

(No Model.)

E. V. WINGARD.
LIMEKILN.

No. 566,106.

Patented Aug. 18, 1896.

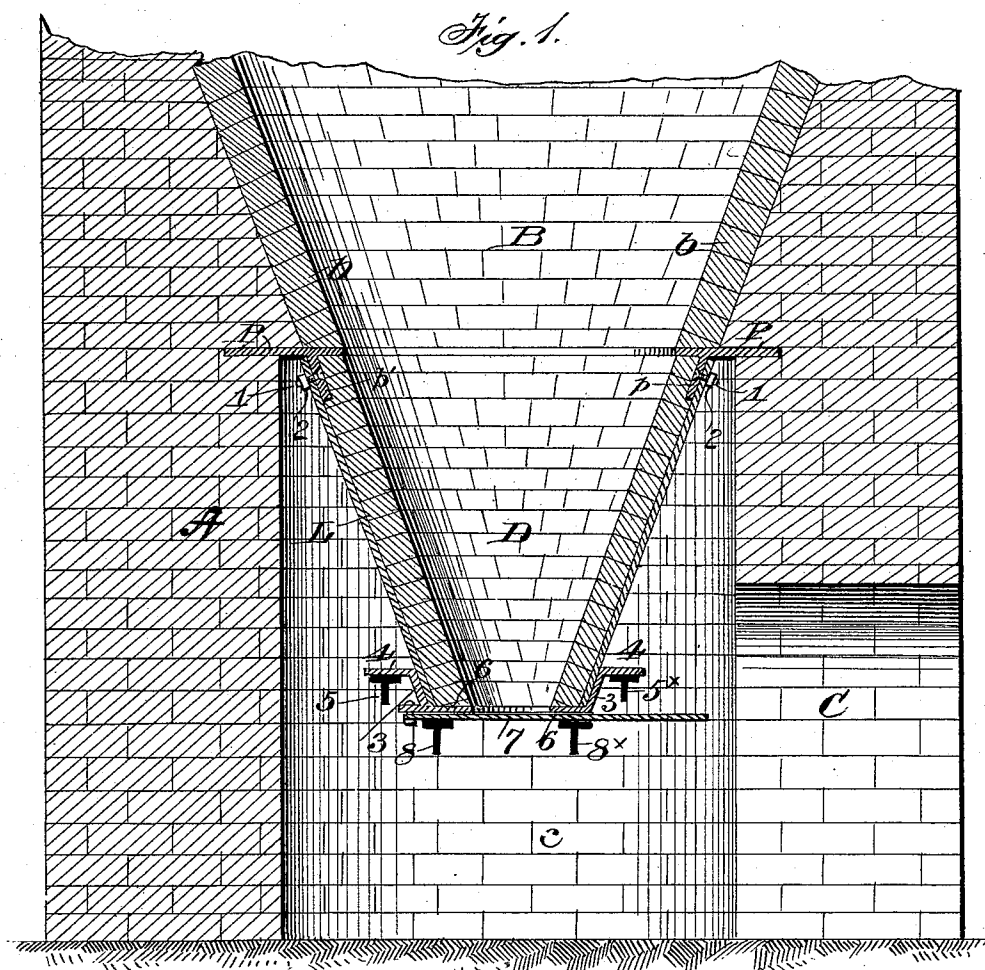


Fig. 2.

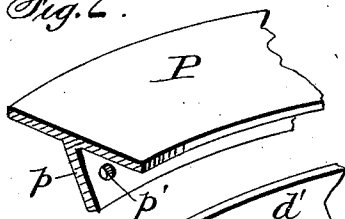
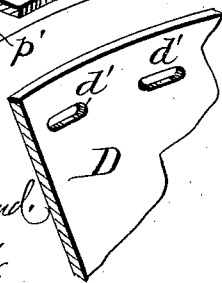
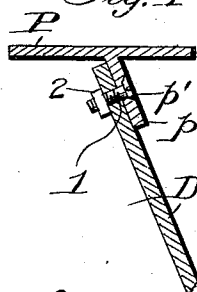


Fig. 3.



Witnesses
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Fig. 4.



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UNITED STATES PATENT OFFICE.

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LIMEKILN.

SPECIFICATION forming part of Letters Patent No. 566,106, dated August 18, 1896.

Application filed June 30, 1896. Serial No. 597,572. (No model.)

To all whom it may concern:

Be it known that I, EDWIN V. WINGARD, a citizen of the United States of America, residing at Kennett Square, in the county of Chester, State of Pennsylvania, have invented certain new and useful Improvements in Limekilns, of which the following is a specification.

My invention relates to limekilns; and the object is to construct a new and improved cooling-chamber, at the lower portion or the base of the kiln, whereby the defects attending present constructions are remedied and a cooling-chamber provided which is effective in operation, which is durable and not likely to warp or become displaced, and which can be readily and conveniently repaired, and, if desirable, may be detached and replaced. Heretofore these cooling-chambers have been built or formed in the masonry of the kiln, or have been made from metal, cast or plate, and rigidly secured by rivets to, or made integral with, a supporting-plate built in the masonry, and have also been held by rods depending from a top plate and arranged to connect to the lower end of the shell of the chamber to hold the upper end of the shell in a flange-groove in the top plate. In the instances where the chamber is built of masonry integral with the base and cupola the effects of the heat, in its variable temperature, shortens the life of the part by making it crack and warp, and the reparation is expensive, tedious, and extensive. In the instances where the cooling-chamber is constructed of metal the connections have proved uncertain, insufficient, and perishable.

It is the design of my present invention to remedy existing defects by an improved construction, and to provide improved means for securing and maintaining the cooling-chamber in position.

I have fully and clearly illustrated my improvements in the accompanying drawings, forming a part of this specification, and wherein—

Figure 1 is a central vertical section of the base portion of a limekiln having my invention applied. Fig. 2 is a detail view, partly in section, of a portion of the supporting-plate. Fig. 3 is a detail of a portion of the upper end of the metal shell of the cooling-

chamber. Fig. 4 is a detail section showing the fastening means for holding the chamber-shell to the flange of the supporting-plate. 55

The upper parts of the kiln, comprising the furnaces, the cupola, &c., may be of any of the approved constructions, and for this reason they have not been illustrated in the drawings. 60

Referring to the drawings, A designates the base portion of a limekiln made up of substantial mason-work of such dimensions as may suit it to the purpose intended. In the upper part of the base is formed the lower portion of the combustion-chamber B of the kiln, which is lined with fire-bricks *b* or similar durable and non-combustible material, constituting the usual lining of the kiln, and in the base is formed an arched way C, leading into the chamber or space *c*, in the center of the structure, which surrounds the cooling-chamber. 70

D designates the cooling-chamber, composed of a conical metal shell of suitable dimensions and taper, substantially as shown in the drawings. In the masonry at the base of the combustion-chamber B is inserted an annular plate P, formed with an inwardly-inclined annular flange *p* on the inner edges extending down a desired distance and provided with a plurality of bolt-holes *p'*, arranged at determined distances, substantially as indicated in the drawings. 80

In the upper end of the metal shell of the cooling-chamber are formed a plurality of elongated bolt-holes *d'*, registering with the bolt-holes *p'* in the flange of the annular supporting-plate P. The inclines of the flange *p* and shell D aline, and the upper end of the latter being disposed up and around the flange fastening-bolts 1 are projected through the registering bolt-holes, and then by screwing up the nuts 2 of the bolts the shell of the cooling-chamber is held firmly to the supporting-flange, yet so that the variations of the contraction and the expansion are not attended with the usual effects of warps or breaks, the consequent movements being compensated by the elongated bolt-holes in the shell of the cooling-chamber. On the lower end of the metal shell is arranged a tapering shell 3, formed with a horizontally-arranged annular flange 4, which rests on sub- 85 90 95 100

stantial cross-bars 5 5^x, the ends of which are secured in the walls of the masonry, and at the bottom of the tapering shell 3 is formed a horizontally-arranged annular flange 6, extending inwardly, and on which the lining of the cooling-chamber is supported, substantially as shown in the drawings.

L designates the lining of the cooling-chamber, consisting of fire-bricks or other suitable refractory material, extending throughout the interior of the shell, and reaching up into proper contact and union against the bottom of the lining of the combustion-chamber, substantially as shown in Fig. 1 of the drawings.

To the bottom of the shell 3 is suitably secured the doors 7, which, as usual, swing on a horizontal plane to open and close the lower end of the cooling-chamber, the doors being supported on cross-bars 8 8^x, secured across the draw-room or chamber.

The lower end of the cooling-chamber is at such height above the floor of the base as to permit the convenient access under it of a car or other suitable receptacle to take the lime from the cooling-chamber to carry it for deposit to any place desired.

It will be perceived from the foregoing description, taken in connection with the drawings, that I have provided a cooling-chamber about which the atmosphere has free exterior circulation and in which the body of the cooler may be detached and replaced, and so held as to compensate for contraction and expansion, and also by providing a refractory lining I greatly improve the durability and integrity of the structure.

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

1. In a limekiln, a cooling-chamber, located

in the base of the kiln, comprising a circular supporting ring-plate formed with an interior flange inclined inward and extending downward and provided with a plurality of bolt-holes; a conical metal shell having its upper end fitted on the flange of the supporting-plate and provided with bolt-holes adjacent to the upper end, clamping-bolts projected through the holes of the said flange and shell; a tapering metal shell on the lower end of the conical metal shell, formed with an outwardly-directed horizontal annular flange at its upper end and an inwardly-directed flange at its lower end, and a lining of refractory material supported on the lower flange of the tapering shell and extending over the interior of the conical metal shell.

2. In a limekiln, a cooling-chamber comprising an annular plate P formed with an inwardly-inclined annular flange *p*, and provided with a plurality of bolt-holes *p'*; a metal conical shell D provided with a plurality of elongated bolt-holes *d* in the upper end; fastening-bolts 1, to hold the shell to the said flange; a tapering shell 3 on the lower end of the cooling-shell formed with a horizontal annular flange 4 and interior annular bottom flange 6, supporting-bars 5, 5^x, and interior brick-lining L extending throughout the interior of the cooling-chamber and resting on the bottom flange of the shell 3.

In witness whereof I have hereto set my hand in the presence of two attesting witnesses.

EDWIN V. WINGARD.

Attest:

A. G. HEYLMUN,
GEO. H. EVANS.