

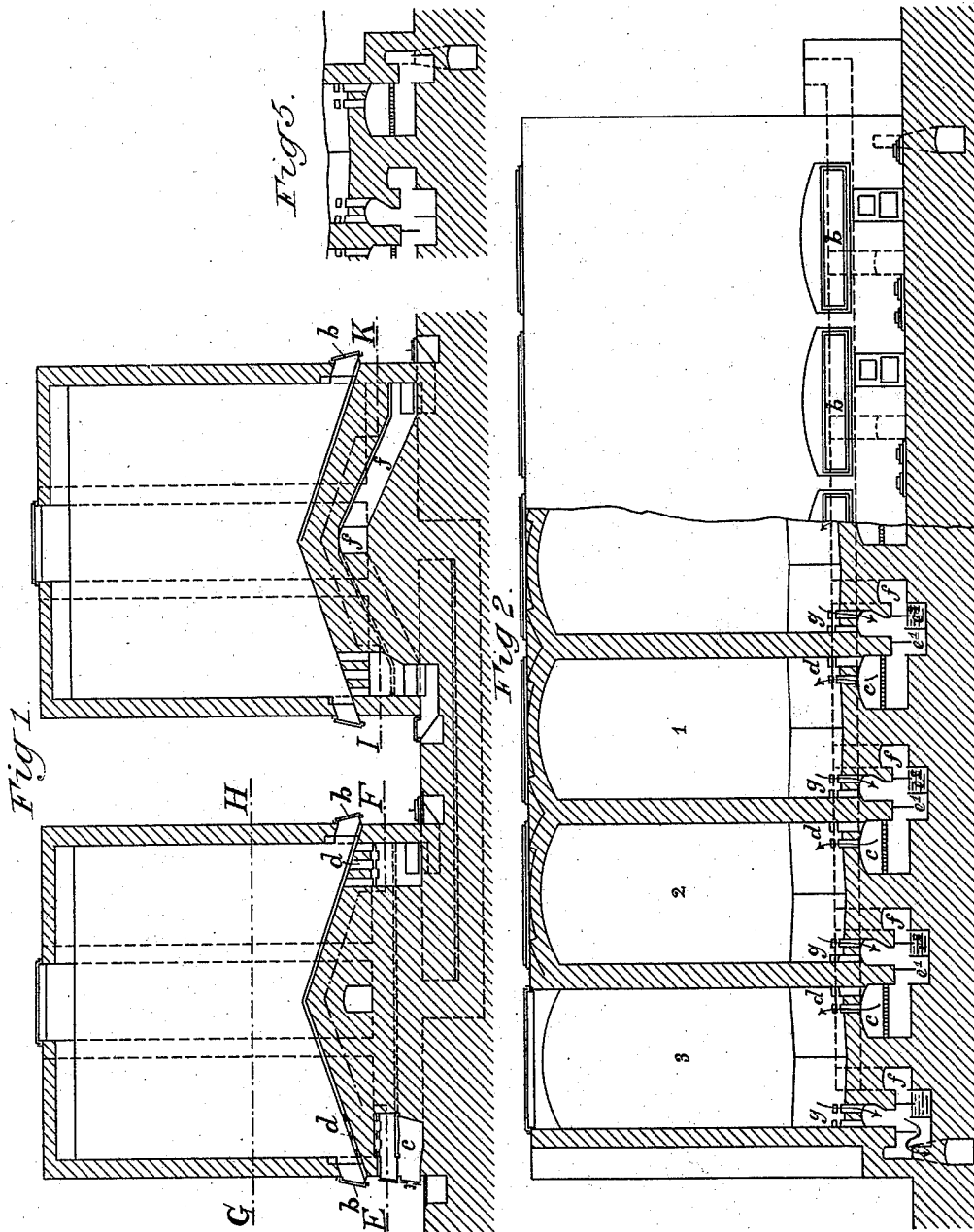
(No Model.)

2 Sheets—Sheet 1.

E. J. LJUNGBERG.
CONTINUOUS CHARCOAL KILN.

No. 547,271.

Patented Oct. 1, 1895.



WITNESSES:

Paul Johas
John CoWa

INVENTOR:

E. J. Ljungberg

BY

Munn & Co

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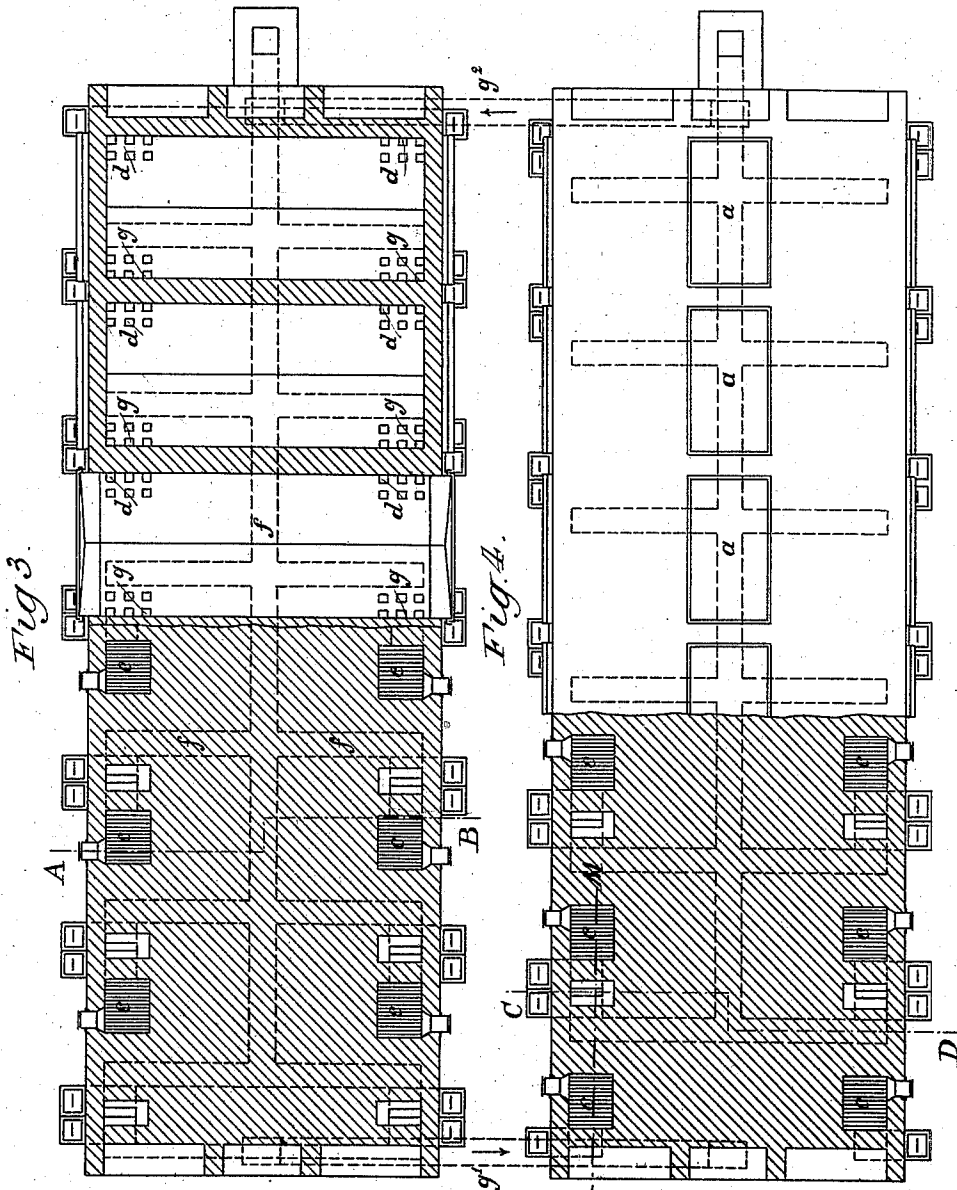
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UNITED STATES PATENT OFFICE.

ERIK JOHAN LJUNGBERG, OF FALUN, SWEDEN.

CONTINUOUS CHARCOAL-KILN.

SPECIFICATION forming part of Letters Patent No. 547,271, dated October 1, 1895.

Application filed June 13, 1895. Serial No. 552,727. (No model.)

To all whom it may concern:

Be it known that I, ERIK JOHAN LJUNGBERG, a citizen of Sweden, and a resident of Falun, Sweden, have invented certain new and useful Improvements in Continuous Charcoal-Kilns, of which the following is a specification.

The present invention relates to certain improvements in kilns for a continuous carbonization of wood and turf, and particularly to kilns of that class which consist of several compartments in which the wood is introduced and ignited, the combustion-gases being conveyed from one compartment to the other.

The improvement relates to the manner of connecting the compartments of the kiln, which in this case is effected with the assistance of valves closed by a sheet of water or water seals in such a manner that by causing the surface of the liquid to rise or fall one compartment of the kiln may either be connected to another or disconnected therefrom, in order to cool the carbonized material.

The invention also comprises certain improvements in the means of conveying the turf or wood into the kiln.

The invention will be fully described hereinafter, and the features of novelty pointed out in the claims.

In the accompanying drawings, in which the same letters and numerals refer to corresponding parts, Figure 1 is a vertical section of the kiln, the left part being taken on the line A B of Fig. 3 and the right part on the line C D of Fig. 3. Fig. 2 is a broken side elevation of the kiln, partly in section. Fig. 3 is a horizontal section of the kiln, in which the left part is a section on the line E F in Fig. 1 and the right part a section on the line G H in Fig. 1. Fig. 4 is another plan, the left half being a section taken on the line I K of Fig. 1; and Fig. 5 is a section on the line L M in Fig. 4.

Figs. 1 to 5 show two rows of kiln-compartments, which are connected with each other through channels g' and g^2 . (See Figs. 3 and 4.) This arrangement allows one complete row to be worked independently of the other or certain compartments in each row to be worked while the other compartments are out of action according to the degree of coarseness or dryness of the turf or the wood. The mate-

rial is filled into the several compartments 1 2 3, &c., through the openings a , and the charcoal or the carbonized material is taken out at the bottom through the openings b . These openings are so large that pieces of wood of a length of up to four meters may be introduced and taken out by means of mechanical power. The openings for the introduction of the material may be fitted with a water seal. Underneath the lower vault of each compartment 1 2 3, &c., a furnace with a grate is arranged in such way that it communicates with the compartment of the kiln through holes d in the vault. In the example shown in the drawings there are two such furnaces for each compartment of the kiln. At the side of each such furnace and underneath the vault of the adjoining compartment there is a valve or water seal e , which is double, and which is connected through one part e' and the furnace c at the side thereof with one of the kiln-compartments and communicating through the other part e^2 with a channel f that leads either to the chimney or to another outlet. The upper part of the water seal is in communication with the compartment of the kiln through holes g .

When the kiln is at work, the part e^2 in each water seal belonging to the kiln-compartments which are in use is filled, whereby the connection of these compartments with the chimney is closed. The water seal is filled from above and is emptied through a cock at the bottom. (Not shown in the drawings.) When the wood in the kiln-compartment 1 gets heated, the gases travel in the direction shown by the arrows in Fig. 2. When the wood in compartment 1 has been heated so much as to produce inflammable gases, these gases are ignited, when passing through the grate to the compartment 2, by placing a layer of burning coal on the grate, so that the said inflammable gases will heat the wood in the compartment 2. The same operation takes place in the other compartments which are connected with the compartments 1 and 2. From the compartment 3 the gases are conveyed to the other row of compartments through the channel g' . When the wood in the compartment 1 has been carbonized, the connection with the compartment 2 is closed by filling

the part e' of the water seal. The compartment adjoining the compartment last in use may then be connected thereto by filling the part e^2 of the water seal belonging to the former, through which the direct communication between this compartment and the chimney is closed, and emptying the part e' , whereby a connection is made between both compartments. During the use of the kiln the process of carbonization may be regulated by raising or lowering of the water-surface in the parts e' with relation to the valve or plate extended into its upper portion, whereby the area for the passage of the inflammable gases may be altered.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the kiln compartments with water-seals communicating with the adjoining kiln compartments and with a channel leading to a chimney or other issue, substantially as described.

2. The combination of the kiln compartments with water-seals located underneath the bottom of each compartment, channels connecting the water-seals with the kiln compartments, and channels connecting said water-seals and in communication with the chimney or other outlet, substantially as described.

3. The combination of the kiln compartments with water-seals underneath the bottom of each compartment, each seal consisting of two separate parts, a channel connecting each water-seal with one kiln compartment, a channel connecting one part of the water-seal with the adjoining kiln compartment, and channels connecting the other part

of the water-seal with the chimney or other outlet, substantially as described.

4. The combination of the kiln compartments with water-seals, passages from the seals to the compartments, and furnaces situated in the passages between the water-seals and the kiln compartments, substantially as described.

5. The combination of the kiln compartments, passages from one compartment to the adjoining compartment, a channel leading from each such passage to the chimney or other outlet, and a double water-seal located at the connection of the said channel with the said passage, whereby each compartment may be connected either with the chimney or with the adjoining compartment, substantially as described.

6. The combination of the kiln compartments, passages from one compartment to the adjoining compartment, a channel leading from each such passage to the chimney or other outlet, a furnace located in each passage to ignite the gases passing from one compartment to the adjoining compartment, and a double water-seal located at the connection of the said channel with the said passage, whereby each compartment may be connected either with the chimney or with the adjoining compartment, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ERIK JOHAN LJUNGBERG.

Witnesses:

WREDEMAN BOMAN,
H. DAHLGREN.