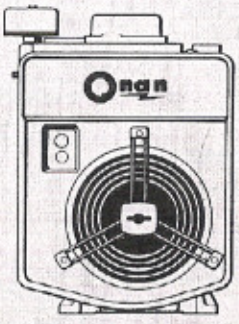


ONAN J LINE ENGINE-GENERATOR SETS

Gasoline • Diesel • Gas

NEW Onan "J" High-Use Industrial Engines

SIX AIR COOLED MODELS—7 TO 40 HP—GASOLINE, DIESEL, GAS

Here's the new engine design that sets a new standard for high-use industrial engines—gasoline, diesel or gas in one, two or four cylinder configurations. All models are vertical, smooth operating in-line units with efficient overhead valve design.

In the development of the J-Line, Onan drew upon the experience gained in the design and manufacture of more than 650,000 engines in the past 30 years. The payoff: these five outstanding advantages for you and your customers.

• INTERCHANGEABLE GASOLINE OR DIESEL

Engines in the same horsepower class can be interchanged without space penalty. You can offer the option of gasoline or diesel power without changing your product design.

• PARTS STANDARDIZATION

Your customers will benefit from the high degree of parts standardization in the J-Line. Many parts are interchangeable between gasoline and diesel, and there is virtually complete interchangeability of working parts for 1, 2 and 4 cylinder models in either gasoline or diesel.

• 3 STARTER OPTIONS, 4 IGNITION OPTIONS AVAILABLE

You can select a starter to meet your specific requirements: Bendix drive, solenoid shift, and a continuously engaged gear system, with overrunning clutch, are available on all models.

Gasoline ignition options include:

BATTERY—breaker points and coil on single cylinder models; breaker points and double-ended coil on two cylinder engines. Automatic retard for starting is provided.

BATTERY—distributor and single coil used on four cylinder engines. Optional distributor available for two cylinder engines.

FLYWHEEL MAGNETO delivers 23 kilovolts at 100 rpm for sure starting. Reduces output at running speeds to triple point life and extend plug life. Available on one and two cylinder engines.

IMPULSE-COUPLED MAGNETO contains magnets, coil, distribution and automatic retard systems. May be serviced or replaced as a unit. Available on two and four cylinder engines.

• ACCESSORIES GROUPED ON SAME SIDE FOR EASIER SERVICE

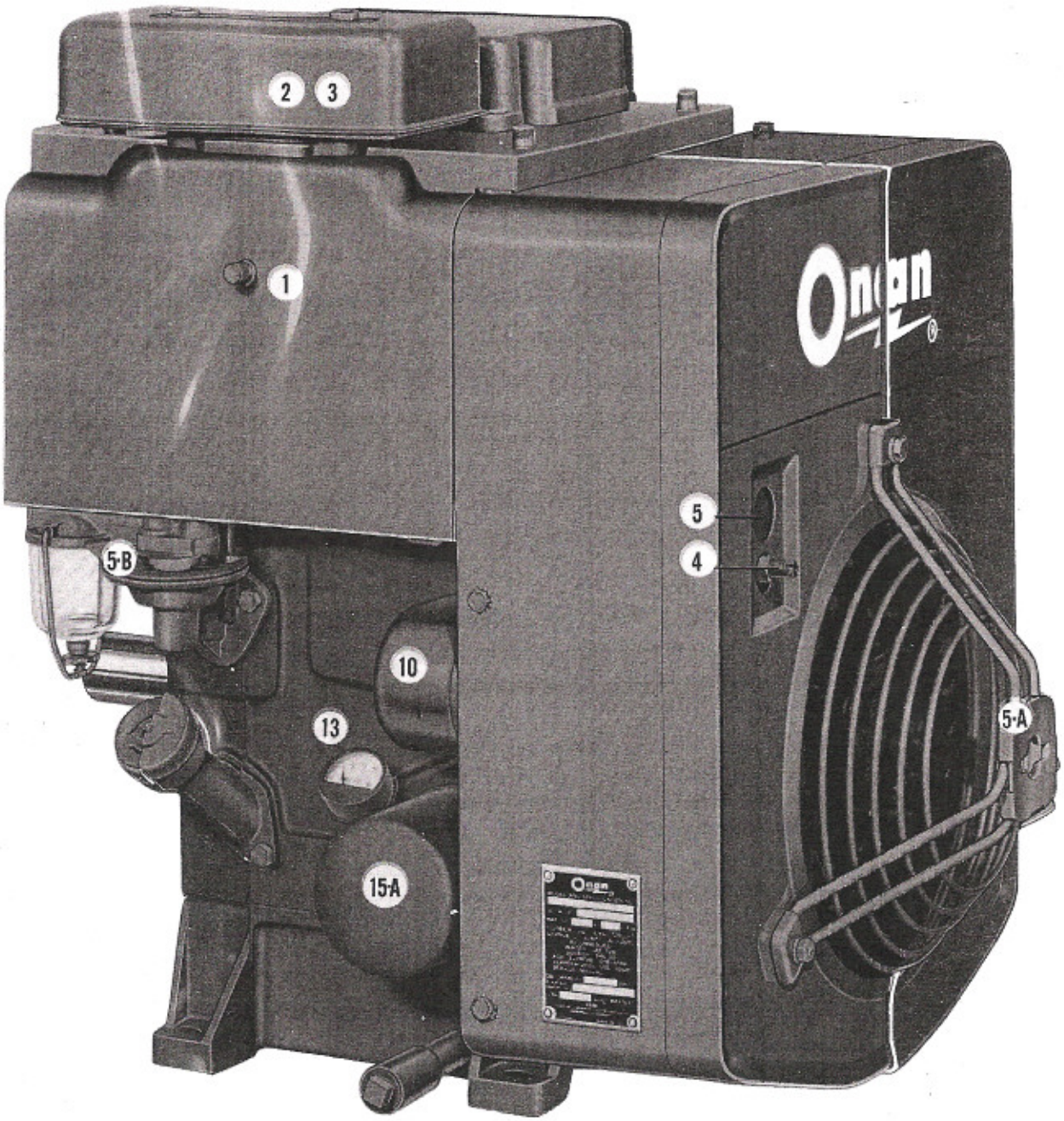
All accessories except starter are grouped on left side, so maintenance is simple even when engine is installed in tight compartment. Fuel pump and carburetor are in coolest location to make Onan engines less sensitive to vapor lock.

• OVERHEAD VALVE DESIGN

OHV reduces surface to volume ratio and increases thermal efficiency. Heat is put to work, increases engine power 15%, cuts fuel consumption 10% compared to L-head design.

OHV reduces oil consumption by eliminating cylinder distortion caused by hot spots associated with L-head engines.

J-Line engines operate *twice* as long as L-head engines before lead deposits build up and combustion chambers must be cleaned.



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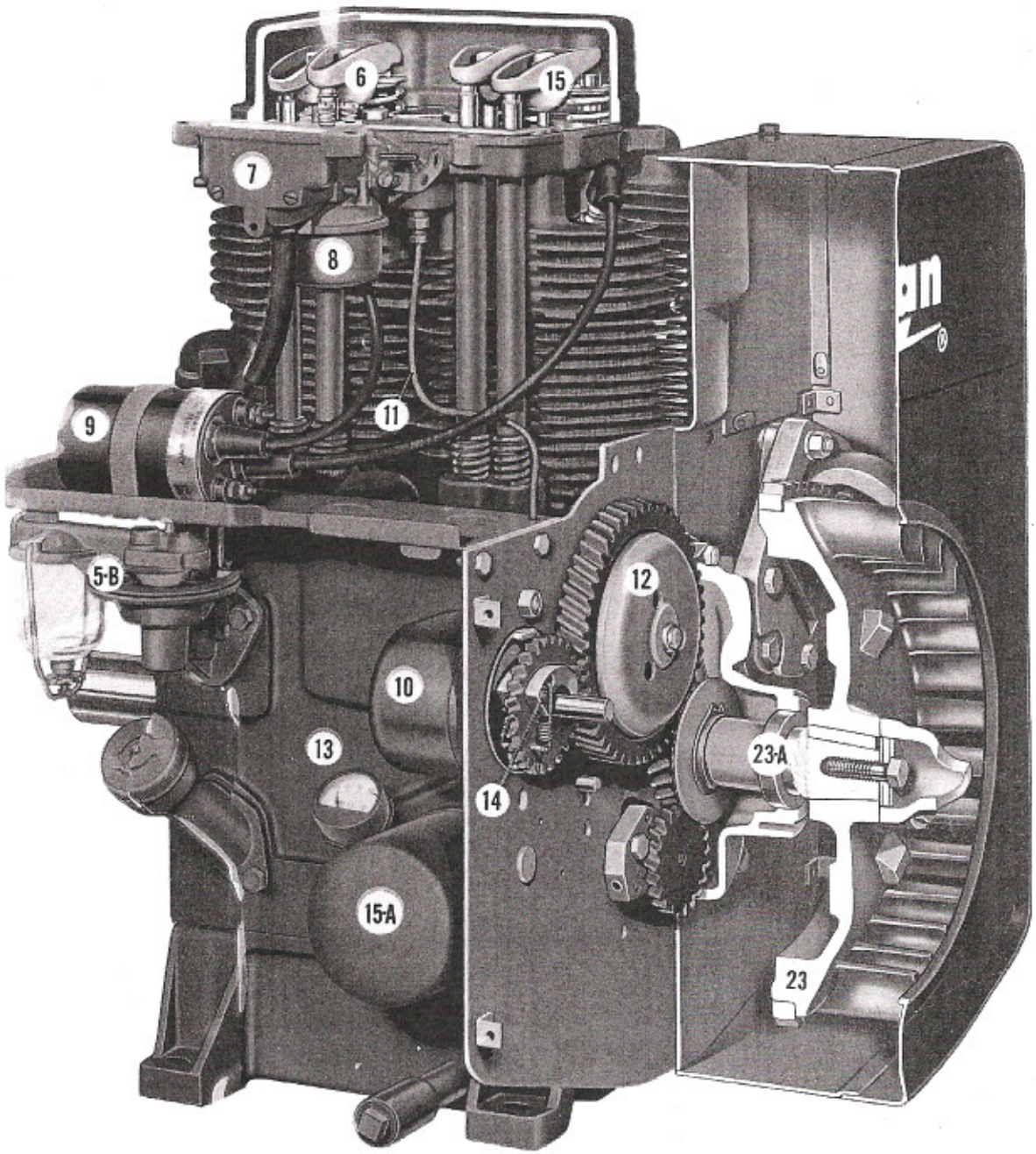
ONAN J-LINE GASOLINE ENGINES

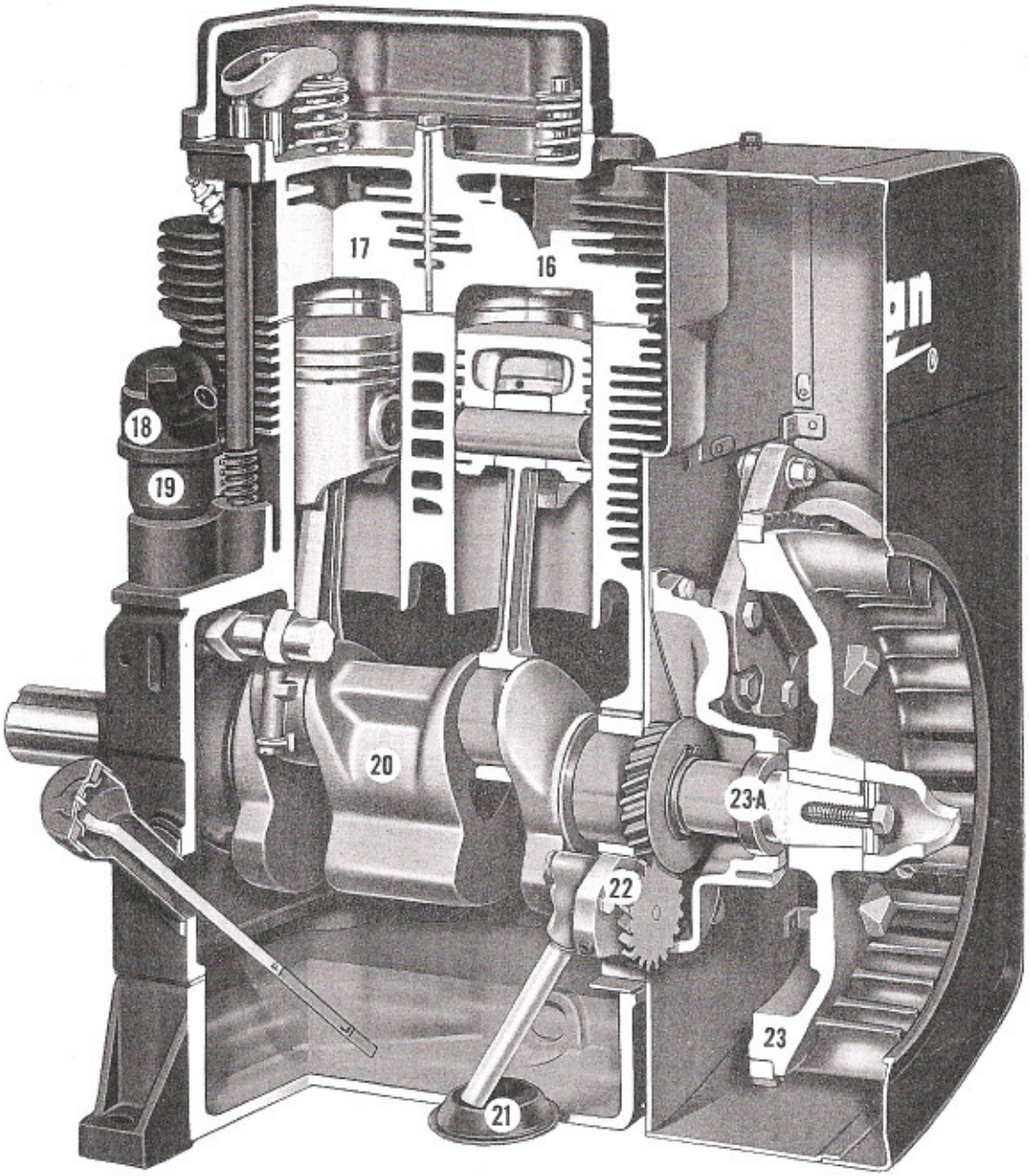
In the next four pages, exploded views of Onan J-Line gasoline engine features provide visual proof of the greater efficiency of these OHV design engines. They're built for high-use, hard-use applications. Long engine life and reduced service are two important features that make the J-Line your best source for engine power. On a cost-per-horsepower basis, these rugged and reliable J-Line engines are competitive with conventional L-head units.

1 Sheet metal removes with captive thumb screws
2 Washable dry element air cleaner (polyurethane)
3 Oil bath air cleaner optional
4 Governor adjustments centrally located
5 Choke on manual models at front near crank
5-A Hand crank support and flywheel guard



TRANS-VISION® MILPRINT, INC.
MILWAUKEE, WISCONSIN

5-B Fuel filter and fuel pump
6 Valve free to rotate for longer life
7 Automatic choke on electric start gasoline models
8 Gasoline, gas or gas/gaso fuel options
9 Sheet metal enclosed ignition coil and high tension leads provide radio shielding
10 Up to 4 gasoline ignition options. (Onan magneto with automatic retard, battery ignition with breaker points, battery ignition with distributor, impulse-coupled magneto)
11 Oil pressure line feeds oil to rocker arms and valve deck
12 Flyball governor
13 Oil pressure gauge standard equipment
14 Automatic ignition retard mechanism for starting
15 Patented General Motors rocker arm — one self-locking nut adjusts valve lash
15-A Full flow oil filter



16 Overhead Valve design provides 15% more power, 10% less fuel. Reduces oil consumption 50%. Lead deposit build-up 100% less than L-head engines.

17 Stellite faced valves and solid stellite valve seats give up to 3 times longer life than conventional types

18 Crankcase breather vented to engine air intake

19 Check valve keeps crankcase at a slight vacuum to prevent oil leakage at gasketed joints and through oil seals

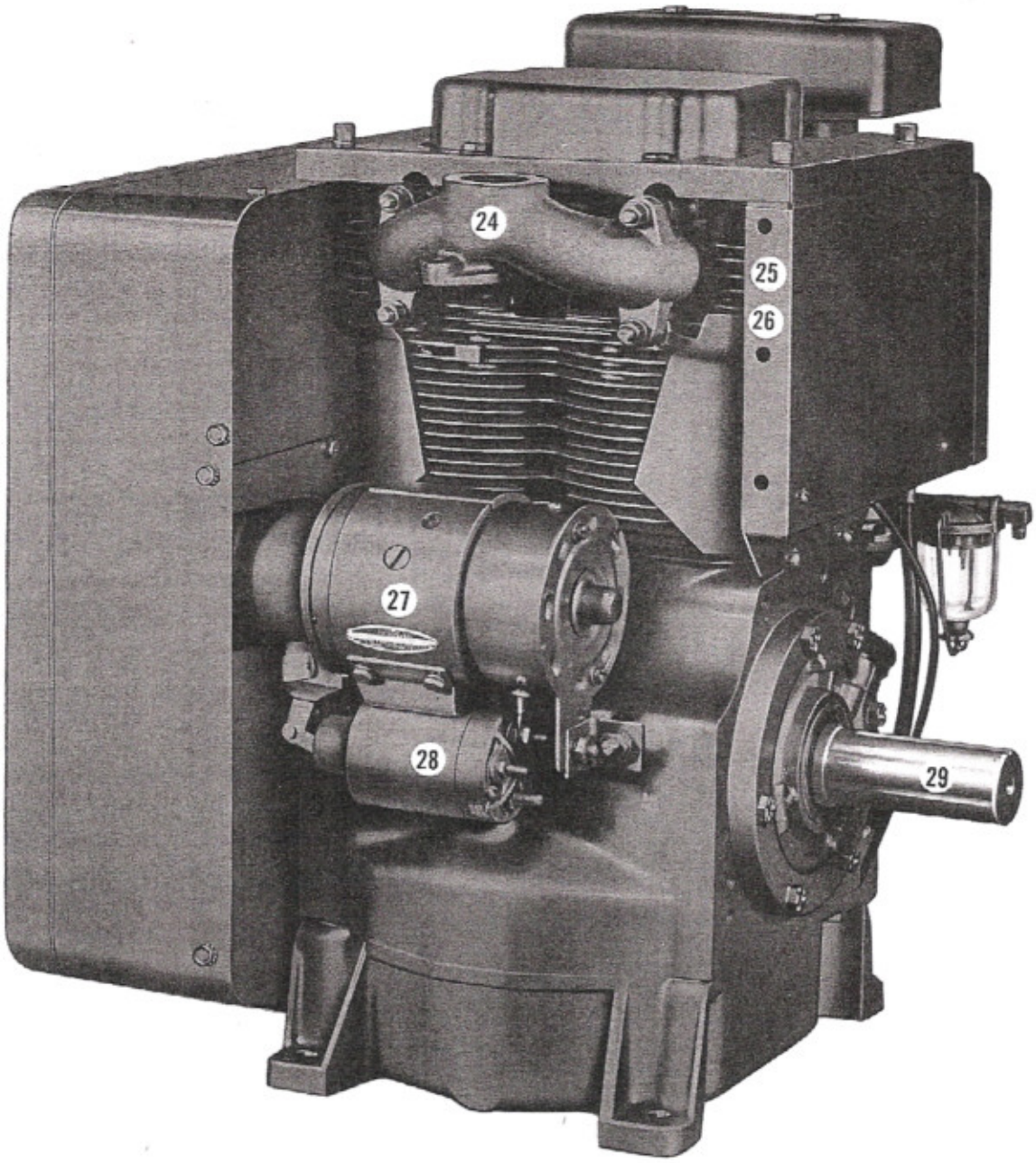
20 Bigger, stronger crankshaft than competitive engines

21 Screened oil pickup

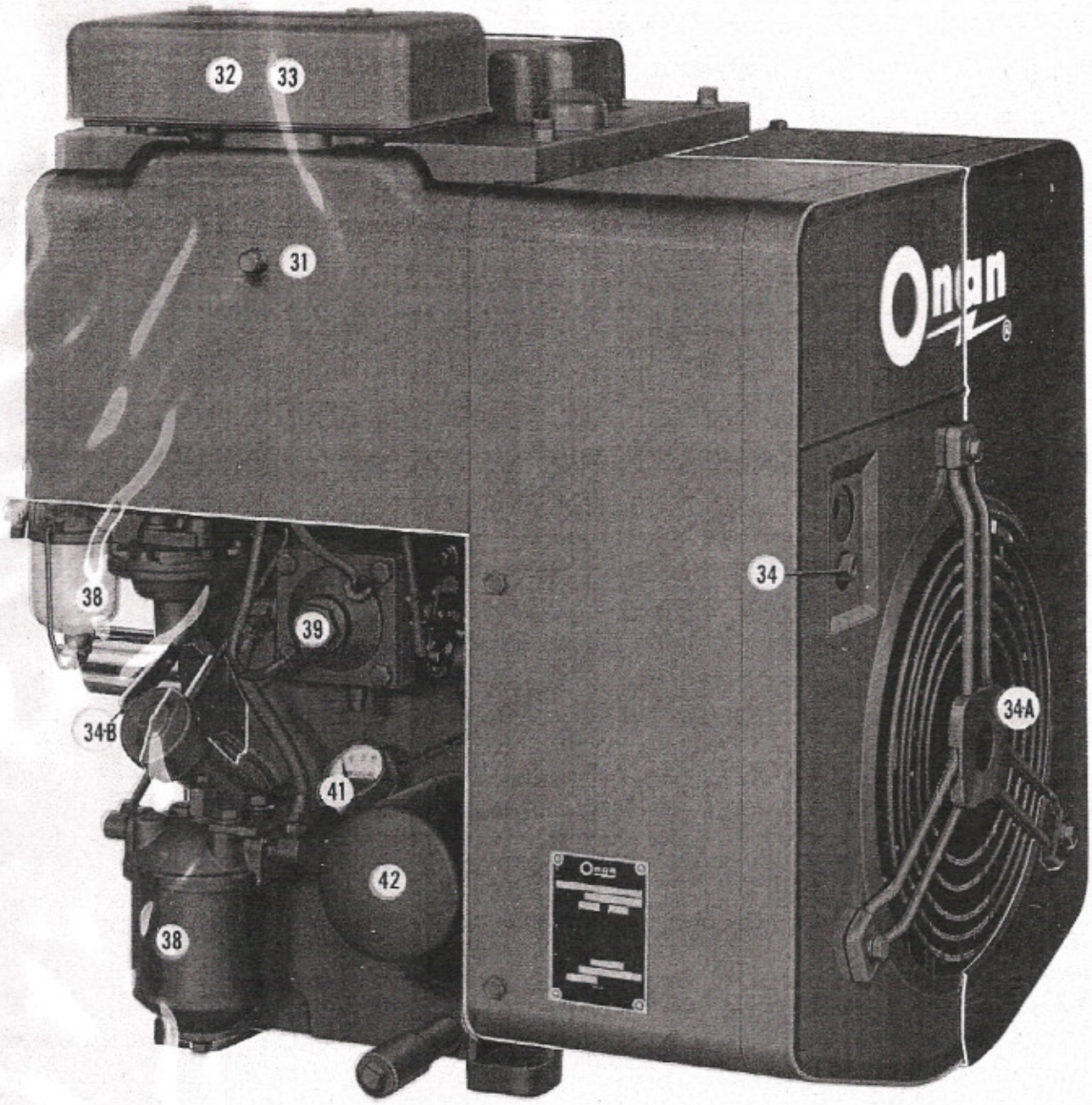
22 Gear type oil pump supplies oil under pressure to crankshaft mains, rod journals and front cam bearings

23 Blower — centrifugal

23-A Double lip crankshaft oil seals — to retain oil and keep dirt out



24 Up outlet exhaust for universal application
25 Single engine air outlet. Ducts may be up to 10 feet long with two 90° elbows, duct adaptor optional
26 Thermostat air temperature control optional in duct adaptor
27 Three engine starter options: 1) Solenoid shift 2) Bendix drive 3) Constant mesh gear with over-running clutch
28 Solenoid shift starter
29 PTO end of engine unobstructed by flywheel



TRANS-VISION® MILPRINT, INC.
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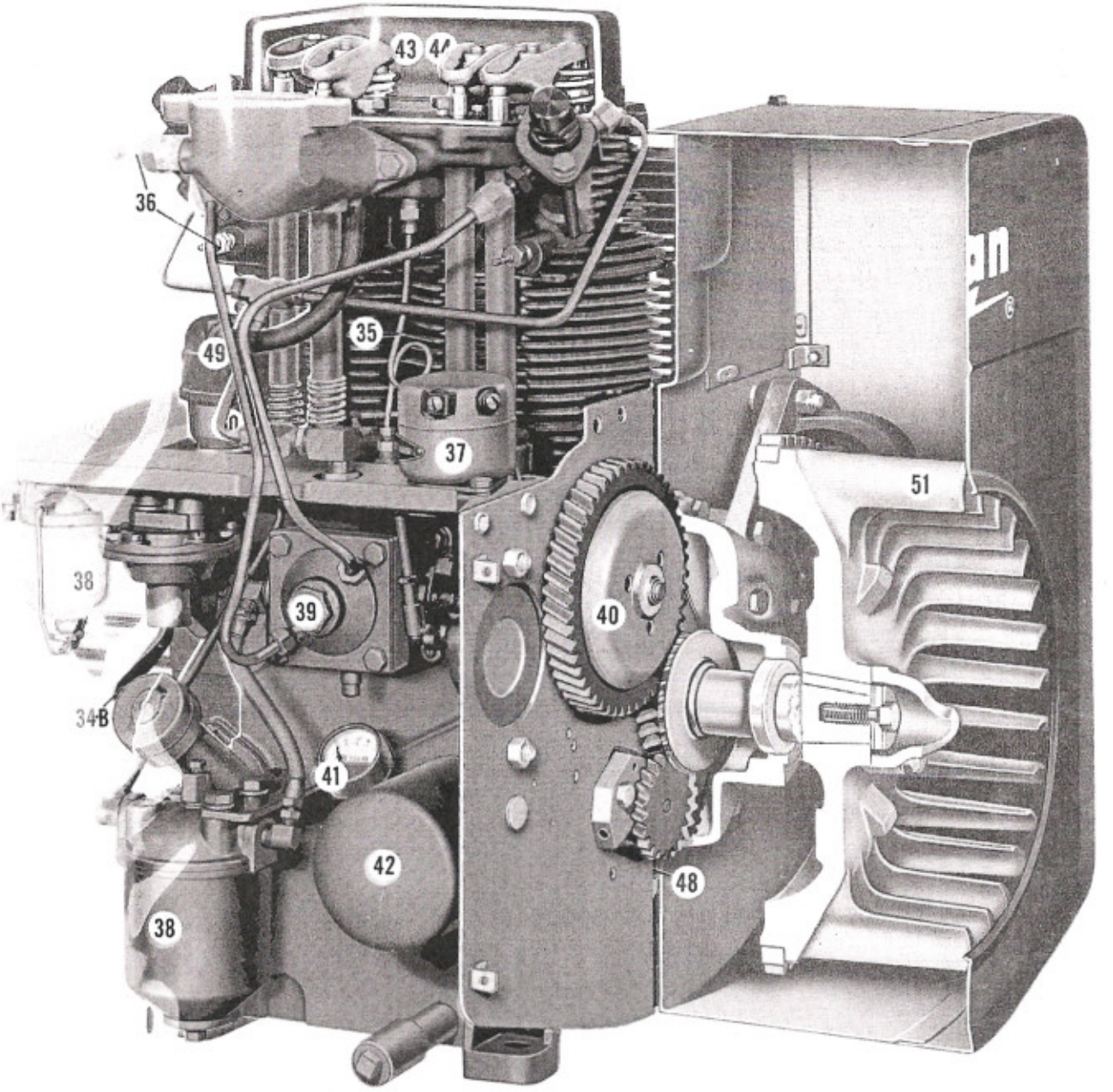
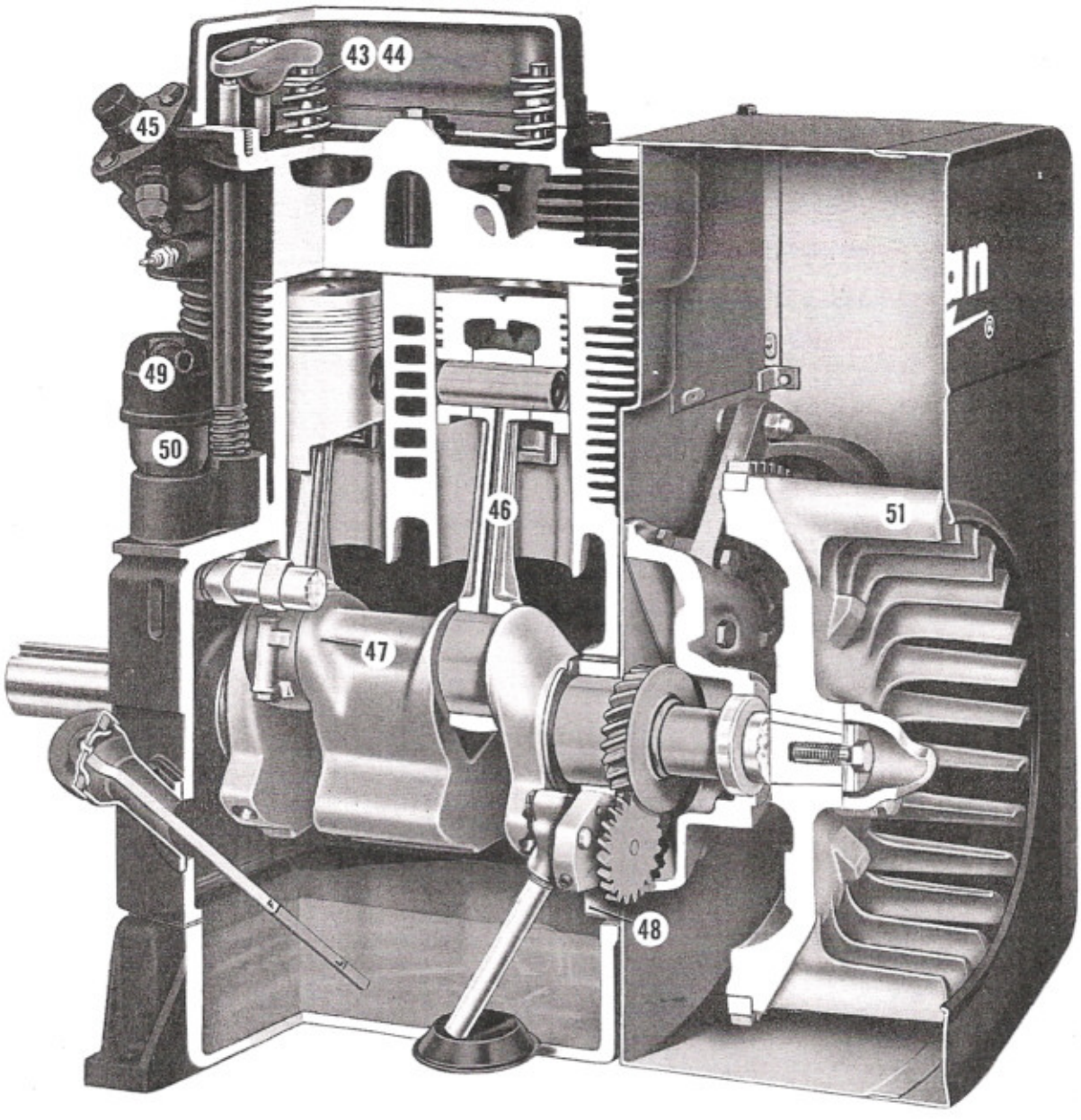
ONAN J-LINE DIESEL ENGINES

Onan J-Line diesel engines can be interchanged with gasoline engines in the same horsepower class without space penalty. Mounting and drive shaft dimensions are identical. (For details, see inside back cover.) Benefit: For the first time, you can offer a choice of gasoline or diesel power without redesigning your product. And your customers can select the right power to meet their needs.

31 Sheet metal removes with captive thumb screws
32 Washable dry element air cleaner (polyurethane)
33 Oil bath air cleaner optional
34 Governor adjustments centrally located
34-A Grille guard



34-B Hand primer for bleeding air from fuel system on initial start-up, after long shut-down periods or after maintenance
35 Oil pressure line feeds oil to rocker arms and valve deck
36 Glow plugs and air heater standard equipment
37 Electric solenoid energized to run; stops engine by shutting off fuel
38 Primary and secondary diesel fuel filters mounted on engine
39 American-Bosch diesel distributor injection pump on two and four cylinder engines
40 Flyball governor
41 Oil pressure gauge standard equipment
42 Full flow oil filter



Pre-chamber type engine — clean exhaust up to rated power

43 Valves free to rotate

44 Stellite faced exhaust valves and solid stellite valve seats last up to three times longer than conventional valves

45 Pintle nozzles American Bosch, as is all injection equipment

46 Connecting rods drilled for oil to pin, and piston cooling

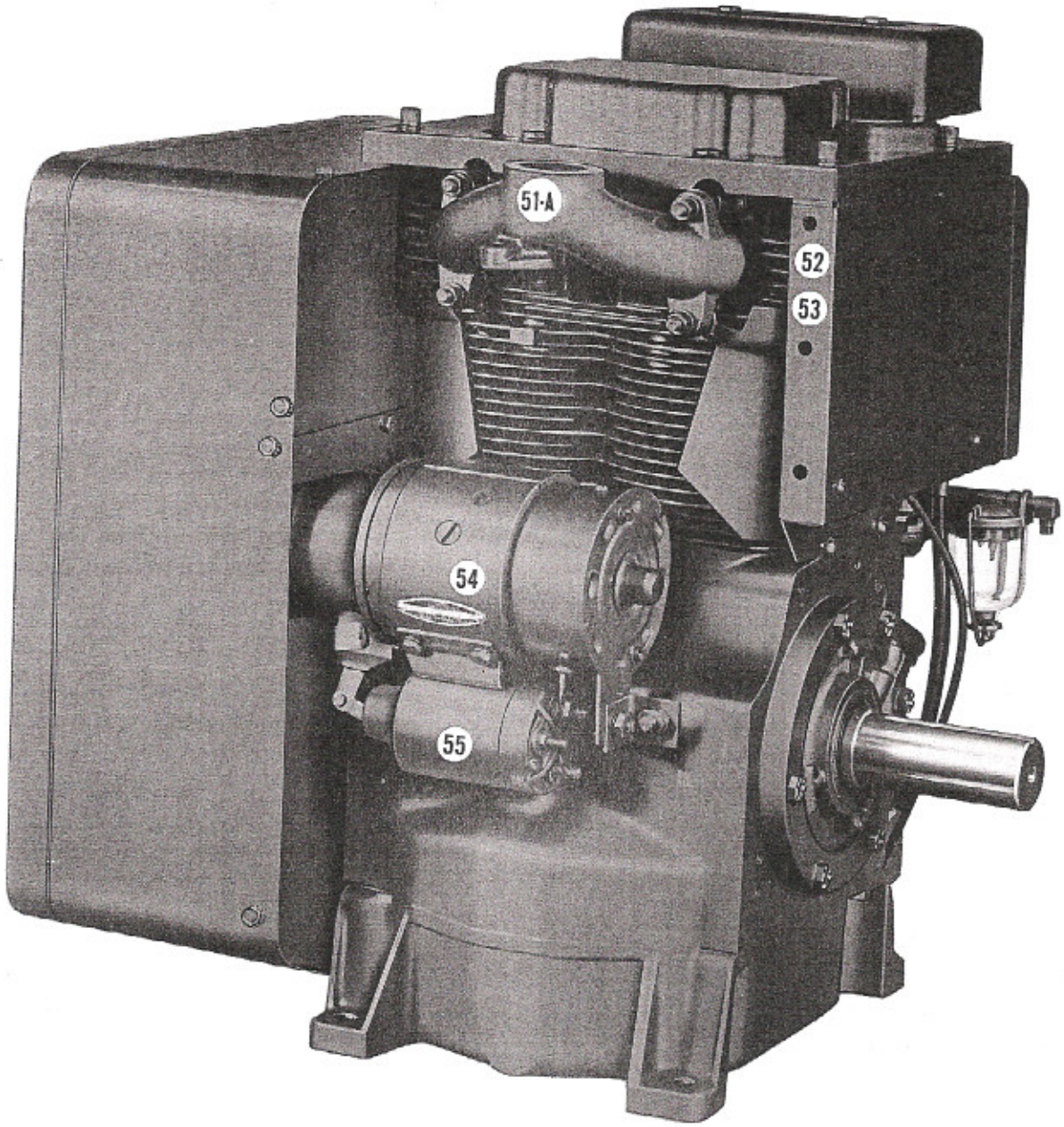
47 Bigger, stronger crankshaft than competitive engines Fillets shot peened for extra strength

48 Full pressure lubrication

49 Crankcase breather vented to engine air intake

50 Crankcase is kept at a slight vacuum by check valve; prevents oil leakage at gasketed joints and oil seals.

51 Blower — centrifugal



51-A Up outlet exhaust for universal application
52 Single engine air outlet. Ducts may be up to 10 feet long with two 90° elbows, duct adaptor optional
53 Thermostat air temperature control optional in duct adaptor
54 Three engine starter options: 1) Solenoid shift 2) Bendix drive 3) Constant mesh gear with over-running clutch
55 Solenoid shift starter

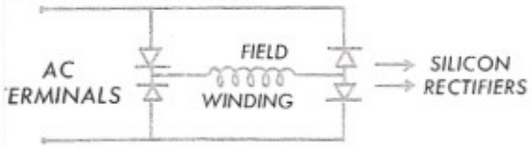
ONAN "J" Line Electric Plants

Engine design is critical in electric plant manufacture—but it isn't the whole story by a long shot.

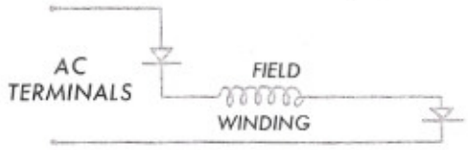
Onan's magneciter generator—with static exciter and voltage regulator—eliminates hundreds of electrical connections. Voltage recovery is five times faster than brushless type generators.

On the following pages, you'll find dozens of other reasons why Onan electric plants are far superior to any other generator set on the market. Exploded view illustrations and circuit diagrams give you easy-to-follow reasons why Onan is the "World's Leading Builder of Electric Power Plants."

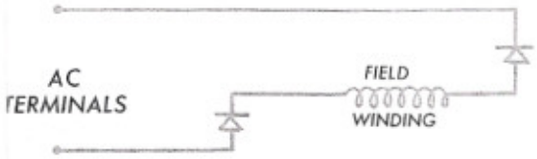
is the basic circuit that provides full wave rectified excita-
ıt to the generator field.



ıalf-wave rectification would take place through the circuit



ıther half-wave is rectified through the circuit below.

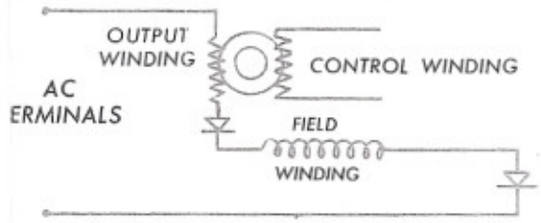


ıs must be provided in the circuit to control the amount of
ɔplied to the field. This is done with the Control compo-
: Magneciter Alternator.

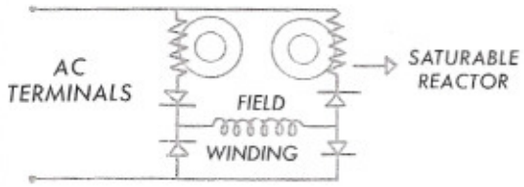
3. CONTROL

accomplished by using the principles of magnetic amplifi-
e circuit of a magnetic amplifier is that of a full wave
ıifier but with two saturable reactors added to that circuit.
ady have the full wave bridge rectifier in the exciter com-
s necessary to add only the saturable reactors.
able reactor (one for each half-wave) consists of a toroid
ın output and a control winding. The output winding is di-
ıected into the rectifier circuit and the control winding is
to the regulator component to be discussed later.

rcuit below shows how the output winding of the satura-
is connected into the exciter circuit for half wave control.



below shows how the output windings of both saturable
connected to complete the magnetic amplifier circuit.



eristics of a saturable reactor core are such that when once
d to saturation by the current in its output windings, it is
y magnetized. It remains so even after the current in
ngs ceases to flow.
since there is a rectifier in series with the output windings
able reactor, current can only flow in one direction. Thus,
tage can act only to magnetize (maintain saturation) but
ıagnetize the core. Demagnetization is necessary and is
the control windings of the saturable reactor and a regu-
will be discussed later.

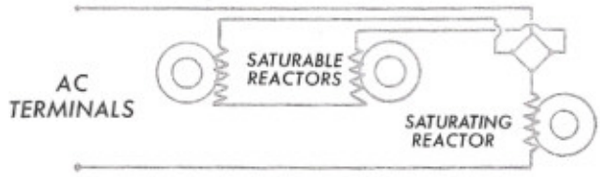
When the saturable reactor cores are in a saturated condition, the reactors are unable to oppose the line voltage. So, the full rectified line voltage is applied to the alternator field winding. Uncontrolled, this high excitation current would result in alternator output voltages greater than desired. Therefore it is necessary to add a control over the alternator field current to secure the rated output voltage. This is accomplished through the control windings of the reactors.

These control windings, when supplied with current of the correct polarity, can act to de-magnetize (or reset) the saturable reactor cores after they have been saturated by line current in the output windings. When de-magnetized, the reactor cores oppose the line voltage. This takes place for some part of that one half-wave during which current is supplied to the alternator field. So part of the half-wave is supplying voltage to saturate the reactor core and the other part sends a flow of current to the field coils. By adjusting the amount of current to the control windings, the amount of de-magnetizing is controlled. This in turn precisely controls the amount of excitation field current and the resulting alternator output voltage. The adjustment of the amount of control current required is handled by the regulator.

4. REGULATOR

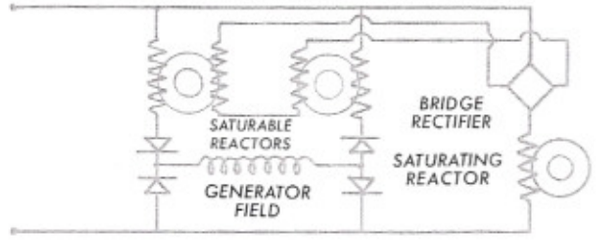
The regulator consists of a saturating reactor (consisting of a toroid coil with only one winding), a rectifier bridge circuit and connections to the control windings of the saturable reactors in the exciter circuit.

#6. Here is how the Regulator's saturating reactor is connected to the rectifier bridge and the control windings of the saturable reactors.

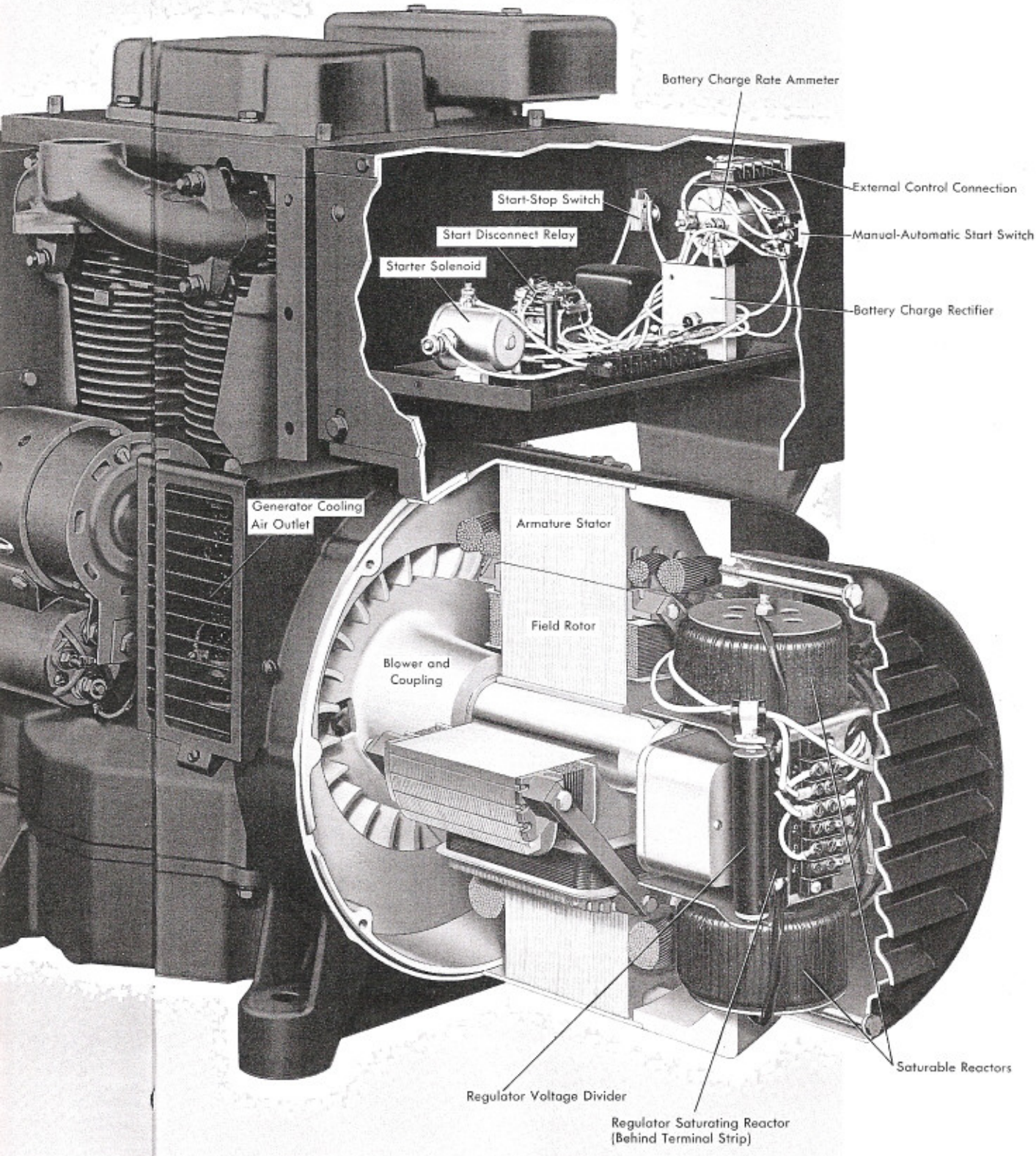


The saturating reactor is the voltage sensitive control of the regulator. This reactor has the property of opposing line voltage up to a pre-determined value. But when the line voltage exceeds that pre-determined value, the reactor permits current to flow.
If the alternator output voltage is below the set voltage, no current passes through the coil. Therefore no de-magnetizing current flows to the control windings of the saturable reactors. This allows full current to reach the field coils which in turn build up the alternator output voltage.
However, as the alternator output voltage comes up to requirement and then tends to exceed the set voltage, the saturating reactor in the regulator allows current to flow through its coil to the regulator bridge rectifiers.
The rectified current then flows through the control windings of the saturable reactors. This in turn de-magnetizes the saturable reactors. As explained before, de-magnetizing the reactor cores results in opposing the flow of current to the alternator field coils and so reduces the alternator's output voltage back to the set requirements.

#7. Basic wiring diagram of Onan Magneciter Alternator.



Regulation is literally instantaneous since rated voltage is restored within two seconds after being affected by a load change.



#1. Here
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#2. One
below.

#3. The

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Control is
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bridge rec
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ponent, it
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core with
rectly con
connected

#4. The c
ble reactor

#5. Circuit
reactors ar

The charac
magnetize
permanent
those wind
In addition,
of the satu
the line vo
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lator which

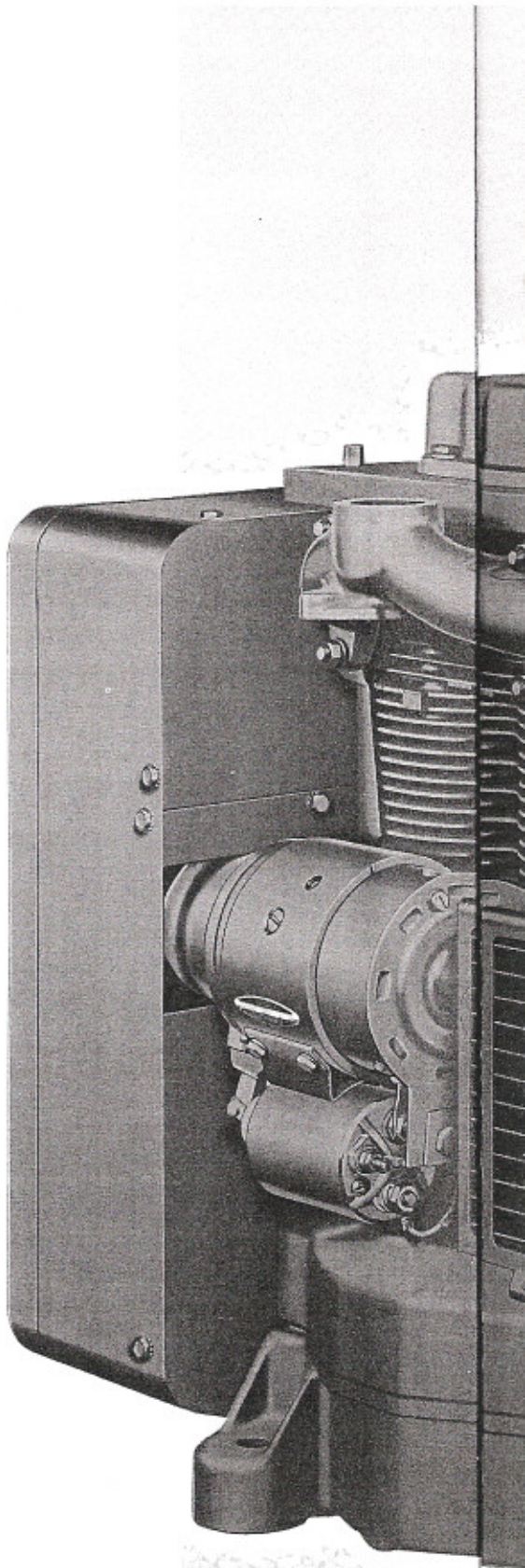
ONAN MAGNECITER ALTERNATOR with STATIC EXCITER and VOLTAGE REGULATOR

Longer Life • Lighter Weight • More Compact

(A) EXCITER: Eliminates rotating exciter used in other alternators.
(A) REGULATOR: No moving parts — no multiple delicate contact points.
CONSTRUCTION: Only rugged coils and windings — will not go out of adjustment.
SIMPLICITY: Eliminates hundreds of electrical connections, commutator and its brush rig and many other "break down" points.
SERVICE: All components easily accessible as compared to complete dismantling of alternator as is necessary for rotating exciters.
ADJUSTMENTS: No extra sensitive adjustments necessary. Regulation and stability are "built in."
VOLTAGE RECOVERY: Rated voltage restored within two seconds compared with 5 seconds for rotating exciters.
VOLTAGE FLUCTUATION: Voltage fluctuation with load changes are less than one half that of rotating exciters.

ONAN MAGNECITER CONTROLLED ALTERNATOR

The basic differences in the Onan Magneciter Controlled Alternator as compared to the standard rotating field alternator (B) lie in the exciter and regulator. First let's look at a simple explanation of how the new Static Exciter and Voltage Regulator work and then we'll explore the principles of how they operate.
All revolving field alternators require excitation for their field coils. Normally, this is done with hundreds of turns of electrical wires, connections, and a commutator and brush rig mounted on the rotating member and commonly called a rotating exciter. With the Static Exciter, this is done by using the output voltage of the alternator. The output is A.C. As Direct Current is required, this output is rectified and then fed to the field coils (C) through a set of collector rings and brushes. (D)
A control of that excitation current is needed so that the alternator output voltage will remain within the desired limits. Two wound coils (E) with special core properties (this complete assembly is known as a saturable reactor) are connected into the exciter circuit. These reactors have the job of controlling the amount of current flowing into the alternator field coils.
Now, something must be used to tell the reactors how much current to allow. This is done by the regulator. It, too, is static in nature and consists of a rectifier, (the same type as used in the exciter) and another type of saturable reactor. This combination is connected to the two reactors in the exciter circuit.
Thus in the Onan Magneciter Controlled Alternator, you have a Static Regulator telling the control coils in the Static Exciter how much current to send to the field coils which in turn determines the output voltage of the alternator.
Now let's look at this same operation on the basis of a technical explanation.



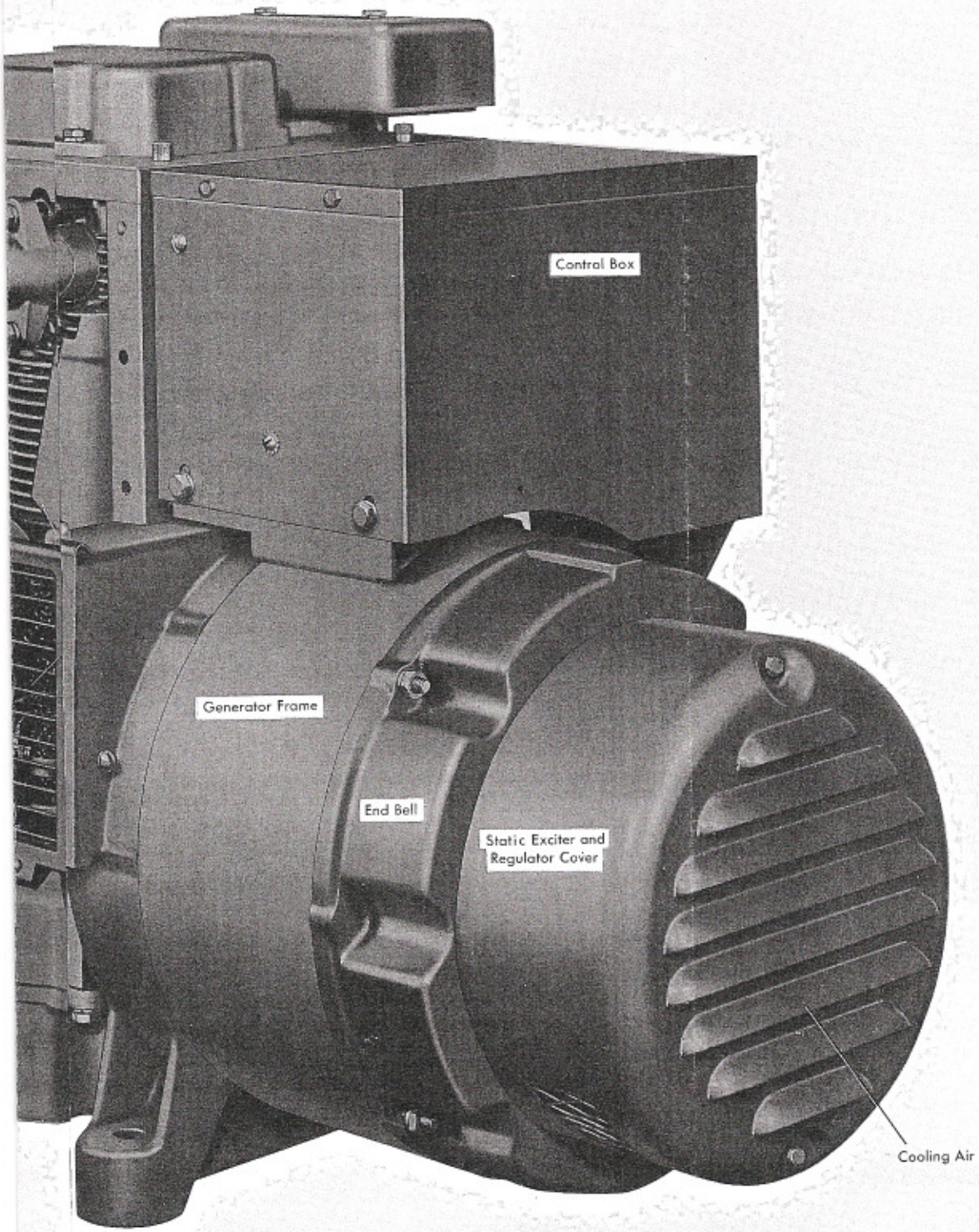
MAGNECITER ALTERNATOR

PRINCIPLES OF OPERATION

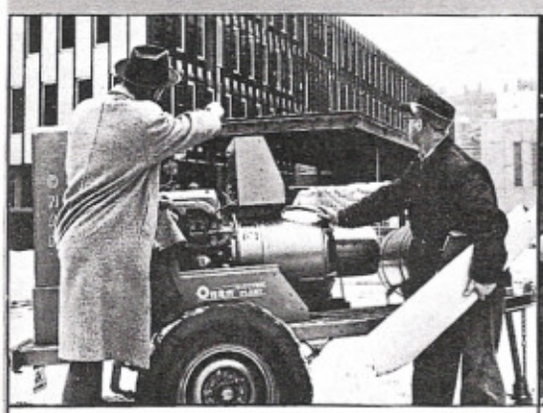
To more easily understand these principles, we will consider the alternator as consisting of four components — 1. Alternator, 2. Exciter, 3. Control and 4. Regulator. The alternator (which in the case of the Magneciter Alternator is designed especially for it) is basic in principle and so will not be covered here. But the other components will be discussed in detail in the same sequence as listed above.

2. EXCITATION

The excitation is static in that there are no moving parts. It is accomplished through the means of silicon bridge rectification. In this arrangement, the excitation current is taken from the main A.C. output of the alternator, rectified, and fed through collector ring brushes to the revolving field.

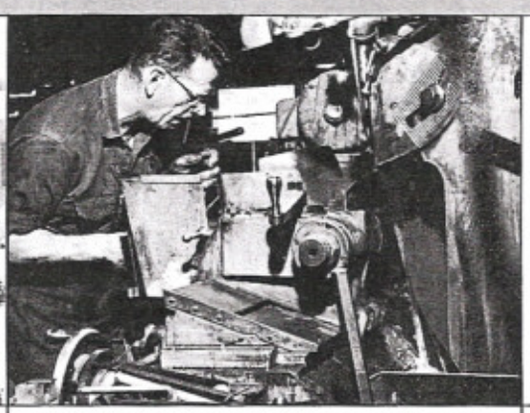

Control Box
Generator Frame
End Bell
Static Exciter and
Regulator Cover
Cooling Air

Some of the reasons why **Onan and only Onan** electric plants are Performance Certified



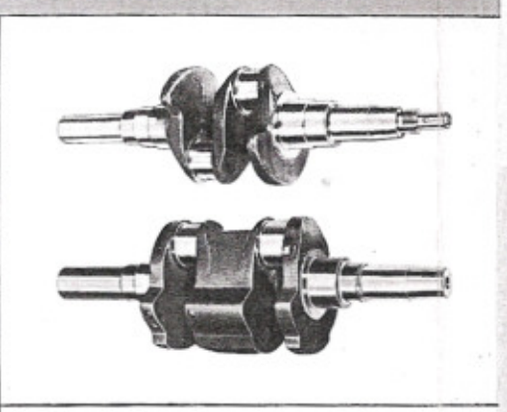
Onan electric plants are designed by engineers with an unequalled knowledge of actual operating conditions. There are over 1000 different Onan electric plants—each designed for a specific situation.

Stellite—standard on Onan—gives engines up to 3 times the valve life. Onan exhaust valves and valve seats are coated with Stellite, one of the hardest alloys known. Scorching punishment—Stellite can take it!



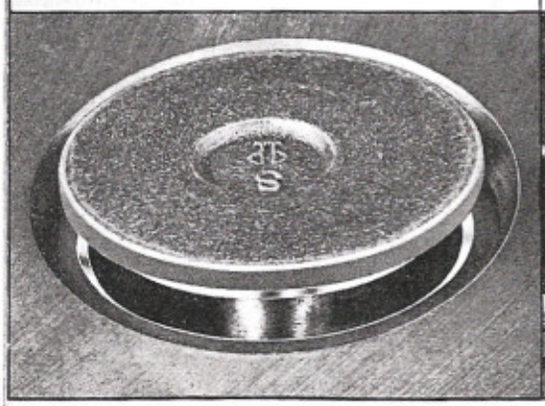
Onan electric plants are produced by the skilled hands of master machine builders. They give an Onan what it takes to deliver full rated output month after month with minimum attention and maintenance.

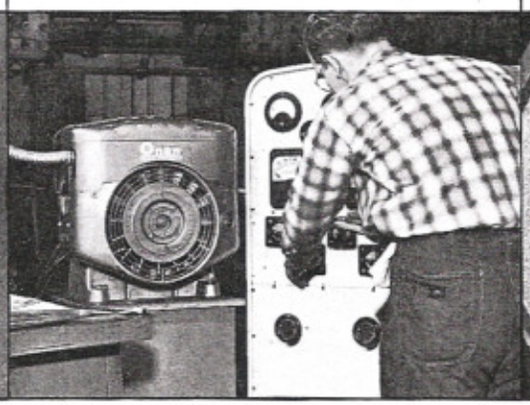
Onan electric plant runs 12,197 hours—equivalent to 487,888 automotive miles—to prove long-lasting design and performance. When it was all over, the plant still produced *all* the power promised by its nameplate.

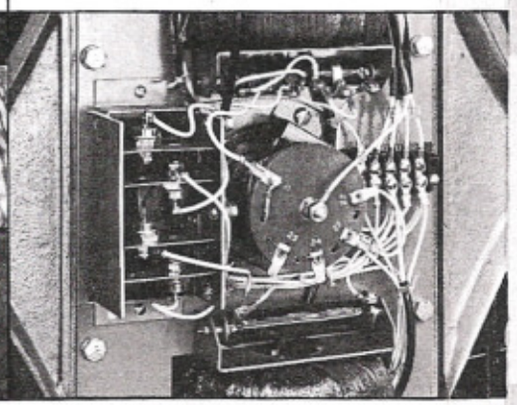


Onan's bigger, stronger crankshaft, compared to typical competitive part, typifies the extra ruggedness Onan builds into all Electric Plants. Made from 80-60-03 ductile iron. Shot-peened on diesels for added strength.

Onan's Magneciter gives faster voltage regulation and greater reliability. Rated voltage is restored within 1 second after load is applied or removed, compared with 5 seconds for ordinary rotating exciter generator.







PERFORMANCE CERTIFIED

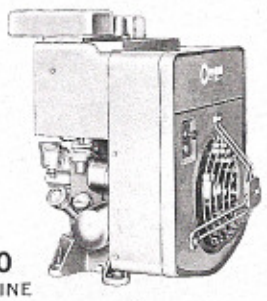
We certify that when properly installed and operated this Onan electric plant will deliver the full power and the voltage and frequency regulation promised by its nameplate and published specifications. This plant has undergone several hours of running-in and testing under realistic load conditions, in accordance with procedures certified by an independent testing laboratory.

There's a Performance Certified Onan for every power requirement

- *Gasoline-powered electric generating plants 500 watts to 170 kw*
- *Diesel-powered electric generating plants 3,000 watts to 230 kw*

Onan®

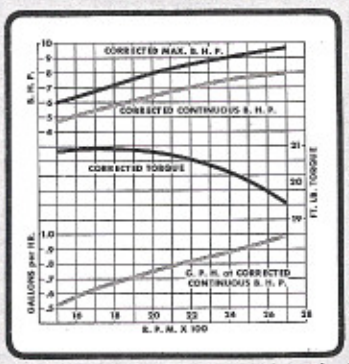
ONAN'S NEW J-LINE



J-30
GASOLINE

Cylinders.....1
Max. bhp (2700 rpm).....9.6
Cont. bhp (2700 rpm).....7.6
Displacement, cu. in.....30
Length*..17-1/16" Height.....24½"
Width.....18" Weight**..175 lbs.

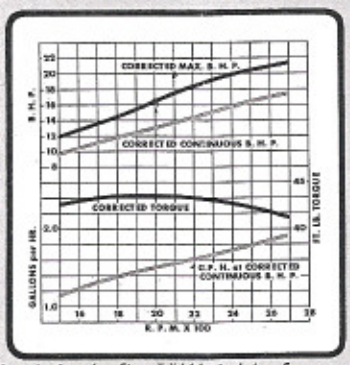
Availability schedule to be established upon completion of endurance tests

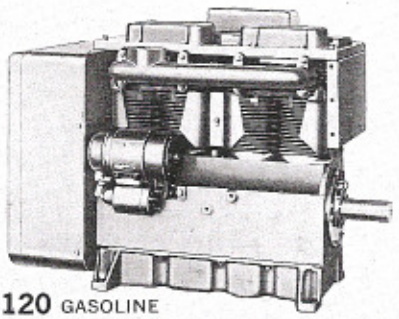


J-60
GASOLINE

Cylinders.....2
Max. bhp (2700 rpm).....21.6
Cont. bhp (2700 rpm).....17.1
Displacement, cu. in.....60
Length*.....20⅝" Height.....24½"
Width.....17⅞" Weight**..218 lbs.

AVAILABLE NOW

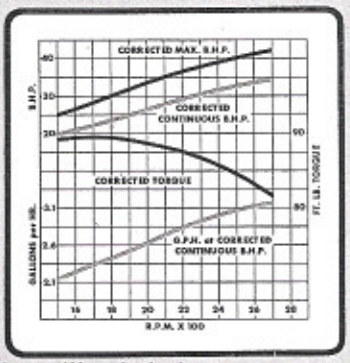




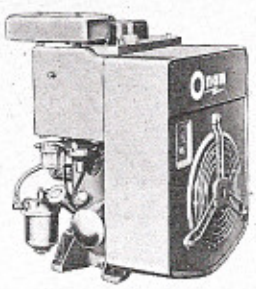
J-120 GASOLINE

Cylinders.....4
Max. bhp (2700 rpm).....42.5
Cont. bhp (2700 rpm).....34
Displacement, cu. in.....120
Length*.....33¼" Height .....24½"
Width.....19½" Weight**..375 lbs.

AVAILABLE NOW



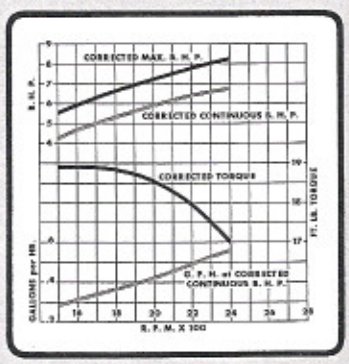
*Does not include 4-inch stub shaft **Weight of gasoline engine without starter

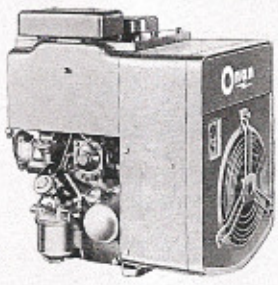


DJ-30
DIESEL

Cylinders.....1
Max. bhp (2400 rpm).....8.2
Cont. bhp (2400 rpm).....6.6
Displacement, cu. in.....30
Length†.....14¼" Height.....24½"
Width.....18" Weight††..228 lbs.

AVAILABLE NOW

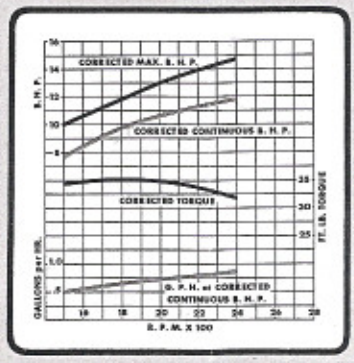


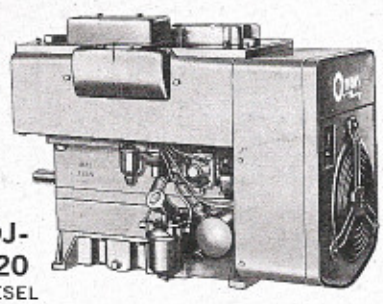


DJ-60
DIESEL

Cylinders.....2
Max. bhp (2400 rpm).....14.6
Cont. bhp (2400 rpm).....11.7
Displacement, cu. in.....60
Length†.....19¼" Height.....24½"
Width.....17⅞" Weight††..287 lbs.

AVAILABLE NOW

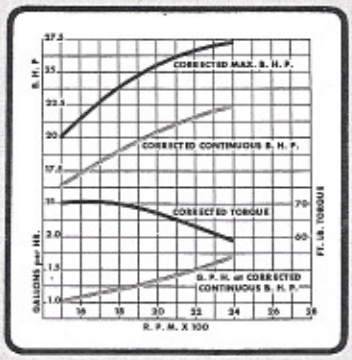




DJ-120
DIESEL

Cylinders.....4
Max. bhp (2400 rpm).....27.5
Cont. bhp (2400 rpm).....22.5
Displacement, cu. in.....120
Length†.....30⅜" Height.....24½"
Width.....19½" Weight††..448 lbs.

AVAILABLE JANUARY '63



†Does not include 4-inch stub shaft ††Weight of diesel engine includes solenoid shift starter
Engine performance data taken and corrected to conditions set forth in I.C.E.I. Engine Test Code.