

No. 892,565.

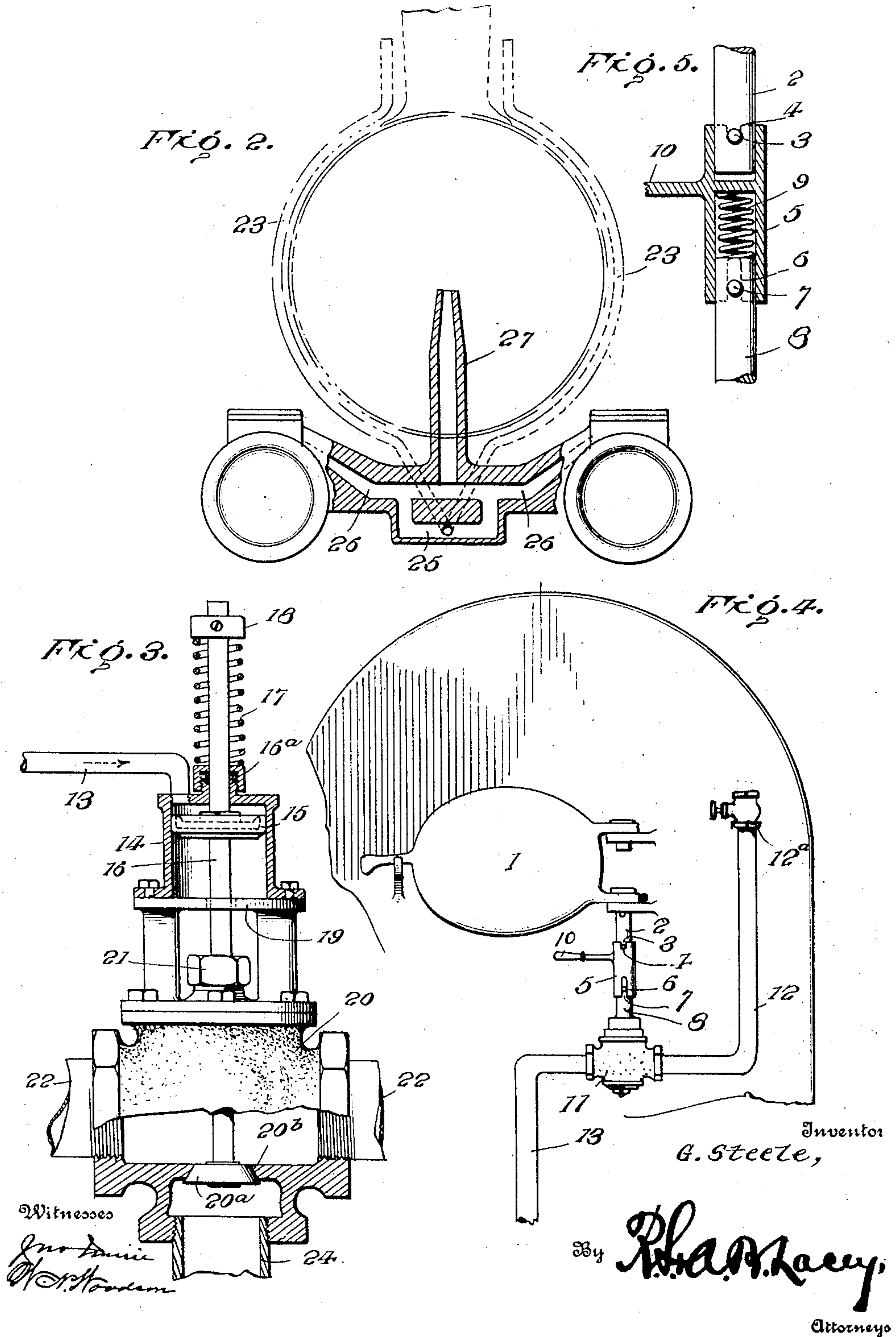
PATENTED JULY 7, 1908.

G. STEELE.

DRAFT REGULATOR FOR BOILER FURNACES.

APPLICATION FILED APR. 6, 1907.

3 SHEETS—SHEET 2.



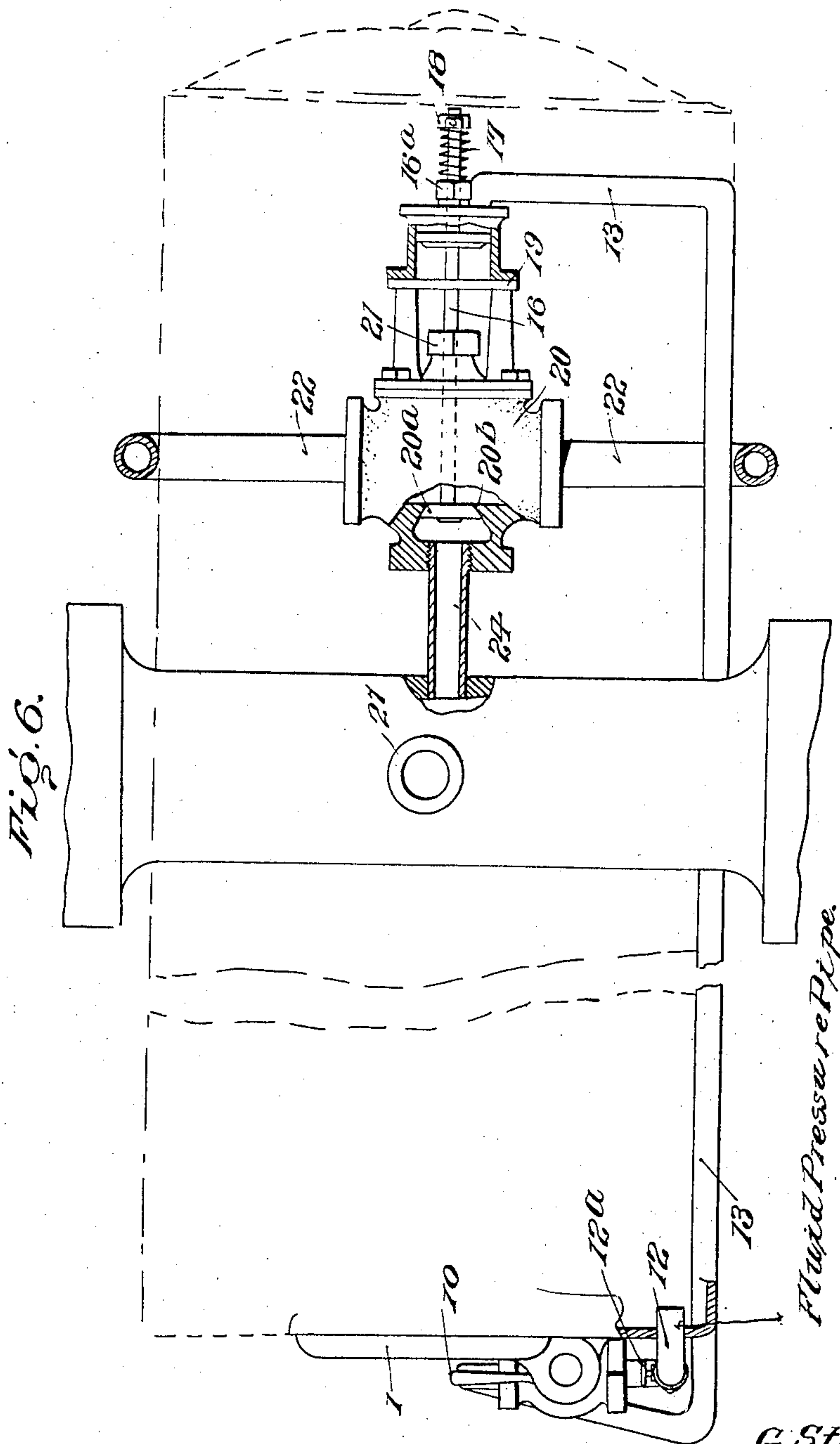
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Witnesses

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UNITED STATES PATENT OFFICE.

GABRIEL STEELE, OF SIOUX CITY, IOWA, ASSIGNOR OF ONE-HALF TO FRED L. EATON, OF SIOUX CITY, IOWA.

DRAFT-REGULATOR FOR BOILER-FURNACES.

No. 892,565.

Specification of Letters Patent.

Patented July 7, 1908.

Application filed April 6, 1907. Serial No. 366,777.

To all whom it may concern:

Be it known that I, GABRIEL STEELE, citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented certain new and useful Improvements in Draft-Regulators for Boiler-Furnaces, of which the following is a specification.

This invention contemplates certain new and useful improvements in means for automatically regulating the draft of the boiler furnaces for locomotives or other portable engines and the invention has for its object an improved construction and arrangement of parts of an automatic draft regulator, whereby, upon the opening of the fire door for any purpose, the draft is automatically shut off or cut down, cold air being thereby prevented from entering the boiler furnace to interfere with the combustion and to cause contraction of the tubes and flue sheets with disastrous results, relieving the back pressure on the engine when the fire door is open and when the boiler is generating the least steam, effecting economies in the consumption of fuel and affording the fireman more time in which to spread his fire than he would have if he were compelled to close the door after putting in each shovelful of coal. By the use of the invention, full force of the draft is automatically restored upon the closing of the fire door.

With this and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts which I shall hereinafter fully describe and then point out the novel features in the appended claims.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result, reference is to be had to the following description and accompanying drawings, in which:

Figure 1 is a side elevation of a locomotive embodying the improvements of my invention. Fig. 2 is a transverse sectional view, partly in elevation, of the front end of the locomotive boiler. Fig. 3 is an enlarged detail sectional view of the three-way valve of the mechanism. Fig. 4 is an elevation of that portion of the mechanism which is located at the fire door. Fig. 5 is a detail sectional view of the means for manually actu-

ating the mechanism. Fig. 6 is a horizontal sectional view, of parts in top plan and other parts broken away, illustrating the invention, the view being in the nature of a diagram.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The fire door 1 has one of its hinged pintles 2 extended in a downward direction through its supporting ear, said pintle being provided with a pin 3 normally located within an upwardly facing notch 4 in a sleeve 5 which encircles the lower end of the pintle. The sleeve 5 is provided in its lower edge with a downwardly facing notch 6 accommodating the pin 7 formed on the upper end of a valve stem 8. A spring 9 is mounted within the sleeve 5 and normally raises the latter so as to couple the pintle 2 with the valve stem 8, and said sleeve is provided with a handle 10 so that the sleeve may be depressed against the tension of the spring 9 to disengage the notch 4 from the pin 3 and permit the fireman to turn the valve stem 8 without affecting the movement of the pintle 2 or the fire door 1 which it assists in carrying. Under normal conditions, however, it will be understood from the foregoing, that the stem 8 is turned to open an air passage through the valve case 11, every time the door is opened, and to close said passage every time the fire door 1 is closed.

12 designates an air supply pipe leading from any suitable source of supply of compressed air, and provided with a globe or other valve 12^a. 13 designates an air pipe which leads from the valve casing 11. The pipe 13 leads to an air cylinder 14 which is supported in any desired manner at the front end of the boiler, and within said cylinder is a piston 15 adapted to be moved downwardly by the air pressure admitted through the pipe 13, and restored to an upper position by means of a spring 17 encircling its rod 16 and bearing against the stuffing box 16^a, and a collar 18 on the upper end of said rod. The cylinder 14 is directly supported upon a cross head 19 which is in turn supported on a three-way valve casing 20, and the rod 16 extends downwardly through the stuffing box 21 into the valve casing 20, and carries at its lower end a valve 20^a adapted to close upwardly upon a seat 20^b. From the

branches of this valve casing 20, pipes 22 lead, said pipes having upwardly extending ends 23 on opposite sides of the boiler and open into the atmosphere at the top of the smoke stack, outside of the same. The third branch of said valve casing 20, designated 24, is connected with a by-pass 25 which communicates with the exhaust passages 26 leading to the exhaust blast nozzle 27 within the smoke box.

In the practical operation, the closed position of the fire door 1 shuts off the supply of compressed air from the pipe 13, and the valve 20^a is consequently held closed on the seat 20^b so as to cut out the by-pass from the passages 26. Hence the full force of the exhaust is directed into and through the blast nozzle 27 to effect a draft.

Whenever the door 1 is opened, the valve stem 8 will be turned to admit air under pressure through the case 11 and through the pipe 13 into the upper end of the air cylinder 14. This will result in forcing the piston 15 downwardly and in the opening of the valve 20^a, so that the by-pass 25 will be thus operatively connected to the exhaust passages 26, and the exhaust steam or most of it, will be shunted from the nozzle 27 and be directed out into the atmosphere through the pipes 23. Hence the draft will be lowered, with the advantages above pointed out, until the fire door is again closed.

Having thus described the invention, what is claimed as new is:

1. The combination with a boiler furnace and its exhaust nozzle and passages, of means for automatically shunting the exhaust from the nozzle upon the opening of the fire door of the furnace, said means comprising a valve mechanism open to the atmosphere and controlling the communication between the exhaust passages and the atmosphere, a compressed air cylinder, a piston mounted therein and operatively connected to the valve of the valve mechanism to open the same, a fire door, an air pipe adapted to admit air under pressure into the cylinder, a valve in said air pipe, and an operative connection between the fire door and said valve.

2. The combination with a boiler furnace and its exhaust nozzles and exhaust passages, of means for shunting the exhaust from the nozzle upon the opening of the fire door of the furnace, said means comprising a by-pass connection between said passages and nozzle, a valve mechanism adapted to control communication between said by-pass and the atmosphere, compressed air mechanism operatively connected to the valve to open the same upon the admission of compressed air, means for controlling the supply of compressed air to said mechanism, said means including a fire door and means whereby the opening of the same will admit air to the compressed air mechanism for opening the

valve, and manually operable means for controlling the admission of compressed air into the cylinder independently of the said door.

3. The combination with a boiler furnace and its exhaust nozzle and exhaust passages, of a by-pass connection between said passages and nozzle, a valve mechanism adapted to control communication between said by-pass and the atmosphere, a compressed air cylinder, a piston mounted therein, said piston being operatively connected to the valve of the valve mechanism to open said valve, a fire door, an air pipe adapted to admit air under pressure into the cylinder, a valve in said air pipe and an operative connection between the fire door and said valve.

4. The combination with a boiler furnace, its draft creating exhaust nozzle and passages leading thereto, of a by-pass connection around said passages and adapted to open to the atmosphere, a valve controlling such by-pass, means for opening said valve, said means including a cylinder for compressed air and a pipe for feeding air therein, a valve controlling said pipe and provided with a valve stem, a fire door, a connection between said fire door and stem whereby the opening of the door will turn the same, and manually operable means for turning the stem independently of the door.

5. The combination with a boiler furnace and its draft creating exhaust nozzle and passages leading thereto, of means for shunting the exhaust steam from the nozzle, said means including a valve, an air actuated mechanism for opening said valve, and means for controlling said compressed air, said controlling means including a valve casing, a valve and its stem mounted in said valve casing, a fire door provided with an extended pintle in alinement with said stem, a sleeve encircling the adjacent ends of the pintle and stem and provided with a handle, and a spring adapted to normally connect the sleeve to both stem and pintle, the sleeve being adapted for manual actuation to disconnect the stem from the pintle and effect the actuation of the stem independently of the pintle.

6. The combination with a boiler furnace and its draft creating exhaust nozzle and passages leading thereto, of means for shunting the exhaust steam from the nozzle, said means including a valve, an air actuated mechanism for opening said valve, and means for controlling said compressed air, said controlling means including a valve casing, a valve and its stem mounted in said casing, a fire door provided with an extended pintle in alinement with said stem, a sleeve encircling the adjacent ends of the stem and pintle, and provided in its upper and lower edges with oppositely facing notches, a spring within said sleeve and normally pressing the same upwardly, the stem and pintle

being provided with pins adapted for accom-
modation by said notches, the spring exer-
cising its tension so that the sleeve will en-
gage with both pins, and said sleeve being
5 formed with a handle whereby it may be de-
pressed and disengaged from the pintle, as
and for the purpose set forth.

In testimony whereof I affix my signature
in presence of two witnesses.

GABRIEL STEELE. [L. S.]

Witnesses:

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BLANCHE WATSON.