Jan. 6, 1959 J. WEISSENBACH 2,867,202

INTERNAL COMBUSTION ENGINE ACCESSORY ADAPTER DRIVE UNIT

Filed Feb. 14, 1955 2 Sheets-Sheet 1

Fig. 1.

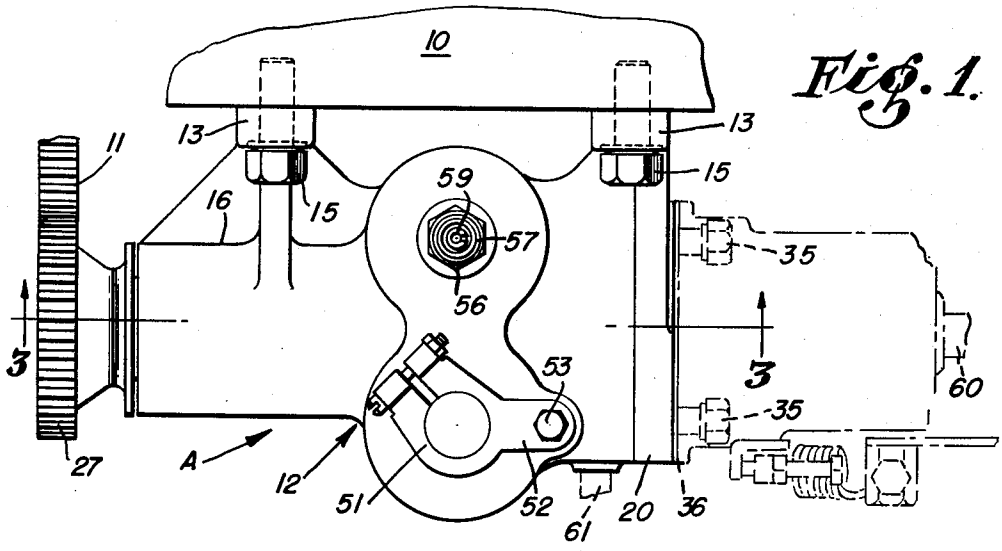
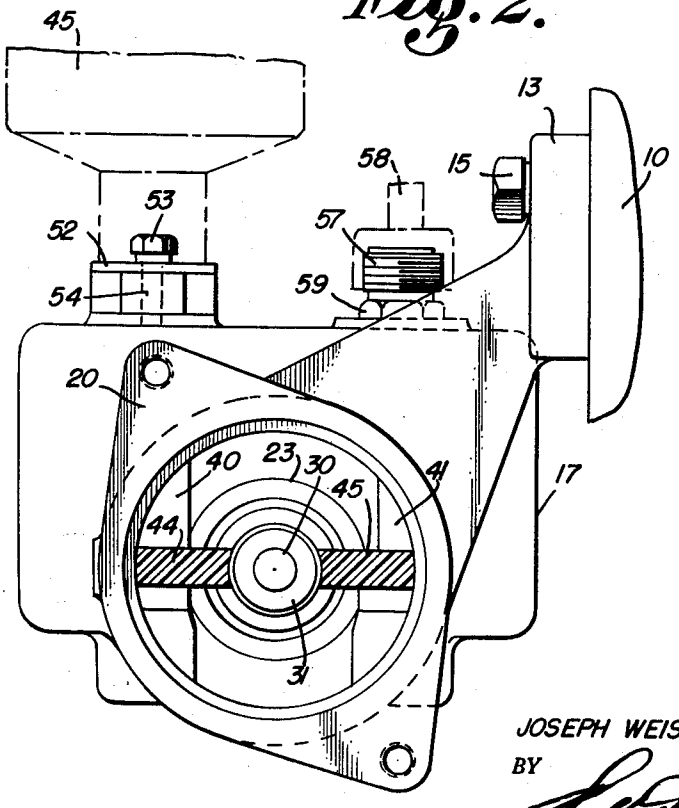


Fig. 2.



INVENTOR.
JOSEPH WEISSENBACH
BY
Attorney

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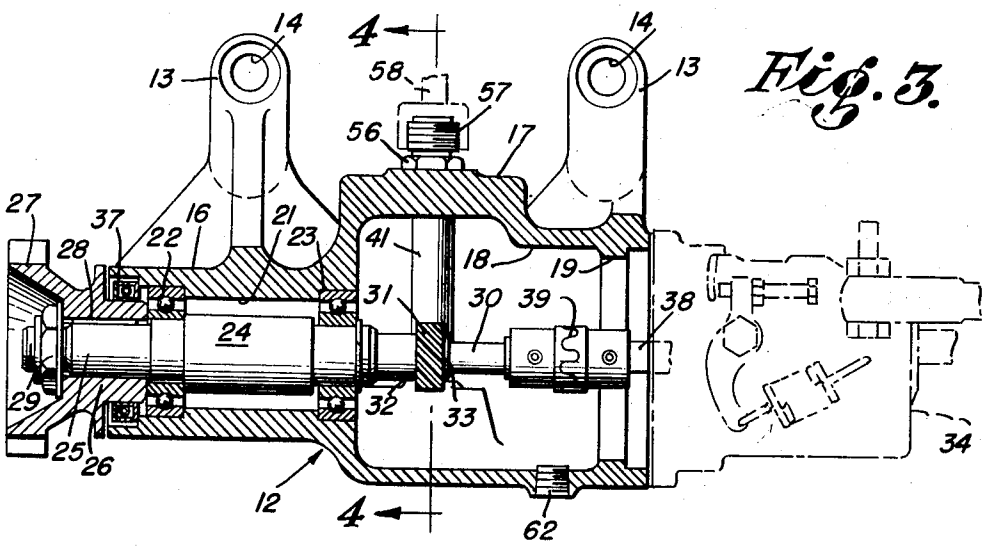
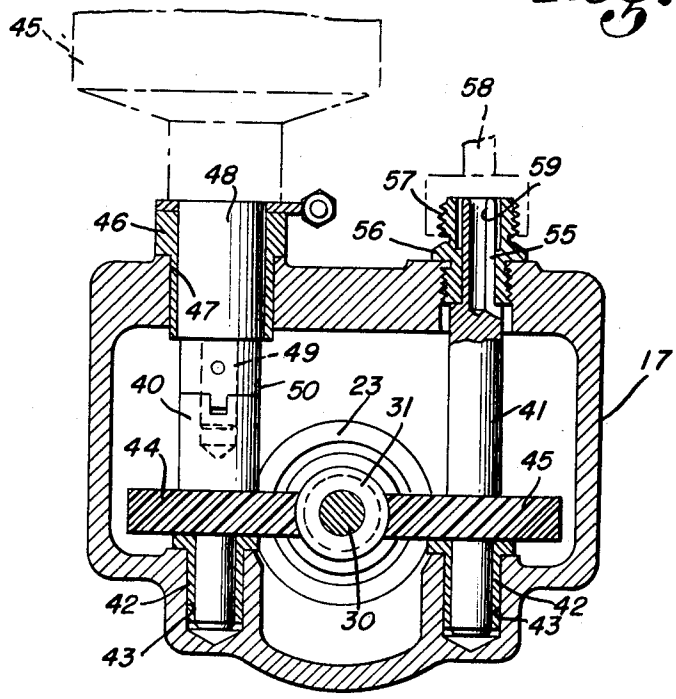


Fig. 3.

Fig. 4.



INVENTOR.
JOSEPH WEISSENBACH
BY
Attorney

United States Patent Office

2,867,202

Patented Jan. 6, 1959

2,867,202

INTERNAL COMBUSTION ENGINE ACCESSORY ADAPTER DRIVE UNIT

Joseph Weissenbach, Los Angeles, Calif.

Application February 14, 1955, Serial No. 488,075

3 Claims. (Cl. 123—195)

The present invention relates generally to an internal combustion engine accessory drive, and is more particularly concerned with an accessory drive which is fabricated as a self-contained unit for utilization in converting diesel-cycle engines for Otto-cycle operation.

Changing conditions, such as unavailability of certain types of fuel, increased cost of fuel, etc., may in many cases make it uneconomical and impractical to operate presently installed diesel engines. To replace these engines with a different type, for example an engine operating on the Otto-cycle, which could operate on other available types of fuel and possibly cheaper fuels, would be extremely expensive.

Realizing therefore that under such circumstances it would be very desirable, if possible, to be able to convert presently installed diesel-cycle engnes, so that they could operate according to the Otto-cycle; it is one object of the present invention to provide an accessory drive unit which is fabricated as a unit package that may be installed in place of the no longer needed fuel pump mechanism of the diesel engine, and driven by the same actuating facility, the drive unit having a plurality of power take-off connections adapted for driving connection with accessory devices required for the Otto-cycle operation of the engine which is being converted.

It is a further object to provide as a separate article of manufacture, an accessory drive assembly in the form of a unit for use in converting a diesel engine for operation on an Otto-cycle utilizing such fuels as gasoline, L. P. G. butane, L. P. G. propane, etc.

It is also an object of the invention to provide an accessory unit in which the housing is arranged to provide a reservoir for oil, so that the movable parts therein will be lubricated.

Further objects of the invention will be brought out in the following part of the specification, wherein detailed description is for the purpose of fully disclosing the invention without placing limitations thereon.

Referring to the accompanying drawings, which are for illustrative purposes only:

Fig. 1 is a plan view of an accessory drive unit incorporating the novel features of the herein described invention;

Fig. 2 is an end elevational view of the same;

Fig. 3 is a longitudinal sectional view showing the cooperative relationship of the parts within the unit housing, taken substantially on line 3—3 of Fig. 1; and

Fig. 4 is a transverse section, taken substantially on line 4—4 of Fig. 3.

Referring now generally to the drawings, the accessory drive unit of the present invention is generally indicated in Fig. 1 by the letter A as being associated with the framework or other suitable part **10** of an engine which is to be converted, such engine including an actuating facility such as a driving gear **11** as ordinarily utilized for driving the diesel-cycle fuel pump (not shown) of the engine.

More specifically, the accessory drive unit of the present invention comprises a casing or housing **12** which is fabricated of suitable material and provided with appropriate lugs **13—13** or equivalent means by which the housing and associated elements may be secured to the engine framework. In the present instance, the lugs **13** are apertured as indicated at **14** for receiving anchor bolts **15** adapted to threadedly engage the engine framework.

The casing or housing **12** is formed with a tubular sleeve portion **16** and a connecting enlarged portion **17** which defines a compartment **18**, one side of which has an opening **19** which is formed in an end flange structure **20**.

The sleeve portion **16** has a longitudinally extending bore **21** within which spaced antifriction bearings **22** and **23** are positioned and in which a main shaft **24** is rotatably supported.

The shaft **24** has a projecting contracted end portion **25** which is adapted to receive the hub **26** of a gear **27** which is secured to the shaft end **25** by means of a suitable key **28** and retaining nut **29**. The gear **27** is adapted to mesh with the driving gear **11** previously mentioned.

The main shaft **24** at its opposite end is provided with a reduced end portion **30** upon which there is mounted a spiral driving gear **31**, this gear being retained in position against a shoulder **32** on the shaft by means of a snap ring **33**.

Direct driving connection is made between the end portion **30** of the shaft with an accessory device, shown in this instance as comprising a governor which may be of the centrifugal, hydraulic or other required type, as generally indicated by the numeral **34**. This governor is adapted to be secured to the flange **20** by means of suitable bolts **35**, a sealing gasket **36** being interposed between the associated parts of the governor and flange in order to provide a sealed connection and prevents leakage of lubricant from the housing **12**. At the other end of the housing, leakage of lubricant is prevented by means of an oil seal assembly **37** associated with the hub **26** of the gear **27**.

The governor **34** includes a driving shaft **38** which is in alignment and end-to-end relation with the reduced end portion **30**, the shaft and end portion being interconnected through a flexible coupling **39** of conventional construction. As thus connected, the governor will be driven at the same speed as the main shaft **24**.

The accessory drive unit is also arranged to drive other accessories needed for the conversion, and which it may be required to be driven at a different speed than that of the main shaft **24**. As shown in Fig. 4, a countershaft **40** is rotatably supported on one side of the main shaft end portion **30**, while a second countershaft **41** is rotatably supported on the opposite side. Each of these shafts has its lowermost end supported in a suitable bearing **42** positioned within a bearing recess **43** formed in the bottom wall of the enlarged housing portion **17**. The shafts are thus supported in an upright position, and the shaft **40** is driven from the main shaft through a spiral gear **44** which meshes with the gear **31**, while the countershaft **41** is driven through a gear **45** which likewise meshes with the gear **31**.

The shaft **40** is adapted to drive an accessory device, which in this instance is shown diagrammatically in dotted lines as comprising a distributor **45** of conventional construction, and which is adapted to be mounted on the accessory drive unit by means of a spacer adapter **46** of tubular construction arranged to fit within an opening **47** in the top wall of the housing.

The distributor has a tubular support in the form of an extension **48** which is arranged to slip into the adapter, this support housing the distributor operating shaft **49** which is shown in this case as being connected with the

countershaft **40** by means of a conventional flexible coupling **50**.

The distributor is anchored in operating position by means of a clamping collar **51**, this collar having a projecting arm **52** which is apertured to receive an anchoring or holding down bolt **53**, a spacer **54** being inserted between the arm and adjacent face of the housing.

The countershaft **41** is provided with a contracted upper end portion **55** which is rotatably supported within a bushing **56** which serves as a steady bearing for this end of the shaft and further incorporates a threaded end **57** adapted for connection with a tachometer drive as shown in dotted lines and indicated by the numeral **58**, the contracted end **55** of the countershaft having an end recess **59** for receiving the flexible driving shaft for the tachometer. While the countershaft **41** is illustrated as being adapted for driving a tachometer, in some installations this shaft may be utilized for driving some other type of accessory such, for example, as a vacuum pump in the case of stationary engines.

The sleeve portion **16** and enlarged portion **17** of the housing cooperate to form an oil reservoir to which a suitable lubricant may be furnished so that the rotating shafts, gears and bearings contained therein will be appropriately lubricated at all times. Flow connections for lubricant may be made directly to the housing **12** or other arrangements may be made depending upon the particular installation. In the present instance, a supply line **60** is shown as being connected to the governor, and lubricant supplied thereto will flow from the governor into the interior of the compartment **18** which is provided with a lubricant discharge line connection **61**. By this means, the necessary amount of lubricant will be maintained within the housing at all times. When it becomes necessary, the housing may be cleaned and any accumulated deposits therein may be drained off by removing a drain plug **62** provided in the bottom wall of the housing portion **17**.

It is believed that it will be readily appreciated from the foregoing description that the accessory drive unit of the present invention provides a compact unit of simple construction which materially facilitates the conversion of a combustion engine operating on a diesel-cycle for operation on an Otto-cycle.

Various modifications may suggest themselves to those skilled in the art without departing from the spirit of my invention, and, hence, I do not wish to be restricted to the specific form shown or uses mentioned, except to the extent indicated in the appended claims.

I claim:

1. A unitized component assembly for converting a diesel-cycle engine having an auxiliary driving shaft into an engine operating on an Otto-cycle, said unit comprising: a housing adapted to be mounted on a part of the engine structure adjacent said auxiliary driving shaft; a distributor mounted on and supported by said housing and having an operating countershaft extending into the housing; tachometer driving means including a countershaft extending into said housing; a speed responsive engine control governor mounted on and supported by said housing and having an operating shaft extending into said housing adapted to be driven from the auxiliary driving shaft of the engine; and transmission means within said housing forming a driving connection between said governor shaft and said countershafts.

2. A unitized component assembly for converting a diesel-cycle engine having an auxiliary driving shaft into an engine operating on an Otto-cycle, said unit comprising: a housing adapted to be mounted on a part of the engine structure adjacent said auxiliary driving shaft; a distributor mounted on the top of said housing having a countershaft extending into the housing; tachometer driving means including a countershaft extending into said housing, said shaft being spaced from and parallel to said first countershaft and having a power take-off driving connection at the top of said housing; a speed responsive engine control governor mounted at one end of said housing and having an operating shaft extending into said housing between said countershafts; means at an opposite end of said housing from said governor providing a driving connection with said governor shaft and enabling its being driven from said auxiliary driving shaft; and speed reducing transmission means within the housing forming driving connections between said governor shaft and said countershafts, whereby said countershafts may be actuated at speeds other than the speed of the governor shaft.

3. A unitized transmission and support for housing and driving an Otto-cycle ignition distributor, an engine speed governor, and tachometer driving means for converting a full diesel-cycle engine for operation as a full Otto-cycle engine, comprising: a housing adapted to be mounted on a part of the engine structure adjacent to a drive shaft used for actuating the diesel-cycle engine fuel system and governing accessories prior to said conversion; means respectively supporting said governor, distributor, and tachometer driving means on said housing; and a transmission assembly mounted in said housing, said transmission assembly being adapted for driving connection from said engine drive shaft, and having separate power take-offs connected respectively with said distributor, governor, and tachometer driving means.

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