2 Sheets--Sheet 1.

S. TORREY.

Reciprocating Steam-Engines.

No. 133,813. Patented Dec. 10, 1872.

Fig. 1.

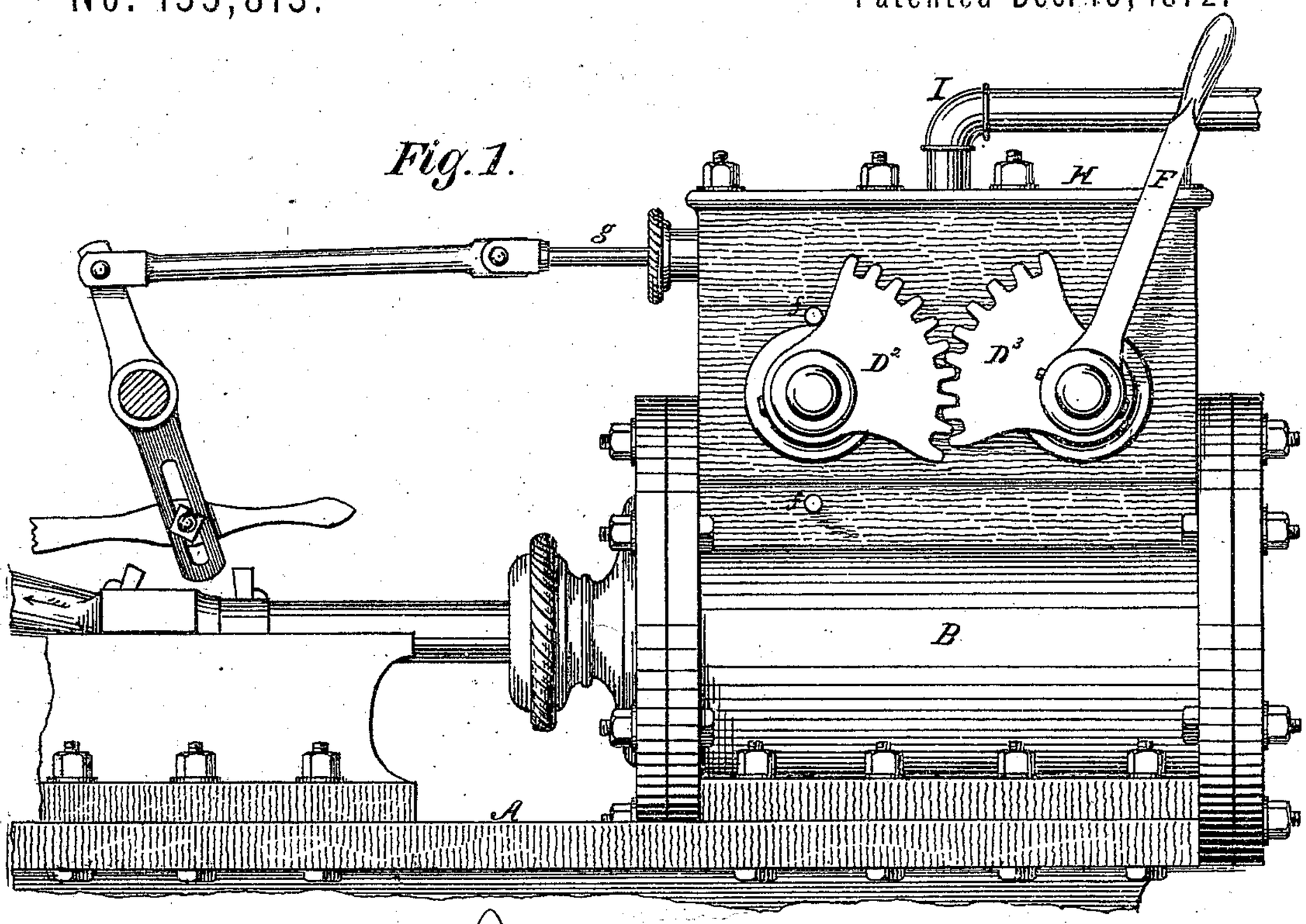


Fig. 4.

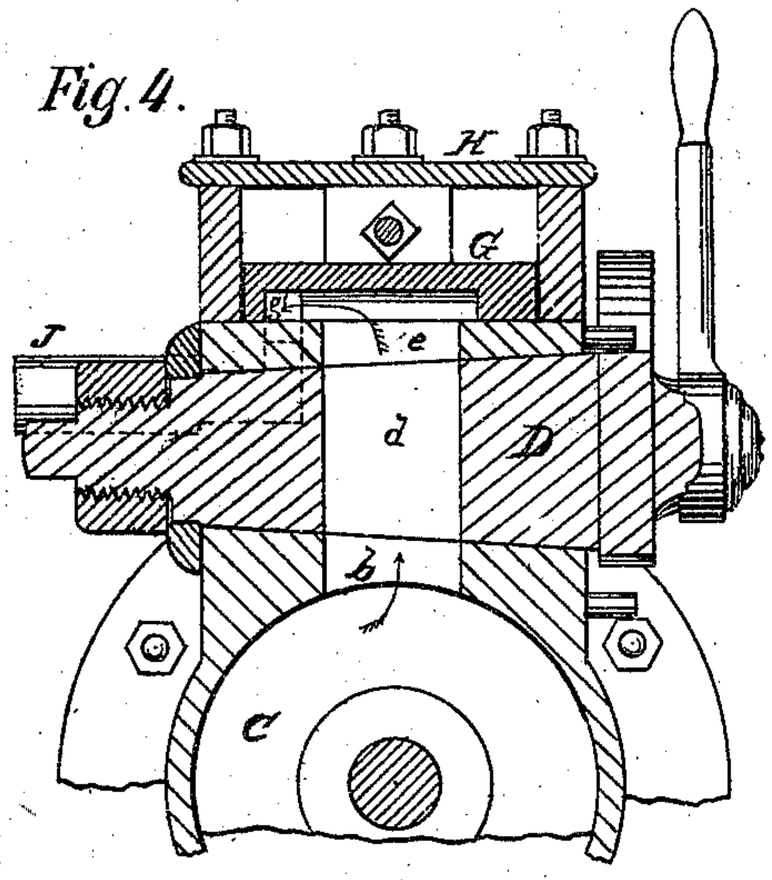


Fig. 2.

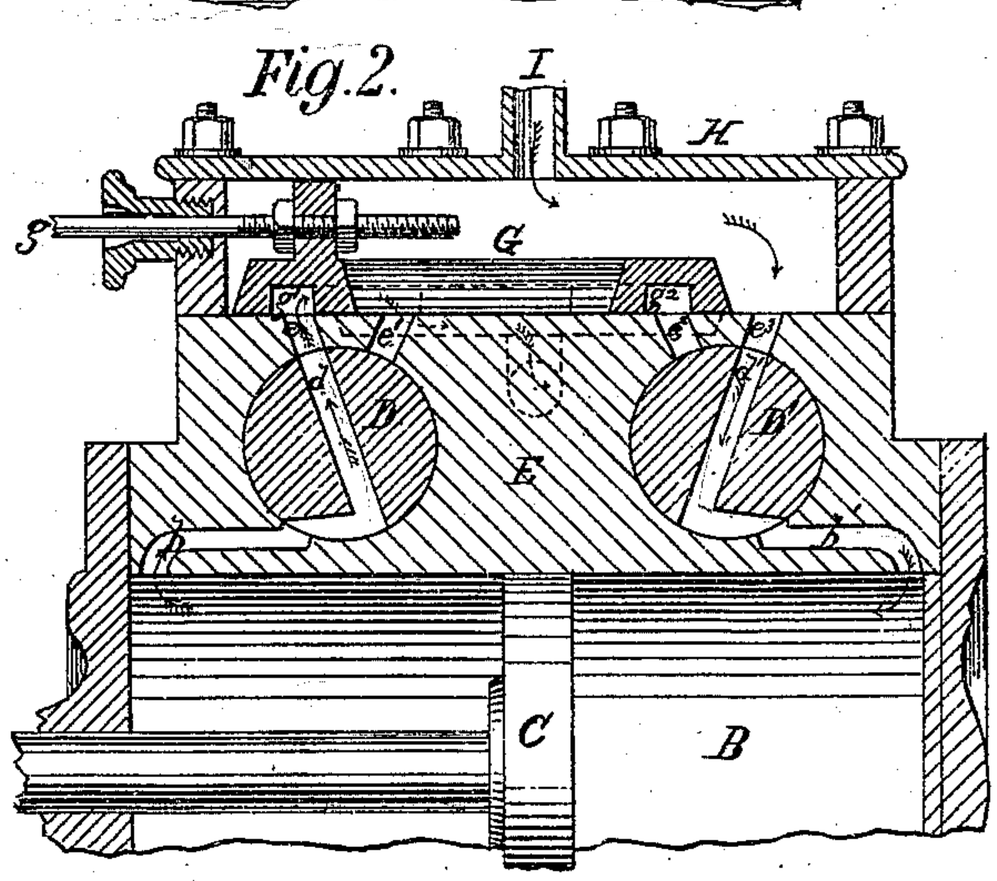


Fig. 5.

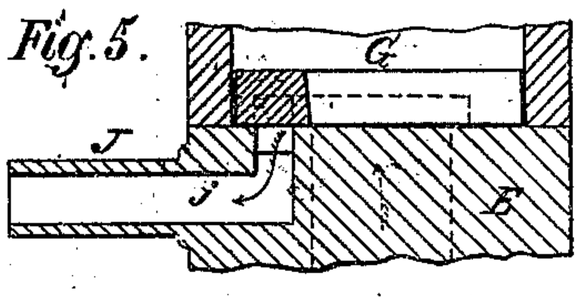
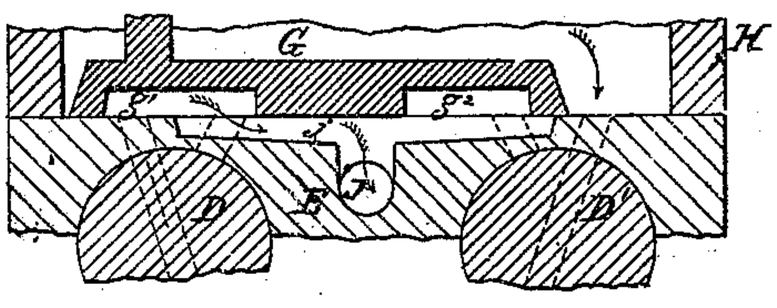


Fig. 3.



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AM. PHOTO-LITHOGRAPHIC CO. N.Y. (OSBORNE'S PROCESS.)

2 Sheets--Sheet 2.

S. TORREY.

Reciprocating Steam-Engines.

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Fig. 7.

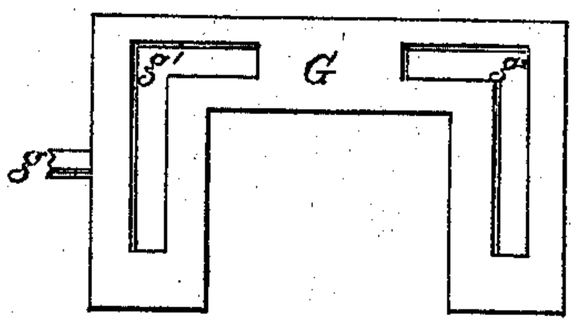


Fig. 6.

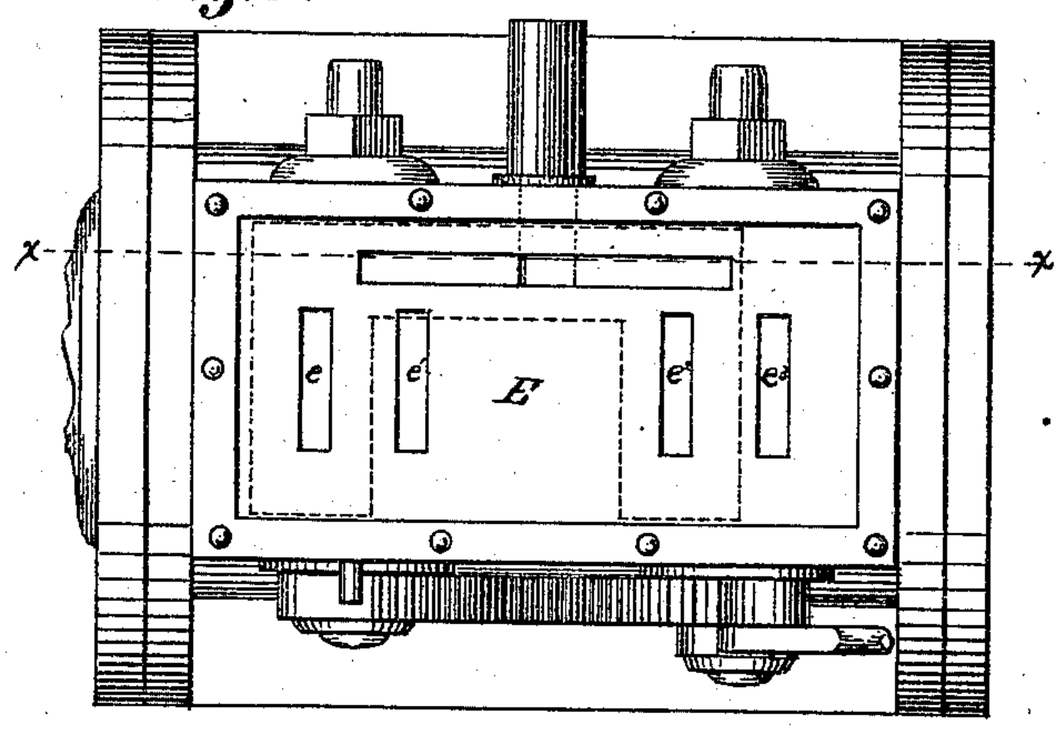
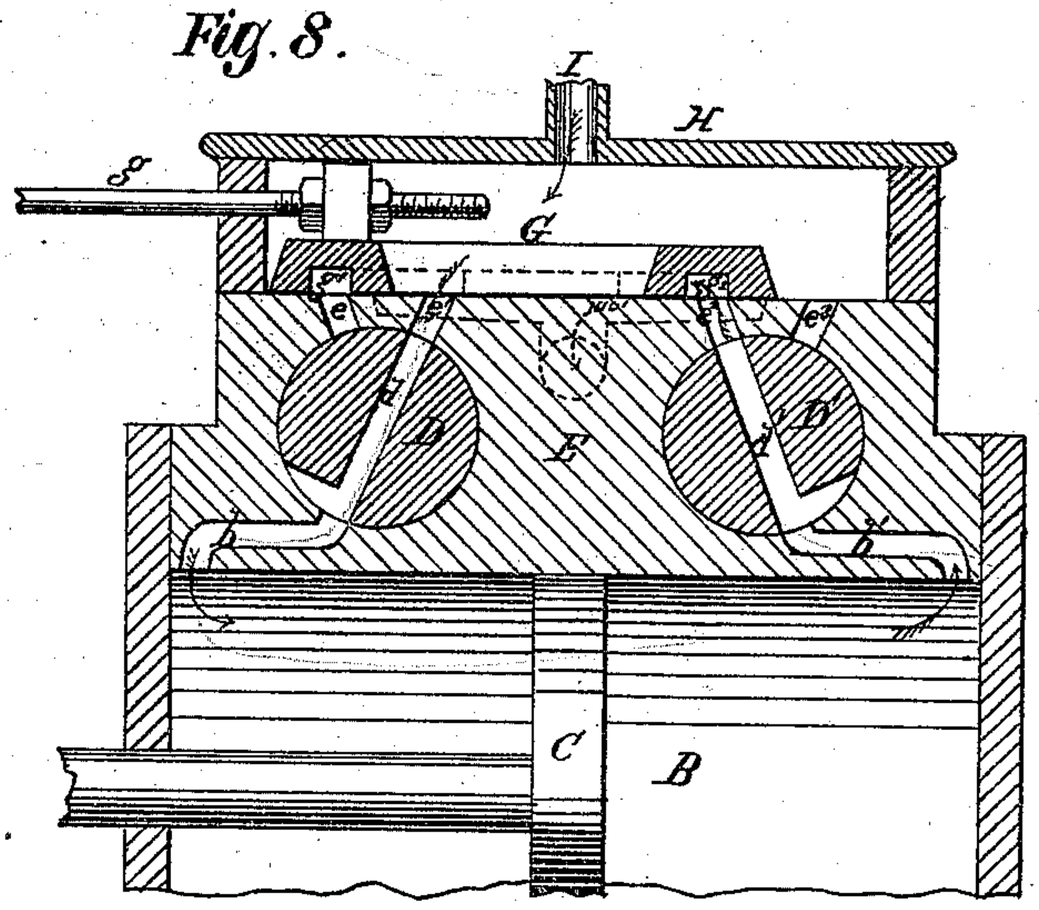


Fig. 8.



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UNITED STATES PATENT OFFICE.

SILAS TORREY, OF TOLEDO, OHIO.

IMPROVEMENT IN RECIPROCATING STEAM-ENGINES.

Specification forming part of Letters Patent No. **133,813**, dated December 10, 1872.

To all whom it may concern:

Be it known that I, SILAS TORREY, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Steam-Engines, of which the following is a specification:

My invention relates to steam-engines of that class having reversing-valves between the steam-chest and cylinder, whereby the motion of the engine may be reversed without changing the slide-valve. Its objects are to secure this reversal in a simple and effective way, and to economize steam by the use of short steam-passages between the steam-chest and cylinder; to which ends the improvement consists in interposing between the cylinder and the steam-chest in which the slide-valve works an intermediate steam-chest having extra ports at each end corresponding with the usual ports of the cylinder, and provided with proper valves and reversing-gear, as hereinafter more fully specified.

In the accompanying drawing, which represents my improvements as embodied in the best form now known to me, Figure 1 represents a side elevation of so much of an engine embracing my improvements as is necessary to illustrate the subject-matter claimed; Fig. 2 represents a vertical longitudinal central section through the cylinder and steam-chests with the parts in the relation they assume when the engine is going ahead; Fig. 3 represents a vertical longitudinal section through the exhaust-ports on the line *x x* of Fig. 6; Fig. 4 represents a transverse section through the valve-chests and cylinder in the axial line of one of the reversing-valves; Fig. 5 represents a vertical section through the exhaust-pipe; Fig. 6 represents a plan view of the supplementary steam-chest, the slide-valve chest being removed; Fig. 7 represents a view of the under side of the slide-valve; and Fig. 8 shows a section similar to Fig. 2, but with the engine reversed.

In this instance a cylinder, B, is shown as secured upon a firm bed-plate, A. A piston-head, C, fits and traverses this cylinder in the usual way. Ports *b b′*, at each end of the cylinder, connect with steam-passages *d d′* through faucet-valves D D^1, turning in steam-tight sockets in a steam-chest, E, having a double set of ports, *e* e^1 e^2 e^3, at each end, either set being capable of being connected with the passages *d d′*, as hereinafter explained. The valves D D^1 are operated by means of a hand-lever, F, and two interlocking sector-gears D^2 D^3, each gear being mounted on the arbor of its respective valve. Stops *f f* limit the movement of the valves. A valve, G, slides on top of the chest E over the ports *e* e^1 e^2 e^3, its throw being regulated by the valve-rod *g* and its connections, as usual.

In operation, steam enters the slide-valve chest H through the induction-pipe I, and (with the parts in the relation shown in Figs. 1 to 6 inclusive) passes down the passages e^3, *d′*, and *b′* to the cylinder, as shown by the arrows in Fig. 2. The other ports are covered by the slide-valve. The steam, escaping from that end of the cylinder toward which the piston-head is moving, passes up through the passages *b*, *d*, *e*, g^1, and *j* to the exhaust-pipe J. The details of these parts are clearly shown in the drawing, and, being well known to skillful engine-builders, need not be here described. On the reverse stroke of the engine, the slide-valve moves far enough to clear the port *e* and to cover the port e^3 with the exit-port g^2, the valves D D^1 remaining stationary; the steam then enters through the valve D and escapes through the valve D^1, these motions being repeated at every reciprocation of the piston-head. To reverse the motion of the engine, the engineer, without disturbing the slide-valve, rocks the faucet-valves D D^1 in their bearings, by means of the hand-lever F, until the parts assume the attitude shown in Fig. 8. This movement closes the ports *e* e^3, and opens those e^1 e^2. The steam now passes to the cylinder through the ports e^1, *d*, and *b*, until the stroke is completed, the escaping steam passing through the ports *b′*, *d′*, e^2, and g^2. On the reversal of the stroke the slide-valve opens the port e^2 and covers that e^1, and exhausts the full end of the cylinder, as above explained.

I am thus, by my invention, enabled materially to diminish the length of the steam-passages, and consequently the amount of steam wasted, by using two short steam-passages between each set of the slide and faucet valves, and a single direct connection between each

of the faucet-valves and the cylinder, instead of reversing this arrangement. Simplicity and economy, as well as efficiency, are secured by this arrangement.

I do not broadly claim interposing reversing-valves between the cylinder and slide-valve.

I claim as my invention—

The combination of the cylinder, the reversing-valves, the single steam-passages connecting the cylinders and reversing-valves, the slide-valve, and the double set of ports connecting the slide and reversing valves, these members being constructed and arranged to operate substantially as set forth.

In testimony whereof I have hereunto subscribed my name.

SILAS TORREY.

Witnesses:

WAGER SWAYNE,

HARRISON FITTS.