

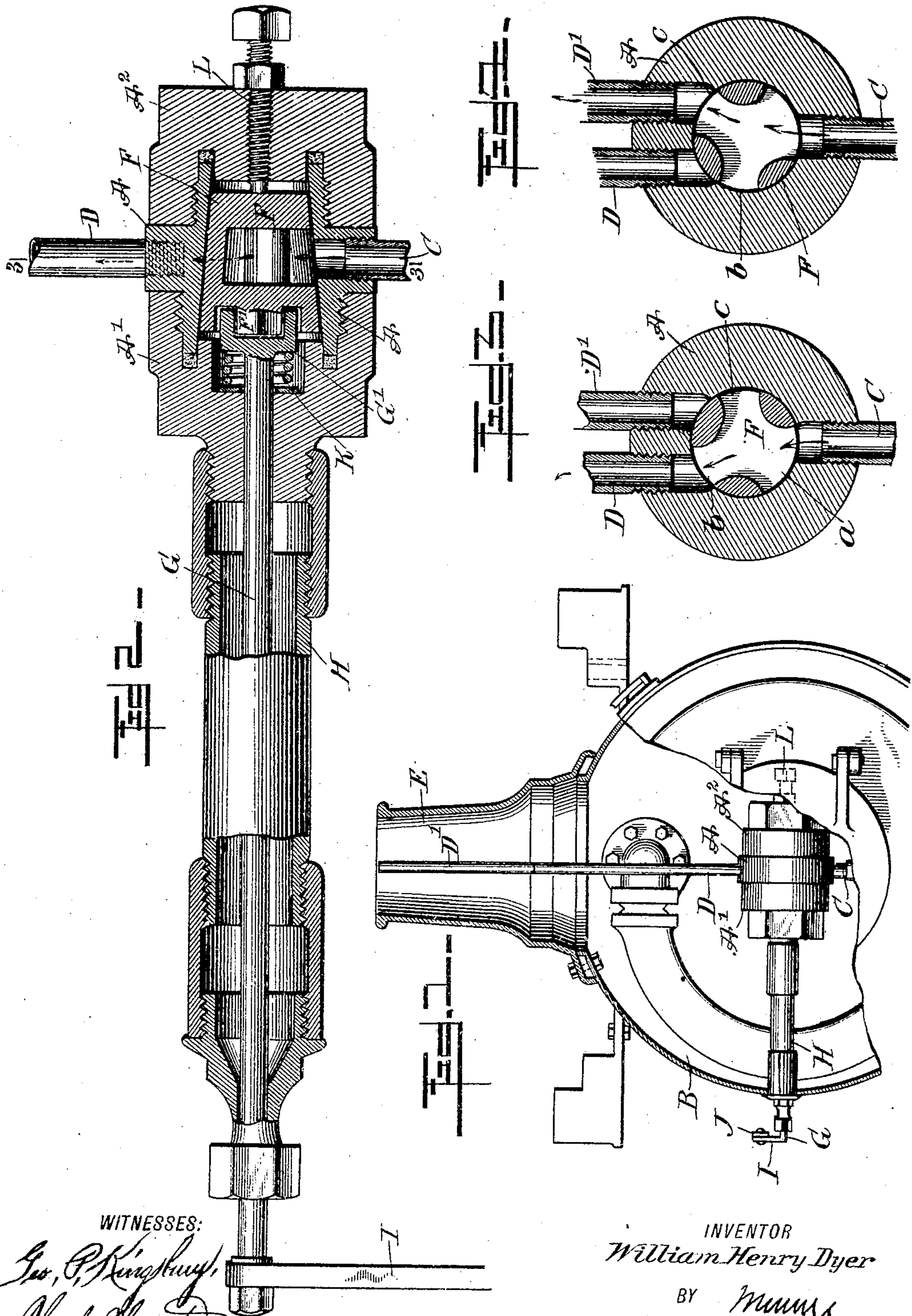
No. 814,435.

PATENTED MAR. 6, 1906.

W. H. DYER.

# EXHAUST VALVE FOR STEAM ENGINES.

APPLICATION FILED JULY 12, 1905.



**WITNESSES:**

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# UNITED STATES PATENT OFFICE.

WILLIAM HENRY DYER, OF IONIA, MICHIGAN, ASSIGNOR OF ONE-HALF  
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## EXHAUST-VALVE FOR STEAM-ENGINES.

No. 814,435.

Specification of Letters Patent.

Patented March 6, 1906.

Application filed July 12, 1905. Serial No. 269,275.

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY DYER, a citizen of the United States, and a resident of Ionia, in the county of Ionia and State of Michigan, have invented a new and Improved Exhaust-Valve for Steam-Engines, of which the following is a full, clear, and exact description.

The invention relates to steam-generators and engines in which the exhaust-steam of the engine is utilized to produce a draft in the fire-box of the steam-generator.

The object of the invention is to provide a new and improved exhaust-valve for steam-engines arranged to produce more or less draft in the fire-box and without danger of creating back pressure in the engine-cylinder.

The invention consists of novel features and parts and combinations of the same which will be more fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a cross-section of the smoke-box of a locomotive provided with the improvement. Fig. 2 is an enlarged longitudinal sectional elevation of the improvement. Fig. 3 is a transverse section of the same on the line 3 3 of Fig. 2, and Fig. 4 is a like view of the same showing the parts in a different position.

The valve-casing A of the exhaust-valve is arranged within the smoke-box B of the locomotive, and the said valve-casing A is connected with the exhaust-pipe C of the locomotive-engine, so that the exhaust-steam from the engine passes by way of the pipe C through the exhaust-valve in the manner hereinafter more fully described. From the valve-casing A extend upwardly outlet-pipes D and D' made of different lengths, so that the short pipe D terminates within the smoke-box B at or near the beginning of the smoke-stack E, while the other pipe D' extends to the upper end of the smoke-stack, as plainly shown in Fig. 1.

In the valve-casing A is mounted to turn a valve-plug F, having a large inlet-port *a* in register at all times with the pipe C, and the said valve-plug F is also provided with outlet-ports *b* and *c*, of which the port *b* is adapt-

ed to register with the pipe D, (see Fig. 3,) and the port *c* is adapted to register with the pipe D'. (See Fig. 4.) When the valve-plug F is thrown into an intermediate position, the ports *b* and *c* register at the same time with both pipes D and D', so that part of the exhaust-steam can pass through the short pipe D and part through the longer pipe D'. When the valve-plug F is in the position shown in Fig. 3 and the engine is running, then the exhaust-steam passes from the pipe C through the valve-plug F and the port *b* into and through the short pipe D, thus creating a suction in the smoke-box, and consequently in the fire-box of the boiler, with a view to insure the rapid combustion of the burning fuel in the fire-box. When the valve-plug F is turned to the position shown in Fig. 4, then the exhaust-steam from the engine passes by way of the pipe C, ports *a* and *c*, into and through the pipe D', so that the steam passes out into the air at the upper end of the smoke-stack E without creating any draft in the fire-box. When the valve-plug F is turned into an intermediate position, part of the steam is exhausted through the pipe D and part through the pipe D', and consequently a draft of less force is obtained in the fire-box, and by shifting the valve-plug F to connect the port *b* more or less with the pipe D it is evident that more or less draft is had in the fire-box.

The valve-plug F is preferably made in the form of the frustum of a cone, provided at its base with a polygonal offset F', engaged by a correspondingly-shaped head G', formed on a rod-stem G, extending through a casing H, secured to the head A' of the valve-casing A. This casing H is attached to the wall of the smoke-box B, and the rod G extends through the casing to the outside of the smoke-box, and the said rod is provided at its outer end with a rod I, connected by a rod J with a hand-lever in the cab of the locomotive within convenient reach of the engineer, so that the latter on manipulating the said hand-lever can turn the valve-plug F to any one of the positions above mentioned and for the purpose described.

In order to hold the valve-plug F at all times to its seat, a spring K is provided, fitted in a recess in the head A' and pressing on the head G' and by the latter on the valve-plug F. The small end of the valve-plug F abuts



against a set-screw L, screwing in the head A<sup>2</sup> of the valve-casing A, and by adjusting the screw L the spring K can always hold the valve-plug F in proper seating position to  
5 allow comparatively easy working of the valve-plug and without danger of undue leakage of steam.

The device is very simple and durable in construction, is not liable to get easily out of  
10 order, and can be readily adapted for various kinds of engines.

By being enabled to control the draft in the fire-box according to requirements it is evident that the fuel is used to the fullest ad-  
15 vantage and without any waste thereof.

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

1. A locomotive provided with an exhaust-  
20 valve in the smoke-box, the valve comprising a casing having an inlet connected with the engine-exhaust, two outlets of different lengths extending from the casing, one outlet terminating in the smoke-box and the other  
25 at the upper end of the smoke-stack, a valve-plug mounted to turn in the said casing and adapted to connect the said inlet with either

or both outlets, a rod mounted to turn and connected with the said plug, an arm on the said rod, and an operating device under the  
30 control of the engineer and connected with the said arm.

2. A locomotive provided with an exhaust-valve in the smoke-box, the valve comprising a casing having an inlet connected with the  
35 engine-exhaust, two outlets of different lengths extending from the casing, one outlet terminating in the smoke-box and the other at the upper end of the smoke-stack, a valve-plug mounted to turn in the said casing and  
40 adapted to connect the said inlet with either or both outlets, an adjusting device for said plug, a rod mounted to turn and connected with the said plug, an arm on the said rod, and an operating device under the control of  
45 the engineer to turn the said arm.

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

WILLIAM HENRY DYER.

Witnesses:

IME NESBITT,  
AGNES A. NESBITT.