No. 742,723. PATENTED OCT. 27, 1903.

G. M. NEWHALL.

CHAR DRIER.

APPLICATION FILED AUG. 10, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

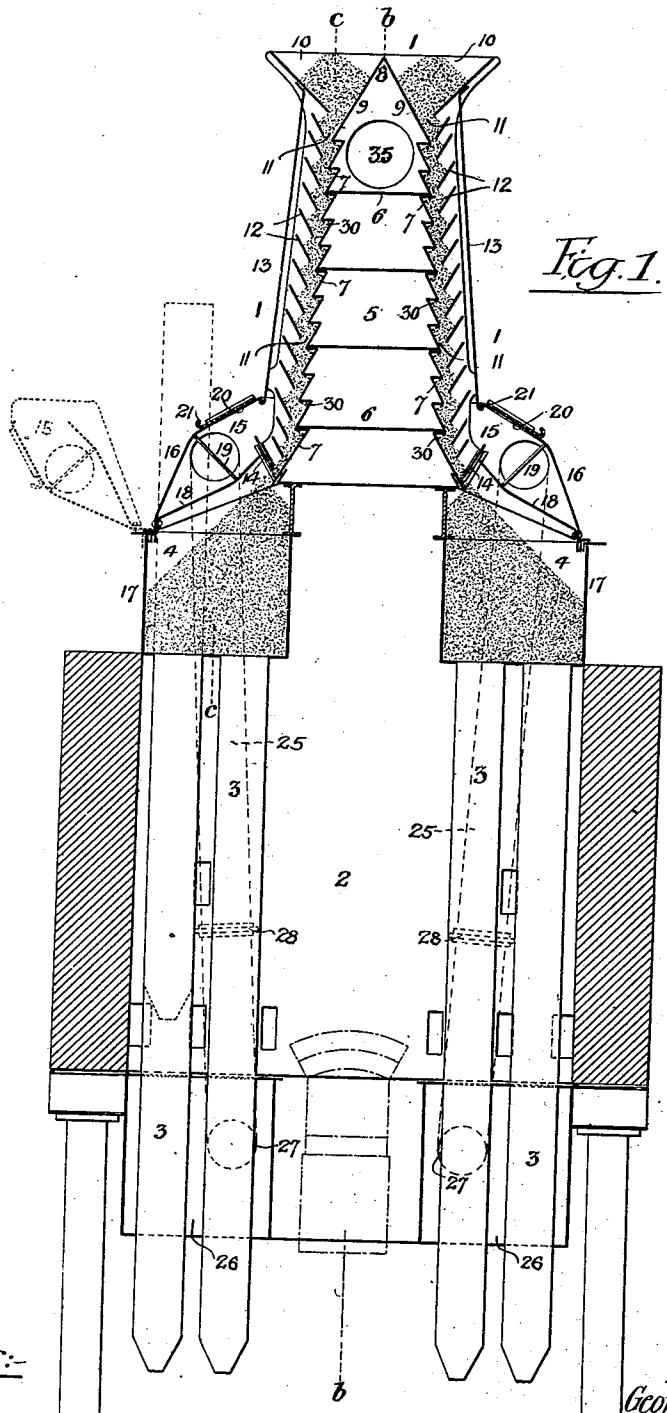


Fig. 1.

Witnesses:-
Titus T. Irons
Herman E. Metius

Inventor:-
George M. Newhall,
by his Attorneys
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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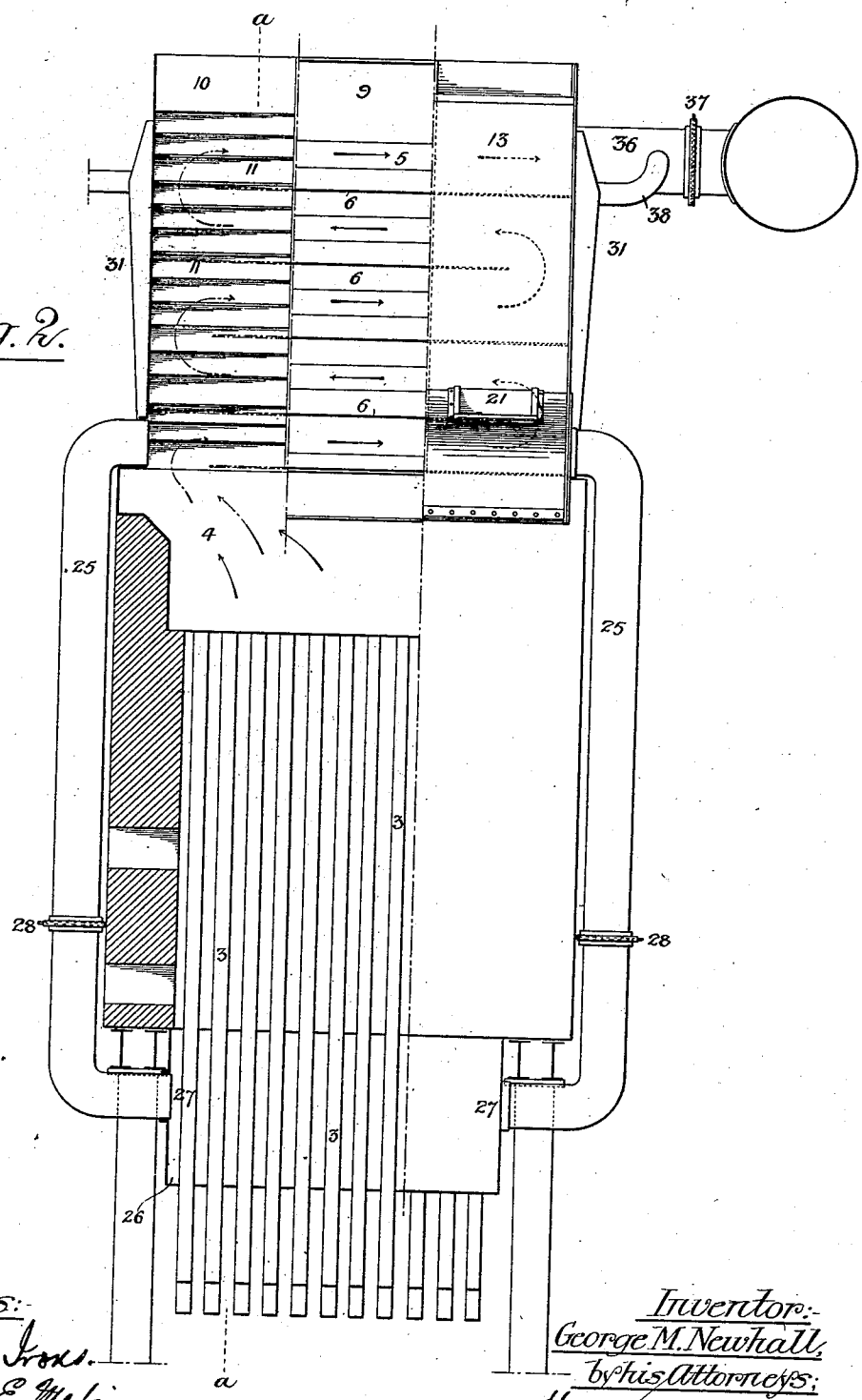
G. M. NEWHALL.

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APPLICATION FILED AUG. 10, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:
Titus H. Strong.
Herman E. Metzin

Inventor:
George M. Newhall,
by his Attorneys:
Howson & Howson

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 742,723. Patented October 27, 1903.

UNITED STATES PATENT OFFICE.

GEORGE M. NEWHALL, OF PHILADELPHIA, PENNSYLVANIA.

CHAR-DRIER.

SPECIFICATION forming part of Letters Patent No. 742,723, dated October 27, 1903.

Application filed August 10, 1903. Serial No. 168,964. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. NEWHALL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Char-Driers, of which the following is a specification.

My invention relates to apparatus for drying animal charcoal employed in industries using this decolorizing agent, of the general character, for instance, as the structure illustrated in the patent taken out by myself and A. W. Colwell, No. 341,497, dated May 11, 1886.

The present invention has for its object the greater utilization of the heat of the gases from the kiln in keeping the drier-plates hot, the passage of the heated air from the cooling-chamber through the body of char to pick up and carry off the moisture from the same, which moisture is not allowed to condense, but which is thoroughly dried by the higher temperature of the conduit, and finally to provide a structure in which the flow of the char may be readily controlled and in which the direction and flow of the heated air and gases may also be controlled.

My invention further comprises a structure that normally incloses all of the char in its passage through the drier, but which is arranged to permit the exposing of the top of the kiln for the removal of the retorts in case such action ever becomes necessary.

My invention is fully shown in the accompanying drawings, in which—

Figure 1 is a cross-sectional view of the drier, taken on the line *a a*, Fig. 2. Fig. 2 is a view at right angles to Fig. 1, partly in elevation, partly in section on the line *b b*, and partly in section on the line *c c*, Fig. 1.

In the accompanying drawings, 1 represents the drier, and 2 the kiln. The kiln may be constructed in any suitable manner and is provided with a series of the usual retorts 3, into which the char is passed from the drier and in which said char is reburned or revivified.

The drier, comprising a series of compartments, is mounted above the kiln, being supported at some distance above the mouths of the retorts, and at this point chambers 4 on each side are provided to receive the dried char temporarily before it is passed into the retorts to be reburned and revivified. The drier has a central chamber 5, containing a series of baffle or deflector plates 6, controlling or directing the flow of the gases and products of combustion from the kiln, and the casing or walls 7 of this chamber have corrugated surfaces, the corrugations being horizontal and a cross-section of the same forming zigzag lines. The walls 7 incline toward each other in general direction and meet at the top at the point 8, the upper portions 9 forming the sides of a pair of hoppers 10, leading to the space or passage-way 11 within the drier for the char. Directly opposite each zigzag wall is a series of inclined plates 12, suitably spaced apart, and each series of plates has the same general incline as said zigzag wall, so that the spaces between the ends of said plates and the projections of the walls 7 will be uniform. Inclosing these inclined plates on each side are aprons or cover-plates 13, properly secured to the end plates of the casing, which serve to keep the hot air circulating between the inclined plates and the zigzag walls in close contact with the char. The passage-ways 11 may be closed at the bottom, stopping the flow of char by means of sliding gates 14, suitably mounted.

At the bottom and at each side of the drier chambers 15 are formed by means of curved plates 16, which extend from the lower edge of the aprons or cover-plates 13 to the outside wall 17 of the chamber 4, and the plates 18, which extend from the wall 17 to the sliding gates 14. These plates are suitably supported to form the chambers by means of braces 19, and the plate 16, forming the outer wall of the chamber, is provided with a series of apertures 20, whereby access may be had to the cut-off gates 14. These apertures are closed by means of sliding doors or covers 21.

Communicating with the ends of the chambers 15 are pipes 25, leading from the cooling-chamber 26, surrounding the lower portion of the retorts, and serving as conduits to carry the heated air given off by the retorts in the cooling-chamber to the char as it passes through the drier, the circulation being maintained in a manner shortly to be described.

The braced plates forming the chambers 15

are supported in such manner on the edge of the walls of the chamber 4 that they may be tilted back when it is desired to remove any of the retorts in the manner shown in Fig. 1. To do this, it is necessary of course to guard against disarrangement of the pipes 25, and they may be provided with slip connections at this point readily connected and disconnected, or the pipes may be pivotally hung at the point of connection 27 with the walls of the cooling-chamber 26, so as to be capable of swinging with the chambers 15. These pipes 25 have valves or dampers 28 arranged at convenient points and serving to control the flow of heated air from the cooling-chamber.

The char in its flow over the zigzag walls 7 and inclined plates 12 leaves spaces 30 between the angle of flow and the reëntrant angles of the corrugations of the plates 7, and through these spaces the heated vapors from the char passing between the plates is carried off. Mounted against each end wall of the drier-casing are chambers 31, with which the spaces 30 communicate, and these chambers 31 are in communication with the stack or a fan-exhaust, whereby the vapors arising from the char during drying may be carried off.

The interior of the drier or chambers 5 is heated by the waste products of combustion and gases arising from the kiln, and to insure that these heated elements will come in contact with all portions of the walls 7 of said chamber and maintain them at a proper temperature to effect the drying of the char baffle-plates or deflectors 6 are mounted within the same open at alternate ends to cause the heated elements to pass back and forth within the chamber 5, as indicated by the arrows. At the upper part of this chamber is an opening 35, which communicates with a pipe 36, leading to the stack or to a fan-exhaust. This pipe is provided with a valve or damper 37 in order to regulate the force of draft.

Leading from the chambers 31, which communicate with the spaces 30 in the drier, are pipes 38, which are connected with the pipe 36, so that the draft in said pipe, caused either by the natural draft of the stack or by a fan-exhaust, will maintain the circulation of the heated air from the cooling-chamber of the retorts and that surrounding the kiln and carry off the vapors rising from the drying char. The char is thus dried by means of the plates over which it passes, heated by the waste gases and products of combustion from the kiln and by direct contact of the heated air surrounding the kiln and that from the cooling-chambers, which passes to the chambers 15 and thence to the passage-ways for the char, passing off with the vapors from the drying char through the spaces 30, chambers 31, and pipes 38 to the pipes 36, and thence to the stack.

In a drier constructed in accordance with my invention the char is completely inclosed from the time it starts in the wet condition from the top of the drier until it is removed from the cool ends of the retorts, reburned, revivified, and ready for further use, and is never in danger of contamination by the gases and waste products from the kiln.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. In an apparatus for drying char, the combination of a casing having horizontally-corrugated walls, a kiln over which said casing is mounted, said casing forming a chamber, means for passing the waste gases from the kiln into said chamber and in contact with the walls of the casing, a series of inclined plates mounted on opposite sides of said casing and forming with the outer surface of the corrugated walls, a passage-way for the char, an inclosing member for the inclined plates, a series of retorts, a cooling-chamber at the lower portion of the same, and means for passing the heated air from said cooling-chamber to the passage-way for the char.

2. In an apparatus for drying char, the combination of a kiln, a series of retorts mounted therein, a casing mounted above the kiln and arranged to be heated by the waste heat and products of combustion passing therefrom, means for discharging such heating medium from the casing, a series of inclined plates mounted on each side of the casing and forming with the walls of the latter a passage-way for the char, an inclosing member for said plates, a cooling-chamber arranged at the lower portion of the retorts, means for conveying the heated air from said chamber to the passage-way for the char, and means for causing such air to circulate through the char and join the waste heat and products of combustion from the kiln in their passage from the casing to the stack.

3. In an apparatus for drying char, the combination of a casing, means for heating the walls of the same, a series of inclined plates disposed opposite said walls and forming with the latter passage-ways for the char to be dried, an inclosing member for said plates, a wall surrounding the lower part of said shield and forming chambers communicating with the passage-ways for the char, a series of retorts, a cooling-chamber for the same, pipes extending from said cooling-chamber to the chambers at the bottom of the char passage-ways, a stack in communication with said passage-ways and the casing and means for causing the heated air to pass through the char as it descends and thence to the stack with the heating medium emerging from the casing.

4. In an apparatus for drying char, the combination of a casing, means for heating the walls of the same, a series of inclined plates disposed opposite said walls and forming with the latter the passage-ways for the char to be dried, an inclosing member for said plates, a wall surrounding the lower part of said shield and forming chambers communicating with

the passage-ways for the char, and cut-off gates for said passage-ways.

5. In an apparatus for drying char, the combination of a casing, means for heating the walls of the same, a series of inclined plates disposed opposite said walls and forming with the latter passage-ways for the char to be dried, an inclosing member for said plates, a wall surrounding the lower part of said shield and forming chambers communicating with the passage-ways for the char, a series of retorts opening into said chambers, the walls of said chambers having openings for the removal of the retorts, and sliding doors or gates closing said openings.

6. In an apparatus for drying char, the combination of a casing, means for heating the walls of the same, a series of inclined plates disposed opposite said walls and forming with the latter passage-ways for the char to be dried, chambers at the lower part of said casing communicating with said passage-ways, a series of retorts, a cooling-chamber for the same, means for affording communication between said cooling-chamber and the chamber at the lower portion of the drier, said latter chambers being arranged to communicate with the passage-ways for the char and being bodily movable to permit removal of the retorts.

7. In an apparatus for drying char, the combination of a casing, means for heating the walls of the same, a series of inclined plates disposed opposite said walls and forming with the latter passage-ways for the char to be dried, chambers at the lower part of the said casing in communication with said passage-ways, a series of retorts, a cooling-chamber for the same, pipes for affording communication between said cooling-chamber and the chamber at the lower portion of the drier, said latter chamber being bodily movable to permit removal of the retorts, and means for attaching said pipes so as to permit movement of said chamber.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE M. NEWHALL.

Witnesses:
MURRAY C. BOYER,
JOS. H. KLEIN.