

J. A. STEARNS.

Improvement in Puddling-Furnaces.

No. 129,762.

Patented July 23, 1872.

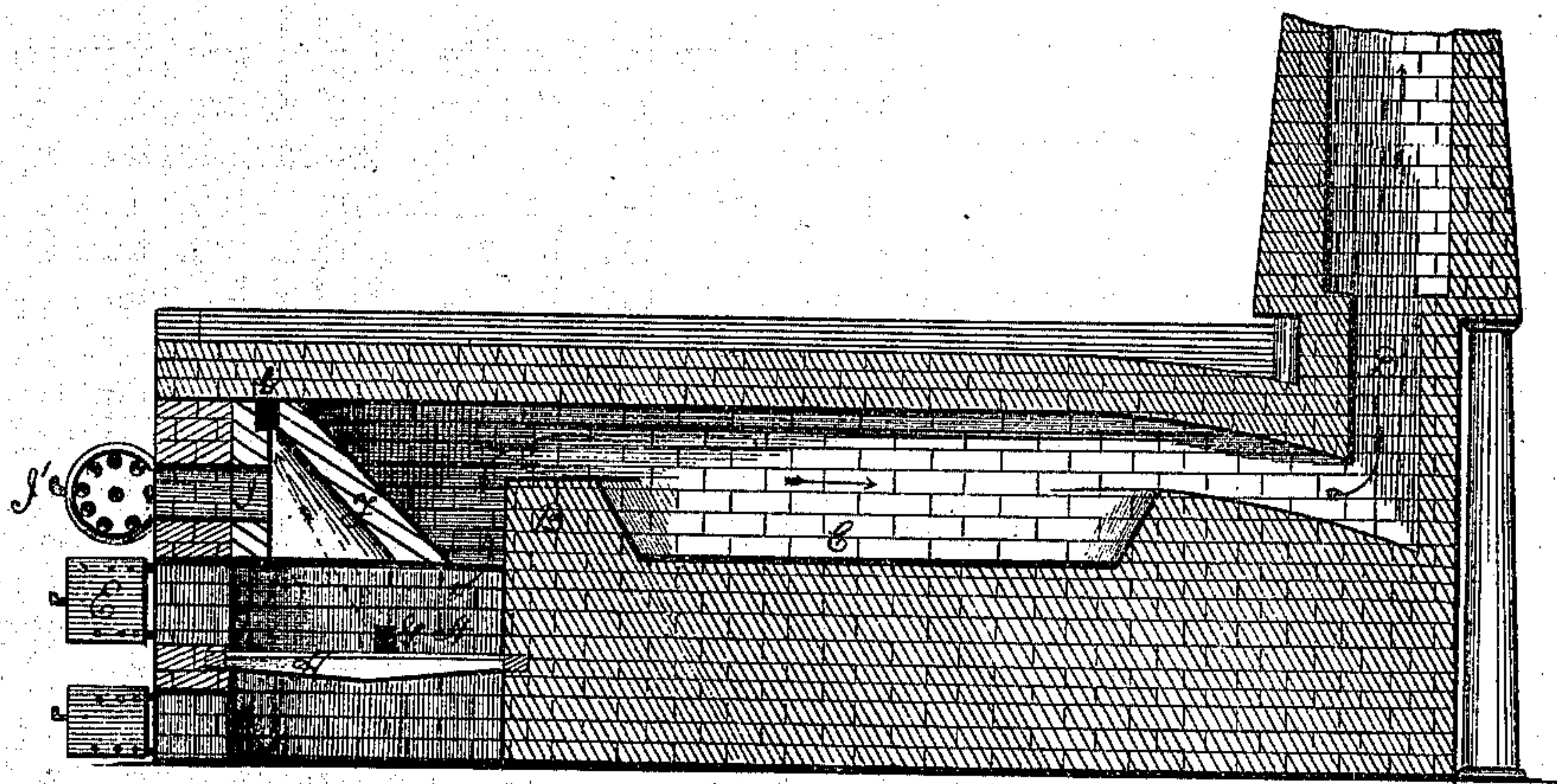


Figure 1.

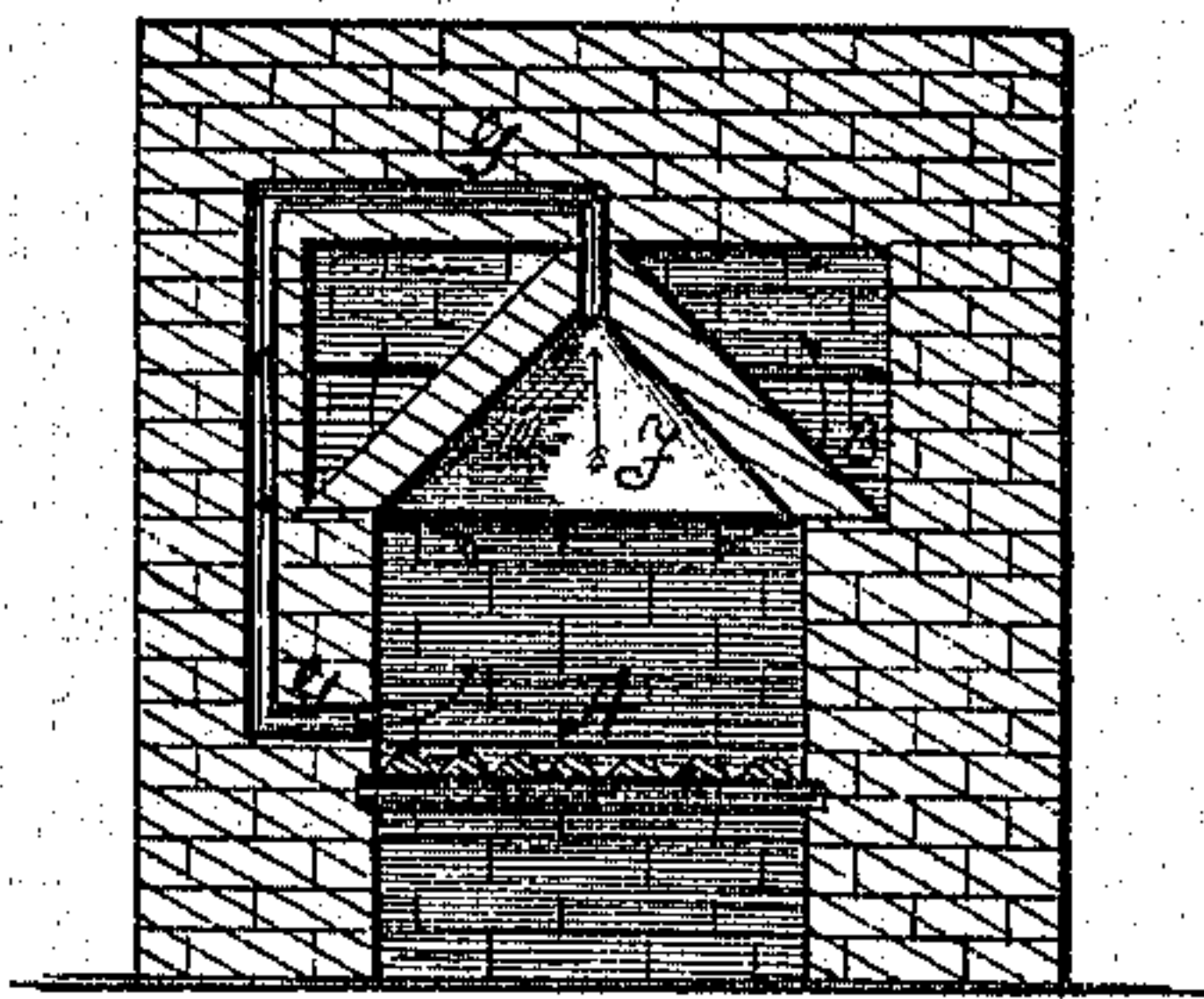


Figure 2.

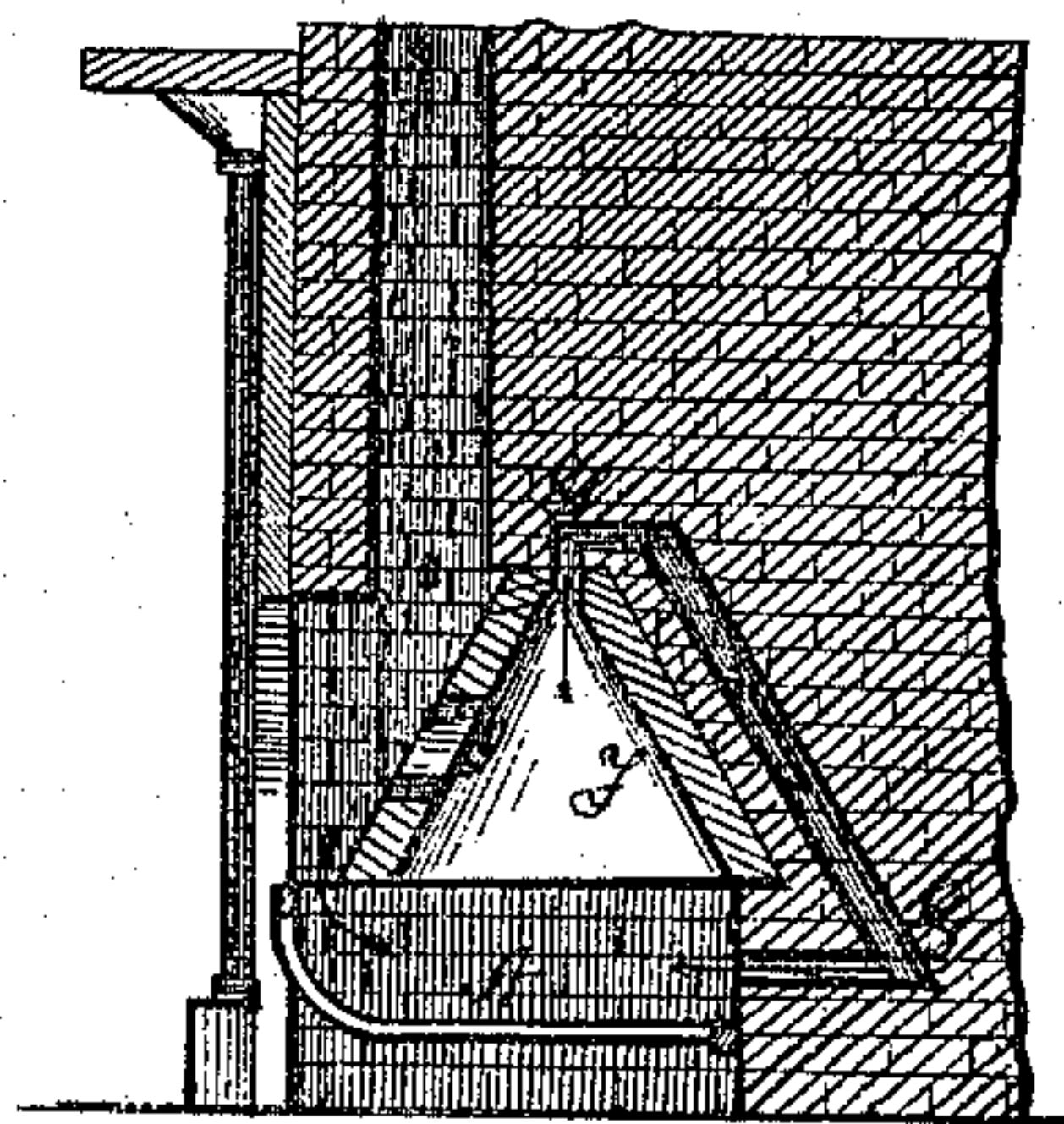


Figure 3.

Witnesses  
E. C. Titler  
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Inventor  
John A. Stearns  
by his Attorneys  
Barwell, Christy & Ken



# UNITED STATES PATENT OFFICE.

JOHN A. STEARNS, OF ROLLA, MISSOURI, ASSIGNOR TO THE PITTSBURG & ST. LOUIS IRON IMPROVEMENT COMPANY, OF PITTSBURG.

## IMPROVEMENT IN PUDDLING-FURNACES.

Specification forming part of Letters Patent No. 129,762, dated July 23, 1872.

### SPECIFICATION.

*To all whom it may concern:*

Be it known that I, JOHN A. STEARNS, of Rolla, in the county of Phelps and State of Missouri, have invented a new and useful Improvement in Smoke-Consuming Apparatus; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing forming part of this specification, in which—

Figure 1 is a longitudinal sectional view of my invention as applied to a puddling-furnace. Fig. 2 is a front view of the same with the front wall removed, and Fig. 3 is a view of the invention as applied to an ordinary open fire-place.

Like letters of reference indicate like parts in each.

My invention consists in the construction of apparatus for collecting and returning to the fire to be burned the volatile combustible matters which are eliminated in the combustion of coal, especially the variety known as "bituminous." Ordinarily, these matters are allowed to pass off through the chimney in the form of smoke and are lost, the reason for this being that, although many way for accomplishing this have been tried, no cheap or easy method has been discovered. My invention effectually accomplishes this purpose, and is cheap and easy of application.

In Fig. 1 is shown a puddling-furnace of the ordinary description, with a grate, A, fire-wall B, bed C, chimney D, and door E. In the front part of the furnace, just over the front part of the grate A, above the door E, I place a cowl or cap, F, wide at the bottom, and narrowing to the top, where it opens into the flue G, which runs to the side of the furnace, and from thence down the side wall, and opens into the grate A just above the bars H. Entering the cowl F from the front, just above the door E, is an opening, I, which is closed by the door I'.

The operation is as follows: After the fire has been started in the grate A in the usual manner, the cowl F is filled nearly or about half full with coal through the opening I.

The action of the fire in the grate upon the coal in the cowl drives off its volatile gases, such as carbonic-acid gas, carbureted hydrogen, &c., which, ascending to the top of the vessel F, pass down through the flue G into the fire, where the combustible gases ignite and burn, producing intense heat. The coal in the cowl F, losing its gases, is reduced to coke, which is drawn down into the grate A by means of hook, where it serves as fuel to support the fire. The cowl F is then replenished with coal, as before described.

The carbonic-acid gas, which is composed of two parts of oxygen and one part of carbon, although not itself combustible, in passing through the red-hot coke in the grate A, takes up enough carbon to convert a large portion of it into carbonic oxide, which, being combustible, burns with the other gases.

The cowl F extends over only the front part of the grate, and the flue G runs back beyond it, so that the heat from the combustion of the gases passes up over the fire-wall B, and acts upon the iron in the bed C.

A damper may be made in the side of the cowl F, for the purpose of regulating the heat by letting off the gases unconsumed.

Fig. 3 shows my invention as applied to an ordinary open fire-place. The cowl F has its opening I and flue G, and is set above the grate in the same manner, as shown.

By simply modifying the shape of the cowl F and the arrangement of the return flue to suit, this invention may be applied to locomotive-engines, furnaces under boilers, stoves, and fire-places of all kinds and descriptions.

No raw coal is put on the fire after it is first started, the coke from the cowl F being the only fuel used.

What I claim as my invention, and desire to secure by Letters Patent, is—

The arrangement of the cowl F, flues I and G, and grate A, substantially as set forth.

In testimony whereof I, the said JOHN A. STEARNS, have hereunto set my hand.

JOHN A. STEARNS.

Witnesses:

A. S. NICHOLSON,  
THOS. B. KERR.