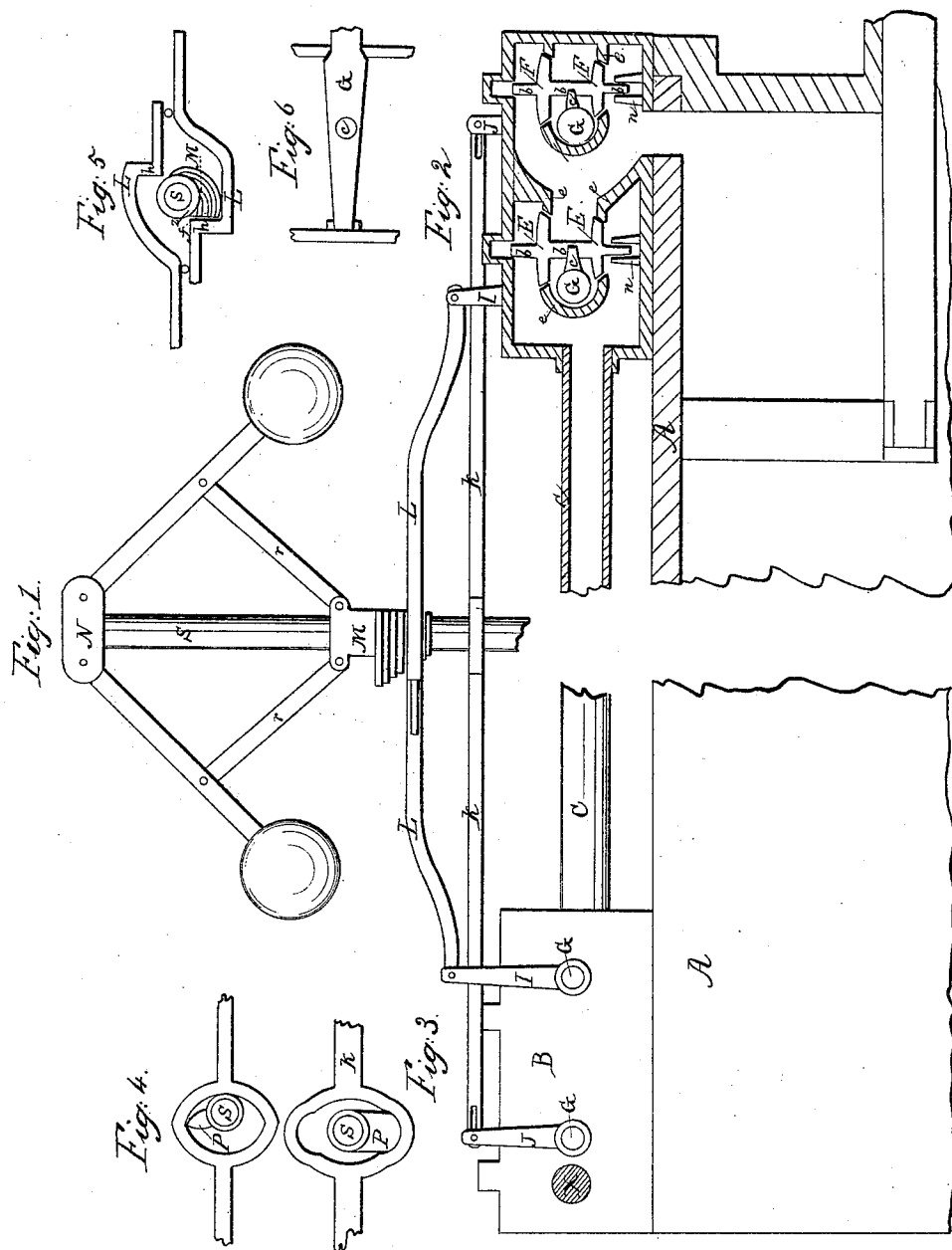


R. Porter,
Steam-Engine Valve-Gear.
N^o 22,200. Patented Nov. 30, 1858.



UNITED STATES PATENT OFFICE.

RUFUS PORTER, OF WASHINGTON, DISTRICT OF COLUMBIA.

STEAM-ENGINE.

Specification of Letters Patent No. 22,200, dated November 30, 1858.

To all whom it may concern:

Be it known that I, RUFUS PORTER, of Washington, in the District of Columbia, have invented a new and useful Improvement in Steam-Engines; and I hereby declare that the following is a full and exact description, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is the governor. Fig. 2 is a vertical section of one of the valve-chambers with the valves and a portion of the cylinder. Fig. 3 is a rear view of a valve chamber and portion of the cylinder. Fig. 4 is a vertical view of the central part of the exhaust-valve rod, and the cam that operates it. Fig. 5 is a vertical view of the graduated cam, inverted, with a portion of two induction-valve rods, and Fig. 6 is one of the lifting shafts.

The nature of this invention consists in the direct application of balance valves for the induction and eduction of steam into and out of a steam engine cylinder, in combination with an arrangement of mechanism whereby the action of the induction valves are so regulated by the governor as to admit into the cylinder, only sufficient quantities of steam to maintain the required uniform motion of the engine.

To the upper side of a horizontal steam cylinder, A, at the ends thereof, are attached two valve-chambers B, B, to the centerward ends of which are attached steam pipes C C. Each valve chamber is furnished with horizontal and curved partitions *e e*, through the horizontal portions of which are circular apertures in which are seated the balance valves E E and F F. Above and below the center of each valve, are sockets *n n*, to receive and guide the ends of the valve stems *b b*. Near the stem of each valve, centerward, is a horizontal lifting shaft G G, the rear ends of which extend through the rear side of the chamber (as shown in Fig. 6) and terminate in valve levers I J, which are thereto attached. From the center of each lifting shaft, an arm or lifter *c* projects, and enters a hole or notch in the side of the valve-stem *b*; so that when the levers I J are drawn centerward, the valves are lifted from their respective seats.

To the heads of the valve levers J are connected the two ends of the exhaust-valve rod K, through the center of which is an elliptical aperture (as shown in Fig. 4) of such form and size that the cam P (which is attached to the shaft of the governor) in its revolutions, moves the rod K alternately to the right and left, whereby the valves F are operated. Through each end of the rod K is a horizontal slot *m*, through which projects a pin attached to the lever J. This slot is so arranged that when the rod K is moved to the left, from its central position, the lever J is drawn centerward; but when moved to the right, the pin slides freely within the slot *m*, and the lever remains stationary; but the lever at the opposite end, is moved.

Near the center of the cylinder is a governor N, the braces (*r*) of which are connected to a graduated cam M, which slides freely upon the vertical shaft (S) of the governor. This cam partakes of the snail form in part (as seen in Fig. 5) but has steps of gradation from the top to the bottom of the conical part, and the shoulder (*f*) thereof is on a line tangential to its shaft or hub.

The two induction-valve rods L L, are connected to the levers I I, and the centerward ends terminate in the hook form represented in Fig. 5, each having a shoulder (*h*) which are alternately impinged upon by the shoulder of the revolving cam M. By this arrangement it will be seen that when the cam M has a low position, it will lift the valves E alternately, and hold them up during nearly half of a revolution of the governor; but when the speed is accelerated so as to elevate the cam, the rods being acted upon only by the little shoulder *z*, the induction valves will be but slightly affected, and will admit only small quantities of steam into the cylinder. The steam is exhausted through lateral pipes X in the rear of the valve chamber.

What I claim as my invention and desire to secure by Letters Patent, is—

1. Furnishing steam engine cylinders with balance valves E F combined with lifting shafts G and so arranged that both induction and eduction valves communicate with the same port, substantially as described.
2. I also claim in combination with bal-

ance valves arranged as herein described, so
connecting the induction valves E to a gov-
ernor, by an arrangement of mechanism sub-
stantially as herein described, that the said
5 induction valves shall be so regulated by the
governor as to admit into the cylinder such
quantities of steam as shall be required to

maintain a proper and uniform motion of
the engine.

RUFUS PORTER.

Witnesses:

ROBERT WATERS,
B. W. FERGUSON.