A. E. WACKERNIE.

Movable Fire-Bars for Furnaces, &c.

No. 210,827. **Patented Dec. 10, 1878.**

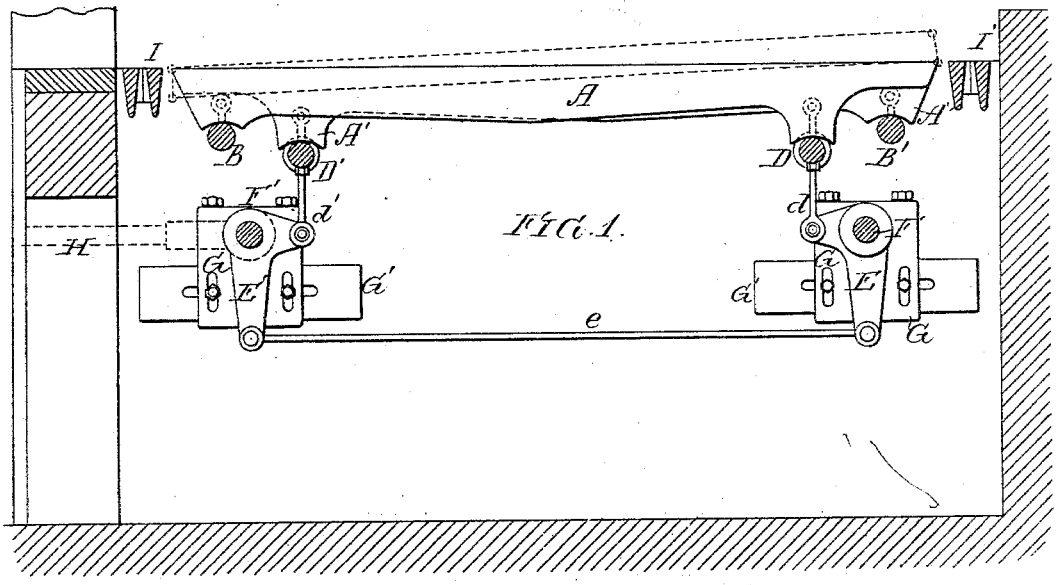

FIG. 1.

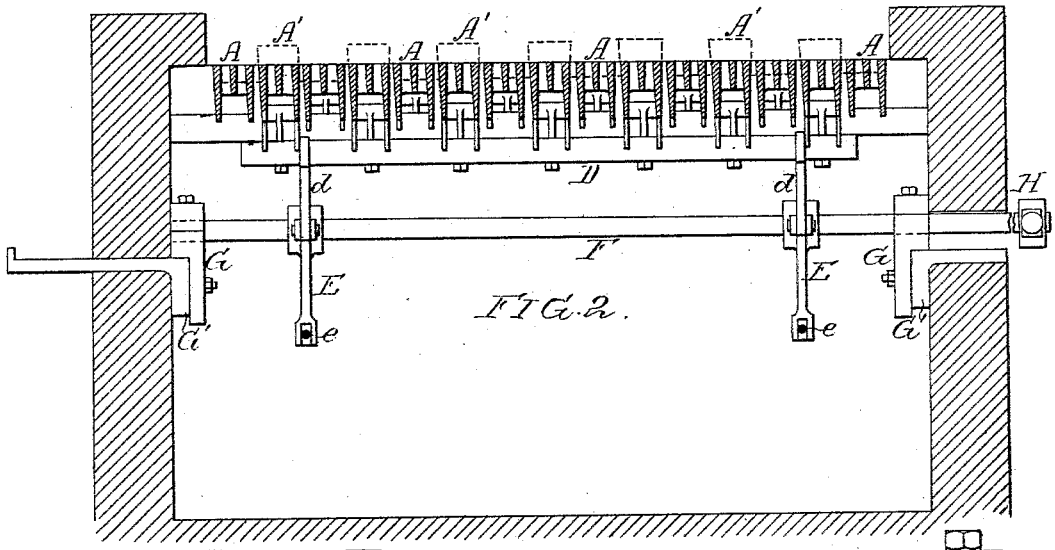

FIG. 2.

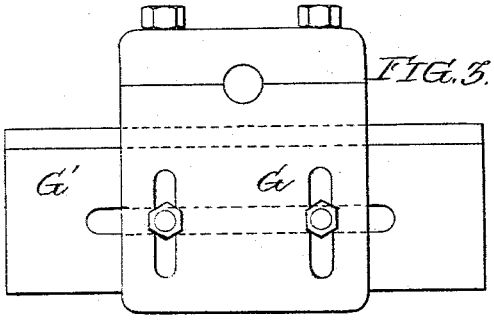

FIG. 3.

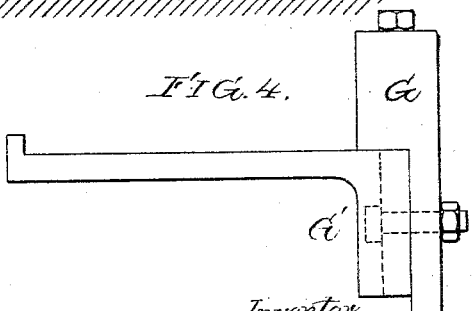

FIG. 4.

Witnesses.
Henry Howson Jr.
Harry Smith

Inventor
Alphonse E. Wackernie
by his Attorneys
Howson and Sons

UNITED STATES PATENT OFFICE.

ALPHONSE E. WACKERNIE, OF PARIS, FRANCE.

IMPROVEMENT IN MOVABLE FIRE-BARS FOR FURNACES, &c.

Specification forming part of Letters Patent No. **210,827**, dated December 10, 1878; application filed November 6, 1878.

To all whom it may concern:

Be it known that I, ALPHONSE EDOUARD WACKERNIE, of Paris, France, have invented certain Improvements in Furnace-Grates, of which the following is a specification:

The object of my invention is to so construct a furnace-grate with movable bars as to prevent the choking of the said bars with cinders, &c.; and this object I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal section of my improved grate applied to an ordinary stationary steam-boiler furnace; Fig. 2, a transverse section; and Figs. 3 and 4, views of detached parts of the device, drawn to an enlarged scale.

The grate is composed of a number of compound bars, A A′, each consisting of a number of single bars (three in the present instance) cast in one piece, as shown in Fig. 2. Each bar is mounted at one end on a horizontal pivot-rod, and at the other end is supported by, and connected to, a movable horizontal rod, by which a vertical rocking motion is imparted to the bar. The bars are so arranged alternately that while one bar, A, is connected to the movable rod D at one end, the next adjoining bar, A′, is connected to the movable rod D′ at the other end, of the grate; and in the same manner, while the rod A is mounted on the stationary support or pivot B at one end, the next adjoining bar, A′, is mounted on the rod B′ at the opposite end, of the grate, as shown in Fig. 1.

The movable rod D is connected by a link, *d*, to the short arm of a bell-crank lever, E, secured to the shaft F, which is mounted in bearings on adjustable plates G. These plates G are secured to shoes or supports G′, which are built into the masonry on the opposite sides of the furnace, by means of bolts passing through horizontal slots in the said shoes, and through vertical slots in the plates G, so that the latter may be adjusted vertically or horizontally, as occasion may require. The movable rod D′ is connected in a similar manner by a link, *d*′, to the short arm of a bell-crank lever, E′, secured to a shaft, F′, which is also mounted in adjustable bearings G.

To one end of the shaft D′ is secured an operating-handle, H; and the long arms of the levers E E′ are connected to each other by a rod, *e*, so that when the said handle H is depressed the alternate bars A′ will be raised at one end of the grate through the medium of the rod D′ and the levers and rods above described, while the opposite ends of the bars A will be depressed, as indicated by dotted lines in Fig. 2.

On reversing the movement of the handle, the positions of the bars will be reversed, the ends of the bars A being raised at one end, while the bars A′ are depressed at the opposite end, of the grate. By this means a rocking or vibrating motion in opposite directions is imparted to adjacent grate-bars on the pivoting-centers B B′.

Transverse bars I I′ are arranged at opposite ends of the grate, to protect the front wall and the fire-bridge from the effects of accidental blows from the vibrating fire-bars.

Although I have shown my improved grate as applied to a stationary furnace, it may be applied without departing from my invention to furnaces of other forms—such as marine boilers, locomotives, portable engines, &c.

I claim as my invention—

1. A furnace-grate consisting of a series of bars pivoted alternately at opposite ends of the grate, in combination with levers E and connecting-rod *e*, whereby a vibrating motion in opposite directions may be imparted to adjacent grate-bars on their opposite pivoting-points, substantially as set forth.

2. The combination of a series of grate-bars pivoted alternately at opposite ends to transverse stationary rods B B′ with independent movable lifting-bars D D′, substantially as described.

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

ALPHONSE EDOUARD WACKERNIE.

Witnesses:

ALFRED COINY,

ROBT. M. HOOPER.