(No Model.)

5 Sheets—Sheet 1.

E. URBAIN.

GROUND BONE FURNACE.

No. 414,608. Patented Nov. 5, 1889.

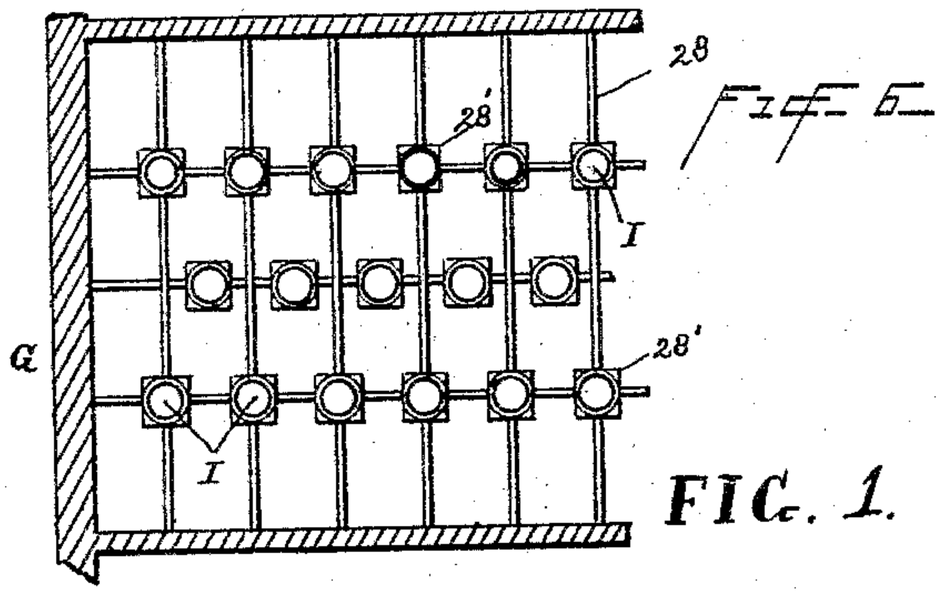


FIG. 1.

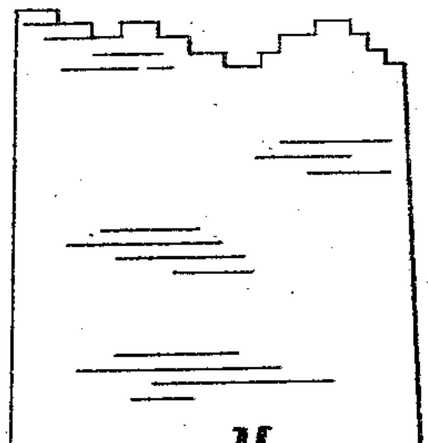
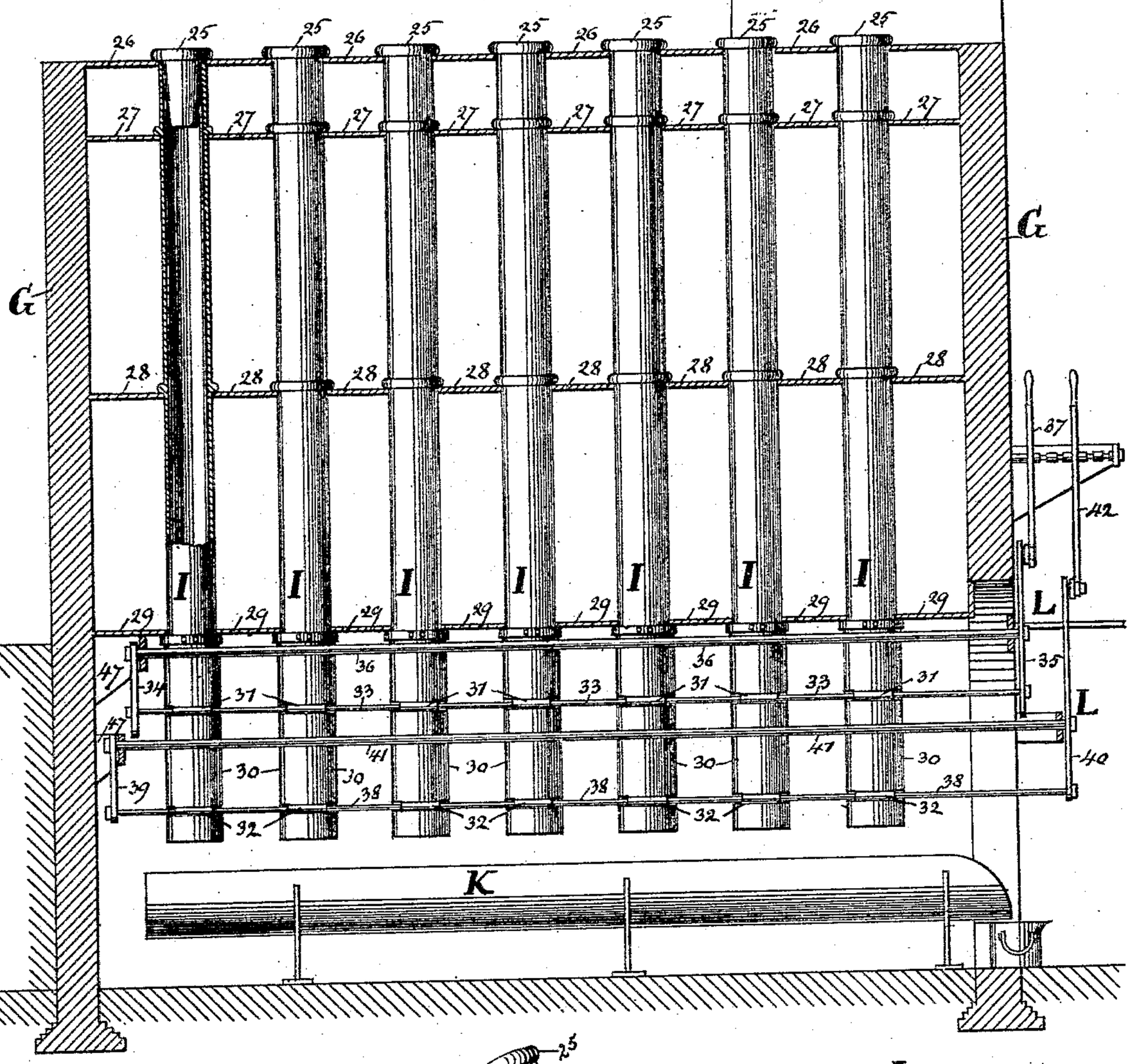


FIG. 6.



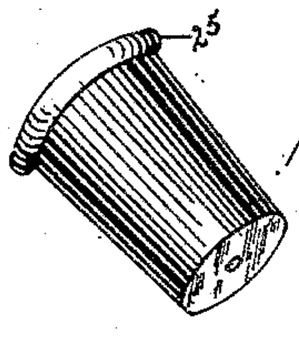


FIG. 7.

Witnesses.

Leon C. Boillot

H. R. Smith

Inventor:

Eugene Urbain

By his Att'y.

Alexander & Dick

(No Model.) 5 Sheets—Sheet 2.

E. URBAIN.

GROUND BONE FURNACE.

No. 414,608. Patented Nov. 5, 1889.

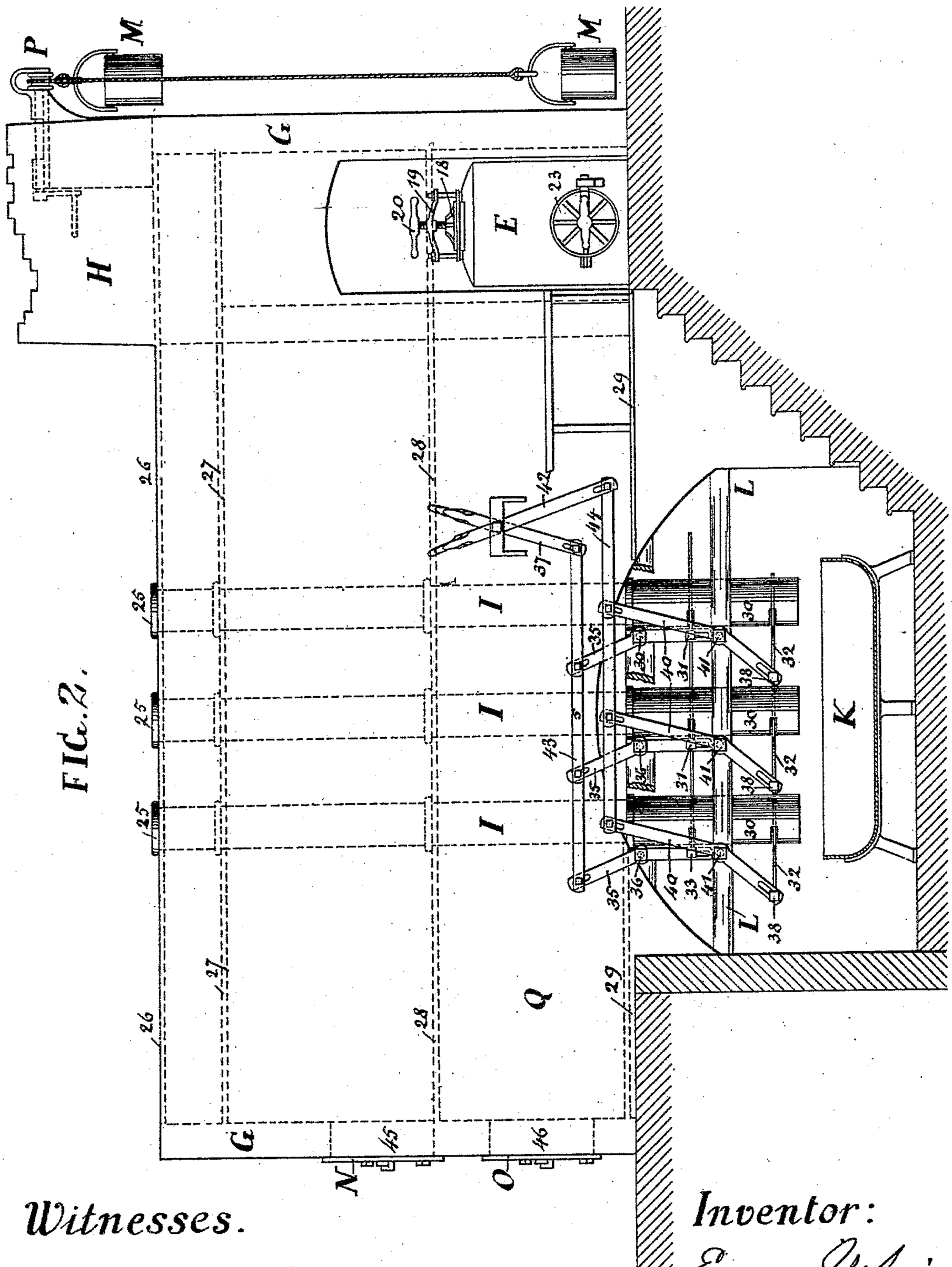


FIG. 2.

Witnesses.

Leon C. Boillot

K. R. Smith

Inventor:

Eugene Urbain

By his Atty.

Alphonso F. Smith

(No Model.)

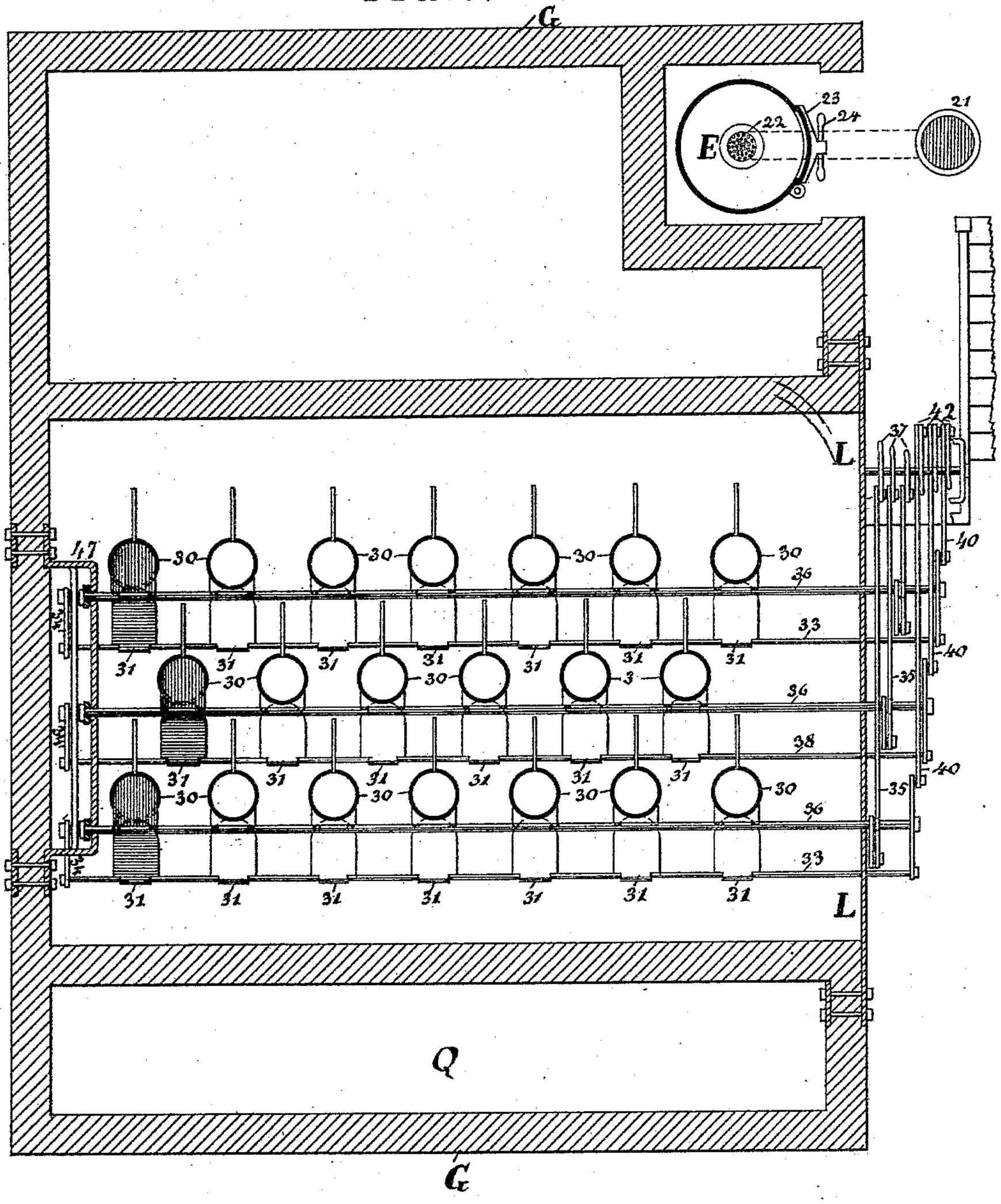
5 Sheets—Sheet 3.

E. URBAIN.

GROUND BONE FURNACE.

No. 414,608. Patented Nov. 5, 1889.

FIG. 3.



Witnesses:

Leon C. Baillot

H. R. Smith

Inventor:

Eugene Urbain
By his Att'y.
Upthorne & Smith

(No Model.)

5 Sheets—Sheet 4.

E. URBAIN.

GROUND BONE FURNACE.

No. 414,608. Patented Nov. 5, 1889.

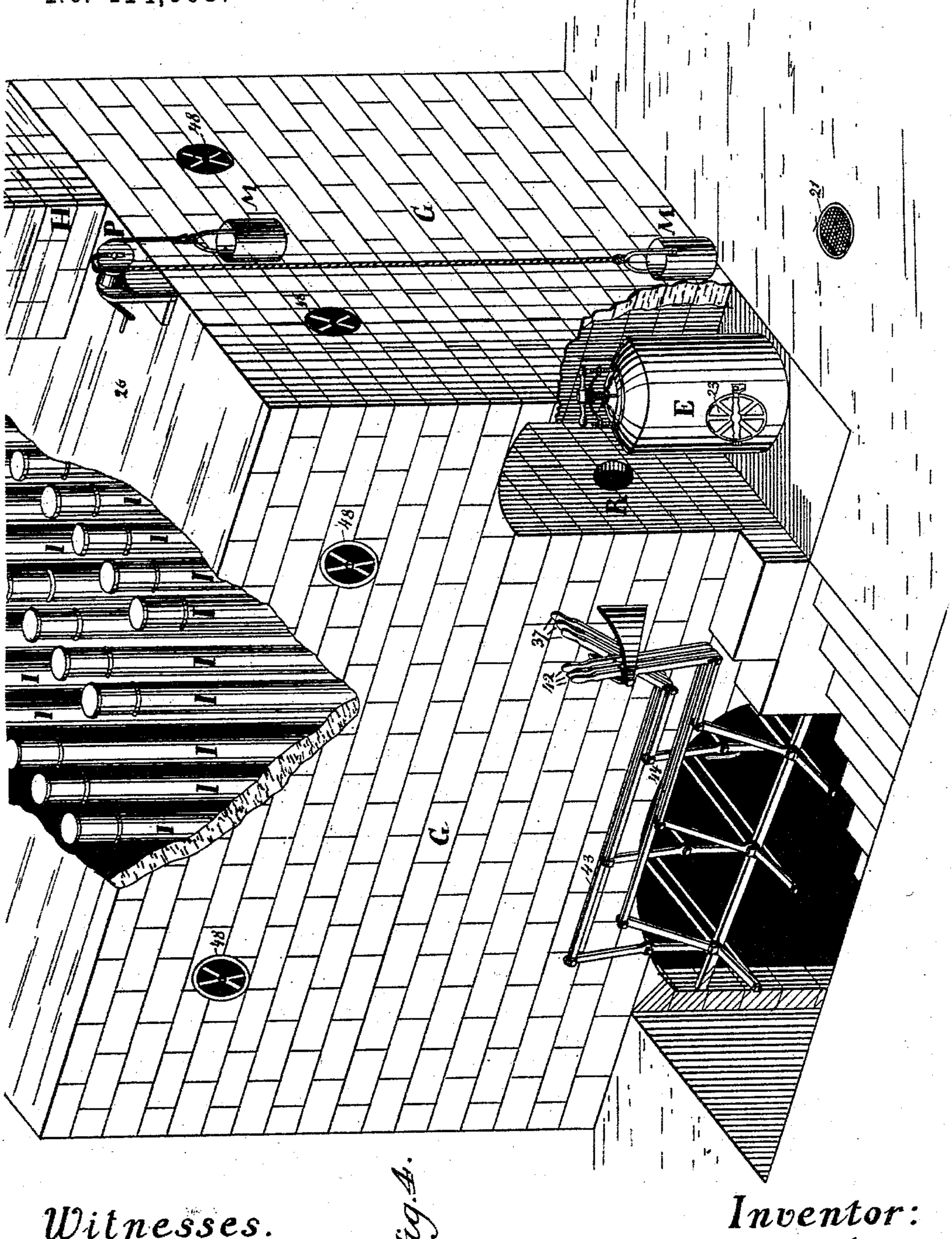


Fig. 4.

Witnesses.

Leon C. Boillot.

H. R. Smith

Inventor:

Eugene Urbain

By his Att'y.

Watson E. Smith

(No Model.) 5 Sheets—Sheet 5.

E. URBAIN.

GROUND BONE FURNACE.

No. 414,608. Patented Nov. 5, 1889.

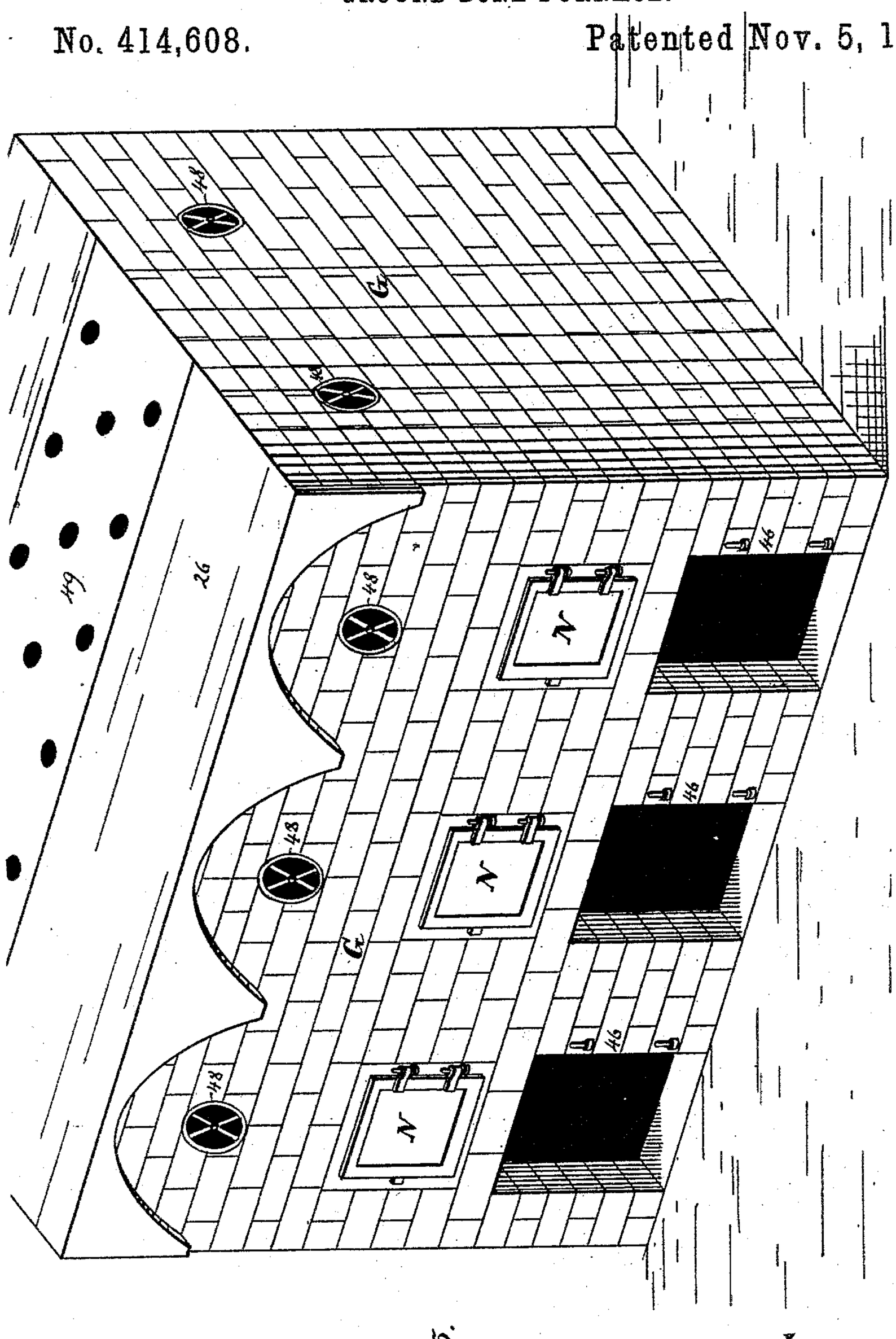


Fig. 5.

Witnesses.

Leon C. Boillot.

H. R. Smith

Inventor:

Eugene Urbain

By his Atty.

Alfred Jason Smith

UNITED STATES PATENT OFFICE.

EUGÈNE URBAIN, OF SAN FRANCISCO, CALIFORNIA.

GROUND-BONE FURNACE.

SPECIFICATION forming part of Letters Patent No. 414,608, dated November 5, 1889.

Application filed June 29, 1887. Serial No. 242,908. (No model.)

To all whom it may concern:

Be it known that I, EUGÈNE URBAIN, a citizen of France, and a resident of the city and county of San Francisco, State of California, have invented a new and useful Improvement in Ground-Bone Furnaces, of which the following is a full, clear, and exact description, referring to the accompanying drawings.

The object of my invention is to purify, clear, burn, or evaporate ground bone or bone-charcoal that has been used in the refining of sugar and has become unfit for further use. This object I attain by means hereinafter described and set forth.

Figure 1 is a front view of pipes or pots in a furnace, one wall of the furnace being removed. Fig. 2 is a side view of a furnace and sampling-pots. Fig. 3 is a plan of a furnace, the cover of the furnace being removed. Fig. 4 is a perspective view of the furnace with a section of the wall and cover removed, showing the retorts and devices for operating the discharging-slides. Fig. 5 is a perspective view of a furnace, showing the fireplaces and the furnace-cover. Fig. 6 is a view on a smaller scale of the frame, the supporting-walls being in horizontal section and broken away in part; and Fig. 7 is a view on an enlarged scale showing the perforation in the bottom of funnel-shaped covering-pots.

G (see Fig. 1) refers to the brick walls of the furnace, and H to the smoke-stack, and I to the retorts or pots constructed of metal or other suitable material.

In the top of each of the retorts or stack of pots may be placed a funnel-shaped pot 25, which is readily removed to permit bone to be shoveled into the retort, after which the funnel-shaped pot 25 is replaced on the retort I, thereby closing it sufficiently to retain the heat, the small opening in the bottom of the funnel-shaped pot or cover (see Fig. 7) permitting the gases to escape to the open air. Heretofore open tubes or chutes have been used for this purpose, and they do not sufficiently cover the bone nor prevent air from entering the retorts.

The perforation in the bottom of my covering-pot is small and excludes external air, though it is sufficient to allow the escape of vapors under light pressure from the interior of the bone.

The top floor or cover of the furnace is constructed of metal plates or other suitable material and provided with openings to admit the funnel-shaped pots 25.

For the purpose of preventing the top 26 from becoming red-hot, whereby much heat would be wasted and workmen prevented from access to the pots to charge the same continuously, I construct and apply to my furnace a second or fire-guard floor 27. The air-space included between the cover and fire-guard acts as a non-conductor, and the cover will not be heated, as in former constructions, in which the metal or masonry of the top of the furnace is directly exposed to the hot products of combustion.

A removable cover has heretofore been placed on the furnace-top over the retorts. Such cover did not serve to prevent heating of the furnace-top, and was inconvenient to handle. My guard or floor is co-extensive with the furnace top or cover. Each retort is separately provided with a funnel-shaped covering-pot, having a perforated bottom which extends down to about the level of the guard or floor, and as air can circulate freely in these covering-pots they aid in preventing the excessive heating of the upper ends of the retorts and of the furnace-top. This floor 27 I construct of iron or other suitable material, and provide the same with openings, through which the retorts I pass.

About midway between the fire-guard 27 and the bottom of the furnace is supported in the brick walls a metal frame 28, to prevent the pots I from warping and to securely support them by means of projections or flanges on the pots which rest on this frame. Said frame is made as open as is consistent with its supporting and staying functions, in order that it may not materially interfere with the free expansion and circulation of the products of combustion, it being a material feature of my improvement that the pots are heated in an even manner between the floor and the upper fire-guard, which equable or even heating tends to prevent excessive heating at the bottom, which must occur in those furnaces that are provided with flues running around the pots or running lengthwise

of the same, as heretofore sometimes practiced.

The frame can be secured in the walls and also around the pots in any well-known manner. A convenient method of connecting it to the retort is indicated in Fig. 6 of the drawings, according to which the retorts pass through openings in enlargement 28′ of the frame, and by means of flanges rest upon the same. It will of course be understood that the frame is made rigid and of proper form and dimensions to brace and support the retorts without materially preventing the circulation of the products of combustion.

The bottom 29 of the furnace is constructed of metal or other suitable material, and provided with openings to permit the pots I to project through and below said bottom. To this bottom 29 I connect metal pipes 30 below the retorts or pots I, for the purpose of sampling or examining the bone. Pipes 30 have cut-off sliding plates 31 moving in transverse slots in the pipes and are connected to rod 33. To this rod 33, for each range of pots, I connect arms 34 and 35, and said arms are loosely connected to fixed rod 36, secured in the bracket 47 and bar L near the bottom of the furnace. The arm 35 is outside the brick wall G, and is suitably connected with operating-lever 37.

In operating the cut-offs 31 lever 37 is swung to one side, turning arm 35 upon stationary rod 36, so that the connecting-rod 33 is forced away from the pipes 30, thereby moving the cut-offs 31 out of the transverse slots in pipes 30, which action allows a quantity of the bone to fall on the lower cut-offs 32, which should then be in closed position. The upper cut-offs 31 are next forced back into the slots in pipes 30, thereby closing the bottom of pots I. The lower cut-offs 32 may then be opened by rods 38, loosely connected to arms 39 and 40, which are journaled or fulcrumed on rods 41, supported in the bracket 47 and bar L. The arms 40, outside the walls of the furnace, are loosely connected with the bar 44, operated by the lever 42.

When it is desired to inspect a sample of bone, bar 40 is turned on the fulcrum-rod by means of one of the levers 42. This throws the connecting-rod 38 forward and withdraws slides 32, permitting samples of bone to fall into trough K. If the samples are found to be in desirable condition, the upper slides 31 are pulled out also and the full contents of pots I drop into the trough. The slides 31 and 32 may then be returned into the pipes 30, thus effectually closing the bottom of pots I and pipes 30.

The reheated or burned bone may be removed from trough K by any suitable means, and used in purifying molasses, sirup, or sugar. The trough K, which obviously should be made of non-combustible material, I prefer to mount upon trusses or standards 5, so as to admit the circulation of air below it, thus hastening the cooling of heated bone, and permitting a more rapid and convenient removal of bone from the pots when found to be in suitable condition.

In Fig. 2 the furnace is shown with the wall below the ground-level removed, to show the mechanism for operating the sampling devices above set forth.

M M denote the buckets, and P the windlass, by means of which the bone may be elevated to the top 26 of the furnace.

G denotes the brick walls inclosing the heating or furnace chamber, in which are suspended the pots to receive the washed bone, and at one side of which, at Q, is left a space or fire-chamber for the combustion of fuel, which can be supplied through openings 46, doors O being opened.

Openings 45 are ordinarily closed by doors N. These openings provide for entering on top of frame 28, for cleaning pots and for gaining access to pots I inside of the furnace in case they require repairing or resetting. The hot products from the burning fuel in chamber Q circulate freely around the pots I, and finally escape through the chimney H.

At 48 are indicated ventilating-openings closed by shutters of usual form, which openings permit, also, an inspection of the interior of the furnace. R also denotes a peep-hole.

In Figs. 2, 3, and 4, at E, is shown a retort for cleansing bone preparatory to drying the same, having a cover 18 and fastening devices 19 and 20 therefor, a man-hole 23, with cover and fastening 24, and having a strainer 22 in its bottom, and a steam-outlet 21.

In operation the fouled bone is first chemically treated and then washed, and subsequently treated with steam or air under pressure in retort E. It is next raised to the top of the furnace and charged into the pots or retorts I, wherein it is reheated, and from which it is discharged fit for use.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The furnace provided with a cover and with the bone pots or retorts, and having an open frame extending entirely across the furnace and embracing the pots, said pots being provided with flanges at about their mid-height, whereby they are supported and warping is prevented, substantially as specified.

2. In a ground-bone refinery, the furnace-walls inclosing a fire-chamber located at one side and provided with doors, bone-heating pots or retorts, a fire-guard floor parallel to the furnace-cover, an open-work frame located about mid-height between the fire-guard and the furnace-floor, secured to its side walls on every side and embracing the pots, said pots being provided with flanges resting on the frame to prevent the warping of the pots without obstructing the free expansion and circulation of hot gases on the whole surface thereof below the guard-floor,

and doors located near the level of the frame to give access to the same and to the pots, substantially as specified.

3. In a bone-refinery, the furnace provided with a cover, and with a fire-guard below its cover or top, inclosing a dead-air chamber between them, and with pots or retorts passing through both the furnace-top and the guard and closely fitting the same, said retorts having each a funnel-shaped cover extending down into the same to about the level of the fire-guard, and provided with a bottom having a small perforation, substantially as specified, whereby the heating of the bone-pots between the guard-floor and the cover is obviated, and whereby a small vent for vapors or gases under pressure is provided.

In witness whereof I have hereunto set my hand and seal.

EUGÈNE URBAIN. [L. S.]

Witnesses:
ALPHONSO B. SMITH,
FERDINAND IMHORST.