(No Model.)

G. W. KRAFT.

FURNACE.

No. 566,774. Patented Sept. 1, 1896.

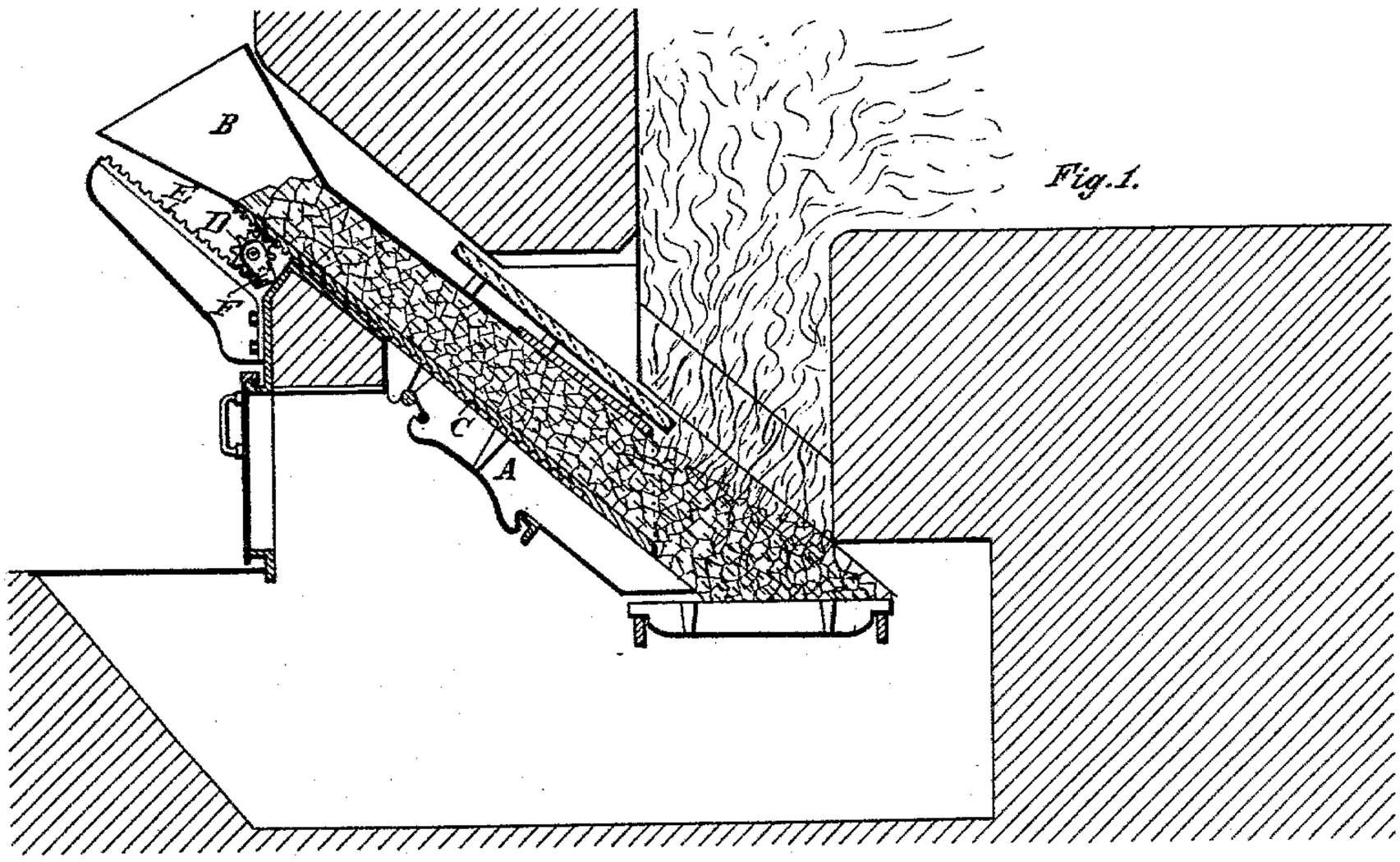

Fig. 1.

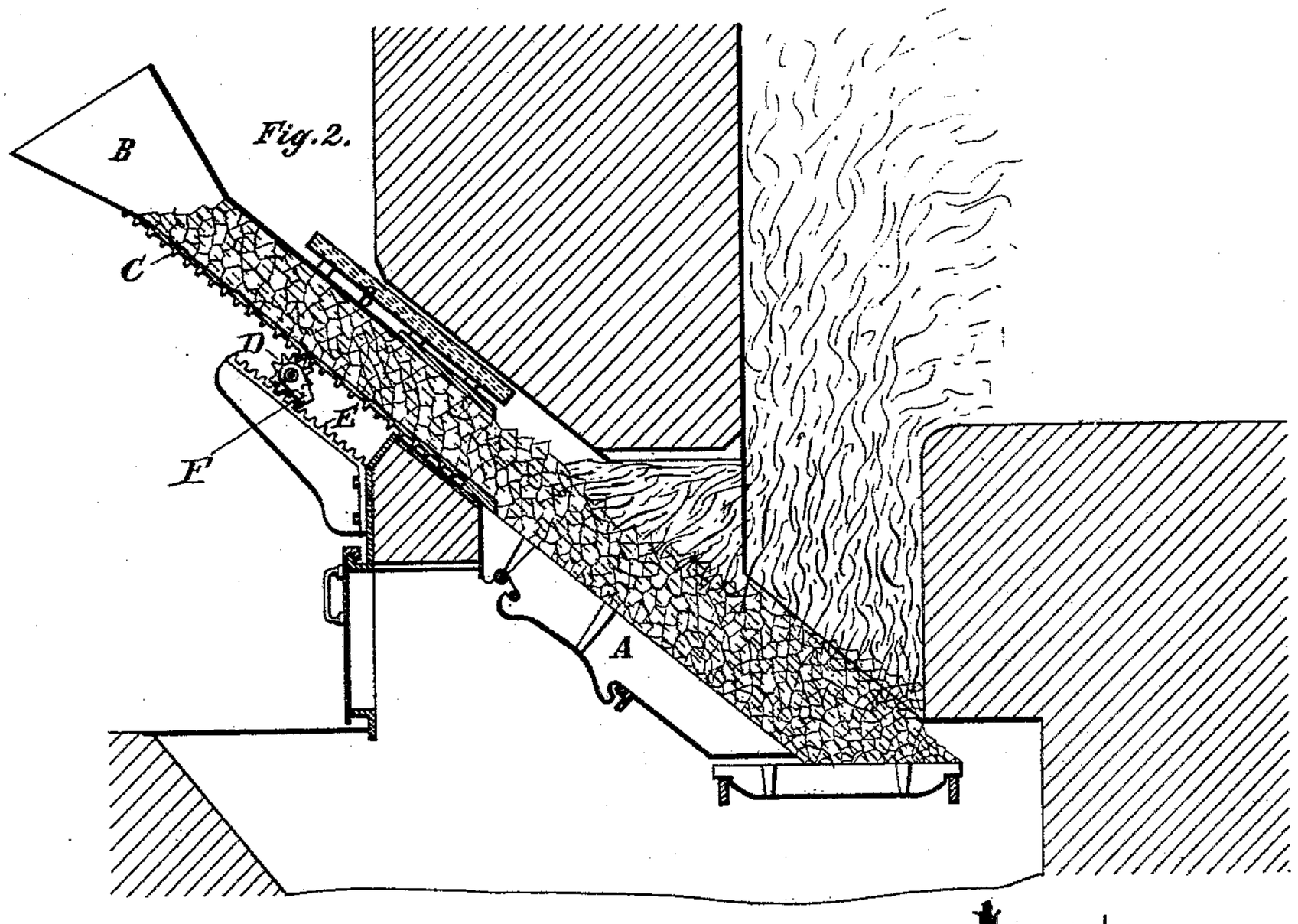

Fig. 2.

Witnesses

Inventor

Georg Wilhelm Kraft.

By his Attorneys

UNITED STATES PATENT OFFICE.

GEORG WILHELM KRAFT, OF DRESDEN, GERMANY.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 566,774, dated September 1, 1896.

Application filed March 9, 1895. Serial No. 541,151. (No model.) Patented in Germany May 2, 1894, No. 79,015; in France July 25, 1894, No. 240,300; in England October 23, 1894, No. 20,260; in Austria January 7, 1895, No. 45/386, and in Hungary January 9, 1895, No. 2,035.

To all whom it may concern:

Be it known that I, GEORG WILHELM KRAFT, engineer, of 10 An der Ziegelscheune, Dresden, Saxony, in the Empire of Germany, have invented Improvements in or in Connection with Smoke-Consuming Hopper-Fed Fireplaces of Variable Size, (for which I have obtained Letters Patent in Germany, No. 79,015, dated May 2, 1894; in France, No. 240,300, dated July 25, 1894; in Great Britain, No. 20,260, dated October 23, 1894; in Austria, No. 45/386, dated January 7, 1895, and in Hungary, No. 2,035, dated January 9, 1895;) and I do hereby declare that the following is a full, clear, and exact description of my invention, reference being had therein to the accompanying drawings.

Inclined grates have heretofore been employed for smoke-consuming fireplaces in which the coal supplied to a hopper above is allowed to slide down automatically by its own weight at a rate proportioned to the rate of combustion of the lower portion of the coal on the grate. While there is a bright fire in the grate the smoke resulting from the gasification of the coal contained in the feed-hopper or in the shaft fire-space connected thereto is consumed or burned up in its passage over the incandescent coals; but the inclined hopper-fed furnaces now in existence only act in an effective manner when the dimensions of the grate are exactly proportioned to the amount of fuel which is to be supplied to it in a short time and when the operation of the furnace-grate or fireplace or the demands made are uniform. Increasing or diminishing the intensity of the fire has been possible only to a very slight extent with the so-called "smokeless" or "smoke-consuming" furnaces or fireplaces hitherto employed, and in such cases the proper combustion of the smoke has always been disturbed.

So far as I am aware, no one has yet been successful in providing hopper-fed furnaces or fireplaces which would always equally well consume their smoke when the rate of combustion has been varied, that is to say, at times more intense and at times less intense.

My present invention has for its object to provide a smokeless furnace in which the amount or rate of combustion can be varied without injuriously affecting its smoke-consuming action.

In the accompanying drawings my present invention is illustrated in two longitudinal sections, *i. e.*, Figure 1 showing the apparatus adjusted for a small fire, and Fig. 2 showing the same adjusted for a large fire.

The inclined grate A has at its upper end the feed-hopper B, which may be made funnel-shaped at top to facilitate the charging of coal therein. This feed-hopper is made adjustable in such a manner that by moving it higher up or lower down it will cover a greater or less area of the grate, thus enabling the grate surface or area to be varied.

The angle of inclination of the inclined grate is made such that the coal will not be caused to roll quickly down, but will advance gradually forward in a uniform layer (depending in depth on the clear passage through the hopper) to the open portion of the grate, where it is burned, while fresh coal that has already become gasified or heated in the feed-hopper slides down as required to automatically replace the burned coal. The angle of inclination is preferably a little more than the "angle of rest"—*i. e.*, a little more than the angle at which coal would not move itself.

It is obvious that the greater the area or surface of the grate that is not covered by the feed-hopper the greater will be the amount of coal which can be burned at one and the same time without affecting the combustion and gasifying processes, and consequently without affecting the combustion of the smoke in any way.

In the drawings the feed-hopper is shown actuated by means of the toothed rack C on the under side thereof, which engages with a toothed wheel D, which in turn engages in the toothed rack E, fixed to the frame or support, this toothed wheel D being adapted to roll in engagement with the toothed racks C and B on both sides. This toothed roller D is provided with a catch or pawl F to retain the hopper at any desired point, or any other well-known or suitable mechanical device may be employed for this purpose.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. In a combustion-grate with feeding ap-

pliance for fuel wherein the area of the burning-surface of the grate and the area of the burning layer of fuel may be varied, the combination of an inclined grate and an inclined feeding-box adapted to contain the fuel and feed it to the grate, the box being placed upon the grate and movable thereon for the purpose of increasing or diminishing the area of the grate and of the layer of burning fuel without altering the thickness of the layer of burning fuel.

2. In a fireplace or furnace, the combination with a grate, of an adjustable hopper to contain and feed the fuel to the grate provided with the rack C, the rack E, and a toothed wheel D between the racks E and C to adjust the hopper with reference to the grate.

3. In a fireplace or furnace, the combination with a grate, of an adjustable hopper to contain and feed the fuel to the grate provided with the rack C, the rack E, and a toothed wheel D between the racks E and C to adjust the hopper and provided with the pawl F to hold the hopper in any adjusted position.

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

GEORG WILHELM KRAFT.

Witnesses:

HERNANDO DE SOTO,

PAUL ARRAS.