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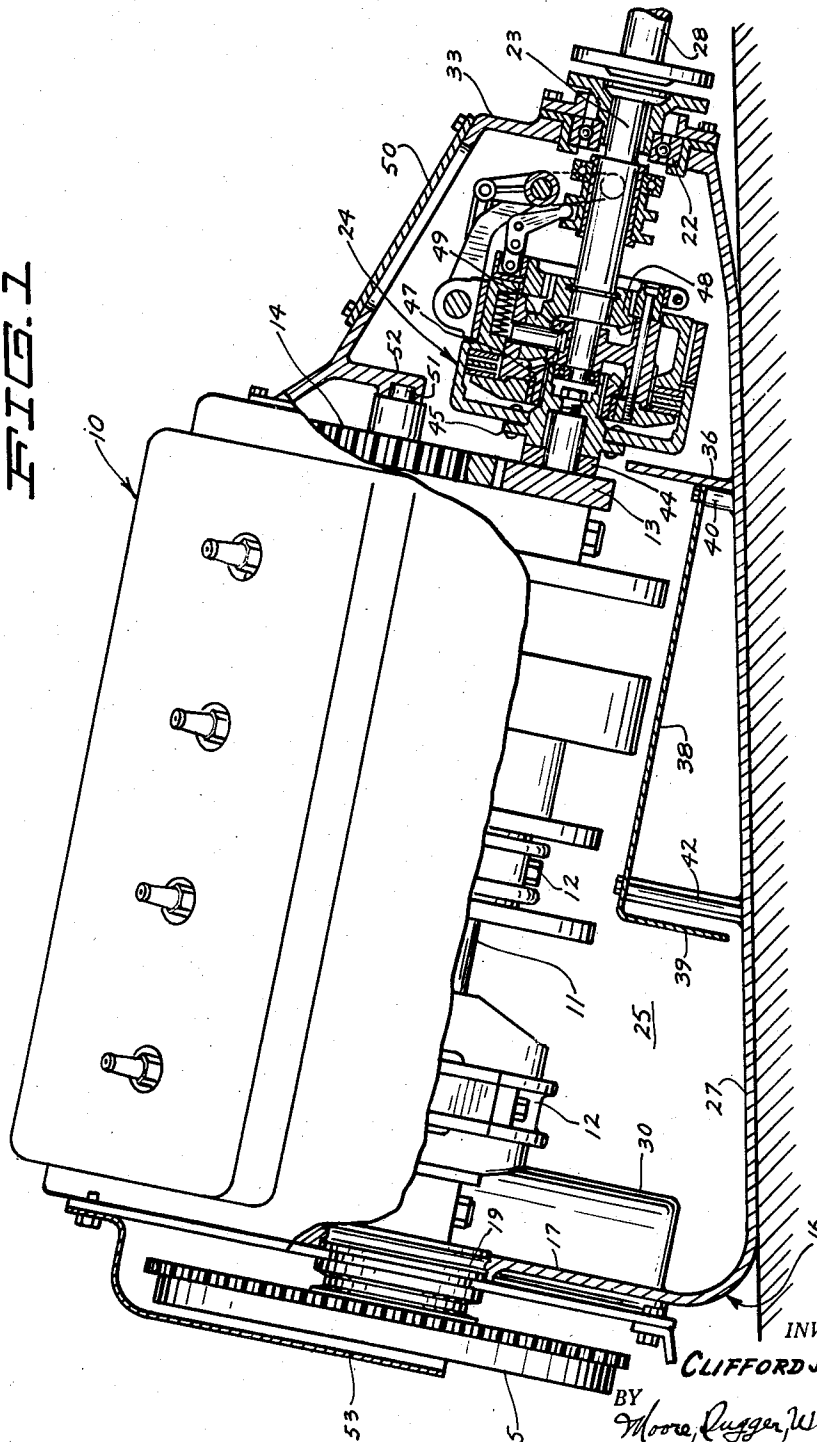
C. J. TROMBLEY  
MARINE CONVERSION UNIT

2,833,163

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2 Sheets-Sheet 1

FIG. 1



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2 Sheets-Sheet 2

FIG. 2

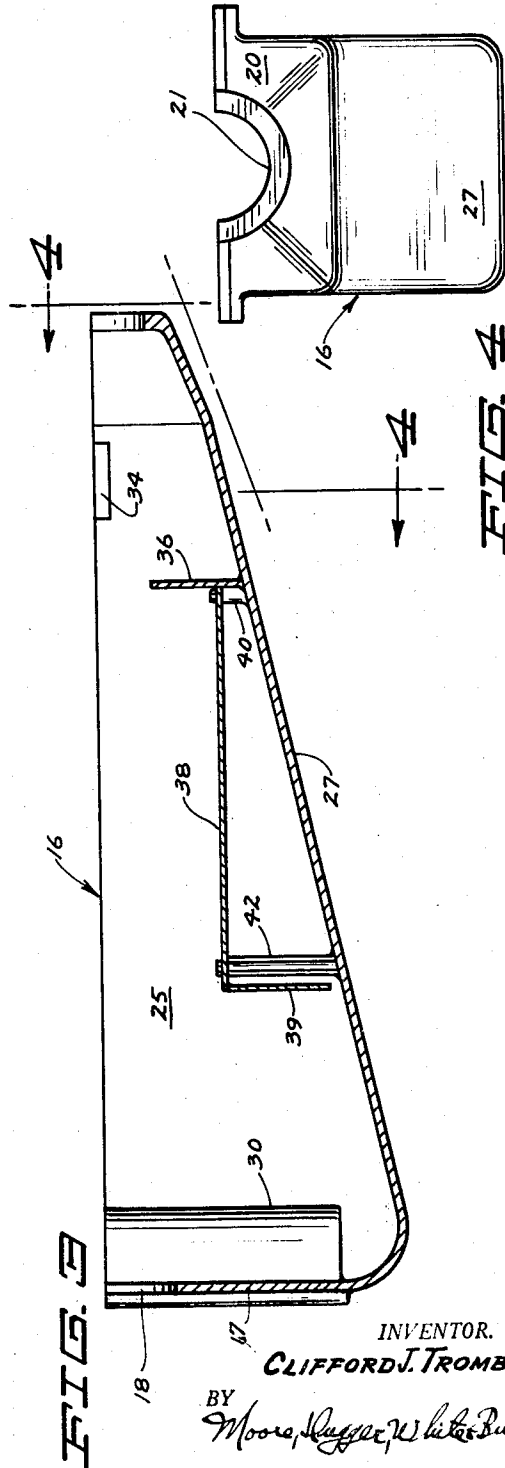
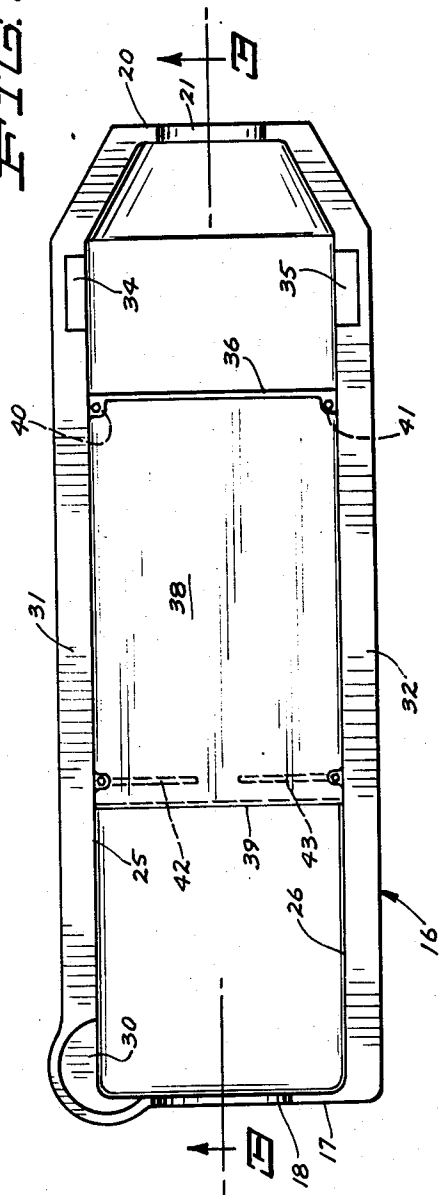


FIG. 3

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1

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## MARINE CONVERSION UNIT

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7 Claims. (Cl. 74—780)

This invention relates to a conversion unit for adapt-

ing automotive internal combustion engines for marine use. The principal object of this invention, therefore, is to provide a unit for converting automotive engines for marine installation.

Other objects of the invention will become apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, this invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following description setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

The invention is illustrated by the drawings in which the same numerals refer to corresponding parts and in which:

Figure 1 is a side elevation of an automotive engine converted by the unit of this invention for marine use, the view being partly in section;

Figure 2 is a top plan view of the conversion pan which is a component of the conversion unit;

Figure 3 is a vertical section taken on the line 3—3 of Figure 2 and in the direction of the arrows; and

Figure 4 is an end view of the pan taken on the line 4—4 of Figure 3 and in the direction of the arrows.

Broadly stated, the conversion unit of this invention comprises a planetary type reverse gear permitting utilization of a drive from the timing gear end of the automotive engine, a conversion crankcase pan which extends outwardly beyond the timing gear to form part of a housing for the reverse gear and a reverse gear cover which closes off all of the water openings which are ordinarily provided for the front end accessories of an automotive engine and the upper portion of the crankcase-reverse gear pan. The unit also includes a flywheel cover. The conversion pan provides the proper alignment of the drive shaft for marine use and provides for a common oil supply for the engine and the reverse gear.

Referring to the drawings and particularly to Figure 1, there is indicated generally at 10 a V-type automotive engine. The conversion kit of this invention is particularly adapted to the use of a Ford V-8 engine, but obviously it is not so limited. The crank shaft 11 of engine 10 carries piston connecting arms 12. Timing gear 13 keyed on one end of the crankshaft 11 meshes with timing gear 14 on the camshaft. Flywheel 15 is keyed to the opposite end of the crankshaft.

The standard crankcase oil pan of the automotive engine is replaced by a conversion oil pan indicated generally at 16. The conversion pan includes a relatively deep front wall 17 having a recess 18 for receiving a ring bearing 19 carrying the flywheel end of crankshaft 11 and a somewhat narrower relatively shallow back wall 20 having a recess 21 for receiving a ring bearing 22 carrying one end of the drive shaft 23 of the reverse gearing mechanism 24. The opposite sidewalls 25 and 26

2

are generally triangular in shape and taper inwardly at their rearward ends toward the somewhat narrower back wall. The sloping bottom wall 27 is adapted when rested in the flat bottom of a boat to provide the proper angle of inclination (about 15°) for the crankshaft 11, reversing gear drive shaft 23 and consequently for propeller drive shaft 28. A generally cylindrical well 30 is provided for an oil pump at the intersection of side wall 25 and front wall 18.

Conversion pan side walls 25 and 26 are provided with flanges 31 and 32, respectively, along the top edges to fit the forward portion of the pan to the lower face of the engine block and the rearward portion of the pan to the lower face of the reversing gear housing 33. There are provided seating depressions 34 and 35 in the sidewalls 25 and 26, respectively, to support and position the reversing gear mechanism 24.

To insure the maintenance of a pool of oil in the reversing gear end of the conversion pan there is provided a transverse barrier wall 36 projecting from the bottom wall 27 of the pan. Barrier wall 36 extends between sidewalls 25 and 26 toward the rear wall end of the pan so as to divide the pan generally into an engine block portion lying under the engine block and a reversing gear portion lying under the reversing gear mechanism. Wall 36 is generally normal to the top edges of the sidewalls and is of a height about two-thirds the depth of the pan at that point, sufficient to avoid interference with the crankshaft or reversing gear.

A baffle plate 38 is disposed forward of barrier wall 36 generally parallel with the top edges of the sidewalls. The forward edge of the baffle plate has a depending portion 39 extending almost to bottom wall 27 of the conversion pan. The rearward end of baffle plate 36 is supported by and secured to two posts 40 and 41 cast integrally with the conversion pan adjacent barrier wall 36 and the sidewalls. The forward end of the baffle plate is supported by two transverse baffle wall portions 42 and 43. The conversion pan is desirably cast from aluminum.

The reverse gearing system 24 does not per se form any part of this invention. The particular gearing system preferably used and here illustrated is the subject matter of expired United States Patent No. 1,571,210 issued February 2, 1926 to John D. Mooney. The disclosure of that patent is incorporated herein by reference. It is to be understood that the reversing gear of that patent is illustrative of the type of reversing gear which may be used as part of the conversion unit of this invention but that the invention is not limited to this particular reversing gear.

The reversing gear 24 is positioned generally at the timing gear end of engine 10. A spacer sleeve 44 is fitted over the stub end of crankshaft 11 and a collar 45 is keyed to the projecting end of the shaft. Collar 45 in turn carries a housing 46 enclosing a pair of facing coaxial bevel gears 47 and 48 and a plurality of bevel planetary gears 49 carried by housing 46 and meshing with both of said gears 47 and 48. Bevel gear 48 is keyed to drive shaft 23. Means are provided to couple drive shaft 23 to propeller drive shaft 28. Suitable clutch means are provided to put the reverse gearing system into and out of gear.

The reversing gear housing 33 is provided with an access opening and a cover plate 50. The forward end of camshaft 51 is journalled in a bracket 52 on the interior of reversing gear housing 33 which replaces the normal timing gear cover. A protective cover 53 is also provided over flywheel 15.

In effecting the conversion of an automotive engine to marine use the standard oil pan is discarded and the engine block is stripped of its front end accessories includ-

3

ing the timing gear housing. The normal front-rear alignment of the engine is reversed in converting it to marine use. The conversion pan 16 is longer than the standard engine oil pan. The normally rearward or flywheel end of the engine is positioned over the forward deep end of the conversion pan. The reversing gear system 24 is mounted to be driven from the normally forward or timing gear end of the engine and is positioned in the seating depressions 34 and 35 in the shallow rearward end of the conversion pan. The reversing gear housing 33 is fitted to the normally forward end of the engine block and over the reversing gear. A protective cover is fitted over the flywheel 15.

When so assembled the automotive engine is now adapted for marine use. When mounted in a marine vessel the normal horizontal axial alignment of the engine crankshaft is modified by the angle of the bottom of the conversion pan to align the shafts properly with a marine propeller shaft 28 to which the reversing gear drive shaft 23 is adapted to be coupled.

It is apparent that many modifications and variations of this invention as hereinbefore set forth may be made without departing from the spirit and scope thereof. The specific embodiments described are given by way of example only and the invention is limited only by the terms of the appended claims.

What I claim is:

1. A conversion unit for adapting a V-type automotive internal combustion engine to marine use which comprises an elongated conversion oil pan, a planetary reversing gear system to be driven from the timing gear end of the crank shaft of said engine to drive a drive shaft, said reversing gear system being positioned in one end of said conversion pan and a reversing gear housing enclosing said reversing gear system and that end of said conversion pan and adapted to be fitted to said engine to be converted replacing the timing gear housing, the opposite end of said conversion pan being adapted to be fitted to said engine to be converted, replacing the oil pan, said conversion pan comprising a relatively deep portion to be fitted to said engine and a relatively shallower portion to receive said reversing gear system, a recess in the deeper end wall to receive a ring bearing journalling the flywheel end of the crankshaft of said engine and a recess in the shallower end wall to receive a ring bearing journalling the drive shaft of the reversing gear, the bottom wall of said pan connecting said end walls being disposed at an angle with respect to the axis of said shafts to align said converted engine with respect to a propeller shaft to be driven.

2. A conversion unit according to claim 1 further characterized in that said conversion pan includes a transverse barrier wall extending between the conversion pan side walls and substantially normal to the top edges of said side walls, said barrier wall being positioned adjacent the reversing gear end of said pan to partially enclose said reversing gear, transverse baffle wall portions extending between the pan sidewalls and substantially normal to the top edges of said sidewalls, said baffle wall portions being positioned between said barrier wall and the deeper end wall of said pan and a baffle plate extending substantially over the area between said sidewalls, barrier wall and baffle wall portions substantially parallel with the top edges of said sidewalls.

3. A conversion unit according to claim 2 further characterized in that said baffle plate is provided with a

4

depending portion extending downward toward the pan bottom wall adjacent to said barrier wall portions.

4. A conversion unit according to claim 1 further characterized in that said reversing gear system comprises a first bevel gear adapted to be driven by said engine to be converted, a second bevel gear coaxial with the first and keyed to drive a drive shaft and a plurality of planetary bevel gears meshing with both of said first mentioned gears.

5. A conversion unit for adapting V-type automotive internal combustion engines to marine use which comprises an elongated conversion oil pan, a reversing gear system and a housing for said reversing gear system, said conversion pan being adapted to be fitted to said engine to be converted, replacing the oil pan and extending beyond the timing gear end of said engine to support and partially enclose said reversing gear system and comprising a relatively deep portion to be fitted to said engine and a relatively narrower portion to receive said gearing system, a recess in the deeper end wall to receive a ring bearing journalling the flywheel end of the crankshaft of said engine and a recess in the shallower end wall to receive a ring bearing journalling the drive shaft of the reversing gear, the bottom wall of said pan connecting said end walls being disposed at an angle with respect to the axis of said shafts to align said converted engine with respect to a propeller shaft to be driven, a transverse barrier wall extending between the pan sidewalls and substantially normal to the top edges of said sidewalls, said barrier wall being positioned adjacent the reversing gear end of the pan to partially enclose said reversing gear, a pair of transverse baffle wall portions extending between the pan sidewalls substantially normal to the top edges of said sidewalls and positioned between said barrier wall and deeper end wall, a horizontal baffle plate extending substantially over the area between said sidewalls, barrier wall and baffle wall portions substantially parallel with the top edges of said sidewalls and a depending portion extending downward from said baffle plate toward the pan bottom wall adjacent to said barrier wall portions; said reversing gear system being adapted to seat in the sidewalls of said conversion pan and to be driven from the timing gear end of said engine to be converted and comprising a first bevel gear adapted to be driven by said engine, a second bevel gear coaxial with the first and keyed to drive a drive shaft and a plurality of planetary bevel gears meshing with both of said first mentioned gears; said gear housing enclosing said reversing gear system and fitted to the top edges of the sidewalls of the conversion pan at that end of the pan and adapted to be fitted to the normally forward end of said engine to be converted replacing the timing gear housing, and a bracket within said housing to journal the timing gear end of the camshaft of said engine.

6. A conversion unit according to claim 5 further characterized in that said conversion pan, barrier wall and baffle wall portions are integrally cast of aluminum.

7. A conversion unit according to claim 5 further characterized in that a protective cover is provided adapted to be fitted to said engine block and partially enclose the flywheel of said engine.

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65