



Detroit Diesel

Service Manual

6-110 Series

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Service Manual



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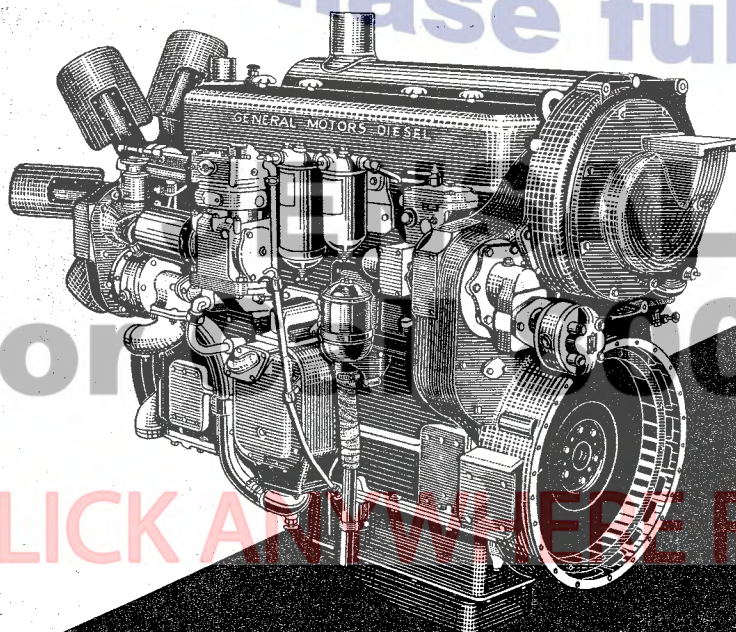
EUCLID

ENGINE

MAINTENANCE MANUAL

SERIES 6-110

GENERAL MOTORS DIESEL



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GENERAL MOTORS CORPORATION
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HOW TO USE THIS MANUAL

FOR YOUR CONVENIENCE AND TO FACILITATE THE LOCATING OF THE MAJOR SECTIONS IN THIS MANUAL, THE FIRST PAGE OF EACH SECTION IS IMPRINTED WITH A BLACK SQUARE IN A POSITION CORRESPONDING TO THE SECTION POSITION AS LISTED ON THIS PAGE. TO USE THE RAPID INDEX, HOLD THE BOUND EDGE OF THE MANUAL WITH LEFT HAND AND SPREAD UNBOUND PAGES WITH RIGHT THUMB UNTIL SQUARE IS LOCATED CORRESPONDING TO INDEX POSITION OF SECTION DESIRED. THEN LET PAGES ESCAPE UNDER THE RIGHT THUMB UNTIL DESIRED SECTION IS REACHED.



EUCLID

ENGINE MAINTENANCE MANUAL

SECTION 1

Page 1

GENERAL

INFORMATION REGARDING THE MANUAL AND ITS USE

SCOPE OF THE MANUAL

This manual contains complete instructions on operation, adjustment (tune-up), preventive maintenance (including lubrication) and repair (including complete overhaul). It was written primarily for persons servicing and repairing the engine, but in addition contains all instructions needed by operators and users.

HOW TO LOCATE INFORMATION

Information regarding a general subject such as the lubricating system can best be located by using the Table of Contents in the front part of this manual. Opposite each subject in this Table of Contents is printed a section number which lines up with a similar section number printed on page 1 of each section throughout the manual. Information on a specific sub-assembly or accessory can be found by consulting the alphabetical index in the back of the manual.

SECTION NUMBERS

The manual is divided into arabic numbered sections, each dealing with a sub-assembly of the engine or with a complete system such as the fuel system. For example: the fuel system section includes the injectors, fuel oil pump, fuel oil filters, and fuel oil manifolds. The lubricating, cooling, and air intake systems are made up of accessories or sub-assemblies in the same manner. The sections and subjects are listed in the Table of Contents on the preceding page.

PAGE NUMBERS

Pages are numbered consecutively, starting with a new page 1 at the beginning of each section.

ILLUSTRATION NUMBERS

The illustrations are numbered consecutively, beginning with a new figure 1 at the beginning of each section.

TOOL REFERENCES

Tool references in the text and in the illustrations are followed by a vendor's tool number which serves to identify each tool. The special tools mentioned in the manual have been developed for the Series 6-110 Diesel engines and are recommended to facilitate service operations. These tools are not supplied by the Euclid Division. All inquiries regarding availability and price should be directed to the vendor: Kent-Moore Organization, General Motors Building, Detroit 2, Michigan.

CLEARANCES, TORQUE SPECIFICATIONS

Clearances of New Parts and Wear Limits are listed in tabular form in Section 17 of this manual. It should be specifically noted that the new clearances apply only when all new parts are used at the point where the various specifications apply. This also applies to references within the text of the manual. The column entitled "maximum allowable worn" in this chart lists the amount of wear which can be tolerated in used engine parts and still assure satisfactory performance. It should be emphasized that the figures given as "maximum allowable worn" must be qualified by the judgment of personnel responsible for installing new parts.

Section 17 also contains Bolt, Nut, and Stud Torque Specifications for standard weight Series 6-110 engines. These Torque Specifications do not apply to certain models containing light weight materials and built to special military specifications.



PRINCIPLES OF OPERATION

The Diesel Principle—The Diesel engine is an internal combustion power unit, in which the heat of fuel is converted into work in the cylinder of the engine.

In the Diesel engine, air alone is compressed in the cylinder; then, after the air has been compressed, a charge of fuel is sprayed into the cylinder and ignition is accomplished by the heat of compression.

The Two-Cycle Principle—In the two-cycle engine, intake and exhaust take place during part of the compression and power strokes respectively, as shown in figures 1, 2, 3, and 4. In contrast, a four-cycle engine requires four piston strokes to complete an operating cycle; thus during one half of its operation, the four-cycle engine functions merely as an air pump.

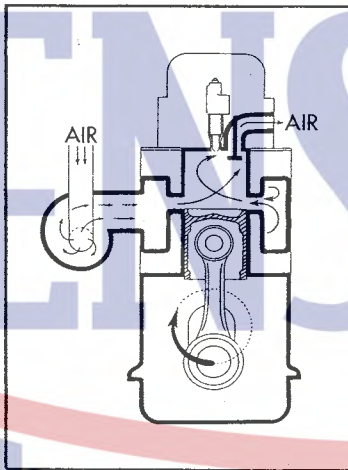


Fig. 1—Scavenging.

A blower is provided to force air into the cylinders for expelling the exhaust gases and to supply the cylinders with fresh air for combustion. The cylinder wall contains a row of ports which are above the piston when it is at the bottom of its stroke. These ports admit air from the blower into the cylinder as soon as the top face of the piston uncovers the ports, as shown in Fig. 1.

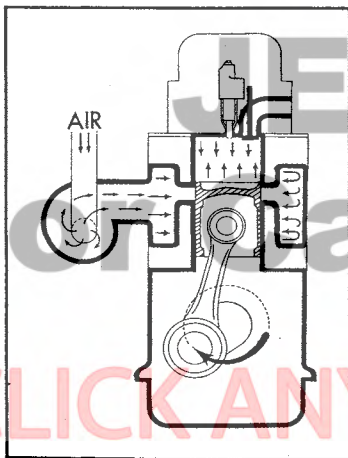


Fig. 2—Compression.

The unidirectional

flow of air toward the exhaust valves produces a scavenging effect, leaving the cylinders full of clean air when the piston again covers the inlet ports.

As the piston continues on the upward stroke, the exhaust valves close and the charge of fresh air is subjected to compression, as shown in Fig. 2.

Shortly before the piston reaches its highest position, the required amount of fuel is sprayed into the combustion space by the unit fuel injector, as shown in Fig. 3. The intense heat generated during the high compression of the air ignites the fine fuel spray immediately, and combustion continues as long as the fuel spray lasts.

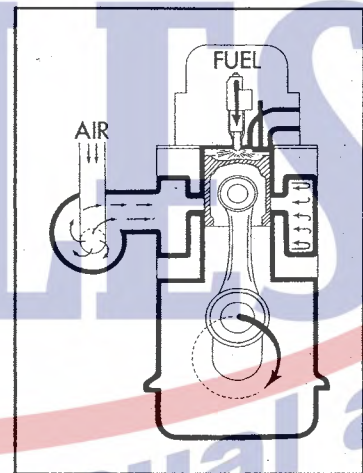


Fig. 3—Power.

The resulting pressure forces the piston downward on its power stroke. The exhaust valves are again opened when the piston is about half way down, allowing the burnt gases to escape into the exhaust manifold as shown in Fig. 4. Shortly thereafter,

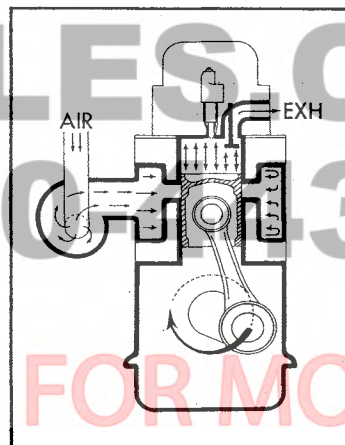


Fig. 4—Exhaust.

the downward moving piston uncovers the inlet ports and the cylinder is again swept with clean scavenging air, as shown in Fig. 1. This entire combustion cycle is completed in each cylinder for each revolution of the crankshaft or, in other words, in two strokes; hence the "two-stroke cycle".



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Fig. 5—Left Side View of a Typical Series 110 Industrial Fan-to-Flywheel Unit.

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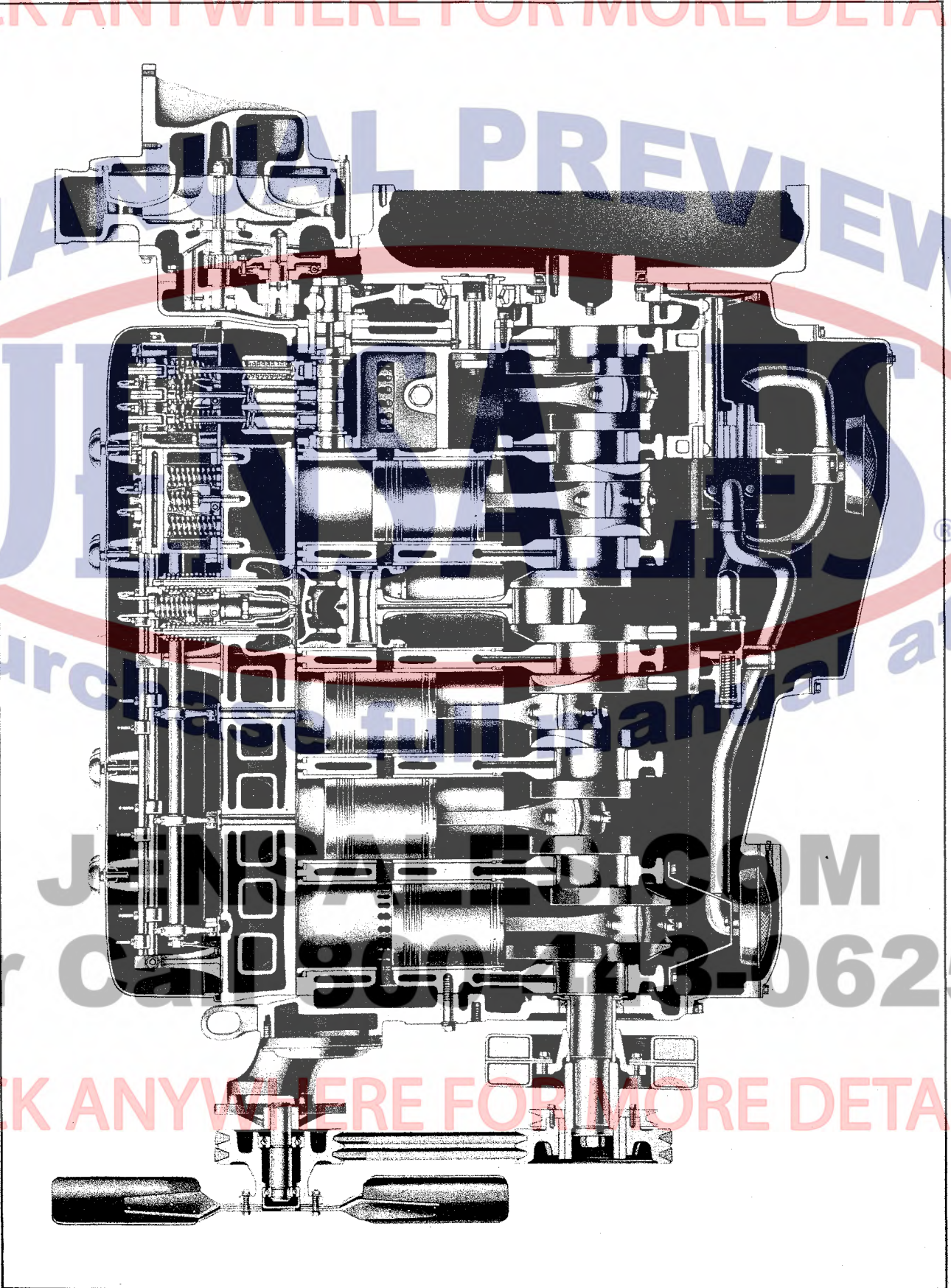


Fig. 6—Side Section of a Series 110 Engine.



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MANUAL PREVIEW

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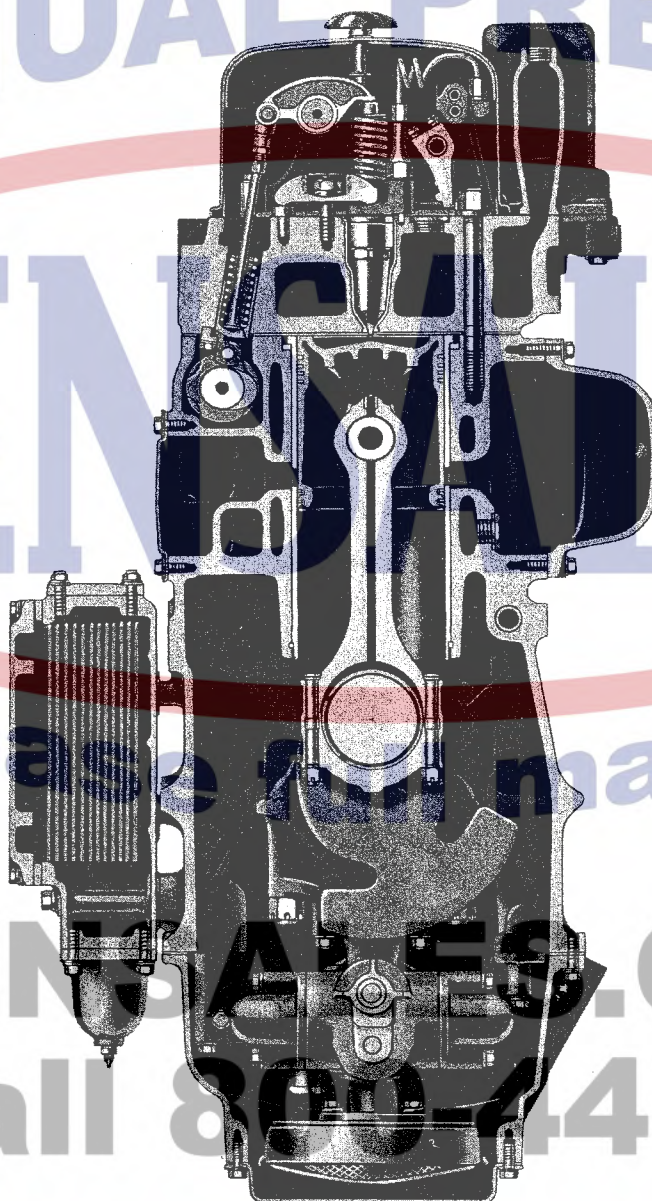


Fig. 7—End Section of a Series 110 Engine.

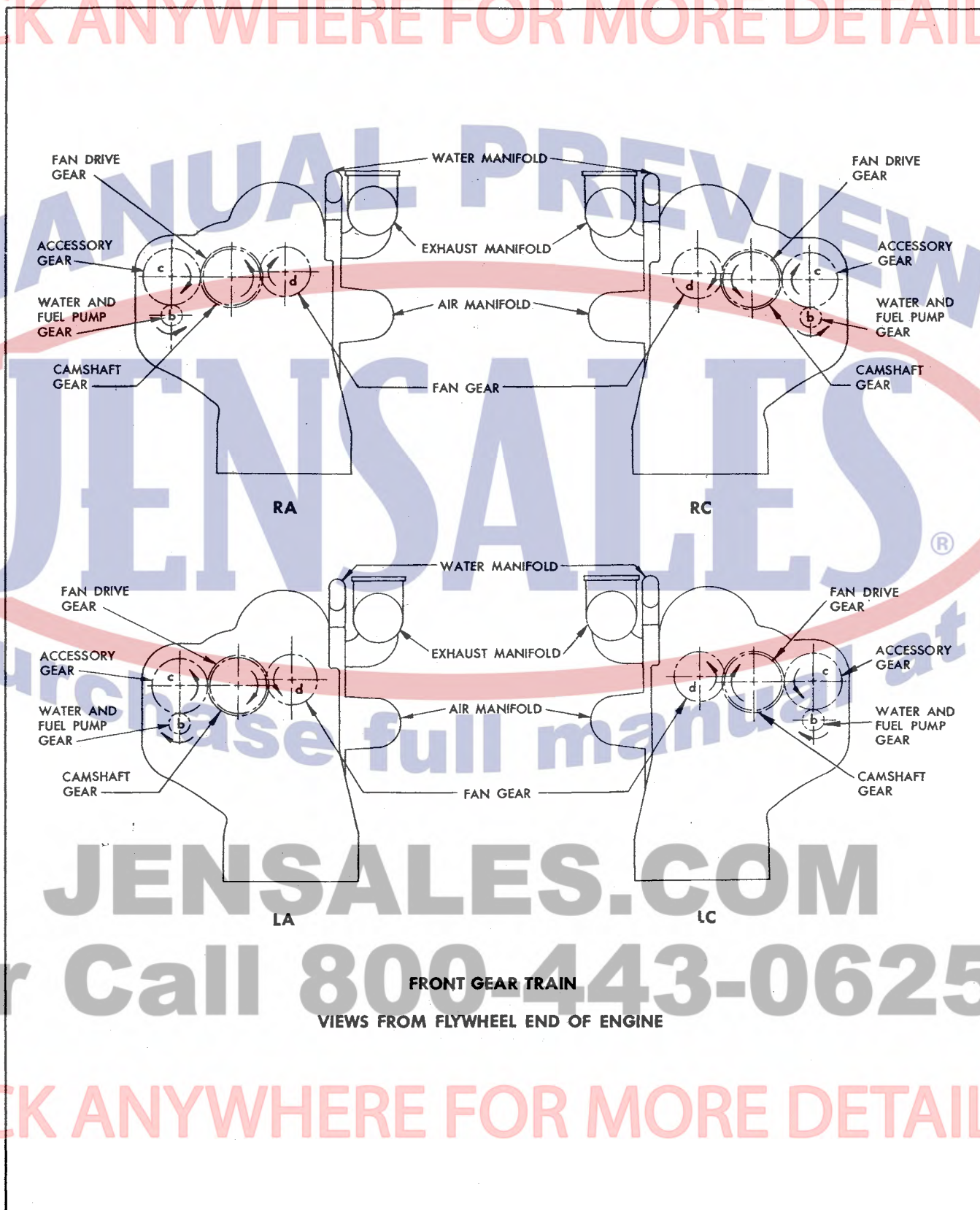
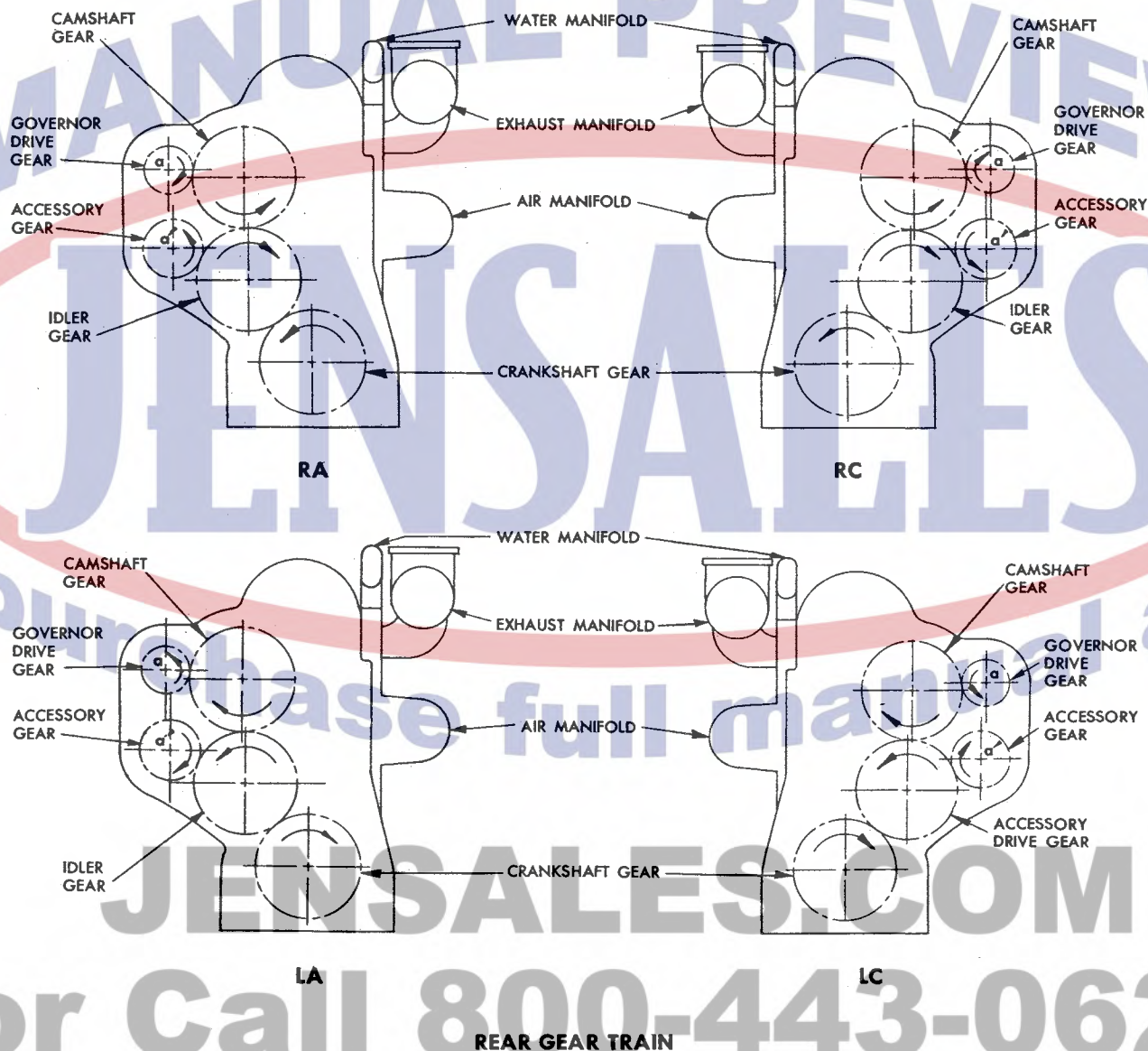


Fig. 8—Front Gear Train Rotation and Arrangement for Corresponding Rear Gear Trains Shown in Figure 9.



VIEWS FROM FLYWHEEL END OF ENGINE

Fig. 9—Rear Gear Train Rotation and Basic Engine Arrangement for Series 110 Engines.