S. H. PUDNEY.

FIRE DOOR OPERATING MECHANISM.

APPLICATION FILED JAN. 6, 1919.

1,315,155.

Patented Sept. 2, 1919.

Fig. 1.

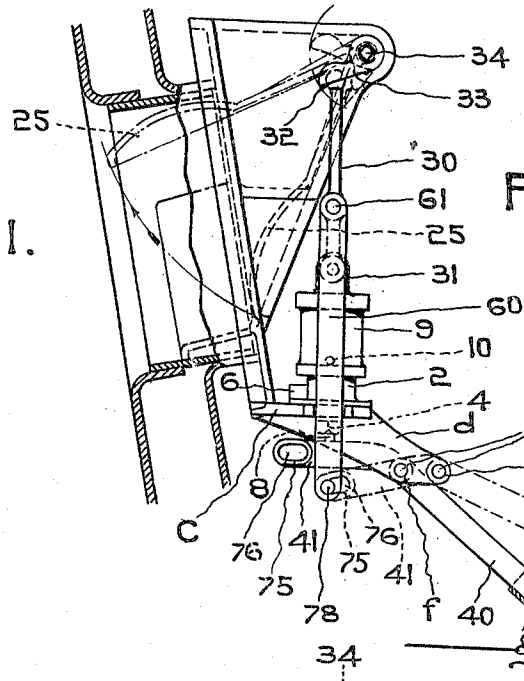


Fig. 4.

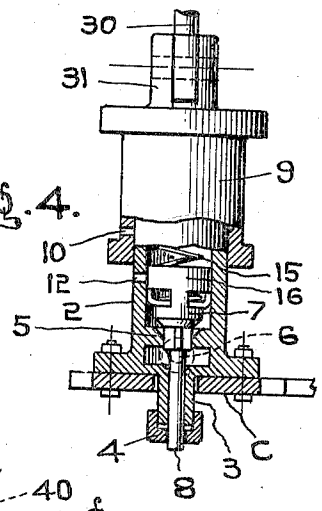


Fig. 2.

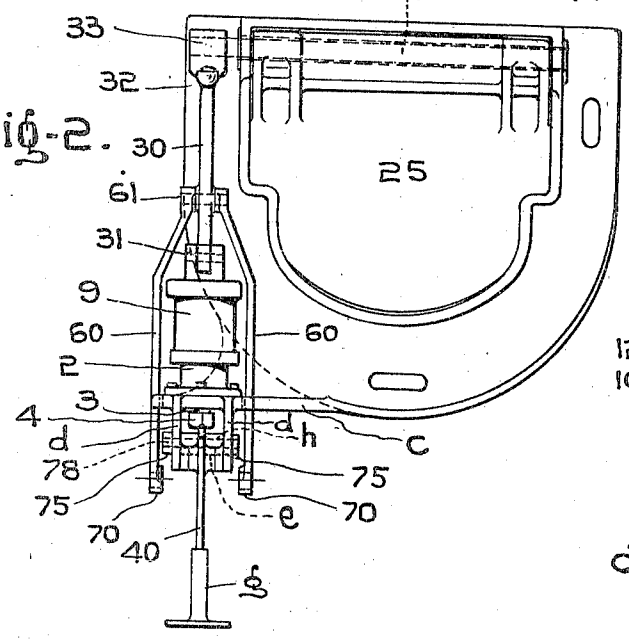
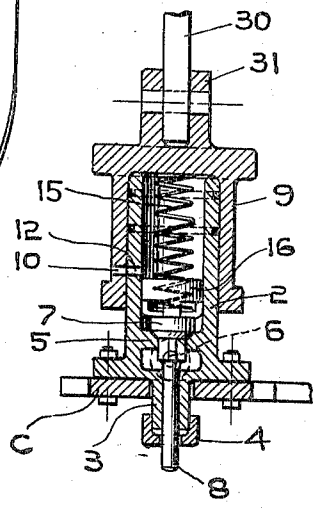


Fig. 3.



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FIRE-DOOR-OPERATING MECHANISM.

1,315,155. Specification of Letters Patent. Patented Sept. 2, 1919.

Application filed January 6, 1919. Serial No. 269,883.

To all whom it may concern:

Be it known that I, SYDNEY H. PUDNEY, a subject of the King of Great Britain, residing at Toronto, in the Province of Ontario and Dominion of Canada, have invented new and useful Improvements in Fire-Door-Operating Mechanism, of which the following is a specification.

My invention has particular reference to the consumption of smoke and economy of fuel obtained by the use of power operated mechanism for operating the doors of the fuel boxes of boilers for generating steam; and it has for its object to simplify this type of mechanism and facilitate its operation by foot power.

To this end the invention may be said, briefly, to comprise a device having a straight line reciprocal movement, means operatively connecting the device to the swinging door and adapted to convert the direct reciprocal movement into an oscillatory movement utilized for opening the door and permitting it to close. More specifically speaking my invention consists of a fixed vertical piston with a sleeve slidably mounted thereon and pivotally connected to the lower end of a push rod the top of which is rotatively connected to the door. The piston has valvular means controlling a motive-fluid supply, while a relatively movable member thereof is in operative relation with the valvular means; operating means being provided for connection, either to the push rod or the relatively movable member for the operation of the door by direct foot power or through the medium of motive-fluid means.

For full comprehension however of my invention reference must be had to the accompanying drawing in which similar reference characters indicate the same parts, and wherein,

Figure 1 is a side elevation of my smoke consuming and fuel economizing apparatus applied to the door of a locomotive boiler; the door opening being shown in fragmentary vertical sectional view;

Fig. 2 is a front elevation thereof;

Fig. 3 an axial sectional view of the power member of my improved apparatus, and

Fig. 4 is a similar view to Fig. 3 and partly in elevation.

The front cap of the boiler has a platform extension *c* with integral brackets *d* which have two pairs of alined holes *e e* and *f f*. These respective pairs of holes are the pivot points of a lever *g* which constitutes the operating means. The pin *h* on which this lever is fulcrumed is journaled in the holes *f f* when the door is to be operated by power and in holes *e e* when foot power is to be used for direct operation.

As illustrated the lever is fulcrumed in holes *f f* which places its upper end in proper operative relation with the motive fluid controlling means.

This motive fluid means consists of a fixed piston 2 mounted rigidly on the platform extension *c* and having a tubular extension 3 projecting downwardly through a hole in the platform and provided with a stuffing box 4. The valve seat 5 is formed within this piston above the compressed air intake port 6. On this valve seat the valve 7 is adapted to be seated, the valve stem 8 thereof protruding downwardly through the tubular extension 3 and stuffing box 4 to a point slightly below the stuffing box; the idea being to lift the valve from its seat by raising the valve stem. A sleeve 9 fits slidably over the piston and has therein an exhaust port 10 which communicates with a like port 12 in the piston; and an expansive spring 15 within the piston bears between the end of the sleeve and the valve its function being to tend to keep the valve on its seat. The exhaust port 12 is controlled from the inside of the piston by a valvular ring 16 carried rigidly by the valve to move in unison therewith.

This motive fluid means operates the door 25 of the furnace through a push rod 30 the lower end of which is pivotally connected between a pair of lugs 31 cast on the upper end of the sleeve 9, the upper end of this push rod being connected by a ball and socket joint 32 with an arm 33 in operative engagement with the shaft 34 of the door. The door in the present embodiment of my invention is swung from its top edge and, consequently, by vibrating the arm 33 and shaft 34 the door is swung to and from closed position.

The operating means of this motive fluid mechanism consists of a lever 40 which is also a part of the manually operated means as will be presently shown. This lever, for the motive fluid means, is fulcrumed in the holes *f f* which places its short end 41 in the proper position to engage the valve stem 8. In this arrangement this lever is

shown in full lines in Fig. 1 where the floor line is indicated at 50.

By depressing the lever, with the foot, the valve stem is pushed up thereby lifting the valve from its seat and admitting compressed air into the piston which has the effect of raising the sleeve 9 and through it the push rod and arm 33 thereby swinging the door to the upper position shown in dotted lines in Fig. 1.

For the opening of the door by foot power a pair of hanging links 60 are pivotally connected as at 61 to the push rod 30 and have their lower ends depending to points below the level of the platform and are provided with bosses 70; while the end 75 of the lever to perform its function in this relation is widened at its upper end as at 75 and provided with a slot or eye 76 of relatively increased length to permit of lost motion between the lever end and the connecting pin 78 (adapted to be inserted through the bosses 70) and this eye 76 in order to effect the pivotal connection with lever and the arm 60. This alternative arrangement is obtained by withdrawing the fulcrum pin from the holes *f* and fulcruming the lever in the holes *e*. This arrangement provides greater effective throw of the lever which, when depressed, throws the arms 60 and push rod 30 to the same extent as the push rod is thrown by the motive fluid means.

What I claim is as follows:

1. The combination with a fire-door of the type described; of a mechanism for operating the same, said mechanism including a reciprocatory device operatively connected to the door, a motive fluid actuated means operatively connected to the device, and a foot-operated lever, means for fulcruming said lever in two positions, the lever being constructed and arranged when in one position to control the motive fluid supply and in the other position to be operatively connected to the said device for the purpose of actuating the door independently of said motive fluid means.

2. The combination with a door of the type described, of a mechanism for operating the same said mechanism including a motive fluid means having a vertically reciprocal part, a motive fluid supply port and a valve for controlling the port the valve stem of which protrudes through the lower end of said means, a push rod operatively connected to the door and to the motive fluid actuated means, a pair of links the upper ends of which are connected to said push rod, a foot-operated lever, means for fulcruming said lever in two positions, said lever when in one position being adapted to engage the valve stem and when in the other position to be connected to said links for the purpose of actuating the door independently of the motive fluid means.

3. In a mechanism of the type described, the combination with a boiler front having a fire door hung from a shaft at its top, and a lever arm mounted rigidly on the shaft, of a platform extension carried integrally by the front; a motive-fluid device mounted rigidly on the platform and having a reciprocal part and a motive fluid supply port, a valve controlling the motive-fluid supply and having a valve stem protruding downwardly below the platform, a push rod pivoted at one end to the reciprocal part and at is opposite end to the lever arm; a pair of spaced parallel lugs carried by the platform and presenting two pairs of pivot points; an angular lever; means for fulcruming the lever in one or the other pair of said pivot points, such lever having one end adapted for foot operation and its opposite end adapted when it is fulcrumed in one pair of pivot points, for engagement with the valve stem; a pair of links pivoted to the push rod and extending beneath the platform; means for pivotally connecting the lower ends of the links to the adjacent end of the lever when the said lever is pivoted in the other pair of pivot points.

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

SYDNEY H. PUDNEY.

Witnesses:

GORDON G. COOKE,

WILLIAM J. C. HEWETSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."