W. B. POLLOCK.

Hot Blast Pipe.

No. 46,698. Patented March 7, 1865.

Fig. 1.

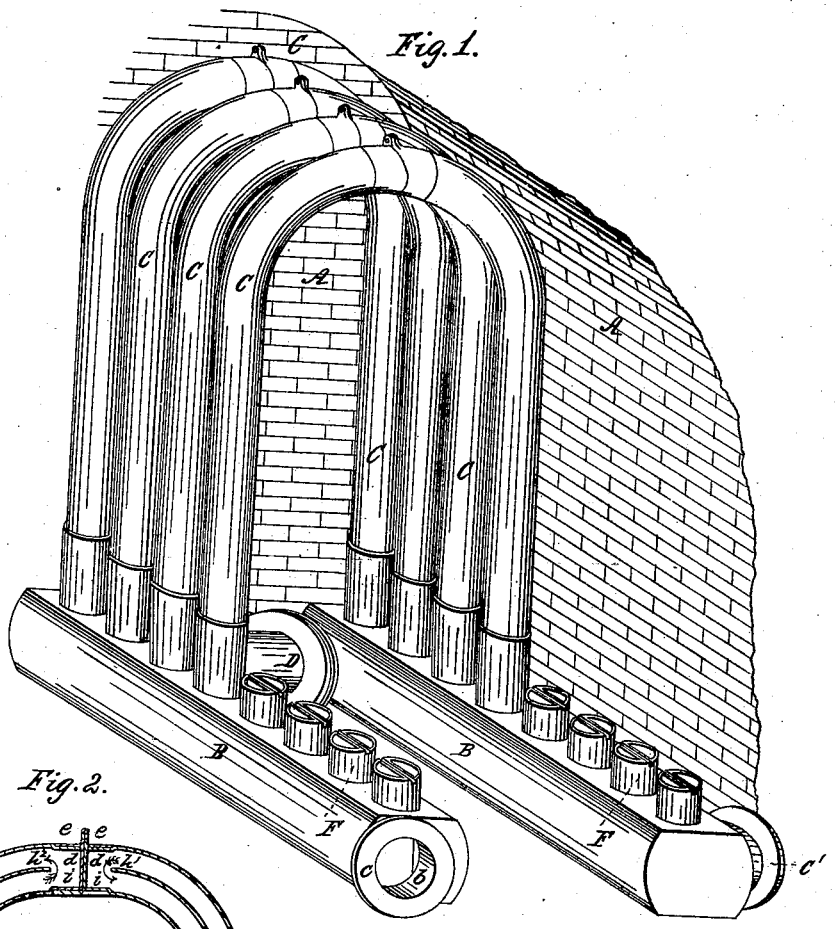


Fig. 2.

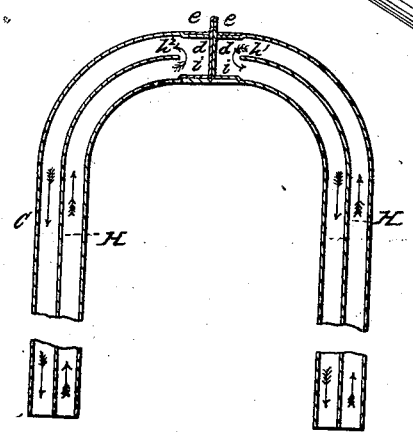
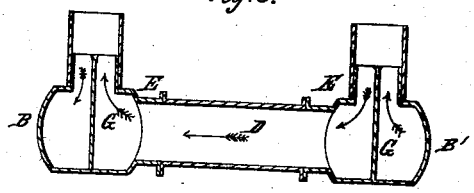


Fig. 3.



Witnesses:
Theodore Lang
Fr Schmidt

Inventor:
W. B. Pollock
by his Attys
Baldwin & Son

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

WM. B. POLLOCK, OF YOUNGSTOWN, OHIO.

IMPROVEMENT IN HOT-BLAST PIPES.

Specification forming part of Letters Patent No. **46,698**, dated March 7, 1865.

To all whom it may concern:

Be it known that I, WILLIAM B. POLLOCK, of Youngstown, in the county of Mahoning and State of Ohio, have invented a new and useful Improvement in Hot-Blast Pipes for Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make a part of this specification, and in which—

Figure 1 is a view in perspective showing part of my invention in open, and part in closed, pipes, with a portion of the furnace-wall. Fig. 2 is a vertical section through one of the pipes, and Fig. 3 a section through the trunks on which the pipes rest and the pipe connecting the trunks.

It is the object of my invention to conduct the hot air for blast-furnaces over a large surface of the heated portions of the stack without extending the pipes to an inconvenient length, under an arrangement that shall admit of easy access to the interior of any portion of the pipes, for the purposes of cleansing or repair, without stopping the furnace, and to establish a uniform expansion throughout each of the pipes; and to these ends my improvement consists, first, in placing a diaphragm through the trunks and the pipes resting thereon, so as to compel the air to ascend in one half and descend on the opposite half of each pipe, and thus double the heating-surface without increasing the length of the pipes; secondly, in connecting the section-pipes at the bottom to the trunks by a slip-joint, and at the top by a clasp or bolt, so as to admit of the removal of one or more sections without stopping the furnace and with only a short interruption to the blast; thirdly, in making the pipes in sections and uniting them in the center of their length, (but without their having any communication directly with each other,) so that each pair of sections constituting a single pipe will have equal expansion, and the varying expansion of the pipes differently located will not fracture or injure one another.

My system of pipes may be arranged to suit any desired form or size of blast-furnace, and may be located within the brick-work or against it, (as at A, Fig. 1,) in which latter position it is obvious that the products of combustion escaping from the furnace will pass on both sides of and between the pipes; or an independent fire may be used with my system of pipes, which can be located wherever desired.

I construct two trunks, B B′, of any sufficiently refractory metal to sustain the heat of the spot in the furnace in which they are located, as a base for the pipes C. These trunks are closed at their rear end, but are connected together by a coupling-pipe, D, having a flange on each end to match the flanges on the short pipes E E′ on the trunks. The front end of the trunk B has an opening, *b*, terminating in a flange, *c*, to which the pipe terminating at the tuyere is to be united, while the front end of trunk B′ has an opening terminated by the flange *c′* to receive a pipe from the blast-generator. The position of these openings can, however, be changed at pleasure to adapt them most advantageously, and it is indifferent at which end of the trunk the blast may be introduced. On the top of the trunks short pipes F are placed, equal in number to the number of pipes to be used. These short pipes must be placed on a line through their centers and through the centers of the trunks, and directly opposite each other on both trunks, as seen in Figs. 1 and 2. On these trunks the pipes C are placed, and may be of any length required to give the temperature of the blast desired. The pipes C are made in sections divided in the center of their length, at which point each section is closed by an air-tight cap, *d*, that may carry a projecting lip, *e*, by which means the two opposite sections of each pipe can be secured together by bolts passing through the lips or by a ring slipped over them, while the sections at their lower end rest on the trunks fitting neatly around the short pipes F. The trunks B B′ and short pipes F are divided centrally and longitudinally by a vertical diaphragm, G, which passes from the bottom of the trunks to the top of the several short pipes F, so as effectually to prevent the passage of the blast through them in any other directions than those shown by the red arrows in Figs. 2 and 3. The sections of the pipes C are likewise divided vertically and longitudinally by diaphragms H, that register truly with those G of the short pipes F at the lower end of the sections, so as to make the diaphragms continuous from the bottom of the trunks to near the upper ends of the sections, where they terminate, as shown at *h*

h', Fig. 2, leaving the sections of their full diameter for the length of one diameter, at least, as at i, Fig. 2. The trunks B B′ being placed in position, the sectional pipes C put over the short pipes F, and secured by passing a ring over or bolts through the lips e, the connecting-pipe D fastened to the trunks by its flanges, and the induction and eduction properly attached, the blast may be introduced, when it will enter the trunk B′, ascend the right half of the pipes C, pass around the end of the diaphragm h', down the left side of the pipes C, (as shown by the red arrows, Fig. 2,) through the connecting-pipe D, (as similarly shown in Fig. 3,) up the right half of the opposite sections of the pipes C, around the diaphragm h^2, down the left side of the pipes C, and through the escape-pipe to the tuyere. The blast having thus traversed through the pipes this distance, double their length and that of the trunks, while both were acted upon over nearly their entire surface by the heated products of combustion escaping from the furnace, will have attained the degree of heat required for the most effective results in the rapid reduction of ores to their metals.

Should one of the pipes or sections become burned or fractured, it is obvious that it can easily be removed and repaired or replaced by a new one simply by lifting it out of place and covering or closing the short pipe on which the injured section rested with an air-tight cap, to be removed when the repaired or new pipe is restored. The stoppage of the blast for the brief period required to make these changes obviously would not induce the necessity for stopping the furnace. It is likewise evident that these pipes, differently situated in the series, may have varying degrees of expansion or contraction without injury to each other. For example, the pipe situated in the least-heated locality in the stack will be unaffected by the greater expansion of the pipe that is more highly heated.

What I claim as my invention in hot-blast pipes of furnaces, and desire to secure by Letters Patent of the United States, is—

1. The combination of the trunks B B′ with the sectional pipes C and connecting-pipe D, arranged substantially in the manner and for the purpose set forth.

2. The combination of the trunks, diaphragms, and section-pipes, substantially in the manner described, so that an injured or worn tube or section may be singly removed and a new one inserted without stopping the blast longer than merely to make the removal or change of the section.

3. Making the continuous pipes in sections, and so uniting them with the trunks that any one of the several pipes may expand unequally and independently without fracturing the others having a different expansion, as set forth.

In testimony whereof I have hereunto subscribed my name.

WM. B. POLLOCK.

Witnesses:
PAUL JONES,
GEO. J. MARGERUM.