E. G. RUSSELL.

VALVE GOVERNOR.

No. 13,498. Patented Aug. 28, 1855.

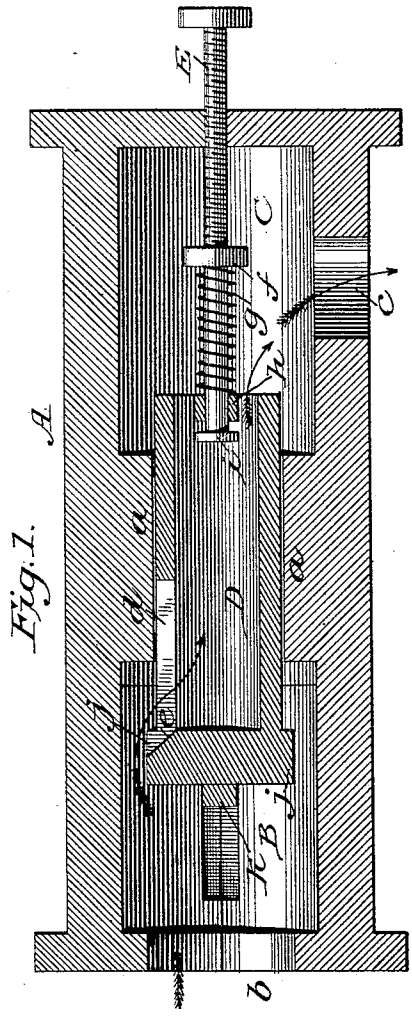



Fig. 1.

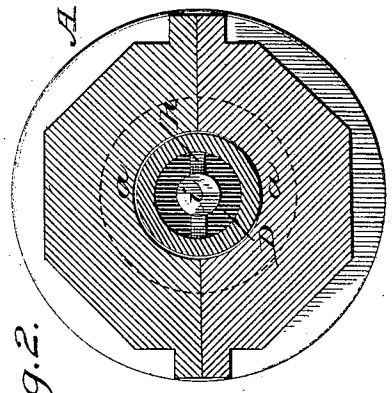



Fig. 2.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

# UNITED STATES PATENT OFFICE.

E. G. RUSSELL, OF RAVENNA, OHIO.

## REGULATING-VALVE FOR STEAM-ENGINES.

Specification of Letters Patent No. 13,498, dated August 28, 1855.

*To all whom it may concern:*

Be it known that I, E. G. RUSSELL, of Ravenna, in the county of Portage and State of Ohio, have invented an Improved Automatic Regulating-Valve for Governing the Speed of Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a central longitudinal section of the valve, and Fig. 2, a transverse section of the same.

Similar letters of reference indicate corresponding parts in both figures.

This invention consists in a valve of peculiar construction which is acted upon by the pressure of steam in such a manner as to cause the area of its opening to be increased or diminished by any tendency to diminished or decreased velocity.

A, is the valve box which contains at about the middle of its length a truly bored cylindrical seat *a*, *a*, to receive the cylindrical valve B. The inlet *b*, to the valve box is at one end the outlet C, is on the opposite side of the seat *a*, *a*, near the end of the box.

The valve B, consists of a hollow cylinder fitting to the seat *a*, *a*, being open at the end which enters the outlet chamber C, and closed at the other end, which enters the inlet chamber D. It has a slot *d*, which commences at the closed end of the valve and extends nearly the whole length of the seat, being of such width as to give it an area about equal to its internal diameter. Through this slot the steam passes from the inlet to the outlet. At the closed end of the valve there is a shoulder *j*, which is even with the end of the slot *d*, and is to form a stop when it comes in contact with the valve seat. The end of the slot is beveled off into this shoulder as shown at *e*, in Fig. 1, so that when the shoulder arrives in contact with the seat there will still be a small opening. Instead of thus beveling the end of the slot the same result may be obtained by making the shoulder at a short distance within the end of the slot so as to leave a small portion of the slot protruding from the seat when the shoulder *j* is in contact with the seat. The above provision is necessary to prevent the closing of the valve entirely and shutting off the steam. A screw E, is fitted to a female screw in the end of the outlet chamber, and provided with a shoulder, nut or collar *f*, as a bearing to one end of an expanding spring *g*, the other end of which bears against a yoke *k*, at the open end of the valve. The end of the screw has its thread turned off and fits loosely in the yoke *h*, with a shoulder *i*, inside the yoke which serves to regulate the maximum area of the opening of the slot *d*, *k*, is a guide for the valve fitting to slots inside the case.

The action of the valve is as follows. When steam is first admitted at the inlet *b*, as it rushes in upon the valve it drives the valve along until the shoulder *j*, comes in contact with the seat, and there holds it until by the passage of steam through the small opening left by the beveling of the slot at *d*, the outlet chamber is filled with steam and an equilibrium being restored the valve is forced open by the spring *g*. In consequence of the free egress of steam from the outlet chamber when the engine is in operation the pressure of the steam in that chamber will always be less than it is in the inlet chamber and there will be a tendency to close the valve, but that is prevented by the spring *g*, which balances the excess of pressure. As the velocity of the engine increases the quantity exhausted from the outlet chamber increases, and the relative pressure on the outlet side of the valve is diminished consequently the valve is acted upon by the pressure of steam in the inlet chamber and the opening of the slot is contracted. If the velocity of the engine diminishes an opposite result is produced and the opening is enlarged. The excess of pressure on the inlet side of the valve is always balanced by the spring *g*, whose force increases as the pressure increases and vice versa.

To give more or less steam to the engine the screw E, is screwed into or out of the valve box to allow a greater or less opening to the valve. This movement of the valve does not interfere with the action of the spring *g*.

I do not claim to be the first inventor of a regulating valve the area of whose opening is increased or diminished by any tendency of increased or diminished velocity. But

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

The hollow cylindrical valve D, open at

one end and closed at the other, fitted in a cylindrical seat with its closed end on the inlet side of the said seat, and provided with a slot at one side near the closed end to allow the steam to pass through its interior, and having a spring applied to balance the excess of pressure on the inlet side and to give a tendency to open the valve, the whole operating substantially as herein described.

E. G. RUSSELL.

Witnesses:
J. W. ENOS,
B. H. ENOS.