

## 6-TON MONARCH TRACTOR

### MODEL "H"

## LUBRICATING INSTRUCTIONS

### MOTOR

All motor bearings are supplied with oil from a pump located in the bottom of the crank case, and the oil for this pump is drawn from a reservoir in the base of the crank case. There is an oil pressure gauge at the base of the steering column, which indicates that the general oiling system of the motor is functioning properly, when this gauge shows a pressure of not less than 20 lbs. The operator should observe the oil pressure from time to time during the day's operation, and if the gauge shows very low pressure or none at all, the motor should be immediately stopped and an investigation made to determine the reason why the gauge does not indicate pressure. Oil for the general lubrication of the motor is replenished through a filler pipe located on the left hand side of the motor. The oil in the crank case should be changed at least once for every six day's operation. Once for every month of operation the crank case should be thoroughly washed out and the oil screen surrounding the pump should be thoroughly cleaned. When refilling the crank case use 5 gallons of a good grade of motor oil. The kind of oil to be used should have a minimum flash of 400° F.; a minimum fire test of 475° F ; with a low cold test viscosity 65-80 seconds at 210° F. and 80-100 for summer. No special trade names of oils are recommended but there are a number of good oils which meet with the above requirements, and which may be used. An oil gauge rod is located at the left-hand side of the crank case. This may be removed for testing the depth of the oil. The oil should not be higher than the high mark on the rod, nor lower than the low mark. To properly use this rod, it should be removed and wiped off with a clean rag, then inserted and removed again to correctly read the depth of the oil. In addition to the general lubrication of the motor as described, there are two grease cups located on the water pump, which should be filled and screwed down every day the tractor is operated. The governor drive should be oiled with a medium engine oil at least once a day.

### TRANSMISSION

The transmission case contains 2 gallons of lubricating oil. It is filled through a stand pipe which is accessible by removing the cushion from

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the seat. An oil gauge rod is located in the center cover of the transmission case. The oil in the transmission case should not be lower than the ~~LOW~~ mark on the gauge rod and should not be higher than 1-1/2" over the low mark on the gauge rod. The tractor operator should ascertain the level of the oil in the transmission case by means of this gauge rod at least twice a day; in the morning before starting and after the tractor has stood idle during the noon hour. The oil should not be measured only after the tractor has stood idle long enough to allow the oil to settle in the case. All bearings in the transmission are lubricated by splash from the supply of oil put into the transmission case with the exception of the two bearings on the steering clutch shaft, which are just behind the upper chain drive sprockets. These two bearings should receive for every day's operation not more than 1 or 2 ounces of the same kind of oil as used in the transmission. This oil can be put into the bearings by means of the oil gun when the pipe plugs have been removed. Care should be used so that these bearings do not receive an excessive amount of oil as it might collect in the steering clutches. After oiling, care should be taken to screw back the pipe plugs firmly. The regular oiling of these two bearings is very important. Such an oil should be used in the transmission as will measure up to the following specifications: an oil with a viscosity of 150 to 200 seconds at 212 ° F., for summer and for winter an oil with a viscosity of 100 to 150 seconds at 212 F., A good grade oil of this nature will flow satisfactory at temperatures of 40° to 50° F.

## REAR SPROCKET ASSEMBLY

The rear sprocket assembly bearings are lubricated from a supply contained in the reservoir in the hub between the two sprockets. The reservoir, if filled, with approximately three pints of the same kind of oil as used in the transmission, should properly lubricate these bearings for a period of one week. The reservoir is filled through pipe plugs which will be found in the sprocket hub. This reservoir is filled by means of the oil pump which accompanies the tractor. On later tractors this pipe plug will be found at the outer end of the sprocket shaft.

## FRONT SPROCKET ASSEMBLY

The front sprockets should be oiled at intervals of one week, in the same manner as described for the rear sprockets.

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## TRUCK WHEELS

Each truck wheel is mounted on two Hyatt roller bearings, one at each end of the shaft. These bearings are lubricated from oil reservoirs contained in the journal or bearing box. The oil reservoir should be filled up, when the tractor starts operation, with the same grade of oil as described for the transmission, which is adequate for about two weeks of normal operation of the tractor. However, it may be well to inspect the oil level carried in these journal boxes twice a week. Oil is put into these bearings through stand pipes provided for each bearing. These stand pipes are closed by means of a pipe cap. When oiling or inspecting these bearings, care should be taken that the pipe caps are replaced and screwed down tight. It should be especially noted that each truck wheel has a bearing on the outside and also on the inside of the truck roller frame, and the operator should not neglect to oil the inside bearings. Special care should be taken in connection with the inside bearing of the rear truck wheels. This bearing has a horizontal pipe about 20" long leading to it, and therefore in filling the bearing the operator must give the oil time to run down this horizontal pipe. Otherwise he might only fill the pipe and not fill the oil reservoir.

## TRACK SUPPORTING ROLLERS

The track supporting rollers are lubricated from oil reservoirs contained in the bracket carrying the rollers. These oil reservoirs should be inspected once a day and, if necessary, filled with heavy engine oil. Under normal operation one filling a week is sufficient. Care should be taken to replace the pipe plugs through which the reservoirs are filled so that they are tight.

## STEERING CLUTCH THROW-OUT BEARINGS

The steering clutch throw-out bearings are lubricated by means of pipes coming up through each of the two side covers on top of the transmission case. Approximately one ounce of medium engine oil should be placed in these bearings every day.

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### PIVOT AXLE

The pivot axle is provided with grease cups, one on each side. These should be screwed down and filled up at least once for every six days the tractor operates.

### MAGNETO - GENERATOR

Lubricating instructions for the magneto, generator and starting motor will be found in the instruction books for these units which are sent with each tractor.

### DRIVE CHAINS

Oil under certain conditions applied to the drive chains will add to the life of them if the tractor is operating under conditions where mud, sand or other dirt does not continually come in contact with the chains. The chains will be benefited by an application of oil with a brush or swab once or twice a day. If, however, the tractor is operating under conditions where the chain is being continually covered with dirt or sand, then the application of oil is not beneficial. Where conditions permit, it is recommended that the drive chains be removed from the tractor about twice a month, thoroughly washed in kerosene, and then immersed in a lubricant of three parts of tallow to one part of graphite and replaced. If such lubricant is not available, use a good grade of engine oil. This procedure will add materially to the life and efficiency of the chains.

### DRIVE CHAIN HOUSINGS

The drive chains are protected by means of suitable housings which prevents mud, rocks and other foreign material from obstructing the operation of the drive chains and becoming lodged between the chain and the teeth of the sprocket. Each housing consists of two halves bolted together at the front and rear. On top of each housing will be found an inspection plate held in place by means of two cap screws which can be removed to inspect and oil the chains when necessary. At the bottom of each housing is a slot approximately 2" wide and 6" long, which will allow dirt and sand to escape from the housings should such foreign matter gain entrance to them.

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To remove these housings it is only necessary to remove the bolts and nuts at the end of each housing which secure it in position. The upper half may then be removed by lifting it out and the lower half can be taken out from below.

In making reinstallation of these housings they should be carefully replaced so that they will line up in such a position that the operation of the sprockets and chains will not be obstructed.

## GENERAL OPERATING INSTRUCTIONS AND ADJUSTMENTS

In preparing the tractor for service, regardless of the condition in which it is received, the first duty of anyone charged with its care and operation, is to give the tractor a detailed inspection.

Make sure that the tractor has been thoroughly lubricated.

Examine the crankcase to determine the amount of oil present.

Read the instructions under this heading carefully.

Be sure that the radiator is filled with pure, clean water, free from all dirt or sediment. Water with lime or other alkaline impurities is not to be used. Rain water that is clean is better.

Fill the fuel tank, making sure that there is no presence of dirt or water in the fuel. If there is reason to believe that it contains any impurities, strain it before filling the tank.

## STARTING THE MOTOR

Determine first of all that the gear shift lever is in neutral position. Before attempting to start the motor, for the first time, the spark plugs should be removed and a small quantity of cylinder oil should be injected into each cylinder, about a quarter of a pint for the four cylinders.

Then crank the motor over slowly a few times. This will replace the oil film on the cylinder walls and make starting easier. Open the priming cups and inject about a tablespoon full of gasoline into each priming cup. Do not overprime, as excess priming tends to wash away the oil film on the cylinder walls and dilutes the oil in the crank case.

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Turn the magneto switch key so that it will be in the "on position", pull the throttle control lever about one-third back on the quadrant, then turn the motor over either by hand or with the electric starter. As soon as the motor starts, set the throttle to a position on the quadrant where the motor will run at a fair rate of speed. Allow it to run this way long enough to become thoroughly warmed up before operating under load. Be sure that the oil and water are circulating before starting the tractor.

### DIFFICULT STARTING

Difficult starting can generally be traced to the following causes:

- Magneto switch key not in place.
- Magneto breaker points out of adjustment.
- Broken spark plug wires.

Fouled spark plugs or points not properly adjusted, adjust to not less than  $1/64$ " and to not more than  $1/32$ ".

#### Carburetion:

- Carburetor out of adjustment
- Overprimed motor
- Leaks above the carburetor

Leaks may exist in the throttle valve shaft, carburetor, around the intake valve gasket, or around the intake valve stem guides.

In case of overpriming, crank the motor over a reasonable number of times with the priming cups open. This will work out the excessive amount of fuel. Clean the gasoline lines out by putting them under air pressure.

### LACK OF COMPRESSION

Valves not closed properly, caused by insufficient clearance between rocker arms and push rods.

Dirt or carbon on valve seats.

Valve stems sticking in guides.

Piston rings worn, broken or stuck in piston grooves.

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## OVERHEATING OF MOTOR

Overheating of the motor is generally traced to clogged water passages, due to dirty water, causing a sludge to accumulate in the cooling system. To remove this sludge fill the radiator with boiling water, adding six pounds of common washing soda; let this solution stand for about twelve or sixteen hours, after which it should be drained, flushed and filled with clean water.

If overheating is caused from the carburetor being out of adjustment, the instruction book furnished by the manufacturer of the instrument and which will be found in the tool box, should be closely studied and adjustments made accordingly. This also applies if the magneto is found to be at fault.

Carbon deposits in the motor will also cause overheating, and these deposits are generally found to exist from the use of oil that has the incorrect body or viscosity, or may be traced to the oil level being carried too high, resulting in over lubrication.

## STEERING

Steering of the tractor is effected through the use of steering clutches, one on each side of the tractor, working in conjunction with the transmission.

In steering the tractor in any given direction, turn the hand steering wheel in the direction to which the turn is to be made. If a short turn is to be made apply the foot brake according to the shortness of the turn desired.

## DRIVING THE TRACTOR

After the motor has been thoroughly warmed up, and the tractor is ready to move forward with its load, the master clutch lever should be pushed forward far enough so that it will disengage the master clutch and thus keep it from turning while the gears are being shifted into proper position. The next step is to shift the gears into the position desired. Viewed from the operator's seat, gear shifting is accomplished as follows:

To the right and forward engages the low speed gears

To the right and back engages the second speed gears

To the left and forward engages the high speed gears.  
To the left and back engages the reverse speed gears.

In case the gears do not engage readily and a grinding noise is discovered, engage the master clutch gently. This will change the relative position of the teeth on the sliding pinion with those on the mating gear, and allow them to slide between each other. By no means should an attempt be made to shift gears while the tractor is in motion. The reason for this is due to the fact that the tractor stops as soon as the clutch is released, especially when pulling a load, and an attempt to shift gears under this condition might result in breaking or chipping of the gears.

#### THE BRAKES.

The foot pedal brakes are used not only as an aid to steering, but also to retard the motion of the tractor or to hold it in position. If it is desired to slow up the motion of the tractor, or bring it to a stop, both foot pedals may be used. The brake pedals are equipped with ratchets which are used to lock the brakes. Never drive the tractor with the feet resting on the pedals, as this will cause the brake bands to drag on the steering clutch drums, which will not only decrease the power but also generate heat in the steering clutches, to such an extent that early replacement will be necessary.

#### THE MASTER CLUTCH

When wear occurs so that the master clutch does not hold, the necessary adjustment may be made as follows:

With the clutch engaged, turn the motor over until the spring adjusting plunger is accessible. Pull back the adjusting plunger and turn the clutch adjusting collar to the right which will tighten it. A series of holes are spaced around the clutch floating plate and the adjusting plunger must fit into one of these holes when the proper adjustment is obtained.

Should it become necessary to install new friction discs or other parts contained on the inside of the clutch proper, the radiator will have to be taken off and the motor will have to be uncoupled and moved forward far enough to get the clutch out. When the motor has been moved forward far enough it will free itself from the clutch driving pins. These pins are bolted to the fly-

wheel from the back side. After the motor has been moved forward it will be seen that there is a large nut on the end of the clutch shaft; remove this nut and take off the four nuts in rear of the clutch that secures the clutch sliding sleeve assembly to the clamp plate on the clutch sleeve yoke. The clutch can then be taken off as a complete unit. The master clutch consists of the following groups assembled on the clutch shaft, in the order following:

Sliding Sleeve Assembly  
Adjusting Yoke Assembly  
Driving Plate Assembly

Care must be taken, when any of the parts are removed, that they may be reassembled in the same relative position as before removal, to prevent wrong installation, for if they are installed wrong the cost of the new parts and the labor in putting them in might be wasted. Be sure that the pilot bearing in the flywheel is in good condition and well lubricated before the master clutch is replaced and the motor coupled up.

#### THE DRIVE CHAINS

The Drive chains are made of the very best material possible to obtain and will give very satisfactory service if the following instructions are carefully carried out:

To disconnect the chain, the cotter key is removed and a roller and connecting link taken out. Adjustment of the chains is effected from the pivot axle and eccentrics which are located one on each side of the transmission case. When adjustment of the chains is necessary, remove the two  $5/8$ " cap screws that retain the eccentric locks in position. These locks will be found just above the pivot axle bolted to the transmission case, by application of the chain adjusting wrench furnished with the tool equipment. Turn the pivot axle in an anti-clockwise direction (viewed from the left-hand side of the tractor) until the chain is tight, being sure to replace the lock and cap screws after the adjustment has been made. In case this does not tighten the chain sufficiently, a connecting link and roller link will have to be taken out and replaced with an off-set link which will shorten the chain. The chain should be inspected frequently and at fixed dates they should be removed and cleaned with either gasoline or kerosene

and new parts replaced where needed. After the chains have been inspected and repaired, dip them in a melted lubricant consisting of three parts of tallow to one of graphite, being sure to have the lubricant warm enough to insure a perfect coating. The links should be worked back and forth to permit the melted lubricant to work inside the bearings. After the lubricant has "set", wipe off the surplus and replace the chains, being sure to secure the proper alignment of the upper and lower chain sprockets as instructed under the heading of the rear axle and sprocket. If a lubricant as described above is not available, a good grade of engine oil may be used. (See Drive Chain Housings Page 4)

#### THE EQUALIZER BAR

The equalizer bar assembly provides the correct flexibility of the truck units, and also distributes the weight of the front end of the tractor to the front of the truck frames. The construction of the equalizer bar is such that the truck units and track may conform to the surface of uneven ground without disturbing the position of the main frame or placing strains upon it. With this arrangement either track is free to conform to the unevenness of the earth because of the action of the equalizer bar on the king pin. Under operating conditions of this kind the equalizer spring bar remains in a level position at all times, thus the frame of the tractor remains undisturbed. Each end of the equalizer bar carries a ball joint that rests in the socket on the truck frame and which is held in place by means of a cap and four cap screws. To disassemble the equalizer bar assembly, proceed as follows:

With the weight of the tractor resting in a normal position, remove the two cotter keys and nuts from the end of the bolts that extend through the equalizer springs and brackets, then jack the front end of the tractor up so that the weight is barely taken from the king pin. The cotter keys that hold the king pin in position may now be removed and the king pin slipped out of place. This will allow the spring bar to drop down and be taken out. The equalizer springs and bolts can now be removed. It may or may not be necessary

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to remove the equalizer spring brackets, as there is enough room between the lower crank case and the spring to allow it to pass through. If the brackets are to be removed, it will be necessary to remove the four bolts and the nuts which secure each spring bracket to the main frame. The caps that retain the ball joints on the ends of the equalizer bar to the truck frame are next to be taken off, after which the bar may be lifted out of the sockets and removed. In reassembling this bar be sure to clean all of the old grease from the sockets and pack with new. A good grade of cup grease with a heavy body will be satisfactory.

## STEERING DOWN STEEP GRADES

In steering down a steep grade with the load pushing the tractor, the method of steering is entirely opposite from that normally employed, for example:

If it is desired to make a turn toward the right, the steering clutch on the left-hand side or on the outside of the turn is released and the engine being connected with the right-hand track acts as a brake retarding its progress, while the track on the outside of the turn is free to travel faster, thus describing the circle or the turn desired.

## ADJUSTING THE VALVES

Provision for adjusting the valve stems and rocker arms is made by a set screw and lock nut directly over the push rod on the rocker arm.

A clearance of .010 to .015 thousandths of an inch should be maintained between the valve stems and rocker arms at all times, in order to obtain the very best results from the standpoint of power. The feeler gauge on the magneto breaker point adjusting wrench is about the correct thickness and may be used.

This is accomplished by loosening the lock nut, and by placing a screw driver in the slot cut in the head of the set screw and turning it down until the correct clearance between the valve stem and the rocker arm is obtained. The head of the cam on the camshaft

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must be pointing down so that the valve is properly seated and not holding open before the adjustment can be made. The best results will be obtained by making this adjustment while the motor is hot, or better still, if they are made with motor idling at slow speed.

Lubrication of the rocker arms and valves is provided by pipes leading from the motor oil pump.

## OIL PRESSURE ADJUSTMENT

Adjustment of the oil pressure relief valve is obtained by changing the tension on the spring in the relief valve.

If the oil pressure gauge shows that the oil pressure is too low, do not change the adjustment until it has been definitely determined that the low pressure is not due to loose bearings, thin oil or dirty oil screen, dirt in the oil line or other causes not controlled by adjustment of the oil relief valve. Shims in the main bearing and connecting rod wearings must fit close against the crank shaft to maintain oil pressure.

When assured that the above causes are not at fault, the oil pressure may be increased by loosening the adjusting plug lock nut and turning the adjusting plug to the right. This will increase the tension on the relief valve spring. This adjustment will be found mounted on the cylinder head and is accessible by removing the plug on the cylinder head cover.

## REMOVING THE OIL PUMP

The oil pump bracket is bolted to the lower flange on the upper crank case and extends downward to the lowest part of the oil reservoir. It is not necessary to disturb the oil pump to drop the oil pan or lower crank case, but in order to remove the oil pump, the lower crank case and oil pan must be dropped. The oil pump may then be removed by taking out the cap screws which secure it to its position.

## THE WATER PUMP

Normally the water pump will need little attention, except the adjusting of the packing glands, which need to be tightened from time to time. Packing glands are provided at the front and rear of the pump to prevent leakage of water around the pump shaft. The water pump glands are packed with an oil and graphite soaked hemp. If water leaks from these glands when the engine is idling, air will be drawn into the

circulating system when the motor is in operation. In repacking or tightening these glands, remember that the one in front of the pump has a right hand thread, while the one in the rear has a left-hand thread.

### THE TRANSMISSION

For the purpose of discussion the transmission group will be subdivided into the following sub-assemblies:

- A-The sliding gear shaft and change speed gears
- B-The bevel pinion shaft and its gear.
- C-The reverse idler gears and shaft.
- D-The bevel gear and shaft.
- E-The steering clutches.

Power is transmitted from the motor through the master clutch and master clutch shaft to the change speed shaft and gears, the master clutch and the change speed shaft being connected by means of a suitable coupling which is held together by 6-1/2" bolts and nuts with cotter keys. The sliding gear shaft being connected to the master clutch shaft transmits the power to the bevel pinion shaft for all speeds, when one of the sliding gears is engaged with the corresponding gear on the bevel pinion shaft. The sliding gear shaft extends out at the rear of the case, far enough to allow a power pulley to be installed when desired.

### THE BEVEL PINION SHAFT ASSEMBLY

The bevel pinion shaft receives power from the change speed shaft when the mating gears are engaged, and thus transmits power to the bevel gear for all speeds, through a bevel pinion which is a tapered fit, keyed to the forward end of the bevel pinion shaft, and held in position by means of a nut and cotter key. This bevel pinion is constantly in mesh with the bevel gear. The bevel pinion shaft, like the sliding gear shaft, is mounted on heavy duty ball bearings.

### THE REVERSE IDLER

The reverse idler gear and shaft are located at the side of the transmission case between the sliding gear and bevel pinion shaft assemblies. The purpose of this group is to impart a reverse direction of rotation to the bevel pinion shaft.

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## THE BEVEL GEAR

The bevel gear is located at the forward end of the transmission ahead of the sliding gear shaft and bevel pinion shaft. This gear receives its power from the bevel pinion and the bevel pinion shaft and delivers it to the driving members of the steering clutches. There are two bronze nuts on the inner side of the bevel gear through which an adjustment can be made. Both of these nuts have right hand threads and are locked in position by means of a large washer which is hammered into the slot on the nut after the correct adjustment has been obtained. In case it becomes necessary to bring the bevel gear more fully into mesh with the bevel pinion, the outer nut is loosened and the inner nut is tightened. Then the outer nut is tightened and both locked into place as explained above. In order to determine if the proper adjustment has been obtained, take a piece of heavy weight paper and insert this paper between the teeth of the bevel pinion gear, and then by means of a wrench attached to the nut on the rear end of the sliding gear shaft, turn the gears around until this piece of paper has been entirely taken through the bevel pinion and bevel gear and deposited in the bottom of the transmission case. Upon examination of this paper, you will find that the teeth have either chewed it up badly, or else they have not made any impression whatever. In either case the adjustment is not proper and it should be adjusted until the imprint of the outside diameter of the teeth are perfectly visible on the paper. In this case the paper may be slightly cut on the inner edges. When such an adjustment is obtained, the bevel gear and pinion are in proper adjustment. However, this adjustment may be entirely disturbed by drawing the bronze lock nut up too tightly. Therefore, care should be exercised.

## DISASSEMBLING THE TRANSMISSION

To disassemble the transmission or the above groups, the following instructions must be carefully observed.

The steering column, seat, and center transmission cover assembly are to be removed, then the motor is uncoupled from the master clutch and moved forward as far as possible. The master clutch may then be removed as outlined under that heading. To remove the sliding gear shaft and gears, take off the nut on the rear end of the clutch control rod and slide the rear control rod guide back.

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The clutch control rod with the yoke may then be removed through the top of the case as a unit. The 6-1/2" bolts, nuts and cotter keys are now taken from the coupling that connects the master clutch and sliding gear shaft. The master clutch shaft may now be pushed forward and pulled out through the top of the case. Next remove the large nut and cotter key from the inner end of the sliding gear shaft and then the cap of the rear end outside of the transmission case. It might be necessary to use a little force on the retainer. However, it should not be very hard to remove. The sliding gear shaft may now be pushed out through the opening, together with the bearing and its retainer, and thus the gears are lifted out through the top of the case.

### REMOVING THE REVERSE IDLER

To remove the reverse idler and its gears, take off the end cap at the rear of the transmission case. Then take a soft metal bar about 18" long, placing it against the front end of the shaft, tap lightly and the shaft will come out through the opening at the rear end of the case. It is possible to take this shaft out without disturbing the sliding gear shaft or bevel pinion shaft assembly. However, the shaft only can be removed as its gears will not pass the gears on the sliding gear shaft.

### REMOVING THE BEVEL PINION SHAFT

In order to remove the bevel pinion shaft assembly, it is possible to do so without disturbing the large bevel gear, but it might be found necessary in some cases to take out the bevel gear. If such is the case, instructions for the removal of the steering clutches should be followed. It is first necessary to remove the cotter key and nut that retains the small bevel pinion to the end of the bevel pinion shaft. Then take off the cap and spacers at the rear end of the transmission case. Then by tapping the shaft at the forward end, or by means of exerting pressure against it with a pry bar, the shaft may be forced out through the opening at the rear end of the case, together with its bearing retainer

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and bearing. During this process revolve the shaft so that it will not bind.

If the entire transmission has been dismantled, the method of reinstallation of the various units is somewhat different from their removal, in that they are installed in the following order:

First the bevel pinion shaft assembly, then the reverse idler sliding gear shaft assembly, large bevel gear, and so on until the entire transmission has been completed. It is very important that care be used in the reassembling in order that the transmission will function properly after it has been completed. Any gears removed from the shafts must be replaced in the same position as before they were removed, otherwise the transmission will not function and the work will have to be gone over again.

An inexperienced mechanic should not attempt to do this work, except under the guidance of one who is familiar with it and knows what steps to pursue at all times.

Lubrication of the transmission is effected entirely by gear bath and splash. The bevel gear, change speed gears, reverse idler and bevel pinion shaft gears are all lubricated in the same manner. The oil is carried from the bevel pinion shaft assembly to the reverse idler and change speed gears, then to the rear compartment of the case containing the bevel pinion and bevel gear.

The oil that must be used in the transmission to lubricate the gears and bearings is a heavy oil (see general lubricating instructions). Under no condition must a mixture of cup grease and cylinder oil or semi-fluid compound of any nature be used. The use of graphite oil or similar substances are not recommended. In winter where extremely low temperatures are encountered, it may be necessary to use a lighter bodied oil in order that the oil will not congeal or turn to a semi-

solid, because under these circumstances oil will not be splashed to the upper part of the case, and improper lubrication will result.

Transmission oil in continuous use will deteriorate, due to heat generating in the oil by friction of the gears and bearings and by the internal friction of the oil itself caused by the churning action of the gears. Any minute particles of dirt and grit that may be admitted to the transmission case when replenishing the oil supply, will be held in the oil. An undue amount of wear on the bearings and gears of the transmission is a direct indication that the operator has not been careful to keep the oil supply clean.

There are two drains located on the bottom of the transmission case. The transmission should be drained and washed every twenty days of operation. In doing this, drain all the old oil out and put about three gallons of kerosene in the case. Then operate the tractor for three minutes in low gear, after which the kerosene may be drained and two gallons of the quality of oil prescribed put in. Be sure that the drain plugs are screwed securely in place before putting in the fresh oil. Under no circumstances should the oil level be carried too high, as this will cause heat to be generated very rapidly due to internal friction caused by gears churning the oil. A transmission with the correct oil level will heat a very few degrees above normal.

### THE STEERING CLUTCHES

To remove either of the steering clutches it will first be necessary to loosen the track to a point where it may be blocked up high enough to allow the clutch being removed to pass under it. Instructions for the adjustment of the track will be found under another heading. The track supporting roller and spring may also be taken off so that the work can be done more easily. The track may also be disconnected if found desirable. However, it may be accomplished without this operation. If the clutch is to be completely disassembled, following is the order in which the parts and assemblies are removed:

Take off the steering column and remove the steering clutch throw-out yoke which is located in the pocket below the base of the steer-

ing column, also remove the steering clutch throwout plugs and adjustable push rods. Next remove the side cover plate on the side from which the clutch is to be taken out. If both clutches are to be disassembled, these plates can be taken off successively on either side. In turn, the clutch throwout rods and clutch throwout yokes can be removed, the chain guard and drive chains, also the upper drive chain sprocket. Take out the cap screws that retain the clutch cover plate to the case, and the cover plate together with the bearings and seals can be removed. The clutch can now be taken out as a unit with the exception of the steering clutch inner hub.

There will be found in the tool equipment four studs. These studs should be screwed in the clutch pressure plate. Nuts are then placed on these studs and screwed down so that they engage with the steering clutch hub and hold the pressure of the steering clutch springs. The screws which secure the steering clutch hub can now be taken out and the clutch hub, together with the shifter and pressure plate, can be removed as a unit. The steering clutch discs are now exposed and can be removed. These discs and all other parts working in conjunction with the discs must be thoroughly cleaned with gasoline and be allowed to dry before they are reassembled.

In case new lining is to be installed in the inner discs, be absolutely sure that the heads of the rivets are hammered down so that they will not extend up far enough to allow pressure to come against their heads. The steering clutch inner hub can now be removed from the shaft through the use of the 5/8 tapped puller hole located in this hub. The parts removed up to this point and the process is similar on both sides of the tractor, except that on the right side the seal plate and ball bearing must be removed, while on the left side the seal plate and bearing retainer, with its bearing, will have to be taken out, leaving in the case only the bevel gear with the shaft and washers. At this point the bevel gear shaft and washers may also be removed if it is found necessary to do so.

When the removed parts are ready for reinstallation, they should be replaced in the same relative position to each other as before their removal. Otherwise they will not work normally, and perhaps not at all, which would make it necessary to do the work over.

In assembling the hubs to the shaft, the three springs which work on the inner seal must be inserted and the pipe plugs should be screwed down tight, so that there can be no leakage of oil and so that they will not work out of place. Before assembling the Hyatt bearings, they should be thoroughly packed in cup grease.

The steering clutch assembly cannot be installed as a unit, and following is the order in which the component parts are assembled:

The steering clutch ring gear with its back pressure plate is slipped over the hub and back as far as possible. The clutch discs are assembled as shown - on the illustrations of the steering clutch assembly. Care must be taken that each plate is located in its proper place and that the outer and inner plate be in proper relation to each other.

The steering clutch hub, together with its relating parts, providing it has not been disassembled, is returned to its place by centering it over the pilot bearing. This hub must be held in place against the clutch plates, while the screws are being replaced, the reason for this being that the outside clutch disc must be in mesh with the teeth on the inner circumference of the hub. The remaining parts are assembled in the same general rotation as before removal. After the entire arrangement has been assembled, it is very important that the clutch throwout screws are properly adjusted. It is desirable to do this before attaching the steering column. They should be adjusted so that the clutch throwout arm, which is in the pocket below the base of the column, stands in a mid-position and has from  $1/16$ " to  $1/8$ " clearance between the ends of the throwout plugs. This will give an equal action of the throwout cam in controlling the right and left-hand clutch.

The track supporting roller and track may now be adjusted or replaced to their proper position.

## THE REAR AXLE AND SPROCKETS

The rear axle and sprocket assemblies are the means by which power is transmitted to the track. The sprockets, both chain and track, are of the ring type, heat treated and fastened to the sprocket hub by the use of the 3/4" bolts 2-1/2" long with nuts and cotter keys on the outer side of each sprocket. The hub is of one piece construction and carries the rear axle, together with the bearings, oil seals and springs. The rear axle rests in the rear axle bracket caps, which are part of the pivot axle bracket. The bearings in which the axle rests are split and the axle is held in place by means of two bearing caps each, and with two bolts.

To disassemble the rear axle and sprocket assembly, the following instructions will be in order:

Disconnect the track and drive chain as outlined under their respective headings. Then remove the bearing caps that hold the rear axle and which are a part of the rear end of the pivot axle bracket. The entire sprocket and shaft assembly may then be removed. Next take out the 6-1/2" cap screws that retain the oil seal cover caps and which are bolted to the sprocket hub, one on each side of the assembly. The cork seals and pressure rings with the oil seals and springs may then be taken out. It will be noted that the pressure ring is keyed to the axle shaft with a #9 Woodruff key, and this key should be preserved unless there is another with which to replace it. The cork oil seals should also be preserved unless they are to be renewed. The bearing retaining rings and Hyatt bearings may now be removed; also the bearing housings and the rear axle thrust collars. The same operations are necessary for each rear axle assembly.

The method of reinstallation is just the reverse from that of disassembling, and care should be used to fit all parts correctly and assemble them in their proper place. The two gaskets which fit between the bearing housing and rear axle cap must not be left out, and if they are mutilated in any way they should be replaced with new ones. The sprocket and its parts at the time of disassembly should be scraped out and the parts washed in gasoline. When the sprocket hubs have been refilled with the grade of grease as called for under General

be securely screwed in place. After ~~the~~ assembly has been put back into the tractor, before the drive chain and track has been coupled up, it will have to be determined if the sprockets are in line. A straight edge that will reach from the lower chain sprocket to the upper one should be obtained. Now place the straight edge against the face on the side of the teeth on the lower and upper chain sprockets. If the straight edge fits flush against the face of the teeth as the lower sprocket is revolved, it may be said that correct adjustment has been made. When the above adjustment has been made, the drive chains and track may be connected.

#### THE FRONT SPROCKETS

The front sprocket assemblies are the means by which the track is received from the track supporting rollers and laid down squarely in front of the truck frames. They also contain the necessary devices for the adjustment of the tracks. Like the rear sprockets, they are of the hub and ring type, heat treated. Both the hub and sprocket ring are bolted together with 10-3/4" bolts with nuts and cotter keys. The hub of these sprockets carry the front sprocket shaft, bearings, oil seals and springs. They are mounted on two brackets which are bolted and clamped to the truck frames by two bolts with nuts and cotter keys. To disassemble the front sprocket completely proceed as follows:

The track must first be disconnected, then remove the nut and lock nut on the front of the track release spring adjusting rod. This will allow the plate to be taken off. Next remove the bolts and nuts that hold the front sprocket brackets to the truck frame, and then the complete assembly may be removed from its position. Next, take off the large nut on the end of the sprocket shaft and the bracket with the track release spring and rod will come off. The left-hand bracket on each sprocket assembly is keyed to the sprocket shaft with a #15 Woodruff key, and care should be used that this key

## OPERATING INSTRUCTIONS AND ADJUSTMENTS

may not be lost or destroyed in removing. After the brackets have been dismantled, the front sprocket cap can be taken off. This is accomplished by the removal of 6-1/2 x 1-1/4" cap screws which hold it in place. The entire oil seal and bearing assembly can now be taken out. This assembly consists of the following parts:

- Oil Seal
- Oil Seal Washer
- Woodruff Key
- Oil Seal Pressure Ring
- Oil Seal Springs and bearings with shims

In reassembling, be sure that all worn parts are replaced with new ones, and also be sure that the parts are replaced in the same relative position to each other as before their removal. After the sprocket has been reassembled, and placed back in its original position and the track connected, care should be used to adjust it strictly in accordance with instructions which will be found under the heading of the Track Assembly

## THE TRACKS

The tracks form an endless chain composed of unit type drop forged track links connected by heat treated steel track pins, carried in hardened steel bushings. Both the bushings and track pins are knurled and are pressed into place by means of a large press. The track links are so constructed that grouser may be used in connection with them, when conditions necessitate their use. The grousers are connected to the track links by the use of U-bolts, nuts and washers. To disassemble the track, proceed as follows:

Disconnect the track at either the front or rear to suit the circumstances, by removing the master pin. This pin can be identified by a small hole drilled in the end of the welch expansion plug. In the center of the track pin, between the bosses on the track links which carry the pin and bushings, will be found a retainer clip which has to be taken off before the pin can be driven out, and

## OPERATING INSTRUCTIONS AND ADJUSTMENTS

the track disconnected. If any of the track links are to be removed from the assembly, the operation of removing the track pins is the same as the removing of the master pin which connects the track, due to the fact that all of the other pins fit in the same manner. These pins are knurled and pressed into the track and can only be driven out in the same way that they were driven in. This can be determined by the position of the steel retainer clip as described above. It will be noted, by examination of the track pin, that the pin has been pressed in just far enough to allow the steel retainer clip to be put on, and that the distance from the track shoe bosses to the retainer clip is less on one side than it is on the other, which indicates that the track pin was pressed in from the side of the shoe on which the narrowest distance between the track shoe bosses and the retainer clip is found. In driving the pin out, place a drift against the end of the track pin on the opposite side of the shoe, and drive the pin back out in the same manner that it was pressed in. Unless there is sufficient slack in the track, it will be necessary to loosen the adjusting nuts on the track release rod to a point where the track may be easily coupled. Tightening and loosening the track is effected by adjusting the nuts on the extreme front end of the track release spring adjusting rod. When making this adjustment, care must be taken that the front sprocket is kept an equal distance between the sides of the truck frame, in order that undue wear on the sprocket teeth and the track may be avoided. The spring on the track tension rod should always be kept at the same tension. This tension is regulated by a nut bearing against the bracket which carries the front sprocket shaft. The nut, to be in correct operating position, should be screwed down the entire length of the thread on the track release adjusting rod. In making adjustment the nut on the extreme front end of the rod should be used and a wrench

should be placed on the opposite end of the track release rod to prevent it from turning and disturbing the position of that nut which bears against the bracket carrying the front sprocket, as this nut is not to be disturbed, nor is it necessary, in making the ordinary adjustments, to do so, due to the fact that it was properly adjusted and set at the factory. When the track tension is adjusted properly, the tracks will not be excessively tight, nor loose, but will operate smoothly. Under no circumstances should the tractor be operated with the tracks too tight.

### THE TRUCK WHEELS

Five truck wheels are provided on each side of the tractor. Each wheel is mounted on Hyatt bearings. The wheels are drop forged and pressed on to a hardened steel shaft. The truck roller bearings are protected from dirt and grit by means of an adjusting seal at each end of the wheel. This seal consists of two cork rings, one on each side, with pressure rings which are actuated by six small springs. The constant pressure against the cork seals forms a perfect oil seal at all times. To remove a truck wheel without uncoupling the track, proceed as follows:

Loosen the track as much as possible and raise one side of the truck frame up by the use of a jack screw. With the truck frame raised and the track loosened it will sag in the center at the bottom. Next place a good size block under the front of the track and one under the rear end. Take off the truck wheel guards by removing the bolts and nuts that hold them in place. Remove the caps from the top of the oil pipes and the U-bolts with nuts that secure the truck wheels to the truck frames. The truck wheels may then be removed. To further dismantle, the assembly is just a matter of removing the component parts from the truck wheel. All removed parts should be thoroughly cleaned before reassembling and all worn parts replaced with new ones. Before assembling the cork seals, it might be well to dip them in oil.

## LIST OF PARTS

25

BEVEL GEAR SHAFT ASSEMBLY

		No. Required	
21227	Bevel Gear Shaft -----	1	BEVEL
21228	Bevel Gear -----	1	GEAR
21229	Bevel Gear Hub -----	1	SHAFT
21586	Flat Countersunk Head Cap Screw 1/2-13 -----	10	ASSEM*
21237	Adjusting Pins -----	6	BLY
21231	Adjusting Nut -----	2	
21524	Lock Washer -----	1	
21232	Lock Washer -----	1	
21234	Spacer -----	1	
21235	Washer -----	1	
	Ball Bearing N.D. #1315 -----	1	
21238	Seal Plate -----	1	
21522	Gasket -----	2	
21239	Bearing Retainer -----	1	
	Ball Bearing N.D. #215 -----	1	
21241	Bearing Retainer Plate -----	1	
21242	Pressure Plate Seal -----	4	
21243	Locating Pin -----	4	
21244	Seal -----	4	
21528	Spring -----	12	
21236	Steering Clutch Hub -----	2	
21526	Oil Ring -----	2	
21306	Key -----	2	
21245	Washer -----	2	
	Hyatt Bearings #210 -----	2	
21525	Washer -----	2	
21308	Nuts -----	2	

BEVEL PINION SHAFT ASSEMBLY

21473	Bevel Pinion Shaft -----	1	BEVEL
	Ball Bearing N.D. #5307 -----	1	PINION
21468	Bearing Retainer -----	1	SHAFT
21251	Bearing Cover -----	1	ASSEMBLY
21462	Shim -----	3	
21463	Shim -----	1	
21464	Gasket -----	2	
21466	Spacer -----	1	
21469	Low Speed Gear -----	1	
21471	Second Speed Gear -----	1	
21472	High Speed Gear -----	1	
21465	Spacer -----	1	
21467	Bearing Adapter -----	1	
	Ball Bearing N.D. 1412 -----	1	
21461	Bevel Pinion -----	1	
21481	Key -----	1	
21221	Hex Nut -----	2	

CANOPY TOPNo.  
Required

21486	Roof Frame (Birch) -----	1
21487	Angle (Right Front) -----	1
21488	Angle (Left Front) -----	1
21489	Angle (Rear) -----	2

CHAIN HOUSING ASSEMBLY - LEFT

21420	Chain Housing Assembly - Left, Consisting of the following parts -----	1	CHAIN HOUSING ASSEMBLY LEFT
21671	Plate Rear Inside -----	1	
21672	Plate Rear Outside -----	1	
21675	Clip -----	5	
21734	Clip -----	3	
21687	Dirt Guard -----	1	
21678	Band Top-Left -----	1	
21682	Clips -----	4	
21684	Band Lower Left -----	1	
21659	Clip -----	3	
21676	Guard Clamp Front -----	2	
21677	Guard Clamp Rear -----	2	
21795	Cover Plate -----	1	

CHAIN HOUSING ASSEMBLY - RIGHT

21430	Chain Housing Assembly-Right, Consisting of the following parts -----	1	CHAIN HOUSING ASSEMBLY RIGHT
21671	Plate Rear Inside -----	1	
21672	Plate Rear Outside -----	1	
21675	Clip -----	5	
21734	Clip -----	3	
21687	Dirt Guard -----	1	
21679	Band Top Right -----	1	
21682	Clip -----	4	
21685	Band Lower Right -----	1	
21659	Clip -----	3	
21676	Guard Clamp - Front -----	2	
21677	Guard Clamp Rear -----	2	
21795	Cover Plate -----	1	

CURTAINS

21566	Side Curtain-Left -----	1	CURTAINS
21567	Side Curtain-Right -----	1	
21564	Front Curtain -----	1	
21565	Rear Curtain -----	1	
21563	Curtain Straps -----	10	
	Murphy Fasteners #10 Machine Screw Base 1/2" Long -----	35	
	Murphy Fasteners Wood Screw Base -----	10	

DIRT GUARD ASSEMBLY - LEFT

21624	Dirt Guard-Left Front -----	2	DIRT GUARD LEFT
21626	Dirt Guard-Left Rear -----	2	
21622	Supporting Angle -----	2	
21618	Connecting Plate -----	2	
21635	Track Support Bracket - Left -----	2	

DIRT GUARD ASSEMBLY-RIGHT

21625	Dirt Guard-Right Front -----	2	Dirt
21627	Dirt Guard-Right Rear -----	2	Guard
21623	Support Angle -----	2	Right
21618	Connecting Plate -----	2	
21636	Front Support Bracket-Right -----	2	

DRAW-BAR ASSEMBLY

21350	Draw-bar Tongue Assembly -----	1	Draw
21458	Draw-bar Coupling Pin -----	1	Bar
21456	Draw-bar Pin (Front) -----	1	
21457	Draw-bar "U" Bolt -----	1	
21459	Draw-bar Pin Clip -----	1	
21340	Draw-bar Support Assembly -----	1	

DRAW-BAR TONGUE ASSEMBLY

21542	Lower Bar -----	1	Draw
21514	Upper Bar -----	1	Bar
21543	Bands -----	2	Ton-
21544	Re-enforcement -----	1	gue
21079	Spacer -----	1	

DRIVE CHAIN

	Drive Chain Baldwin #675-44 pitches -----	2	Drive
	Offset Link Baldwin #675 -----	2	Chain

EQUALIZER ASSEMBLY

	Equalizer Beam Assembly (consisting of the following parts) -----	1	Equal-
21247	Spring Bar -----	1	izer
21377	Pin -----	1	Bar
21206	Spring Seat -----	2	
21371	Spring -----	2	
21378	Ball Spindle -----	2	
21208	Spacer -----	2	
21209	Spacer -----	2	

EQUALIZER BEAM ASSEMBLY

21656	I-Beams -----	2	Equal
21376	Center Plates -----	2	izer
21378	Ball Spindle -----	2	Beam
21641	Spacer -----	2	

MAIN FRAME ASSEMBLY

	Frame Riveted Assembly -----	1	Main
21323	Spring Bracket -----	2	Frame

FRONT SPROCKET ASSEMBLY

		No. Required	
21617	Front Sprocket Shaft -----	2	Front
21492	Front Track Sprocket Ring -----	2	Sproc-
21494	Front Sprocket Hub -----	2	ket
11315	Hex Head Bolts 3/4-16 x 2-1/2 -----	16	
	Castle Nuts 3/4-16 -----	16	
	Cotter Pins 1/8 x 1-1/4 -----	16	
	Timken Bearings #537-532- A -----	4	
21619	Pressure Ring -----	4	
	Woodruff Key #3 -----	4	
17701	Springs -----	24	
21339	Washer -----	4	
21621	Oil Seal -----	4	
21342	Bearing Retainer -----	4	
	Shims .005 -----	4	
	Shims .010 -----	2	
	Shims .020 -----	1	
21344	Bracket Left -----	2	
21345	Bracket Right -----	2	
21308	Nuts -----	4	
	Woodruff Key #15 -----	2	
21654	Plate Clamp -----	4	
21587	Hex Head Cap Screw -----	8	
21369	Springs -----	8	
21669	Bolt -----	4	
21368	Washer -----	4	
21655	Springs -----	4	
21592	Track Adjusting Rod -----	4	
11343	Lock Washer -----	4	
21207	Spacing Washer -----	16	
	Pipe Plug 3/8 Standard -----	2	
21612	Track Release Spring Bracket-Left -----	4	
21613	Track Release Spring Bracket-Right -----	4	
21668	Spring Support -----	4	

FUEL SUPPLY SYSTEM

21495	Fuel Tank -----	1	Fuel
21551	Tank Strap -----	2	Sup-
21552	Anti Rub Strips -----	2	ply
	Shut Off Cock -----	1	
21553	Fuel Line -----	1	
21554	Housing Side Plate (Left) -----	1	
	Fuel Tank Housing -----	1	
21555	Housing Side Plate (Right) -----	1	
21556	Angle Tank Support -----	2	
21557	Housing Top Plate -----	1	
21558	Angle Top Plate Support -----	2	
21559	Dash Plate -----	1	
21561	Hood Ledge (Top) -----	1	
21549	Hood Ledge (Bottom) -----	2	

INSTRUMENT GROUP

21408	Instrument Plate -----	1	In-
	Universal Switch -----	1	Stru-
	Oil Pressure Gauge -----	1	ment
	Choke Push & Pull Type -----	1	Group
21154	Magneto to Ignition Switch Wire -----	1	
11186	Ignition Switch to Ground Wire -----	1	

MASTER CLUTCH ASSEMBLY

21220	Master Clutch Assembly consisting of the following parts -----	1	Master
21219	Clutch Shaft -----	1	Clutch
21246	Key -----	1	
21222	Nut 1-1/2" - 18 U.S.S. -----	1	
21212	Washer -----	1	
21317	Clutch Sleeve -----	1	
	Key Woodruff "A" -----	1	
21213	Clamp Plate -----	1	
21216	Brake Disc -----	1	
21305	Key -----	1	
21215	Seal -----	1	
21318	Seal -----	1	
21331	Seal Retainer -----	1	
21214	Washer -----	1	
21333	Control Rod Guide -----	1	
21589	Guide Pins -----	2	
21332	Clutch Control Rod -----	1	
21334	Clutch Sleeve Yoke -----	1	
21335	Washer -----	2	
21218	Hub Coupling -----	1	
21297	Key -----	1	
21211	Washer -----	1	
21221	Nut -----	1	
21569	Bolts -----	6	
21588	Spring -----	1	
21601	Gasket -----	1	
	Twin Disc Clutch Assembly #7174 Model 2-B-11 $\frac{1}{2}$ Subdivided into the following groups -----	1	
5272	Back Plate & Hub -----	1	
	Adjusting Yoke Assembly consisting of the following parts -----	1	
D4C10	Adjusting Yoke -----	1	
103-F	Finger Levers -----	4	
106	Finger Pins -----	4	
105	Cotter Pins -----	4	
114	Adjusting Lock Pin -----	1	
115	Adjusting Lock Pin Springs -----	1	
	Sliding Sleeve Assembly consisting of the following parts -----	1	
3309	Sliding Sleeve -----	1	
1471	Lever Links -----	8	
1456	Lever Link Pin -----	8	
105	Cotter Pin -----	8	

	Driving Plate Assembly consisting of the following parts -----	No. Required	
		1	Master
5275	Driving Plate -----	2	Clutch
112-B	Friction Disc -----	4	(Cont)
1 12B14	Rivet -----	32	
5274	Floating Plate -----	1	
5273	Center Plate -----	1	
1437	Release Springs -----	4	

## MOTOR

Motor Stearns Model "DU"

CYLINDER ASSEMBLY

22000	Cylinder Assembly -----	1	
22001	Cylinder - 5-1/8" Bore -----	1	
22002	Cylinder Head Stud (Nickel Steel) -----	1	
22003	Cylinder Head Gasket -----	16	
22004	Cable Holder -----	1	
22005	Inspection Plate -----	2	
22006	Inspection Plate Gaskets -----	2	
22007	Valve Tappet Crabs -----	4	
22008	Valve Tappet Crab Studs -----	4	
22009	Water Connection -----	1	
22010	Washer - Brass -----	15	
22011	Water Inlet Gasket -----	1	
	Nuts 9/16" SAE Plain -----	15	
	Priming Cups - 1/8" Right Angle -----	4	
	Nuts 3/8" SAE Plain -----	4	
	Cap Screws 5/16 x 1/2 20 Hx Hd -----	24	
	Washers 5/16" Spring Lock -----	8	
	Washers 3/8" -----	4	

CYLINDER HEAD ASSEMBLY

22012	Cylinder Head Assembly -----	1	Cylin-
22013	Cylinder Head Cover (New Style) -----	1	der
22014	Cylinder Head Cover Gasket -----	1	Head
22015	Cylinder Head (New Style) -----	1	
22016	Valves Tungston (Intake) -----	4	
22017	Valves Silchrome - Exhaust -----	4	
22018	Valve Springs -----	8	
22019	Valve Spring Seats -----	8	
22020	Valve Spring Seat Retainers -----	8	
22021	Valve Guides -----	8	
22022	Rocker Shaft Bracket Studs -----	8	
22023	Water Hole Cover -----	1	
22024	Water Hole Gasket -----	2	
22025	Manifold Extension -----	1	
22026	Intake & Exhaust Manifold Studs -----	10	
22027	Exhaust Manifold Extension Gasket -----	2	
22028	Exhaust Manifold Extension Gasket Center -----	1	
22029	Exhaust Manifold Extension Gasket End -----	2	
22030	Exhaust Manifold -----	1	
22031	Inlet Manifold -----	1	

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No. Required

22032	Inlet Manifold Extension -----	1	Cylin
22033	Intake Manifold Gasket -----	2	der
22034	Cylinder Head Cover Screw - Long -----	4	Head
22035	Cylinder Head Cover Screw - Short -----	4	Cont.
22036	Oil Pressure Relief Insp. Plug -----	1	
22037	Breather Cap -----	1	
22038	Upper Water Connection -----	1	
22039	Oil Pump Inspection Plug Gasket -----	1	
22040	Carb. Flange Gasket -----	1	
22041	Cylinder Head Cover Gasket - Felt -----	1	
22042	Cylinder Head Cover Washers - Brass -----	8	
22043	Ex. Manifold Extension Clips -----	2	
	3/8 x 7/8 USS Hex. Hd. Cap Screws -----	4	
	3/8 SAE Plain Nuts -----	8	
	3/8 Spring Lock Washers -----	14	
	3/8 x 3/4 Cap Screws -----	2	
	7/16 SAE Plain Nuts -----	10	
	7/16 Lock Washers -----	10	
	5/8 x 1-1/2 Cap Screws -----	2	
	7/16 SAE Plain Nuts -----	2	

CRANKCASE ASSEMBLY

22044	Crankcase Assembly -----	1	
22045	Crankcase -----	1	
22046	Crankcase Cover - Lower -----	1	
22047	Crankcase Oil Pan -----	1	
22048	Front Bearing Cap -----	1	
22049	Center & Head Bearing Caps -----	2	
22050	Main Bearing Studs -----	12	
22051	Front Main Bearings - Upper -----	1	
22052	Front Main Bearings - Lower -----	1	
22053	Center Main Bearing - Upper -----	1	
22054	Center Main Bearing - Lower -----	1	
22055	Rear Main Bearing - Upper -----	1	
22056	Rear Main Bearing - Lower -----	1	
22057	Front Main Bearing Shim (Lam.) -----	2	
22058	Rear & Center Main Bearing Shim (Lam) ---	4	
22059	Gear Case Cover -----	1	
22060	Rear Camshaft Bearing -----	1	
22061	Center Camshaft Bearing -----	1	
22062	Handhole Cover -----	1	
22063	Inspection Plate - Steel -----	1	
22064	Oil Pump Handhole Cover -----	1	
22065	Oil Screen -----	1	
22066	Cylinder Hold Down Studs -----	12	
22067	Pump Brackets -----	2	
22068	Pump Bracket Studs -----	4	
22069	Front Cover Screws -----	13	
22070	Gear Cover Dowels -----	2	
22071	Front Cover Gasket -----	1	
22072	Lower Cover Gasket R.H. -----	1	
22073	Lower Cover Gasket L.H. -----	1	

22074	Oil Pan Gasket -----	1	Crank
22075	Cylinder Gasket -----	2	Case
22076	Handhole Gasket -----	2	Cont.
22077	Inspection Plate Gasket -----	2	
22078	Oil Pump Inspection Plate Gasket -----	1	
22079	Magneto Drive Shaft Brg. Gasket -----	1	
22080	Oil Pressure Relief -----	1	
22081	Oil Return Cover -----	2	
22082	Bell Housing -----	1	
22083	Lower Cover Bolts -----	15	
22084	Magneto & Governor Bracket -----	1	
22085	Starter Bracket -----	1	
22086	Oil Pump Drain Plug Gasket -----	1	
22087	Studs -----	2	
22088	Flywheel Housing Bolts -----	4	
22089	Flywheel Housing Bolts -----	4	
22090	Lock Screws for Starter -----	1	
22091	Supporting Arms -----	1	
	3/8 Pipe Plug for Oil Line (Spec.) -----	2	
	1/8" Drain Plugs -----	2	
	1-1/4 x 3/8 cap screws (Oil Pan) -----	24	
	5/16 x 3/4 cap screws H. H. Cover -----	12	
	1/4 x 1/2 cap screws insp. plate -----	8	
	5/8 SAE Castle Nuts -----	12	
	5/8 SAE Plain Nuts -----	12	
	3/8 SAE Plain Nuts -----	4	
	5/8 Spring Lock Washers -----	12	
	3/8 Spring Lock Washers -----	48	
	7/32 Spring Lock Washers -----	4	
	3/8 x 1" Cap Screws -----	24	
	3/8 USS x 2-1/2 Cap Screws -----	1	
	3/8 SAE Nuts -----	2	
	3/8 SAE Lock Washers -----	3	

#### CRANKSHAFT ASSEMBLY

22092	Crankshaft Assem -----	1	Crank
22093	Crankshaft Gear - Hardened -----	1	shaft
22094	Flywheel -----	1	
22095	Flywheel Bolts -----	6	
22096	Flywheel Bolt Nuts -----	6	
22097	Flywheel Ring Gear -----	1	
22098	Flywheel Clutch Pin -----	6	
22099	Starting Pin -----	1	
22100	Oil Throw -----	1	
22101	Crankshaft -----	1	
	Cotter Pins 1/8 x 1" -----	6	
	#21 Woodruff Key -----	1	
	5/8 SAE Plain Nuts -----	6	
	5/8 Lock Washers -----	6	

CONNECTING ROD & PISTON ASSEMBLY

No. Required

22102	Connecting Rod and Piston Assembly-----	4	Con
22103	Connecting Rod Lynite (Spun in Bearing)	4	nect
22104	Piston -----	4	ing
22105	Wrist Pin (with 3/8 slot) -----	4	Rod
22106	Piston Ring -----	12	&
22107	Piston Ring - Drain Oil -----	4	Piston
22108	Piston Pin Bushing -----	4	
22109	Connecting Rod Bolts -----	16	
22110	Connecting Rod Bolt Nuts -----	16	
22111	Connecting Rod Oil Tube -----	4	
22112	Wrist Pin Key -----	4	
22113	Connecting Rod Brg. Shims -----	8	
	Pins 3/32 x 1" Cotter -----	4	

CAMSHAFT ASSEMBLY

22114	Camshaft Assembly -----	1	Cam-
22115	Camshaft -----	1	Shaft
22116	Camshaft Bearing - Front -----	1	
22117	Camshaft Gear - Hardened -----	1	
22118	Camshaft Gear Retainer Nut -----	1	
22119	Camshaft End Nut -----	1	
22120	Oil Pump Drive Gear (Driver) -----	1	
	Woodruff Key #9 -----	1	
	Woodruff Key #21 -----	1	
	Screws 3/8 x 1" USS Fil. Hd. Mch. -----	4	
	Washers 3/8" Lock -----	4	
	Pin 3/16 x 2" Cotter -----	1	

VALVE TAPPET ASSEMBLY

22121	Valve Tappet Assembly -----	8	Valve
22122	Valve Tappet -----	8	Tap-
22123	Valve Tappet Guide -----	8	pets
22124	Valve Tappet Roller -----	8	
22125	Valve Tappet Roller Pin -----	8	
22126	Push Rod -----	8	
22127	Push Rod End -----	8	

ROCKER SHAFT ASSEMBLY

22128	Rocker Shaft Assembly -----	2	Rocker
22129	Rocker Shaft -----	2	Shaft
22130	Rocker Shaft Bushing -----	8	
22131	Rocker Shaft Bracket -----	4	
22132	Rocker Shaft Spacer -----	2	
22133	Rocker Shaft End Cover -----	2	

		No. Required	
22134	Rocker Shaft End Cover Stud -----	2	Rocker
22135	Rocker Lever L. H. -----	2	Shaft
22136	Rocker Lever R. H. -----	2	Cont.
22137	Valve Adjusting Screw -----	8	
22138	Valve Adjusting Screw Lock -----	8	
	Nuts 1/4" USS -----	2	
	Plug 1/8" Pipe -----	1	
	Nuts 1/4" Castle -----	4	

## WATER PUMP ASSEMBLY

22139	Water Pump Assembly -----	1	Water-
22140	Water Pump Case -----	1	Pump
22141	Water Pump Cover -----	1	
22142	Water Pump Rotor -----	1	
22143	Water Pump Shaft -----	1	
22144	Water Pump Gland Nut R.H. -----	1	
22145	Water Pump Gland Nut L.H. -----	1	
22146	Water Pump Steel Gland -----	2	
22147	Water Pump Hose 1-1/2 x 5-1/2 -----	1	
22148	Water Pump Bushing -----	2	
22149	Water Pump Packing -----	2	
22150	Water Pump Gasket -----	1	
22151	Water Pump Inlet Elbow -----	1	
	Grease Cups 1/8" -----	2	
	Screws 1/4 x 5/8-20 USS Oval Mch -----	7	
	Washers 1/4" Spring Lock -----	7	
	Pin #3 x 1-1/4" Taper -----	1	
	Woodruff Key #9 -----	1	
	Woodruff Key #6 -----	1	
	Hose Clamps 1-1/2" -----	2	
	Screws 1/4 x 1-1/4-20 Rd Hd Mch -----	2	
	5/32 x 1-1/4 Key -----	1	

## PUMP &amp; MAGNETO DRIVE ASSEMBLY

22152	Pump & Magneto Drive Assembly -----	1	Pump
22153	Pump & Magneto Drive Shaft -----	1	&
22154	Pump & Magneto Drive Gear -----	1	Magneto
22155	Fan Drive Wheel -----	1	Drive
22156	Washer for Fan Drive -----	1	
22157	Bearing Housing -----	1	
22158	Bearing Housing Gasket -----	1	
22159	Packing -----	1	
22160	Spacer -----	1	
22161	Radial Bearing -----	1	
22162	Radial Bearing -----	1	
	Woodruff Key -----	1	
	Taper Pin 2" long -----	1	
	Woodruff Key -----	1	
	#3 Taper Pin 1-1/4" long -----	1	
	Woodruff Key -----	1	
	3/32 x 1" Cotter Key -----	1	
	5/16 x 7/8 Fill. Hd. Cap Screws -----	4	
	5/16 Lock Washers -----	4	

OIL PUMP ASSEMBLY

## No. Required

22250	Oil Pump Assembly -----	1	Oil Pump
22163	Oil Pump Assembly -----	1	
22164	Oil Pump Body -----	1	
22165	Oil Pump Bracket & Cover -----	1	
22166	Oil Pump Shaft - Short - Bronzo -----	1	
22167	Oil Pump Shaft - Long -----	1	
22168	Oil Pump Gear - Driver -----	1	
22169	Oil Pump Gear - Driven -----	1	
22170	Oil Pump Drive Gear -----	1	
22171	Oil Pump Shaft Bushing - Upper -----	1	
22172	Oil Pump Shaft Bushing - Lower -----	1	
22173	Oil Pump Gasket -----	1	
22174	Oil Pump Shaft Collar -----	1	
22175	Oil Pump Tube 1/2 x 13-3/4 long -----	1	
22176	Oil Screen -----	1	
22177	Oil Pump Bracket Stud -----	2	
	Elbow 3/8" x 1/2 -----	1	
	Woodruff Keys #9 -----	2	
	Pins #3 x 1-1/4" Taper -----	2	
	Scrows 5/16 x 1" Hex Hd Cap -----	6	
	3/8 Oil Pump Bracket Stud Nut -----	2	
	14-20 x 5/8 Fill. Hd. Screw -----	7	
	Washers 5/16 Lock -----	6	

FAN ASSEMBLY (Chain Drive)

22178	Fan Assembly -----	1	Fan
22179	Chain Housing & Bracket -----	1	
22180	Chain Housing Cover -----	1	
22181	Chain Housing Cover Gasket -----	1	
22182	Fan Drive Chain 86 Pitches -----	1	
22183	Fan Shaft -----	1	
22184	Fan Blade 24" -----	1	
22185	Fan Drive Flange (Rear) -----	1	
22186	Fan Drive Flange (Front) -----	1	
22187	Fan Drive Fibre Washer -----	1	
22188	Fan Adjusting Flange -----	1	
22189	Fan Spring -----	1	
22190	Fan Shaft Nut -----	1	
22191	Felt Washer -----	1	
22192	Bearing Cover Gasket -----	1	
22193	Radial Bearing -----	1	
22194	Radial Bearing -----	1	
	5/16" x 1" Hex. Hd. Cap Screws -----	10	
	5/16" x 1-1/2" Hex. Hd. Cap Screws -----	2	
	5/16" Lock Washers -----	12	
	5/16" Fill. Hd. Cap Screws -----	4	
	Woodruff Key #13 -----	2	
	1/8 x 1-1/2" Cotter Pins -----	1	

(Chain) PUMP & MAGNETO COUPLING ASSEMBLY

No. Required

22195	Chain - Pump & Magneto Coupling Assembly	1	Pump
22196	Coupling Flange -----	2	&
22197	Coupling Chain -----	1	Mag-
	Loose Link -----	1	neto
	Loose Link Plate -----	1	Coup-
	Loose Link Spring Clip -----	1	ling

STARTING CRANK ASSEMBLY

22198	Starting Crank Assembly -----	1	Start-
22199	Starting Crank Handle -----	1	ing
22200	Starting Crank Shaft -----	1	Crank
22201	Starting Crank Housing -----	1	
22202	Starting Crank Spring -----	1	
22203	Starting Crank Shaft Bracket -----	1	
22204	Washer for Starting Shaft -----	1	
22205	Starting Crank Jaw -----	1	
22206	Starting Crank Lever Handle -----	1	
22207	Starting Crank Handle -----	1	
	Woodruff Key #C -----	1	
	Woodruff Key #21 -----	1	
	Pin 1/4 x 2-1/2 (Straight) -----	1	
	3/8 x 2-1/2 Cap Screw USS -----	1	

FILLER ASSEMBLY

22208	Filler Assembly -----	1	Fill
22209	Filler & Handhole Plate -----	1	er
22210	Filler Cap -----	1	Assem
22211	Filler Strainer -----	1	bly
22212	Oil Filler Screen with washer with 1/8 x 3/8" Rivets -----	1	

OIL PRESSURE RELIEF ASSEMBLY

22213	Oil Pressure Relief Assembly -----	1	Oil
22214	Oil Pressure Relief Body -----	1	Pres-
22215	Oil Pressure Relief Plug -----	1	sure
22216	Oil Pressure Relief Spring -----	1	Re-
22217	Oil Pressure Relief Adj. Screw -----	1	lief
22218	Oil Pressure Relief Adj. Screw Nut -----	1	
22219	Adjusting Screw Washer -----	1	
22220	Tee 1/4 x 5/16 x 5/16" -----	1	
22221	Steel Ball 1/2" -----	1	
	Screws - 3/8 x 3/4" Hex. Hd. -----	1	
	Washers 3/8 Lock -----	2	
	Elbow 1/4 x 3/8" -----	1	

OIL LINE ASSEMBLY

22222	Oil Line Assembly -----	1	Oil
22223	Elbow from Header -----	1	Line

## No. Required

22224	Main Line Cylinder Wall Elbow-----	1	Oil
22225	Elbow Cylinder Return Line -----	1	Line
22226	Cylinder Wall Elbow Lock Nut -----	2	Cont.
22227	Tube-Header to Cylinder 3/8" -----	1	
22228	Tube-Cylinder to Pressure Relief -3/8"----	1	
22229	Tube-Pressure Relief to Rocker Shaft 5/16"-----	2	
22230	Tube-Rocker Shaft to Union -5/16" -----	1	
22231	Tube-Union to Cylinder Wall Elbow -5/16"-----	1	
22232	Tube-Cylinder Wall Elbow to Cam 1/4" -----	1	
22233	Tube-Cylinder Wall Elbow to Pump Shaft 1/4" -----	1	
22234	Cam & Pump Shaft Bearing Elbow -----	1	
22235	Tee from Camshaft to Pump Shaft -----	1	
22236	Elbow 1/8 x 1/4 Comp -----	1	
	Nuts Std. Union Taper 3/8" -----	3	
	Elbow 1/4 x 3/8" Female -----	1	
	Nuts 5/16" Union Taper -----	8	
	Union 5/16" Compression -----	1	
	Plug 1/8" Pipe -----	1	
	Elbow 1/4 x 3/8" USS -----	1	
	Elbows 1/8 x 5/16" Compression -----	2	
	Nuts 1/4" Union Std -----	4	

OIL GAUGE ASSEMBLY

22237	Oil Gauge Assembly -----	1	Oil
22238	Oil Gauge Rod -----	1	Gauge
22239	Oil Gauge Plug -----	1	
22240	Oil Gauge Pipe -----	1	
22241	Air Cleaner -----	1	
22242	Exhaust Pipe -----	1	
22243	Water Pump Inlet Elbow Gasket -----	1	
22244	Oil Gauge Hand Nut -----	1	
	Pin #0 x 3/4" Taper -----	1	
22245	Ball bearing S.K.F. -----	1	
22246	Drive Chain Con. Link -----		
22247	Drive Chain Offset Link -----		
22248	Drive Chain Roller Link -----		
22249	Hood Fasteners -----		

## LIST OF PARTS

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MOTOR HOOD

		No. Required	
21497	Hood Top Plate -----	1	
21518	Clips -----	4	MOTOR
21548	Cap Screws -----	4	HOOD
21496	Clips -----	3	
21531	Hood Side Plate (Left) -----	1	
21532	Hood Side Plate (Right) -----	1	
	Hood Handles #2786 C.H. Co. -----	4	
	Hood Fasteners Ideal #89 -----	4	

RADIATOR AND ACCESSORIES

21316	Radiator -----	1	
21354	Water Outlet Connection -----	1	RADIA*
21512	Gasket -----	2	TOR
21515	Radiator Hose -----	2	
21513	Water Inlet Connection -----	1	
21603	Radiator Pad -----	2	

REAR SPROCKET ASSEMBLY

21187	Rear Axle Shaft -----	22	REAR
21192	Thrust Collar -----	4	SPROCKET
	Woodruff Key #9 -----	4	
	Hyatt Bearing W-212 -----	4	
21189	Bearing Housing -----	4	
21188	Bearing Cap -----	4	
21185	Bearing Cap & Cup Gasket -----	8	
21184	Rear Axle Bearing Oil Seal -----	4	
21182	Oil Seal Pressure Ring -----	4	
21183	Bearing Retainer Ring -----	4	
17701	Oil Seal Spring -----	24	
21491	Rear Axle Shaft Sleeve -----	2	
21492	Rear Track Sprocket Ring -----	2	
21493	Rear Driving Chain Sprocket -----	2	
11315	Hex Head Bolts 3/4-16 x 2-1/2 -----	32	
	Castle Nuts 3/4-16 -----	32	
	Cotter Pins 1/8 x 1-1/4 -----	32	
	Pipe Plug 3/8 Standard -----	2	

REAR SPROCKET DIRT GUARD\*LEFT

21639	Guard Plate -----	1	REAR
21638	Guard Support-Front -----	1	SPROCKET
21637	Guard Support-Rear -----	1	DIRT
			GUARD

REAR SPROCKET DIRT GUARD-RIGHT

21639	Guard Plate -----	1	
21638	Guard Support-Front -----	1	
21637	Guard Support-Rear -----	1	

REVERSE GEAR GROUP

21262	Reverse Gear Shaft -----	1	REVERSE
			GEAR
			GROUP

# LIST OF PARTS

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		No. Required	
21259	Reverse Gear -----	1	REVERSE
21261	Bushing -----	1	GEAR
21263	Cover -----	1	GROUP
21329	Gasket -----	1	(contd.)

## SEAT AND TOOL BOX

21570	Seat and Tool Box Assembly (Seperate Parts not Served)---	1	SEAT AND TOOL BOX
21403	Seat Cushion -----	1	
21404	Back Rest -----	1	

## SLIDING GEAR ASSEMBLY

21485	Sliding Gear Shaft-----	1
21477	Coupling Gear -----	1
21481	Key-----	1
21266	Internal Coupling Gear -----	1
21267	Coupling Gear Washer -----	1
21484	High and Reverse Pinion -----	1
21478	Low and Second Pinion -----	1
21476	Spacer -----	1
21521	Spacer -----	1
21475	Washer -----	1
	Ball Bearings N.D. #1309 -----	2
21483	Bearing Retainer -----	1
21482	Bearing Cap -----	1
21474	Gasket -----	2
21221	Hex Nut -----	2

## SPECIAL EQUIPMENT

### Starting & Lighting Equipment

	Generator 12-Volt Auto-Lite Clockwise Rotation Type	
	G.A.E. 4002 Bracket Type Mounting -----	2
	Generator Coupling American Bosch -----	1
	Generator & Magneto Bracket Stearns #BF-36 --	1
	Starter 12-Volt Auto-Lite Type M-1 #4123 Triple X	
	Bendix Drive Clockwise Rotation -----	1
	Ammeter -----	1
	Starter Switch with Screws American Bosch-	1
	Head Lamps Adams-Westlake #4537-5 with 12-Volt	
	Bulbs -----	2
	Dash Light #685-5 with 12-Volt Bulb -----	1
	Battery 11-Plate 12-Volt -----	1
21584	Clamp Bolt -----	2
21632	Starting Motor to Starting Switch Cable --	1
	Conduit -----	1
21633	Battery to Starting Switch Cable -----	1
	Conduit -----	1
21629	Battery to Ground Cable -----	1
21628	Generator to Ammeter Cable -----	1
21634	Ammeter to Starting Switch Cable -----	1
21562	Head Lamps to Switch Cable -----	1
11185	Ammeter to Switch Cable-----	1

STEERING CLUTCH SHAFT ASSEMBLY

		No. Required
21275	Steering Clutch Shaft -----	2
21276	Steering Clutch Retainer Hub -----	2
21594	Shrink Ring -----	2
21355	Key -----	2
21356	Washer -----	2
21277	Steering Clutch Retainer -----	2
21527	Hex Head Cap Screw 3/8-16 -----	12
21278	Pressure Plate Inner -----	2
21279	Clutch Disc Outer -----	5
21281	Clutch Disc Inner -----	6
21282	Clutch Lining -----	12
21283	Pressure Plate -----	2
21284	Clutch Throwout Collar -----	2
21352	Steering Clutch Springs -----	12
21285	Seal Plate -----	2
21289	Spacer -----	2
	Ball Bearing N.D. #1314 -----	2
21286	Spacer -----	2
21288	Seal Plate -----	2
21287	Spacer -----	2
21291	Seal -----	4
21292	Bearing Seal Retainer - Inner -----	2
21293	Bearing Seal Retainer - Outer -----	2
21523	Gasket -----	4
21294	Pressure Plate Seal -----	4
14701	Springs -----	12
21585	Cap Screw 1/2-13 x 2-3/4 -----	12
21295	Sprocket -----	2
21296	Washer -----	2
21308	Slotted Nut -----	2

STEERING COLUMN ASSEMBLY

21407	Base -----	1
21441	Steering Wheel Shaft -----	1
21398	Cam -----	1
	Woodruff Key #13 -----	1
21436	Steel Tubing -----	1
21437	Throttle Lever Quadrant -----	1
21444	Throttle Shaft -----	1
16701	Spring -----	1
16038	Throttle Lever -----	1
D6801	Pin -----	1
D6406	Throttle Shaft Lever -----	1
21779	Steering Wheel-Shellerte -----	1
	Acorn Nut 1/2-20 S.A.E. -----	1
	Woodruff Key #13 -----	1
21511	Throttle Lever Rod to Carburetor ---	1
	Ball & Socket Joints 1/4" x 28 -----	2
21614	Guide -----	1
	Nut 1/4-28 S.A.E. Hex -----	2
	Lock Washer 1/4-3/32 x 1/16 -----	2

# LIST OF PARTS

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## STEERING CONTROL ASSEMBLY

		No. Required
21426	Clevis -----	2
21394	Pivoting Bar -----	2
21539	Pin -----	2
21388	Pressure Yoke -----	2
21409	Pin -----	4
21529	Washer -----	4
21423	Washer -----	4
	Bearing N.D #5304 -----	4
	Pipe Plug 3/8" Std.-----	2
21649	Chain Adjusting Wrench -----	1
21453	Studs -----	4
	Track Wrench -----	1
	Wrench Kit -----	1
	Spark Plug Wrench -----	1
	Hammer -----	1
	Screw Driver -----	1
	Pliers -----	1
	Cold Chisel -----	1
	Punch -----	1
	Oil Can -----	1
	Priming Can with Cap & Spring -----	1
	Monkey Wrench -----	1
	Super Grease Gun -----	1
	Connecting Link -----	1
	Roller Link -----	1
	Carburetor Jet Wrench -----	1

See 41-A for "TOOLS AND STANDARD EQUIPMENT".

## TRACK ASSEMBLY

21498	Track Shoe -----	62
21501	Track Pin -----	58
21667	Master Pin -----	4
21499	Track Shoe Bushing -----	124
21502	Retainer Clip -----	62
	Expansion Plug 1-3/4" Dia. -----	124
21611	Grousers -----	62
21455	Grouser Bolts -----	62

## TRACK SUPPORTING ROLLER ASSEMBLY

11200	Track Supporting Roller Assembly -----	4
21446	Track Supporting Roller Spring -----	2
21447	Spring Saddle -----	4
21448	Spring U-Bolt -----	4
11308	Track Supporting Roller Bracket -----	4
11306	Track Supporting Roller Shaft -----	4
11305	Track Supporting Roller Bushing -----	8
11304	Track Supporting Roller Oil Ring -----	4
11307	Track Supporting Roller Thrust Washer -----	8
17025	Track Supporting Roller -----	8
	Pipe Plug 3/8 Standard -----	8
	Welch Plug 1" Dia. -----	4

## TRANSMISSION ASSEMBLY

21223	Transmission Case -----	1
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(See Page  
42 for con-  
tinuation)

## TOOLS AND STANDARD EQUIPMENT

21649	Chain Adjusting Wrench -----	1
21453	Studs -----	4
	Track Wrench -----	1
	Wrench Kit -----	1
	Spark Plug Wrench -----	1
	Hammer -----	1
	Screw Driver -----	1
	Pliers -----	1
	Cold Chisel -----	1
	Punch -----	1
	Oil Can -----	1
	Priming Can with Cap & Spring -----	1
	Monkey Wrench -----	1
	Super Grease Gun -----	1
	Connecting Link -----	1
	Roller Link -----	1
	Carburetor Jet Wrench -----	1

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TRANSMISSION ASSEMBLY (CONTINUED FROM PAGE 41)

21372	Side Plate	-----	2
21225	Steering Clutch Cover	-----	2
21375	Gasket	-----	1
21374	Transmission Cover Plate	-----	1
21224	Eccentric Sleeve	-----	2
21226	Eccentric Clamp	-----	2
21373	Pivot Axle	-----	1
21396	Key	-----	2
27601	Pivot Axle Collar	-----	2
21533	Drain Plug	-----	2
21011	Pivot Axle Pin	-----	2
21536	Motor Support - Rear	-----	2

TRANSMISSION COVER AND CONTROL ASSEMBLY

	Center Top Plate Assembly (Consisting of the following parts)	-----	1
21427	Shifter Rod High and Reverse	-----	1
21428	Shifter Rod Second and Low	-----	1
21391	Yokes	-----	2
21429	Interlock	-----	1
	Woodruff Key "C"	-----	1
	Ball 7/16" Dia.	-----	2
21431	Selector Plugs	-----	2
21537	Springs	-----	2
	Pipe Plugs 1" Dia.	-----	2
21509	Nipple 1-1/4 Std. Pipe	-----	1
	Pipe Cap 1-1/4" Std.	-----	1
21508	Oil Gauge	-----	1
	Cover Plate and Brake Control Assembly (Left) consisting of the following parts	-----	1
21402	Cover Plate - Left	-----	1
21392	Push Rod	-----	1
21383	Adjusting Screw	-----	1
21379	Ratchet	-----	1
21270	Brake Band Riveted Assembly (Consisting of the following parts)	-----	1
21422	Brake Band	-----	1
21381	Brake Band Ends	-----	2
	Brake Lining	-----	1
21382	Pin	-----	2
21384	Pedal Lever	-----	1
21385	Washer	-----	2
16401	Pedal Pad	-----	1
21386	Pawl	-----	1
21538	Pin	-----	1
	Cover Plate and Brake Control Assembly (Right) consisting of the following parts	-----	1
21401	Cover Plate	-----	1
21392	Push Rod	-----	1
21383	Adjusting Screw	-----	1
21379	Ratchet	-----	1
21270	Brake Band Riveted Assembly consisting of the following parts	-----	1
21422	Brake Band	-----	1
21381	Brake Band Ends	-----	2
	Brake Band Lining	-----	1

21382	Pin -----	1
21384	Pedal Lever -----	1
21385	Washer -----	1
16401	Pedal Pad -----	1
21386	Pawl -----	1
21538	Pin -----	1

#### TRUCK FRAME BRACING ANGLE

21265	Angle -----	1
21595	Angle Left -----	1
21596	Angle Right -----	1

#### TRUCK UNIT ASSEMBLY LEFT

Truck Frame Riveted Assembly (Left) consisting of the following parts -----		1
21361	Channel -----	1
21362	Angle Left -----	1
21363	Angle Right -----	1
21651	Angle Left -----	1
21652	Angle Right -----	1
21366	Bracket -----	1
21321	Pivot Axle Bracket Left -----	1
21092	Pivot Axle Bracket Bushing -----	2
	Street Ell 3/8" -----	1
	Pipe Plug 3/8" -----	1
21014	Rear Axle Bracket Cap -----	2
27037	Pivot Axle Bracket Cap Shims -----	4
21325	Track Release Spring Bracket Left -----	1
21326	Track Release Spring Bracket Right -----	1
21653	Equalizer Beam Ball Socket -----	1
27012	Equalizer Beam Ball Socket Cap -----	1
21516	Guard Angle -----	2

#### TRUCK UNIT ASSEMBLY RIGHT

Truck Unit Assembly Right consisting of the following parts -----		1
21361	Channel -----	1
21362	Angle Left -----	1
21363	Angle Right -----	1
21651	Angle Left -----	1
21652	Angle Right -----	1
21366	Bracket -----	1
21322	Pivot Axle Bracket Right -----	1
21092	Pivot Axle Bracket Bushing -----	2
	Street Ell 3/8 -----	1
	Pipe Plug 3/8 -----	1
21014	Rear Axle Bracket Cap -----	2
27037	Pivot Axle Bracket Cap Shims -----	4
21325	Track Release Spring Bracket Left -----	1
21326	Track Release Spring Bracket Right -----	1
21653	Equalizer Beam Ball Socket -----	1
27012	Equalizer Beam Ball Socket Cap -----	1
21516	Guard Angle -----	2

TRUCK WHEEL ASSEMBLY

21298	Truck Wheel Shaft -----	10
21299	Truck Wheel -----	20
21301	Journal Box -----	20
21506	Dowel Pin -----	20
21302	Oil Seal -----	20
21303	Pressure Ring -----	20
21505	Dowel Pin -----	20
14703	Spring -----	120
	Bearings Hyatt #309 -----	20
21307	Thrust Washer -----	20
21304	Pressure Ring -----	20
21349	Dowel Pin -----	20
21348	U-Bolt -----	20