(No Model.)

I. A. TURNER.

STEAM ENGINE.

No. 336,025. Patented Feb. 9, 1886.

Fig. 2

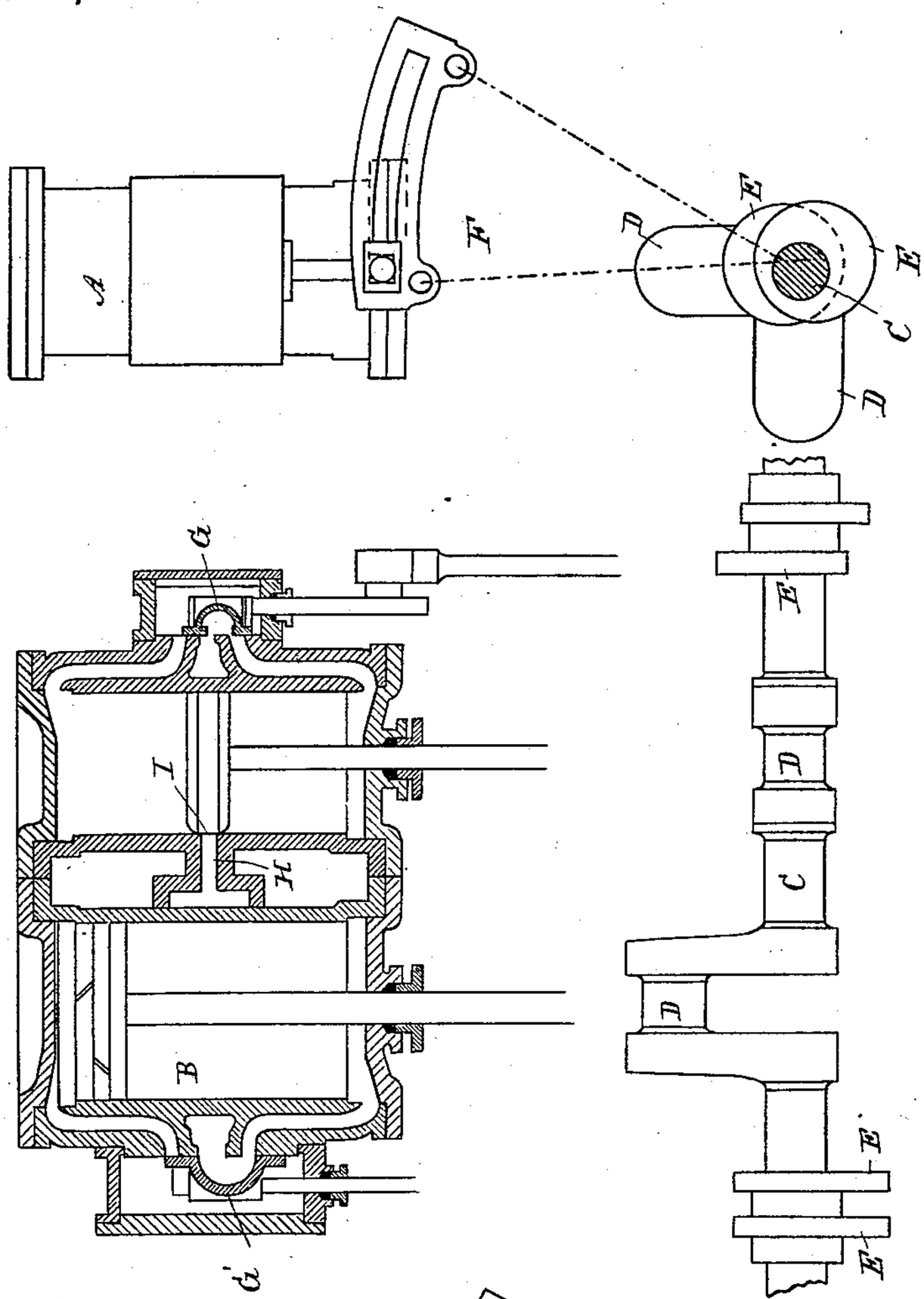
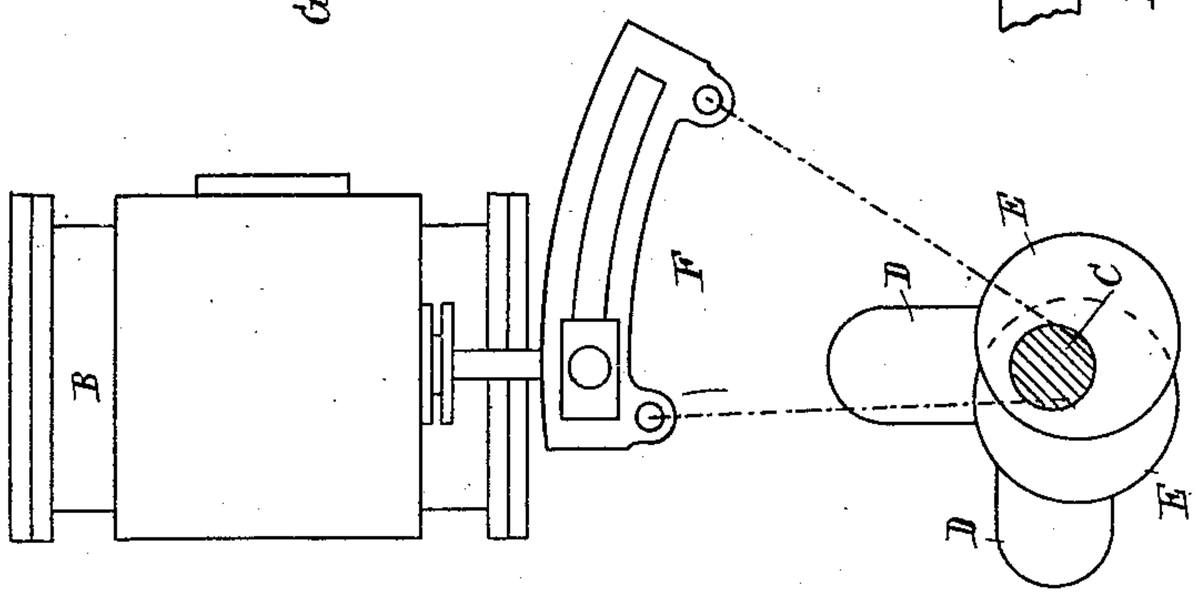


Fig. 1

Fig. 3



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UNITED STATES PATENT OFFICE.

ISAAC A. TURNER, OF DETROIT, MICHIGAN, ASSIGNOR OF ONE-HALF TO CHESTER B. TURNER, OF SAME PLACE.

STEAM-ENGINE.

SPECIFICATION forming part of Letters Patent No. 336,025, dated February 9, 1886.

Application filed October 8, 1885. Serial No. 179,297. (No model.)

To all whom it may concern:

Be it known that I, ISAAC A. TURNER, of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Steam-Engines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to a new and useful improvement in compound engines; and the improvement consists in the peculiar arrangement and combination of two three-ported slide-valve engines of the ordinary type, whereby the desired distribution of steam is obtained in a simple manner susceptible of a large degree of variability, and also admitting of a reversal of the motion of the engine.

In the drawings which accompany this specification, Figure 1 is a plan showing the engine in horizontal section. Fig. 2 is a side elevation of the high-pressure cylinder, and Fig. 3 is a similar view of the low-pressure cylinder.

A and B are the cylinders of two engines of the ordinary type known as "three-ported slide-valve engines." These two cylinders are of the usual relative dimensions of the high and low pressure cylinders of a compound engine; and C is the crank shaft common to both engines.

D D are the engine-cranks, placed at right angles to each other.

E E are the slide-valve eccentrics.

G G′ are the D slide-valves, and F F are the link-motions for operating the slide-valves, all these parts being of the usual construction and operation, except as hereinafter described.

H is a steam-passage, which connects the high-pressure cylinder A with the steam-chest of the low-pressure cylinder B. This steam-passage forms a steam-port, I, in the cylindrical wall of the high-pressure cylinder, so that the steam may pass from the high-pressure cylinder into the steam-chest of the low-pressure cylinder, except at the times when the port I is closed by the piston in the high-pressure cylinder.

In practice the steam-chest of the high-pressure cylinder receives the live steam from the boiler in the usual manner, while the steam-chest of the low-pressure cylinder receives its steam through the passage H alternately from opposite sides of the piston in the high-pressure cylinder.

Fig. 1 shows the moving parts in their proper relative positions when the piston in the high-pressure cylinder is in the middle of its stroke and moving toward the front, while the piston in the low-pressure cylinder is at the end of the stroke and beginning to move in the same direction. As soon as the piston clears the port I steam will pass from the high-pressure cylinder through the steam-passage H into the steam-chest of the low-pressure cylinder, and presently into said cylinder itself as the valve G′ is just beginning to open. The valve G being yet open, steam under full pressure is permitted to enter the cylinder B, and may be used more or less expansively, according to the adjustment of the valve G′; but if the valve G is adjusted to cut off the admission of steam at one-half the stroke or less, the steam admitted into the cylinder B will be at a more or less reduced pressure. Of course the valves G G′ have to be constructed and arranged to suit the conditions. Thus the valve G′ must be arranged and constructed to properly distribute the steam during the interval of supply, while the valve G is provided with sufficient inside lap to keep the exhaust of the high-pressure cylinder closed until the low-pressure cylinder has taken steam, without, however, producing an injurious compression in the high-pressure cylinder.

From the foregoing description it will be seen that the two engines can be variably compounded, as steam may be admitted into the low-pressure cylinder from its dull pressure down to its lowest practical limit, thus allowing the utmost economy of steam, while at the same time the compound engine may be readily reversed by reversing the two valves G G′ simultaneously.

What I claim as my invention is—

1. In a compound engine, the combination, with two three-ported slide-valve engines, arranged as described, of a single steam-passage connecting the high-pressure cylinder with the steam-chest of the low-pressure cylinder, substantially as specified.

2. In a compound engine, the combination of two three-ported slide-valve engines, ar-

ranged as described, a steam-eduction port in the high-pressure cylinder near the middle of its length, and a single steam-passage connecting said port with the steam-chest of the low-pressure cylinder, substantially as specified.

3. In a compound engine, two three-ported slide-valve engines, arranged as described, with a steam-port connecting the cylinder of the high-pressure engine with the steam-chest of the low-pressure cylinder, and forming a steam-port in the cylindrical wall of the high-pressure cylinder, substantially as and for the purpose specified.

ISAAC A. TURNER.

Witnesses:
H. S. SPRAGUE,
CHARLES J. HUNT.