(No Model.)

D. M. BORNARTH.

VALVE GEAR.

No. 457,932. Patented Aug. 18, 1891.

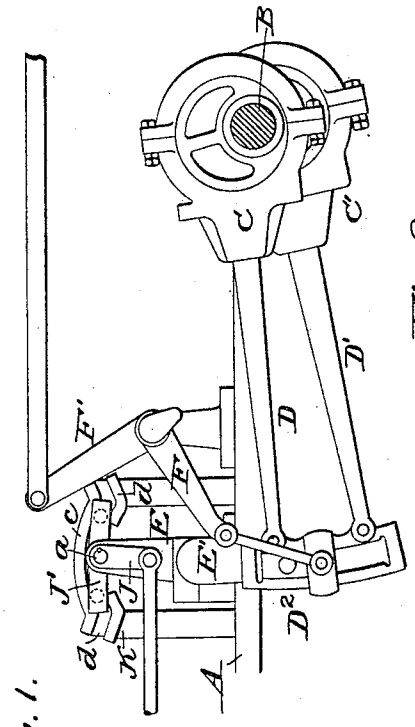
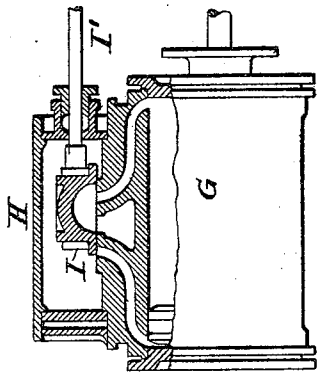


Fig. 1.



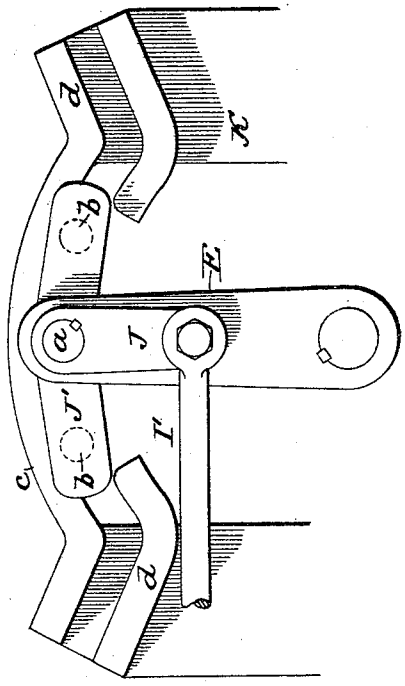


Fig. 2.

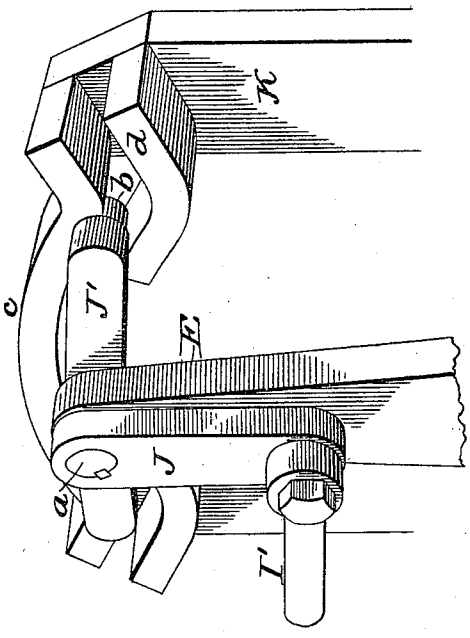


Fig. 3.

Witness:
Horace A. Dodge.
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

DANIEL M. BORNARTH, OF ST. PAUL, MINNESOTA.

VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 457,932, dated August 18, 1891.

Application filed March 3, 1891. Serial No. 383,537. (No model.)

To all whom it may concern:

Be it known that I, DANIEL M. BORNARTH, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Valve-Gears, of which the following is a specification.

My invention relates to valve-gears for steam-engines; and it consists in a novel construction and arrangement of parts, whereby the valve is moved at different rates of speed throughout its travel, the motion or speed being accelerated during the admission of steam to the cylinder.

In the drawings, Figure 1 is a side view of so much of the valve-gear as is necessary to show the application of my invention thereto; Fig. 2, a face view of the devices whereby the speed of the valve is accelerated, and Fig. 3 a perspective view of the same.

A indicates the engine-frame; B, the main shaft; C C′, the eccentrics; D D′, the eccentric-rods; D^2, the link; E E′, the rocker-arm; F F′, the reversing-lever connections; G, the cylinder; H, the steam-chest; I, the valve, and I′ the valve-rod, all of which parts may be of ordinary construction.

In the upper end E of the rocker-arm is a short shaft or stud *a*, to the outer end of which is secured an arm J, which latter is connected at its lower end with the valve-rod I′.

To the inner end of the shaft or stud *a* is a block or arm J′, carrying upon its inner face at opposite ends two rollers or studs *b b*, designed to work in connection with a peculiarly-formed block or guide K, secured to the engine-frame. This block or guide K is provided or formed with a curved bearing-face *c*, concentric with the pivot of the rocker-arm, and a guideway or bearing-face *d* at each end of the curved face *c*, the guideways or bearing-faces *d d* being straight, but at an angle to the curved bearing-face. Now as the arm E E′ is rocked the block J′ and arm J, carried thereby, will also be rocked, and as the valve-rod is connected with the arm J the valve will be moved. As the curved bearing-face *c* is concentric with and directly above the pivot of the rocker-arm, the rollers or studs *b* of the block J′ will merely ride along the curved face without causing the block J′ and attached arm J to change their position relatively to the rocker-arm; but as the rocker-arm continues its movement the roller or stud at one end of the block J′ will enter the straight inclined guideway *d* and thereby tip or rock said block J′ and its attached arm and give to the latter a movement independent of that given it by the rocker-arm. This rocking or tipping of the arm and block gives to the valve an accelerated movement at opposite ends of its stroke, it being understood, of course, that the action is the same as the rocker-arm moves from one side of its pivot to the other to carry the valve to opposite ends of the cylinder. The accelerated motion thus imparted to the valve at opposite ends of its stroke results in a quick and sudden cut-off, while the movement during the exhaust remains slow, as is usual.

Having thus described my invention, what I claim is—

1. In combination with a valve and its seat, a rocker-arm, a shaft *a*, journaled therein and provided with arm J and block J′, the latter having rollers or studs *b*, a rod I′, connecting the valve with the arm J, and the bearing-faces *c d d*, against which the rollers or studs *b* act.

2. In combination with a valve and its seat, means for imparting a continuous reciprocating motion to the valve alternately in opposite directions, and the guides or bearing-faces *d d* for giving to the valve an accelerated motion at the ends of its stroke.

3. In combination with a valve and its seat, a rocker-arm adapted to actuate the valve and provided with the T-shaped block J J′, bearing-faces *d d*, adapted to act in conjunction with the block J J′ to give an accelerated motion to the valve at opposite ends of its stroke, and means for imparting motion to the rocker-arm.

In witness whereof I hereunto set my hand in the presence of two witnesses.

DANIEL M. BORNARTH.

Witnesses:

GEO. HERBERT,

JOHN J. ELLIS.