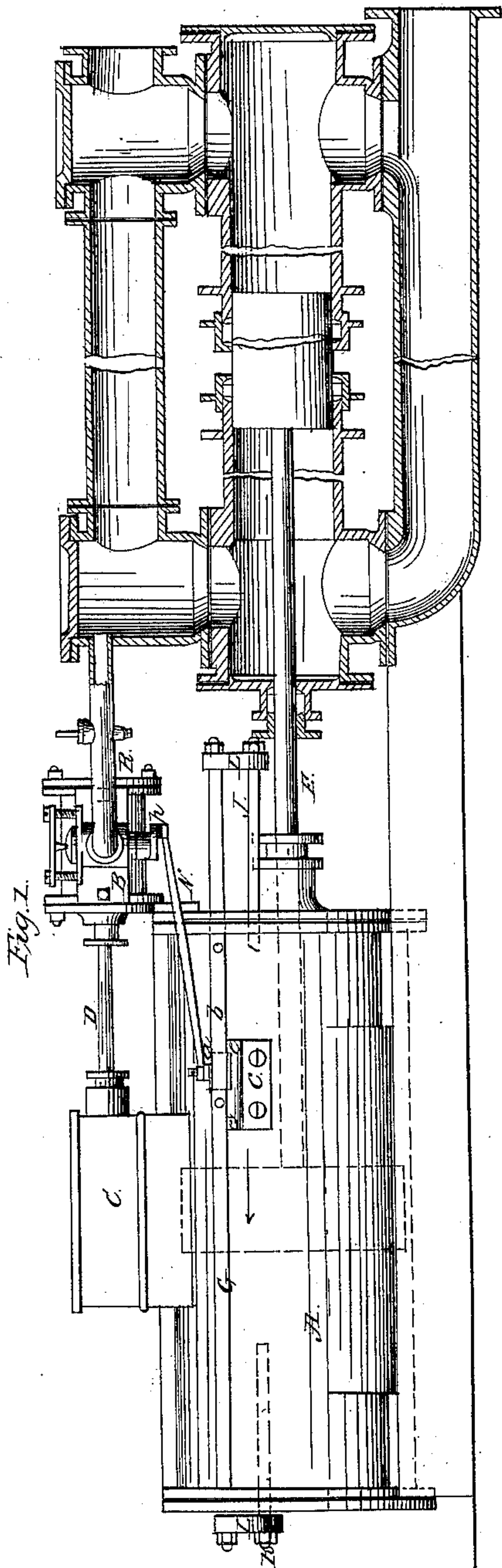


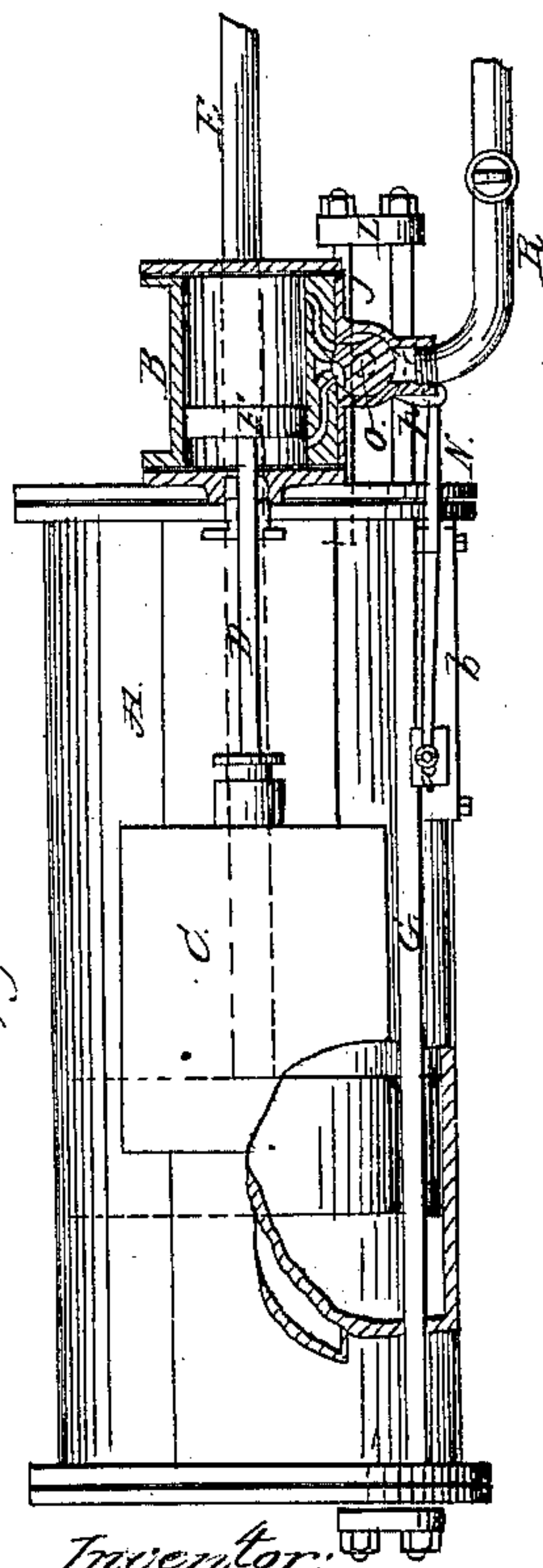
*R. Allison,*  
*Steam Pump.*

*N<sup>o</sup> 69,153.*

*Patented Sep. 24, 1867.*



*Fig. 1.*



*Fig. 2.*

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# United States Patent Office.

ROBERT ALLISON, OF PORT CARBON, PENNSYLVANIA.

*Letters Patent No. 69,153, dated September 24, 1867.*

## IMPROVEMENT IN STEAM ENGINES.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, ROBERT ALLISON, of Port Carbon, in the county of Schuylkill, and State of Pennsylvania, have invented a new and useful Improvement in Pumping Steam Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

This invention relates to a new and improved method of operating the valve of a steam engine when the same is used for pumping water from mines and other purposes.

This invention consists in the arrangement of a supplementary cylinder, a piston, and valve, the latter being operated to admit steam or water to the cylinder, and of a rod connected to a bar sliding in suitable brackets or guides upon the side of the main cylinder, and provided at each end with short arms entering each head of the main cylinder, to be operated upon by its piston, and in the combination of the supplementary cylinder with the sliding-block and stop-plate upon the main cylinder, as will be hereinafter more particularly described.

Figure 1 represents a longitudinal side elevation of the steam engine, showing the supplementary cylinder with its oscillating valve, and the means by which it is operated.

Figure 2 is a top or plan view of the same, partly in section.

Figure 3 represents a pump which is driven by the steam engine, showing the manner in which the two are connected.

Similar letters of reference indicate corresponding parts.

The plunger of the pump is attached to the piston-rod of the steam engine, so that the action of the steam is direct, there being no loss of power through a crank or fly-wheel motion, but to control the movement of the piston the supplementary cylinder is provided, the piston of which is attached to the valve-rod, and may be operated by either steam or water.

A represents the steam-engine cylinder. B is the supplementary cylinder. C is the steam-chest of the engine. D is the valve-rod. E is the steam-engine piston-rod. F (fig. 2) is the piston of the supplementary cylinder on the end of the valve-rod.

As these steam pumping engines not unfrequently raise water from two to four hundred feet, in pumping from mines, the sudden letting on of the steam is very destructive to the machinery employed, on account of the shock thereby occasioned. To avoid this, I arrange for moving the steam-valve and letting on steam at any point from six to twenty inches (more or less) before the piston reaches the end of the cylinder. For this purpose, I arrange a bar upon the side of the cylinder, which is marked G, which bar has a longitudinal movement as it is impelled by the piston. To produce this movement there are rods, marked J and K, attached to the ends of the bar G by cross-heads or arms, as seen in the drawing. These rods J and K pass through the cylinder-heads and enter each end of the cylinder, as seen in dotted lines in fig. 1. The steam piston is also seen in dotted lines in both figures.

N is a rod which connects the valve of the supplementary cylinder with the bar G. In this example of my invention an oscillating valve is shown as operating in this cylinder, marked *o*, and the rod N operates it by a short crank, *p*. The rod N is not attached directly to the bar G, but to a sliding-block, *a*, which plays in a slot which is formed by the bar, and another piece, *b*, which is attached to its side. *c* is a bracket or plate which is attached to the cylinder, and which has flanges *e e* which project up, and which act as stops for the block *a*, preventing it thereby from moving only a certain distance, thus giving a uniform motion to the valve.

R is a pipe which connects the supplementary cylinder with the water-head, as shown. If steam is used, it is connected with the steam-chest or boiler.

As seen in fig. 1, the steam-engine piston is moving to the left, or in the direction of the arrow. When the piston comes in contact with the rod K, (which projects into the cylinder,) as seen, that rod will be forced out, and the rod J, at the other end of the cylinder, will be forced in. This movement of the bar G operates the oscillating valve *o* through the rod N, thereby allowing water to enter the supplementary cylinder to drive the piston F, which works the steam-valve. When this movement of the rod K by the piston commences, steam will begin to be discharged into that end of the cylinder, so that before the piston reaches the end of its stroke



it will be resisted by the full force of the steam pressure. The steam cushion thus provided prevents all danger from concussion or sudden shock, and the piston plays back and forth in the cylinder, thus controlled, with the softness and ease of the motion imparted by an eccentric.

When steam is used in the supplementary cylinder to move the steam-valve, a dash-pot or some other equivalent device is to be connected with the steam-valve for the purpose of controlling its movement.

The pump, which is driven by the steam engine, is represented in red lines, the plunger of which is seen attached to the piston-rod E.

The whole arrangement for operating the steam-valve is such as to commence the movement of the valve at a point in the stroke of the piston that will give time for a gradual shutting off and letting on of the steam in the steam-cylinder.

I do not confine myself to an oscillating valve for the supplementary cylinder B—other kinds of valves may be used with the same or a similar effect—nor to the particular construction of the other parts, as here represented and described, as it might be necessary to vary them somewhat to suit different kinds of pumps, but having thus described my invention, I claim as new, and desire to secure by Letters Patent—

1. The supplementary cylinder B, with its piston F and valve *o*, the rod N, the bar G, and the rods J and K, arranged and operating substantially as shown and described, for the purposes set forth.
2. In combination with the supplementary cylinder, I claim the sliding-block *a* and the stop-plate *c*, substantially as and for the purposes set forth.

ROBERT ALLISON.

Witnesses:

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