(No Model.) 2 Sheets—Sheet 1.

E. M. SCOVILLE.

BRASS CRUCIBLE FURNACE.

No. 533,090. Patented Jan. 29, 1895.

Fig. 2.

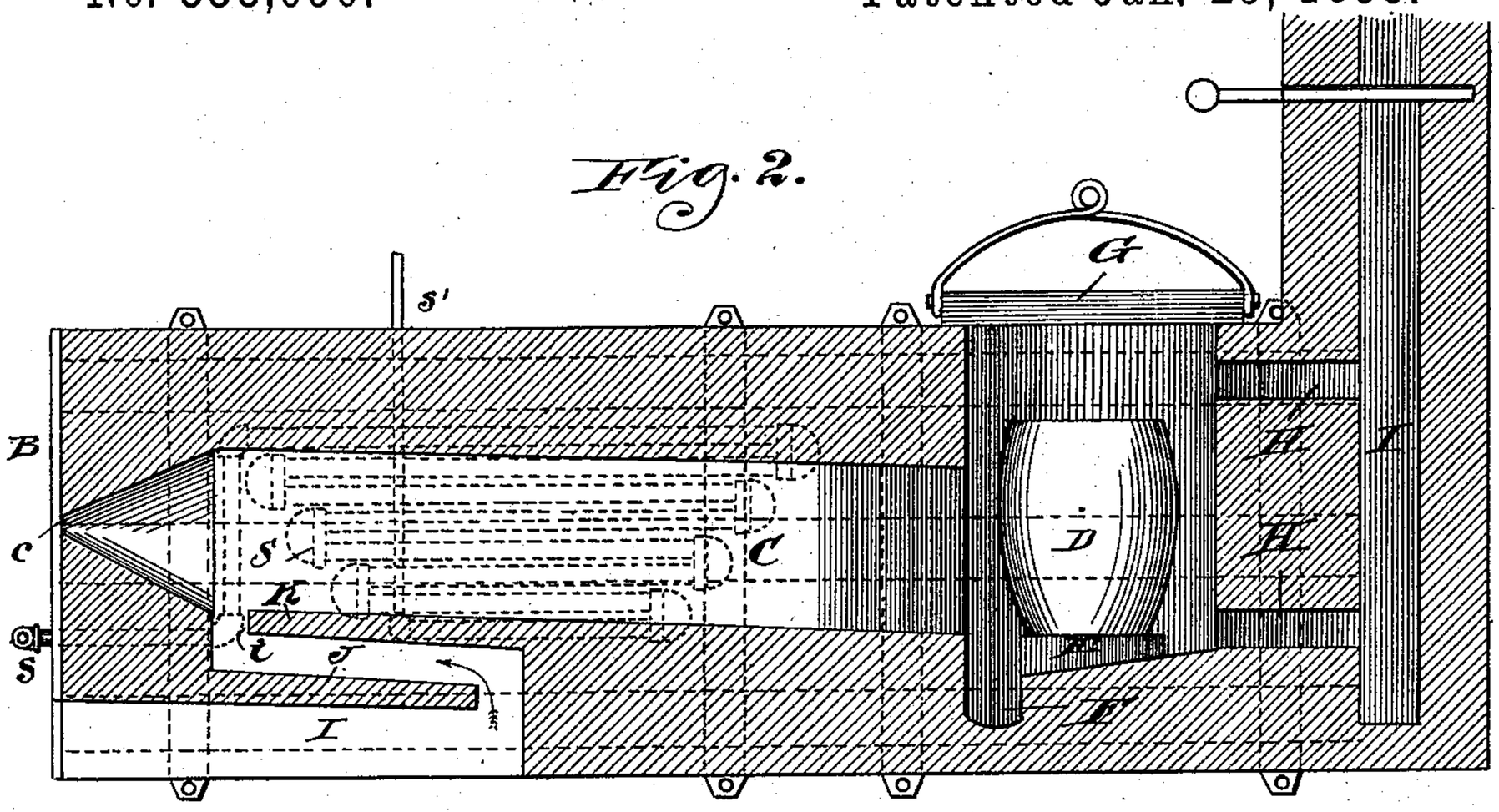
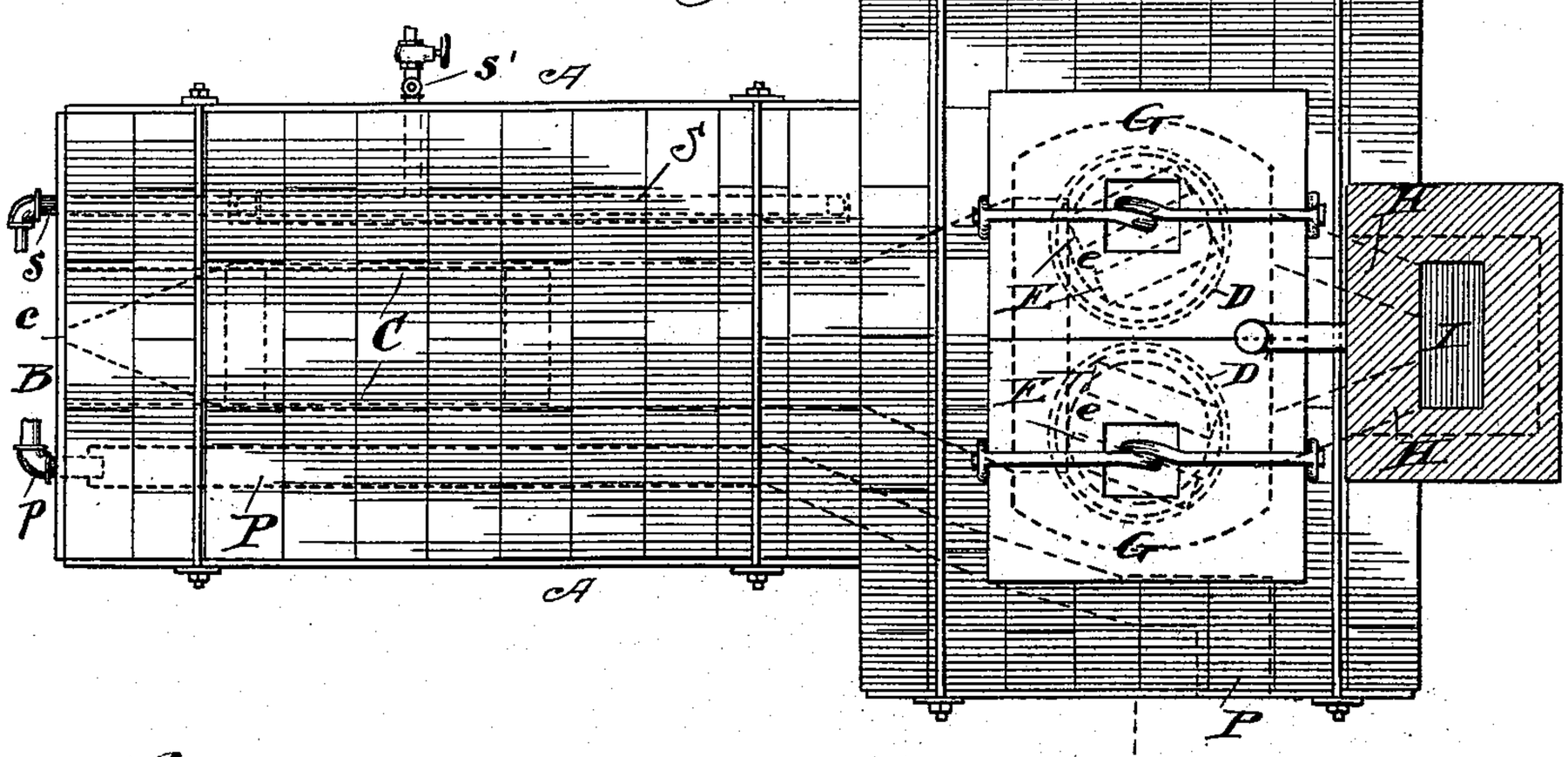


Fig. 1.



Witnesses,
D. G. Swann,
Frederick P. Goodwin

Inventor;
Eugene M. Scoville
By Offield Towle & Linthicum
Attys.

(No Model.) 2 Sheets—Sheet 2.

E. M. SCOVILLE.

BRASS CRUCIBLE FURNACE.

No. 533,090. Patented Jan. 29, 1895.

Fig. 3.

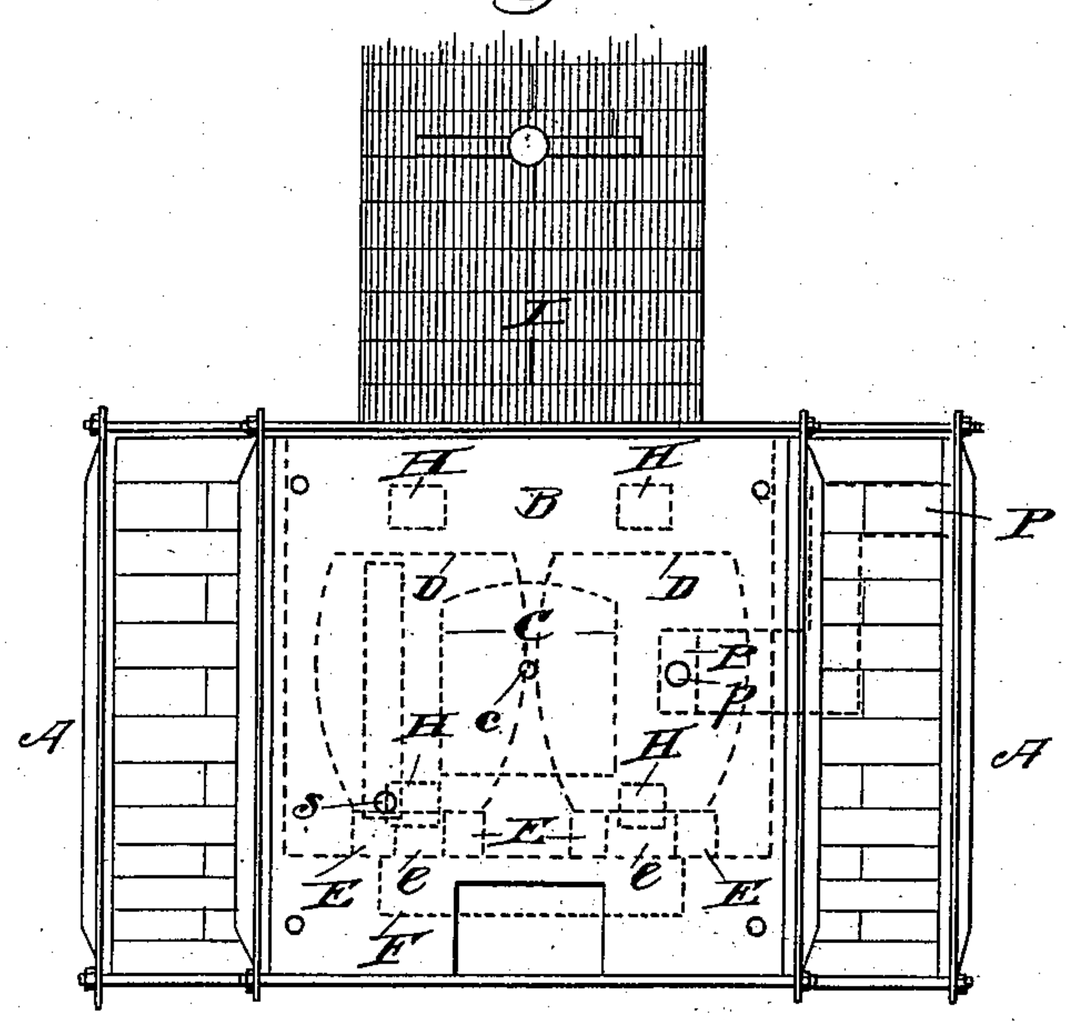
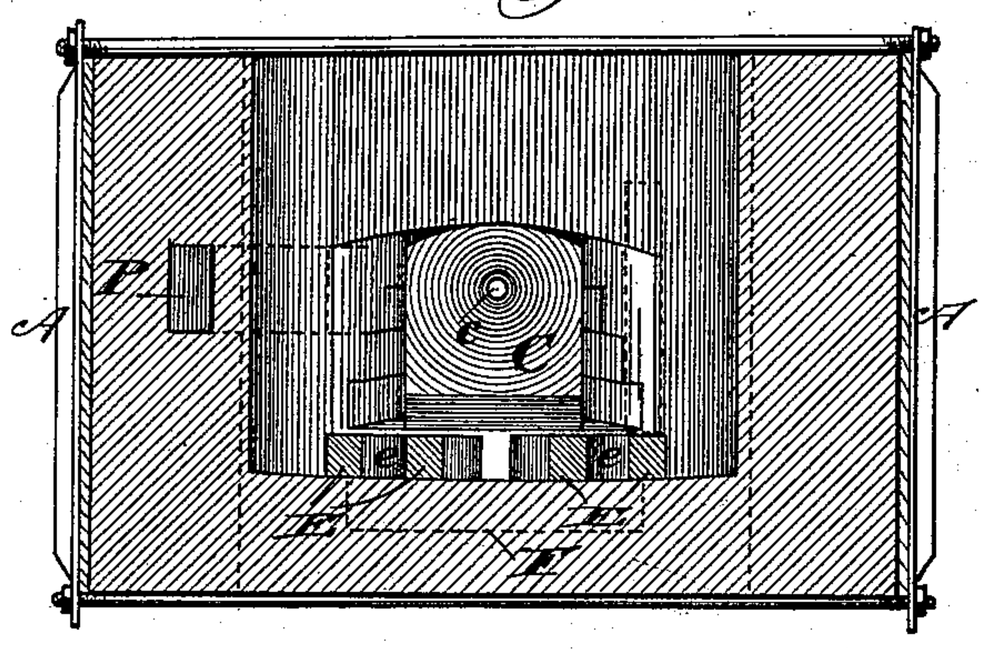


Fig. 4.



Witnesses,
D. S. Mann,
Frederick F. Goodwin

Inventor,
Eugene M. Scoville
By Offield, Towle & Linthicum
Attys.

UNITED STATES PATENT OFFICE.

EUGENE M. SCOVILLE, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE INTERNATIONAL GAS AND FUEL COMPANY, OF SAME PLACE.

BRASS CRUCIBLE-FURNACE.

SPECIFICATION forming part of Letters Patent No. 533,090, dated January 29, 1895.

Application filed January 26, 1892. Serial No. 419,290. (No model.)

To all whom it may concern:

Be it known that I, EUGENE M. SCOVILLE, of Chicago, Illinois, have invented certain new and useful Improvements in Brass Crucible-Furnaces, of which the following is a specification.

This invention relates to certain improvements in brass furnaces; and it has for its object to provide a crucible furnace which is adapted to use a hydro-carbon or other fluid or gaseous fuel.

The invention consists in a furnace of the character described and in certain novel features of the construction thereof.

In order to utilize a hydro-carbon fuel in a furnace of this character, it is necessary to mix with the oil or other carbon supplying material air and preferably also steam, and one feature of my invention relates to the provision of air and steam heating passages in such manner that the products of combustion are utilized for effective work in melting brass, and also for the heating of the air and steam which is to be mingled with the carbonaceous ingredient of the fuel in order to promote combustion thereof.

Another feature of my invention consists in providing a combustion chamber of such form as will secure a complete combustion of the commingled gases; and to this end I make the combustion chamber of considerable length and arrange the crucible or crucibles at its rear end while at its forward end it is converged to an orifice through which the liquid fuel is introduced by means of an injector burner. I also provide a duct in the furnace front for taking in cold air and cause said air to pass beneath an apron or shelf within the influence of the furnace heat whereby the air is heated and escapes in a heated condition into the combustion chamber. I also arrange the crucibles in such manner that any overflow therefrom will be caught in a notch below the crucible and the latter is set upon a support having passages therethrough for the heat so that the crucible is surrounded by the products of combustion.

In the accompanying drawings, Figure 1 is a plan view of a two pot crucible furnace, the air and steam passages and the combustion chamber being indicated by dotted lines. Fig. 2 is a central longitudinal sectional elevation of the same, the crucible showing in elevation. Fig. 3 is a front elevation. Fig. 4 is a transverse section on the line 4—4 of Fig. 1 viewed in the direction of the arrow.

A indicates the usual furnace walls; B, the furnace front, and C the combustion chamber. Said chamber is constricted at its front to provide an inlet opening *c* to which a suitable injector burner or fluid or gaseous fuel feeder delivers. Within the rear portion of the combustion chamber the crucibles D are placed, preferably upon a foundation or pier E provided with passages *e*.

F is an over-flow notch in front of the foundation, the walls of the bottom of the chamber sloping toward said notch.

G represents a cover for the crucible chamber and H passages to the stack I, provided with damper I′.

I have found in practice that for a two pot furnace a combustion chamber about four to five feet long and about ten inches square will produce good results. The horizontal portion of this chamber is enlarged at its rear as indicated by the dotted lines in Fig. 1, and of course the crucible chamber which forms a continuation of the combustion chamber C may be varied as to size to adapt it to contain any number of crucibles. There are provided within the masonry at each side of the combustion chamber C and parallel therewith passages or openings, and in one of these is arranged in vertical tier the steam pipe S having a supply branch *s* and a discharge *s′*, both exterior to the furnace walls. The other passage need not contain a pipe but is intended to admit cold air from a point at the rear of the furnace. This passage is marked P, and at its front it is provided with an outlet pipe *p*. It will be observed that the walls between said passage and the combustion chamber are thin, and therefore there will be sufficient heat radiated through said walls to super-heat the steam in the pipe S and to heat the air in the passage P. This hot air and super-heated steam are to be delivered to an injector burner Q of any approved construction which will be supplied with oil by pipe R, and adapted in its construction to mingle the oil, steam and air and to discharge them

commingled through the orifice *c* into the combustion chamber C.

In order to supply air to support combustion within the chamber C, I have provided the passage or duct, I, which leads from the furnace front beneath a shelf J projected from the front wall of the furnace and thence beneath an over-hanging shelf K, forming a part of the bottom of the combustion chamber, and terminating short of the constricted portion thereto to provide the passage *i* for the air. This over-hanging shelf K is, of course, highly heated and a certain amount of heat is also permitted to escape into the passage between said shelf and the shelf J. The cold air rushing into this chamber is heated by contact with said shelves and with the heated air in the passage itself and is finally delivered into the combustion chamber in a heated condition. The air admitted through the passage I is thus delivered into the chamber near the front thereof, and being added to and mingled with the commingled gases or vapors delivered through the injector burner furnishes the necessary ingredient for a complete combustion which is effected in the chamber C so that a high degree of heat is attained by the fuel before it is finally discharged upon the crucible. The escape passages to the stack being located at the back of the crucible the products of combustion are caused to envelope the latter and the smelting is rapidly and economically accomplished.

The form and size of the combustion chamber may and will be varied as circumstances demand. I have found that good results are accomplished by converging the front thereof to the inlet orifice but such converging portion may be omitted. I have also found it expedient to admit the air through the furnace front and to deliver it into the combustion chamber at the point shown in the drawings, but of course the opening to this passage might be in the side walls. A better combustion is produced by mingling with the oil super-heated steam and hot air, and the provision of the heating passages adjacent to the combustion chamber affords an economical means for performing these desirable operations.

I have for convenience designated the fuel which this furnace is designed to burn as a hydro-carbon fuel, but my invention of course is not limited to a fluid fuel composed of oil, steam and air as the furnace may be used without change of construction for burning natural gas or other gases, fluids or liquids.

I am aware that gas has been used as a fuel in both heating and melting furnaces, but so far as I am advised after extended and long continued inquiry, brass furnaces have not been successfully operated with a hydro-carbon fuel, although numerous attempts have been made. I attribute the efficiency and success of my invention, which has now been in practical use for about a year, mainly, to the form and proportion of parts. As above described, the combustion chamber has a length of about four or five times its cross sectional diameter. At its forward end it is converged to a small orifice in which the injector burner is placed while at its rear end it is expanded or enlarged to receive the crucible. There is no effective heat within the combustion chamber, by which I mean that the degree of heat obtained within the combustion chamber is not sufficient to melt brass or other hard metals while the point of intense heat is within the crucible chamber mainly at the place where it is needed.

My invention is therefore to be distinguished from mere heating furnaces or those in which there is no interposed combustion chamber and those in which the combustion chamber is relatively short, so that complete combustion and intense heat is not attained prior to the delivery of the products of combustion into the melting chamber.

I claim—

1. In a brass furnace, the combination with a crucible chamber, of a combustion chamber having an inlet orifice for a hydro-carbon fuel, a passage within the furnace wall parallel with the combustion chamber, a pipe coiled therein and terminating outside the furnace adjacent to the inlet orifice and in which pipe steam may be superheated and a second passage also in the furnace wall communicating with the atmosphere for the admission of air, and a pipe or passage to deliver the air after being heated in such passage adjacent to the inlet orifice, substantially as described.

2. A brass furnace comprising in combination a combustion chamber having an injector burner for supplying a hydrocarbon fuel thereto, a crucible chamber at the rear of and communicating with the combustion chamber a foundation or support for the crucible having heating passages therethrough, and an over-flow notch to which the bottom of the crucible chamber converges, substantially as described.

EUGENE M. SCOVILLE.

Witnesses:
E. T. WILLIAMS,
C. C. LINTHICUM.