Sept. 5, 1933. E. J. STANTON 1,925,706

RECIPROCATING ENGINE

Filed June 3, 1930 2 Sheets-Sheet 1

FIG. 1.

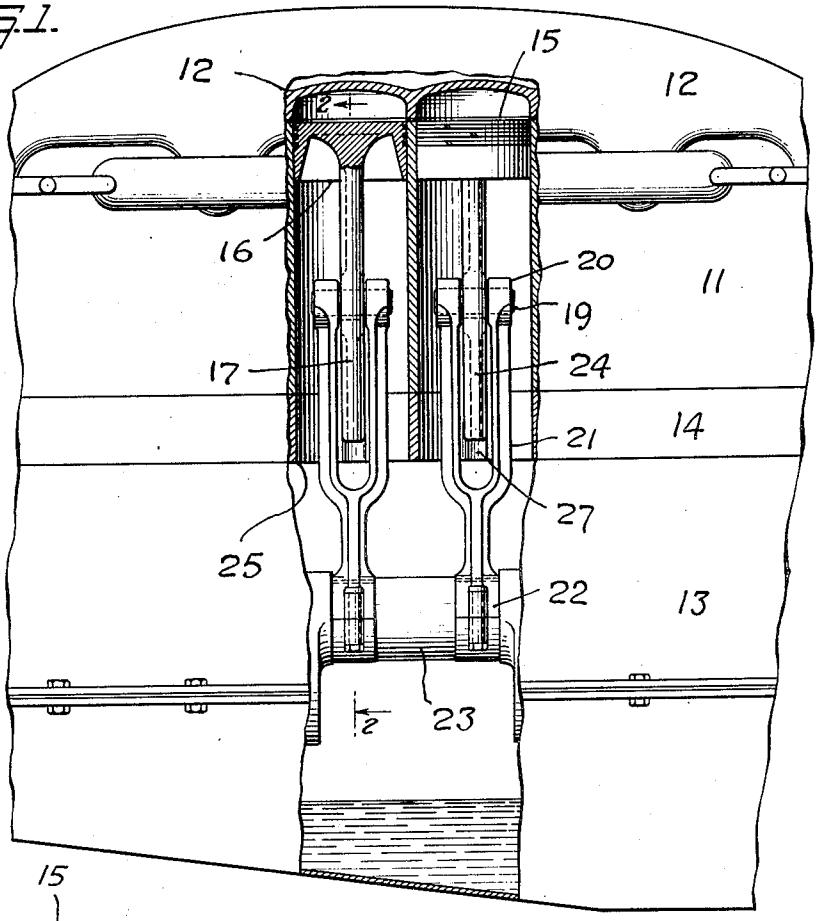


FIG. 2.

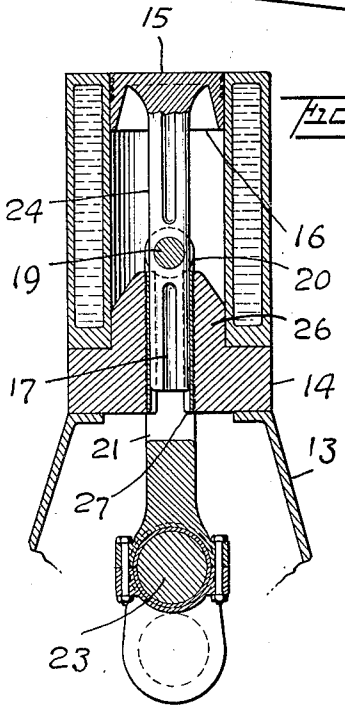
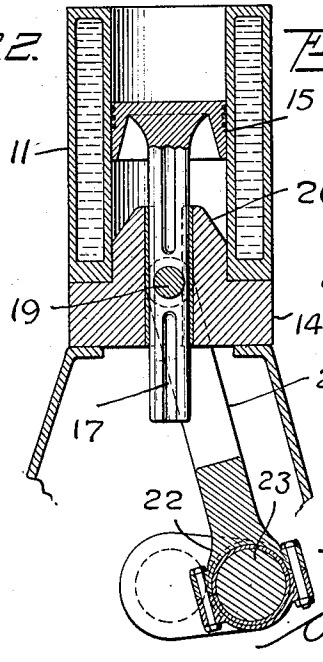


FIG. 3.



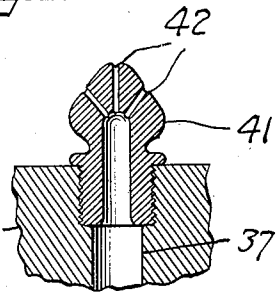


FIG. 10.

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Sept. 5, 1933. E. J. STANTON 1,925,706

RECIPROCATING ENGINE

Filed June 3, 1930 2 Sheets-Sheet 2

FIG. 4.

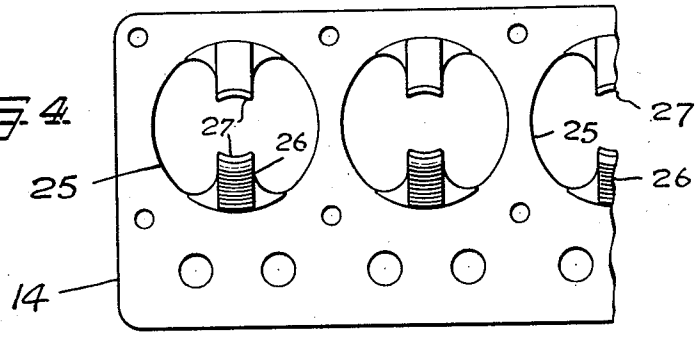
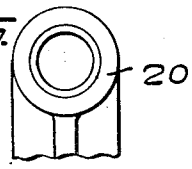
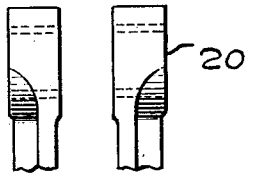


FIG. 5.





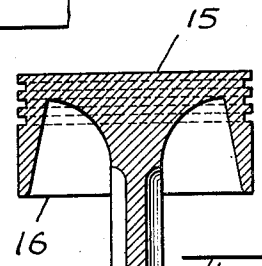
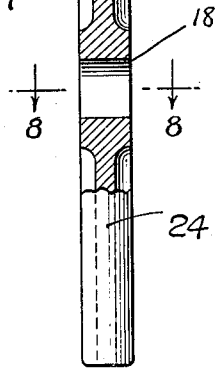


FIG. 7.



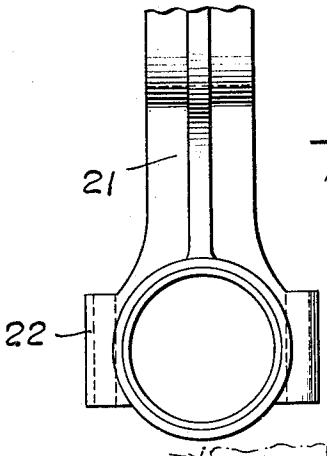
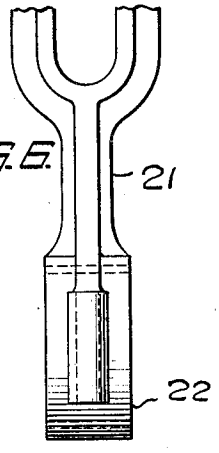


FIG. 6.



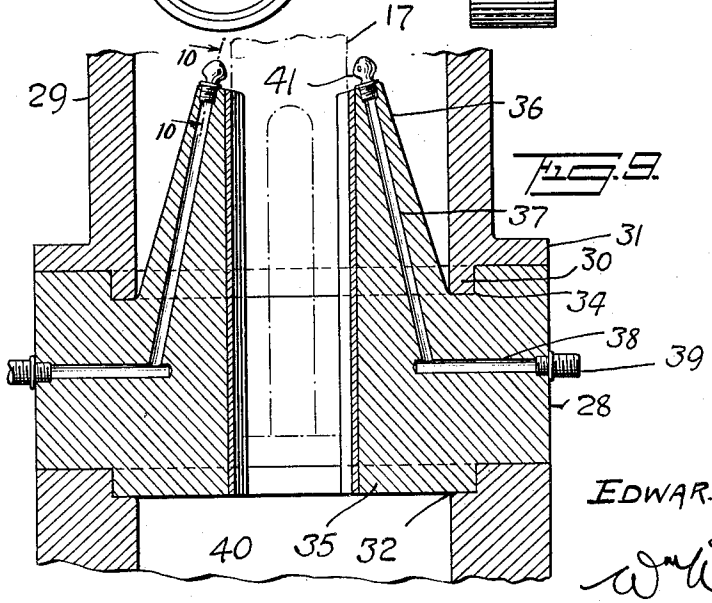
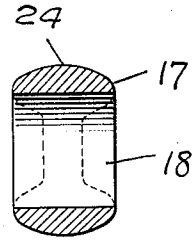


FIG. 9.

FIG. 8.



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UNITED STATES PATENT OFFICE

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RECIPROCATING ENGINE

Edward J. Stanton, Brooklyn, N. Y.

Application June 3, 1930. Serial No. 459,031

2 Claims. (Cl. 74—14)

This invention relates to internal combustion and other reciprocating engines of the single-acting type and may be applied to rotary reciprocating engines of the type commonly used as air-cooled airplane motors or engines, or to vertical automobile engines or other water or air-cooled engines of the reciprocating type.

The invention may also be applied to pumps of the type in which a single acting piston reciprocates in a cylinder and is connected to a crank-pin from which it is operated.

One object of this invention is to provide improved means for ensuring proper motion of the piston in the cylinder and for eliminating uneven pressure and wear between the sides of the piston and the cylinder walls. A further object of the invention is to ensure greater and more uniform gas-tightness between the piston and cylinder, and to give increased power and greater compression. A still further object is to ensure more efficient lubrication of the cylinder walls to improve temperature conditions in the engine and to effect a substantial saving in fuel and lubrication.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, sizes and minor details may be made without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings, Fig. 1 is a side view showing part of a multi-cylinder water-cooled engine of the type used in automobiles with a part thereof shown in vertical section through the center line of the cylinders; Fig. 2 is a cross-section taken on the line 2—2 Fig. 1; Fig. 3 is a view corresponding to Fig. 2 but showing the position of the parts after the crank has moved through 90 degrees from the position shown at Fig. 2; Fig. 4 is a plan view showing part of a guide member for a multi-cylinder engine; Fig. 5 is a face view of one of the connecting rods; Fig. 6 is a view looking at right angles to Fig. 5; Fig. 7 is a view partly in section showing one of the pistons; Fig. 8 is an enlarged cross-section on the line 8—8 Fig. 7; Fig. 9 is a cross-section through the center of one cylinder of an air-cooled motor and Fig. 10 is an enlarged detail sectional view on the line 10—10 of Fig. 9.

Referring to Fig. 1 of the drawings, 11 is the usual cylinder block of a multi-cylinder water-cooled automobile engine, 12 is the usual engine head; 13 is the crank case and 14 is a guide member which is interposed between the cylinder block 11 and crank case 13 and is secured therebetween in the manner heretofore employed in assembling the crank case and cylinder block or in any other suitable or well-known manner.

The piston 15 is formed with a depending skirt portion 16 and with an integral or rigidly attached stem 17 of substantially H or other convenient cross-sectional formation and with a bushing or bore 18 for the reception of a pin 19 by which the said stem is joined to the open or forked upper ends 20 of a connecting rod 21 having a boss 22 of usual or well-known form to be mounted in the same manner as the usual connecting rod upon the usual crank-pin 23 of the engine. The sides 24 of the stem 17 are preferably concentric to each other as shown at Fig. 8 and are adapted to engage the fixed guides hereinafter described, whereby the piston 15 and stem 17 are kept in a straight line during their reciprocating movement.

In the arrangement shown at Figs. 1 to 4, the guide member 14 has an opening 25 to coincide with each of the cylinder bores of the engine and extending into each opening 25 are two guide brackets 26 having phosphor bronze or other suitable metallic liners 27 for engagement with the surfaces 24 on the stem 17 of the piston. These brackets 26 extend upwardly into the open lower end of the cylinder and are accommodated within the skirt 16 of the piston when the latter is at the lower extremity of its stroke.

Figs. 9 and 10 of the drawings show a guide member 28 adapted for insertion between the crank case 40 and each of the individual cylinders 29 of an air-cooled airplane motor of the type in which air-cooled cylinders 29 are each formed with an annular depending rim 30 and a flange 31 for engagement with an annular recess 32 and a flat face 33 respectively provided on the crank case 40. The guide member 28 is formed on its upper face with a recess 34 for engaging the said rim 30 on the cylinder and has on its lower face an extension or rim 35 for engaging the said recess 32 in the crank case or body 40 of the engine so that the member 28 may be interposed between the usual cylinder and crank-case or body of an engine of well known form. In Fig. 9 of the drawings, the broken lines indicate the position of the stem 17 of the piston and the parts 36 correspond to the brackets 26 and are adapted to extend within the skirt portion 16 of the piston when the latter is at the lower extremity of its

stroke. Each of the parts 36 is formed with an internal bore 37 communicating with a bore 38 having a nipple 39 for attachment to an oil line or tube by which lubricating oil under suitable pressure may be supplied from a suitable pump. The bore 37 also communicates with a perforated head 41 (see Fig. 10) having a plurality of outlet orifices 42 adapted to supply fine sprays of oil against the convex surfaces 24 of the piston stem 17 in such manner that the oil impinging against these convex surfaces is deflected outwardly in all directions so as to effectively apply a fine oil spray or mist against the side walls of the cylinder while at the same time effectively lubricating the said surfaces of the stem 17 and the parts 36 in sliding engagement with each other.

Although the drawings and above specification disclose the best modes in which I have contemplated embodying my invention, I desire to be in no way limited to the details of such disclosure for in the further practical application of my invention, many changes in form and construction may be made as circumstances require or experience suggests without departing from the spirit of the invention within the scope of the appended claims; and it will be readily understood that the guide member may be made as an integral part of the cylinder or cylinder block or of the crank-case or body of the engine, or may be made or applied in any other suitable or convenient manner to suit the type and design of the engine to which the invention is applied.

What I claim is:

1. In a reciprocating engine having a piston and a skirt portion and central stem portion with an annular recess therebetween, guide members for the piston adapted to extend into the cylinder and into the said recess, concave surfaces on said guide members for engagement with said stem, and means for directing oil sprays through said guide members upon said stem.

2. In a single-acting reciprocating engine having a piston, with a stem depending therefrom and having convex sides, guide means engaging the convex sides of the stem, a crank pin, a connecting rod connecting the said stem to the crank-pin and extending on both sides of said guide means, and means for directing oil sprays through said guide means upon the said convex sides of the stem at an angle to deflect the oil spray outwardly to the cylinder wall.

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