Feb. 5, 1957 R. H. MALCOLM 2,780,212

INTERNAL COMBUSTION ENGINE LUBRICATING
MEANS AND VISCOUS DAMPENER

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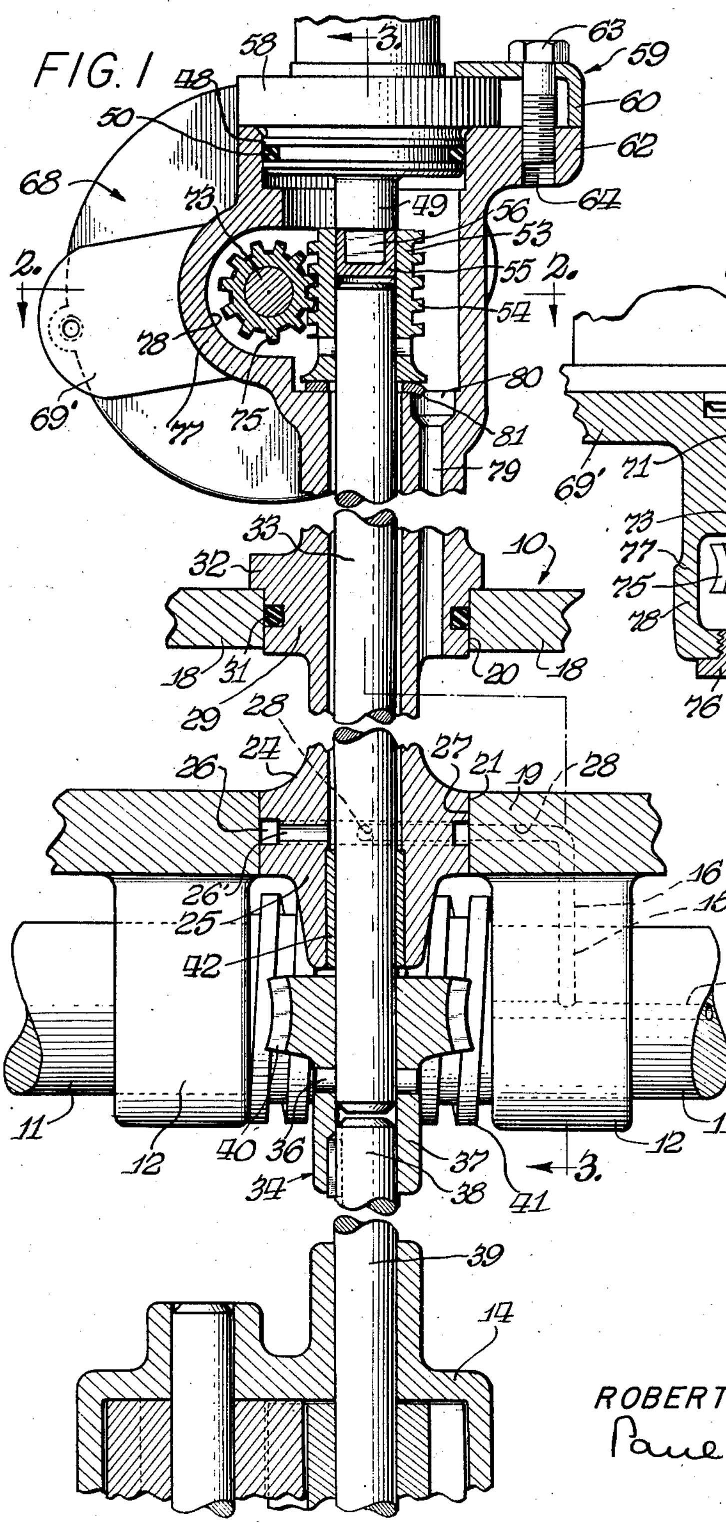
FIG. 1



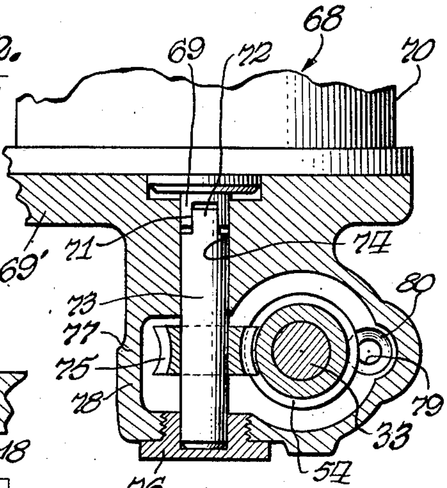


FIG. 2

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FIG. 3

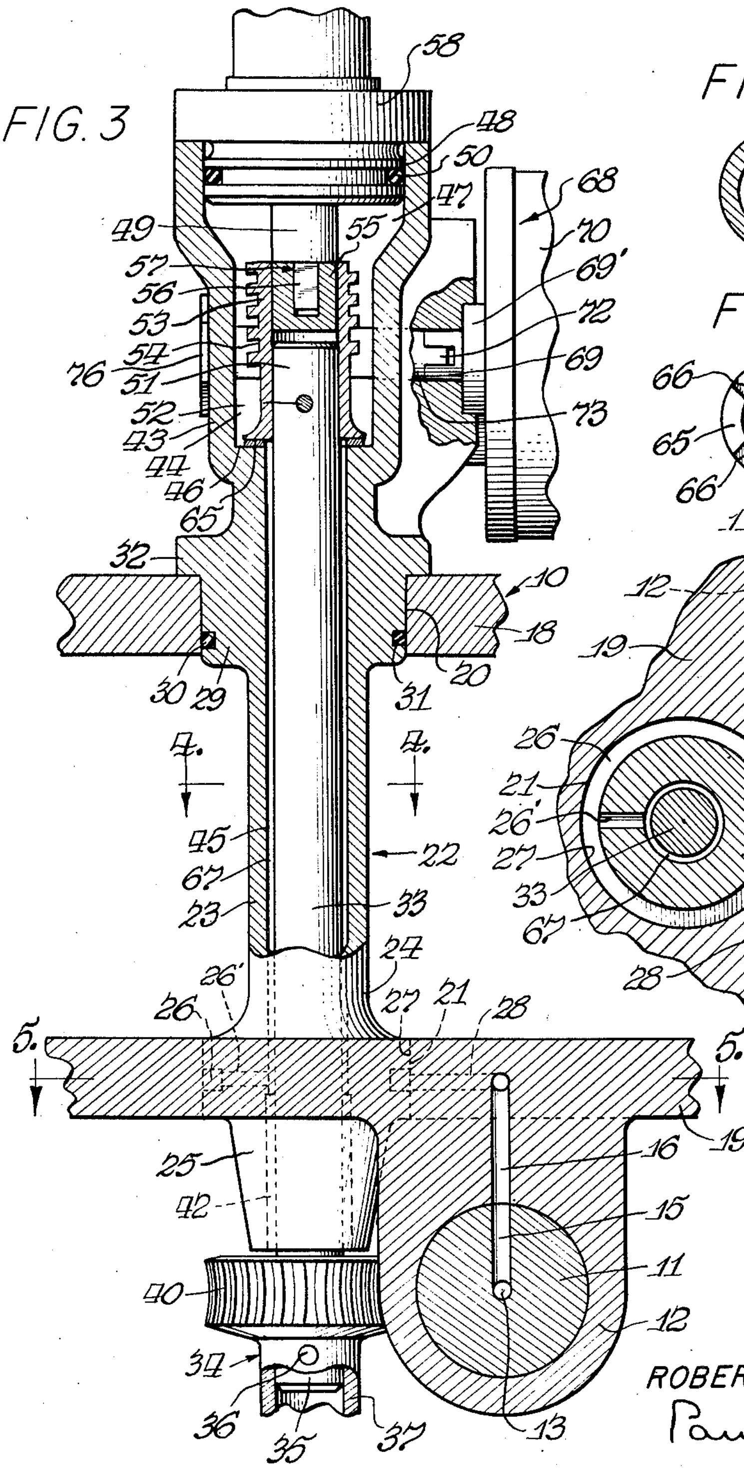


FIG. 4

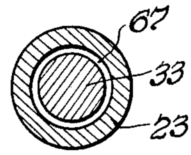
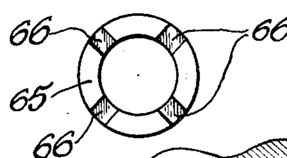


FIG. 6



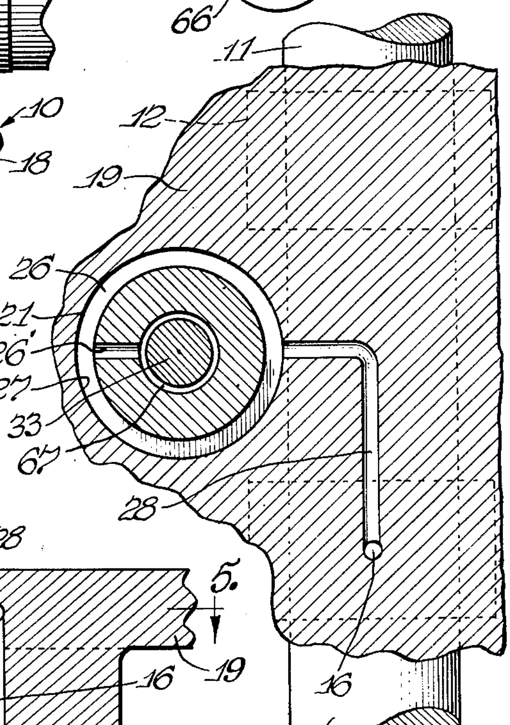


FIG. 5

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INTERNAL COMBUSTION ENGINE LUBRICATING MEANS AND VISCOUS DAMPENER

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17 Claims. (Cl. 123—195)

This invention relates to motor vehicles employing spark ignition type internal combustion engines for developing propulsion power, and more particularly to a new and improved means for conducting lubricant to an engine accessory drive gear and bearing and for utilizing the shear resistance of the lubricant so conducted to dampen torsional oscillations of the drive shaft of another engine accessory.

It is common knowledge that the main power or crankshaft of an internal combustion engine is rotated by means of reciprocating pistons which are operatively connected to the crankshaft by connecting rods which are periodically and sequentially acted upon by driving forces caused by the expansion of gases. The thrust of each connecting rod is transmitted to the crankshaft at a particular point or section of the length thereof causing such particular section to be subjected to a severe torsional or twisting impact with the result that the section tends to rotate faster than the rest of the shaft. Thus in normal engine operation the crankshaft is repeatedly subjected to thrusts of the connecting rod at different points along the length thereof tending to oscillate the crankshaft in a torsional sense. Such torsional oscillations of the crankshaft causes the crankshaft to accelerate above and decelerate below the average angular speed of the crankshaft.

Certain of the engine accessories and appurtenances are mechanically driven from the engine crankshaft and since the crankshaft is subjected to torsional oscillations such oscillations are transmitted to the engine accessories unless they are effectively dampened. While no serious harm will result from the transmission of torsional oscillations from the crankshaft to most engine accessories during normal engine operation the transmission of oscillations to certain other engine accessories will adversely affect efficient operation of the engine. One of the engine accessories in the later category is the ignition distributor. The ignition system in internal combustion engines has the function of producing high voltage surges and directing them to the spark plugs in the engine cylinders. The sparks must be timed to appear at the plugs at the correct instant near the end of the compression stroke with relation to piston position. The spark ignites the fuel air mixture under compression so that the power stroke follows in the engine. The ignition distributor which is part of the ignition system operates to assist in the production of the high voltage surges, to time the production of such voltage surges with regard to engine requirements, and to direct each voltage surge to a particular spark plug located in an associated cylinder which is ready to fire. Hence it is necessary to obtain efficient engine operation that the distributor rotor be rotated at a constant velocity without accelerating above or decelerating below such velocity value at a particular engine speed. Obviously if the torsional oscillations of the crankshaft referred to above are imparted to the distributor drive shaft which is drivingly connected to the rotor the distributor will operate improperly and the engine consequently will tend to run erratic. It is therefore one of the primary objects of the present invention to provide means for dampening torsional oscillations of the ignition distributor drive shaft.

Motor vehicles such as trucks are equipped with internal combustion engines provided with mechanically driven governors for controlling the operation of the engine. In most installations the governor drive shaft carries a gear which meshes with a gear carried by or integrally formed with the distributor drive shaft. Difficulty has been experienced in providing adequate lubricating oil to the meshing gears as well as to the distributor drive shaft thrust bearing. Hence it is another important object of the present invention to provide means for insuring sufficient lubrication of the governor drive gear and the distributor drive shaft thrust bearing.

Still another object is to provide means for conducting lubricating oil to a lubricant reservoir in which a governor drive shaft gear and distributor drive shaft thrust bearing are located in order to lubricate the gear and thrust bearing which means are so constructed that the shear resistance of the lubricant so conducted is utilized to dampen torsional oscillations of the distributor drive shaft.

Still another object is to provide means for transmitting and controlling the transmission of energy from a nonsteady source of power to an engine accessory for the purpose of achieving a steadier power impact into the accessory.

A still further object is the provision of a viscous damper for an engine ignition distributor valve shaft.

The foregoing and other important objects and desirable features inherent in and encompassed by the invention together with many of the purposes and uses thereof will become readily apparent from a reading of the ensuing description in conjunction with the annexed drawings in which:

Figure 1 shows a fragmentary vertical sectional view of an engine incorporating the invention; the section being taken along the center line of the distributor drive shaft;

Figure 2 is a cross-sectional view taken substantially along line **2—2** of Figure 1;

Figure 3 is a vertical sectional view similar to Figure 1;

Figure 4 is a horizontal sectional view taken substantially along line **4—4** of Figure 3;

Figure 5 is a horizontal sectional view taken substantially along line **5—5** of Figure 3; and

Figure 6 is a detailed plan view of a distributor drive shaft thrust washer.

Referring to the drawings in detail wherein like reference characters designate like elements throughout the various views numeral **10** is used to designate the engine cylinder block. As in conventional internal combustion engines a crankshaft (not shown) is rotatably supported by the cylinder block **10** and is adaptably rotated by the thrust of connecting rods. The crankshaft is drivingly connected to an engine camshaft **11** by means of timing gears (not shown). A plurality of bearings **12**, one of which is partially shown in Figure 3, support the camshaft **11** for rotational movement within the cylinder block. The camshaft bearings **12** are suitably attached to the cylinder block **10**. As shown in Figure 3 the camshaft **11** is provided with an axially extending passageway **13** which is supplied with lubricating oil under pressure derived from a gear type positive action oil pump **14** when the engine is operating. The above engine parts are of ordinary construction and form no part of the invention except insofar as they are modified to cooperate with the components of the invention to be described hereinafter.

A radially extending passageway **15** communicates with passageway **13** and extends to the outer periphery of the camshaft 11 beneath the camshaft bearing 12. Once during every revolution of the camshaft 11 the radial passageway 15 is in communication with a passageway 16 extending through the bearing 12 as shown in Figure 3.

The cylinder block 10 is provided with spaced ledge portions 18, 19 which have aligned bores 20, 21 respectively. Ledge portion 18 is a part of the outer wall of the cylinder block 10 and the ledge portion 19 is a partition disposed within the engine crank case. The ignition distributor adaptor, designated generally by a reference character 22, includes an elongated sleeve 23 which extends through the bores 20, 21 and is suitably journalled in the cylinder block 10 for oscillating movement with respect thereto. The lower end 24 of the sleeve 23, as viewed in Figures 1 and 3, is in the form of an enlarged journal portion 25 which is provided with an annular lubricant channel 26 in the outer peripheral surface thereof encircled by the surface 27 defining the bore 21. An oil duct 28 formed in the partition 19 extends between and is in communication with the channel 26 and the passageway 16 formed in the camshaft bearing 12. Channel 26 is in lubricant communication with a radial passageway 26′ formed in the journal portion 25. By virtue of the above described structure lubricating oil under pressure is fed to the channel 26 and passageway 26′ when the passageway or duct 15 is in communication with the passageway 16 which occurs once during every revolution of the camshaft 11 when the engine is operating. Sleeve 23 is provided with another integrally formed enlarged journal portion 29 adjacent its upper end which is journalled in the bore 20. Sealing means such as the O-ring 30 disposed in a groove 31 formed in the periphery of the journal portion 29 prevents entrance of dirt and other foreign elements into the engine crank case and the escape of lubricating oil from the area between the sleeve 23 and the cylinder block outer wall portion 18. The sleeve 23 is provided with an annular shoulder 32 which abuts the outer surface of the wall portion 18 adjacent the bore 20 to correctly position the sleeve in the cylinder block 10.

A distributor drive shaft, designated generally by reference character 33, is disposed within the sleeve 23 and the lower end thereof, as viewed in Figures 1 and 3, extends below the partition 19. A sleeve member 34 is keyed to the lower end portion 35 of the distributor drive shaft 33 by means of a pin 36 which extends through registrable apertures provided through the sleeve member and the distributor drive shaft. The section 37 of the sleeve member 34 depends below the end of the distributor drive shaft 33 and is adapted to function as a socket for receiving one end 38 of the oil pump drive shaft 39 in order to couple the oil pump drive shaft 39 and the sleeve member 34 for rotation together. A distributor shaft drive gear 40 is formed on the sleeve member 34 at its upper end which meshes with the teeth 41 of a worm gear fixed to the chamshaft 11. By virtue of this coupling, rotation of the distributor drive shaft 33 effects operation of the oil pump 14. A bushing 42 of bronze impregnated with graphite is press fit into the lower end of the sleeve 23 to provide a plain radial bearing for the lower end of the distributor drive shaft 33.

The ignition distributor adapter 22 includes an enlarged hollow section 43 which is integrally formed with the sleeve 23. The hollow interior of the section 43 is generally formed by a first axial bore 44 which is in axial alignment with and of larger diameter than the bore 45 of the sleeve 23 and thus a radially extending annular bearing shoulder 46 is provided. A second axially aligned bore 47 of larger diameter than bore 44 extends from the uppermost end of the section 43 to the bore 44. The ignition distributor head includes a tubular section 48, partially shown in Figures 1 and 3, the lower end of which is piloted into the bore 47. A distributor operating shaft or rotor 49 is suitably journalled in the tubular section 48 and extends downwardly from the lowermost end thereof, as viewed in Figures 1 and 3. Sealing means, designated generally by numeral 50 and similar in construction and arrangement to ring 30 and groove 31 described hereinbefore, are employed the seal and the joint between the tubular section 48 and the section 43.

The uppermost end 51 of the distributor drive shaft 33 is disposed within the bore 44 and has a radially extending opening therethrough for receiving a pin 52. A sleeve 53 is adapted to slip over the uppermost end 51 of the shaft 53 and is provided with a pair of aligned apertures for respectively receiving the projecting end portions of the pin 52. A worm gear 54 is integrally formed with the sleeve 53 intermediate its ends. The uppermost end of the sleeve 53 is closed by a plug 55 which is provided with an upwardly facing socket cavity for receiving a mating tongue 56 defining the terminal end of the rotor 49. Thus the rotor 49 and the distributor drive shaft 53 are drivingly connected together by a one-way slip joint connection 57 so that the distributor head may be readily removed and disconnected from the distributor adaptor 22. The tubular section 48 is provided with a radially extending annular flange 58 which bears against the surface of the section 43 adjacent the outer end of the bore 47. A clamping device 59 including a clip 60 having an L-shaped cross section, as viewed in Figure 1, and which engages the flange 58 and a radially extending pad 62 integrally formed with the section 43, and a bolt 63 which extends through the clip 60 and is adapted to engage the threads of a vertically extending threaded aperture 64 in the pad 62 in order to secure the distributor head to the adapter 22 and prevent relative movement therebetween.

When the engine is operating and the camshaft worm teeth 41 are meshing with the distributor drive gear 40 to rotate the rotor 49, the distributor drive shaft 33 and all the components described above rigidly connected thereto tend to move axially downwardly as viewed in Figure 1 because of the frictional forces developed between the meshing gears 40 and 41. Thus a thrust bearing in the form of a graphite-coated bronze washer 65 is provided to distribute the thrust force over a relatively large area of the adapter 22. The thrust washer 65 is loosely mounted on the shaft 33 and is interposed between the bearing shoulder 46 which it engages and the lower end of the sleeve 53. The lowermost end of the sleeve 53 is defined by a radially extending annular flange, the flat bottom surface of which abuts against the face of the thrust washer 65 opposite the face thereof engaging the shoulder 46. Referring to Figure 6, it will be noted that the thrust washer 65 is provided with a plurality of radially extending oil grooves 66 in one surface thereof which communicate with the bore 44 and the interior of the sleeve 23. It will be noted that the internal diameter of the sleeve 23 is of such dimension with respect to the diameter of the distributor drive shaft 33 that the major portion of the outer peripheral surface of the shaft 33 is radially spaced from and parallel to the interior of the sleeve 23. Thus a passageway 67 around the shaft 33, extending from the channel 26 to the oil grooves 66 in the thrust washer 65, is provided in the sleeve 23. When the engine is operating normally, lubricating oil, under pressure, emitted from the channel 26 flows upwardly around the shaft 33 through the passageway 67 and is discharged into the interior of the section 43 of the distributor adapter 22 through the oil grooves 66. A conventional engine governor, designated generally by numeral 68, is suitably fastened to a mounting pad 69′ integrally formed with the adapter section 43. The governor 68 includes an operating shaft suitably journaled in the governor housing 70, partially shown. The lower extremity of the operating shaft 69, as viewed in Figure 2, is provided with a diametrically extending slot 71 which is adapted to receive a tongue 72 formed on one end of a governor drive shaft 73 in order to couple shafts 69 and 73 for rotation together. The adapter section 43 is provided with a bore 74 which serves as a bearing for the end of the governor drive shaft 73 adjacent the tongue 72. A gear 75 integrally formed with the drive shaft 73 intermediate its ends is adapted to mesh with worm gear 54 whereby rotation of the distributor drive shaft 33 results in rotation of the governor operating shaft 69. The end of the governor drive shaft 73 opposite the tongue 72 is journaled in a bearing member 76 threaded into an opening disposed in axial alignment with the operating shaft 69 in the section 43. It will be noted that a portion 77 of the wall of the section 73 is bulged outwardly to provide a cavity 78 for accommodating the gear 75. The cavity 78 is open to the bore 44.

From the foregoing it will be appreciated that the wall portion of the section 43 and the bottom surface of the tubular section 48 define the cavity 78 and bore 44 and enclose a thrust washer 65, worm gear 54 and governor drive gear 75. As pointed out hereinbefore, lubricating oil flows through the grooves 66 when the engine is operating and fills the cavity 78 and bore 44. Thus the thrust washer 65, worm gear 54 and governor drive gear 75 being disposed in the cavity 78 and bore 44 are immersed in lubricant and are continuously supplied with a copious amount of oil during the operation of the engine. Oil flows from the oil reservoir which is defined by the wall portions of the section 43 enclosing the cavity 78 and the bore 44 to the engine oil sump, not shown, by gravity through an elongated return duct 79 extending through the sleeve 23. The duct 79 has one end enlarged as indicated by the numeral 80 and opens into a portion of the wall defining the shoulder 46. The opposite or lower end of the duct 79 terminates at a point below the outer wall 18 of the cylinder block 10. As shown in Figures 1 and 6, the thrust washer 65 is provided with a tab 81 which engages the edge of the enlarged opening 80 to key the thrust washer 65 to the shoulder 46 and prevent relative rotation therebetween.

As in conventional internal combustion engines of the spark ignition type the distributor rotor 49 is operatively connected to the camshaft worm teeth 41 for positive rotation together. The distributor drive shaft 33 forms a part of the positive drive connecting means between the rotor 49 and the worm teeth 41 and a major portion of the length thereof is disposed within the sleeve 23 between the thrust washer 65 and the bronze bearing 42. Now since the camshaft gear teeth 41 are subjected to torque impulses which are created by reason of the unsteady nature of the power development in the engine, the camshaft worm teeth 41 transmit torque impulses in conventional engines to the distributor rotor 49. In engines equipped with the structure described above, the velocity of the rotor 49 is controlled as to uniformity to an extent which prevents the intrusion of velocity variations which cause noticeable erratic engine operation characteristics. This is accomplished by providing a viscous dampener for resisting the momentary deviations in velocity of the distributor drive shaft 33 whereby the rotor 49 which is positively driven thereby is rotated at a substantially uniform velocity. As pointed out above, during operation of the engine passageway 67 is completely filled with lubricating oil which empties into the oil reservoir for lubricating the thrust washer 65 and gears 54 and 75. The surface to volume ratio of the passageway 67 is relatively large and one surface defining the passageway 67, namely the outer peripheral surface of the shaft 33, moves in a parallel path relatively to the interior surface of the sleeve during operation of the engine and since the lubricating oil between the surfaces has a viscosity such that the cohesive and adhesive properties existing between the oil particles and the spaced relatively movable surfaces, a viscous drag or resistance between the surfaces is created. Thus the torque impulses or oscillations transmitted by the worm teeth 41 are dampened and are not transmitted to the distributor rotor 49 to cause the engine to operate erratically and inefficiently. Hence it will be appreciated that the shear resistance of the lubricating oil supplied to the oil reservoir is utilized to dampen torsional oscillations and a section of the duct means for conveying the oil to the lubricant reservoir also functions as a viscous damper.

The embodiment of the invention chosen for the purposes of description and illustration herein is that preferred for achieving the objects of the invention and developing the utility thereof in the most desirable manner, due regard being had to existing factors of economy, simplicity of design and construction and improvements sought to be effected. It will be appreciated, therefore, that the particular structural and functional aspects emphasized herein are not intended to exclude but rather to suggest such other adaptations and modifications of the invention as fall within the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system and a governor; a cylinder block including an outer wall portion and an inner partition spaced therefrom, said wall portion and partition having aligned bores; an ignition distributor including an adapter, head and a drive shaft, said adapter including an elongated sleeve journaled in said bores and an enlarged hollow section integrally formed with said sleeve exteriorly of said outer wall portion, the juncture of said section and sleeve being defined by an internal annular shoulder, said head being mounted on said hollow section and adapted to close one end of said section, the wall of said section and the surface of said head closing said end of said section defining an oil reservoir, said head including a rotor having one end terminating within said oil reservoir, said drive shaft being journaled in and extending through said sleeve and having one end disposed within said oil reservoir and its opposite end extending beyond the adjacent end of said sleeve and having a gear mounted thereon, said drive shaft being of a diameter less than the internal diameter of said sleeve whereby a passageway in said sleeve is provided which extends substantially the full length of said sleeve and has a relatively large surface-to-volume ratio; said governor including a governor drive shaft journaled in said section having a gear fixed thereto; means for drivingly connecting said distributor drive shaft to said rotor and said governor gear, said means being disposed within said oil reservoir and including a sleeve member fixed to said distributor drive shaft, said sleeve member having a gear meshing with said governor drive shaft gear and a radially extending annular bearing flange; a thrust washer encircling said distributor drive shaft and secured to said shoulder, said bearing flange being adapted to bear against said washer, said washer having a plurality of radially extending grooves therein opening into the interior of said section and said passageway; a cam-shaft rotatably supported by said cylinder block having a gear fixed thereto meshing with said gear fixed to said distributor drive shaft and an oil duct therethrough adapted to receive lubricating oil under pressure from said force-feed lubrication system when said engine is operating; means for conducting lubricating oil to said passageway at the end thereof opposite said thrust washer whereby oil fills said passageway and flows to said oil reservoir; and oil return duct means for establishing fluid communication between said reservoir and the suction side of said force-feed lubrication system.

2. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system; an ignition distributor including an adapter, head, and a drive shaft, said adapter including an elongated sleeve and an enlarged hollow section integrally formed with said sleeve, the juncture of said section and sleeve being defined by an internal annular shoulder, said head being mounted on said hollow section and adapted to close one end of said section, the wall of said section and the surface of said head closing said end of said section

defining an oil reservoir, said head including a rotor having one end terminating within said oil reservoir, said drive shaft being journaled in and extending through said sleeve and having one end disposed within said oil reservoir, said drive shaft being of a diameter less than the internal diameter of said sleeve whereby a passageway in said sleeve is provided which extends substantially the full length of said sleeve and has a relatively large surface-to-volume ratio; a governor mounted on said hollow section having a governor drive shaft journaled in said section; means for drivingly connecting said distributor drive shaft to said rotor and said governor drive shaft, said means being disposed within said oil reservoir; a thrust washer interposed between said internal shoulder and said distributor drive shaft, said washer having a plurality of radially extending grooves therein opening into the interior of said section and said passageway; means for supplying lubricant to said passageway from said force-feed lubrication system, and lubricant return duct means for returning lubricant from said oil reservoir to said force-feed lubrication system by gravity.

3. In an internal combustion engine of the spark-ignition type equipped with a governor; an ignition distributor including an adapter comprising an elongated sleeve and an enlarged hollow section integrally formed with one end of said sleeve, a distributor head having a rotor journaled therein, said rotor extending into said hollow section, and a drive shaft journaled in said sleeve drivingly connected to said rotor, said drive shaft being driven from a pulsating power source whereby such shaft is subjected to torsional oscillations; a thrust bearing for said shaft disposed within said hollow section, said bearing including a thrust washer; an operating shaft for said governor; means disposed within said hollow section for drivingly connecting said distributor drive shaft and said governor operating shaft; a viscous dampener including a compartment defined by the major portion of the interior wall surface of said sleeve and the peripheral surface of said distributor drive shaft encircled thereby, and lubricating oil flowing in said compartment for adding a dampening load to said distributor drive shaft in order to resist torsional oscillations of said rotor; and means for conducting oil from said viscous dampener compartment to the interior of said hollow section for lubricating said thrust bearing and the means drivingly interconnecting said distributor drive shaft and said governor operating shaft.

4. The combination substantially as set forth in claim 3, in which said last-mentioned means includes a plurality of grooves formed in said thrust washer opening into the interior of said hollow section and said compartment.

5. In an internal combustion engine of the spark-ignition type equipped with a governor; an ignition distributor including an adapter comprising an elongated sleeve, said adapter including a portion thereof defining an oil reservoir, said ignition distributor further including a drive shaft extending longitudinally in said sleeve, a major portion of the peripheral surface of said shaft being spaced and parallel to the interior surface of said sleeve, one end of said shaft being drivingly connected to a pulsating power source whereby said shaft is subjected to torsional oscillations and the other end of said shaft extending from one end of said sleeve and terminating in said oil reservoir; a governor operating shaft; means drivingly interconnecting said governor operating shaft and said distributor drive shaft, said means being disposed in said oil reservoir; and a viscous dampener including said major portion of the peripheral surface of said distributor drive shaft and the interior surface of said sleeve spaced and parallel thereto for adding a dampening load to said distributor drive shaft in order to resist torsional oscillations thereof, said peripheral surface of said distributor drive shaft and said interior wall surface of said sleeve defining a compartment for receiving lubricating

oil, said compartment having a relatively large surface area-to-volume ratio; and means for conveying oil from said compartment to said oil reservoir to lubricate said means drivingly interconnecting said distributor drive shaft and said governor operating shaft.

6. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system; an ignition distributor including a distributor adapter, a distributor head mounted on said adapter having a rotor journaled therein, and a drive shaft journaled in said adapter drivingly connected to said rotor, wall portions of said adapter and said distributor head defining an oil reservoir, a thrust bearing between said drive shaft and said adapter, said thrust washer being disposed within said oil reservoir; a governor mounted on said distributor adapter including an operating shaft; means drivingly connecting said distributor drive shaft and said governor operating shaft, said means being disposed within said oil reservoir; means for supplying lubricant to said oil reservoir; and lubricant return duct means for returning lubricant from said oil reservoir to said force-feed lubrication system by gravity.

7. The combination substantially as set forth in claim 6, in which said distributor drive shaft is driven from a pulsating power source whereby said shaft is subjected to torsional oscillations; and further includes a viscous dampener including the peripheral surface of a major portion of the length of said distributor drive shaft and a wall surface of said adapter encircling said peripheral surface of said shaft whereby a passageway is formed, said passageway including a portion of the means for supplying lubricant to said oil reservoir from said force-feed lubrication system whereby a dampening load is added to said distributor drive shaft in order to resist torsional oscillations of said rotor.

8. In an internal combustion engine of the spark-ignition type; an ignition distributor including a distributor adapter, a distributor head mounted on said adapter having a rotor journaled therein, and a drive shaft journaled in said adapter drivingly connected to said rotor, a thrust bearing between said drive shaft and said adapter, said drive shaft being driven from a pulsating power source whereby said shaft is subjected to torsional oscillations; and a viscous dampener for adding a dampening load to said shaft in order to resist torsional oscillations of said rotor including the peripheral surface of a major portion of the length of said shaft and the wall surface of said adapter encircling said peripheral surface, and a lubricant disposed within said adapter between said peripheral surface of said shaft and the wall surface of said adapter encircling said peripheral surface; and means for conducting said lubricant from said viscous dampener to said thrust bearing to lubricate the same.

9. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system; an ignition distributor including a distributor adapter, a distributor head mounted on said adapter having a rotor journaled therein, and a drive shaft journaled in said adapter drivingly connected to said rotor, wall portions of said adapter and said distributor head defining an oil reservoir; a governor mounted on said distributor adapter including an operating shaft; means drivingly connecting said distributor drive shaft and said governor operating shaft, said means being disposed within said oil reservoir; means for supplying lubricant to said oil reservoir; and lubricant return duct means for returning lubricant from said oil reservoir to said force-feed lubrication system by gravity.

10. The combination substantially as set forth in claim 9, in which said distributor drive shaft is driven from a pulsating power source whereby said shaft is subjected to torsional oscillations; and further includes a viscous dampener including the peripheral surface of a major portion of the length of said distributor drive shaft and the wall surface of said adapter encircling said peripheral surface of said shaft whereby a passageway is formed, said passageway including a portion of the means for

supplying lubricant to said oil reservoir from said force-feed lubrication system whereby a dampening load is added to said distributor drive shaft in order to resist torsional oscillations of said rotor.

11. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system; an ignition distributor including an adapter having a portion thereof partially defining an oil reservoir, and a drive shaft journaled in said adapter; a governor including an operating shaft mounted on said adapter, means for drivingly connecting said distributor drive shaft and said governor operating shaft, said means being disposed within said oil reservoir; means for supplying said oil reservoir with lubricant from said force-feed lubrication system; and oil duct means for returning oil from said reservoir to said force-feed lubrication system by gravity.

12. In an internal combustion engine of the spark-ignition type; an ignition distributor including a distributor adapter, a distributor head mounted on said adapter and a rotor journaled in said head, and a drive shaft journaled in said adapter drivingly connected to said rotor, said drive shaft being driven from a pulsating power source whereby said shaft is subjected to torsional oscillations; and a viscous dampener including the peripheral surface of a major portion of the length of said shaft and the wall surface of said adapter encircling said peripheral surface of said shaft, and a viscous fluid between said peripheral surface of said shaft and said wall surface of said adapter for adding a dampening load to said shaft in order to resist torsional oscillations of said rotor.

13. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system including an oil sump; said engine including a camshaft provided with a passageway adapted to receive lubricating oil under pressure from the force-feed lubrication system when the engine is operating; a governor for said engine including an operating shaft; an ignition distributor including an adapter provided with an oil reservoir, a rotor, and a drive shaft journaled in said adapter; means drivingly connecting said camshaft and said drive shaft; means drivingly interconnecting said drive shaft and said rotor and governor operating shaft, said last-mentioned means being disposed within said oil reservoir; means for conveying lubricating oil from said camshaft passageway to said reservoir; means for returning oil from said reservoir to the engine oil sump by gravity; and a torsional oscillation dampener for said distributor drive shaft including a portion of said means for conveying lubricating oil from said camshaft passageway to said oil reservoir.

14. In an internal combustion engine of the spark-ignition type having a force-feed lubrication system; a governor for said engine including an operating shaft; an ignition distributor including an adapter provided with an oil reservoir, a rotor, and a drive shaft journaled in said adapter; means for driving said drive shaft; means drivingly interconnecting said drive shaft and said rotor and governor operating shaft, said last-mentioned means being disposed within said oil reservoir; means for conducting lubricating oil from the force-feed lubricating system to said reservoir; means for returning oil from said oil reservoir to the force-feed lubricating system and a torsional oscillation dampener for said distributor drive shaft including a portion of said means for conducting lubricating oil from the force-feed lubricating system to said oil reservoir.

15. An ignition distributor including a distributor head having a rotor journaled therein and a drive shaft drivingly connected to said rotor, said drive shaft being driven from a pulsating power source whereby said shaft is subjected to torsional oscillations, and a viscous dampener including the peripheral surface of a major portion of the length of said shaft for adding a dampening load to said shaft in order to resist torsional oscillations of said rotor.

16. In an internal combustion engine of the spark-ignition type having a governor; an ignition distributor including an adapter having an elongated sleeve and an enlarged open end hollow section integrally formed with one end of said sleeve, the juncture of said sleeve and hollow section being defined by an internal annular shoulder, said ignition distributor including a head mounted on said section and sealing one end thereof, the wall portion of said hollow section between said shoulder and head defined in an oil reservoir, a distributor drive shaft extending longitudinally in said sleeve and in spaced relation thereto, one end of said shaft being disposed within said oil reservoir and the other end of said shaft extending from the other end of said sleeve for an external driving connection; a governor mounted on said section including a governor drive shaft; means drivingly connecting said distributor drive shaft and said governor drive shaft including a gear secured to said distributor drive shaft meshable with a gear operatively connected to said governor drive shaft; means for introducing lubricating oil to the space between said sleeve and said distributor drive shaft so as to maintain a frictional drag therebetween to dampen torsional oscillations of said distributor drive shaft; and means for establishing lubricant communication between said space between said sleeve and said distributor drive shaft and said oil reservoir.

17. In a combination substantially as set forth in claim 16, in which a thrust washer is mounted on said internal annular shoulder, said thrust washer being adapted to be operatively engaged by said distributor drive shaft; and said last-mentioned means includes a plurality of radially extending grooves formed in said thrust washer.

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