May 8, 1962 R. E. HULTEN 3,033,118

ENGINE ACCESSORY MOUNTING AND DRIVE

Filed Feb. 1, 1960 3 Sheets-Sheet 1

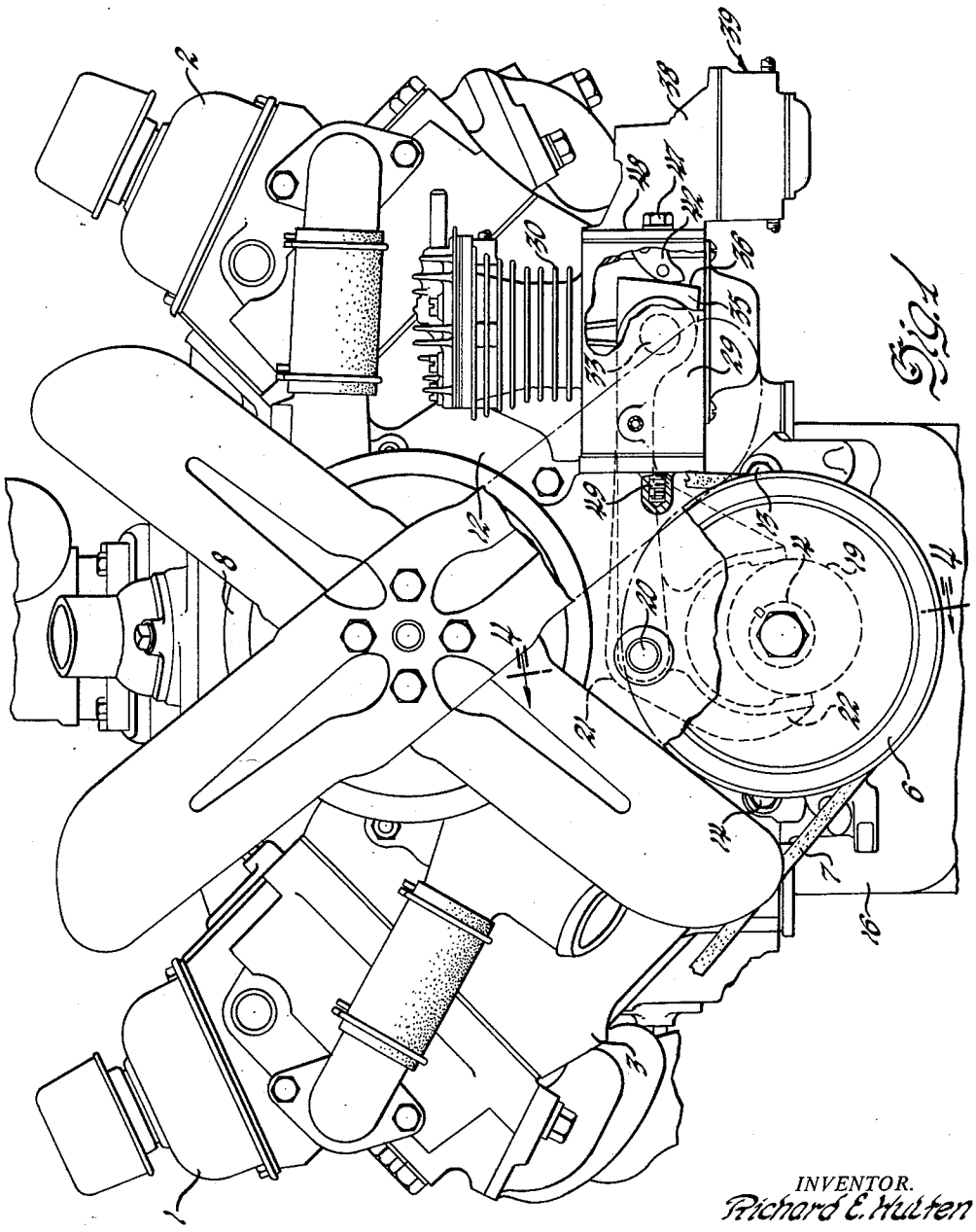


Fig. 1

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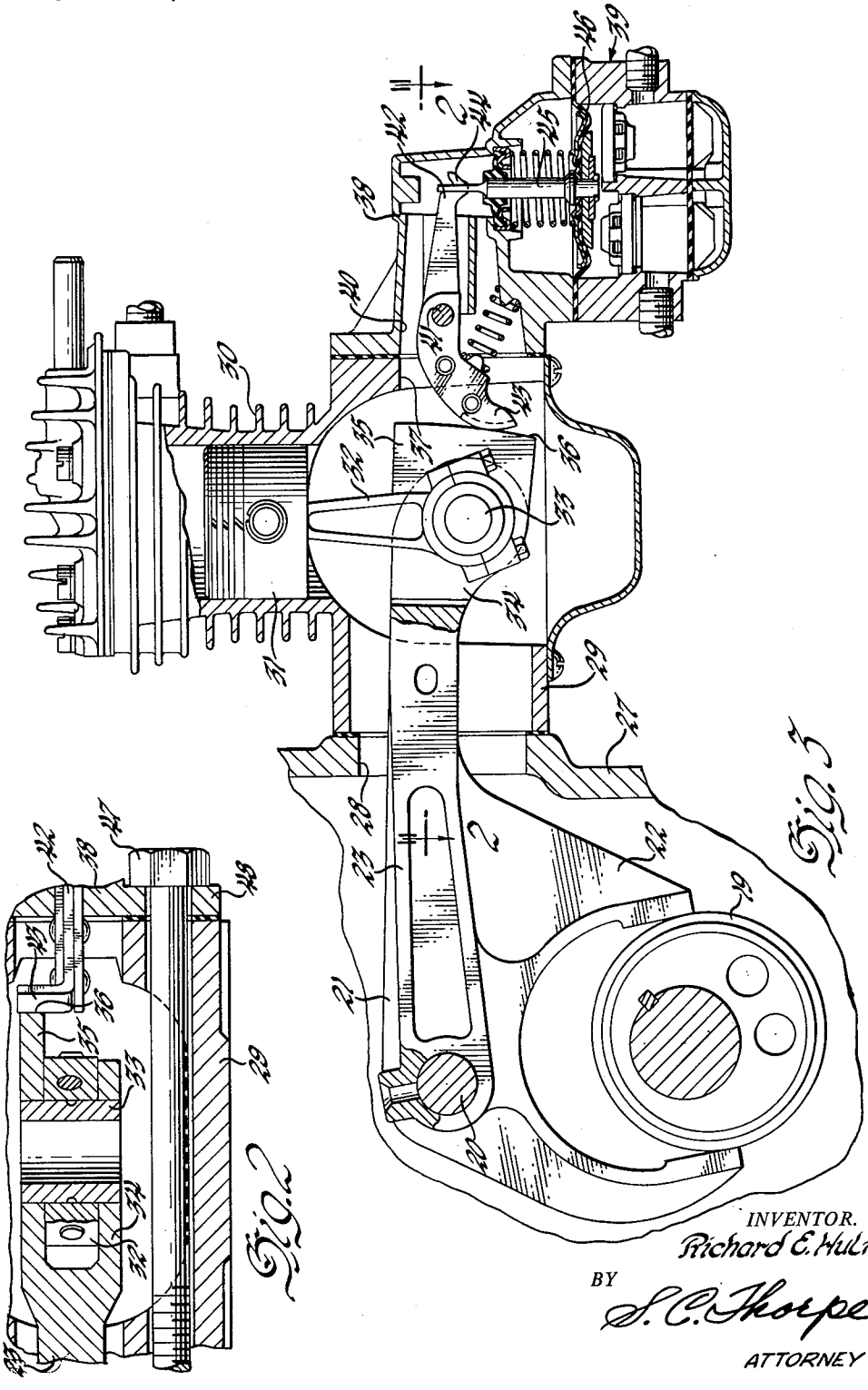


Fig. 1

Fig. 2

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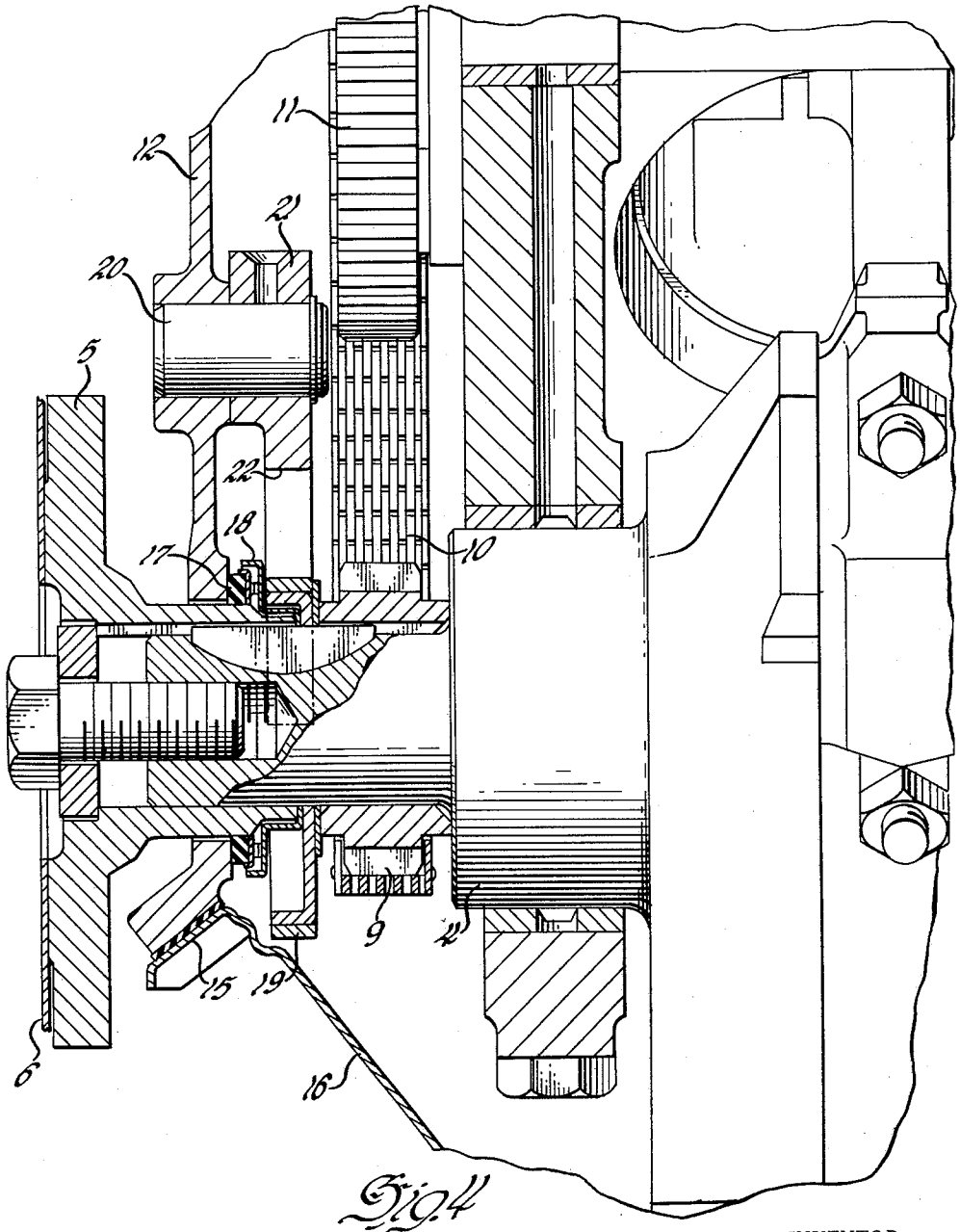


Fig. 4

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ENGINE ACCESSORY MOUNTING AND DRIVE

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1 Claim. (Cl. 103—6)

This invention relates to internal combustion engines and particularly to accessory mounting and drive means therefor.

With the current trend in modern automotive vehicle practice toward lower engine hood lines and increasing numbers of engine powered accessories a problem exists in providing proper mounting for such accessories as will enable their convenient servicing and assembly on the engine within the limited space available. While it is conventional to provide belt drives from the crankshaft pulley for such engine auxiliaries as the cooling fan and water pump and generator, the addition of belt drives for such added accessories as air compressors, power steering pumps, etc. severely aggravates the crowding of the engine compartment. To overcome this problem I have conceived of a noval arrangement for mounting and driving reciprocating piston type engine accessories which obviates the need for additional belts and pulleys, and which enables use of a common driving rocker for actuating two such accessories from a single cam means on the engine power takeoff shaft. The housings for such two commonly driven accessory units are mounted in tandem relation on the engine, and in the particular embodiment proposed the outboard unit is the engine fuel pump which by its remoteness from the engine proper has the advantage of operating at lower temperature than in the case of the more conventional mounting thereof directly on the engine.

The means by which these and other objects and advantages of the invention are attained will be more clearly understood from the following description of one selected physical embodiment thereof, having reference to the drawings wherein:

FIGURE 1 is a front elevational view of an automotive vehicle engine installation with parts broken away and in section to show my improved air compressor and fuel pump mounting and drive means.

FIGURE 2 is an enlarged fragmentary sectional view in plan taken substantially on line 2—2 of FIGURE 3, showing details of the compressor and fuel pump drive connections and the bolted mounting of the compressor and fuel pump housings.

FIGURE 3 is an enlarged fragmentary view similar to FIGURE 1 but with additional parts broken away and in section to more clearly illustrate the compressor and fuel pump driving arrangement.

FIGURE 4 is a further enlarged fragmentary view in section, taken substantially along the line 4—4 of FIGURE 1.

Referring now in detail to the drawings and first to FIGURE 1, an automotive internal combustion, V-type engine is shown having right and left cylinder banks 1 and 2 jointed by a common cylinder block 3. Journaled in the bottom of the block is the engine crankshaft, indicated at 4. Mounted on the forward end of the crankshaft as best shown in FIGURE 4 is a crankshaft pulley driving member in the form of a hub 5, to which the crankshaft pulley 6 (FIGURE 1) is suitably mounted. Above this pulley and drivably connected thereto by the flexible belt 7 is the usual water pump and fan pulley 8. The belt 7 also wraps a generator drive pulley (not shown). Secured to the crankshaft behind the pulley hub 5 is a timing gear 9 which is shown connected by a

chain belt 10 to the camshaft gear 11, and enclosing these gears and chain is the usual timing chain cover 12 which is bolted as at 13, 14 to the front end of the cylinder block 3. The lower end of the cover is open to the crankcase, being sealed as at 15 to the forward end of the engine oil pan 16 (FIGURE 4). The crankshaft extends through an opening in the forward wall of the cover 12 to mount the pulley hub 5, and oil leakage at this opening is prevented by a suitable seal 17 and deflector 18. The arrangement thus far described is conventional and forms no part of my invention.

Fixed between the timing gear 9 and the pulley hub 5 on the crankshaft, so as to rotate therewith, is a cam means in the form of an eccentric 19. Pivotal about an axis, defined by a pin 20 which is fixed to the cover above the crankshaft, is a rocker 21 having a bifurcated arm 22 drivenly straddling the eccentric 19. A second arm 23 of this rocker extends from the pin 20 through an opening 28 in the side wall 27 of the cover and into the housing 29 of an engine accessory such as an air compressor. The cylinder 30 of this air compressor is shown fitted with a trunk type piston member 31 having a connecting rod 32 which is pivotally connected by a pin 33 to the yoke-like end 34 (FIGURE 2) of the rocker arm 23. One of the legs 35 of this yoke is formed with a cam surface 36 facing generally laterally of the axis of compressor piston 31.

The compressor housing is provided with an opening 37 in its side opposite the opening 28 in the timing chain cover, and secured to this housing at this opening is the body 38 of a fuel pumping means 39. Aligned with the compressor housing opening 37 is an opening 40 in the pump body 38, and pivoted on a pin 41 within the pump body is an actuator for the fuel pumping means in the form of a cam follower 42. This follower has one end 43 in driven engagement with the cam surface 36 on the rocker 23, and its opposite end 44 is drivingly linked by a rod 45 to the fuel pump piston means, shown as a diaphragm 46.

During engine operation, rotation of the crankshaft drivably oscillates the rocker 21 about the pin 20. The compressor piston 31, being linked by its connecting rod 32 to the arm 23 of this rocker, is thus reciprocated in its cylinder 30. Coincident with such reciprocation, the laterally facing cam surface 36 on the rocker acts through its pivoted follower 42 to drive the diaphragm 46 of the fuel pump. Two bolts, one of which is shown at 47, secure the mounting flange 48 of the fuel pump body to the compressor housing 29 and extend through the latter on opposite sides of the rocker arm 23 to anchor in threaded holes 49 in the side wall 27 of the timing chain cover.

A very simple and rigid mounting of the fuel pump and compressor housing, together with a common power take-off from the crankshaft for these two units, is thus obtained which provides a desirable saving of space in the engine compartment over that of conventional separate drives therefor. Also, the remote location of the fuel pump from the engine, which results from interposing the air compressor between them, materially reduces the transmission of engine heat to the fuel pump as compared with that which obtains with conventional mounting of the fuel pump directly on the engine.

It is appreciated that various minor changes in the design and construction of the parts from that described may be made without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

In combination, an engine including a cylinder bock, a crankshaft journaled therein and having an end extending externally of the block, a timing gear and pulley driving

member in axially spaced relation on said extended end of the crankshaft, an eccentric on the crankshaft intermediate said gear and member, a cover secured to the block and having end and side walls enclosing said gear and member, one of said cover side walls having an opening, an air compressor secured to said one side wall of the cover, said compressor including a piston, a cylinder for said piston, a housing supporting said cylinder and a connecting rod extending into said housing from the piston, said housing being open to said cover at said opening adjacent one side of the cylinder and having an opening adjacent the opposite side of the cylinder, a fuel pump including a hollow body and a pumping diaphragm mounted therein, said body being secured to said housing adjacent said second mentioned opening and having an opening aligned with said second mentioned opening, a rocker pivotally mounted to said cover and having a bifurcation at one end embracing said eccentric, the opposite end of said rocker having spaced legs pivoted to and embracing the extended end of said connecting

rod, one of said legs terminating with a cam surface facing said second mentioned opening, and a pivoted follower in driven engagement with said cam surface and extending therefrom through said second mentioned and pump body openings, said follower having a pivotal axis within the pump body and a pivotal and slidable connection with said diaphragm on the opposite side of said axis from said cam surface.

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