March 31, 1925.

R. D. BOBBITT

1,532,029

FIRE DOOR OPERATING DEVICE

Filed Feb. 25, 1924

3 Sheets-Sheet 1

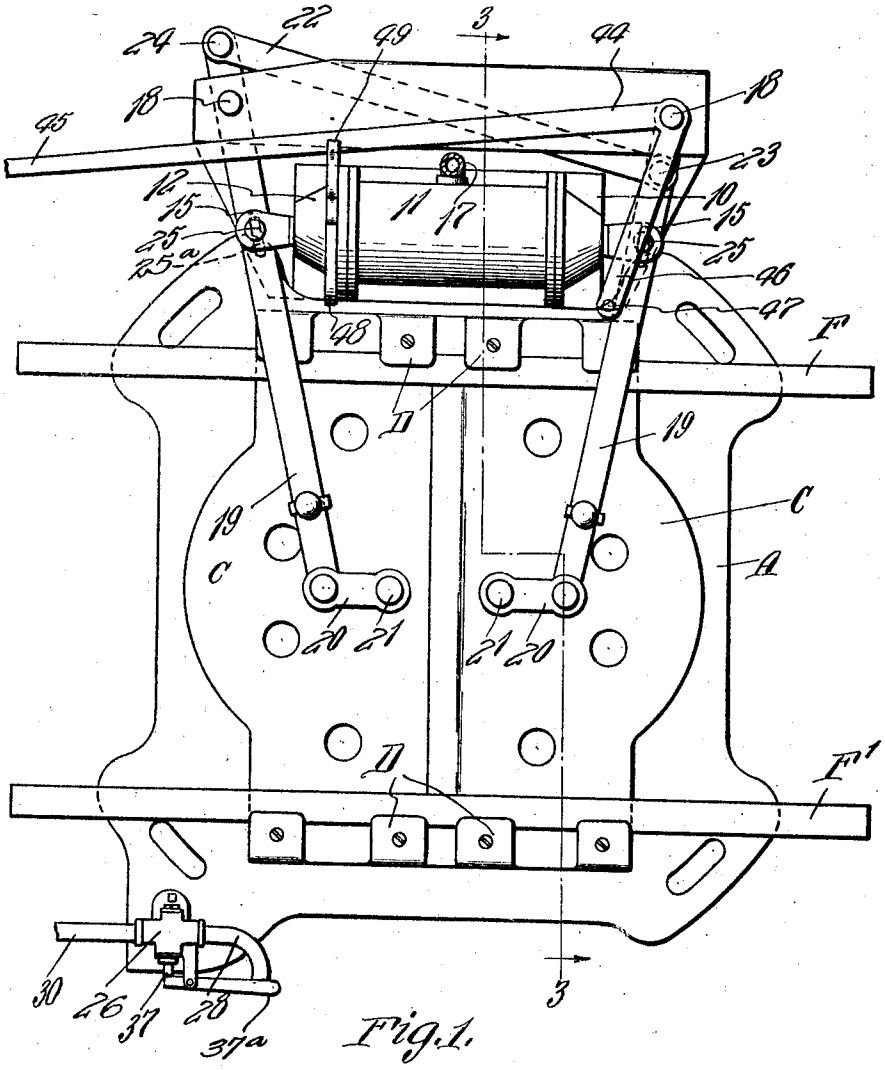


Fig. 1.

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3 Sheets-Sheet 2

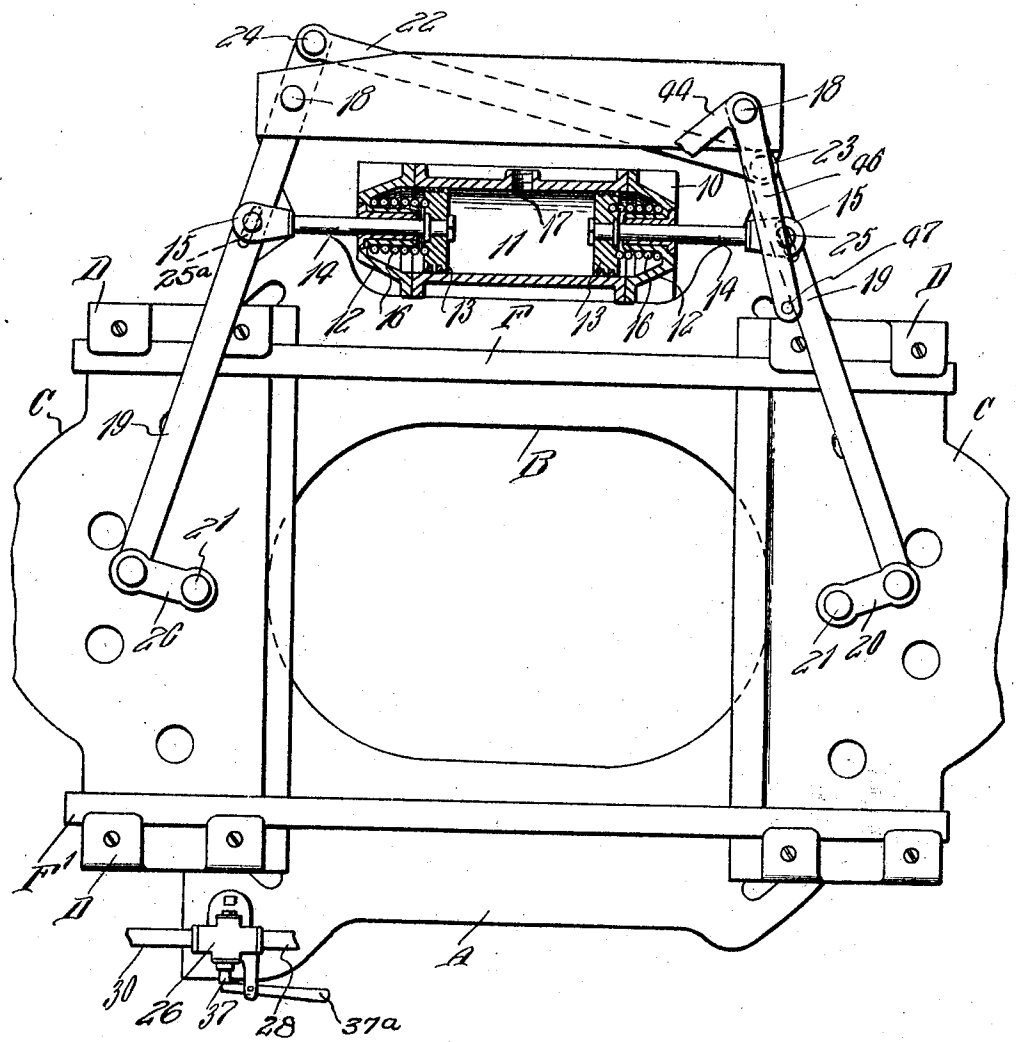


Fig. 2.

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Fig. 3.

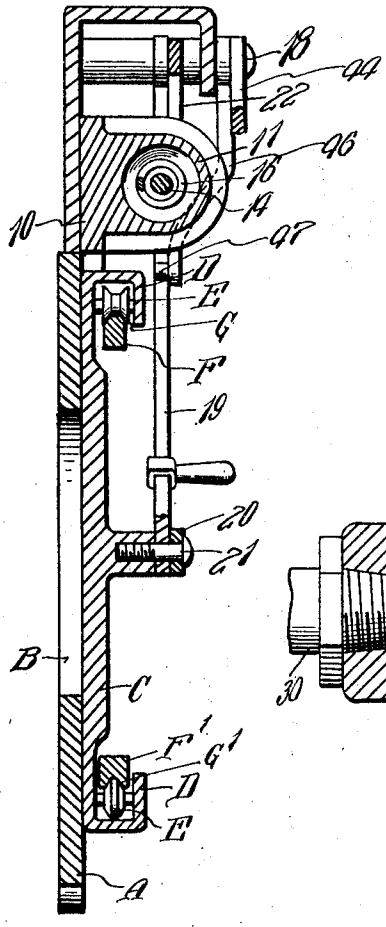
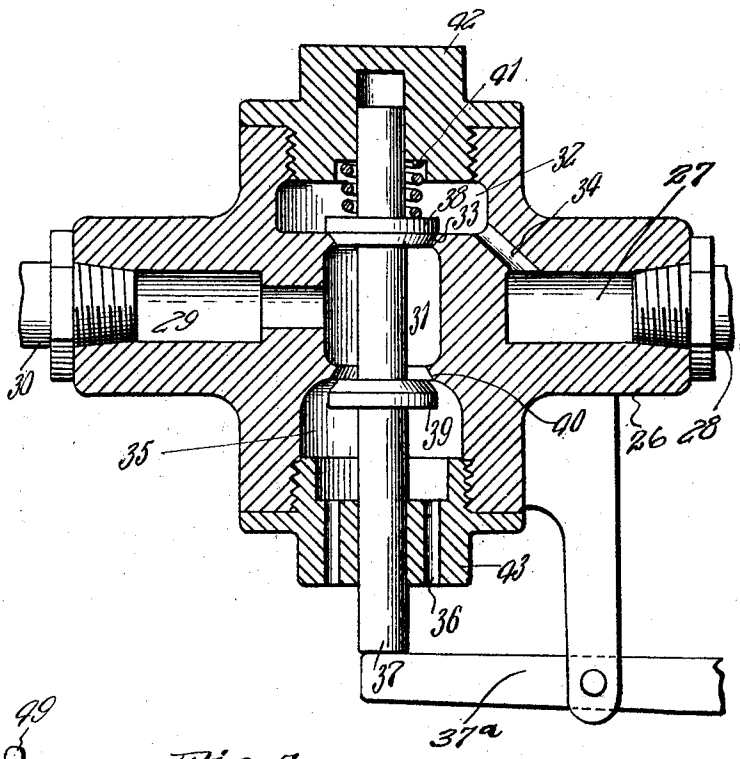


Fig. 4.



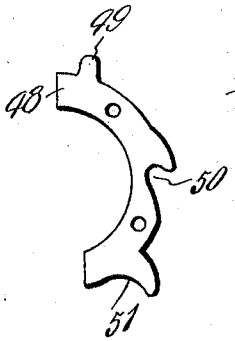


Fig. 5.

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Patented Mar. 31, 1925. 1,532,029

UNITED STATES PATENT OFFICE.

RALPH D. BOBBITT, OF NORFOLK, VIRGINIA.

FIRE-DOOR-OPERATING DEVICE.

Application filed February 25, 1924. Serial No. 695,134.

To all whom it may concern:

Be it known that I, RALPH D. BOBBITT, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented new and useful Improvements in Fire-Door-Operating Devices, of which the following is a specification.

This invention relates to door operating mechanism and has for its object the provision of power means for controlling opening of the doors on a locomotive fire box whereby to obviate any necessity for manual operation.

An important and more specific object is the provision of a fluid pressure operated mechanism for this purpose in which the actuating force may be either steam or compressed air.

An additional object is the provision of a mechanism of this character which will be simple and inexpensive in manufacture and installation, easy to control and operate, positive in action, efficient and durable in service and a general improvement in the art.

With the above and other objects and advantages in view the invention consists in the details of construction to be hereinafter more fully described and claimed and illustrated in the accompanying drawings, in which:

Figure 1 is an elevation of the mechanism applied to the fire doors of a locomotive the doors being shown as closed.

Figure 2 is a similar view with the doors in open position and showing the operating cylinder in section,

Fig. 3 is a vertical sectional view on the line 3—3 of Figure 1.

Figure 4 is a detail sectional view of the controlling valve mechanism.

Figure 5 is a detail view of a holding bracket for the manual control lever.

Referring more particularly to the drawings the letter A indicates the door frame having an opening B normally closed by a pair of doors C which are slidably mounted and which have hangers D equipped with rollers E traveling upon guide rails F and F′ suitably secured onto the frame A. The upper rail has its upper edge V-shaped and conformingly engaged by the rollers G which are correspondingly grooved. The lower rail F′ is grooved at its underside and the rollers G′ are correspondingly shaped. The exact manner of mounting the door frame and other details need not be illustrated or described specifically as such will be obvious to one skilled in the art.

In carrying out the invention I provide a support 10 adapted to be bolted or otherwise secured to the frame A. Carried by this support is a cylinder 11 having heads 12 and containing two pistons 13 mounted on the inner ends of piston rods 14 which are slidable through the heads 12 and which terminate in forks 15. The pistons are normally urged toward the center of the cylinder by springs 16 which engage against the pistons and against the heads. At the center of the cylinder is an inlet port 17 for the introduction of steam or compressed air supplied through control means to be described.

Pivoted at 18 on the support 10 are levers 19 to the free ends of which are pivotally connected links 20 which are in turn pivoted at 21 on the doors C. To insure simultaneous movement of the levers at all times, I provide a bridle bar 22 pivotally connected at 23 with one lever below its pivot and pivoted at 24 to the other lever above its pivot. The forks 15 are pivotally connected at 25 with the respective levers. The connection must be loose to prevent binding and for illustrative purposes I have shown the levers as slotted at 25ª to permit the necessary play.

The control valve mechanism comprises a body 26 having an inlet 27 to which is connected a suitable pipe 28 leading from the engine boiler or from some compressed air reservoir. At an opposite point the body has an outlet 29 to which is connected a pipe 30 leading to the inlet port 17 in the cylinder 11. Internally the body is formed with a chamber 31 and a separate chamber 32 having a valve seat 33 therein. The chamber 32 communicates with the inlet 28 through a passage 34. Below the chamber 31 is a chamber 35 communicating with the atmosphere through ports 36. Slidable through the body is a double valve which includes a stem 37 carrying a valve 38 adapted to engage the seat 33, and further carrying a valve 39 adapted to engage a seat 40 formed at the juncture of the chambers 31 and 35. Above the valve 38 is a spring 41 which operates to force it downwardly, and the top of the body is closed by a removable plug 42

which forms an abutment for the spring 41 and a guide for the stem 37. The bottom part of the body is provided with a removable plug 43 within which the above described ports 36 are formed.

In the operation it will be seen that to effect opening of the doors, it is necessary to move the valve stem 37 upwardly by some suitable handle device such as that illustrated at 32ª, whereupon the valve 39 seats and the valve 38 unseats, permitting steam or compressed air to pass from the passage 28 through the passage 34, chamber 32, chamber 31 and pipe 30 to the cylinder 11. When this is done the expansion of this fluid pressure within the cylinder forces the pistons 13 outwardly resulting in swinging the levers 19 outwardly and opening the doors. To reclose the doors, pressure on the valve stem 37 is released whereupon the spring 41 forces the stem 37 downwardly, closing the inlet valve 38 and opening the exhaust valve 39. The fluid within the cylinder 11 then escapes through the pipe 30, chamber 31, chamber 35 and ports 36 to the atmosphere, the springs 16 returning the pistons to normal position so that the doors are again slid into their closed position.

In order that the doors may be operated manually, I provide an angle lever 44 which has its angle pivoted at the point 18 and which includes a long arm 45 constituting a handle, and a short arm 46 which carries a transverse pin 47 engaging the lever 19. In case the power means is not used for any reason, downward pressure upon the handle 45 will cause the angle lever 44 to swing the doors open. The opening of the doors by the power means does not effect the hand lever. For holding the doors in partly or entirely open position, I provide a bracket 48 which is clamped or otherwise secured at one end of the cylinder, and which bracket is formed with a stop 49 against which the lever normally rests. The bracket is also formed with notches 50 and 51 within which the lever may be engaged for holding the lever with the doors partly or entirely open, as the case may be. By disengaging the hand lever from its holding bracket and swinging it down the doors are forced open as shown in Figure 2. If the doors are opened by power, the hand lever does not move.

While I have shown and described the preferred embodiment of my invention it is of course to be understood that I reserve the right to make such changes in the form, construction and arrangement of parts as will not depart from the spirit of the invention or the scope of the subjoined claim.

Having thus described my invention I claim:

In combination with the movably mounted doors of a locomotive fire box, a cylinder, pistons oppositely arranged therein and carried by piston rods, levers pivotally mounted at one end and having their other ends pivotally connected with the doors, said piston rods being pivotally connected with said levers, a control valve having an inlet from a source of fluid pressure and having an outlet connected with said cylinder at a point between the pistons therein, valve seats within the valve structure, and a stem carrying two valves controlling said seats whereby to permit flow of fluid pressure to or from the cylinder.

In testimony whereof I affix my signature.

RALPH D. BOBBITT.