

W. SWINDELL.
Metallurgic Gas Furnace.

No. 219,603.

Patented Sept. 16, 1879.

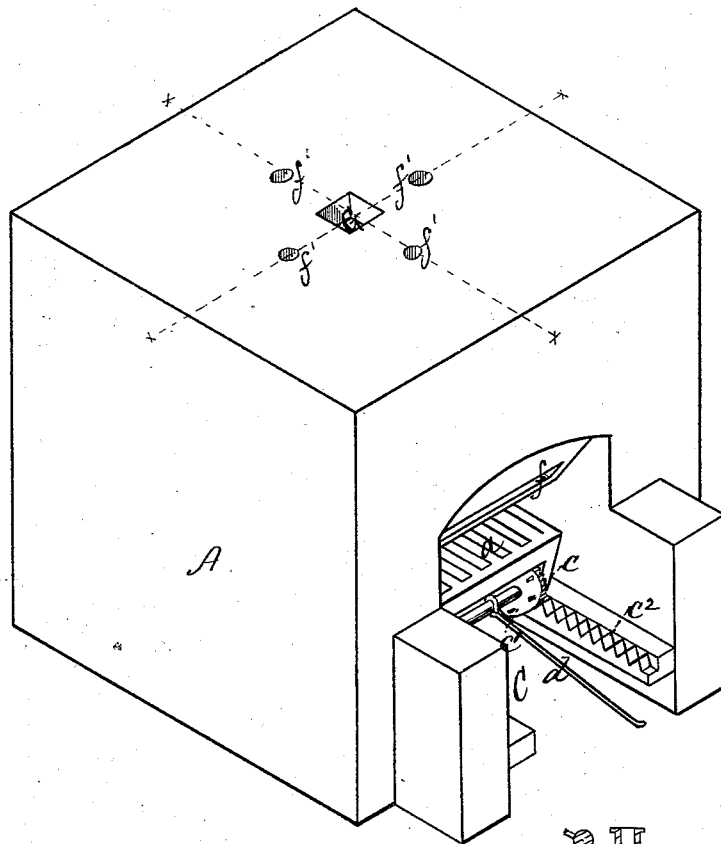


Fig. 1.

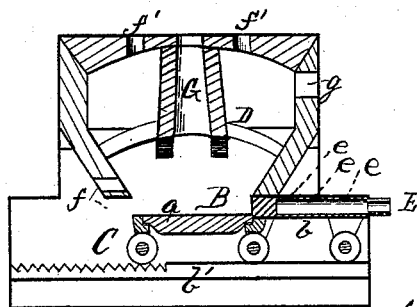


Fig. 2.

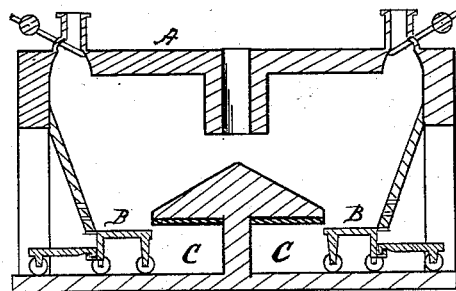


Fig. 3.

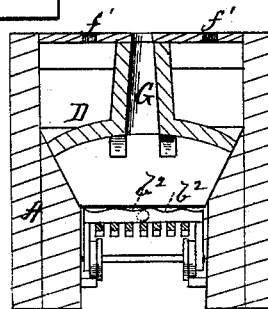


Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM SWINDELL, OF ALLEGHENY, PENNSYLVANIA.

IMPROVEMENT IN METALLURGIC GAS-FURNACES.

Specification forming part of Letters Patent No. **219,603**, dated September 16, 1879; application filed July 14, 1879.

To all whom it may concern:

Be it known that I, WILLIAM SWINDELL, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Producers; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a producer embodying my invention, partly broken away. Fig. 2 is a vertical section of the same, showing the grate in one position. Fig. 3 is a modification showing a double producer, the shifting grate being in the second position. Fig. 4 is a transverse vertical section on line *x x*, Fig. 2.

Like letters refer to like parts wherever they occur.

My invention relates to the construction of gas-producers and to grates especially adapted therefor, but generally useful for like furnaces where a shifting grate is desirable; and consists, first, in the combination, with a producer, of a shifting grate so constructed that the main grate may be withdrawn for the removal of clinkers, for slicing the grate-bars, or renewal thereof without disturbing the operation of the producer; secondly, in a shifting grate for producers and other furnaces, said grate composed of two sections, one of which is provided with grate-bars and is the main grate, while the other is devoid of bars and may be termed the "supplemental grate," the two sections so connected that either may be used at will for the purpose of cleaning the grate, damping down or accelerating the fire; and, finally, in details of construction herein-after more specifically set forth.

Heretofore in the construction of producers and many other like furnaces where large grate-bars are used the grate has been of the ordinary construction—that is to say, a series of independent bars supported upon cross-bars or shoulders formed in the masonry of the furnace, and when such bars became clogged with clinkers so as to obstruct the draft they had to be separately removed and "sliced" or cleaned, all of which disturbed more or less the operation of the furnace or

producer, often to the great detriment of the metallurgic operations being carried on in furnaces connected therewith. It sometimes becomes necessary (owing to the banking of the fuel or other cause) to supply a greater amount of air to producers than will be provided by the natural draft, and in such cases the only provision heretofore made has been by closing the ash-pit and introducing a blast therein. Sometimes also it is desirable to dampen the fire and reduce the amount of air which is admitted through the grate.

The object of the present invention, therefore, is first to facilitate the removal of clinkers, &c., from the grates; secondly, to provide means for either increasing or diminishing at will the air-supply; thirdly, to provide means for properly introducing the fuel and preventing the banking or irregular distribution thereof.

I will now proceed to describe my invention, so that others skilled in the art to which it appertains may apply the same.

In the drawings, A indicates the walls of the producer, which may be a single or double producer, as preferred, and of any approved construction.

B represents the shifting grate, which is composed of two sections, *a b*, mounted upon wheels, *a'*, which traverse a track, *b'*, arranged in the ash-pit C.

In order to readily apply power to move the shifting grate, and also to prevent the slipping of the wheels upon the track when any resistance is offered by clinkers or by the superimposed mass of fuel, one or more of the wheels may be provided with cogs *c*, which engage with a rack-bar, *c'*, and pins *c'* may be provided as fulcrums for a bar or lever, *d*; but other devices may be used for supporting and shifting the grate in lieu of those specified, if preferred.

The section *a* of shifting grate B is composed of a series of grate-bars of any approved form, and applied in the ordinary manner, while the section *b* may be either a solid hearth, preferably grooved or corrugated, as shown at *b'*, to permit the introduction of a stoking-bar, or it may be a hollow case, as shown in the drawings, perforated as at *e*, and provided with a blast-pipe, E. The first form or a solid

hearth will be found useful in that class of furnaces where it is only desirable to shift the grate for the removal and cleaning of the bars, or where the fire is to be dampened down at times, while the second construction, or hollow perforated section *b*, can not only be used for the two purposes before specified, but will enable an air-blast to be used with the (producer) fire when required.

D indicates a grated arch, usually constructed of fire-brick, though other material may be employed, and arranged in the producer at a height below which it is desirable to keep the fuel. This arch supports a central feed-chute, G, which is preferably wider below than it is above, so as to obviate all tendency of the fuel to clog in its descent. The function of the arch is, first, to support the feed-chute; secondly, to cause the even and uniform distribution of the fuel; and, thirdly, to indicate the height to which the fuel can rise in the producer, and leave the top of the producer clear for the unobstructed escape of the gas. The arrangement of the feed-chute also prevents heavy gases given off by the coking of the new charge from mingling with the lighter gases of the producer until the same has first passed through the fuel below the arch D.

f indicates the usual stoking-hole, just over the grate; *f'*, those in the roof of the producer, and *g* the gas-exit.

The operation of the above-described devices, or their equivalents, will be substantially as follows: The fuel being fed into the chute G will sink centrally, and then spread out evenly toward the sides of the producer, and the gas given off by the fuel will rise above the grating D into the upper part of the producer, from whence it can escape under uniform pressure.

When it is desired to either dampen the fire—that is to say, reduce the amount of air admitted below—or clean the grate-bars, the shifting grate can be operated by the lever *d*, or in other suitable manner, so as to withdraw the section *a* from beneath the producer and

substitute the section *b*. As this top of section *b* is on a somewhat higher level than section *a*, a portion of the spent fuel, ashes, and clinkers will be carried out of the furnace on section *a*, and after having been removed the bars can be removed, sliced, and replaced, or if any of the bars be burned out new bars can be inserted. If the section *b* is solid; or even if hollow, as shown, so long as no blast is introduced, the draft will be reduced and the fire dampened down, as air can only gain admission through the limited spaces formed by the corrugations. If more air is required than can be obtained through the grate-section *a*, then the grate having hollow section *b* is shifted, as before specified, and a blast is introduced through pipe E.

Having thus described the nature, operation, and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with a gas-producer, of a shifting grate, substantially as and for the purpose specified.

2. The compound shifting grate composed of the sections having bars and a corrugated section, substantially as and for the purpose specified.

3. In a shifting grate composed of two sections, one of which is grated, a hollow perforated section provided with a blast-pipe and combined with a grated section, substantially as and for the purpose specified.

4. The combination, with a gas producer or furnace, of a shifting grate composed of the sections *a* and *b*, connected together and mounted on wheels, one or more of said wheels being cogged to engage with a rack-bar in the ash-pit of the furnace, the whole constructed substantially as specified.

In testimony whereof I, the said WILLIAM SWINDELL, have hereunto set my hand.

WILLIAM SWINDELL.

Witnesses:

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