R. SANDERSON.

Cut-off Valve for Steam-Engines.

No. 206,975. Patented Aug. 13, 1878.

Fig. 1.

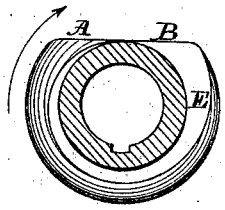


Fig. 2.

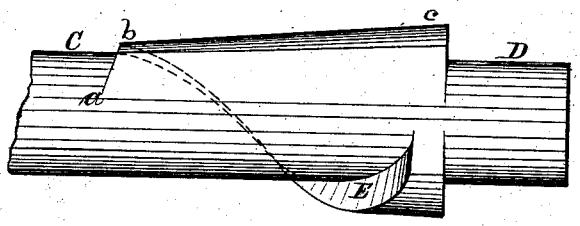


Fig. 3.

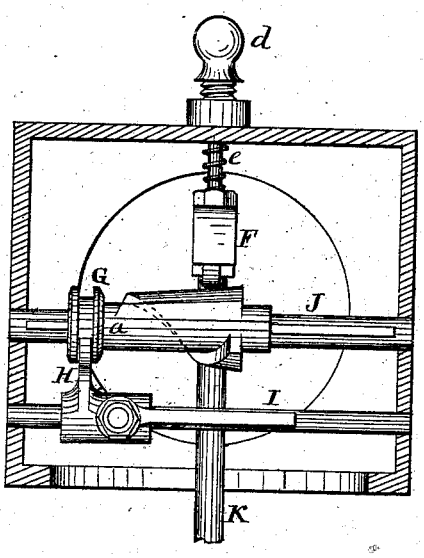
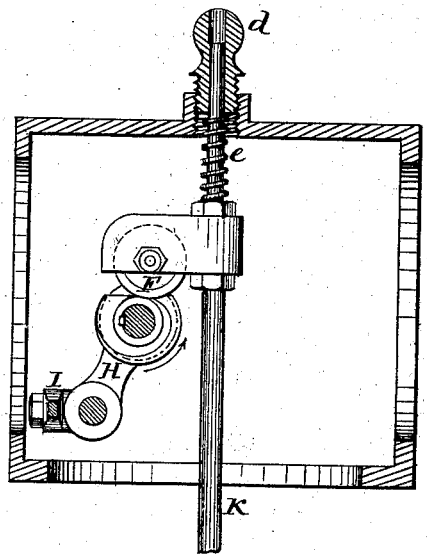


Fig. 4.



Witnesses:

Thomas M. Knight,
John D Anderson

Inventor:

Robert Sanderson

UNITED STATES PATENT OFFICE.

ROBERT SANDERSON, OF CLEVELAND, OHIO.

IMPROVEMENT IN CUT-OFF VALVES FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **206,975**, dated August 13, 1878; application filed July 17, 1876.

To all whom it may concern:

Be it known that I, ROBERT SANDERSON, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Cut-Off Valves for Steam-Engines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of my invention is to secure a higher lift and a longer-continued opening of the cut-off valve when the speed of the engine is decreased, either by increased work or diminished pressure of steam, and less lift and shorter cut-off when by any means the speed is increased beyond the desired rate; also, to provide against damage resulting from any accident by which the governor would be stopped or the engine suddenly released from its work, by the combination of the tapering spiral-shaped cam shown in Figures 1 and 2 with the governor, which it is not deemed necessary to show, and any suitable gearing to the engine-shaft, giving the cam a rotary and longitudinal motion on the shaft J, Fig. 3, operating the cut-off valve by means of the roller or toe F, Fig. 4, on the valve-stem K, as hereinafter described; and two of such movements, as is represented by one drawing, may be used when the engine has ports at each end, and by this means take off nearly all the steam-pressure from the main valve, and in a great measure save the friction arising from such pressure when ports are opened alternately.

In the accompanying drawings, Fig. 1 represents an end view of the cam. Commencing at the point *a* in Figs. 2 and 3, the unshaded portion in Fig. 1 shows the increase of the lift of the cam, also seen at *b* and *c* in Fig. 2, from a slight movement from *b* to a full movement at *c*, and an instantaneous cut-off at *b* to *a*, full-stroke cut-off at *c*, and any desired cut-off between the points *b* and *c*, as will be readily seen by following the dotted line and full line at E, Fig. 2.

H represents a fork turning in the groove G in Fig. 3, by means of which, in connection with the rod I, which connects it with the governor, the cam is moved backward and forward on the shaft J, and under the roller or toe F, to accomplish the object already set forth. *d* is an adjustable screw for graduating the spring *l* on the valve-stem K.

The operation is as follows: When the engine is running too slow the dropping of the governor-balls moves the cam in the direction of C, and a higher and longer-continued lift given to the valve, and the reverse when the engine runs too fast.

To secure safety the cam is turned down at C and D, so that no lift will be given to the valve when either of these points is under the roller or toe F. Thus, by properly adjusting the connections, the stopping of the governor by any accident moves the cam so the point D will be under the roller or toe F and the engine stopped, and any unusual speed moves the cam so that the point C will be under the roller or toe, and the engine checked until it would again commence using steam at the point *b*.

I am aware that spiral-shaped and tapering cams have been used for valve-gear, in some of which a narrow space has been left of a cylindrical form; but I do not know that any such spaces have been used for the purpose of allowing the toe of the valve to drop down and check the engine thereby, as previously described herein; and I also disclaim the device shown in the patent of W. Wright, of October 10, 1871, No. 119,908.

I claim—

In a cut-off valve, the spiral-shaped and tapering elongated cam E, having at the ends the safety-cylinders C and D, formed above the surface of the shaft, constructed and arranged substantially as and for the purpose described.

ROBERT SANDERSON.

Witnesses:

THOMAS M. HIGHT,

JOHN POLLOCK.