June 29 , 1926. 1,590,204

A. L. POWELL

INTERNAL COMBUSTION ENGINE

Filed Feb. 2, 1921

Fig. 1.

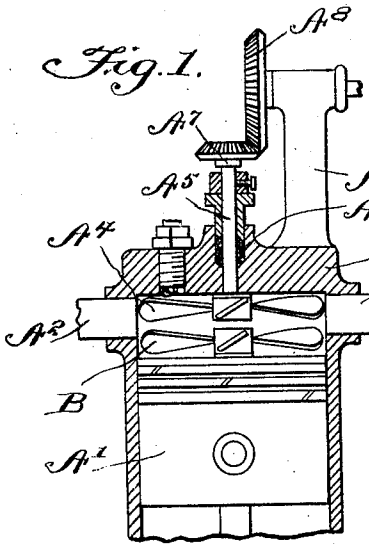


Fig. 6.

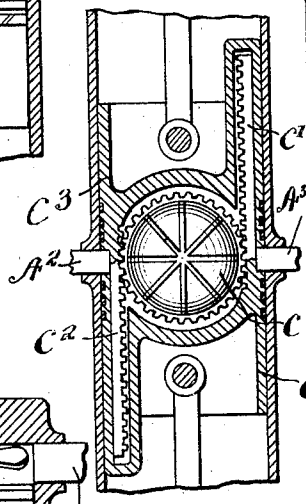


Fig. 3.

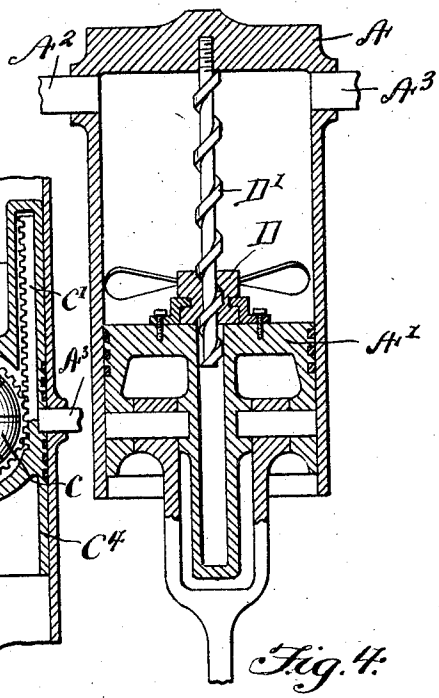


Fig. 2.

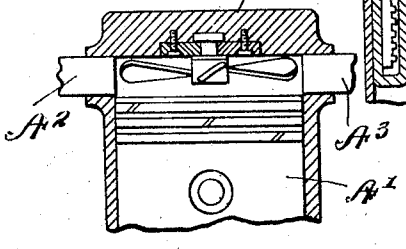


Fig. 4.

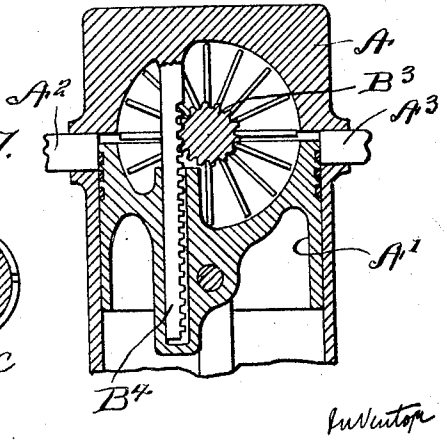


Fig. 5.

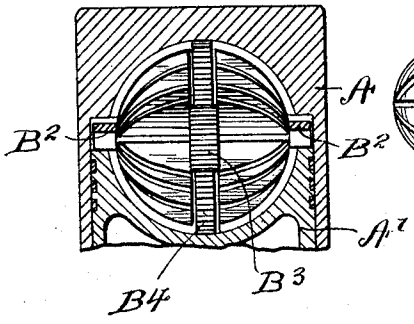
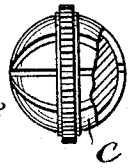


Fig. 7.



Inventor
Alvah L. Powell

Patented June 29, 1926. 1,590,204

UNITED STATES PATENT OFFICE.

ALVAH L. POWELL, OF MILES CITY, MONTANA, ASSIGNOR TO THE A. L. POWELL POWER CO., INC., OF MILES CITY, MONTANA, A BODY CORPORATE.

INTERNAL-COMBUSTION ENGINE.

Application filed February 2, 1921. Serial No. 441,972.

My invention relates to improvements in mixing devices for internal combustion engines in which I provide means for insuring thorough mixing of the explosive charge in such engines. This I obtain by a fan within the combustion chamber, the said fan being rotated by either mechanical means, or by the movement of the incoming gases themselves.

In the annexed drawings I show a form of my invention and modifications thereof, in which

Fig. 1 is a vertical elevation in section of a form of my improvement.

Fig. 2 is a modification of the construction shown in Fig. 1.

Figs. 3. 4, 5, 6, 7, are further modifications of my improvement.

In Fig. 1, A is the cylinder of any internal combustion engine, and A^1 the piston. Inlet and exhaust ports are shown at A^2, A^3. A fan, A^4, suitably mounted on a shaft, A^5, is suspended in the combustion chamber, preferably in the position shown. The shaft, A^5, passes through a stuffing box, A^6, and driven by bevel gears, A^7, A^8. Gear A^8 is mounted on a bearing, A^9, and is rotated by any conventional means from the engine shaft. On head of piston A^1 a second fan, B, is rotatably mounted. On suction downstroke of piston A^1 the fan B will revolve by reason of the movement of air set up by the positive fan A^4, and will therefore help to agitate and mix more perfectly the air and gas in which it moves. On compression downstroke, when inlet and exhaust valves are closed the positive movement of fan A^4 will continue fuel-air agitation until combustion. On exhaust stroke the fan movement will break up stratification in the burned charge, the exhausting mass being more even as to quality. The residual charge always left after exhaust, and which mixes with the fresh charge will conform to a higher average as to sameness, the effect on engine being to effect more uniformity in the explosions.

Fig. 2 shows a fan operated by the inlet of air on suction stroke, and from the force of gas pressure created by piston on clearance stroke.

In Figs. 4, 5, I show a fan the vanes of which are made to the contour of a hemisphere. The said fan is mounted in a piston at B^2, this piston being recessed to allow the fan to rotate freely. The cylinder head is suitably shaped to accommodate the fan. A pinion B^3 in engagement with a stationary rack, B^4, rotates said fan by the movement induced by the reciprocating action of the piston.

Figs. 6, 7, show a form of my improvement applied to a double piston (single cylinder) engine. A fan is formed by cutting a series of grooves in a sphere, C, Fig. 7. Teeth are cut in a ring that encircles the central plane of the sphere, the teeth meshing with racks, C^1, C^2, Fig. 6, attached to pistons C^3, C^4. The movement of the pistons causes the grooved sphere C to rotate, its position between exhaust and inlet ports A^2, A^3, remaining fixed during the reciprocating movement of pistons.

In Fig. 3 I show a construction in which a fan is rotated on the piston by the pressure of a thread in D on the thread of a stationary screw, D^1, the motion reversing as piston reverses stroke.

The circulation set up by the fans will not only improve the uniformity of combustion charges but will also assist in cooling the cylinder walls.

What I claim is new and ask to have protected by Letters Patent is—

1. In an internal combustion engine, a combustion cylinder, a fan journaled in the top thereof and adapted to be rotated by external means, a piston, a second fan journaled in the upper part of said piston and adapted to be rotated by the combined action of the piston, the first fan and the gases within the combustion chamber.

2. In an internal combustion engine, a combustion chamber, a fan in said chamber, means for rotating said fan, a piston, a fan on said piston and means for rotating said fan whereby the fuel and air charges are blended.

3. In an internal combustion engine, a combustion cylinder, a fan journaled in the top thereof and adapted to be rotated by external means, a piston, a second fan journaled in the upper part of said piston and means whereby the first fan actuates the second fan.

In testimony whereof I affix my signature.

ALVAH L. POWELL.