

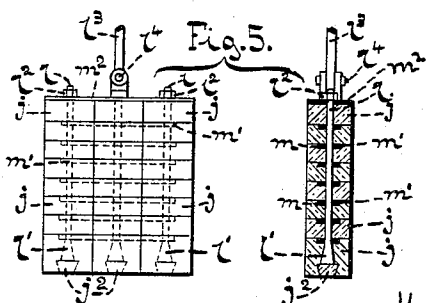
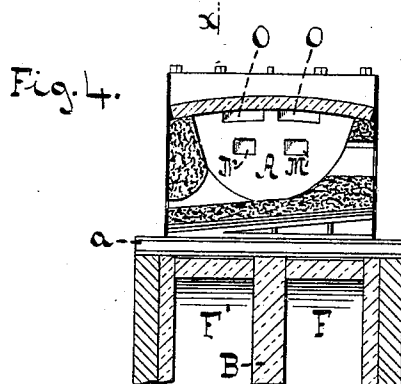
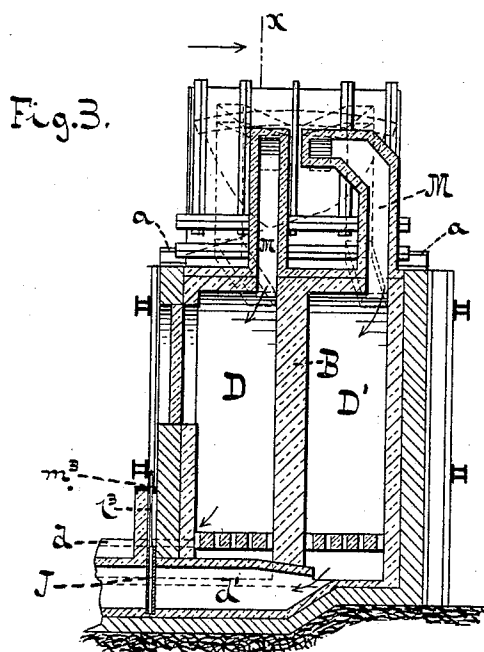
(No Model.)

H. SCHOENWAEELDER.
FURNACE.

2 Sheets—Sheet 2.

No. 480,969.

Patented Aug. 16, 1892.



WITNESSES:

Klas A. Reintest
A. Faber du Raur

INVENTOR

Heinrich Schoenwaelder
BY *A. Faber du Raur*
ATTORNEY

UNITED STATES PATENT OFFICE.

HEINRICH SCHOENWAELDER, OF FRIEDENSHÜTTE, GERMANY.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 480,969, dated August 16, 1892.

Application filed November 30, 1891. Serial No. 413,561. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH SCHOENWAELDER, a subject of the King of Prussia, residing at Friedenshütte, in the Kingdom of Prussia, Germany, have invented new and useful Improvements in Furnaces, of which the following is a specification.

My invention relates to furnaces in which gaseous fuel is used and in which regenerators are employed to heat the fuel and the air for supporting combustion.

It has for its object to render the furnace and regenerators more effective and durable; and to this end it consists in certain novel features in the construction and arrangement of the plant, as fully pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation, partly in section, on the line $x x$, Fig. 3, of a furnace constructed according to my invention. Fig. 2 is a horizontal section in the plane $y y$, Fig. 1. Fig. 3 is a vertical section in the plane $z z$, Fig. 1. Fig. 4 is a vertical section taken through the hearth on the line $x' x'$, Fig. 1. Fig. 5 represents detail views of the damper. Similar letters indicate corresponding parts throughout the several views.

In the drawings I have shown the general arrangement of the furnace and regenerators, as usual. To relieve the arches of the regenerators from the combined weights of the hearth A and the charge, I support the hearth in the first place upon horizontal iron beams a , having their ends resting upon the masonry forming the side walls of the regenerators. These beams are centrally supported by a wall B, built up centrally between the side walls and extending throughout the length of the regenerators. The wall projects above the arches of the chambers, and consequently said arches are relieved from the load of the hearth and charge, while the chambers stand free and clear and are easily accessible for repairs without taking up the hearth.

The usual chambers of the regenerators are subdivided by the wall B into two chambers each. The chambers C C' and D D' at the ends of the plant are intended for heating the producer-gas, while the intermediate chamber

E E' and F F' are intended for heating the air for combustion.

G G' designate the branched flue from the gas-producer, (not shown;) H H', the air-flue; I I', the reversing-valves, and K the flue leading to the chimney, all as usual. The branch G of flue G G' is connected with the chamber D by two entrance-ports $d d$, and with the chamber D' by a channel d' , which is located between the ports $d d$ and extends beneath the chamber D. (See Figs. 1 and 3, especially.) The branch G' is similarly connected with the respective chambers C and C' by ports $c c$ and channel c' . The branches of flue H' H are connected with the chambers E E' and F F', respectively, by ports $e e$ and channel e' and ports $f f$ and channel f' , in a similar manner, as described in the case of flue G G'.

Each entrance-channel c' , d' , e' , and f' is controlled by a damper J and each entrance-port $c c d d$, &c., by a similar damper J', so that in view of the fact that each chamber has its own individual ports or channels the working of the chambers can be regulated at will and the regenerators can be fatigued in a very uniform manner. Two or more flues for the heated gases and a corresponding number for the air are led from the respective chambers of the regenerators to the furnace.

In the example here illustrated a gas-flue L is led from each of the chambers C C' and a flue M from each of the chambers D D', while an air-flue N is led from each of the chambers E E' and one O from each of the chambers F F'. The flues N and O for the air are built in the heavy masonry of the ends of the furnace. The gas-flues L and M are carried up separate from the masonry of the furnace somewhat in the form of chimneys, so that ready access can be had for repairs while at the same time mingling of the gas and air cannot take place in case of breaks and leakage in the flues with the consequent destruction of the walls of the furnace. Suitable hand-holes, as t , are provided about opposite the horizontal portions of the flues to enable obstructions to be removed.

To utilize the regenerators to their utmost capacity the entrance-ports of the flues L, &c.,

leading to the furnace are arranged diagonally opposite to the outlet-openings of the channels *c' c' d' d'*, &c., and to the ports *c d*, &c., so that the air and gases are led diagonally through the chambers.

To insure exact working and permanent efficacy of the dampers *J J'* the same are constructed practically proof against the action of the flame and mechanical attacks. Referring to Fig. 5, each damper is built up of several rows of blocks *j* of a refractory material. The lower block of each row is provided with a central taper socket *j* and the bolt *l*, uniting the blocks, is provided at the lower end with a taper head *l'* adapted to fit the taper socket. The outer end of the socket *j* has a conical enlargement *j*³, tapered in a direction reverse to that of the socket proper, which enlargement is filled with chamotte stones or other refractory material to obtain a perfect closure. The upper surfaces of the blocks are recessed, as at *m*, into which recesses are laid metal bars or plates *m'*, extending across the center row and past the bolt-holes in the end rows. The bolts *l*, passing through the blocks and bars or plates, unite the several blocks and also the several rows.

*m*² is a cap-plate and *l*² the nuts on the bolts, which being out of the reach of the flames need not be protected. The draw-rod *l*³ is pivoted by a bolt *l*⁴ to suitable ears or lugs on the cap-plate. The several draw-rods pass through a cover *m*³, closing the damper-chambers, suitable bosses being formed on said cover to guide the rods and prevent leakage.

From the foregoing description it will be seen that all the metal work for uniting the blocks is protected from the flames by the refractory material composing the damper.

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

1. In a regenerative furnace, the combination, with the regenerator-chambers and their roof arches, of a central longitudinal wall subdividing the regenerator-chambers into separate air and gas chambers *C C'*, *D D'*, &c., and centrally supporting the hearth to relieve the arches, a separate flue leading from each of the said chambers to the furnace, and flues *G G'* and *H H'*, having entrance-ports into the chambers on one side of the partition-wall, and channels leading beneath the said chambers to the chambers on the opposite side of the wall, substantially as described.

2. In a regenerative furnace, a central lon-

gitudinal wall subdividing the regenerator-chambers into separate air and gas chambers *C C'*, *D D'*, &c., a separate flue leading from each of said chambers to the furnace, and the flues *G G'* and *H H'*, having entrance-ports into the chambers on one side of the partition-wall, and channels leading beneath the said chambers to the chambers on the opposite side of said wall, substantially as and for the purpose set forth.

3. In a regenerative furnace, a central longitudinal wall subdividing the regenerator-chambers into separate air and gas chambers *C C'*, *D D'*, &c., a separate flue leading from each of said chambers to the furnace, and the flues *G G'* and *H H'*, having entrance-ports into the chambers on one side of the partition-wall, and channels leading beneath said chambers to the chambers on the opposite side of said wall, the ports and channels from the flues *G G'* and *H H'* being diagonally opposite the exit-ports of the flues to the furnace, substantially as described.

4. In a regenerative furnace, the combination of separate air and gas chambers *C C'*, *D D'*, &c., a separate flue leading from each of said chambers to the furnace, flues *G G'* and *H H'*, having entrance-ports into the chambers on one side of the partition-wall, and channels leading beneath said chambers to the chambers on the opposite side of said wall, air-flues built in the ends of the furnace and leading from the regenerator-chambers to the furnace, and gas-flues built up separate and independent of the furnace, all substantially as described.

5. In a regenerative furnace, a central longitudinal wall subdividing the regenerator-chambers into separate air and gas chambers *C C'*, *D D'*, &c., a separate flue leading from each of said chambers to the furnace, flues *G G'* and *H H'*, having entrance-ports into the chambers on one side of the partition-wall, and channels leading beneath the said chambers to the chambers on the opposite side of said wall, and a separate damper for each port and channel, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH SCHOENWAEELDER.

Witnesses:

O. HERING,
G. HÜLSMANN.