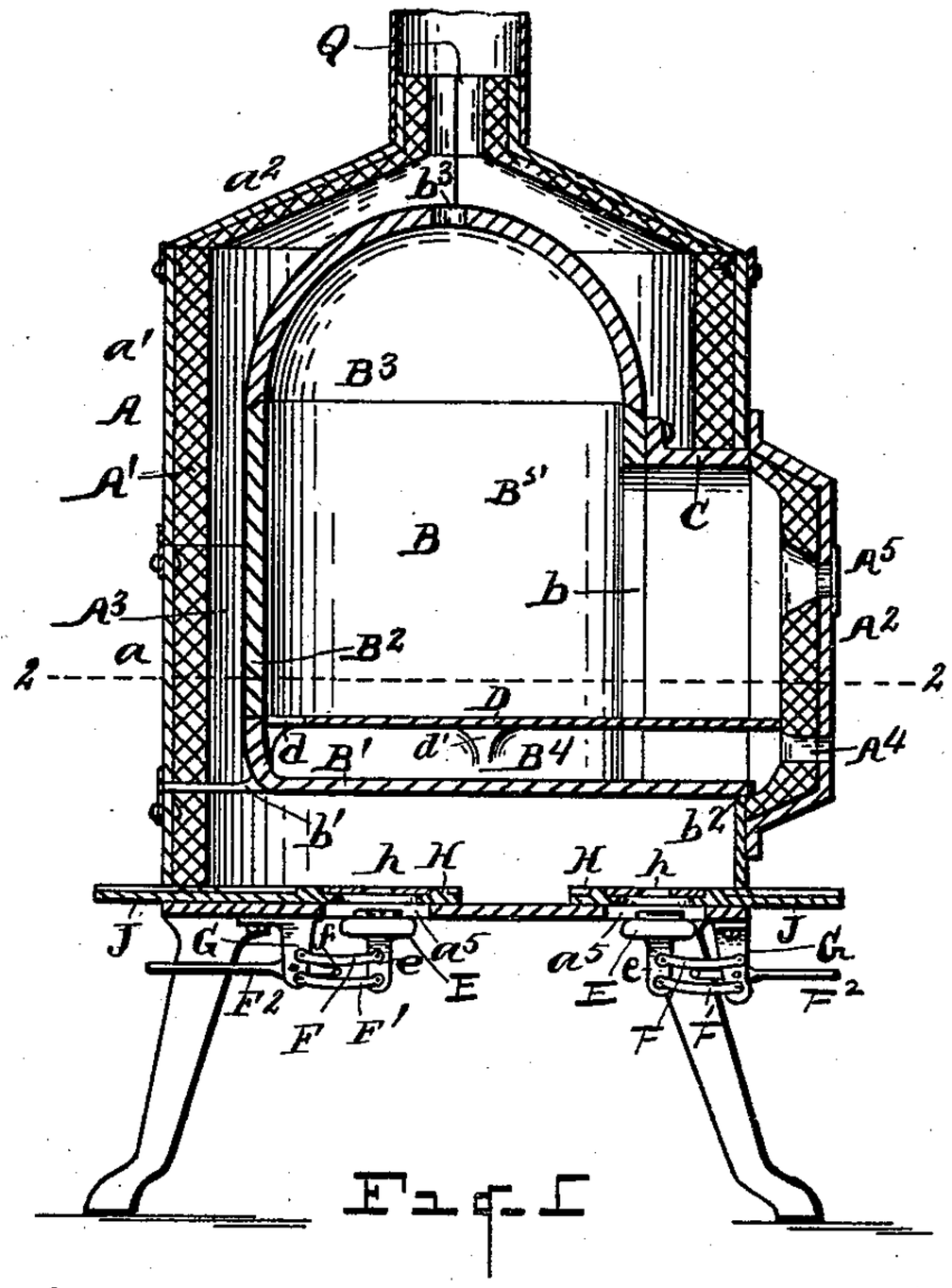


Fig. 1.

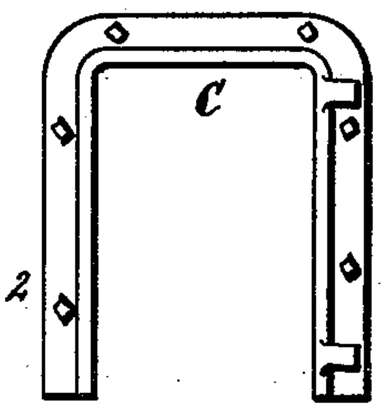


Fig. 4.

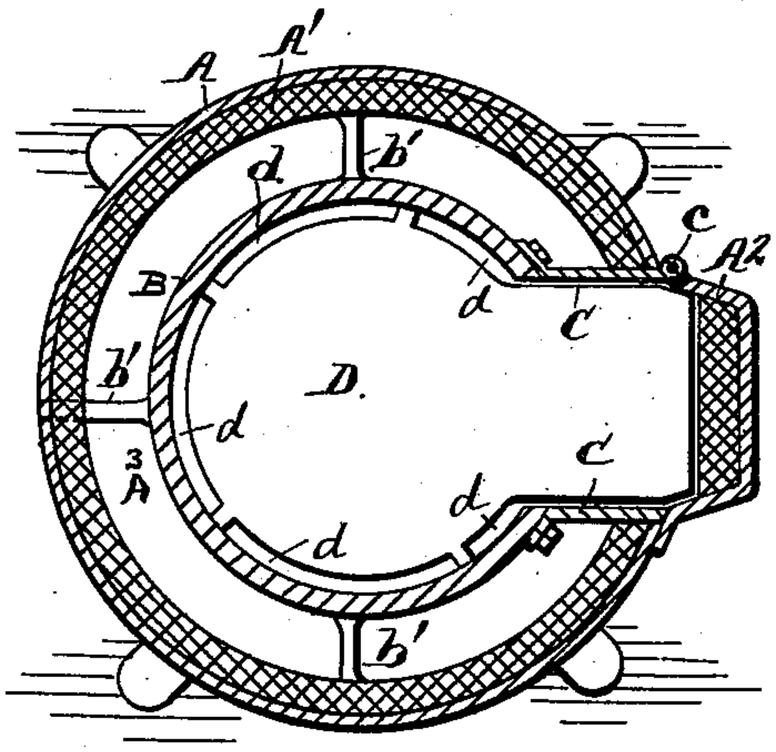
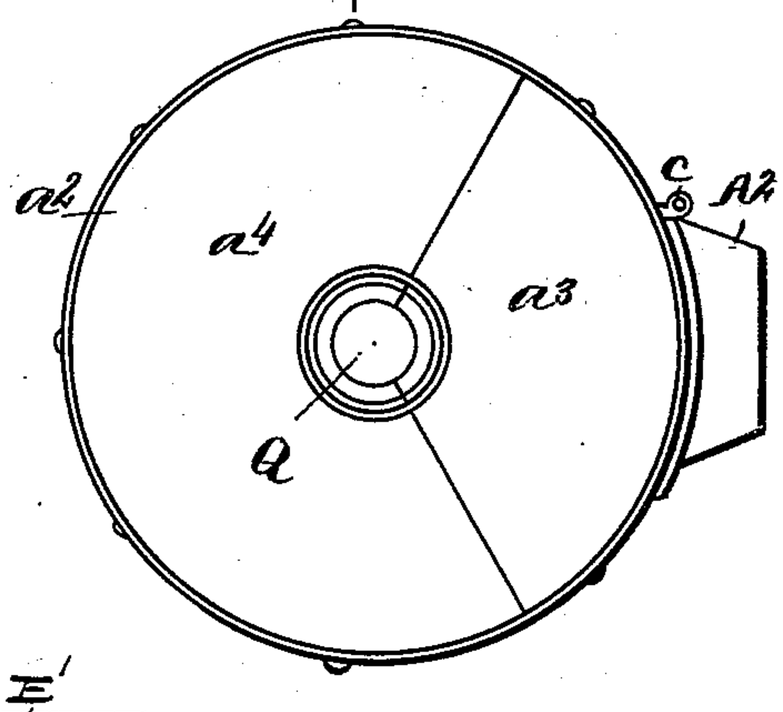


Fig. 2.

Fig. 3.



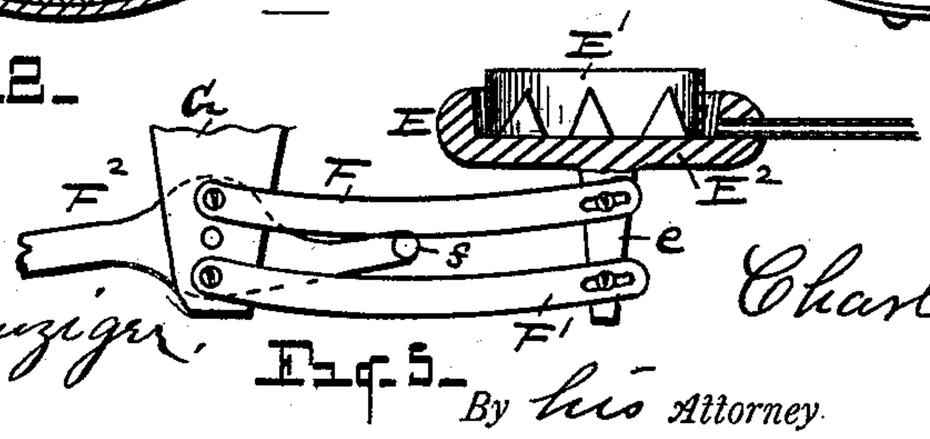


Fig. 5.

WITNESSES

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KILN FOR BURNING DECORATED CHINA, &c.

SPECIFICATION forming part of Letters Patent No. 547,646, dated October 8, 1895.

Application filed December 6, 1894. Serial No. 530,998. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. LAND, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented certain new and useful Improvements in Kilns for Burning Decorated China and for Analogous Purposes; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to a kiln for burning decorated china and for analogous purposes; and it consists of the construction, combination, and arrangement of the devices hereinafter specified and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical cross-section of my improved device. Fig. 2 is a horizontal cross-section on the line 2 2, Fig. 1. Fig. 3 is a plan view. Fig. 4 is a view in side elevation of the arch leading into the inner receptacle. Fig. 5 is a detail view of portions of the burner in section.

This invention has for its object more particularly, first, certain arrangements of parts in a kiln for the purposes mentioned whereby it becomes more convenient to place the wares in the kiln and to remove them therefrom; second, the construction of the interior receptacle of several removable sections, so that when those portions that are more directly exposed to the intense heat of combustion become worn out first such portions may be readily renewed, thus securing greater economy in the cost of operating the kiln; third, the provision of more suitable means of ventilating the interior receptacle, whereby the air is better distributed and not permitted to come in large volume against the ware, while at the same time it is uniformly heated before coming into contact with the ware; fourth, a better method of distributing the heat about the interior receptacle by providing a fire-space between the arch that is adjacent to the door and the exterior jacket of the kiln and placing a burner directly beneath this arch, so that the flame will be drawn especially about the arch; fifth, and in connection with this construction the placing of a second burner to heat the body of the kiln. The desirable feature of this arrangement of burners is to enable the operator to throw the heat forward or backward, so that when certain pieces may need a little more heat on one side it may be accomplished by reducing or augmenting the heat in either burner; sixth, in the combination of a kiln with an improved system of consuming the fuel consisting of a removable perforated diaphragm and a burner therebeneath so constructed that the exact proportions of flame and air may be focused through the diaphragm into the combustion-chamber free from the formation of carbonic oxide.

My invention also aims to provide a kiln adapted for the use of oil, gasoline, or gas as a fuel, the whole so arranged as to readily secure the requisite degree of heat without any injury to the ware being burned therein from the products of combustion.

I carry out my invention as follows: A represents any suitable inclosing case or jacket provided with any suitable refractory lining A′. This inclosing case or jacket I prefer to make in sections, as shown, Fig. 1 showing a lower section a, an intermediate section a' thereabove, and an upper or top section a^2. This upper section a^2 I prefer to make in two parts, one part a^3 forming about one-third of the upper section, the other part a^4 forming the remaining two-thirds of the upper section a^2. This upper section forms the cap of the jacket. I prefer to make this cap or upper section of the parts a^3 a^4 to facilitate the removal of the dome of the inner receptacle, as hereinafter more fully explained. The upper section a^2 is also formed with an uptake Q. At one side the case or jacket A is formed with a door A^2. Within the jacket or case A I locate an inner receptacle B. This inner receptacle B, I also prefer to construct in sections, Fig. 1 disclosing a lower section B′ with an intermediate section B^2 thereabove and a dome or top section B^3.

The receptacle B is made open on the side adjacent to the door A^2, as indicated at b. About said opening b I locate an arch C. The inner receptacle B is preferably made in sections, of metal, and the arch C is bolted thereto, as shown. To one of the outer edges of the arch the door A^2 is hinged, as shown at c.

The lower section B′ of the inner receptacle is provided with supporting-arms b', projecting outward and supported in the jacket or case A of the kiln, as indicated in the drawings. The front end of the section B′ rests upon the jacket, as indicated at b^2. In this manner the inner receptacle is supported within the case A, the inner receptacle being spaced from said case, forming a combustion-chamber A^3 and permitting a free circulation of the flame about said inner receptacle. Toward the base of the receptacle B, I locate a removable floor D, having openings therethrough at the outer edge thereof, as indicated at d. Underneath this floor D the door A^2 is formed with a ventilating-orifice A^4, through which air is admitted into the chamber B^4 beneath the floor D and the base of the receptacle B, the air passing through the orifices d into the chamber B^5 above said floor. By providing the orifices d at the outer edge of the floor D, it will be observed that the air is let into the main chamber b^5 of the receptacle B through said orifices only. By this means the air is spread and distributed into the chamber B^5 and through the ware placed therein. It is a matter of special importance, as producing more satisfactory results, thus to provide for the ventilation of the chamber B^5 by admitting the air thereto at the outside. The floor D thus forms a spreading device and is preferably made removable through the door A^2. It may be supported in any suitable manner, as upon lugs d'. The dome-section B^3 is provided with a ventilating-orifice b^3. The door A^2 is also provided with an observation-orifice, as at A^5, through which the work can be watched. It will be seen that by this provision for ventilating the chamber B^5 all fumes occasioned by the burning of the ware therein are carried off, and provision is also made thereby to carry off any products of combustion should any enter into the chamber B^5, as through a crack therein. I employ in connection with my improved kiln preferably two burners E E, each preferably consisting of a pan or other receptacle E^2 to receive the fuel, said pan provided with a foraminous collar E′, supported thereupon toward its periphery. This foraminous collar acts as an air-mixer. The base of the burner-pan is closed and air is admitted through the foraminous collar to the flame after primary ignition has taken place. The burner is made vertically adjustable in any suitable manner. I prefer for this purpose to employ an arrangement of levers, as shown in Fig. 1, levers F and F′ being pivotally connected with an arm e, depending from the base of the burner-pan, the opposite extremities of said levers having a pivotal connection with a bracket-arm G, depending from the base of the jacket, as shown.

An operating-lever E^2 is fulcrumed upon the bracket-arm G, connected with the base of the jacket A. The forward end of the lever F^2 projects between the levers F F′ and is bent so as to bear upon the adjacent edge of either of said levers, as at f. It will be evident that by raising or lowering the operating-lever F^2 the burner will be correspondingly raised or lowered. The base of the jacket of the kiln is constructed with suitable openings therein above the burners E E, respectively, as indicated at a^5 a^5, through which the flame of combustion may pass from the burner beneath the receptacle B into the combustion-chamber A^3. Beneath each of the openings a^5 a^5 I locate a removable diaphragm H, said diaphragms being each provided with a contracted orifice, as at h. The diaphragms H H are preferably engaged in guideways J J. By making the diaphragms H H removable a diaphragm having any desired size of aperture h therein may be employed, and the diaphragm may be changed, as required, in order to properly focus the flame of the burner through the aperture h.

I would call special attention to the method of burning the fuel herein employed, whereby the air is mixed with the flame after primary ignition has taken place. By primary ignition I mean the initial ignition of the fuel. This I have found to be a very essential feature in securing satisfactory results in the burning of decorated china and analogous uses, inasmuch as by thus mixing the air with the flame after primary ignition has taken place, instead of mixing the air with the hydrocarbon fuel before ignition has taken place, I effectually prevent the formation of carbonic oxide.

By preventing the formation of carbonic oxide I of course avoid any possible liability of damage to the ware occasioned where carbonic oxide is present, as is well understood.

The burners are obviously so arranged that there will be an extra heat underneath the arch C for warming the air, the arch, and the space adjacent to the door. This I accomplish by locating one of the burners under said arch toward the forward part of the device, the other burner being placed toward the rear of the kiln and serving to afford more effectually the general heat for the interior of the kiln.

I design to make the parts a^3 a^4 of the upper section a^2 of the jacket as hereinbefore described, in order that I may remove the dome B^3 by simply removing the smaller part a^3 of the upper section of the jacket without having to remove the larger part of said upper section and without disturbing the uptake Q. I design to make the dome B^3 removable from the receptacle and from the jacket A to provide for the insertion and removal of large pieces of ware, too large to be admitted through the door A^2. I design to make the door A^2 of sufficient size to admit ware of most sizes, the dome being only required to be removed for pieces of unusually large size. The advantages of having a side entrance to the receptacle B lies in the fact that the work can be more readily placed therein and removed therefrom, while also

the door can be opened for observation, if necessary, and work can constantly be observed through the peep-hole A^6. In this manner the operation going on within the receptacle can be constantly examined even while the process of burning is going on.

I prefer to cast the receptacle B in sections to provide for any expansion and contraction that may take place and so that those parts when worn out may be economically renewed.

What I claim as my invention is—

1. A kiln for burning decorated china &c., having in combination a jacket provided with orifices at its base, an interior receptacle forming a combustion chamber thereabout, burners located beneath said orifices respectively, said jacket and said interior receptacle provided with a side entrance, and an arch located over the entrance into the interior receptacle, one of said burners being located beneath said arch, substantially as set forth.

2. In a kiln for burning decorated china &c., the combination of a jacket provided with an uptake, an interior receptacle for the ware provided with a removable dome, a portion of the top of said jacket being removable without disturbing the uptake, to permit the removal of said dome therefrom, substantially as set forth.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES H. LAND.

Witnesses:
OTTO B. BAENZIGER,
MARY A. MARTIN.