

INSTRUCTION BOOK

< FOR >

ALLIS-CHALMERS



MODEL "WC" TRACTOR

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BY**

Allis-Chalmers Mfg. Co.

**TRACTOR DIVISION
MILWAUKEE, WISCONSIN
U. S. A.**

FOREWORD

THE KNOWLEDGE AND ABILITY TO OPERATE, MAINTAIN, AND REPAIR A TRACTOR IS OF THE UTMOST IMPORTANCE TO THE TRACTOR OWNER WHO DEPENDS UPON THIS EQUIPMENT TO DO MOST OF HIS HEAVY DRAWBAR AND BELT WORK.

THE FACT THAT A TRACTOR IS HEAVY AND LOW SPEED COMPARED TO THE AUTOMOBILE DOES NOT MEAN THAT IT IS CRUDELY BUILT. ALLIS-CHALMERS TRACTORS ARE CONSTRUCTED WITH JUST AS HIGH QUALITY MATERIALS, FINE WORKMANSHIP, RIGID TESTS AND CAREFUL INSPECTION AS ARE THE MODERN AUTOMOBILES.

WE STRONGLY URGE UPON YOU THE ADVANTAGE AND IMPORTANCE OF STUDYING YOUR TRACTOR AT THE SAME TIME YOU DO THIS BOOK, AS IT WILL ENABLE YOU TO QUICKLY FAMILIARIZE YOURSELF WITH THE DETAILS OF CONSTRUCTION AND THE PRINCIPLES OF OPERATION, WITHOUT WHICH KNOWLEDGE YOU CAN NOT OBTAIN THE BEST RESULTS.

THE ILLUSTRATIONS IN THIS INSTRUCTION BOOK ARE THE SAME AS USED IN THE REPAIR BOOK FOR THIS MODEL TRACTOR, A CLOSE STUDY OF WHICH WILL ENABLE YOU TO BECOME FAMILIAR WITH THE PROPER NAMES OF EACH PART OR ASSEMBLY. THE NUMBERS USED FOR REFERENCE IN THIS BOOK ARE THE SAME AS USED TO POINT OUT THE LOCATION OF PARTS IN THE REPAIR BOOK. IN CASE YOUR REPAIR BOOK SHOULD BECOME LOST OR MISPLACED, REPAIRS CAN BE ORDERED INTELLIGENTLY BY GIVING THE REFERENCE AND PLATE NUMBER AND THE TRACTOR MODEL.

FOR EXAMPLE: IF PART 7 ON PLATE 6 WAS ORDERED FOR MODEL "WC" TRACTOR, THE REPAIR DEPARTMENT COULD FILL THE ORDER CORRECTLY AND YOU WOULD RECEIVE A WATER PUMP SHAFT No. U-3122.

THE MOST COMMON CAUSE OF TRACTOR DELAY AND HIGH REPAIR EXPENSE IS CARELESSNESS IN LUBRICATION. THIS MAY BE EITHER LACK OF LUBRICATION, OR THE USE OF AN INFERIOR GRADE OF OIL. DO NOT BUY OIL ON PRICE ALONE. PURCHASE YOUR OIL AND GREASE FROM A RELIABLE COMPANY AND KEEP THE CONTAINERS CLEAN.

MAKE A SPECIAL EFFORT TO KEEP YOUR TRACTOR IN THE SAME CONDITION AS IT WAS WHEN PURCHASED.

ALLIS-CHALMERS MFG. COMPANY

TRACTOR DIVISION

MILWAUKEE, WISCONSIN

MODEL "WC" TRACTOR

SPECIFICATION

MOTOR

MAKE	OWN
BORE	4"
STROKE	4"
R.P.M.	1300

SPEED

FIRST	2.50 M.P.H.
SECOND	3.50 M.P.H.
THIRD	4.75 M.P.H.
FOURTH	9.00 M.P.H.
REVERSE	2.00 M.P.H.

BELT PULLEY

DIAMETER	9"
FACE	6-1/2"
R.P.M.	1170

CRANKCASE CAPACITY 6 QUARTS

TRANSMISSION CAPACITY 4 QUARTS

DIFFERENTIAL CAPACITY 4 QUARTS

DRIVE CASE CAPACITY 1 PINT

FUEL TANK CAPACITY 15 GAL.

LENGTH 136"

WIDTH 71-82"

HEIGHT 63"

TREAD 65-76"

AIR TIRES

REAR	11.25-24
FRONT	5.25-17

WEIGHT

STEEL TIRES	2700 LBS.
AIR TIRES WITH WEIGHTS	3300 LBS.

OPERATION

WHEN TRACTOR IS DELIVERED

CHECK THE OIL LEVEL IN THE MOTOR CRANKCASE.

CHECK ALL POINTS OF LUBRICATION AND GREASE THOSE EQUIPPED WITH ZERK FITTINGS.

FILL THE RADIATOR WITH GOOD CLEAN WATER AND SEE THAT THERE IS FUEL IN THE FUEL TANK. IF GASOLINE IS TO BE USED AS FUEL, FILL THE LARGE TANK WITH THIS FUEL. IF LOW GRADE FUEL SUCH AS KEROSENE, DISTILLATE OR TRACTOR FUEL IS TO BE USED, FILL THE LARGE TANK WITH THIS AND THE SMALL GASOLINE TANK WITH GASOLINE.

STARTING ENGINE

WITH THE FUEL TURNED OFF AT LARGE TANK, IF LOW GRADE FUEL IS TO BE USED, OPEN THE VALVE UNDER THE SMALL TANK CONTAINING GASOLINE. SEE THAT THE GEAR SHIFT LEVER IS IN THE NEUTRAL POSITION AND OPEN THE THROTTLE 3 OR 4 NOTCHES. TURN THE CHOKE LEVER ON THE SIDE OF CARBURETOR TO THE "DOWN" POSITION. CRANK THE ENGINE OVER TWO COMPRESSION STROKES. MOVE THE CHOKE LEVER TO THE FORWARD POSITION. ENGINE SHOULD START ON CRANKING OVER THE THIRD COMPRESSION. IF IT DOES NOT START, REPEAT THE CHOKING OPERATION. WHEN ENGINE IS STARTED, SEE THAT THE OIL GAUGE IS REGISTERING PRESSURE. DO NOT OPERATE ENGINE UNDER ANY CIRCUMSTANCES UNLESS THE OIL GAUGE REGISTERS. LET THE ENGINE WARM UP A SHORT TIME BEFORE IT IS PUT UNDER A LOAD.

STARTING TRACTOR

WITH THE ENGINE RUNNING, PUSH AND HOLD THE CLUTCH PEDAL FORWARD TO RELEASE CLUTCH. MOVE THE GEAR SHIFT LEVER TO THE DESIRED SPEED POSITION. GEAR SHIFT POSITIONS ARE CAST ON THE TRANSMISSION CASE COVER, PLAINLY VISIBLE FROM THE OPERATOR'S POSITION. RELEASE THE PRESSURE ON THE CLUTCH PEDAL SLOWLY TO AVOID SUDDEN JERKS IN STARTING. HAVE THROTTLE OPEN FAR ENOUGH TO PREVENT STALLING ENGINE. THIS TRACTOR IS STARTED IN VERY MUCH THE SAME WAY AS MOST MODERN AUTOMOBILES AND A LITTLE PRACTICE WILL ENABLE THE OPERATOR TO GET THE SAME "FEEL" OF THE CLUTCH AND GEAR SHIFT MOVEMENT.

WHEN STOPPING THE TRACTOR, PRESS DOWN ON THE CLUTCH PEDAL AND MOVE THE GEAR SHIFT LEVER TO THE NEUTRAL POSITION AS SOON AS THE TRACTOR STOPS. TO STOP ENGINE, PUSH DOWN ON THE SHORT CIRCUIT PLUNGER ON MAGNETO AND HOLD THIS DOWN UNTIL THE ENGINE STOPS.

LUBRICATION

STEERING GEAR AND FRONT END

ZERK FITTINGS ARE LOCATED ON EACH FRONT WHEEL HUB. APPLY THE ZERK GUN ONCE EACH DAY AND PUMP SUFFICIENT GREASE INTO EACH HUB SO THAT SOME IS FORCED OUT AROUND THE INSIDE END. THIS WILL PROVIDE SUFFICIENT LUBRICATION FOR THE WHEEL BEARINGS AND WILL PREVENT DUST AND DIRT FROM WORKING INTO THE BEARINGS THROUGH THE FELT GREASE RETAINERS.

ZERK FITTING IS ALSO LOCATED JUST BELOW THE STARTING CRANK. APPLY THE ZERK GUN TO THIS FITTING EACH DAY, USING TWO OR THREE STROKES OF THE GUN. BOTH THE UPPER AND LOWER BEARINGS ARE LUBRICATED FROM THIS FITTING.

A ZERK FITTING WILL BE FOUND ON THE STEERING SHAFT BEARING JUST BELOW THE MAGNETO IN THE RIGHT MAIN FRAME CHANNEL. APPLY THE ZERK GUN TO THIS FITTING TWICE DAILY. TWO OR THREE STROKES OF THE GUN IS SUFFICIENT.

THE STEERING WORM AND GEAR IS LOCATED IN THE UPPER SECTION OF FRONT FRAME CASTING. IN ORDER TO LUBRICATE THESE, REMOVE THE COVER ON THE TOP OF THIS CASTING (15 PLATE 10) WHICH IS HELD IN PLACE BY FOUR CAPSCREWS. ADD SUFFICIENT TRANSMISSION OIL SO THAT WORM CAN PICK UP THE OIL. DO NOT TOTALLY SUBMERGE THESE GEARS WITH OIL FOR IF TOO MUCH OIL IS ADDED IT WILL LEAK OUT THROUGH THE STEERING SPINDLE BEARINGS.

INSPECT OIL LEVEL ONCE EACH WEEK AND ADD OIL AS REQUIRED. (USE TRANSMISSION OIL ONLY.)

WATER PUMP

APPLY ZERK GUN TO ZERK FITTING ON WATER PUMP BODY ONCE EACH DAY. TWO OR THREE STROKES OF THE GUN IS SUFFICIENT. TOO MUCH LUBRICANT AT THIS POINT WILL FORCE GREASE INTO THE COOLING SYSTEM AND CLOG THE WATER PASSAGES IN THE RADIATOR.

BELT PULLEY SHAFT BEARINGS

A ZERK FITTING IS LOCATED ON THE OUTER END OF BELT PULLEY SHAFT. APPLY ZERK GUN TO THIS FITTING ONCE EACH DAY IF PULLEY GEARS ARE ENGAGED. FOUR OR FIVE STROKES OF THE GUN IS SUFFICIENT.

CLUTCH THROWOUT BEARING

A ZERK FITTING IS PROVIDED ON THIS BEARING AND IS REACHED BY THE REMOVAL OF THE SMALL PLATE (43 PLATE 11) HELD IN PLACE BY TWO CAP OR THUMB SCREWS. APPLY THE GREASE GUN TO THIS FITTING EACH 30 HOURS OF OPERATION. TWO OR THREE STROKES OF THE GUN IS SUFFICIENT. DO NOT OVER LUBRICATE THIS BEARING AS EXCESS GREASE MAY GET INTO THE CLUTCH WHICH WILL CAUSE IT TO SLIP AND BE SLUGGISH IN ACTION.

CLUTCH FORK SHAFT BEARINGS

ZERK FITTINGS ARE LOCATED AT BOTH ENDS OF THE CLUTCH FORK SHAFT ON CLUTCH HOUSING. APPLY ZERK GUN TO THESE FITTINGS ONCE EACH DAY. TWO STROKES OF THE GUN IS SUFFICIENT.

TRANSMISSION

THE TRANSMISSION ON THE "WC" TRACTOR IS VERY SIMILAR TO THAT USED ON THE MODERN AUTOMOBILE AND REQUIRES ABOUT THE SAME ATTENTION. USE ONLY APPROVED TRANSMISSION OIL SAE-160 FOR SUMMER AND SAE-90 FOR WINTER. DO NOT USE FIBER GREASE. OIL MUST FLOW FREELY AT PREVAILING ATMOSPHERIC TEMPERATURES. KEEP OIL LEVEL UP TO THE OIL FILLER PLUG LOCATED ON THE SIDE OF THE TRANSMISSION CASE.

THE PULLEY GEARS WHICH OPERATE IN THE SMALL COMPARTMENT IN CLUTCH HOUSING ARE LUBRICATED BY OIL FROM THE TRANSMISSION CASE SUPPLY WHICH IS CARRIED TO THIS COMPARTMENT BY THE TRANSMISSION GEARS. BE SURE THAT OIL AS SPECIFIED ABOVE IS USED IN TRANSMISSION, ESPECIALLY WHEN OPERATING TRACTOR FOR BELT WORK IN COLD WEATHER. HEAVY OIL WILL NOT CIRCULATE TO THESE GEARS.

DIFFERENTIAL

THE DIFFERENTIAL REQUIRES THE SAME GRADE OF OIL AS THE TRANSMISSION. KEEP OIL LEVEL UP TO FILLER PLUG ON THE REAR OF THE DIFFERENTIAL HOUSING. THE WORM GEAR THAT DRIVES THE POWER LIFT ATTACHMENT, AND ALL DRIVE SHAFT BEARINGS ARE LUBRICATED BY OIL FROM THE DIFFERENTIAL HOUSING.

REAR WHEEL BEARINGS

ZERK FITTINGS ARE LOCATED ON EACH REAR WHEEL HUB CAP. APPLY THE GREASE GUN TO THESE DAILY WITH THREE OR FOUR STROKES OF THE GUN.

FINAL DRIVE GEARS

USE A HEAVY DUTY TRANSMISSION GREASE IN THE FINAL DRIVE GEAR HOUSINGS AND KEEP FILLED TO THE LEVEL OF THE FILLER PLUG HOLES IN THE SIDE OF THE DRIVE GEAR HOUSINGS. EACH HOUSING HOLDS APPROXIMATELY ONE PINT AND LEAKAGE MAY OCCUR IF FILLED TOO FULL.

DIFFERENTIAL BRAKES

USE THE DIFFERENTIAL BRAKES LOCATED ON EACH END OF THE REAR AXLE DRIVE SHAFT, FOR SHORT TURNS. STEERING WHEEL SHOULD BE TURNED IN THE DESIRED DIRECTION AS THE BRAKES ARE APPLIED.

TRACTOR SPEEDS

THE MODEL "WC" TRACTOR HAS FOUR FORWARD SPEEDS. THE MILES PER HOUR OF THE DIFFERENT SPEEDS IS GIVEN ON PAGE 2 UNDER "TRACTOR SPECIFICATIONS".

IT IS ADVISABLE TO SELECT THE SPEED TO BE TRAVELED BY THE SIZE OF THE LOAD TO BE PULLED. DO NOT ATTEMPT TO PULL A HEAVY LOAD IN A SPEED WHICH WILL HOLD THE ENGINE SPEED BELOW NORMAL. IT IS BETTER TO SELECT A SPEED OF TRAVEL WHICH CAN BE EASILY HANDLED BY THE ENGINE.

MOST PLOWING OPERATIONS ARE PERFORMED IN SECOND OR THIRD SPEED, DEPENDING ON THE KIND AND CONDITION OF THE SOIL. THESE VARY CONSIDERABLY. IN ORDINARY WHEAT STUBBLE A 14-INCH PLOW RUNNING 6 INCHES DEEP WILL HAVE A RESISTANCE OF 336 POUNDS. THE SAME PLOW WORKING THE SAME DEPTH IN CLOVER SOD WILL HAVE A 580-POUND RESISTANCE. THIS STEPS UP TO WHERE HEAVY GUMBO HAS A RESISTANCE OF APPROXIMATELY 1500 POUNDS.

IT IS THEREFORE VERY ESSENTIAL THAT THE OPERATOR EXERCISE JUDGMENT IN THE SELECTION OF SPEEDS OF TRAVEL AND BE GOVERNED BY THE SOIL CONDITIONS.

FOURTH SPEED IS USED FOR ROAD TRAVEL AND FASTER TRAVEL TO AND FROM THE FIELD; OR FOR LIGHT FIELD WORK WHICH WILL NOT OVERLOAD THE MOTOR. ENGINE SHOULD BE RUN AT ITS NORMAL SPEED ORDINARILY, BUT ON LIGHT LOADS, ENGINE CAN BE OPERATED ECONOMICALLY AT LOWER SPEED, IF PROPER TRACTOR SPEED IS USED.

OIL PUROLATOR

THE OIL PUROLATOR USED ON THE "WC" TRACTOR IS OF THE CARTRIDGE TYPE HAVING NO REPLACEMENT CLEANING ELEMENT. WHEN THE CLEANING ELEMENT BECOMES FILLED UP ENTIRELY WITH FOREIGN MATTER IT IS NECESSARY TO REPLACE THE COMPLETE UNIT. TO DO THIS, DISCONNECT THE OIL LINES AT THE FILTER TOP AND REMOVE THE PIPE FITTINGS. LOOSEN THE CLAMPS THAT FASTEN FILTER TO THE SIDE OF THE ENGINE AND REMOVE FILTER. REVERSE THIS ACTION TO INSTALL NEW UNIT.

WITH ENGINE RUNNING, YOU CAN TELL WHETHER OR NOT OIL IS CIRCULATING THROUGH THE PUROLATOR BY DISCONNECTING THE OIL LINE LEADING TO THE ROCKER ARM SHAFT. IF NO OIL IS PASSING THROUGH THIS LINE, THE ELEMENT HAS SERVED ITS PERIOD OF USEFULNESS AND MUST BE REPLACED AT ONCE TO PROVIDE LUBRICATION TO THE ROCKER ARMS WHICH OPEN THE VALVES.

THE ENTIRE PUROLATOR IS INEXPENSIVE, COSTING NO MORE THAN THE REPLACEMENT ELEMENT IN OTHER TYPES OF OIL FILTERS.

KEEP ALL OIL LINE CONNECTIONS TIGHT.

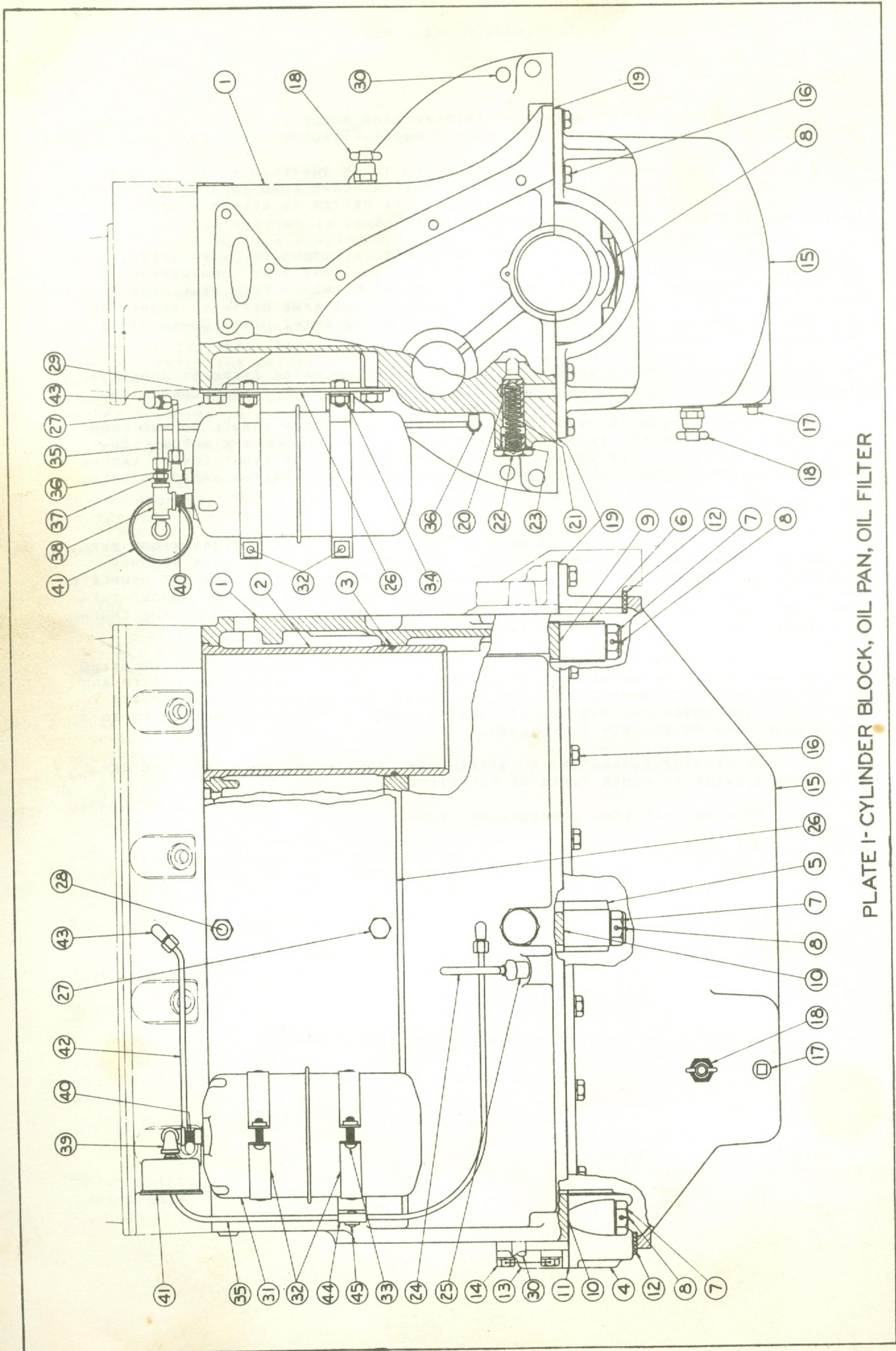


PLATE 1-CYLINDER BLOCK, OIL PAN, OIL FILTER

ENGINE

THE TRACTOR ENGINE, BEING THE SOURCE OF POWER, NEEDS FREQUENT CARE AND ATTENTION TO KEEP IN FIRST CLASS CONDITION AND ITS LIFE AND EFFICIENCY DEPENDS ENTIRELY UPON HOW MUCH OF THE NECESSARY CARE AND ATTENTION YOU GIVE IT.

THE ENGINE IN THE "WC" TRACTOR IS WELL MADE AND THOROUGHLY TESTED BEFORE LEAVING THE FACTORY AND A CAREFUL STUDY OF THESE INSTRUCTIONS WILL AID THE OPERATOR IN OBTAINING THE MOST EFFICIENT, ECONOMICAL AND CONTINUOUS SERVICE FROM THIS UNIT.

THE ENGINE COMES TO YOU WITH A GOOD CLEAN CRANKCASE FULL OF GOOD CLEAN OIL. THE RINGS AND VALVES ARE FITTED PROPERLY AND EVERY MECHANICAL PART FUNCTIONS PERFECTLY. A LITTLE CARE ON YOUR PART IN THE SELECTION OF PROPER LUBRICANT FOR THE CRANKCASE AND THE DRAINING AND RE-FILLING AT PROPER INTERVALS, WILL PROLONG THE LIFE OF THE MANY PARTS DEPENDENT ON THE CRANKCASE OIL SUPPLY FOR LUBRICATION.

USE A GOOD STANDARD GRADE OF OIL SUITABLE FOR THE PREVAILING TEMPERATURES. KEEP IT IN CLEAN, TIGHT CONTAINERS AND BE SURE YOUR MEASURE IS CLEAN WHEN CONVEYING OIL TO YOUR MOTOR.

CYLINDER BLOCK AND LINERS

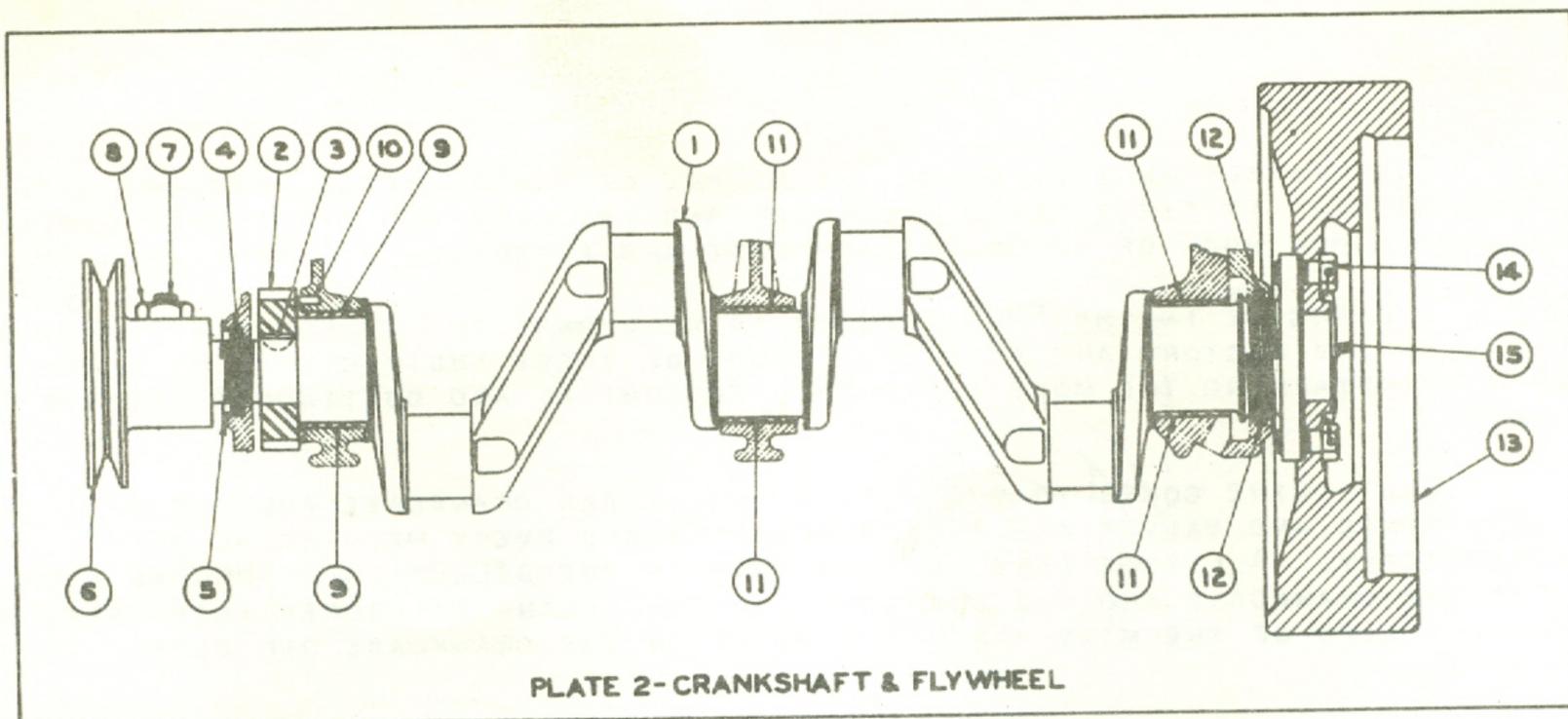
THE ALLIS-CHALMERS "WC" MODEL TRACTOR ENGINE IS DESIGNED WITH RENEWABLE CYLINDER LINERS, MAKING REBORING UNNECESSARY. BY REFERRING TO PLATE 1 YOU CAN NOTE HOW THIS INSTALLATION IS MADE. EACH LINER (2) IS PACKED AT THE BOTTOM END WITH A RUBBER PACKING RING (3) TO PREVENT LEAKAGE OF WATER AT THAT POINT. NEW PACKING RINGS SHOULD ALWAYS BE USED WHEN NEW LINERS ARE INSTALLED OR WHEN THE ORIGINAL LINERS ARE REMOVED AND REPLACED FOR ANY REASON. THE DANGER OF A WATER LEAK INTO THE CRANKCASE IS TOO GREAT TO RISK THE USE OF THE OLD RINGS THE SECOND TIME.

TO INSTALL NEW CYLINDER LINERS

REMOVE THE CYLINDER HEAD AS PER INSTRUCTIONS ON VALVE GRINDING. REMOVE THE OIL SUMP (15) BY TAKING OUT THE CAPSCREWS (16) AROUND THE RIM. REMOVE THE COTTER PINS AND NUTS FROM THE CONNECTING ROD BOLTS AND PUSH THE PISTONS AND CONNECTING RODS OUT OF THE TOP AFTER REMOVING THE CONNECTING ROD CAP. REPLACE THE CONNECTING ROD CAP, SHIMS, AND NUTS IN THE SAME POSITION AND ON THE SAME CONNECTING ROD THAT THEY CAME OFF.

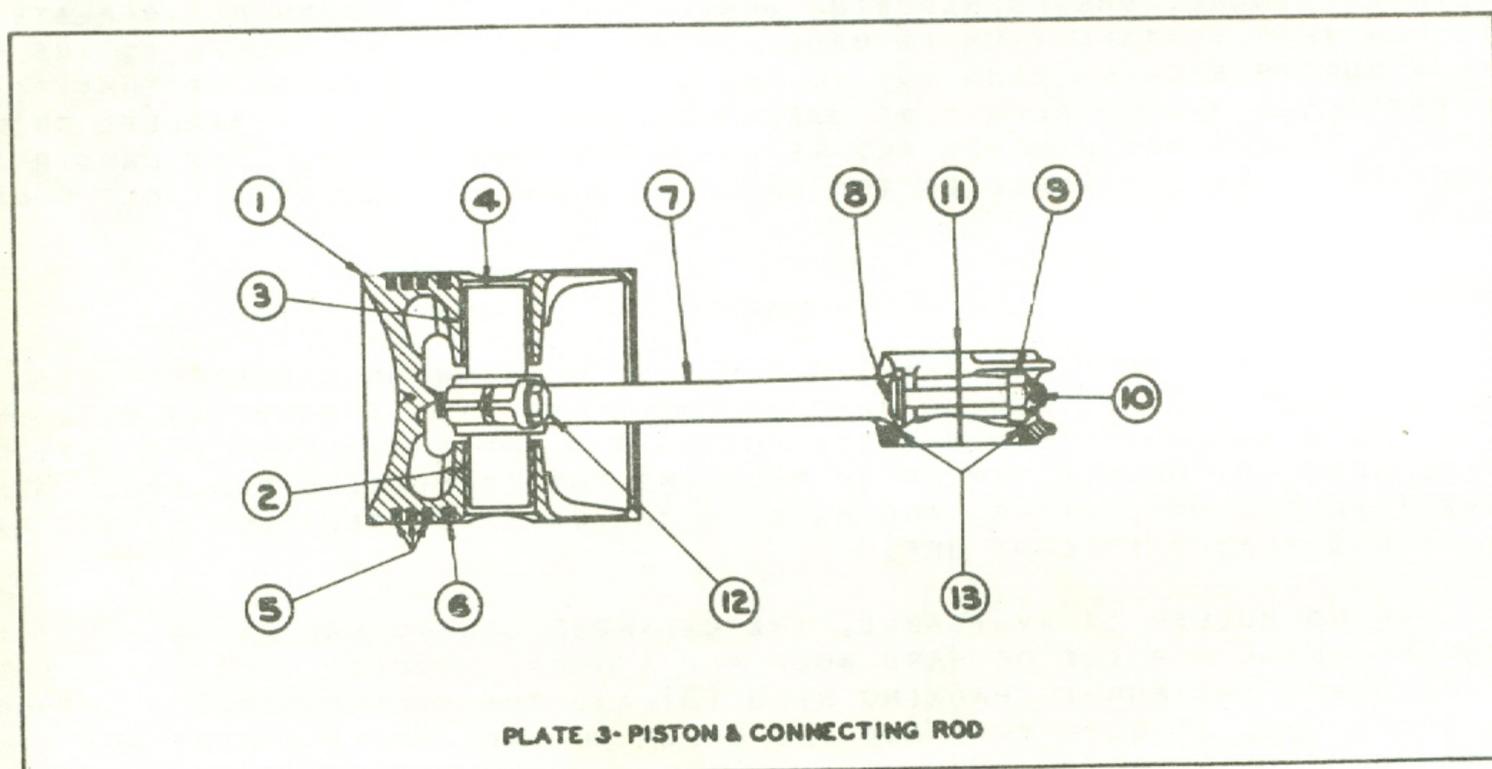
IF NO PULLER IS AVAILABLE, THE CYLINDER LINERS CAN BE DRIVEN OUT OF THE BLOCK BY USING A PIECE OF HARD WOOD AND A HEAVY HAMMER. THE LOWER END OF THE LINERS CARRY THE RUBBER PACKING RING (3) AND THE CYLINDER BLOCK SHOULD BE CLEANED THOROUGHLY AT BOTH THIS AND THE UPPER CONTACT POINT BEFORE NEW LINERS ARE INSERTED.

CLEAN THE LINERS THOROUGHLY AT THE CONTACT POINTS AND PLACE THE RUBBER PACKING RING IN ITS POSITION ON THE LINER AND COVER WITH A THIN COAT OF OIL OR LIGHT GREASE. SET THE LINER IN THE BORE OF THE BLOCK WITH THE PACKING RING END DOWN, AND FORCE THE LINER IN, USING A HEAVY CLEAN BLOCK OF HARD WOOD. LAY THE BLOCK ACROSS THE TOP OF THE LINER AND DRIVE ON IT WITH A HEAVY HAMMER. CARE SHOULD BE EXERCISED THAT THE LINER BE DRIVEN DOWN STRAIGHT IN THE BLOCK TO AVOID DAMAGE TO THE RUBBER PACKING RING WHICH MIGHT RESULT IN A WATER LEAK INTO THE CRANKCASE.



CRANKSHAFT

THE CRANKSHAFT AND MAIN BEARINGS WILL GIVE A LONG PERIOD OF SERVICE WITHOUT ATTENTION IF PROPER LUBRICATING OIL IS USED IN THE CRANKCASE AND INSTRUCTIONS ON OIL CHANGES ARE FOLLOWED. WHENEVER THE OIL SUMP IS REMOVED FOR ANY REASON, THE BEARINGS SHOULD BE INSPECTED AND THE OIL PUMP SCREEN CLEANED.



PISTON AND CONNECTING ROD

IN THE EVENT A COMPLETE SET OF LINERS, PISTONS, AND RINGS ARE PURCHASED, THE PISTON AND RINGS ARE ALREADY FITTED AND THE INSTALLATION OF THE ORIGINAL CONNECTING ROD TO THE PISTON IS ALL THAT IS NECESSARY. WHEN MAKING THIS INSTALLATION, SPECIAL ATTENTION SHOULD BE GIVEN TO THE POSITION OF THE PISTON. REFERRING TO PLATE 3 YOU WILL NOTE THAT BUSHING (3) IS $\frac{1}{4}$ " LONGER THAN BUSHING (2), AND THIS OFFSETS THE CONNECTING ROD THAT AMOUNT. EACH PISTON IS TO BE INSERTED IN THE CYLINDER LINER WITH THE LONG BUSHING SIDE TOWARD THE CLOSEST MAIN BEARING. IN OTHER WORDS, THE LONG BUSHING SIDE OF EACH PISTON WILL BE AS FOLLOWS:

ON No. 1, TOWARD THE FRONT
ON No. 2, TOWARD THE REAR

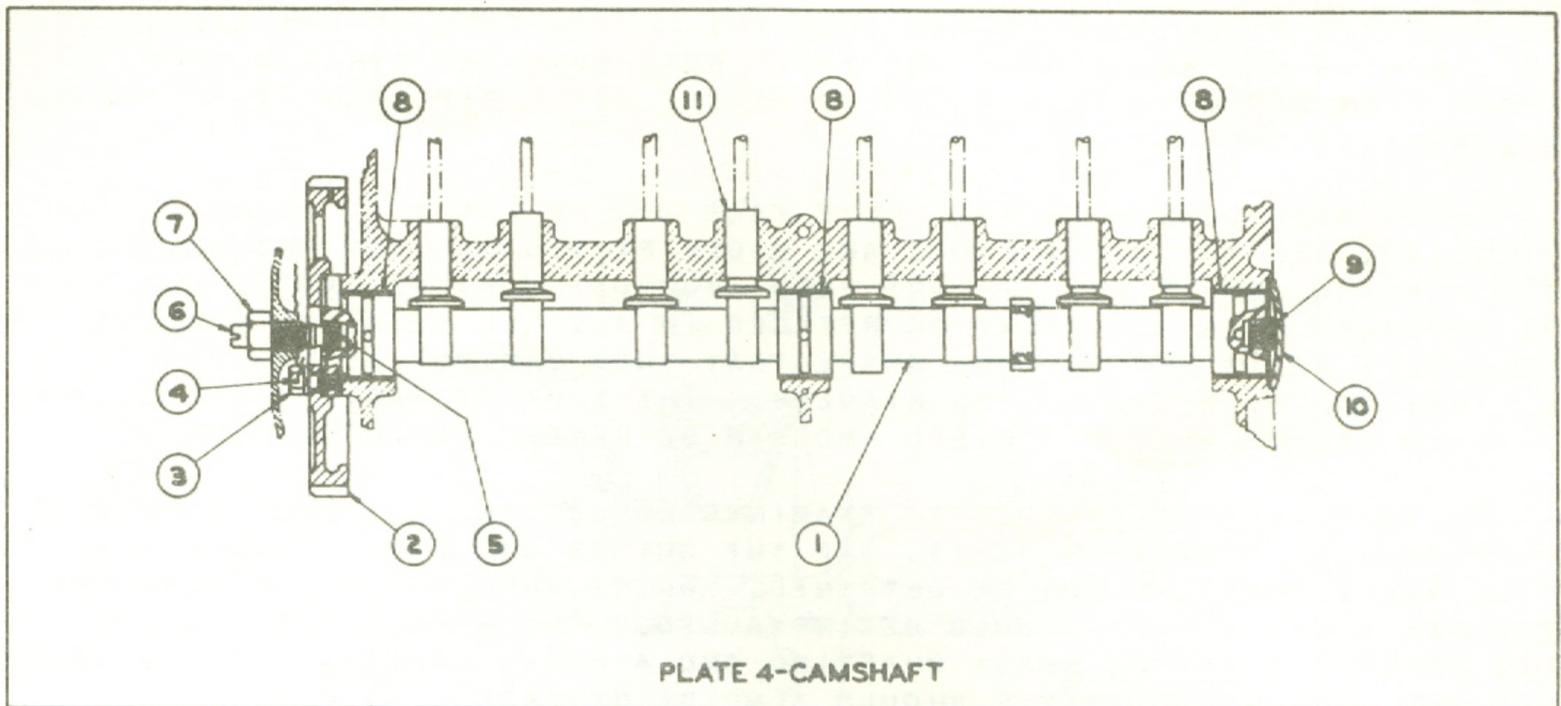
ON No. 3, TOWARD THE FRONT
ON No. 4, TOWARD THE REAR

CYLINDERS ARE NUMBERED FROM THE FRONT OF MOTOR.

WHEN THE WEAR ON THE CYLINDER LINERS IS NOT ENOUGH TO WARRANT ITS REPLACEMENT, AND THE OPERATOR DESIRES TO INSTALL NEW RINGS ONLY, GENUINE ALLIS-CHALMERS RINGS SHOULD BE USED. CLEAN OUT EACH RING GROOVE THOROUGHLY. AN OLD RING BROKEN IN HALF AND FILED TO A SHARP EDGE IS A GOOD TOOL TO USE FOR THIS WORK. INSERT THE NEW RING IN THE CYLINDER LINER BEFORE PLACING IT ON THE PISTON SO AS TO CHECK THE GAP OPENING WHICH SHOULD BE AROUND .012. SPACE THE RING OPENINGS AROUND THE PISTONS SO THAT THEY WILL NOT BE IN A DIRECT LINE.

THE PISTON ON THE "WC" TRACTOR USES FOUR RINGS. THREE OF THESE ARE COMPRESSION RINGS (5) AND ARE TO BE FITTED TO THE TOP THREE-RING GROOVES. THE BOTTOM RING IS THE OIL RING AND IS WIDER MAKING IT IMPOSSIBLE TO PLACE IN THE WRONG GROOVE.

THE PISTON BUSHINGS SHOULD LAST THE LIFE OF THE PISTON; BUT SHOULD THEY NEED REPLACING, THE WORK SHOULD BE DONE AT SOME SHOP WHERE THEY CAN BE BURNISHED IN PLACE.



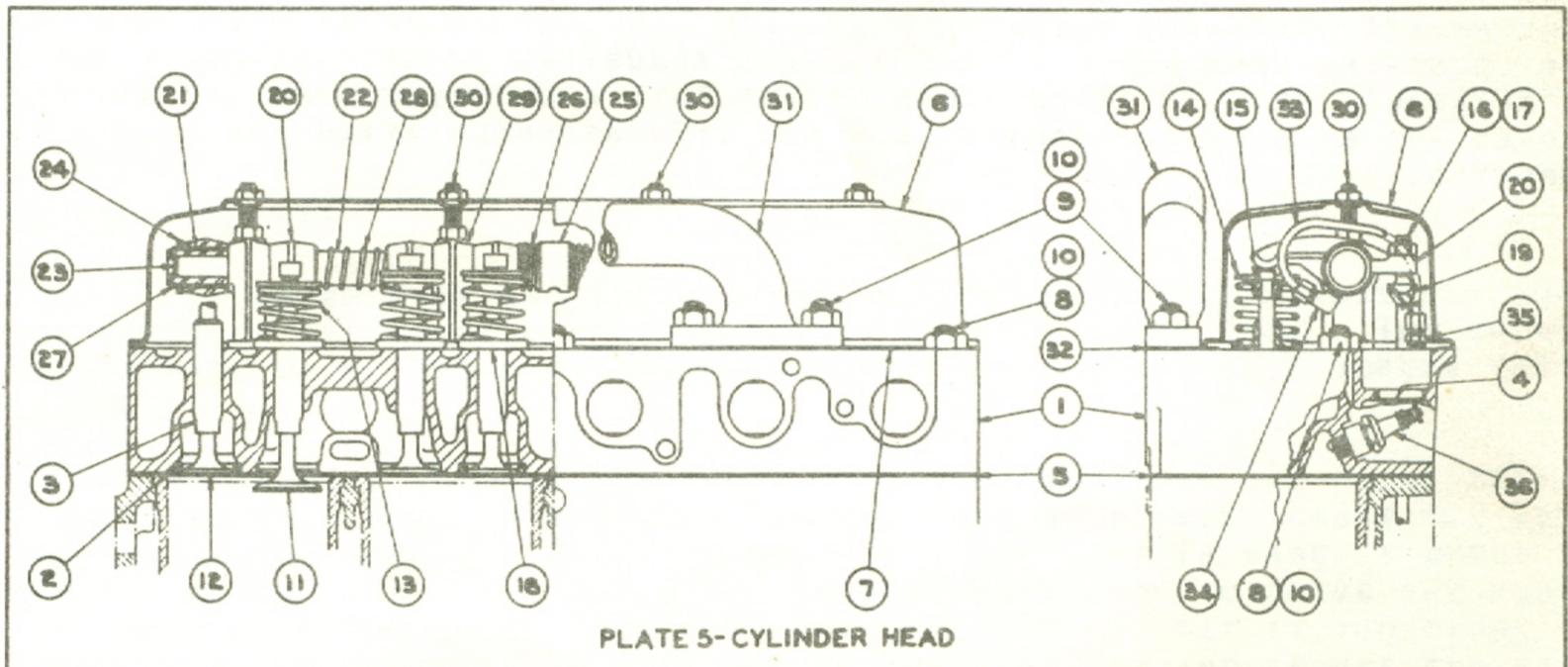
CAMSHAFT

THE CAMSHAFT SHOULD LAST THE LIFE OF THE TRACTOR WITHOUT ATTENTION. HOWEVER SHOULD IT EVER BE REMOVED, CARE SHOULD BE EXERCISED TO PUT IT BACK IN THE ORIGINAL POSITION. THERE ARE MARKS ON THE CAMSHAFT GEAR (2) AND ALSO ON THE CRANKSHAFT GEAR (2) IN PLATE 2.

CYLINDER HEAD AND VALVES

LACK OF COMPRESSION BECAUSE OF LEAKY VALVES MAY BE CAUSED BY EITHER INSUFFICIENT CLEARANCE BETWEEN THE ENDS OF THE ROCKER ARMS (20) AND THE STEMS OF THE VALVES (11) OR (12), OR BY THE COLLECTION OF CARBON AT THE VALVE SEAT, PREVENTING THE CLOSING OF THE VALVE IN EITHER CASE AND PERMITTING THE GASES UNDER COMPRESSION TO ESCAPE, RESULTING IN A LOSS OF POWER AND UNEVEN RUNNING OF THE ENGINE.

IF WHEN CRANKING THE MOTOR, THERE IS A LACK OF RESISTANCE ON ONE OR MORE CYLINDERS. AT THE COMPRESSION POINT, PISTONS AND RINGS ARE IN GOOD SHAPE AND THERE IS SUFFICIENT CLEARANCE BETWEEN THE ROCKER ARMS AND THE VALVE STEMS, IT INDICATES THAT THE VALVES NEED REGRINDING.



TO REGRIND VALVES

DRAIN THE COOLING SYSTEM. DISCONNECT THE FUEL LINE AT SMALL TANK FUEL VALVE. REMOVE THE HOOD STRAP AND HOOD. TAKE OFF THE SIX NUTS WHICH FASTEN THE EXHAUST AND INTAKE MANIFOLD TO CYLINDER HEAD, AND REMOVE THE MANIFOLD. REMOVE THE TOP WATER MANIFOLD BY TAKING OFF THE FOUR NUTS WHICH FASTEN IT TO THE HEAD AND DISCONNECT THE WATER HOSE AT RADIATOR. TAKE OFF THE CYLINDER HEAD COVER (6), DISCONNECT THE OIL LINE FROM PUROLATOR AND REMOVE THE ROCKER ARM ASSEMBLY. REMOVE ALL NUTS THAT HOLD CYLINDER HEAD AND REMOVE THE HEAD.

THE CYLINDER HEAD ON THE "WC" TRACTOR HOLDS THE VALVES, VALVE GUIDES, ETC. WHICH MAKES IT POSSIBLE TO TRANSPORT THE ENTIRE ASSEMBLY TO A CONVENIENT PLACE TO WORK. PLACE THE HEAD ON A GOOD SMOOTH WOOD SURFACE TO REMOVE THE VALVE SPRING CAPS (14) AND TAPER RETAINERS (15). DO NOT PLACE THE CYLINDER HEAD ON A CONCRETE FLOOR AS THIS MAY SCAR THE GROUND FACE OF THE HEAD. PRESS DOWN ON THE SPRING CAP AND REMOVE THE TAPER RETAINERS AND SPRINGS (13). TURN THE CYLINDER OVER AND MARK EACH VALVE TO ASSURE THEIR REPLACEMENT IN THE SAME GUIDE THEY WERE ORIGINALLY.

VALVE WEAR OCCURS ON THE VALVE FACE AND ON THE STEM WHERE IT ENTERS THE VALVE GUIDE. IF THE VALVE FACES ARE BADLY PITTED AND CAN NOT BE RECONDITIONED BY GRINDING, OR IF GROOVES ARE WORN AROUND THE VALVE FACE, THEY SHOULD EITHER BE REPLACED BY A NEW VALVE OR REFACED IN A VALVE REFACING MACHINE. IF THE INTAKE VALVE SEATS ARE IN SUCH SHAPE THAT THEY CAN NOT BE RESTORED BY GRINDING, THEY CAN BE REFACED WITH REAMERS. THE EXHAUST VALVE SEATS (2) ON THE "WC" MOTOR ARE OF HARDENED STEEL AND CAN BE RENEWED WHEN NECESSARY.

VALVE GUIDES (3) SHOULD BE EXAMINED BEFORE ANY ATTEMPT IS MADE TO GRIND OR REFACE THE VALVES OR SEATS. IF THE GUIDES ARE WORN TO MORE THAN .004 A TRUE VALVE SEAT CAN NOT BE OBTAINED. WHERE THIS AMOUNT OF WEAR HAS DEVELOPED, NEW VALVE GUIDES SHOULD BE INSTALLED. THE WORN GUIDES CAN BE DRIVEN OUT USING A PIECE OF BRASS SHAFTING AND A HEAVY HAMMER. IF THE VALVE STEMS SHOW TOO MUCH WEAR, VALVES SHOULD ALSO BE REPLACED.

IF THE GUIDES ARE FOUND TO BE IN GOOD SHAPE OR RENEWED, AND THE VALVES AND SEATS ARE READY FOR GRINDING, SECURE A CAN OF OIL MIXED VALVE GRINDING COMPOUND OF A FINE GRADE.

VALVE GRINDING IS NOT A DIFFICULT JOB BUT REQUIRES TIME AND PATIENCE. A THIN COAT OF THE GRINDING COMPOUND IS SPREAD EVENLY OVER THE FACE OF THE VALVE. VALVE STEM IS INSERTED IN THE VALVE GUIDE AND VALVE IS GIVEN AN OSCILLATING MOVEMENT, USING A BRACE OR VALVE GRINDING TOOL MADE FOR THIS PURPOSE. A LIGHT SPRING THAT FITS THE VALVE STEM AND WITH TENSION ENOUGH TO LIFT THE VALVE FROM ITS SEAT WHEN THE PRESSURE IS REMOVED, WILL HELP IN THIS WORK. WHEN A GOOD EVEN GRAY BAND APPEARS ALL THE WAY AROUND THE VALVE AND SEAT, IT INDICATES A GOOD FIT. WIPE OFF THE VALVE AND SEAT TO REMOVE ALL THE SURPLUS COMPOUND. DO NOT LET ABRASIVE GET ON VALVE STEM. OIL THE STEMS BEFORE THE VALVES, SPRINGS AND RETAINERS ARE REASSEMBLED.

WHEN REPLACING HEAD, EXAMINE CYLINDER HEAD GASKET (5) AND REPLACE WITH A NEW ONE IF POSSIBLE. CLEAN BOTH THE BLOCK AND THE FACE OF THE HEAD SO THAT NO PARTICLES REMAIN TO PREVENT A PERFECT FIT BETWEEN THESE TWO PARTS. TIGHTEN ALL NUTS THAT HOLD THE HEAD, STARTING WITH THE CENTER NUTS. DO NOT TIGHTEN THE OUTSIDE OR END NUTS FIRST.

WHEN THE CYLINDER HEAD HAS BEEN SECURELY TIGHTENED AND THE ROCKER ARM ASSEMBLY PUT BACK IN PLACE, THE ROCKER ARMS WILL HAVE TO BE ADJUSTED TO SECURE THE PROPER CLEARANCE BETWEEN THE ROCKER ARMS AND VALVE STEMS. THIS IS DONE BY LOOSENING LOCK NUT (17) AND TURNING ADJUSTING SCREW (16) UNTIL THE PROPER CLEARANCE OF .012 IS OBTAINED. MAKE THIS ADJUSTMENT WHEN THE VALVES ARE CLOSED AND BE SURE TO TIGHTEN LOCK NUT (17) SECURELY AFTER THE ADJUSTMENT IS COMPLETED.

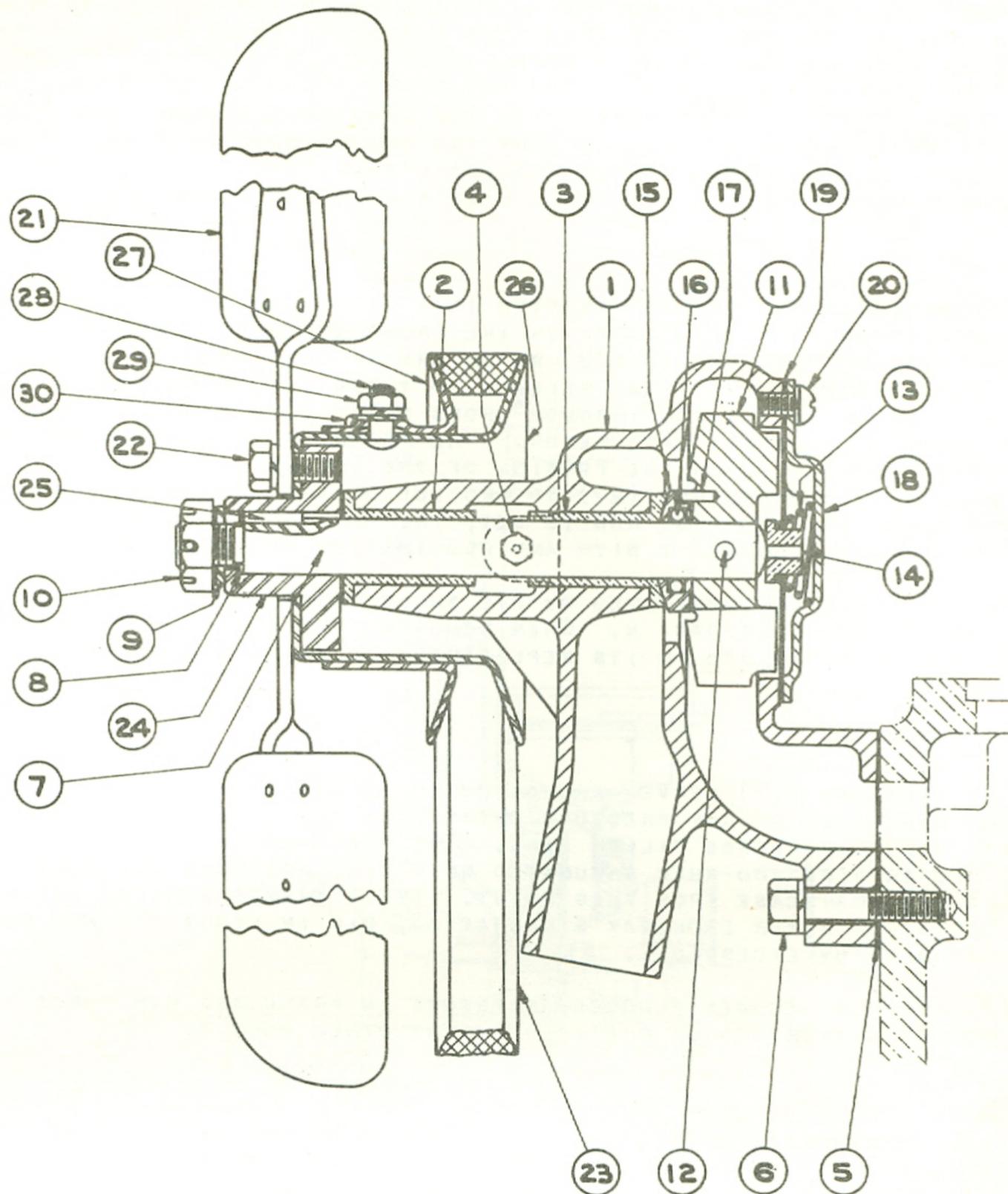


PLATE 6-WATER PUMP & FAN

WATER PUMP AND FAN

THE WATER PUMP AND COOLING FAN ARE OF ONE COMPLETE ASSEMBLY MOUNTED ON THE FRONT OF THE MOTOR BLOCK AND DRIVEN BY A "V" BELT (23). THE DRIVE PULLEY IS MADE UP OF TWO SECTIONS HELD TOGETHER BY THREE LOCK SCREWS (28) AND NUTS (29).

TO ADJUST: LOOSEN THE THREE NUTS (29) AND TURN THE FRONT SECTION (27) BRINGING IT CLOSER TO THE REAR SECTION (26) WHICH WILL CAUSE THE BELT TO RUN HIGHER IN THE GROOVE. WHEN THE DESIRED ADJUSTMENT IS MADE, TIGHTEN THE LOCK SCREW NUTS. THE BELT SHOULD RUN ONLY TIGHT ENOUGH TO DRIVE THE PUMP AND FAN UNIT AND KEEP THE MOTOR FROM OVER-HEATING. DO NOT GET IT TOO TIGHT AS THIS WILL RESULT IN AN UNNECESSARY PRESSURE ON THE BEARINGS AND REDUCE THE LIFE OF THE FAN BELT.

THE WATER PUMP IS OF THE PACKING-LESS TYPE WITH NO PACKING NUTS TO KEEP TIGHT. LEAKAGE WILL SELDOM IF EVER OCCUR AND IF IT DOES, IT WILL BE NECESSARY TO RENEW THE RUBBER PACKING RING (16). THIS CAN BE DONE BY THE REMOVAL OF THE ENTIRE UNIT FROM THE MOTOR BLOCK BY TAKING OUT THE SIX CAPSCREWS AT (6). DISCONNECT HOSE, REMOVE NUT (10) AND PULL THE FAN ASSEMBLY FROM THE SHAFT. REMOVE KEY (25). THEN REMOVE COVER (18) AND PULL OUT THE IMPELLER (11) AND SHAFT (7) AS A UNIT. OLD RUBBER RING CAN THEN BE REMOVED AND NEW RING INSTALLED. IN THE COURSE OF TIME THE WATER PUMP SHAFT (7) AND BUSHINGS (2) AND

(3) MAY BECOME WORN TO A POINT WHERE TOO MUCH STRAIN IS THROWN UPON THE RUBBER RING CAUSING EARLY REPLACEMENTS OF THIS PART. IF THIS OCCURS, INSTALL NEW WATER PUMP SHAFT AND BUSHINGS. THE BUSHINGS CAN BE DRIVEN OUT OF PUMP BODY AND NEW ONES DRIVEN IN. CARE SHOULD BE EXERCISED SO AS TO NOT SWELL THE BUSHINGS AND BE SURE THE SHAFT TURNS FREELY.

A ZERK FITTING (4) IS LOCATED ON THE SIDE OF THE PUMP BODY FOR THE LUBRICATION OF THE PUMP SHAFT AND BUSHINGS AND SHOULD RECEIVE 2 OR 3 STROKES OF THE GREASE GUN DAILY. DO NOT OVER LUBRICATE THIS POINT AS THE SURPLUS GREASE WILL BE FORCED INTO THE COOLING SYSTEM AND IMPAIR RADIATION.

GOVERNOR

THE GOVERNOR ON THE "WC" TRACTOR IS A VERY SIMPLE UNIT AND REQUIRES VERY LITTLE ATTENTION. IT IS LOCATED ON THE FRONT END OF THE MAGNETO DRIVE SHAFT AND CONSISTS OF TWO WEIGHTS (29) WHICH ARE PIVOTED AT PIVOT PIN (31). THE CENTRIFUGAL ACTION CAUSES THESE WEIGHTS TO THROW OUT, EFFECTING A MOVEMENT OF THE GOVERNOR LEVER (40) WHICH THROUGH CROSS SHAFT (37) REGULATES THE MOVEMENT OF THE THROTTLE VALVE AT CARBURETOR. THE AMOUNT OF THE EXPANSION OF THE GOVERNOR WEIGHTS, DEPENDS UPON THE TENSION OF THE SPRING (45). THIS TENSION CAN BE VARIED BY THE CONTROL ROD (47) TO PRODUCE DESIRED SPEED OF THE MOTOR. REGARDLESS OF WHERE THIS CONTROL ROD IS SET, THE GOVERNOR WILL ACT AND THE MOTOR SPEED WILL REMAIN CONSTANT WITH ANY FLUCTUATION OF THE LOAD.

THE GOVERNOR IS LUBRICATED BY OIL THROWN FROM THE TIMING GEARS AND REQUIRES NO GREASE GUN LUBRICATION. WHEN REMOVING THE ENTIRE GOVERNOR ASSEMBLY, CARE SHOULD BE EXERCISED IN ITS REPLACEMENT TO PREVENT GETTING THE MAGNETO OUT OF TIME.

CRANKCASE BREATHER

THE BREATHER (17) SERVES A DUAL PURPOSE. IT SERVES AS A MEANS FOR RELIEVING THE CRANKCASE OF ANY PRESSURE CREATED BY THE LEAKAGE OF COMPRESSION, AND A COVER FOR THE CRANKCASE FILLER PIPE. THE BREATHER IS FILLED WITH THE USUAL METAL FILTER WIRE AND WHEN SATURATED WITH OIL, PREVENTS ANY DUST OR DIRT FROM ENTERING THE CRANKCASE FROM THIS POINT. IT IS THEREFORE VERY IMPORTANT TO WASH THE BREATHER AFTER EACH DAY'S OPERATION, DIP IN LIGHT OIL AND REPLACE AFTER SLINGING OFF ANY EXCESS OIL.

IF BREATHER BECOMES PLUGGED, PRESSURE IN CRANKCASE MAY FORCE THE ENGINE OIL OUT AT EITHER END OF CRANKCASE OR AT OTHER POINTS.

MAGNETO

SPECIAL MAGNETO INSTRUCTIONS ARE MADE UP BY THE MAGNETO MANUFACTURER AND FURNISHED WITH THIS UNIT. THE MAGNETO IS MANUFACTURED BY AN OLD RELIABLE CONCERN AND IS SERVICED THROUGH ITS MANY AUTHORIZED SERVICE STATIONS.

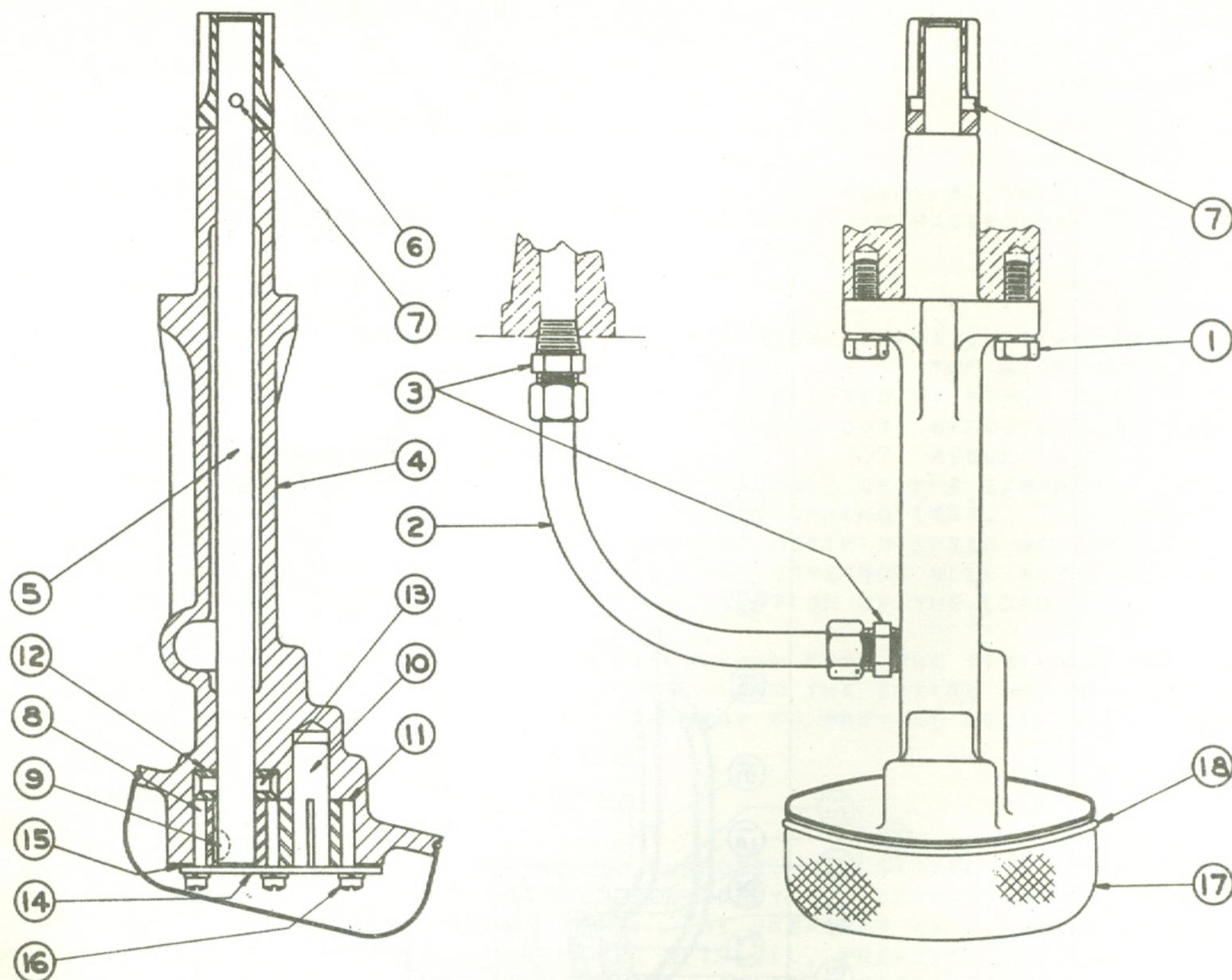


PLATE 8-OIL PUMP

OIL PUMP

AS THE OIL PUMP OPERATES SUBMERGED IN THE CRANKCASE OIL, ITS PARTS ARE NOT SUBJECT TO MUCH WEAR AND NEVER LOSES ITS PRIME. CARBON OR SLUDGE MAY IN TIME CLOG THE OIL PUMP SCREEN. AT THE BEGINNING OF EACH SEASON'S RUN, IT IS ADVISABLE TO REMOVE OIL SUMP AND CLEAN THE SCREEN THOROUGHLY. IN CASE SCREEN SHOULD BECOME DAMAGED, REPLACE WITH A NEW SCREEN.

WHILE THE OIL SUMP IS REMOVED, EXAMINE AND TIGHTEN IF NECESSARY, THE OIL LINE TUBE CONNECTIONS (3) AND THE CAPSCREWS (1). ALSO CHECK THE CONNECTING ROD BEARINGS AND COTTER PINS IN THE CONNECTING ROD BOLTS.

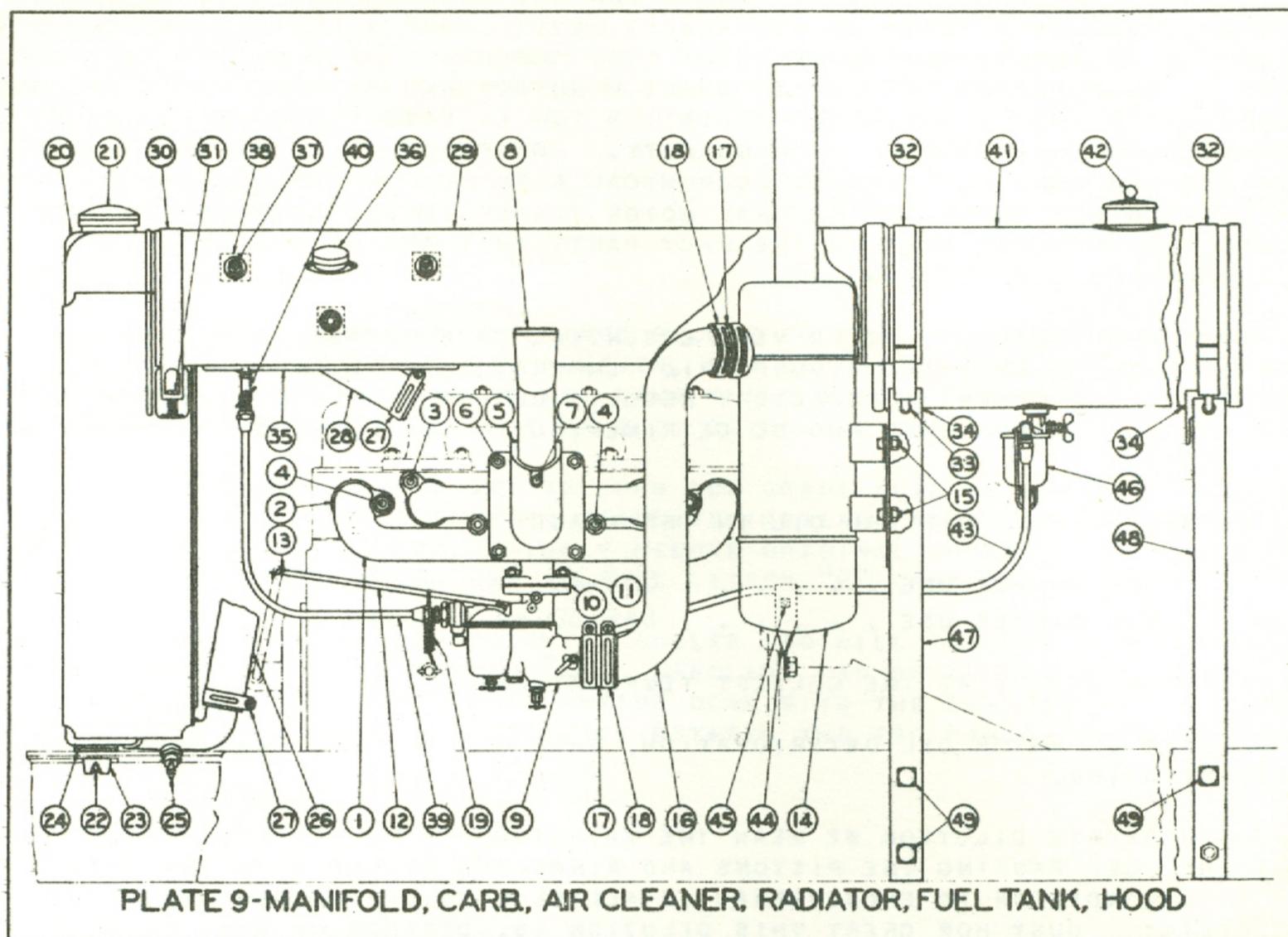
THE OIL PUMP CAN BE VERY EASILY REMOVED FROM THE MOTOR IN CASE REPLACEMENT OF GEARS IS NECESSARY.

AIR CLEANER

THE AIR CLEANER ON THE "WC" TRACTOR (14) IS OF THE OIL TYPE, DUAL ACTION. OIL FOR WASHING THE AIR IS CARRIED IN A CUP AT THE LOWER END OF THE CLEANER BODY. ALL AIR TAKEN INTO THE ENGINE PASSES DOWN THROUGH AN AIR PASSAGE ENTIRELY SEPARATE FROM THE CONTAINER CONTAINING THE WIRE FILTER ELEMENT. A SKIRT EXTENDS DOWN INTO THE OIL IN THE OIL CUP. AIR MUST TRAVEL AROUND THIS SUBMERGED SKIRT AND IS THEREFORE FORCED TO TRAVEL THROUGH THE OIL BEFORE IT ENTERS THE CLEANING MEMBER. A MAJOR PORTION OF THE DIRT IS REMOVED IN THIS OPERATION. THEN, DUE TO THE CONSTRUCTION, THE AIR SETS UP A WHIRLING ACTION THAT SPRAYS THE CLEANING ELEMENT WITH OIL, KEEPING IT WASHED CLEAN AND SATURATED SO THAT NO DIRT CAN FOLLOW THE AIR ON ITS JOURNEY THROUGH THE CLEANING ELEMENT TO THE ENGINE.

BEFORE PUTTING YOUR TRACTOR IN SERVICE, REMOVE THE OIL CUP AND SEE THAT IT IS FILLED WITH LIGHT ENGINE OIL TO THE LEVEL OF THE BEAD PRESSED IN THE CUP. THEN AFTER EACH TEN HOURS OF OPERATION, REMOVE THE CUP, EMPTY ALL OIL AND CLEAN OUT THOROUGHLY AND REFILL WITH FRESH CLEAN OIL. USED CRANKCASE OIL WILL BE SATISFACTORY IF CLEAN AND LIGHT IN BODY. THE USE OF A HEAVY OIL IN CUP WILL RESTRICT THE FLOW OF AIR, RESULTING IN AN OVER-RICH CARBURETOR MIXTURE AND WILL IMPAIR THE AIR CLEANER'S EFFICIENCY.

A BROKEN HOSE, LOOSE CLAMPS, OR A LEAK OF ANY KIND BETWEEN THE AIR CLEANER AND THE CARBURETOR DEFEATS THE PURPOSE OF THIS UNIT AND NEGLECT OF ITS CARE WILL RESULT IN ABNORMAL WEAR ON THE PISTONS, RINGS, AND CYLINDER LINERS NECESSITATING THE EARLY REPLACEMENT OF THESE PARTS.



FUEL FILTER

THE FUEL FILTER (46) UNDER FUEL TANK IS FOR THE PURPOSE OF REMOVING ANY FOREIGN SUBSTANCE THAT MAY GET INTO THE FUEL TANK. THIS SHOULD BE CLEANED AT REGULAR INTERVALS. REMOVE THE GLASS BOWL AND WASH OUT THOROUGHLY; ALSO CLEAN SCREEN.

CARBURETOR

SPECIAL CARBURETOR INSTRUCTIONS HAVE BEEN MADE UP BY THE MANUFACTURER OF THIS UNIT AND ARE ATTACHED TO THIS BOOK. STUDY THESE CAREFULLY AND PRESERVE FOR REFERENCE.

COOLING SYSTEM

THE COOLING OF THE "WC" TRACTOR MOTOR IS BY RADIATOR, WATER PUMP, AND FAN, AND RAIN OR SOFT WATER SHOULD BE USED IF AVAILABLE. HARD OR ALKALINE WATER WILL FORM A SCALE WHICH WILL IMPAIR RADIATION. THE USE OF A WASHING SODA WILL HELP TO DISSOLVE THIS SCALE, AND WHERE ONLY HARD OR ALKALINE WATER IS USED, THE WASHING SODA SHOULD BE USED AT REGULAR INTERVALS AND BEFORE THE ACCUMULATION OF SCALE BECOMES HEAVY ENOUGH TO STOP UP THE RADIATOR.

IN COLD WEATHER OPERATION, AN ANTI-FREEZE SOLUTION CAN BE USED IN THE RADIATOR. HOWEVER, ALCOHOL CAN NOT BE USED WHEN LOW GRADE FUEL IS BEING BURNED, AS THE BOILING POINT OF ALCOHOL IS EXTREMELY LOW MAKING IT IMPOSSIBLE TO MAINTAIN THE PROPER ENGINE TEMPERATURE WITHOUT BOILING AWAY THE ALCOHOL. IF LOW GRADE FUEL IS BEING USED, AN ANTI-FREEZE SUCH AS GLYCERINE OR SOME SIMILAR SOLUTION CAN BE USED IN THE COOLING SYSTEM.

DO NOT RUN THE ENGINE WITHOUT WATER IN THE RADIATOR.

NEVER POUR COLD WATER INTO A HOT ENGINE WHEN WATER IS LOW.

THERE ARE TWO POINTS TO DRAIN ON THE COOLING SYSTEM. A DRAIN COCK (25) IS LOCATED UNDER THE RADIATOR AND ONE ON THE MOTOR BLOCK NEAR THE CARBURETOR.

LUBRICATION AND FUELS

THE VITAL IMPORTANCE OF CORRECT LUBRICATION CAN NOT BE OVER-EMPHASIZED. QUALITY IN MOTOR CRANKCASE OIL IS DIFFICULT FOR THE AVERAGE OPERATOR TO DETERMINE, AND EVEN LABORATORY TESTS DO NOT ALWAYS REVEAL JUST WHAT WILL HAPPEN TO AN OIL WHEN USED IN AN ENGINE CRANKCASE. THE BEST ASSURANCE OF SECURING AN OIL OF HIGH QUALITY IS TO PURCHASE THE BETTER GRADE MANUFACTURED BY A RELIABLE OIL COMPANY WHO HAS ESTABLISHED A NATIONAL REPUTATION FOR QUALITY PRODUCTS AND WHOSE SUCCESS DEPENDS UPON MAINTAINING SUCH QUALITY. LOW GRADE OILS ARE MADE TO MEET COMPETITION AND ARE SELDOM, IF EVER, ECONOMICAL ALTHOUGH THE PRICE MAY BE LOWER. THESE USUALLY THIN OUT UNDER THE NATURAL MOTOR TEMPERATURES, CAUSING CORROSION OF THE VALVES AND ABNORMAL WEAR ON THE MANY PARTS THAT ARE DEPENDENT ON THE CRANKCASE SUPPLY FOR LUBRICATION.

ALONG WITH QUALITY, IT IS VERY ESSENTIAL TO PURCHASE AN OIL OF THE PROPER BODY TO FIT THE EXISTING ATMOSPHERIC TEMPERATURES. EVEN THE VERY BEST GRADE OF OIL THAT HAS GIVEN SATISFACTORY RESULTS DURING THE SUMMER MONTHS, MAY NOT FLOW AT COLDER TEMPERATURES AND BE DETRIMENTAL TO THE WORKING PARTS OF THE ENGINE.

USE ONLY A PURE MINERAL OIL IN CRANKCASE.

FOR SUMMER USE SAE-40
FOR WINTER USE SAE-30 OR LIGHTER

ALL OILS MUST FLOW FREELY AT THE COLDEST TEMPERATURES.

A PHASE OF MOTOR OIL DETERIORATION, PROBABLY THE MOST SERIOUS OF ALL, IS CRANKCASE DILUTION.

BY CRANKCASE DILUTION WE MEAN THE THINNING OF THE OIL BY CERTAIN PORTIONS OF THE FUEL PASSING THE PISTONS AND RINGS AND MIXING WITH THE CRANKCASE OIL. THIS CONDITION IS ENCOUNTERED IN ALL CLASSES OF ENGINES REGARDLESS OF MAKE OR DESIGN. JUST HOW GREAT THIS DILUTION IS, DEPENDS ON MANY THINGS. IT MAY BE CAUSED BY IMPROPER ENGINE TEMPERATURES, OVER-RICH MIXTURE FROM IMPROPER CARBURETOR ADJUSTMENT OR RESTRICTED AIR INTAKE TO THE CARBURETOR DUE TO DIRTY AIR CLEANER, OR FROM SUCH MECHANICAL FAULTS AS WORN CYLINDER LINERS, BAD RINGS, FAULTY VALVES, DEAD OR FOULED SPARK PLUGS OR WEAK IGNITION FROM ANY CAUSE THAT MIGHT PRODUCE MISFIRING.

THE MOST COMMON OF THESE IS IMPROPER ENGINE TEMPERATURES, ESPECIALLY WHEN THE WEATHER IS COOL AND WHEN LOW GRADE FUEL SUCH AS KEROSENE OR DISTILLATE IS BEING USED.

IT IS SOMETIMES A PROBLEM FOR AN INEXPERIENCED OPERATOR TO OPERATE A TRACTOR PROPERLY ON LOW GRADE FUEL. HOWEVER, THE PROBLEM IS SIMPLE IF THE FOLLOWING INSTRUCTIONS ARE CARRIED OUT.

- 1 - SELECT THE BEST GRADE OF LOW GRADE FUEL YOU CAN GET, SUCH AS KEROSENE, No. 1 DISTILLATE OR FUEL HAVING SIMILAR POWER QUALITIES, WITH A GRAVITY OF 39.1 OR AS NEAR TO IT AS POSSIBLE.
- 2 - COVER THE RADIATOR AND LET THE ENGINE WARM UP THOROUGHLY ON GASOLINE. NEVER TURN ON THE LOW GRADE FUEL UNTIL THE COOLING SOLUTION IS NEAR THE BOILING POINT AND WHEN OPERATING IN COOL WEATHER KEEP SUFFICIENT COVER ON RADIATOR TO MAINTAIN THIS TEMPERATURE.
- 3 - ALWAYS TURN OFF LOW GRADE FUEL AND SWITCH TO GASOLINE BEFORE ENGINE IS STOPPED IN ORDER THAT CARBURETOR WILL CONTAIN GASOLINE WHEN ENGINE IS AGAIN STARTED.
- 4 - DRAIN CRANKCASE OIL DOWN TO THE LEVEL OF THE DRAIN COCK ON THE SIDE OF THE OIL SUMP AFTER EACH TEN HOURS OF OPERATION AND ADD SUFFICIENT FRESH OIL TO THE CRANKCASE TO BRING THE LEVEL UP TO THE FULL MARK ON THE OIL GAUGE ROD. AFTER EACH 30 HOURS OF OPERATION, DRAIN ALL THE OIL FROM THE CRANKCASE AND REFILL TO THE FULL MARK ON GAUGE.

BY FOLLOWING THESE FOUR SIMPLE INSTRUCTIONS YOU WILL FIND THAT YOUR MOTOR WILL BURN UP THE LOW GRADE FUEL IN THE COMBUSTION CHAMBER RESULTING IN A MINIMUM AMOUNT OF DILUTION OF THE CRANKCASE OIL.

IT IS CONSIDERED GOOD PRACTICE TO REMOVE THE OIL SUMP AND CLEAN OUT THE SUMP AND OIL SCREEN AT THE BEGINNING OF EACH SEASON'S RUN.

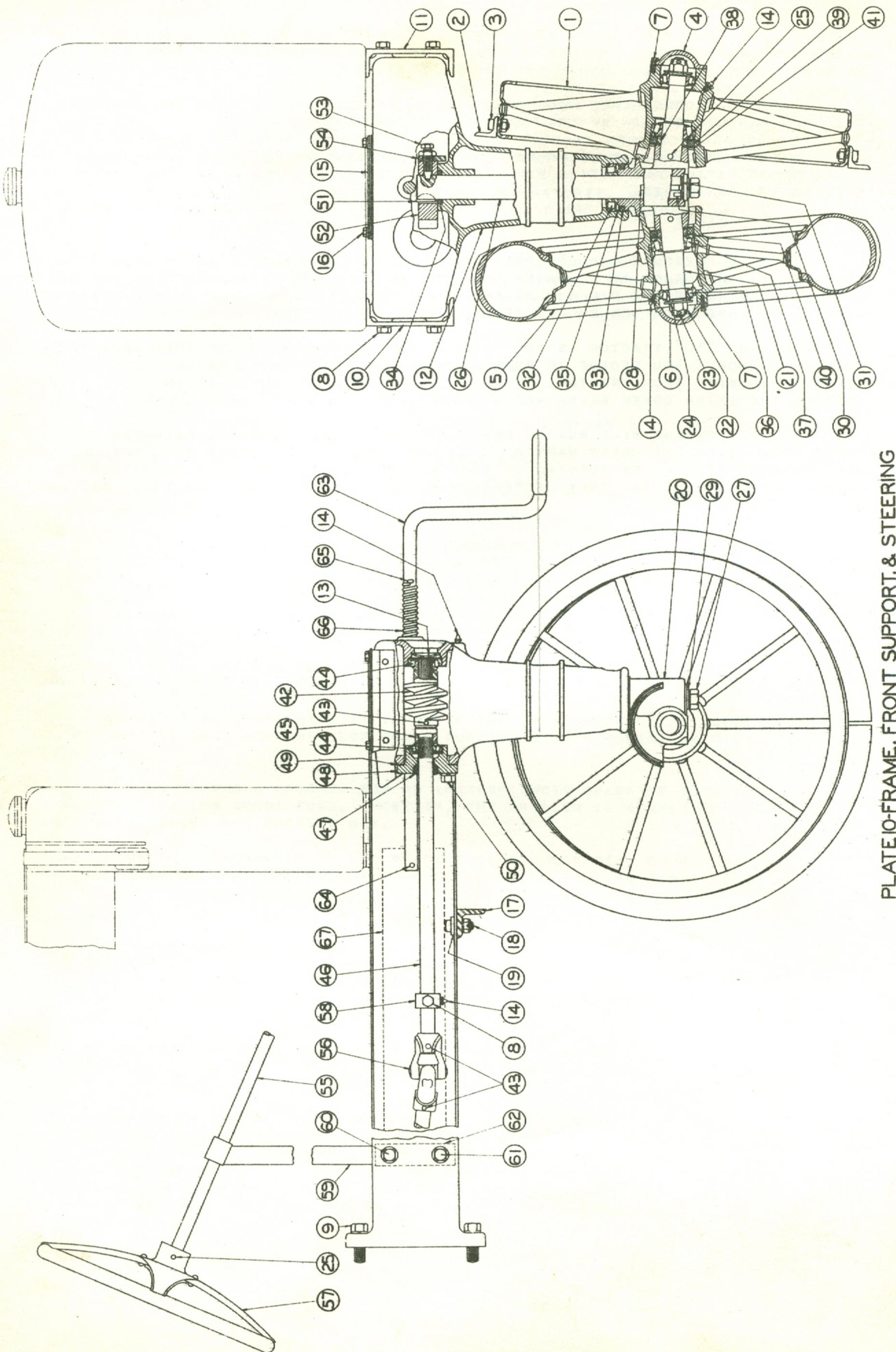
IF GASOLINE IS BEING USED AS FUEL, DRAIN THE OIL SUMP AFTER EACH 60 HOURS OF OPERATION AND REFILL WITH FRESH OIL OF THE PROPER BODY TO MEET THE EXISTING TEMPERATURES.

OIL PRESSURE GAUGE

OIL PRESSURE GAUGES SOMETIMES BECOME BROKEN AND DO NOT REGISTER CORRECTLY. IN THE MAJORITY OF CASES HOWEVER, LOW OIL GAUGE REGISTRATION IS CAUSED BY THE THINNING OF THE OIL AND AT ANY TIME WHERE A SUDDEN DROP IN OIL PRESSURE OCCURS, AN INVESTIGATION SHOULD BE MADE TO DETERMINE THE CAUSE.

THE "WC" TRACTOR IS SET TO BURN LOW GRADE FUEL AS SHIPPED FROM THE FACTORY. SHOULD YOU DECIDE TO BURN GASOLINE INSTEAD, AN EXTRA MANIFOLD COVER IS SUPPLIED WITH EACH TRACTOR. SIMPLY REMOVE ORIGINAL COVER (5 IN PLATE 9) AND INSTALL THE EXTRA COVER WHICH HAS A LARGE LETTER "G" CAST ON IT.

THE ENGINE WILL RUN SLIGHTLY COOLER AND WILL DEVELOP SLIGHTLY MORE POWER WHEN USING THE COVER MARKED "G". GASOLINE CAN BE BURNED WITH THE ORIGINAL COVER MARKED "K" BY TURNING IT UPSIDE DOWN WITH THE EXHAUST PIPE POINTING TOWARD THE GROUND. THE ONLY DIFFERENCE BETWEEN THE TWO PARTS IS THE DIRECTION OF THE EXHAUST PIPE.



PLATEIO-FRAME, FRONT SUPPORT, & STEERING

FRONT WHEELS AND STEERING GEAR

IF THE FRONT WHEEL HUBS ARE KEPT FULL OF A GOOD GRADE OF GREASE AS EXPLAINED ON PAGE 4, NO DIRT CAN ENTER TO PRODUCE WEAR ON THE BEARINGS. AT REGULAR INTERVALS, REMOVE THE WEIGHT FROM THE FRONT WHEELS AND CHECK FOR END PLAY. IF THIS DEVELOPS, IT CAN BE TAKEN OUT BY THE REMOVAL OF THE COTTER PIN AND TURNING NUT (22) TO THE RIGHT THE REQUIRED AMOUNT TO TAKE OUT THE PLAY BUT SHOULD NOT BE TIGHT ENOUGH TO PRODUCE A BIND. WHEN THE FINAL POSITION OF THE NUT IS DETERMINED, WHEEL SHOULD TURN FREELY WITH NO PLAY. PUT THE COTTER PIN BACK IN PLACE. BEFORE GOING INTO EACH SEASON'S RUN, FRONT WHEELS SHOULD BE REMOVED AND BEARINGS (36) AND (37) AND THE WHEEL HUBS THOROUGHLY WASHED OUT WITH GASOLINE, NEW FELT WASHER (39) INSTALLED AND THE BEARINGS PACKED WITH CLEAN GREASE.

THE STEERING SPINDLE SHAFT (26) CARRIES A TAPER ROLLER BEARING (32) AT THE LOWER END. THIS BEARING CARRIES THE WEIGHT OF THE FRONT END AND NO ADJUSTMENT IS EVER REQUIRED. IF KEPT PROPERLY LUBRICATED, THIS BEARING SHOULD NEVER NEED REPLACEMENT. SHOULD IT REQUIRE REPLACING, REMOVE THE WEIGHT FROM THE FRONT END AND REMOVE THE FRONT WHEELS. REMOVE COVER (15) FROM FRONT SUPPORT CASTING, BACK OUT SET SCREW (53), AND DRIVE SHAFT (26) DOWN, USING CARE TO PREVENT BATTERING THE SHAFT END. WHEN RENEWING BEARING (32) INSTALL NEW CORK SEAL (33). WHEN REASSEMBLING, INSERT THE SHAFT IN THE FRONT SUPPORT AND ALLOW THE WEIGHT OF THE FRONT END TO REST ON THE FRONT WHEELS. A NEW CORK SEAL (34) SHOULD BE INSTALLED BEFORE GEAR (52) IS PUT BACK IN PLACE. WHEN THIS GEAR IS INSTALLED, BE SURE THE SET SCREW IS SEATED IN THE HOLE IN SPINDLE SHAFT AND THAT SET SCREW AND LOCK NUT ARE TIGHT. THE UPPER BEARING IS EQUIPPED WITH A ZERK FITTING AND THIS SHOULD BE GIVEN SUFFICIENT GREASE TO WORK OUT AS THE SURPLUS GREASE DROPS DOWN AND LUBRICATES THE LOWER BEARING (32).

THE STEERING WORM SHAFT (46) IS MOUNTED ON TWO TAPER ROLLER BEARINGS (44) IN THE FRONT SUPPORT CASTING. ANY END PLAY WHICH MAY DEVELOP IN THIS SHAFT CAN BE TAKEN UP BY THE REMOVAL OF SHIMS (49). BE SURE SHAFT TURNS FREELY AFTER ADJUSTMENT. SHOULD IT BE NECESSARY TO REMOVE THE ENTIRE SHAFT, REMOVE PIN (43) FROM THE FRONT OF THE UNIVERSAL JOINT, REMOVE CAPSCREW (8) FROM BEARING (58). REMOVE THE TWO CAPSCREWS (50) FROM BEARING CAGE (48) AND PULL THE ENTIRE ASSEMBLY OUT OF THE FRONT SUPPORT.

THE ZERK FITTING IN BEARING (58) SHOULD BE GREASED DAILY. AN OIL SEAL (47) IS PROVIDED IN THE BEARING CAGE (48) TO PREVENT LEAKAGE OF OIL AROUND THE STEERING SHAFT AND TO PREVENT DIRT FROM ENTERING THE BEARINGS.

TRANSMISSION OIL SHOULD BE USED FOR THE LUBRICATION OF THE WORM AND WORM GEAR AND IS PUT IN THROUGH THE OPENING ON THE TOP OF THE FRONT SUPPORT AND COVERED BY PLATE No. 15. FILL TO A POINT WHERE WORM GEAR IS ABOUT ONE-THIRD-SUBMERGED. IF THE OIL LEVEL IS CARRIED TOO HIGH, LEAKAGE WILL OCCUR THROUGH THE SPINDLE SHAFT BEARINGS.

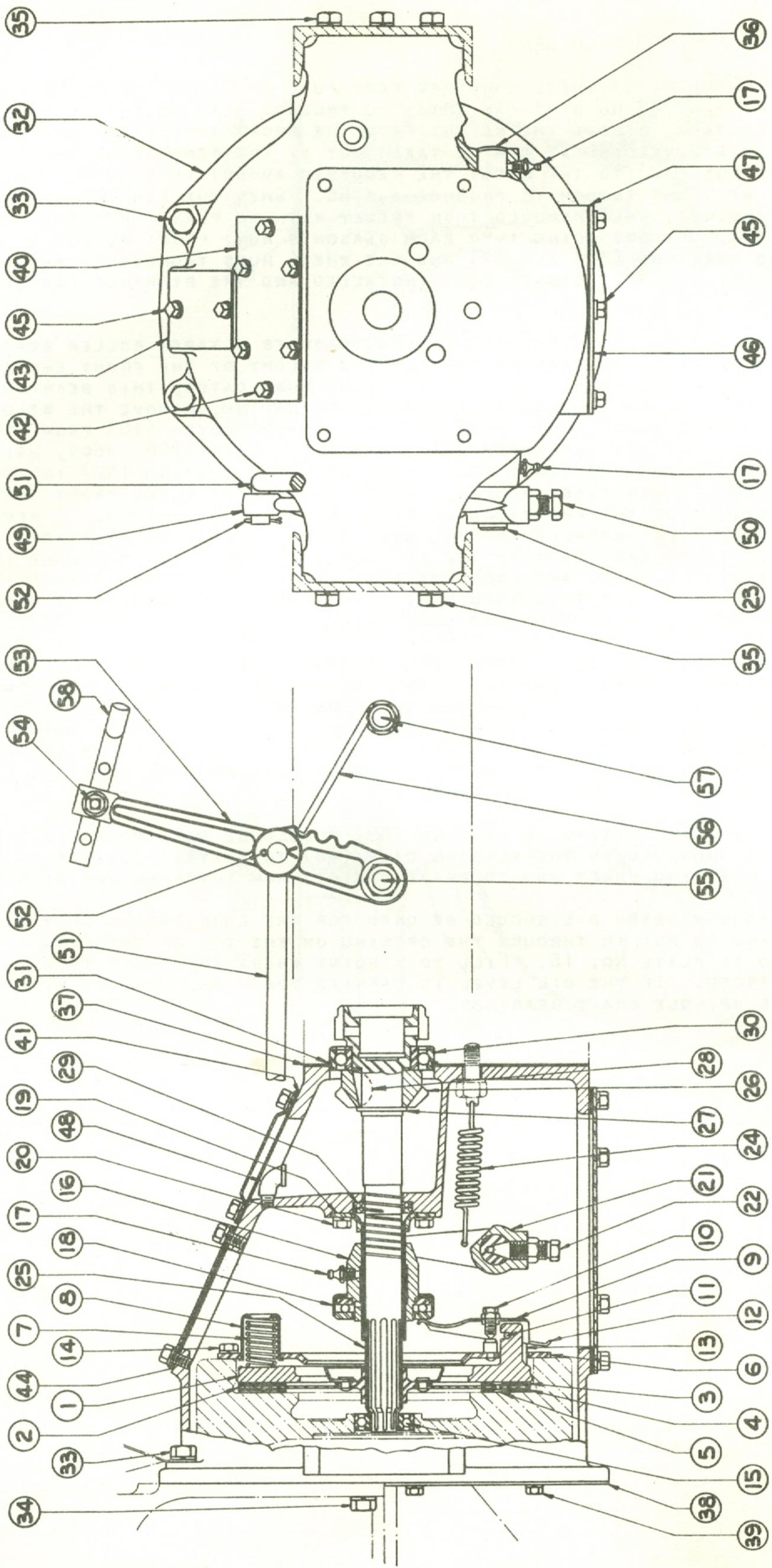


PLATE II-CLUTCH & CLUTCH HOUSING

CLUTCH

THE OPERATION OF THE CLUTCH ON THE "WC" TRACTOR IS BY MEANS OF FRICTIONAL ENGAGEMENT BETWEEN TWO SETS OF PLATES FORCED TOGETHER BY PRESSURE SPRINGS (7). THE BODY OF THE FLYWHEEL ACTS AS ONE OF THESE PLATES OR THE DRIVING MEMBER. NEXT TO THIS IS PLACED THE CLUTCH PLATE (2) TO WHICH CLUTCH FACINGS (3) AND (4) ARE RIVETED. A COMPLETE SET OF FACINGS CONSIST OF 4 SECTIONS $1/8$ " THICK AND 4 SECTIONS $5/32$ " THICK. THESE ARE TO BE ALTERNATED ON CLUTCH PLATE (2) WHEN REFACING BECOMES NECESSARY. START ON ONE SIDE OF THE PLATE WITH A $1/8$ " FACING. NEXT TO THIS ON THE SAME SIDE PLACE A $5/32$ " FACING, THEN A $1/8$ " FOLLOWED BY ANOTHER $5/32$ " PIECE. OPPOSITE THIS $5/32$ " FACING PLACE A $1/8$ " FACING, NEXT A $5/32$ " AND SO ON AROUND THE PLATE. WHEN THESE FACINGS ARE RIVETED TO THE PLATE BE SURE TO COUNTERSINK THE RIVETS AND SEE THAT EACH FACING IS TIGHT AGAINST THE PLATE.

THE DRIVEN MEMBER IS A CAST PRESSURE PLATE (1) AGAINST WHICH THE SPRINGS (7) EXERT PRESSURE AT ALL TIMES. TO THE CENTER OF CLUTCH PLATE (2) A HUB IS RIVETED WHICH IS SPLINED TO CORRESPOND TO THE SPLINES ON CLUTCH SHAFT (25). RELEASE LEVER (9) IS CONNECTED TO THE DRIVEN MEMBER (1) BY RELEASE LEVER PIN (11). THIS RELEASE LEVER IS PIVOTED ON A POINTED SET SCREW (10). WHEN THE CLUTCH IS DISENGAGED BY THE PRESSURE OF THE FOOT PEDAL AT THE OPERATOR'S LEFT, THE CLUTCH FORK (21) MOVES CLUTCH SHIFTER FORWARD CAUSING THE THROW-OUT BEARING (18) TO CONTACT THE ENDS OF THE THREE RELEASE LEVERS (9). THE CONTINUED FORWARD MOVEMENT OF THIS CLUTCH SHIFTER FORCES THE DRIVEN CLUTCH MEMBER BACK AGAINST THE SPRING TENSION RELEASING THE PRESSURE ON THE CLUTCH PLATE AND ALLOWING THE ENGINE TO RUN FREE.

CLUTCH PILOT BEARING (15) IS PACKED WITH GREASE AT THE TIME OF ASSEMBLING AND REQUIRES NO ATTENTION EXCEPT TO REPACK WITH GREASE, IF CLUTCH IS REMOVED.

THE CLUTCH ADJUSTMENT IS EFFECTED BY THE REMOVAL OF THE BOTTOM COVER (46) ON THE CLUTCH HOUSING AND THE MOVEMENT OF THE THREE ADJUSTING SCREWS (10). THE PRESSURE ON THE CLUTCH PLATE IS DEPENDENT UPON THE PRESSURE SPRINGS AND THE ONLY ADJUSTMENT NECESSARY IS TO PROVIDE CLEARANCE BETWEEN THE ENDS OF THE RELEASE LEVERS AND THE BALL THROWOUT BEARING (18) TO PREVENT THE RELEASE LEVERS FROM PARTLY REDUCING THIS PRESSURE AND CAUSING THE CLUTCH TO SLIP. THE BOTTOM COVER (46) SHOULD BE REMOVED AT REGULAR INTERVALS AND A CHECK MADE ON THE AMOUNT OF CLEARANCE BETWEEN THE THREE RELEASE LEVERS AND THE THROWOUT BEARING WHICH SHOULD BE $1/4$ INCH. AS THE CLUTCH FACINGS WEAR, THIS CLEARANCE BECOMES LESS; AND SHOULD CLUTCH SHOW A TENDENCY TO GET HOT, IT INDICATES THAT THE CLEARANCE BETWEEN THE LEVERS AND THROWOUT BEARING HAS BEEN USED UP AND THE ADJUSTING SCREWS (10) SHOULD BE BACKED OUT AN EQUAL AMOUNT UNTIL $1/4$ -INCH CLEARANCE HAS BEEN OBTAINED.

THE CLUTCH SHIFTER (16) AND THE BALL THROWOUT BEARING (18) ARE LUBRICATED BY THE ZERK FITTING (17) AND SHOULD BE GIVEN TWO OR THREE STROKES OF THE GUN EACH 30 HOURS OF OPERATION. THE OVER LUBRICATING OF THIS BEARING WILL RESULT IN THE EXCESS GREASE GETTING ON THE CLUTCH FACINGS AND CAUSE THE CLUTCH TO SLIP OR BE SLUGGISH IN ACTION. THIS ZERK FITTING IS REACHED BY THE REMOVAL OF THE SMALL COVER (43) ON TOP OF THE CLUTCH HOUSING. TWO ZERK FITTINGS ARE PROVIDED ON THE ENDS OF THE CLUTCH FORK SHAFT BEARINGS AND REQUIRE GREASING DAILY.

TO REMOVE THE CLUTCH UNIT: REMOVE THE TWO CAPSCREWS THAT FASTEN THE RADIATOR TO THE MAIN FRAME. DISCONNECT THE AIR CLEANER HOSE AT CARBURETOR AND THE FUEL LINES AT THE TWO TANKS. REMOVE THE CAPSCREWS ON THE TOP OF THE CLUTCH HOUSING. REMOVE THE PIN IN THE STARTING CRANK AND PULL THIS OUT. LOOSEN THE STRAP OVER THE HOOD AT RADIATOR, BLOCK UP UNDER THE MOTOR AND REMOVE THE TWO CAPSCREWS ON THE SIDE OF THE CLUTCH HOUSING AND THE TWO BOLTS IN THE MAIN CHANNEL THAT FASTEN FRONT MOTOR SUPPORT. DISCONNECT THE THROTTLE ROD AND MOVE THE MOTOR FORWARD. THE PILOT BEARING (15) SHOULD REMAIN IN THE FLYWHEEL RECESS AND THE CLUTCH WILL SLIDE OFF THE SPLINED SHAFT (25). BY THE REMOVAL OF THE SIX CAPSCREWS (14) THE DRIVEN PLATE (1) CAN BE REMOVED. THE CLUTCH PLATE (2) CAN THEN BE TAKEN OUT. TO REASSEMBLE, REVERSE THIS ACTION AND REPACK THE PILOT BEARING WITH GREASE.

IN CASE CLUTCH FACINGS BECOME DIRTY OR GUMMED UP FROM GREASE AND DIRT, THEY CAN BE WASHED BY THE REMOVAL OF THE TOP AND BOTTOM COVERS ON CLUTCH HOUSING AND GIVEN A BATH OF KEROSENE. APPLY THIS WHILE THE ENGINE IS RUNNING AND ENGAGE AND DISENGAGE THE CLUTCH WHILE IT IS BEING APPLIED. THIS WILL HAVE A SCRUBBING EFFECT ON THE FACINGS AND WILL WASH OUT THE GREASE OR DIRT THAT HAS EFFECTED THE CLUTCH OPERATION.

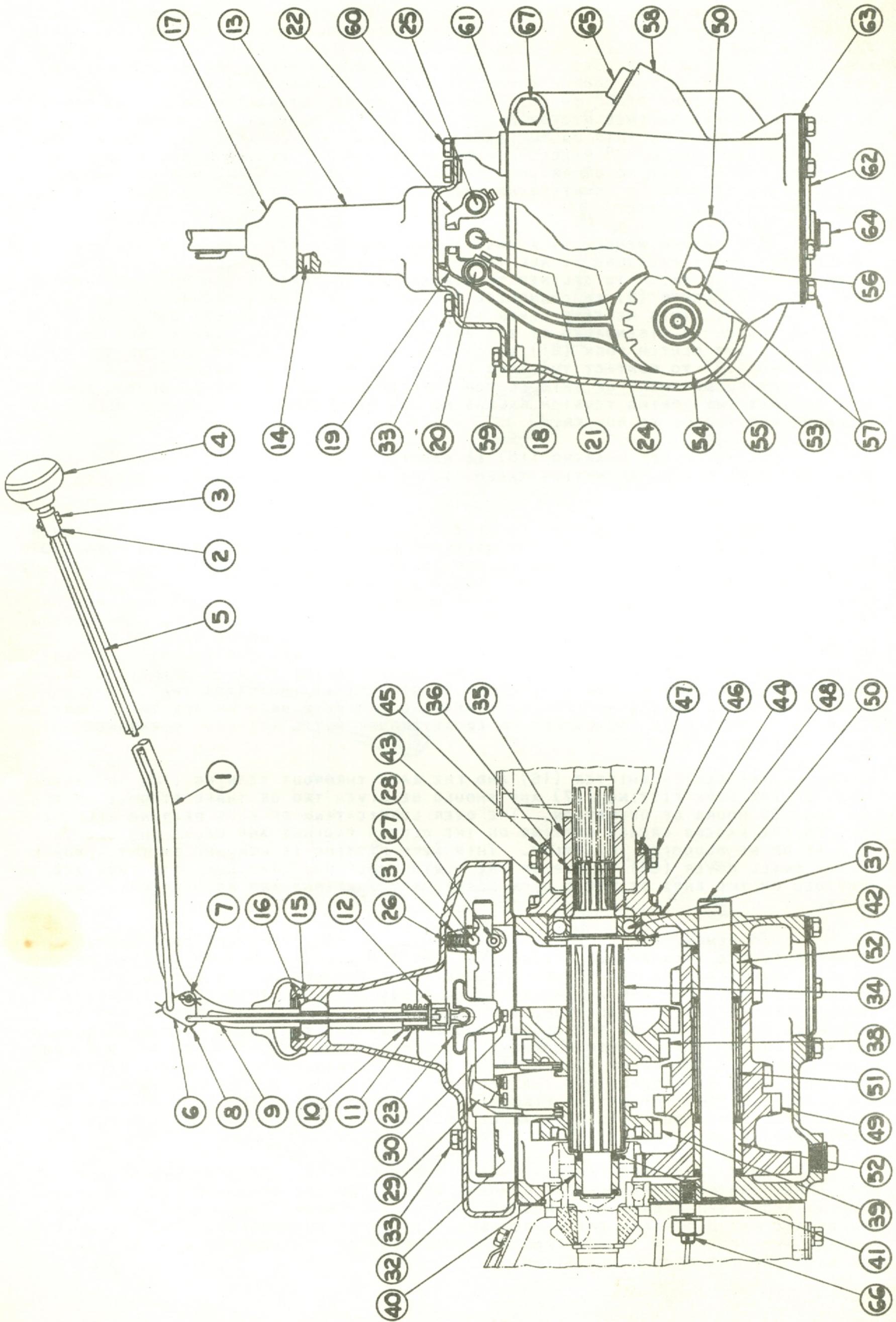


PLATE 12- TRANSMISSION

TRANSMISSION

SINCE IT IS NECESSARY TO KEEP THE MOTOR SPEED SOMEWHERE NEAR NORMAL AND TO VARY THE SPEED OF THE GROUND WHEELS TO CONFORM TO THE VARIOUS TYPES OF WORK TO WHICH A TRACTOR IS SUBJECTED, IT IS NECESSARY TO PLACE IN BETWEEN THE POWER UNIT AND THE FINAL DRIVE, A SERIES OF GEARS OF VARIOUS SIZES AND A METHOD OF MOVEMENT OF CERTAIN GEARS IN THIS SERIES, TO OBTAIN A VARIATION OF SPEED OF THE GROUND WHEELS.

THIS UNIT IS CALLED THE TRANSMISSION AND SELDOM GIVES TROUBLE IF KEPT PROPERLY LUBRICATED. A GRADE OF TRANSMISSION OIL SHOULD BE USED THAT FITS THE EXISTING ATMOSPHERIC TEMPERATURES. USE ONLY AN APPROVED OIL OF SAE-160 FOR SUMMER AND SAE-90 FOR WINTER. DO NOT USE A FIBER GREASE. KEEP OIL LEVEL UP TO THE LEVEL OF THE FILLER PLUG LOCATED ON THE SIDE OF THE TRANSMISSION CASE.

WHERE CONTINUED BELT WORK IS BEING DONE WITHOUT MOVING THE TRACTOR, FOLLOW THE INSTRUCTIONS GIVEN UNDER THE HEADING OF "BELT PULLEY".

TRANSMISSION OILS MAY BECOME CONTAMINATED BY PARTICLES FROM THE INSIDE OF THE TRANSMISSION CASE. THESE ABRASIVES WHICH ARE HELD IN SUSPENSION BY THE THICK BODY OF THE OIL, CIRCULATE AND CAUSE SERIOUS WEAR IF ALLOWED TO REMAIN IN THE TRANSMISSION CASE OVER A LONG PERIOD OF TIME. IT IS CONSIDERED GOOD PRACTICE TO CHANGE THE TRANSMISSION OIL IN A NEW TRACTOR AFTER THE FIRST WEEK OF OPERATION WHICH INSURES THE REMOVAL OF ANY ABRASIVES WHICH MIGHT ACCUMULATE FROM NEW PARTS OR ASSEMBLING. AFTER THAT, DRAIN THE OIL AFTER EACH SEASON'S RUN, WASH OUT THOROUGHLY WITH KEROSENE AND REFILL WITH FRESH OIL OF THE PROPER GRADE TO MEET SEASONABLE TEMPERATURES.

ALL GEARS ARE CAREFULLY CARBURIZED AND HARDENED, AND OPERATE ON ANTI-FRICTION BEARINGS AND REQUIRE NO GREASE GUN LUBRICATION.

THE SHIFTING OF THE GEAR FOR THE DESIRED SPEED OF TRAVEL IS ACCOMPLISHED BY THE MOVEMENT OF THE GEAR SHIFT LEVER (1) EASILY REACHED FROM THE OPERATOR'S POSITION AND A DIAGRAM OF THE LEVER LOCATION FOR THE DESIRED SPEED IS CAST ON THE REAR END OF THE TRANSMISSION CASE COVER. A LITTLE PRACTICE WILL ENABLE THE OPERATOR TO GET THE "FEEL" OF THE GEARS AS THEY MOVE INTO POSITION BUT DO NOT ATTEMPT TO MOVE THE GEAR SHIFT LEVER TO ANY SPEED POSITION UNTIL THE CLUTCH IS RELEASED.

THE LATCH ON THE GEAR SHIFT LEVER IS FOR REVERSE ONLY. PULL THIS LATCH AND MOVE THE GEAR SHIFT LEVER TO THE EXTREME RIGHT AND BACK.

WITH PROPER LUBRICATION AND THE CORRECT HANDLING OF THE CLUTCH AND SHIFTER LEVER, YOU SHOULD HAVE NO OCCASION TO DISASSEMBLE THE TRANSMISSION. HOWEVER, SHOULD IT BECOME NECESSARY TO REPLACE ANY PART, THIS UNIT IS VERY SIMPLE AND EASY TO WORK ON.

TO REPLACE MAIN SPLINE SHAFT (34) AND BEARINGS (37 AND 40) REMOVE THE 4 3/4-INCH CAPSCREWS (9 IN PLATE 10). BLOCK UP UNDER THE FRAME CHANNELS AND MOVE THE ENTIRE REAR AXLE ASSEMBLY BACK UNTIL THE TORQUE TUBE SLIDES OUT OF THE REAR BEARING CAP (43). REMOVE THE TRANSMISSION CASE COVER (13). REMOVE THE BEARING CAP (43) AND THE SPLINED SHAFT (34) TOGETHER WITH THE BALL BEARING (37). BY DRIVING OUT THE SLEEVE PIN (36), AND REMOVING SLEEVE (35) FROM THE SPLINED SHAFT, BEARING (37) CAN BE REMOVED. HYATT BEARING (40) CAN ALSO BE REMOVED AT THIS TIME. WHEN THE SPLINED SHAFT IS REMOVED THE TWO SLIDING GEARS (38) AND (39) CAN BE TAKEN OUT. WHEN THE SHAFT IS REINSTALLED, CARE SHOULD BE EXERCISED TO SEE THAT THESE GEARS ARE PUT BACK IN THE ORIGINAL POSITION WITH THE SINGLE GEAR ON THE FORWARD END AND THE SHIFTER FORK GROOVES AS SHOWN IN PLATE 12. IF THE BEARINGS (52) OR THE COUNTERSHAFT GEAR (49) ARE TO BE REMOVED, THE TRANSMISSION CASE CAN BE REMOVED FROM THE CLUTCH HOUSING AND COUNTERSHAFT (50) REMOVED. USE A GOOD GRADE OF OIL IN THE TRANSMISSION AND OF THE PROPER BODY WHICH WILL FLOW IN THE COLDEST TEMPERATURES.

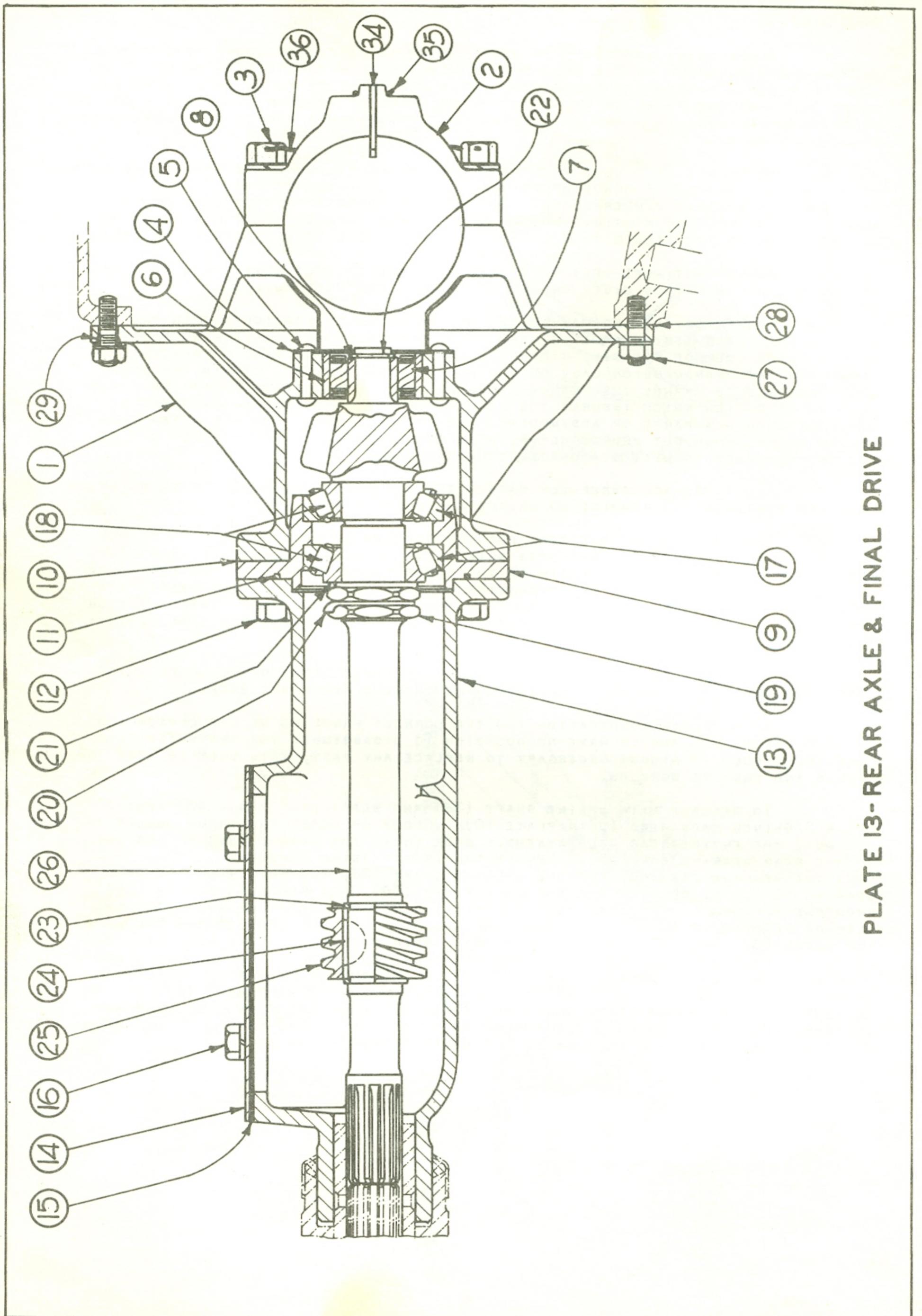


PLATE 13- REAR AXLE & FINAL DRIVE

REAR AXLE AND FINAL DRIVE

THE POWER IS TRANSMITTED FROM THE TRANSMISSION TO THE DIFFERENTIAL THROUGH A DRIVE SHAFT (26). THIS SHAFT IS SPLINED AT THE FRONT END AND OPERATES IN A TORQUE OR HOUSING (13). IT IS COUPLED TO THE TRANSMISSION SHAFT BY A SPLINED COUPLING. ON THE REAR END OF THIS SHAFT IS A PINION WHICH IS MADE A PART OF THE SHAFT. THE LOAD OF THE SHAFT IS CARRIED ON TWO TAPER ROLLER BEARINGS (18) WHICH SET IN A SEPARATE CAGE (9) AND AT THE FRONT END OF WHICH IS TWO HEXAGON NUTS (19) FOR BEARING ADJUSTMENT. AT THE EXTREME REAR END OF THIS SHAFT A HYATT BEARING IS PROVIDED AS A PILOT. ALL OF THESE BEARINGS ARE LUBRICATED FROM THE DIFFERENTIAL OIL SUPPLY WHEN OIL IS UP TO THE PROPER LEVEL IN THE DIFFERENTIAL HOUSING. BY THE CONTINUOUS OPERATION OF THE TRACTOR WITH A LOW OIL LEVEL IN THE DIFFERENTIAL HOUSING, THE BEARINGS ON THIS DRIVE SHAFT WILL RECEIVE INSUFFICIENT LUBRICATION RESULTING IN WEAR WHICH, IF NOT TAKEN CARE OF, WILL RESULT IN A RUINED RING GEAR AND PINION.

ON THE DRIVE SHAFT (26), DIRECTLY BELOW THE COVER PLATE (14) IN THE MIDDLE OF THE TORQUE TUBE (13), A WORM GEAR (25) IS PROVIDED FOR THE PURPOSE OF DRIVING THE POWER LIFT ASSEMBLY.

THE DRIVE PINION ON SHAFT (26) MESHES WITH THE RING GEAR (26 IN PLATE 13-A) WHICH IS RIVETED TO THE DIFFERENTIAL CASE ASSEMBLY (37). THIS CASE IS MOUNTED ON TWO TAPER ROLLER BEARINGS (32) SECURELY FASTENED TO THE DIFFERENTIAL CARRIER ASSEMBLY (1) BY CLAMP (2). ADJUSTING RINGS (33) ARE ALSO HELD BY THESE CLAMPS AND LOCKED IN PLACE BY (34). THE ADJUSTING RINGS ARE FOR THE PURPOSE OF OBTAINING THE PROPER MESH OF THE RING GEAR AND PINION. THIS ADJUSTMENT NEEDS NO ATTENTION EXCEPT IN EVENT OF RING GEAR OR PINION REPLACEMENT.

THE POWER IS TRANSMITTED FROM THE DIFFERENTIAL TO THE FINAL DRIVE GEARS AND REAR WHEELS THROUGH TWO DRIVE SHAFT (43). ONE END OF THESE SHAFTS IS SPLINED TO FIT THE SPLINES IN THE DIFFERENTIAL SIDE GEAR (40), AND DRIVE PINION (50) IS KEYED TO THE OUTER END. THIS DRIVE PINION MESHES WITH THE FINAL DRIVE GEAR ASSEMBLY (54) TO WHICH THE REAR WHEELS (92 OR 95) ARE BOLTED.

EACH FINAL DRIVE GEAR ASSEMBLY IS MOUNTED ON TWO TAPER ROLLER BEARINGS (66 AND 67) WITH A NUT AT THE OUTER END OF THE STUB AXLE (64) TO PROVIDE ADJUSTMENT. INSPECT THE REAR WHEEL BEARINGS AT REGULAR INTERVALS TO BE SURE THERE IS NO END PLAY. THIS PLAYS A VERY IMPORTANT PART IN THE LIFE OF THE FINAL GEARS AND ALSO THE CORK OIL SEAL (73).

THE FINAL DRIVE GEARS SHOULD RUN IN A BATH OF OIL CARRIED IN THE GEAR CASE AND SHOULD BE INSPECTED AT REGULAR INTERVALS TO BE SURE THAT THE GEARS ARE RECEIVING LUBRICATION. THESE GEAR CASES CARRY APPROXIMATELY 1 PINT EACH, WHICH SHOULD BRING THE LEVEL UP TO THE FILLER PLUG (63) ON THE INSIDE OF THE GEAR CASE. TOO MUCH OIL IN THIS CASE WILL RESULT IN A LEAKAGE AROUND THE OIL SEAL (73). USE A HEAVY DUTY TRANSMISSION GREASE. IN COLD WEATHER ADD A SLIGHT AMOUNT OF MOTOR OIL TO THIN OUT HEAVY GREASE.

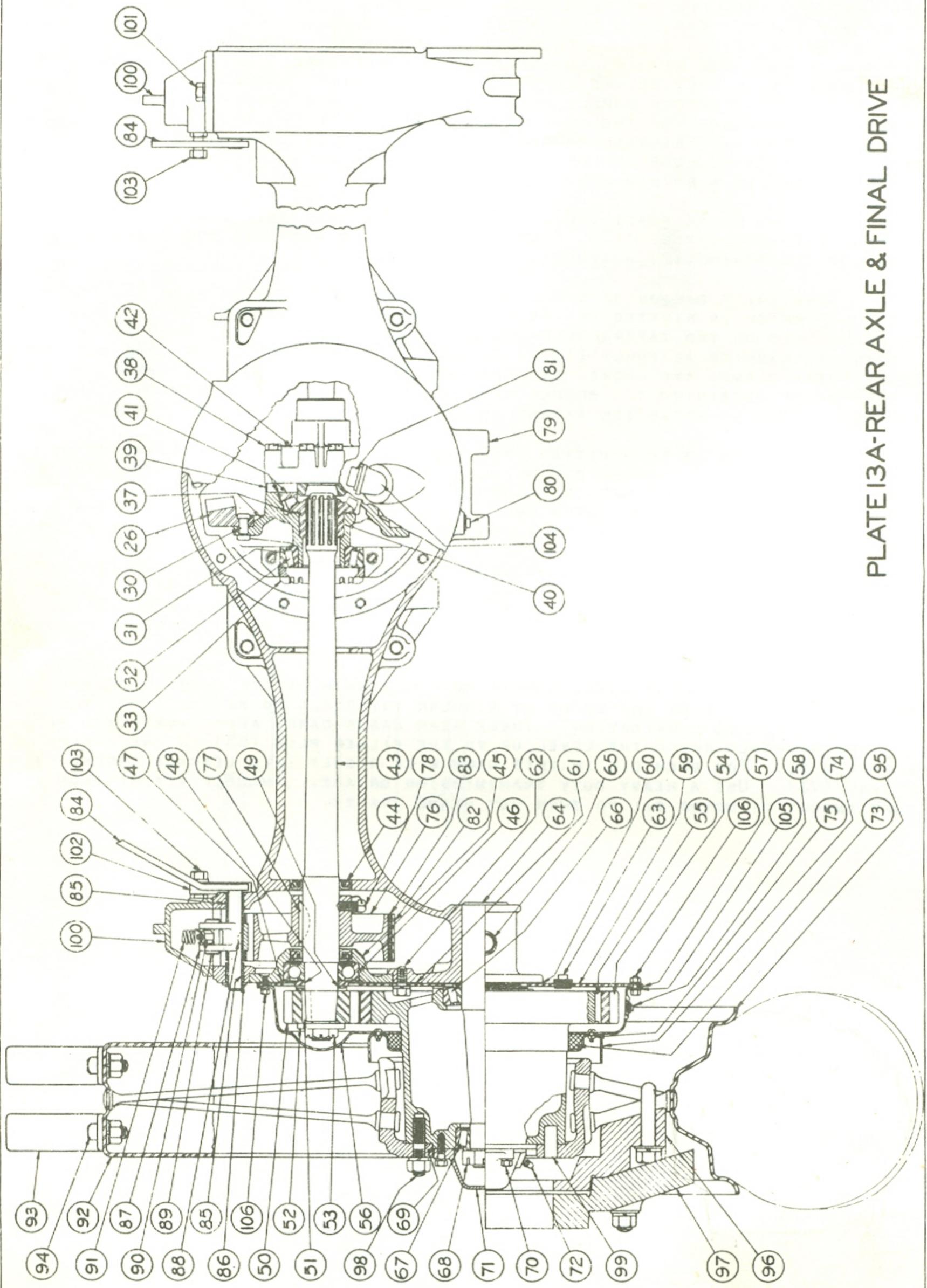


PLATE 13A-REAR AXLE & FINAL DRIVE

TO REMOVE THE FINAL DRIVE GEARS AND DRIVE SHAFT: REMOVE THE FENDER. BLOCK UP THE REAR END OF TRACTOR UNDER THE DRAWBAR. REMOVE THE REAR WHEELS; REMOVE ALL BOLTS AND CAPSCREWS AROUND THE GEAR CASE AND THE CASE. TAKE OFF THE HUB CAP (71) AND THE NUT WHICH HOLDS THE DRIVE GEAR ASSEMBLY. PULL THIS ASSEMBLY FROM THE STUB SHAFTS. THE DRIVE PINION (50) IS KEYED TO THE TAPERED DRIVE SHAFT (43) AND HELD ON BY NUT (53). BY REMOVING THE CAPSCREWS FROM THE DRIVE SHAFT BEARING CAGE (45), THE DRIVE SHAFT ASSEMBLY CAN BE PULLED OUT. CARE SHOULD BE EXERCISED SO AS NOT TO DAMAGE THE OIL SEAL (44).

TO INSTALL NEW RING GEAR AND PINION: PROCEED AS ABOVE TO REMOVE THE DRIVE SHAFTS. PUT ON BOTH WHEELS TEMPORARILY TO CARRY THE REAR END. REMOVE THE BLOCKING FROM UNDER THE DRAWBAR ALLOWING THE REAR WHEELS TO REST ON THE GROUND. BLOCK UP UNDER THE MAIN FRAME CHANNELS IN FRONT OF THE REAR AXLE HOUSING (79). REMOVE THE 4 3/4-INCH CAPSCREWS THAT FASTEN THE MAIN FRAME CHANNELS TO THE REAR AXLE HOUSING. REMOVE THE 10 7/16-INCH NUTS THAT FASTEN THE DIFFERENTIAL CARRIER ASSEMBLY (1) TO THE MAIN AXLE HOUSING. THE REAR AXLE HOUSING CAN NOW BE BACKED AWAY LEAVING THE RING GEAR AND THE DIFFERENTIAL CARRIER ASSEMBLY EXPOSED. BY THE REMOVAL OF THE FOUR CAPSCREWS WHICH FASTEN CLAMP (2) TO THE CARRIER ASSEMBLY, THE RING GEAR ASSEMBLY CAN BE REMOVED. CUT OUT THE 12 RIVETS (30) WHICH FASTEN THE RING GEAR TO THE DIFFERENTIAL CASE. CLEAN OUT THE HOLES AND BOLT THE NEW RING GEAR IN PLACE TEMPORARILY WITH TWO BOLTS. LINE UP ALL HOLES AND INSERT NEW RIVETS FROM THE FLANGE SIDE AND RERIVET BEING CAREFUL TO SWELL THE RIVETS IN THE HOLES.

WITH THE RING GEAR PROPERLY RIVETED, SET THE COMPLETE ASSEMBLY BACK IN THE CARRIER AND REPLACE THE CLAMPS. THE ONLY ADJUSTMENT NECESSARY IS TO PROVIDE THE PROPER BACKLASH BETWEEN THE RING GEAR AND THE DRIVE PINION. THIS IS ACCOMPLISHED BY MOVING THE ENTIRE RING GEAR ASSEMBLY WITH THE ADJUSTING RINGS (33). BY BACKING UP ON ONE AND TIGHTENING THE OTHER, THE RING GEAR CAN BE MOVED IN THE DESIRED DIRECTION TO OBTAIN THE NECESSARY .004 BACKLASH.

IF PINION ADJUSTMENT IS NECESSARY TO OBTAIN A UNIFORM PINION BEARING ON THE RING GEAR TEETH, SHIMS (10) CAN BE REMOVED OR ADDED BETWEEN THE DRIVE SHAFT BEARING CAGE AND THE DIFFERENTIAL CARRIER. SPECIAL CARE SHOULD BE EXERCISED IN THE MOVEMENT OF THE RING GEAR ASSEMBLY SO THAT WHEN THE FINAL POSITION IS DETERMINED THE ROLLER BEARINGS WHICH CARRY THIS RING GEAR ASSEMBLY ARE PROPERLY ADJUSTED SO THAT THEY ARE NOT TOO TIGHT OR TOO LOOSE.

BY A CAREFUL STUDY OF PLATE 14 AND THE USE OF RED LEAD ON THE TEETH OF THE RING GEAR, YOU WILL BE ABLE TO PROPERLY SET THE DIFFERENTIAL GEARS.

TO RE-ASSEMBLE, REVERSE THIS OPERATION. TAKE A FEW EXTRA MINUTES TO INSPECT EVERYTHING THOROUGHLY TO BE SURE EVERYTHING IS RIGHT AND ALL BOLTS IN THEIR PLACE AND TIGHTENED PROPERLY.

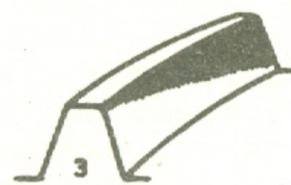
DO NOT GUESS AT THE LEVEL OF YOUR LUBRICANT IN THE REAR AXLE HOUSING OR THE FINAL DRIVE CASES. BE SURE IT IS ALWAYS UP TO THE PROPER LEVEL.



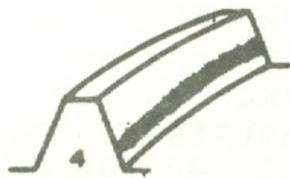
1 SHOWS PROPER ADJUSTMENT.
GEARS ADJUSTED THIS WAY GIVE BEST RESULTS.



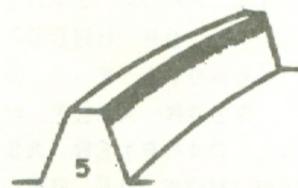
2 SHOWS IMPROPER ADJUSTMENT.
WITH PRESSURE ON HEEL OF TOOTH.
TO CORRECT, MOVE RING GEAR TOWARD PINION AND READJUST PINION FOR BACKLASH.



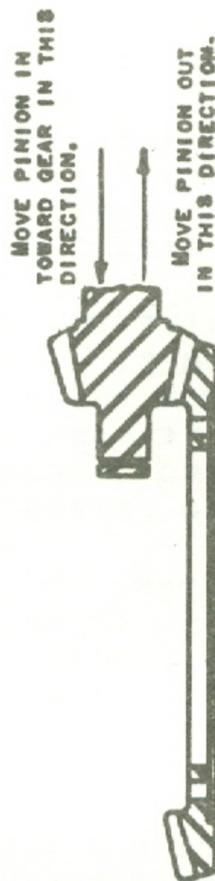
3 SHOWS IMPROPER ADJUSTMENT
WITH PRESSURE ON TOE OF TOOTH.
TO CORRECT, MOVE RING GEAR AWAY FROM PINION AND READJUST PINION FOR BACKLASH.



4 SHOWS IMPROPER ADJUSTMENT
WITH PRESSURE ON FLANK OF TOOTH.
TO CORRECT, PULL PINION OUT FROM RING GEAR AND READJUST RING GEAR FOR BACKLASH.



5 SHOWS IMPROPER ADJUSTMENT
WITH PRESSURE ON FACE OF TOOTH.
TO CORRECT, MOVE PINION IN TOWARD RING GEAR AND READJUST RING GEAR FOR BACKLASH.



MOVE GEAR AWAY FROM PINION IN THIS DIRECTION.

MOVE GEAR TOWARD PINION IN THIS DIRECTION.



PLATE 14

BELT PULLEY

THE BELT PULLEY ON THE "WC" TRACTOR IS SO DESIGNED THAT IT NEED NOT BE ENGAGED UNLESS NEEDED FOR BELT WORK. IT IS BUILT UP IN ONE COMPLETE ASSEMBLY CONSISTING OF PULLEY AND PULLEY SHAFT WITH BEVEL GEAR (3), MOUNTED IN A SLEEVE ON ANTI-FRICTION BEARINGS (10 AND 13) AND HELD IN PLACE BY A SPECIAL POINTED SET SCREW (8) LOCATED ON THE CLUTCH HOUSING JUST INSIDE THE MAIN FRAME CHANNEL.

WHEN THE TRACTOR LEAVES THE FACTORY THE PULLEY IS IN THE ENGAGED POSITION. TO DISENGAGE IT SO IT WILL NOT TURN WHEN DOING DRAWBAR WORK, LOOSEN LOCK NUT (9) ON SET SCREW (8), BACK OUT FAR ENOUGH TO ALLOW THE COMPLETE PULLEY ASSEMBLY TO BE PULLED OUT ONE INCH, AND SCREW THE SET SCREW IN. THIS SET SCREW SHOULD SEAT IN THE GROOVE PROVIDED, TO HOLD THE GEARS OUT OF MESH. TO ENGAGE THE PULLEY FOR BELT WORK, REVERSE THIS OPERATION. THERE IS AN ARROW MARK ON THE MAIN FRAME CHANNEL AND ALSO ON THE PULLEY TUBE (6) FOR GUIDANCE IN PROPERLY MESHING THE GEARS. THESE MARKS SHOULD BE IN LINE WITH EACH OTHER VERTICALLY. THERE IS A SERIES OF HOLES PROVIDED AROUND THE PULLEY TUBE WHICH ARE SO SPACED THAT BY LOOSENING SET SCREW (8) AND TURNING THE TUBE (6) TO THE LEFT, A .005 DEEPER MESH ON THE GEARS CAN BE HAD FOR EACH HOLE TURNED IN THAT DIRECTION OR VICE VERSA BY TURNING TO THE RIGHT. BE SURE THE SET SCREW IS SEATED IN THE HOLE DESIRED AND TIGHTEN BOTH THE SET SCREW AND JAM NUT SECURELY.

WE CAN NOT OVER-EMPHASIZE THE IMPORTANCE OF A PROPER SIZE OF PULLEY ON THE DRIVEN UNIT, AS MUCH POWER IS LOST IF A PULLEY OF IMPROPER SIZE IS USED.

THE PULLEY ON THE "WC" TRACTOR IS 9 INCHES IN DIAMETER AND RUNS AT 1170 REVOLUTIONS PER MINUTE (R.P.M.); AT NORMAL ENGINE SPEED OF 1300.

TO FIGURE THE SPEED OF THE DRIVEN UNIT OR TO DETERMINE THE SIZE OF PULLEY, PROCEED AS FOLLOWS:

TO DETERMINE SIZE OF PULLEY: MULTIPLY THE DIAMETER OF THE DRIVING OR TRACTOR PULLEY BY ITS R.P.M. AND DIVIDE BY THE R.P.M. OF THE UNIT TO BE DRIVEN.

EXAMPLE: 9" DIAMETER x 1170 R.P.M. = 10530
10530 DIVIDED BY 1000 (R.P.M. OF DRIVEN UNIT) IS 10.5 WHICH IS THE SIZE PULLEY NEEDED.

WHERE THE PULLEY SIZE IS KNOWN AND THE SPEED OF THE DRIVEN UNIT IS TO BE DETERMINED, DIVIDE THE BELT CONSTANT, WHICH IS THE DIAMETER X THE R.P.M. BY THE SIZE OF THE PULLEY.

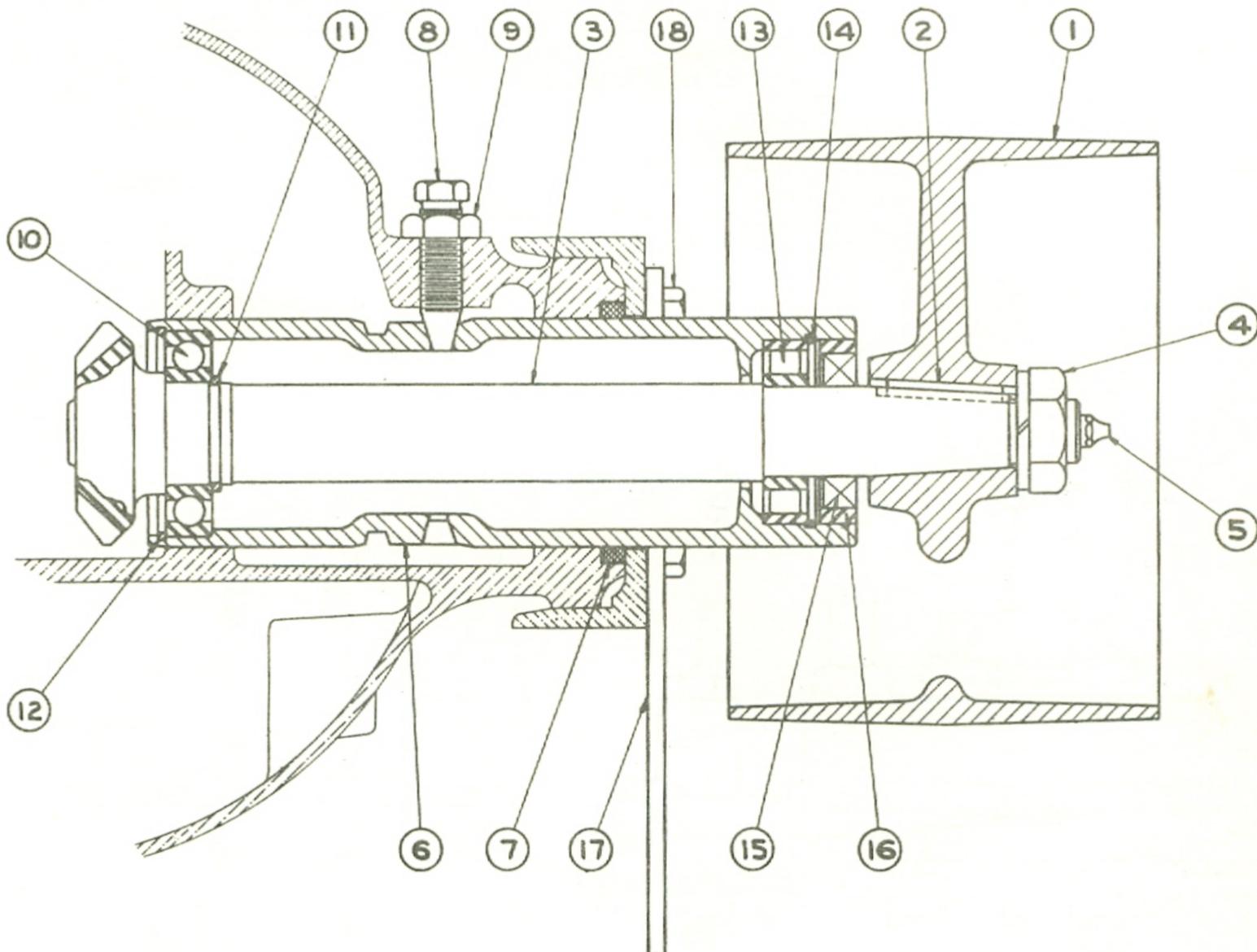


PLATE 15-BELT PULLEY

WHEN HEAVY LOADS ARE ENCOUNTERED, IT IS BETTER TO USE A SLIGHTLY LARGER PULLEY ON THE DRIVEN UNIT AND INCREASE THE ENGINE SPEED. HOWEVER, IT IS NOT GOOD POLICY TO OVERLOAD OR OVERSPEED FOR ANY GREAT LENGTH OF TIME.

THE BELT PULLEY DRIVING AND DRIVEN BEVEL PINION OPERATE IN A SEPARATE COMPARTMENT IN THE CLUTCH HOUSING. OIL IS CARRIED TO THIS COMPARTMENT BY THE TRANSMISSION GEARS AND AN OVERFLOW IS PROVIDED TO CARRY ANY SURPLUS OIL BACK TO THE TRANSMISSION. IF THE OIL USED IN THE TRANSMISSION IS TOO HEAVY, IT WILL NOT CIRCULATE OR BE CARRIED TO THE PULLEY COMPARTMENT. IF TRACTOR IS OPERATED FOR BELT WORK FOR ANY LENGTH OF TIME, WITHOUT THE TRACTOR BEING MOVED, REMOVE THE COVER (40 IN PLATE 11) OVER THE GEAR COMPARTMENT AND ADD OIL, IF NECESSARY TO INSURE THE PROPER LUBRICATION OF THE GEARS. THE SURPLUS OIL IN THIS COMPARTMENT WILL BE CARRIED TO THE TRANSMISSION CASE AND AFTER LONG PERIODS OF BELT OPERATION AND BEFORE THE TRACTOR IS AGAIN OPERATED ON DRAWBAR WORK, THE TRANSMISSION OIL SUPPLY SHOULD BE CHECKED AND DRAINED TO THE PROPER LEVEL.

THE ZERK FITTING (5) ON THE END OF THE PULLEY SHAFT SHOULD BE GREASED DAILY WITH THREE OR FOUR STROKES OF THE GREASE GUN WHEN THE PULLEY GEARS ARE IN MESH.

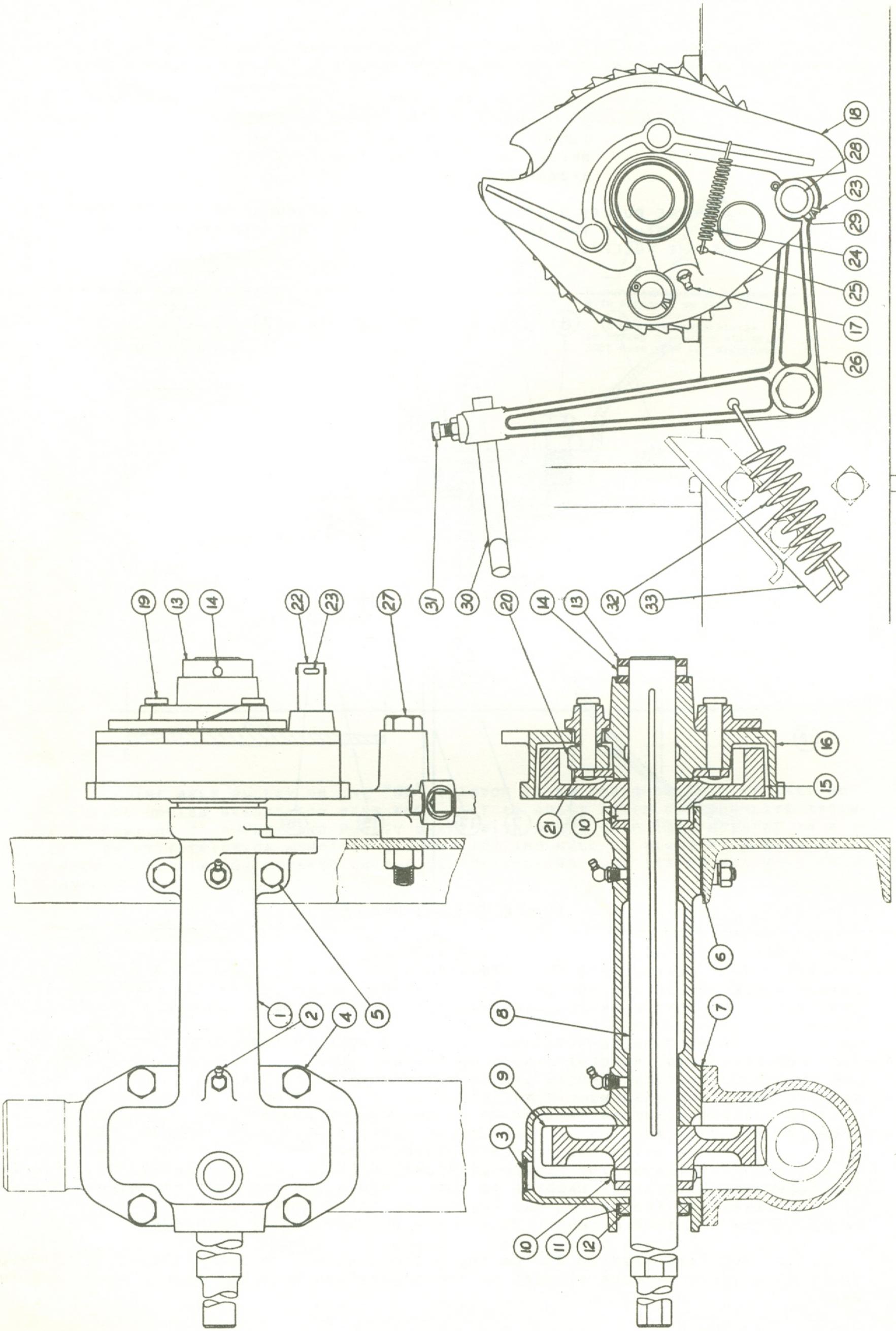


PLATE 16- POWER LIFT

POWER LIFT ASSEMBLY

THE POWER LIFT ASSEMBLY IS AN EXTRA ATTACHMENT USED FOR THE LIFTING OPERATION ON CULTIVATORS, PLANTERS, AND OTHER ATTACHMENTS. THE ATTACHMENT IS VERY SIMPLE AND REQUIRES VERY LITTLE ATTENTION.

TO ATTACH: REMOVE COVER (14) OVER THE WORM (25) SHOWN IN PLATE 13. LOCATE THE ASSEMBLY ON TOP OF THE MAIN FRAME CHANNEL WITH THE WORM GEAR (9 IN PLATE 16) IN MESH WITH THE WORM. BOLT THE ASSEMBLY TO THE TORQUE TUBE USING THE $4 \frac{1}{2}$ X $1\frac{1}{4}$ CAPSCREWS. BOLT THE OUTSIDE END TO THE MAIN FRAME CHANNEL WITH THE $2 \frac{3}{8}$ X $1\frac{3}{4}$ CAPSCREWS USING THE LOCKWASHERS, BEVEL WASHERS, AND HEX NUTS ON THE BOTTOM. FIVE SHIMS (6) ARE PROVIDED TO BE USED BETWEEN THE ASSEMBLY AND THE MAIN FRAME CHANNEL, IF NECESSARY TO GET PROPER ALIGNMENT.

BOLT THE FOOT PEDAL TO THE MAIN FRAME CHANNEL USING THE $\frac{5}{8}$ X $4\frac{3}{4}$ CAPSCREW (27) AND THE HEX NUT ON THE INSIDE OF THE CHANNEL. BOLT THE SPRING BRACKET (33) ONTO THE FRAME AND COUPLE THE SPRING FROM THIS BRACKET TO THE FOOT LEVER 26.

THE ZERK FITTING (17) AND THE TWO FITTINGS ON THE HOUSING REQUIRE THREE OR FOUR STROKES OF THE GREASE GUN DAILY.

GENERAL

IN COMPILING THIS INSTRUCTION BOOK, WE HAVE MADE A SPECIAL EFFORT TO COVER EVERYTHING THAT WE THINK MAY HELP YOU IN THE OPERATION AND MAINTENANCE OF YOUR TRACTOR.

THESE INSTRUCTIONS ARE BASED ON FIELD EXPERIENCE, AND WHILE WE KNOW THAT CERTAIN CONDITIONS MAY DEVELOP IN YOUR IMMEDIATE VICINITY THAT HAVE NEVER BEEN EXPERIENCED, AND SOME ARTICLE IN THIS INSTRUCTION BOOK MAY NOT BE ENTIRELY CLEAR TO YOU, WE WANT YOU TO FEEL THAT WE ARE INTERESTED IN THE PURCHASE YOU HAVE MADE AND CONSIDER YOU ONE OF THE ALLIS-CHALMERS FAMILY.

WE WANT YOU TO FEEL FREE TO WRITE US ABOUT ANYTHING YOU DO NOT UNDERSTAND AND WE WILL MAKE AN HONEST EFFORT TO GIVE YOU ANY INFORMATION POSSIBLE.

YOU PURCHASED YOUR TRACTOR TO DO CERTAIN WORK AND THE RETURNS YOU RECEIVE FROM YOUR INVESTMENT WILL ALMOST ENTIRELY DEPEND UPON, NOT ONLY HOW WELL YOU KNOW YOUR TRACTOR, BUT ON HOW YOU APPLY THIS KNOWLEDGE.

STUDY THIS BOOK THOROUGHLY AND PRESERVE IT FOR FUTURE REFERENCE.

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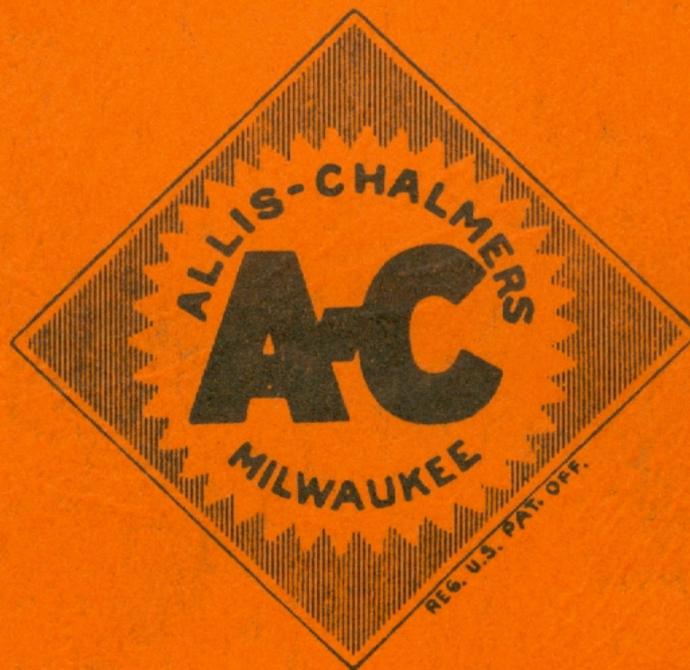
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