

No. 774,859.

PATENTED NOV. 15, 1904.

J. E. TURNEY.
DRIER.

APPLICATION FILED DEC. 21, 1903.

NO MODEL.

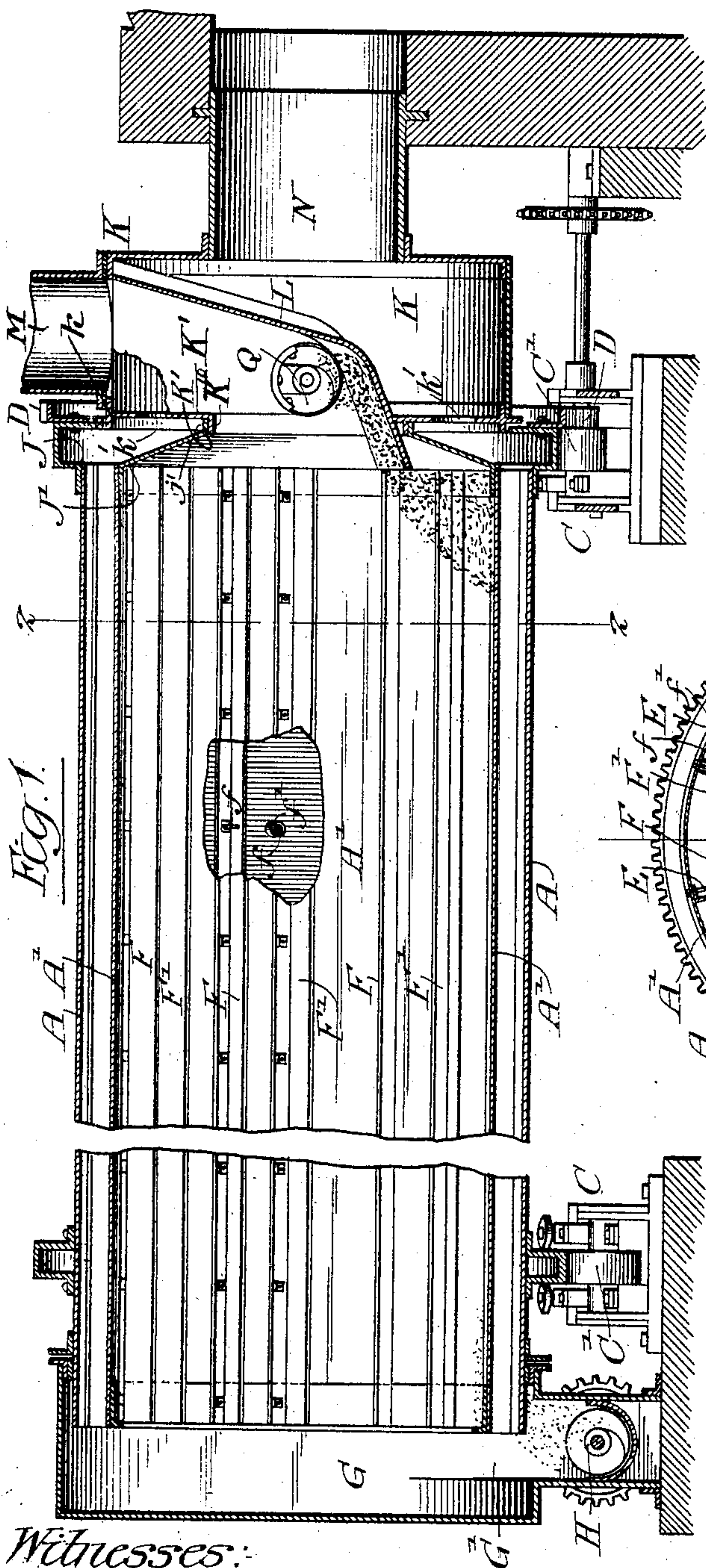


Fig. 1

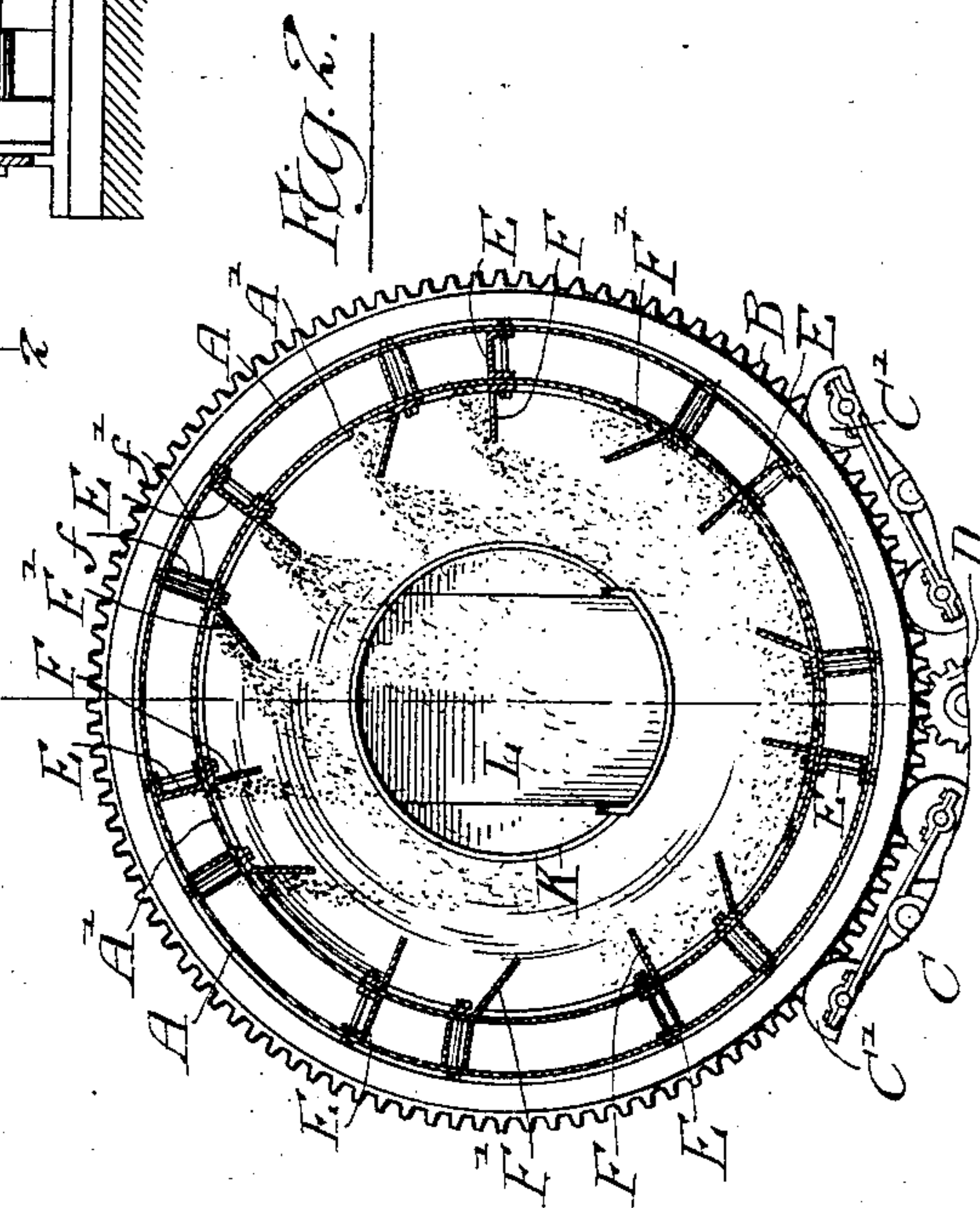


Fig. 2

Witnesses:

Louis M. Whitehead

Fred B. Fischer

Inventor:
John E. Turney
By Burton Burton
his atty

UNITED STATES PATENT OFFICE.

JOHN E. TURNEY, OF LOUISVILLE, KENTUCKY, ASSIGNOR OF ONE-HALF TO CHARLES E. GEIGER, W. E. KOOP, AND G. W. FISKE, DOING BUSINESS UNDER THE FIRM-NAME OF GEIGER, KOOP & FISKE, OF LOUISVILLE, KENTUCKY.

DRIER.

SPECIFICATION forming part of Letters Patent No. 774,859, dated November 15, 1904.

Application filed December 21, 1903. Serial No. 185,974. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. TURNEY, a subject of the King of Great Britain, 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.

This invention is an improvement on a drier for which United States Patent No. 740,607 was issued to me, dated October 6, 1903.

The improvement consists in the features of construction set out in the claims.

In the drawings, Figure 1 is a longitudinal section of my improved drier, the middle portion being broken away to condense the view. Fig. 2 is a section at the line 2 2 on Fig. 1.

This drier comprises a cylinder A, encompassed by an annular gear B and supported in a cradle C on antifriction-rolls C' and provided with means for rotating in such cradle, consisting of the pinion D, meshed with the annular gear B and provided with any suitable means for rotating them to rotate the cylinder in its cradle. This cylinder A is double-walled, the inner cylindrical element A' being spaced from the outer a distance sufficient to provide a cavity which is subdivided longitudinally by partitions E into passages which constitute flues or pipes extending from end to end of the cylinder for the purpose hereinafter explained. The inner surface of the inner wall is provided with lifts or flights F F', conveniently formed of angle-metal secured by one lip to the wall and the other projecting to form a shelf for lifting and spilling the material to be dried in the cylinder as the latter rotates. Conveniently the partitions E for subdividing the annular space between the inner and outer wall of the cylinder are made of channel-bars, and the bolts or rivets which secure them in place and bind the two cylinder-walls together also secure alternate flights to the wall. Intermediate the flights F thus secured other flights F' are secured directly to the inner wall by bolts f' through both walls and tubes f'', interposed

between the walls. The alternate flights F' of the entire series F F' are preferably made to protrude at an acute angle—that is, at a slope upward from the cylinder-wall—when in the upward movement with the revolving cylinder they reach the level of the axis of the cylinder, so that the material carried by them will be carried higher in the rising movement of the flights before being spilled than in the case of the flights F, which project substantially radially and are therefore horizontal at the position mentioned at which the flights F' are inclined upward. The material carried by the radially-projecting flights is liable to be all spilled by the time those flights have passed half-way up from horizontal toward vertical position, and if no flights of any other form were present the shower of material falling through the cylinder would be confined to less than half of its width, even allowing for considerable pitch forward, which would probably occur from the material sliding off the inclined flights after being carried up to the highest point to which any of it would be carried before being spilled; but by providing the flights F', which making an acute angle, as pointed out, form pockets which carry the material, or some portion of it at least, substantially to the top, so that in filling it is projected nearly across to the farther side, the shower of falling material is distributed quite uniformly across the entire width, and the full available drying capacity of the drying-current of air and gases passing through the cylinder is utilized.

The cylinder A at its opposite ends extends in two fixed heads, named for distinction, respectively, the "receiving" and the "discharge" head. The discharge-head G consists merely of a rigid, preferably cast-iron, structure having a suitable cavity with cylindrical openings at one side, into which the discharge end of the cylinder protrudes for delivering the dried material which falls into the discharge-throat G', in which any suitable conveying means, as the screw H, may operate to carry away the dried material.

At the receiving end the cylinder has rigid

with it, so as to receive with it, an annular diaphragm, which is in the form of a hollow annular head comprising two annular parts J and J', the former being secured fast to the outer cylinder-wall A and the latter similarly secured to the inner wall A', the two annular parts when thus secured together forming between them a vestibule-chamber leading into the longitudinal flues, into which the annular space between the two cylinders is partitioned by the channel-bars E. The annular chamber thus formed has an annular opening between the inner circumference of the outer element and the outer circumference of the inner element, and said annular opening registers with an annular diaphragm K', which constitutes the inner wall of the stationary receiving-head K, said annular diaphragm having a multiplicity of apertures k' for communication from the cavity or chamber of said stationary head with the cavity of said annular vestibule and the flues into which it leads. A flange l on the diaphragm K' protrudes into the annular mouth of said vestibule or hollow head to make a suitably close joint at the outer circumference of said opening, and a flange K¹⁰ at the inner circumference of the diaphragm K' telescopes with the corresponding flange j' on the inner element J' of said annular head. Through the central opening of the annular diaphragm K' a funnel L from the central opening of the cylinder leads up to the top of the main cavity of the stationary head K and there communicates with the discharge pipe or stack M. Said stationary head K is connected at the outer side, by means of a pipe N, with the discharge-passage of a furnace, which is not shown, but which is adapted to discharge the products of combustion, preferably clear gas intensely heated, by way of the fixed head K around the funnel L, through the apertures k' k' of the diaphragm K', into the vestibule or hollow annular head J J' of the cylinder, and thence into the longitudinal flues formed by the bars E. The material to be dried is conducted from any suitable source by a suitable means, as a spiral conveyer, represented in section at Q, and which without further illustration may be understood generally as leading from outside the head K across the space outside the funnel L into the latter, into which it discharges the material which is delivered down the inclined bottom of the funnel through the central aperture of the hollow head J J' into the interior of the double-walled revolving cylinder, by whose flights F it is picked up and spilled as the cylinder rotates, gradually passing to the farther end of the latter and finally being discharged into the conveyer H.

The general operation of this drier is similar to that of the one shown in my said Patent No. 740,607 in that the heated products

of combustion, which enter through the annular vestibule or hollow head J J', pass through the longitudinal flues formed by the partitions E to the farther end of the cylinder and to the chamber of the head at that end, thus heating the inner wall of the cylinder and the flights, so that they are adapted to rapidly dry the material, which falls upon and is carried by them in the rotation of the cylinder. The gases of combustion, having performed this first function, are drawn back through the open central space of the cylinder and encounter, while still dry and only somewhat cooler than when they first emerged from the furnace, the material which is being lifted and showered through said space in the cylinder, acting thus directly upon it to take up its moisture and complete the drying process and then passing out, moisture-laden, through the stack M.

Suitable means will be employed for advancing the material longitudinally through the cylinder as it rotates—preferably such means as setting the cylinder at slight inclination longitudinally, as shown in the drawings.

I claim—

1. A drier comprising an approximately horizontal cylinder having a double or hollow wall; longitudinal partitions extending through the annular cavity dividing the same into longitudinal flues; fixed receiving and discharge heads with which the cylinder and said flues communicate at the ends; means for supporting the rotating cylinder; the receiving-head being partitioned to separate an annular portion from a central portion, the annular portion only communicating with the flues, and the central portion communicating with the central cavity of the cylinder; an inlet for a heating medium leading into said annular portion, and a vapor-discharge tube leading from said central portion across the annular portion, and a final vapor-discharge pipe communicating with such throat.

2. A drier comprising an approximately horizontal cylinder having a double or hollow wall; longitudinal flights or lifts for carrying the material up and spilling it with the rotation of the cylinder mounted on the inner surface of the inner element or shell of the hollow wall; means for securing such flights comprising bolts taking through both elements of the hollow wall and across the cavity between them, and spacing tubes or sleeves on the bolts between the inner and outer wall.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Louisville, Kentucky, this 10th day of December, A. D. 1903.

JOHN E. TURNEY.

In presence of—

EDWARD T. WRAY,
FRED G. FISCHER.