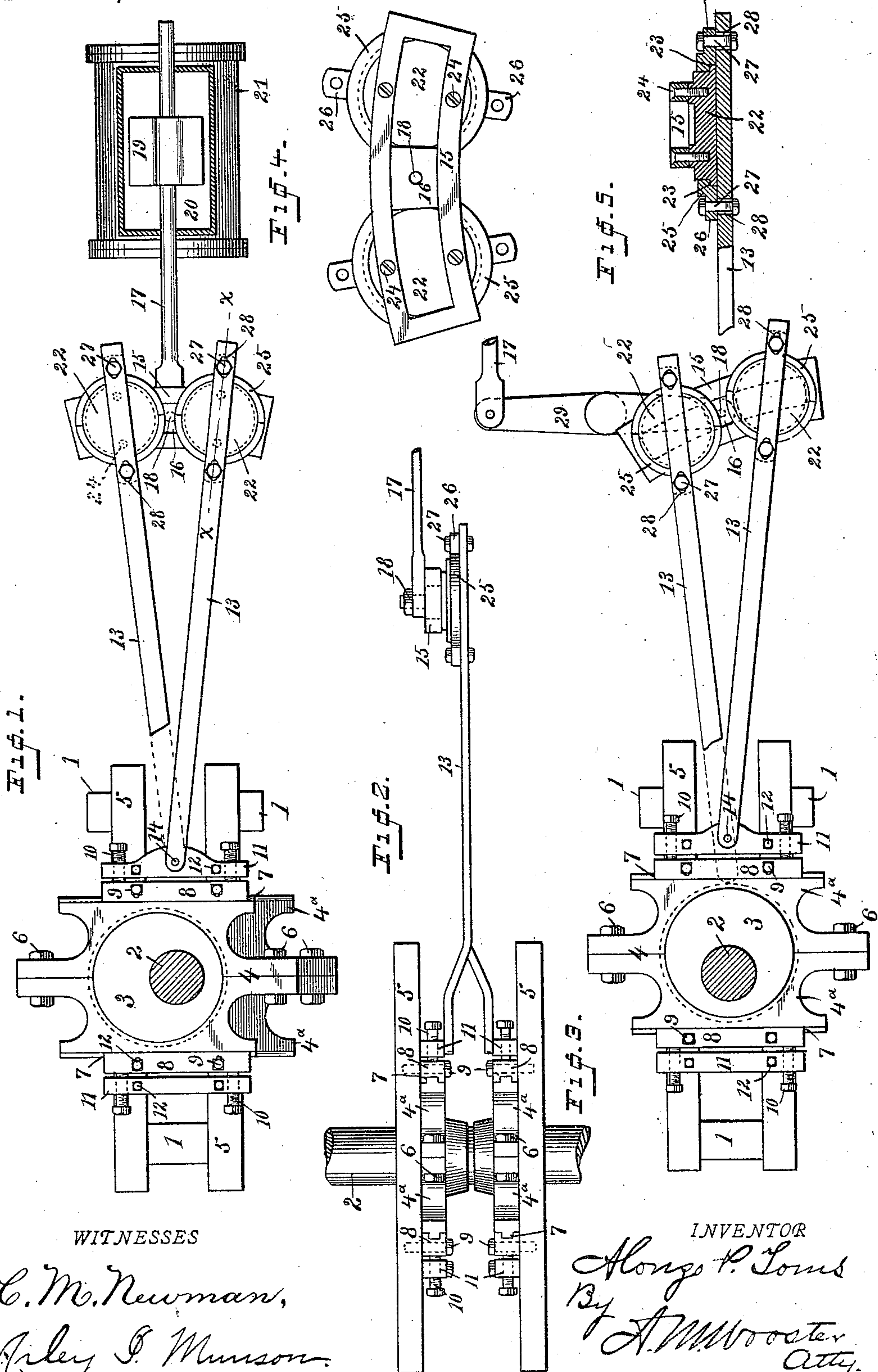


(No Model.)

A. P. TOMS.
VALVE GEAR.

No. 440,796.

Patented Nov. 18, 1890.



WITNESSES

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VALVE-GEAR.

SPECIFICATION forming part of Letters Patent No. 440,796, dated November 18, 1890.

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To all whom it may concern:

Be it known that I, ALONZO P. TOMS, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Valve-Gear for Steam-Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to produce a valve-gear which shall be direct in its action during the entire stroke both ways—that is to say, in which the pivotal points of the eccentric-rods to the slides, which I substitute for the usual eccentric-straps, shall reciprocate in the same plane as the pivotal point of the valve-stem to the link-block, and, furthermore, in which said pivotal point of the valve-stem to the link-block shall lie at all times in an arc with the centers of the connections of the eccentric-rods to the link, by which means the slip of the link-block is entirely done away with, and likewise the kick of the reversing-lever, (not shown in the drawings, as it forms no portion of my present invention,) thus transmitting the full throw of the eccentric directly to the valve.

An important feature of my novel construction is that the link may be set to cut off the steam as early as the end of the first quarter of the stroke and to carry the steam to the beginning or past the beginning of the third quarter of the stroke, thus enabling me to utilize to the fullest extent the expansive power of the steam, and, furthermore, enabling me to continue the exhaust almost to the end of the stroke, thus reducing the compression at the end of the cylinder to the minimum.

Still another important feature is that the construction is such that the lead is necessarily positive at all points of cut-off in both forward and backward movements.

In order that my invention may be clearly understood, I will describe the same in detail, referring by numbers to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation of my novel valve mechanism as applied to a marine en-

gine, showing the extremes of movement of the vertical slides, the cylinder being in plan and the steam-chest in horizontal section; Fig. 2, a plan view corresponding with Fig. 1, the cylinder and steam-chest being omitted; Fig. 3, a view corresponding with Fig. 1, showing the application of my invention to a locomotive and showing one longitudinal slide at the extreme of its forward movement; Fig. 4, a rear view of the link detached; and Fig. 5 is a detail sectional view on an enlarged scale, the section-line being indicated at *xx* in Fig. 1.

1 denotes guides, which are fixed portions of the frame-work, and may be of any suitable or preferred construction; 2, the shaft; 3, the eccentrics; 4, the vertical slides, and 5 the longitudinal slides, which are supported by the guides. The vertical slides are made in two parts (denoted by 4^a) and secured together by bolts 6. These parts are so formed as to inclose the eccentrics tightly and correspond to the eccentric-straps of ordinary mechanisms of this class.

The edges of the vertical slides are suitably shaped to engage ways 7 upon the longitudinal slides. I preferably form these ways in strips 8, which are adjustably secured to the longitudinal slides by bolts 9, passing through slots in said strips and engaging the longitudinal slides. The object of this construction is to provide a ready means of adjustment to take up lost motion caused by wear of the vertical slides. Strips 8 are held firmly in position by set-screws 10, passing through strips 11, said strips being either formed integral with the longitudinal slides or rigidly secured thereto by bolts 12, as shown in the drawings.

13 denotes the eccentric-rods, which, however, are not pivoted to the eccentric-straps, as in ordinary mechanisms of this class, but are centrally pivoted to the longitudinal slides, as at 14. It will be seen that by this construction I entirely avoid lateral throw of the eccentric-rods, which has been a source of serious inconvenience in the various valve mechanisms heretofore placed in use.

My novel construction gives direct action and no other to the eccentric-rods, as the lateral throw of the eccentrics is entirely taken up by the vertical slides, which takes the place of the eccentric-straps of ordinary valve

mechanisms. This is an important feature of construction, for the reason that these pivotal points, when the link-block is adjusted centrally, as shown in Fig. 1, form the center of the circle of which the link is an arc. By so constructing the parts that side throw of these pivotal points is done away with I transmit the full throw of the eccentrics to the valve and remove the serious objection of variation in the lead when the link adjustment is changed and insure a positive lead, no matter what may be the adjustment.

15 denotes the link, which is an arc of a circle of which the eccentric-rods are radii; 16, the link-block; 17, the valve-stem which is pivoted thereto, as at 18, (see Fig. 2;) 19, the valve; 20, the steam-chest, and 21 the cylinder. The details of construction of the piston, piston-rod, supports, &c., have been omitted, as they form no portion of my present invention.

22 denotes disks having shoulders 23, which are cast integral with the link or may be secured thereto by screws 24, passing through the link and engaging the disks. The eccentric-rods are connected to the links by means of curved clamping-pieces 25, each of which is provided with a lug 26. These clamping-pieces engage the shoulders upon the disks, as clearly shown in the drawings, and are secured to the eccentric-rods by bolts 27, which preferably pass through slots 28 in the eccentric-rods, so as to permit adjustment of the clamping-pieces to take up lost motion. It will be seen that the centers of the disks—i. e., the actual pivots of the eccentric-rods to the link—are at all times in an arc with the pivotal point of the valve-stem to the link-block.

In applying my invention to a locomotive the valve-stem is pivoted to a lever 29, (see Fig. 3,) the opposite end of which is pivoted to the link-block, as in the other form.

It will of course be understood that the various details of construction may be varied to an almost unlimited extent without departing from the principle of my invention.

I claim—

1. In a mechanism of the class described, the combination, with the eccentric-rods, of longitudinal slides to which they are pivoted and vertical slides which inclose the eccentrics and are carried by the longitudinal slides, whereby the entire throw of the eccentrics is transmitted to the valve by direct action of the eccentric-rods.

2. The combination, with the eccentric-rods and slides to which they are pivoted, and which are provided with ways lying transversely to their line of movement, of the eccentrics and slides which engage the eccentrics and reciprocate in said ways, as and for the purpose set forth.

3. The eccentric-rods and longitudinal slides to which they are pivoted, and which are provided with ways lying transversely to their line of movement, in combination with the eccentrics and slides made in two parts which inclose the eccentrics and reciprocate in the ways.

4. The combination, with the eccentric-rods, slides to which they are pivoted, and transverse strips 8, adjustably secured to said slides and provided with ways, of the eccentrics and two-part slides which engage the eccentrics and reciprocate in the ways.

5. In a mechanism of the class described, the combination, with the eccentric-rods and the link, of disks secured to the link and curved clamping-plates which engage the disks and are secured to the eccentric-rods, substantially as described.

6. The combination, with the eccentric-rods and the link, of shouldered disks secured to the link and clamping-plates which engage the shoulders and are adjustably secured to the eccentric-rods.

7. The combination, with the link, link-block, and valve-stem, of the eccentrics, eccentric-rods, longitudinal slides to which they are pivoted, and vertical slides which inclose the eccentrics and are carried by the longitudinal slides, the pivotal point of the valve-stem to the link-block being in the same plane as the pivotal points of the eccentric-rods to the longitudinal slides, as and for the purpose set forth.

8. In a mechanism of the class described, the link, link-block, and the valve-stem pivoted thereto, in combination with eccentric-rods connected to the link, the centers of the connections of the eccentric-rods to the link being in an arc with the pivotal point of the valve-stem to the link-block, as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ALONZO P. TOMS.

Witnesses:

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