

(No Model.)

G. F. MOORS.
FURNACE DOOR OPENER.

No. 426,461.

Patented Apr. 29, 1890.

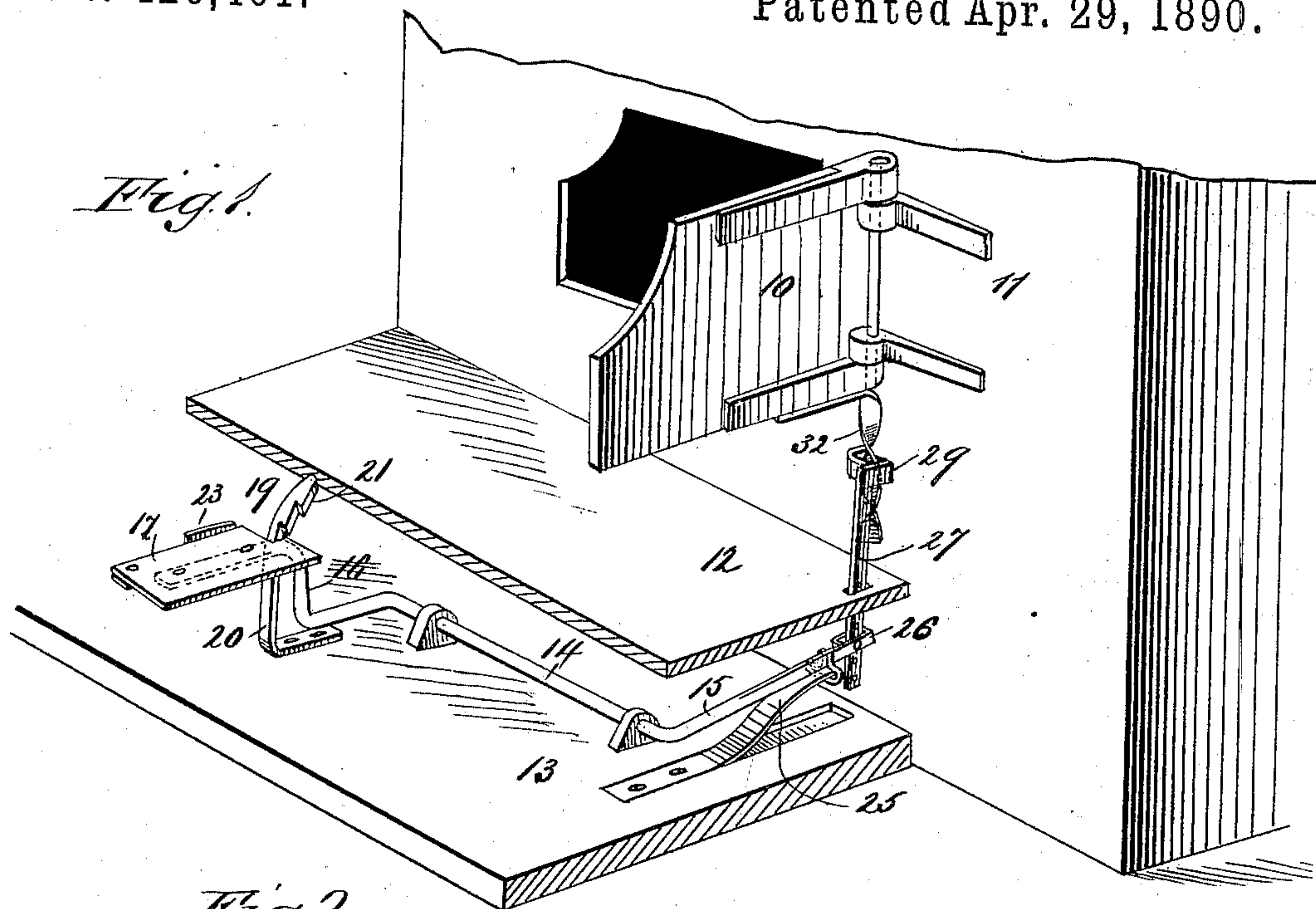


Fig. 2.

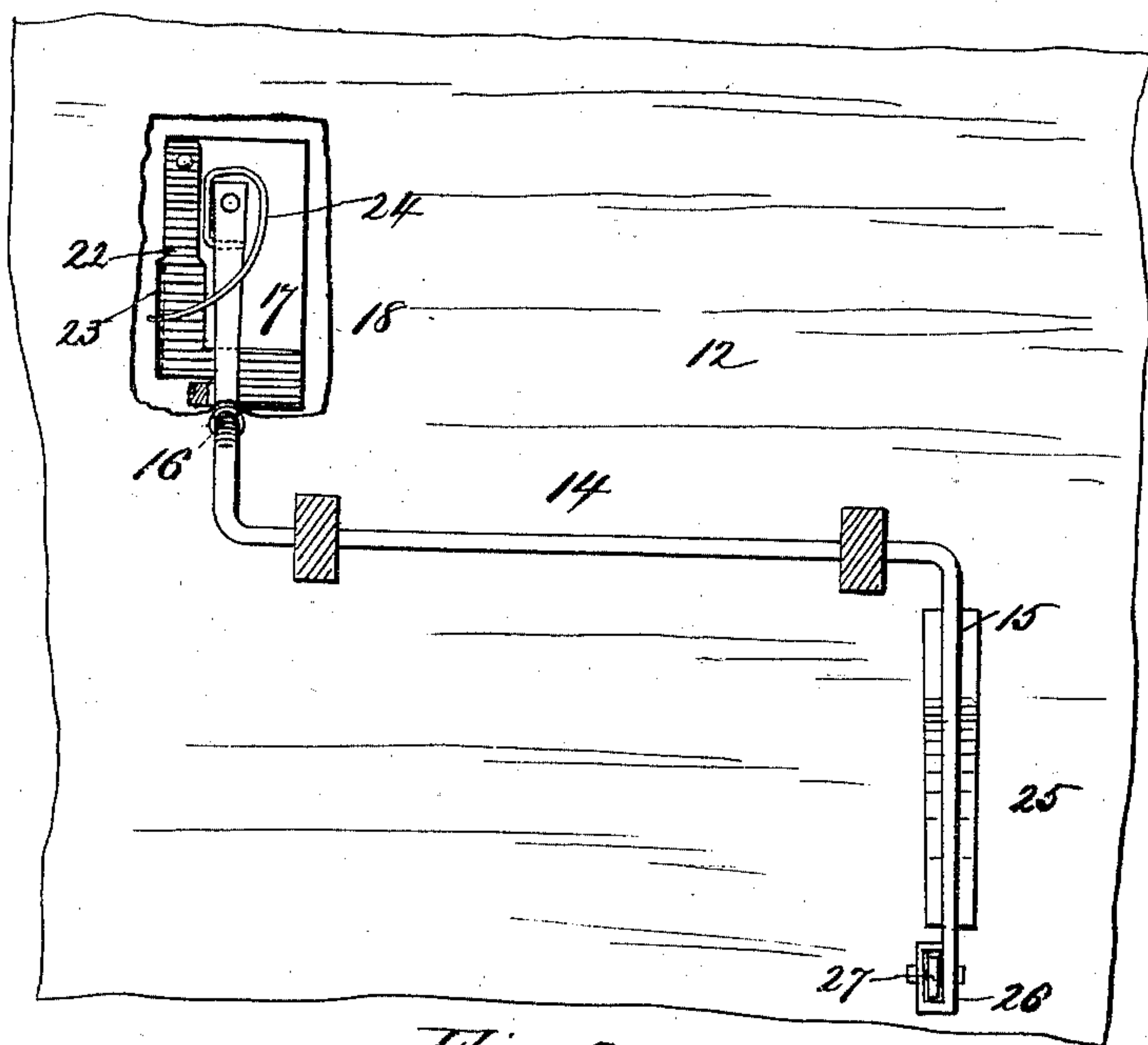


Fig. 5

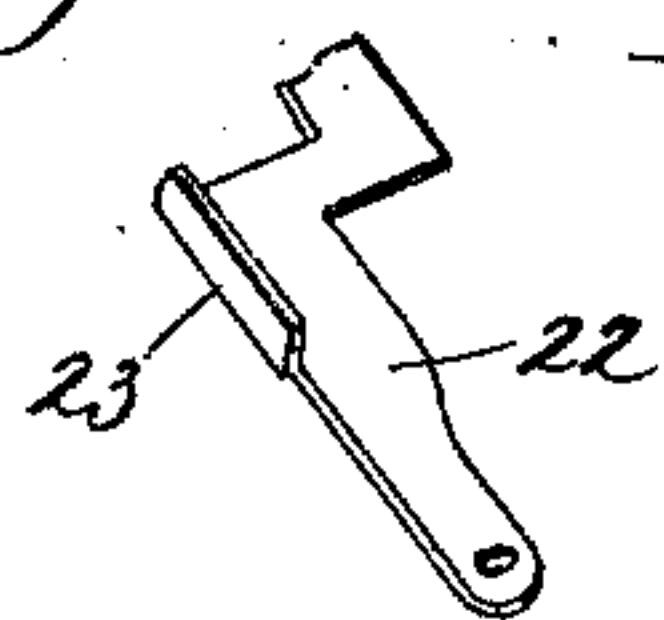


Fig. 6

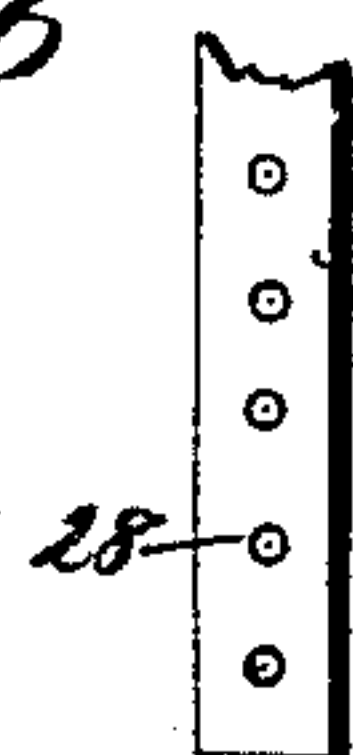


Fig. 4

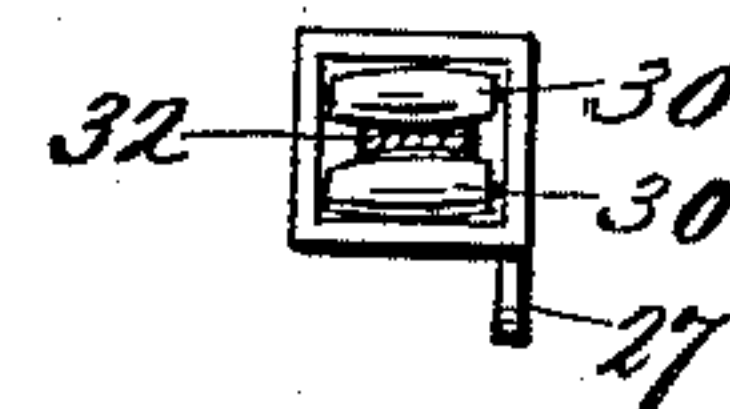
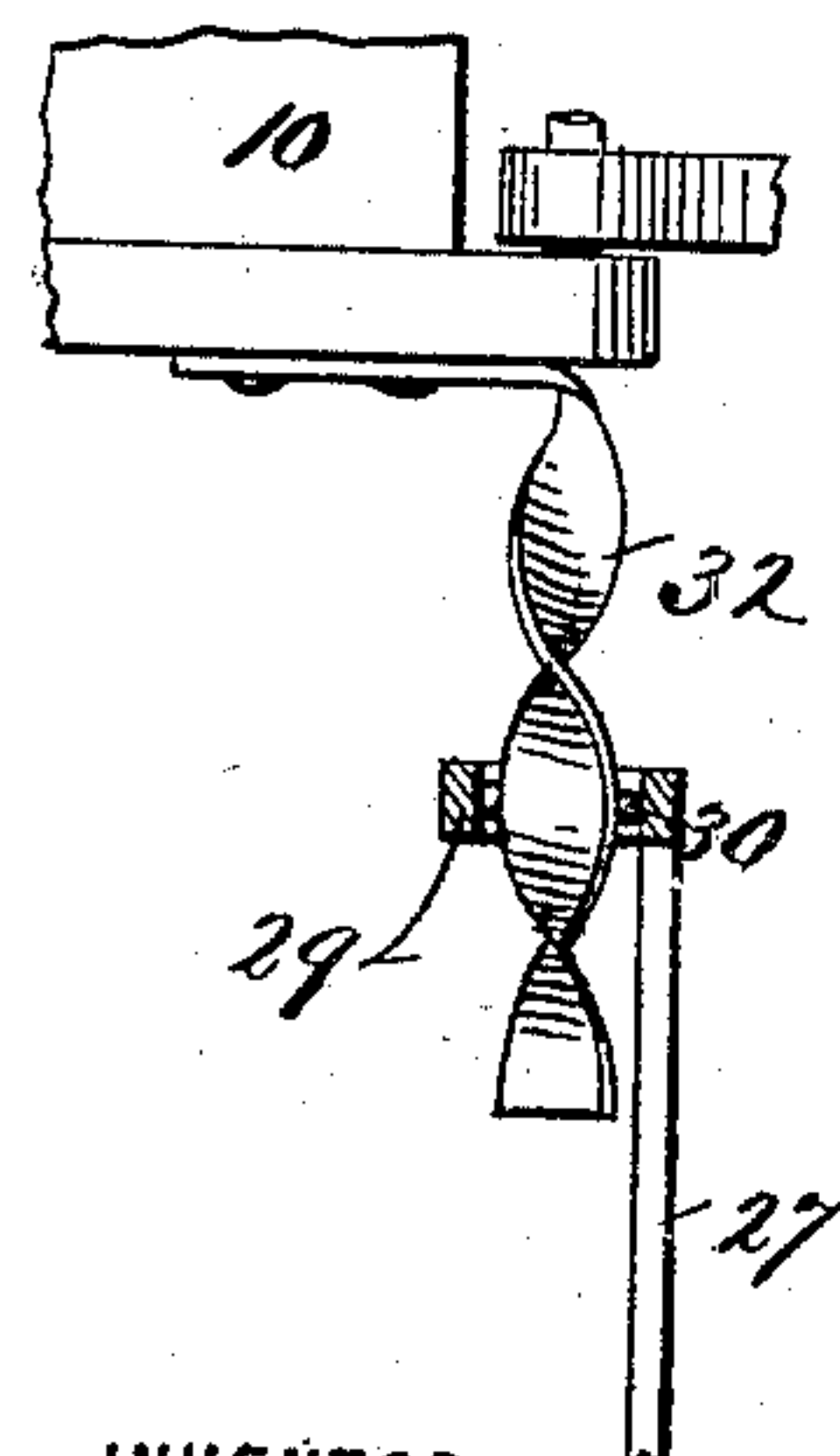


Fig. 3



WITNESSES:

F. Mc Ardle.
C. Sedgwick

INVENTOR:

G. F. Moors

Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

GEORGE FREDERICK MOORS, OF OWENSBOROUGH, KENTUCKY.

FURNACE-DOOR OPENER.

SPECIFICATION forming part of Letters Patent No. 426,461, dated April 29, 1890.

Application filed August 7, 1889. Serial No. 320,004. (No model.)

To all whom it may concern:

Be it known that I, GEORGE FREDERICK MOORS, of Owensborough, in the county of Daviess and State of Kentucky, have invented a new and useful Improvement in Furnace-Door Openers, of which the following is a full, clear, and exact description.

My invention relates to a device for opening and closing furnace-doors, especially adapted for use in connection with locomotive steam-boilers and other large boiler-furnaces, and has for its object to provide a means whereby when the fireman bears his weight upon or presses on a foot-plate the door of the furnace will be automatically opened, and whereby when the plate is released the door will be instantly and automatically closed, thus obviating the necessity of leaving the door open during the entire process of firing and thereby cooling the furnace.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a perspective view of a portion of a furnace, illustrating the application of the device. Fig. 2 is a bottom plan view of the main floor, illustrating the attachment of the device thereto. Fig. 3 is a detail side elevation and a partial sectional view of the door and its screw-connection with the rock-shaft. Fig. 4 is a plan view of the yoke through which the screw passes. Fig. 5 is a perspective view of the pawl attached to the foot-plate, and Fig. 6 is a side elevation of the lower end of the yoke-carrying link.

The door 10 is hinged to the furnace 11 in the usual manner, and beneath the main floor 12 of an engine-cab, for instance, an auxiliary or lower floor 13 is constructed, which may consist of a series of beams only. Upon this lower floor a rock-shaft 14 is journaled, having one end carried at a right angle therefrom in the direction of the furnace, as illustrated at 15 in Fig. 1, the other extremity being carried outward at a right angle in the opposite direction and vertically upward, as

shown at 16, and again horizontally outward. Upon the upper horizontal extension of the rock-shaft a foot-plate 17 is rigidly bolted or otherwise secured, which foot-plate is adapted to project through the opening 18, produced in the upper or main floor 12, as illustrated in Fig. 2.

At one side of the foot-plate at the inner end, which is provided with an angular recess 19, an upwardly and inwardly curved standard 20 is secured to the upper face of the floor, extending through and beyond the opening 18, in the side of which standard, contiguous to the foot-plate, a series of teeth 21 is cut. Upon the bottom of the foot-plate a pawl 22 is pivoted, consisting of an angled plate extending preferably parallel with one longitudinal edge of the foot-plate and across the recessed or inner end thereof, the said pawl being provided with an upwardly-extending lip or lug 23, integral with one side. The lug is held normally in contact with the side of the foot-plate by means of a spring 24, secured to the said plate and to the pawl, as shown in Fig. 2. The pawl may be made to contact or engage with the teeth of the standard 20 at any time by pressing the lug or lip laterally outward.

The inner crank-arm 15 of the rock-shaft is normally held essentially in contact with the lower floor 13 by means of a spring 25, the function of which spring is to draw the said crank-arm downward. The crank-arm 15 is preferably made to terminate in a loop 26, and through said loop the lower end of a link 27 is passed, which link is provided with a series of apertures 28 and is attached to the loop by a pin passed through the latter and through one of the apertures, as shown in Fig. 1. The upper end of the link is formed as a yoke 29, and in the said yoke, which is preferably rectangular in general contour, two parallel and horizontally-aligning friction-rollers 30 are pivoted, as shown in Fig. 4, the said friction-rollers being of greatest diameter at the center.

To the under edge of the door 10, at its hinged end, a spiral, twisted, or screw plate 32 is attached at one end, the other end of which plate passes downward between the friction-rollers 30 of the yoke 29. When the crank-arm 15 of the rock-shaft is in its nor-

mal position, the yoke 29 is drawn downward near the lower end of the screw-plate 32, whereupon the said plate is so turned as to force the door closed and to retain it in such position.

When it is necessary to fire, the fireman presses with one foot upon the foot-plate 17, whereupon the crank-arm 15 is elevated and the yoke 29 forced upward, and the upward movement of the yoke and the contact of the yoke friction-rollers with the screw-plate 32 revolve the said plate to such an extent as to fully open the door, as shown in Fig. 1.

If it is desired to retain the door in the open position by lateral pressure against the lip 23 of the pawl attached to the foot-plate, the said pawl is made to engage with one of the teeth 21 of the standard 20. To close the door, the pawl is returned to its normal position, whereupon the spring 25 acting presses the yoke downward and shuts the door.

The adjustment of the link 27, carrying the yoke 29, with the crank-arm 15 of the rock-shaft, is provided in order that the door may be opened, when the foot-plate is pressed downward, any desired distance.

In Fig. 2 I have illustrated the rock-shaft as journaled upon the under face of the main floor, the lower or auxiliary floor being dispensed with. When the shaft is so placed, the crank-arm 16 extends upward through an aperture in the floor, the foot-plate is above the floor, the standards 20 being secured to the upper face of the same, and the spring 25 is secured to the under face of the floor and is made to bear downward upon the crank-arm 15 of the rock-shaft.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a rock-shaft pro-

vided with a crank-arm and a spring secured thereto, of a link adjustably secured to the said crank-arm, carrying a yoke having convex frictional surfaces, and a screw or spiral plate adapted for attachment to the furnace-door and passed downward through the yoke in contact with its frictional surfaces, substantially as shown and described.

2. The combination, with a rock-shaft provided with a spring-actuated crank-arm, of a foot-plate secured to one end of the rock-shaft, a link adjustably attached to the outer extremity of the spring-actuated crank-arm, a yoke formed integral with the upper end of the link, provided with parallel friction-rollers, and a screw or spiral plate adapted for attachment to the furnace-door and passed downward through the yoke in contact with the rollers, substantially as and for the purpose specified.

3. The combination, with a rock-shaft having a spring-actuated crank-arm integral with one end and a second angled crank-arm extending in an opposite direction from the opposite end, a foot-plate attached to the angled crank-arm, a pawl pivoted to the bottom of the plate, and a toothed standard adapted for engagement with the said pawl, of an adjustable link secured to the spring-actuated crank-arm of the rock-shaft, a yoke integral with the upper end of the said link, having parallel spaced friction-rollers journaled therein, and a spiral or screw plate adapted for attachment to the furnace-door and passed downward through the yoke in contact with the friction-rollers, substantially as and for the purpose specified.

GEORGE FREDERICK MOORS.

Witnesses:

GEORGE W. WILLIAMS,
FREDERIC V. STIRMAN.