3 Sheets—Sheet 1.

J. J. ANTHONY.

STEAM-ENGINES.

No. 195,246. Patented Sept. 18, 1877.

Fig: 1.

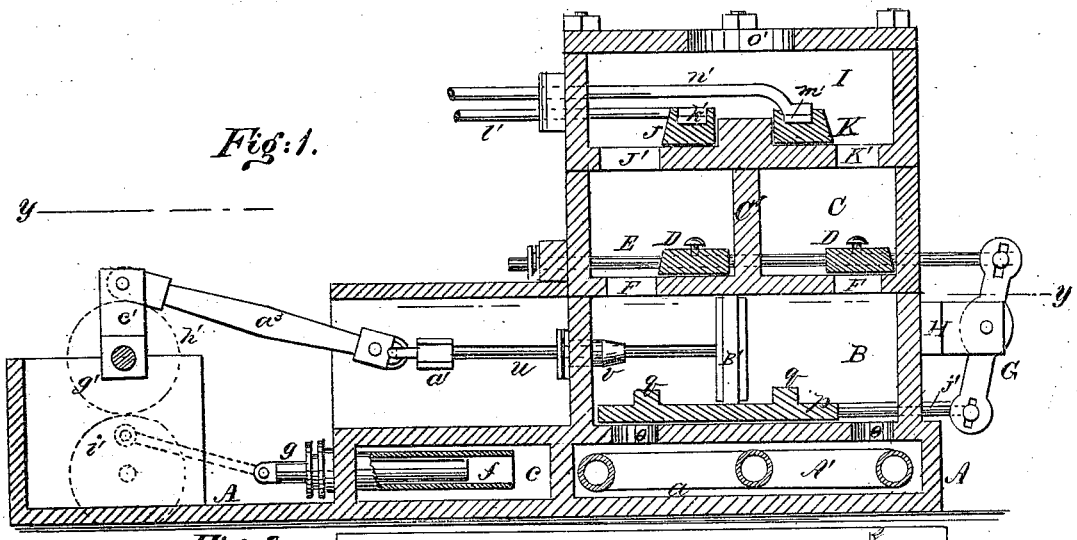
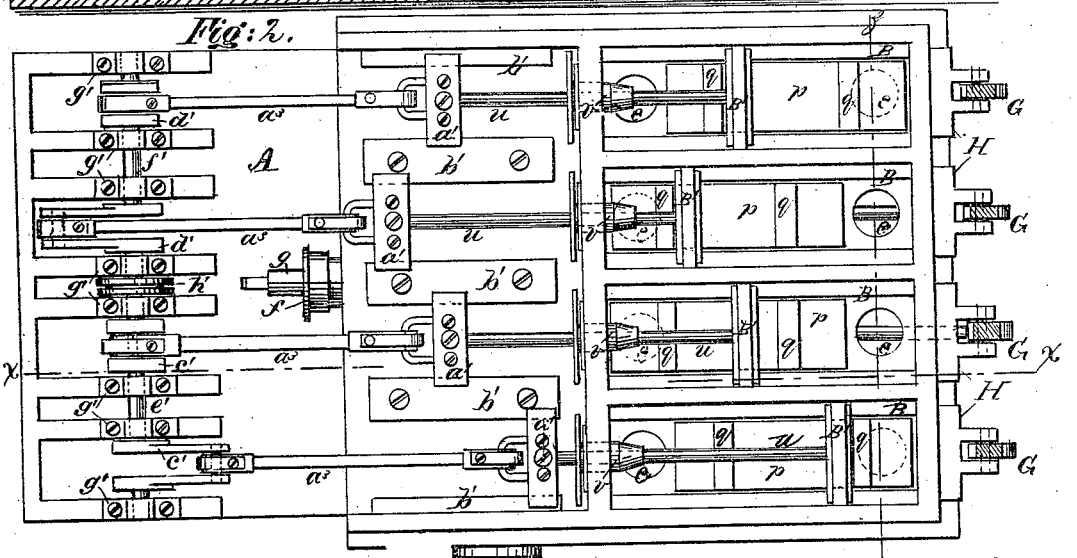


Fig: 2.



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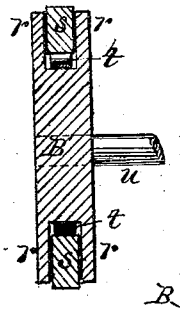


Fig: 3.

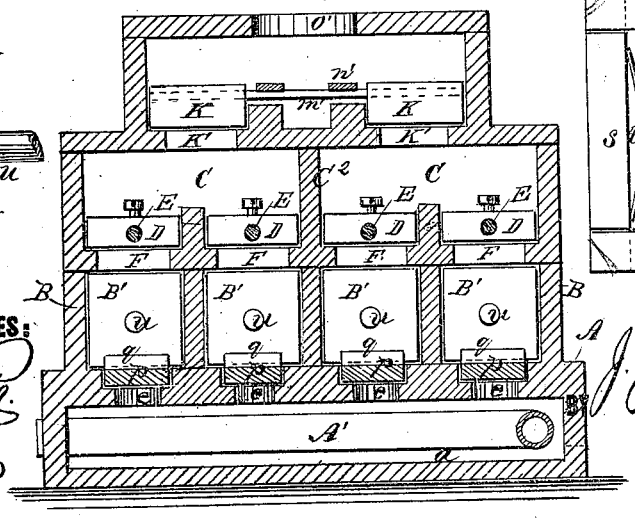
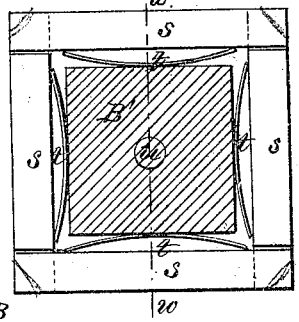


Fig: 4.



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3 Sheets—Sheet 2.

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STEAM-ENGINES.

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Fig: 6.

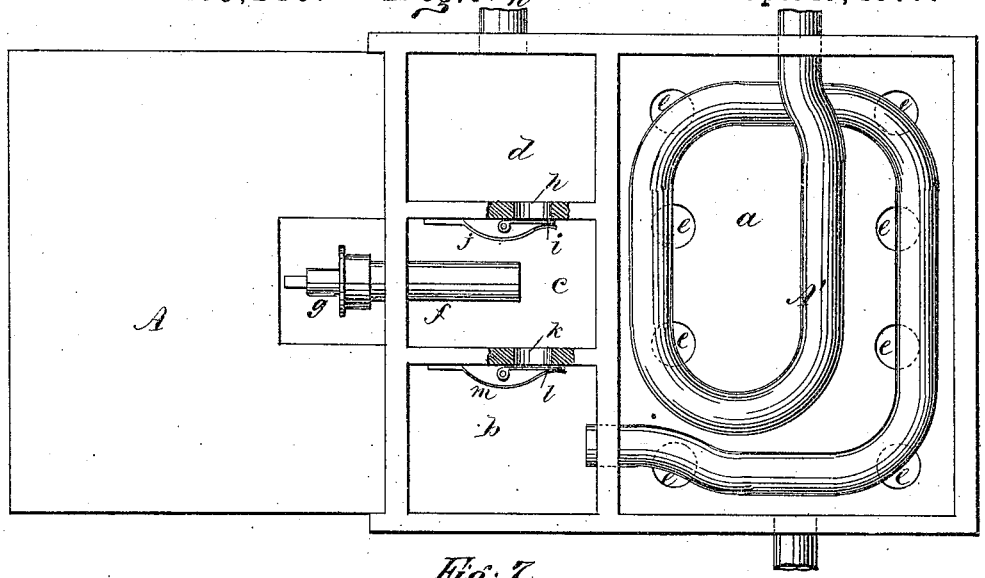


Fig: 7.

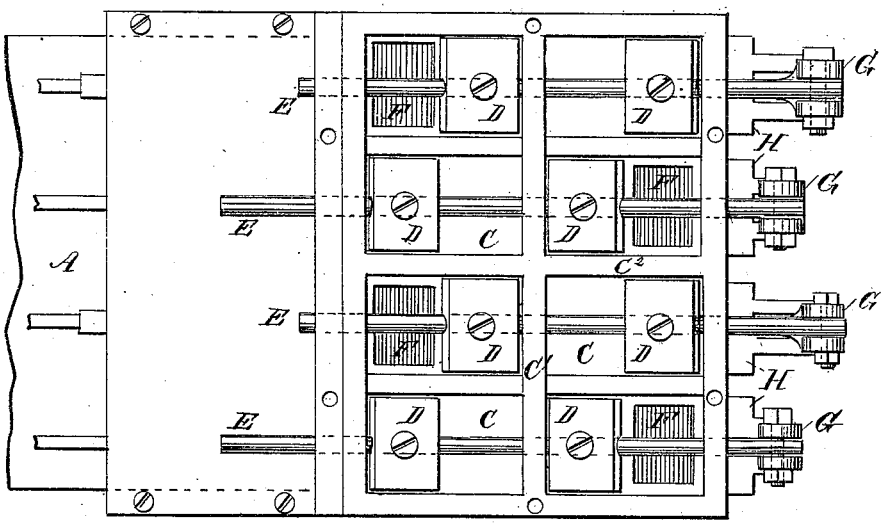
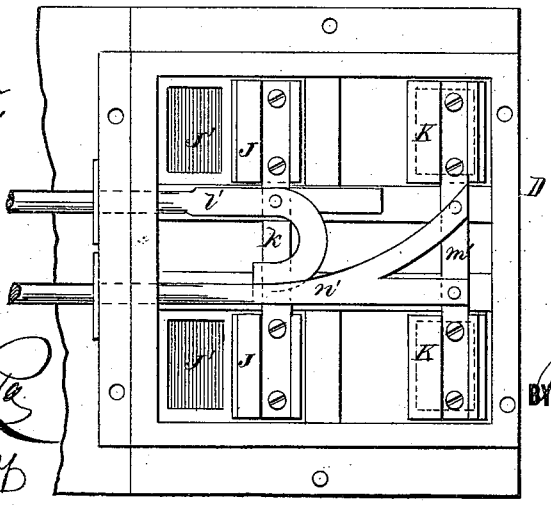


Fig: 8.



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J. J. ANTHONY.

STEAM-ENGINES.

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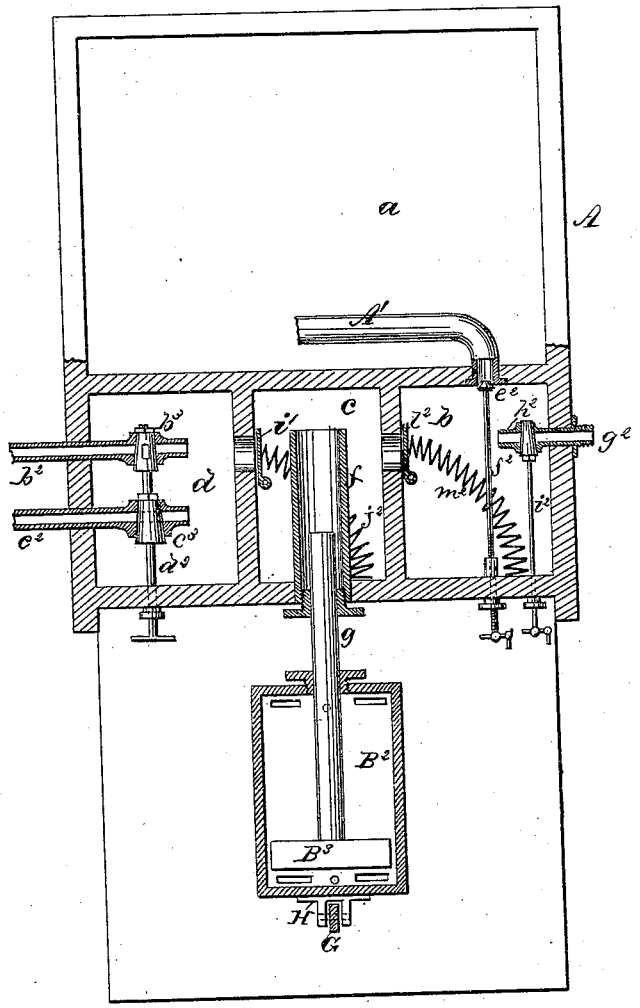
Fig: 9.



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UNITED STATES PATENT OFFICE.

JACOB J. ANTHONY, OF SHARON SPRINGS, NEW YORK.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **195,246**, dated September 18, 1877; application filed May 26, 1877.

To all whom it may concern:

Be it known that I, JACOB J. ANTHONY, of Sharon Springs, county of Schoharie, and State of New York, have invented a new and useful Improvement in Engines, of which the following is a specification:

Figure 1 is a longitudinal section taken on line *x x* in Fig. 2. Fig. 2 is a plan view in section on line *y y* in Fig. 1. Fig. 3 is a transverse section on line *z z* in Fig. 2. Fig. 4 is a detail view of one of the pistons. Fig. 5 is a transverse section on line *w w* in Fig. 4. Fig. 6 represents the feed-water heating and pumping apparatus. Fig. 7 is a plan view of the valve-chest, showing the slide-valves. Fig. 8 is a plan view of the throttle or reversing valves. Fig. 9 is a plan view of a modified form of pumping apparatus.

Similar letters of reference indicate corresponding parts.

The object of my invention is to furnish an engine that is simple in construction, compact in form, and efficient in operation, which may be adapted to any of the purposes for which ordinary engines are used; but it is especially designed for locomotives and steamboats.

In the drawings, A is the base of the engine, in a portion of which chambers *a b c d* are formed. The chamber *a* is located under the cylinders B, and receives the exhaust-steam from them through ports *e*. A coil of pipe, A′, is placed in the chamber *a*, and receives cold feed-water from the chamber *b*, which, in its passage through the pipe A′ toward the boiler, becomes heated.

In the chamber *c* a pump-cylinder, *f*, having the plunger *g*, is placed. The chamber *d* is designed for receiving water from a supply-tank. There is an opening, *h*, in the partition between the chambers *c d*, over which a valve, *i*, is placed, which opens into the chamber *c*, and is held to its seat by a spring, *j*. An opening, *k*, is made in the partition between the chambers *b c*, which is covered by a valve, *l*, that opens into the chamber *b*, and is held to its seat by a spring, *m*. The supply-pipe *n*, through which water is drawn by the pump, is inclosed in a pipe, through which steam passes to keep the water from freezing.

Above the chamber *a* four cylinders, B, are placed, which are formed, together with the base, in a single casting. These cylinders are rectangular in transverse section, and are provided with exhaust-ports *e* at each end at their lower sides, which communicate with the chamber *a*. The lower side of each cylinder is recessed to receive a slide-valve, *p*, which accurately fits the recess, and is exactly even with the lower inner surface of the cylinder.

Transverse ribs *q* are formed on each end of the valves *p*, which are engaged by the pistons in the cylinders at each end of the stroke.

The pistons B^1 consist of a head having flanges *r*, between which packing-strips *s* are placed. These packing-strips are forced outward against the sides of the cylinder by springs *t*. The rods *u* of the pistons B^1 pass out of the ends of the cylinders through stuffing-boxes *v*, and are attached to cross-heads a^1, that move upon guides b^1, that are supported upon standards that project upward from the bed-piece A. The cross-heads a^1 are connected with the cranks c^1 c^1 and d^1 d^1 by connecting-rods a^3. The cranks c^1 c^1 are rigidly connected to the shaft e^1, and are arranged in relation to each other at an angle of ninety degrees. The cranks d^1 d^1 are, in like manner, connected by a shaft, f^1. The shafts of these cranks are journaled in pillow-blocks g^1, that are secured to the bed A, and are connected together by a clutch, h^1. Upon one portion of this clutch a spur-wheel is placed, and a spur-wheel, i^1, (shown in dotted lines in Fig. 1,) meshes with it, and is provided with a crank-pin and a connecting-rod for driving the pump-plunger *g*.

The valve-chest C is placed over the cylinders B, forming the upper or fourth side of the cylinder, and is divided transversely by a partition, C^1, and longitudinally by a partition, C^2. Valves D are secured to the rods E, that pass through stuffing-boxes at each end of the valve-chest. The said valves are capable of alternately covering the ports F, which communicate with opposite ends of the cylinders. Rods j^1 are attached to the valves *p*, and project through the rear end of the cylinders B, and are connected with levers G, which are pivoted in supports H, attached to the rear heads of the cylinders B.

The upper ends of these levers are connected to the rods E of the valves D. Both ends of the levers G are slotted, to permit the rods E j^1 to move easily in a direct line.

Above the valve-chest C the chest I is placed, which contains four throttle-valves, J J and K K, which are capable of covering the ports J′ J′ and K′ K′. The valves J are connected by a bar, k', which is attached to a rod, l^1, that passes through a stuffing-box in the side of the chest I, and the valves K K are connected in a similar way by a bar, m^1, which is attached to rod, n', that passes through a stuffing-box in the side of the chest I.

Steam is admitted to the chest I through the opening o'.

The modification of the supply-pump shown in Fig. 9 consists of a steam-cylinder, B^2, placed on the bed in front of the pump, and having the piston B^3, which is connected with the pump-plunger g. The arrangement of the valves and ports of this cylinder is like that of the cylinders B.

Two suction-pipes, b^2 c^2, pass into the chamber d, and are each provided with stop-cocks b^3 c^3, the plugs of which are connected by a single spindle, d^2, which extends through a stuffing-box in the side of the chamber d, and is provided with a handle, by which it is turned.

The passages through the plugs of the stop-cocks b^3 c^3 are arranged at right angles to each other, so that when one of the stop-cocks is opened the other will be closed. The pipe b^2 corresponds to the pipe n in Fig. 6, and the pipe c^2 is designed for receiving a flexible pipe or hose.

The chamber c is provided with a valve, i^1, and a coil-spring, j^2, which is curved, so as to rest against the front wall of the chamber. The chamber b is provided with the valve l^2, which is pressed to its seat by the curved spiral spring m^2.

The coil A′ is provided with a valve, e^2, which is attached to a spindle, f^2, that extends through the front of the chamber b, and a discharge-pipe, g^2, extends through the side of the chamber b, and is provided with a stop-cock, h^2, having the spindle i^2.

This modified form of pump is designed for the double purpose of extinguishing fires and feeding the boiler.

The operation of my improved engine is as follows: Steam is admitted to the chest I through the opening o', whence it passes through the ports J′ K′ to the steam-chest C, and through one of the ports F into the cylinder B. The valves p and D, by their connection with the lever G, are made to move in opposite directions, so that when one of the supply-ports is opened the exhaust-port below it in the same end of the cylinder is closed, while at the opposite end of the cylinder the exhaust-port is open and the supply-port is closed.

The piston B is propelled by the steam toward the end of the cylinder until it strikes one of the ribs q, when the valves are shifted and the piston is moved toward the opposite end of the cylinder.

The reversing of the engine is effected by admitting steam to the valve-chest C to start the engine on one side of the partition C^1, and afterward admitting it to the other side.

All of the cylinders may be used in connection, or by disconnecting the coupling h^1 they may be used in pairs. When the engine is applied to steamboats one pair of cylinders may be connected with each wheel, and by the action of the engine alone the boat may be steered.

When the pump shown in Fig. 9 is used for feeding, the boiler-water is taken in through the pipe b^2 and forced through the pipe A′ into the boiler; but when the pump is used for forcing water for fire or other purposes than feeding the boiler, the pipe b^2 is closed and water is taken through the pipe c^2, the valve e^2 is closed and the valve h^2 is opened, when the water will be discharged through the pipe g^2.

Both forms of pump may be secured to the bed-piece, so that if one of them should fail to operate the other may be employed.

The bolts for connecting the cylinders, steam-chests, and their caps should have beveled heads and nuts under which a soft metallic packing should be placed.

The advantages claimed for my improved engine are that it is easily constructed, compact, and efficient.

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

1. The combination of the rectangular cylinder B, having the ports F e, the piston B^1, valve p, having the ribs q, the steam-chest C, valves D, and levers G, substantially as shown and described.

2. The combination, with chest I, having four ports, of the valves J J, connected by a bar, k', attached to a rod, l^1, and the two valves K K, connected by a bar, m^1, attached to rod n', as and for the purpose specified.

3. The bed A, having chambers a b c d, the heating-pipe A′, and pump consisting of the barrel f, plunger g, and valves i l, in combination, substantially as shown and described.

JACOB J. ANTHONY.

Witnesses:
FREDERICK HAESSEE,
WM. LYKE.