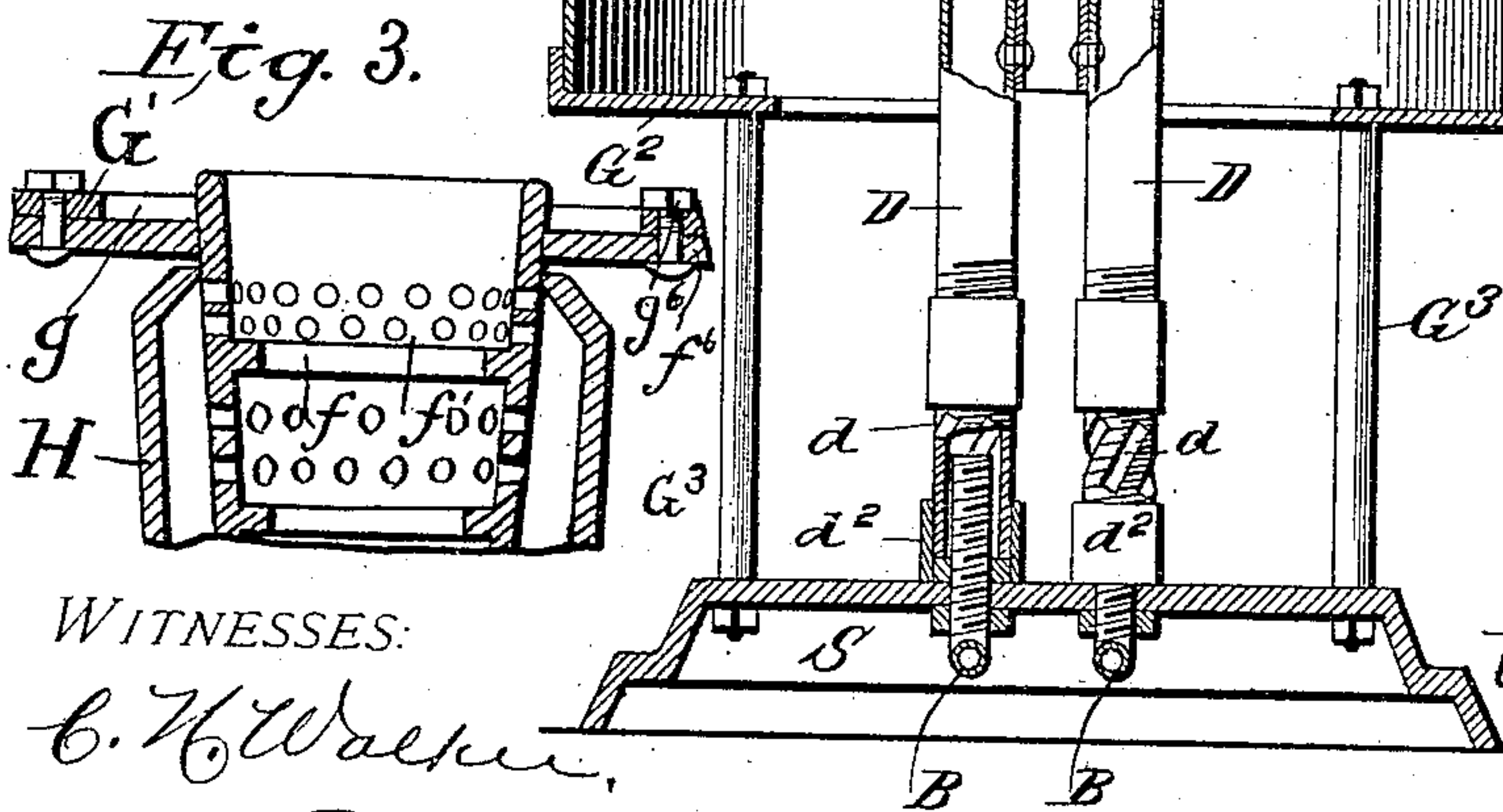
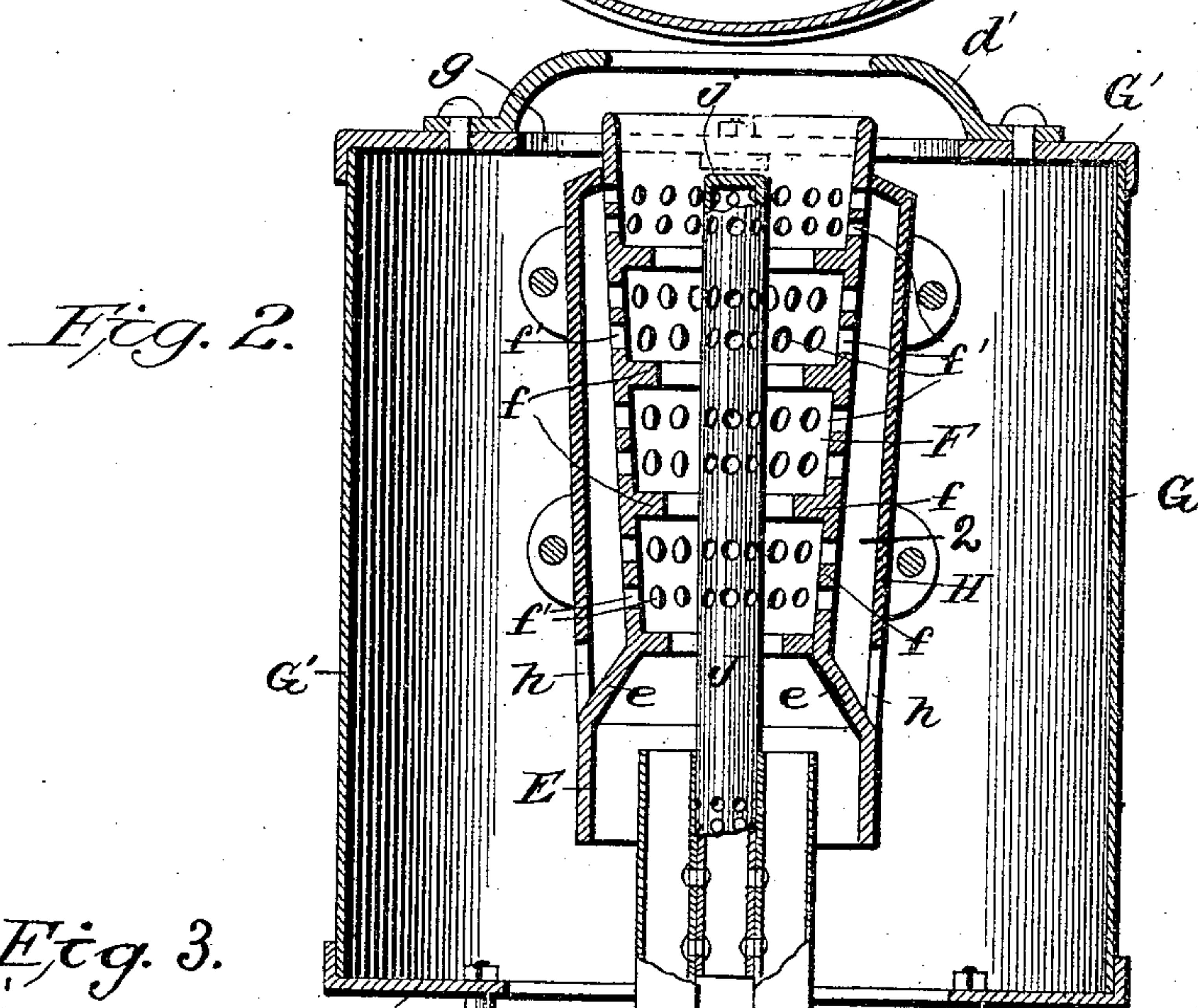
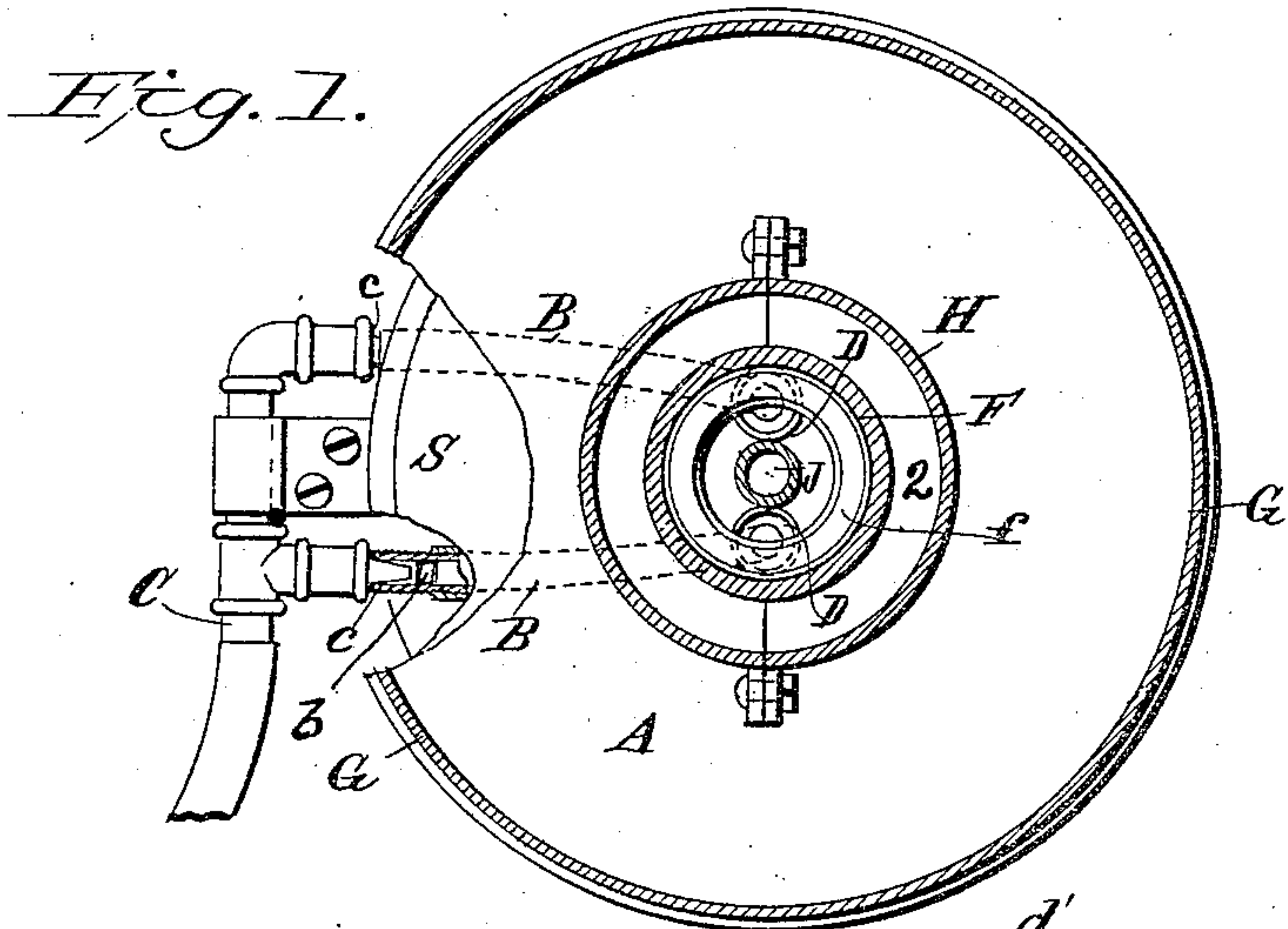


No. 868,250.

PATENTED OCT. 15, 1907.

V. W. BLANCHARD.  
GAS BURNING APPARATUS.  
APPLICATION FILED JAN. 22, 1906.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

VIRGIL W. BLANCHARD, OF NEW YORK, N. Y.

## GAS-BURNING APPARATUS.

No. 868,250.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed January 22, 1906. Serial No. 297,243.

*To all whom it may concern:*

Be it known that I, VIRGIL W. BLANCHARD, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Gas-Burning Apparatus; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improved gas burning apparatus particularly designed for use in heating and cooking stoves; but also adaptable for other uses in the arts wherever gaseous fuel is available and an intense heat is desired.

The object of the invention is to provide a heater or burner wherein the gaseous fuel will be entirely consumed and approximately perfect combustion realized.

The principal feature of the present invention is the novel means of supplying fresh air to the burning gases in the most advantageous manner.

In the present invention the gases flowing upwardly through the burner are subjected to numerous jets of air directed thereinto, both axially and peripherally, the air being heated before being admitted into the gases so that complete assimilation of all the fuel elements by the oxygen in the air is almost instantaneously realized.

I set forth in the claims the features and combination of parts particularly constituting the present invention, and for which protection is desired herein, and refer to the accompanying drawings, forming part of this specification, for more detailed information regarding the structure of the apparatus embodying the invention; although I do not restrict myself to the particular form and dimensions of parts illustrated in the drawings.

In said drawings—Figure 1 is a transverse section through the burner and stove; and Fig. 2 is a vertical sectional elevation of the complete stove and burner embodying the invention. Fig. 3 is a detail.

Under the base A, of any suitable form, are arranged primary mixing-tubes B provided with air inlets *b* at their receiving ends into which gas is admitted through jet heads *c* connected to a pipe C, to which gas may be supplied in any suitable manner as by connecting it by an ordinary gas-hose with the gas fixtures in the room.

The discharge ends of tubes B project above the base into the lower ends of secondary mixing-tubes D which are provided with air inlet slots *d* near their lower ends, and with sleeves *d*<sup>2</sup> for regulating the amount of air admitted to tubes B and D as indicated in the drawings.

The tubes D discharge into a superposed combustion chamber, preferably comprising a lower hood portion E having a protected roof *e* connecting with the lower end of the upper part F, which forms the burner proper. The tubes D are preferably arranged so as to discharge

their contents, partly at least, against the inclined roof *e* of the hood E, instead of directly into the burner F. This burner is provided with a series of annular constrictions in its throat, formed by internal annular flanges *f* therein, and between these flanges or constrictions in the walls of the burner are numerous perforations *f*<sup>1</sup>.

The top-plate G' of the stove is mounted on a cylindrical casing G supported on a plate G<sup>2</sup> mounted upon standards G<sup>3</sup> attached to base S, as shown. The form of the casing may be, of course, varied to suit the designer and constructor of this stove. The said top-plate is provided with apertures *g* around the edge of the burner for the escape of heated air from the casing, and with an annular converging collar *d*<sup>1</sup> which projects over the said apertures and is adapted to project the heated air into the rising products of combustion issuing from the burner.

The burner is preferably inclosed in a jacket H which forms an air chamber 2 around the burner into which air is admitted through openings or notches *h* at the bottom of the chamber 2. As thus far described, the primary and secondary mixing-tubes, hood and burner are constructed substantially as shown in my application for gas burners, filed January 22, 1906, Serial No. 297,240, and have substantially the mode of operation set forth therein.

The burner F may be suspended from the top plate G' as in my said application, and as illustrated in Fig. 3; it is provided with ears *f*<sup>0</sup> which underlie plate G' and are fastened thereto by bolts *g*<sup>0</sup> thus suspending the burner in position.

In the present case in order to increase the amount of air supplied to the burner during the operation of the device, I provide a central air tube or duct J which may be supported at its lower end upon the tubes D and extends axially up through the hood and burner and may be centered at the top within the burner by a bridge piece *j*. This air supplying tube is provided with numerous perforations in its walls within the burner through which air can escape in lateral jets into the surrounding current of burning gases rising in the burner. As this tube is located in the center of the burner it is subjected to intense heat and the air rising therethrough and issuing therefrom will be correspondingly intensely heated.

In the operation of this device gas is admitted with the air into the primary mixing-tubes B and passes therefrom into the secondary mixing-tubes D where a further quantity of air is admitted at the slots *d* and the mixtures of air and gas escape upward into the hood E being further mechanically commingled by impact against the inclined roof of said hood, and then they flow upward through the gradually enlarging throat of the burner F, and in passing therethrough they are alternately expanded and contracted in pass-



ing the various constrictions  $f$  in the throat of the burner. The combusting gases in the burner F highly heat the walls thereof and consequently the air in the chamber 2 will be highly heated and will be jetted  
 5 through the perforations  $f'$  inwardly into the annular current of gases rising in the burner, and at the same time heated air in pipe J is jetted outwardly through the perforations  $f'$  into the surrounding current of gases, and thus the gases are subjected to both internal and  
 10 external series of jets of heated air, whereby the most thorough and complete oxidation of all the combustible elements is realized; and by this apparatus the most intense heat is obtainable without flame.

Having thus described my invention what I therefore claim as new and desire to secure by Letters Patent thereon is:

1. The combination of a tubular burner provided with a series of perforations in its walls for the admission of air, and with internal constrictions adapted to cause the  
 20 alternate expansion and contraction of the current of burning gases; with an air duct or pipe disposed axially in the burner and provided with numerous perforations to admit air in jets into the surrounding current of gases.

2. In combination, a burner provided with a series of  
 25 internal constrictions adapted to cause the alternate expansion and contraction of the current of burning gases; with an air heating and supply pipe arranged axially of the burner and provided with numerous perforations to admit air in jets to the center of the column of burning  
 30 gases in the burner.

3. In combination, a burner provided with a series of internal constructions adapted to cause the alternate expansion and contraction of the current of gases there-  
 35 through and with perforations in its walls for admission of air into the combusting gases passing therethrough; with an air heating and supply pipe arranged axially of the burner and perforated to supply air in jets to the center of the burning current of gases.

4. The combination of a tubular burner provided with  
 40 perforations in its walls for the admission of air circum-

ferentially around the current of burning gases and with internal projections to arrest the flow of gases and cause their alternate expansion and contraction in flowing there-  
 45 through; with an air heating chamber surrounding the burner to supply air to the perforations, and an air heating and supply pipe arranged axially of the burner and perforated to admit air into the surrounding gases, and means for supplying combustible mixtures of gas and air to the burner.

5. The combination of a tubular tapered burner pro-  
 50 vided with a series of internal constrictions adapted to cause the alternate expansion and contraction of the burning gases, and with numerous perforations in its walls intermediate the constrictions for the admission of air circumferentially around the current of burning  
 55 gases, and an air heating chamber surrounding the burner to supply air to the perforations; with a perforated air heating and supplying pipe arranged axially of the burner, and means for supplying combustible mixtures of gas and  
 60 air to the burner.

6. The combination of the casing, a tubular burner suspended therein having annular constrictions in its throat adapted to cause the alternate expansion and con-  
 65 traction of the burning gases passing therethrough and perforations in its walls to admit air thereto, a hood on the lower end of said burner, and a perforated air supply pipe arranged axially of said burner and hood.

7. The combination of a casing, a tubular burner therein having a series of annular constrictions in its throat adapted to cause the alternate expansion and contraction  
 70 of the burning gases passing therethrough and also having air inlet perforations in its walls and gradually enlarging from bottom to top, a hood on the lower end of said burner, an air heating jacket surrounding said burner, secondary  
 75 mixing tubes arranged to discharge into said hood, an air heating pipe extended axially into said burner and perforated for the escape of air thereinto, and means for supplying gas and air to said mixing tubes.

In testimony that I claim the foregoing as my own, I affix my signature in presence of two witnesses.

VIRGIL W. BLANCHARD.

In presence of—

JAMES R. MANSFIELD,  
 L. E. WITHAM.