



WATERLOO BOY TRACTOR

Model "N"

MANUAL OF INSTRUCTION
AND
PARTS LIST

No. 15

FURNISHED BY
JOHN DEERE TRACTOR CO.

WATERLOO, IOWA, U. S. A.

FORMERLY
WATERLOO GASOLINE ENGINE CO.

F-55-August, 1929

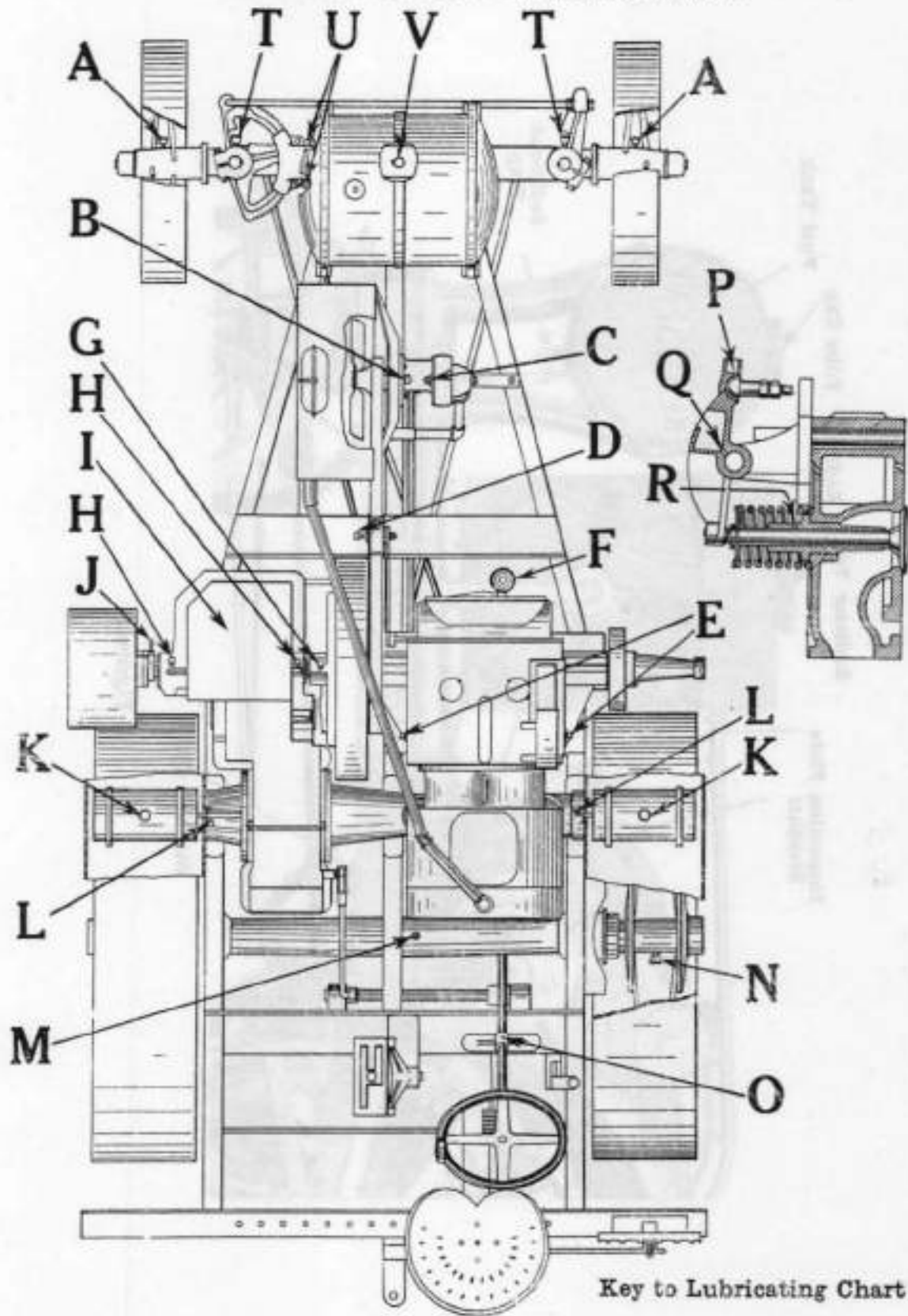
INSTRUCTIONS

HOW TO USE THIS BOOK

In compiling this book we have made two divisions:

1st. Manual of Instruction. Beginning on page 4 you will find index which refers to the page on which instruction on any particular part is given.

2nd. Parts List. On page 46 you will find parts list index which is a complete alphabetical arrangement of all major parts of the tractor. You will refer to this index to find a part where number is not known. In looking for such a part think of where it is located on any of the various major parts of the tractor, then refer to that name in index and said part can then be found on page number referred to.



THE TRACTOR AND ITS OPERATION

CHAPTER I

PREPARATION FOR STARTING

UPON RECEIPT OF TRACTOR, look it over carefully for

- (1) Damage caused in shipping.
- (2) Evidence of tampering by unauthorized persons.
- (3) Loose bolts, grease cups, etc.
- (4) Any irregularities in operation of levers, controls, etc.

OILING

All grease cups should be refilled with a good grade of cup grease. Turn down cup until the grease appears at the end of bearing. See that there is oil in the crank case. This holds about one gallon. Be sure that the tractor is properly oiled. Turn the engine over slowly by hand and oil moving parts by removing inspection plate in front of motor and see that they move freely. See oiling chart and diagram on pages 6-7.

FUEL

Before filling fuel tanks shut off carburetor from both tanks by turning lever on three way cock straight down. Fig. 10.

Fill the fuel tank at the front of tractor with clean kerosene. It holds about 20 gallons.

Fill the gasoline tank located on the fender on the left side with good gasoline.

Strain the fuel to prevent water or other foreign substances getting into tank. Water and dirt in the fuel is sure to cause trouble.

The small vent hole in the filler cap should always be open to insure proper flow of fuel to carburetor. Gasoline is necessary only for starting and warming up motor. Gasoline, naphtha or kerosene may be used regularly as fuel in the large tank. Kerosene is recommended.

(4) It may be necessary to adjust the needle valve (see fuel system) on carburetor to develop maximum power. Too much fuel will be indicated by a black smoky exhaust; too little fuel will be indicated by a popping back through the carburetor.

(5) The speed of the motor can be regulated by means of the throttle lever, through the governor linkage. The motor develops its rated horse power at 750 R. P. M.

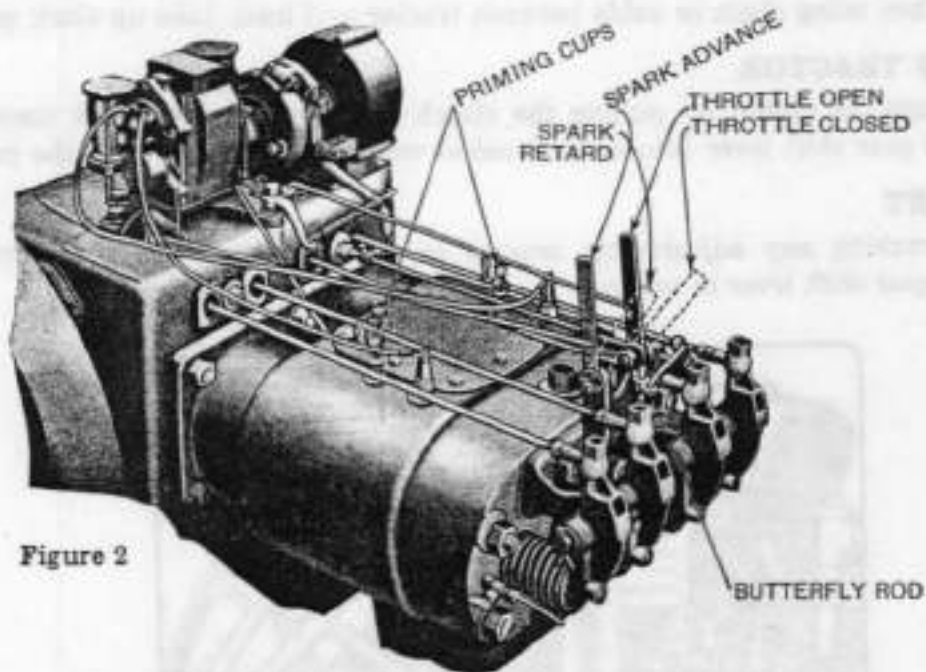


Figure 2

IMPORTANT

Never run a new engine under full load. Make sure that all moving parts are sufficiently lubricated.

STARTING TRACTOR

After the engine is running:

(1) See that the clutch is released by pulling the clutch lever at the right of the operator back (see Fig. 3), thereby disengaging the clutch and engaging a brake in the pulley to stop the shaft from rotating.

(2) The gear shift lever at the left of the operator operates in the H slot similar to the automobile.

Neutral—Lever in center slot.

Low Speed Forward—From neutral position move lever to the left and back in the slot. Fig. 3.

High Speed Forward—From neutral position move lever to the right and forward in slot. Fig. 3.

Reverse—From neutral position move lever to the left and forward in slot. Fig. 3.

STOPPING THE ENGINE

(1) In stopping the engine turn lever on three way valve straight down, shutting off gasoline and kerosene lines. See Fig. 10. The engine will then stop when it has drained the carburetor of all the kerosene.

(2) In case the engine has stopped when running on kerosene, it may be started again on kerosene if the engine is still hot. Prime the engine with high test gasoline. If the engine is cold, the kerosene must be drained from the carburetor and gasoline turned on.

CARE OF TRACTOR

Keep your engine clean and well lubricated.

Keep your engine and tractor adjusted properly, but before making adjustments mark the parts so that they can be put back in the original position if necessary.

Keep all bolts and nuts tight. Try them with a wrench.

Examine spark plugs occasionally, and keep them clean. Keep the spark gap adjusted properly. In removing spark plugs be careful not to break the insulation. Keep an extra set of spark plugs on hand.

Don't take the magneto off of engine without the aid of an expert.

Keep the breaker points and distributor clean.

Be sure the impulse starter pawl throws out when the motor is running. If action is sluggish lubricate with a little kerosene.

Do not overload your tractor.

Always use clean oil and grease.

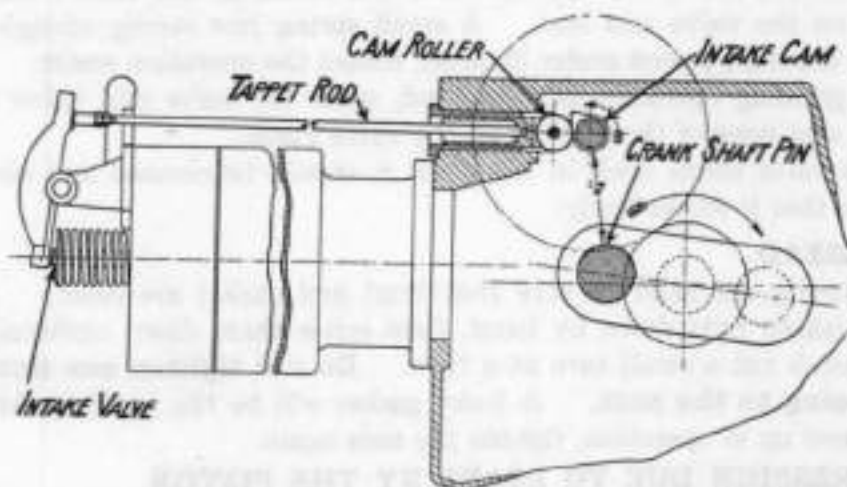
Part No.	Name and Description	Part No.	Name and Description
5R	Inspection Plate	272R	Cover—Cylinder Bottom
21R	Stud—Cylinder Head (long)	279R	Glass—Sight Feed Oiler
22R	Stud—Cylinder Head (short)	290R	Spring—Oil Pump Check
24R	Gasket—Cylinder to Crank Case	291R	Spring—Oil Pump Plunger
39R	Liner—Marine Connecting Rod	293R	Washer—Oil Pump Plunger
48R	Piston	335R	Bolt—Marine Connecting Rod
50R	Piston Rings	357R	Three Way Cock—N. S. Fuel Line
52R	Piston Pin	405R	Ball—Steel Check—3/8" Standard
57R	Cam Shaft	408R	Wire—Spark Plug (short)
62R	Cam Roller	410R	Spark Plug
63R	Pin—Cam Roller	454R	Link—Governor Control (O. S.)
65R	Body—Push Rod	463R	Gasket—Crank Case Cover
66R	Guides—Push Rods	464R	Gasket—Inspection Plate
68R	Lever—Tappet (Right)	480R	Cap—Valve Spring
72R	Lock Nut—Tappet Rod End	485R	Spring—Valve
75R	Rivet—Tappet Lever	469R	Lock Washer—Valve Spring Retaining
78R	Shaft—Tappet Lever	511R	Plate—Cylinder Top
86R	Valve Guide	517R	Rod—Tappet
92R	Washer—Tappet Lever Shaft	781R	Motor Support
98R	Collar—Governor Fork	784R	Pin—Motor Equalizer
101R	Fork—Governor	1305R	Castle Nuts
102R	Shaft—Governor Fork	1329R	Flywheel
103R	Shaft—Governor	1420R	Nipple—Breather Cap
104R	Pin—Governor Weight	1450R	Plug—Oil Pump
105R	Weights—Governor	1481R	Elbow (Steel)—Breather Cap
106R	Spring—Governor Weight	1508R	Hexagon Nut—Cylinder Head Stud
112R	Manifold	1529R	Jam Nut
118R	Tappet Rod End	1665R	Cap Screw
126R	Bracket—Dixie Magneto	1669R	Cap Screw
140R	Crank—Hand Throttle Bell	1675R	Cap Screw
146R	Shaft—Carburetor Operating	1676R	Cap Screw
153R	Lever—Hand Throttle	1683R	Cap Screw
154R	Arm—Carburetor Control	1684R	Cap Screw
157R	Link—Carburetor Operating	1706R	Washer
158R	Arm—Carburetor Control (short)	1730R	Cotter Key
160R	Rod—Governor Control	1733R	Cotter Key
161R	Lever Hand—Governor Control Rod	1735R	Cotter Key
162R	Rod—Hand Lever Magneto Control	1742R	Cotter Key
164R	Spring—Carburetor Control Operating	1745R	Cotter Key
166R	Washer—Hand Throttle Lever Spring	1770R	Set Screw
168R	Plate—Oil Pump Eccentric Lever	AN2091	Carburetor Complete 1-1/2" D with 357-R (5/16" 3-way cock)
169R	Lever—Oil Pump Eccentric Lever	AN2092	Crank Case ("N" for 6-1/2" Motor)
172R	Plunger—Oil Pump	AN2093	Cover—Crank Case
173R	Rod—Oil Pump to Eccentric Lever	AN2097	Cylinder Complete (without head)
176R	Cap—Sight Feed Oiler	AN2099	Cylinder Head with Guides
176R	Body—Oil Pump	AN2101	Gasket—Cylinder Head (for 6-1/2" and 6" motors)
180R	Stove Bolt—Sight Feed Oiler	AN2102	Bracket—Tappet Lever (for 6-1/2" and 6" motors)
181R	Base—Sight Feed Oiler	AN2108	Shaft—Crank (with 11/16" studs and gear)
183R	Washer—Cork—Sight Feed Oiler	AN2109	Rod—Marine Connecting (w) Bushing Pin
255R	Priming Cup	AN2118	Strainer—Oil Pump (Brass)
256R	Cock—Oil Lever Test	AN2121	Oiler—Sight Feed Y Tube
258R	Cap—Breather	AN2154	Valve—Head and Stem
		K2455	Coupling—Dole Compression
		QW	Carburetor Control Shaft Connection

TRANSMISSION AND REAR AXLE ASSEMBLY

Part No.	Name and Description	Part No.	Name and Description
AN2067	Drive Wheel	1079R	Bearing Collar, Short Differential Shaft
AN2089	Clutch Band	1081R	Thrust Collar, Differential Case
AN2126	Reverse Pinion	1083R	Collar, Intermediate Shaft Bearing
AN2128	Dust Collar	1100R	Pinion, Low-Speed Drive
AN2191	Belt Pulley Rim	1101R	Pinion, High-Speed Drive
AN2192	Belt Pulley Hub	1105R	Intermediate Gear, Low Speed
AN2263	Dust Cap	1106R	Intermediate Gear
114R	Flywheel Bolt	1108R	Key, Intermediate Gear
249R	Brake Band	1110R	Pinion, Differential Drive
637R	Brake Adjusting Rod End	1116R	Ring Gear, Differential Drive
640R	Bull Pinion	1118R	Grease, Differential Shaft
643R	Differential Case	1125R	Inner Race, Hyatt Long Bearing
644R	Differential Case Cover	1126R	Outer Race, Hyatt Long Bearing
645R	Differential Shaft Key	1127R	Roller, Hyatt Long Bearing
659R	Differential Pinion	1128R	Inner Race, Hyatt Short Bearing
650R	Spacing Ring, Differential Gear	1129R	Outer Race, Hyatt Short Bearing
664R	Key, Bull Pinion	1130R	Roller, Hyatt Short Bearing
681R	Rear axle	1131R	Hyatt Long Bearing Complete
684R	Washer, Rear Axle	1132R	Hyatt Short Bearing Complete
685R	Washer, Rear Axle	1135R	Shifter Fork, Low and Reverse Gear
763R	Anchor Pin, Brake Adjusting	1136R	Shifter Fork, High Gear
790R	Spoke, Drive Wheel	1140R	Shaft, Low and Reverse Gear Shift
794R	Hub, Drive Wheel	1141R	Shaft, High Gear Shift
797R	Hub Cap, Drive Wheel	1151R	Crank, Low and Reverse Gear Shift
798R	Collar, Rear Axle	1152R	Crank, High Gear Shift
872R	Grease Cup	1188R	Bell Crank, Brake
997R	Inner Race, Hyatt Bearing	1189R	Shaft, Brake Bell Crank
998R	Outer Race, Hyatt Bearing	1191R	Washer, Transmission Case Bearing
999R	Roller, Hyatt Bearing	1196R	Bull Gear
1001R	Thrust Collar, Extension Shaft	1197R	Bull Gear Feet
1002R	Hyatt Bearing Complete	1205R	Cannon Bearing, Rear Axle
1006R	Clutch Spider, Counterweight Side	1206R	Thrust Washer, Rear Axle
1009R	Operating Lever	1207R	Dust Collar, Rear Axle
1012R	Anchor Pin, Clutch Band	1209R	Felt Washer, Rear Axle Dust Collar
1017R	Clutch Spider, Lever Side	1220R	Hyatt Bearing Complete
1023R	Lining, Belt Pulley Brake	1221R	Outer Race, Hyatt Bearing
1027R	Cap, Belt Pulley Brake	1222R	Roller, Hyatt Bearing
1034R	Clutch Yoke, Long End	1329R	Flywheel
1043R	Key, Drive Wheel	1452R	Pipe Plug, Rear Wheel Hub
1051R	Flange, Dust Collar	1617R	Machine Bolt
1052R	Retaining Collar	1688R	Cap Screw, Quill to Differential Case
1053R	Dust Collar, Leather	1929R	Machine Bolt, Belt Pulley
1055R	Transmission Case, Lower Half	2212R	Long Differential Shaft
1068R	Long Quill	2214R	Nut, Differential Shaft
1069R	Short Quill	2216R	Short Differential Shaft
1074R	Dust Cap, Intermediate Shaft	2217R	Engine Extension Shaft

over one turn to get the punch marks in line as the crank shaft gear makes two turns to one of the cam shaft gear. The marks should then come together. Then adjust the tappet rods so that there is not more than $1/64''$ clearance between the rocker arm and the valve stem. The tappet adjustment must be made when the roller is on the back side or heel of the cam, in which position the valve is closed.

In case the markings on the gears have been obliterated, the following method may be used. See Fig. 4. First, adjust the tappet rods. Then turn cam gear



VALVE TIMING DIAGRAM

Figure 4

until the intake valve tappet rod on No. 1 cylinder just tightens. Mesh the crankshaft gear with cam gear so that the distance between the heel of the intake cam and the crank pin is $4-1/4''$.

POOR COMPRESSION DUE TO LEAKY VALVE

(1) Loss of compression due to imperfect seating of valves may be caused by insufficient clearance between the rocker arm and the valve stem. The clearance should be approximately $1/64''$.

(2) Carbon deposit or dirt may have deposited on the valve seat. If a particle of dirt has lodged on the valve seat, it may be blown out by turning the engine over so that compression is felt in the particular offending cylinder and the valve opened suddenly by tapping the rocker arm with a hammer, causing a sudden rush of air through the valve.

(3) Burnt valves or valve seats and warped valve stems cause valve leaks. The only remedy is to regrind them.

Never operate an engine if the valves leak. Always regrind them.

REGROUNDING VALVES

Remove the cylinder head. (**Important:** Do not insert a sharp tool between head and cylinder. Loosen head by turning the engine against compression and tap the head with a hammer.) Then take off the valve spring. Take out the valve and clean the valve and valve seat of carbon, etc., and wash with gasoline. Apply

ring now being out of the groove in the piston, can be removed by slipping it over the piston. See Fig. 6. Be sure and take off the top ring first, followed by the next in succession. In putting rings back on the piston put the bottom one on first, using the same device as used for removing. Always clean out the grooves in the piston when the rings are removed. Also clean old rings if they are to be put back on the piston.

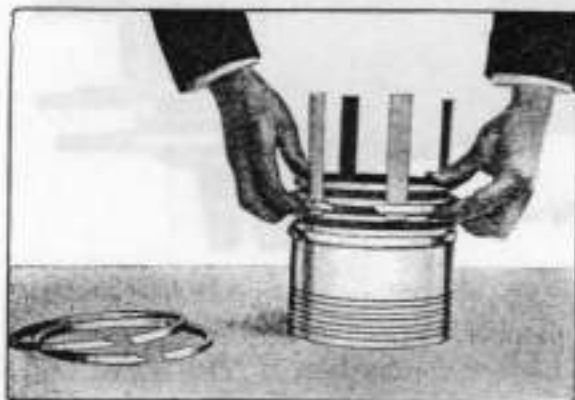


Figure 6

into the piston, wash it in gasoline to remove the grit and dirt. Then oil the piston and rings thoroughly before replacing in the cylinder.

FITTING NEW RINGS

When fitting new rings try the ring around the groove in which it is to be placed, and be sure it is a good fit but not too tight in any one position. See Fig. 7. Then place the ring in the cylinder and see that it sets square. The gap should close up, leaving .008 inch to .010 inch clearance between the ends. In case the rings are too large, file off the end of the ring a little and try the ring in the cylinder again. After the rings have been assembled

REPLACING THE PISTON

In case the connecting rod has been removed from the piston, see that it is reassembled so that the piston when replaced in the cylinder has the piston pin set screw toward the flywheel. The flange or offset on the crank end of the connecting rod should be toward the other cylinder. The ring gaps should be down and arranged so the openings do not line up.

Be sure the rings are setting properly in the groove before pushing the piston into the cylinder.

Oil the crank pin before connecting up the crank pin bearing. Replace the cap on the connecting rod, and be sure all the shims are put back in place. Draw the nuts up tight on the bolts and replace cotter pins, being careful to spread them.

Replace the cylinder head and be sure that head and copper asbestos gasket are perfectly clean and in good condition.

Tighten the head down evenly.

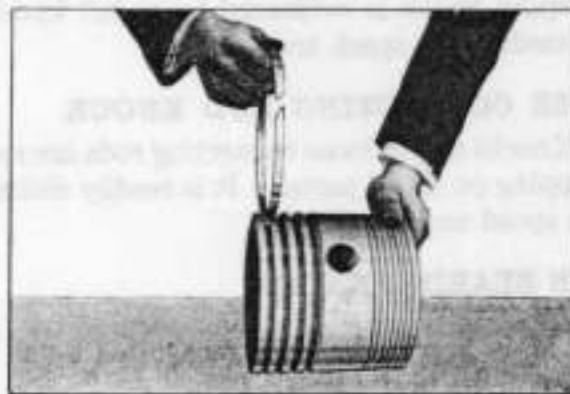


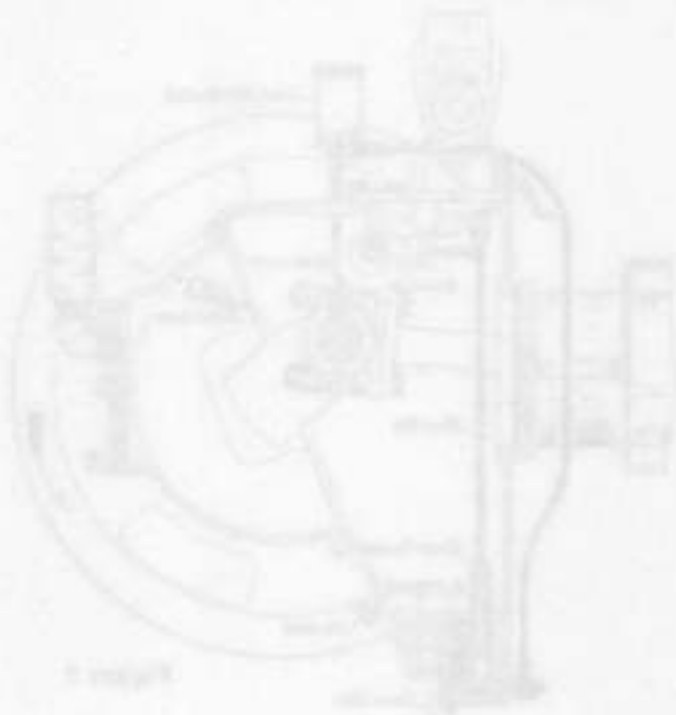
Figure 7

INSPECTION AND ADJUSTING BEARINGS

To inspect and adjust connecting rod bearings, remove the inspection plate on the crank case cover and the connecting rods are very accessible. Bearings should be inspected often. Connecting rods are properly adjusted when they can just be moved sidewise on the pin. They should have about 1/32-inch side play and .003 to .005 in journal clearance. The bearing is fitted with steel shims. To adjust the bearings, loosen cap bolts and remove steel shims from each side of the bearings of the necessary thickness to take up lost motion. Replace the cap and bolt up tight. If, after taking out shims the bearings are too tight, do not loosen up on the bolts. Put back a thin shim and draw nut up tight. Be sure and replace cotter pins before closing the crank case.

To adjust main bearings remove the crank case cover. The bearing will then be easily adjusted by removing shims, as mentioned in taking up connecting rod bearings.

When a shim is removed from the bearing, save it.



and conducts it to the connecting rod bearings. The excess oil is thrown off, forming an oil spray in the engine, effectively lubricating the pistons and all moving parts. On each side of the crank case is a catch basin which collects oil, from whence it is distributed to the main bearings.

This system is not a splash system. The oil level should never be so high that the connecting rods dip in the oil. The crank case holds about one gallon of oil. Fill the case with oil until it flows out of the try cock. Be sure the try cock is not clogged. The advantage of this system over the regular splash system is that the motor is effectively oiled in whatever position the tractor may be setting. See Fig. 9 for oiling system.

ENGINE CRANK CASE

In the crank case, use the best quality of heavy-grade engine oil in summer, and the best quality medium-heavy in winter. For winter use, the oil must pour freely when cold so that the pump will handle it easily. The crank case holds about one gallon of oil. Fill until it flows out of the try cock. See that this cock is not clogged.

The heavier lower grades of kerosene now being used, as explained herein, make it necessary to drain out the old oil and refill the crank case with new oil after every ten or twelve hours' work instead of doing this every five or six days, as formerly recommended.

MAGNETO

The bearings on the magneto are provided with oil cups. (See chapter on ignition.)

Use a good grade of light oil such as cream-separator or sewing-machine oil. Don't get oil on the breaker points. Do not use ordinary machine oil on the magneto.

TRANSMISSION

Supply transmission case with three gallons of 600-W or heavy transmission oil. This quantity will bring the level of the oil up to the lower side of the transmission shaft. When tractor has been running continuously, add oil about every week to keep it up to this level. Drain and thoroughly wash out transmission case with kerosene once a year. Do this before starting the season's work. Inspect bearings at this time.

The outer differential, or bull-pinion bearings, require once a week about one-fourth pint of same quality of oil as used in transmission.

Hand-oil the two pulley-shaft bearings with about thirty drops of machine oil twice a day when doing belt work.

Give two turns twice a day to clutch-operating collar grease cup near pulley and flywheel pilot bearing grease cup near flywheel.

BULL GEARS AND PINIONS

Fill the tanks on fenders with used crank case oil, and set valves for twenty drops per minute.

highly polished they may appear to be, a grinding effect is set up that rapidly grows in magnitude, creates friction and heat, consumes power, and soon destroys both surfaces. That is what happens when a bearing burns out. When the right oil is used between moving surfaces, the tiny drops of oil hold them apart. If the oil is replenished so that its quality is not materially affected, bearings properly adjusted will run for months without appreciable wear. Good oils have strong, uniform load-carrying drops and will last until worn out or until weakened by dilution.

Cheap oils are the most expensive for tractor use because they soon break down and fail to carry the load on the bearings. Regardless of how satisfactory they may appear to be, cheap oils are invariably made of inferior material. The load-carrying drops are not of the same size and strength. Under the load and heat of the tractor engine, they soon fail. One break-down caused by using poor oil costs more than a barrel of good oil. High-grade oil, frequently renewed, insures longer life and more continuous use of your tractor. Fifty cents out of every dollar spent for repairs can be saved by proper lubrication. **You cannot afford to use cheap oil.**

KIND OF OIL TO BUY

Good, high-grade oil doubles the life of your tractor.

There are many oil manufacturers in the country who make hundreds of brands of oil. No one brand is always obtainable by all tractor owners. It is, therefore, impractical to recommend brands of oil for each locality. The selection of oil must be left largely to the judgment of the owner. A number of oil companies employ experienced lubricating engineers, who determine, by actual test, the most effective oil to use in every make of tractor. Recommendations made from the results of these tests are widely advertised. Reliable companies making such recommendations assume responsibility for the performance of their oil in your tractor. There are some irresponsible concerns who make a practice of meeting responsible competition with "just as good" an oil at a much lower price. The use of such oils is hazardous and may result in serious damage to the tractor before the quality can be determined. Oils should be bought on a basis of quality, and on the reputation of the manufacturer.

OIL TESTS

You can make no simple test, in the laboratory or elsewhere, that will prove the absolute suitability of any oil for tractor use. The only positive test must be made in the tractor engine under working conditions. Such tests are made by all reliable oil manufacturers before compiling their specifications.

There are, however, some simple comparative tests that roughly show radical differences in oil quality. A good quality of oil, when rubbed vigorously between the finger tips or in the palm of the hand, will not rub out or break down as quickly as a poor grade. When drops of oil are placed on a clean white cloth, no dirt or sediment should be left after the oil soaks in. Any deposit of sediment proves the oil to be adulterated.

THE FUEL SYSTEM

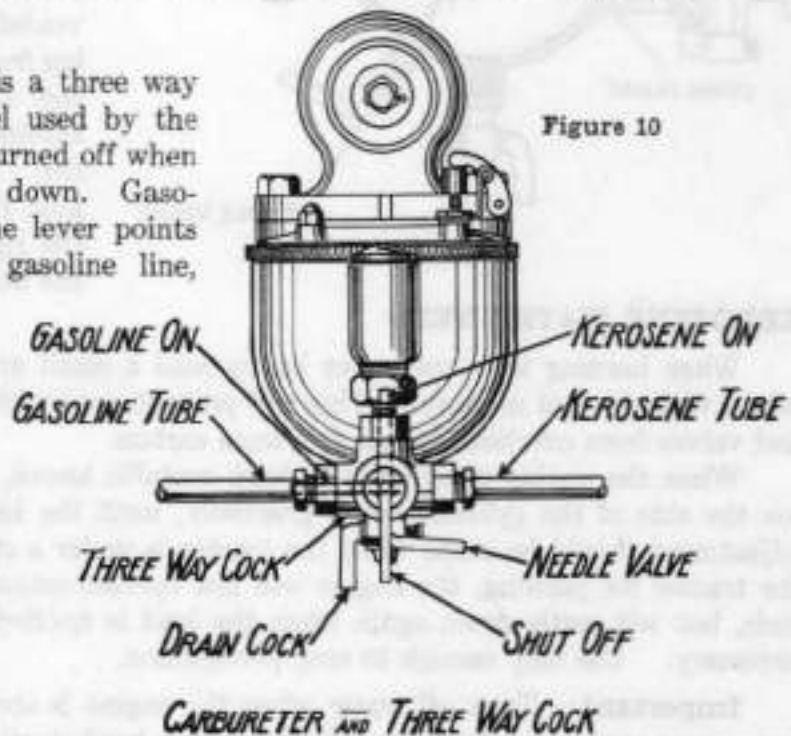
CHAPTER IV

FUEL TANK AND PIPING

The kerosene tank is located on the front end of the tractor. The gasoline tank is located on the left hand fender at the rear. Beneath the kerosene tank is a sediment trap for collecting water and dirt. Drain the trap occasionally and you will have no trouble due to clogged pipe lines and water in the carburetor. The fuel flows through the pipe line, through the three way valve into the float chamber of the carburetor. From there it is metered through the needle valve mixed with the air, forming an explosive mixture which in turn is taken into the cylinder.

THREE WAY COCK

Near the carburetor is a three way cock for changing the fuel used by the carburetor. The fuel is turned off when the lever points straight down. Gasoline is turned on when the lever points in the direction of the gasoline line, kerosene is turned on when the lever points straight up. Fig. 10. Keep all fuel line connections tight. Leaky connections waste a large quantity of fuel in a year. If the three way valve leaks, take it off and grind it so it seats. Use a paste of emery and oil.





THE IGNITION SYSTEM

CHAPTER V

THE MAGNETO

The engine is equipped with a high tension magneto with starter coupling. It forms a complete unit for furnishing electrical energy to ignite the charge in the cylinder. No batteries are required.

The principle of the magneto is based on the fact that a current is induced in the circuit of a coil whenever magnetic flux or a flow of magnetism is introduced or withdrawn. This is accomplished in the magneto by revolving a rotor between the north and south poles of permanent magnets. The action of the rotor produces a current in the primary winding. The opening of the breaker points interrupts the flow of current in the primary winding and at the same time the magnetism through the coil is reversed due to the rotating feature of the rotor. This sudden withdrawal of the current in the primary winding and reversal of the magnetic flux generates a current of sufficient voltage in the high tension coil to jump the gap in the spark plug.

INSTALLATION

The magneto, as installed on the Waterloo Boy Engine, rotates at engine speed and revolves in the clockwise direction (looking at the starter coupling end). Timing the magneto with the engine is merely a matter of putting the spark in the proper cylinder at the right time. Two important facts are essential to remember: (1) The spark is produced when the breaker points **open**. (2) The magneto is timed to the engine when the breaker is in the retard position and the engine is passing inner dead center. (Piston is at the head end).

TO TIME THE MAGNETO

(1) Secure the magneto to the engine in its proper place and make sure it is aligned properly with the driving shaft.

BREAKER MECHANISM (See Fig. 14)

The breaker mechanism offers a means of breaking or interrupting the primary circuit. The breaker bar is oscillated on a pin by means of a two-point cam. When the shoe of the breaker bar rides upon the hump of the cam, the platinum points should be open, breaking the circuit of the primary winding.

ADJUSTING THE BREAKER

It is essential that the gap between the platinum points be .020" when the fiber bumper of the breaker bar is on the high point of the cam.

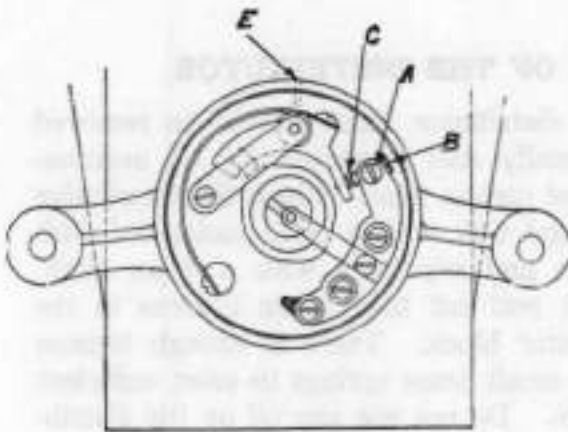


Figure 14

(1) Loosen lock screw (A). See Fig. 14.

(2) Adjust platinum contact screw (B) until the gap is wide enough to permit the gauge in the magneto screw driver furnished with the tractor, to enter the gap at (C), Fig. 14.

Caution: Be sure the fiber bumper is on the high point of the cam as shown in Figs. 12 and 14.

(3) Then tighten down lock screw (A), securing platinum contact screw in position.

CARE OF THE BREAKER

(1) Inspect the gap between the platinum points occasionally and correct the setting when necessary.

(2) Platinum points should be kept **clean**. Oil on the points causes flashing, resulting in irregular running. Carbon and dirt will keep the points apart, causing an open primary circuit.

(3) Oil may be removed by running a piece of stiff hard paper (not soft or blotting paper) between the points.

(4) Should the platinum points become pitted they should be smoothed down with a fine magneto file until they have a perfect contact over the complete area of the point. File lightly, platinum is expensive.

member carrying the cam continues to rotate, being positively driven by the engine, which action compresses the coil spring inside. When the cam strikes the starter pawl it forces it out of engagement. The compressed spring expands, revolving the rotor member forward at a fast rate of speed until the members reach their former relative position.

During the rapid forward movement of the rotor, the breaker points open, producing a hot spark of the same intensity as when the engine is running up to speed.

This process is repeated until the engine gains speed, when the pawl is thrown out of engagement due to shape of the pawl and notch, and held in the inoperative position. In normal running conditions the coupling has no effect on the operation of the magneto. It is not necessary to give the starter any further attention until the engine is to be started again. Then simply trip the pawl into engagement again.

CARE OF THE STARTER COUPLING

The coupling is packed with grease at the factory and requires no attention. Should the engine be left exposed to the weather, cover the coupling with oil or grease to protect it from rust. If the starter is gummy or rusted it may stick, thereby retarding the magneto with its attendant evils. Keep all parts clean and free from dirt. If the starter pawl does not throw out automatically, be sure it is free on the pin. Oil with kerosene.

REPLACING SPRINGS IN THE STARTER COUPLING

Note in Fig. 15-A the location of the short, or cushion, spring against the post. To put the actuating, or long, spring in place, a pin or nail (B) should be inserted in the lateral hole. The ends of the spring are pressed into the spring chamber first, and by pressing on the middle portion, it can be easily placed. This will leave a suitable opening between the small cushion spring and the pin (B) for the lug in the cover. After the cover, or cam member, is pressed into position, the pin or nail may be removed, leaving the unit assembled.



Figure 15-A

THE COOLING SYSTEM

CHAPTER VI

CIRCULATING SYSTEM

The engine is cooled by circulation of water in the water jackets of the engine. The heat absorbed by water in the engine is taken away from it by radiation in passing through the radiator. The water is circulated by means of a centrifugal pump.

The capacity of the system is about 13 gallons. **Use only clean water.** Soft or rain water is preferable for use in the system, as they contain no dissolved salts or alkalis.

THE RADIATOR

The radiator is one of the most important units of your tractor, and its cooling efficiency is vital to successful operation and continuous tractor service.

When new, the radiator is guaranteed, first, to cool the water properly; second, to have sufficient water capacity; third, to be properly constructed and to be built of good materials. If the radiator performs its water-cooling function satisfactorily during the first few days of use, it is proof that it has no defects. Troubles that may develop later are due to abuse or clogging of the radiator cores.

REASONS WHY THE RADIATOR CLOGS

Water from watering troughs, sloughs or running streams often contains leaves, straw, mud or moss—foreign matter which will invariably clog the radiator. Only a part of this is caught by the strainer in the radiator filler cap. Clean water, which should always be used, often contains an excessive amount of dissolved minerals, of which lime, iron and alkalis are the most common. These minerals tend to increase the rusting action in the cooling system. The heat from the engine cylinders causes the dissolved minerals to accumulate in the form of sediment, scale and rust. This foreign matter, circulating with the water, eventually clogs the passages of the radiator and practically stops its water-cooling action. The result, invariably, is an overheated engine.

WATER STRAINER

Between the two halves which form the water compartment is a fine meshed brass screen which allows the water to pass through, but stops the sediment that would otherwise clog your radiator. See sectional view at top of Fig. 16-A. When sediment

When your engine overheats, analyze your trouble, or expensive repairs may be necessary.

1. Examine the timing of the magneto. Make sure it is timed correctly. (Read your instruction book).
2. Make your fuel mixture leaner by adjusting needle valve on your carburetor. Excessive fuel consumption causes overheating.
3. Keep tappets adjusted to 1/64-inch clearance.
4. Examine oil in the crank case. It may be very thin and have no lubricating value. Use good oil and change it after ten hours' work.
5. Examine your pump. Determine if the impeller revolves when engine is running.
6. See that your fan and pump belts are not slipping.
7. Clean dirt and chaff out of the air passages of your radiator core.
8. Examine inside of the radiator and note whether there is an accumulation of rust, grease or sediment.
9. Drain the radiator once a week.
10. Flush radiator before re-filling.
11. Clean strainer and screen once a week.

By correcting the causes of overheating, your engine will develop more power, will run smoother, and will save needless delays and expense for repairs.



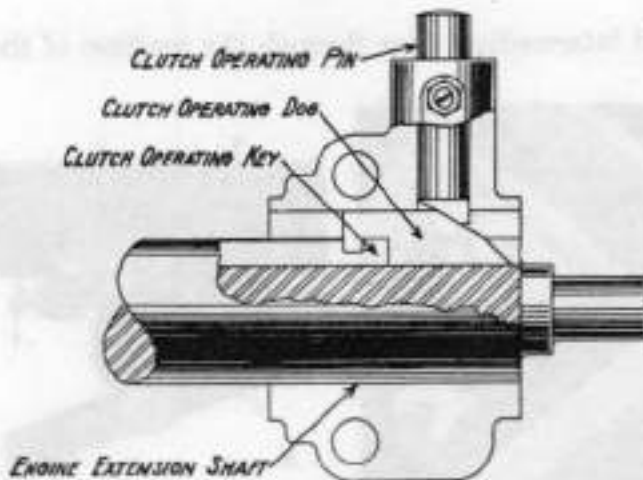


Figure 18

Fig. 18 shows the clutch operating pin only partially engaged. This is the position that these parts are in when the clutch will not stay in engagement. As will be seen in Fig. 18 the bevel of the clutch operating pin rests on the bevel of the clutch operating dog and due to the pressure on the clutch operating pin and vibration of the tractor caused by unevenness of ground, the operating pin naturally forces the operating dog out of engagement. Any attempt

to hold the clutch in engagement in this position will result in wear and frequent renewal of clutch operating parts.

Fig. 19 shows the position of the clutch operating pin and dog when the clutch is properly engaged. As will be seen the flat point of the clutch operating pin rests on the flat portion or top of the clutch operating dog. With the clutch operating parts in this position there is no tendency for the clutch to become disengaged.

TRANSMISSION

Action of Speed Changing Gears: Two speeds forward and one reverse is secured in the transmission by means of sliding gears.

High Speed Forward is obtained by sliding low speed drive pinion into engagement with the high speed intermediate gear.

Low Speed Forward is obtained by sliding low speed drive pinion into engagement with the low speed intermediate gear.

Reverse is obtained by sliding the low speed drive pinion into engagement with the reverse pinion located beneath the engine extension shaft. Engagement with the reverse pinion changes the rotation of the transmission gearing, commencing with the intermediate gears.

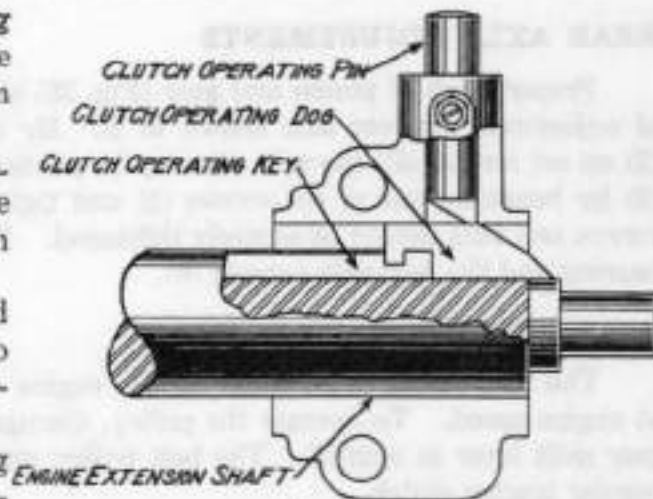


Figure 19

MOVEMENT OF GEAR SHIFT LEVER

By moving the gear shift hand lever to the right in engagement with the gear shift lever and moving it forward in the slot, this action shifts the high speed drive

Adjustment on the brake is made by shortening the band. This is accomplished by screwing down the yoke end on the "T" bolt. This adjustment can be made by taking off the inspection plate on the rear end of the transmission case.

FINAL DRIVE

The final drive is accomplished by operating a chilled semi-steel pinion in an internal gear mounted in the wheel. Means for lubricating these is provided for by tanks in the fenders. Always oil the gears when using the tractor.

To adjust the gears for mesh, loosen bolts which fasten the rear cannon bearing to the frame and mesh the gears properly by loosening the set screw on one side and tightening the other. Be sure all nuts and lock nuts are tight after adjusting. Adjust the gears at the highest point in the gear. Be sure the pinion meshes over the full face of the gear. Use washers on the axle for this.

FRONT AXLE

The axle is held in position by two radius rods and is adjusted by means of the double nuts on their forward end. It is properly adjusted when the axle casting is centrally located between the two members of the front end support.

The front wheels should be adjusted so that the outer rim of the wheel is from one-half to one inch closer in front than behind. Adjustment is made by turning the adjuster pin to the right to turn the wheels in at front, and left to turn the wheels out at front.

The steering arm and sector should always be kept tight on the steering knuckles.

WATERLOO BOY TRACTOR

MODEL "N"

PARTS LIST

INSTRUCTIONS FOR ORDERING PARTS

- First:* Always give serial number of tractor when ordering repairs. The number is stamped on the brass name plate on rear cross member of the frame.
- Second:* Give number and name of each part ordered. If in doubt as to the correct name and number, send dimensioned sketch or return broken parts, charges prepaid.
- Third:* Orders for parts should be written separately from correspondence.
- Fourth:* Orders for parts should be sent thru regular John Deere dealer.
- Fifth:* State whether shipments are to be forwarded by Freight, Express or Parcel Post. Telegraph orders will be shipped Express or Parcel Post unless otherwise instructed.
- Sixth:* Parts net f. o. b. Waterloo, Iowa, U. S. A.

JOHN DEERE TRACTOR CO.
Waterloo, Iowa, U. S. A.

Part No.	Name and Description	Part No.	Name and Description
AN2267	Motor, Complete, Flat Belt.		
	CRANK CASE		CRANKSHAFT, PISTON, CONNECTING RODS
AN2092	Crank Case, Complete.	AN2083	Crankshaft, Complete, Includes 54R.
AN2093	Cover Crank Case with Main Bearing Oilers	AN2220	Connecting Rod, Includes 2183R.
AN2385	Oiler, Main Bearing, Right.	AN2258	Connecting Rod Bolt with Nut, Includes 335R, 1305R, 1529R.
AN2586	Oiler, Main Bearing, Left.	AN2259	Crank Pin Box, Marine Connecting Rod, Complete, Includes AN2258, AN2266, 38R, 39R, 337R, 1735R.
2R	Cap, Main Bearing.		
5R	Inspection Plate.	38R	Shim (Thick), Marine Connecting Rod Box.
8R	Bushing, Main Bearing (2 halves).	39R	Shim, Marine, Connecting Rod Bearing Oil-ing.
23R	Shim, Thick, 26-Ga. Main Bearing.	48R	Piston, 6-1/2".
24R	Gasket, Cylinder to Crank Case.	52R	Piston Pin.
64R	Stud, Cam Gear Housing, or Cam Shaft Bearing, 3/8" x 1-1/2".	54R	Gear, Crankshaft.
123R	Shim, Thin, 30-Ga. Main Bearing.	56R	Key, Whitney, Crankshaft Gear.
204R	Drain Cock, Crank Case, 3/8".	114R	Flywheel Bolt, 1/2" x 2".
207R	Drain Cock, or Test Cock Oil Level, 1/8".	335R	Bolt, Marine Connecting Rod Box.
294R	Stud, Eccentric Lever Plate, 1/2" x 1-5/8".	337R	Shim (Thin), Marine Connecting Rod Box.
400R	Ball, Bushing Pin, Steel, 1/4".	342R	Set Screw, Piston Pin.
419R	Pin, Main Bearing Bushing.	343R	Wire, Piston Pin Set Screw.
433R	Stud, Crank Case to Cylinder, 3/4" x 3".	454R	Ring, Piston, 6-1/2", 1/8", Oversize.
463R	Gasket, Crank Case Cover (3 pieces per set).	1329R	Flywheel, Flat Belt.
464R	Gasket, Inspection Plate.	2166R	Piston Ring.
522R	Shim (Thin), Slotted, Main Bearing.	2183R	Bushing, Piston Pin.
523R	Shim (Very Thin), 36-Ga. Main Bearing.	2377R	Piston, 6-1/2"—1/8" Oversize.
1305R	Nut, Hexagon, Castellated, Main Bearing Stud, 5/8" S. A. E.	2571R	Piston Pin, 6-1/2"—1/8" Oversize.
2197R	Breather.		OUTSIDE COUNTERWEIGHT
2203R	Stud, Main Bearing, 5/8" x 3-1/2", Stud End, U. S. S.; Nut End, S. A. E.	AN2213	Outside Counterweight, Complete, Includes 1726R, 1954R.
2344R	Tie Wire, Main Bearing Stud.		CAM SHAFT
2525R	Angle Clamp Bolt for Oiler.		
	CYLINDER		
AN2097	Cylinder, Complete, Includes 263R, 272R, 284R, 465R, 466R, 510R, 511R, 1669R, 1883R, 2204R, 2205R.	AN2201	Gear, Cam Shaft, Complete, Includes 91R, 1494R, 1723R.
AN2098	Cylinder Head, Includes K2599, 96R.	53R	Gasket, Cam Shaft Bearing Cap.
AN2100	Cylinder Head, Complete, Includes AN2098, AN2154, 485R, 1731R, 2209R, 2210R.	56R	Key, Whitney, Cam Shaft Gear.
AN2101	Gasket, Cylinder Head.	57R	Cam Shaft.
AN2102	Bracket, Tappet Lever, sold with 1517R, 1775R.	58R	Bearing (Short), Cam Shaft.
AN2104	Manifold with 64R.	59R	Bearing (Long), Cam Shaft.
AN2105	Gasket, Manifold, Copper.	60R	Cap, Cam Shaft Bearing.
AN2154	Valve, Intake and Exhaust.	61R	Thrust Washer (Fiber), Cam Shaft.
K2455	Coupling, Fuel Line, 1/4" x 1/8" Pipe Thread	64R	Stud, Cam Shaft Bearing, 3/8" x 1-1/2".
K2539	Needle Valve, Water, 1/4" x 1/4" Pipe Thread	90R	Gasket, Cam Shaft Bearing.
14R	Manifold Stud, 1/4" x 5-7/16".	91R	Bolt, 7/16" x 2-1/2", Drilled.
27R	Washer, Manifold Stud, 1/2".	1091R	Oiler, Hinge Lid, Cam Shaft Bearing.
64R	Stud, Carburetor, 3/8" x 1-1/2".		TAPPET
86R	Valve Guide.	AN2113	Guide, Push Rod, Complete, Includes 62R, 63R, 65R, 66R.
146R	Shaft, Carburetor Operating.	AN2236	Tappet Rod, Complete, Includes 72R, 118R, 517R.
164R	Spring, Carburetor Operating.	62R	Cam Roller.
265R	Priming Cup.	63R	Pin, Cam Roller.
272R	Cover, Cylinder Bottom.	65R	Push Rod Body.
321R	Gasket, Carburetor.	66R	Push Rod Guide.
357R	Three Way Cock, 5/16", Fuel Line.	67R	Clamp, Push Rod Guide.
413R	Plate, Manifold Stud.	68R	Tappet Lever, Right.
465R	Gasket, Cylinder Bottom Cover.	69R	Tappet Lever, Left.
466R	Gasket, Cylinder Top Plate.	72R	Lock Nut, Tappet Rod End, S. A. E., 3/8".
485R	Spring, Valve, Intake and Exhaust.	78R	Shaft, Tappet Lever.
511R	Plate, Cylinder, Top.	79R	Spring, Tappet Lever.
514R	Stud, Manifold, 1/2" x 7-1/2".	92R	Washer, Tappet Lever Shaft.
781R	Motor Support.	118R	End, Tappet Rod.
784R	Equalizer Pin, Motor Support.	244R	Cap Screw, Control Shaft Bearing, 1/2" x 1-1/4" (Drilled).
1084R	Taper Pin, Manifold No. 0x1".	517R	Tappet Rod.
2204R	Stud, Cylinder Head (Long), 3/4" x 6-1/4".		
2205R	Stud, Cylinder Head (Short), 3/4" x 5-5/8".		
2209R	Cap, Valve Spring, used with Conical Washer.		
2210R	Washer, Valve Spring Retaining, One-half Conical.		

Part No.	Name and Description	Part No.	Name and Description
	TRANSMISSION (Continued)		BRAKE (Continued)
1106R	High-Speed Intermediate Gear.	1190R	Pin, Brake Band, 1/2" x 2-3/8".
1108R	Key, Intermediate Gears, Oval Ends, 1/2" x 1-3/4" x 6-3/4".	1192R	Stud, Brake Band, 1/2" Rd. x 3/8".
1110R	Pinion, Differential Drive.	1193R	Pin, Brake Band, Adjusting Yoke, 1/2" x 1-3/4".
1125R	Inner Race, Hyatt (Long).	1194R	Key, Bell Crank Shaft Arm, 1/4" Sq. x 1-3/4".
1126R	Outer Race, Hyatt (Long).	1555R	Rivet, Brake Band, O. H., 1/4" Rd. x 1/2".
1127R	Roller, Hyatt (Long Assembly).	1577R	Copper Rivet, Brake Lining, No. 9" x 5/8".
1131R	Hyatt Bearing, Complete (Long).		ENGINE EXTENSION SHAFT
1191R	Washer, Transmission Case Bearing, 4-3/4" O. D. x 3" I. D.	AN2037	Dust Collar, Complete, Includes 1004R, 1024R, 1025R, 2188R.
1563R	Rivet, O. H., 5/16".	AN2265	Engine Extension Shaft with Race, Includes 997R, 1001R, 1125R, 1129R, 2217R, (1125R pressed at factory).
	DIFFERENTIAL		
AN2261	Long Differential Shaft, Includes 1125R, 1128R, 2212R, 2213R, 2214R, 2215R, AN2263.	997R	Inner Race, Hyatt Pilot Bearing.
AN2262	Short Differential Shaft, Includes 1125R, 1128R, 2214R, 2215R, 2216R.	998R	Outer Race, Hyatt Bearing.
AN2263	Dust Collar Long Differential Shaft with Washer, Includes 1209R, 2218R.	999R	Roller, Assembly, Hyatt Pilot Bearing.
643R	Differential Case.	1001R	Thrust Collar, Engine Extension Shaft.
644R	Differential Case Cover.	1002R	Hyatt Bearing, Complete, Pilot for Extension Shaft.
651R	Nut, S. A. E., Hexagon, Differential Shaft, 1-1/4".	1004R	Washer (Felt), Extension Shaft Pilot Bearing, 1002R.
654R	Key, Differential Shaft, 3/8" x 5/8" x 2-3/8".	1025R	Collar, Plate, Extension Shaft Bearing, 1002R.
659R	Differential Pinion.	1037R	Washer (Fiber), Engine Extension Shaft, 3-3/8" O. D. x 2-1/4" L. D.
660R	Spacing Ring, Differential Gear.	1083R	Collar, Extension and Intermediate Shaft Bearing.
664R	Key (Whitney), Bull Pinion.	1084R	Taper Pin, Extension Shaft Bearing Collar, No. 0 x 1".
1068R	Long Quill, Transmission Case.	1100R	Pinion, Low-Speed Drive.
1069R	Short Quill, Transmission Case.	1101R	Pinion, High-Speed Drive.
1076R	Collar, Dust, Long Differential (Inside), used with Removable Race.	1124R	Extension, Inner Race.
1078R	Packing, Inside Dust Collar, Long Differential Shaft, 1/8" Rd. x 14".	1125R	Inner Race, Hyatt Long Bearing.
1079R	Bearing, Collar (Inside), Short Differential Shaft.	1126R	Outer Race, Hyatt Long Bearing.
1081R	Thrust Collar Differential Case.	1127R	Roller, Assembly, Hyatt Long Bearing.
1116R	Differential Drive Gear, Complete.	1128R	Inner Race, Hyatt Short Bearing.
1118R	Differential Shaft Gear.	1129R	Outer Race, Hyatt Short Bearing.
1125R	Inner Race, Hyatt (Long).	1130R	Roller Assembly, Hyatt Short Bearing.
1126R	Outer Race, Hyatt (Long).	1131R	Hyatt Bearing, Complete, Long, Engine Extension Shaft.
1127R	Roller Assembly, Hyatt (Long).	1132R	Hyatt Bearing, Complete, Short, Engine Extension Shaft.
1128R	Inner Race, Hyatt (Short).	2188R	Rivet Extension Shaft Pilot Bearing, 1/4" x 5/8".
1129R	Outer Race, Hyatt (Short).		GEAR-SHIFTING MECHANISM
1130R	Roller Assembly, Hyatt (Short).	AN2004	Dust Collar, Extension and Differential.
1131R	Hyatt Bearing, Complete (Long).	107R	Key (Whitney), Shift Crank Arm, 1/2" x 1/8".
1132R	Hyatt Bearing, Complete (Short).	506R	Yoke, Gear Shift Rod.
1209R	Washer, Felt, Rear Axle and Long Differential Shaft Dust Collar.	598R	Pin, Gear Shift Rod Yoke.
2211R	Pin, Differential Gear, 1/4" x 2-7/8".	1051R	Flange, Dust Collar, Extension and Differential Shaft.
2214R	Nut, S. A. E., Slotted, Hexagon, Differential Shaft, 1-1/4".	1052R	Retaining Collar, Extension and Differential Shaft.
2218R	Collar, Dust, Long Differential Shaft, (Inside), used with Pressed Race.	1053R	Leather, Dust Collar, Extension and Differential Shaft.
	BRAKE	1054R	Shim, Dust Collar, Extension and Differential Shaft.
AN2002	Brake Band with Lining, Includes 249R, 1174R, 1184R, 1555R, 1577R.	1063R	Top Cover, Transmission Case.
AN2003	Brake Band, Complete, for Transmission Assembly, Includes AN2002, 626R, 763R, 1179R, 1185R, 1188R, 1189R, 1192R, 1193R, 1194R, 1520R, 1616R, 1722R, 1735R, 1782R, 637R, 1749R.	1064R	End Cover, Transmission Case.
626R	Brake Arm.	1065R	Gasket, Top Cover, Transmission Case.
637R	Rod End, Brake Adjusting, 1/2".	1066R	Gasket, Transmission Case End Cover.
763R	Anchor Pin, Brake Adjusting, 3/4" x 3/4".	1073R	Gasket, Intermediate Shaft Dust Cap.
1174R	Lining, Brake Band, 3/16" x 26-1/2".	1074R	Dust Cap, Intermediate Shaft.
1179R	Key, Brake Shaft Arm, 1/4" Sq. x 1-1/4".	1135R	Shift Fork, Low and Reverse Gear.
1184R	Guide, Brake Band, 1" x 3-3/4".	1136R	Shift Fork, High Gear.
1188R	Bell Crank, Brake.	1138R	Set-Screw (Drilled), Low and Reverse Shift Fork, 1/2" x 1-1/4".
1189R	Shaft, Brake Bell Crank.	1140R	Shift Shaft, Low and Reverse.
		1141R	Shift Shaft, High Gear.
		1144R	Stop Pin, Shift Shaft, 1/2" x 1-5/16".
		1146R	Spring, Shift Shaft Stop Pin.

Part No.	Name and Description	Part No.	Name and Description
	FRAME		MUFFLER (Continued)
771R	Channel, Center.	AN2245	Outer Drum.
775R	Channel, Right Side.	AN2246	Inner Drum.
776R	Channel, Left Side.	227R	Bottom.
1270R	Cross Member, Front, Lower.	426R	Head, Top.
1272R	Cross Member, Rear, Lower.	2420R	Brace, Muffler.
1273R	Cross Member, Rear, Upper.		
1274R	Cross Member, Front, Upper.		
	FOOT BRAKE		GEAR SHIFT, HAND CONTROL
AN2029	Shaft, Brake, Complete, Includes 593R, 881R, 1178R, 1187R, 1195R, 1520R, 1533R, 1634R, 1782R.	AN2039	Control Stand, Complete.
506R	End, Adjusting Yoke, End of Brake Rod, 5/8".	AN2042	Rod, High Gear Shift, Includes 506R.
589R	Plate, Brake and Clutch Hook-up.	AN2043	Rod, Low and Reverse Gear Shift, Includes 506R.
592R	Hanger, Brake Shaft.	506R	Adjustment End.
593R	Shaft, Brake.	1160R	Rod, High Gear Shift Rod.
598R	Pin, Brake Rod Yoke End, 5/8" x 2-1/4", Drilled.	1161R	Rod, Low and Reverse Gear Shift Rod.
881R	Pedal, Brake.	1162R	Lever, Gear Shift, Lower.
1175R	Brake Rod.	1163R	Spring, Lower Gear Shift Lever.
1178R	Lever, Brake Pedal.	1164R	Hand Lever.
1179R	Key, Brake Shaft Arm, 1/4" Sq. x 1-1/4".	1165R	Fulcrum, Hand Shift Lever.
1180R	Anchor, Brake Pedal Lever Spring.	1171R	Bracket, Control Lever.
1186R	Spring, Brake Pedal Lever.	1172R	Shaft, Control Bracket.
1187R	Arm, Brake Shaft.	1176R	Gate, Control Bracket.
1196R	Key, Brake Pedal Lever, 5/16" Sq. x 2".	1557R	Rivet, Spring to Shift Lever.
	BELT PULLEY		COMBINED PUMP AND FAN
AN2190	Pulley Belt, Complete, 8" Face, Includes AN2191, AN2192.	AN2165	Quill, Pump and Fan, Includes 1344R.
AN2191	Rim, Belt Pulley, 8" Face, Includes 533R, 535R, 1558R, 1582R, 1583R, 1724R, 1928R.	AN2169	Combined Pump and Fan, Complete.
AN2192	Belt Pulley, Includes 1780R.	AN2189	Fan Belt, 2", Complete, Includes 1383R, 2364R.
AN2399	Rim, Belt Pulley, 11" Face, Includes 533R, 534R, 535R, 1558R, 1582R, 1724R, 1928R.	AN2253	Pump Vent Pipe Assembly, Includes K2457.
533R	Weight, Balance, Small.	294R	Stud, Pump and Fan Brace.
534R	Weight, Balance, Medium.	469R	Packing, Pump Shaft Gland.
535R	Weight, Balance, Heavy.	1091R	Oiler, Bowen, Spring Cap.
1558R	Rivet, Balance Weight, 1/4" x 1-1/8".	1304R	Nut, Castellated, Pulley to Shaft, 1/2", S.A.E.
1582R	Rivet, Balance Weight, 1/4" x 1-3/8".	1334R	Brace, Pump and Fan to Frame.
1583R	Rivet, Balance Weight, 1/4" x 1-5/8".	1336R	Body, Pump.
	PLATFORM	1337R	Pulley, Pump and Fan.
AN2135	Platform, Complete, Includes 509R, 821R, 822R, 824R, 833R, 835R, 836R, 839R, 964R, 1230R, 1231R, 1603R, 1604R, 1625R, 1627R, 1724R, 1726R, 1811R, 1943R.	1339R	Gland, Pump Shaft.
589R	Plate, Brake Pedal.	1340R	Impeller, Pump Shaft.
833R	Bracket, Platform.	1341R	Shaft, Pump and Fan.
835R	Brace, Platform, Upper.	1342R	Cover, Quill Bearing.
836R	Plank, Platform, Wide.	1343R	Washer, Hyatt End Bearing.
839R	Plank, Platform, Narrow.	1344R	Bushing, Pump and Fan Quill.
966R	Dust Shield, Lower.	1345R	Bracket, Pump and Fan.
1230R	Brace, Lower Right Brace.	1347R	Washer (Felt), Hyatt End Bearing.
1231R	Brace, Lower Left Brace.	1372R	Hyatt Roller Bearing Assembly.
1811R	Nail, Dust Shield.	1373R	Key (Woodruff), Pulley to Shaft.
	Drawbar	1374R	Fan, Blades and Spider.
AN2019	Drawbar Bracket, Complete, Includes 926R.	1376R	Gasket, Pump Body.
820R	Drawbar, Upper.	1379R	Grease Cup, Wing, Cap, No. 60, 1/8".
821R	Guide, Upper Drawbar.	1383R	Clip Fastener, Belt.
822R	Guide, Lower Drawbar.	1581R	Rivet, Pump Impeller to Shaft, 1/4" x 1-1/2".
824R	Spacer, Drawbar Guide.	K2456	Body, Water Line Coupling, 1/4", Pump Vent.
920R	Drawbar, Lower.	K2457	Nut, Water Line Coupling, Body Pump Vent, 1/4".
921R	Spacer, Rear Drawbar.		
1087R	Pin, Drawbar, 3/4" x 4-1/2".		
1564R	Rivet, Drawbar Bracket, 5/8" x 2-1/4".		
	MUFFLER		WATER LINE
AN2061	Muffler, Complete, Includes AN2245, AN-2246, 227R, 231R, 426R.	AN2397	Clamp, Radiator Hose, used with Strainer, Includes 1501R, 1693R, 2534R.
		204R	Drain Coch, 3/8", Below Motor.
		210R	Hose, Radiator.
		211R	Clamp, Radiator Hose, 3-Ply.
		331R	Clamp, Radiator Hose, 4-Ply.
		332R	Support, Radiator Hose.
		538R	Support, Lower Water Pipe.
		539R	"U" Bolt, Water Pipe to Support.
		1501R	Nut, Hexagon, Machine Screw for Clamp.
		1693R	Screw, Machine, in Clamp.
		2242R	Nipple, Pump Body to Lower Hose, T.O.E., 1" x 15-3/4", Curved.
		2243R	Nipple, Upper Water Line, T.O.E., 1" x 60", Curved.

Part No.	Name and Description	Part No.	Name and Description
KEROSENE TANK (Continued)		FLYWHEEL GUARD	
AN2330	Filler Cap with Flange.	AN2381	Guard, Flywheel, Includes 1551R, 2514R, 2518R, 2519R, 2524R, 2532R.
207R	Drain Cock, Fuel Tank, 1/8".	1551R	Rivet.
212R	Strap, Fuel Tank, Flat.	1621R	Bolt, Machine, Front Support to Frame, 1/2" x 1-1/2".
215R	Fuel Tank, Outlet.	2514R	Support, Left Center.
257R	Filler Cap, Fuel Tank.	2518R	Support, Front.
322R	Cushions between Fuel Tank and Bracket.	2519R	Support, Rear.
356R	Cut-off Cock, (in Fuel Line at Tank), 5/16".	2524R	Support, Right Center.
789R	Bracket, Fuel Tank, 20-1/8" High, N. S.	ATTACHING MOTOR TO FRAME	
AIR INTAKE		475R	Shim, Motor and Transmission Quill Support.
AN2058	Air Stack.	761R	Shim, Motor.
220R	Elbow, Air Intake.	780R	Shim, Motor Location (under Motor Feet).
308R	Bracket, Air Intake.	1120R	Support, Transmission, Front End.
326R	Hose, 3-Ply, Garden, Air Stack.	2208R	Angle, Washer.
SEAT		SCHEBLER CARBURETOR	
842R	Plate, Seat Spring.	AN2091	Schebler Carburetor, Complete, Model "D" 1-1/2".
846R	Seat.	X845	Air Valve Casting, Complete, 3W, AW, QW, YW, MW, 20W.
847R	Seat Spring.	X173C	Bowl, Complete, BW, DW, EW, XW, UW, RW, SW, TW, PW, 4W, JW, 6W, 7W, 8W, 9W.
PLOW SHIFT		X774	Throttle, Complete, PW, KW, 2, 18W, 14W, 15W, 16W, 17W, 2-10W, 2-11W, 12W, 13W, QW.
AN2070	Quadrant, Plow-Shifting, Complete, 844R, 845R, 944R, 945R, 1533R.	X156	Lid, Complete, DW, MW, YW, 19W.
843R	Bar, Plow-Shifting.	X533C	Butterfly Throttle Shaft Assembly, Complete, 2-10W, 2-11W, 12W, 13W, 14W, 14W, KW.
844R	Lever, Plow-Shifting.	X1537	Leather Air Valve Disk.
845R	Quadrant, Plow-Shifting.	DW	Spray Nozzle.
945R	Spring, Plow-Shifting, Gear.	EW	Needle Valve and Packing Nut.
TOOL BOX AND ACCESSORIES		FW	Cork Float.
AN2072	Tool Box.	HW	Float Valve.
AN2144	Tool Box, Complete, with Tool Fittings (Domestic), 488R, 1600R, 1702R, 1837R, K2967, AN2072, AN2146.	MW	Air Valve Adjusting Screw.
AN2145	Socket Wrench Set, 411R, K2065, 1819R, 1821R.	NW	Cork Gasket for Lid.
AN2146	Wrenches, Complete Set, AN2145, 2381R, 2382R, 2383R.	OW	Air Valve Spring.
411R	Socket Wrench Handle.	S87	Lock Nut for Adjusting Screw.
460R	Name Plate.	XW	Needle Valve Connection.
488R	Valve-Grinding Key.	3W	Air Valve Casting.
1600R	Lag Screw, Tool Box to Platform, 1/4" x 1-1/2".	7W	Float Lever Screw.
1575R	Name Plate Rivet, Copper.	8W	Float Lever Bearing Screw.
1819R	Socket Wrench, Cylinder Head, 3/4".	20W	Air Valve Spring Seat Washer.
1821R	Socket Wrench, 31/32".	EXTRA EQUIPMENT	
2381R	Wrench, Flat, 7/16" x 11/16".	Canopy Top	
2382R	Wrench, Flat, 1-1/16" x 1-1/4".	AN2150	Curtains, Canopy Top, Complete Set, Canvas.
2383R	Wrench, Flat, 7/8" x 31/32".	AN2148	Canopy Top, Complete (with Curtains).
K2067	Oil Can, 1/2 Pint.	AN2149	Canopy Top, Complete (no Curtains).
STARTING CRANK		AIR CLEANERS	
AN2076	Starting Crank, Complete, with 243R, 248R, 246R, 151R.	AN2241	Bennett Air Cleaner, Complete, Includes 359R, 360R, 361R, 362R, 364R, 1502R.
258R	Handle, Starting Crank.	359R	Cleaner only.
STARTING QUILL		360R	Bracket.
AN2254	Quill, Starting, Complete, 251R, 1724R, 1935R, 2150R, Outside Counterweight.	361R	Strap.
250R	Quill, Starting, Short.	362R	Flexible Tube.
251R	Cap, Starting Quill.	364R	Jar.
2150R	Quill, Starting, 8-3/4" Long.	2351R	Donaldson Air Cleaner.
QUILL GUARD		2352R	Elbow for Donaldson Air Cleaner.
AN2183	Quill, Guard, 10" Wide.	EXTENSION RIMS AND SPECIAL GROUSERS	
AN2391	Quill, Guard, 14" Wide.	AN2151	Rim, 8", Extension, Complete, Includes 795R, 796R.
501R	Bracket, Quill Guard.	AN2164	Spade Lug, Includes 1726R, 1512R, 2-5/8" High.
1555R	Rivet, 1/4" x 1/2".		
2513R	Quill Guard, Brace.		

Part No.	Name and Description	Part No.	Name and Description
	WASHERS (Continued)		CAP SCREWS
284R	Washer, Lead, 3/8"	1685R	Cap Screw, 5/16" x 1/2"
786T	Washer, 12-Ga., 21/32" I. D. x 1-3/4"	1686R	Cap Screw, 5/16" x 3/4"
1702R	Washer, Plain, 1/4"	1688R	Cap Screw, 5/16" x 1-1/2"
1704R	Washer, Plain, 3/8"	1669R	Cap Screw, 3/8" x 3/4"
1706R	Washer, Plain, 1/2"	1670R	Cap Screw, 3/8" x 1"
1716R	Washer, Plain, 12-Ga., 1" I. D. x 2" O. D.	1671R	Cap Screw, 3/8" x 1-1/4"
1719R	Washer, Plain, 20-Ga., 1" I. D. x 2" O. D.	1672R	Cap Screw, 3/8" x 1-1/2"
1720R	Washer, Plain, 22-Ga., 1-1/8" I. D. x 2" O. D.	1675R	Cap Screw, 7/16" x 1"
1721R	Lock Washer, 5/16"	1676R	Cap Screw, 7/16" x 1-1/4"
1722R	Lock Washer, 3/8"	1683R	Cap Screw, 1/2" x 1-1/4"
1723R	Lock Washer, 7/16"	1684R	Cap Screw, 1/2" x 1-1/2"
1724R	Lock Washer, 1/2"	1685R	Cap Screw, 1/2" x 2"
1726R	Lock Washer, 5/8"	1688R	Cap Screw, 3/4" x 1-3/4"
1728R	Lock Washer, 3/4"		SET SCREWS
1729R	Lock Washer, 1/4"	1018R	Set Screw, Headless, 1/4" x 1"
1881R	Lock Washer, 7/8"	1770R	Set Screw, 1/4" x 1/2"
1882R	Lock Washer, 1"	1775R	Set Screw, 3/8" x 1"
2163R	Washer, Lead, 5/16"	1780R	Set Screw, 1/2" x 3/4"
2532R	Washer, Plain, 20-Ga., 3/16" I. D. x 1/2" O. D.	1782R	Set Screw, 1/2" x 1-1/4"
		1783R	Set Screw, 1/2" x 1-1/2"
		1787R	Set Screw, 1/2" x 2-1/2"
		1800R	Set Screw, Headless, 5/16" x 3/4"