A. HIGGINSON.

Reciprocating Steam-Engine.

No. 196,451. Patented Oct. 23, 1877.

Fig. 5

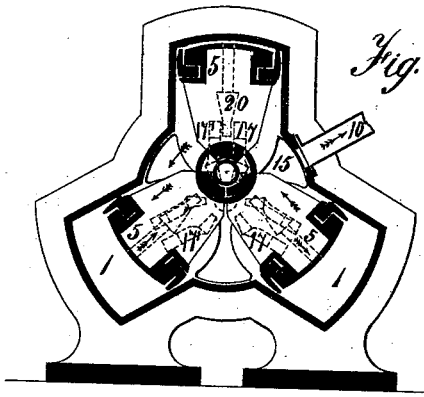


Fig. 6

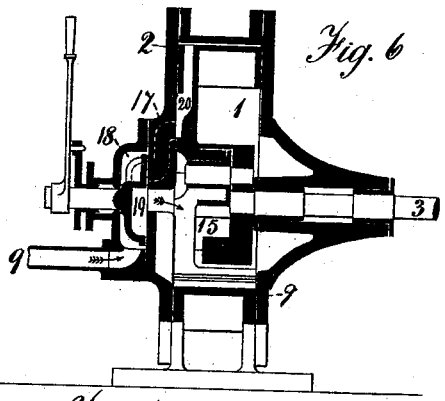


Fig. 3

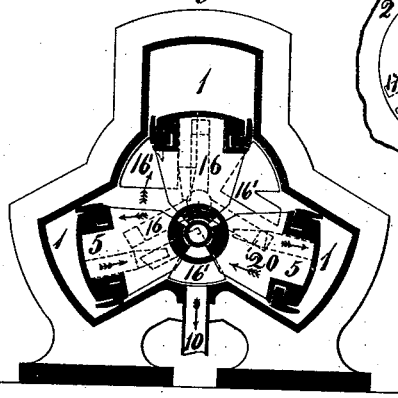


Fig. 7

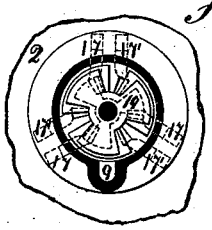


Fig. 4

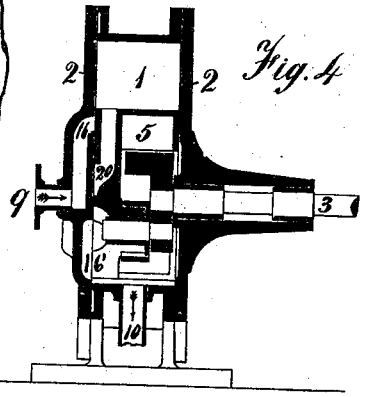


Fig. 1

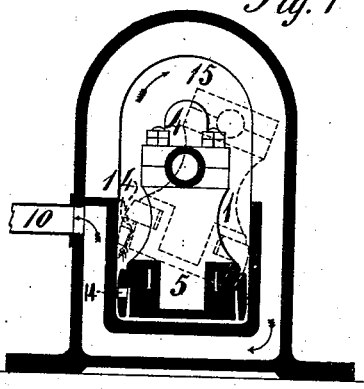
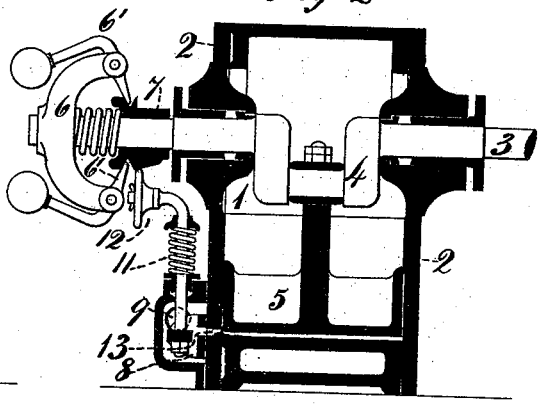


Fig. 2



Witnesses

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UNITED STATES PATENT OFFICE.

ANDREW HIGGINSON, OF LIVERPOOL, ENGLAND.

IMPROVEMENT IN RECIPROCATING STEAM-ENGINES.

Specification forming part of Letters Patent No. **196,451**, dated October 23, 1877; application filed May 16, 1877.

To all whom it may concern:

Be it known that I, ANDREW HIGGINSON, of Liverpool, in the county of Lancaster, England, have invented a new and useful Improvement in Motive-Power Engines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawings.

The object of this invention is to provide simple, durable, and efficient engines to be operated by steam, air, or other fluid under pressure.

For this purpose I employ one, two, or more, preferably three, rectangular chambers, each provided with a reciprocating and oscillating piston attached direct to a crank, and I cause steam or other fluid to act on one side only of the said piston or pistons.

Figure 1 is a front section, and Fig. 2 a side section, of a single-chamber non-reversing engine constructed under my invention.

In both these views like letters denote the same parts, and the arrows show the direction of motion.

1, rectangular chamber; 2, covers; 3, crank-shaft; 4, crank; 5, reciprocating oscillating piston; 6, governor; 7, cam which revolves with the shaft 3, and is caused to slide to and fro on the said shaft by the governor-arms 6′; 8, valve which admits and cuts off steam or fluid from beneath the piston 5; 9, steam or fluid admission pipe; 10, exhaust-pipe; 11, spring to keep the valve-rod and friction-roller 12 in contact with the cam 7; 13, steam or fluid admission port.

In action, steam or fluid passes through the port 13 beneath the piston 5, and exhausts, on the completion of the stroke, by the way 14, into the space 15, and out of the exhaust-pipe 10. The downstroke is made by the momentum of a fly-wheel. As the engine increases in speed the governor causes the cam to slide on the shaft 3, so as to bring the valve-rod and friction-roller 12 in contact with the smaller diameter of the cam, and so admit steam or fluid to beneath the piston during a shorter portion of the stroke.

Fig. 3 is a front section, and Fig. 4 a side section, of a non-reversing three-chamber engine constructed under my invention.

Like letters denote the same parts as in Figs. 1 and 2.

Here the steam or fluid admission pipe is formed with three branches, 16, one for each piston. Each piston is provided with a port, 20, in its face, opening beneath the said piston into the chambers 1. At the completion of the stroke, steam or fluid discharges into the spaces 16′. Steam or fluid may be admitted beneath the pistons by a governor and valves, as in Figs. 1 and 2.

Fig. 5 is a front section, and Fig. 6 a side section, of a three-chamber reversing-engine constructed under my invention, and Fig. 7 is a view of the reversing-valve.

The action of this engine is similar to that described under Figs. 3 and 4, except that there are six passages, 17 17′, two for each piston leading from the chamber 18. One-half of the said passages 17 are covered by the valve 19, so as to connect to the exhaust, while the other three, 17′, are open to the steam-admission pipe.

During motion the ports 20 in the pistons oscillate, so as to be alternately open to one or other of the passages 17 17′; therefore the engine will run in either direction, according as the passages 17 or 17′ are opened to the exhaust or to the steam or fluid admission pipe by the valve 19.

This engine may also be operated in a manner similar to that described under Figs. 1 and 2.

By making the piston and its chamber rectangular, the parts can be more readily and easily constructed, and can be made to work tightly—a result most troublesome to effect in cylinders.

I claim—

1. The combination, in an engine, of a piston-chamber and a reciprocating oscillating piston provided with a single port, adapted to act as both receiving and exhaust port, substantially as and for the purpose specified.

2. The combination, in an engine, of two or more oscillating reciprocating pistons and two

or more piston-chambers, forming a chamber which incloses the crank-shaft, the exhaust of the piston-chambers being into the crank-chamber, substantially as and for the purpose specified.

3. The combination, in an engine, of a piston-chamber, a reciprocating oscillating piston provided with a single port, and a valve having two passages, adapted to be opened alternately to the exhaust or admission port, to reverse the engine, substantially as specified.

4. The combination, in an engine, of a rectangular piston-chamber and a rectangular reciprocating and oscillating piston, substantially as and for the purpose specified.

ANDREW HIGGINSON.

Witnesses:
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W. B. JOHNSON.