No. 725,945. PATENTED APR. 21, 1903.

E. C. DOOLITTLE.

STEAM ENGINE.

APPLICATION FILED APR. 11, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1

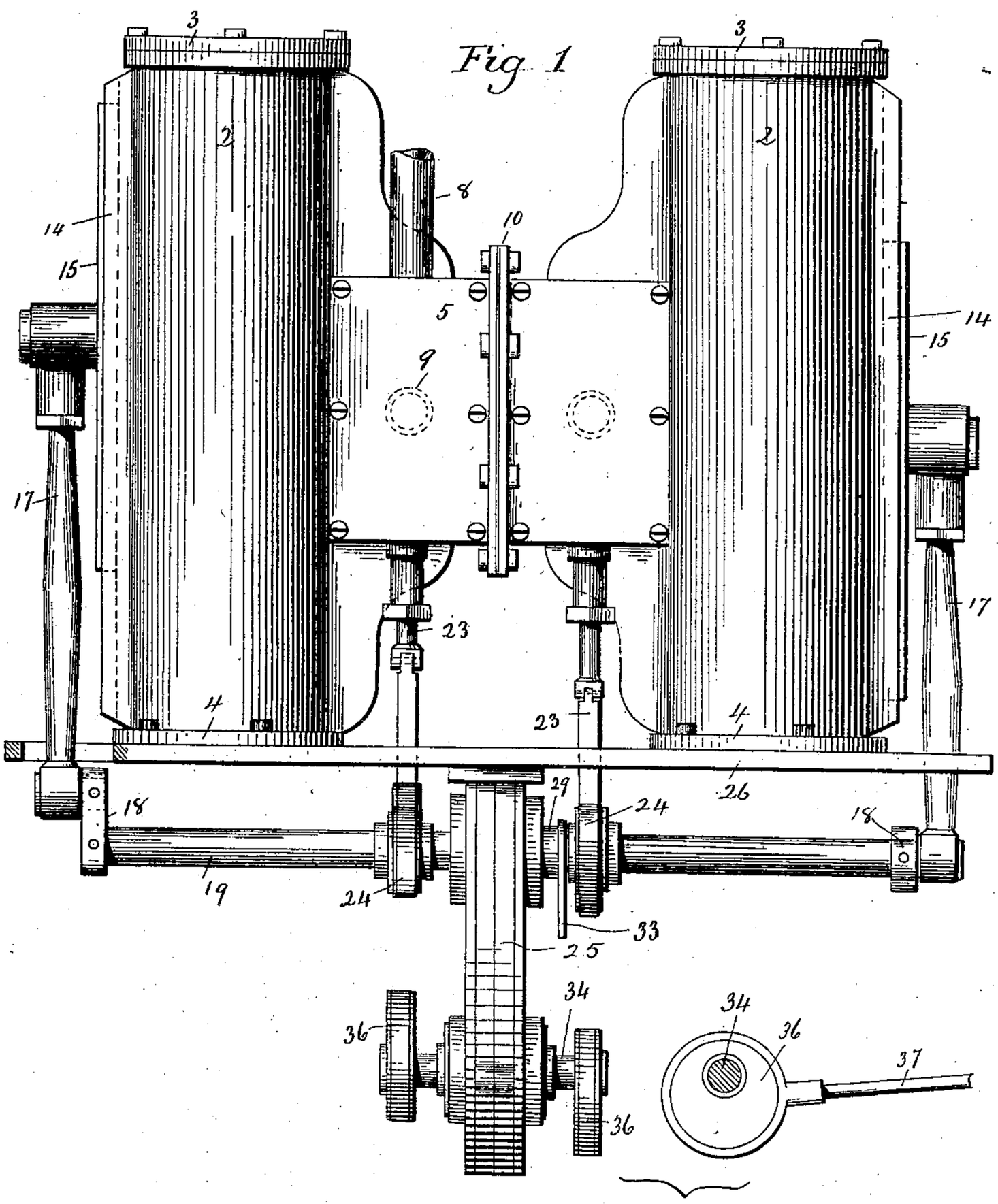
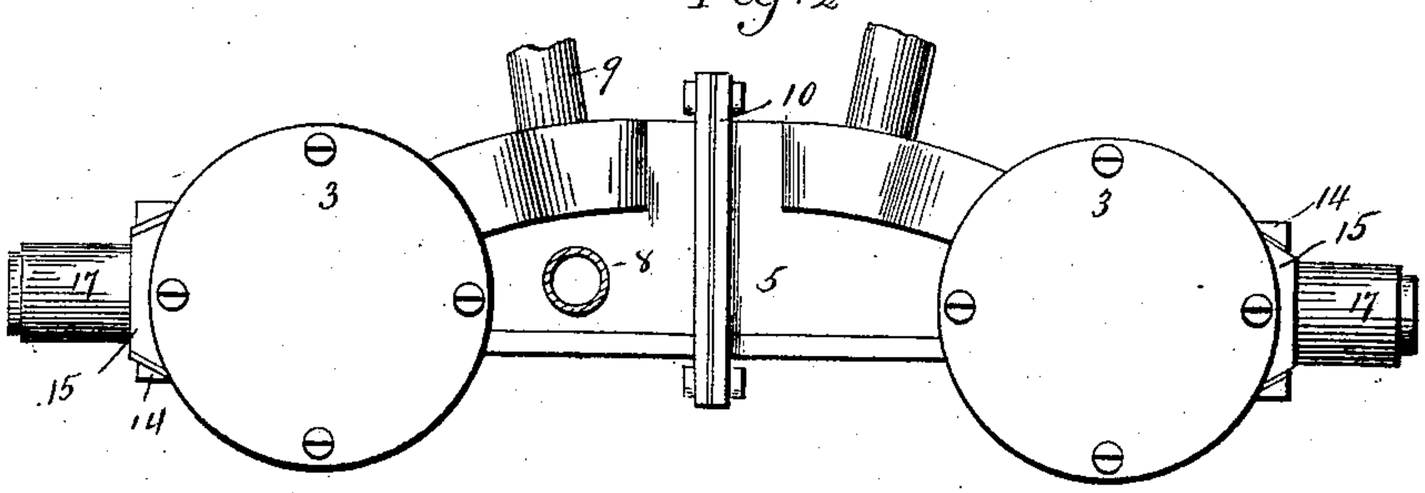


Fig. 2



Witnesses
J. H. Shumway
Clara L. Reed.

Elbridge C. Doolittle,
Inventor
By Atty Seymour & Pearce

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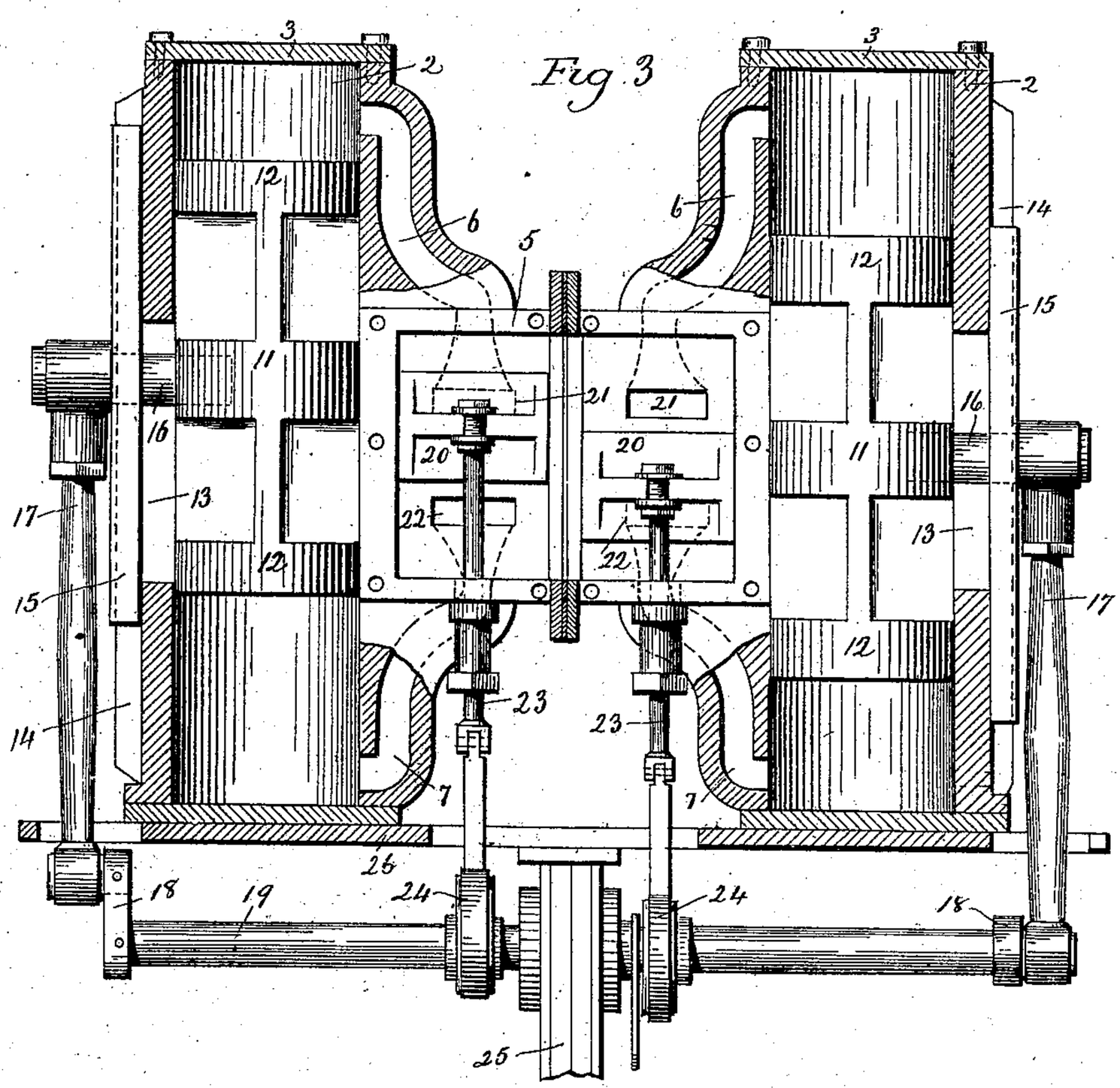
NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3



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UNITED STATES PATENT OFFICE.

ELBRIDGE C. DOOLITTLE, OF WALLINGFORD, CONNECTICUT, ASSIGNOR OF ONE-HALF TO WILLIAM HASSETT, OF WALLINGFORD, CONNECTICUT.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 725,945, dated April 21, 1903.

Application filed April 11, 1902. Serial No. 102,350. (No model.)

To all whom it may concern:

Be it known that I, ELBRIDGE C. DOOLITTLE, of Wallingford, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Steam-Engines; and I do hereby declare the following, when taken in connection with the accompanying drawings and the figures of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a side view of a double engine constructed in accordance with my invention; Fig. 2, a top or plan view of the same; Fig. 3, a vertical central section thereof.

This invention relates to an improvement in steam-engines, and while particularly applicable for motor-vehicles and other purposes in which a compact construction is essential is equally applicable for larger engines for any desired purpose, the object of the invention being to construct an engine in which the connection between the piston and the crank-shaft shall be as direct as possible, so as to prevent loss of power, one so simple in construction that it can be built at very low cost, and one not liable to derangement; and the invention consists in the construction as hereinafter described, and particularly recited in the claims.

As herein shown, I have illustrated a double or two-cylinder engine; but the two cylinders are counterparts of each other, and the description of one will be the description of both, and, if desired, but one cylinder may be employed. The cylinders 2 are closed at opposite ends by caps 3 4, and on one side of the cylinder is a steam-chest 5, having a passage 6 extending into the top of the cylinder and a passage 7 extending into the bottom of the cylinder, the steam-chest and cylinder being formed integral with each other. Opening into the steam-chest is an inlet-pipe 8, and in one side of the steam-chest is an exhaust-opening 9, leading to any desired point. The steam-chests are formed with a flange 10, by which they may be coupled together or which may be closed by a plate when only one cylinder be employed. In the cylinder is a piston having a central portion 11 and heads 12, and in the side of the cylinder opposite the steam-chest is a slot 13, the length of which is slightly greater than the throw of the piston. On opposite sides of this slot are guideways 14 for a slide 15, the length of the slide being such that when the piston is at its extreme positions the slide will close the slot 13. Extending through the slide and into the central portion 11 of the piston is a pin 16, to which a pitman 17 is connected, the pitman extending downward into engagement with a crank 18 on a crank-shaft 19. Within the steam-chest is the usual cut-off 20, adapted to alternately open and close the ports 21 and 22, which lead to the passages 6 and 7, and this slide is operated by a stem 23, which extends downward into engagement with an eccentric 24, mounted on the crank-shaft 19, so that the rotation of that shaft will operate the cut-off. This crank-shaft 19 extends through a gear-box 25, which may be connected with flanges 26, projecting from the bottom of the cylinders, or secured to the frame or casing upon which the cylinders are mounted.

The operation is as follows: Steam being admitted to the steam-chest will pass through one of the ports therein into one end of the cylinder and drive the piston to the opposite end. This movement of the piston moving the pin 16 projecting from it moves the pitman 17, and hence turns the crank 18 and the crank-shaft 19, the rotation of which turns the eccentric 24 and moves the cut-off slide 23, and hence the slide 20, so as to close one of the ports and open the other, allowing the steam to pass to the opposite end of the cylinder to move the piston in the opposite direction. When two cylinders are employed, it will be understood that the cut-offs for the second cylinder are arranged to operate reversely on the quarter from those of the first cylinder, as do also the cranks to prevent dead-center.

It will thus be seen that an extremely simple engine is produced and that no piston-rod proper is employed, the pitman taking the place of one, and the connection between the piston and the crank-shaft is so direct that there is practically no loss of power, the movement of the piston positively causing the crank-shaft to be turned.

The reversing mechanism herein shown and described is not claimed in this application, as it will form the subject of a separate application.

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

1. In a steam-engine, the combination with the cylinder thereof, of a steam-chest formed integral therewith and upon one side thereof, and having passages from it to opposite ends of the cylinder, a slot in one side of said cylinder, longitudinal guideways arranged upon the outer face of the cylinder on opposite sides of the slot, a slide longitudinally movable between said ways and adapted to cover said slot, a piston in said cylinder, a pin connected with said piston and extending outward through said slot and slide, and direct connection between the pin and the crank-shaft, substantially as described.

2. In a steam-engine, the combination with two cylinders arranged parallel with each other, of two steam-chests arranged side by side between the said cylinders and having passages at opposite ends into said cylinders, pistons arranged within said cylinders which are formed in their outer sides with longitudinal slots, pins mounted in said pistons and extending outward through said slots, direct connection between said pins and a transversely-arranged crank-shaft, eccentrics on said shafts, cut-off slides in said steam-chests, and connection between the cut-off and said eccentrics, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ELBRIDGE C. DOOLITTLE.

Witnesses:

J. H. SHUMWAY,

FREDERIC C. EARLE.