Jan. 9, 1923. 1,441,329

J. L. CATO.

INTERNAL COMBUSTION ENGINE.

FILED AUG. 25, 1919.

2 SHEETS-SHEET 1

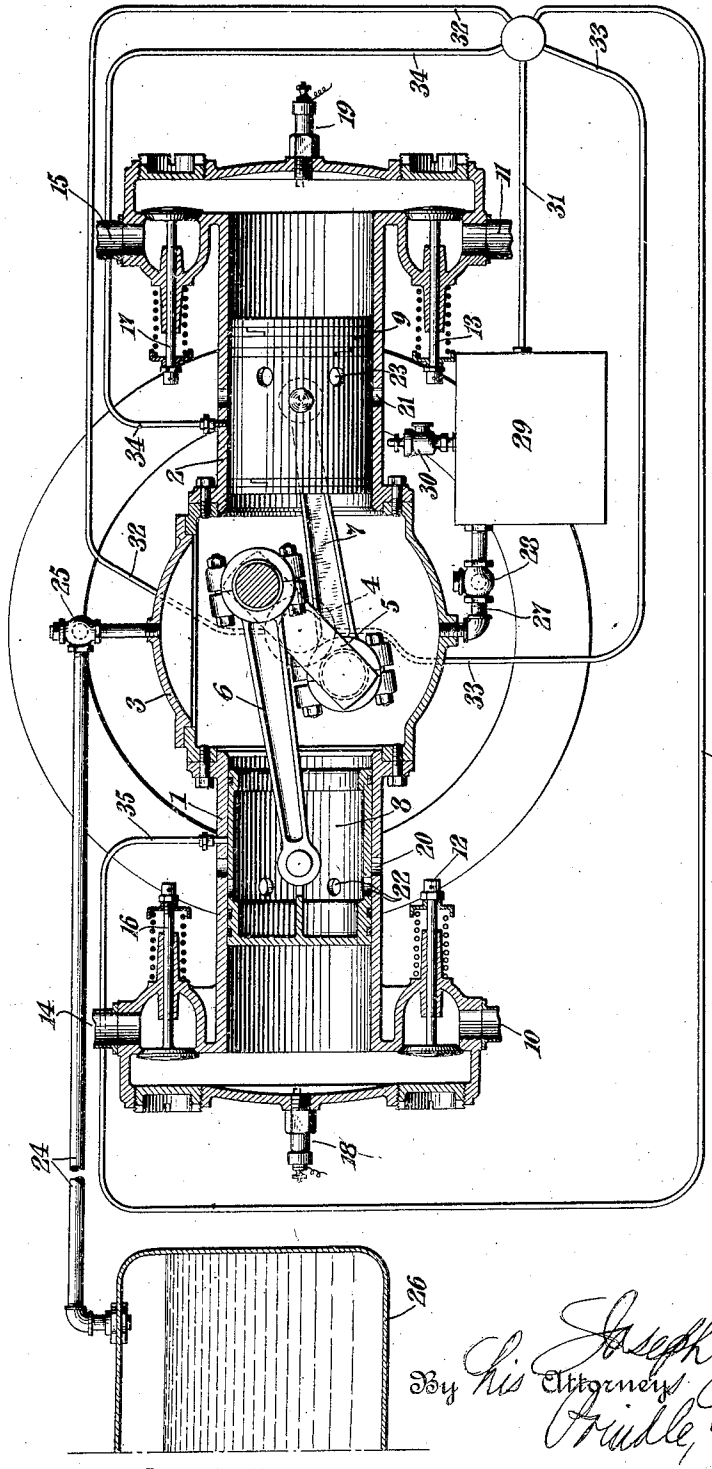


Fig. 1.

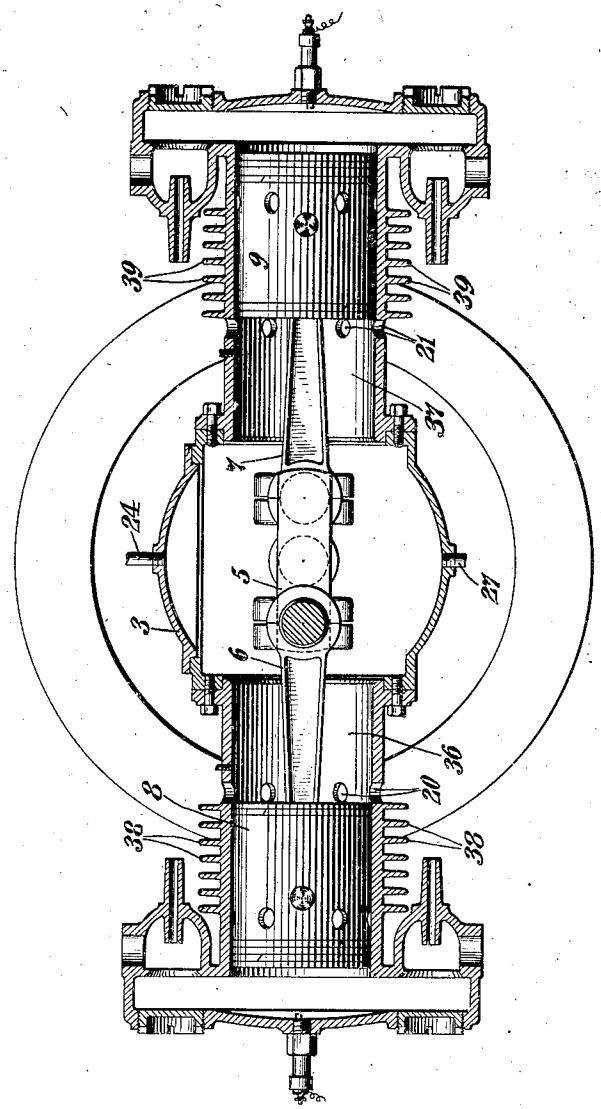
Inventor
Joseph L. Cato,
By His Attorneys
Brindle, Wright & Brindle

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2 SHEETS-SHEET 2

Fig. 2.



Joseph L. Cato, Inventor
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Patented Jan. 9, 1923. 1,441,329

UNITED STATES PATENT OFFICE.

JOSEPH L. CATO, OF ELMHURST, NEW YORK, ASSIGNOR TO L-W-F ENGINEERING COMPANY INC., OF COLLEGE POINT, NEW YORK, A CORPORATION OF MICHIGAN.

INTERNAL-COMBUSTION ENGINE.

Application filed August 25, 1919. Serial No. 319,761.

To all whom it may concern:

Be it known that I, JOSEPH L. CATO, a citizen of the United States, residing at Elmhurst, in the county of Queens and State of New York, have invented a certain new and useful Improvement in Internal-Combustion Engines, of which the following is a specification.

My invention is applicable to internal combustion engines of many different kinds, but it is especially applicable to such engines used for driving automobiles or aeroplanes.

The object of my invention is to provide an internal combustion engine having thereon a very effective cooling system and which is of such a character that the engine will have less weight than with previously used cooling systems.

A further object is to provide an engine of this character having automatic means for oiling the various parts thereof and for supplying any pressure needed upon the fuel supply tank.

Further objects of my invention will appear from the detailed description thereof contained hereinafter.

While my invention is capable of being carried out in many different ways, for the purpose of illustration I have shown only certain ways of carrying out the same in the accompanying drawings, in which—

Fig. 1 is a vertical section of an engine made in accordance with my invention, and

Fig. 2 is a similar section showing a modified form thereof.

In the drawings I have shown a double opposed four cycle internal combustion engine comprising two cylinders 1 and 2 connected together by means of a crank casing 3 having bearings 4 to receive a crank shaft 5 connected by connecting rods 6 and 7 to pistons 8 and 9 respectively located in the cylinders 1 and 2. The cylinders 1 and 2 are constructed in the usual way so as to supply a fuel mixture and exhaust the products of combustion therefrom after electric ignition therein. For this purpose the cylinders 1 and 2 may be provided with fuel inlet pipes 10 and 11 controlled by valves 12 and 13 and exhaust pipes 14 and 15 controlled by valves 16 and 17. The fuel mixture in the cylinders may be ignited by means of spark plugs 18 and 19. Inasmuch as the casing 3, capable of confining air under pressure entirely encloses the space between the inner ends of the cylinders 1 and 2 air will be compressed therein upon the inward movement of the pistons 8 and 9, the air for this purpose having been admitted to the casing 3 through openings 20 and 21 in the cylinders 1 and 2 when the pistons 8 and 9 are at the extreme outer ends of their paths of movement. When said pistons 8 and 9 begin to move inwardly however, the inner ends of said pistons will cover the openings 20 and 21 and the compressed air which remains in the casing 3 will not be allowed to escape until the pistons 8 and 9 have reached the inner ends of their paths. At this point however the outer ends of the pistons 8 and 9 will register with the openings 20 and 21 so that openings 22 and 23 located in the pistons at this point will convey the air from the interior of said cylinders to the outside of said cylinders through the openings 20 and 21. A portion of the air which is compressed in the casing 3 however passes out from the same by means of a pipe 24 receiving pressure from the space between the inner ends of the cylinders and having a check valve 25 to a gasoline tank 26 used for supplying fuel to the engine whose carburettor and connections are not shown. Another portion of the air compressed in the casing 3 is conveyed therefrom by a pipe 27 having a check valve 28 to an oil tank 29 which is provided with an automatic relief valve 30 to relieve any excessive pressure accumulating therein. Oil is supplied from the tank 29 by a pipe 31 to two pipes 32 and 33 which lead to the bearings 4 and in addition to two pipes 34 and 35 which lead to the cylinders 1 and 2 for lubricating these parts of the engine.

The modification of my invention shown in Fig. 2 is constructed the same as the form of my invention previously described except that, in this instance, there are two cylinders 36 and 37 which are supplied respectively with air cooling vanes 38 and 39 to provide external air cooling in addition to the internal air cooling.

In the operation of the form of my invention shown in Fig. 1 the reciprocation of the pistons 8 and 9 due to the inlet of the fuel mixture and the explosion thereof will bring about the compression of the air in the

crank casing 3 which air has been admitted thereto through the openings 20 and 21. The feeding in of this air will have a cooling effect upon the interior surfaces of the piston and cylinders 1 and 2. When the pistons 8 and 9 are at the inner ends of their paths the air which has been so compressed will be fed outwardly from said cylinders so as to again exercise a cooling effect upon the same. Inasmuch as this air is always in contact with the inner surfaces of the cylinders 1 and 2 there will be an extraordinarily effective air cooling as these are the hottest parts of the engine while the same is in operation. Independently of the cooling system a portion of the air which is so compressed is preferably utilized to place the fuel in the gasoline main supply tank under pressure and another portion thereof is shown as utilized to effectively lubricate the different parts of the engine requiring lubrication.

The modified form of my invention shown in Fig. 2 operates in the same manner except that in this instance in addition to the internal cooling there is an external cooling of the same due to the presence of the fins 38 and 39 upon the external surfaces of the same.

An engine constructed in this manner will operate with extraordinary efficiency as the parts thereof are very effectively cooled and the weight of the engine is comparatively small. The air compressed in the crankcase and released through the openings near the head of the piston cools the under side of the head by flowing against it and the cooling fin attached to it and by flowing over the interior of the piston skirt.

While I have described my invention above in detail I wish it to be understood that there may be many changes made therein without departing from the spirit thereof.

I claim:

1. An internal combustion engine having a cylinder, a piston and means for supplying air to the interior of the same but outside the combustion chamber so as to cool the engine comprising an opening connecting the interior of the cylinder with the outer air adapted to be covered and uncovered by the piston, said piston having an opening passing laterally therethrough adapted to register periodically with the cylinder opening.

2. An internal combustion engine of the double opposed type, each of the units having a piston and a cylinder, means for supplying air to the interior of both at points outside the combustion chamber so as to cool the engine, the inner ends of the two cylinders being connected together but closed from the outer air, and an oil feeding means receiving pressure from the space between the inner ends of the cylinders for lubricating the engine.

3. An internal combustion engine of the double opposed type, each of the units having a piston and a cylinder, means for supplying air to the interior of both at points outside the combustion chamber so as to cool the engine comprising an opening connecting the interior of the cylinder with the outer air, the inner ends of the two cylinders being connected together but closed from the outer air, and an oil feeding means receiving pressure from the space between the inner ends of the cylinders for lubricating the engine.

4. An internal combustion engine of the double opposed type, each of the units having a cylinder, a piston, means for supplying air to the interior of both at points outside the combustion chamber so as to cool the engine comprising an opening connecting the interior of the cylinder with the outer air adapted to be covered and uncovered by the piston, the inner ends of the two cylinders being connected together but closed from the outer air, and an oil feeding means receiving pressure from the space between the inner ends of the cylinders for lubricating the engine.

5. An internal combustion engine of the double opposed type, each of the units having a cylinder, a piston, means for supplying air to the interior of both at points outside the combustion chamber so as to cool the engine comprising an opening connecting the interior of the cylinder with the outer air adapted to be covered and uncovered by the piston, said piston having an opening passing laterally therethrough adapted to register periodically with the cylinder opening, the inner ends of the two cylinders being connected together but closed from the outer air, and an oil feeding means receiving pressure from the space between the inner ends of the cylinders for lubricating the engine.

6. An internal combustion engine having a piston and a cylinder, means for supplying air to the interior of both at points outside the combustion chamber so as to cool the engine, and means for utilizing said air to feed oil for lubricating the engine.

7. An internal combustion engine of the double opposed type, each of the units having a piston, a cylinder, a crank case capable of confining air under pressure, a fuel supply tank, means for utilizing said air to feed liquid fuel from said supply tank, and means for utilizing said air to feed oil for lubricating the engine.

In testimony that I claim the foregoing, I have hereunto set my hand this 24th day of July, 1919.

JOSEPH L. CATO.