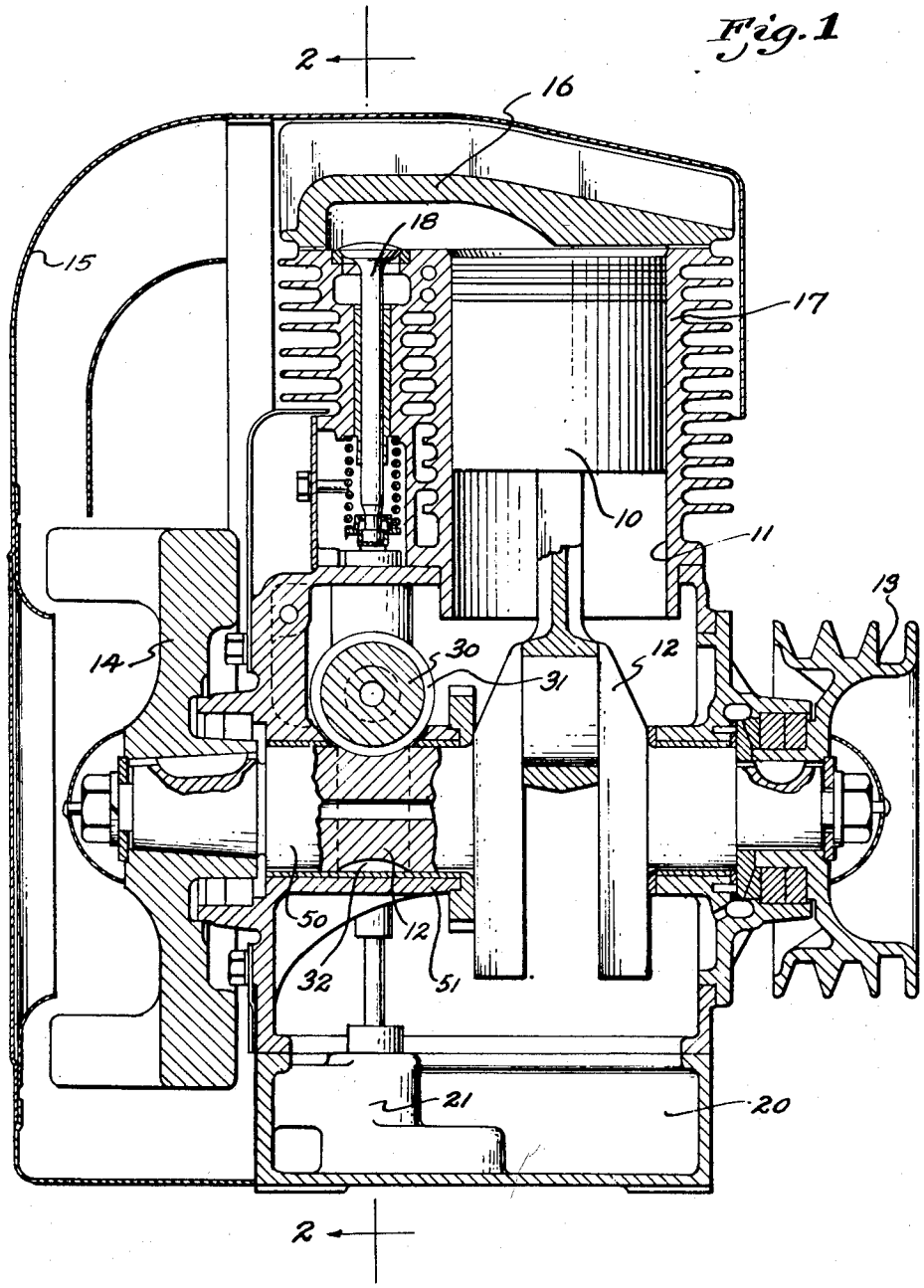
Dec. 12, 1950 E. GINN 2,533,575

INTERNAL-COMBUSTION ENGINE

Filed June 28, 1945 2 Sheets-Sheet 1

Fig. 1



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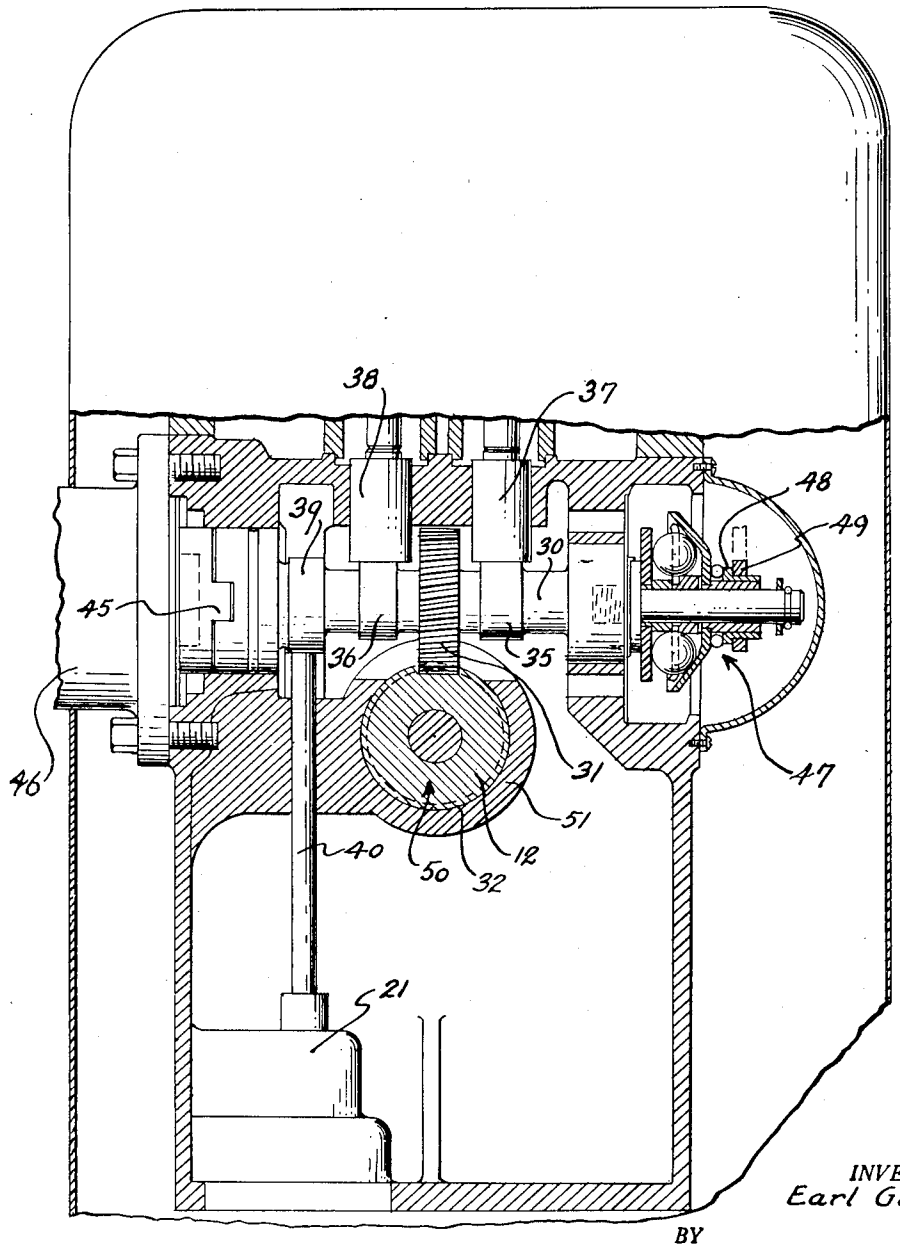
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INTERNAL-COMBUSTION ENGINE

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Fig. 2



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UNITED STATES PATENT OFFICE

2,533,575

INTERNAL-COMBUSTION ENGINE

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Application June 28, 1945, Serial No. 601,982

2 Claims. (Cl. 123—195)

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This invention relates to internal combustion engines and has particularly to do with an engine construction and the novel arrangement of mechanisms to be used where lightness and compactness are desired.

In particular the present construction is adapted to a portable engine intended for a multiplicity of uses on a farm, in a factory, and so forth.

An object of the design is the provision of a self-contained, air-cooled engine in as small a space as possible so that it may be handled by one man.

A further object is the provision of such an engine wherein the control parts such as the magneto and the governor are available at the outside of the housing.

For a more detailed understanding of my invention, reference may be had to the accompanying drawings which illustrates a preferred embodiment of my invention, in which like characters refer to like parts throughout the several views, and in which:

Fig. 1 is a vertical section through the crankshaft, and

Fig. 2 is a partial vertical section at line 2—2 of Fig. 1 showing the cam shaft.

In Fig. 1 the main parts of the engine are shown. A piston 10 in cylinder 11 drives a crankshaft 12. At one end of the crank-shaft is a drive pulley 13, while at the other end is a cooling fan 14 which passes cooling air through shroud 15 to the finned cylinder 11 and head 16. The two valves of the cylinder are aligned on the left side of the cylinder as viewed in Fig. 1, where the cooling air passes each valve. One valve 18 is shown.

Below the crankshaft, the crankcase is provided with a reservoir 20, in which is mounted an oil pump 21. Also in Fig. 1 a section of a cam shaft or what might better be called an accessory drive shaft 30 is shown.

The shaft 30 is suitably journaled in the engine housing at right angles to the crankshaft 12. A wormwheel 31 cooperates with a worm 32 on crankshaft 12 to cause reduced rotation of the control shaft 30, said shaft 30 preferably rotating at one half crankshaft speed as is standard with a four stroke cycle engine. In its transverse position the shaft 30 has numerous functions. On either side of wheel 31 are valve cams 35 and 36 which cooperates with valve lifters 37 and 38. A third cam 39 to the left causes reciprocation of a pump actuator 40 extending into the oil pump 21.

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The left end of shaft 30 is coupled at 45 to a magneto drive, the housing of which is shown at 46. At the other end of the shaft a speed governor control 47 is shown. Collar 48 moves out with increased speed to actuate a throttle control 49.

Thus, the single shaft 30 has five different functions, actuation of two valves, oil pump, magneto drive and governing control. Its position also permits the magneto and the governor to be located on the outer walls of the engine where connecting wires, lubrication, and lever control may be easily supplied. As a result the overall size of the engine housing may be reduced and the parts arranged compactly in juxtaposition around the regulating shaft.

As will be seen the regulating shaft is directly above the crankshaft extension 50 and no intervening bevel gears or other connecting gears are necessary. It should be noted further that the worm gear formation 12 is mounted within a bearing housing 51 thus avoiding any additional overall length in the crankshaft. Likewise lubrication furnished to the crankshaft takes care of the drive connection with the regulating shaft and also lubricates the valve cams and oil pump cam on either side of the drive gear 31.

All of the actuated accessories are mounted between two parallel vertical planes which include the actuator shaft and cut the crankshaft transversely. The oil pump is at the bottom, the two valves surmount the actuator shaft, and the magneto and governor are coaxial with the actuator shaft at the respective ends.

Although I have illustrated but one form of my invention and have described in detail but a single application thereof, it will be apparent to those skilled in the art to which my invention pertains, that various modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

I claim:

1. In a single cylinder internal combustion engine constructed and arranged compactly to minimize weight and overall engine size, a crankcase structure, a crankshaft supported by said crankcase structure, one of said means for supporting said crankshaft comprising a bearing support projecting from a side wall of the crankcase, extending normal to the crankshaft axis and carrying a bearing which journals one end of the crankshaft, an actuating shaft supported by the crankcase structure to extend substantially normal to the crankshaft and overlying the afore-

said bearing support, cams and other driving means carried by said actuating shaft for actuating engine valves, a governor and a lubricant pump, a gear secured to the actuating shaft, said crankshaft bearing having an opening through which said gear projects, the crankshaft portion lying within the said bearing formed with gear teeth which are enmeshed directly with the actuating shaft gear, a lubricant pump driving cam on said actuating shaft overlying the crankshaft bearing support, and a pump actuating means comprising a reciprocating shaft supported in said crankshaft bearing support, said lubricant pump located beneath the aforesaid crankshaft bearing support.

2. In a single cylinder internal combustion engine constructed and arranged compactly to minimize weight and overall engine size, a crankcase structure, a crankshaft supported by said crankcase structure, one of said means for supporting said crankshaft comprising a bearing support projecting from a side wall of the crankcase, extending normal to the crankshaft axis and carrying a bearing which journals one end of the crankshaft, an actuating shaft supported by the crankcase structure to extend transversely of

said crankshaft and closely overlying the aforesaid bearing support, a gear carried by said actuating shaft and overlying the aforesaid bearing which journals one end of the said crankshaft, the aforesaid bearing having an opening cutaway only in the upper portion thereof through which the gear carried by said actuating shaft projects to mesh with a gear teeth formed in the crankshaft portion within said bearing, a cam on said actuating shaft overlying said bearing, and a plunger extending through said bearing support and guided thereby, said cam engaged with said plunger to actuate same.

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