(No Model.)

A. R. WEISZ.

ATMOSPHERIC ENGINE.

No. 343,875. Patented June 15, 1886.

Fig. 1.

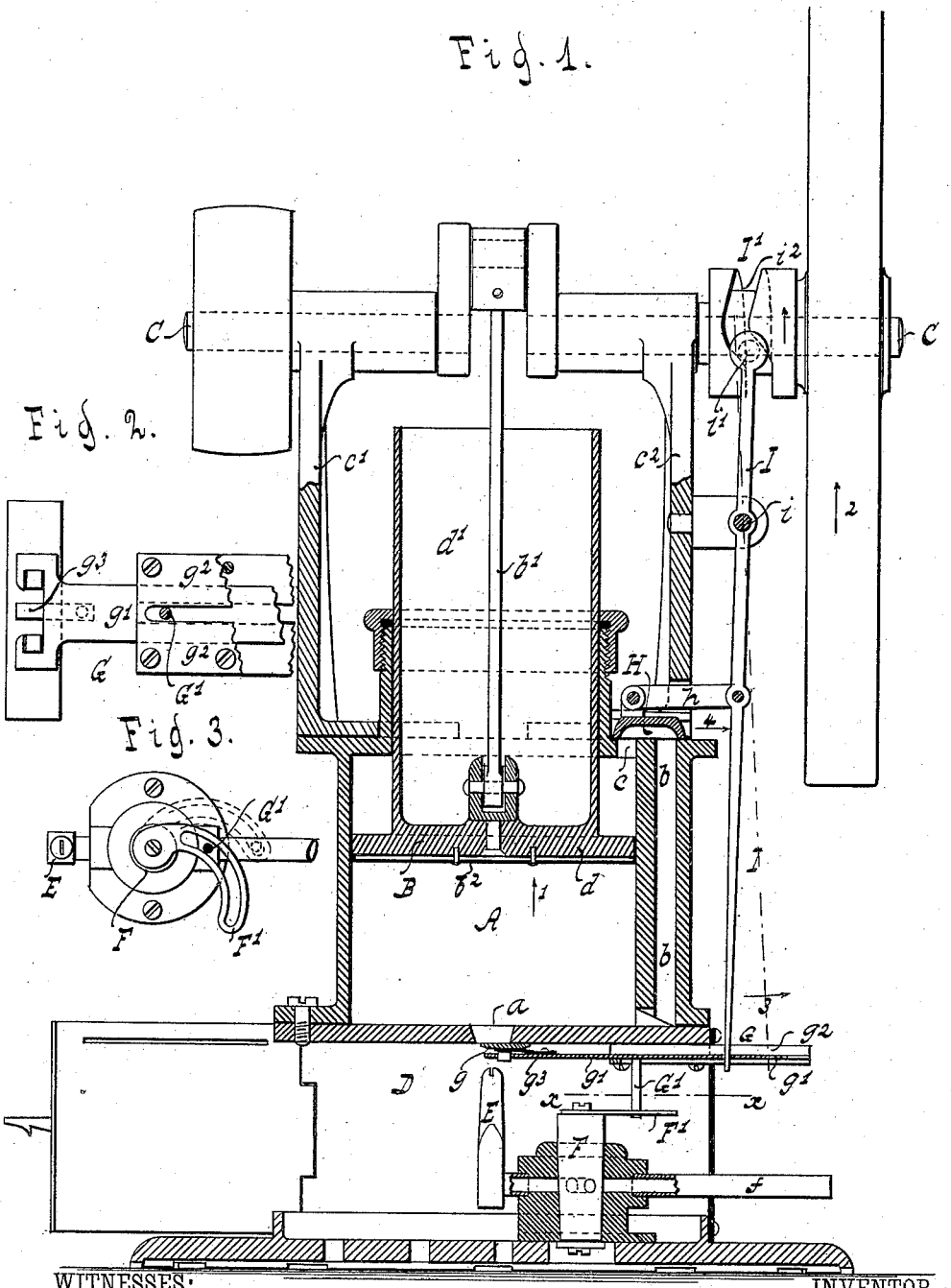

Fig. 2.

Fig. 3.

WITNESSES:

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ALBERT RICHARD WEISZ, OF BROOKLYN, NEW YORK.

ATMOSPHERIC ENGINE.

SPECIFICATION forming part of Letters Patent No. 343,875, dated June 15, 1886.

Application filed December 3, 1885. Serial No. 184,615. (No model.)

To all whom it may concern:

Be it known that I, ALBERT RICHARD WEISZ, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Atmospheric Engines, of which the following is a specification.

My invention relates to improvements in that class of atmospheric engines in which motive power is obtained by admitting heated air to a cylinder during the entire or part of the stroke of the piston, so that a partial vacuum is formed on one side of the piston by the rarefied air, and the excess of atmospheric pressure on the other side of the piston effects its propulsion.

My invention consists, essentially, in the combination, with a cylinder and with the piston, of an air-admission port at one end of the cylinder, a slide for controlling the same, a burner or other device for directing a flame to the air-admission-port, proper exhaust-ports, a valve governing the same, and means for imparting the requisite motion to the valve and slide and for controlling the supply of heat at the admission-port, all of which is more fully pointed out in the following specification and claims, and illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of a prime mover constructed according to my invention. Fig. 2 is an inverted plan view of the slide and fittings for controlling the air-admission port. Fig. 3 is a horizontal section in the plane *x x*, Fig. 1, of the heat-supply-controlling apparatus.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates the cylinder of the engine, which is provided with an air-admission port, *a*, at one end, an exhaust-passage, *b*, leading from the lower end of the cylinder, and an exhaust-passage, *c*, which leads from the upper end of the cylinder.

B is the piston, one part or head, *d*, of which is fitted to the cylinder, while the remaining part, *d'*, is of a smaller diameter and is in the form of a hollow plunger, to the bottom of which is attached one end of the connecting-rod *b'*. A disk or cup, b^2, is attached to the bottom of the piston, so as to leave an air-space beneath the piston, to prevent undue heating thereof, but other well-known means may be employed for this purpose.

C is the crank-shaft, which can carry a driving-wheel and a fly-wheel, as usual, and is supported in suitable standards, c' c^2, secured to the cylinder. The cylinder rests upon a casing, D, in which is located a burner, E, which is so situated that the flame will be directed to the air-admission port *a* of the cylinder.

The burner E is connected with a cock, F, and a supply of gas is led to the burner through suitable tubing, (not shown in the drawings,) which is connected with a pipe, *f*, which is in communication with the cock F, so that when the cock is turned in the proper direction the gas-supply will be shut off.

To open or close the air-admission port *a*, I provide a slide, G, Figs. 1 and 2, which consists of a metallic plate, *g*, supported upon a sliding piece, *g'*, which can move longitudinally in guideways, g^2, secured to the cylinder-head. In order to keep the plate *g* continually pressed against the cylinder, a flat spring, g^3, is interposed between the piece *g'* and the plate.

To open and close the exhausts *b c* in a manner hereinafter to be described, a slide-valve, H, Fig. 1, is employed, which is guided in a valve-case formed in the standard c^2, and is so constructed that when it is in the position shown in Fig. 1 the two exhaust-passages *b c* are in communication; but when in its extreme opposite position, the exhaust-post *c* is open and the fluid above the cylinder can make its exit through this port *c*. The proper reciprocating motion is imparted to slide-valve H and slide G by means of a valve-lever, I, pivoted at *i* to the standard c^2, and to which the slide-valve is connected by a link, *h*, which is pivoted to the valve and to the valve-lever. The lower end of the lever I projects through a hole in the slide G, but can be connected thereto in any other suitable manner. The upper end of the valve-rod I is provided with a roller-stud, i', which engages with a groove, i^2, in a grooved cam, I^2, which is mounted on the crank-shaft C, and rotates therewith.

To regulate the supply of gas, an arm, F', is attached to the plug of the cock F, Figs. 1 and 3, which arm has therein a curved slot,

which is engaged by a pin, G′, projecting downwardly from the slide G, so that when the slide is caused to reciprocate the supply of gas will be alternately nearly shut off or turned on full.

As shown in the drawings, Fig. 1, the piston is on its upward stroke in direction of arrow 1, and has passed through about three-quarters of its stroke, and the crank-shaft C is turning in direction of arrow 2. The slide-valve H now covers the exhaust-port *c*, slide G almost closes the air admission port *a*, while the gas-supply is nearly shut off, leaving only a sufficient supply to afford a very small flame. As the piston now proceeds in the direction of arrow 1 in the completion of its stroke, the valve H is moved a very slight distance toward the cylinder, and the slide G is moved sufficiently to completely close the admission-port, so that the gases beneath the piston are allowed to expand freely, and thus increase the vacuum. The difference of pressure now existing on the opposite faces of the piston causes the piston to descend, and during this downward stroke the positions of the valve H, slide G, and consequently that of cock F, remain unchanged, owing to the path of the groove in the cam I′, and the air below the piston is forced up passage *b*, through port *c*, and in the space above the pistons. Suppose the piston to be at the end of its downward stroke and begin a new cycle. As the piston starts upward, the valve-lever I is caused to turn about its fulcrum in the direction of arrow 3, and valve H is moved in direction of arrow 4, so as to clear the exhaust-port *c*, but to obstruct exhaust-passage *b*, so that the air which had been introduced above the piston in the previous stroke is expelled through ports *c* into the open air. By the same movement of the valve-lever I the slide G is moved in the proper direction to completely open the admission-port *a*, while at the same time the gas-supply cock E is turned on full. The flame now enters through port *a* into the space below the piston and the exterior air drawn into the cylinder is heated thereby very rapidly, since the flame will be in thorough contact with the air, sufficient oxygen being continually supplied by the influx of fresh air. As the piston continues in its stroke the valves again return to the position shown in Fig. 1, when the gas supply and exhaust are cut off. This cut-off can be fixed according to the usual rules of practice at such a point which will be productive of the highest economical effect.

In the drawings only one burner is shown, but for larger sizes of engines several could be used, if necessary.

From the preceding description it will be seen that the heated air does not in the least act in driving the piston, but is only a medium necessary to produce a vacuum on one side of the same, which results in a pressure tending in the opposite direction, due to the surrounding atmosphere. A water-jacket, as usually employed with this class of engines, is superfluous with my improved construction, as the material of the cylinder will never be subjected to an extremely high temperature, owing to the fact that the supply of heat is completely shut off when not in immediate use.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, substantially as shown and described, with the cylinder and the piston fitted therein, of the air-admission point *a* at one end of the cylinder, a slide controlling the port, a burner or other device for directing a flame to the admission-port, the exhaust-ports *b c*, the valve governing the same, and means, substantially as described, for imparting the requisite motion to the valve and slide, and means for controlling the supply of heat at the admission-port.

2. In an atmospheric engine, the combination, with the cylinder, of a piston having a head, *d*, closely fitted to the bore of the cylinder, and a plunger or rod extending from the piston-head, ports *b c*, leading from the cylinder, and a valve, H, controlling said ports, substantially as and for the purpose specified.

3. The combination, with the cylinder and the piston, of the port *a*, the slide G, grooved cam I′, and the valve-lever I, engaging said cam, and the slide, substantially as shown.

4. The combination, with the cylinder and the piston, of the admission-port *a*, the gas-burner E, cock F, reciprocating slide *g*, and the connection of the slide with the cock, substantially as shown and described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

ALBERT RICHARD WEISZ. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.