

No. 637,731.

Patented Nov. 21, 1899.

C. GROLL.
SELF FEEDING SMOKE CONSUMING FURNACE.

(Application filed Dec. 30, 1897.)

(No Model.)

4 Sheets—Sheet 1.

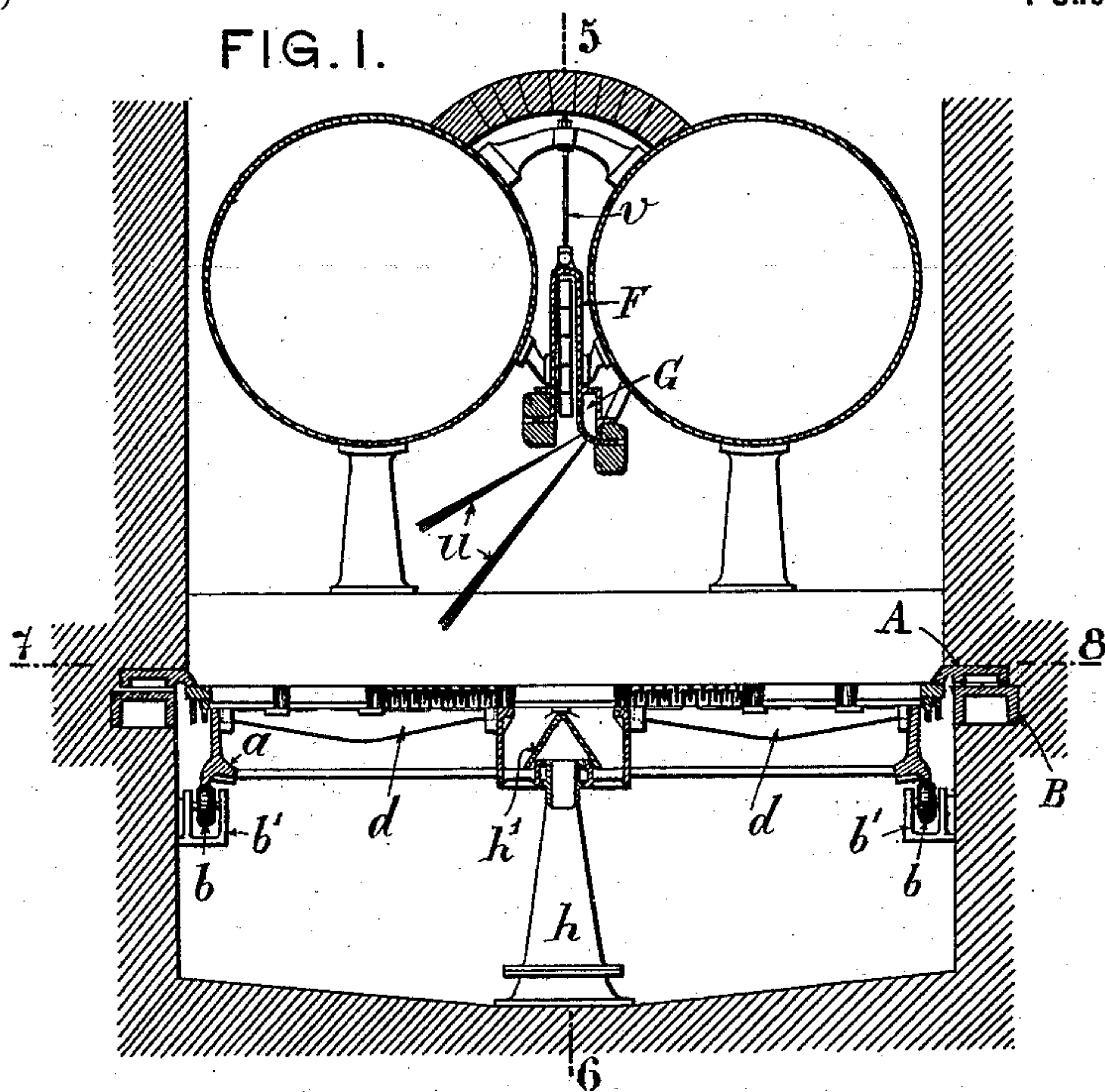


FIG. 5.

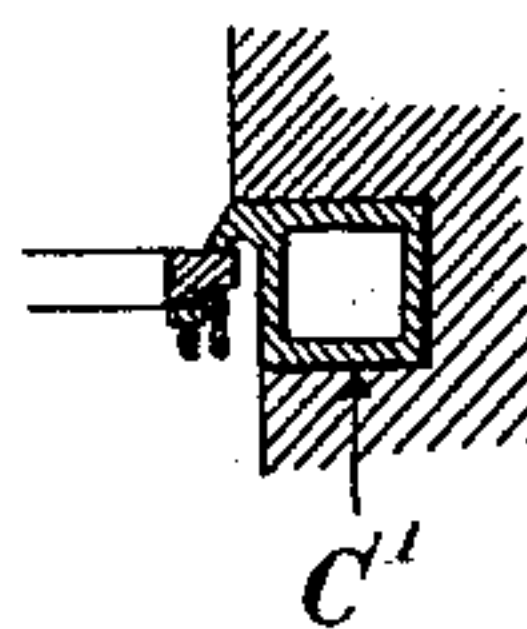
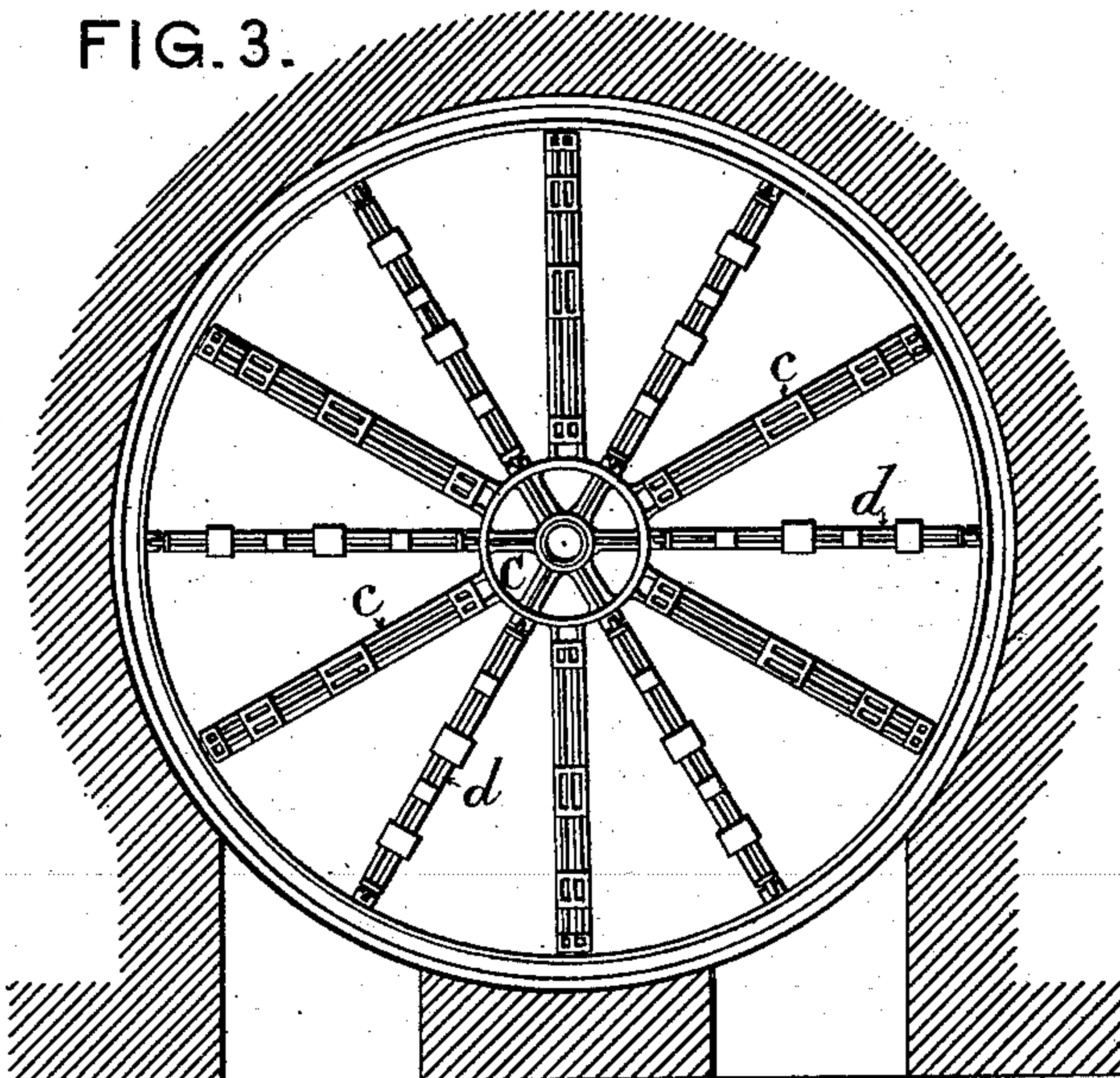


FIG. 3.



Witnesses

Charles Linn

Wm. H. Linn

Inventor:

Charles Groll

No. 637,731.

Patented Nov. 21, 1899.

C. GROLL.

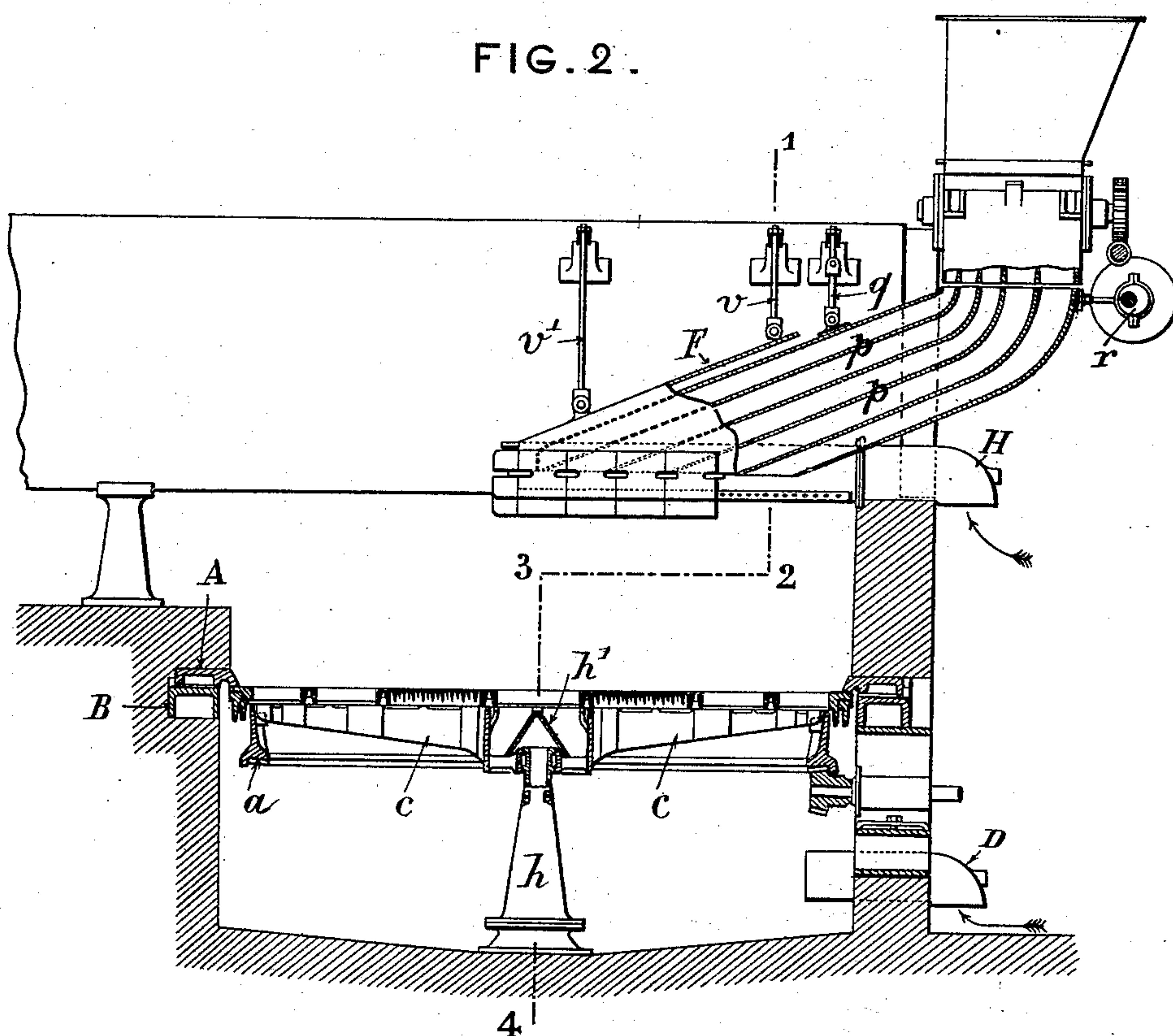
SELF FEEDING SMOKE CONSUMING FURNACE.

(Application filed Dec. 30, 1897.)

(No Model.)

4 Sheets—Sheet 2.

FIG. 2.



Witnesses

Calvin Lee

Julius Fuchs

Inventor,

Charles Groell

No. 637,731.

Patented Nov. 21, 1899.

C. GROLL.
SELF FEEDING SMOKE CONSUMING FURNACE.

(Application filed Dec. 30, 1897.)

(No Model.)

4 Sheets—Sheet 3.

FIG. 5.

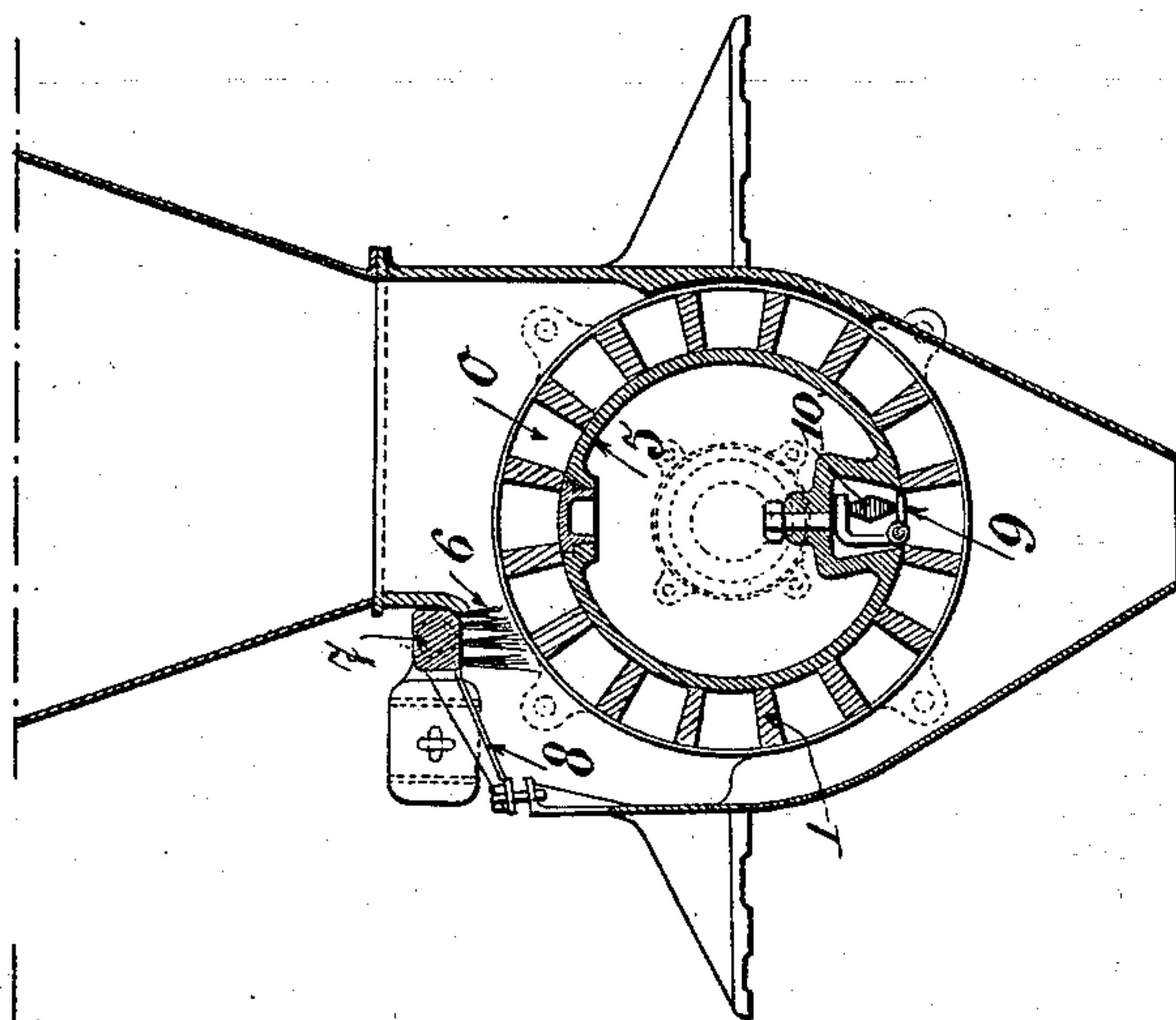
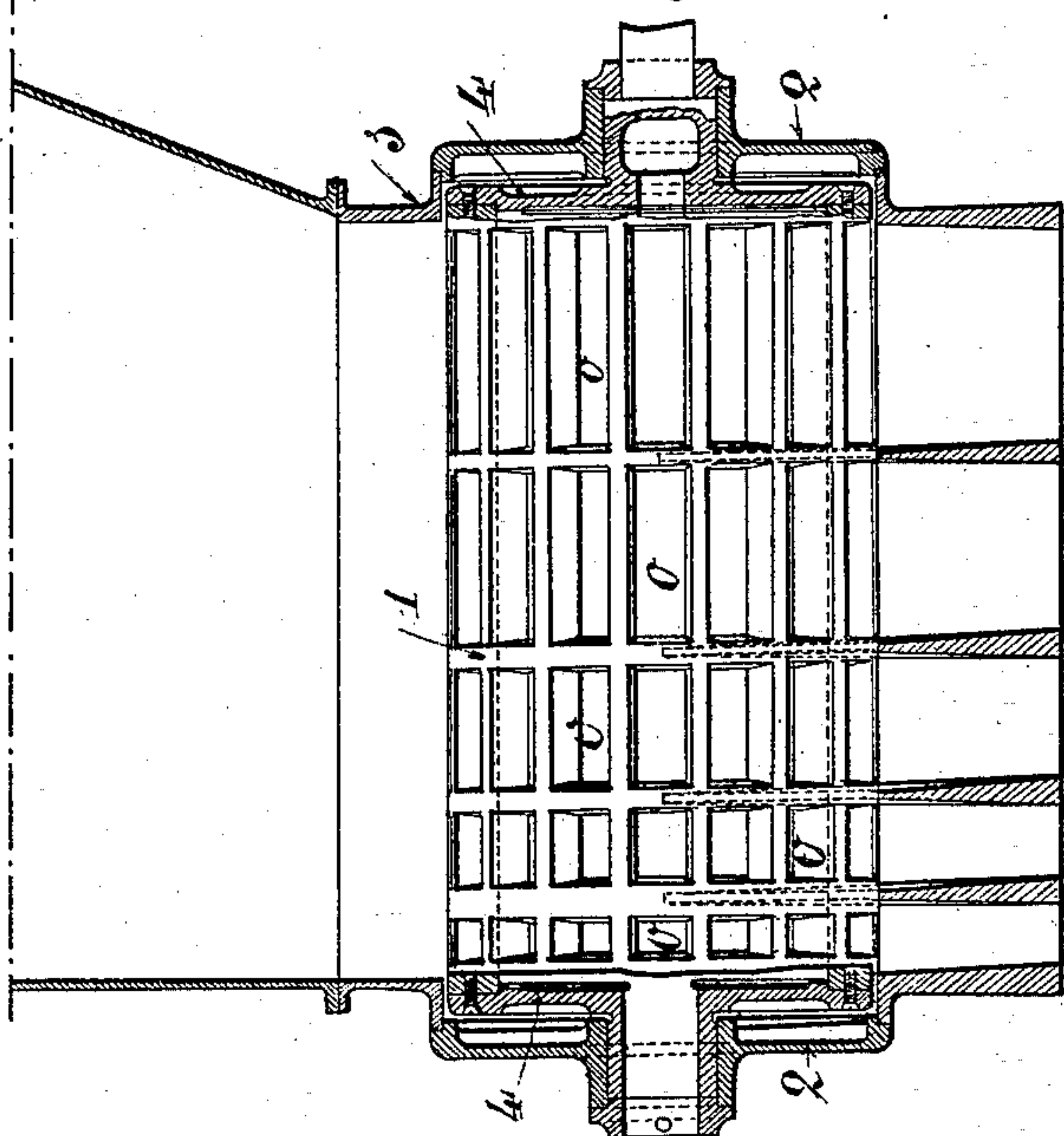


FIG. 4.



WITNESSES.

Julius Lutz
J. M. Hanford

INVENTOR:
C. Groll

BY

Murray
ATTORNEYS.

No. 637,731.

Patented Nov. 21, 1899.

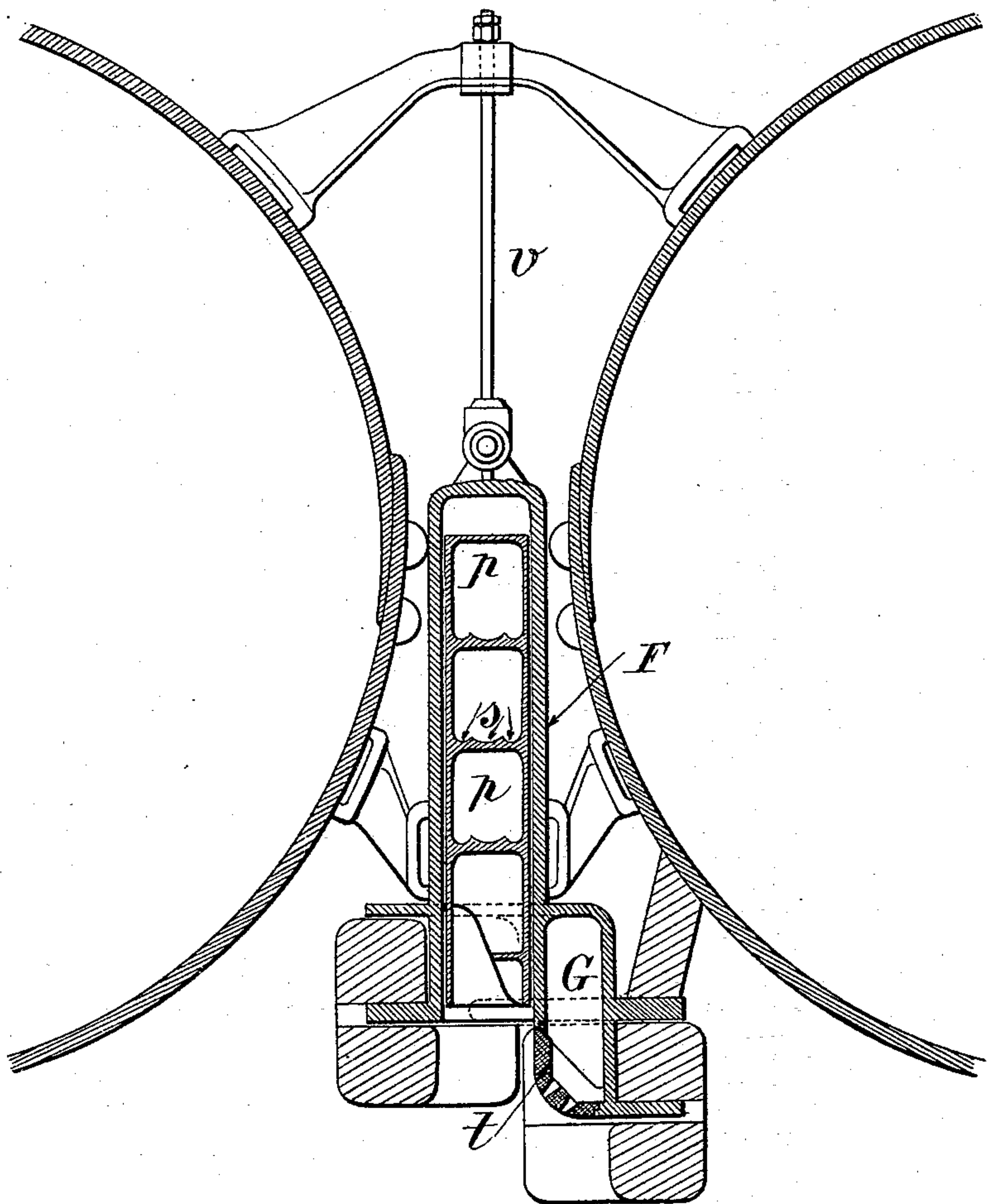
C. GROLL.
SELF FEEDING SMOKE CONSUMING FURNACE.

(Application filed Dec. 30, 1897.)

(No Model.)

4 Sheets—Sheet 4.

FIG. 7.



Witnesses

Charles Linn

Jules Groll

Inventor

Charles Groll

UNITED STATES PATENT OFFICE.

CHARLES GROLL, OF ROUBAIX, FRANCE.

SELF-FEEDING SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 637,731, dated November 21, 1899.

Application filed December 30, 1897. Serial No. 664,647. (No model.)

To all whom it may concern:

Be it known that I, CHARLES GROLL, of Roubaix, Nord Department, in the Republic of France, have invented new Improvements in Self-Feeding Smoke-Consuming Furnaces, (for which I have obtained under date of October 7, 1897, a certificate of addition to my French patent, No. 256,099, of May 30, 1896;) and I do hereby declare that the following is a full and exact description thereof, reference being made to the accompanying drawings.

My invention has for its object several improvements in the class of furnaces which are fitted for consuming the smoke and in which the fuel is automatically distributed onto a grate having a continuous or intermittent rotatory movement.

My invention has more particularly for its object improvements in the rotatory grate and self-feeding smoke-consuming furnace which is described in the Letters Patent granted to me under the No. 578,146, said Letters Patent being for the same subject-matter as the French patent, No. 256,099, above mentioned.

These improvements relate particularly to the self-acting coal-feeder, to which I give a shaking movement, and to the coal-distributor, which is provided with a device enabling wet coal to be used.

Other novel features of the invention will appear from the description following hereinafter.

The accompanying drawings show the new improvements in all their details.

In the said drawings, Figures 1 to 3 are general views of the furnace as established according to the new construction. Fig. 1 is a vertical section through the boilers and on the line 1 2 3 4 of Fig. 2. Fig. 2 is a longitudinal section on the line 5 6 of Fig. 1. Fig. 3 is a sectional plan on the line 7 8 of Fig. 1. Figs. 4 and 5 are respectively a longitudinal section and a transverse section of the coal-distributor. Fig. 6 refers to a modified construction of the grate-ring with water circulating therein. Fig. 7 is a detail view, on a larger scale, of the radial feed-chamber.

By referring to the drawings it will be seen that the grate-support consists of a toothed ring *a*, moving on four rollers *b*, more or less, fitted in supports *b'*, fixed in the masonry of

the ash-pit. Six radial arms *c* are mounted on a common hub *C* and rest at their outer ends on the ring *a*, which is provided with recesses to receive the said ends. The said arms are provided with a series of apertures intended to receive the heels of the grate-plates, which they support. Six other radial arms *d* rest on supporting-lugs of the hub *C* and of the ring *a*, and they, together with the arms *c*, constitute the supports of the grate-bars.

The hub *C* rotates on a standard *h*, fixed to the bottom of the ash-pit and covered by a cone *h'*, turning with the hub, to prevent ashes or cinders from interfering with the rotatory movement in penetrating between the surfaces which are in contact with each other.

The outer grate-bars rotate under a ring *A*, made in several segments in order to allow of the expansion of each of its parts or plates. The said plates rest on a ring *B*, fixed entirely in the masonry, so that the said ring, which is not exposed to the fire, prevents the plates or segments *A* from becoming unlevel. By this means the grate can be fitted very near to the said plates, but without giving rise to friction, whereby very small power is required for the rotatory movement. Furthermore, air from the ash-pit cannot pass in excess through the joints, which, on the other hand, are always covered with coal. The ring and the grate can freely expand, even when they are not cooled by steam from the blast-pipes when the engine is started, for instance, or when a fan is employed for obtaining a draft.

I may replace the plates *A* and the ring *B* by a single ring *C'*, tubular in cross-section and in which a circulation of water may be established. This arrangement is shown in section in Fig. 6.

The furnace arranged as hereinbefore described may be operated either with the natural draft of the chimney or with a forced draft. In the latter case the ash-pit being closed the air is sent under the grate by jets of steam by means of the blast-pipes *D*.

The coal is fed by means of a cellular distributor, which allows of using wet coal. The distributor shown in Figs. 4 and 5 of the accompanying drawings is provided with five series of cells, more or less. The suitable quantity of coal passing through each series

can be obtained either by varying the number of cells or by changing the dimensions of the same. The coal-discharging capacity of the distributor therefore increases in such a manner that the series of cells which supplies the fuel to the central portion of the grate has the smallest capacity and that series of cells which supplies the fuel to the peripheral portion of the grate has the largest capacity.

10 A particular arrangement insures the discharge of the coal from the cells when the latter are filled with wet coal, which is often met with. A cellular cylinder 1 revolves in the double bottom 2 of casing 3 by means of plate-trunnions 4 4. The said cylinder, which is hollow, surrounds a fixed core 5, pinned at one of its ends to one of the bottoms of the casing 3. A series of brushes 6, pivoted at 7, are held against the cylinder by springs 8.

20 The coal, coming from the upper hopper, enters into the cells, where it is held by the brushes, which only yield when too large a piece of coal has penetrated into the holes. The coal is discharged at the bottom either by gravity or through the pressure exerted against it by a tappet 9, actuated by a spring 10 at the moment when the said tappet registers with the cell. The tappet is then closed by the pressure of the solid parts of the moving cylinder 1 until a fresh aperture registers with it. The regular discharge of the coal, however wet it may be, is thus insured.

Each series of cells *o* discharges the coal into the corresponding channels *p* of the inclined coal-distributor, Fig. 2, suspended from a connecting-rod *q* and receiving a shaking movement from an eccentric *r* in order to cause the coal to fall down. The coal slides in the small grooves *s* made in the bottom of each channel *p*, Fig. 12, in order to assist in its being equally distributed along the obliquely-cut ends of the channels, so that the surface of the grate may be supplied with coal in a perfectly-uniform manner.

45 The inclined coal-distributor is housed in a cast-iron casing F, which is protected against the effects of fire or heat by bricks of suitable shape, and there is cast on the side and along the said casing a lateral pipe G, closed by a removable wall *t*, and into which is sent, by means of a steam-injector arranged at H, the blast of air necessary for the combustion of the gases above the grate. The air enters into the furnace in very small jets *u*, which have also the advantage of preventing the gases of combustion from moving up into the casing of the coal-distributor.

The casing F is suspended from the boilers by two bars *v* and *v'*. The distributor itself is suspended between the boilers, as hereinbefore described, by a connecting-rod *q*, whereby a very light and noiseless reciprocating movement can be given to it.

I claim—

65 1. An improved smoke-consuming furnace comprising a rotary grate, a casing located radially above the grate and spaced therefrom,

a coal-distributor provided with a spring-actuated coal-ejector, a coal-feeder movably mounted in said casing and having inclined channels arranged to receive coal from said distributor and to deliver it upon the grate, and means for shaking the coal-feeder.

2. In a furnace, a coal-feeder comprising parallel inclined channels, a housing for said channels, links by which said housing is suspended, and mechanism for imparting a shaking motion to the suspended housing.

3. An improved smoke-consuming furnace having an oscillating coal-feeder, in combination with a cellular coal-distributor provided with a spring-actuated device which forces the coal filling each cell to become disengaged from the same, even when the said coal is wet, at the moment such cell passes above the coal-feeder, substantially as described, and for the purpose specified.

4. An improved smoke-consuming furnace having an oscillating coal-feeder and a cellular distributor provided with a device for disengaging the coal, substantially as described, and for the purpose specified.

5. The combination with the rotary grate, of a fuel-distributor comprising a rotary cylinder having a plurality of series of cells or chambers, each series having a different capacity from the adjacent series, a channel for feeding the fuel to the distributor, and separate channels for conveying the fuel from each series of cells to the grate, said conveying-channels being so arranged that the series of cells having the largest capacity supplies fuel for the outer portion of the grate, while the series of cells having the smallest capacity supplies fuel for the central portion of the grate.

6. The combination with the rotary grate, of a fuel-distributor comprising a rotary cylinder having a plurality of series of cells or chambers, the width of said series increasing from one end of the cylinder to the other, a channel for feeding the fuel to the distributor, and separate channels for conveying the fuel from each series of cells to the grate, the channel leading from the widest series of cells being arranged to discharge fuel upon the outer portion of the grate, while the channel leading from the narrowest series of cells is arranged to discharge fuel upon the central portion of the grate.

7. A fuel-distributor comprising a rotary cellular or chambered cylinder, a stationary core upon which said cylinder is mounted, and an outwardly-movable tappet or ejector located upon said core and adapted to enter the cylinder-chambers to discharge the fuel therefrom.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHARLES GROLL.

Witnesses:

GALTIER LIG,
JULES DUBEY.