J. SANGSTER & V. H. BECKER.

Improvement in Valve-Gearing.

No. 133,121. Patented Nov. 19, 1872.

Fig. 1

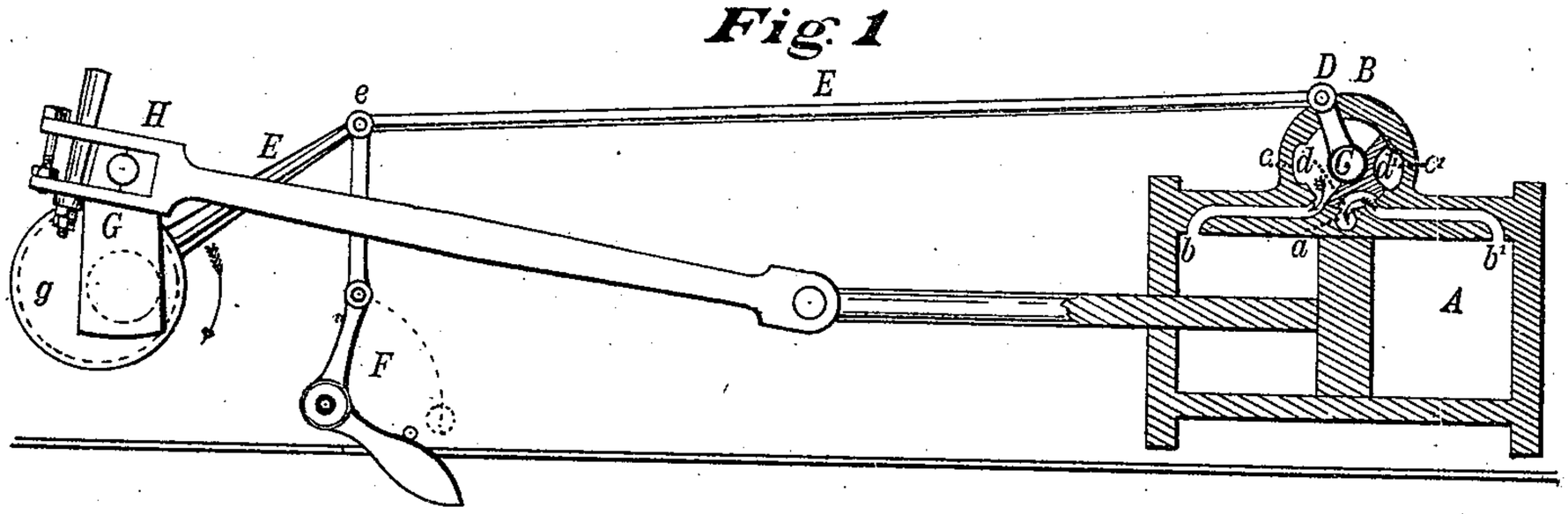
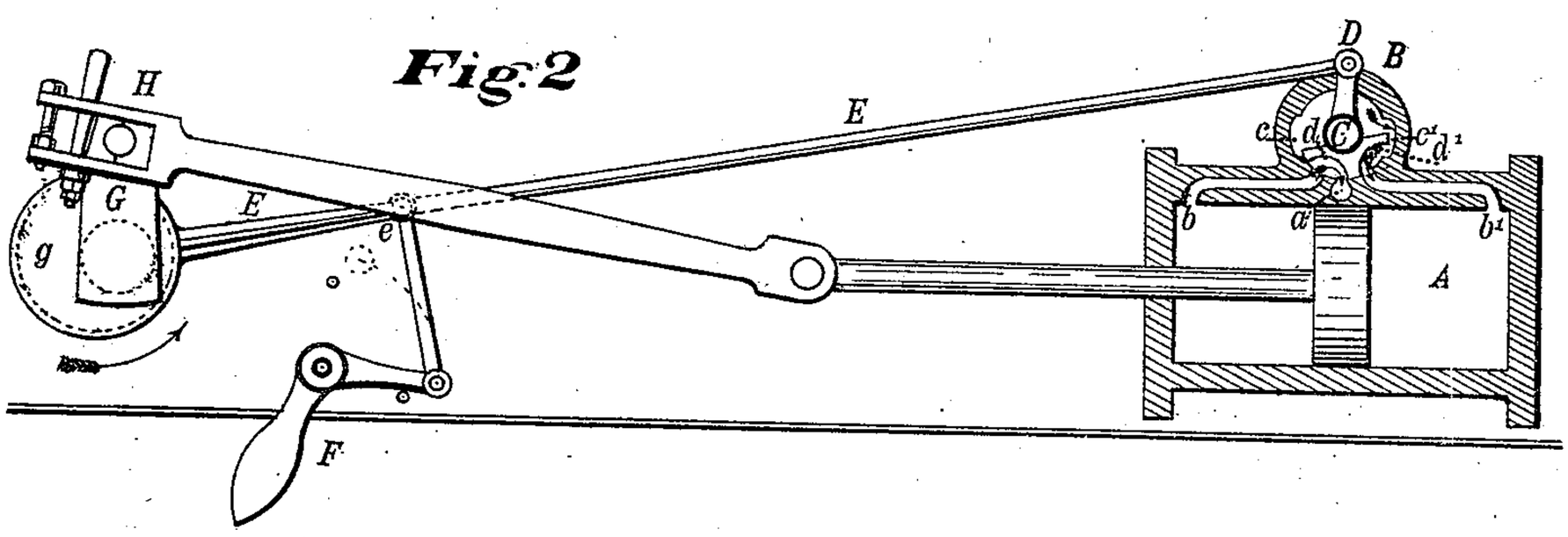


Fig. 2



Witnesses.

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JAMES SANGSTER AND VICTOR H. BECKER, OF BUFFALO, NEW YORK.

IMPROVEMENT IN VALVE-GEARINGS.

Specification forming part of Letters Patent No. **133,121**, dated November 19, 1872.

To all whom it may concern:

Be it known that we, JAMES SANGSTER and VICTOR H. BECKER, both of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in the Construction of Steam-Engines, of which the following is a specification:

Our improvements relate to that class of engines termed reversible, and more particularly to the construction of the valve-gear of such engines. The invention consists in providing the eccentric-rod of a single-eccentric reversible steam-engine with a device for increasing or decreasing the distance between the center of movement of the valve and the shaft; also, in arranging the valve and steam-ports in such a manner that a lengthening or shortening of the eccentric-rod will change the relation they bear to each other sufficiently to reverse the engine.

In the accompanying drawing, Figure I is a sectional elevation of that portion of a steam-engine embodying our improvements, wherein the eccentric-rod is shown in position for running the engine forward. Fig. II is a like view, showing the eccentric-rod in position for running backward.

Like letters of reference designate like parts in each of the figures.

A is the cylinder of a steam-engine, of which B is the steam-chest and *a* is the exhaust-steam-port; this and the steam-ports *b* and *b'* are of ordinary construction. *c c'* are auxiliary passages or depressions formed in the valve-face of the cylinder—one on either side of the ordinary steam-ports. C is the valve, which can be constructed in the form to receive either a sliding or a rocking motion. *d d'* are the passages or depressions cast in the face of the valve. D is the valve-arm, and E the eccentric-rod, which is connected by a joint, *e*, to an arrangement of levers, F, for raising and lowering it. G is the crank-shaft, and *g* the eccentric set thereon; this eccentric is set in such a position on the shaft in relation to the crank as will operate the valve to run the engine backward when the joint in the eccentric-rod is in the position shown in Fig. II, it being set with the lead for running that way. The engine is reversed by raising the joint to the position shown in Fig. I, which gives the lead to the valve for running forward.

The operation of our invention is as follows: The joint *e* in the connecting-rod being in the position shown in Fig. II, and the piston being in the center of its movement, the steam-port communicating with the front end of the cylinder is full open, steam being admitted through the auxiliary passage *c'* into the depression *d'* cast in the face of the valve, from whence it passes through the steam-port *b'* into the front end of the cylinder, the steam contained in that portion of the cylinder backward of the piston is being exhausted precisely as an ordinary valve would exhaust it—viz., through the communication formed with the exhaust-port by the depression *d* in the valve. The piston now having arrived at the forward end of its stroke, the valve has had a correspondingly-forward movement, and has closed the exhaust-port on that side and opened the lead through the auxiliary passage *c* into the depression *d* of the valve, and through the port *b* against the backward side of the piston, forcing it forward to the other end of the cylinder, when the lead is opened to return it, repeating the operation. The joint *e*, being raised into the position shown in Fig. I, pushes the valve forward until a full port of steam communicates with the backward side of the piston, forcing it to the front end of the cylinder, and, by the motion which it communicates to the shaft, moving the valve so as to give it the required lead-opening at that end. The steam, in this case, is admitted to the opposite end of the cylinder, by the alternate opening of the main port *b* and auxiliary passage *c'*.

In running the engine forward, the auxiliary passage *c'* is outside of the movement of the valve, and not used; whereas, in the opposite movement of the engine, both the passages *c* and *c'* are used in admitting steam to the opposite ends of the cylinder.

In opening the steam-ports for the backward revolutions of the engine, the valve moves in a direction opposite that of the pis-

ton, after the crank has passed the center, while, in the forward movement, it moves in the same direction with it.

Claims.

1. In a single-eccentric reversible steam-engine, the combination, with the eccentric and valve, of the jointed eccentric-rod E and lever F, when constructed and operated substantially as described.

2. A valve having depressions *d* and *d'* formed in its face, when operated in connection with the auxiliary steam-passages *c* and *c'*, and the ports *a*, *b*, and *b'*, and the jointed adjustable eccentric-rod, substantially as and for the purpose set forth.

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Witnesses:
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