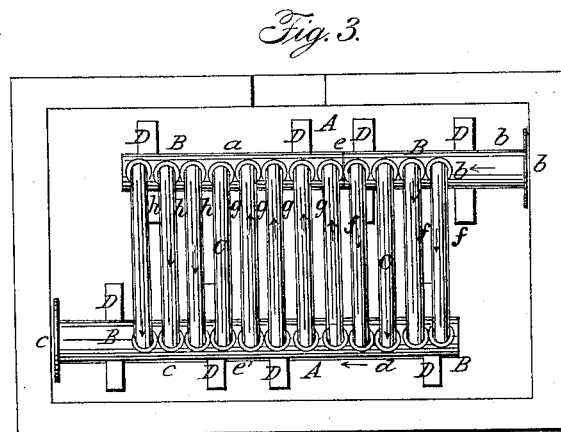
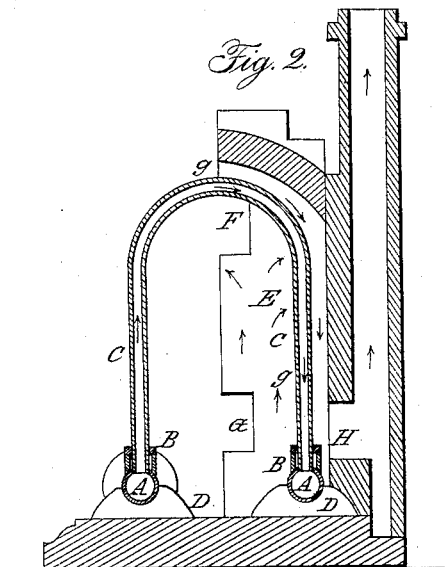
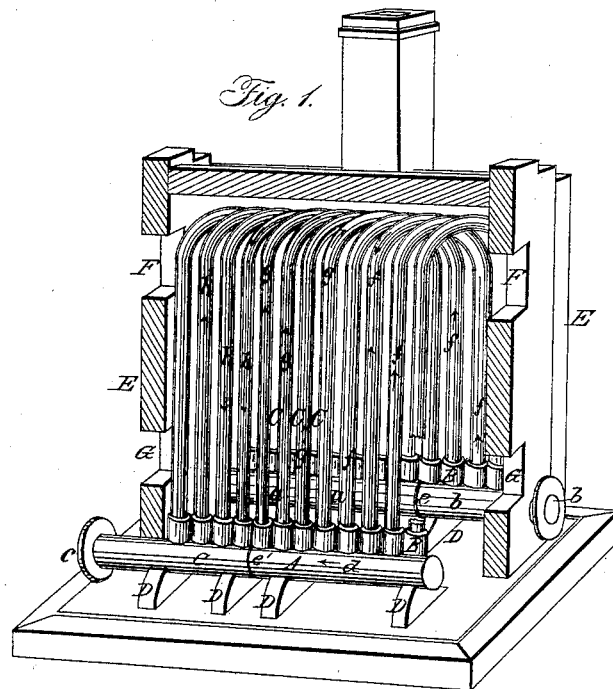


R. DENHOLM.
Hot-Blast Oven.

No. 49,862.

Patented Sept. 12, 1865.



Witnesses:

W. H. Burridge
A. W. McIlwain

Inventor:

Robert Denholm

UNITED STATES PATENT OFFICE.

ROBT. DENHOLM, OF NEWBURG, OHIO.

IMPROVEMENT IN HOT-BLAST APPARATUS.

Specification forming part of Letters Patent No. 49,862, dated September 12, 1865.

To all whom it may concern:

Be it known that I, R. DENHOLM, of Newburg, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in a Hot-Blast Apparatus for Furnaces; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view with a portion of the stack removed. Fig. 2 is a vertical transverse section. Fig. 3 is a top view of the flues and pipes.

Like letters of reference denote like parts in the different views.

The nature of my improvement relates to the economy in constructing and repairing the apparatus, and the generation of an intense degree of heat with great saving of fuel.

The flues A A are in four sections, *a b c d*, Figs. 1 and 3, the separation of them being at *c*, at which point the ends of the flues are closed up. Connected with the flues are sockets B, which receive the ends of the arch-pipes C, as seen in Fig. 2. The arch-pipes are luted into the sockets B by fire-clay at the bottom, that fills up the sockets around the pipes to about one-half of an inch from the top. The iron cement is filled in upon the clay to the top of the socket. This mode of luting the pipes renders the joint very secure and tight, and at the same time, if required, one or more of the arch-pipes may be easily released from the socket, and others replaced without in any way disturbing the other pipes and flues.

The flues rest upon blocks D instead of being walled up in the stack or covered with brick-work. By means of the blocks the flues are allowed to extend by the action of the heat and also to turn upon them. Hence the arch-pipes are not so liable to be injured or destroyed by the action of the heat on the flues A as when the flues are walled in with the stack.

It is well known that arch-pipes are continually being injured and destroyed by the flues when arranged and set in the ordinary way.

It will be noticed that the stack E is to be built over and around the flues and pipes—that is, the pipes and flues are so arranged as to be set inside of the building, and not walled up with it, as it is usually done, but rests upon

the blocks D. By this means an additional advantage to what has been set forth is obtained in removing old pipes and replacing new ones.

It is not required to pull down nearly the entire stack to replace an old pipe, as is the case when the pipes and stacks are arranged and set up in the ordinary way, but only to remove a portion of the wall on one side, so as to replace a new pipe for the old one.

E represents openings for the convenience of getting at the pipes, if required, and G are openings into the fire-place and for the admission of the gas-pipes from the furnace, so that waste gas may be employed in heating the blast, and instead of having the draft up through the arch of the pipes, which tends to strain and injure them more easily at this point. The draft from the fire-place is through the throat H and chimney, as indicated by the arrows in Fig. 2.

The air to be heated may be admitted into the flues either at *b* or *c*, and discharged accordingly. In case the air is admitted at *b* it passes along to *c*, when it is arrested by the flue being stopped up. It then turns, passes up, over, and down the arch-pipes, as noted by the arrows *f*, into the flue *d*, through which it passes. The flue being closed at *c'* causes the air to pass up, over, and down the pipes into the flue *a*. From the flue *a* it returns up, over, and down into the flue *c*, from which it is conveyed to the tuyeres. The course taken by the air as it passes from the flue *d* to the flue *a* is noted by the arrows *g*, and the course taken from *a* to *c* is noted by the arrows *h*. Thus the air passes and returns four times through the pipes. The passing of the hot air to and fro through the pipes and flues may be increased or diminished, according to the arrangement of the pipes.

By this arrangement of the pipes and flues the air is so constantly subject to the intense heat of the fire that it quickly becomes superheated to a degree that at three tuyeres connected with a furnace the test of melting cold lead by the hot-blast has been applied and found to melt the lead at the three tuyeres alike. This is owing to the concentration of the air to the lead as it passes through the pipes and flues, which allows but little loss of heat by radiation.

It is also practically shown that this im-

proved apparatus costs one-third less, takes up less room, saving one-third of the fuel, with a blast of more intense heat than those of the ordinary construction.

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

The sectional flues A, mounted on the blocks D, in combination with the curved pipes C,

arranged within a furnace, E, having its throat H opening into the chimney near its base, as and for the purpose herein set forth.

ROBERT DENHOLM.

Witnesses:

W. H. BURRIDGE,

A. W. McCLELLAND.