J. BUTCHER.

Valve-Gear for Steam-Engines.

No. 209,013. Patented Oct. 15, 1878.

Fig - 1.

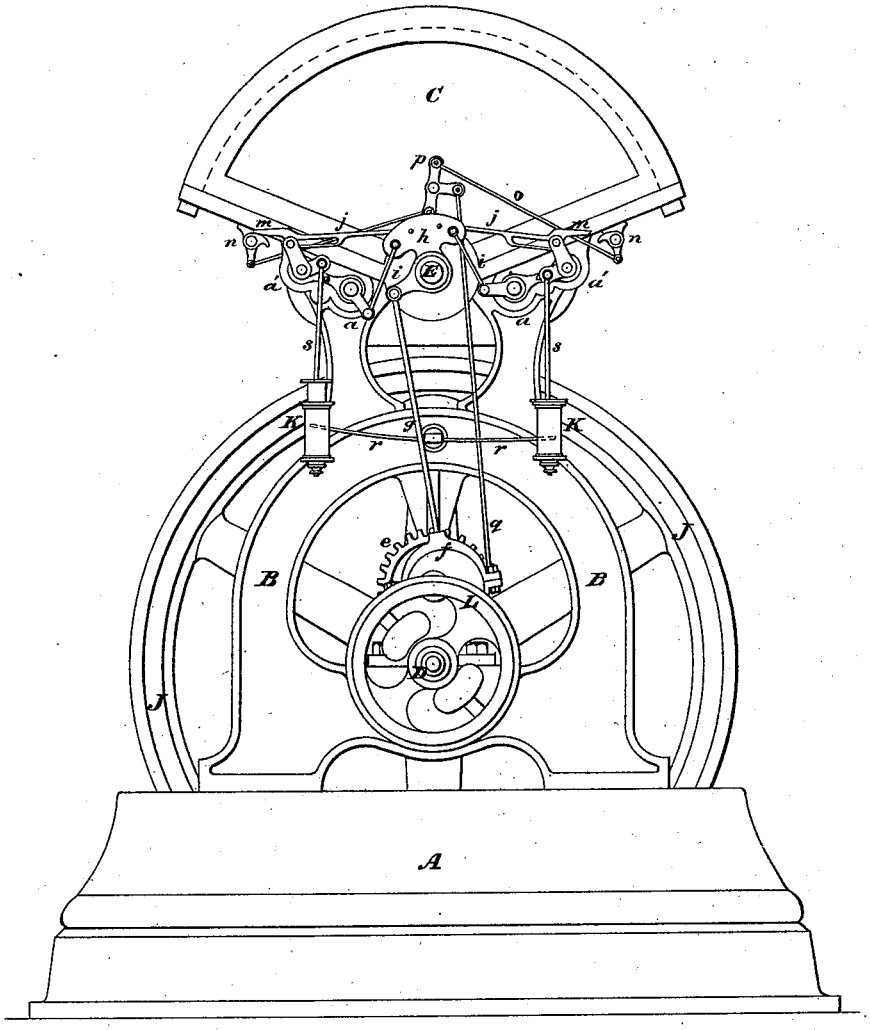
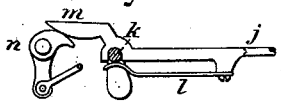


Fig - 2.



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IMPROVEMENT IN VALVE-GEARS FOR STEAM-ENGINES.

Specification forming part of Letters Patent No. **209,013,** dated October 15, 1878; application filed April 25, 1878.

To all whom it may concern:

Be it known that I, JOSEPH BUTCHER, of the city, county, and State of New York, have invented certain Improvements in Valve-Gear for Steam-Engines, of which the following is a specification:

This invention relates to that class of valve-gear wherein an oscillating valve is provided with variable cut-off mechanism under control of a governor; and it consists essentially in the construction of the cut-off mechanism and the various combinations, all as will be more fully hereinafter set forth.

In the drawings, Figure 1 is a side elevation of an engine to which my improved valve-gear is adapted. Fig. 2 is a detail view, showing the cut-off mechanism enlarged.

C represents the sectoral chamber of a vibrating-piston engine, mounted upon a frame, B, set on a bed-plate, A, and J is the fly-wheel of the engine. The cranks, connecting-rod, &c., being on the opposite side from the valve-gear, are not seen.

None of the above form any part of my present invention, but are introduced simply to illustrate the adaptation of the valve-gear.

An eccentric, *f*, receives rotary motion from the main shaft D, and communicates through a rod, *g*, an oscillating motion to a crank-disk, *h*, mounted on a stud, E, as shown. From this disk reach arms *i i*, which take hold of cranks on the projecting ends of the exhaust-valve stems.

Other rods, *j j*, reach out and take hold of cranks on the extremities of the receiving-valve stems. These valves are provided with dash-pots and devices for automatically cutting off the steam under the control of a governor. This mechanism is shown in detail in Fig. 2, but more in general in Fig. 1.

The rod *j* is provided with a recess, *k*, to receive the wrist of the valve-crank, a spring, *l*, secured to it so as to leave a space for the play of the valve-wrist when disengaged, and bent up at the end to press upon the said wrist and keep it elastically engaged, and a wiper, *m*, to engage a toe, *n*, which is under the control of the governor. A rod, *o*, extends to take hold of a three-armed crank, *p*, or some equivalent device, from one arm of which a rod, *q*, extends down and connects with a governor, L, which may be of any suitable construction or kind.

The operation of the cut-off is as follows: When the engine attains a high rate of speed, the governor acts through the rods *q* and *o* to raise the toe *n*. This causes the wiper *m* to ride high upon it at an early point in the stroke and release the wrist from the recess *k* and permit the dash-pot spring *r* to shut the port instantly, which it accomplishes through the medium of the dash-pot K and rod *s*. As the speed slackens the governor gradually permits the toe *n* to drop, and this compels the engagement of the wrist with the recess *k* until a more remote point of the stroke is reached, until finally the toe *n* may drop low enough to fail entirely in the disengagement of the wrist, and in this condition of the valve the steam is cut off only at the extremity of the stroke.

I do not claim anything as new in connection with the dash-pots, as these are common; and I am perfectly well aware of the existence of cut-off valves controlled by the governor. Therefore I do not broadly claim cut-off-valve gear arranged to cut off the steam at a point of the stroke varying directly with the speed of the engine; but

What I do claim, and desire to secure by Letters Patent, is—

1. The rod *j*, provided with a recess, *k*, to receive the wrist of the valve-crank, the spring *l*, secured to it so as to leave a space for the play of the wrist when disengaged, and bent up at the end to press upon said wrist and keep it elastically engaged, and a wiper, *m*, to lift the said rod, all as and for the purposes set forth.

2. The combination of the rod *j*, provided with the recess *k*, spring *l*, and wiper *m*, all as set forth, with the toe *n*, arranged to take under the wiper *m* when the rod advances, and a governor, L, arranged to operate the said toe *n* and cause it to disengage the crank-wrist from the recess *k*, substantially as herein shown.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOSEPH BUTCHER.

Witnesses:
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ARTHUR C. FRASER.