(No Model.) 2 Sheets—Sheet 1.

F. DOYLE.

APPARATUS FOR OPENING FURNACE DOORS.

No. 384,137. Patented June 5, 1888.

Fig. 1.

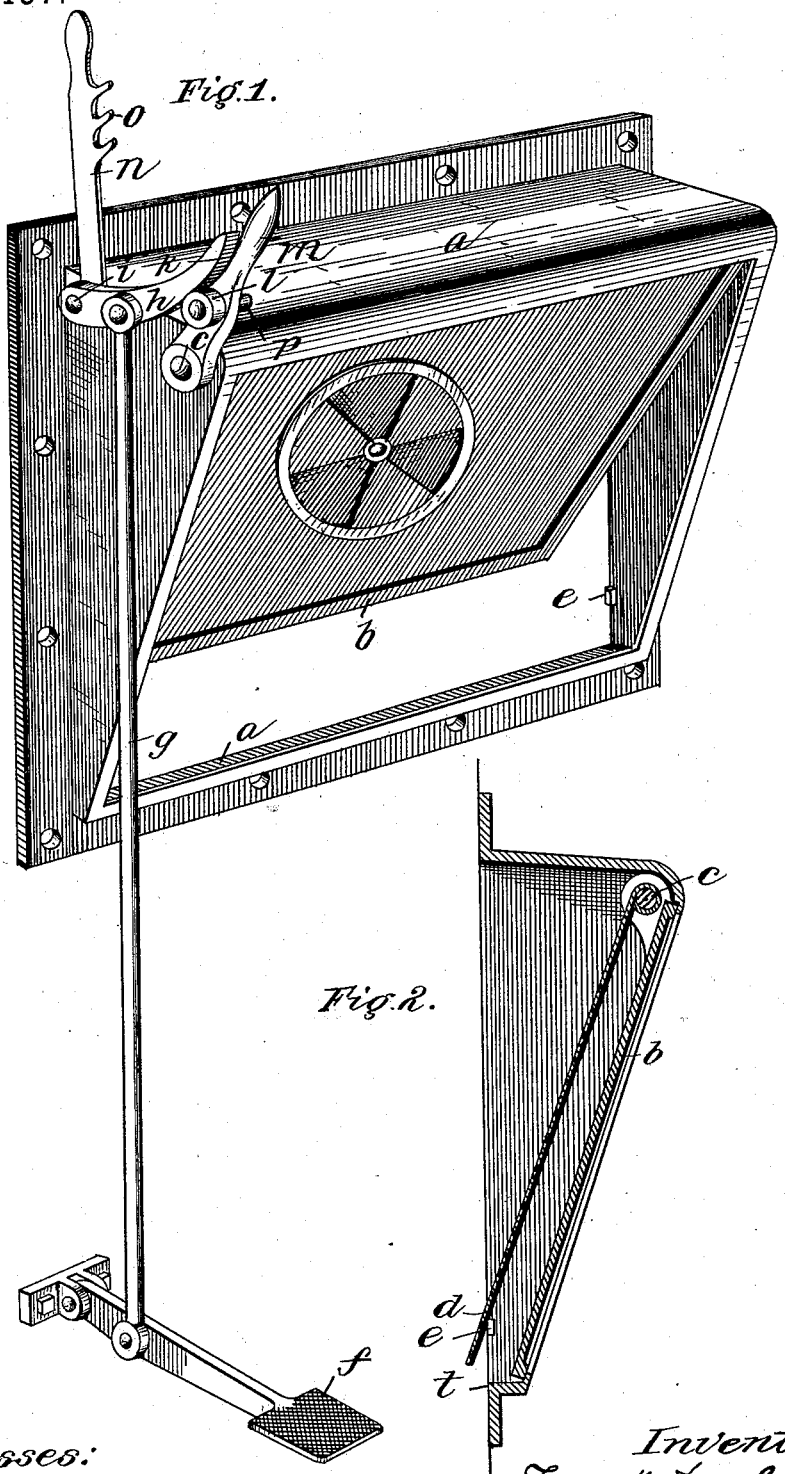


Fig. 2.

Witnesses:
Sam'l B. Dover.
Wm. M. Gilles.

Inventor:
Frank Doyle.
By George P. Barton.
Attorney.

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

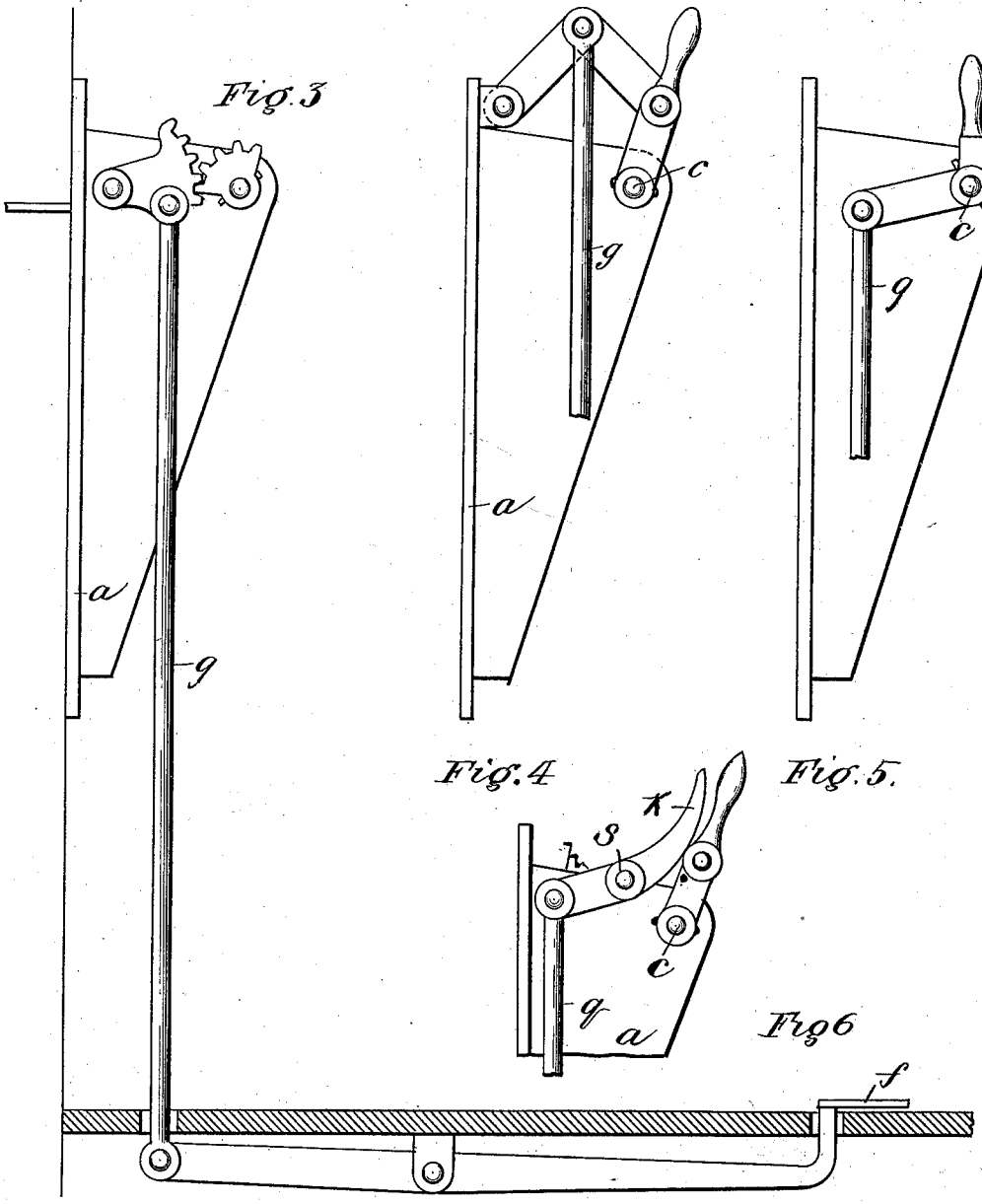
(No Model.) 2 Sheets—Sheet 2.

F. DOYLE.

APPARATUS FOR OPENING FURNACE DOORS.

No. 384,137. Patented June 5, 1888.

Fig. 3



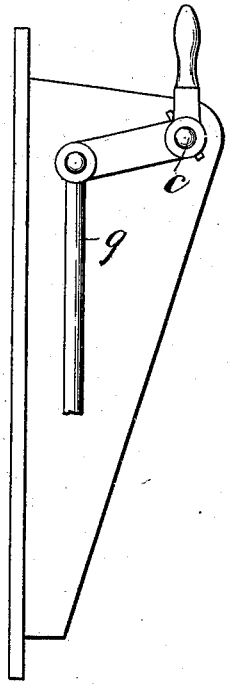


Fig. 4

Fig. 5.

Fig 6

Witnesses:
Sam'l B. Dover.
Wm M. Gillen

Inventor.
Frank Doyle
By George P. Barton
Attorney.

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

UNITED STATES PATENT OFFICE.

FRANK DOYLE, OF CHICAGO, ASSIGNOR OF ONE-HALF TO JOHN BAIRSTOW, OF LAKE VIEW, ILLINOIS.

APPARATUS FOR OPENING FURNACE-DOORS.

SPECIFICATION forming part of Letters Patent No. 384,137, dated June 5, 1888.

Application filed August 6, 1887. Serial No. 246,270. (No model.)

To all whom it may concern:

Be it known that I, FRANK DOYLE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Apparatus for Opening Furnace-Doors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to furnaces; and its object is to enable the fireman as he takes up a shovel of coal to open the door by simply pressing upon a pedal, the connections and operating mechanism between the pedal and door being such that when the pressure is removed the door will close itself.

My invention also relates to the construction of the door, which consists of two thicknesses of iron, the inner casting or lining being held at a short distance from the front casting when the door is closed, but, when the door is held open, resting directly upon the rear side of the front casting. The space between the front casting and the lining may thus be as great as may be desired to keep the heat from radiating from the front, while the door may be opened as wide as may be desired, since the lining rests directly against and is lifted by the front casting when swung open.

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

Figure 1 is a perspective view of my furnace-front with the pedal and mechanism connected therewith for opening the door. Fig. 2 is a sectional view showing the door closed, the lining of the door being supported at a distance from the front casting by lugs projecting from the frame. Figs. 3, 4, 5, and 6 are modifications of the pedal and other mechanism for opening the door.

I will now describe my invention as shown in detail in Figs. 1 and 2. The frame *a* is a casting and intended to be bolted to the front of the furnace. The door proper consists of the casting *b*, rigidly supported upon the rod *c*. The lining *d* may be perforated in the usual manner, and is supported loosely upon the rod *c*, and rests upon lugs *e* when the door is closed, as shown in Fig. 2. On opening the door by turning the rod *c*, the front *b* comes against lining *d* and lifts the same from lug *e*, and the two pieces *b* and *d* are then carried back until the door is open as far as is desired. The lining *d*, it should be observed, is somewhat wider than the front *b*, and hence, when the power is removed from the rod, the door falls back to the position shown in Fig. 2, the front passing by the lugs, while the lining is caught thereon and held at a distance from the front to protect the same, as shown. The pedal *f* is placed in position so as to be conveniently stepped upon by the man having a shovelful of coal.

I will now describe the lever and cam mechanism between the pedal and door and the device for holding the door open when desired, as illustrated in Fig. 1. The rod *g* is pivoted to the pedal at its lower end and to the cam *h* at its upper end. This cam is pivoted at *i*, and its outer upwardly-curved end, *k*, rests upon the friction-wheel *l* upon the crank *m*, which is rigidly secured to the rod *c*. Pressure being applied to the pedal, the cam is forced against the friction-wheel, and the crank is turned, and with it the rod *c*, to open the door. The door is thus thrown wide open at once, and, the pressure being removed, the door is closed by gravity. In Fig. 1 I have shown the door partially open, and in Fig. 2 the door is shown entirely closed. It may sometimes be desired to hold the door open. For this purpose I have provided the pivoted dog *n*, which is provided with projecting lugs or teeth *o*. By pulling the dog forward by hand any one of these lugs may be placed under the pin *p* of the crank, and thus the door may be propped open at any angle desired.

As shown in Fig. 3, pressure on the pedal throws up the connecting-rod *g*, which is connected with a segment-gear, which meshes with the gear upon the shaft or rod *c*, which carries the door. In Fig. 4 the rod *g* is shown connected with a toggle-joint which is connected with the crank of shaft *c*. On pulling down the rod *g* the shaft *c* will be turned to open the door, as described with respect to the mechanism shown in Fig. 1.

As shown in Fig. 5, the rod *g* is connected directly with the crank. On forcing the rod up, as shown in Fig. 3, the shaft *c* will be turned and the door opened.

In Fig. 6 I have shown the rod *g* connected with a cam, *h*, pivoted at the center *s*. On forcing the rod *g* up the cam is forced against the friction-wheel and the door opened, as described with respect to Fig. 1.

It is evident that my device admits of other modifications, which would readily suggest themselves to one skilled in the art. For example, the door might be swung outwardly instead of inwardly.

My invention might be applied to the doors of bake-ovens, or to any analogous devices, and I therefore do not limit the application of my invention to steam-boiler-furnace doors; but

I claim broadly—

1. The combination, with the pedal, of the rod *g*, pivoted thereto and to the cam, said cam bearing upon the friction-wheel upon the crank-handle, and the door rigid with the crank-shaft, whereby the door is opened when pressure is applied to the pedal, substantially as specified.

2. The combination, with the door, of the crank and the crank-shaft with which the door is rigidly connected, the friction-wheel upon the crank-handle, a cam bearing against said wheel, and lever mechanism for forcing the cam against the wheel to turn the crank, substantially as described.

3. The combination, with the door rigidly secured to the crank-shaft, of the pin upon the crank and a pivoted dog provided with teeth, whereby the door may be held at any angle desired.

4. The combination, with the crank mechanism and means for operating the same, of the double door, the front portion thereof being rigidly attached to the crank-shaft and the lining loosely mounted thereon, and stop mechanism for holding the lining at a distance from the front when the door is closed, said front coming against the lining when swung by the crank mechanism, substantially as described.

In witness whereof I hereunto subscribe my name this 2d day of August, A. D. 1887.

FRANK DOYLE.

Witnesses:

GEORGE P. BARTON,

WM. M. GILLER.