

(No Model.)

W. J. LEWIS.
LOCOMOTIVE VALVE GEAR.

No. 331,799.

Patented Dec. 8, 1885.

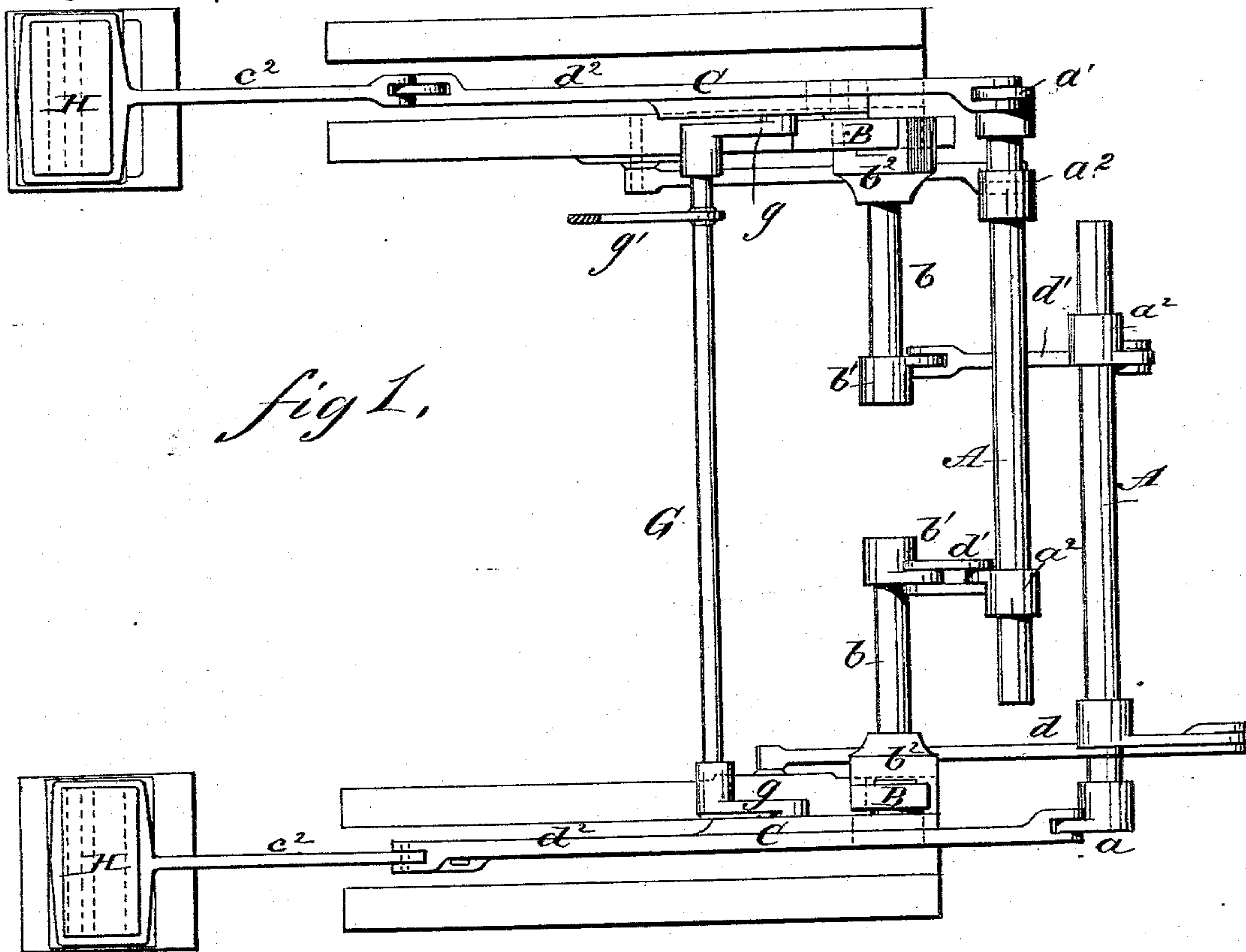


fig 1.

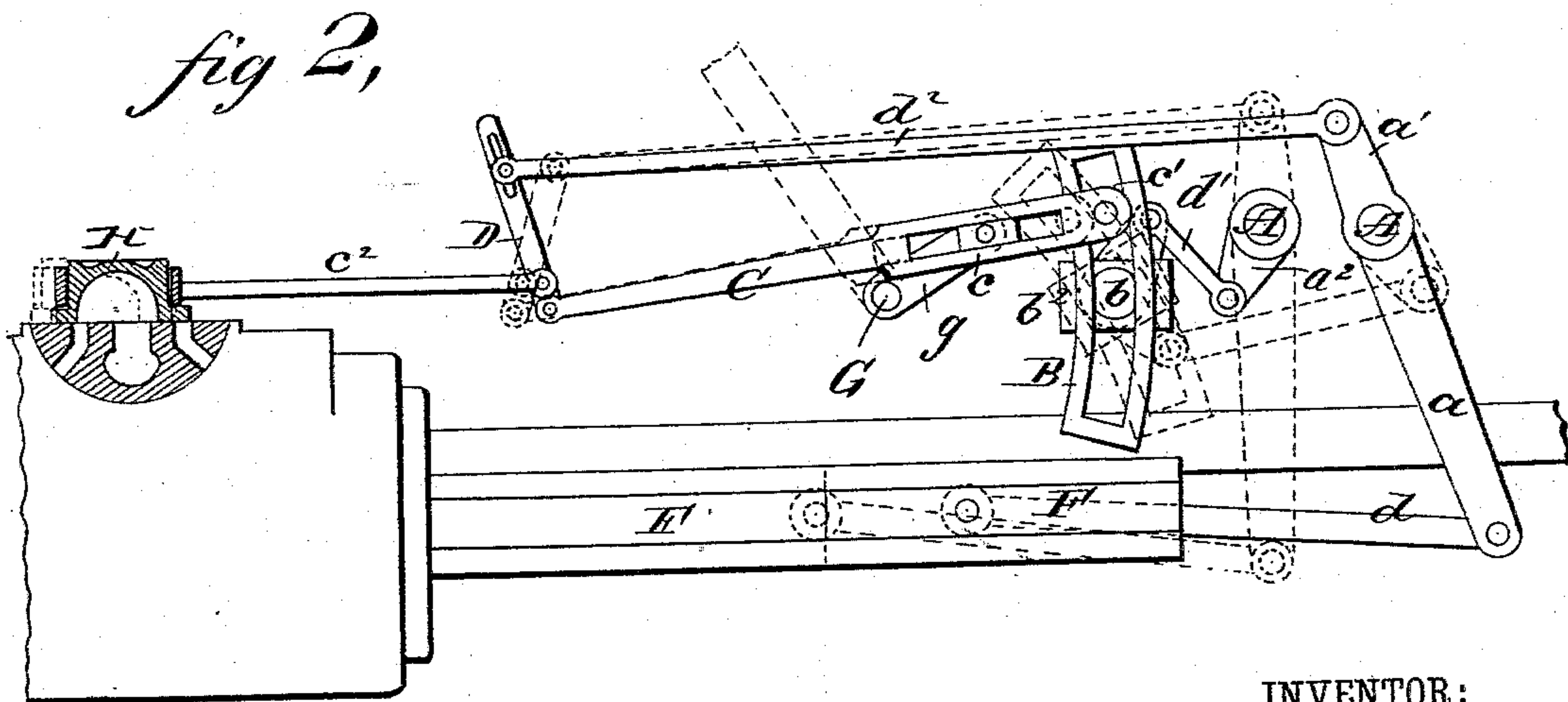


fig 2.

WITNESSES:

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LOCOMOTIVE VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 331,799, dated December 8, 1885.

Application filed May 5, 1884. Serial No. 130,410. (No model.)

To all whom it may concern:

Be it known that I, WALLACE J. LEWIS, of Tyler, in the county of Smith and State of Texas, have invented a new and Improved Locomotive Valve-Gear, of which the following is a full, clear, and exact description.

My improved gearing is especially designed for locomotive-engines; and the invention consists of a combination of rockers, shafts, arms, levers, links, and connecting-rods worked from the cross-head of the locomotive exclusively, and so arranged as to give the valve a correct motion, as hereinafter described and claimed.

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

Figure 1 is a plan view of the gearing, and Fig. 2 is a side view, partly sectional, showing the gearing as applied in connection with a cylinder and cross-head.

A A are the main rocker-shafts, extending across from one frame of the locomotive to the other, as shown in Fig. 1. On one end of each shaft, and outside the frame, is secured a long cross-head arm, *a*, extending downward, and a short valve-lever arm, *a'*, extending upward, both being in line with each other, and on the opposite end of each shaft is secured a link-arm, *a''*, which is set at the desired angle from the cross-head arm *a* and valve-lever arm *a'* for giving the link the correct motion. The cross-head arm *a* is connected to the cross-head F of the locomotive by means of a connecting-rod, *d*.

B B are radial links secured to the link rocker-shafts *b b* by means of saddles *b''*, that are keyed to the outside ends of the shafts *b*. At the inner ends of the shafts *b* are short arms *b'*, the arm at one side extending upward and that at the other side downward, and both being at an angle, and connected to the link-arms *a''* by connecting-rods *d'*.

C C are the valve-rods, formed at their ends next the links B with long slots, that receive blocks *c c*, and connected to the links B by link-blocks *c'* and pins. The outer ends of the valve-rods are connected to the lower ends of valve-levers D, which receive the valve-stems *c''* immediately above the connection with the

valve-rods C. The valve-lever D is connected with the valve-lever arm *a'* by means of a long connecting-rod, *d''*.

G is the tumbling-shaft, having on each end a short arm, *g*, and on one end a long arm, *g'*, and this shaft, being for the purpose of reversing the gearing, the outer ends of the arms *g g* are connected to the blocks *c c* on the valve-rods.

The motion is given to the main valves H in the following manner: The cross-head F on the left side and the valve-lever arm *a'* on the right side impart the motion to the right-hand main valve H, and the cross-head F on the right side and the valve-lever arm *a'* on the left side give the motion to the left-hand main valve H. When the back end of the valve-rod C on the right side is in the center of the radial link B, a fulcrum is formed for the valve-lever C, and by its connection with the valve-lever arm *a'* on the right side through the long connecting-rod *d''* a motion which is constant is given to the valve H to the extent of the desired lap and lead. By raising and lowering the back end of the valve-rod C, which is done by the aid of the tumbling-shaft G, the valve H receives its second motion—that of opening the steam-ports. The link B on the left side receives its motion from the link-arm *a''* of the main rocker-shaft A, and has a reverse motion from the arm *a'*, while the link B on the right side has the same motion as the arm by which it is moved. This is done in order to give each engine the same motion of the valve, as otherwise one engine would be going ahead and the other side would be backing up, and vice versa.

The advantage of this valve-gearing is, that it gives to the valve a perfect motion, it does away with the use of eccentrics, and brings most of the working parts out from under the boiler to a position where they can be readily seen. It also reduces the friction a large percentage, and leaves desirable space under the boiler for other implements for which want of space has been a great drawback. There is a great saving in oil, in that the oil that is required for a set of eccentrics alone will be sufficient to run the whole engine supplied with the gear. Further, any desired lead may

be given to the valve and the lap be compensated for.

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

1. The locomotive valve-gearing consisting of the main rocker-shafts A A, each provided with a cross-head arm, valve-lever arm, and link-arm, and connected to the cross-heads of
10 the locomotive by means of adjustable connecting-rods, the link rocker-shafts *b b*, provided with hub-saddles *b*², carrying the radial links B, and connected by arms *b'* and links *d'* to the main rocker-shafts A, the valve-rods C,
15 formed with slots containing blocks *c*, that are connected to a tumbling-shaft, and the said valve-rods being connected at one end to the radial links by means of shifting blocks and pins, and the valve-levers D, connected to the
20 valve-rods C and to the valve-stem at a point above the connection to the valve-rod, the

lever being also connected to the valve-arm of the main rocker-shaft, all substantially as shown and described.

2. In locomotive valve-gearing, the combination of the main rocker shafts A A, the link rocker-shafts *b b*, the valve-rods C, the valve-levers D, and the connecting-rods, substantially as described, for operation as specified.
25 30

3. In locomotive valve-gearing, the combination of the main rocker-shafts A A, the link rocker-shafts *b b*, the valve-rods C, the valve-levers D, and the connecting-rods, said valve-levers being adapted to give the valves
35 lead and to compensate for lap, substantially as and for the purpose set forth.

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Witnesses:

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