OWNER'S MANUAL

International Hopper Cooled 1½ to 2½ and 3 to 5 H.P. Model "LB" Engines

(Gasoline or Kerosene)

This manual contains information which will be valuable to you during the entire life of your engine. It includes operation and maintenance information, and a parts list. Rely on your manual for operating and maintenance information . . . and rely on your International Harvester dealer when in need of skilled mechanical service or genuine IHC service parts.

INTERNATIONAL HARVESTER COMPANY
180 NORTH MICHIGAN AVE. CHICAGO 1, ILLINOIS, U.S.A.

TO THE ENGINE OWNER

Please accept our congratulations on your investment in an International Harvester engine. We feel sure you will obtain from this machine the economical and superior performance it is designed to give. It is certain that you will derive a large measure of personal satisfaction from operating it.

Years of engine manufacturing experience and actual contact with problems in the field have been combined with advancements in engineering and metallurgical science to produce all the features and refinements built into your engine. Properly adjusted, operated, and maintained, this engine will respond to every reasonable demand you make upon it and give you reliable service for years to come.

The purpose of this Owner's Manual is to explain maintenance requirements and routine adjustments which are necessary for the most efficient operation of your engine. To protect your engine investment, study your Manual before starting or operating your engine.

If you should need information not given in this Manual, or require the services of a trained mechanic, we urge you to use the extensive facilities offered by the International Harvester dealer in your locality. Dealers are kept informed on the best methods of servicing and are equipped to provide prompt, high-class service in the field or in an up-to-date service station.

Dealers carry ample stocks of essential genuine IHC parts. These dealers are backed in every case by the full facilities of a conveniently located International Harvester branch.

When in need of parts, always give the International Harvester dealer your engine serial number. We suggest that you write this serial number in the space provided below, for ready reference when parts are required.

Engine Serial No. _____

(Stamped on plate above cylinder head)

* * *

It is the policy of International Harvester Company to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements at any time without incurring any obligation to make such changes on machines sold previously.

CONTENTS

Note:- The instructions in this manual are for both Gasoline or Kerosene Engines, except where otherwise specified.

IMPORTANT

This engine has been designed to be one of the safest engines for operation inside of a building. The fuel tank is below the carburetor to eliminate any possibility of fuel leakage from fuel lines or carburetor. We suggest, however, that you obtain a permit from the insurance company whenever engine is installed in an insured building.

BEFORE STARTING THE ENGINE

All oil is drained from the crankcase, and the water is drained from the hopper when the engine is shipped.

Fill the crankcase to the top of filler boss *(see ref. no. 2, Illust. 3)* with the proper grade of oil for the prevailing temperature *(see table on page 7.)*

See that the crankcase water drain plug *(see ref. no. 11, Illust. 1)* is in place and tight, then fill hopper to within 3/4" of the top with clean water. Use soft or rain water, if possible, and keep hopper well filled at all times. In cold weather engine can be started easier if hot water is used.

The hopper capacity for the 1-1/2 to 2-1/2 H.P. engine is approximately 2-1/4 U.S. gallons and for the 3 to 5 H.P. engine it is approximately 4 U.S. gallons.

On gasoline engines fill the fuel tank with clean gasoline. On kerosene engines fill the fuel tank with clean kerosene and fill the gasoline (starting) chamber in the mixer with clean gasoline. **Caution:** Never fill fuel tank while engine is running.

Because the fuel consumption of this engine is very small, a high test gasoline is a good investment especially in cold weather. Trouble can be avoided if the fuel is kept free from water and dirt. Keep your supply of gasoline in a closed container so the more volatile portion does not evaporate. The fuel tank should be removed and cleaned out at least once a year.

STARTING GASOLINE ENGINE

Open the gasoline needle valve 1/3 to 1/2 of a turn.

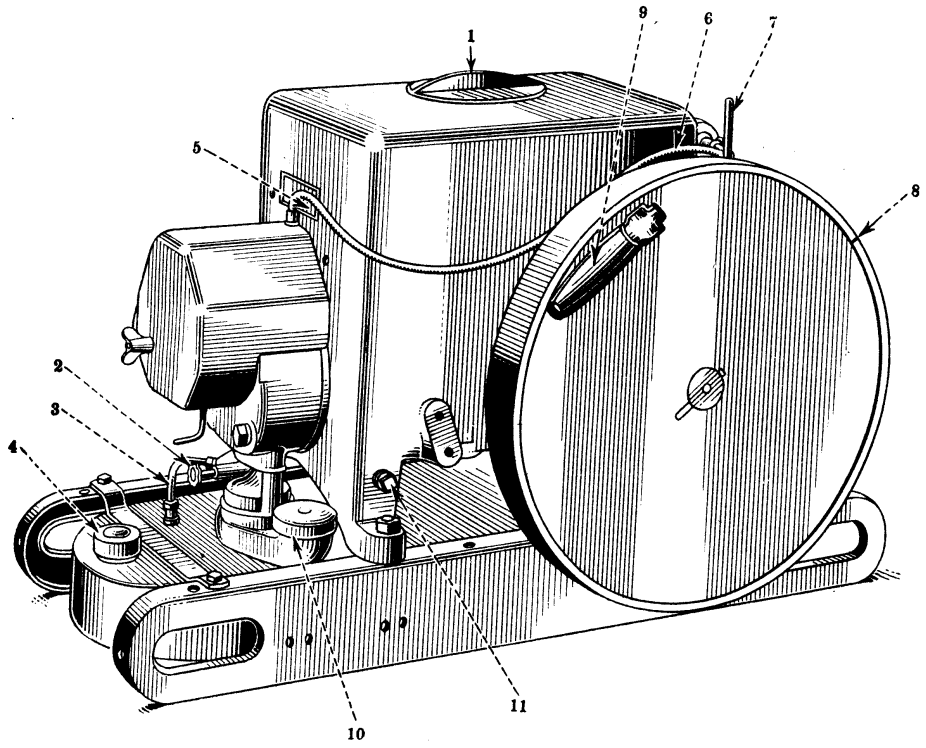
Grip the crank about 1" from the flywheel and when cranking keep tension on hand away from the flywheel.

Press down on choke valve and crank engine two complete revolutions, then release choke. Crank till it is on the compression stroke, then give the crank a quick upward flip. If engine does not start after a few cranks, choke again. Do not choke the engine too much or you may flood it and cause hard starting. As soon as engine starts to run, adjust needle valve to give the smoothest operation. After engine is hot readjust needle valve. Excessive fuel will cause the engine to run uneven and smoke, not enough fuel will cause the engine to run uneven and backfire.

If engine becomes flooded, spark plug should be removed, cleaned and reinstalled, then crank engine with the fuel completely shut off, until it starts to run. Adjust the gasoline needle valve to best operating position.

If the engine has been flooded it is a good policy to pour about one tablespoonful of oil into the cylinder through the spark plug opening before replacing the spark plug.

When starting a hot engine, do not use the choke, but close the needle valve one-fourth of a turn from the regular operating position.



Illust. 1 - Gasoline Engine

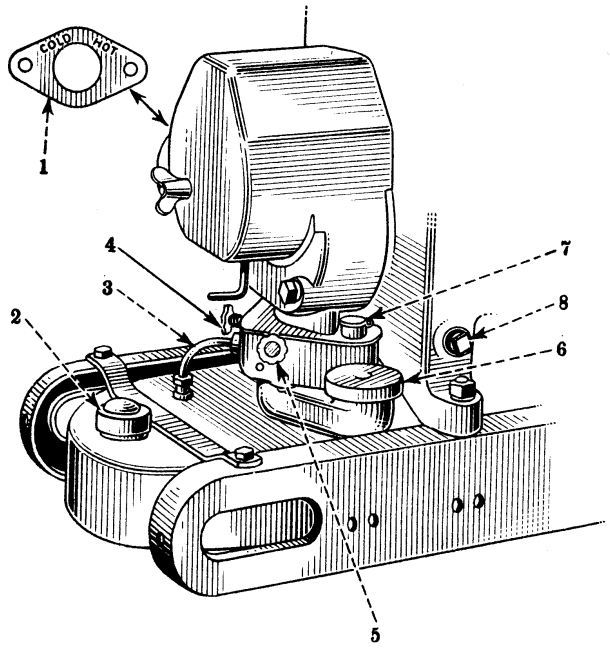
Index to reference nos. on illustration.

Ref. No.	Description
1	Water hopper cover (Special).
2	Gasoline needle valve.
3	Fuel pipe.
4	Fuel tank filler cap.
5	Serial number.
6	Timing notch (in side plate).
7	Speed control lever.
8	Timing (D.C.) notch.
9	Starting crank handle.
10	Choke valve.
11	Crankcase water drain plug.

STARTING KEROSENE ENGINE

This engine is started on gasoline and must be run on gasoline until it is hot enough to run on kerosene.

To start on gasoline, close the kerosene needle valve and open the gasoline needle valve 1/3 to 1/2 of a turn. See that heat regulating valve at the exhaust outlet is in the correct position. (See "Heat Regulating Valve on Kerosene Engines" *on page 5.)* It is not necessary to change this valve once it has been correctly set, except for extreme differences in temperature, load or fuel. Press down on the choke valve and crank the engine two complete revolutions, then release the choke valve. When cranking the engine grip the crank about 1" away from the flywheel and keep tension on hand away from flywheel. Now, crank the engine until it is on the compression stroke and then give the crank a quick upward flip. If the engine does not start after a few cranks choke again. Do not choke the engine too much or you **may** flood it and make it hard to start.



Illust. 2 - Kerosen Engine

Index to reference numbers on illustration.

Ref. No.	Description
1	Heat control valve retainer plate.
2	Fuel tank filler cap.
3	Fuel pipe.
4	Kerosene needle valve.
5	Gasoline (starting) needle valve.
6	Choke valve.
7	Gasoline chamber filler cap.
8	Crankcase water drain plug.

As soon as engine starts to run, adjust gasoline needle valve to give the smoothest operation and allow the engine to operate on gasoline until the gasoline chamber is nearly empty, then open the kerosene needle valve and close the gasoline needle valve. Adjust the kerosene needle valve to give the smoothest operation. Excessive fuel will cause the engine to run uneven and smoke and not enough fuel will cause it to run uneven and backfire.

The warming-up time can be shortened by putting only enough water in the hopper to cover the cylinder. After the engine is changed over to operate on kerosene, fill the water hopper.

Gasoline must always be used for starting this engine, regardless whether the engine is hot or cold. When starting a hot engine, do not use the choke, but open the gasoline needle valve about 1/3 of a turn.

If engine becomes flooded the spark plug should be removed, cleaned and reinstalled and the engine cranked, with the fuel completely shut off, until the engine starts to run; then adjust the gasoline needle valve to best operating position.

If the engine has been flooded it is a good policy to pour about one tablespoonful of oil into the cylinder through the spark plug opening before replacing the spark plug.

ENGINE SPEED CONTROL LEVER

Your engine is equipped with a governor which maintains constant engine speed under variable loads. Speeds of from 600 to 1000 RPM can be obtained by retarding or advancing the speed control lever. The engine develops its maximum horsepower at the higher speed.

The governor has been correctly set at the factory and should not be changed.

To get satisfactory service, do not overload the engine.

HEAT REGULATING VALVE ON KEROSENE ENGINES

Hot exhaust gases are circulated around the intake passage in the cylinder head of the kerosene engines, to bring the kerosene mixture up to the proper temperature for efficient combustion. The amount of heat circulated is controlled by the heat regulating valve at the exhaust muffler *(see reference 1, Illust. 2)*.

The heat regulating valve should be set as hot as possible without causing excessive detonation (pinging or knocking). If excessive detonation occurs under heavy loads or high temperatures, loosen two capscrews and turn muffler counter-clockwise to a slightly colder position. After turning heat valve to a new position, engine will have to run for about 15 minutes before the effect of the new setting can be noticed. After correct adjustment has been made, tighten capscrews.

If the engine is running too cold it can be detected by uneven running, excess fuel consumption and crankcase oil dilution.

OPERATING A KEROSENE ENGINE ON GASOLINE

This kerosene engine is designed to operate with maximum efficiency on kerosene. It can be operated on gasoline, but not as efficiently as the gasoline engine.

When operating this kerosene engine on gasoline set the heat regulating valve in the extreme "Cold" position. Close the gasoline valve in the mixer and use the kerosene valve.

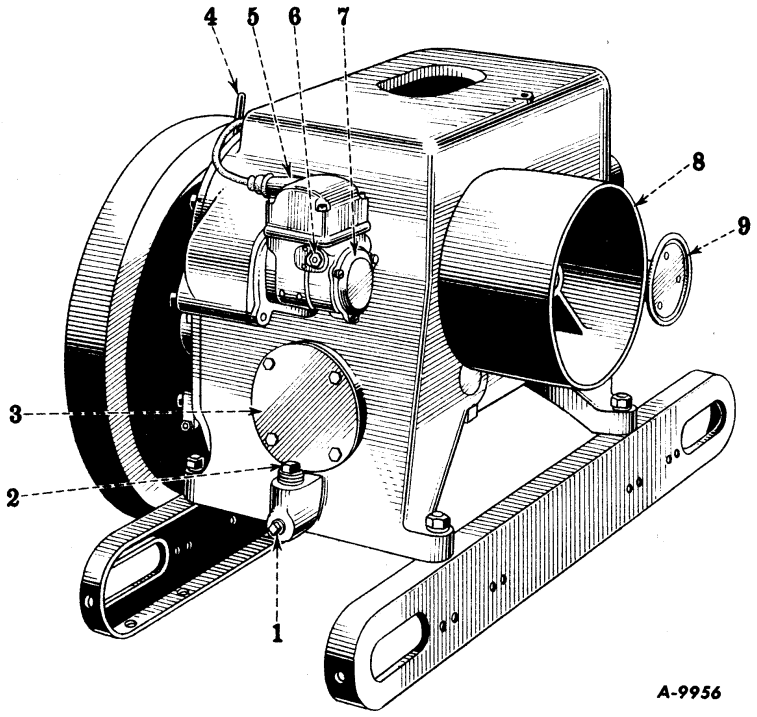
TO STOP GASOLINE ENGINE *(see Illust. 3)*

Close fuel needle valve, or short-circuit the magneto by placing a screw driver or other metal object between the magneto short-circuiting terminal and magneto frame. A wire can be attached to this terminal for a remote cut-out switch, if desired.

TO STOP KEROSENE ENGINE

Close the kerosene needle valve and open the gasoline needle valve. Operate the engine two or three minutes with the speed control lever one-half open to empty mixer of kerosene and fill with gasoline.

This will assure having gasoline in mixer for starting again. Then shut off gasoline needle valve, or ground magneto terminal to frame.



Index to reference nos. on illustration

Ref. No.	Description
1	Crankcase oil drain plug.
2	Crankcase oil filler plug.
3	Hand hole cover plate.
4	Speed control lever.
5	Magneto.
6	Short-circuiting terminal.
7	Magneto breaker cover.
8	Pulley.
9	Exhaust muffler.

Illust. 3

VALVE CLEARANCE

The intake valve clearance is .006" to .008" and the exhaust valve clearance is .008" to .010" when the engine is hot.

EXHAUST PIPE

In case the exhaust is to be carried to the outside of the building, a drain should always be provided close to the cylinder head and slightly below the exhaust outlet from the head. Use 45 degree bends or long radius elbows to make the turns. The pipe should be increased one size, starting at the cylinder head, and increased one size for every 10 feet of length.

FLYWHEEL

If the flywheel is to be removed, loosen clamp bolt at hub and tap flywheel as close to hub as possible. *Caution:* Never strike flywheel rim to remove flywheel.

BELT PULLEY

If belt pulley has been removed and is being reassembled, or if a new pulley is being installed, assemble the pulley with felt washer in place.

The 6" pulley is standard equipment for the 1-1/2 to 2-1/2 H.P. engine, but pulleys varying in size from 3" to 14" are available as special equipment. For the 3 to 5 H.P. engine the 8" pulley is standard equipment and the same special pulleys as used for the 1-1/2 and 2-1/2 H.P. engine are available.

LUBRICATION

The entire engine, including the governor, valve mechanism, and magneto impulse coupling, is lubricated by the oil in the engine crankcase. Keep oil up to top of filler boss *(see ref. 2, Illust. 3)*.

ENGINE LUBRICATING OIL

Engine lubricating oil shall be of well-refined petroleum oils, free from water, sediment, and without admixtures of fatty oils, acids, soaps, resins or any other substances not derived from petroleum. Oil shall not corrode any metal used in engine construction. Also, engine lubricating oil containing additive products not necessarily derived from petroleum but being of non-corrosive type, is satisfactory for use in our engines.

VISCOSITY OF RECOMMENDED LUBRICATING OILS

Air temperature	Oil to use
Above 32° F.	SAE-30
32° F. to 10° F.	20-W
Below 10° F.	10-W

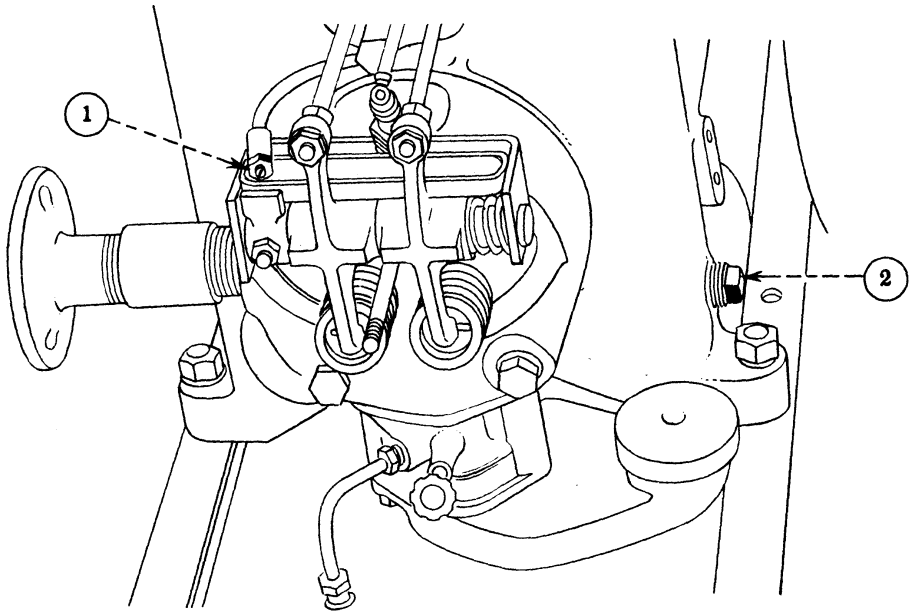
Refer to special instructions for "Cold Weather Operation" *on page 9.*

Never test the oil level while the engine is running.

Drain the oil completely after every 120 hours of operation and refill with new oil. Change oil after every 50 hours when operating under very dusty conditions.

Always wipe off surface around oil filler plug before removing plug, so that no dirt will fall into opening.

VALVE OILER ADJUSTING SCREW



Illust. 4

View shows (1) valve oiler adjusting screw, and (2) crankcase water drain plug.

The amount of oil delivered to the valve levers and valve guides is controlled by the valve oiler adjusting screw. **This screw is set at the factory to give approximately three drops of oil per minute when the oil is hot.**

Whenever the valve housing is removed, inspect the valve oiler and if it is not supplying approximately three drops of oil per minute when engine is running (oil hot), adjust it as follows:-

Loosen the jam nut, and turn the screw in (clockwise) slightly to decrease the supply, or out slightly to increase it. Then tighten the jam nut and check oil feed.

After an air cleaner attachment is applied in the field, be sure to check oil feed and readjust if necessary. *See instructions on page 36.*

COLD WEATHER OPERATION

If the engine is to be operated in temperatures of 32° F. or lower, observe the following precautions:

Fuel System

Use only a high-test winter-grade gasoline for starting, and keep your supply in a closed container so the more volatile portion does not evaporate.

Fill the fuel tank at the end of the day's run to prevent moisture from collecting in the tank.

Lubrication

Be sure to use the correct grade of lubricating oil in the engine crankcase *as specified on page 7.*

Cooling System

When the temperature is likely to be 32° F. or lower, there is danger of the water freezing in the hopper. To overcome this, drain the water at the end of each run.

Filling the hopper with hot water will facilatate starting.

SPARK PLUGS

The recommended standard service spark plugs for this engine are the Champion No. 1 Commercial or the AC-77.

The spark plug gap should be .028 to .032 inches.

Note: To remedy fouling or sooting, use a hotter (light service) spark plug. To remedy pre-ignition and burning of electrodes, use a colder (severe service) spark plug *(see list of Spark Plugs on page 25).*

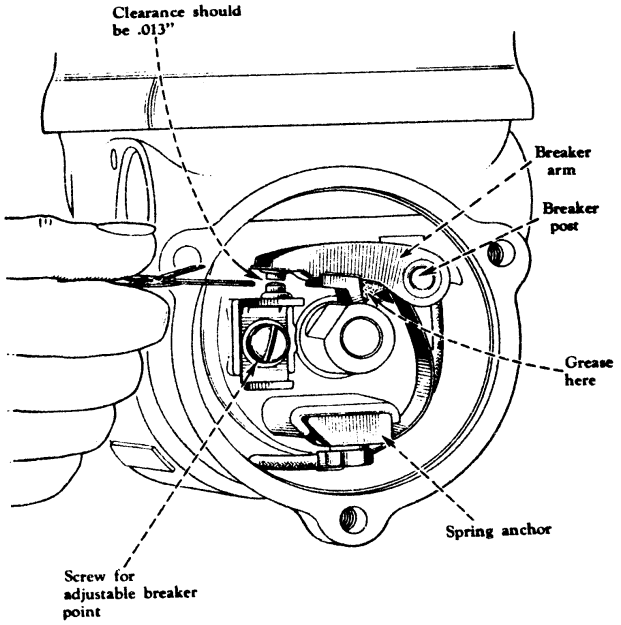
MAGNETO

Your engine is equipped with a high-tension magneto, with automatic impulse coupling, which is designed and built in accordance with the latest ignition practices. A magneto of this type is used by International Harvester because our engineers have proved that it is superior from the standpoint of performance, long life, and trouble-free operation.

GREASING BREAKER MECHANISM AND CHECKING POINTS

Your magneto requires very little attention. It is important, however, to keep the breaker arm chamber clean, as oil on the breaker points will cause rapid point wear. After every 250 hours of operation the breaker point chamber should be inspected to assure that it is clean. See that the points are in good condition and have the proper clearance. If the chamber is clean, no attention is necessary other than checking the clearance of the points; but if the chamber is dirty, all parts must be thoroughly cleaned. After cleaning, the points should be dressed, the point clearance checked, and the breaker arm regreased as outlined below.

To get at the breaker mechanism, remove the breaker cover. Pry the breaker arm and anchor from the chamber and clean all parts. Inspect the breaker points and if necessary, dress them with a sharp fine file. If the points are worn excessively, replace both points. Fill the recess in breaker post with grease and pack a small quantity of grease in back of the breaker arm rubbing block *(see Illust. 5)*. See your International Harvester dealer for proper grease to use.



Illust. 5

Assemble the breaker arm, leaving the spring anchor projecting 1/8" to 3/16" out from end of slot so it is pushed into place by breaker cover. Be sure the points line up when breaker arm is pushed into place. Check the gap between the breaker points with the gauge furnished *(see Illust.5)*. The point opening should be .013" when the rubbing block is on the high part of the cam. If gap is not correct, adjust it by loosening the screw holding the adjustable point *(see Illust.5)* and moving the point up or down until gauge slips snugly into opening. After proper adjustment has been made, tighten the screw.

MAGNETO - Continued

TIMING MAGNETO TO ENGINE

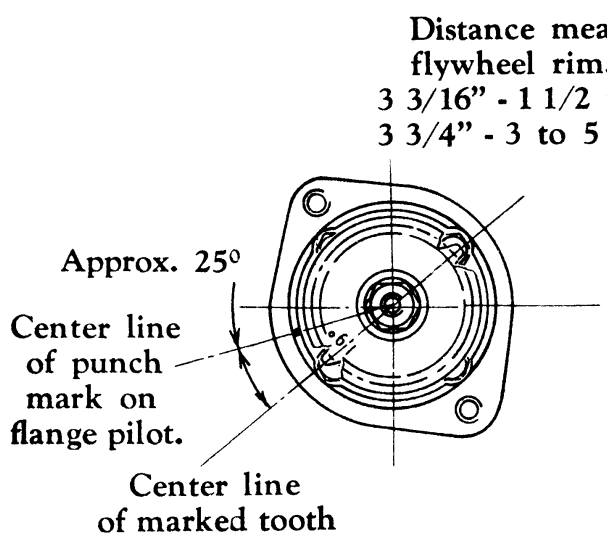
Magneto may be timed to engine by placing "D.C." mark on flywheel in line with timing notch on side plate and inserting magneto into place, with marked tooth of magneto gear held in line with punch mark on magneto flange.

However, necessity of holding the magneto gear while assembling may be eliminated by the following procedure:

Place flywheel in position *shown in Illust. 6A*, then turn magneto gear marked tooth to stable position *shown in Illust. 6* and insert magneto in its mounting hole so gears mesh. Then tighten the magneto screws lightly so magneto can be rocked.

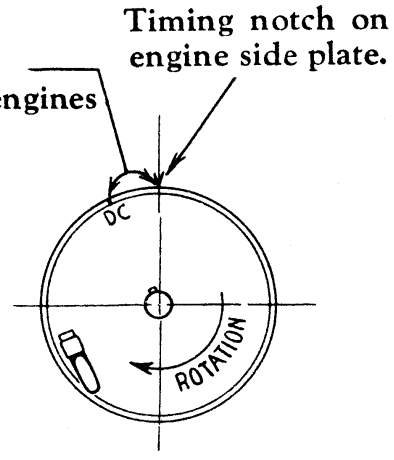
By tipping the magneto forward or backward, the magneto impulse coupling can be made to trip exactly at the time the "D.C." timing mark on flywheel is in line with timing notch on side plate. Then tighten the magneto screws.

CAUTION: When checking tripping point of coupling, take a firm hold on flywheel and move slowly so you do not pass the point of actual trip. Never allow magneto impulse coupling to trip before "D.C." because there is a possibility of engine kicking back when starting it.



Illust. 6

View of magneto when rotor is held in stable position by magnetic field.



Illust. 6A

View of engine flywheel in position for assembly of magneto with rotor in stable position.

SUGGESTIONS FOR CHECKING TROUBLE

Study the Problem Before Making Any Changes

If any adjustments are to be disturbed, the original setting should be noted, so that this same setting may be restored in case the new adjustment does not remedy the trouble.

Failure to Start:

No gasoline in mixer.
Fuel valve closed.
Mixer choked too much.
Magneto grounded.
Kerosene instead of gasoline in mixer for starting.

Irregular Speed:

Governor sticking, out of adjustment, or worn.
Throttle shaft bent or out of alignment.

Lack of Power:

Governor out of adjustment.
Exhaust pipe clogged.
Engine speed control lever not advanced.
Air cleaner pipe clogged (when used).

Overheating:

Insufficient amount of water.
Excess load.
Inside of cylinder head limed up or clogged with dirt.
Excess carbon in the cylinder.

Missing and Backfiring:

Water in the fuel.
Air leaks around the mixer.
Engine not warmed up.
Red-hot carbon deposits in cylinder.

Knocking:

Excess carbon in the cylinder.
Sticky valve or improperly adjusted valves.
Loose piston pin, connecting rod, camshaft, or crankshaft bearings.
Broken piston rings or loose piston.

Lack of Compression:

Sticky, dirty, pitted or improperly adjusted valves.
Stuck, worn or broken piston rings.
Worn piston.
Leaky cylinder head gasket.

Excess Fuel Consumption:

Choke closed.
Air intake cap or air cleaner clogged (when used).
Mixer adjustment too rich.

Lack of Fuel:

Fuel low in the tank.
Air vent hole in fuel tank filler cap plugged.
Fuel valve closed or only partially opened.
Clogged fuel strainer screen, or fuel line.

Defective Ignition:

Wrong kind, old, cracked, dirty, or poorly set spark plug.
Broken, loose or improperly connected wiring.
Dirty, pitted, or improperly set breaker points.
Breaker arm not free on its bearing or the breaker arm spring weak or broken.
Magneto not timed correctly with the engine.

Explosions in exhaust pipe often occur just after starting, due to first charges not firing in cylinder and passing through into exhaust pipe, where burning gases from first few explosions will ignite them.

STORING AND HOUSING ENGINES

When your engine is not to be used for a period of time, it should be stored in a dry and protected place. To leave equipment outdoors, exposed to the elements, will result in materially shortening the life of the machine.

The following procedure should be followed when your engine is placed in storage and the lubrication precautions should be repeated every six months thereafter. We also recommend caution to be practiced in starting an engine that has been in storage *(see instructions on the bottom of the page)*

1. Drain water from the cooling system.

2. After the engine has become cold, remove the spark plug and pour one tablespoonful of SAE-50 lubricating oil of a good grade into the cylinder. Crank engine 2 or 3 times to distribute oil over the cylinder wall. Replace spark plug.

3. Turn the engine with the crank until it is on the compression stroke and leave it in this position. Both intake and exhaust valves are now closed, which prevents the entrance of any dust into the cylinder.

4. Plug up the ends of breather pipe and exhaust pipe.

5. Drain the fuel tank and clean out the mixer.

CAUTION: A gummy substance will form in the tank fuel lines, and mixer if gasoline is allowed to stand in them for a period of time. These gum deposits can be completely dissolved with acetone or a mixture of equal parts of alcohol and benzol.

STARTING ENGINES THAT HAVE BEEN IN STORAGE

1. Remove spark plug and pour a mixture of one-half gasoline and one-half light lubricating oil into the cylinder (two tablespoonfuls is enough).

2. Remove valve housing cover and flush valve and valve operating mechanism with the same mixture.

3. Crank engine rapidly until excess oil has been blown out of spark plug hole. This operation will loosen any tight piston rings and wash old gummy oil from valves and piston.

4. Flush out crankcase with kerosene and fill with specified lubricating oil.

5. Remove crankcase breather pipe plug, and exhaust pipe plug.

6. Install spark plug.

7. Fill water cooling system.

8. Fill fuel tank.

9. Start engine and let it run slowly; observe if any valves are sticking. If so, pour small quantity of kerosene on valve stem until loose.

10. Assemble valve housing cover.

CAUTION! Do not operate at high speed immediately after starting.

PARTS LIST

INTRODUCTION TO PARTS LIST

To aid in locating the various parts of this engine, the list is divided into units as shown in the index below. Each unit is illustrated with an "exploded" view which shows the unit disassembled so that the parts wanted may be readily identified. The reference numbers shown on the illustration are merely to assist in locating the part in the list *and should never be used for ordering parts; always use the IHC Part no. which is shown in the list accompanying the illustration.*

Standard parts such as bolts, capscrews, lockwashers, etc., are listed with, and indented from the part they attach, but are not a component part of that piece. Standard parts having no I.H.C. part number must be ordered separately by size. Standard parts having I.H.C. part number must also be ordered separately but may be ordered by their part number. The N.C. and N.F. designations following the description on some of the standard parts mean "National Coarse Thread" and "National Fine Thread."

INDEX TO UNITS

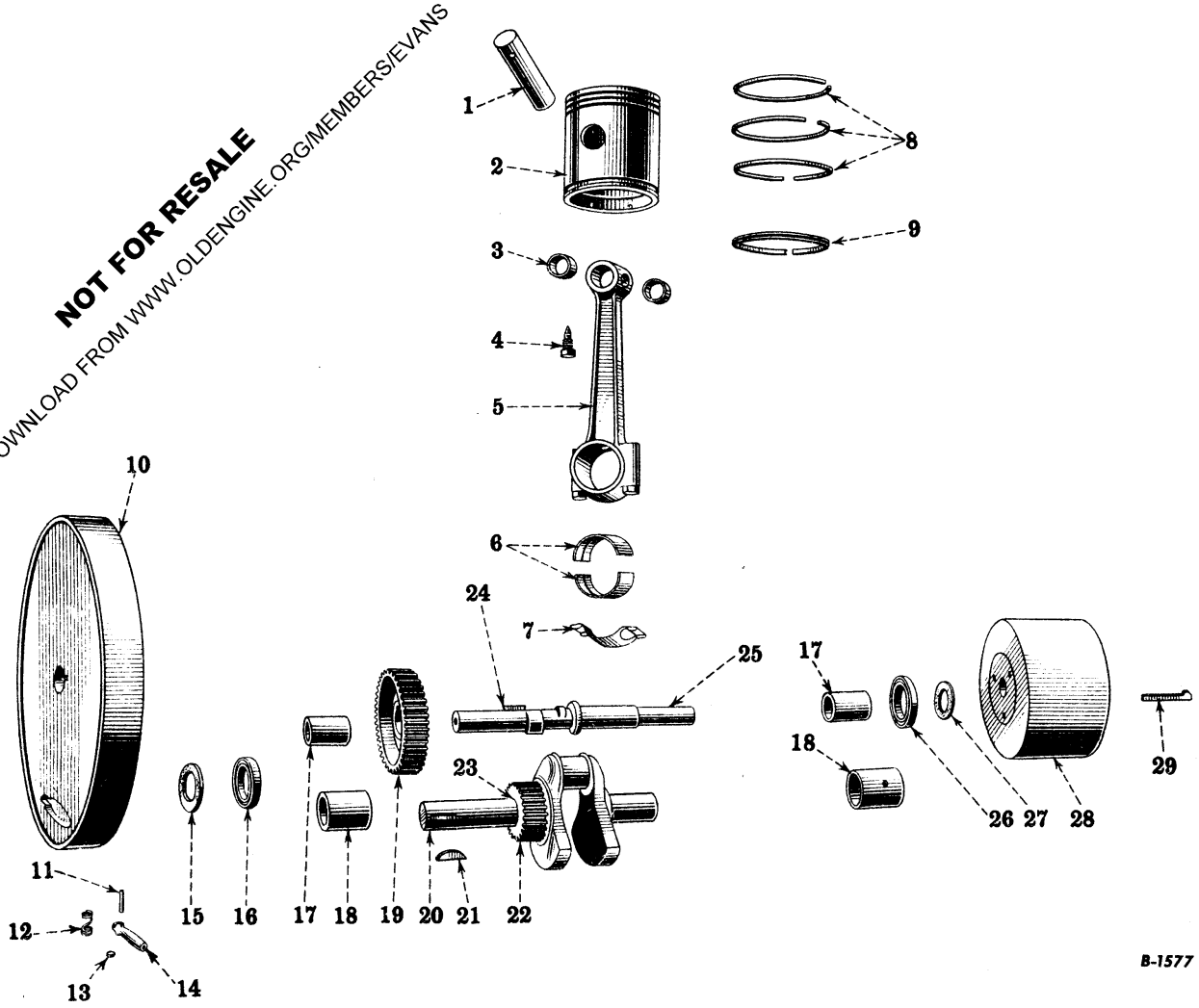
CYLINDER HEAD, VALVES, SPARK PLUG AND MUFFLER

Ref. No.	I H C Part Number 1½ to 2½ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.	Ref. No.	I H C Part Number 1½ to 2½ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
1	62065 D	61401 D	Valve oiler pipe	1		9242 DX	9178 DX	Cylinder head with throttle, stud and valve guides.	1
2	61722 DA	61722 DA	Valve oiler tube with regulator	1		9242 DY	9178 DY	Cylinder head with throttle, stud, valve guides and valves . .	1
...	.....	.....	Headless cone point set screw, 1/4" N.C. x 3/4"	1	24	.....	.....	Cap screw, 1/2 N.C. x 3-1/4" (for 1-1/2 to 2-1/2 HP only) .	4
...	.....	.....	Hex. jam nut, 1/4" N.C.	1		.....	.....	Cap screw, 1/2" N.C. x 3-1/2"	4
3	27945 D	27945 D	Valve lifter	2		.....	.....	Lock washers, 1/2" .	4
	33277 D	33277 D	Valve lifter, .003" oversize.	2		.....	.....	Ctsk. head pipe plug, 1-1/4" (for 3 to 5 HP only)	1
	33278 D	33278 D	Valve lifter, .005" oversize.	2					
	33279 D	33279 D	Valve lifter, .008" oversize.	2					

4	27946 D	29601 D	Valve push rod	2
5	62064 DX	61390 DX	Valve lever shaft bracket, oil trough and pipes	1
6	61394 D	61394 D	Valve lever oil trough felt.	1
7	L-15217	L-15217	Valve lever adjusting screw	2
...	.....	.....	Hex. jam nut, 5/16" N.C.	2
8	LX-15217	LX-15217	Valve lever adjusting screw with nut. . . .	2
9	9244 D	9181 D	Valve lever, left hand, exhaust	1
10	9244 D	9182 D	Valve lever, right hand, intake.	1
11	63390 D	63391 D	Valve housing with drainpipe	1
12	.....	.....	Wing nut, 5/16". . .	1
13	63887 D	61402 DA	Valve oiler pipe bumper (felt)	1
14	27954 D	27954 D	Valve housing stud . .	1
15	27939 DB	29589 DC	Cylinder head gasket .	1
16	27985 D	27985 D	Spark plug cable support	1
17	27957 D	29609 D	Muffler, complete. . .	1
18	27943 D	29600 D	Exhaust valve.	1
	66922 D	66924 D	Inlet valve.	1
19	27940 D	29602 D	Throttle shaft	1
20	27941 D	29558 D	Throttle valve stop pin	1
21	L-15136	29596 D	Throttle valve	1
...	.....	.....	Round head screw, No. 6-32 x 1/4" . .	1
...	.....	.....	Lock washer, No. 6 .	1
22	27942 D	27942 D	Throttle valve shaft plug.	1
23	62061 D	9180 D	Exhaust valve seat insert.	1
25	9243 DR	9179 DR	Valve guide.	1
26	61398 D	61398 D	Valve guide felt . . .	4
27	61399 D	61399 D	Valve stem felt. . . .	2
28	61397 D	61397 D	Valve felt retainer. .	2
29	39147 DA	39147 DA	Valve spring	2
30	39148 D	39148 D	Valve spring retainer.	2
31	L-15102	L-15102	Valve spring retainer. pin	2
32	36228 H	36228 H	Valve lever shaft plug, 7/16"	1
33	61389 D	61389 D	Valve lever shaft felt	1
34	61388 D	61388 D	Valve lever shaft. . .	1
35	61388 DX	61388 DX	Valve lever shaft with felt and plug	1
36	62063 DX	61395 DX	Valve lever shaft sleeve and spacer . .	1
...	102377	102377	Headless oval point set screw, 1/4" N.C. x 1/2"	1
...	218436	218436	Hex. jam nut, 1/4" N.C.	1
37	24541 D	24541 D	Valve lever shaft spring.	1
39	13293 V	13293 V	Spark plug cable terminal insulator . . .	1
40	28357 DAX	39753 DX	Spark plug cable with terminals, reinforcement and insulator. .	1
*41	32670 DA	32670 DA	Spark plug, Champion No. 1 Commercial (optional for standard service). . . .	1
	61594 DA	61594 DA	Spark plug, A.C. No. 77 (optional for standard service) . .	1
42	37291 D	37291 D	Cable terminal (Push type)	1
43	3405 H	3405 H	Spark plug gasket. . .	1
...	65064 D	65064 D	Spark plug and breaker point gauge	1
...	54965 D	54965 D	Spark plug wrench. . .	1
44	62067 DA	62187 DA	Valve oiler pipe wick.	1
45	63135 D	63135 D	Valve housing gasket .	1
46	1924 T	1924 T	Terminal	1

* - *See page 25 for list of spark plugs for special service.*

CRANKSHAFT, CONNECTING ROD, PISTON, FLYWHEEL, CAMSHAFT AND PULLEY



Ref. No.	I H C Part Number $1\frac{1}{2}$ to $2\frac{1}{2}$ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
	27937 D	29563 D	Piston pin, standard.	1
1	31168 D	31171 D	Piston pin, .003" oversize.	1
	31169 D	31172 D	Piston pin, .005" oversize.	1
	31170 D	31173 D	Piston pin, .008" oversize.	1
	3574 DX	3861 DX	Piston with rings, standard	1
	3575 DX	3862 DX	Piston with rings, .005" oversize .	1
	3576 DX	3863 DX	Piston with rings, .010" oversize .	1
	3577 DX	3864 DX	Piston with rings, .020" oversize .	1
	3578 DX	3865 DX	Piston with rings, .030" oversize .	1
	3938 DX	3945 DX	Piston with rings, 8000 ft. altitude (Special)	1
2	3947 DX	3951 DX	Piston with rings, 8000 ft. altitude (Special) .005" oversize. . .	1
	3948 DX	3952 DX	Piston with rings, 8000 ft. altitude (Special) .010" oversize. . .	1
	3949 DX	3953 DX	Piston with rings, 8000 ft. altitude (Special) .020" oversize. . .	1
	3950 DX	3954 DX	Piston with rings, 8000 ft. altitude (Special) .030" oversize. . .	1
3	27935 DAX	29561 DAX	Connecting rod bushing (set of two)	1

(Continued on next page)

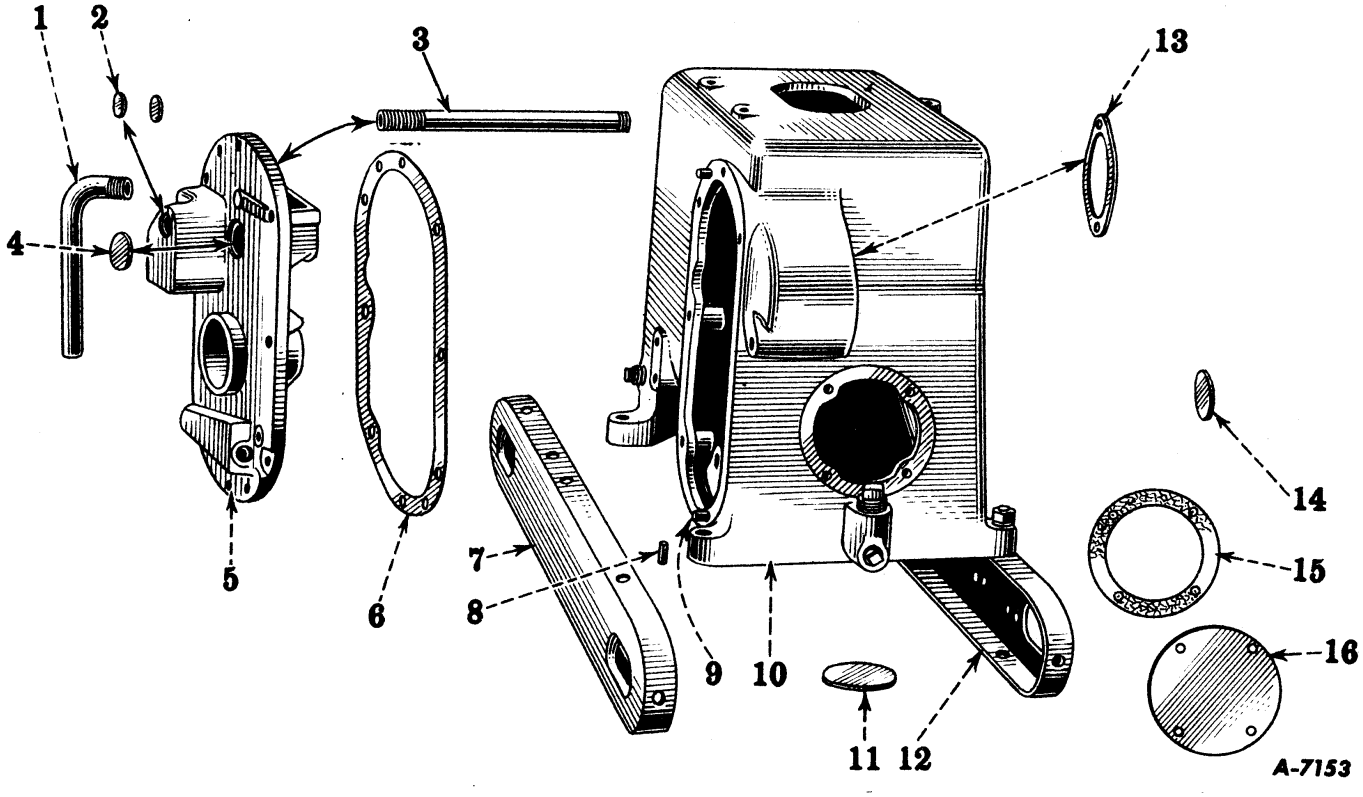
CRANKSHAFT, CONNECTING ROD, PISTON, FLYWHEEL, CAMSHAFT AND PULLEY - Continued

Ref. No.	I H C Part Number 1½ to 2½ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
	27938 D	.....	Piston pin set screw.	1
4	.....	.....	Lock washer, 5/16".	1
	.....	29562 D	Piston pin set screw.	1
	.....	.....	Lock washer, 3/8"	1
	27916 D	29615 D	Connecting rod and cap.	1
	27916 DX	29615 DX	Connecting rod and cap with bearing, bushing and cap screw lock. .	1
5	.....	.....	Cap screw, 3/8" N.F. x 1-1/2" (For 3 to 5 HP only)	2
	.....	.....	Cap screw, 5/16" N.F. x 1-1/4" (For 1-1/2 to 2-1/2 HP only) . .	2
	28014 DAX	29611 DAX	Connecting rod bearing, standard (two halves)	1
	28015 DAX	29612 DAX	Connecting rod bearing, .005" undersize (two halves)	1
6	28016 DAX	29613 DAX	Connecting rod bearing, .020" undersize (two halves)	1
	28017 DAX	29614 DAX	Connecting rod bearing, .025" undersize (two halves)	1
7	27936 D	29560 D	Connecting rod cap screw lock . . .	1
	3579 D	3907 D	Compression ring, standard.	3
	3580 D	3908 D	Compression ring, .005" oversize. .	3
8	3581 D	3909 D	Compression ring, .010" oversize. .	3
	3582 D	3910 D	Compression ring, .020" oversize. .	3
	3583 D	3911 D	Compression ring, .030" oversize. .	3
	3584 D	3912 D	Oil ring, standard.	1
	3585 D	3913 D	Oil ring, .005" oversize.	1
9	3586 D	3914 D	Oil ring, .010" oversize.	1
	3587 D	3915 D	Oil ring, .020" oversize.	1
	3588 D	3916 D	Oil ring, .030" oversize.	1
	3554 DAX	3866 DX	Flywheel with handle.	1
	.....	6646 DX	Flywheel with handle (Special for high mounted engines). (Handle location rotated 180° from that of 3866 DX)	1
10	8863 DX	.....	Flywheel with handle (Special with dual V-belt grooves)	1
	.....	.....	Carriage bolt, 1/2" N.C. x 3-1/4" (for 3 to 5 HP only). . .	1
	.....	.....	Carriage bolt, 1/2" N.C. x 2-1/2" (for 1-1/2 to 2-1/2 HP only).	1
	.....	.....	Hex. nut, 1/2" N.C.	1
	.....	.....	Lock washer, 1/2"	1
11	L-15109	L-15109	Flywheel handle pin	1
12	L-15181	L-15181	Flywheel handle spring.	1
13	27998 D	27998 D	Flywheel handle pin expansion plug, 5/16".	1
14	27933 DB	27933 DB	Flywheel handle	1
15	27999 D	29586 D	Crankshaft oil seal felt washer . .	1
16	52931 D	52975 D	Crankshaft oil seal	1
	28010 DA	29578 DA	Camshaft bearing, standard.	2
	28011 DA	.....	Camshaft bearing, .005" undersize .	2
17	.....	29579 DA	Camshaft bearing, .010" undersize .	2
	28012 DA	29580 DA	Camshaft bearing, .020" undersize .	2
	28013 DA	.....	Camshaft bearing, .025" undersize .	2
	.....	29581 DA	Camshaft bearing, .030" undersize .	2
	28010 DA	29574 DA	Crankshaft bearing, standard. . . .	2
	28011 DA	.....	Crankshaft bearing, .005" undersize	2
18	.....	29575 DA	Crankshaft bearing, .010" undersize	2
	28012 DA	29576 DA	Crankshaft bearing, .020" undersize	2
	28013 DA	.....	Crankshaft bearing, .025" undersize	2
	.....	29577 DA	Crankshaft bearing, .030" undersize	2

Continued on next page

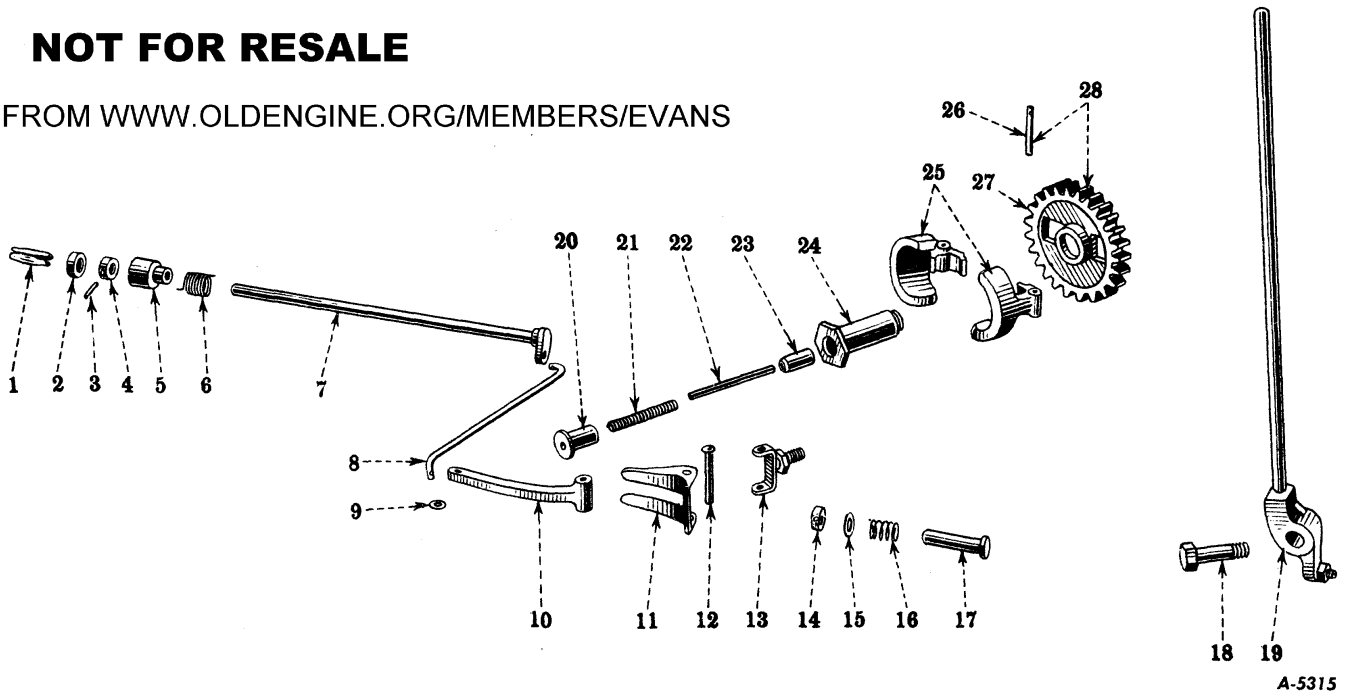
CRANKSHAFT, CONNECTING ROD, PISTON, FLYWHEEL, CAMSHAFT AND PULLEY - Continued

Ref. No.	I H C Part Number 1½ to 2½ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
	3560 DB	.....	Camshaft gear (38 teeth)	1
	36502 D	.....	Camshaft gear (38 teeth) (Special silent - used only where power required is not over 2 HP)	1
19	.....	55349 D	Camshaft gear (48 teeth)	1
	.....	36503 D	Camshaft gear (48 teeth) (Special silent - used only where power required is not over 3 HP)	1
20	27919 DB	29618 DA	Crankshaft	1
	27919 DBX	29618 DAX	Crankshaft with pinion	1
21	13070 D	.....	Flywheel key (Woodruff No. 127)	1
	.....	13058 D	Flywheel key (Woodruff No. 29)	1
22	27932 D	.....	Crankshaft pinion (19 teeth)	1
	.....	29585 D	Crankshaft pinion (24 teeth)	1
23	4710 D	.....	Crankshaft pinion key (Woodruff No. 15)	1
	.....	29822 D	Crankshaft pinion key (Woodruff No. E)	1
24	4710 D	.....	Camshaft gear key (Woodruff No. 15)	1
	.....	29822 D	Camshaft gear key (Woodruff No. E)	1
25	27915 D	29616 D	Camshaft	1
26	52931 D	46976 D	Camshaft oil seal	1
27	27999 D	29587 D	Camshaft oil seal felt washer	1
	3589 D	3589 D	Pulley, 4" dia., 5" face (Special)	1
	3590 D	3590 D	Pulley, 3" dia., 5" face (Special)	1
	3591 D	3591 D	Pulley, 5" dia., 5" face (Special)	1
	3592 D	3592 D	Pulley, 6" dia., 5" face (Standard for 1-1/2 to 2-1/2 HP) (Special for 3 to 5 HP)	1
28	3593 D	3593 D	Pulley, 7" dia., 5" face (Special)	1
	3594 D	3594 D	Pulley, 8" dia., 5" face (Standard for 3 to 5 HP) (Special for 1-1/2 to 2-1/2 HP)	1
	5047 D	5047 D	Pulley, 12" dia., 6" face (Special)	1
	5048 D	5048 D	Pulley, 10" dia., 6" face (Special)	1
	5256 D	5256 D	Pulley, 14" dia., 6" face (Special)	1
29	28018 D	28018 D	Pulley key, 5/16" x 2-1/2"	1



CRANKCASE, SIDE PLATES, AND SKIDS

Ref. No.	I H C Part Number $1\frac{1}{2}$ to $2\frac{1}{2}$ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
1	28005 D	29591 D	Side plate breather pipe. . . .	1
2	17562 D	17562 D	Expansion plug, 1".	2
3	28004 D	29592 D	Crankcase breather pipe	1
4	13053 D	.....	Expansion plug, 1-3/8".	1
	.....	29564 D	Expansion plug, 1-9/16"	1
	5265 DX	.....	Side plate with plugs, bearings, gasket and oil seal. .	1
	.....	.....	Cap screw, 3/8" N.C. x 1" . .	5
	.....	.....	Lock washer, 3/8"	5
5	.....	5266 DAX	Side plate with plugs, bearings, gasket and oil seal. .	1
	.....	.....	Cap screw, 3/8" N.C. x 1" . .	1
	.....	.....	Cap screw, 3/8" N.C. x 1-1/4"	6
	.....	.....	Lock washer, 3/8"	7
6	28003 D	29590 D	Side plate gasket..	1
	28007 DA	.....	Skid runner, right hand	1
	.....	.....	Square head bolt, 7/16" N.C. x 1-1/2"	2
	.....	.....	Hex. nut, 7/16" N.C	2
	.....	.....	Lock washer, 7/16".	2
7	.....	29746 DA	Skid runner, right hand	1
	.....	.....	Cap screw, 1/2" N.F. x 1-3/4".	2
	.....	.....	Hex. nut, 1/2" N.F.	2
	.....	.....	Lock washer, 1/2"	2
8	31164 D	31164 D	Throttle shaft housing breather felt.	1
9	G 3472	29588 D	Side plate dowel.	2
10	3559 DCX	9193 DX	Crankcase with plugs, bearings, dowels and throttle shaft housing breather felt.	1
...	.....	.....	Pipe plug, 3/4"	1
...	.....	.....	Pipe plug, 1/2"	1
...	.....	.....	Pipe plug, 3/8"	1
11	42844 V	42844 V	Expansion plug, 2-3/4".	1
	28006 DA	.....	Skid runner, left hand.	1
	.....	.....	Square head bolt, 7/16" N.C. x 1-1/2"	2
	.....	.....	Hex. nut, 7/16" N.C	2
	.....	.....	Lock washer, 7/16".	2
12	.....	29745 DA	Skid runner, left hand.	1
	.....	.....	Cap screw, 1/2" N.F. x 1-3/4"	2
	.....	.....	Hex. nut, 1/2" N.F.	2
	.....	.....	Lock washer, 1/2"	2
13	27984 D	29582 D	Magneto gasket.	1
14	13053 D	.....	Expansion plug, 1-3/8".	1
	.....	29565 D	Expansion plug, 1-7/8".	1
15	28001 D	28001 D	Hand hole cover gasket.	1
16	28000 D	28000 D	Hand hole cover	1
...	.....	.....	Cap screw, 5/16" N.C. x 1/2".	4
...	3573 D	3573 D	Water hopper splash plate (cover) (Special).	1

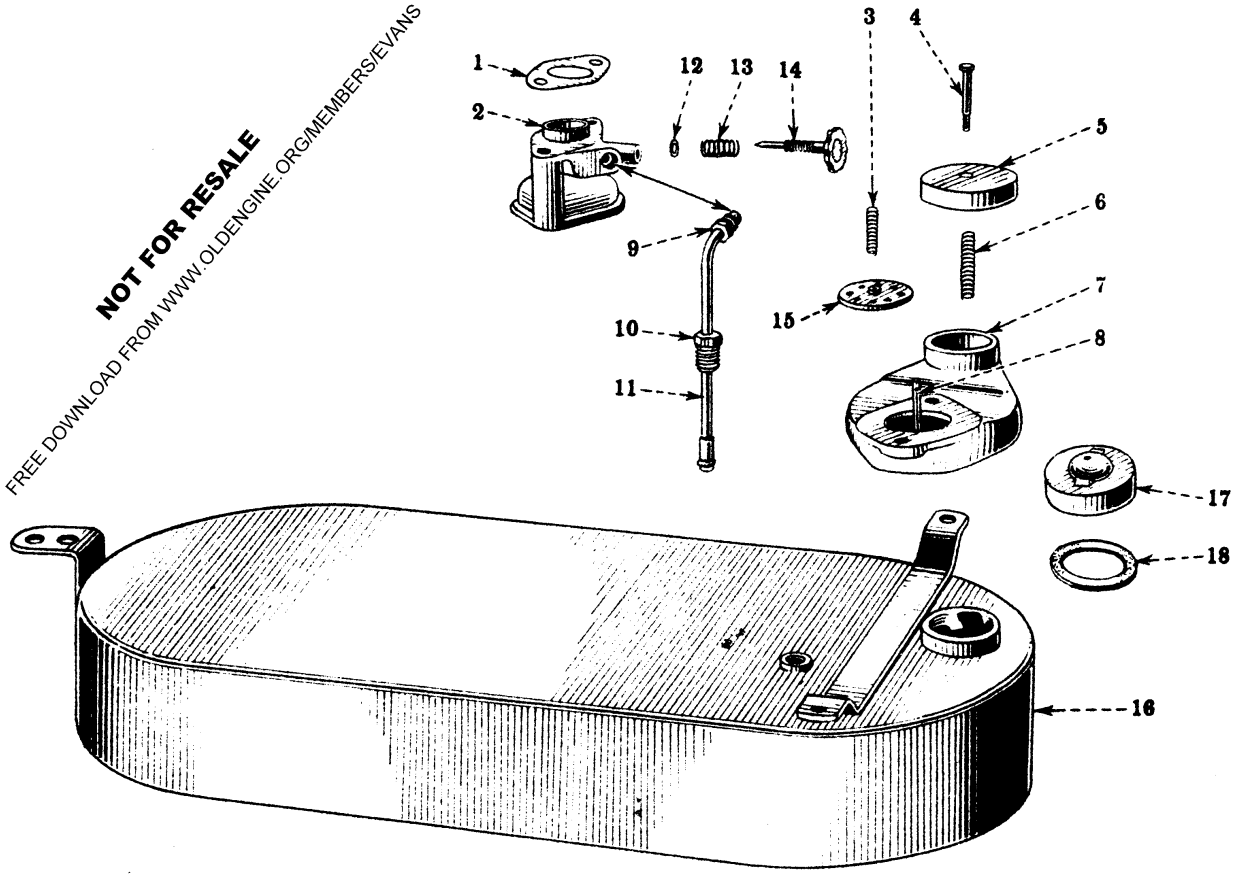


Ref. No.	I H C Part Number		Description	No. Req'd.
	1½ to 2½ HP	3 to 5 HP		
1	57298 DX	57298 DX	Throttle shaft connection, complete.	1
2	30939 DA	30939 DA	Throttle shaft oil seal.	1
3	24778 D	24778 D	Throttle shaft extension groov pin, 3/32 x 5/8"	1
4	36941 D	36941 D	Throttle shaft extension collar.	1
5	28002 D	28002 D	Throttle shaft extension bearing	1
6	27982 D	27982 D	Throttle valve spring.	1
7	27979 DAXA	29598 DAXA	Throttle shaft extension with lever.	1
	or	or		
	63806 DX	63807 DX	Throttle shaft extension with lever.	1
	27979 DAYA	29598 DAYA	Throttle shaft extension with lever, collar bearing and spring.	1
	or	or		
	63806 DY	63807 DY	Throttle shaft extension with lever, collar bearing and spring.	1

GOVERNOR AND THROTTLE SHAFT - Continued

8	27983 D	29594 D	Throttle connection link	1
...	.....	.....	Cotter, 1/16 x 1/2" on the 3 to 5 H.P. engine.	2
...	.....	.....	Cotter, 1/16 x 3/8" on the 1-1/2 to 2-1/2 H.P. engine. .	2
...	.....	.....	Throttle connection link washer.	2
9	L 15138	L 15138	Governor lever, complete	1
10	3570 DX	3570 DX	Speed change lever	1
11	27974 D	27974 D	Speed change lever pin	1
12	52890 D	52890 D	Cotter, 3/32 x 1/2".	1
...	.....	.....	Speed change lever support assembly.	1
13	27978 D	27978 D	Hex. jam nut, 5/16" N.C.	1
...	.....	.....	Speed change plunger felt washer	1
14	13088 E	13088 E	Speed change plunger felt washer retainer.	1
15	27980 D	27980 D	Speed change plunger spring.	1
16	35413 D	35413 D	Speed change plunger	1
17	35412 D	35412 D	Speed change hand lever pivot.	1
18	35411 D	35411 D	Speed change hand lever, complete.	1
19	5267 DX or 9386 DX	5268 DXA or 9387 DX	Speed change hand lever, complete.	1
...	102379	102379	Oval point headless set screw, 1/4" N.C. x 3/4".	1
...	218436	218436	Hex. nut, 1/4" N.C.	1
...	Q 397	.....	Washer, 11/32" I.D. x 3/4" O.D. (For 5267 DX or 9386 DX only)	1
...	.....	Q 1597	Washer, 13/32" I.D. x 3/4" O.D. (For 5268 DX or 9387 DX only)	1
...	.....	64890 D	Speed change hand lever pin, 1/16 x 5/8" (For 9387 DX only)	1
...	.....	27973 D	Speed change collar.	1
20	27973 D	32981 DB	Governor spring.	1
21	27969 D	27971 D	Governor plunger pin	1
22	27971 D	27970 D	Governor plunger	1
23	27970 D	27972 D	Governor plunger with pin.	1
24	27972 D	27967 D	Governor gear shaft.	1
25	27967 D	31884 D	Governor weights (pair).	1
26	31884 D	40884 D	Governor weight pin.	2
...	40884 D	.....	Cotter, 3/32 x 5/8".	2
27	.....	3567 DA or 9384 D	Governor gear, 26 teeth.	1
28	3567 DA or 9384 DX	3567 DAX or 9384 DX	Governor gear, 26 teeth.	1
			Governor gear with pins.	1
			Governor gear with pins.	1

MIXER, AIR INTAKE AND FUEL TANK



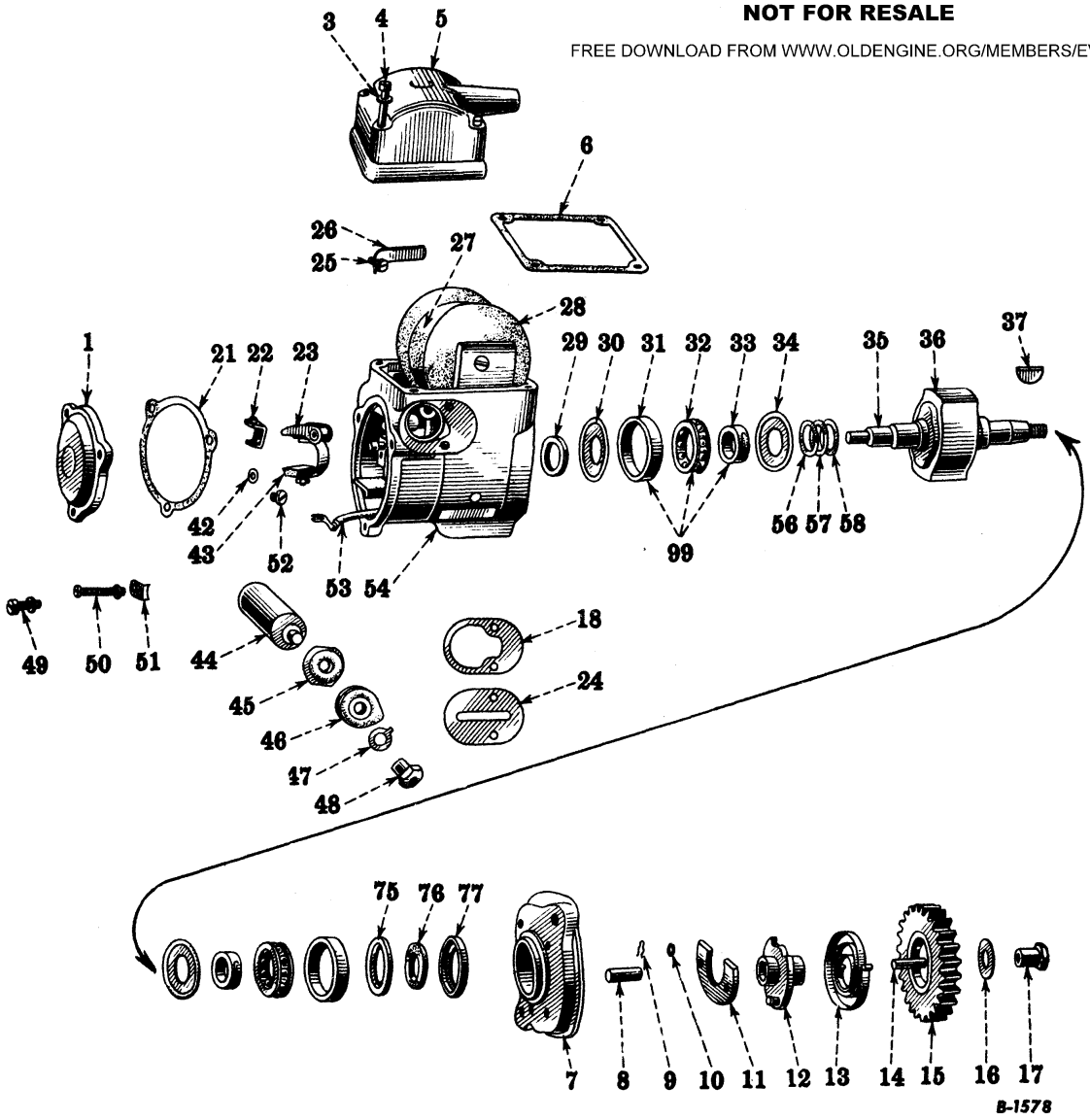
Ref. No.	I H C Part Number $1\frac{1}{2}$ to $2\frac{1}{2}$ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
1	27958 D	29595 D	Mixer gasket.	1
2	3565 DA	3867 DA	Mixer body.	1
	3565 DA or 9381 D	3867 DA or 9380 D	Mixer body.	1
3	LA 15167	29662 D	Compensating valve spring	1
4	27965 D	27965 D	Choke valve pin	1
5	27964 D	29599 D	Choke valve	1
6	27966 D	27966 D	Choke valve spring.	1
7	5336 DX	3860 DX	Air intake with choke assembly.	1
...	179849	.....	Cap screw, 3/8" N.C. x 2-1/2"	2
...	.....	179850	Cap screw, 3/8" N.C. x 2-3/4"	2
...	103321	103321	Lock washer, 3/8"	2
8	27963 D	27963 D	Compensating valve pin.	1
...	.....	.....	Cotter, 1/16 x 1/2"	1
9	29898 D	29898 D	Fuel pipe nut	1
10	27996 D	27996 D	Fuel pipe coupling.	1
11	27997 D	29606 D	Fuel pipe with strainer, check valve and coupling	1
12	27962 D	27962 D	Needle valve spring washer.	1
13	9977 T	9977 T	Needle valve spring	1
14	27961 D	27961 D	Needle valve.	1
15	LA 15135	29559 D	Compensating valve.	1
16	27992 DA	29620 D	Fuel tank assembly with cap	1
...	.....	.....	Square head bolt, 5/16" N.C. x 3/4"	2
...	.....	.....	Cap screw, 5/16" N.C. x 5/8".	1
...	.....	.....	Hex. nut, 5/16" N.C	2
...	.....	.....	Lock washer, 5/16".	3
17	27556 D	27556 D	Fuel tank cap	1
18	27557 D	27557 D	Fuel tank cap gasket.	1

SPARK PLUGS FOR SPECIAL SERVICE (See Page 9)

I H C Part No.	Description	No. Req'd.
	LIGHT SERVICE (HOT PLUG)	
13173 DA	Spark plug (Champion No. 20).	1
61594 DA	Spark plug (A.C. No. 77).	1
	SEVERE SERVICE (COLD PLUG)	
61594 DA	Spark plug (A.C. No. 77).	1
36985 DA	Spark plug (Champion No. 1 Commercial - A). . .	1
	*EXTREMELY SEVERE SERVICE (COLD PLUG)	
98681 H	Spark plug (A.C. No. 75).	1
59424 DA	Spark plug (Champion No. 0 Commercial).	1

* *Consult nearest IHC dealer, or be sure to make a careful investigation before using these plugs.*

MAGNETO (IHC TYPE H-1)



Ref. No.	I H C Part No.	Description	No. Req'd.
...	59155 D	Magneto (IHC Type H-1) (For 1½ to 2½ H.P. engines).	1
...	.....	Cap screw, 3/8" N.C. x 4-1/4"	1
...	.....	Cap screw, 3/8" N.C. x 3-3/4"	1
...	.....	Lock washer, 3/8"	2
...	59156 D	Magneto (IHC Type H-1) (For 3 to 5 H.P. engines).	1
...	.....	Cap screw, 3/8" N.C. x 5"	1
...	.....	Cap screw, 3/8" N.C. x 4-1/4"	1
...	.....	Lock washer, 3/8"	2
1	8926 DX or 63808 DX	Breaker cover with screws and lock washers.	1
		Breaker cover with screws and lock washers.	1
3	38609 DA	Washer.	4
4	49791 D	Screw	4
5	47449 DAY	Cover with secondary lead-out	1
6	47453 D	Cover gasket.	1
7	8928 DX	Mounting flange with outer race, seal, retainers and stop pin (3 to 5 H.P. engines)	1
	8927 DX	Mounting flange with outer race, seal, retainers and stop pin (1-1/2 to 2-1/2 H.P. engines)	1
...	.....	Cap screw, 1/4" N.C. x 3/4"	4
...	.....	Lock washer, 1/4"	4
8	59160 D	Impulse coupling stop pin	1
9	47462 D	Pawl pin snap spring.	1
10	47461 D	Pawl pin washer.	1
11	59161 D	Pawl.	1

Ref. No.	I H C Part No.	Description	No. Req'd.
12	59162 DX	Magneto member and pawl pin.	1
	59162 DY	Magneto member with pawl	1
13	59166 D	Coupling spring.	1
14	59165 D	Gear pin	1
15	59164 DX	Magneto gear (24 teeth) and pin (3 to 5 H.P. engines).	1
	59163 DX	Magneto gear (19 teeth) and pin (1-1/2 to 2-1/2 H.P. engines)	1
16	24603 D	Magneto member lock washer	1
17	59167 D	Impulse coupling nut	1
...	.....	Light lock washer, 1/2" (cadmium plated)	1
18	48472 D	Hole cover gasket.	1
21	47408 D	Breaker cover gasket	1
22	21388 DBX	Point with support	1
23	47431 DB	Breaker arm assembly	1
24	55015 D	Hole cover	1
...	.....	Round head screw, No. 8 - 32 x 3/8" (cadmium plated)	2
...	.....	Lock washer, No. 8 (cadmium plated).	2
25	E4A-546	Secondary lead-out screw	1
...	.....	Lock washer, No. 4	1
26	47452 D	Secondary lead-out	1
	21314 DX	Coil core with screws.	1
	63696 DX	Coil with core and screws.	1
27	133495	Flat head screw, No. 8 - 32 x 5/8"	2
	63697 DX	Coil, less core with end insulators and lead-out tube.	1
28	49593 D	Insulator.	2
29	E4 -226	Felt	1
30	47454 D	Retainer, inner.	1
31	E4A-352	Bearing outer race	2
	or		
	ST 601	Bearing outer race	2
32	E4A-353	Retainer with balls.	2
	or		
	ST 602	Retainer with balls.	2
33	E4A-351	Bearing inner race	2
	or		
	ST 600	Bearing inner race	2
34	E4A-324	Oil flinger.	2
35	59159 D	Breaker cam.	1
36	59158 DYR	Rotor assembly, with keeper.	1
37	4167 T	Rotor shaft key.	1
42	21394 D	Point support washer	1
43	47432 D	Spring anchor.	1
...	.....	Flat head screw, No. 8 - 32 x 3/8"	1
...	.....	Hex. nut, No. 8 - 32	1
...	.....	Lock washer, No. 8	1
44	21409 DB	Condenser.	1
45	47438 DA	Washer, inner.	1
46	48341 D	Washer, outer.	1
47	48342 DA	Lock washer.	1
48	48340 DA	Terminal	1
49	132124	Breaker cover screw (used with 8926 D)	3
	or		
	E4A-358	Breaker cover screw (used with 63808 D).	3
...	120217	Lock washer, No. 10 (cadmium plated)	3
50	.....	Fillister head screw, No. 8 - 32 x 1-1/4" (cadmium plated)	1
51	54254 D	Clip	1
...	.....	Lock washer, No. 8 (cadmium plated).	1
52	21393 D	Point support screw.	1
53	47433 DX	Primary lead-out	1
54	8551 DY	Frame (assembly with felt, inner retainer outer valves, condenser hole cover and gasket).	1
56	E4A-305	Shim, light.	as req'd
57	E4 -212	Shim, medium	as req'd
58	E4A-372	Shim, heavy.	as req'd
75	47474 D	Retainer, inner.	1
76	47475 DA	Oil seal	1
77	47473 D	Retainer, outer.	1
99	E4 -294	Rotor bearing (New Departure No. 15)	2
	ST 307	Rotor bearing (IHC M-15)	2
...	21372 D	Tube of magneto grease	1
...	47442 D	Primary to condenser lead-out tube	1
...	57314 D	Magnet keeper.	1
...	65064 D	Magneto and breaker point gauge.	1

INDEX TO SPECIAL ATTACHMENTS

KEROSENE BURNING ATTACHMENTS

Attachment 63140 D - For 1½ to 2½ HP Type "LB" Engines
Attachment 63410 D - For 3 to 5 HP Type "LB" Engines

INSTALLATION

Drain water from hopper, remove fuel pipe, and remove cylinder head, complete. Remove valve oiler tube with regulator and remove valve push rods.

Screw new valve oiler tube with regulator into place. Remove air intake with choke and compensating valve from old cylinder head. Move cotter pin in compensating valve pin from top hole to bottom hole. Bolt air intake with new kerosene mixer to cylinder head. Secure cylinder head to crankcase with new longer bolts, using new gasket, old valve levers and bracket and spark plug.

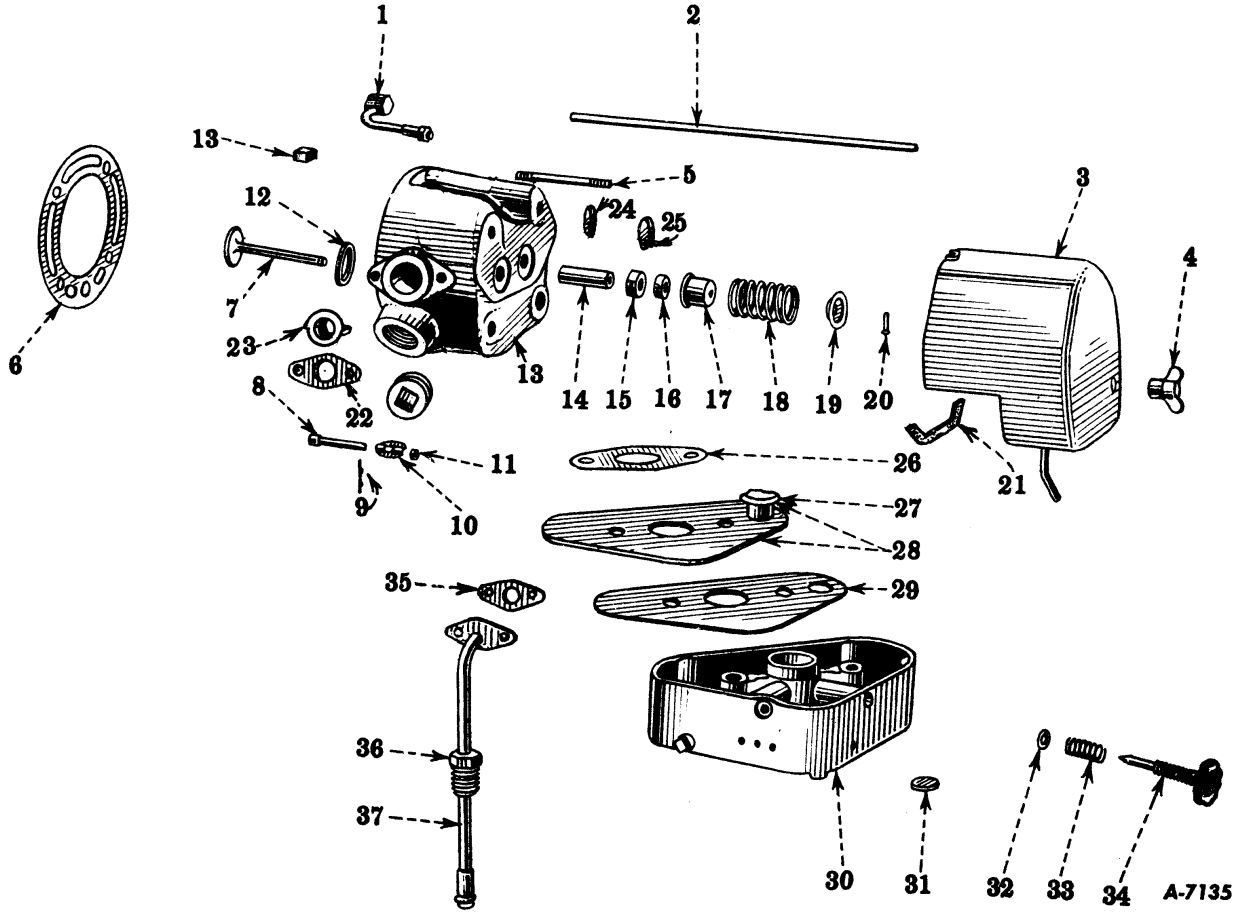
Put new valve push rods in place and temporarily adjust valves so that they have plenty of clearance. Install new fuel pipe assembly with gasket, connect spark plug cable and put new valve housing and gasket in place.

Fill hopper with water, fill fuel tank with clean kerosene and fill gasoline starting chamber in mixer with clean gasoline. Start engine, as instructed under "Starting a Kerosene Engine" *on page 4.*

After engine is hot, stop it, retighten cylinder head bolts and adjust valves to clearance of .006" to .008" for the intake, and .008" to .010" for the exhaust.

KEROSENE BURNING ATTACHMENTS - Continued

* - Attachment 63140 D - For 1-1/2 to 2-1/2 HP Type "LB" Engines.
Attachment 63410 D - For 3 to 5 HP Type "LB" Engines.



Unnumbered parts in the illustration are the same as corresponding parts shown with numbers.

Ref. No.	I H C Part Number $1\frac{1}{2}$ to $2\frac{1}{2}$ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
1	63131 DA	63131 DA	Valve oiler tube with regulator. .	1
...	.....	.....	Headless cone point set screw, 1/4" N.C. x 3/4".	1
...	.....	.....	Hex. jam nut, 1/4" N.C.	1
2	35966 D	30776 D	Valve push rod	2
3	63130 D	63392 D	Valve housing with drain pipe. . .	1
4	Q 3505	Q 3505	Wing nut, 5/16".	1
5	27954 D	27954 D	Valve housing stud	1
6	27939 DB	29589 DC	Cylinder head gasket	1
7	35961 D	30782 D	Exhaust valve.	1
	66923 D	66925 D	Intake valve	1
8	35965 D	30783 D	Throttle shaft	1
9	35962 D	30784 D	Throttle valve stop pin.	1
10	L-15136	29596 D	Throttle valve	1
...	.....	.....	Round head screw, No. 6 - 32 x 1/4".	1
...	.....	.....	Lock washer, No. 6	1
11	27942 D	27942 D	Throttle valve shaft plug.	1
12	62061 D	9180 D	Exhaust valve seat insert.	1

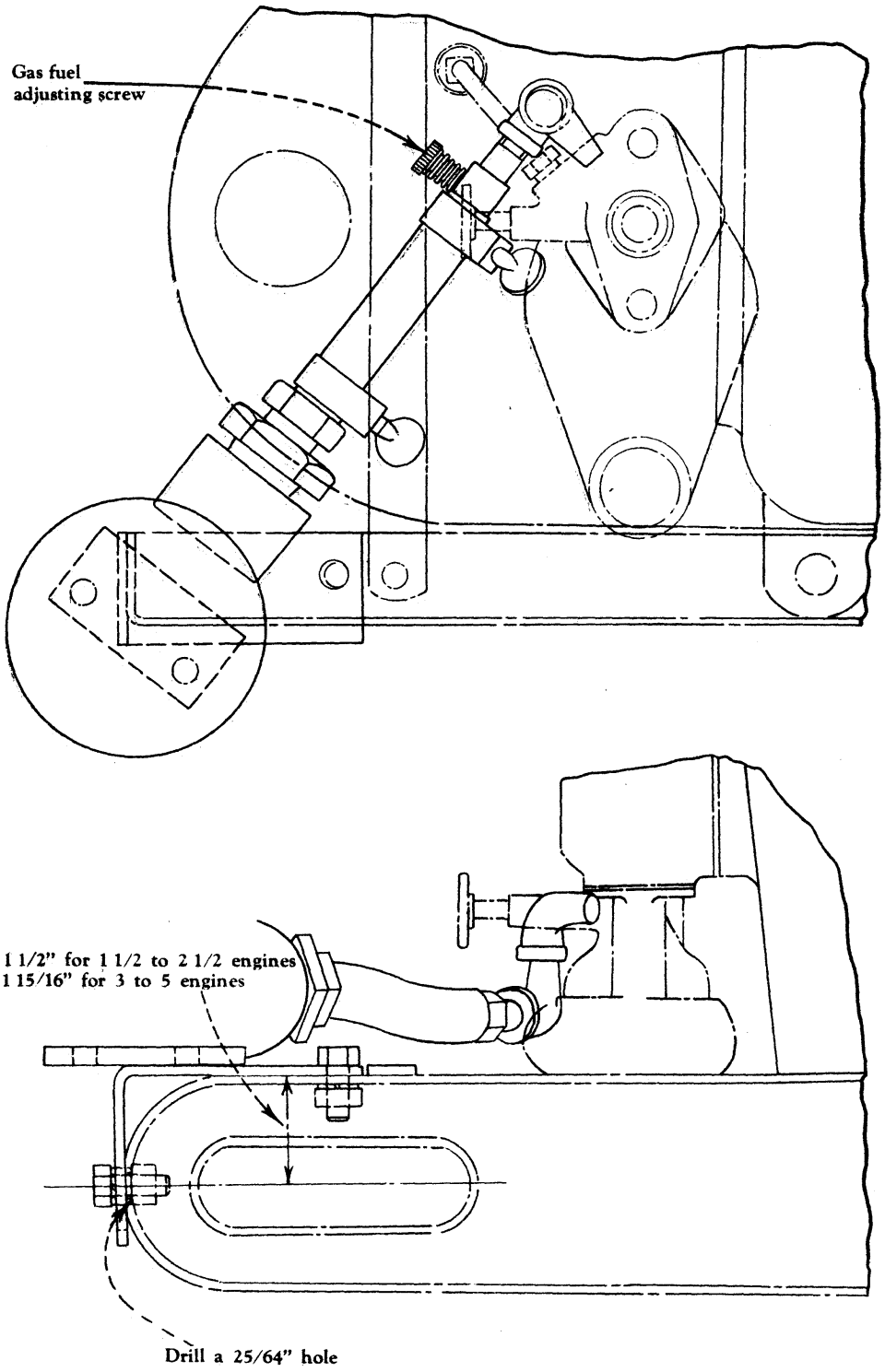
KEROSENE BURNING ATTACHMENTS - Continued

Ref. No.	I H C Part Number $1\frac{1}{2}$ to $2\frac{1}{2}$ HP	I H C Part Number 3 to 5 HP	Description	No. Req'd.
	9324 DX	9352 DX	Cylinder head with throttle, stud and valve guides	1
	9324 DY	9352 DY	Cylinder head with throttle, stud valve guides and valves.	1
13	.....	.....	Cap screw, 1/2" N.C. x 4-3/4" (for 3 to 5 HP only).	4
	.....	.....	Cap screw, 1/2" N.C. x 4-1/2" (for 1-1/2 to 2-1/2 HP only). .	4
	.....	.....	Lock washer, 1/2".	4
	.....	.....	Ctsk. head pipe plug, 1-1/4" (for 3 to 5 HP only.)	1
14	9325 DR	9353 DR	Valve guide.	2
15	61398 D	61398 D	Valve guide felt	4
16	61399 D	61399 D	Valve stem felt.	2
17	61397 D	61397 D	Valve felt retainer.	2
18	39147 DA	39147 DA	Valve spring	2
19	39148 D	39148 D	Valve spring retainer.	2
20	L-15102	L-15102	Valve spring retainer pin.	2
21	63135 D	63135 D	Valve housing gasket	1
22	35960 D	30778 D	Heat control valve retainer. . . .	1
...	.....	.....	Cap screw, 3/8" N.C. x 1". . . .	2
...	.....	.....	Lock washer, 3/8".	2
23	5335 D	9354 D	Heat control valve	1
24	13083 D	13083 D	Cylinder head expansion plug, 3/4"	1
25	17562 D	23007 V	Cylinder head expansion plug, 1" .	1
26	27958 D	29595 D	Mixer gasket	1
27	29243 D	29243 D	Mixer filler cup	1
28	35964 DX	30779 DX	Mixer cover, complete with cup . .	1
29	35963 D	30780 D	Mixer cover gasket	1
30	3806 DAX or 9359 DX	4804 DAX or 9360 DX	Mixer, complete.	1
			Mixer, complete.	1
...	.....	.....	Pipe plug, 1/8".	1
31	29244 D	29244 D	Mixer expansion plug, 5/8"	1
32	27962 D	27962 D	Needle valve spring washer	2
33	9977 T	9977 T	Needle valve spring.	2
34	27961 D	27961 D	Needle valve	2
35	29236 D	29236 D	Fuel pipe adapter gasket	1
36	27996 D	27996 D	Fuel pipe coupling	1
37	29242 D or 63432 D	30785 D or 63433 D	Fuel pipe assembly	1
			Fuel pipe assembly	1
...	.....	.....	Fillister head screw, No. 10 - 24 x 3/4"	2
...	.....	.....	Lock washer, No. 10.	2

* - *Do not use this attachment on milk cooler equipment.*

ENSIGN GAS BURNING ATTACHMENT

Attachment 38727 D - For 1½ to 2½ HP Engines
Attachment 38728 D - For 3 to 5 HP Engines



Illust. 7

Gas Regulator Mounted on Engine

ENSIGN GAS BURNING ATTACHMENTS - Continued

Attachment 38727 D - For 1½ to 2½ HP Engines
Attachment 38728 D - For 3 to 5 HP Engines

INSTALLATION

Drain water from hopper, remove fuel pipe, cylinder head and crankcase hand hole cover. Remove connecting rod cap, then remove piston and connecting rod through head end of cylinder.

Remove old piston from connecting rod and assemble new piston with rings on rod. Insert connecting rod and piston assembly into cylinder and connect to crankshaft so that the two punch marks on rod and cap are on the same side and the countersunk oil hole in the small end of the rod is on top. Replace hand hole cover using new gasket.

Remove mixer and air intake from cylinder head. Assemble new mixer with street elbows on cylinder head, using old air intake. Bolt cylinder head with valve assembly and new gasket to crankcase. Temporarily adjust valves so that they have plenty of clearance. Fill hopper with water and replace gasoline fuel pipe and valve housing.

Drill hole in skid runner and assemble regulator and connections, *as shown in Illust. 7.* Connect regulator to gas line with a convenient shut-off valve.

Start engine as instructed below under "Operating Engine on Natural Gas" and run until hot, then stop it, retighten cylinder head bolts and readjust valves to clearance of .006" to .008" for the intake, and .008" to .010" for the exhaust.

ADJUSTMENT

The gas fuel adjusting screw *(see Illust. 7)* turns in for lean and out for rich mixture. If adjustment is necessary, turn screw in until engine misses under load, then turn screw out until even running is obtained. Excessive fuel will cause the engine to run uneven and smoke; not enough fuel will cause the engine to run uneven and backfire.

OPERATING ENGINE ON GAS

Start engine on gasoline *as instructed on page 3.* As soon as engine starts, close gasoline needle valve, on mixer, and at the same time open valve on gas line. If engine starts to miss just after switching to gas, depress choke on air intake of mixer momentarily.

The gas regulator is set at the factory and should require no further adjustment.

Pressure of gas at inlet of regulator must be maintained at from 7 to 10 inches of water, or 4 to 5 ounces of gauge pressure.

To stop the engine, close valve on gas line, or short-circuit the magneto. Always close valve on gas line if engine is to be stopped for any length of time.

ENSIGN GAS BURNING ATTACHMENTS - Continued

Attachment 38727 D-For 1½ to 2½ HP Engines.
Attachment 38728 D-For 3 to 5 HP Engines.

I H C Part No.	Description	No. Req'd. for Attachment	
		38727 D	38728 D
3579 D	Compression ring	3	...
3584 D	Oil ring	1	...
3907 D	Compression ring	...	3
3912 D	Oil ring	...	1
3938 DX	Piston, with rings	1	...
3945 DX	Piston, with rings	...	1
5588 D or 9485 D	Mixer body, gas.	1	...
	Mixer body, gas.	1	...
5589 D or 9486 D	Mixer body, gas.	...	1
	Mixer body, gas.	...	1
27939 DB	Cylinder head gasket	1	...
27958 D	Mixer body gasket.	1	...
28001 D	Hand hole cover gasket	1	1
29589 DC	Cylinder head gasket	...	1
29595 D	Mixer body gasket.	...	1
38726 D	Ensign Gas Regulator, complete (see detail list below)	1	1
.....	Street elbow, 1/8", 90°	2	2
41970 DX	Regulator bracket with plate	1	1
.....	Cap screw, 3/8" N.C. x 3/4"	1	1
.....	Hex. nut, 3/8" N.C.	1	1
.....	Lock washer, 3/8"	1	1
.....	Cap screw, 5/16" N.C. x 3/4"	3	3
.....	Hex. nut, 5/16" N.C.	1	1
.....	Lock washer, 5/16"	3	3

DETAIL PARTS OF GAS REGULATOR (38726 D)

I H C Part No.	Description	No. Req'd.
40122 DA	Drain filter assembly	1
40123 D	Gas adjustment assembly	1
40124 D	Outlet hose connection, 1/4".	1
40125 D	Regulator unit (see detail list on next page)	1
40759 D	Connecting hose, 1/2 x 12", 2 ply	1
40760 D	Connecting hose clamp, 1/2"	2
.....	Reducer bushing, 1 x 1/4"	1

ENSIGN GAS BURNING ATTACHMENTS - Continued

DETAIL PARTS OF REGULATOR UNIT (40125 D)

I H C Part No.	Description	No. Req'd.
36758 D	Adjusting retainer spring.	1
36894 D	Regulator body.	1
36895 D	Valve seat gasket.	1
36896 D	Valve seat.	1
36897 D	Valve assembly.	1
36902 D	Pilot valve assembly.	1
36903 D	Valve lever support gasket.	1
36907 D	Valve lever push rod assembly.	1
36909 D	Upper diaphragm and gasket assembly.	1
36910 D	Partition plate locking wire.	1
36911 D	Partition plate.	1
37009 D	Balance tube plug.	1
37009 D	Pressure test hole plug.	1
37010 D	Lower diaphragm spring.	1
37011 D	Idle adjusting screw.	1
37012 D	Upper diaphragm gasket.	1
40113 D	Primer stop lever assembly.	1
40114 D	Primer spring.	1
40115 D	Primer shaft primer control.	1
40116 D	Primer lever and screw.	1
42331 D	Lower diaphragm assembly.	1
42332 D	Lower diaphragm.	1
42333 D	Lower diaphragm plate.	1
42334 D	Diaphragm screw assembly.	1
42335 D	Diaphragm screw nut assembly.	1
42336 D	Diaphragm bypass screen.	1
42337 D	Bowl (partial assembly).	1
42339 D	Bowl cover (partial assembly).	1
.....	Fillister head screw (brass plated) No. 10-32 x 5/8" (clamp screw).	1
.....	Fillister head screw (brass plated) No. 10-32 x 9/16" (valve seat screw)	3
.....	Fillister head screw (brass plated) No. 10-32 x 1/2" (bowl and cover screw)	16
.....	Fillister head screw (brass plated) No. 10-32 x 3/8" (clamp screw).	1
.....	Lock washer, No. 10 (bowl and cover)	16
.....	Fillister head screw (brass plated) No. 6-32 x 3/8" (in valve lever support).	1

AIR CLEANER ATTACHMENTS

Attachment 28730 DA-For 1½ to 2½ HP Gasoline or Kerosene Engines
Attachment 33584 DB-For 3 to 5 HP Gasoline Engines
Attachment 33585 D -For 3 to 5 HP Kerosene Engines

If the engine is to be operated under dusty conditions we recommend these "Oil Bath Type" Air Cleaner Attachments.

INSTALLATION

Drain oil from crankcase.

Remove flywheel and crankcase side cover. Remove breather pipe from crankcase side cover and replace it with the new one provided. Replace side cover and flywheel and refill crankcase with new oil. *(see Oil Specifications on page 7).*

Disconnect fuel pipe and remove fuel tank to get at air intake bolts. Remove air intake and replace it with new air intake and gasket. Compensating valve cotter pin should be in top hole for gasoline engines, and in lower hole for kerosene engines.

Bolt air cleaner with gasket to air intake and fasten hose connection to breather pipe.

Fasten fuel tank and fuel pipe back in place. Fill air cleaner oil cup to "OIL LEVEL" mark with SAE-20 or lighter oil.

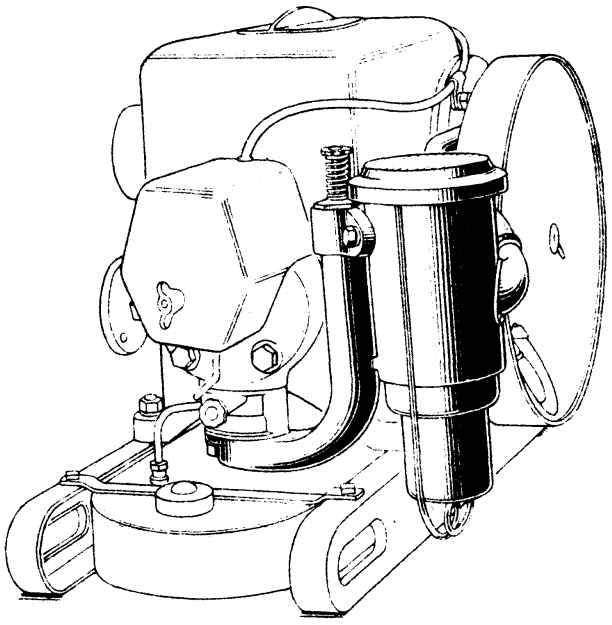
After starting engine check oil feed of valve oiler (see "Valve Oiler adjusting Screw" *on page 8).*

MAINTENANCE

All oil is drained from air cleaner when it is shipped. Fill oil cup to "oil level" mark with SAE-20 or lighter oil.

Clean and refill the oil cup every day, or every 10 hours of operation. Cleaning period may be extended to 30 hours when operating under very light dust conditions. At no time should dirt be allowed to accumulate in bottom of oil cup to a depth greater than 3/4".

The complete air cleaner must be removed and the inside washed thoroughly in kerosene at intervals frequent enough to insure clean screens in the cleaner. This may be necessary every sixty (60) hours of operation if operating in an atmosphere heavily laden with dust.



Illust. 8

Showing Air Cleaner Assembled on 1½ to 2½ HP Gasoline Engine.

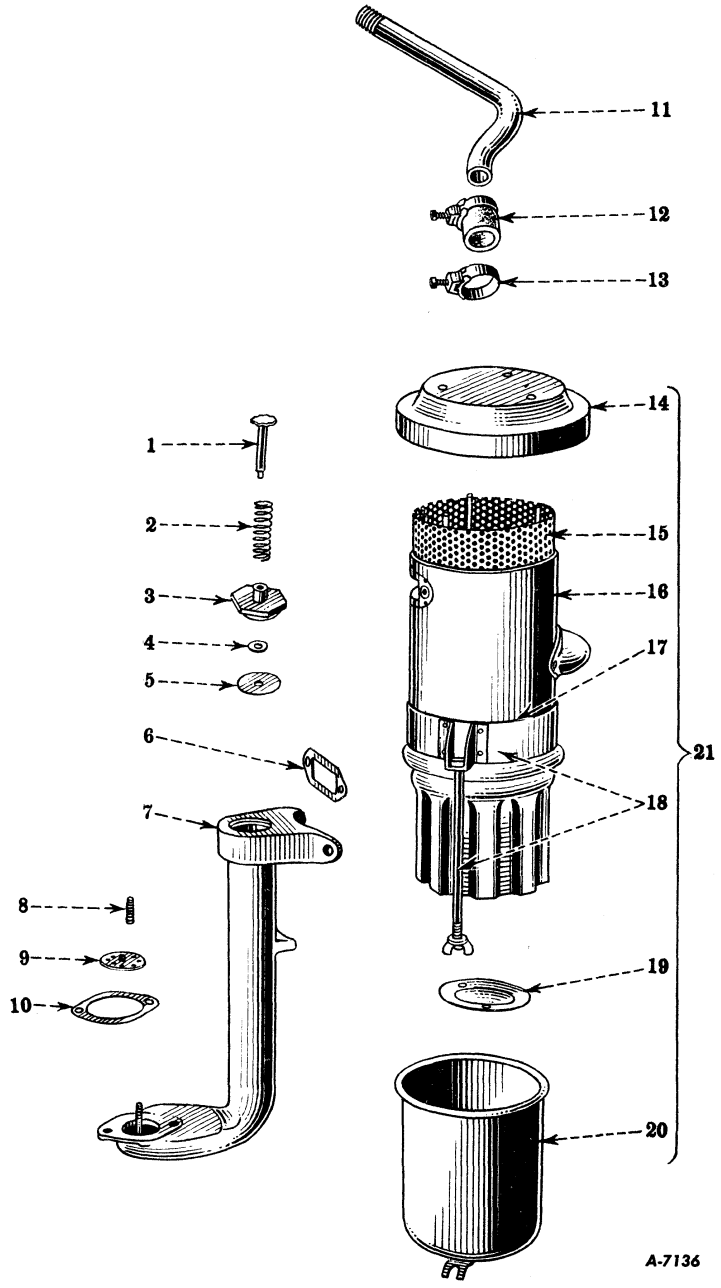
AIR CLEANER ATTACHMENTS - Continued
INTERNATIONAL MODEL 40-4"

Attachment 28730 DA-For 1½ to 2½ HP Gasoline or Kerosene Engine

I H C Part No.	Description	No. Req'd.
3701 DAX	Air pipe with compensating valve pin	1
.....	Cap screw, 3/8" N.C. x 2-1/2"	2
.....	Lock washer, 3/8" N.C.	2
27963 D	Compensating valve pin	1
.....	Cotter, 1/16 x 1/2"	1
28693 DX	Air cleaner (4" - Model 40), with gasket	1
.....	Cap screw, 3/8" N.C. x 7/8"	2
.....	Lock washer, 3/8"	2
*28704 DX	Air cleaner body assembly	1
*28713 D	Air cleaner cup	1
*28714 D	Air cleaner cup gasket	1
*28715 D	Air cleaner cup bail	1
*28717 DX	Air cleaner orifice plate	1
*28720 D	Air cleaner gasket (body to air pipe)	1
28721 DAX	Breather pipe, complete with plug (gasoline engine)	1
28722 D	Breather pipe hose	1
28723 D	Air cleaner connection gasket (at mixer)	1
28724 D	Choke valve	1
28725 D	Choke valve seal	1
28726 D	Choke valve guide	1
28727 D	Choke valve spring	1
28729 D	Choke valve stem, complete	1
.....	Hex. nut No. 10-32	1
.....	Lock washer, No. 10	1
30522 D	Breather pipe hose clamp	2
39511 DAX	Breather pipe, complete with plug, 3/8" (for kerosene engines)	1
64477 D	Breather pipe restriction plug, 1/4"	1
LA 15135	Compensating valve	1
LA 15167	Compensating valve spring	1

* - *Part of Cleaner 28693 DX.*

AIR CLEANER ATTACHMENTS (33584 DA AND 33585 D)
INTERNATIONAL MODEL C-50-5"
FOR 3 TO 5 HP ENGINES



Unnumbered parts in the illustrations are the same as corresponding parts shown with numbers.

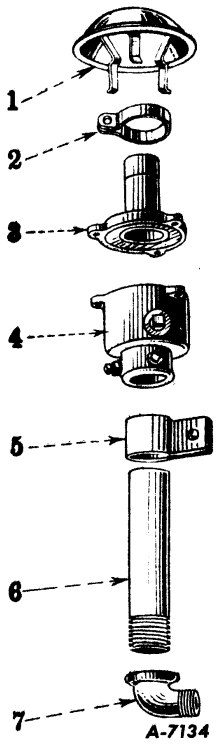
AIR CLEANER ATTACHMENTS (33584 DB AND 33585 D) - Continued
INTERNATIONAL MODEL C-50-5"
FOR 3 to 5 HP ENGINES

Attachment 33584 DB - For 3 to 5 HP Gasoline Engines
Attachment 33585 D - For 3 to 5 HP Kerosene Engines

Ref. No.	I H C Part No.	Description	No. Req'd. for Attachment	
			33584 DB	33585 D
1	28729 D	Choke valve stem	1	1
...	.....	Hex. nut, No. 10 - 32	1	1
...	.....	Lock washer, No. 10	1	1
2	28727 D	Choke valve spring	1	1
3	3964 D	Choke valve guide	1	1
4	28725 D	Choke valve seal	1	1
5	30288 D	Choke valve	1	1
6	30316 D	Body flange gasket	1	1
7	5108 DX	Air pipe with compensating valve pin	1	1
...	.....	Cap screw, 3/8" N.C. x 2-3/4"	2	2
...	.....	Cap screw, 3/8" N.C. x 7/8"	2	2
...	.....	Lock washer, 3/8"	4	4
8	29662 D	Compensating valve spring	1	1
9	29559 D	Compensating valve	1	1
...	.....	Cotter, 1/16 x 1/2"	1	1
10	30291 D	Air pipe to mixer gasket	1	1
11	33581 DA	Breather pipe	1	...
	33582 DA	Breather pipe	...	1
	33581 DAX	Breather pipe with restriction plug	1	...
	33582 DAX	Breather pipe with restriction plug	...	1
12	30290 D	Breather pipe hose	1	1
13	39107 H	Breather pipe hose clamp	2	2
*14	33573 DX	Air cleaner cap	1	1
*15	33574 DX	Air cleaner cap screen with spacer	1	1
*16	33583 D	Air cleaner body with lug ring, screens, and orifice plate	1	1
...	.....	Carriage bolt, No. 10 - 24 x 2-1/2"	3	3
...	.....	Hex. nut, No. 10 - 24	3	3
...	.....	Lock washer, No. 10	3	3
*17	23981 DAX	Lug ring	1	1
*18	23981 DAY	Lug ring with bolts and nuts	1	1
...	.....	Square head bolt, 5/16" N.C. x 7"	2	2
...	.....	Wing nut, 5/16" N.C.	2	2
...	.....	Washer, 11/32" I.D. x 3/4" O.D	2	2
*19	23992 D	Orifice plate	1	1
...	.....	Self-tapping screw, No. 10 x 3/8"	2	2
*20	23984 DX	Oil cup and clamp bar	1	1
21	33580 DX	Air cleaner assembly (Model C50)	1	1
...	62479 D	Breather pipe restriction plug	1	...
...	63867 D	Breather pipe restriction plug	...	1

** - Part of Cleaner 33580 DX*

SPARK ARRESTER ATTACHMENT (54966 D) FOR 3 TO 5 HP ENGINES



Ref. No.	I H C Part No.	Description	No. Req'd.
1	65837 D	Spark arrester rain shield	1
2	35282 D	Spark arrester rain shield clamp	1
...	.....	Square head bolt, 5/16" N.C. x 1-1/4". .	1
...	.....	Hex. jam nut, 5/16" N.C.	1
3	5126 D	Spark arrester top	1
...	.....	Square head bolt, 5/16" N.C. x 1". . . .	3
...	.....	Hex. nut, 5/16" N.C.	3
...	.....	Lock washer, 5/16"	3
4	5125 D	Spark arrester body.	1
...	.....	Square head cup point set screw, 3/8" N.C. x 7/8"	2
...	.....	Hex. jam nut, 3/8" N.C	2
...	.....	Pipe plug, 1/2".	1
5	51020 D	Spark arrester pipe bracket.	1
...	.....	Cap screw, 5/16" N.C. x 3/4"	1
...	.....	Lock washer, 5/16"	1
6	.....	Pipe, 1-1/2 x 10" (threaded on one end).	1
7	.....	Street elbow, 1 x 1-1/2", 90°	1

TWO WHEEL HAND TRUCK ATTACHMENT

Attachment 32104 D-For 1½ to 2½ HP Engines
Attachment 33356 D-For 3 to 5 HP Engines

I H C Part No.	Description	No. Req'd for Attachment	
		32104 D	33356 D
4932 D	Truck wheel	2	2
32100 DX	Truck axle and supports	1	...
.....	Square head bolt, 7/16" N.C. x 1"	4	...
.....	Hex. nut, 7/16" N.C.	4	...
.....	Lock washer, 7/16".	4	...
.....	Washer, 25/32" I.D. x 1-1/4".	2	...
.....	Cotter, 5/32 x 1-1/4"	2	...
32101 D	Truck handle.	1	...
.....	Square head bolt, 3/8" N.C. x 1-1/2".	2	...
.....	Hex. nut, 3/8" N.C.	2	...
.....	Lock washer, 3/8"	2	...
32103 D	Truck leg	1	...
.....	Square head bolt, 3/8" N.C. x 1-3/4".	2	...
.....	Hex. nut, 3/8" N.C.	2	...
.....	Lock washer, 3/8"	2	...
32105 D	Truck skid brace.	1	...
33351 D	Truck leg	...	1
.....	Square head bolt, 3/8" N.C. x 1-3/4".	...	4
.....	Hex. nut, 3/8" N.C.	...	4
.....	Lock washer, 3/8"	...	4
33353 D	Truck handle.	...	1
33354 D	Truck skid brace.	...	1
33355 D	Truck axle and supports	...	1
.....	Square head bolt, 7/16" N.C. x 1-1/4"	...	2
.....	Square head bolt, 7/16" N.C. x 1"	...	2
.....	Hex. nut, 7/16" N.C.	...	4
.....	Lock washer, 7/16".	...	4
.....	Washer, 25/32" I.D. x 1-1/4" O.D.	...	2
.....	Cotter, 5/32 x 1-1/4"	...	2

AUXILIARY WATER HOPPER ATTACHMENTS

Attachment 28703 D -For 1½ to 2½ HP Engines
Attachment 29928 DA-For 3 to 5 HP Engines

I H C Part No.	Description	No. Req'd for Attachment	
		28703 D	29928 DA
3699 D	Deflector.	1	1
.....	Cap screw, 1/2" N.C. x 2-3/4".	1	1
28699 DX	Hopper assembly.	1	...
28701 D	Lower clamp.	1	1
28702 D	Hopper ring.	1	1
30662 D	Hopper assembly.	...	1

CLUTCH SPROCKETS AND PULLEYS

INSTALLATION

Remove regular pulley from engine.

Remove hand wheel and clutch cover from clutch pulley or sprocket a assembly; then back out clutch yoke lock screw until clutch yoke can be unscrewed from assembly.

Slide assembly on engine pulley shaft back to the shoulder on shaft and drive pulley key in place.

The clutch yoke should then be screwed on to such a position that it will require a definite effort to pull the hand wheel out and over-center. (Put wheel on temporarily to check this).

After correct adjustment of yoke has been obtained, align clutch lock screw with nearest hole in pressure plate, then screw it down.

Remove wheel, replace cover, then replace wheel.

LUBRICATION

Daily or every 10 hours of operation, lubricate clutch sprocket through lubricator fitting. Use pressure gun grease (chassis lubricant) and apply 3 or 4 strokes of hand lubricator.

Daily or every 10 hours of operation, fill grease cup on clutch pulley with pressure gun grease (chassis lubricant) and turn it down.

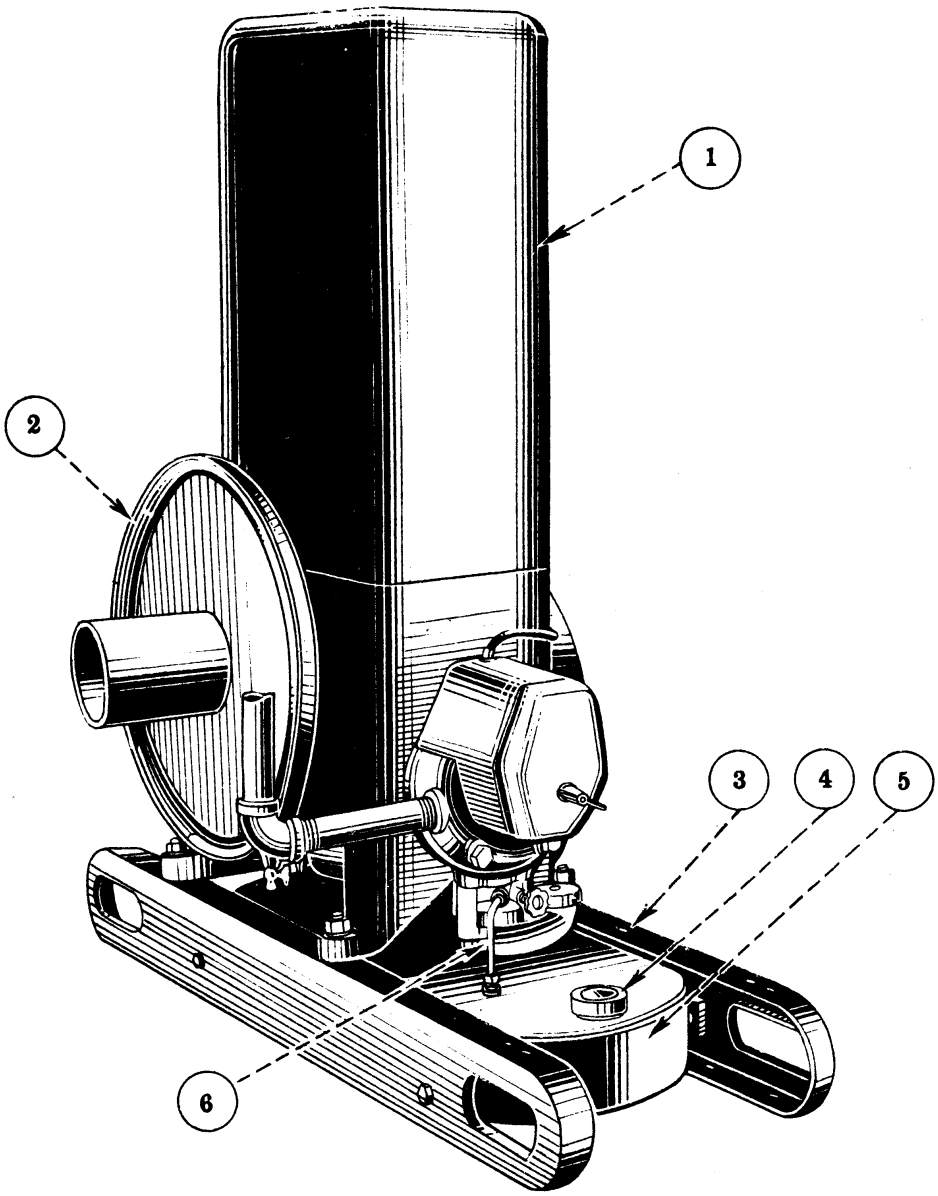
CLUTCH SPROCKETS AND PULLEYS
FOR BOTH 1½ TO 2½ HP AND 3 TO 5 HP ENGINES

*5418 DX Clutch Pulley, (10" Dia. x 6" Face).
*5417 DX Clutch Pulley, (8½" Dia. x 6" Face).
*5092 DX Clutch Pulley, (12" Dia. x 6" Face).
*35587 D 24-Tooth Clutch Sprocket.
35589 D 24-Tooth Clutch Sprocket Attachment.
33349 D Clutch Pulley Attachment (12" Dia., 6" Face).
*42476 D 20-Tooth Clutch Sprocket.
42817 D 20-Tooth Clutch Sprocket Attachment.

** For use on Engines equipped with Attachments 33349 D, 35589 D or 42817 D.*

I H C Part No.	Description	No. Req'd. for Attachment							
		5418 DX	5417 DX	5092 DX	35587 D	35589 D	33349 D	42476 D	42817 D
5087 D	Clutch pulley sleeve.	.	.	.	.	1	1	.	1
5088 D	Clutch pressure plate	.	.	.	.	1	1	.	1
5089 D	Clutch yoke	.	.	.	.	1	1	.	1
5090 D	Clutch toggle lever	.	.	.	.	2	2	.	2
5091 D	Clutch hand wheel	.	.	.	.	1	1	.	1
5092 D	Clutch pulley (12" dia. x 6" face)	.	.	1	.	.	1	.	.
5294 DA	Clutch sprocket flange.	.	.	.	1	1	.	.	.
5295 DA	Clutch sprocket carrier	.	.	.	1	1	.	.	.
.....	Cap screw, 3/8" N.C. x 1-1/2" .	.	.	.	4	4	.	.	.
.....	Lock washer, 3/8"	.	.	.	4	4	.	.	.
5417 DX	Clutch pulley, (8½" dia. x 6" face) (optional)	.	1	.	.	.	.	.	.
5418 DX	Clutch pulley, (10" dia. x 6" face) (optional)	1	.	.	.	.	.	.	.
5948 D	Clutch sprocket flange.	.	.	.	.	.	.	1	1
5949 D	Clutch sprocket carrier	.	.	.	.	.	.	1	1
.....	Cap screw, 3/8" N.C. x 1-1/2" .	.	.	.	.	.	.	4	4
.....	Lock washer, 3/8"	.	.	.	.	.	.	4	4
14186 DA	Clutch sprocket lubricator. . . .	.	.	.	1	1	.	1	1
33335 D	Clutch friction disc.	.	.	.	.	2	2	.	2
33336 D	Clutch pressure plate driving pin	.	.	.	.	2	2	.	2
33337 DX	Clutch control shaft, with stop .	.	.	.	.	1	1	.	1
.....	Hex. nut, 1/2" N.C. (Type "D").	.	.	.	.	1	1	.	1
33338 D	Clutch spring	.	.	.	.	4	4	.	4
33339 D	Clutch spring seat.	.	.	.	.	4	4	.	4
33340 D	Clutch yoke lock.	.	.	.	.	1	1	.	1
.....	Lock washer, 5/16".	.	.	.	.	1	1	.	1
33341 D	Clutch toggle link.	.	.	.	.	4	4	.	4
33342 D	Clutch toggle link lever pin, long	.	.	.	.	1	1	.	1
.....	Cotter, 1/16 x 5/8"	.	.	.	.	1	1	.	1
33343 D	Clutch toggle link lever pin, short.	.	.	.	.	2	2	.	2
.....	Cotter, 1/16 x 5/8"	.	.	.	.	2	2	.	2
33344 D	Clutch toggle link fulcrum pin. .	.	.	.	.	2	2	.	2
33345 D	Clutch cover.	.	.	.	.	1	1	.	1
.....	Cap screw, 5/16" N.C. x 1/2". .	.	.	.	.	4	4	.	4
.....	Lock washer, 5/16".	.	.	.	.	4	4	.	4
33346 D	Clutch hand wheel washer.	.	.	.	.	1	1	.	1
33347 D	Clutch hand wheel bushing	.	.	.	.	1	1	.	1
33348 D	Clutch pulley grease cup.	1	1	1	.	.	1	.	.
35588 D	Clutch sprocket (24 teeth). . . .	.	.	.	1	1	.	.	.
39209 D	Friction clutch (only).	.	.	.	.	1	1	.	1
42816 D	Clutch sprocket (20 teeth). . . .	.	.	.	.	.	.	1	1

PARTS FOR 1½ TO 2½ HP GASOLINE ENGINE WHEN USED WITH INTERNATIONAL MILK COOLERS



Ref. No.	I H C Part No.	Ref. No.	I H C Part No.
1	35535D	4	27556D
2	12795C 22341C	5	35530D
3	35622D	6	35532D

PARTS FOR 1-1 2 TO 2-1 2 HP GASOLINE ENGINE WHEN USED WITH INTERNATIONAL MILK COOLERS - Continued

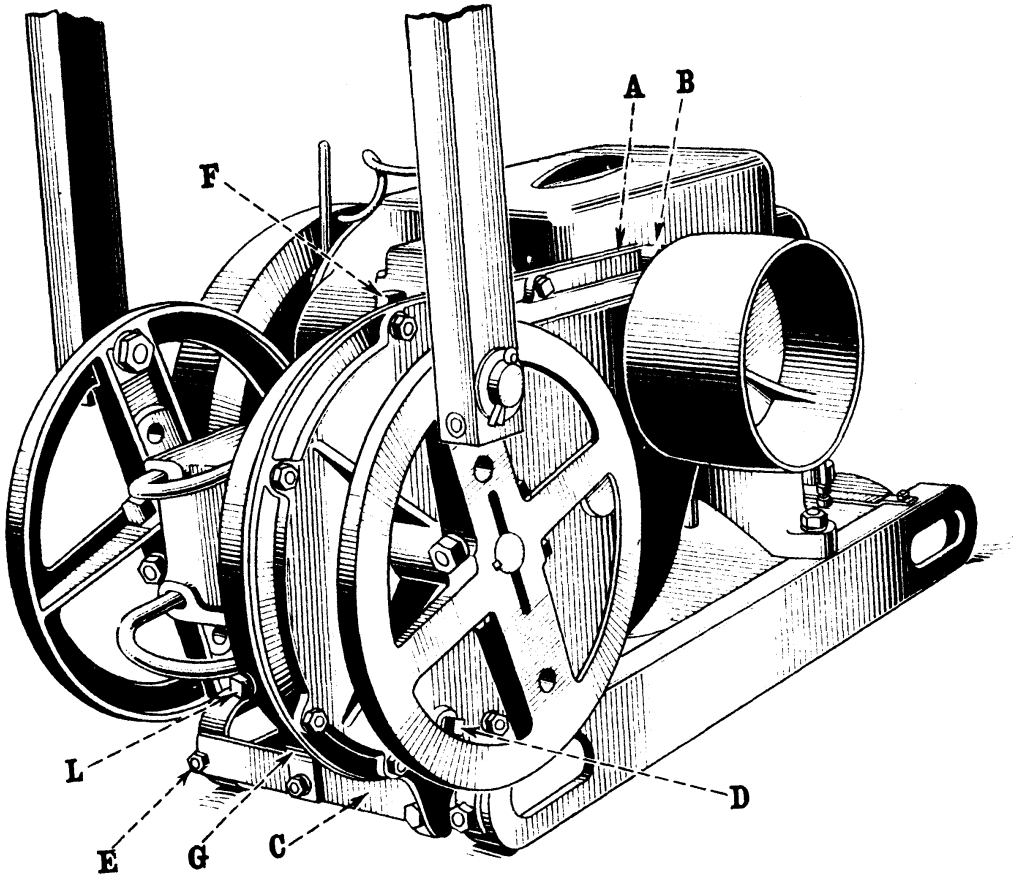
I H C Part No.	Description	No. Req'd.
	FUEL TANK UNIT (35621 D)	
27556 D	Fuel tank filler cap	1
35530 D	Fuel tank assembly	1
.....	Cap screw, 3/8" N.F. x 5/8"	4
.....	Lock washer, 3/8"	4
35532 D	Fuel pipe assembly	1
35621 D	Fuel tank unit, complete	1
	AUXILIARY WATER HOPPER UNIT (35535 D)	
3699 D	Deflector	1
.....	Cap screw, 1/2" N.C. x 2-1/4"	1
.....	Lock washer, 1/2"	1
28701 D	Lower clamp	1
28702 D	Hopper ring	1
35534 D	Hopper body assembly	1
35535 D	Auxiliary hopper assembly, complete	1
	"V" DRIVE ENGINE PULLEYS	
12795 C	Pulley (15" diameter)	1
22341 C	Pulley (13" diameter)	1
	SKIDS UNIT (35622 D)	
29745 DA	Skid runner, left hand	1
29746 DA	Skid runner, right hand	1
35538 D	Skid runner bolt	2
.....	Hex. nut, 7/16" N.C.	2
.....	Lock washer, 7/16"	2
35622 D	Skid unit, complete	1

V-BELTS AVAILABLE

I H C Part No.	Description	No. Req'd.
12779 C	V-Belt, 93" inside circumference	1
22038 C	V-Belt, 105" inside circumference	1
22039 C	V-Belt, 120" inside circumference	1
22040 C	V-Belt, 136" inside circumference	1
22041 C	V-Belt, 158" inside circumference	1
22042 C	V-Belt, 180" inside circumference	1

PUMP JACK ATTACHMENTS

Attachment 30732 DB-For 1½ to 2½ HP Engines (less Clutch)
Attachment 36110 D For 1½ to 2½ HP Engines (with Clutch)
Attachment 35460 D For 3 to 5 HP Engines (with Clutch)



Illust. 9

INSTALLATION

Remove engine crankcase oil drain plug and allow oil to drain. Replace plug with elbow, pipe and cap provided. Refill crankcase with new oil *(see Engine Oil Specifications on page 7)*.

Remove engine pulley. Attach skid brace "C" with bolts "E" to the rear of skid runners *(see Illust. 9)*. Loosen the engine hold-down bolts and fuel tank bolts. **Loosening these bolts is necessary to get good alignment.**

Remove crankcase hand hole cover. Bolt pump jack housing (with gasket "A" in place) to crankcase with capscrews "B" *(see Illust. 9)*. Attach body brace "G" to pump jack, fastening lower end to skid brace and upper end to engine with hand hole cover capscrews *(See Illust. 9)*.

Slip drive pinion on engine pulley shaft and adjust pump jack housing so that the clearance around drive pinion flange is uniform. Then tighten the two capscrews "B" *(see Illust. 9)* and the bolts fastening pump jack to skid brace. Tighten engine hold-down bolts and fuel tank bolts.

PUMP JACK ATTACHMENTS - Continued

Attachment 30732 DB-For 1½ to 2½ HP Engines (less Clutch)
Attachment 36110 D -For 1½ to 2½ HP Engines (with Clutch)
Attachment 35460 D -For 3 to 5 HP Engines (with Clutch)

INSTALLATION - Continued

Put pulley felt washer in pump jack cover, insert drive pinion key and fasten the new pulley to drive pinion with the three capscrews.

Place two 1/16" thick spacers (not furnished) opposite each other between pulley hub and pump jack cover to maintain 1/16" gap. With spacers in place, drive home the key, then remove the spacers.

Attach pitman rods to crank arms and fasten pitman cross bar securely to pitman rods. Then fasten pump jack to pump barrel with the two "U" bolts and connect pitman cross bar to pump rod with bolt furnished.

LUBRICATION

Remove filler plug "F" and level plug "L" *(see Illust. 9)*. Pour transmission lubricant through filler "F" until it reaches level "L", then replace plugs.

Check oil level once a week, or after every 60 hours of operation, and keep up to level "L".

Use SAE-90 transmission lubricant in the gear housing for all temperatures above Zero F. For temperatures below Zero F. use SAE-90 diluted with 1/6 part of kerosene.

Remove drain plug "D" and drain all lubricant from housing at least once a year, and refill with fresh lubricant. If lubricant has been thinned for use in temperature below Zero F., change it before operating in hot weather.

Occasionally lubricate pitman pins with a few drops of engine oil.

OPERATION

When starting a cold engine having an attachment without a clutch, first crank engine over with fuel shut off until pitman pins are nearly at top of stroke. Then turn on fuel and start engine. This saves cranking against the load of the pump while starting the engine.

Disengage the clutch by turning clutch handle toward flywheel, before starting the engine on attachments equipped with a clutch. After starting engine in cold weather, let it run for a minute or two before engaging clutch. When engaging clutch, give handle a quick positive turn.

PUMP JACK ATTACHMENTS - Continued

Attachment 30732 DB - For 1½-2½ HP Engine (Less Clutch).
Attachment 36110 D - For 1½-2½ HP Engine (With Clutch).
Attachment 35460 D - For 3 -5 HP Engine (With Clutch).

Ref. No.	Description	No. Req'd. for Attachment		
		30732 DB	36110 D	35460 D
191 C	Pitman pin washer, 1-1/32" I.D. x 1-3/4" O.D. x 7/64".	2	2	...
.....	Cotter, 3/16 x 1-1/2".	2	2	...
3988 DAX	Crank gear (47 teeth) with bolt.	1	...	...
3989 D	Idler gear (13 and 52 teeth)	1	...	...
4710 D	Crank arm key (Woodruff No. 15).	3	3	...
5276 D	Crank gear (52 teeth).	...	...	1
5277 DAX	Idler gear, with bushing	...	...	1
5278 DAX	Gear housing cover, with bushing, felt washer, oil seal, expansion plug and pipe plug	...	...	1
.....	Pipe plug, 3/8".	...	...	1
5279 DX	Gear housing, with bushing, oil seal and plug.	...	...	1
.....	Cap screw, 1/2" N.C. x 2-1/2".	...	...	2
.....	Square head bolt, 1/2" N.C. x 1-1/2"	...	...	1
.....	Hex. nut, 1/2" N.C.	...	...	1
.....	Lock washer, 1/2"	...	...	3
.....	Square head bolt, 3/8" N.C. x 2"	...	...	1
.....	Square head bolt, 3/8" N.C. x 1-1/4"	...	...	8
.....	Square head bolt, 3/8" N.C. x 7/8"	...	...	1
.....	Hex. nut, 3/8" N.C.	...	...	9
.....	Lock washer, 3/8".	...	...	10
.....	Pipe plug, 3/8".	...	...	1
5280 D	Clutch spider.	...	...	1
5281 D	Clutch throw-out sleeve.	...	...	1
5282 D	Pitman cross bar	...	...	1
.....	Carriage bolt, 1/2" N.C. x 3-3/4".	...	...	4
.....	Hex. nut, 1/2" N.C.	...	...	4
.....	Washer, 17/32" I.D. x 1-1/4" O.D.	...	...	4
.....	Cap screw, 3/4" N.C. x 3".	...	...	1
.....	Hex. nut, 3/4" N.C.	...	...	1
.....	Lock washer, 3/4".	...	...	1
5283 DX	Crank arm with bolts and nuts.	...	...	2
5284 DX	Drive pinion, with oil deflector	...	...	1
5285 D	Pulley (6-1/2" dia. x 4-1/4" face)	1	1	1
.....	Cap screw, 3/8" N.C. x 1-1/4".	3	3	3
.....	Lock washer, 3/8".	3	3	3
5286 D	Shifter fork	...	...	1
.....	Cap screw, 5/16" N.C. x 1"	...	...	1
.....	Lock washer, 5/16"	...	...	1
5287 D	Shifter handle	...	1	1
.....	Cap screw, 5/16" N.C. x 1"	...	...	1
.....	Lock washer, 5/16"	...	...	1
5243 DX	Gear housing, with bushing, oil seal, expansion plug and pipe plugs	1	1	...
.....	Cap screw, 3/8" N.C. x 7/8".	1	1	...
.....	Square head bolt, 3/8" N.C. x 1-1/4"	1	1	...

PUMP JACK ATTACHMENTS - Continued

Ref. No.	Description	No. Req'd. for Attachment 30732 DB	36110 D	35460 D
.....	Hex. nut, 3/8" N.C.	1	1	...
.....	Lock washer, 3/8".	2	2	...
.....	Pipe plug, 3/8".	1	1	...
5344 D	Clutch spider.	...	1	...
5345 D	Crank gear	...	1	...
5346 D	Clutch throw-out sleeve.	...	1	...
5347 D	Shifter fork	...	1	...
5348 DX	Idler gear, with bushing	...	1	...
5349 D	Drive pinion	...	1	...
5349 DX	Drive pinion, with oil deflector	...	1	...
5352 D	Gear housing cover	1	1	...
.....	Pipe plug, 3/8".	1	1	...
5352 DX	Gear housing cover, with bushing, oil seal and plug.	1	1	...
.....	Cap screw, 3/8" N.C. x 3-3/4".	2	2	...
.....	Lock washer, 3/8".	2	2	...
.....	Cap screw, 5/16" N.C. x 3/4"	1	1	...
.....	Square head bolt, 5/16" N.C. x 1-1/8".	7	7	...
.....	Hex. nut, 5/16" N.C.	7	7	...
.....	Lock washer, 5/16"	8	8	...
5354 DX	Crank arm with bolt and nut.	2	2	...
5355 D	Pitman cross bar	1	1	...
.....	Cap screw, (heat-treated) 1/2" N.C. x 2-1/2".	1	1	...
.....	Carriage bolt, 1/2" N.C. x 3"	2	2	...
.....	Hex. nut, 1/2" N.C.	3	3	...
.....	Lock washer, 1/2".	1	1	...
.....	Washer, 17/32" I.D. x 1-1/4" O.D.	2	2	...
5440 D	Drive pinion (15 teeth).	1	...	...
13062 D	Idler gear shaft cover plug (1-1/2")	...	...	2
13070 D	Crank gear shaft key (Woodruff No. 127).	1	...	...
30731 D	Gear housing expansion plug (1-3/16").	1	1	...
	Gear housing cover expansion plug (1-3/16")	1	1	...
18761 D	Shifter shaft fork key	...	2	2
28001 D	Hand hole cover gasket	1	1	1
28018 D	Drive pinion key (5/16 x 2-1/2")	1	1	1
30719 DX	Pitman, complete (one rod)	1	1	...
.....	Wagon box head rivet, 1/4 x 1-7/8"	2	2	...
.....	Washer, 17/64" I.D. x 5/8" O.D.	2	2	...
30720 D	Pitman pin	2	2	...
.....	Hex. jam nut, 5/8" N.F.	2	2	...
.....	Lock washer, 5/8".	2	2	...
30722 D	Crank gear shaft bushing (in gear housing)	1	1	...
30722 D	Crank gear shaft bushing (in gear cover)	1	1	...
30725 D	Drive pinion oil seal.	1	1	...
30727 D	Gear housing cover gasket.	1	1	...
35425 D	Crank gear shaft	...	...	1
35426 D	Gear housing gasket.	...	...	1
35427 D	Gear housing "U" bolt.	...	...	2
.....	Hex. nut, 1/2" N.C.	...	...	4
.....	Lock washer, 1/2".	...	...	4
.....	Washer, 17/32" I.D. x 1" O.D	...	...	4
35428 D	Drive pinion oil seal.	...	...	1

PUMP JACK ATTACHMENTS - Continued

Ref. No.	Description	No. Req'd. for Attachment		
		30732 DB	36110 D	35460 D
35429 D	Skid brace	...	...	1
.....	Square head bolt, 1/2" N.C. x 1-1/8"	...	...	2
.....	Hex. nut, 1/2" N.C.	...	...	2
.....	Lock washer, 1/2".	...	...	2
35430 DA	Crank gear shaft bushing	...	...	2
35432 DX	Body brace assembly, with cover.	...	...	1
.....	Cap screw, 1/2" N.C. x 1-1/4".	...	...	1
.....	Square head bolt, 1/2" N.C. x 1-1/4"	...	...	1
.....	Hex. nut, 1/2" N.C..	...	...	1
.....	Lock washer, 1/2".	...	...	2
.....	Cap screw, 5/16" N.C. x 3/4"	...	...	4
.....	Lock washer, 5/16"	...	...	4
35433 D	Shifter fork shaft	...	...	1
35434 D	Gear housing filler plug (3/4").	1	1	1
35435 D	Idler gear shaft	...	...	1
35436 D	Gear housing cover gasket.	...	...	1
35437 D	Clutch throw-out lever	...	...	3
35438 D	Clutch throw-out lever pin	...	...	3
.....	Cotter, 3/32 x 5/8".	...	...	6
35439 D	Clutch pawl.	...	...	3
35440 D	Clutch pawl spring	...	...	3
35441 D	Pitman pin	...	...	2
.....	Hex. jam nut, 7/8" N.F.	...	...	2
.....	Lock washer, 7/8".	...	...	2
.....	Washer, 1-9/32" I.D. x 2" O.D.	...	...	2
.....	Cotter, 3/16" x 1-3/4"	...	...	2
35442 D	Pitman	...	...	2
.....	Wagon box head rivet, 1/4 x 2-5/8"	...	...	2
.....	Washer, 17/64" I.D. x 5/8" O.D.	...	...	2
35443 D	Idler gear bushing	...	...	2
35444 D	Camshaft oil seal.	...	...	1
35450 D	Crank arm key (Woodruff No. 22).	...	...	3
35451 D	Crank gear shaft oil seal.	...	...	2
35798 D	Clutch spider key.	...	...	1
36096 DX	Body brace with cover.	1	1	...
.....	Square head bolt, 3/8" N.C. x 1"	1	1	...
.....	Hex. nut, 3/8" N.C.	1	1	...
.....	Lock washer, 3/8".	1	1	...
.....	Cap screw, 5/16" N.C. x 3/4"	4	4	...
.....	Lock washer, 5/16"	4	4	...
36097 D	Skid brace.	1	1	...
.....	Square head bolt, 3/8" N.C. x 1"	2	2	...
.....	Hex. nut, 3/8" N.C.	2	2	...
.....	Lock washer, 3/8".	2	2	...
36098 D	Camshaft oil seal.	1	1	...
36099 D	Gear housing gasket.	1	1	...
36100 D	Crank gear shaft	...	1	...
36101 D	Clutch pawl.	...	3	...
36102 D	Clutch pawl spring	...	3	...
36103 D	Clutch throw-out lever	...	3	...
36104 D	Clutch throw-out lever pin	...	3	...
.....	Cotter, 3/32 x 5/8".	...	6	...

PUMP JACK ATTACHMENTS - Continued

Ref. No.	Description	No. Req'd. for Attachment		
		30732 DB	36110 D	35460 D
36105 D	Shifter fork shaft	...	1	...
36106 D	Idler gear shaft	1	1	...
36107 D	Idler gear bushing	...	2	...
36108 D	Gear housing "U" bolt	2	2	...
.....	Hex. nut, 7/16" N.C.	4	4	...
.....	Lock washer, 7/16"	4	4	...
.....	Washer, 1/2" I.D. x 7/8" O.D.	4	4	...
36109 D	Clutch spider key	...	1	...
36861 D	Crank gear shaft	1	...	...
37331 D	Crank gear bolt	1	...	...
.....	Hex. nut 1/2" N.F.	1	...	...
.....	Lock washer, 1/2".	1	...	...
37331 DX	Crank gear bolt with nut and washer	1	...	...
37530 D	Crank arm bolt	...	...	4
.....	Hex. nut, 5/8" N.F.	...	...	4
.....	Lock washer, 5/8".	...	...	4
37530 DX	Crank arm bolt with nut and washer	...	...	4
37531 D	Crank arm bolt	4	4	...
.....	Hex. nut, 1/2"	4	4	...
.....	Lock washer, 1/2".	4	4	...
37531 DX	Crank arm bolt with nut and washer	4	4	...
M 22440	Crank gear shaft oil seal (in gear housing)	1	1	...
M 22440	Crank gear shaft oil seal (in gear cover)	1	1	...
7699 TM	Idler gear shaft key (Woodruff No. 5)	1	1	1
.....	Pipe nipple, 3/8 x 7" (engine crankcase oil drain) (for 3 to 5 HP only)	...	...	1
.....	Pipe nipple, 3/8 x 6" (engine crankcase oil drain) (for 1-1/2 to 2-1/2 HP only)	1	1	...
.....	Street elbow, 3/8" (engine to crankcase oil drain)	1	1	1
.....	Pipe cap, 3/8" (engine crankcase oil drain)	1	1	1

SPECIFICATIONS

	1½ to 2½ H.P.	3 to 5 H.P.
Horsepower (at engine speed of 600 R.P.M.)	1½	3
Horsepower (at engine speed of 1000 R.P.M.)	2½	5
Bore	3⅛"	4"
Stroke	3¼"	4⅛"
No. of cylinders	1	1
Engine speed	600 to 1000 R.P.M.	600 to 1000 R.P.M.
Flywheel size	14⅝" dia., 1⅞" face	17⅛" dia., 2⅛" face
Magneto—high tension, rotary type	IHC Type "H-1"	IHC Type "H-1"
Spark plug (optional)	Champion No. 1 Commercial or A.C. 77	Champion No. 1 Commercial or A.C. 77
Pulley (standard)	6" dia., 5" face	8" dia., 5" face
Pulley sizes (furnished as ordered)	3" to 14" dia.	3" to 14" dia.
Pulley speed	300 to 500 R.P.M.	300 to 500 R.P.M.
Water hopper—capacity	2¼ U.S. gallons	4 U.S. gallons
Fuel tank—capacity	1⅛ U.S. gallons	2 U.S. gallons
Lubricating oil—capacity	2 U.S. pints	3 U.S. pints
Length overall	28"	33½"
Width overall	16 13/16"	19 3/16"
Height overall	17⅞"	20¾"

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