

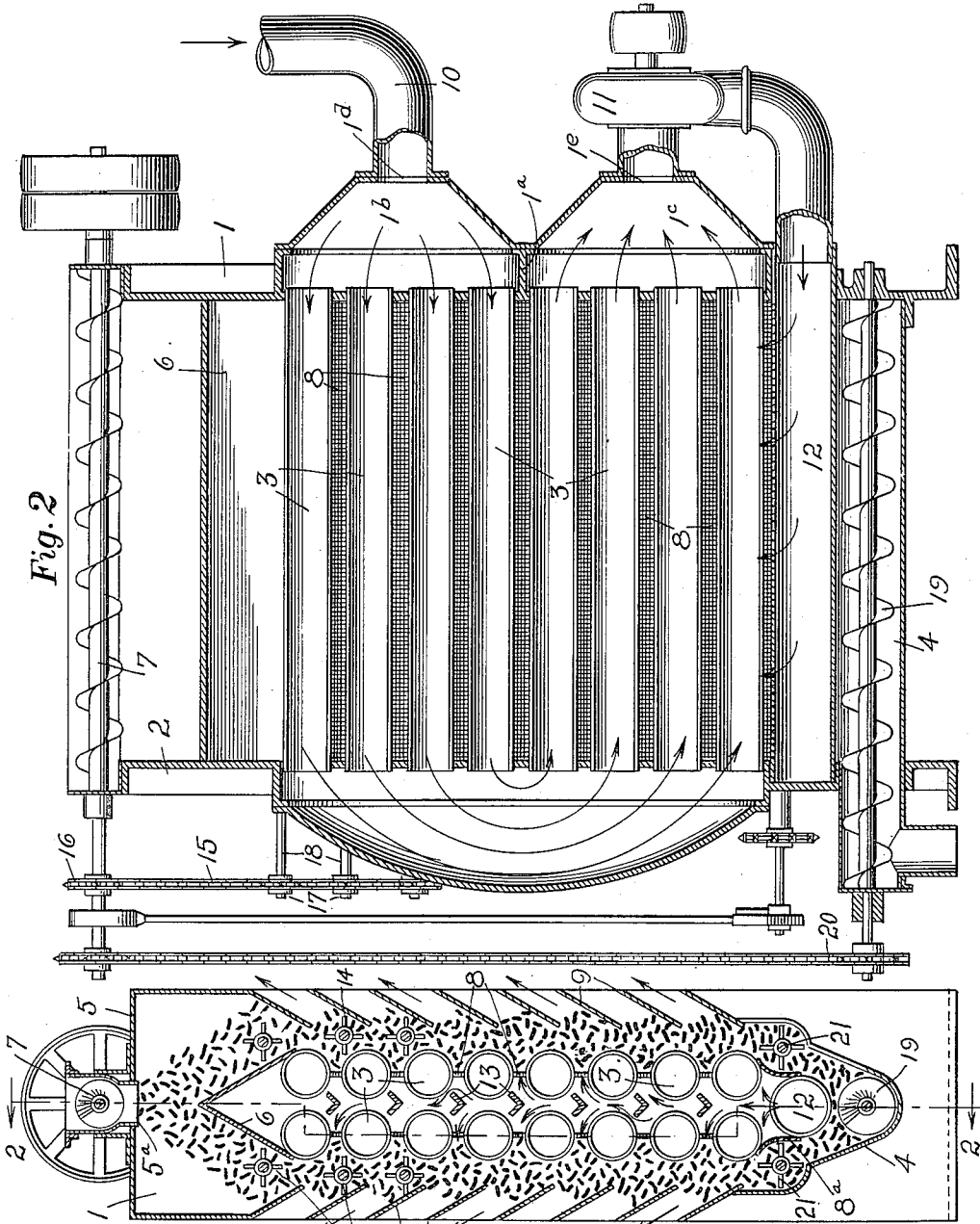
C. E. GEIGER.
DRIER.

APPLICATION FILED MAY 6, 1909. RENEWED SEPT. 26, 1910.

990,433.

Patented Apr. 25, 1911.

2 SHEETS—SHEET 1.



WITNESSES:

John M. Culver
G. S. Abbott

Fig. 1

INVENTOR

Charles E. Geiger
by Denton Denton
his Atty

C. E. GEIGER.

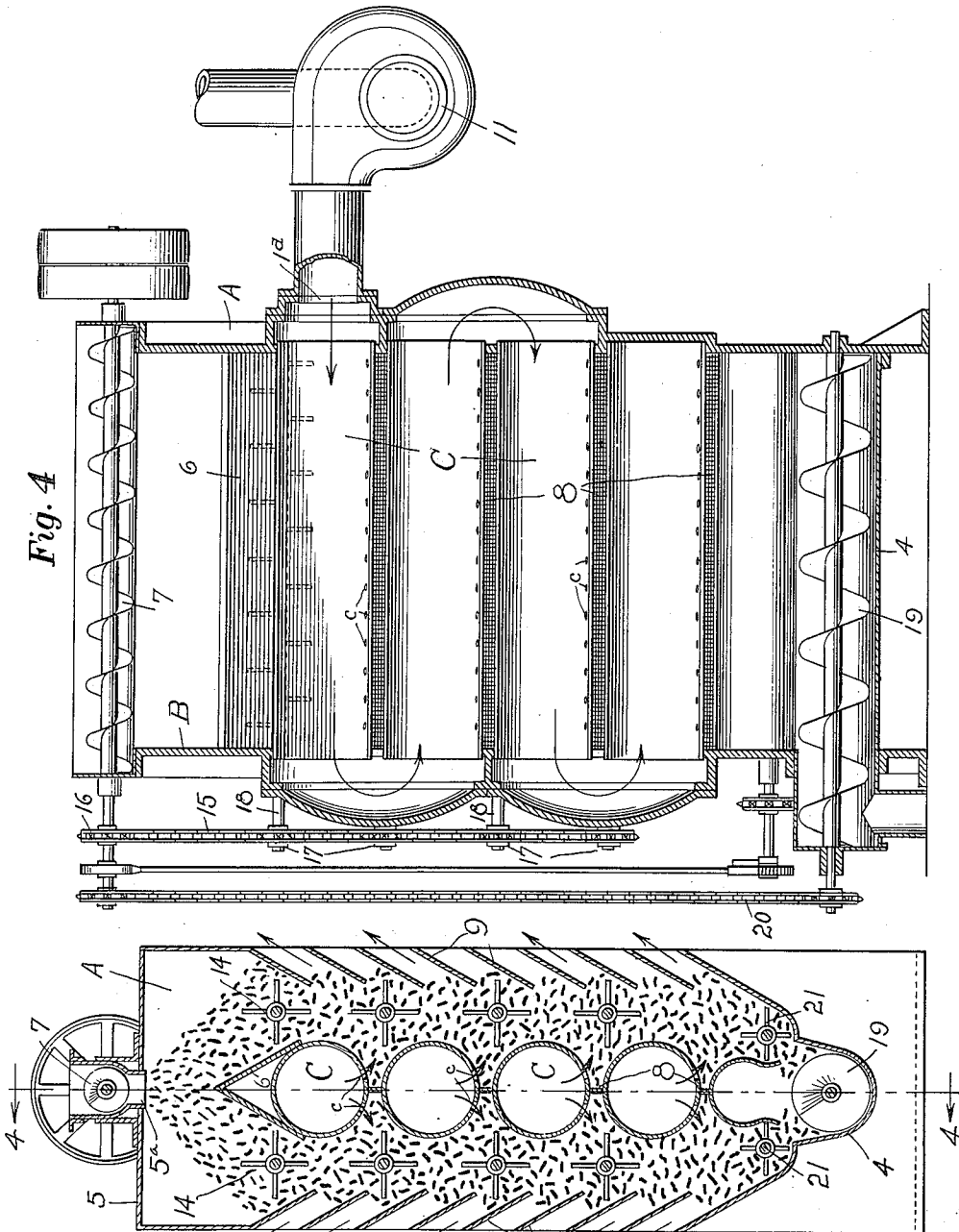
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Fig. 3

INVENTOR
Charles E. Geiger
by Burton Burton
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UNITED STATES PATENT OFFICE.

CHARLES E. GEIGER, OF LOUISVILLE, KENTUCKY, ASSIGNOR OF ONE-THIRD TO WILLIAM E. KOOP AND ONE-THIRD TO G. WALTER FISKE, OF LOUISVILLE, KENTUCKY.

DRIER.

990,433.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed May 6, 1909; Serial No. 494,404. Renewed September 26, 1910. Serial No. 533,911.

To all whom it may concern:

Be it known that I, CHARLES E. GEIGER, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented new and useful Improvements in Driers, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved drier especially adapted for the purpose of drying grains, small fruit, sand and the like.

It consists in the features of construction shown and described as indicated in the claims.

In the drawings:—Figure 1 is a transverse vertical section of the structure embodying this invention. Fig. 2 is a section at the line 2—2 on Fig. 1. Fig. 3 is a section similar to Fig. 1 showing a modification. Fig. 4 is a section at the line 4—4 on Fig. 3.

The structure shown in Figs. 1 and 2 comprises two opposite chambered heads, 1 and 2, which are connected by horizontal pipes, 3, arranged in two parallel tiers or columns. These heads form two ends of the casing of which the bottom is formed by the trough, 4, a top, 5, being also provided which is longitudinally rifted at 5^a, and above the rift there is mounted for discharge through the rift a spiral conveyer, 7, in which the material to be treated is delivered and by which it is distributed longitudinally of the drier casing for delivery in a stream or shower extending over the entire length of the same. Directly below the discharge rift of this conveyer, which is above a line between the two tiers or columns of pipes, 3, there is an inverted V-shaped deflector, 6, for parting the descending stream of material and deflecting the two parts to the opposite outer sides of the two tiers of pipes, 3. Perforated diaphragm strips, 8, are interposed between the consecutive pipes of each tier so that said pipes together with these partitions and the V-shaped deflector at the top make an inclosing but apertured wall of the heating chamber in which the pipes are the heating element. The outer side walls

of the structure preferably consist of inclined slats, 9, which constitute deflecting plates for the material to be dried as it descends within the drying chamber, and which also form between them passages for the escape of the drying element which is discharged into the chamber as hereinafter described. The right-hand or receiving head, 1, is partitioned midway in its height at 1^a. The upper of the two chambers, 1^b and 1^c, separated by this partition has an intake aperture, 1^d, connected with a pipe, 10, leading from a source of supply of a heating and drying element, as, for example, from the flue of a furnace from which the products of combustion may be conducted to serve said purpose or from an oven chamber from which the heated air may be derived for such purpose. Such heating element being conducted through all the pipes leading from said chamber, 1^b, passes into the left-hand head, 2, and therethrough into the lower half of the group of pipes which are connected into the lower chamber, 1^c, of the right-hand head. Said chamber has a discharge aperture, 1^e, leading to the intake of a fan blower, 11, whose discharge leads to a pipe, 12, which extends longitudinally within the drier immediately below the two tiers of pipes, 3, forming the bottom of the heating chambers whose sides are formed by said pipes and the intervening perforated partitions, 8, mentioned, shields, 8^a, corresponding to said perforated partitions, 8, but not perforated, being provided to span and close the interval between said pipe, 12, and the lowest pipes, 3, of the two tiers. Said pipe, 12, is closed at the end opposite its connection with the fan, and is perforated at its upper side for discharge of the drying medium into the heating chamber mentioned; that is, between the two tiers of pipes, 3. In order to cause the drying medium thus discharged into this chamber to circulate most thoroughly around and between the pipes, there is preferably located in the interval between each four pipes two in each tier a V-shaped deflector, 13. These deflectors are supported at the ends by the headers, 1 and 2, and they are spaced away

from all four of the pipes between which they are located respectively so that the heating medium can pass above as well as below them in circulating past the pipes.

5 When the material to be treated delivered through the rift, 5^a, is considerably moist and liable to mass together on that account, stirrers, 14, extending longitudinally parallel with the pipes, 3, are provided for keeping the material agitated as it descends until it becomes sufficiently dry to dispense with such agitation. The stirrers are rotated by any convenient power-communicating connection from the shaft of the spiral conveyer, as a chain, 15, passing about sprocket wheels, 16 and 17, respectively on the shaft of the spiral conveyer and on the agitator shafts, 18. The material is controlled in its descent through the drying chamber and retained therein long enough for completing drying by means of rotary valves, 21, operating in the throats between the outer casing and the shields, 8^a, respectively. Upon passing these rotary valves the material is received in the lower part of the trough bottom, 4, of the casing which is located under the pipe, 12, and in which there is a screw conveyer, 19, by which the material is conducted lengthwise of the pipe for delivery at one end thereof, such conveyer being driven by a chain, 20, from the shaft of the conveyer, 7.

In Figs. 3 and 4 there is shown a modification of the heating pipe system. In this modification, heads, A and B, corresponding to heads, 1 and 2, of the construction shown in the other figures are connected by a single series of horizontal pipes, C, corresponding to the pipes, 3, the two heads being suitably partitioned to cause the heating and drying medium which is supplied from the discharge of the fan, 11, and circulate by movement alternately in opposite directions through successive pipes, C, from highest to lowest, as seen clearly in Fig. 4, the lowest of said pipes being closed by the head at the end opposite that at which it receives its supply so that there is no discharge from the end of the pipe system, the discharge of the drying medium being effected throughout the entire system by apertures, *c, c*, distributed throughout the length of all the pipes in two rows, one at each side of the perforated diaphragms, 8, which are positioned between the successive pipes of the single tier in this construction precisely as between successive pipes of each tier of the other construction. The drying medium is thus discharged directly from the pipes into the material to be dried, not only at the lowest but at all the pipes of the system, and passes through said material with an upward tendency on account of the pressure derived from the fan, and escapes from the drying chamber in the same man-

ner as in the other form, between the inclined slats, 9, which serve as deflecting plates for the material in the same manner as in the other construction, stirrers, 14, being provided in similar relation to the pipes and deflectors as in the other structure, and the material being controlled in its movement and discharged by the rotary valves, 21, past which the material is delivered into the lower conveyer, 19, as already described in respect to the other construction.

I claim:—

1. A drier having, in combination, a heating element consisting of a pipe system in which the heating medium circulates, and a drying chamber within which such heating element is situated, provided with means for controlling the advance through it of the material treated; means for impelling the heating medium through the pipe system and for forcing it after its discharge from said pipe system through the material to be treated in the drying chamber, said chamber having at distributed points in its height means for permitting the free escape of the heating medium.

2. A drier having, in combination, a heating element consisting of a pipe system in which the heating medium circulates; a drying chamber within which such heating element is contained; means in said drying chamber for advancing therethrough the material to be treated; a fan connected to the pipe system for causing the heating medium to circulate therethrough, said pipe system being provided with means for discharge into the drying chamber, the latter having means for permitting free escape of said heating medium through its outer walls.

3. A drier having in combination a heating element consisting of a pipe system in which the heating medium circulates; a drying chamber within which such heating element is contained, and means therein for advancing therethrough the material to be treated, said pipe system having its intake connected with the source of the heating medium; a fan having its intake connected with the discharge of said system and its discharge connected with the drying chamber at the lower part thereof, said chamber having means for permitting the free escape of the drying medium through its outer walls and distributed throughout its height.

4. A drier having in combination a heating element consisting of a pipe system in which the heating medium circulates; a drying chamber within which such heating element is contained provided with means for controlling the advance therethrough of the material treated, said pipe system having its intake connected with the discharge of the pipe system; a pipe connected with the discharge of the fan extending in the drying chamber at the bottom thereof and per-

forated for discharge of the heating medium
within said chamber for circulation through
the material therein, said chamber having
provision for the escape of the heating
5 medium at distributed points in its height.

In testimony whereof, I have hereunto set
my hand, in the presence of two witnesses,

at Chicago, Illinois, this 4th day of May,
1909.

CHARLES E. GEIGER.

In the presence of—

JULIA S. ABBOTT,
M. GERTRUDE ADY.