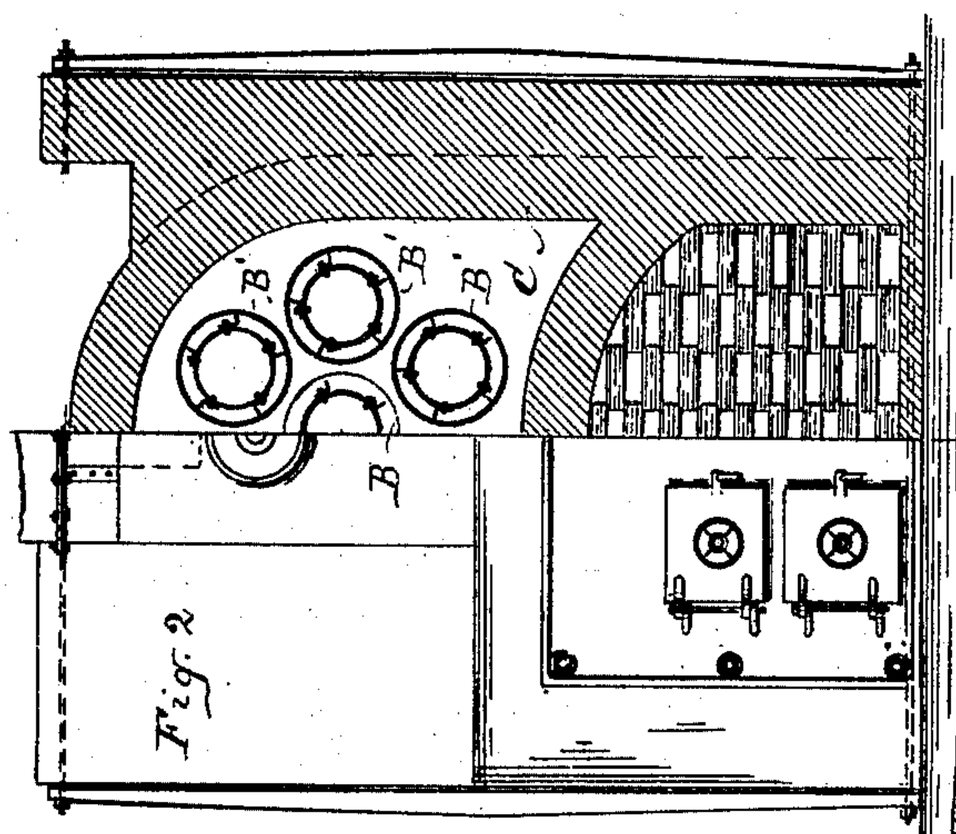
No. 709,704. Patented Sept. 23, 1902.

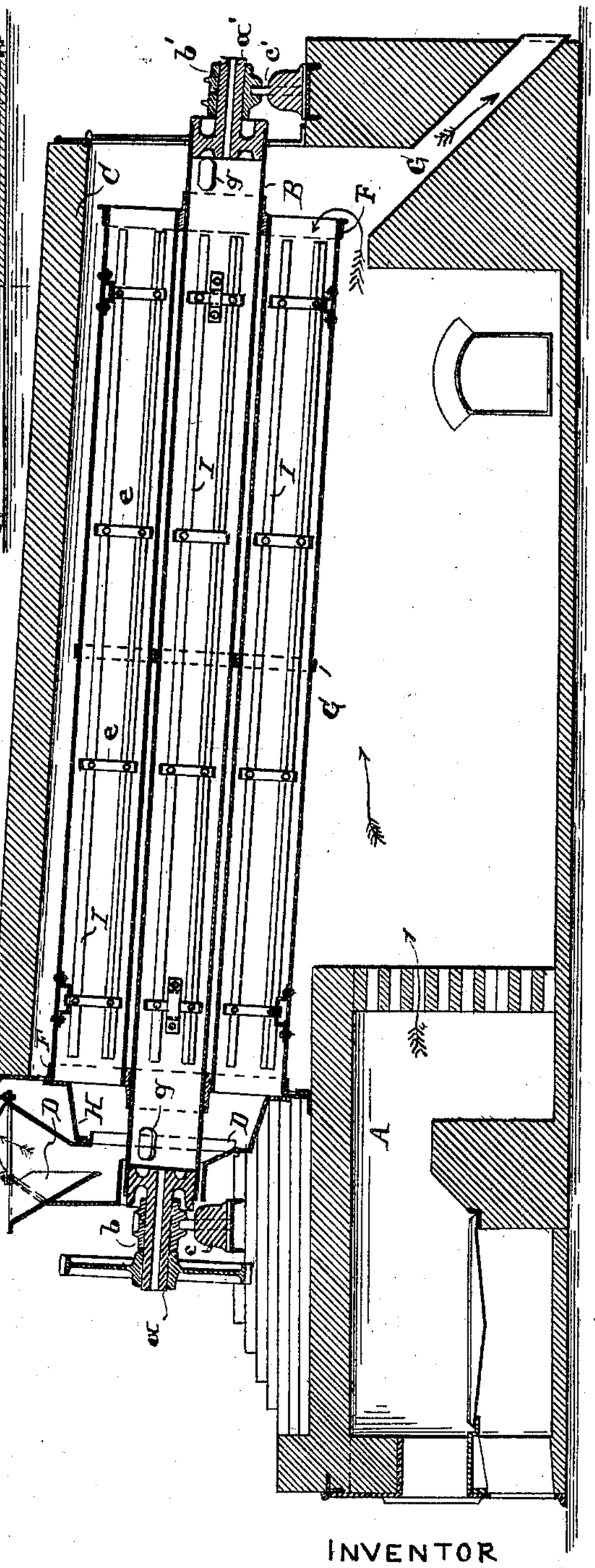
L. GRILL.

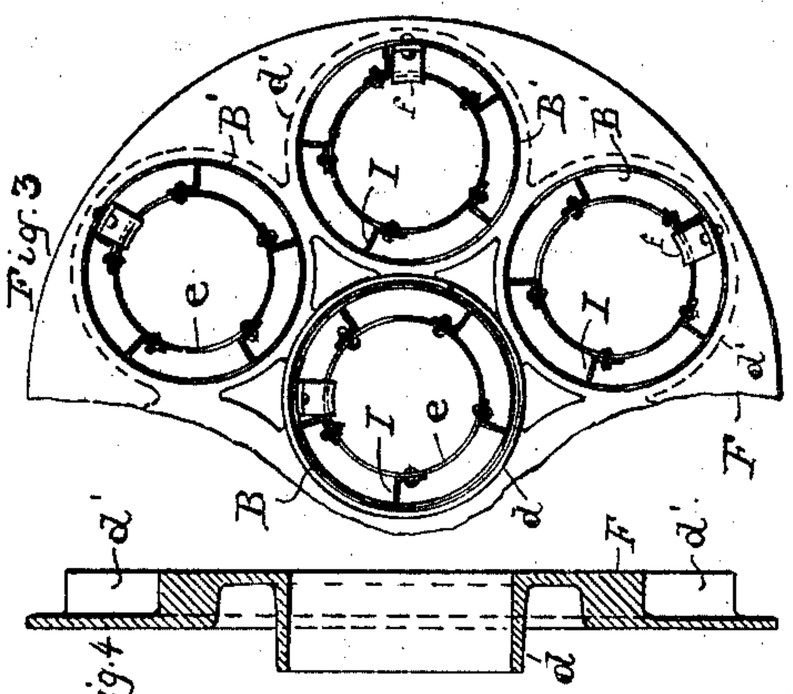
ROTARY DRIER.

(Application filed Jan. 13, 1902.)

(No Model.)







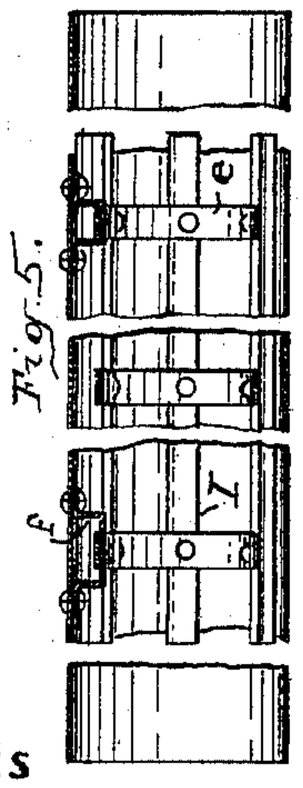


Fig. 1.

WITNESSES

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UNITED STATES PATENT OFFICE.

LEVI GRILL, OF CLEVELAND, OHIO.

ROTARY DRIER.

SPECIFICATION forming part of Letters Patent No. 709,704, dated September 23, 1902.

Application filed January 13, 1902. Serial No. 89,604. (No model.)

To all whom it may concern:

Be it known that I, LEVI GRILL, a citizen of the United States of America, and a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rotary Driers, of which the following is a specification.

My invention relates to power-operated driers; and the objects of my improvement are, first, to obtain the largest possible heating or drying surface in a given amount of space, and, second, to reduce the cost of construction and maintenance of such driers. I attain these objects in a drier constructed substantially as shown in the accompanying drawings, in which—

Figure 1 represents a longitudinal sectional view of said drier. Fig. 2 is a part end view and part transverse sectional view of said drier. Fig. 3 is an enlarged end view of one of the heads, showing the tubes therein. Fig. 4 is a vertical section of one of the heads, and Fig. 5 is a similar view of one of the tubes.

Like letters of reference denote like parts in the drawings and specification.

Substantially the apparatus consists of the furnace A, a plurality of flues B B′ B′, a brick inclosure C for said tubes, means for rotating said flues, a hopper D, and a fan E.

The principal feature of my invention consists in the construction, arrangement, and equipment of the flues, the manner in which the material is fed to said flues, and the manner in which the hot gases are directed around and in said flues.

As shown, the center flue or tube B extends from the front to the rear brick wall and terminates in trunnions *a a′*, which are journaled in bearings *b b′*, same having pivotal connection with the stands *c c′*, the relative connection of trunnions, bearings, and stands being such as to admit of free rotation of the tube or flue regardless of the effects of heat upon said tube or flue. Part way in from the terminals of said tube are secured the heads F F′. (See Fig. 1 and detached views Figs. 3 and 4.) Symmetrically arranged upon said heads around the central sleeve *d* are a plurality of sleeves *d′* for reception of the outer flues or tubes B′ B′ B′. All the tubes have riveted connection with themselves and the heads by means of said sleeves, thereby establishing a solid, durable, yet comparatively light structure, considering the capacity of such driers. The center ring or plate G is another element adding stability to this structure. Furthermore, a cone-shaped hood H is secured to the outer face of head F. Thus the hood is turned with and by said head. Part way into the mouth of said hood is snugly fitting the stationary hopper-casing D. (See Fig. 1.) Inside each tube I provide a series of carriers I, which extend above the entire length of the tubes. (See Figs. 3 and 5.) Angle-iron I prefer for said carriers. A series of rings *e* form the means of connecting said angle-irons. Said rings pass through stirrups *f* near the terminals of said flues, thus causing the angle-irons (carriers) to move in unison with said flues, as well as preventing longitudinal displacement of said angle-irons. By means of said carriers I the material to be dried is stirred up, lifted, and dropped for the purpose of effecting a thorough and uniform treatment thereof, thereby enhancing the efficiency of such driers.

As above stated, the material is fed through the hopper D, the bulk of which descends to the lowest situated part of head H to be distributed among the outer flues, while a portion of the material enters the central tube by way of one or more slots *g*. (See Fig. 1.) The hot gases from the fireplace A pass around the exterior of all the flues and travel through the interior of the flues before same can be drawn off through fan E. Therefore the material not only becomes uniformly dried, but the heat energy is also utilized to the best advantage. From the rear terminal of the flues the dried material is discharged into the channel G ready for being packed and shipped.

In driers of smaller capacity the central flue may be omitted without departing from the nature of my invention. When no central tube is used, then the trunnions may be formed integral with the heads F F′, in which instance the cost of construction is materially lessened.

What I claim, and desire to secure by Letters Patent, is—

1. In a power-operated drier, the combination of a rotating central tube and a plurality of flues moved by said central tube, all communicating with a hopper for receiving their

charges as shown, and for the purpose described.

2. In a power-operated drier, comprising a central tube and a plurality of auxiliary tubes, all being connected as shown, the center tube terminating in trunnions and having side openings for the passage of material therethrough.

3. In a drier, in combination, a central drying-tube rotatively mounted, and a plurality of exterior drying-tubes positioned relative to and rotatable with said central tube and forming a unitary structure therewith.

4. In a power-operated drier, in combination, a furnace, and a series of rotatable flues for the passage of gases from said furnace, said flues being combined to form a unitary structure and forming independent drying-chambers, one of said flues forming the support for the remaining flues.

5. In a drier, in combination, a plurality of flues mounted in rotating heads to form a unitary structure, one of said flues forming the support for said heads.

6. In a drier, in combination, a plurality of rotating drying-tubes connected by rotating heads, one of said tubes forming the support for said heads, a hopper, and means for feeding the material from the hopper to said tubes.

7. In a drier, a furnace, a fan, and a plurality of flues mounted in rotating heads to form a unitary structure, one of said flues forming the support for said heads, said flues forming the sole passage-way leading to said fan, whereby the gases will be drawn through each tube in the same direction.

Signed at Cleveland, Ohio, this 24th day of December, 1901.

LEVI GRILL.

Witnesses:
BERNH. F. EIBLER,
CLARENCE A. GIBBS.