

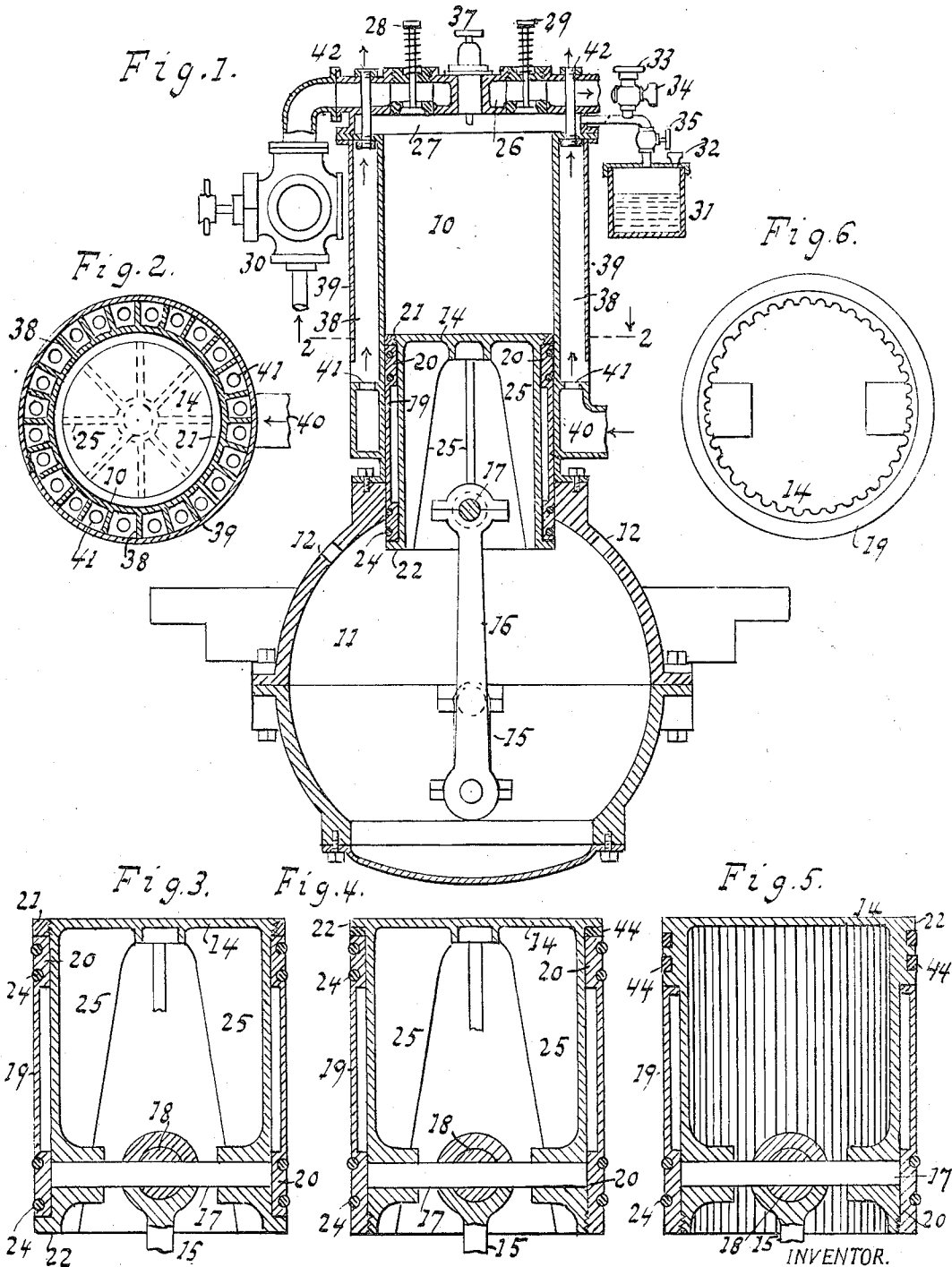
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T. KEENAN

EXPLOSIVE ENGINE

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INVENTOR.
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UNITED STATES PATENT OFFICE.

THOMAS KEENAN, OF BROOKLYN, NEW YORK, ASSIGNOR TO KEENAN PISTON SLEEVE AND ENGINE CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

EXPLOSIVE ENGINE.

Application filed October 10, 1921. Serial No. 506,641.

To all whom it may concern:

Be it known that I, THOMAS KEENAN, 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 Explosive Engines, of which the following is a specification.

This invention relates essentially to an explosive engine and one of the objects of the invention is to provide the cylinder with air cooling devices whereby air is continually sucked into a series of pockets surrounding the cylinder and expelled above the firing compartment.

Another object of the invention is to provide a piston with a sleeve to accurately fit into the cylinder thereby keeping it in perfect alignment and compensating for the expansion and contraction of the piston.

Another object of the invention is to prevent endwise movement of the wrist-pin so that it cannot get into contact with the bore to injure or score it by the pin scraping along the interior of the cylinder.

The invention resides more particularly in the novel combinations hereinafter described and claimed, reference being made to the accompanying drawing in which:

Figure 1 represents a vertical section of an engine embodying this invention.

Figure 2 is a horizontal section taken along the line 2—2 of the same.

Figure 3 is a sectional side elevation of the piston on a larger scale.

Figures 4 and 5 are views like Figure 3 showing modifications of the piston.

Figure 6 is an inverted plan view of Figure 5.

In the drawing the numeral 10 designates a cylinder which is bolted to a crank case 11 having air inlets 12 to circulate air in the case and cool a piston 14 slidably arranged in the cylinder. A crank 15 mounted in the case transmits reciprocating motion to the piston by means of a connecting rod 16 pivoted to the lower portion of the piston by means of a wrist-pin 17 extending transversely through the cylinder. The central part of the pin carries a ball 18 on which the rod is mounted thus forming a universal joint to prevent uneven throw of the piston caused when the crank shaft is out of alignment with the piston.

As indicated in Figures 1 and 3 the piston carries a sleeve 19 having interior annular

bosses 20 made to jam against the periphery of the cylinder. A nut 21 screwed to the top of the piston clamps the sleeve between it and a flange 22 formed at the lower end of the piston. The boss portions of the sleeve are provided with exterior grooves for the insertion of rings 24 to distribute oil or serve as packing. The lower end of the piston when down protrudes into the crank case to more readily carry up the oil. The piston is preferably cast of aluminum and it is tubular having a head and provided with internal ribs 25 to strengthen it.

On the upper end of the cylinder is mounted a valve chamber 26 communicating with a fuel or firing chamber 27 adjacent to the top of the cylinder. Spring pressed inlet and exhaust valves 28 and 29 are actuated in the usual way and respectively admit a combustible into the firing chamber and exhaust the products of combustion after the explosion. A carbureter 30 connected to a gasoline tank vaporizes the fuel before it enters the valve chamber. A tank 31 containing water is connected to the upper portion of the cylinder. The water is converted into steam by the heat generated after it is drawn into the fuel chamber by the suction created by the down stroke of the piston so as to scavenge the cylinder by mixing with the vaporized fuel. The tank is provided with a vent normally closed by a plug 32 to permit filling of the tank. A primer cup 33 controlled by a cock 34 is adapted when a valve 35 is closed to force small quantities of gasoline into the fuel chamber where it is fired by a spark plug 37 to accelerate the charge when the main supply of combustible misses fire.

The device for cooling the cylinder includes a series of radial vanes or fins 38 extending longitudinally along the outside of the cylinder. A sleeve or jacket 39 is arranged to enclose the vanes so as to form pockets or passages for conducting the air. These pockets are connected to a conduit 40 whereby air is forced by a pump or otherwise into the pockets through individual holes 41 in the upper wall to the conduit. The air passes from the upper part of the pockets into a series of tubes 42 leading from each pocket and extending up through the firing and valve chambers. In this construction each pocket receives a quantity of air to effectively cool the cylinder and the

tubes at the upper end by forming an annulus about the firing and valve chambers thoroughly absorb the heat generated by the explosion.

- 5 As indicated in Figure 4 the sleeve 19 is screwed on to the piston and the upper end impinges on to a packing ring 44 pressing it against the lower portion of the flange 22' located at the upper end of the cylinder.
- 10 As shown in Figures 5 and 6 the interior portion of the piston 10 is grooved or corrugated so as to give a larger area of cooling surface inside of the piston. The last mentioned piston is also provided with a flange
- 15 22 at the top which, however, is made with grooves to carry a number of packing rings 44. The sleeves of all the pistons form an annular air space between the bosses adjacent to the interior of the cylinder so as
- 20 to effectively absorb the heat radiated from the walls of the piston. The sleeve also con-

stitutes a cushion to eliminate the noise produced by the piston against the cylinder bore and any excessive expansion of the piston does not affect the sleeve.

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I claim:

An engine piston comprising a tubular headed member with flanged and threaded ends, said member having its interior longitudinally grooved, a cylindrical sleeve inserted on the member with a boss at the top and bottom to coact with the periphery of the member and form an annular space, and a nut engaging the threaded member to force the end of the sleeve against the flange.

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

THOMAS KEENAN.

Witnesses:

INEZ M. SCHOMBS,
WILLIAM MILLER.