J. E. Atwood,

Reciprocating Steam Engine,

No. 36,985, Patented Nov. 25, 1862.

Fig. 1.

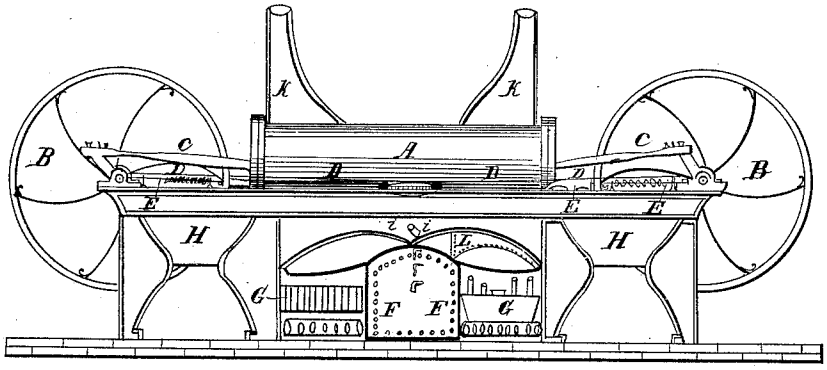


Fig. 2.

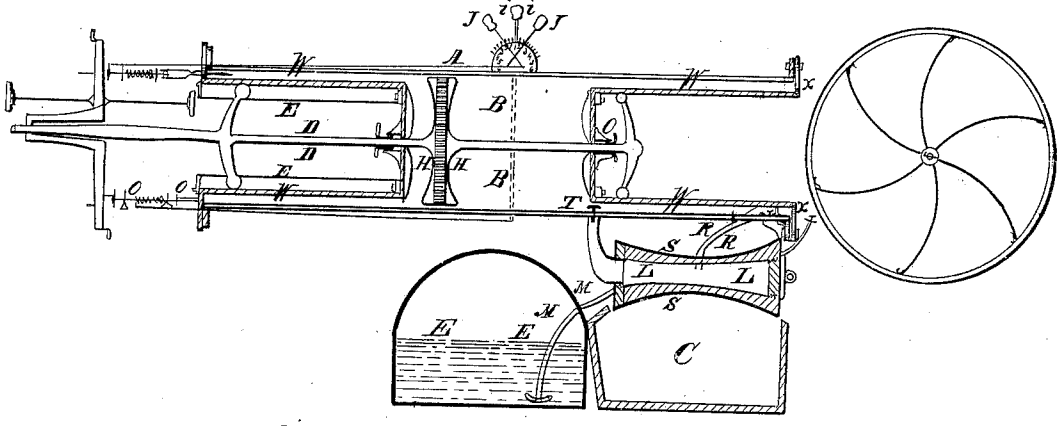


Fig. 3.

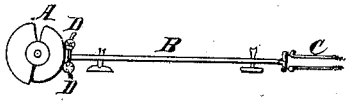
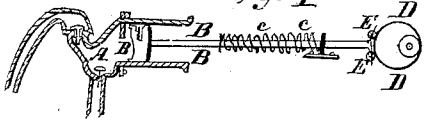


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES E. ATWOOD, OF BUCKSPORT, MAINE.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. **36,985**, dated November 25, 1862.

To all whom it may concern:

Be it known that I, JAMES E. ATWOOD, of Bucksport, in the county of Hancock, in the State of Maine, have invented a new and Improved Steam-Engine; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side view. Fig. 2 is an inside view of cylinder A with its several working parts and steam-generator and fire berth and reservoir. Fig. 3 is an inside view of escape or let-off; Fig. 4, inside view of feed-pump and end view of eccentric.

In Fig. 1 letter A is the main cylinder. B B are balance-wheels; C C, connecting-rods; D D D, governing-rods to feed-pump; E E, plunger-rod and spiral spring; F F, water tank or reservoir. G G are fire-berths; H H, frame or bed work. I I is the regulator. K K is the smoke-stack.

In Fig. 2 letter A is the main cylinder. B B is length of stroke for piston H H. C C are the packing-boxes; D′ D′, piston-rods; E E, guides to piston-rod; H H, piston; J J, levers for shutting off or letting on water; T T, check-valve; O O, the escape or let-off; S S, the steam-generator; L L, inside of S S; P, solid screw-plug; F F, water tank or reservoir; M M, suction-pipe; R R, leading-pipe from feed-pump to steam-generator; W W W W, annular space between cylinder A and cylinders X X.

In Fig. 3 letter A is two half-circles; B, the escape-rod; D D, friction-rollers; C, the escape.

In Fig. 4 letter A is an inside view of feed-pump; B B B, plunger and rod; C C, spiral spring; E E, friction-rollers; D D, eccentric on main crank.

The nature of my invention consists in constructing steam-engines so as to generate the steam no faster than it is used, thereby preventing explosion.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct a double-acting engine on the plan of Fig. 1. The frame or bed work H H is of cast-iron, very much resembles the bed-work of a power-gear lathe, or it can be made of brick or stone with iron top ways for attaching the cylinder A, pump E, and driving-wheels B B.

K K are made of galvanized iron and cover both ends of cylinder A, or the whole draft can go up the back side.

In Fig. 2 letter A is made of cast-iron or any metal used for the purpose, and is three times the length of the old-fashioned ones of the same diameter, having the same stroke for the piston. The cylinders X X are of cast metal and answer three purposes: first, they are the cylinder-heads; second, they keep the dust from falling on piston-rod and guides; third, they form the annular space W W W W, so as to prevent the piston-rod D D, packing-box C, and guides E E from getting so hot is to destroy the oil. Guides E E, packing-box C, piston-rod D D, and piston-head H H are all made in the usual way. T is made of composition, and is a common button-valve. It keeps the steam from going back into the generator S S on the back-stroke. S S is made of cast metal, six inches in diameter, one foot long (more or less) for a five-horse-power engine, the inside L L about three inches diameter. This generator is to be used when salt-water has to be used. When fresh water is used there is no use for plug P. Plug P is screwed in, and is to be taken out at any time when the salt collects. Pipe R R is common steam-pipe—iron or copper. Pipe M M is of the same with strainer at the end in tank F F, to prevent any thing going into pump E. Reservoir or tank F F is made of boiler-plate, and holds about one hundred gallons for a five-horse-power engine, or the water can be drawn from a well or cistern, in which case the tank is not needed. It sets between the fire-berths G G and receives some heat from them, not enough to boil the water. The pipe M M passes through the fire-berth G, so as to heat the water very hot. When the pump E passes the water into L L, it is very hot, consequently it does not cool the generator S S, and less fuel is used than if cold water was used. The fire-berths are of iron or fire-brick. When coal is used, they are about one foot square and twenty inches deep. When oil is used, it is the same width, but extends farther back.

In Fig. 3 letter A is made of case-hardened iron or steel with a flange to fasten them to

crank of driving-wheel B. In stationary engines only one of these half-circles is needed. The use of these half-circles is to close the escape at the instant the steam acts on piston-head H H, and to let it be entirely open on the back-stroke. B is made of square iron with a pad of rubber packing, so as to shut the escape steam-tight. C is made of common brass or iron pipe of suitable diameter to let the steam pass free.

Fig. 4 is made of composition with common button-valves and solid plunger. The plunger and rod B B B is thrown back by spiral spring C C and forward by eccentrics D D. Thus it will be seen by drawing up the spiral spring C C that the pump E can be regulated to throw a small amount of water or its full capacity into generator S S or shut off entirely by means of the regulators J J in Fig. 2. E E are two friction-rollers. The generator S S is made round, flat, or oval. Other engines can be made to work on this principle by using the same boiler for the reservoir, setting the steam-generator S S in the fire-berth, and connect pipes R R and M M with pump E and pump E to main crank, as before described, the old valves and cut-off to be made stationary. The old cylinder and balance-wheel can be used by using spiral spring C C and eccentric D D.

To set the engine in operation, make one revolution of balance-wheel or one stroke of pump E by lever J. When less steam is desired, put the levers J J down toward figure 6. When more steam or the whole head is wanted, bring the levers J J up to figure 1, which gives the pump E full stroke. When the steam is to be cut off entirely, spread the levers J J out to their full extent. That leaves the engine entirely powerless and no danger of an explosion; but, should the steam-generator S S get very hot and a large quantity of water thrown into space L L, it might break the generator. In such a case no great danger or damage would be done, as the generators can constantly be kept on hand and easily replaced.

My engine differs from others in several respects: First, it has no boiler, and can be put into operation as soon as the generator gets hot enough to generate hot water into steam; second, it has no steam-chest; third, the cylinders are so close to the fire that they keep hot, which keeps the steam from going back to water; fourth, it generates steam no faster than it is used.

I do not claim to be the original inventor of the principle herein contained, for it is well known that water and powder, when thrown upon a red-hot iron, produce the same effect; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the generator S S with the cylinder A, when constructed substantially as shown and described, for the purpose set forth.

2. The combination and arrangement of cylinder A with cylinders X X, steam-generator S S, reservoir F F, and levers J J, operating in the manner and for the purpose substantially as set forth.

3. The combination of pump E, spiral spring C C, and eccentrics D D, in the manner and for the purpose substantially as described.

JAMES E. ATWOOD.

Witnesses:

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