

(No Model.)

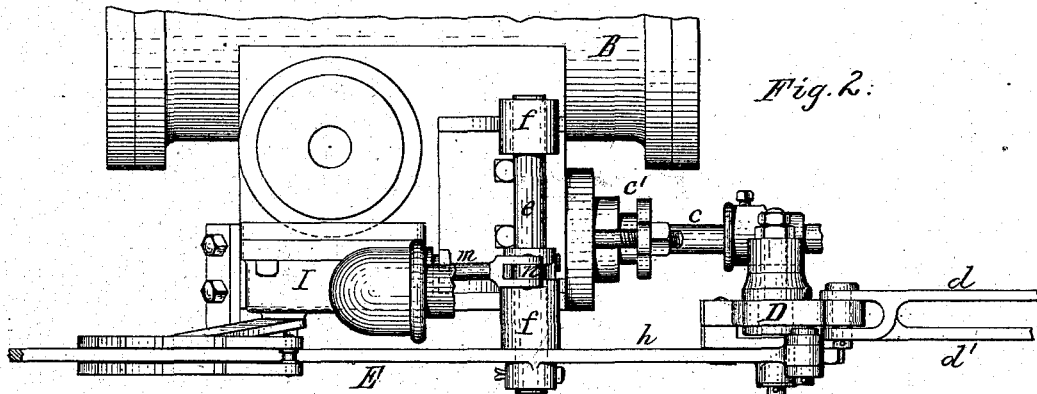
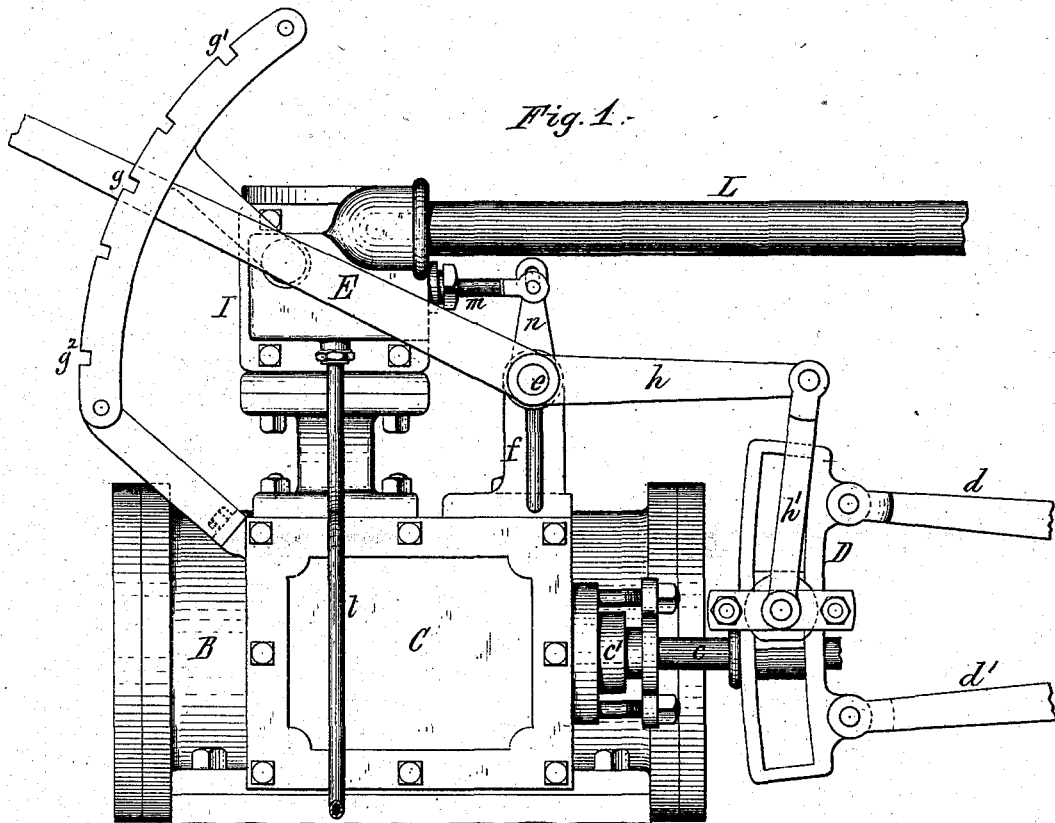
2 Sheets—Sheet 1.

R. W. AITKEN & D. FARQUHAR.

VALVE GEAR FOR STEAM ENGINES.

No. 257,994.

Patented May 16, 1882.



Chas. Buchheit
Edw. J. Brady Witnesses.

Robt. W. Aitken
D. Farquhar Inventors.
By *Michael St. Bernard*
Attorneys.

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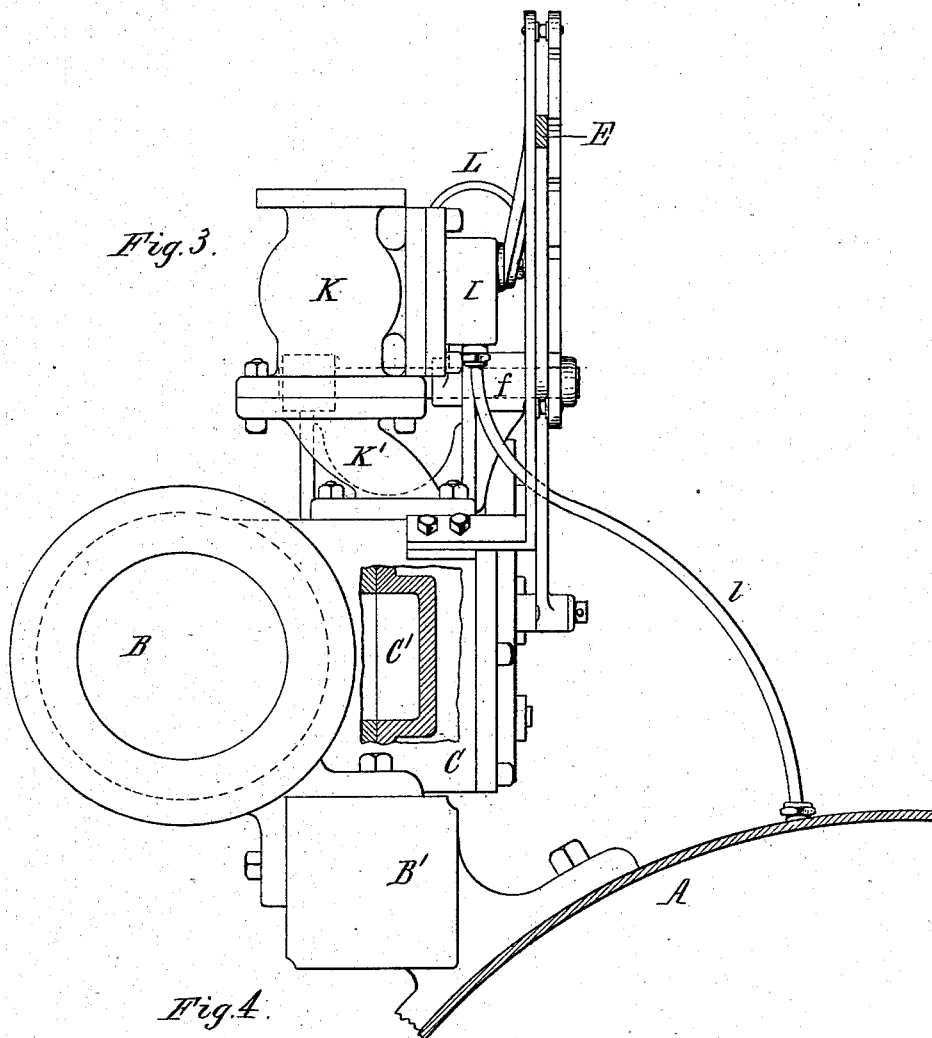


Fig. 3.

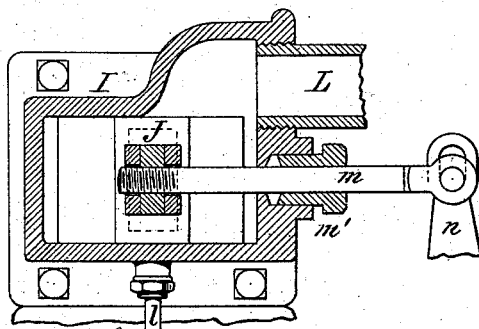


Fig. 4.

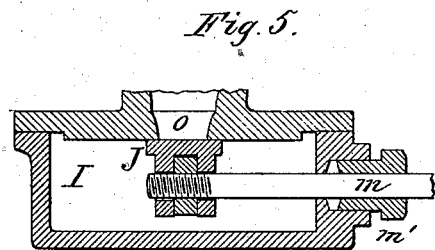


Fig. 5.

Chas. Buchheit
 Edw. J. Brady } Witnesses.

Robt. W. Aitken
 David Farquhar } Inventors.
 By Mitchell & Bonnes }
 Attorneys.

UNITED STATES PATENT OFFICE.

ROBERT W. AITKEN AND DAVID FARQUHAR, OF BUFFALO, NEW YORK,
ASSIGNORS TO THE PITTS AGRICULTURAL WORKS, OF SAME PLACE.

VALVE-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 257,994, dated May 16, 1882.

Application filed March 16, 1882. (No model.)

To all whom it may concern:

Be it known that we, ROBERT W. AITKEN and DAVID FARQUHAR, of the city of Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Valve-Gear for Steam-Engines, of which the following is a specification.

The object of this invention is to simplify the operations of adjusting the link of a reversible engine and opening or closing the throttle, so that these operations can be simultaneously executed; and our invention consists to that end in connecting the mechanism of the link which controls the motion of the steam-valve with the mechanism for opening and closing the throttle-valve, to admit steam to or exclude it from the steam-valve, in such a manner that the movement of a single lever will adjust both the link and the throttle-valve.

Our invention consists, further, of a drip-pipe which leads from the valve-chest down to the boiler, and whereby the water which accumulates in the valve-chest is returned to the boiler.

In the accompanying drawings, consisting of two sheets, Figure 1 is a side elevation, Fig. 2 a top plan view, and Fig. 3 a rear elevation, of the cylinder of a steam-engine provided with our improvement. Fig. 4 is a vertical section, and Fig. 5 a horizontal section, through the chest of the throttle-valve.

Like letters of reference refer to like parts in the several figures.

A represents the steam-boiler of a portable or traction engine.

B represents the steam-cylinder, secured in the usual manner to a frame, B', which is attached to the boiler A.

C represents the valve-chest, in which the slide-valve C' operates, which directs the steam to both ends of the cylinder.

e is the rod of the slide-valve, which projects through a stuffing-box, *c'*, in the front end of the valve-chest, and which is operated by a link, D, and eccentric-rods *d d'* in a well-known manner.

E represents the reversing-lever, mounted on a horizontal shaft, *e*, which rocks in standard-bearings *f*, secured to the valve-chest C.

f' represents the guide-segment, provided with notches *g g' g''*, in which a suitable spring-catch engages, which is attached to the reversing-lever E in a well-known manner, and whereby the reversing-lever may be secured in one of several positions.

h represents the short arm of the reversing-lever, and *h'* is a rod whereby the link D is suspended from the arm *h*. All of these parts may be constructed in any suitable and well-known manner.

I represents the chest in which the throttle-valve J is arranged, whereby the admission of steam from the boiler to the valve-chest C is regulated. As shown in the drawings, the throttle-valve chest I communicates with the valve-chest C by means of the governor-casing K and a tube, K'.

L represents the pipe through which the steam is conducted from the dome of the boiler to the throttle-valve chest I, and *l* is a drip-pipe descending from the bottom of the chest I to the body of the boiler, so as to form an outlet for the water of condensation which may collect in the chest I, and which is returned by the pipe *l* to the boiler.

m represents the rod by which the throttle-valve J is operated, and which projects through a stuffing-box, *m'*, in the front end of the valve-chest I, and is attached to an arm, *n*, which is secured to the rod-shaft *e* of the reversing-lever E, so that by moving the latter in one or the other direction, both the link D and the throttle-valve J are moved simultaneously.

The arm *n* is so arranged with reference to the reversing-lever E and the valve J that the latter will be in its central position and cover its port *o*, as shown in Figs. 4 and 5, when the reversing-lever E is in its central position or on the stopping-point, as shown in Fig. 1, in which the link D does not operate the main slide-valve sufficiently to admit steam to the cylinder.

Upon moving the reversing-lever E out of its central position in either direction the throttle-valve J is moved out of its central position, so as to open the port *o* and admit steam to the valve-chest C. The extent to which the port *o* is opened will be greater or less accord-

ing to the distance to which the reversing-lever is moved out of its central position, so that the degree of expansion given by the link and the quantity of steam admitted to the cylinder
5 by the throttle-valve will be regulated simultaneously and in an inverse ratio by simply adjusting the reversing-lever.

When the reversing-lever is in the central position the throttle-valve J is closed, and the
10 steam-pressure is thereby removed from the steam-valve C'. The reversing-lever can therefore be moved easily out of its central position either toward the forward notch, *g'*, or back-
15 ward notch, *g*². The engine is also readily reversed, because the throttle-valve J will be closed or only slightly opened during a large portion of the movement of the reversing-lever as it approaches its central position and recedes therefrom.

20 By connecting the throttle-valve with the reversing-lever, as described, the direction in which the engine-shaft is rotated and the admission of steam to the cylinder or the shutting off of the steam are regulated by simply
25 moving the reversing-lever, which latter is readily operated with one hand, leaving the other hand of the engineer free to operate the steering mechanism, if the apparatus is applied to a traction-engine.

30 Upon placing the reversing-lever in the central position or on the stopping-point, the throttle-valve J is closed at the same time, and the steam contained in the passages between the throttle-valve and the cylinder is confined and
35 enters both ends of the cylinder, whereby a steam cushion is formed in the cylinder in front of the piston, which prevents the piston from stopping at the end of its stroke, and the

crank on its dead-center, thereby facilitating the starting of the engine. 40

We claim as our invention—

1. In a reversible steam-engine, the combination of a steam-distributing valve adapted to be operated forward and backward, a throttle-valve whereby the admission of steam to
45 the steam-distributing valve is controlled, and mechanism whereby the motion of the steam-distributing valve and the position of the throttle-valve are controlled simultaneously, substantially as set forth. 50

2. The combination, with the link D, whereby the motion of the steam-distributing valve is controlled, and a throttle-valve, J, whereby the admission of steam to the distributing-valve is regulated, of a reversing-lever, E, connected with the link D and the valve J, where-
55 by both are adjusted simultaneously, substantially as set forth.

3. The combination, with the steam-valve C' and the throttle-valve J, of the link D, connected with the valve C', the reversing-lever E, mounted on a rock-shaft, *e*, and connected
60 with the link D, and an arm, *n*, secured to the shaft *e* and connected with the throttle-valve J, substantially as set forth. 65

4. The combination of a valve-chest, I, connected with the steam-boiler by a pipe, L, and a drip-pipe, *l*, which descends from the valve-chest to the steam-boiler, and whereby the water of condensation is returned to the boiler,
70 substantially as set forth.

ROBERT W. AITKEN.
DAVID FARQUHAR.

Witnesses:

JNO. J. BONNER,
CHAS. F. GEYER.