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ATMOSPHERIC ENGINE.

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1,028,511.

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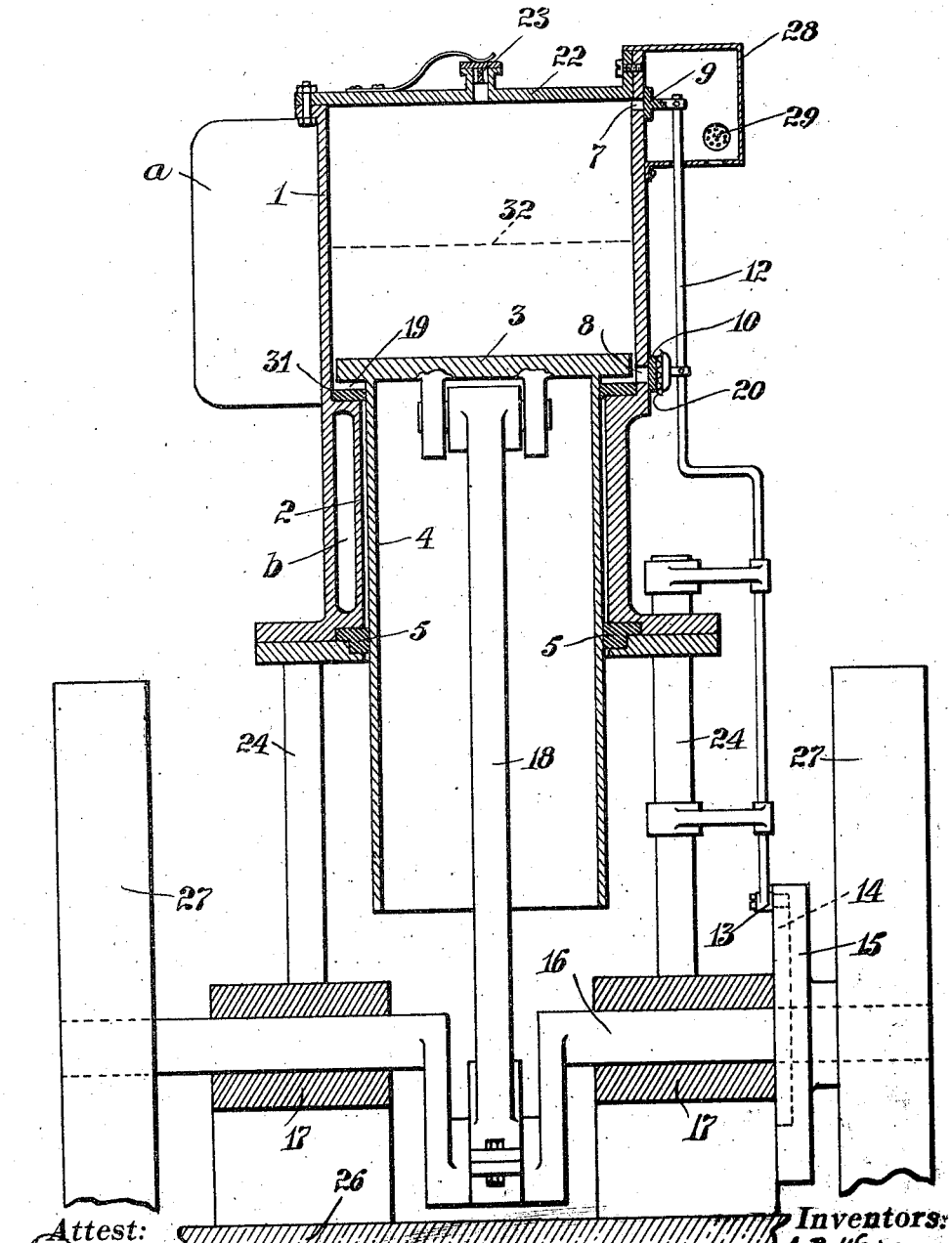

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ATMOSPHERIC ENGINE.

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Application filed December 1, 1911. Serial No. 663,238.

To all whom it may concern:

Be it known that we, ALBERT R. WEISZ and GEORGE R. WEISZ, citizens of the United States, and residents of the borough of Brooklyn, city of New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Atmospheric Engines, of which the following is a specification.

This invention relates to improvements in atmospheric engines and the object of this invention is to provide a new and improved motor of this kind which is simple in construction, strong and durable, and effective and economical in use.

In the accompanying drawing a vertical diagram section of our new and improved motor is shown.

The cylinder of the engine is composed of two sections namely the upper section 1 and the lower section 2, the upper section 1 being of greater diameter. A piston 3 works in the upper section 1 and is of such diameter that there is a clearance between the inner circumference of the upper cylinder section and the outer circumference of the piston, and from this piston 3 a cylindrical hollow trunk 4 extends downward and fits snugly in the lower cylinder section 2 in which it is packed at the lower end of said section 2 by suitable annular packing 5. The upper and larger cylinder section is provided with an inlet port 7 for the hot gases at the top and an outlet port 8 for the cooled gases at or near the bottom. An inlet valve 9 is suitably mounted to alternately open and close the inlet port 7 and a valve 10 is mounted to open and close the outlet port 8. These two valves are attached to a common rod 12, the lower end of which is provided with a pin 13 entering the cam groove 14 in the side of the cam disk 15 secured on the main crank shaft 16 mounted in suitable bearings 17. The crank of the shaft is connected by a suitable connecting rod 18 with the underside of the piston 3. The parts are so dimensioned that when the piston 3 is in its lowest position it does not rest on the annular bottom part of the upper larger cylinder section, but is a short distance from the same, as indicated at 19.

The outlet valve 10 is not rigidly connected with the valve operating rod 12 but such connection is made by means of yielding spring 20 so that in case there is undue pressure exerted on this valve it may yield outwardly.

On the top head 22 of the cylinder, we provide a spring pressed puppet-valve 23 which can yield outward when there is internal pressure in the upper end of the cylinder. The combined cylinders are supported by standards 24 from the base 26 in any suitable manner so as to form a rigid structure.

27 is a fly-wheel.

The cylinder is to be cooled by water jacket or fins or any other suitable cooling means.

When the piston 3 is at the top of the cylinder the inlet port 7 and outlet port 8 are both open and hot gases can pass from a hot gas chamber 28 through the port 7 into the upper part of the cylinder, which hot gases are generated by a suitable burner or furnace 29 of any suitable construction, the details of which form no part of the present invention and this burner or furnace may be provided with solid, gaseous or liquid fuel. When the piston has descended to about half the height of the cylinder section 1 as indicated by the line 32 both valves 9 and 10 are moved so as to close the inlet port 7 and outlet port 8 and the supply of hot gases is thus cut off at the time when the crank has moved, say through an arc of 90 degrees, more or less. During the time that the piston 3 moves from the top of the cylinder to the line 32, the port 8 is open and the condensed gases beneath the piston 3 are partly forced out through the outlet port 8 until the piston position on line 32 has been reached. Then the ports 7 and 8 are closed and the piston continues to descend, the hot gases that have been admitted into the upper part of the cylinder section 1 coming in contact with the cooler walls of the cylinder section 1, and the plunger or trunk, are cooled more or less, and as the piston continues to descend these expanding gases fill the constantly increasing space between the piston and the head of the cylinder and thus expand, and in expanding they cool still further. When the port 8 is closed by the outlet valve 10 the condensed gases beneath the piston 3 escape upward through the annular clearance between the rim of the piston and the inner diameter of the cylinder and are further cooled by the resultant agitation thereof, and as these gases mix with the heated and expanded gases above

the piston the temperature of the gases above the piston is still further reduced and this takes place until the crank has turned through an arc, say from 90 to 180 degrees when the piston will be in its lowest position, that is when the crank pin is on its outer dead center. When the piston is in its lowest position it does not come in contact with the shoulder 31 at the bottom of the larger section 1 of the cylinder but remains a short distance above the same thus leaving an annular space 19 which is bounded by the shoulder 31 at the bottom, the underside of the rim part of the piston 3 at the top, the cylinder wall at the outside and the cylindrical trunk wall 4 at the inside. The fly-wheel now carries the crank pin over the outer dead center and the piston now makes the upstroke, under the pressure of atmospheric air, the valves 9 and 10 being closed, and the condensed gases free to pass from above the piston into the space forming beneath the piston. When the piston and trunk rise the gases which are forced through the annular space between the rim of the piston and the inner surface of the upper cylinder section come in contact with the walls of that portion of the trunk extending into the upper section of the cylinder, and thus are cooled. This trunk at all times had more or less of its surface surrounded by a cooled air, bounded by the lower portion, or less diameter of the cylinder, and this lower portion being cooled and not coming in contact with hot gases serves to cool the air surrounding the trunk, and thereby to cool the trunk. The valves 9 and 10 remain closed until the piston has substantially completed its up-stroke whereupon the valves 9 and 10 are suddenly opened and the cycle above described repeats itself, and the gases that have passed from above the piston to beneath the piston are forced out by the piston through the port 8 in its down-stroke.

As explained, the valve 23 in the head of the cylinder may be forced up by any outward pressure developing in the upper part of the cylinder, thereby preventing undue resistance to the piston during the up-stroke.

As shown either fins as indicated by *a* or water jackets as indicated by *b* may be used for cooling the cylinder walls, either by air cooling or water cooling, this depending upon the size of the motor and upon the conditions under which and where it is used.

Having described our invention what we claim as new and desire to secure by Letters Patent is:—

1. In an engine, the combination with a cylinder composes of two sections, one of greater diameter than the other, a piston within the larger section of the cylinder, having a clearance between the rim of the piston and the walls of the cylinder, a trunk projecting from said piston, an inlet port, and an outlet port in the cylinder section of greater diameter, valves for said ports, a hot-gas supply-means connected with the inlet port, a crank shaft, connections from the saint to the piston and means for operating the valves automatically, substantially as set forth.

2. In an engine, the combination with a cylinder composed of two sections, one of greater diameter than the other, a piston within the larger section of the cylinder, having a clearance between the rim of the piston and the walls of the cylinder, a trunk projecting from said piston, an inlet port, and an outlet port in the cylinder section of greater diameter, valves for said ports, a hot gas supply means connected with the inlet port, an automatic relief valve in the cylinder section of greater diameter, a crank shaft, connections from the same to the piston and means for operating the valves automatically, substantially as set forth.

3. In an engine, the combination with a cylinder composed of two sections, one of greater diameter than the other, and forming an integral shoulder at the open end of the greater diameter section, a piston within the larger section of the cylinder, having a clearance between the rim of the piston and the walls of the cylinder, a trunk projecting from said piston, the distance from the innerside of the closed end of the cylinder section of greater diameter to the said integral annular shoulder being greater than the distance between the innermost point reached by the inner surface of the piston and the outermost point reached by the outer surface of the piston, within the greater diameter part of the cylinder, a trunk projecting from said piston, an inlet port, and an outlet port in the cylinder section of greater diameter, valves for said ports, heat supply means connected with the inlet port, a crank shaft, connections from the same to the piston and means for operating the valves automatically, substantially as set forth.

Signed in the borough of Brooklyn in the county of Kings and State of New York this 27th day of November A. D. 1911.

ALBERT R. WEISZ.
GEORGE R. WEISZ.

Witnesses:
HUGH A. MAXWELL,
HENRY F. MACKEY.