KAHLENBERG

MARINE AND STATIONARY ENGINES

THE Kahlenberg Bros. Co., builders of heavy duty marine and stationary engines, was organized in 1895. In 1916 they built their first oil-burning engine of the Diesel type, which has found ready acceptance amongst commercial boat owners.

Kahlenberg engines are built in units of from 2 to 6 cylinders with an output of from 30 to 300 hp. They are of the two-stroke cycle type with crankcase scavenging and mechanical fuel injection. Their construction is unique in many of the major features they embody.

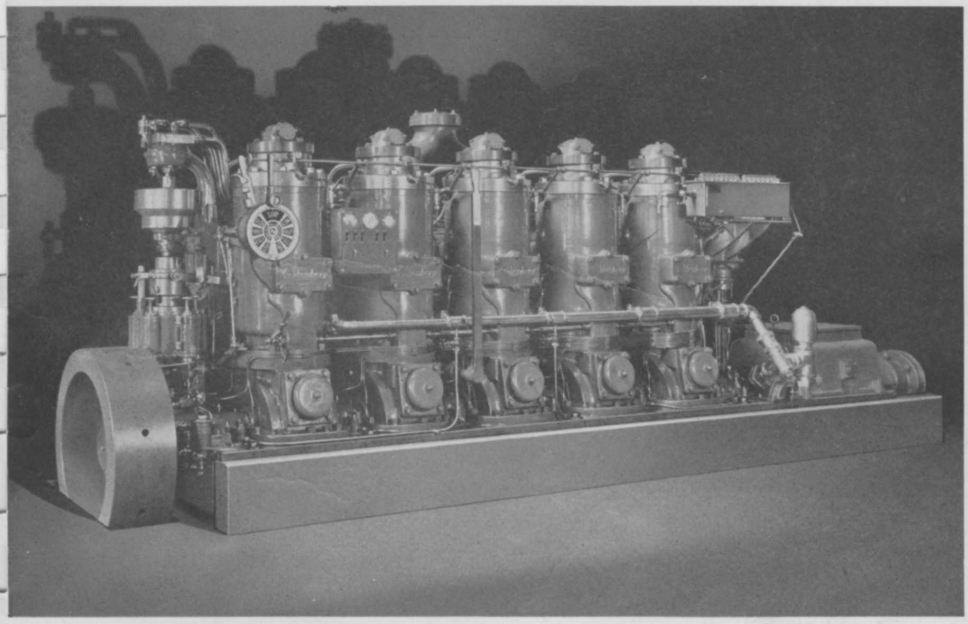
The foundation of all Kahlenberg engines is a solid one-piece bed plate upon which rests not only the cylinders but the reverse or one-way clutches as well, Fig. 4. The bedplate serves as the lower half of the crankcase for all cylinders, whereas the upper half consists of individual castings, the number depending upon the number of cylinders a given unit contains.

Such construction makes for simplicity, and, in addition, it exposes the main crankshaft bearings for easy inspection. The lower (one-piece) crankcase is, of course, divided into a number of separate compartments, one for each individual cylinder. Air-seal rings are placed not only at the end bearings but also on both ends of each center bearing between the cylinders. The purpose of the latter is to prevent the air compressed in one crankcase passing through the bearing along the crankshaft into the adjacent crankcase and blowing the lubricating oil out of the bearing. Cooling water is directed through large water jacket spaces cast into the base plate under each main bearing. This feature combined with the extra bearing length and extreme low bearing pressure provides an exceptionally cold running bearing.

The cylinders are individual castings with intake and exhaust ports on opposite sides. For salt water service a thick renewable zinc plug is provided in the cylinder jacket which effectively counteracts salt water corrosion. Likewise, each cylinder is provided with a water jacket cleanout port permitting flushing sand and sediment from the jackets when required.

The cylinder heads are simple symmetrical castings and for the larger engines having 12½ in. bore, are cast in three separate pieces, Fig. 5.

Fig. 1. Five cylinder Kahlenberg marine engine.



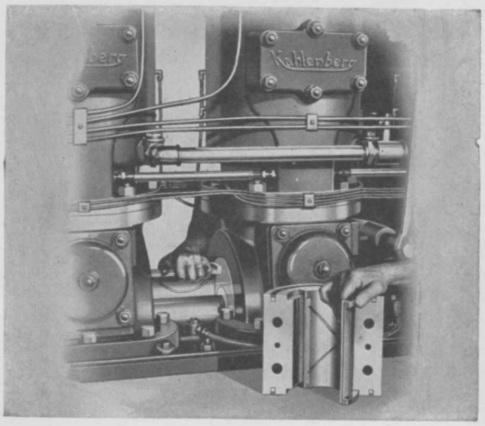


Fig. 2. Showing easy removal of main bearings.

The cylinder head contains the ante-chamber in which the actual combustion takes place. This chamber is connected with the cylinder by only a small opening, consequently the entire burning of the fuel takes place in the ante-chamber instead of the cylinder proper, thus avoiding piston overheating and carbon accumulation on the piston rings.

The pistons are relatively long with heads fitted with integral deflectors forcing the incoming air upwards and permitting the exhaust to leave the cylinder via its proper port and not mingle with the incoming charge of fresh air. The pistons are fitted with five compression rings and one oil wiper ring, as shown in Fig. 7.

The connecting rods are of the marine type, Fig. 8, with crank bearing box built of bronze. The upper half of the box is machined to a smooth bearing surface before the bearing metal is cast in.

The Kahlenberg governor is of the distinctive vertical type, driven by spiral gears and is a complete self-contained combination fuel-injection and speed-regulating unit. The action of the governor is as follows: By extending or withdrawing the single cam used to drive the fuel pumps, the governor changes the stroke of the pumps and consequently the speed of the

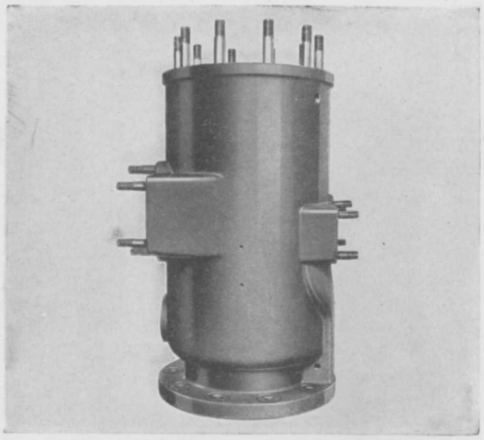


Fig. 3. Kahlenberg cylinder design.

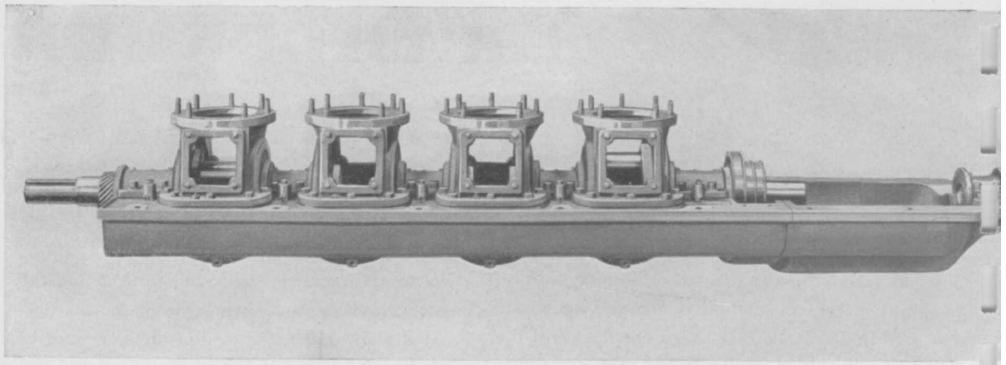


Fig. 4. Engine base and crankcase assembly.

engine, since a shorter stroke delivers correspondingly less fuel than a longer stroke. The combination governor and fuel pump assembly is shown in Fig. 10.

The fuel pumps are of the individual type, assembled in a cluster around the single cam drive and can be removed, replaced, or interchanged without affecting the pump stroke. The maximum stroke is set by measurement and locked. As only one cam is used, it is obvious that the strokes of all pumps are identical and the various plungers are affected at the same instant and exactly the same amount. Since the variable cam movement affects all of the pump plungers, none of the engine's cylinders can receive more fuel than the others. There are no individual adjustments, and wear, if any, affects all pumps in the same manner.

In addition, the fuel pump cam is arranged to be movable in order to vary the fuel injection timing. As only one cam is used to drive all the fuel pumps, by changing the position of this cam, the time of injection can be advanced or retarded at will. A single control lever permits the operator to advance or retard the time of injection while the engine is running. This is an important advantage, for there can be no question as to whether the engine is properly timed, and there is no necessity for experimenting as the operator can immediately shift the timing while the engine is running to secure the best results with any particular propeller speed, or fuel.

The speed control of Kahlenberg engines is equally simple. On 2-cylinder models a hand wheel is placed at the forward port side of the engine to provide for operation at any speed from the slowest up to the maximum. The control is so designed that the engine remains under full governor regulation at all speeds. This enables the governor, when the clutch is engaged or disengaged, to automatically hold the speed of the engine at that corresponding to the position of the control levers. Engines having three or more cylinders are fitted with Kahlenberg single-lever dial control for starting, stopping, speed control, and direct reversing, and have the same governing action as the 2-cylinder models. (See Fig. 10.)

The air intake to the crankcase is by means of air valves. Each crankcase is fitted with two disc valves through which the scavenging air is drawn. With this type of construction, a large valve opening is obtained with but a slight movement of the discs, consequently wear is reduced and the valves are practically noiseless in operation. The material used for the valve discs is a spring bronze and is therefore not subject to salt water corrosion.

The water pumps of Kahlenberg engines are of the plunger type, Fig. 9. They are of bronze, thus avoiding the corrosive and rusting action of salt water. In addition to the cooling

Fig. 5. Kahlenberg cylinder head used on largest bore engines is in three parts.

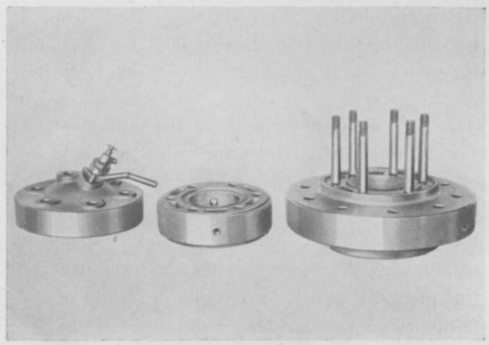
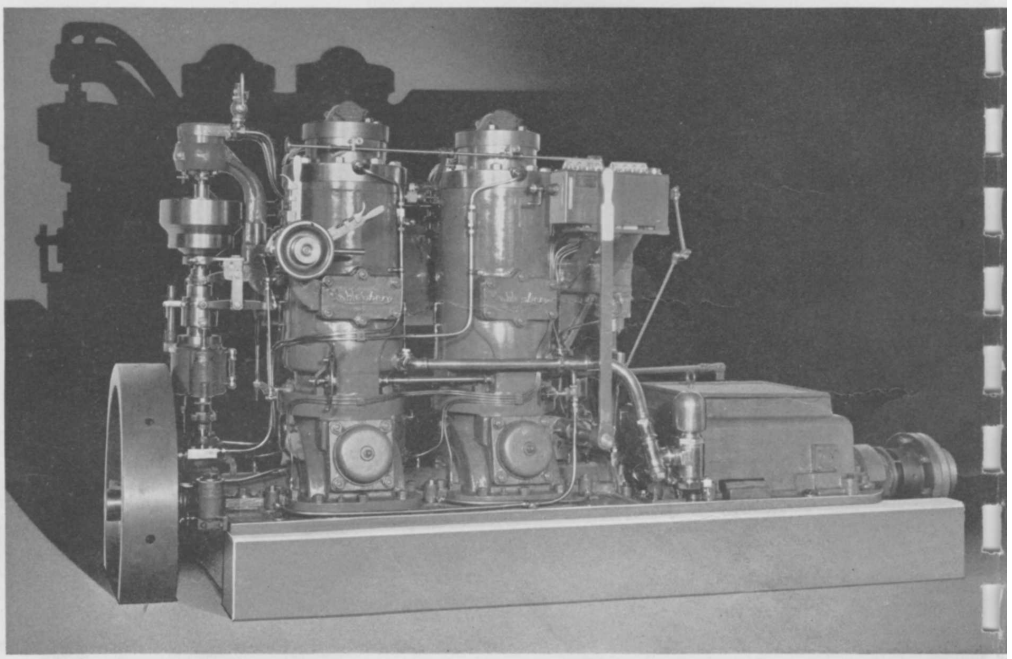


Fig. 6. Two-cylinder Kahlenberg marine engine.



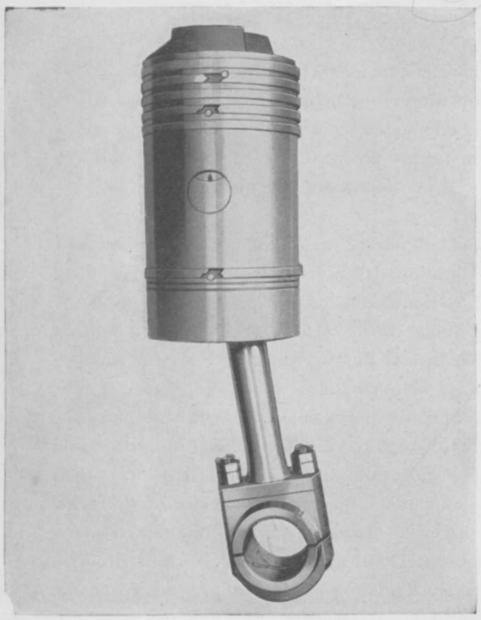


Fig. 7. Piston and connecting rod assembly.

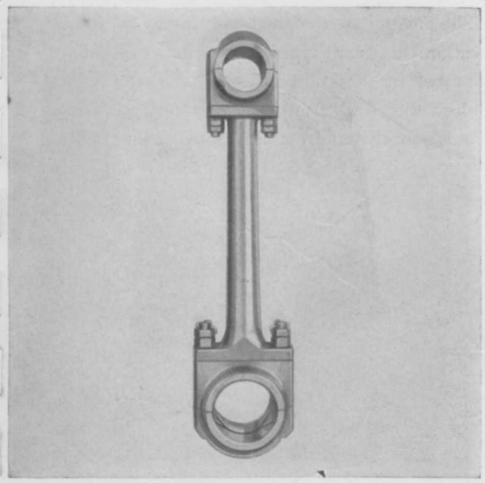


Fig. 8. Double-marine type connecting rod used on largest bore engines.

water pump, the engines are furnished with a bilge pump of identical design and of the same capacity. While this second pump is intended for bilge service, it can be arranged to take the place of the circulating pump in an emergency. Reversible centrifugal circulating pumps are furnished where this type of pump is desirable.

Kahlenberg engines are started and reversed by compressed air and each engine is fitted with built-in air compressor mounted on the rear cylinder and driven by means of an eccentric. A lever controlling the suction valve starts and stops the delivery of air. In addition, an automatic pressure relief valve comes into action when the air pressure reaches a pre-determined point. The air under pressure is piped to a rotary valve from whence it is delivered to the individual cylinders of the engine in proper sequence for starting or reversing.

All 2-cylinder Kahlenberg engines are fitted with reverse gears while those having three or more cylinders are direct reversible and are offered fitted with either reverse gear or one-way sailing clutch or direct connected.

Starting of Kahlenberg engines is aided by a built-in glow plug which heats the air charge compressed in the ante-chamber; thus starting in zero weather or below is assured.

The lubrication system of Kahlenberg engines consists of mechanical lubricators with individual adjustments and attached filter system. One, mounted on the starboard side of the engine, supplies the cylinder walls and wrist pins. The other forces oil to all bearings. The visible feeds and individual adjustments permit regulating the amount of oil fed according to need. The cam and other parts operating the fuel pumps are enclosed and run submerged in oil.

Kahlenberg engines are made in the following units and horsepower range:

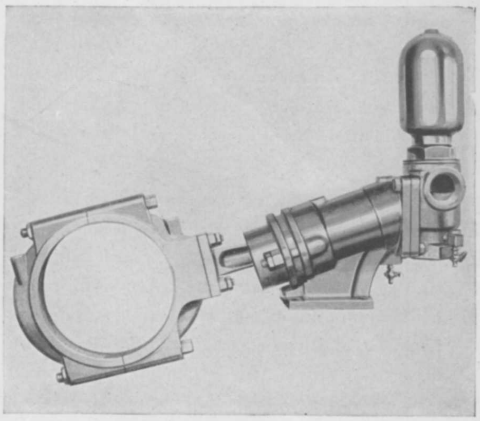


Fig. 9. Plunger-type water pump, bronze throughout.

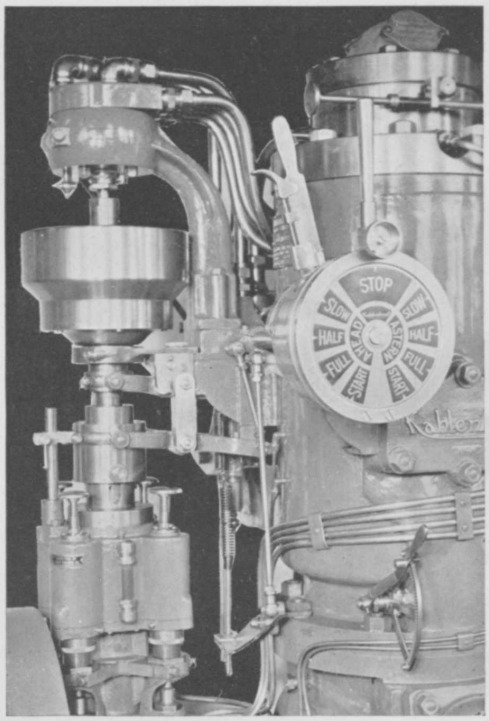


Fig. 10. Kahlenberg type vertical governor and single lever dial control.

KAHLENBERG DIESELS

Model	Cycle	HP.	Cyls.	Bore	Stroke	R.P.M.	Fuel System	S.	M.	A. or P.	Starting
AD	2	30-36	2	8½	9	375-400	Kahlenberg	Yes	Yes		Air
AT	2	45-54	3	8½	9	375-400	Kahlenberg	Yes	Yes		Air
BD	2	50-60	2	10	10½	340-400	Kahlenberg	Yes	Yes		Air
AF	2	60-70	4	8½	9	375-400	Kahlenberg	Yes	Yes		Air
BT	2	75-90	3	10	10½	340-400	Kahlenberg	Yes	Yes		Air
BF	2	120	4	10	10½	340-400	Kahlenberg	Yes	Yes		Air
B-5	2	150	5	10	10½	340-400	Kahlenberg	Yes	Yes		Air
CT	2	150	3	12½	14	275-327	Kahlenberg	Yes	Yes		Air
B-6	2	180	6	10	10½	340-400	Kahlenberg	Yes	Yes		Air
CF	2	200	4	12½	14	275-327	Kahlenberg	Yes	Yes		Air
C-5	2	250	5	12½	14	275-327	Kahlenberg	Yes	Yes		Air
C-6	2	300	6	12½	14	275-327	Kahlenberg	Yes	Yes		Air

S—Stationary; M—Marine; A—Automotive and/or P—Portable.