

C. E. GEIGER.
DRIER.

APPLICATION FILED MAY 4, 1911.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 1.

1,052,660.

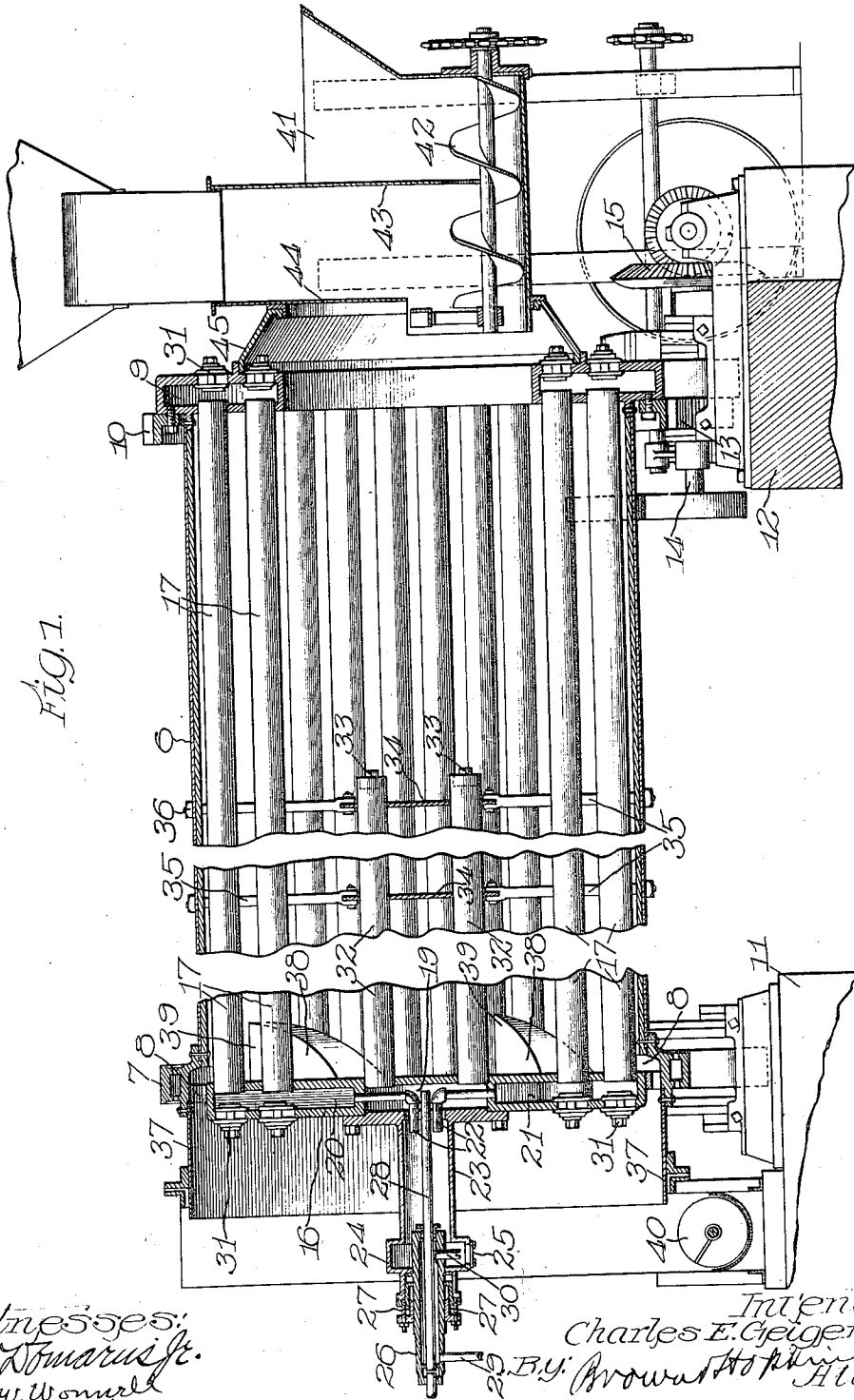


Fig. 1.

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2 SHEETS—SHEET 2.

FIG. 2.

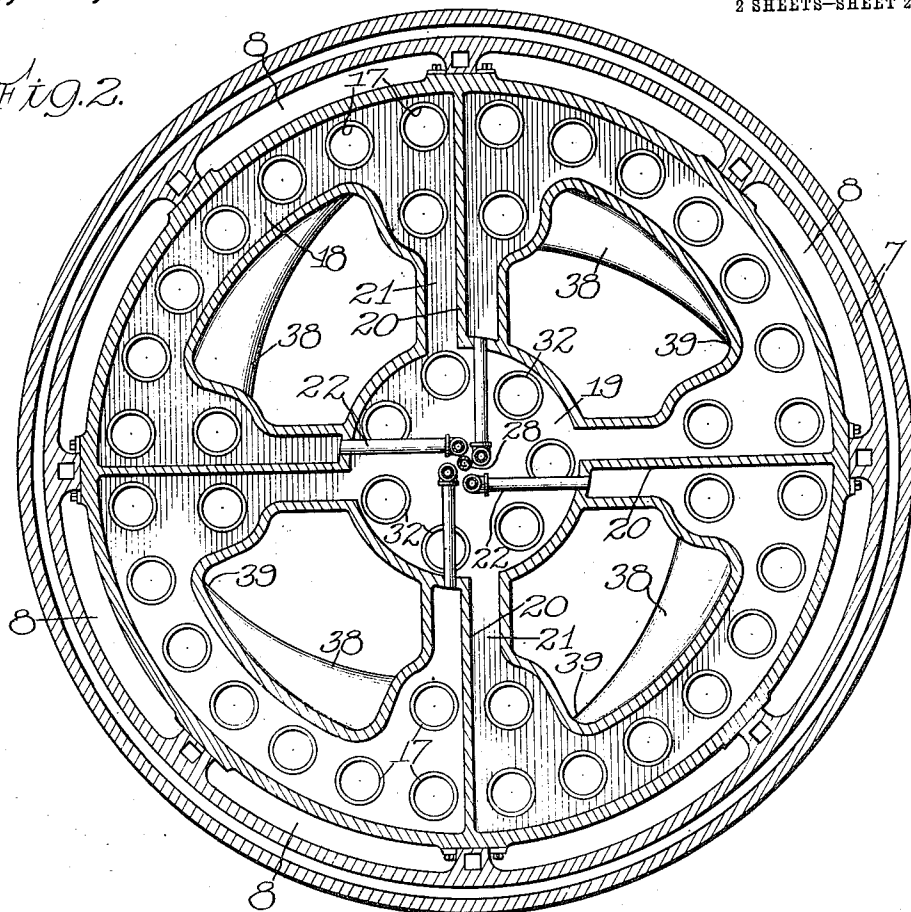
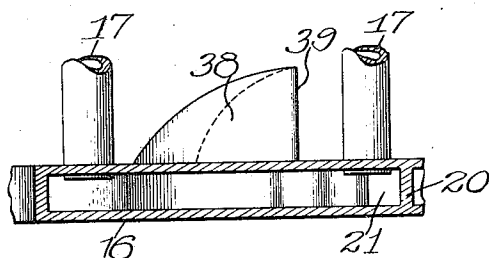


FIG. 3.



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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, BOTH OF LOUISVILLE, KENTUCKY.

DRIER.

1,052,660.

Specification of Letters Patent.

Patented Feb. 11, 1913.

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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 certain new and useful Improvements in Driers, of which the following is a specification.

This invention relates to driers more particularly designated and described as rotary driers, comprising a rotatable cylindrical member in which a number of steam pipes are positioned, and being adapted to receive the material to be dried at one end and to discharge it from the other.

The principal object of the invention is to provide an improved, simple and cheap apparatus of the class described which is effective and efficient in operation.

For the attainment of these ends and the accomplishment of other new and useful objects, my invention consists in the features of novelty in the construction, combination and arrangement of the several parts generally shown in the drawing and described in the specification, but more particularly pointed out in the appended claims.

In the accompanying drawings,—Figure 1 is a longitudinal sectional view of the preferred embodiment of my invention. Fig. 2 is a cross sectional plan view through the manifold in the discharge end of the cylinder. Fig. 3 is a detail view of one of the deflector plates positioned in the discharge end of the cylinder.

Driers of this class are employed to remove the moisture from grains, herbage and the like, and when used to dry grasses or herbs, it is necessary to make some provision for the disposal of the stems or particles which are too large to pass readily between the tubes, and which tend to clog up the passage-ways unless they are ejected from the cylinder. The cylinders are generally provided with apertures near or at the discharge end thereof through which the smaller particles or grains may pass, and the present invention has for its object more particularly to provide means to eject material through the end of the cylinder between the spokes of the manifold. It is also necessary when treating grasses or the like, to provide an entrance chamber, in which the stems or larger particles may not become clogged between the tubes of the drier. The central drying tubes are therefore shortened in this

drier to provide a greater space at the inlet end of the cylinder.

Referring now more particularly to the drawings, a cylinder 6 is provided at one end with a flange 7 slightly larger in diameter than the cylinder and having communication with the cylinder by means of openings 8 in the walls thereof, and at the other end with a manifold 9 to which is secured a flange 10. The cylinder 9 is adapted to be mounted by means of these flanges 7 and 10 so that it may be rotated about an axis through its center, suitable bases 11 and 12 being provided at the ends with means rotatably to mount the cylinder thereon. Any suitable driving means may be employed to rotate the cylinder upon its bases. In the present exemplification of the invention, the flange 10 is provided with teeth which mesh with the teeth in a pinion 13 mounted on a shaft 14 and having suitable gears 15 in connection with the shaft to effect the rotation of the pinion 13 and of the cylinder 6. One end of the cylinder will be hereinafter designated as the inlet end and the other as the discharge end. The discharge end is provided with a manifold 16 secured to the cylinder 6 and having a plurality of tubes 17 secured in the manifold through the inner side and communicating with the interior thereof. This manifold is shown in section in Fig. 2, and in the form shown is provided with four peripheral chambers 18, an axial chamber 19 and four spoke-like connecting portions 20 between the axial chamber and the peripheral chambers, although it is to be understood that any desired number of peripheral chambers may be employed. Each peripheral chamber is connected from its forward end (assuming the direction of rotation of the cylinder to be in a clock-wise direction) with a passage 21 which communicates with the interior of the axial chamber 19. The rear end of each peripheral chamber is closed from such communication and is provided with a pipe 22 which extends adjacent the center of the axial chamber 19 and from there extends outwardly into a chamber 23 which is secured to the manifold and is adapted to receive the water of condensation which may be delivered by the said pipes 22. This chamber 23 is formed with an enlarged portion 24 into which the water of condensation from the pipes 22 is collected, a removable

plate 25 being provided to cover an opening into the said chamber. A steam pipe connection 26 is adapted to be inserted in the end of the chamber 23, and suitable packing devices 27 are provided to make the connection between the steam pipe connection 26 and the chamber 23 substantially steam-tight. This steam pipe connection 26 is provided with openings in the ends through which a pipe 28 extends, the inner end of the pipe being adapted to extend also through the chamber 23 and into the axial chamber 19 of the manifold. Inserted in the steam pipe connection 26 and having communication with the hollow interior thereof are tubes 29 and 30, the latter of which is positioned so as to project into the enlarged portion 24 of the chamber 23 while the former is adapted to afford communication between the interior of the steam pipe connection 26 and the exhaust connection. This exhaust may be either to the atmosphere, to a waste pipe or drain, or to a steam trap, whichever is desired. In the outer surface of the manifold 16 and opposite the ends of the tubes opening into the manifold are removable plugs 31, which are adapted to afford communication with the interior of the manifold adjacent the ends of the tubes 17. The axial chamber 19 is also provided in the present exemplification of the invention with a number of tubes 32, which are secured in the inner face of the said chamber and which extend toward the outer end of the cylinder. These tubes are provided at the other end with removable plugs 33 which are adapted to close the ends of the tubes and are adjustable for the purpose of allowing fluid to escape from the tubes. These tubes 32 do not extend to the inlet end of the cylinder 6 and are supported intermediate of the ends by means of the perforated plate 34, which is positioned in the cylinder by means of rods 35 extending through the shell thereof and secured by nuts 36 or other suitable means. The discharge end of the cylinder is also provided with a housing 37 preferably secured to the flange portion 7 extending beyond the manifold and providing a conveying means for material which escapes from the cylinder through the openings 8 adjacent the end of the cylinder. By reference to Fig. 2 it will be seen that the opening 8 extends around the manifold 16 on all sides, permitting the continuous escape of material from the cylinder through the said opening when the cylinder is rotated.

Extending inwardly from the manifold 16 and positioned between the pipes 17 and the pipes 32 are deflectors 38. These deflectors may be formed integrally with the manifold, or may be attached thereto in any suitable manner, and are formed with a wide mouth portion 39 narrowing gradually toward the base to form a scoop or deflecting plate so

that as the cylinder is rotated, the material inside the cylinder and adjacent the discharge end will be scooped into the deflectors 38 and will be ejected from the cylinder through the end thereof between the spokes of the manifold 16, falling into the projecting part of the housing 37.

A conveyer 40 is positioned at the discharge end of the cylinder and as the cylinder is rotated and material discharged therefrom, it falls into the conveyer 40 and is carried away to any desired or suitable place. It should be understood that the cylinder is given a slight inclination toward the discharge end so that as the cylinder is rotated the material contained therein is moved continuously toward the discharge end.

At the inlet end of the cylinder 6 the pipes 17 are connected into the manifold 9 which is also provided with plugs 31 similar to the plugs in manifold 16. A feeding hopper 41 is also provided at the inlet end of the cylinder in the bottom of which is a spiral conveyer 42 adapted to convey material from the hopper into the inlet end of the cylinder 6, and separated from the hopper by a partition 43 is a vapor passage 44 through which vapors arising from the heated material in the cylinder may escape therefrom. Any suitable driving means may be employed to rotate the conveyer 42, it being found that the material must be fed to the conveyer at different speeds, depending upon the kind of material to be dried.

A yoke 45 connected to the manifold 9 extends toward the hopper and forms a retaining shield for preventing the loss of material at the inlet end of the cylinder and also to prevent the escape of vapors in any other way than from the vapor passage 44.

It is evident that when the drier is used to dry herbage and the like, the stems or particles that are too large to pass between the tubes 17 and out of the cylinder by way of the discharge openings 8 will be deflected by the deflectors 38 and ejected from the cylinder, thus preventing the stems from clogging the discharge end of the cylinder and preventing the discharge of the dried material. The openings 8 may be omitted if desired. It will also be seen that with the applicant's construction an enlarged chamber is formed at the inlet end of the cylinder by reason of the tubes or pipes 32 extending only part of the way toward the inlet end, thus forming a central space or chamber in the inlet end, thereby preventing the material which is fed to the drier from clogging this end of the drier.

Steam or other drying fluid is admitted to the manifold 16 through the pipe 28 and the tubes 32 are freely mounted at their other ends to permit them to extend longitudinally, independently of the other tubes 17. The water of condensation collects in

the enlarged portion 24 of the chamber 23 and is discharged therefrom through the steam pipe connection 26 and the pipe 29. If this pipe 29 is connected to a steam trap, the discharge of water is automatic, but any desired means of discharging this water may be employed.

I desire not to be limited to the exact construction, combination and arrangement of the several parts of my invention for it is evident that those skilled in the arts to which this invention pertains may make various changes therein without departing from the spirit and scope of my invention.

What I claim is:

1. In a rotary drier, the combination of a cylinder having a manifold in the discharge end, and means to discharge the dried material through the manifold as the cylinder is rotated.

2. In a drier, the combination of a rotatable cylinder having inlet and discharge ends, and with a manifold in the discharge end, and deflecting means attached to the manifold and extending within the cylinder operative to eject dried material from the cylinder through the manifold as the cylinder is rotated.

3. In a drier, the combination with a rotatable cylinder having inlet and discharge ends, a manifold in the discharge end, tubes connected in the manifold, and deflecting means operative to discharge dried material clear of the tubes and through the manifold when the cylinder is rotated.

4. In a drier, the combination with a rotatable cylinder having a manifold in the discharge end, tubes disposed adjacent the cylindrical shell and having connection with the manifold, and deflecting plates secured to the manifold operative to discharge material over the tubes through the manifold when the cylinder is rotated.

5. In a rotary drier, the combination with a cylinder having a manifold in the discharge end thereof, tubes arranged adjacent the periphery of the manifold and having communication therewith, the said manifold being formed with spokes, and means to deflect material at the end of the cylinder through the manifold between the spokes when the cylinder is rotated.

6. In a rotary drier, the combination with a cylinder having a manifold in the discharge end thereof, tubes arranged adjacent the periphery of the manifold and having communication therewith, the said manifold being formed with spokes, and means to deflect material at the end of the cylinder over the ends of the tubes, through the manifold between the spokes.

7. In a rotary drier, the combination with a cylinder having a manifold in the discharge end thereof, tubes arranged adjacent the periphery of the manifold and hav-

ing communication therewith, the said manifold being formed with spokes, and plates secured to the manifold and the spokes to deflect material from the end of the cylinder as it is rotated.

8. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end having axial and peripheral chambers, and means to deflect material from the cylinder between said chambers as the cylinder is rotated.

9. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end having axial and peripheral chambers joined by passages in the spokes thereof, and means to deflect material from the cylinder between the spokes as the cylinder is rotated.

10. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end having axial and peripheral chambers joined by passages in the spokes, tubes connected to said chambers, and deflecting means attached to the manifold to eject material from the cylinder clear of the tubes and through the manifold between the spokes when the cylinder is rotated.

11. In a rotary drier, the combination with a cylinder of a manifold in the discharge end, the cylinder being provided with openings adjacent the manifold for outlets, and means to discharge material through the manifold.

12. In a rotary drier, the combination with a cylinder, of a partition in the end, the cylinder being formed with outlet openings adjacent the end of the cylinder, and means to discharge material over the partition through the end of the cylinder.

13. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end, tubes adjacent the periphery of the manifold, the cylinder being provided with outlet openings in proximity to the manifold to permit the discharge of material below the tubes, and means to discharge material above the tubes through the manifold.

14. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end, tubes connected in the manifold and arranged adjacent the shell of the cylinder, the cylinder being provided at the discharge end with openings to provide outlets for material which passes between the tubes, and deflecting plates secured to the manifold to eject material from the cylinder through end of the cylinder as the cylinder is rotated.

15. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end having a plurality of tubes connected thereto, some of said tubes being shorter than others to provide an enlarged inlet space for material to be dried, the cyl-

inder being provided with peripheral openings to discharge finely divided particles of the dried material, and means to eject larger particles of the said material from the discharge end of the cylinder.

16. In a rotary drier, the combination with a cylinder, of a manifold in the discharge end having peripheral and axial chambers with communicating passages through connecting spokes, tubes connected to said chamber, the tubes in connection with the peripheral chamber being longer than the other tubes, a manifold at the other end of the cylinder into which the longer tubes are connected, means to support the free ends of the shorter tubes in the cylinder,

apparatus to discharge material to be dried into the cylinder in the space at the end of the shorter tubes and deflecting plates at the discharge end of the cylinder to eject dried material from the cylinder through the end thereof through the openings in the manifold between the spokes thereof.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 2nd day of May, A. D. 1911.

CHARLES E. GEIGER.

Witnesses:

CHARLES H. SEEM,
K. W. WONNELL.