

No. 620,458.

Patented Feb. 28, 1899.

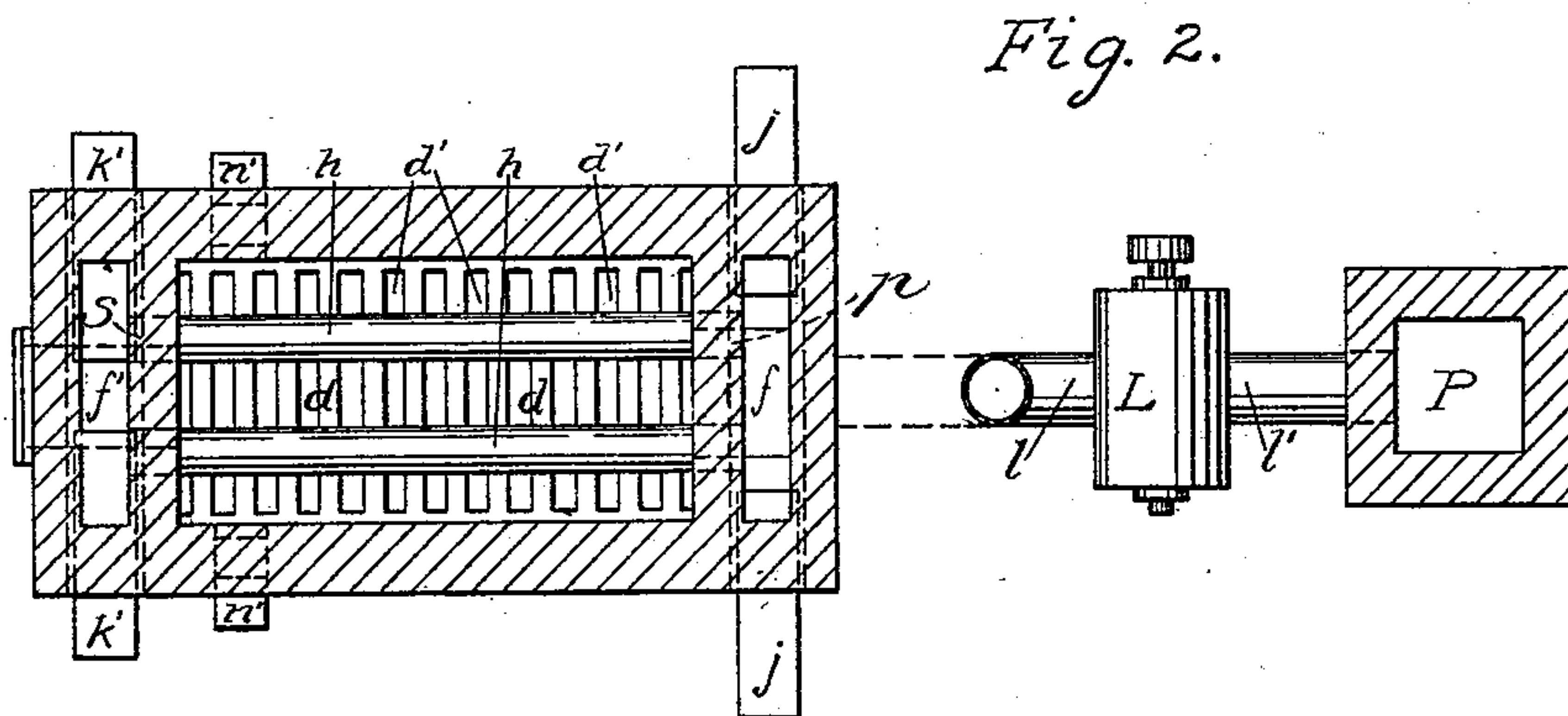
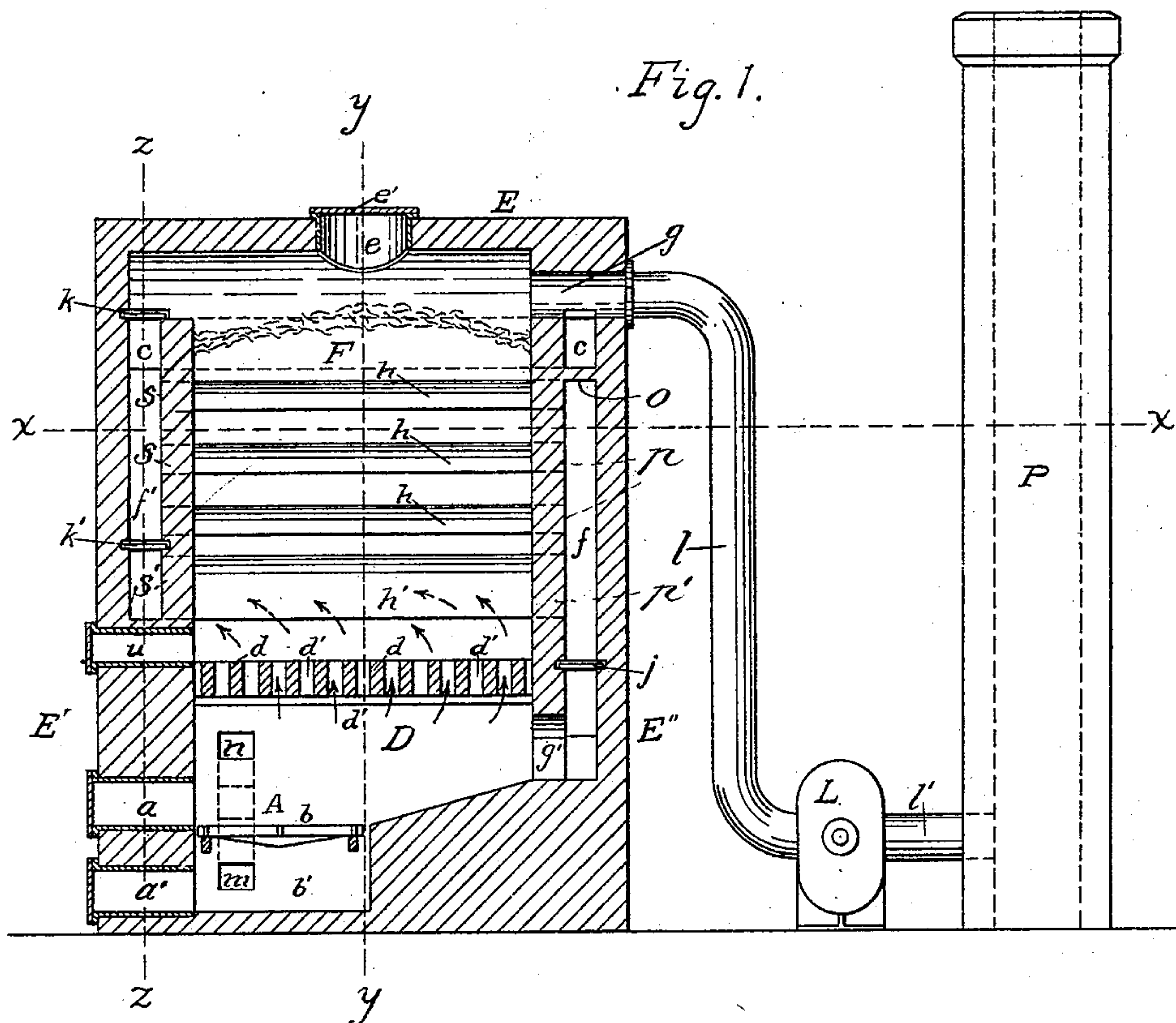
J. J. KENNEDY.

APPARATUS FOR DRYING AND BURNING GARBAGE.

(Application filed Feb. 19, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

Fig. 3.

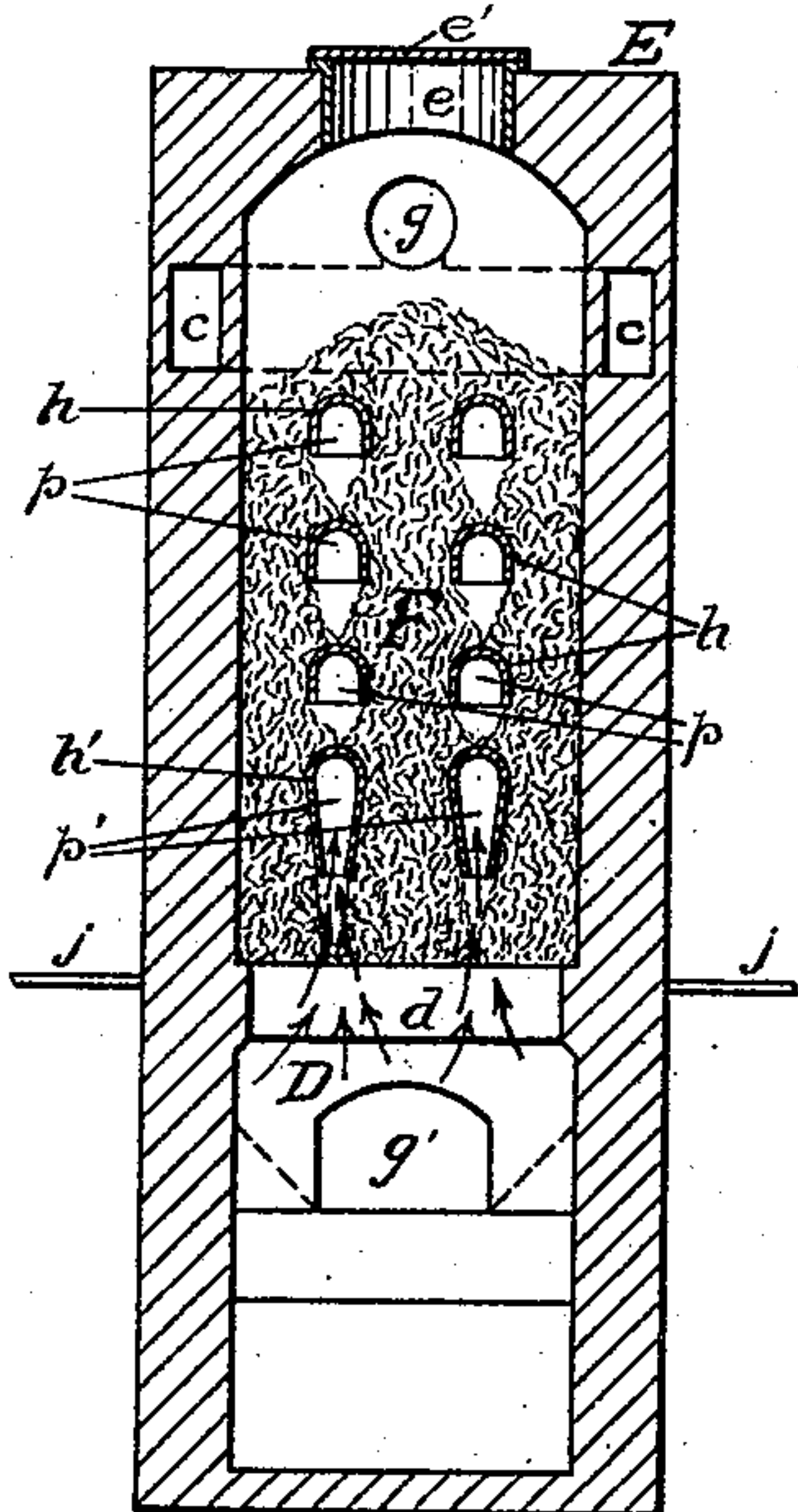


Fig. 4.

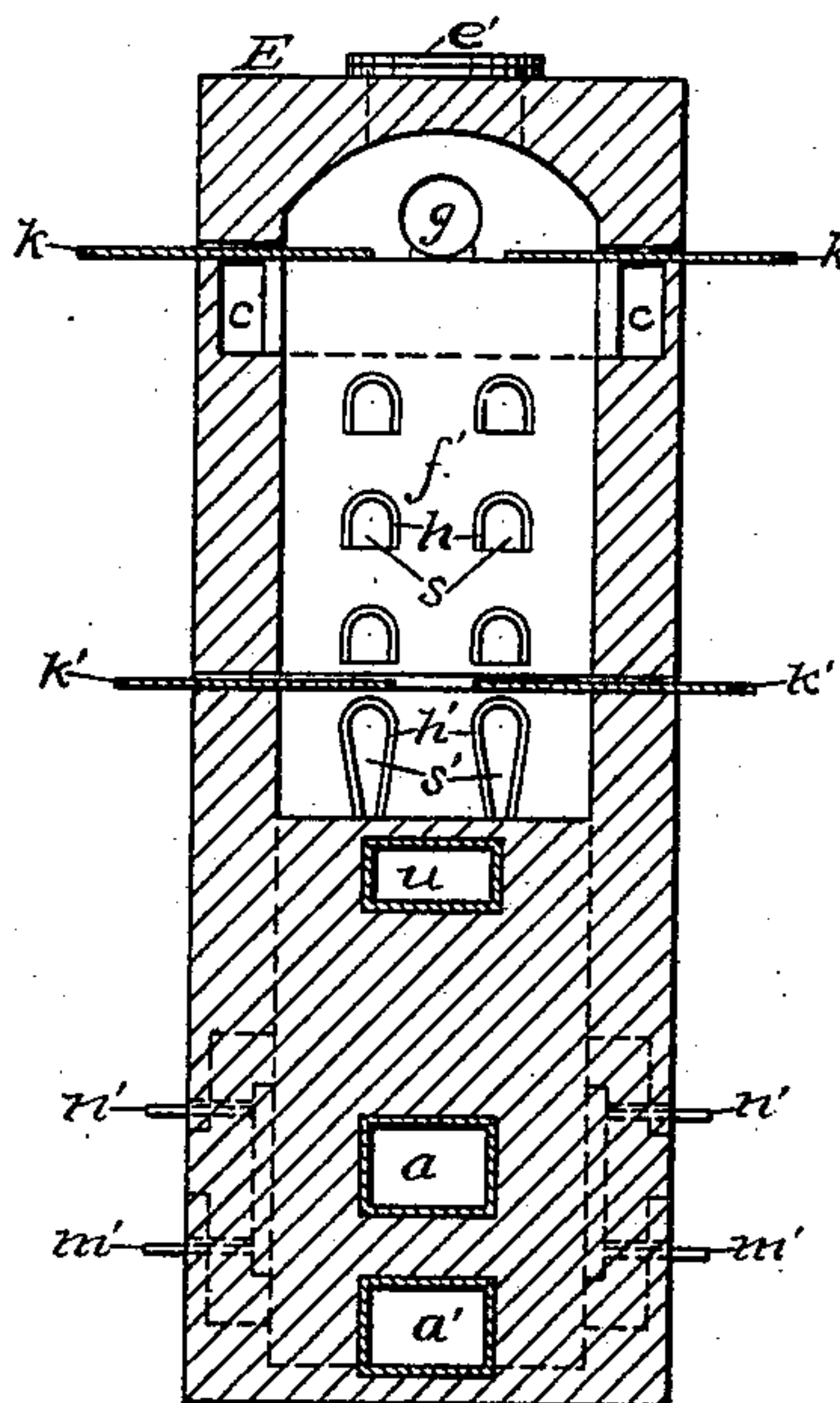
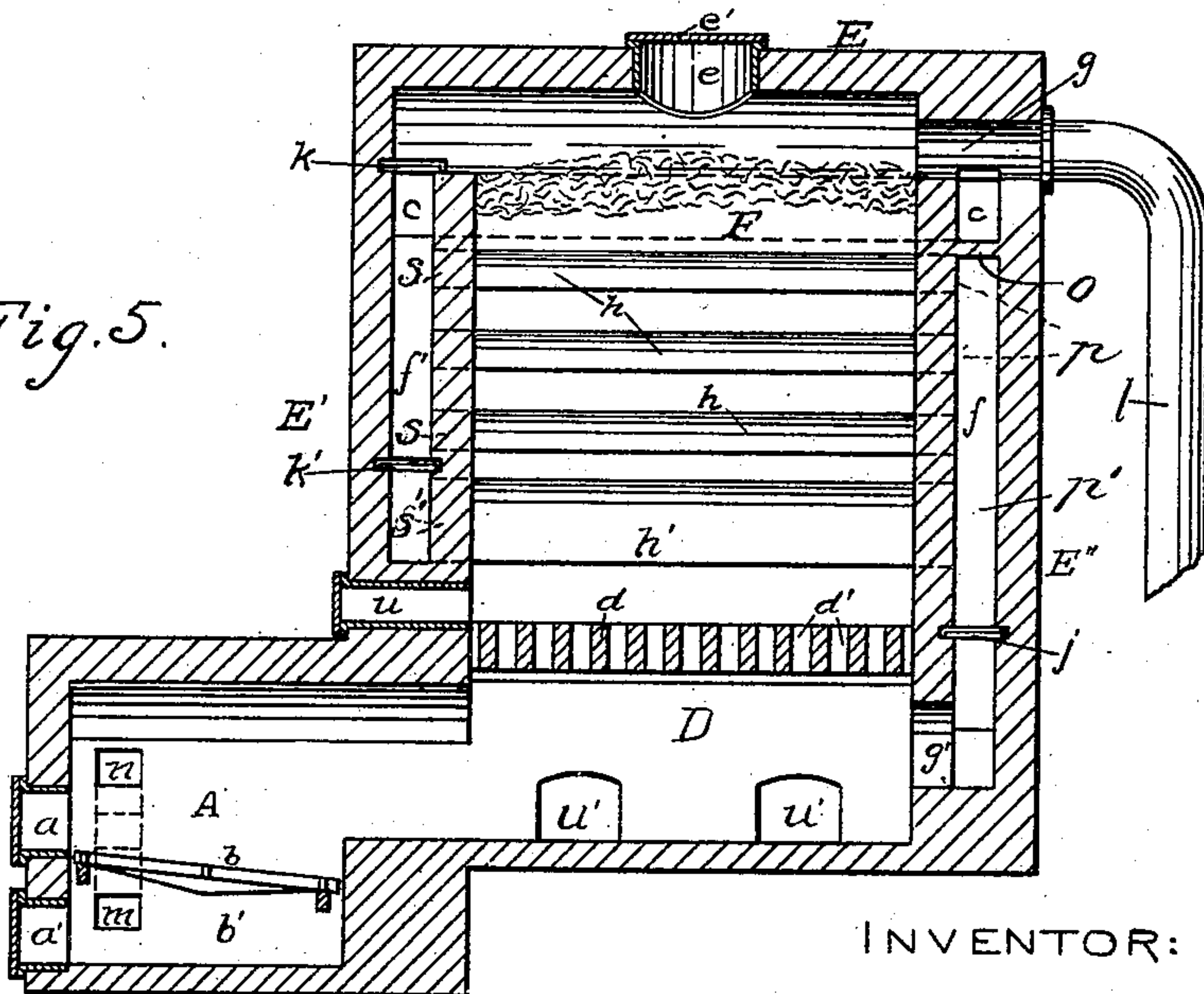


Fig. 5.



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UNITED STATES PATENT OFFICE.

JEREMIAH J. KENNEDY, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR DRYING AND BURNING GARBAGE.

SPECIFICATION forming part of Letters Patent No. 620,458, dated February 28, 1899.

Application filed February 19, 1897. Serial No. 624,172. (No model.)

To all whom it may concern:

Be it known that I, JEREMIAH J. KENNEDY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Drying and Burning Garbage; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to apparatus for drying and burning garbage and adapted for drying spent grain from breweries, sand, and other substances.

The object of my invention is to provide an effective and economical construction of apparatus for drying and burning garbage and all kinds of refuse.

Another object of my invention is to economically and rapidly dry garbage and other substances by providing an apparatus constructed to form and maintain draft-passages through the body of garbage charged into it and adapted to conduct hot products of combustion and heated air through and in direct contact with the interior of the body of garbage to effect the rapid evaporation and removal of contained moisture.

I attain these objects in the apparatus illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical longitudinal section of the apparatus arranged to dry and burn garbage. Fig. 2 represents a horizontal section thereof on the line *xx*, Fig. 1. Fig. 3 represents a vertical transverse section on the line *yy*, Fig. 1. Fig. 4 represents a vertical transverse section on the line *zz*, Fig. 1. Fig. 5 represents a vertical longitudinal section of another form of my apparatus arranged to dry garbage and other substance without consuming them.

In my apparatus I preferably use solid fuel for generating the heat required in the drying and burning operation; but I also obtain good results with liquid or gaseous fuel.

The garbage-drier *E* is constructed with thick end walls *E'* and *E''* for containing the necessary flues and inlets and outlets and is provided with a grate *d*, dividing it into a

garbage-chamber *F*, into which the garbage is charged, and a chamber *D*, into which the dried garbage falls.

The end wall *E''* is constructed with the vertical inlet-flue *f*, connecting with the outlet *g'*, and the end wall *E'* is constructed with the outlet-flue *f'*, as shown in Figs. 1, 2, 4, and 5. The inlet-flue *f* is provided with the dampers *j*, and the outlet-flue *f'* is provided with the dampers *k* and *k'*. The lateral flues *c* connect the flue *f'* with the outlet *g* of the garbage-drying chamber when the dampers *k k'* are closed, such flues *c* being separated from flue *f* by the horizontal partition *o*. The interior rear end wall is provided with suitable openings *p* and *p'*, and the front interior wall is provided with similar openings *s* and *s'*, into which are set the longitudinal bars *h* and *h'*, thus providing ports connecting the interior of the garbage-chamber *F* with the flues *f f'*. The bars are preferably of inverted-U shape, as clearly shown in Figs. 3 and 4, so that long draft-passages are formed and maintained in the body of garbage for permitting the free circulation of hot air or products of combustion and the escape of moist vapor from the garbage for facilitating the rapid desiccation of the same. The bars *h* connect the openings *p* and *s*, and the bars *h'* connect the openings *p'* and *s'*, as shown in Figs. 1 and 2. The bars *h* are for the purpose of forming and maintaining draft-passages connecting the flues *f* and *f'* through the openings *p* and *s* and through the charge of garbage, and the bars *h'* are for forming and maintaining draft-passages connecting the openings *d'* in the grate *d* with the flue *f* through the openings *p'* and with the flue *f'* through the openings *s'* and through the charge of garbage supported by the grate *d*. A feed-opening *e*, having a tight-closing lid *e'*, is provided at the top of the chamber *F*, and an opening *u* is constructed in the end wall *E'* for giving access to the grate *d*.

A furnace *A*, having the grate *b*, the ash-pit *b'*, a fuel-supply opening *a*, and an opening *a'* for removing ashes from the ash-pit, is constructed in the chamber *D*. The furnace *A* is provided with air-inlet flues *m* for supplying air to the ash-pit *b'* and the air-inlet flues *n* for supplying air to the chamber

D. The air-flues m are provided with dampers m' and the air-flues n are provided with dampers n' for controlling the air-supply to the chamber D. The outlet g from the garbage-chamber F connects by the pipe l with the exhauster L, which connects by the pipe l' with the stack P.

In Fig. 5 the furnace A is constructed in an extension of the chamber D in order that the dried garbage or other material passing through the grate d may be collected in said chamber and further exposed to the action of the hot products and air from the furnace without being consumed. Lateral openings u' , Fig. 5, are provided for giving access to the chamber D for the removal of dried garbage or other material.

The apparatus having been constructed as described and substantially as illustrated in the drawings may be operated as follows: The dampers j , k , and k' being open, the garbage-chamber F is charged with garbage through the feed-opening e and a fire is kindled on the grate b of the furnace A. Air for combustion is drawn through the ash-pit b' by the action of the exhauster L, and the hot products distributed through the chamber D pass out through the outlet g' and the openings d' in the grate d . The hot products entering the flue f through the outlet g' pass through the inlet-openings p , the charge of garbage, and the outlet-openings p' into the flue f' , and the hot products entering the openings d' in the grate d pass through the charge of garbage and enter the flue f' through the openings s' . The dampers k being open, the hot products then pass from the flue f' to the outlet g and to the exhauster and stack. After the walls of the chamber D and the grated bottom d of the garbage-chamber F become heated the dampers k' are closed, causing the hot products entering the openings d' to pass through the garbage to the openings p' , thence through the flue f and through the garbage to the flue f' with the other hot products.

The rate of drying varies with the amount of moisture and character of the garbage, but should be such as will insure the garbage being dry when it reaches the grated bottom d of the chamber F. To effect this result, sufficient time must be allowed for the moisture to work to the surfaces of the smaller masses forming the charge and for its absorption by the hot products of combustion and air passing through it.

To avoid carbonizing garbage to be dried, but not burned, and to effect economy in operation, the temperature of the hot products in the chamber D and passing through the garbage may be reduced and controlled by opening the dampers n' , admitting air to the chamber D.

The descent of the garbage in the chamber F may be controlled in the following manner: By closing the dampers j and passing all the hot products and air through the openings d' in the grate d and through the garbage and

outlets p' to the flue f the descent of the charge will be accelerated, and by opening the dampers j and passing all or nearly all the hot products and air directly through the outlet g' into the flue f the descent of the charge will be retarded and the drying action in the upper part of the charge increased.

If at any time during the drying operation the temperature of the products passing through the flue f' should be lowered so that contact with the upper surface of the charge might cause condensation of the vapors, the dampers k are closed, and the products are passed through the flues c to the outlet g .

In drying and burning garbage which does not contain sufficient combustible matter to furnish the heat required to dry succeeding charges additional fuel is supplied to the furnace to make the operation continuous.

The form of my apparatus shown in Fig. 5 is adapted for drying sand to be used in the manufacture of prepared plaster and in sand-boxes of motor-cars and for cooking and drying garbage for fertilizing purposes and spent grain from breweries. It is operated in the same manner as the apparatus shown in Fig. 1; but I prefer using anthracite coal or coke for fuel to avoid discoloring the dried product. Damp sand or spent grain when charged into the chamber F packs closely and bridges over the openings d' in the grate d . It is gradually dried in its descent through the chamber F and on reaching the grated bottom d parts with the last traces of the moisture necessary for its cohesion, and the individual grains separate and fall into the chamber D. The continuous downward movement of the charge of garbage, sand, or other substance being dried causes every part of the charge to be acted upon by the currents of hot gases, resulting in the rapid and economical absorption and removal of contained moisture.

In drying and burning garbage which contains a relatively small percentage of moisture I do not use the furnace A to generate heat, but instead I kindle a fire on the grate d of the chamber F and start the exhauster L, the air-inlet dampers n' being open to admit air to the under side of the grate d to support combustion. I then charge garbage into the chamber F, where it is ignited, and its combustion is effected by the draft induced through the openings in the grate d and through the draft-passages formed and maintained through the garbage by the bars h and h' .

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

1. A garbage drying and burning apparatus having an outlet for products of combustion and vapors, a furnace, and a garbage-chamber having a grate separating it from the furnace, inlets for admitting the products of combustion from the furnace, outlets for communicating with the outlet for products of combustion and vapors and means for forming

and maintaining draft-passages through the charge of garbage and connecting said inlets and outlets, substantially as described.

2. A garbage drying and burning apparatus
5 having an outlet for products of combustion and vapors, a chamber D, having inlets for admitting air, and a garbage-chamber F, having a grate separating it from the chamber D, outlets communicating with the outlet for
10 products of combustion and vapors, inlets communicating with the chamber D, and means for forming and maintaining draft-passages through the charge of garbage and connecting said inlets and outlets, substantially
15 as described.

3. In a garbage drying and burning appara-

tus, the combination of the chamber D, the chamber F, having the grated bottom d , the flue f , connecting with the chamber D, the flue f' , connecting with the upper part of the chamber F, and the bars h , for forming and maintaining draft-passages connecting the flue f , with the flue f' , through the body of garbage charged into the chamber F, substantially as described.

In testimony whereof I affix my signature
in presence of two witnesses.

JEREMIAH J. KENNEDY.

Witnesses:

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R. B. MARCHANT.