

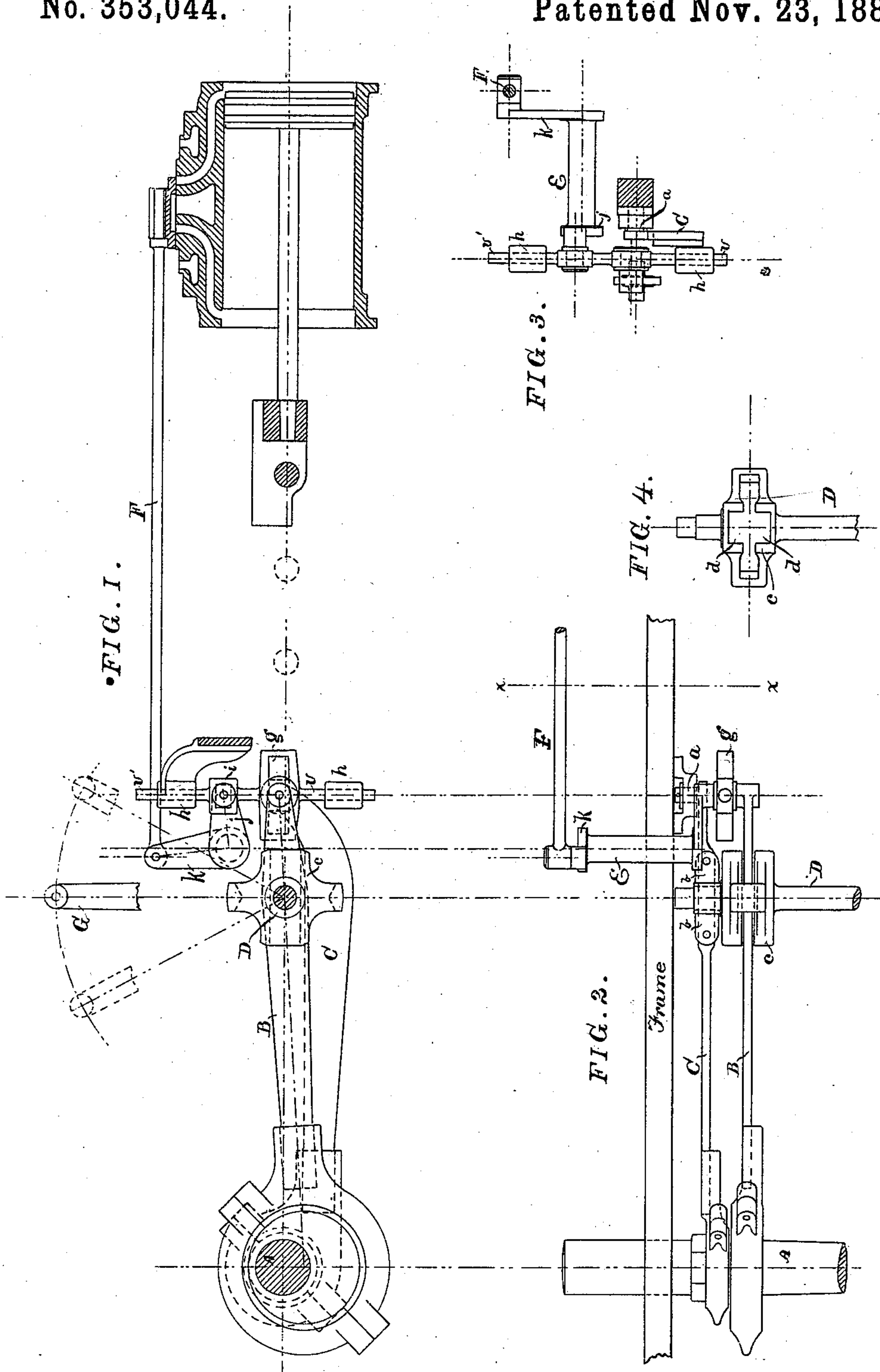
(No Model.)

2 Sheets—Sheet 1.

W. WILSON.
VALVE GEAR FOR STEAM ENGINES.

No. 353,044.

Patented Nov. 23, 1886.



Witnesses.

E. A. West
Albert H. Adams.

Inventor
William Wilson

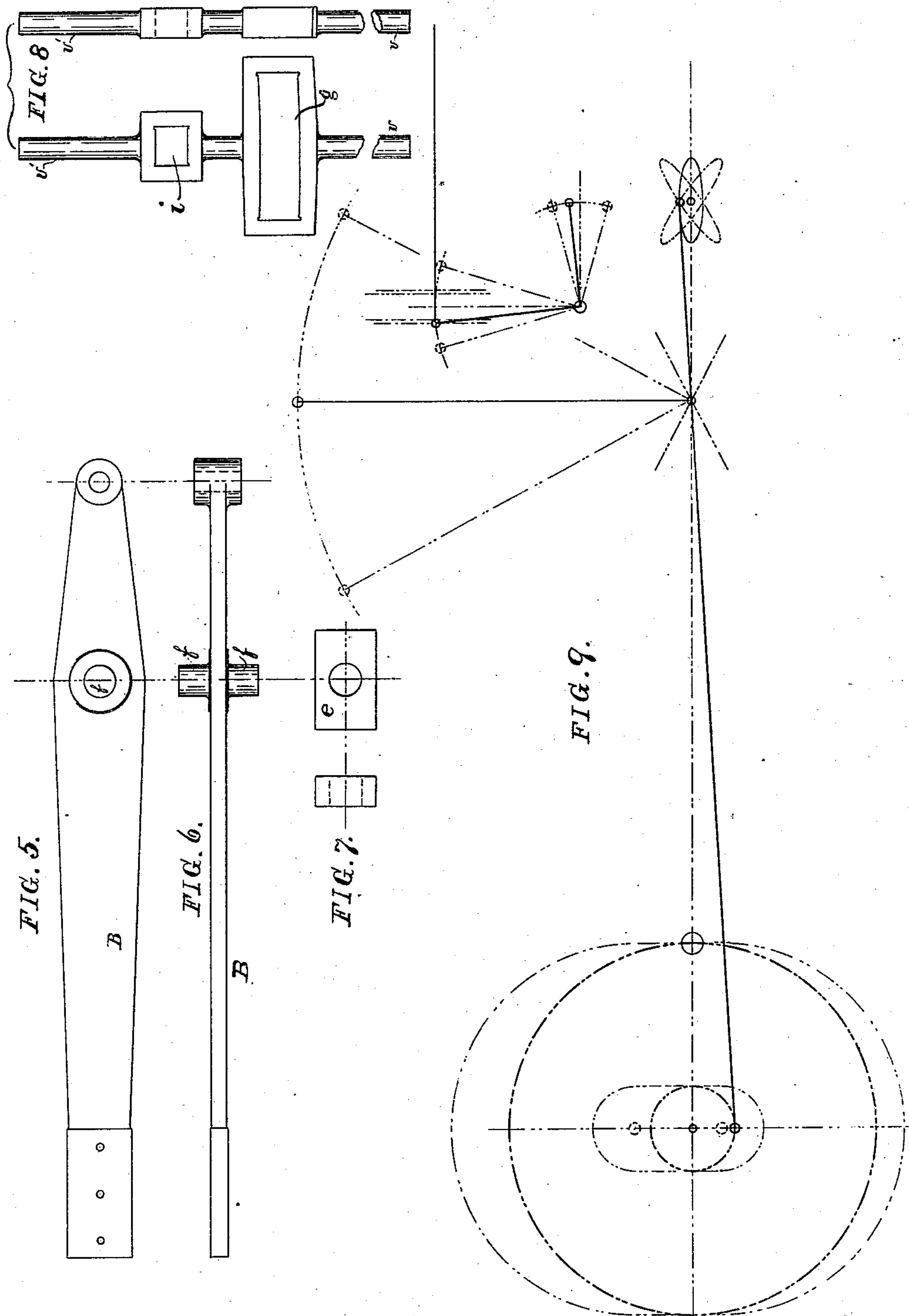
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UNITED STATES PATENT OFFICE.

WILLIAM WILSON, OF BLOOMINGTON, ILLINOIS.

VALVE-GEAR FOR STEAM-ENGINES.

SPECIFICATION forming part of Letters Patent No. 353,044, dated November 23, 1886.

Application filed November 2, 1885. Serial No. 181,619. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILSON, residing at Bloomington, in the county of McLean and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Valve-Gear for Steam-Engines, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation looking at the outside. Fig. 2 is a plan. Fig. 3 is a section at line *x* of Fig. 2. Fig. 4 is a detail, being a side elevation of the parts shown. Fig. 5 is a side elevation of the eccentric-lever. Fig. 6 is a top view of the same. Fig. 7 represents a sliding block; Fig. 8, two views of the slotted yoke. Fig. 9 is an illustrative figure. Figs. 5, 6, 7, and 8 are enlarged.

Letters Patent of the United States No. 327,047, dated September 29, 1885, have been granted to me for an improvement in valve-gear for steam-engines. The leading objects of that invention were to secure more perfect movement of the valve or valves and at the same time maintain a constant lead, and also to provide devices to prevent the vertical movement of the axle of the locomotive with which the eccentric is connected from affecting the action of the valve-lever. In that patent the eccentric-lever travels over a fulcrum located between the axle and the center of the eccentric-lever, and this lever was fulcrumed on a radius-bar to prevent the movement of the axle from affecting the action of the valve-lever. As the fulcrum was arranged in that patent, the front end of the eccentric-lever traveled in an oval path, the longest diameter of which is transverse to the lever.

My present invention is an improvement on that patent to me as aforesaid, and its leading object is to secure a correct movement of the valve or valves and at the same time maintain a constant lead by more simple mechanism, which I accomplish by arranging the fulcrum of the eccentric-lever so that the path in which its forward end moves will be an oval whose greatest diameter is in line with the eccentric-lever, instead of transverse thereto, and by other devices and combinations, as illustrated in the drawings, and hereinafter claimed.

This invention is primarily designed for use on locomotives, but may be used with station-

ary engines. I will describe my improvements adapted for use with a locomotive.

In the drawings, A represents the axle.

B is an eccentric-lever, connected with the axle and operated thereby as usual, the eccentric of the lever having a throw at right angles with the crank.

C is a radius-bar, one end of which is arranged upon the axle concentric therewith. The forward end of this bar C is pivoted at *a* to a block which is located in a short slot in the frame, or in some part connected therewith, to permit a slight movement of the block as the axle rises or falls. Of course there is an eccentric-lever and radius-bar on each side of the locomotive, only one side being shown in the drawings.

D is a reversing-shaft supported in bearings *b* on the radius-bars C.

c is a guide secured to the reversing-shaft D. This guide has a recess, *d*, on each side to receive a block, *e*, Fig. 7, and the eccentric-lever is provided with trunnions *f*, by which it is pivoted and fulcrumed in the blocks *e*. As the axle rotates the eccentric-lever slides back and forth in the guide *c*. The forward end of the eccentric-lever is pivoted to a block located in the slotted yoke *g*, from which yoke a rod, *v*, extends downward, and another one, *v'*, upward, which rods are guided in the bearings *h*, suitably supported. The upper rod is provided with a small yoke, *i*.

E is a short shaft, supported in a bearing on the frame, which bearing is omitted in the drawings. Secured to one end of this shaft E is an arm, *j*, the outer end of which is pivoted to a small block located in the yoke or opening *i*.

k is another arm, the lower end of which is secured to the shaft E, and its upper end is pivoted to the valve-rod F.

G is a lever connected with the reversing-shaft D, by means of which it can be operated.

In use the eccentric-lever and its fulcrum travel in the guide *c* on the reversing-shaft D, and the circular motion of the lever at one end will be converted into an oval motion at the other end, the largest diameter of the oval being in the direction of the eccentric-lever, and the shortest diameter of the oval being transverse to such lever, and such shortest diameter will always be equal to twice the combined lead and lap of the valve; hence the lead must

be constant. The eccentric-lever being fulcrumed in the guide *c*, and the forward end of such lever being pivoted in the yoke *g*, as the axle rotates the forward end of the eccentric-lever will move up and down and carry with it the slotted link *g* and rod *v'*, and through *j k* motion will be given to the valve-rod F. I thus dispense with the independent valve-lever shown in my former patent, and provide a more direct mode of operating the valve-rod, and at the same time provide for maintaining a constant lead by simple and effective means.

The reversing-shaft can be partly rotated in its bearings, either by a reversing-lever connection or automatically by a governor, as usual, and the travel of the valve can thus be regulated, as usual.

The operation of the radius-bar is substantially the same as that described in my former patent. It supports the fulcrum of the eccentric-lever so that the vertical movement of the axle does not affect its action upon the valve.

In Fig. 9 I have illustrated the movements

of the rock-shaft with its guides *c* of the forward end of the eccentric-lever, and of the arms *j k*, through which the valve-rod is operated; also, the supposed vertical movement of the axle.

My invention can be used with stationary engines, in which case the radius-bar need not be used; but the rock-shaft D, with its guide, in which the eccentric-lever is fulcrumed, may be supported in bearings on the frame.

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

The combination of an axle or main shaft, an eccentric-lever, a reversing-shaft carrying a guide in which the lever moves and is fulcrumed, a slotted yoke, a valve-rod, and connections between the yoke and valve-rod, substantially as and for the purposes specified.

WILLIAM WILSON.

Witnesses:

ALBERT H. ADAMS,
E. A. WEST.