

(No Model.)

M. J. McCARTER.

CUT-OFF VALVE GEAR.

No. 294,650.

Patented Mar. 4, 1884.

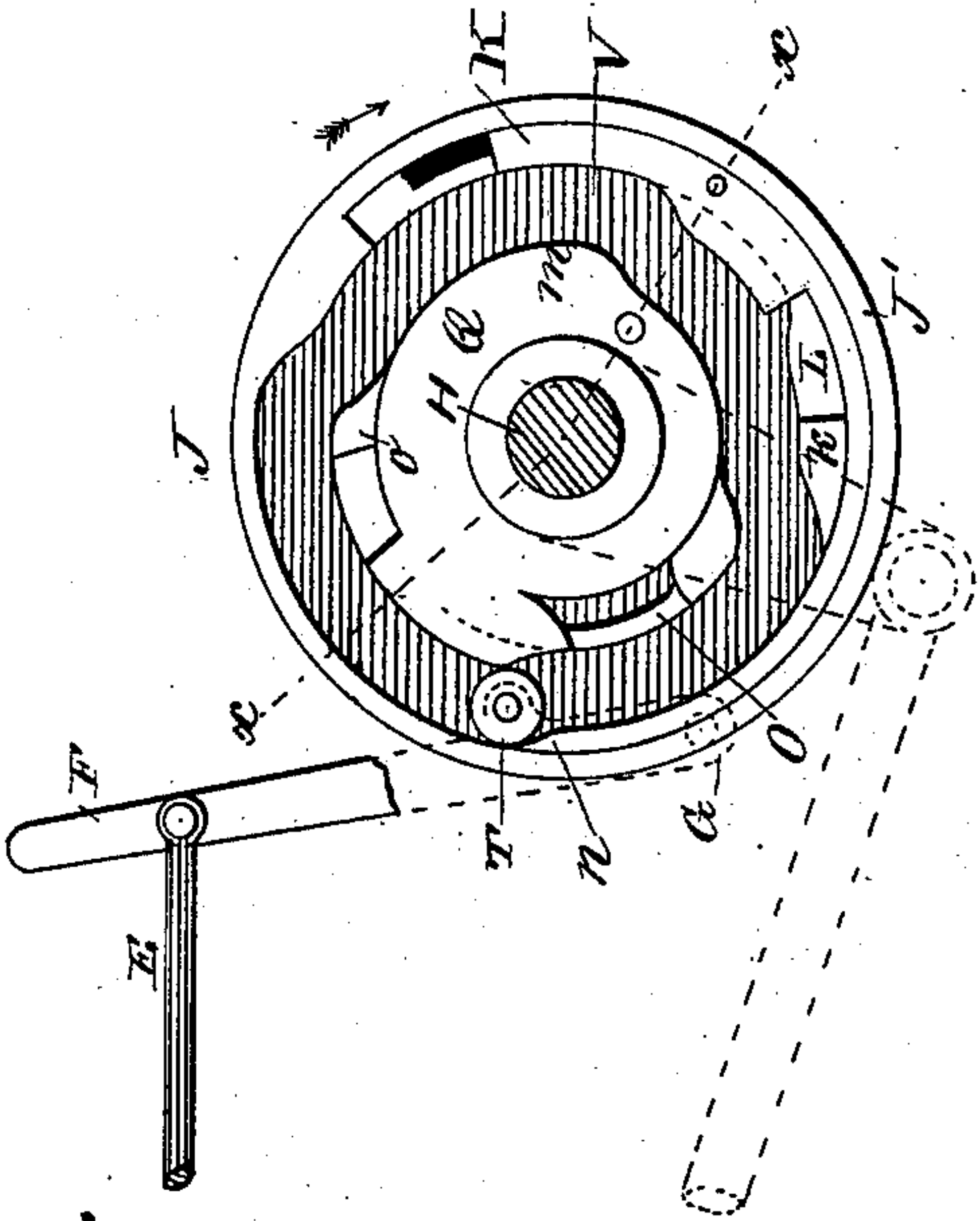
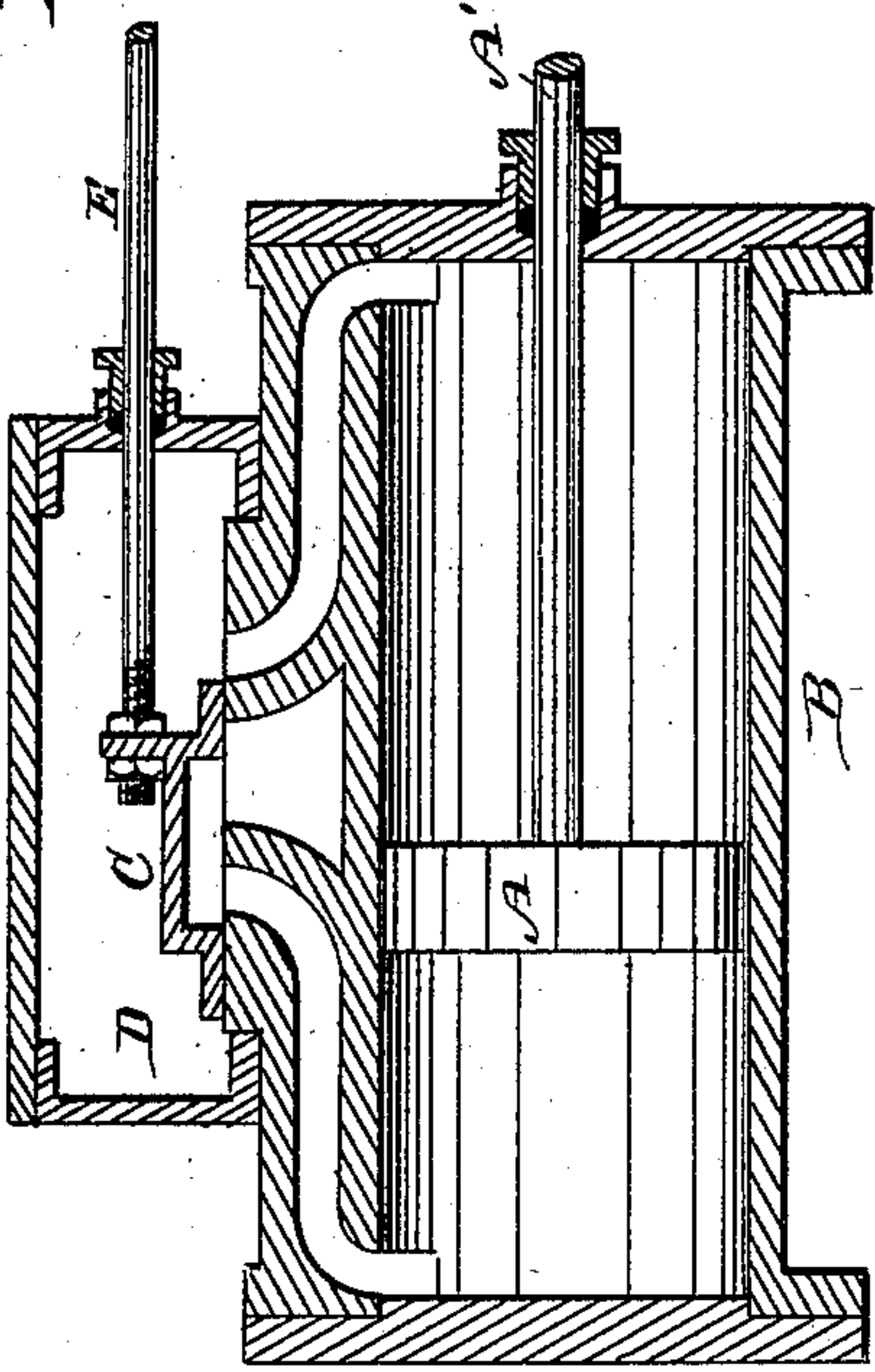


Fig. 1.



WITNESSES:

Theo. G. Hoster
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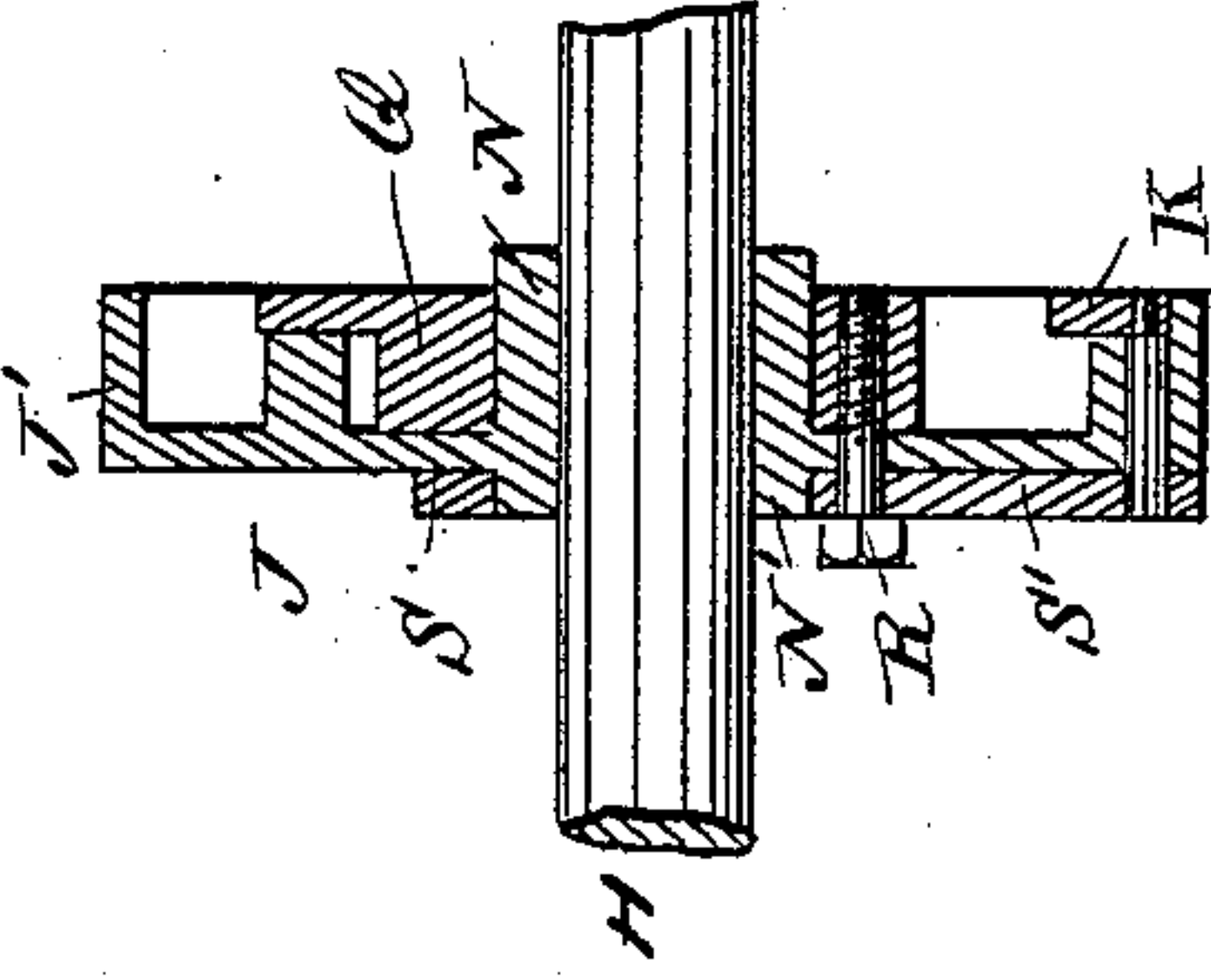


Fig. 3.

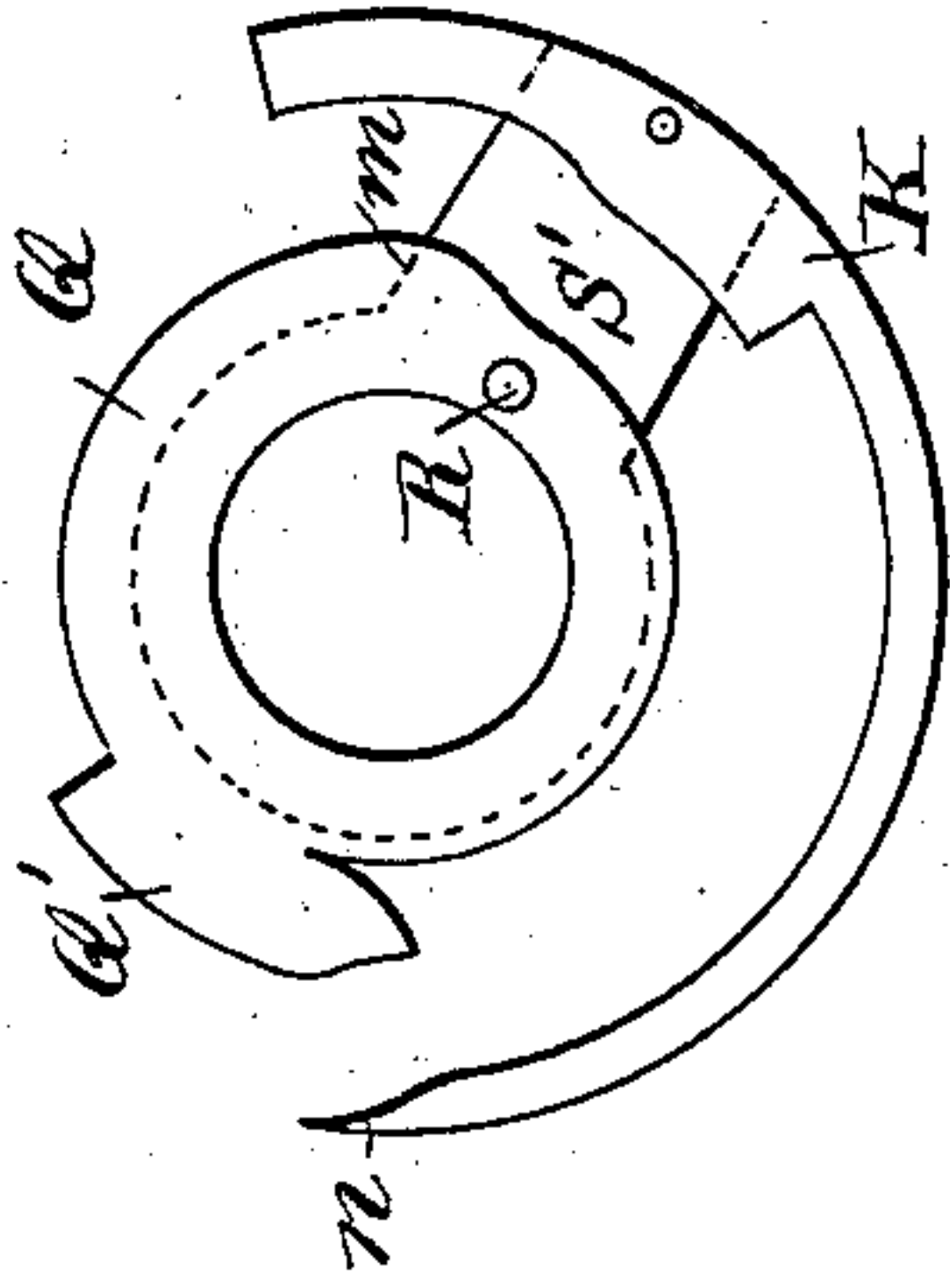
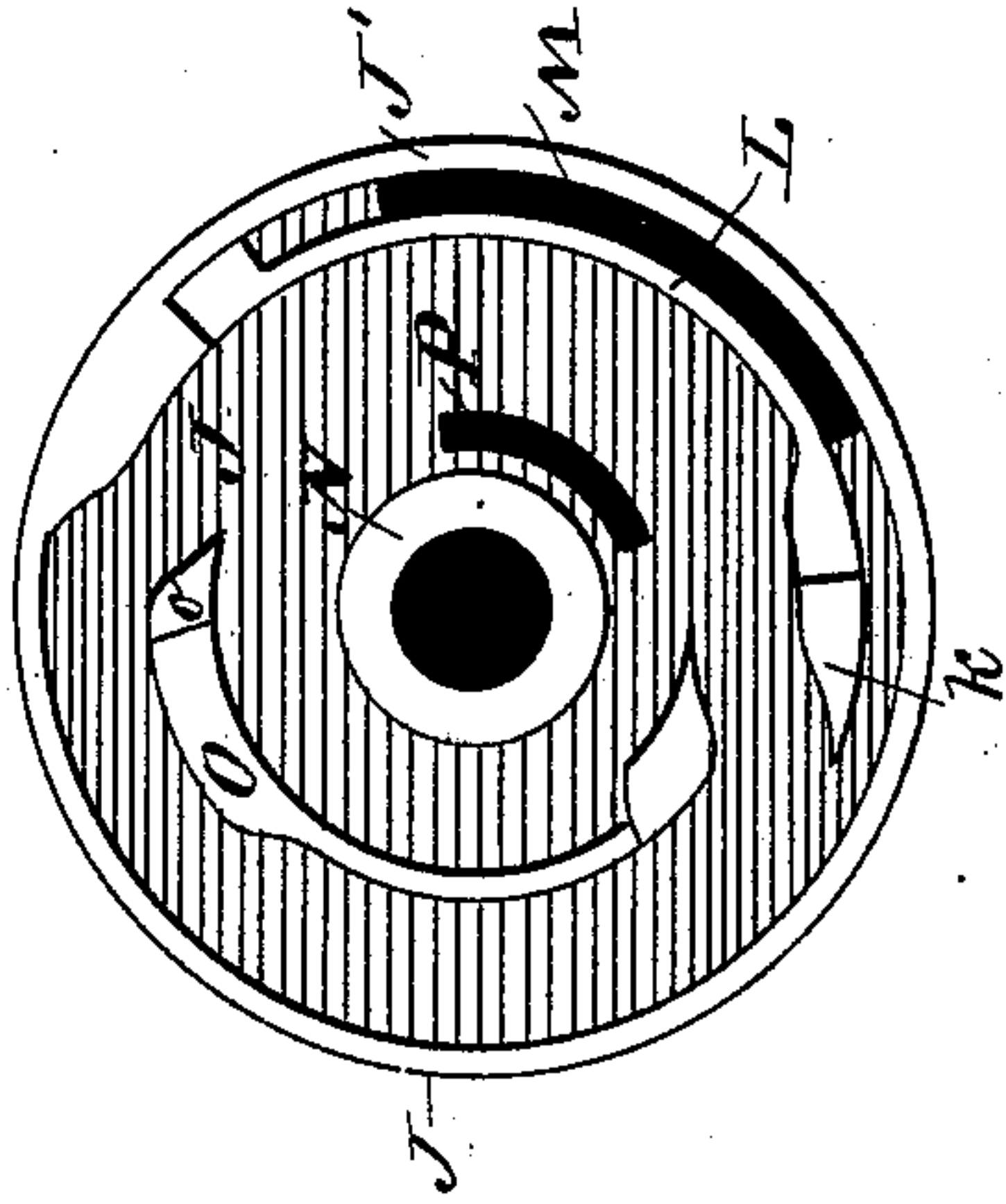


Fig. 2.



INVENTOR:

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UNITED STATES PATENT OFFICE.

MARSHALL J. McCARTER, OF NORRISTOWN, PENNSYLVANIA.

CUT-OFF-VALVE GEAR.

SPECIFICATION forming part of Letters Patent No. 294,650, dated March 4, 1884.

Application filed August 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, MARSHALL J. McCARTER, of Norristown, in the county of Montgomery and State of Pennsylvania, have invented a new and Improved Adjustable Cut-Off-Valve Gear for Steam-Engines, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved attachment to the eccentric of a steam-engine, whereby the said eccentric can be adjusted to cut off the steam at any part of the stroke, as may be desired.

The invention consists in a disk mounted on a crank-shaft and provided with an irregular or eccentric adjustable cam-groove, into which a pin or roller projects from a swinging or rocking frame or lever which is connected with the slide or other valve, whereby the said valve will be so operated by the cam as to cut off the steam after a certain length of the stroke, the same being provided with means for adjusting it to be cut off at any desired part of the stroke.

The invention also consists in numerous parts and details and various combinations of the same, as will be fully described and set forth hereinafter.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a longitudinal sectional elevation of the cylinder and steam-chest and side view of the eccentric provided with my improved cut-off. Fig. 2 is a face view of the eccentric. Fig. 3 is a face view of the adjustable eccentric track-plate in the same. Fig. 4 is a cross-sectional elevation of the eccentric on the line *xx*, Fig. 1.

The piston A, fitting in the cylinder B, is provided with a piston rod, A', connected with a crank-shaft in the usual manner. Steam is admitted into the cylinder B by a sliding valve, C, or by a rocking or other suitable valve contained in the steam-chest D, into which the steam is conducted, which valve C is secured to a rod, E, which is pivoted to a frame, F, pivoted vertically on the base G of the machine, or on any other suitable support, so that the frame F can swing in the ver-

tical plane. On the shaft H a flanged disk, J, is mounted, which is provided with an eccentric track, half of which is formed by the inner surface of the flange, and the other half is formed by a cam-ring, K, held to slide between the remaining half of the flange J' and a ridge, L, projecting from the inner surface of the disk J, parallel with the flange J' and close to the same, between which flange J' and ridge L a segmental groove, M, is provided in the disk J. One end of the ridge L is united with the flange J', but the other end is open to permit the cam-ring section K to pass in and out. A segmental ridge, O, of varying thickness projects from the inner surface of the disk, and also forms an eccentric track, the ridge O being opposite the ridge L, but being a greater distance from the flange than the ridge L, but also having less length. A neck, N, projects from the inner surface of the disk J around the central aperture of the same, and between the neck N and the ridge L a segmental slot, P, is formed in the disk J. A collar or neck, N', is formed on the outer side of the disk J. An eccentric ring, Q, fitting around the neck or collar N, is provided with a cam projection, Q', and diametrically opposite the projection is provided with an aperture for a screw, R. The said ring is held in the space between the neck or collar N and the ridge O; but only the ends of the ridge O are in contact with the outer eccentric edge of the ring Q, as the inner edge of the ridge O is nearer to the collar or neck N at the ends than it is between the ends. A ring, S, fitting loosely in the outer neck or collar, N', of the disk J, is made integral with or secured to a plate or arm, S', which extends to the periphery of the disk J. The screw R passes through an aperture in the plate S', through the slot P in the disk J, and into the ring Q. A roller, T, mounted on a suitable pin of the pivoted frame F, passes into the eccentric or irregular groove V, formed by the flange J', the ridge L, the ridge O, and the eccentric-ring Q. The cam-ring K is secured to the outer end of the arm S', so that the ring Q, the ring S, and the cam-ring section K will move together.

The operation is as follows: If the piston is at that end of the cylinder farthest from the shaft, steam will be admitted into the rear end

of the cylinder and the piston will be moved toward the shaft, the slide-valve C remaining immovable. A projection, *m*, of the ring Q then strikes the roller T and moves the rod E in the direction from the shaft, thereby closing that port which admits steam into the rear end of the cylinder, and thus cutting off the steam. The steam then expands and operates the machine, the slide-valve remaining motionless until the stroke has been completed, when the end *o* of the ridge O strikes the roller T and swings the frame F and the rod E in the direction from the shaft, thereby opening the port which admits steam into the front end of the cylinder, whereby the piston will be moved in the direction from the shaft. The slide-valve again remains motionless until the end *n* of the cam-ring section K strikes the roller and swings the frame F and the rod E in the direction toward the shaft, thereby closing the port admitting steam into the front end of the cylinder and cutting off the steam and causing the stroke to be completed by steam under expansion. It must be observed that during the stroke toward the shaft the valve is opened to admit steam by the projection *k* of the ridge L, which point is fixed, and then the port is closed—that is, the steam is cut off by the action of the projection *m*, which is on the movable ring Q. Then the stroke is completed, and the port for admitting steam into the front end of the cylinder is opened by the action of the point *o* of the ridge O, which point is fixed, and the steam is cut off by the action of the point *n* of the cam-ring section K, which cam-ring section is movable. By adjusting the ring Q and the cam-ring section K, which always move together, in such a manner that the end *n* of the cam-ring section K will be a greater or less distance from the point *k* of the ridge L, the cut-off mechanism can be so adjusted that the steam will be cut off during the beginning, at the middle, or at the end of the stroke, as may be desired.

By means of my improved cut-off, I am enabled to adjust the machine to cut the steam off at any desired part of the stroke; and I do not require any special cut-off mechanism, as the steam is cut off by the same mechanism that operates the slide or other valve for admitting steam into the cylinder.

My improved cut-off mechanism can be applied on stationary engines, marine engines, or locomotives.

I do not abandon or dedicate to the public any patentable feature set forth herein and not hereinafter claimed, but reserve the right to claim the same either in a reissue of any patent that may be granted upon this application or in other applications for Letters Patent that I may make.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In a cut-off for steam-engines, the combination, with the disk J, mounted rigidly on the shaft, of an adjustable ring, Q, held centrally on the said disk, and connected with a cam-ring section, also held on the said disk, of the rocking frame or lever F, provided with the pin or roller T, which rocking frame or lever F is connected with the valve, substantially as herein shown and described, and for the purpose set forth.

2. In a cut-off for steam-engines, the combination, with the disk J, mounted rigidly on the shaft, of a ring, Q, held centrally on the said disk, a cam-ring section, K, held on the said disk, the ring S, held on the disk, and provided with an arm, S', to which arm S' the ring K is fastened, the screw R, for connecting the ring Q with the arm S', the rocking frame or lever F, and the pin T, which frame or lever F is connected with the valve, substantially as herein shown and described, and for the purpose set forth.

3. In a cut-off for steam-engines, the combination, with the disk J, provided with the ridges O and L, of the ring Q, connected with the cam-ring section K, both resting on the disk J, the rocking frame or lever F, having a pin or roller, T, and a rod connecting the frame or lever F with the valve, substantially as herein shown and described, and for the purpose set forth.

4. In a cut-off for steam-engines, the combination, with the disk J, provided with the slots P and M, and the ridges O and L, of the ring Q and the cam-ring section K, which are connected and both resting on the disk, the rocking frame or lever F, having a roller or pin, T, and a lever or rod connecting the said frame or lever F with the valve, substantially as herein shown and described, and for the purpose set forth.

MARSHALL J. McCARTER.

Witnesses:

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