



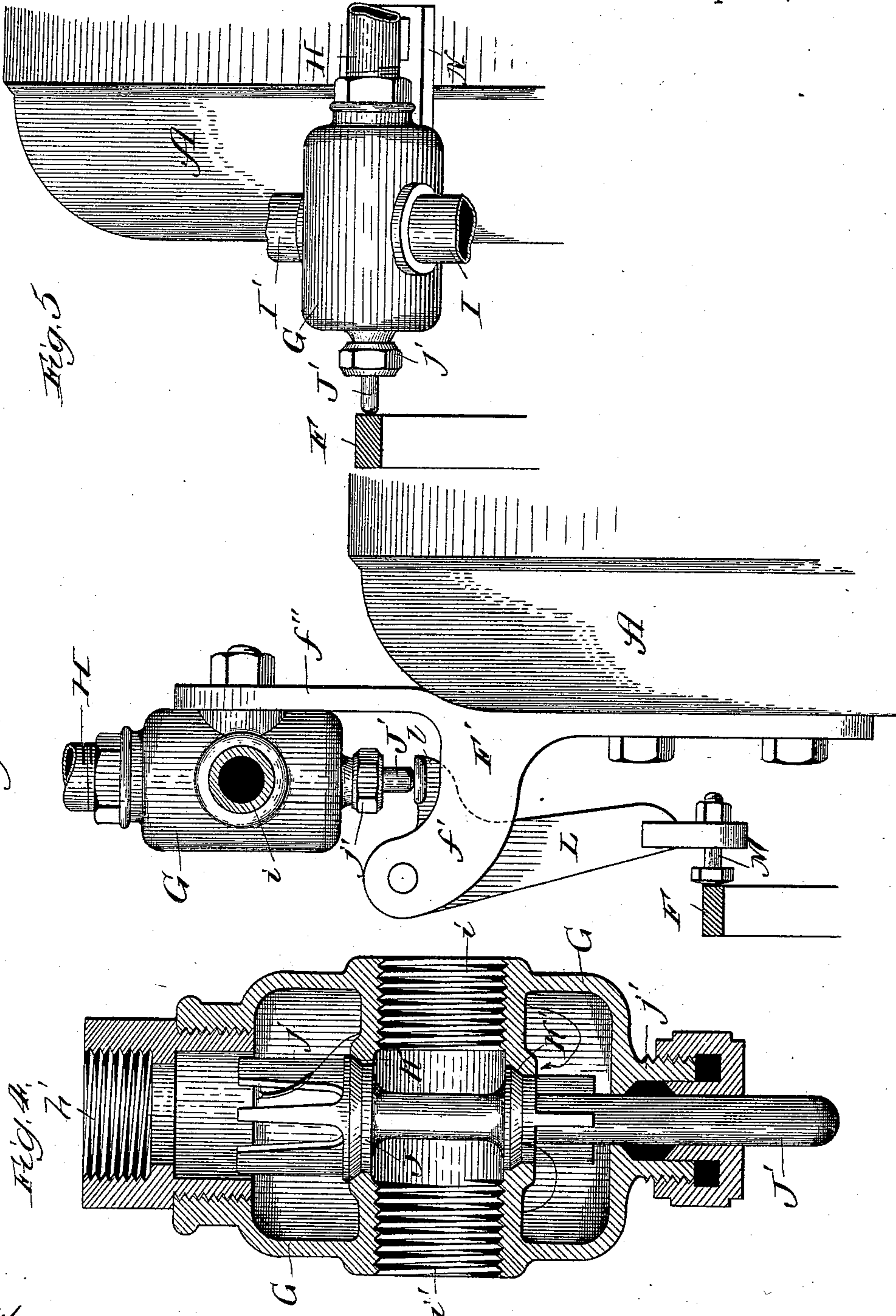
(No Model.)

2 Sheets—Sheet 2.

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SMOKE CONSUMER FOR LOCOMOTIVES.

No. 449,826.

Patented Apr. 7, 1891.



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# UNITED STATES PATENT OFFICE.

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## SMOKE-CONSUMER FOR LOCOMOTIVES.

SPECIFICATION forming part of Letters Patent No. 449,826, dated April 7, 1891.

Application filed December 30, 1890. Serial No. 376,250. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN PLAYER, a citizen of the United, residing at Topeka, Shawnee county, Kansas, have invented certain new and useful Improvements in Smoke-Consumers for Locomotives, of which the following is a specification.

What is known as "Clarke's jet" has heretofore been used in connection with locomotive-engines for promoting more perfect combustion, thereby preventing the formation of smoke and increasing the efficiency of the locomotive. This jet consists, speaking generally, of a pipe running along close to the fire-box of the locomotive, provided with orifices along the side next to the fire-box. Holes are made in the fire-box opposite these orifices or jets, and when steam is admitted to the pipes it is forced through these holes into the fire at a short distance above the grate-bars. When the engine is running, the draft is ordinarily sufficient to prevent the formation of smoke, and consequently it is only necessary to admit steam to the jets and the blower when the engine is standing still or when running into a station with the steam shut off. This renders it necessary for the engineer or fireman to open a valve in the pipe or pipes leading from the steam-dome to the jet and blower. Now it is found that in practice the employes will neglect to do this, and consequently a large amount of smoke will be formed as the result of their negligence.

The object of the present invention is to provide a valve in the pipe leading to the jet or blower, or both, which shall be automatically opened or closed when the engineer shuts or opens the throttle-valve; and the invention consists in the features and details of construction hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of the rear end of a locomotive-boiler, a portion of the casing being broken away to show the arch, jet, and grate-bars. Fig. 2 is a front elevation of a portion of the fire-box, showing the throttle-lever and the automatic valve. Fig. 3 is a side elevation, on an enlarged scale, of the valve and its operating-lever; Fig. 4, a vertical central section through

the valve; and Fig. 5, a side elevation of a modification of the device, the last three figures being on an enlarged scale.

The fire-box A, smoke-arch B, grate C, jet-pipe D, hole *d* through the front end of the fire-box, steam-dome E, and throttle-lever F are all made in the usual manner, and since their construction is well known or will be obvious from an inspection of the drawings they require and will receive no further description.

To the rear end of the fire-box is attached a bracket F', of the form shown more particularly in Fig. 3, wherein it is provided with two outwardly-extending arms *f'* and an upward extension *f''*. The latter is fastened in any suitable manner to the valve-chamber G, which is connected with the steam-dome by means of a pipe H, provided with a suitable valve *h*. This valve-chamber is also connected with the jet-pipe D by means of a pipe I and with the blower by means of a pipe I'. This latter pipe is shown extending for a short distance from the valve apparatus and then broken off. In use it extends from the valve apparatus to the blower or exhaust in the smoke-box beneath the stack, the construction of which is well known, and which therefore does not require to be illustrated. This latter pipe may, if desired, be omitted or may be worked by a separate valve.

The construction of the valve is more particularly shown in Fig. 4. It consists of a casing provided with three ports *h'*, *i*, and *i'*, connecting, respectively, with the pipes H, I, and I'. If desired, the part *i'* may be omitted and the pipe connecting with the port *i* be divided, one branch running to the jet and the other to the blower, and of course if the pipe I' is entirely omitted the port *i'* would also be omitted. The valve J is an ordinary double-balanced valve provided with wings *j* and a stem *j'* and seating at K K'. The valve-stem extends out at the lower end of the casing, which is provided with a suitable stuffing-box *j'*. A bell-crank lever L is pivoted, as shown, between the arms *f'*. One shoulder-arm *l* of this lever abuts, as shown, against the end of the valve-stem J, and the other arm extends down in the front of the smoke-box. Through the lower end of this



latter arm passes an adjustable bolt M, which may be screwed in and out through the lever to regulate the point at which the throttle-lever shall strike it when operating in the manner hereinafter to be described. The length of the longer arm of the lever is such that the bolt M comes immediately in front and in the path of the throttle-lever, so that as the latter is pushed in it will strike against this bolt.

The parts being made as above described operate in the following manner: The valve *h* being opened admits steam to the upper face of the valve J. If now the engine is to be started, the engineer pulls out the throttle-lever away from the boiler, releasing the lower end of the bell-crank lever L, and in consequence the valve-stem J'. The pressure of the steam upon the upper face of the valve J will hold it to its seat and prevent the steam from entering the pipes I I'; but when the steam is shut off, at which time the jet and blower are desired to operate, the throttle-lever is pushed in, strikes against the bolt M, forcing in the longer arm of the bell-crank lever L, and raising the arm *l*. This arm, operating against the valve-stem, raises the valve J, thereby allowing the steam to pass through the ports *i* and *i'* to the jets and to the blower, into which it continues to pass until the throttle-valve is again opened, when the pressure of the steam in the pipe H will seat the valve J, shutting off the steam from the jet and blower, or jet alone, if the blower is not connected with this valve.

In Fig. 5 I have shown a modification of the device. In this form the bracket F and lever L are omitted, and the valve chamber G is secured in a horizontal position to the side of the fire-box by means of a plate N, being placed in such position that as the throttle-lever is pushed toward the fire-box it will strike directly against the valve-stem J' to open the valve J to admit steam to the jet, &c., and when pushed away from the fire-box the valve-stem will be released and the pressure of the steam in the pipe H will seat the valve, as already described when speaking of the device as shown in the previous figures. In using this construction it will be obvious that the engineer has no extra duties thrown upon him, since of course it is absolutely necessary for him to move the throttle-lever back and forth to start or stop his engine, and the motion of

this lever serves to open or close the valve in the manner already set forth.

I claim—

1. In a smoke-consumer for locomotives, the combination of a jet-pipe for admitting steam to the fire-box and a valve in the pipe connecting the jet-pipe with the steam-dome, such valve being opened by means of the throttle-lever to admit steam to the jet-pipe and closed when released from such lever by the pressure of the steam from the dome, substantially as described.

2. In a smoke-consumer for locomotives, the combination of a jet-pipe for admitting steam to the fire-box, a valve-chamber connected with the jet-pipe and steam-dome, the stem of the valve extending out of the valve-chamber and contacting with the throttle-lever, whereby when this lever is pushed in, closing the throttle-valve, the valve J is opened to admit steam to the jet-pipe, and when the lever is drawn out to open the throttle-valve the pressure of the steam upon the valve J closes it, substantially as described.

3. In a smoke-consumer for locomotives, the combination of a jet-pipe D, a valve J, controlling the admission of steam to such pipe, a bell-crank lever L, engaging with the valve-stem and the throttle-lever, whereby when the throttle-lever is pushed in to close the throttle-valve the lever L is rocked to open the valve J, and when the throttle-lever is drawn out, releasing the lever L, the pressure of the steam closes the valve J, substantially as described.

4. In a smoke-consumer for locomotives, the combination of a jet-pipe D for admitting steam to the fire-box, a bracket F, secured to the fire-box, a valve-chamber secured thereto, connected with the dome, jet-pipe, and blower by the pipes H, I, and I', respectively, a pivoted bell-crank lever L, bearing against the valve-stem J' and adapted to engage with the throttle-lever, whereby when the latter is pushed in the valve J is opened to admit steam to the jet-pipe and blower, and when the throttle-lever is drawn out, releasing the lever L, the steam-pressure closes the valve J, substantially as described.

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