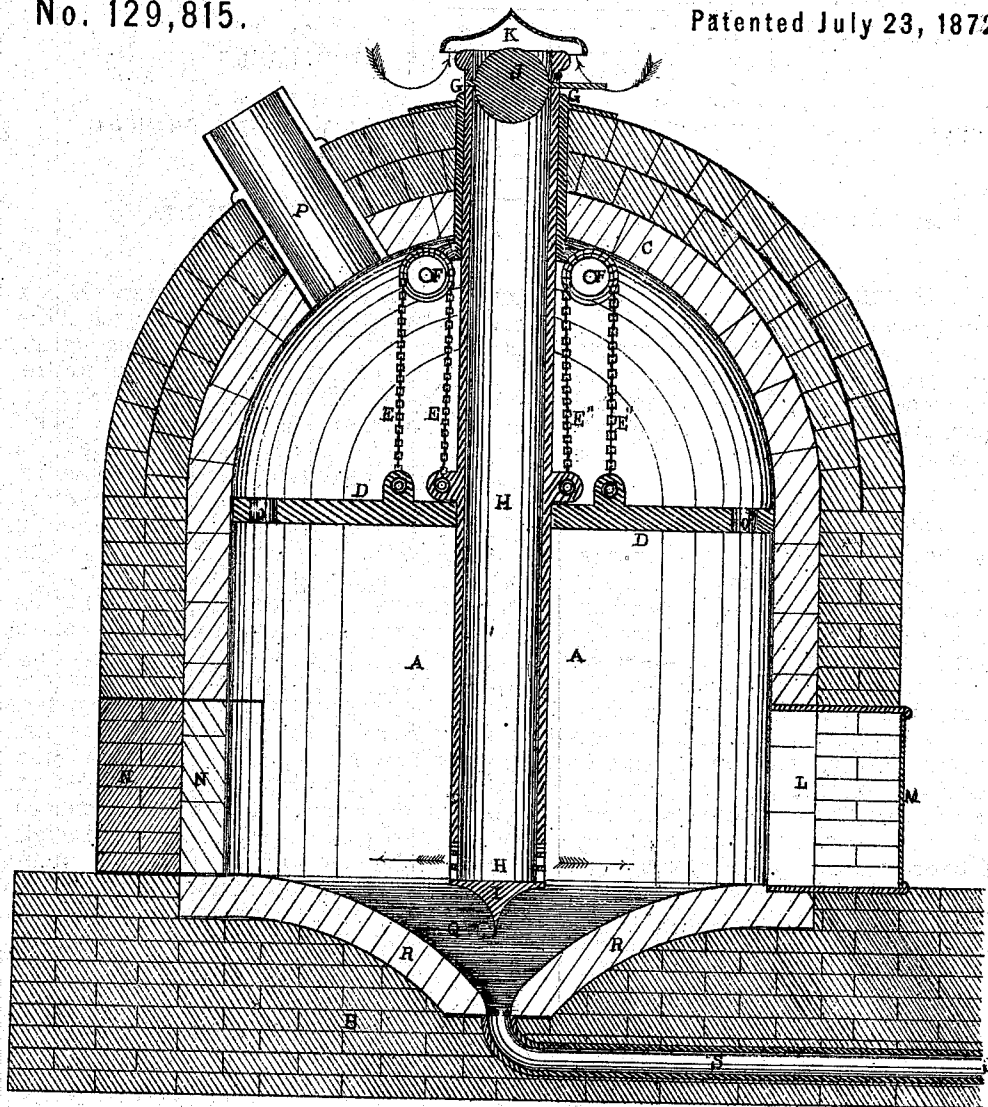


L. S. GOODRICH.  
 Improvement in Process and Apparatus for the  
 Manufacture of Charcoal.  
 No. 129,815. Patented July 23, 1872.



WITNESSES  
*[Signature]*  
 David C. Love

*L. S. Goodrich*  
 INVENTOR

# UNITED STATES PATENT OFFICE.

LEVEN S. GOODRICH, OF WAVERLY, TENNESSEE.

## IMPROVEMENT IN PROCESSES AND APPARATUS FOR THE MANUFACTURE OF CHARCOAL.

Specification forming part of Letters Patent No. 129,815, dated July 23, 1872.

### SPECIFICATION.

*To all whom it may concern:*

Be it known that I, LEVEN S. GOODRICH, of Waverly, in the county of Humphreys and State of Tennessee, have invented a new and useful Apparatus and Process for the Manufacture of Charcoal, of which the following is a specification:

#### *Nature and Object.*

The object of my invention is to produce an apparatus and process for the manufacture of charcoal by the heat arising from the combustion of the flammable gases issuing from the wood, and to prevent as much as possible the destruction of the charcoal thus made—a difficulty manifested in the use of the ordinary charcoal-kiln by the presence of atmospheric air. The nature of my invention consists in the construction of a vertical kiln, having a plunger partially counterbalanced by a hollow pipe or tube in connection therewith by chains and over-head pulleys in such a manner that the said plunger and pipe are made to reciprocate in opposite directions to each other; the object of which is to produce an automatic air-supply to the kiln for the combustion of the aforesaid flammable gases and relieve the charcoal of the presence of said air-supply as soon as possible after the gases have escaped.

In order, however, to describe my invention, I will proceed with the general description, having reference to the accompanying drawing, which represents a vertical section of the entire apparatus.

A is a kiln covered by arch C, and rests upon base B. N is a passage-way giving access to kiln A, or closed by a door or temporary brick-work, as shown. L is a narrow fissure at the opposite side of the kiln, provided with glass M, or other transparent substance, for preventing the atmosphere from entering the kiln through said fissure, and at the same time permit the operator to observe the working of the charge. G is a pipe resting upon C by means of a flange, and provided at the bottom with lugs, to which are connected grooved pulleys F' F', over which chains E E' respectively pass, as shown. H is a reciprocating pipe, suspended by the said chains, and guided in a vertical position by G and D,

through which it freely reciprocates. D is a metallic plate, which freely reciprocates in the kiln A, partially suspended by the reciprocating pipe H in connection therewith by the chains E E', as shown in the drawing, so that D and H are compelled to reciprocate in opposite directions. The pipe H supplies the air to the kiln, receiving it at the top and delivering it at the bottom in the direction of the arrows, being prevented from escaping directly from the bottom by the stopper I. The flow of air is regulated by the damper J, while rain is prevented from entering by the cap K. R is the bottom of kiln A, so constructed as to form a funnel, Q, to contain the kindling charcoal, which may be ignited through the pipe S, which connects thereto from the external atmosphere. When desired said funnel also answers to convey to the said pipe S the condensed products that invariably collect at the bottom of ordinary kilns, by which means they may easily be disposed of. D is provided with orifices O, through which the products of combustion pass from the kiln A to the arch C, from whence they escape through pipe P to the smoke-stack.

#### *Operation.*

The funnel Q is first filled with light dry charcoal or other similar material, and the balance of the kiln filled with wood, the passage-way N closed, the plate D so balanced as to overcome the weight of pipe H, and rests heavily upon the wood, and falls as the wood shrinks, thus holding the same more close and compact. A torch and sufficient blast are then applied to the charcoal in Q, through the pipe S, to ignite the same; the said pipe S is very soon closed to prevent the admission of air at that point. The heat produced by this combustion distills the wood resting upon the charcoal, and the distillate thereof is supplied with a fresh current of air from the pipe H, indicated by the arrows; this produces an intense heat, which is sufficient to distill the wood next above, which is very soon supplied with the same current of air which is now issuing below, as the pipe H is gradually rising by the fall of the plate D, which is following the shrinking charge, and, when the operation is completed or the last of the charge has been converted into charcoal, the plate D and the

bottom of pipe H come in contact, so that no more air is admitted, and the charcoal will begin to cool. The damper J is, however, closed by the operator, and also the end of the pipe P, so that neither air nor water can find its way to any part of the kiln in quantity sufficient to injure its contents, while the operator is enabled to observe the whole operation and condition, before, and after and while being performed by means of the fissure L and transparent plate M.

It may be readily seen that the above combination will produce an automatic air-supply to carry on the wood-charring process with less loss of charcoal than that of the ordinary kiln, though in practice it may prove advantageous to vary the precise construction of kiln above described, and that many other devices may be employed for raising and lowering the pipe H; therefore,

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. The process above referred to, which consists of a variable air-supply to carry on the process of wood-charring by the combustion

of the flammable gaseous products thereof, and to prevent the said air-supply from coming in direct contact with the charcoal produced by the distillation of the wood by the said combustion.

2. The combination of the plate D and the pipe H with chains E E' and pulleys F F', or their equivalents, for the purpose of automatically adjusting the air-supply referred to in the first claim, for the purpose therein named and described in the above specification.

3. The combination of the kiln A, bottom R, arch C, base B, pipe S, passage N, fissure L, and glass M, or its equivalent, substantially as and for the purpose above set forth.

4. I finally claim the combination of the pipe H, damper J, top K, bottom I, passage N, fissure L, glass M, or its equivalent, plate D, orifices O, pipe P, chains E E', pulleys F F', pipes G, with the kiln A, bottom R, arch C, pipe S, and base B, all as arranged and described, for the purpose set forth.

LEVEN S. GOODRICH.

Witnesses:

J. G. WINN,

DAVID C. LOVE.