

July 4, 1933.

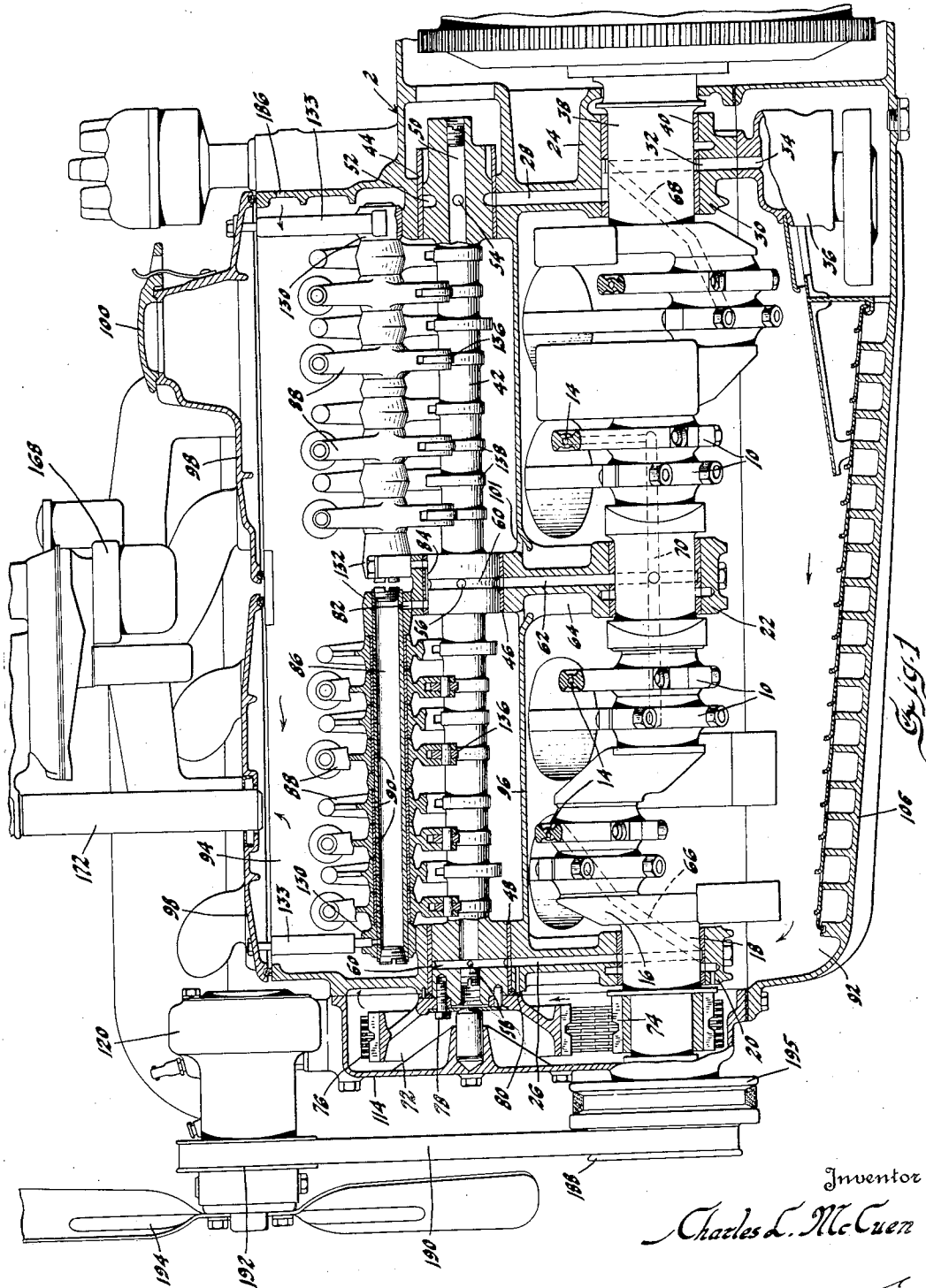
C. L. McCUEN

1,916,522

V-8 ENGINE

Filed Jan. 4, 1930

3 Sheets-Sheet 1



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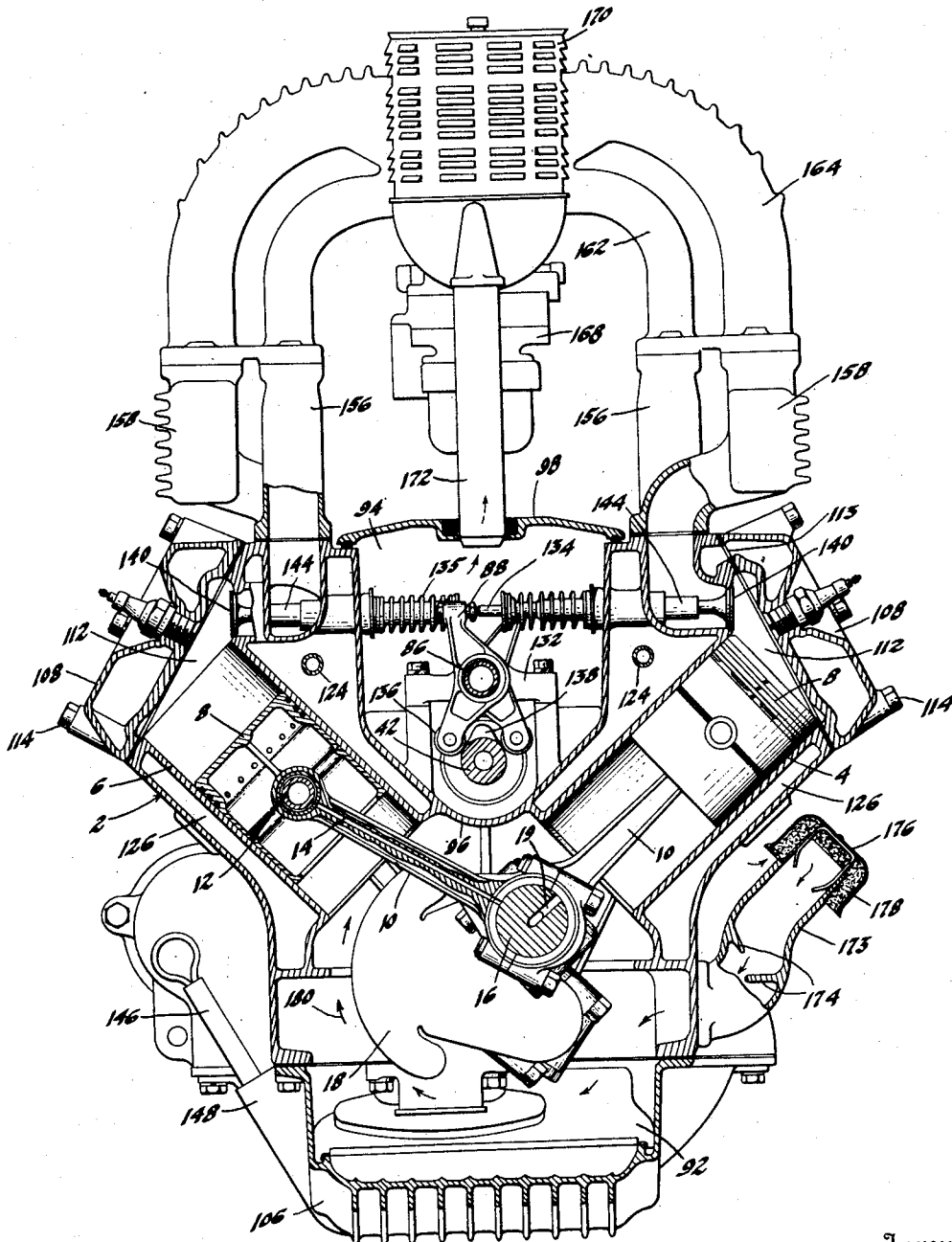


Fig. 2

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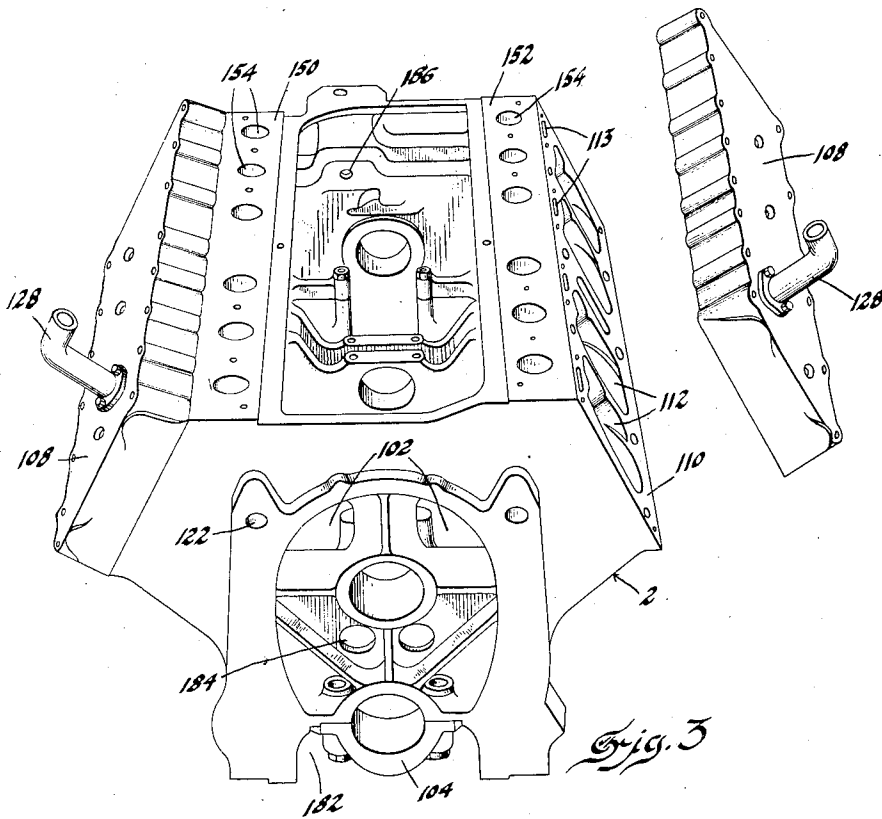
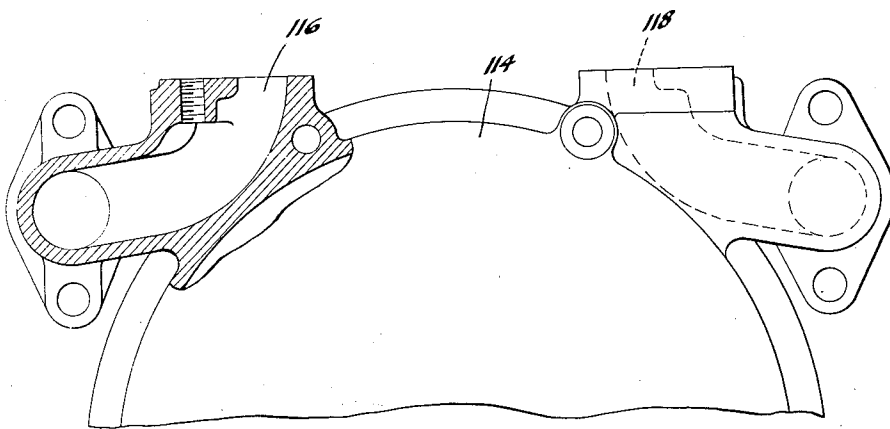


Fig. 4

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UNITED STATES PATENT OFFICE

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V-8 ENGINE

Application filed January 4, 1930. Serial No. 418,559.

This invention relates to internal combustion engines of the V-type and has particular reference to improvements in the lubricating system, crankcase ventilation and the engine block thereof.

The engine block is mono-block or cast singly and has a pair of lateral head pieces to cover the openings in the cylinders. The manifolds are attached to the top of the engine block.

The crankcase ventilating system takes the air into the bottom of the crankcase at one side thereof and circulates the air through the crankcase and over the oil pan. The carburetor inlet is at the top of the engine and opens into a rocker arm or valve compartment at the upper portion of the engine block. The air from the crankcase passes out over the timing chain and into the upper compartment from where it is drawn by the carburetor and delivered to the firing chambers. An opening at the rear of the engine block allows for the entrance of additional air to properly ventilate the rocker arm chamber.

The lubricating system is of the force feed type and is equipped with the usual oil pump. The engine block is preferably provided with three ribs to support the crankshaft and the pump withdraws the oil from the oil pan and delivers it through a suitable passage in the bearing cap to one of the crankshaft bearings to lubricate the same. A passage around the bearing allows the oil to pass upwardly through a passage in the rib or side of the crankcase to a camshaft bearing. The camshaft is hollow and at the bearing is provided with a plurality of openings to allow the oil to enter the interior of the camshaft. From the camshaft, suitable passages lead to the other bearings of the crankcase to lubricate the same. The engine has a plurality of hollow rocker arm shafts and suitable means is provided to deliver oil from the camshaft to the hollow of the rocker arm shafts to lubricate the rocker arms.

On the drawings:

Figure 1 is a longitudinal sectional view through the center of the engine.

Figure 2 is a transverse sectional view

through the engine taken through two of the cylinders.

Figure 3 is a perspective view of the engine block.

Figure 4 is a detail view of parts shown in section of the upper portion of the timing chain cover showing the water delivery ports.

Referring to the drawings, the numeral 2 indicates the engine block as a whole. The engine is of the V-type and has the two banks of cylinders 4 and 6 with preferably four cylinders in each bank. The pistons are indicated at 8, the connecting rods at 10 which are joined by means of the wrist pins 12 to each piston 8. Each piston 8 has the lower oil control ring with a plurality of recesses (Figure 2) and also the holes in the piston in back of the ring to allow excess oil to drain to the interior of the piston. The connecting rods 10 are drilled as at 14 to allow lubricant to pass to the wrist pins 12 from the throws 16 of the crankshaft 18 through the intermediary of the bores 19 which mate once per revolution with the passages 14. The crankshaft is mounted in bearings 20, 22 and 24 formed in the ends and center of the engine block 2. Each bearing 20, 22, 24 is provided with the usual bearing cap to hold the crankshaft in place.

Each end of the engine block 2 is provided with a passage 26 and 28 to allow for the flow of oil. One of the end bearing caps 30 is provided with the passage 32 which unites with the passage 34 from the oil pump 36, the two passages serving to conduct the oil from the oil pump to the end bearing 38. A suitable groove in the bushing 40 at the bearing 38 allows the excess oil to pass around the bearing 38 to the passage 28.

The camshaft is shown at 42 which shaft rests in bearings 44, 46 and 48 formed in the ends and at the middle of the engine block 2. The camshaft is hollow as indicated at 50 and at the bearing 44 immediately above the bearing 38 the camshaft is provided with a groove 52 and a pair of openings 54 which allow the oil to flow to the hollow 50 of the camshaft. At each bearing 46 and 48 the camshaft 42 is provided with the openings 56 and 58 and also the groove 60 to allow the oil to flow from

the interior of the camshaft to the passage 26 in the end and the passage 62 in the rib 64 at the center portion of the crankcase. From the passages 26 and 62, the oil will flow to the end and center bearings 18 and 22 of the crankshaft to lubricate the same.

The crankshaft is provided with the inclined drilled portions 66 and 68 at its ends and the center axial bore 70, the purpose of which is to receive lubricant through the bearings 18, 22 and 24 and to pass it to the bearing portions of the connecting rods 10 on the crankshaft 18. From the passages 66, the excess oil will be delivered to the passages 14 of the connecting rods to lubricate the wrist pins 12.

At the front end of the camshaft there is secured the gear 72 which is connected to a gear 74 on the crankshaft by means of a timing chain 76. The gear 72 is secured to the camshaft by means of suitable bolts as indicated at 78. A passage or bore 80, connected at the passage 26, serves to transmit oil from the force feed system to the timing gears and timing chain.

At the center bearing 46 of the camshaft, two passages 82 are provided which are connected by means of passages 84 to the groove 60 of the center bearing. The passages 82 communicate with suitable mating openings in the rocker arm shafts 86 which are mounted in alignment in bearings over the camshaft 42. Oil is delivered from the center bearing 46 to the interior of the rocker arm shafts 86 through the passages 84 and 82 and from the interior of the shaft the oil lubricates the rocker arms 88 through the intermediary of the openings 90.

The engine block 2 is divided into two compartments 92 and 94 by means of the wall or partition 96. Closure plates 98 are rigidly secured to the engine block to close the upper compartment 94 and an oil inlet opening 100 is provided in one of the plates 98 to allow for the addition of oil to the engine. Oil is squeezed out from the various bearing parts and returns to the crankcase through the openings 101 located over the center main bearing.

The engine block is provided with the removable heads 108 which fit onto surfaces 110 and close the ends of the firing chambers 112. Bolts 114 secure the heads 108 in place. The heads 108 are suitably water jacketed and receive water from the circulating system through the openings 113. The front of the engine is enclosed by means of the timing chamber cover 114 which is provided at its upper end with the two lateral passages 116 and 118 which receive water from the water pump 120 and deliver it into the openings 122 in the end of the engine block and from the openings 122 and water passes to pipes 124 (see Figure 2) which pipes are provided with suitable openings along their lengths to dis-

tribute the water between the cylinders 4 into the water jacketed portion 126 of the engine. From the water jacketed portion 126, the water flows out at the openings 113 and to the removable heads 108, to the outlet pipes 128 and on to the radiator. The water is again withdrawn from the bottom of the radiator by the pump 120 and caused to recirculate through the system.

The hollow rocker arm shafts 86 are mounted at their ends in suitable bearings 130 and at their mid portion in bearings 132. Immediately over the end bearings 130 and 132 there are provided the uprights 133 which are used to secure the plates 98 in place to enclose the valve operating mechanism of the engine. On the rocker arm shafts the rocker arms 88 are mounted which operate on the ends of valve stems 134 to operate the same. Springs 135 surround the valve stems 134 and are positioned between the engine block and the end of the stem and constantly urge the valves to closed position. The rocker arms have rollers 136 on their ends operated by the cams 138 on the camshaft 42. One set of rocker arms will operate the valves 140 on one side of the engine while another set of rocker arms will operate the valves on the opposite side of the engine. The valve stems 134 of the valves operate in a substantially horizontal plane in suitable bearings 144 in the engine block 2.

The oil gauge is shown at 146 operating in openings at 148 at the side of the crankcase.

The engine block 2 has the flats 150, 152 at its upper portion which flats are provided with suitable openings 154 to allow for the inlet and outlet of gases to and from the engine. The intake and exhaust manifolds 156 and 158, respectively, are placed on the flats 150 and 152 and secured thereto by suitable bolts. Both intake and exhaust manifolds are connected by the integral cross header 162, 164. A carburetor 168 is connected to the intake manifold 162 and the air cleaner 170 is placed over the inlet to the carburetor 168. A stand pipe 172 also connects the air cleaner with the chamber 94 of the crankcase in order to draw the vapors from the compartments 92 and 94 into the carburetor.

An air inlet 173 is provided with suitable ribbing 174, and a cap 176 filled with suitable air cleaning material 178 is placed over the mouth of the inlet 173. From the inlet pipe 173, the air will circulate in the lower portion of the crankcase and over the oil pan 106 as shown by the arrows 180 in Figure 2. From the chamber 92 at the lower portion of the crankcase, the vapors will pass beneath the cap 104 at the space 182 and through the openings 184 up over the timing chain 76 and into the upper compartment 94. At its rear portion, the engine block 2 is provided with the opening 186 (Figure 1) which al-

lows for the ingress of additional air from the outside. This additional air will ventilate the upper portion or chamber 94 of the engine block and the contaminated vapors will be drawn through the stand pipe 172 into the carburetor 168 to the firing chambers 112 thereby ventilating the crankcase and rocker arm chamber. Only a smaller fraction of the air for the carburetor is drawn in through the stand pipe.

By referring to Figure 1, it will be noted that the openings in the ends of the engine block 2, as well as in the central rib 64, are much larger than the cams 138. The purpose of these enlarged openings is to permit the camshaft 42 to be inserted from the end of the engine block.

The usual fan pulley is shown at 188 and drives the belt 190 to operate the pulley 192 which drives the fan 194. The water pump 120 is on the same shaft which drives the fan 194. The pulley 188 is double, the second half 195 driving the generator.

The particular structure of the oil pan forms no part of the invention but is described and claimed in the copending application of Richard C. Stolte 326,335, filed December 15, 1928.

I claim:

1. In a force feed lubricating system for internal combustion engines having a crankcase, a crankshaft and a hollow camshaft, a crankshaft bearing in the crankcase, an oil pump, means for conducting the oil to said camshaft bearing, means in the crankcase for conducting the oil from said bearing to the interior of the camshaft, and means for conducting oil from the interior of the camshaft to the other crankshaft bearings.

2. In a force feed lubricating system for internal combustion engines having a crankcase, a crankshaft and a hollow camshaft, crankshaft bearings in the crankcase, an oil pump, a passage for conducting oil from the pump to one of said bearings, a passage around said bearing, a conduit in the crankcase wall leading from said bearing to a camshaft bearing, means at the camshaft

bearing to allow oil to flow to the interior thereof, and means to conduct oil from said camshaft to a second crankshaft bearing.

3. In a force feed lubricating system for internal combustion engines having a crankshaft including crankshaft bearings, a crankcase, a rocker arm shaft and a hollow camshaft including camshaft bearings, an oil pump, a passage in the crankcase wall from the pump to one of the crankshaft bearings, means to pass the oil around the bearings, a passage in the crankcase wall from the bearing to a camshaft bearing, means at the camshaft bearing to cause oil to pass to the interior of the camshaft, means to conduct oil from the interior of the camshaft to the other crankshaft bearings, and means to conduct oil from the camshaft to the rocker arm shaft.

4. In a force feed lubricating system for internal combustion engines having a crankcase, a crankshaft including bearings therefor, a hollow camshaft and a plurality of hollow rocker arm shaft, an oil pump, a passage in the crankcase from the pump to a crankshaft bearing, means to pass excess oil around the bearing, a passage in the crankcase conducting the oil from the bearing to the camshaft, means in the camshaft to conduct oil to the interior thereof, means to conduct oil to the other crankshaft bearings from the camshaft, and means to conduct oil from the interior of the camshaft to the interior of the rocker arm shafts.

5. In a force feed lubricating system for internal combustion engines having a crankcase, a hollow camshaft and a crankshaft, a plurality of bearings for the crankshaft, means to drive the camshaft from the crankshaft, an oil pump, means in the crankcase wall to deliver oil from the pump to the interior of the camshaft past a crankshaft bearing, means to pass lubricant from the camshaft to the driving means, and means to lubricate the remainder of the crankshaft bearings from the camshaft.

In testimony whereof I affix my signature.

CHARLES L. McCUEN.