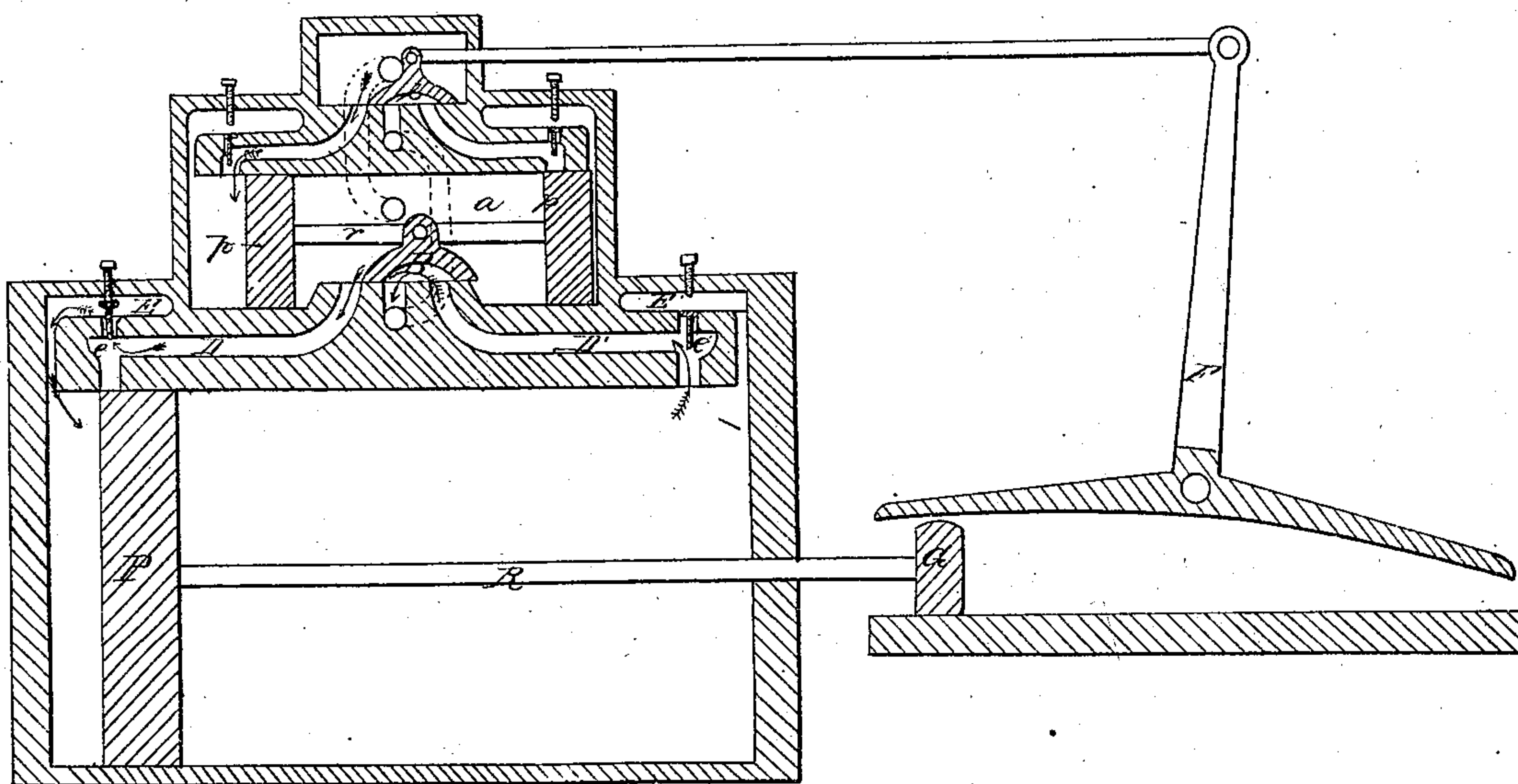


E. D. BARRETT.  
VALVE MOVEMENT FOR STEAM ENGINES.

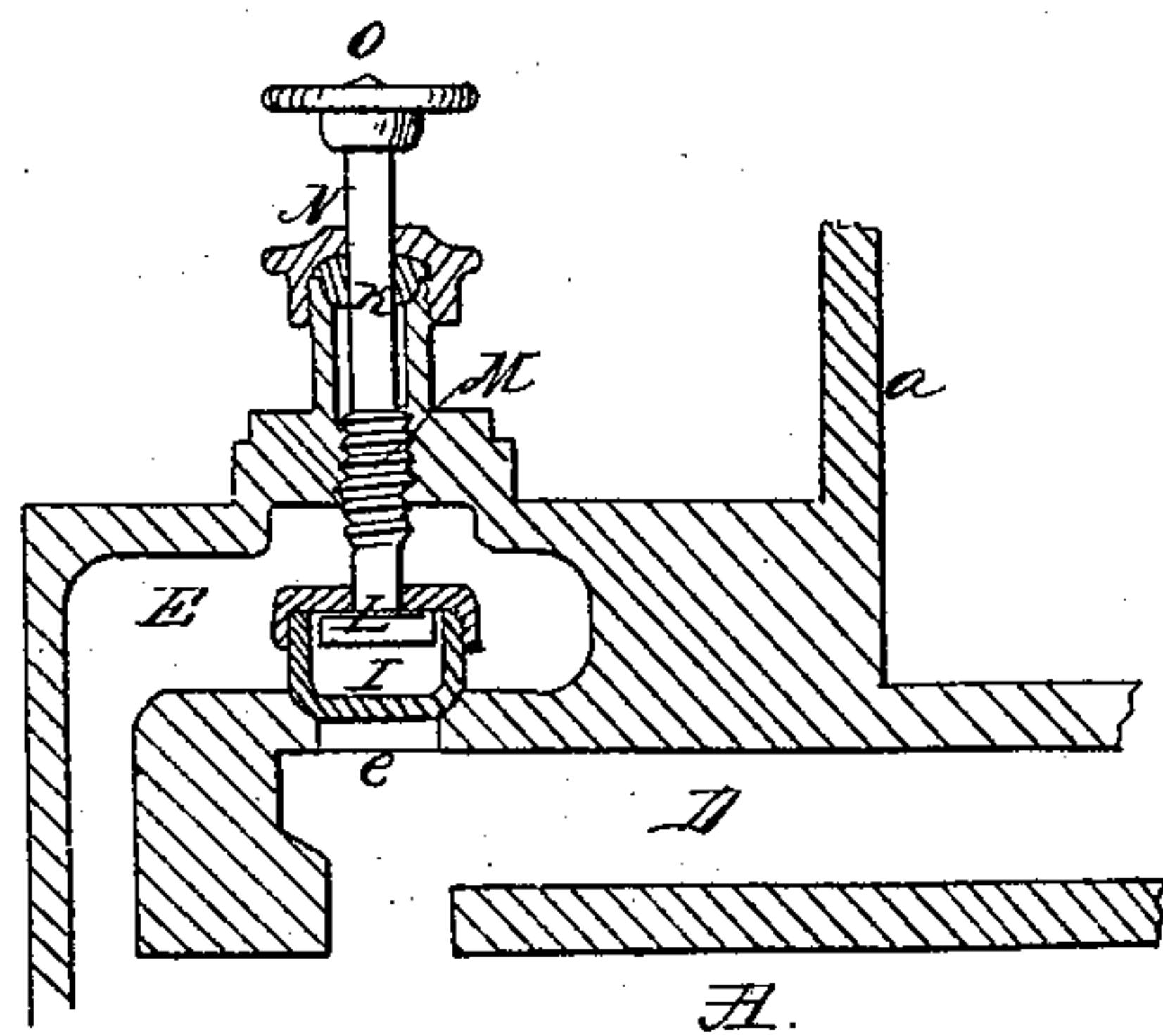
No 19,119.

Patented Jan. 19, 1858.

*Fig 1.*



*Fig 2.*





# UNITED STATES PATENT OFFICE.

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## ARRANGEMENT OF VALVES AND PASSAGES IN THE CYLINDERS OF STEAM-ENGINES.

Specification of Letters Patent No. 19,119, dated January 19, 1858.

*To all whom it may concern:*

Be it known that I, EDWARD D. BARRETT, of Cincinnati, Hamilton county, Ohio, have invented a new and useful Arrangement of  
5 Valves and Passages in the Cylinders of Steam-Engines; and I hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making part of this  
10 specification.

My invention relates to an arrangement of valves and passages in the cylinders of steam engines, for cushioning the piston and aiding in reversing its stroke.

15 In the accompanying drawings Figure 1 is an axial section through the cylinder and valve chambers. Fig. 2 represents the auxiliary port and valve on an enlarged scale.

A, is a steam cylinder, having piston P, slide valve B, exhaust C, and side passages D, D', all of customary form except that the passages D, D', instead of issuing at the extremities of the cylinder are a little less than the length of the piston therefrom.

25 E, E', are two auxiliary passages, fed from the former at certain periods of the stroke, through valve guarded ports *e*, *e'*, and discharging respectively at the extreme ends of the interior space of the cylinder.

30 F, is a rocker arm operated by a tappet G, on the piston rod R. This arm—in the present illustration—operates on the main valve B, through the agency of an auxiliary slide valve *b*, and cylinder *a*, provided with a  
35 double headed piston *p*, *p'*, and operating in connection with a set of passages similar to those of the main cylinder. The main valve B, is attached to the small piston rod *r*, midway between the two heads *p*, *p'*.  
40 This auxiliary cylinder and its appendages may be dispensed with if preferred.

The valve which closes the port *e*, or *e'*, is constructed as follows:—The valve proper consists of a cup formed piece I, having a  
45 cap J, pierced by a stem K, which is retained within the cap by a foot L. The stem K, is screw threaded (M), so as to fit a corresponding hollow screw in the case. The upper part of this stem emerges through  
50 a stuffing box N, and terminates in a knob or handle O. By means of this screw threaded stem the range of the valve I, may be restricted or wholly stopped at will or the valve may be permanently held more or less  
55 open.

The tappet, rocker arm, slide valves and piston are so arranged relatively to each other and to the steam and exhaust passages, that the instant the main piston P, has passed (for example) the side passage D, at  
60 the (then) exhaust end of the cylinder, the small slide valve *b*, is drawn back by the rocker arm to the position indicated in the drawing, which, by reversing the steam in the small cylinder, shoots the main slide  
65 valve B, to the position shown, so as to connect the side passage D' with the exhaust and the side passage D with the steam; but the piston having just closed the vent of this passage, the steam flows by the valve I,  
70 into the auxiliary passage E, and the space 1, in front of the piston until an equilibrium is established when, the valve I, closing the steam thus confined, cushions the piston and aids in reversing its motion. When the pis-  
75 ton has passed the side passage D, in its return stroke, it receives steam therefrom and the same motions are repeated at the other end of the cylinder. It will be observed that this arrangement does not obstruct the free-  
80 dom of the exhaust, the back of the piston being relieved from all but atmospheric pressure at the instant that the steam cushion becomes effective on the other side.

The principal aim of this invention is to  
85 transfer the momentum from the end of each stroke of the piston to the beginning of the next, thus avoiding concussion, insuring the prompt return of the piston and enabling it to pass the dead points without a balance  
90 wheel, whereby it is made applicable to the working of pumps and other purposes where a simple reciprocating movement only is required, but novelty is claimed only in the specific means here employed, as I am aware  
95 that various modes of effecting the above objects have been heretofore proposed.

I claim as new and of my invention herein:

The arrangement of check valves I, I',  
100 and passages E, E', in relation to the passages D, D', and the main valve substantially as herein set forth.

In testimony of which invention I hereunto set my hand.

E. D. BARRETT.

Attest:

GEO. H. KNIGHT,  
J. B. BENNETT.