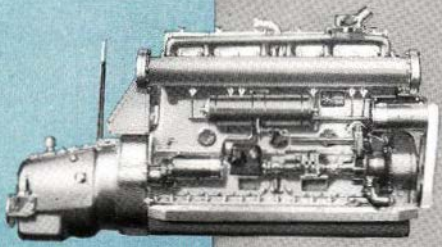
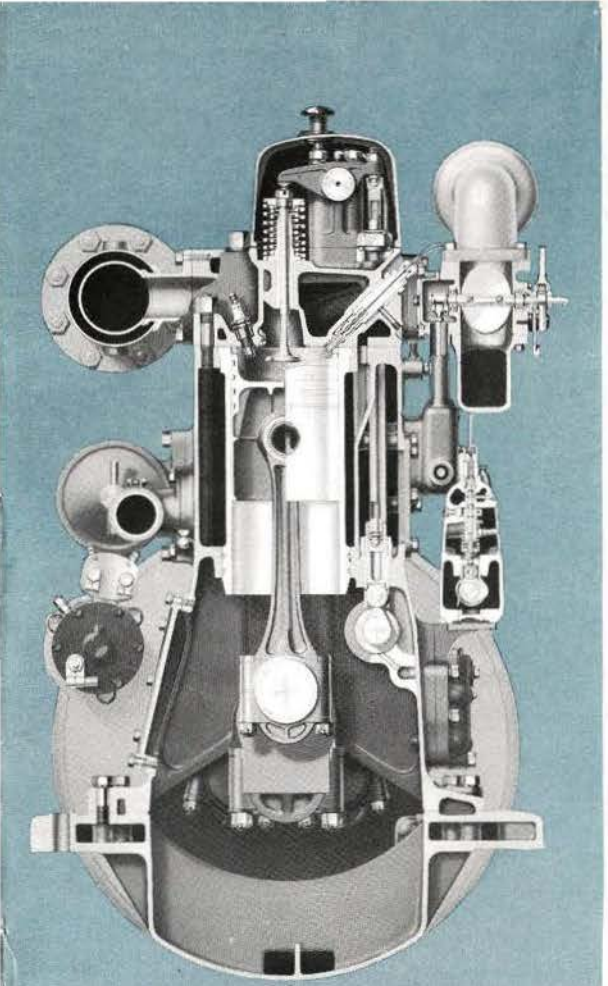
WAUKESHA HESSELMAN

MARINE OIL ENGINES

FOR ECONOMY AND LONG LIFE





SPARK-IGNITION LOW PRESSURE OPERATION PROVIDES OIL ENGINE ECONOMY, GASOLINE ENGINE CONVENIENCE

All of the Waukesha-Hesselman marine engines have the advantages of low pressure operation.

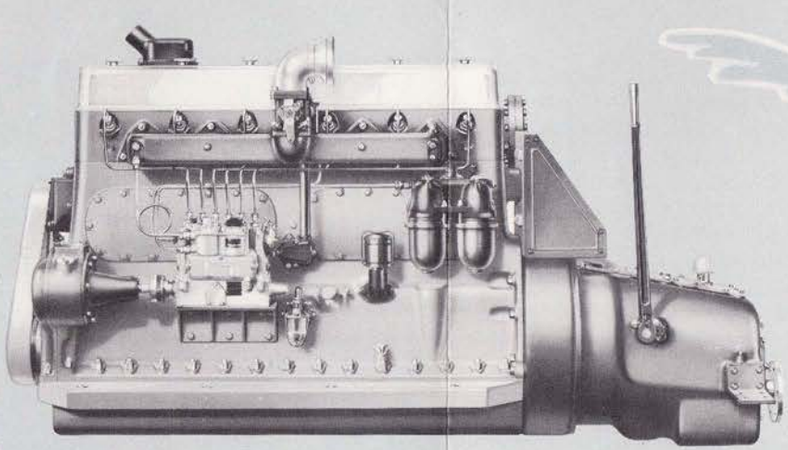
This means first of all that starting is easy; not only can these engines be turned over as easily as a gasoline engine of comparable size but they have positive spark ignition that assures firing on the first turn of the engine—and smooth power delivered to the propeller.

It means also that working parts are less subject to strain. Rods, heads, pistons, cylinders, gaskets, and bearings may be built lighter and still outwear those of the conventional, compression-ignition Diesel engine. The construction, in each case, is such that these parts may be renewed or repaired easily when and if the occasion arises. Cylinders are removable wet sleeve type; crankshaft and rod bearings are made accessible through the use of large hand holes in the sides of the crankcase; and overhead valve design makes valve grinding a comparatively easy task.

Low pressure operation of Hesselman engines eliminates much of the difficulty of securing the proper fuel. Positive spark ignition assures firing at the precise moment desired regardless of small differences in the fuel's ignitability factor; whereas compression ignition forbids this, a slight increase in a fuel's stability—"ignition lag"—may cause serious damage. With Waukesha Marine Oil Engines, even gasoline mixed with a little lubricating oil may be used in emergencies without danger to vital parts.

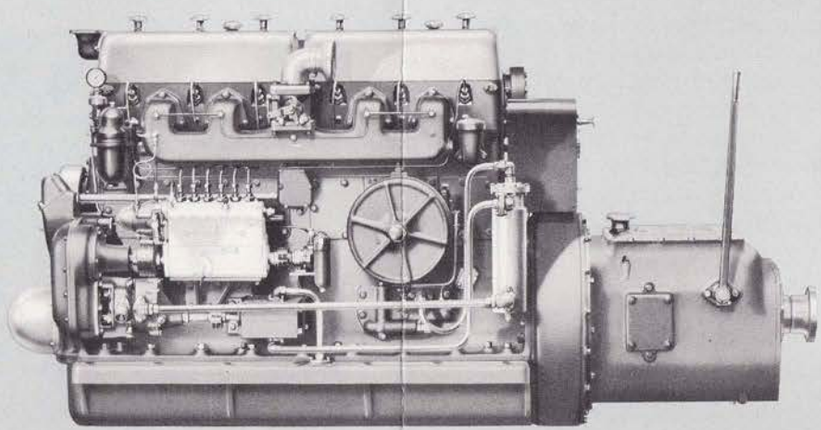
Of course, the greatest advantage is economy. Hesselman low pressure operation reduces maintenance costs to a minimum. Ring sticking, nozzle burning and costly injection servicing are reduced to such an extent that even "overhauls" usually entail little more than valve grinding and spark plug replacement. This, plus long life, plus simplicity, plus economical operation on fuel oil adds up to the "greatest overall economy on record."

WAUKESHA-HESSELMAN MARINE OIL ENGINES



LEFT—Fuel injection side of Defender and Resolute series marine engine with 2:1 reduction and reverse gear. Rated at 160 and 175 hp. respectively, these Waukesha-Hesselman Oil Engines have all the advantages of low pressure construction: integrally cast cylinder frame and crankcase, wet sleeve cylinders, overhead valves, full pressure oiling, and patented Waukesha non-stick piston rings. Like all Waukesha Marine Engines, they incorporate a special closed cooling system.

RIGHT — Fuel injection side of Wanderer Model 215 hp., Waukesha-Hesselman marine engine equipped for direct drive operation. Ruggedly built, this engine has a one-piece crankcase and cylinder frame and rigid, well-braced oil pan. Overhead valve construction, wet sleeve cylinders and availability of all working parts contribute to the Wanderer's economical maintenance, while full pressure oiling, non-stick piston rings and special closed cooling system increase operating efficiency. Open type large orifice — nozzles, with no close fitting moving parts, make frequent cleaning a thing of the past.



EACH OF FOUR MODELS INCORPORATES LOW PRESSURE OPERATING ADVANTAGES

SPECIFICATIONS

	Resolute	Defender	Wanderer	Reliance
Bore and stroke	5¾ x 6½	6¼ x 6½	7 x 8½	8½ x 8½
Displacement, cubic inches	1013	1199	1962	2894
Valve diameter clear, intake	2 3/8	2 3/8	2½	3¼
Valve diameter clear, exhaust	2	2	2¼	2¾
Connecting rod, c. to c.	13¼	13¼	15 3/8	20 7/8
Connecting rod bearing, dia. x lgth.	3 3/8 x 2 1/16	3 3/8 x 2 1/16	3¼ x 2¾	4 x 3¾
Front main bearing, dia. x lgth.	4 x 2 3/16	4 x 2 3/16	3¾ x 3¾	4¼ x 4 13/16
Center main bearing, dia. x lgth.	4 x 3 9/16	4 x 3 9/16	3¾ x 4¼	4¼ x 4⅞
Intermediate main bearings (4), dia. x lgth.	4 x 2 3/16	4 x 2 3/16	3¾ x 2¼	4¼ x 3⅝
Rear main bearing, dia. x lgth.	4 x 3¼	4 x 3¼	3¾ x 5½	4¼ x 5½
Piston pin floating, dia. x lgth.	1⅞ x 5	1⅞ x 5½	2 x 6	2¼ x 5⅜
Compression rings, No. and width	3–¼	3–¼	3–¼	4–¼
Oil control ring, width	5/16	5/16	¼	¼
Timing gears, face	1½	1½	1½	2¼
Exhaust manifold bore, pipe tap	3½	3½	3½	4
Oil capacity, gallons	9	9	11	14
Oil capacity, reverse gear, gallons	3	3	5	6
Oil capacity, reduction gear, gallons			3	4
Reduction gear ratios	1:1, 2:1, 3:1	1:1, 2:1, 3:1	2:1, 3:1	2:1, 3:1
Net weight of unit with reduction gear	3885	3935	7280	9350
Propeller half of shaft coupling	Bored to suit	Bored to suit	Bored to suit	Bored to suit

Standard rotation on all models is clockwise looking at front end—requires left hand propeller. Unless otherwise specified all dimensions are given in inches.

The manufacturer reserves the right to change or modify the design or equipment specifications as herein set forth without incurring any obligation to make like changes on engines previously sold.

WAUKESHA MOTOR COMPANY

MARINE ENGINEERING DIVISION

WAUKESHA **WISCONSIN**

Form No. 1146A—2½M—10-39

Litho in U. S. A.

A DIESEL ENGINE WITH A SPARK PLUG

The average man's conception of a Diesel is an engine that burns cheap fuels, injecting them solidly with a pump and injectors—and as a result "Spark-Diesel" was the term instantly applied by engine users to the patented oil engine built by Waukesha. Technically incorrect, this name describes the engine most clearly because it is a practical definition, and in truth it is no farther from the engine of Rudolph Diesel than the modern compression ignition engine is.

It was to provide an engine that would combine the best points of both gasoline and modern Diesel engines that the Waukesha-Hesselman was designed. The extent to which this has been accomplished is demonstrated by the testimony of thousands of owners that this oil engine has the easy starting, light weight, and general simplicity characteristic of gasoline engines as well as the "greatest overall operating and maintenance economy."

The Waukesha-Hesselman is a low pressure engine that burns Diesel fuels. It is similar to the conventional Diesel in that the fuel is injected solidly, but instead of depending on the heat of high compression pressure to ignite the charge, the Waukesha-Hesselman uses a spark, positively and precisely timed. The net result is a combination of advantages no other engine can claim.

The Waukesha-Hesselman line of marine engines consists of four sizes developing 285 horsepower, 215 horsepower, 188 horsepower, and 160 horsepower. All of these engines burn domestic furnace oils Nos. 1, 2, or 3, distillates or tar oils without any internal changes, and their regular marine equipment includes fresh water and sea water pumps for closed system cooling, full pressure lubrication, outside mounted oil cooler and outside mounted oil circulating pumps and lines, oil filters that can be serviced without stopping the engine, large hand holes for inspection and adjustment of main and rod bearings, instrument panel with tachometer and complete gauge and control equipment, water cooled exhaust manifold, and an assortment of reduction gears, reverse gears, and a new electric transmission which provides an infinite speed range forward and reverse for maneuvering by electric control which can be located either singly or with duplicate stations anywhere about the ship.

WAUKESHA MOTOR COMPANY serves some thirty different industries, building 71 types of engines ranging from 10 hp. to over 300 hp. in a plant that covers more than ten acres. Eighteen hundred men are needed to produce the annual output. Full plant capacity is over 100,000 engines per year.