

UNITED STATES PATENT OFFICE.

FRIEDRICH HEINRICH EDUARD CAESAR NEHSE, OF DUSSELDORF,
GERMANY.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 753,298, dated March 1, 1904.

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To all whom it may concern:

Be it known that I, FRIEDRICH HEINRICH EDUARD CAESAR NEHSE, manufacturer, a subject of the Emperor of Germany, residing at 63 Duisburgerstrasse, Dusseldorf, Prussia, Germany, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification.

My invention relates to furnace-grates, and particularly to such furnace-grates having an adjustable ring-shaped step-grate in combination with means for aiding combustion by the use of a water-evaporating device which has its water-supply effected by means of wicks made of asbestos. In such furnace-grates I obtain a supply of air to the portion of the fire-box above the grate by the means hereinafter fully described and set forth.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a vertical section of the furnace-grate with my improvements. Fig. 2 is a cross-section on the line A B of Fig. 1.

In the construction of my improved furnace-grate I use a cylindrical vaporizer *a*, which is closed at its upper and lower ends and is filled with asbestos. Water is supplied thereto by means of asbestos wicks entering said vaporizer by suitably-shaped pipes *b* and sucking up the water from a tank *c*, arranged on the bottom of the fire-box, as shown in Fig. 1. This vaporizer *a* is mounted in the center of a plurality of concentric grate-rings *d* on a vertical rack-bar *e*, meshing with a pinion *f* on a shaft *g*, which latter is operated by a crank *h* outside the fire-box, as shown in Fig. 2. The straight ends of said pipes *b* are guided within stuffing-boxes *i* on said water-tank for allowing the free vertical adjustment of the vaporizer carrying said pipes *b*. The ring-shaped grates *d* are concentrically arranged round said vaporizer and are supported by radially-arranged rails *k*, which are pivotally secured in brackets *l*, extending from the wall of the fire-box, and have their bifurcated inner ends adjustably linked to the vaporizer, as shown in Fig. 1. Screw-bolts *m* are vertically secured to said grate-rings *n* and passed through slots within the rails *k*, as

shown in Fig. 1, thus securing the rings in position on the said rails. The lowermost ring *d'* is arranged in rigid connection with the fire-box and rests on the brackets *l*. A jacket *o*, having a suitable connection (not shown) with the vaporizer, surrounds the lower portion thereof below the rings *d*, and the vaporizer has outlets *p* opening within said jacket against the walls thereof, which provides means for forming a mixture of air and steam within said jacket when the vaporizer is acted upon by the firing. Then the water sucked up into the vaporizer is evaporated therein, and the steam discharged through the outlets *p* is mixed with air within the jacket *o* and then enters the glowing coals, thus forming water-gas and aiding combustion and heating. By raising and lowering the vaporizer the described action may be regulated.

For simultaneously obtaining a suitable supply of air to the fire-room above the grate-rings I provide a mantle *q*, of refractory material, so as to form the wall of the fire-box, and I arrange a suitable number of vertical channels *r* within said mantle equidistant from each other and each opening against the fire-room through a narrow vertical slot *n*, extending over the whole length of each channel, as shown in the drawings. Further, I construct an outer mantle *s*, concentrically surrounding said inner mantle *q* and leaving a hollow ring-space *t* between said mantles, which space is connected with the vertical channels *r* by obliquely-directed openings *u*, as shown in Fig. 1. Air is admitted to the ring-space *t* through a regulating-slide, as *v*, and suitably corresponding openings, as *w*, in the mantle *s*. (Shown in Fig. 1.)

The operation of my invention is obvious. The air entering from the openings *w* into the ring-space *t* passes through the openings *u* into the highly-heated vertical channels *r* and then enters the firing-room and produces a very effective combustion in combination with the action of water-gas, as above described.

Having now described my invention, I claim—

1. In a furnace-grate, the combination of a

fire-box, a plurality of concentric grate-rings therein, a vaporizer in the center thereof, bars radially arranged and pivoted to the said vaporizer and fire-box, means for continually supplying water to said vaporizer, other means for raising and lowering the vaporizer and grate-rings, a mantle of refractory material concentrically surrounding said grate-rings within said fire-box, vertical channels within said mantle each opening against the fire-room through narrow slots above the grate-rings and means for supplying air to said channels, substantially as for the purpose described.

2. In a furnace-grate, the combination of a fire-box, concentrically-arranged grate-rings therein, a mantle of refractory material within said box and surrounding the said grate-

rings, vertical channels within said mantle, vertical slots on the inside of said channels and inwardly opening above the grate-rings, means for supplying air to said channels, a vaporizer in the center of said grate-rings, bars pivoted to said vaporizer and fire-box and supporting said grate-rings, a rack and pinion for raising and lowering said vaporizer and grate-rings, a water-tank on the bottom of said fire-box, pipes filled with asbestos wicks and arranged in adjustable connection with said said vaporizer and tank, substantially as described.

FRIEDRICH HEINRICH EDUARD CAESAR NEHSE

Witnesses:

P. LIEBER,

WILLIAM ESSENWEIN.