FORM PCD-386
January, 1974

OPERATING AND MAINTENANCE MANUAL WITH SPARE PARTS LIST

PCD-386

MODEL DXL600H

SINGLE STAGE, SCREW TYPE AIR COMPRESSOR

Ingersoll-Rand Company reserves the right to make changes or add improvements without notice and without incurring any obligation to make such changes or add such improvements to products sold previously.

THIS UNIT WAS PURCHASED FROM:

Record the Serial number of your unit here for ready reference

Book No. 35341742

FOREWORD

In preparing this publication every effort has been made to provide sufficient information to permit an operator to perform his duties so as to receive maximum performance and trouble free service from the compressor. All classes of equipment, regardless of how well built, require a certain amount of attention. The purpose of this publication is to acquaint an operator with the functions, operation and lubrication of the various components, which were built with the very best of materials and workmanship, to obtain maximum life from the compressor.

Before starting the compressor, the instructions should be carefully read to obtain a thorough knowledge of the duties to be performed. Take pride in the compressor, keep it clean, and in good mechanical condition. For major servicing, not covered in this publication, consult your nearest Ingersoll-Rand Company Construction and Mining Sales Office.

INDEX

SECTION I

Ingersoll-Rand®

GENERAL DATA

AIR COMPRESSOR ..... MODEL DXL600H

ACTUAL DELIVERY OF COMPRESSOR ..... 600 CFM (16.99 M^3/MIN.)

RATED OPERATING PRESSURE ..... 150 PSIG (10.55 KG/CM^2)

DETROIT DIESEL ALLISON DIV.;
GENERAL MOTORS CORPORATION
DIESEL ENGINE, SERIES 6V-71N. ..... MODEL 7063-7000

ENGINE SPEED AT FULL LOAD ..... 2100 RPM

ENGINE SPEED AT NO LOAD ..... 1000 RPM

ELECTRICAL STARTING SYSTEM ..... 12 VOLT

AIR CLEANER ..... DONALDSON TYPE

LUBE OIL FILTER ..... DONALDSON, FULL FLOW TYPE

LUBE OIL FILTER ELEMENT ..... PART NO. 35251040
(DONALDSON REPLACEMENT PART NO. P16-0116)

COMPRESSOR LUBE OIL CAPACITY ..... 35 US GALS. (132.5 LTS.)
(USE A HEAVY DUTY, DETERGENT TYPE OIL CONFORMING TO SPECIFICATION MIL-L-2104B.)

ENGINE LUBE OIL CAPACITY (INCLUDING OIL FILTER) .... 32 QTS. (30.3 LTS.)

(USE A HEAVY DUTY, DETERGENT TYPE OIL CONFORMING TO SPECIFICATION MIL-L-2104B.)

RECOMMENDED LUBE OIL GRADES

AMBIENT TEMPERATURE	ABOVE −10°F (−23.3°C)
COMPRESSOR OIL	SAE 10W
ENGINE OIL	SAE 30

(CONSULT MANUFACTURER FOR OIL RECOMMENDATION FOR AMBIENT TEMPERATURES BELOW −10°F (−23.3°C). CONSULT COMPRESSOR OPERATING MANUAL FOR ALTERNATE TYPE COMPRESSOR LUBE OIL.)

CAUTION: DO NOT MIX OILS OF DIFFERENT TYPES OR BRANDS.

ENGINE COOLANT CAPACITY ..... 15 1/2 US GALS. (58.7 LTS.)

FUEL TANK CAPACITY ..... 96 US GALS. (363 LTS.)

(USE NO. 2-D DIESEL FUEL OIL WITH MINIMUM CETANE NUMBER OF 45 AND SULFUR CONTENT NOT GREATER THAN 0.5%.)

PNEUMATIC TIRES ..... 8.75 × 16.5 LOAD RANGE B

TIRE PRESSURE ..... 44 PSIG (3.09 KG/CM^2)

LENGTH ..... 13' - 2" (400 CM)

HEIGHT ..... 7' - 3" (220 CM)

WIDTH ..... 5' - 4" (163 CM)

NET WEIGHT INCLUDING LUBE OIL ..... 9,025 LBS. (4,094 KGS.)

GROSS WEIGHT INCLUDING FUEL AND COOLANT .. 9,887 LBS. (4,482 KGS.)

MADE IN USA BY
INGERSOLL-RAND COMPANY
PORTABLE COMPRESSOR DIVISION
MOCKSVILLE, NORTH CAROLINA 27028

35782812

Figure 1-1. Typical General Data Plate Found On Unit

SECTION II

DESCRIPTION

Figure 2-1. Typical Super Spiro-Flo Model XL Series Portable Air Compressor

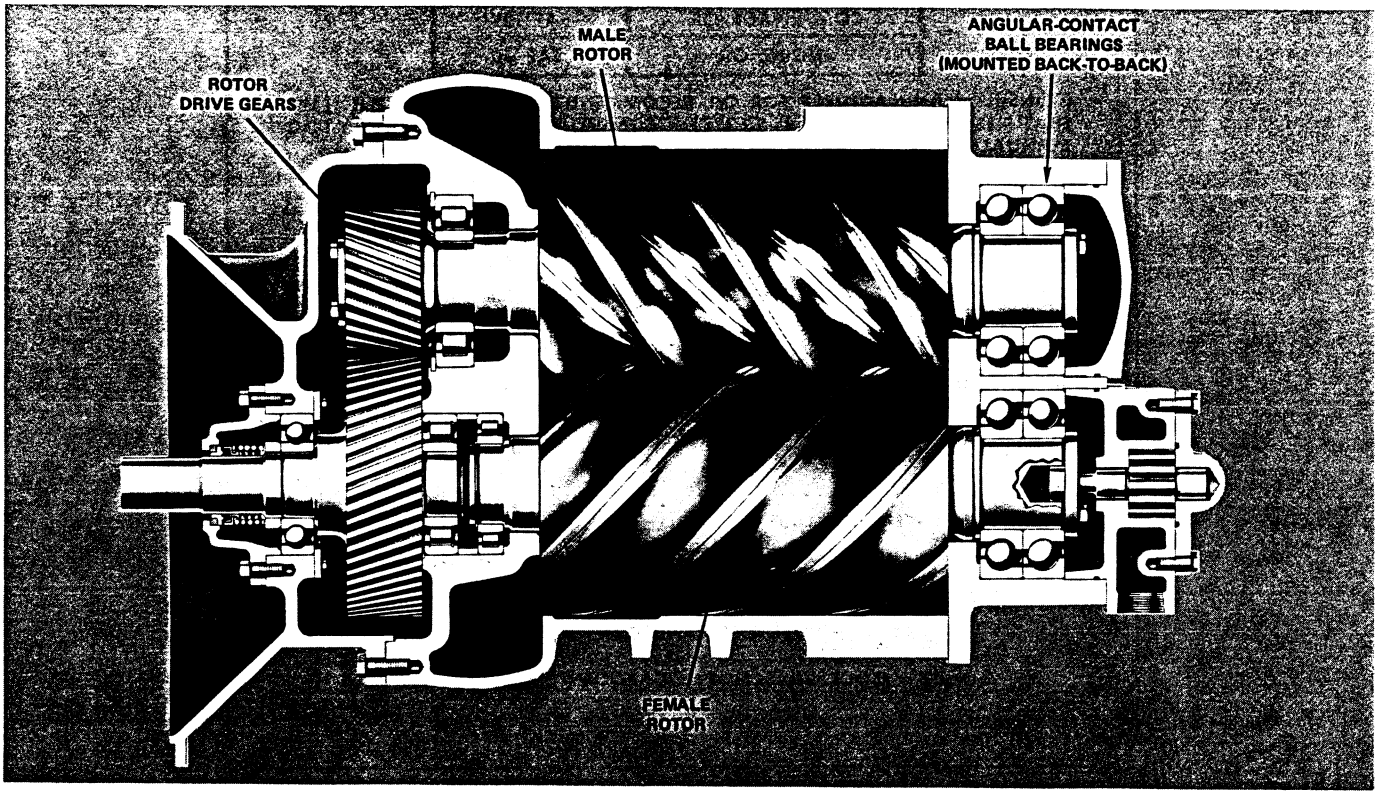


Figure 2-2. Cut-Away Top View of the Compressor E1915-A

SECTION II

DESCRIPTION (Continued)

GENERAL

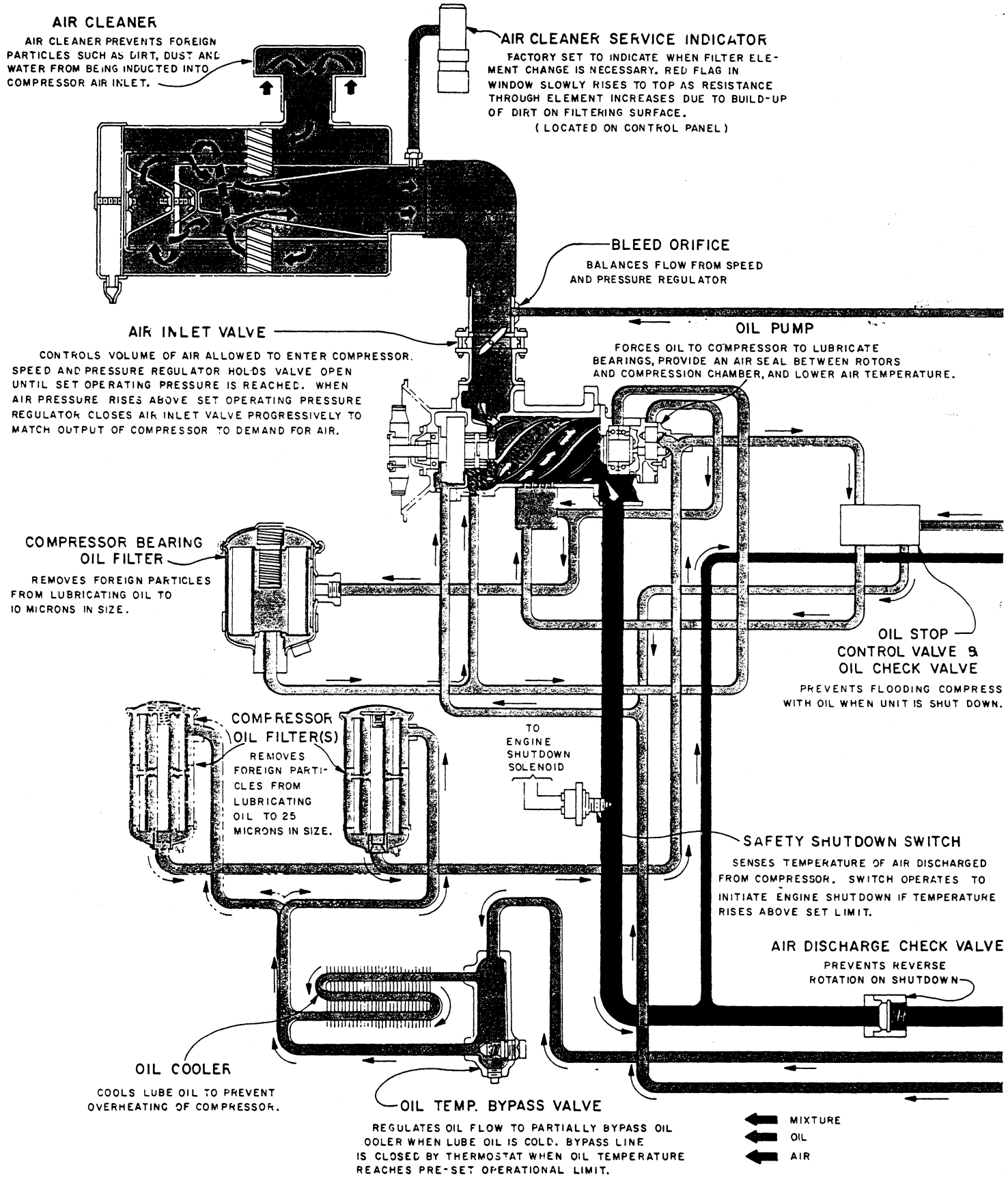
The Super Spiro-Flo® Model XL series air compressor is a single-stage, positive displacement, cycloidal air compressor, directly connected to and driven by a compressor-matched, heavy-duty, industrial engine to provide optimum performance and fuel economy. The compressor and engine are mounted on a rugged channel-section welded steel frame and the entire assembly is completely enclosed in a sheet steel housing. The unit is equipped with rubber tires, semi-elliptical spring mountings, and automotive type steering to facilitate towing. Standard equipment includes compressor and engine inlet air cleaners, compressor butterfly-type inlet valve, engine speed regulator, full instrumentation and controls, and an air receiver-oil separator system. The compressor lubricating oil system includes an oil cooler, oil cooler by-pass valve, oil filters, oil pump and a combination primary oil separator tank and air receiver. The engine is provided with an electrical starting system, cold weather starting aid, large capacity fuel tanks, and a coolant radiator. An engine operator's and parts manual is provided with each unit shipped from the factory. Refer to this manual for specific information concerning the engine in your unit.

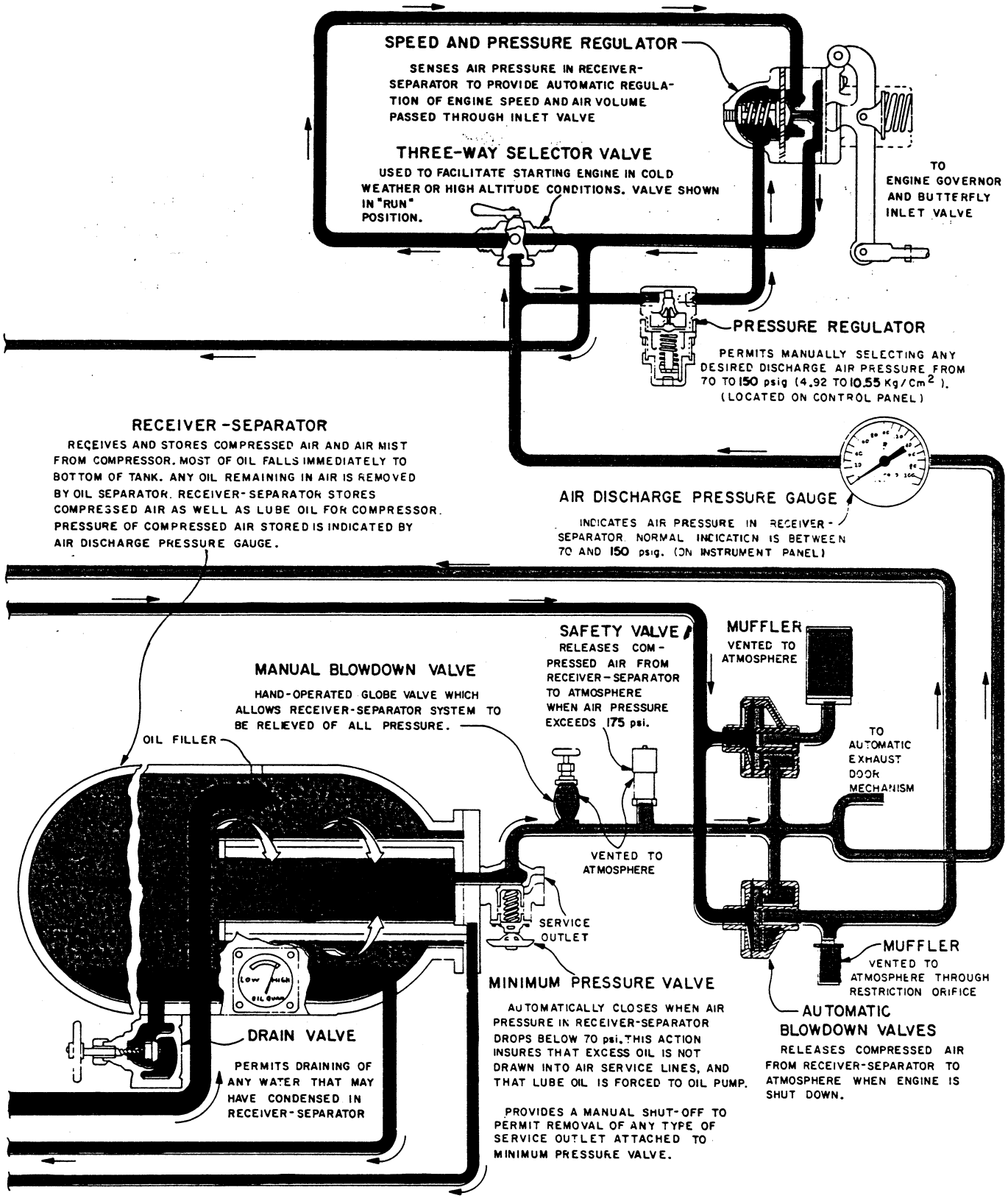
Compression is created by the meshing of two sets of helical rotors (male and female) on parallel shafts enclosed in a heavy-duty cast iron housing with air inlet and outlet ports located on opposite ends of the housing. The male rotor has four lobes 90 degrees apart and the female rotor has six grooves 60 degrees apart. The grooves of the female rotor mesh with and are driven by the male rotor. Thrust ball bearings at the rear of the air end prevent longitudinal movement of the rotors. As rotation of the compressor occurs, the rotors unmesh and free air is drawn into the cavities or pockets between the male rotor lobes and the grooves of the female rotor. The air is trapped in these pockets and follows the direction of rotation of each rotor. As soon as the inlet port is closed, the compression cycle begins and the trapped air is directed to the opposite or discharge side of the rotor housing. As the rotors mesh, the normal free volume of air is decreased and the pressure increased until the closing pocket reaches the discharge port. Cooled lubricating oil is admitted to the compressor by being injected, in metered amounts, directly into the rotor housing so that it passes on with the air being compressed. This removes the heat of compression to a large degree and results in an unusally low final discharge air temperature. From the discharge port, the compressed air and lubricating oil is directed to a combination air receiver, lubricating oil storage reservoir, and lubricating oil separator, called the receiver-separator.

AIR FLOW

Air flow through the compressor can be regulated from full capacity to zero capacity dependent upon the air demand placed upon the unit. Output can be reduced to approximately 70% by the speed and pressure regulator which slows the engine. Further reduction to zero capacity is accomplished by the butterfly-type inlet valve. The inlet valve, mounted on the rotor housing intake port, controls the capacity of the compressor through a throttling effect. Discharge air pressure can then be controlled between 70 and 150 psig (4.92 to 10.55 Kg/Cm^2) by the pressure regulator control mounted on the control panel.

Super Spiro-Flo® - Reg. T. M. of Ingersoll-Rand Co.


AIR CLEANER
AIR CLEANER PREVENTS FOREIGN PARTICLES SUCH AS DIRT, DUST AND WATER FROM BEING INDUCTED INTO COMPRESSOR AIR INLET.
AIR CLEANER SERVICE INDICATOR
FACTORY SET TO INDICATE WHEN FILTER ELEMENT CHANGE IS NECESSARY. RED FLAG IN WINDOW SLOWLY RISES TO TOP AS RESISTANCE THROUGH ELEMENT INCREASES DUE TO BUILD-UP OF DIRT ON FILTERING SURFACE.
(LOCATED ON CONTROL PANEL)
BLEED ORIFICE
BALANCES FLOW FROM SPEED AND PRESSURE REGULATOR
AIR INLET VALVE
CONTROLS VOLUME OF AIR ALLOWED TO ENTER COMPRESSOR. SPEED AND PRESSURE REGULATOR HOLDS VALVE OPEN UNTIL SET OPERATING PRESSURE IS REACHED. WHEN AIR PRESSURE RISES ABOVE SET OPERATING PRESSURE REGULATOR CLOSES AIR INLET VALVE PROGRESSIVELY TO MATCH OUTPUT OF COMPRESSOR TO DEMAND FOR AIR.
OIL PUMP
FORCES OIL TO COMPRESSOR TO LUBRICATE BEARINGS, PROVIDE AN AIR SEAL BETWEEN ROTORS AND COMPRESSION CHAMBER, AND LOWER AIR TEMPERATURE.
COMPRESSOR BEARING OIL FILTER
REMOVES FOREIGN PARTICLES FROM LUBRICATING OIL TO 10 MICRONS IN SIZE.
OIL STOP CONTROL VALVE & OIL CHECK VALVE
PREVENTS FLOODING COMPRESS WITH OIL WHEN UNIT IS SHUT DOWN.
COMPRESSOR OIL FILTER(S)
REMOVES FOREIGN PARTICLES FROM LUBRICATING OIL TO 25 MICRONS IN SIZE.
TO ENGINE SHUTDOWN SOLENOID
SAFETY SHUTDOWN SWITCH
SENSES TEMPERATURE OF AIR DISCHARGED FROM COMPRESSOR. SWITCH OPERATES TO INITIATE ENGINE SHUTDOWN IF TEMPERATURE RISES ABOVE SET LIMIT.
AIR DISCHARGE CHECK VALVE
PREVENTS REVERSE ROTATION ON SHUTDOWN
OIL COOLER
COOLS LUBE OIL TO PREVENT OVERHEATING OF COMPRESSOR.
OIL TEMP. BYPASS VALVE
REGULATES OIL FLOW TO PARTIALLY BYPASS OIL COOLER WHEN LUBE OIL IS COLD. BYPASS LINE IS CLOSED BY THERMOSTAT WHEN OIL TEMPERATURE REACHES PRE-SET OPERATIONAL LIMIT.
MIXTURE
OIL
AIR


SPEED AND PRESSURE REGULATOR
SENSES AIR PRESSURE IN RECEIVER-SEPARATOR TO PROVIDE AUTOMATIC REGULATION OF ENGINE SPEED AND AIR VOLUME PASSED THROUGH INLET VALVE
THREE-WAY SELECTOR VALVE
USED TO FACILITATE STARTING ENGINE IN COLD WEATHER OR HIGH ALTITUDE CONDITIONS. VALVE SHOWN IN "RUN" POSITION.
TO ENGINE GOVERNOR AND BUTTERFLY INLET VALVE
PRESSURE REGULATOR
PERMITS MANUALLY SELECTING ANY DESIRED DISCHARGE AIR PRESSURE FROM 70 TO 150 psig (4.92 TO 10.55 Kg/Cm2). (LOCATED ON CONTROL PANEL)
RECEIVER-SEPARATOR
RECEIVES AND STORES COMPRESSED AIR AND AIR MIST FROM COMPRESSOR. MOST OF OIL FALLS IMMEDIATELY TO BOTTOM OF TANK. ANY OIL REMAINING IN AIR IS REMOVED BY OIL SEPARATOR. RECEIVER-SEPARATOR STORES COMPRESSED AIR AS WELL AS LUBE OIL FOR COMPRESSOR. PRESSURE OF COMPRESSED AIR STORED IS INDICATED BY AIR DISCHARGE PRESSURE GAUGE.
AIR DISCHARGE PRESSURE GAUGE
INDICATES AIR PRESSURE IN RECEIVER-SEPARATOR. NORMAL INDICATION IS BETWEEN 70 AND 150 psig. (ON INSTRUMENT PANEL)
SAFETY VALVE
RELEASES COMPRESSED AIR FROM RECEIVER-SEPARATOR TO ATMOSPHERE WHEN AIR PRESSURE EXCEEDS 175 psi.
MUFFLER
VENTED TO ATMOSPHERE
MANUAL BLOWDOWN VALVE
HAND-OPERATED GLOBE VALVE WHICH ALLOWS RECEIVER-SEPARATOR SYSTEM TO BE RELIEVED OF ALL PRESSURE.
OIL FILLER
TO AUTOMATIC EXHAUST DOOR MECHANISM
VENTED TO ATMOSPHERE
SERVICE OUTLET
MUFFLER
VENTED TO ATMOSPHERE THROUGH RESTRICTION ORIFICE
MINIMUM PRESSURE VALVE
AUTOMATICALLY CLOSES WHEN AIR PRESSURE IN RECEIVER-SEPARATOR DROPS BELOW 70 psi. THIS ACTION INSURES THAT EXCESS OIL IS NOT DRAWN INTO AIR SERVICE LINES, AND THAT LUBE OIL IS FORCED TO OIL PUMP.
PROVIDES A MANUAL SHUT-OFF TO PERMIT REMOVAL OF ANY TYPE OF SERVICE OUTLET ATTACHED TO MINIMUM PRESSURE VALVE.
AUTOMATIC BLOWDOWN VALVES
RELEASES COMPRESSED AIR FROM RECEIVER-SEPARATOR TO ATMOSPHERE WHEN ENGINE IS SHUT DOWN.
DRAIN VALVE
PERMITS DRAINING OF ANY WATER THAT MAY HAVE CONDENSED IN RECEIVER-SEPARATOR

SECTION III

OPERATION

Caution

Do not connect the air discharge on this unit into a common header with any other unit of any description, or any other source of compressed air, without first making sure a check valve is used between the header and the unit. It is extremely important that any backflow of discharge line pressure be prevented to insure against possible contamination of the compressor lubricating and cooling oil and to prevent the formation of scale in the receiver-separator.

SECTION III

OPERATION (Continued)

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OPERATING INSTRUCTIONS

BEFORE STARTING:

1. PLACE UNIT IN LEVEL POSITION. NEVER OPERATE UNIT IN OUT-OF-LEVEL POSITION EXCEEDING 20 DEGREES IN ANY DIRECTION.
2. OPEN MANUAL BLOWDOWN VALVE TO RELIEVE PRESSURE IN RECEIVER-SEPARATOR SYSTEM. CLOSE VALVE AFTER RELIEVING SYSTEM.
3. OPEN VALVE ON BOTTOM OF RECEIVER-SEPARATOR SLIGHTLY TO REMOVE CONDENSATION. CLOSE WHEN OIL APPEARS.
4. CHECK COMPRESSOR AND ENGINE LUBE OIL LEVELS. CHECK RADIATOR COOLANT LEVEL. CHECK BATTERY ELECTROLYTE LEVEL. CHECK FUEL LEVEL GAUGE.
5. ENSURE ENGINE BLOWER DAMPER IS NOT CLOSED.
6. IF NECESSARY, PRIME ENGINE FUEL SYSTEM.
7. CLOSE ALL SERVICE VALVES.
   CAUTION: ALL SERVICE VALVES AND MANUAL BLOWDOWN VALVE MUST BE CLOSED BEFORE STARTING TO BUILD UP FULL AIR PRESSURE.

STARTING:

1. TURN 3-WAY VALVE TO "START" POSITION.
2. PRESS STARTING SWITCH AND SAFETY CIRCUIT BYPASS SWITCH SIMULTANEOUSLY. RELEASE STARTING SWITCH WHEN ENGINE STARTS. RELEASE BYPASS SWITCH WHEN ENGINE OIL PRESSURE REACHES 35 PSIG.
3. IF NECESSARY IN COLD WEATHER, OPERATE STARTING AID DISCHARGER TO ADD FLUID JUST PRIOR TO PRESSING STARTING SWITCH, AND DURING CRANKING CYCLE.
4. IMMEDIATELY AFTER STARTING, OBSERVE ENGINE OIL PRESSURE GAUGE. IF NO PRESSURE IS INDICATED, SHUT UNIT DOWN AND CORRECT CAUSE. IF PROPER OIL PRESSURE IS INDICATED, ALLOW ENGINE TO WARM UP. TURN 3-WAY VALVE TO "RUN" POSITION.
5. WITH ENGINE WARMED, CHECK ENGINE COOLANT TEMPERATURE TO SEE THAT RANGE OF FROM 160°F TO 185°F (71°C TO 85°C) IS MAINTAINED.

STOPPING:

1. CLOSE ALL SERVICE VALVES. ALLOW UNIT TO RUN UNLOADED FOR A FEW MINUTES TO REDUCE ENGINE TEMPERATURE.
2. PULL STOP HANDLE AND HOLD OUT UNTIL ENGINE COMES TO COMPLETE STOP.
3. AS SOON AS ENGINE STOPS AUTOMATIC BLOWDOWN VALVE SHOULD IMMEDIATELY RELIEVE ALL PRESSURE FROM RECEIVER-SEPARATOR.

CAUTION: NEVER ALLOW UNIT TO STAND IDLE WITH PRESSURE IN RECEIVER-SEPARATOR SYSTEM.

35714880

Figure 3-1. Typical Operating Instruction Plate Found On Unit

SECTION IV

LUBRICATION

LUBRICATING OIL RECOMMENDATIONS

1. Normal Operation Between 125°F (51.7°C) and -10°F (-23.3°C) Ambient

   Use an oil conforming to Specification MIL-L-2104B SAE 10W.

2. Normal Operation Between -10°F (-23.3°C) and -40°F (-40°C) Ambient

   Use DEXRON® automatic transmission fluid.

3. Heavy Duty Operation Between 125°F (51.7°C) and -40°F (-40°C) Ambient

   Use DEXRON® automatic transmission fluid.

Drain and refill with new oil every 1000 operating hours or every six months, whichever comes first.

Replace the oil filter element at each oil change. On new or overhauled units, replace element after first 50 and 150 hours; thereafter at each oil change or after 1000 hours of operation, whichever comes first.

Caution

Shorter oil change intervals may be necessary if unit is operated under adverse conditions.

Consult manufacturer for oil recommendation for ambient temperatures below -40°F (-40°C).

GENERAL

Both compressor lubrication and cooling are accomplished by the compressor lubricating oil. The oil is forced from the oil storage reservoir, under system pressure, to the oil cooler. The cooler is located at the radiator end of the unit in such a manner the engine fan serves to cool both the engine jacket coolant and the compressor lubricating oil. When the compressor is operating at low capacity, some of the oil may by-pass the cooler through a thermostatically controlled bypass valve. This valve by-passes varying amounts of oil, depending upon the temperature, until the oil being circulated reaches a temperature of 185°F (85°C) thus maintaining a higher average oil temperature thereby reducing the possibility of water vapor condensation in the oil. From the oil cooler, the oil goes directly to the main oil filters, then to the compressor driven oil pump. Cooled oil is then pumped directly to the rotor bearings, gears, and in metered amounts directly into the rotor housing. All of the oil thus introduced mixes with, and passes on with the air being compressed, thus removing the heat of compression to a large degree. On its way to the final discharge connection the air passes through piping to the receiver-separator where the oil is removed from the air to collect in the oil storage reservoir. Primary separation of the oil takes place through a

DEXRON® - Reg. T. M. of General Motors Corp.

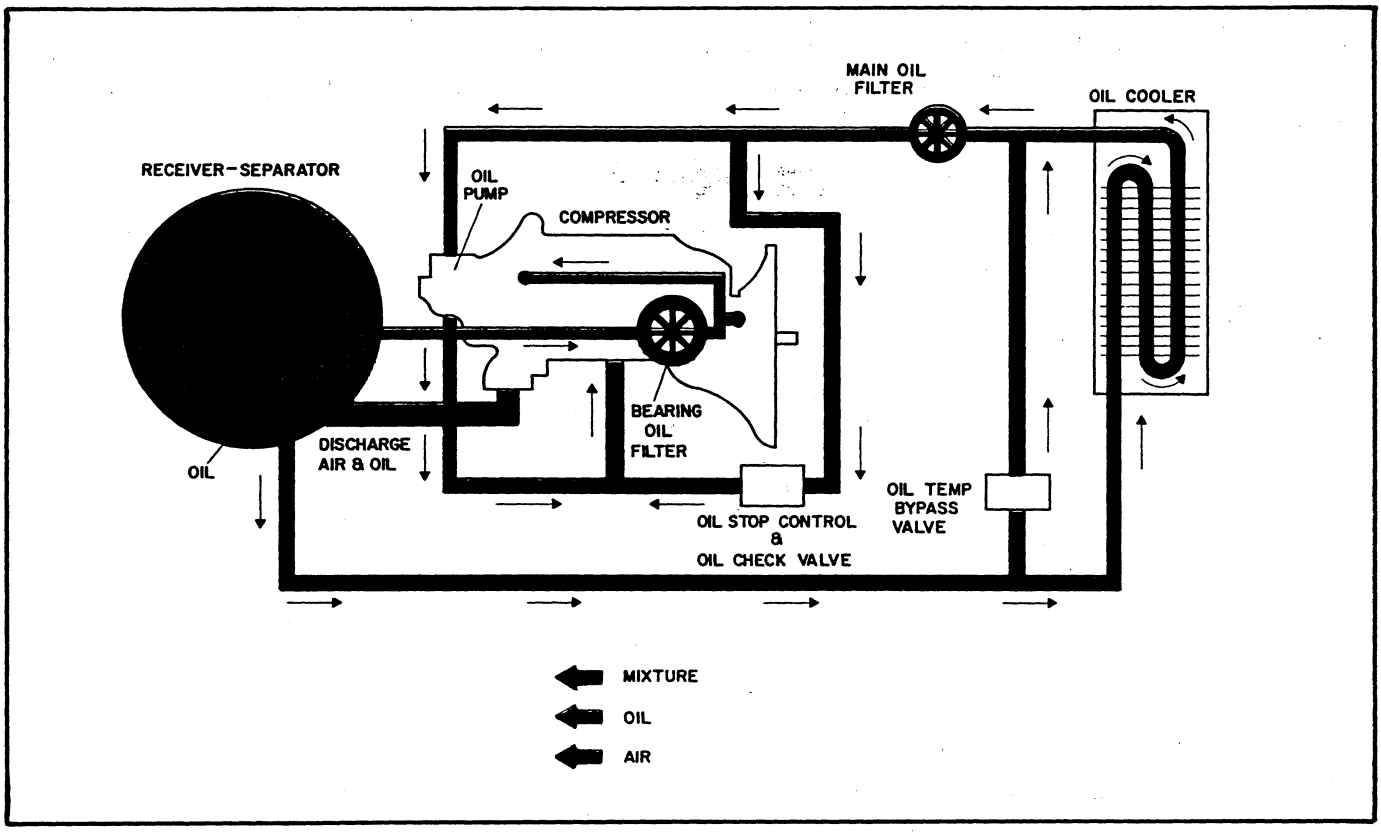

Figure 4-1. Diagram of Typical Compressor Lubricating and Cooling Oil System 35781871

change in velocity and direction as the compressed air enters the receiver-separator, dropping out most of the oil from the air. Secondary separation takes place in the oil separator, which is located entirely within the receiver-separator. The oil separator consists of a series of chambers packed with an oil diverting medium.

Any oil accumulation in this secondary oil separator is continuously drained off by means of a scavenger line, which returns the accumulated oil to the compressor.

COMPRESSOR LUBRICATING AND COOLING OIL

Normally these units are furnished with an initial supply of oil sufficient to allow operation of the unit for approximately 1000 hours; however, if a unit has been completely drained of all oil, the oil storage reservoir in the primary oil separator must be refilled with new oil before operating the unit.

If the unit has been operated for 1000 hours (or when the oil level gauge indicates low when the unit is shut down and is standing approximately level) it should be completely drained of oil. If the unit has been operated under adverse conditions, or under long shutdown periods, an earlier change period may be necessary as oil deteriorates with time as well as by operating conditions. Complete replacement of the old oil with clean new oil every 500 to 1000 hours, depending upon operating conditions, is not only desirable, but is good insurance against the accumulation of dirt, sludge, or oxidized oil products.

Completely drain the receiver-separator and the piping. After the unit has been completely drained of all old oil, replace the drain plugs, making sure they are tight. If the oil is drained immediately after the unit has been run for some time, most of the sediment will be in suspension and, therefore, will drain more readily.

Warning

Do not, under any circumstances, remove any drain plugs, or the oil filler plug from the compressor lubricating and cooling oil system without first making sure the air receiver system has been completely relieved of all air pressure.

Caution

Some oil mixtures are incompatible, and result in the formation of varnishes, shellacs, or lacquers which may be insoluble. Such deposits can cause serious troubles including clogging of the filter. Where possible, try to avoid mixing oils of the same type but different brands. A brand change is best made at the time of a complete oil change.

ENGINE LUBRICATING OIL

Refer to engine operator's manual.

SECTION V

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PREVENTIVE MAINTENANCE

1. DRAIN CONDENSATE FROM RECEIVER-SEPARATOR DAILY.
2. CHECK COMPRESSOR OIL LEVEL DAILY. ADD OIL ONLY IF ON "LOW" MARK WHEN NOT RUNNING.
3. FILL FUEL TANKS AT END OF WORKING DAY TO PREVENT CONDENSATE. DRAIN CONDENSATE AND SEDIMENT EVERY SIX MONTHS.
4. INSPECT AIR CLEANER SERVICE GAUGE, OR GAUGES, DAILY. SERVICE CLEANER ELEMENT WHEN GAUGE SHOWS RED AT FULL SPEED. PRIMARY ELEMENT MAY BE CLEANED BY WASHING GENTLY IN WARM DETERGENT SOLUTION. ALLOW ELEMENT TO DRY BEFORE REPLACING. DO NOT BLOW OFF ELEMENT WITH COMPRESSED AIR. DO NOT ATTEMPT TO CLEAN SAFETY ELEMENT, THIS SHOULD BE REPLACED YEARLY. DO NOT OIL ELEMENTS.
5. CHECK TIRES WEEKLY. MAINTAIN CORRECT TIRE PRESSURE.
6. CHECK BATTERY ELECTROLYTE LEVEL AND SPECIFIC GRAVITY WEEKLY. KEEP TERMINALS CLEAN AND LIGHTLY GREASED.
7. LUBRICATE REGULATOR LINKAGES WEEKLY.
8. KEEP EXTERIOR OF RADIATOR AND OIL COOLER CLEAN OF ACCUMULATED OIL, DIRT AND GREASE.
9. CHANGE COMPRESSOR LUBE OIL EVERY 1000 HOURS, OR MORE FREQUENTLY IF OPERATING UNIT UNDER ADVERSE CONDITIONS.
10. SERVICE COMPRESSOR OIL FILTERS AT EVERY OIL CHANGE. DRAIN AND CLEAN SUMPS OF ACCUMULATED SLUDGE AND DISCARD ELEMENTS. INSPECT SUMPS AND ELEMENTS FOR EVIDENCE OF LACQUER FORMATION. REPLACE ELEMENTS WITH NEW ELEMENTS. NOTE: ON NEW OR OVERHAULED UNITS, REPLACE ELEMENTS AFTER FIRST 50 AND 150 HOURS, THEREAFTER AT EACH OIL CHANGE.

CAUTION: EVIDENCE OF LACQUER FORMATION IS A WARNING THE LUBE OIL HAS IMPROPER CHARACTERISTICS AND SHOULD BE CHANGED IMMEDIATELY.

11. CHECK OPERATION OF SAFETY SHUTDOWN SWITCHES EVERY THREE MONTHS. REMOVE SWITCHES AND CHECK SETTINGS EVERY YEAR.
12. REMOVE AND CLEAN OIL LINE SCREEN AND ORIFICE IN SCAVENGER LINE EVERY 1000 HOURS.
13. APPLY GREASE TO RUNNING GEAR LUBE FITTINGS AND TO SLIP END OF SPRINGS EVERY SIX MONTHS.
14. CLEAN, INSPECT AND REPACK WHEEL BEARINGS EVERY TWELVE MONTHS.
15. MAINTAIN ENGINE PER ENGINE OPERATOR'S MANUAL.

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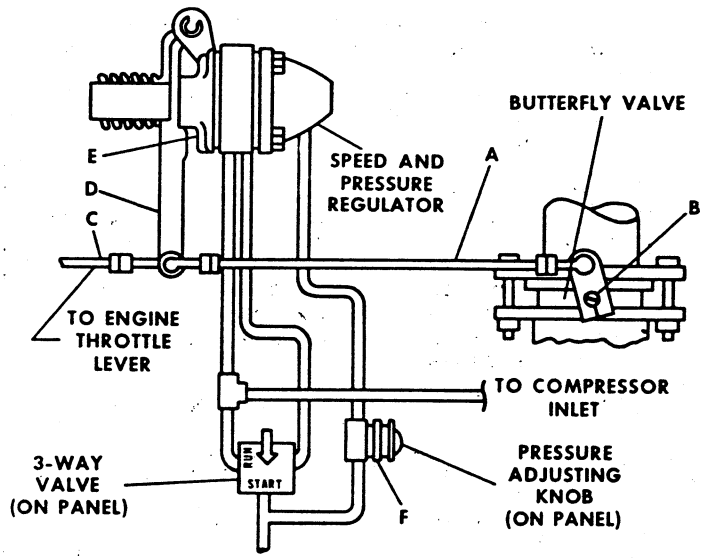
Figure 5-1. Typical Preventive Maintenance Instruction Plate Found On Unit

SECTION VI

Ingersoll-Rand®

SPEED AND PRESSURE REGULATOR ADJUSTING INSTRUCTIONS



NORMALLY REGULATION REQUIRES NO ADJUSTING, BUT IF PROPER ADJUSTMENT IS LOST, PROCEED AS FOLLOWS:

1. WITH UNIT STOPPED ADJUST LENGTH OF BUTTERFLY VALVE LINK ROD (A) SO THAT LINE SCRIBED ON BUTTERFLY VALVE SHAFT (B) IS 60° ABOVE THE HORIZONTAL. ADJUST LENGTH OF ENGINE THROTTLE LINK ROD (C) SO THAT LEVER (D) IS FIRMLY AGAINST STOP (E).

2. START UNIT. ADJUST SERVICE VALVE AND ADJUSTING KNOB ON INSTRUMENT PANEL REGULATOR (F) SO THAT LEVER (D) IS FIRMLY AGAINST STOP (E) AND DISCHARGE PRESSURE GAUGE SHOWS 125 PSIG (8.79 KG/CM²). ADJUST LENGTH OF ENGINE THROTTLE LINK ROD (C) TO HOLD ENGINE SPEED OF 2100 RPM WITH DISCHARGE PRESSURE HELD AT 125 PSIG (8.79 KG/CM²).

3. BACK OFF ADJUSTING KNOB ON INSTRUMENT PANEL REGULATOR (F) SO THAT LEVER (D) JUST STARTS TO MOVE AWAY FROM STOP (E) WITH PRESSURE HELD AT 125 PSIG (8.79 KG/CM²).

4. CLOSE SERVICE VALVE COMPLETELY. BACK OFF ENGINE SLOW SPEED STOP SCREW TO ENSURE THAT BUTTERFLY VALVE IS COMPLETELY CLOSED. ADJUST LENGTH OF BUTTERFLY VALVE LINK ROD (A) SO THAT ENGINE IDLES AT 1000 RPM.

5. TO SELECT ANY PRESSURE BETWEEN 80 AND 150 PSIG (5.62 TO 10.55 KG/CM²) CHANGE ADJUSTMENT OF PRESSURE ADJUSTING KNOB ON INSTRUMENT PANEL REGULATOR (F) TO OBTAIN THE DESIRED DISCHARGE PRESSURE AT FULL SPEED. LOCK ADJUSTING KNOB WITH LOCK RING.

35786292

Figure 6-1. Typical Speed and Pressure Regulator Adjusting Instruction Plate Found On Unit

SECTION VII

TROUBLE SHOOTING

GENERAL

This section contains a trouble shooting chart, Table 7-1, which will aid and guide the operating personnel by indicating possible troubles that may occur in the operation of your unit. Trouble shooting for the engine is not given in this instruction book. Refer to your engine Operator's Manual covering trouble shooting.

The trouble shooting chart lists the probable causes of the troubles that may occur and the necessary remedies for correcting the troubles, and are listed in the chart in the order in which they are most apt to occur.

The necessary remedies include servicing, adjusting or repair, and replacement of the components causing trouble.

NOTE:

Please refer to the following pages for Table 7-1.

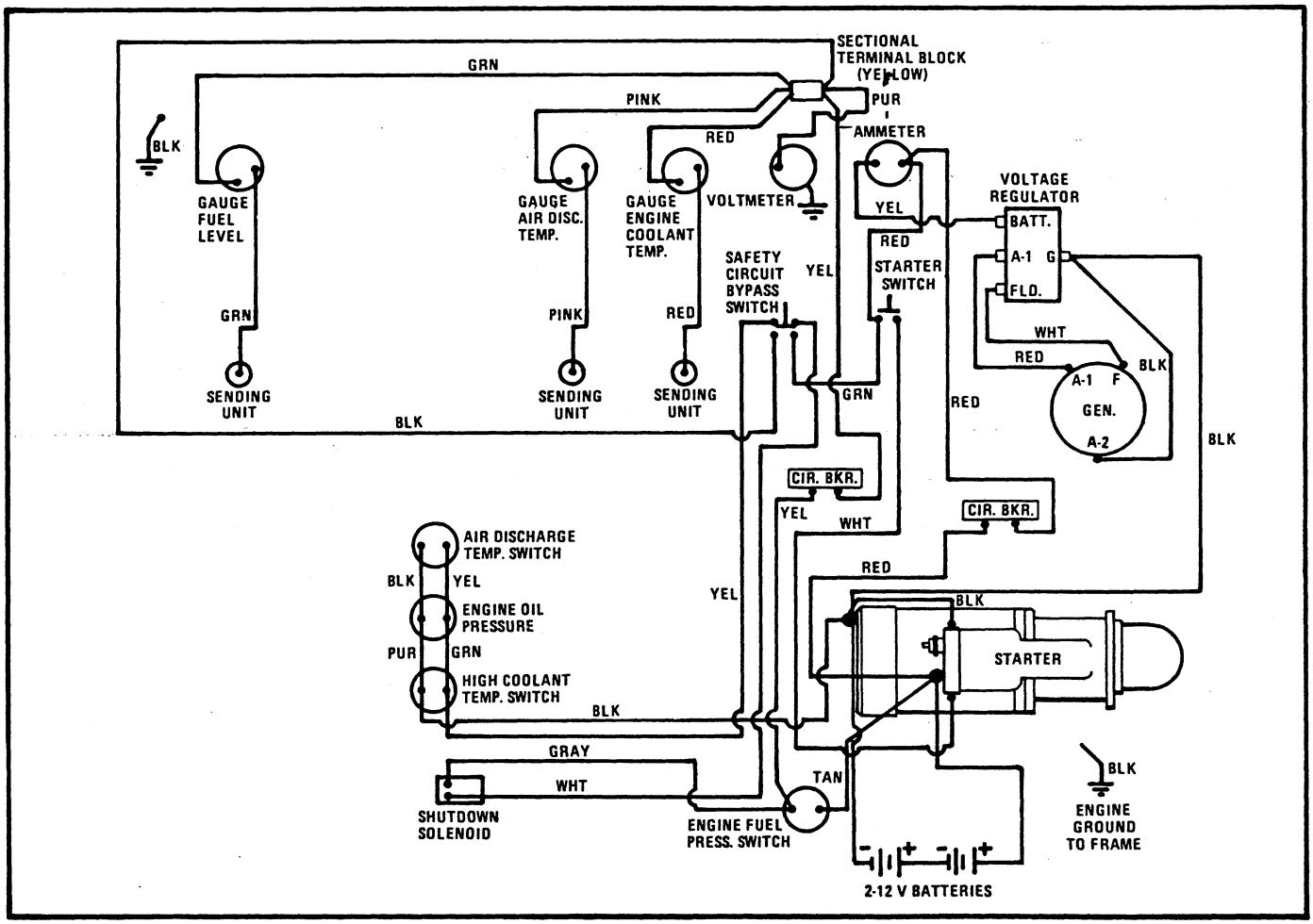


Figure 7-1. Typical Unit Wiring Diagram

TABLE 7-1, TROUBLE SHOOTING

Trouble	Probable Cause	Remedy
1. Overheating or "Tripping" of compressor high discharge temperature shutdown switch. NOTE: For "Tripping" of engine water temperature or engine oil pressure shutdown switches, see Trouble Shooting section of engine operator's manual.	1. Radiator and/or oil cooler external surfaces covered with oil, grease, dirt, etc.	1. Clean with solvent and compressed air.
	2. Radiator and/or oil cooler systems low on coolant levels.	2. Refill to proper levels.
	3. Fan belt(s) loose.	3. Tighten to correct tension.
	4. Fan shroud not properly adjusted (models with adjustable shrouds only).	4. Adjust shroud.
	5. Using antifreeze in high ambient conditions.	5. Drain and refill with clean water.
	6. Recirculation of cooling air due to proximity of other units or wind conditions.	6. Relocate machines allowing more space between units. Note ambient temperature one foot in front of oil cooler.
	7. Operating at pressure in excess of maximum stated on General Data Plate.	7. Reduce discharge pressure to specified maximum.
	8. Regulation system improperly adjusted.	8. Adjust regulation according to instructions on Speed and Pressure Regulator Adjusting Instruction Plate.
	9. Wrong type or grade of compressor lubricating and cooling oil.	9. Check specification requirements for lubricating and cooling oil. Use proper grade for ambient temperature.
	10. Clogged compressor oil filter.	10. Remove oil filter; clean sump and replace element.
	11. Clogged compressor oil cooler.	11. Check oil cooler for flow resistance. Clean and flush lubricating and cooling oil system.
	12. Clogged lubricating and cooling oil system.	12. If the unit is automatically shutting down, and the oil to the oil cooler is hot and the return oil line is cool, check and clean the oil cooler and the oil filter. Also clean the thermostatic bypass valve. See also trouble #2.
	13. Low discharge air pressure due to faulty minimum pressure valve. Low discharge pressure causes oil pump to lose suction thereby starving compressor of lubricating and cooling oil. This generally results in high operating temperatures which, under normal conditions, will cause the discharge air temperature switch to function.	13. Do not operate unit below 70 psig (4.92 Kg/Cm^2). Repair or replace minimum pressure valve if defective.
	14. Failure to "trip" or shutdown on overheating.	14. Check for faulty discharge air temperature switch.
	15. Faulty discharge air temperature switch.	15. Refer to trouble number 6 and its probable causes and remedies.
	16. Thermostat controlled bypass valve not closing properly.	16. Drain lubricating and cooling oil system. Remove oil temperature valve from bypass valve. Test valve operation in hot oil bath with thermometer, and replace if necessary.
2. Clogged compressor lubricating cooling oil system.	1. Receiver-separator clogged with debris.	1. Drain lubricating and cooling oil system. Clean and flush receiver-separator. Replace secondary separator element if excessively deteriorated.
	2. Oil cooler clogged with sludge and lacquer deposits.	2. Drain lubricating and cooling oil system. Remove, clean and flush interior of oil cooler. Refill oil system with new oil to correct specifications.

TABLE 7-1, TROUBLE SHOOTING (CONT.)

Trouble	Probable Cause	Remedy
3. Excessive compressor lubricating and cooling oil consumption. (Passing too much oil out with the discharge air).	1. Clogged screen in scavenger line.	1. Remove, inspect and clean screen.
	2. Discharge pressure too low.	2. Do not operate below 70 psig discharge pressure.
	3. Plugged orifice in scavenger line (if fitted).	3. Remove, inspect and clean orifice.
	4. Deteriorated secondary separator element.	4. Remove secondary separator. Replace element if excessive settling or deterioration is indicated.
4. Unable to obtain correct engine speeds. Unit will not unload. Pressure keeps rising until safety valve blows off.	1. Engine in poor operating condition.	1. Refer to engine Operator's Manual for trouble shooting of the engine.
	2. Speed and pressure regulator out of adjustment.	2. Readjust speed and pressure regulator according to plate on unit.
	3. Regulation bleed orifice plugged.	3. Check air passages and orifice; clean if plugged.
	4. Discharge pressure adjustment set too high.	4. Readjust discharge pressure within limits stated on plate on unit.
	5. Leaking inlet unloader diaphragm (if fitted).	5. Inspect diaphragms for deterioration; replace if necessary.
	6. Leaking speed and pressure regulator metering pin and lever diaphragms.	6. Inspect diaphragms for deterioration; replace if necessary.
	7. Leakage past engine speed and pressure regulator metering pin.	7. Inspect metering pin and metering pin seat for improper seating due to scale or rust. Clean pin and seat; replace if necessary.
5. Defective engine speed and pressure regulator.	1. Worn or deteriorated diaphragms.	1. Remove and disassemble regulator; replace both metering pin seat and regulator lever diaphragms.
	2. Metering pin not seating properly.	2. Remove and disassemble regulator; clean metering pin and seat of any scale or rust; replace if necessary.
6. Failure of discharge air temperature switch.	1. Improper connections or defective wiring.	1. Check for loose connections and faulty wiring causing an open or short circuit.
	2. Defective switch.	2. Remove and test switch operation by placing bulb end in bath of oil heated to approximately 245°F (118°C). Tap switch lightly during checking operation. Replace switch if defective. DO NOT OPERATE UNIT WITH DEFECTIVE SWITCH OR BY SHORTING OUT SWITCH.
7. Failure of oil level gauge.	1. Oil level gauge float is oil logged.	1. Drain lubricating and cooling oil from system. Remove and inspect gauge float. Replace gauge if float leaks or has collapsed.
	2. Magnetic end of flat shaft clogged with attracted particles.	2. Drain lubricating and cooling oil from system. Remove and clean under arms of magnet. Thoroughly clean and flush receiver-separator. Refill oil system with new oil.
8. Short air cleaner element life or frequent servicing of oil-bath-type air cleaners (if fitted).	1. Exhaust soot from other machines running close by or from own exhaust due to wind conditions.	1. Space machines farther apart. Add exhaust stack extensions to get exhaust soot above level of air intakes of adjacent machines.

SECTION VIII
OVERHAUL

GENERAL

In addition to preventive maintenance, some components will require overhauling to maintain maximum output and performance of the unit. This book contains instructions for overhauling the compressor. These instructions cover disassembly and reassembly of the air end assembly. A complete overhaul of the air end assembly is recommended every 10,000 hours of service or every five years.

NOTE

When the cost of labor to remove an air end, overhaul it and replace it in the unit is considered, the cost of bearings and shaft seal is but a small part of the total cost. Accordingly, it is suggested that whenever an air end is disassembled, for whatever reason, all the bearings and the shaft seal should be replaced even though the old bearings do not appear to be worn.

WARNING

Never strike or otherwise impact any part of any bearing. This can cause damage which may not be visible but which will eventually lead to the failure of the bearing.

NOTE

On newer air ends (those manufactured after January, 1971), after the intake valve is removed from the air end, you will notice some figures stamped on the intake flange over the center line of each rotor. Refer to Figure 1. These figures are the intake end clearances for each rotor in thousandths of an inch when the air end was first assembled. For example, "17" means a clearance of 0.017 inch. If an air end is to be dismantled and rebuilt it will be necessary to remeasure the intake end clearances of each rotor and restamp these figures after the old figures have been obliterated.

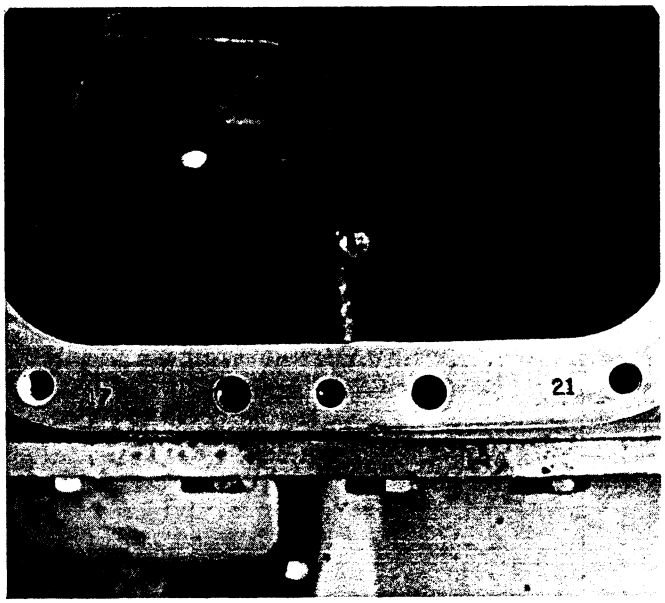


Figure 1

COMPRESSOR DISASSEMBLY

With the air end assembly removed from the unit and placed on a clean, heavy-duty work stand, disassembly of the compressor should be performed as follows:

1. First, remove the compressor coupling. Remove the three cap screws in the tapered hub in the center of the coupling.

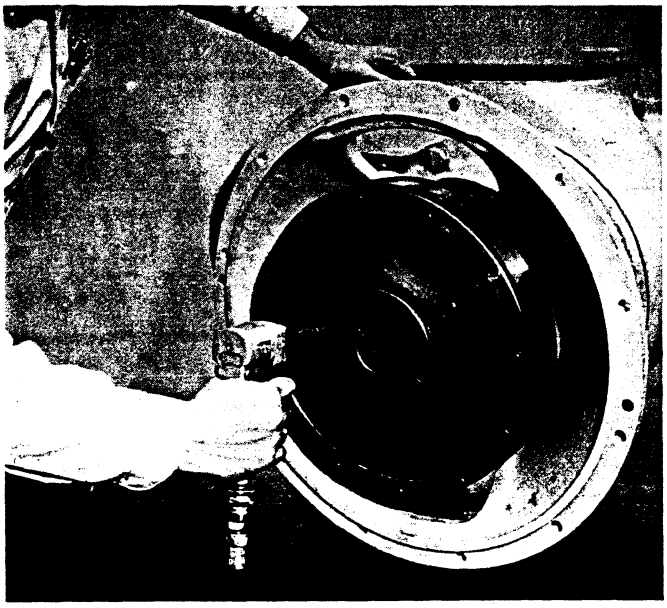


Figure 2

Refer to Figure 2. Using two 3/8" - 16 x $4\frac{1}{2}$" cap screws in the threaded holes in the hub, jack off the coupling. Refer to Figure 3. The hub and the coupling can now be removed by hand. Refer to Figure 4. Remove the coupling and drive shaft keys. NOTE: There is a set screw in the flange of the tapered hub which will become exposed after the coupling has been jacked back. This set screw must be backed off before the hub can be removed.

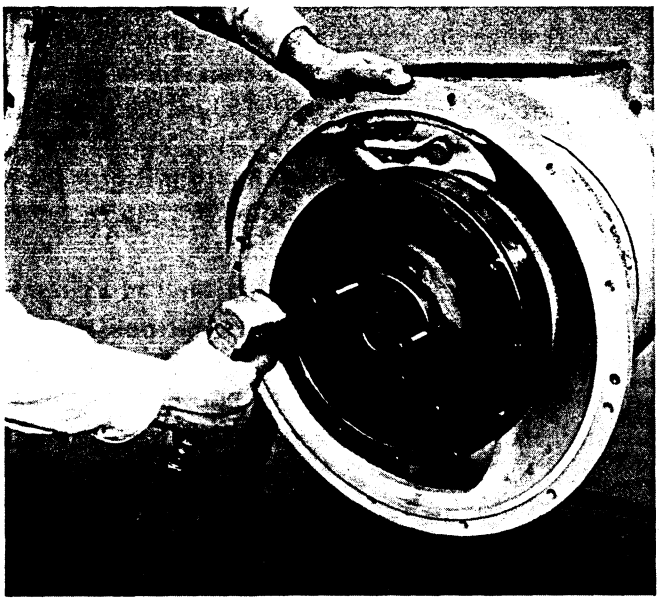


Figure 3

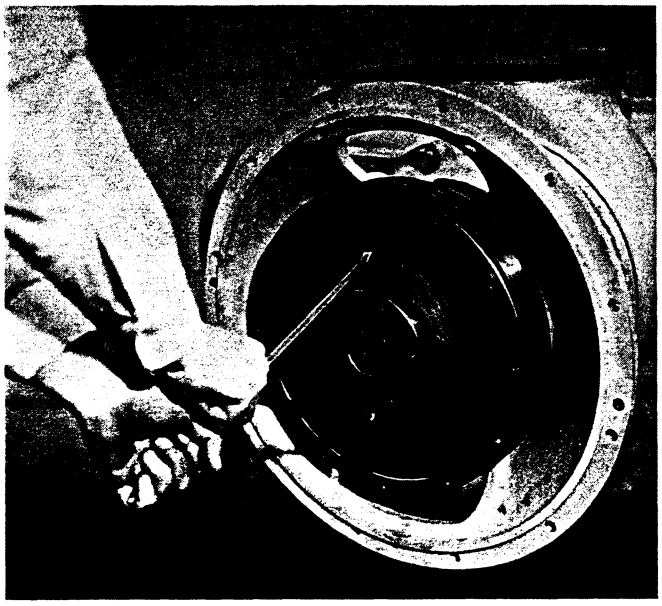


Figure 4

Refer to Figure 5.

2. Remove the cap screws attaching the oil seal cover to the gear case; then, remove the cover and the oil seal cover gasket, discarding the gasket. Refer to Figure 6. The stationary seal ring of the rotary-shaft-type oil seal will probably come off with the cover. Remove the seal ring from the cover and the balance of the oil seal parts off the drive shaft. Use extreme caution when

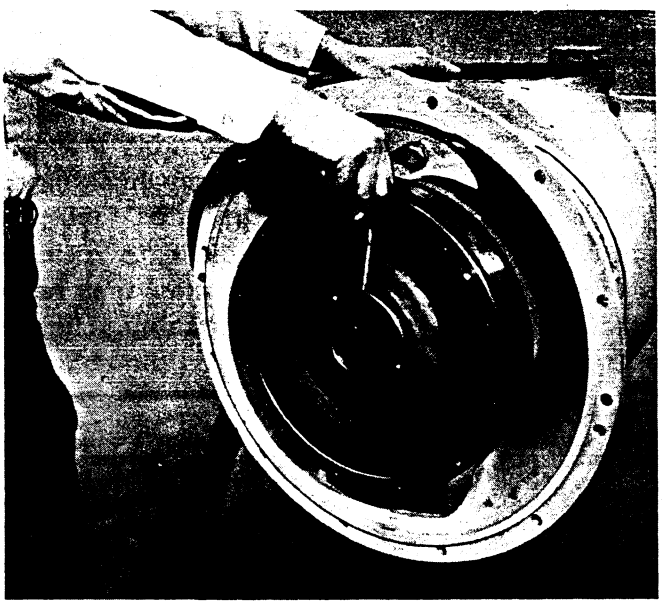


Figure 5

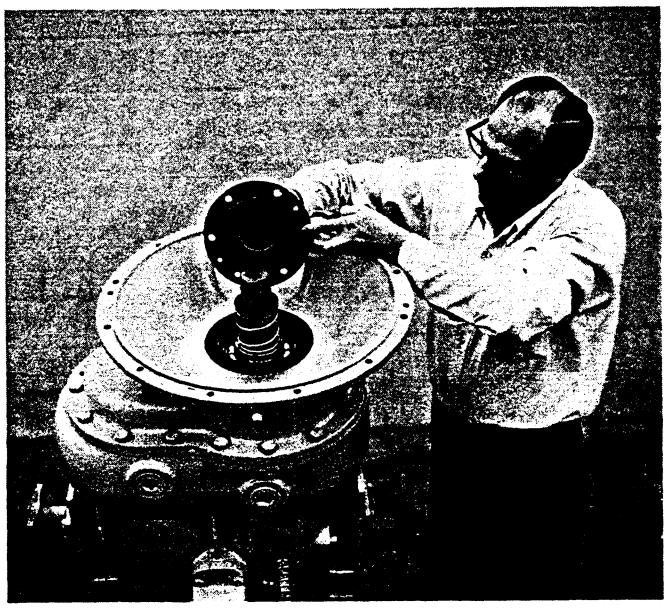


Figure 6

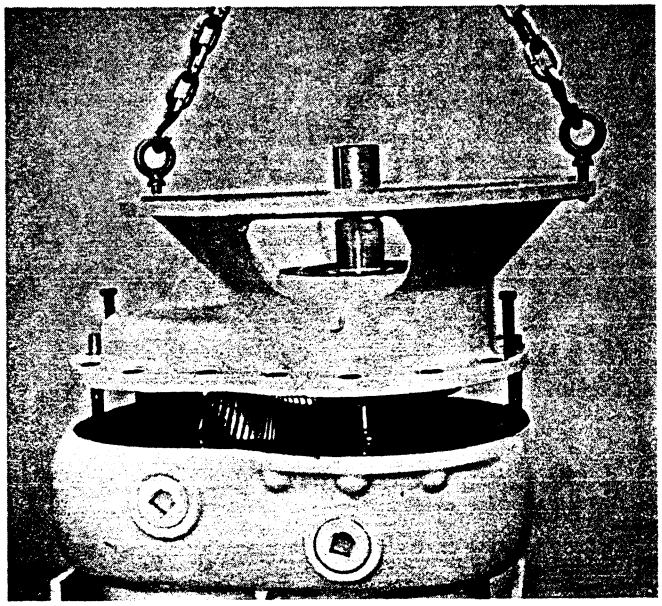


Figure 7

handling the oil seal parts to prevent damage to the sealing surfaces.

3. Remove the compressor gear case assembly from the rotor housing. This can be done by first attaching a rope or chain sling to the gear case; then, removing two opposite gear case to rotor housing attaching cap screws; and replacing these cap screws with studs, or headless bolts, approximately four to five inches (221.6 to 227.0 mm) long. These long studs, or headless bolts, may then act as guides when separating the gear case assembly from the rotor housing. Remove the balance of the attaching cap screws. The gear case assembly may now be jacked loose from the rotor housing, by means of the two $\frac{1}{2}$" - 13 threaded jack screw holes found in the gear case to rotor housing flange. The assembly may then be lifted off and out of the rotor housing. Refer to Figure 7. Remove and discard the gear case gasket.

4. Remove the allen head cap screws attaching the bearing retaining plate to the gear case. This can be done by the use of a socket wrench and an extension through the access holes provided in the drive gear. Refer to Figure 8. The drive shaft and ball bearing assembly may now be pressed out of the gear case. Refer to Figure 9.

5. Remove the bearing lock nut. Place the drive shaft and ball bearing assembly in a press, with suitable blocking under the drive gear. By applying pressure on the coupling end of the drive shaft, the shaft can be pressed out of the drive gear and the ball bearing. Remove the drive gear key.

6. Using the proper tool, carefully remove the external retaining ring from the drive shaft. Place the drive shaft and roller bearing inner race assembly in a press, with suitable blocking under the bearing inner race; then, press the inner race off the shaft.

7. Place the rotor housing and rear bearing housing assembly in a vertical position so that the rear bearing housing may be readily removed. Remove the male rotor bearing retainer cover by first removing the attaching cap screws; then, using jack screws in the holes provided, remove it. Refer to Figure 10. Remove and discard the bearing retainer cover to rear bearing housing "O" ring and any shims that may have been used

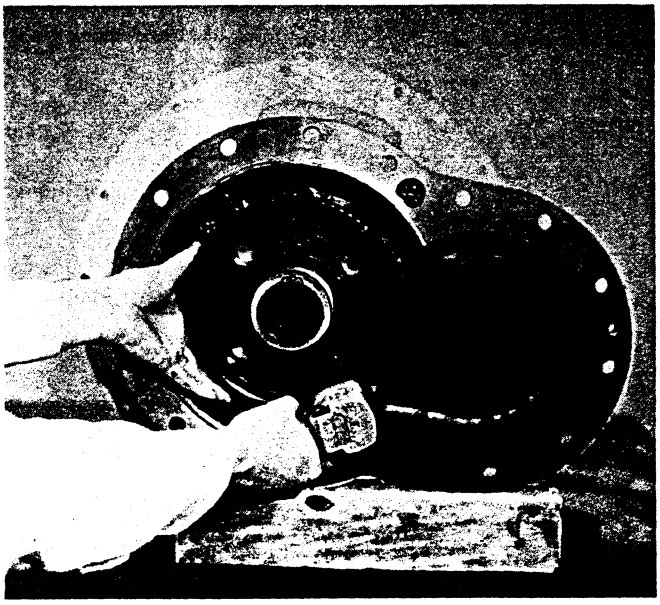


Figure 8

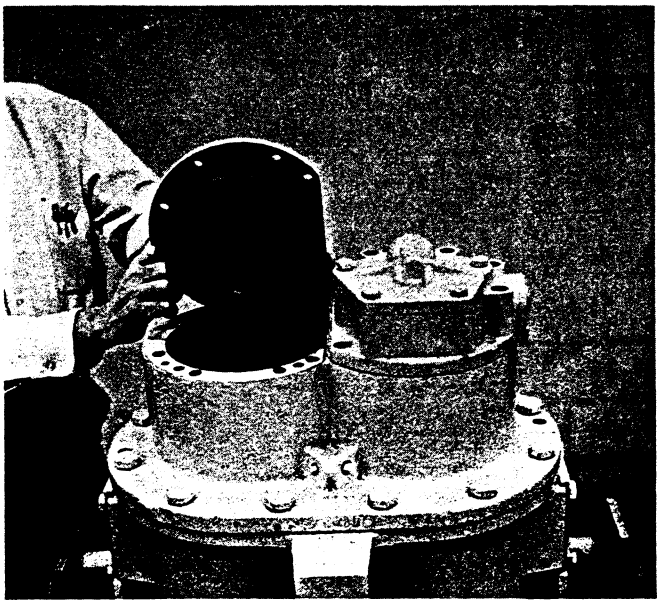


Figure 10

in assembling the retainer cover to the rear bearing housing.

8. Remove the complete oil pump from the rear bearing housing. This can be done by first removing the eight $\frac{1}{2}$" - 13 cap screws; then, using jack screws in the holes provided, lifting the oil pump clear of the bearing housing. Refer to Figure 11 and 12. Remove and discard the oil pump body to bearing housing "O" ring and any shims that may have been used in assembling the oil pump to the rear bearing housing.

9. Disassemble the oil pump and inspect the pump for worn parts. Depending on the extent of wear, either rebuild the pump or replace it with a complete new pump.

10. Remove the place bolts from the

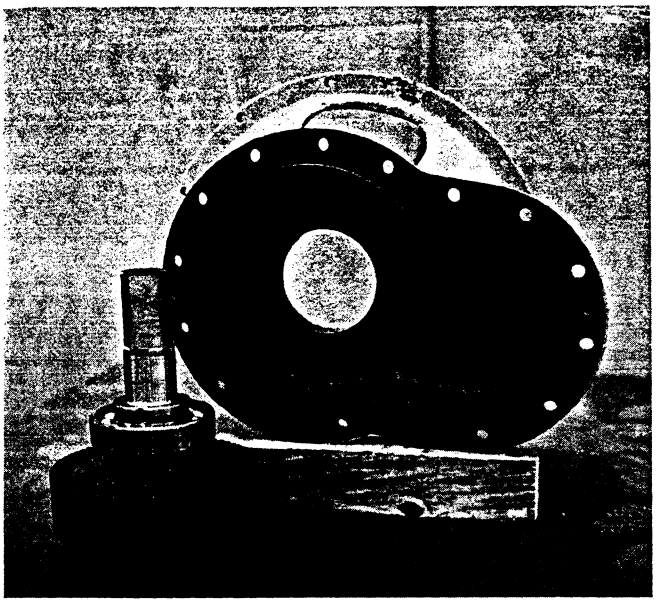


Figure 9

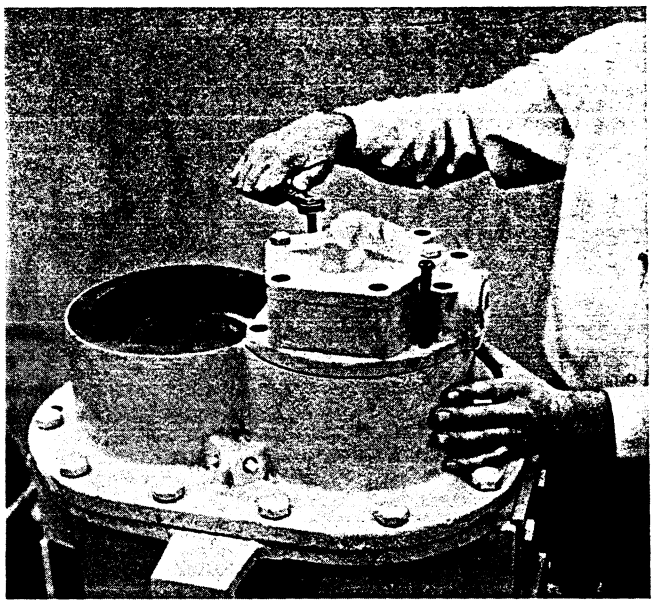


Figure 11

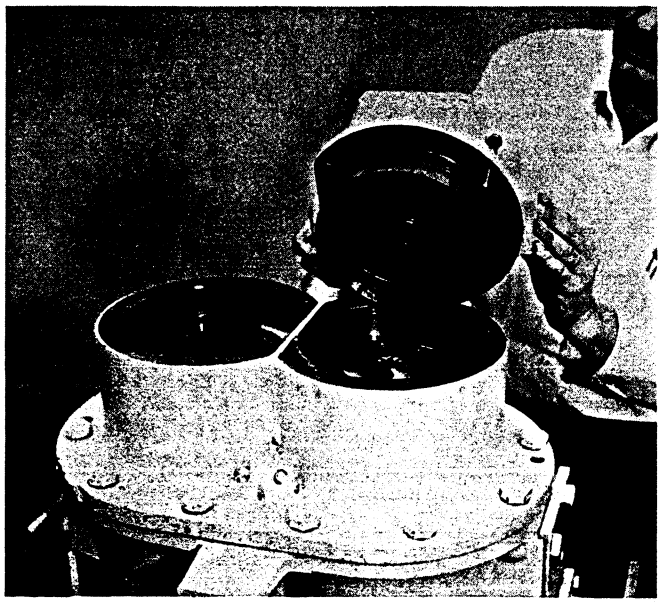


Figure 12

male rotor driven gear retaining plate. Remove the rotor driven gear, and the key from the male rotor.

CAUTION

To assure that tooth hardness of the rotor driven gear will not be destroyed, do not use a flame-type torch to apply heat to the gear to assist in its removal.

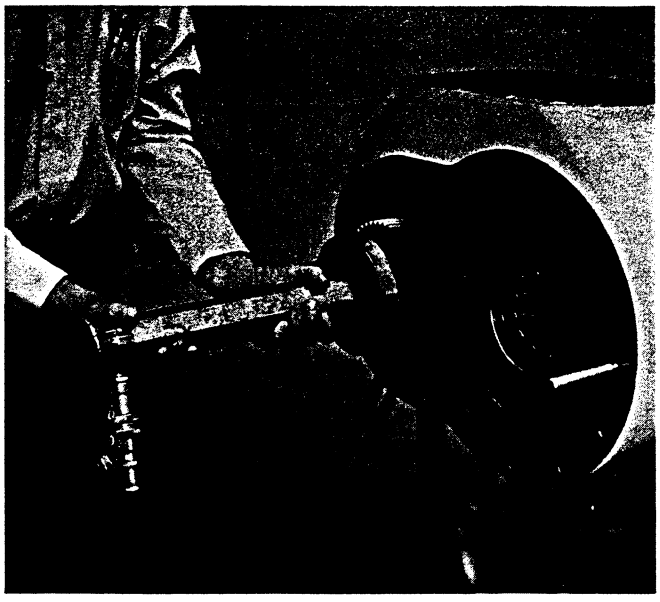


Figure 13

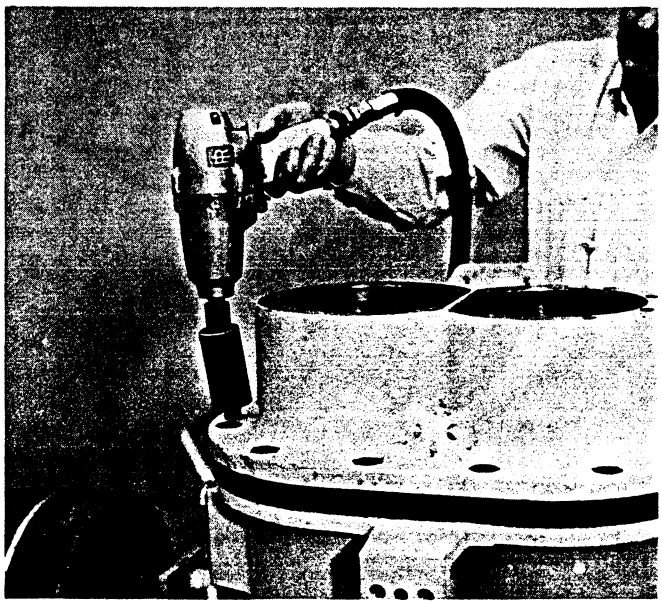


Figure 14

Use a gear puller plate and a hydraulic ram to remove the gear. Refer to Figure 13. The driven gear is provided with three 3/8" - 16 tapped holes, equally spaced on a 2 - 1/4" diameter bolt circle, for this purpose (refer to end of book for note on fabrication of a puller plate).

11. Remove the rear bearing housing assembly from the rotor housing. This can

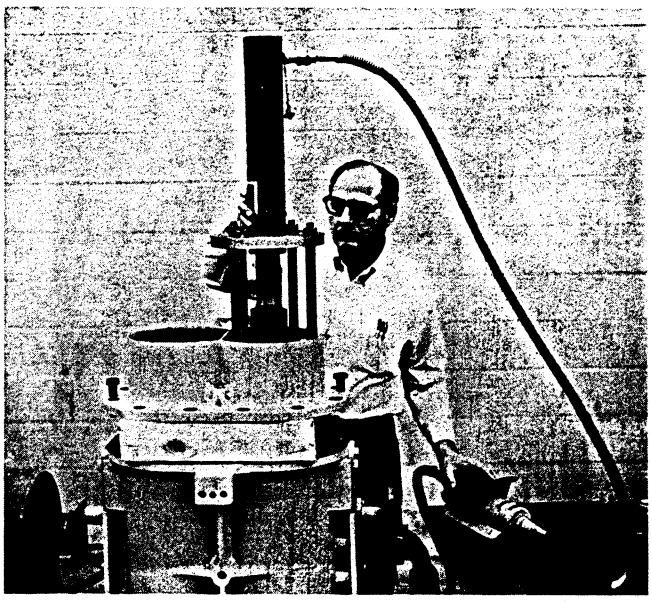


Figure 15

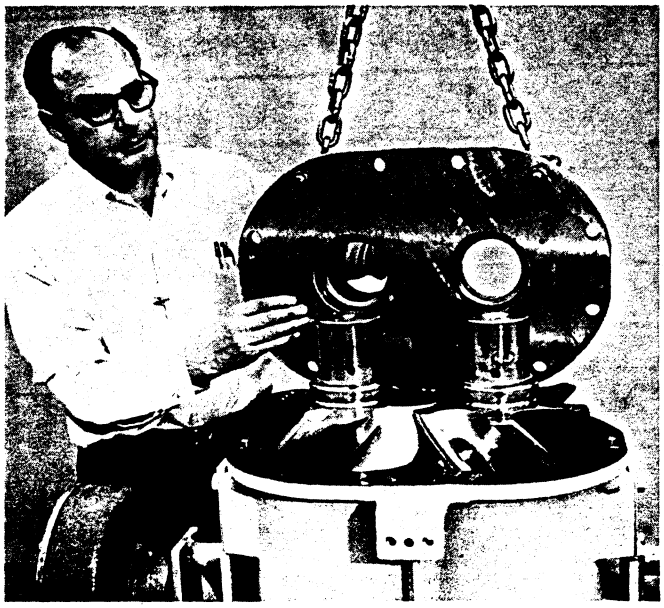


Figure 16

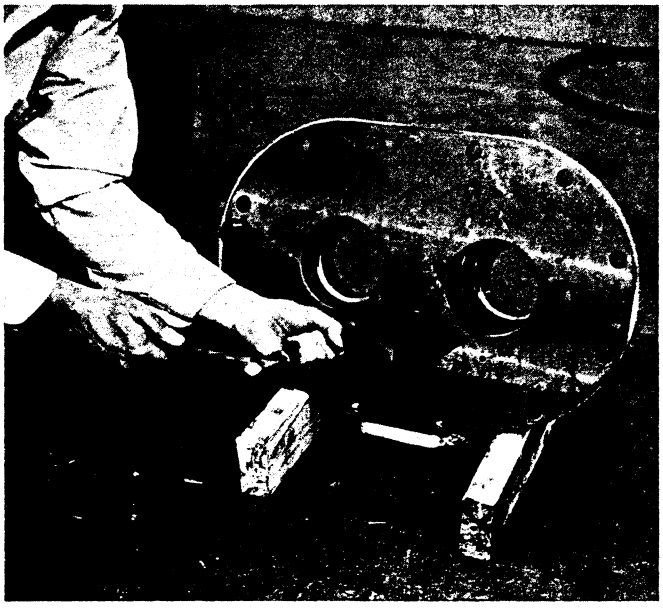


Figure 17

be done by first attaching eye bolts to two of the $\frac{1}{2}$" - 13 tapped holes in the rear of the bearing housing. Remove two opposite bearing housing to rotor housing attaching cap screws; then, replace these cap screws with studs, or headless bolts, approximately four to five inches (221.6 to 227.0 mm) long. These long studs, or headless bolts, may then act as guides when separating the bearing housing from the rotor housing. Remove the balance of the attaching cap screws. The bearing housing may now be jacked loose from the rotor housing, by means of the two 3/4" - 10 threaded jack screw holes found in the bearing housing to rotor housing flange. Refer to Figure 14. With the aid of a hoist, lift the bearing housing assembly only about four inches.

NOTE

If disassembly of the compressor air end is being done for inspection purposes only, lift the rear bearing housing enough so that the rotors are completely out of the rotor. Inspection of the rotors can then be accomplished without disturbing the discharge end bearing adjustments.

To further disassemble the compressor air end assembly, first work some sort of material, such as rags, through the air intake port of the rotor housing into the rotor housing cylinder bores. This must be done to absorb the shock of the rotors as they are pushed down out of the rear bearing housing into the rotor housing cylinder bores. Place wooden blocks, approximately 4" thick, on the flange of the rotor housing; then, lower the rear bearing housing assembly onto the blocks.

12. Remove the place bolts from the two bearing retaining plates. Remove the retaining plates. Press the male and female rotors out of the rear bearing housing using a hydraulic ram. Refer to Figure 15. As soon as the inner races of the bearings have been cleared by the rotor shafts, the rotors will drop into the rotor housing cylinder bores.

13. Remove the rear bearing housing. Refer to Figure 16. Remove and discard the rear bearing housing to rotor housing gasket. Tap the thrust bearings out of the rear bearing housing using a 1/8" diameter drift through the three holes provided around the outer race of each bearing. Refer to Figure 17.

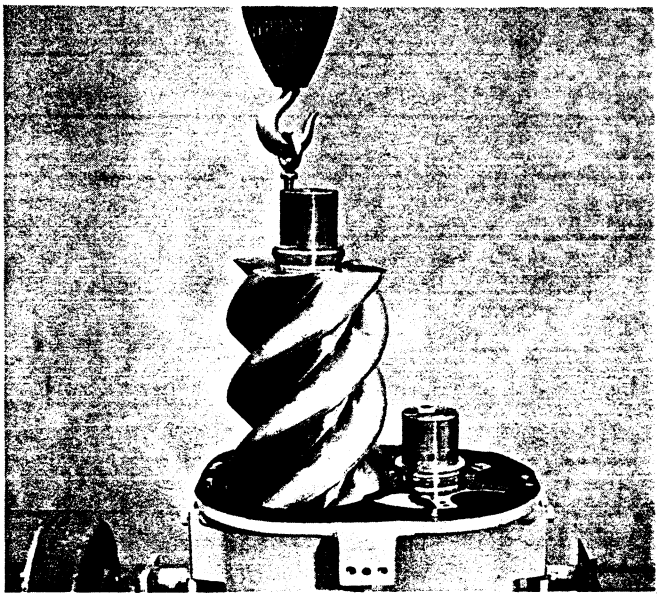


Figure 18

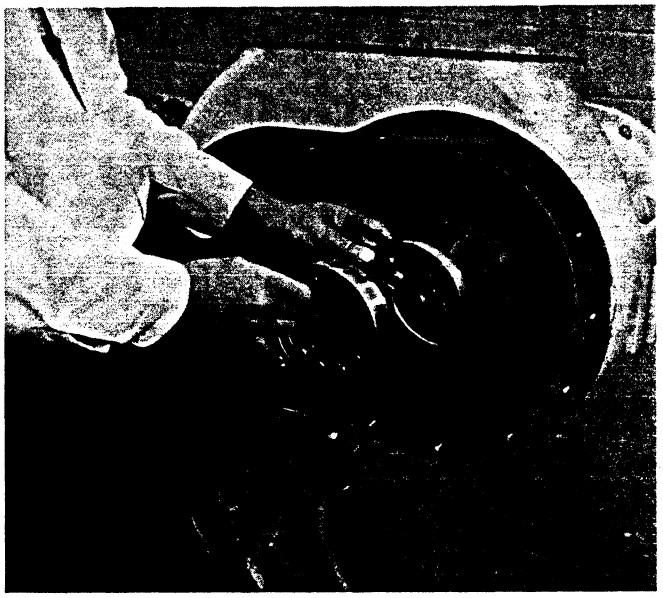


Figure 20

14. Remove the rotors from the rotor housing. This can be done by first attaching an eye bolt to one of the $\frac{1}{2}$" - 13 tapped holes in the end of the rotor shaft. Each rotor may then be lifted out of the rotor housing. Refer to Figure 18. The inner races of the front roller bearings will remain with the rotors as they are removed from the rotor housing. Using the proper tool, remove the external retaining ring from the shaft of the female rotor; then, remove the roller bearing inner races from the rotor shafts. Remove and discard the shims from each rotor.

15. Using the proper tools, remove the two front roller bearing internal retaining rings from the rotor housing. Refer to Figure 19. Remove the outer race of the drive shaft roller bearing, the spacer ring, refer to Figure 20, and the outer races of the two rotor front roller bearings from the rotor housing, using a bearing puller, if necessary.

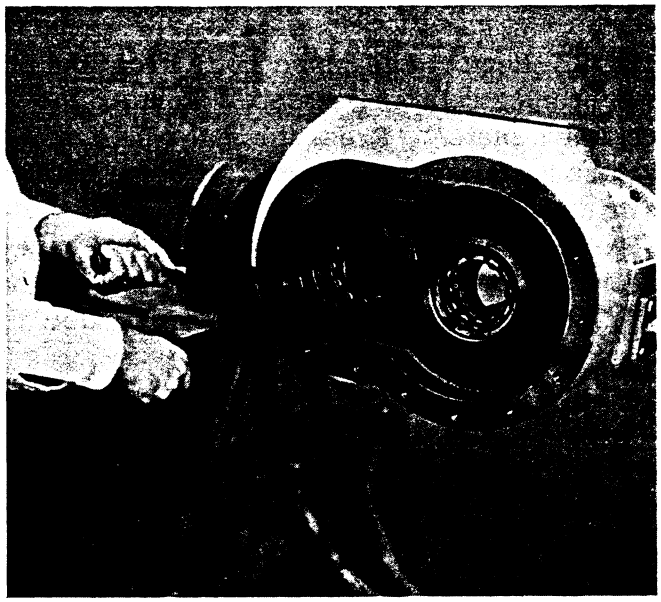


Figure 19

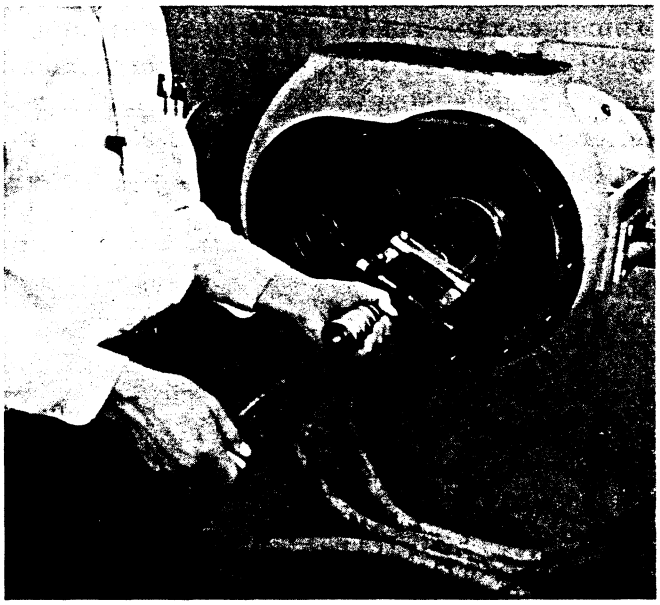


Figure 21

Refer to Figure 21.

Thoroughly clean all parts, using a non-flamable safety solvent. Pay particular attention to the cleaning of the bearings so they may be thoroughly inspected. Inspect the bearings for wear, scoring or damage. Inspect the rotors and roller bearing inner races for wear or damage. Inspect the rear bearing housing face for scoring or damage.

COMPRESSOR REASSEMBLY

The procedure to be followed in reassembling the compressor air end is essentially the reverse of the step-by-step procedure previously outlined under "COMPRESSOR DISASSEMBLY". The following procedures will result in obtaining proper clearances.

1. Make sure that all pipe plugs that may have been removed from the rotor housing are replaced and properly tightened.

NOTE

When reassembling the compressor air end make sure to use all new gaskets and "O" rings. Before assembling the "O" rings, always make sure they are thoroughly lubricated, using an automotive, wheel bearing grease. Replacement sets of gaskets and "O" rings may be ordered from your nearest Ingersoll-Rand Company Construction and Mining Sales Office by part number. Refer to the parts list covering your specific unit for the correct part number of the gasket and "O" ring set and the contents of the set.

2. If any bearings show any indication of wear, or damage, they should be replaced using complete new sets.

3. Clean rotor housing, making sure there are no burrs, nicks or dirt particles which will give false clearance readings —— this step is important, failure to observe it can lead to loss of the air end. Refer to Figure 22.

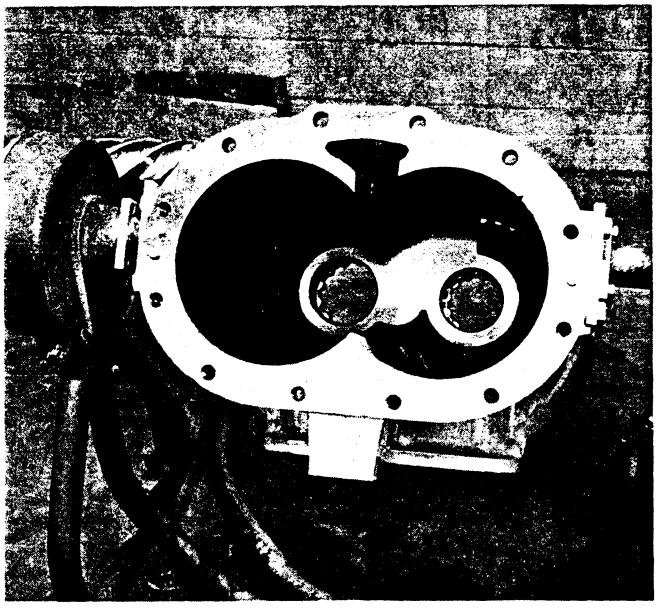


Figure 22

Figure 23

4. Install the three roller bearings (with their respective spacer and snap rings) in the intake end of the rotor housing.

5. Hold the rotor housing in a stand with the rotor bores vertical and the intake end down.

6. Clean both rotors, making sure there are no burrs, nicks or dirt particles which will give false clearance readings. Pay particular attention to the end faces of each rotor —— this is important.

7. Fit roller bearing inner races to intake end of each rotor. Refer to Figure 23. Heat bearing races in oil to 250°F for at least 30 minutes to facilitate installation —— do not use a hot plate; do not use a flame; do not heat above 275°F, Install snap ring to intake end of female rotor shaft.

8. Fit each rotor in its respective bore in the rotor housing.

9. Fit rear bearing housing gasket to flange of rotor housing.

10. Lay a straight edge across the rotor housing flange with the gasket in place and measure the total rotor to rotor housing end clearance with feeler gauges. Do this for each rotor separately. Refer to Figure 24. It should be 0.018 to 0.024 inch. Note these readings as shown in the example calculation on Table I.

11. Make sure face of rear bearing housing is free of burrs, nicks or dirt —— this is important.

TABLE I

TYPICAL EXAMPLE OF AIR END CLEARANCE READINGS

STEP NO.	STEPS TO BE TAKEN	MALE	FEMALE
10.	Total End Clearance	0.022	0.019
12.	Thickness of Rear Bearing Housing "A"	1.249	1.250
13.	Height of Rotor Spacer "B"	1.247	1.245
14.	Subtract "B" From "A"	0.002	0.005
14.	Add Clearance Required	0.003	0.003
14.	Shims Required	0.005	0.008
23.	Discharge End Clearance As Measured After Assembly "C"	0.002	0.003
24.	Intake End Clearance As Measured After Assembly "D"	0.019	0.015
25.	Add "C" and "D". This Must Be Within 0.002 Of Total End Clearance Measured In Step No. 10.	0.021	0.018

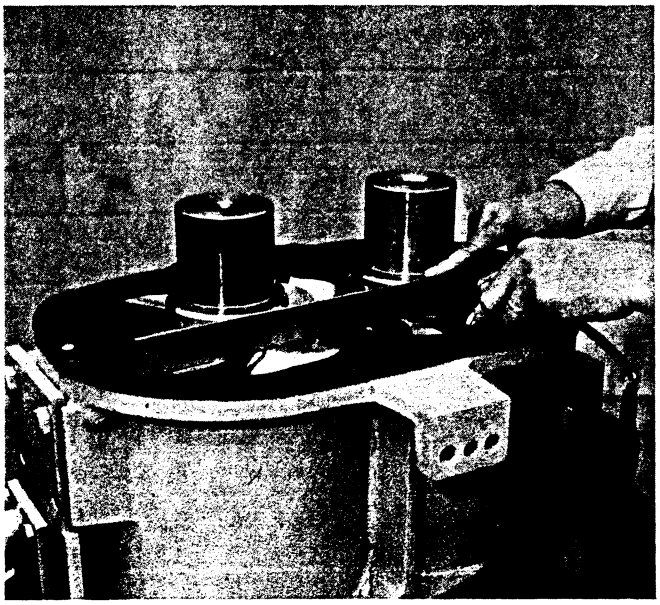


Figure 24

12. Measure the thickness of the bearing housing at the bearing outer race seat. Refer to Figure 25. This is dimension "A". Do this for each rotor. Note these measurements as shown. (Use a 1-2 inch micrometer to measure dimension "A".)

13. Measure the height of the rotor bearing spacer (integral with the rotor) above the face of the rotor lobes. Refer to Figure 26. This is dimension "B". This dimension "B" must be equal to or less than dimension "A". "B" cannot be greater than "A" —— this is important. Use a depth micrometer to measure dimension "B". Do this for each rotor and note these measurements as shown.

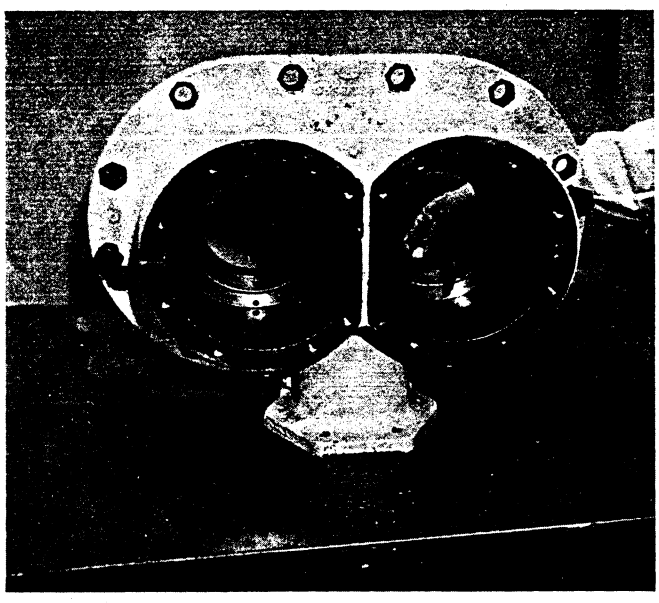


Figure 25

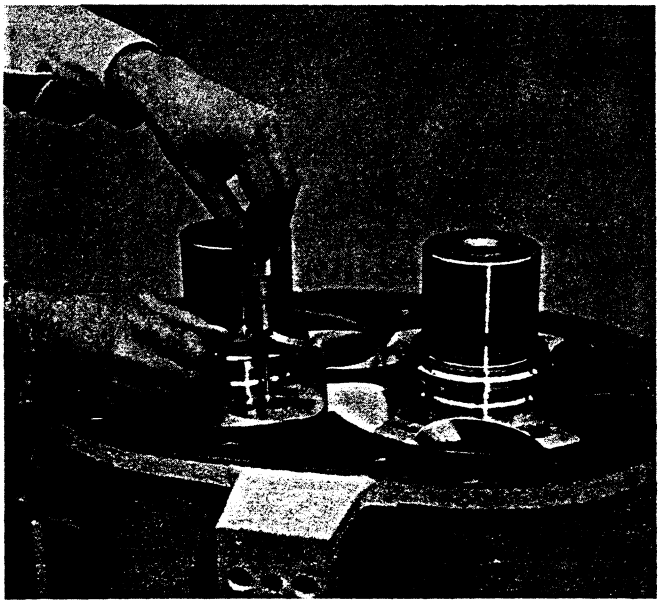


Figure 26

14. Perform arithmetic shown in example calculation to determine thickness of shim required for each rotor.

15. Install shims on each rotor shaft.

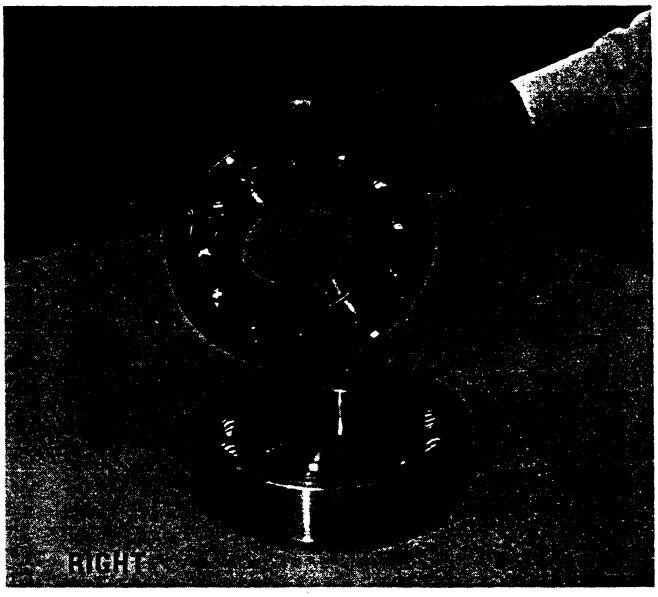


Figure 27

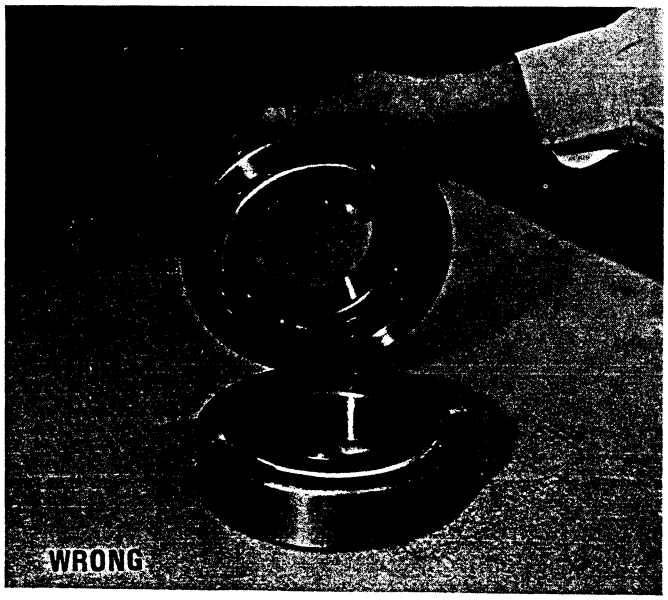


Figure 28

16. Install rear bearing housing (don't forget the gasket) and torque the bolts to 270 lbs. ft. Refer to Table II.

17. Install thrust bearings to each rotor "face to face" (this means with the large flanges of the inner races together in the middle of the bearing pack). Refer to Figure 27. Do not install other way. Refer to Figure 28. WARNING: - Do not, under any circumstances, strike or impact in any way the angular contact thrust bearings. So doing will lead to early failure. Use a hydraulic ram with a jig specially made for this job on this air end. Refer to Figure 29.

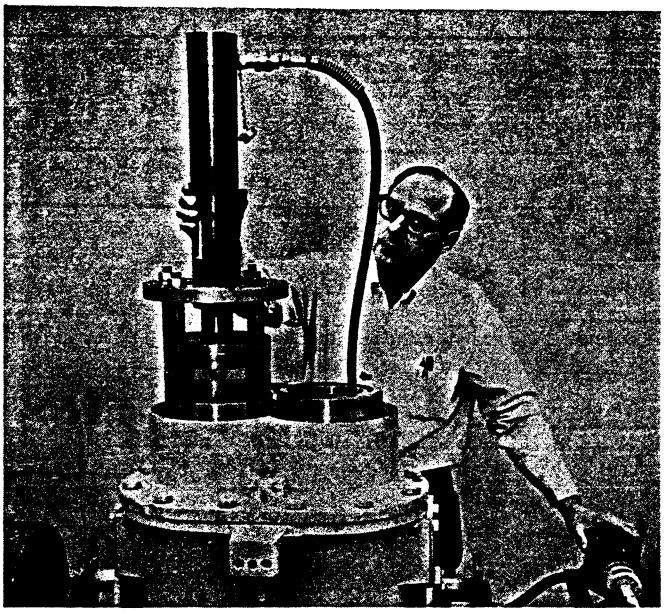


Figure 29

Figure 30

18. Install bearing retainer plates and referring to Table II, torque place bolts (use new bolts each time unit is assembled) to 150 lbs. ft. Refer to Figure 30.

19. Install bearing cover and oil pump

Figure 31

Figure 32

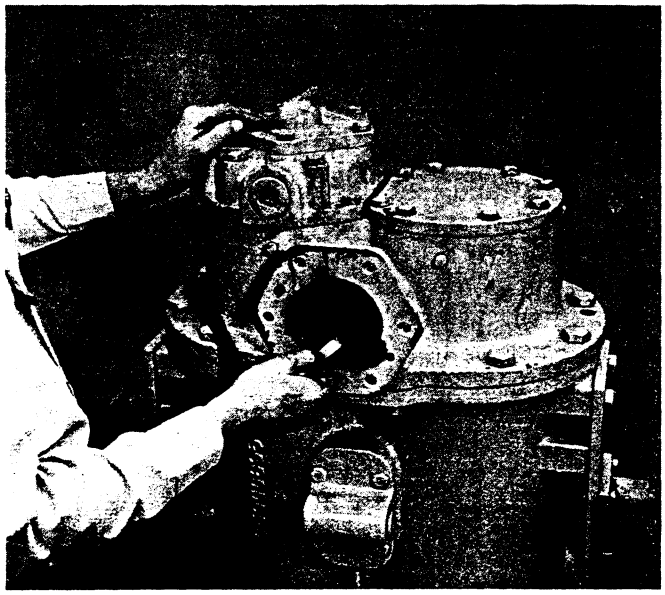


Figure 33

with their "O" rings. Refer to Figure 31. Refer to Table II and torque bolts to 75 lbs. ft.

20. Using a feeler gauge, make sure there is a gap between the oil pump and the bearing housing and between the bearing cover and the housing. Refer to Figure 32. This gap must be present to insure the bearings are pulled down tight in the housing. Older units may have shims at this point. These shims should be discarded and not replaced.

21. The build up is now complete. Check the work as follows.

22. With a feeler gauge measure the discharge end clearance of each lobe of each rotor. Refer to Figure 33. This can be done through the discharge port. This is dimension "C". This dimension, as measured, must be within 0.001 inch of the discharge clearance tried for in the calculation done in Step 14. (It will usually be about 0.001 inch less than calculated due to metal deformation when the covers are torqued down). The discharge clearance must be between 0.002 and 0.004 inch. If it is not, go back to Step 3 and start again.

23. With a feeler gauge through the air intake port, measure the intake end clearance of each lobe of each rotor. Refer to Figure 34. This is dimension "D".

24. Add dimension "C" and "D". This sum should be within 0.002 inch of the total end clearance measured in Step 10. If it is not, go back to Step 3 and start again.

25. This completes assembly of the air end less the gear case.

26. With the rotor housing lying on its side, or inverted with the oil pump end down, inspect the male rotor drive shaft keyway to make sure it is smooth and free of burrs. Install the driven gear key in the shaft keyway and install the gear on the shaft. This can be done by first heating the gear in oil to approximately 250°F, holding the temperature for at least one hour to make sure the gear is uniformly heated. Do not, under any circumstances, attempt to heat the gear with a flame-type torch. It is also recommended, when installing the driven gear, to use some type of anti-seize compound on the rotor shaft to aid in future disassembly. Re-install the driven gear retaining plate. Tighten the retaining plate place bolts to the proper torque, as indicated in Table II.

27. Install the drive shaft roller bearing inner race on the drive shaft. Careful warming of the inner race, to approximately 250°F in oil will aid in the inner race being easily assembled to the drive shaft. Install the external retaining ring on the drive shaft. Inspect the drive gear keyway on the drive shaft

to make sure it is smooth and free of burrs. Also, inspect the keyway in the drive gear to make sure it is smooth and free of burrs. Install the drive gear key in the keyway of the drive shaft and install the gear on the shaft. This can be done by first heating the gear in a container of oil to approximately 250°F, holding the temperature for at least one hour to make sure the gear is uniformly heated. Do not, under any circumstances, attempt to heat the gear with a flame-type torch. It is also recommended, when installing the drive gear, to use some type of anti-seize compound on the drive shaft to aid in future disassembly. The drive gear must be installed tight up against the roller bearing inner race. Check that there is no gap by trying to get a feeler gauge between the gear and the bearing inner race. If the gear is not completely "home" on the shaft, draw it off, reheat it and start over. Do not strike or impact the gear in any way. This will transfer shock to the rear rotor bearings and damage them leading to early failure. Install the drive shaft ball bearing retaining plate on the drive shaft; then, install the ball bearing on the drive shaft, heating the bearing to 250°F in oil before assembling it on the shaft. Install the ball bearing lock nut on the drive shaft.

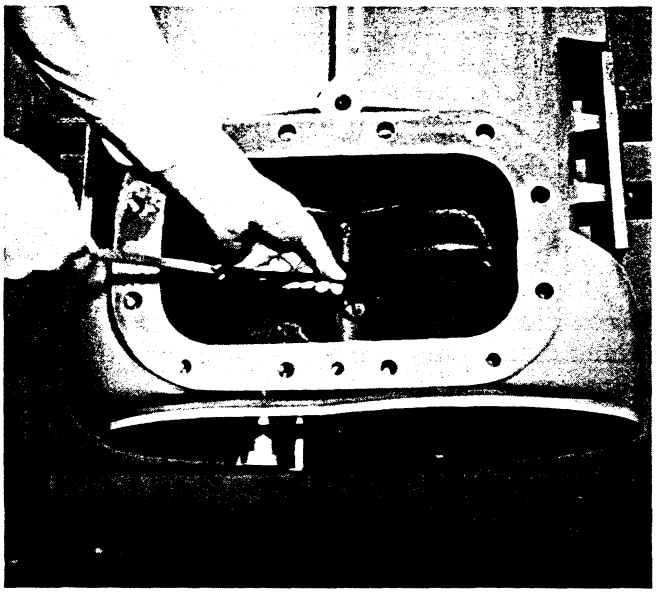


Figure 34

NOTE

Do not forget to install the bearing retainer plate before installing the ball bearing.

28. Make sure that all pipe plugs that may have been removed from the gear case are replaced and properly tightened. Set the gear case on a clean workbench so that the gear case to engine bell housing is down. Support the gear case with wooden blocks, high enough to permit reinstallation of the drive shaft assembly. Install the drive shaft assembly in the gear case, making sure the ball bearing is properly seated in the gear case. Attach the bearing retaining plate to the gear case by means of the attaching allen head cap screws, tightening the cap screws to the proper torque as indicated in Table II. This can be done only by the use of an extension socket wrench and working through the access holes provided in the drive gear.

29. Turn the gear case over, making sure the gear case to rotor housing flange is properly blocked. Carefully install a new oil seal on the drive shaft. Using a new oil seal cover gasket, install the oil seal cover on the gear case, making sure the stationary seal ring of the oil seal is properly seated in the cover. Tighten the cover attaching cap screws, opposite from each other, evenly and to the proper torque as indicated in Table II.

30. With the aid of a rope or chain sling, install the gear case assembly to the rotor housing assembly using a new gear case gasket. The use of two studs, or headless bolts, approximately four to five inches (221.6 to 227.0 mm) long, opposite from each other, in the 5/8" - 11 tapped holes of the rotor housing will aid in the reassembly of the gear case assembly to the rotor housing assembly. Refer to Figure 35. Make sure the attaching cap screws and nuts, opposite from each other, are evenly tightened to the proper torque. Refer to Table II.

31. Install compressor coupling in reverse of the method used to remove it. Make sure the face of the tapered hub is flush with the end of the drive shaft. Refer to Figure 36.

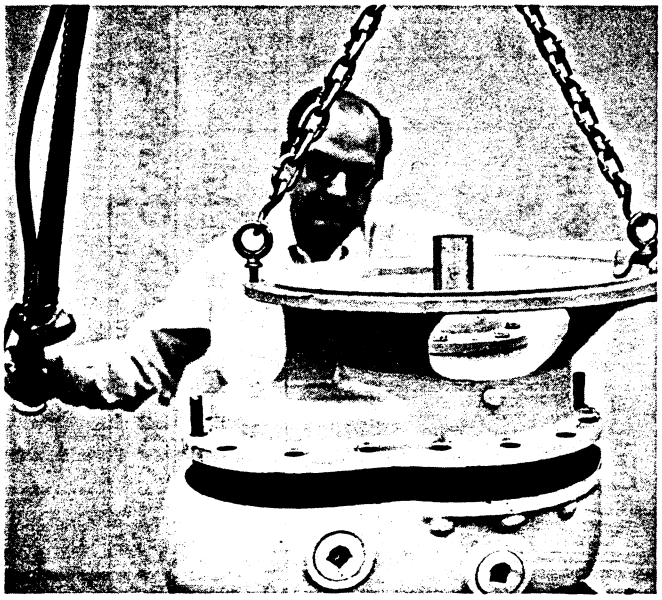


Figure 35

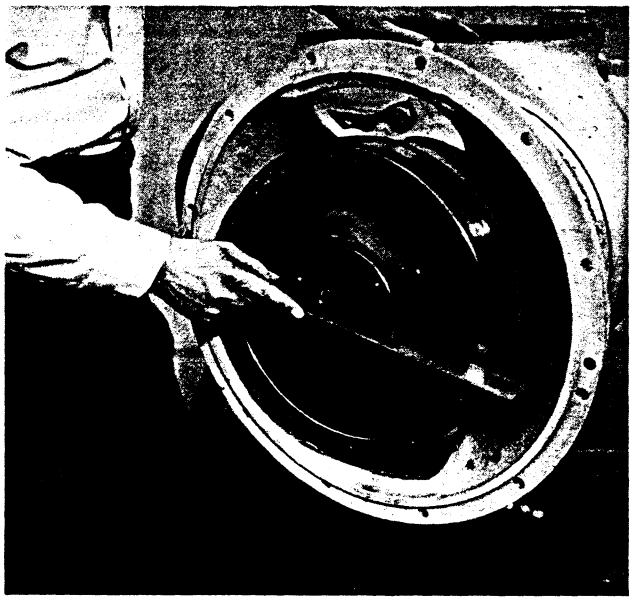


Figure 36

32. Making sure the reassembled compressor air end assembly is securely blocked in a horizontal position, rotate the rotors by means of the compressor coupling to check for proper reassembly of the air end. NOTE: On a new replacement compressor air end assembly or on an overhaul of an air end where new rotors or a new housing has been installed the rotors may bind in the rotor housing. There is nothing wrong if the rotors can be turned with a little effort, even though the seal strips on the rotor lobes are rubbing the housing. One of the purposes of the seal strips is to permit the air end to wear in, and to operate with the minimum possible radial clearance. Once an air end has operated for three or four hours, the rotors should turn very freely with little or no effort. After reassembly, it is extremely important to make sure it is the seal strips that are causing the rotors to turn hard and not something else which could damage the air end when the unit is operated.

WARNING

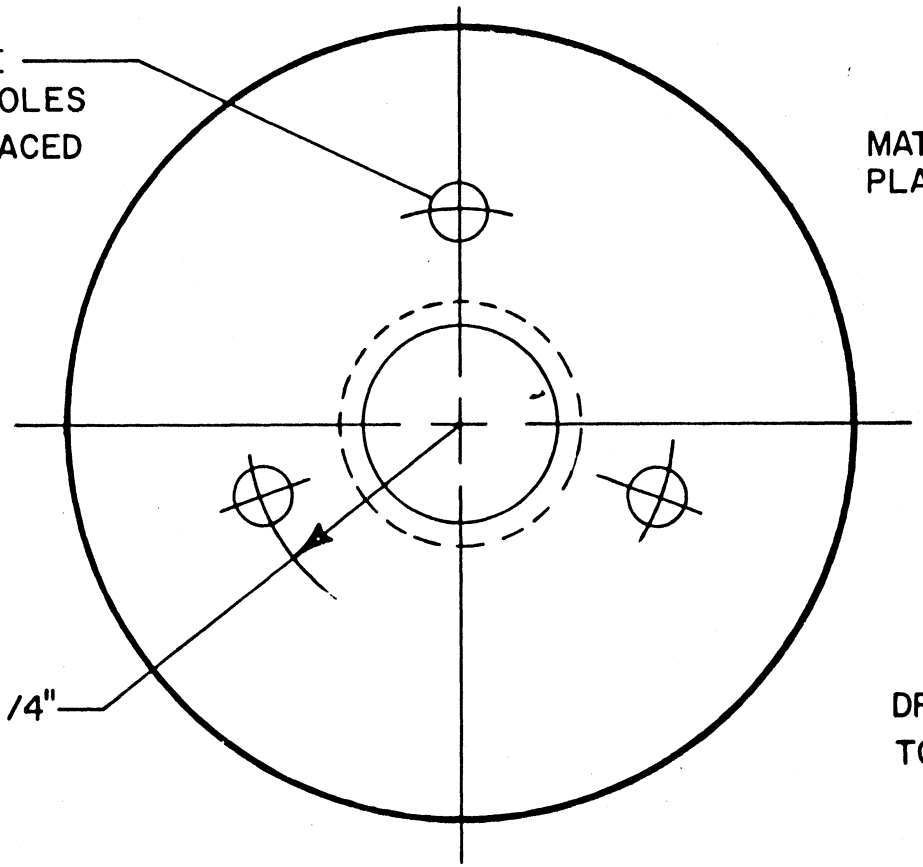
Never strike or otherwise impact any part of any bearing. This can cause damage which may not be visible but will eventually lead to the failure of the bearing.

TABLE II

TORQUE SPECIFICATIONS
FOR
AIR END, HEAT TREATED CAP SCREWS
(Based On Clean, Dry Threads)

CAP SCREW SIZE	LBS. FT.
5/16" - 18 UNC-2A	17
3/8" - 16 UNC-2A	31
7/16" - 14 UNC-2A	49
1/2" - 13 UNC-2A	75
5/8" - 11 UNC-2A	150
3/4" - 10 UNC-2A	270

Tolerance: $\pm$ 10%



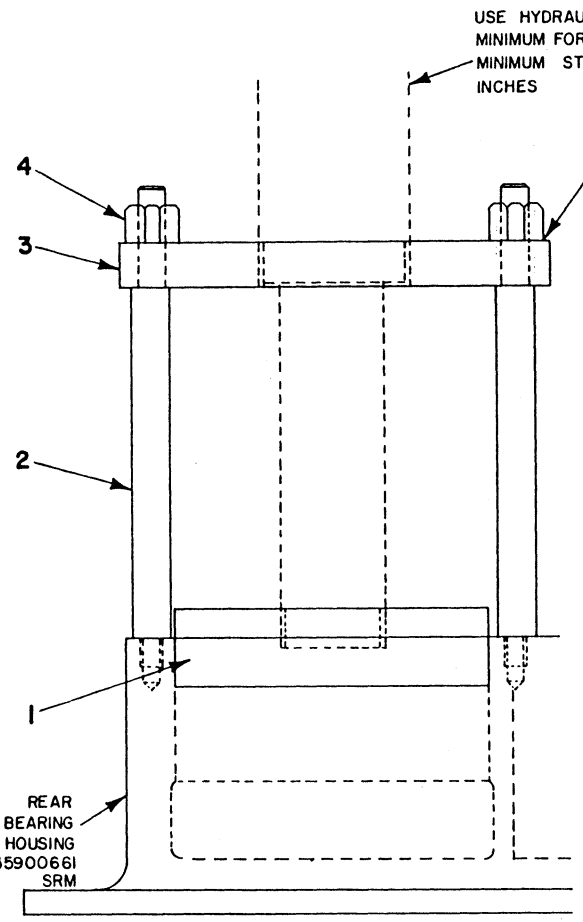
MATERIAL: 1" STEEL
PLATE, 6" IN DIA.

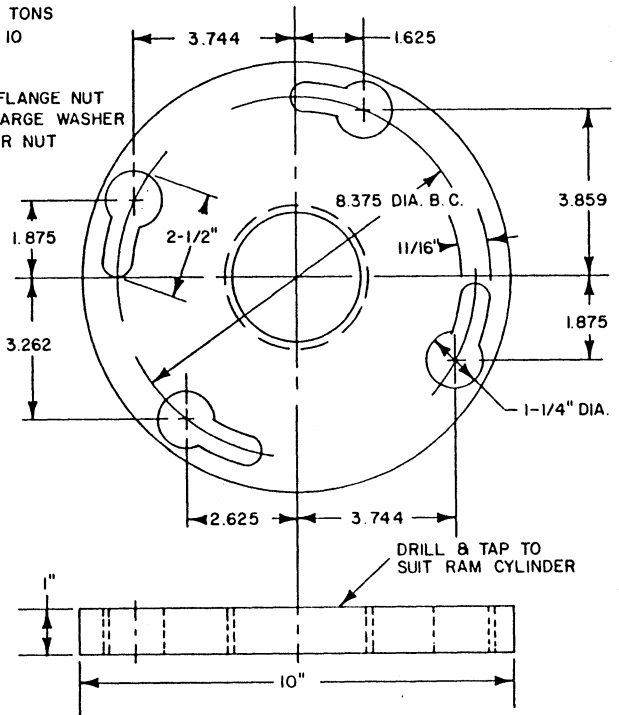
DRILL AND TAP
TO FIT RAM CYLINDER

TOLERANCE - ON FINISH DIMENSIONS GIVEN COMMON FIGURES SHALL BE $\pm \frac{1}{32}$ OR $-\frac{1}{32}$ INCH
UNLESS OTHERWISE SPECIFIED

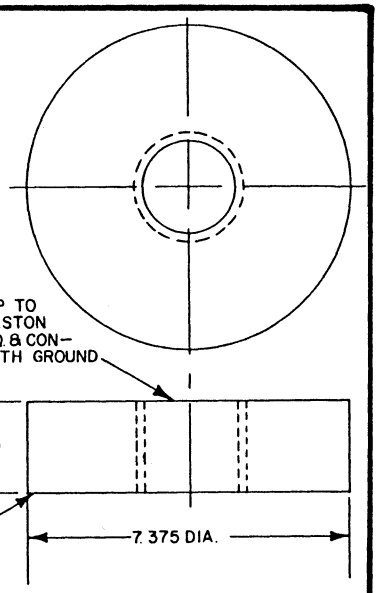
CHARGE NOS:

PATTERN CHANGES	MACHINING CHANGES				MATERIAL	DATE	NAME OF PART
PATT. No.	A		E			1/8/74	ROTOR DRIVEN GEAR PULLER PLATE
ALTERATIONS	B		F		HEAT TREAT	SCALE	
	C		G		NO	OR HAMMER	INGERSOLL-RAND COMPANY MOCKSVILLE PLANT
	D		H		HARDNESS MIN.	TR.	UNIT: XL
					MAX.	CK.	DRAWING NO.: 35259167

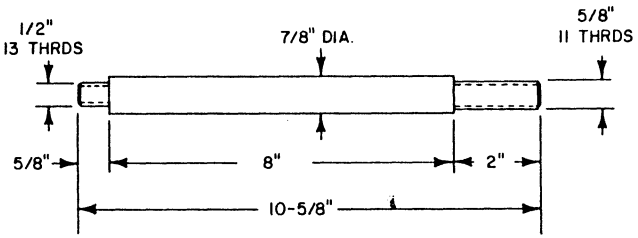




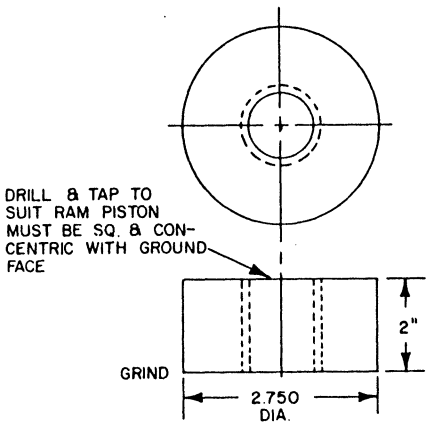
3-RAM CYLINDER PLATE



1-INSTALLATION DOLLY



2-STUD



5-DISASSEMBLY DOLLY

DETAIL	QUANTITY	DESCRIPTION
1	1	INSTALLATION DOLLY
2	4	STUD
3	1	RAM CYL. PLATE
4	4	5/8-11 HEX NUT
5	1	DISASSEMBLY DOLLY

REVISIONS	DATE	CHARGE NOS:	
A		DATE 1/8/74	NAME OF PART BEARING ASSEMBLY FIXTURE
B		NAME E.HAMMER	INGERSOLL-RAND COMPANY MOCKSVILLE PLANT
C		E/C NO.	MODEL NO. XL LINE / DRAWING NO. 35790773
D			

SECTION IX

SPARE PARTS LIST

GENERAL

This section, which contains an illustrated parts breakdown, has been prepared as an aid in locating these parts which may be required in the maintenance of the unit. All of the compressor parts, listed in the parts breakdown, are manufactured with the same precision as the original equipment. For the greatest protection always insist on genuine Ingersoll-Rand Company parts for your compressor.

Ingersoll-Rand Company service facilities and parts are available worldwide. There are Ingersoll-Rand Company Construction and Mining Sales Offices and authorized distributors located in the principal cities of the United States. In Canada our customers are serviced by the Canadian Ingersoll-Rand Company, Limited. There are also Ingersoll-Rand Company subsidiaries and authorized distributors located in the principal cities throughout the free world. A list of sales offices will be found in the back of this publication.

All parts orders pertaining to your engine should be referred to your particular engine manufacturer's authorized distributor or dealer.

INTRODUCTION

The illustrated parts breakdown illustrates and lists the various assemblies, subassemblies and detailed parts which make up this particular air compressor. This includes the standard portable along with all of the options that are available. A series of illustrations show each part clearly and in its correct location relative to the other parts in the illustration. Part numbers only are used on each illustration. These part numbers correspond to those in the part number column in the listing of parts following the illustrations. Those parts illustrated and identified as "NSS" are not sold separately. These parts must be ordered by the next higher assembly.

Following the series of illustrations is a listing of all of the component parts. A separate listing has been provided for the standard portable, as well as separate listings for each available option. These component parts are listed in alpha-numerical order according to the part number shown on the illustration. In addition these listings provide the quantity of parts required, the description of the parts, and the part number of the next higher assembly in which a particular part is used.

As stated previously the listing of parts are arranged in alpha-numerical order by part number. The part number numerical arrangement starts at the left hand column and continues from left to right, one column at a time, until the part number numerical arrangement is determined. The order of precedence in the part number numerical arrangement is as follows:

a. Letters A through Z
b. Numerals 0 through 9 (Alphabetical O's are considered as numerical zeros).

The quantity given in the alpha-numerical listing of parts is the total quantity required per unit. Those items for which no quantity is given should be ordered on an "as required" basis.

Each description is based upon the "noun first" method, i.e., the identifying noun or item name is always the first part of the description. In the event the item is an assembly or sub-assembly, the abbreviations "assy" or "subassy" follows the noun name. If the previous conditions do not exist, the noun name is followed by a single descriptive modifier. Any remaining descriptors will be found in the remarks column. The descriptive modifier may be followed by words or abbreviations such as upper, lower, inner, outer, front, rear, RH, LH, etc. when they are required to modify the part noun.

In referring to the rear, the front, or to either side of the unit, always consider the receiver-separator as the rear of the unit. Standing at the rear of the unit facing the receiver-separator, will determine the right and left sides.

HOW TO USE THIS ILLUSTRATED PARTS BREAKDOWN

a. Turn to the Parts List Table of Contents and find the section or system of the compressor in which the desired part is used.

b. Turn to the proper illustration as designated in the Parts List Table of Contents.

c. Locate the desired part and its part number on the illustration.

d. Locate the part number in the proper alpha-numerical listing to determine the complete description of the part.

RECOMMENDED SPARE PARTS

Special selections of spare parts have been prepared as insurance against prolonged shutdown periods. These selected parts, called gasket sets and spare parts boxes, are shown itemized in the rear of this publication. The contents of each gasket set and spare parts box has been carefully selected so as to provide maximum protection for a unit with a minimum number of parts.

It is important to note the system of identifying those parts which are included with a set or kit of parts. The included part, or parts, is denoted by being indented from the previous items as indicated in the level column, i.e., level 2 items are included with the previous level 1 item with level 3 items being included with the previous level 2 items. When a set or kit is ordered that has indented level of parts following the set, the indented parts are always included with that set. The quantities indicated are, in the case of level 1 items, the total quantity supplied in each spare parts box. The indented component parts listed as level 2 or level 3 items are the quantity required for a single level 1 item. The quantities specified in level 2 or level 3 items therefore, are not necessarily the total supplied in a spare parts box.

HOW TO ORDER

The satisfactory ordering of parts by a purchaser is greatly dependent upon the proper use of all available information. By supplying your nearest Ingersoll-Rand Company Construction and Mining Sales Office, or authorized distributor, with complete information, you will enable them to fill your order correctly and to avoid any unnecessary delays. In order that all avoidable errors may be eliminated, the following instructions are offered as a guide to the purchaser when ordering replacement parts:

a. Always specify the model number of the unit as shown on the general data plate attached to the unit.

b. Always specify the serial number of the unit. THIS IS IMPORTANT. The serial number of the unit will be found stamped on a plate attached to the unit. (The serial number of the unit is also permanently stamped in the metal of the frame side rail).

c. Always specify the form number of this publication.

d. Always specify the quantity of parts required.

e. Always specify the part number, as well as the description of the part, or parts, exactly as it is given in the parts listing.

In the event parts are being returned to your nearest Ingersoll-Rand Company Construction and Mining Sales Office, or authorized distributor, for inspection or repair, it is important to include the serial number of the unit from which the parts were removed.

PARTS LIST

TABLE OF CONTENTS

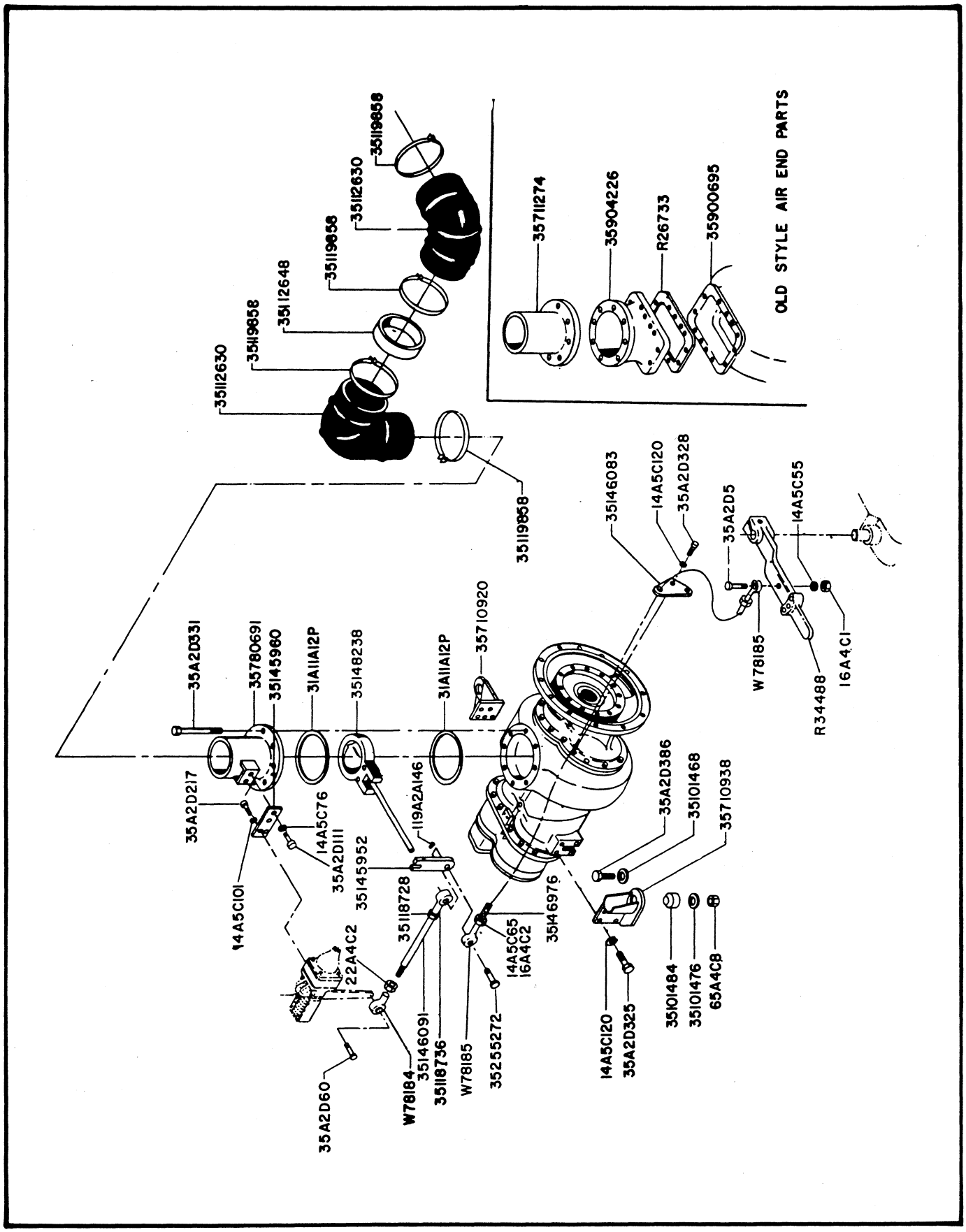


Figure 9-1. Air End Complete With Butterfly Valve and Regulator Linkage

35781673

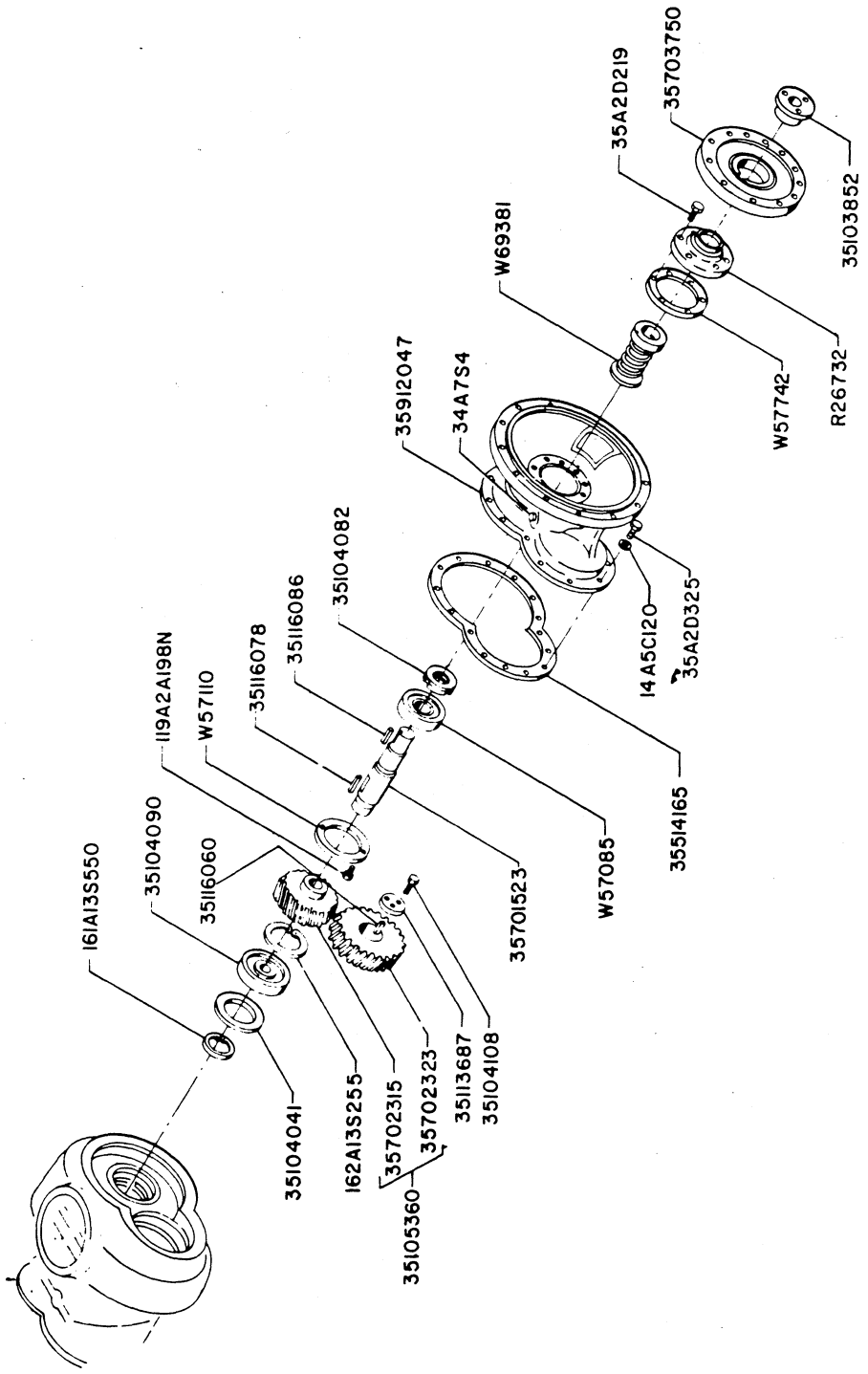


Figure 9-2. Bare Air End Assembly

35781681

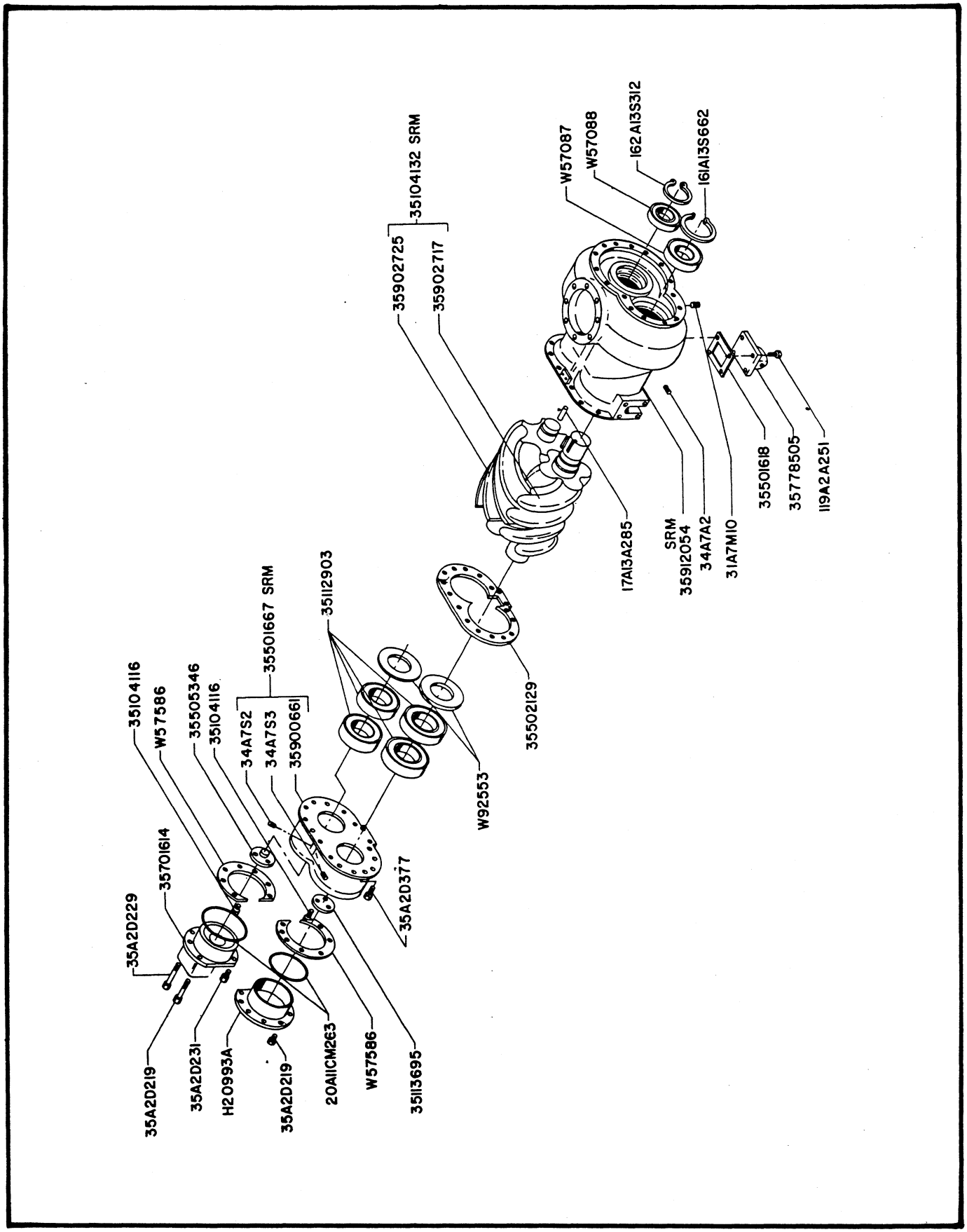


Figure 9-3. Air End Subassembly

35781103

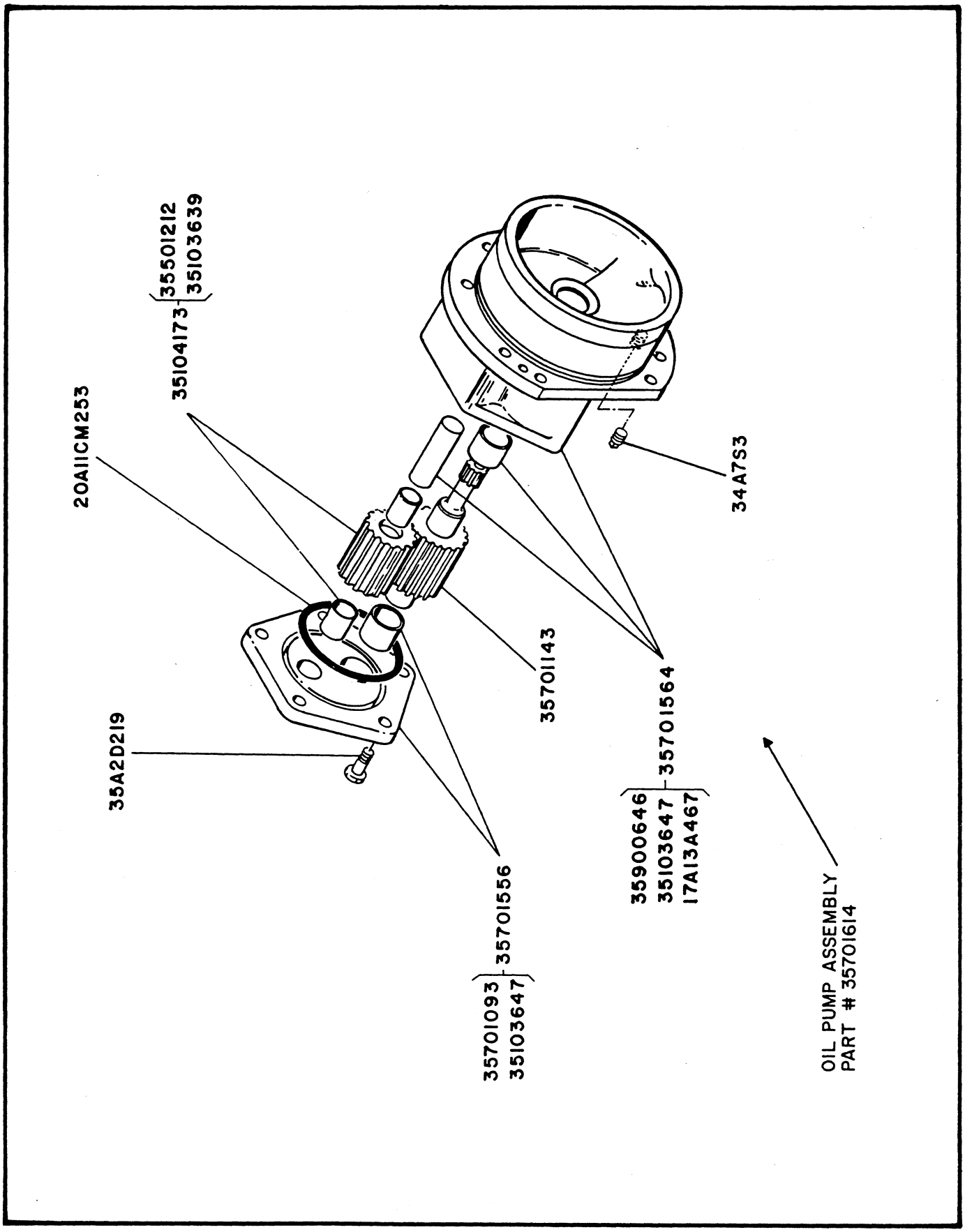


Figure 9-4. Oil Pump Assembly

35713510

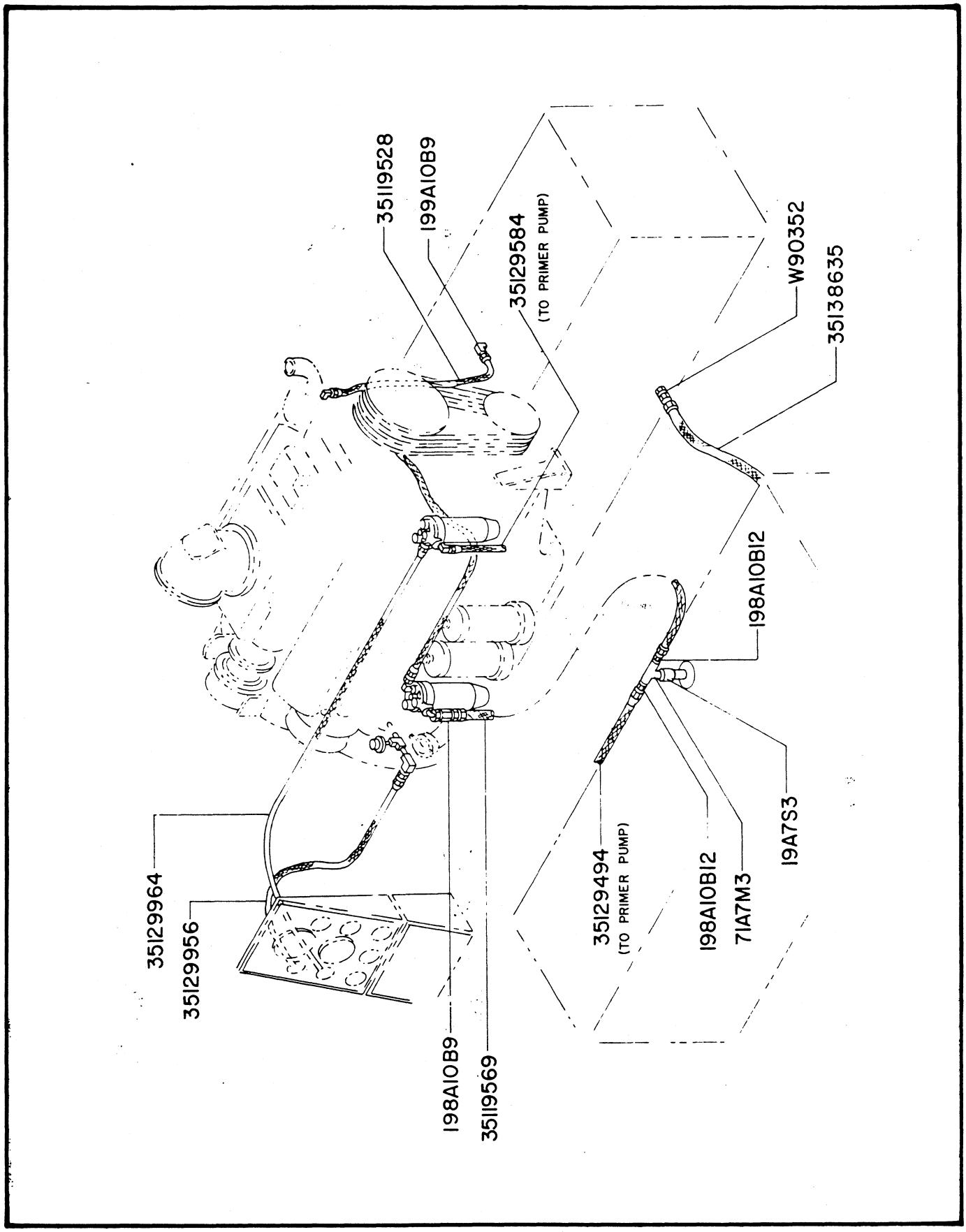


Figure 9-5. Engine Line Tubing

35781699

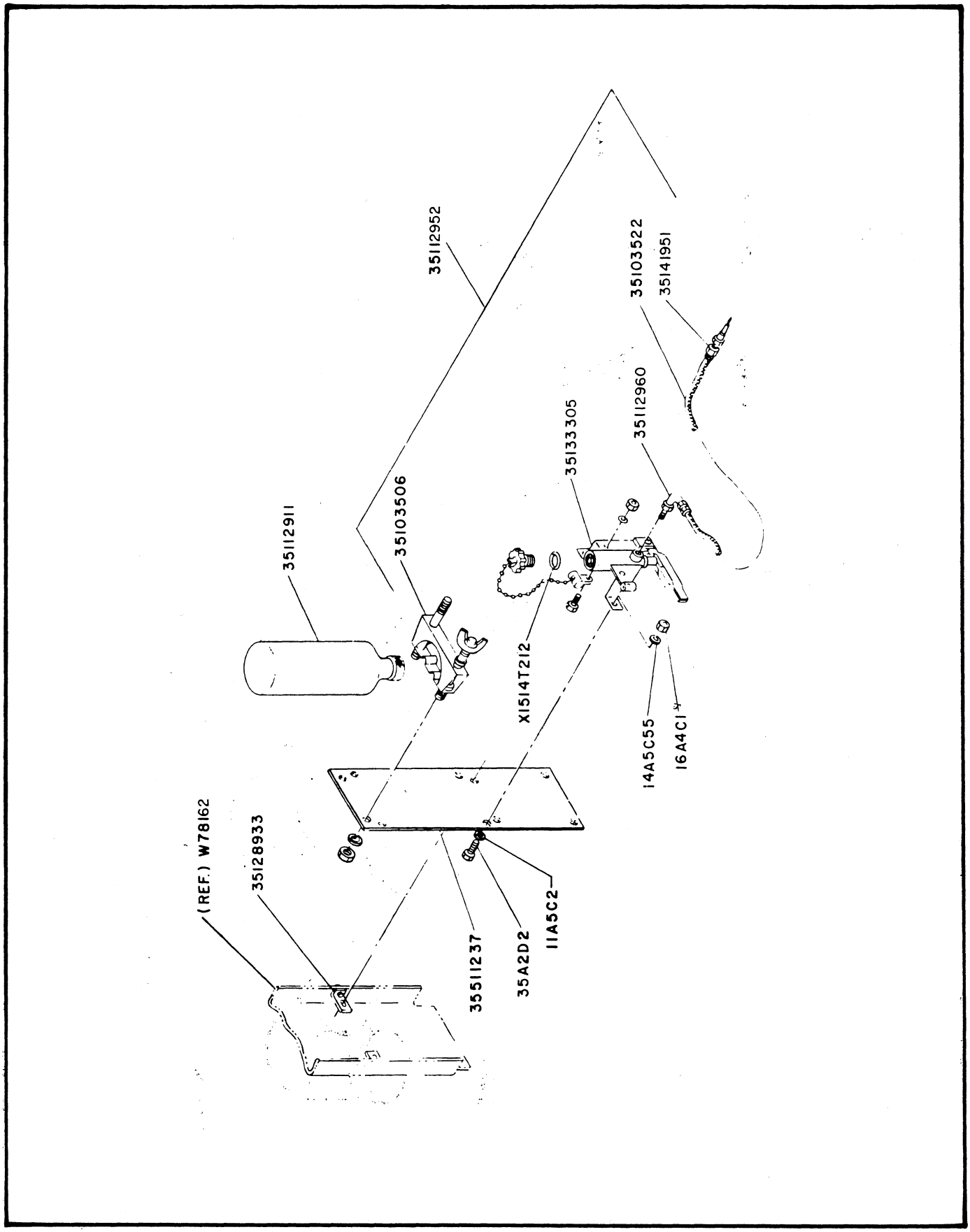


Figure 9-6. Starting Aid Kit

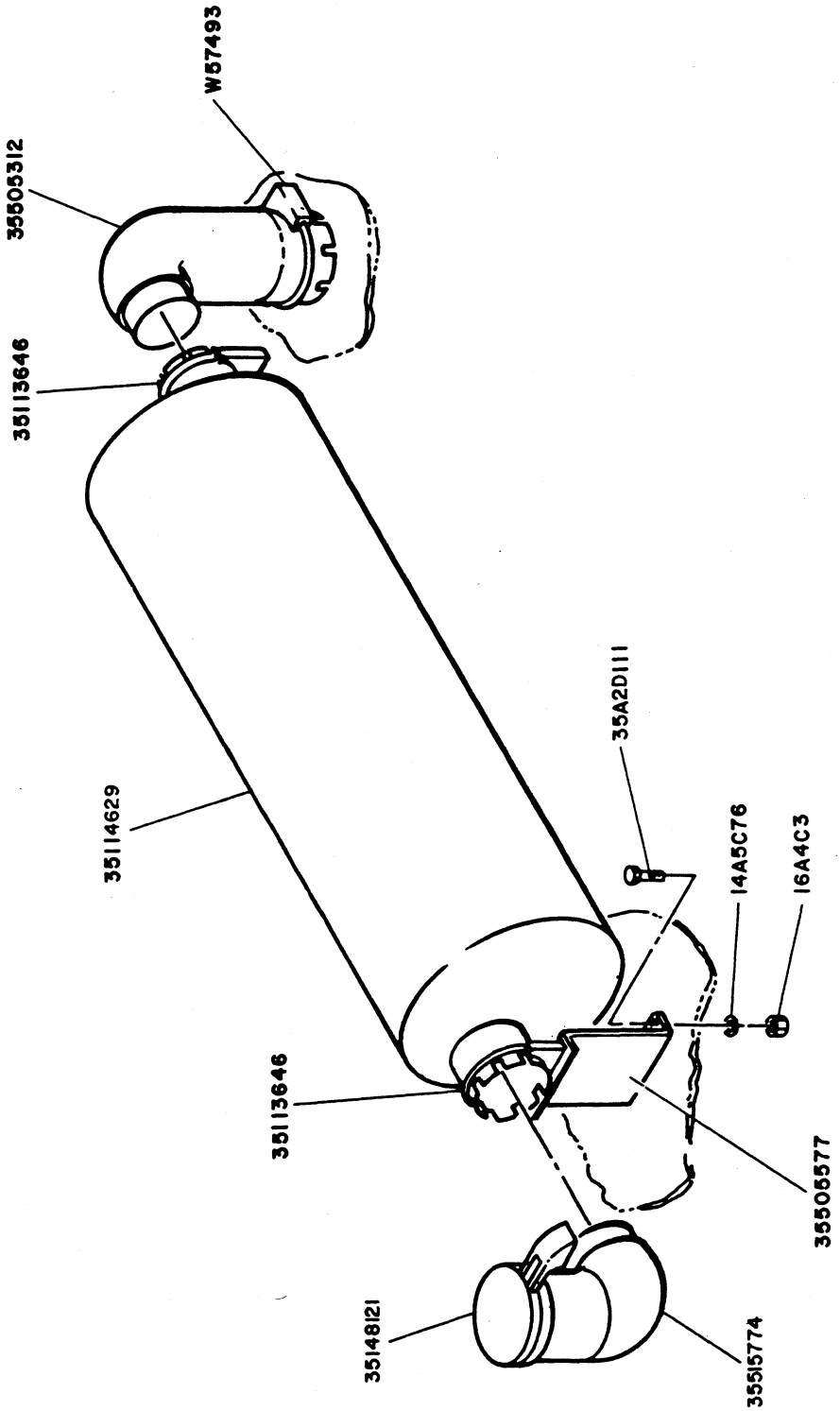


Figure 9-7. Engine Exhaust System

35781715

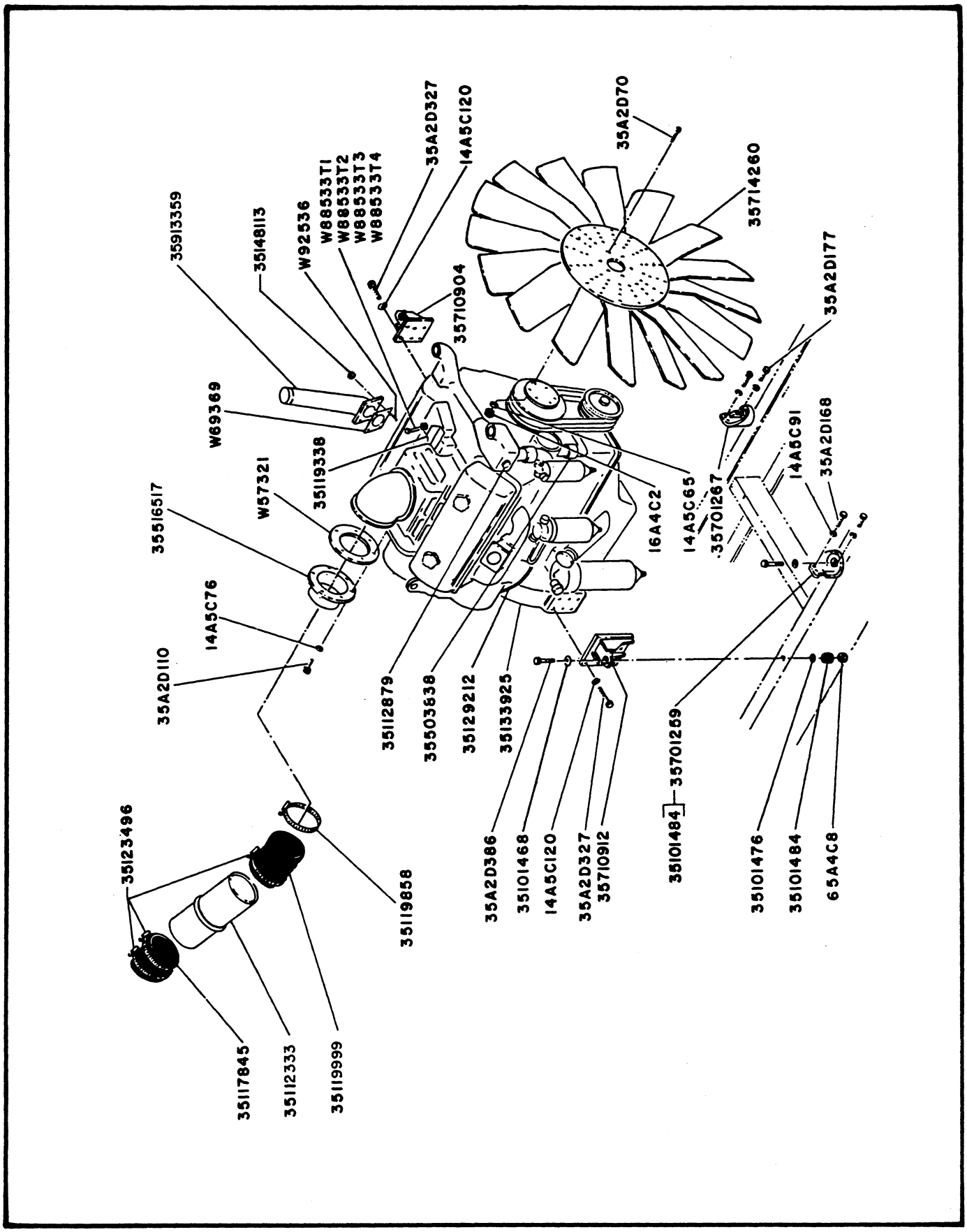


Figure 9-8. Engine and Mounting

35781723

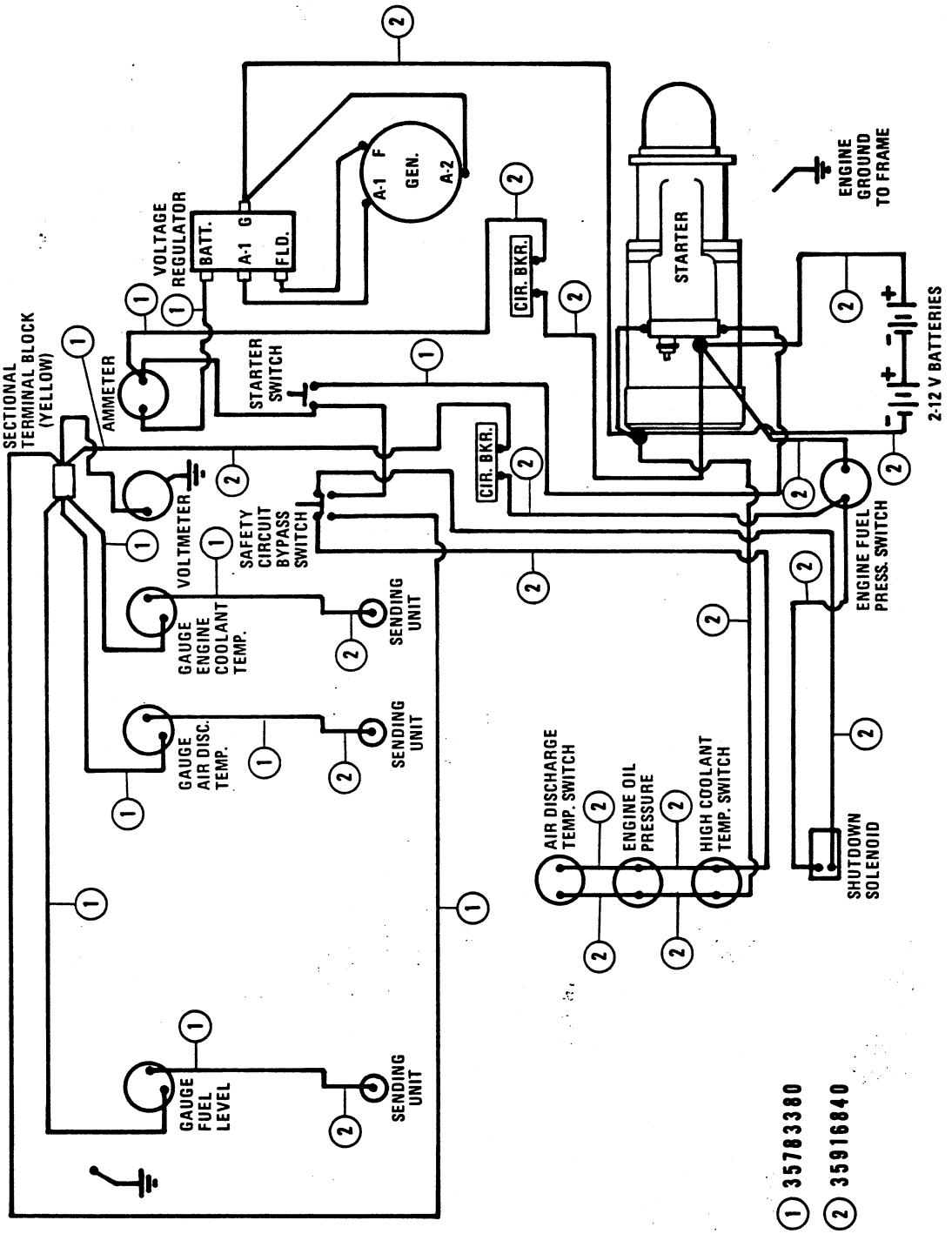


Figure 9-9. Electrical Wiring

35788892

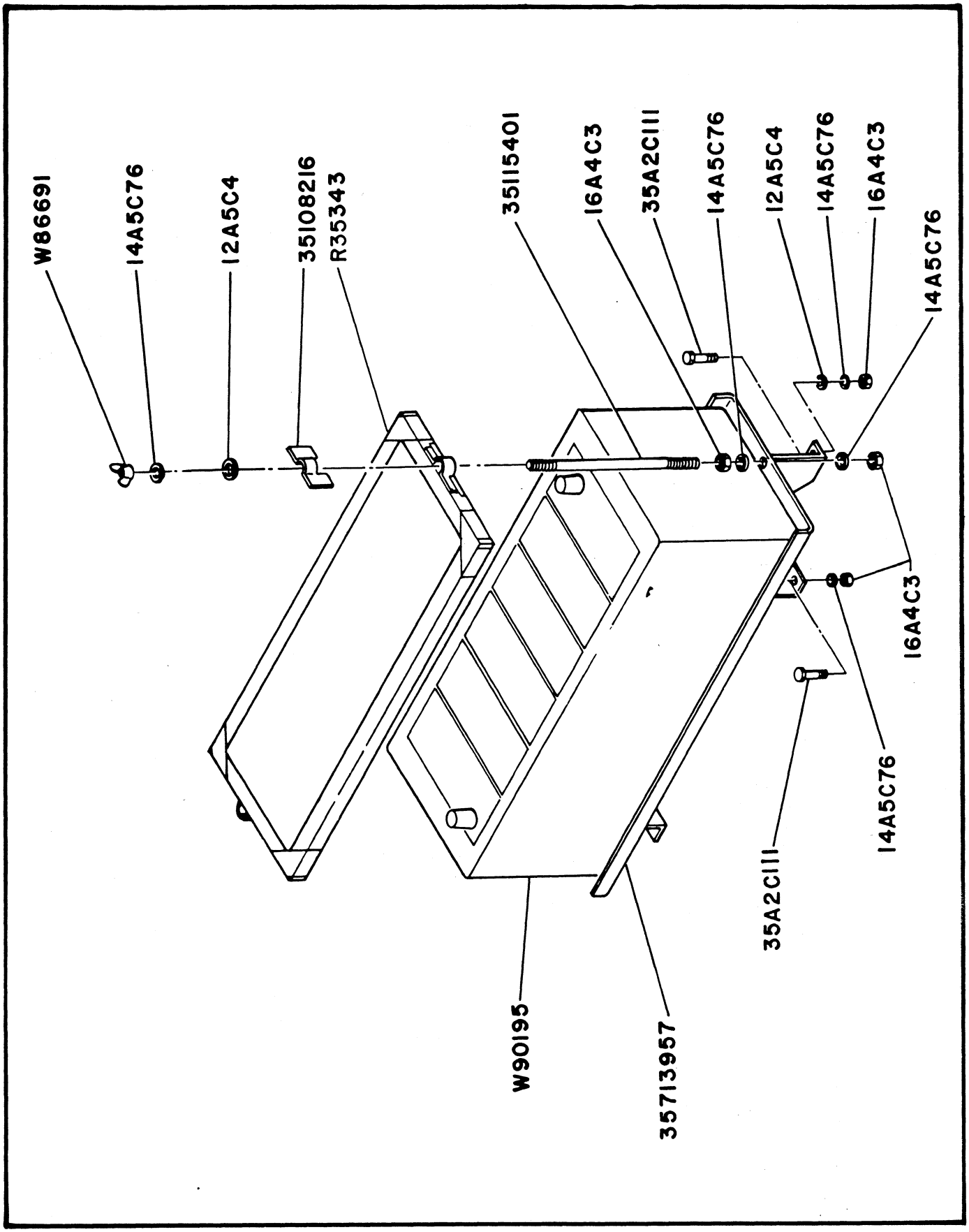


Figure 9-10. Battery and Mounting

35713569

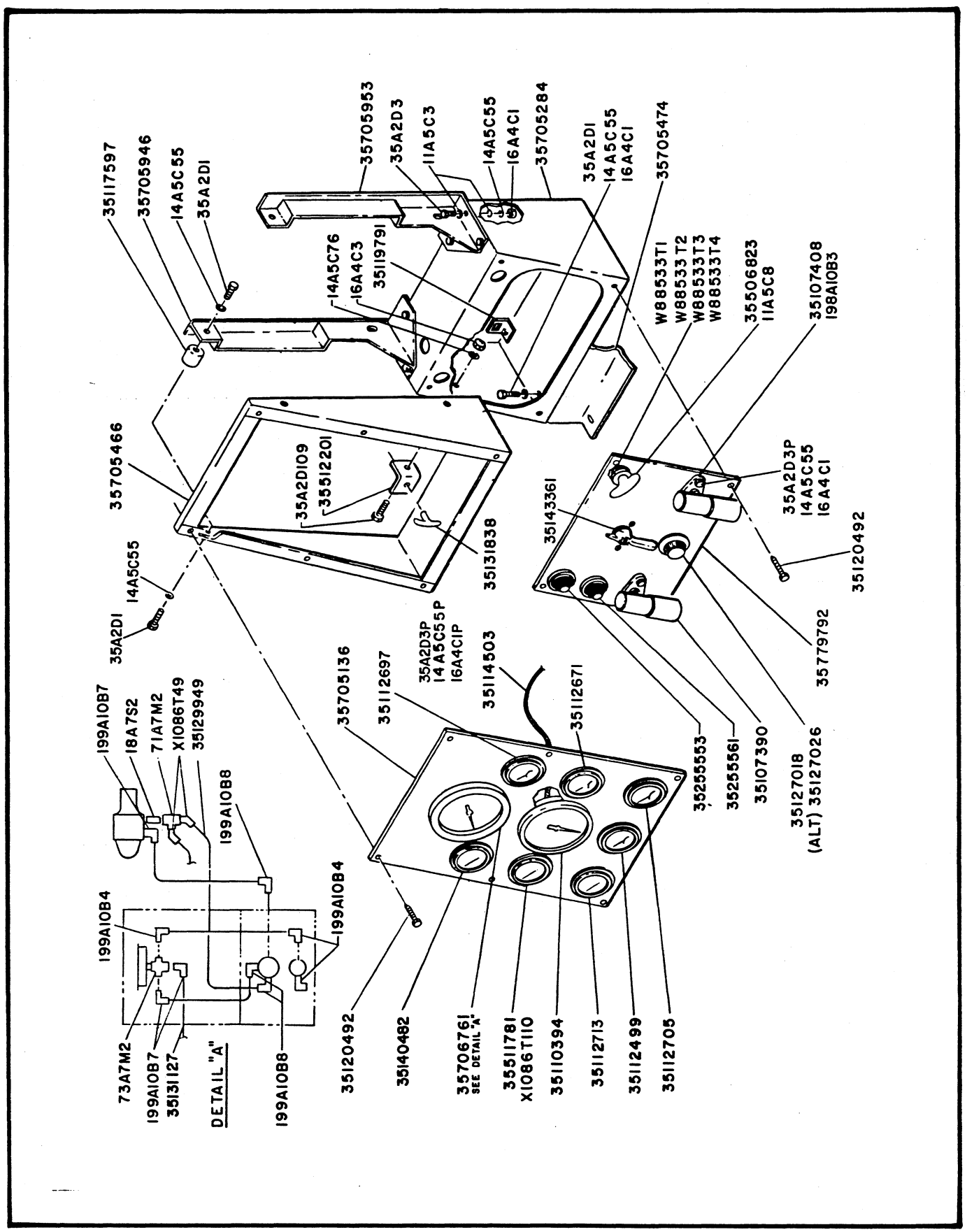


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Figure 9-11. Instrument Panel Complete

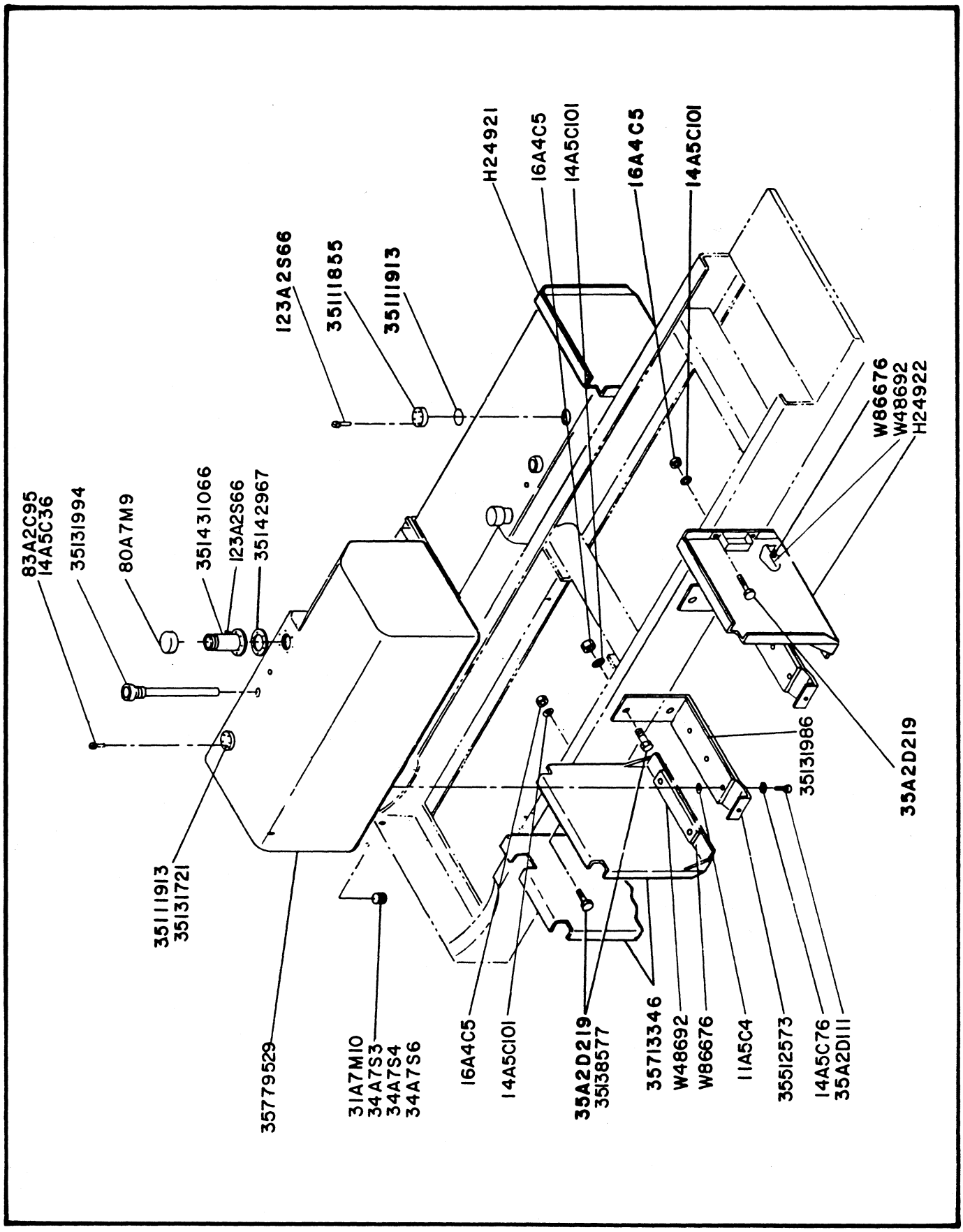

Figure 9-12. Fuel Tanks

35781749

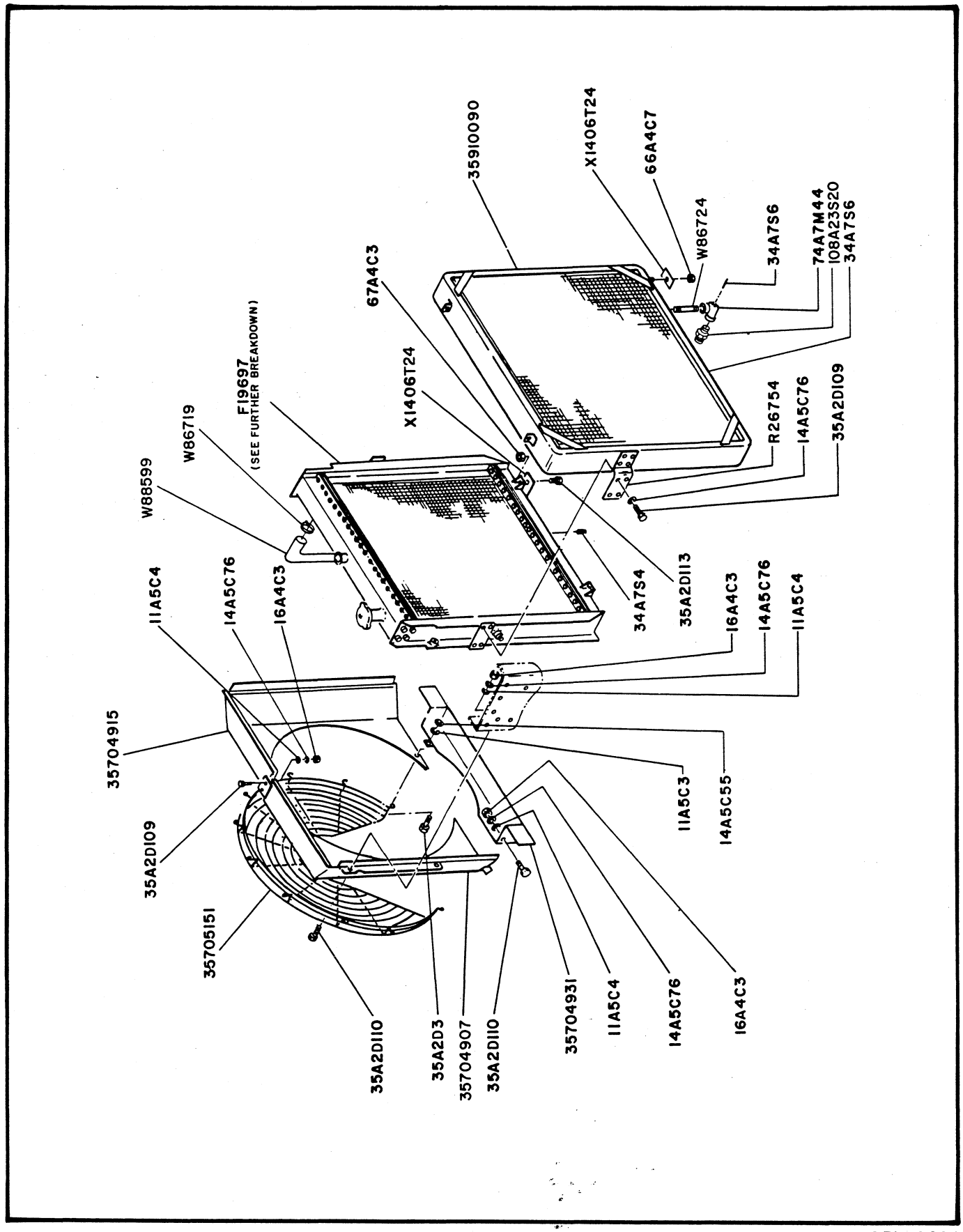

Figure 9-13. Radiator and Oil Cooler

35713601

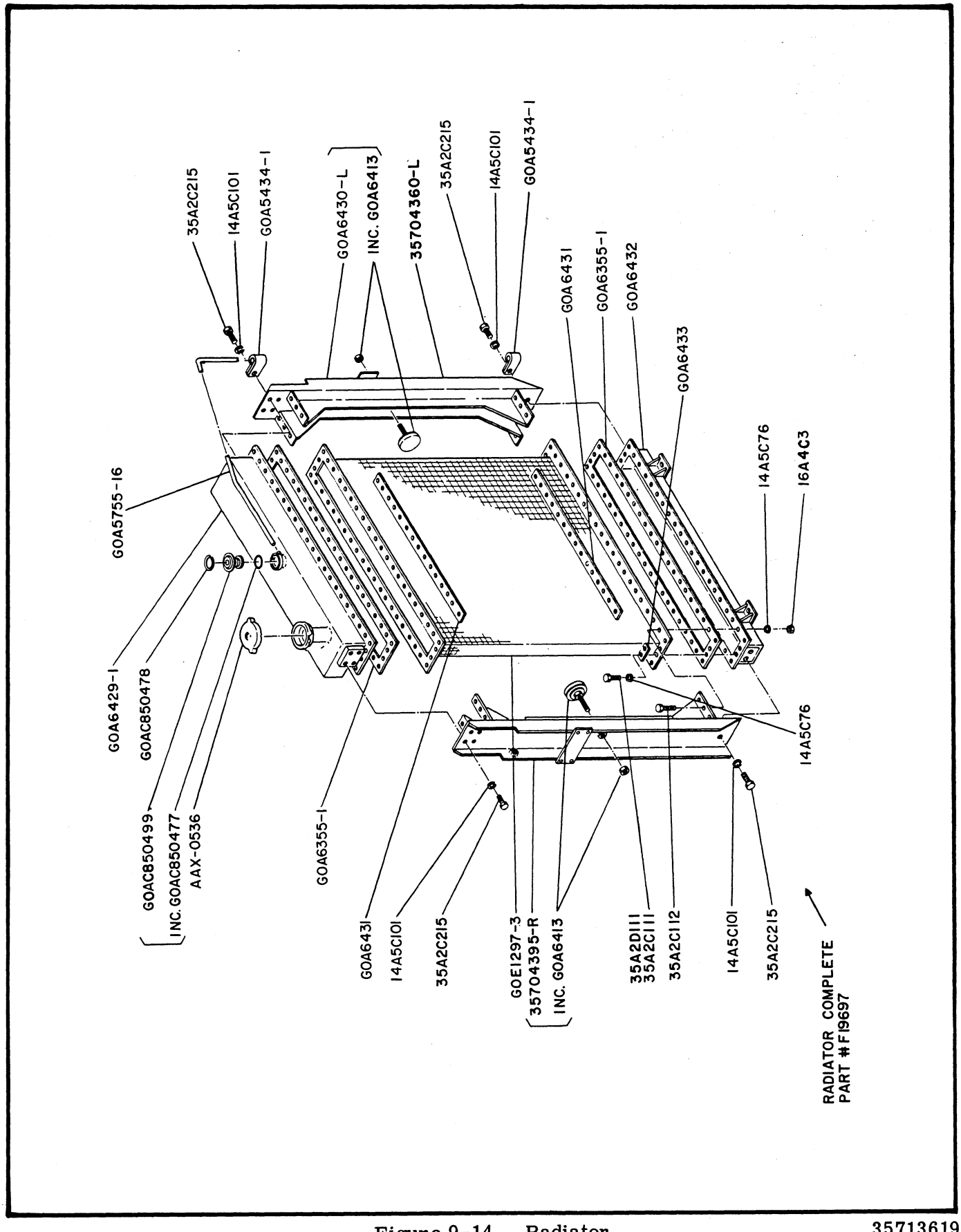

Figure 9-14. Radiator

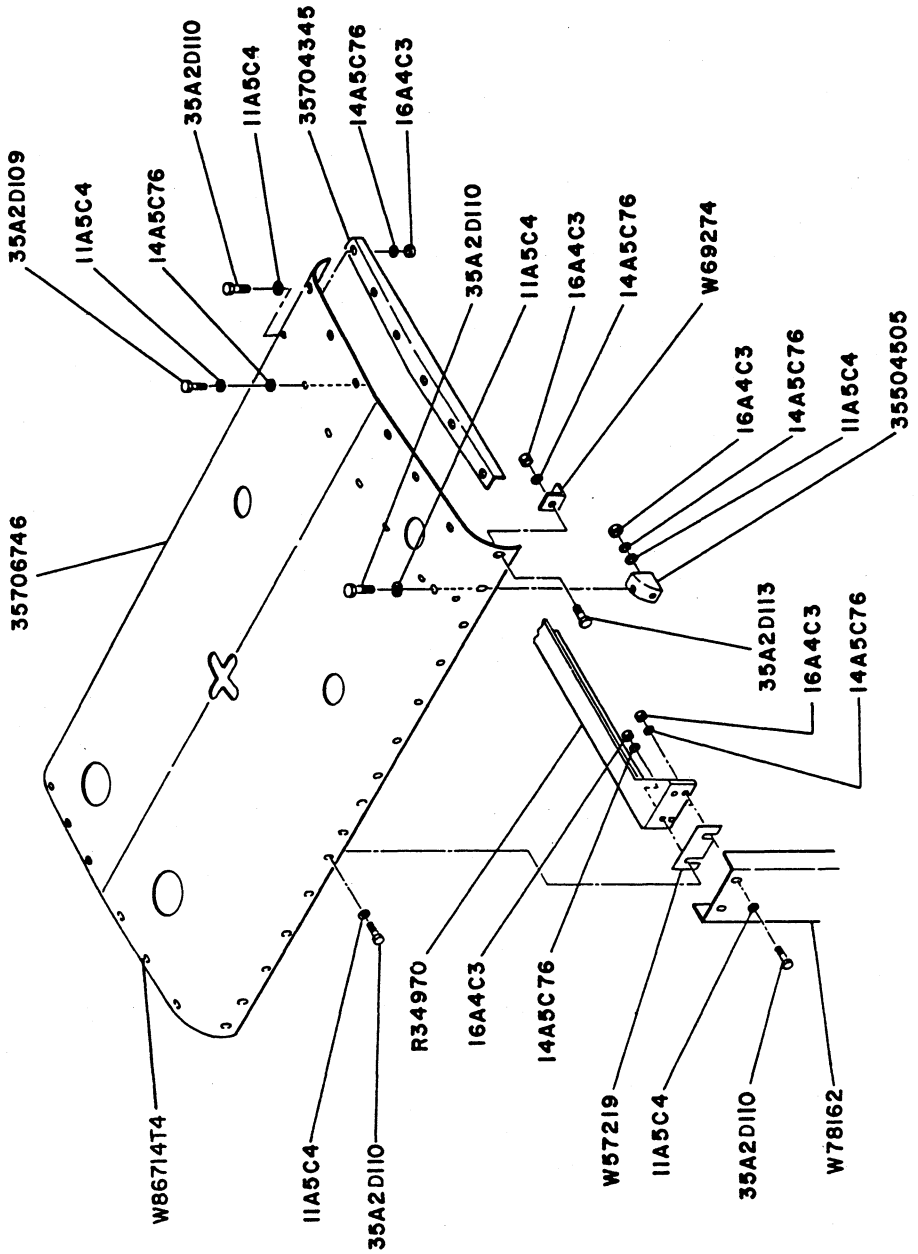

Figure 9-15. Housing Top Cover

35713627

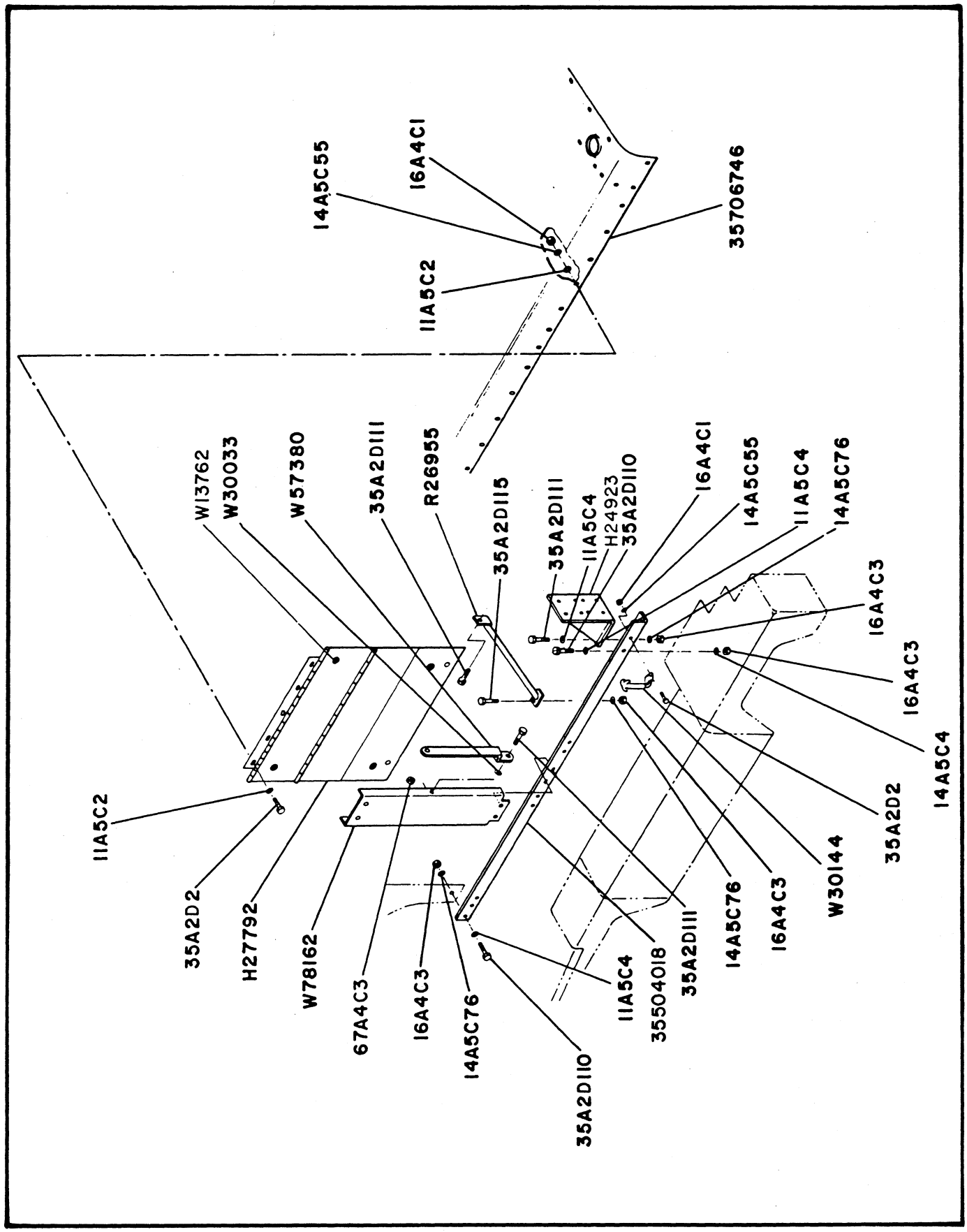

Figure 9-16. Housing Side Cover

35713635

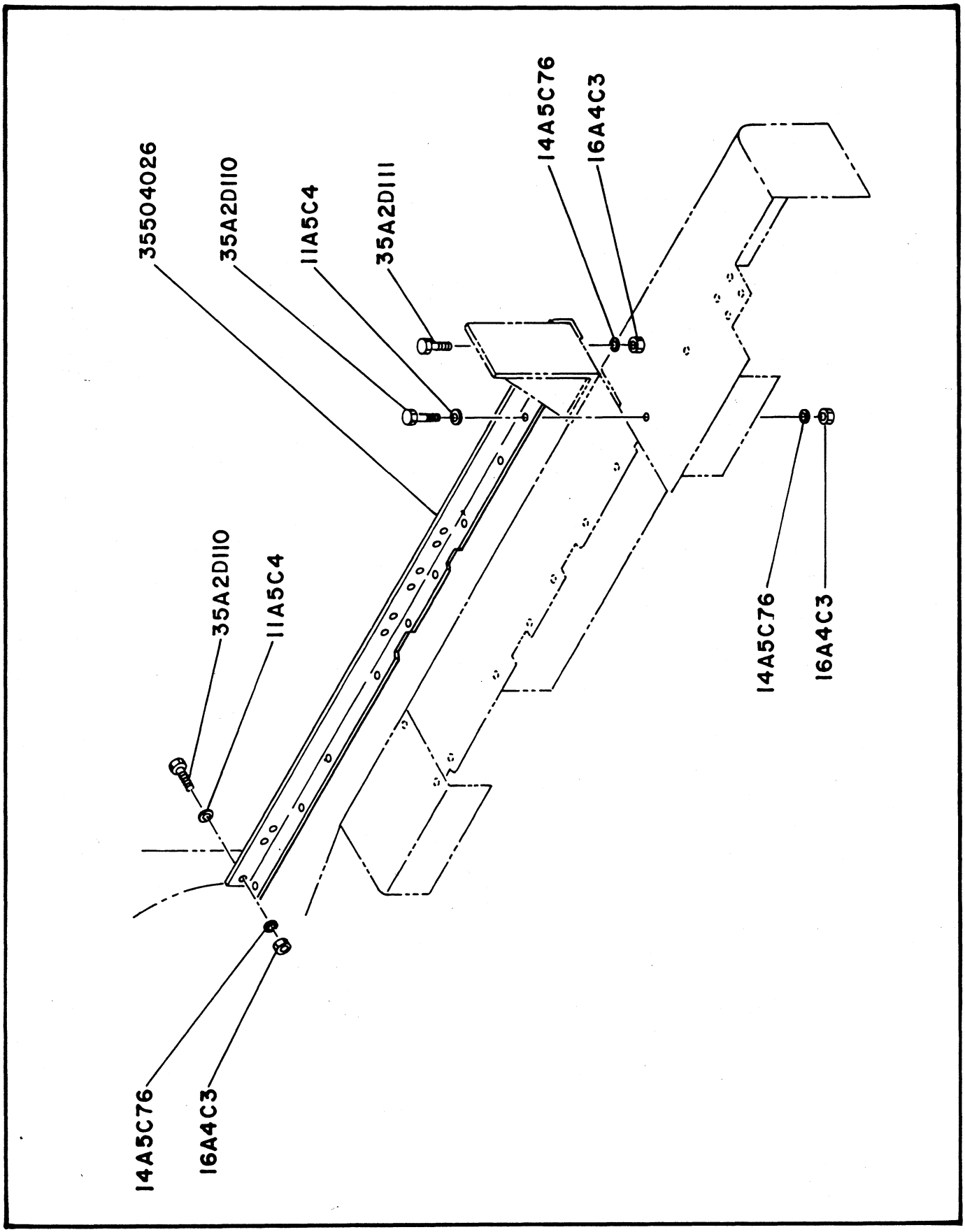

Figure 9-17. Housing Side Angle, L. H.

35713643

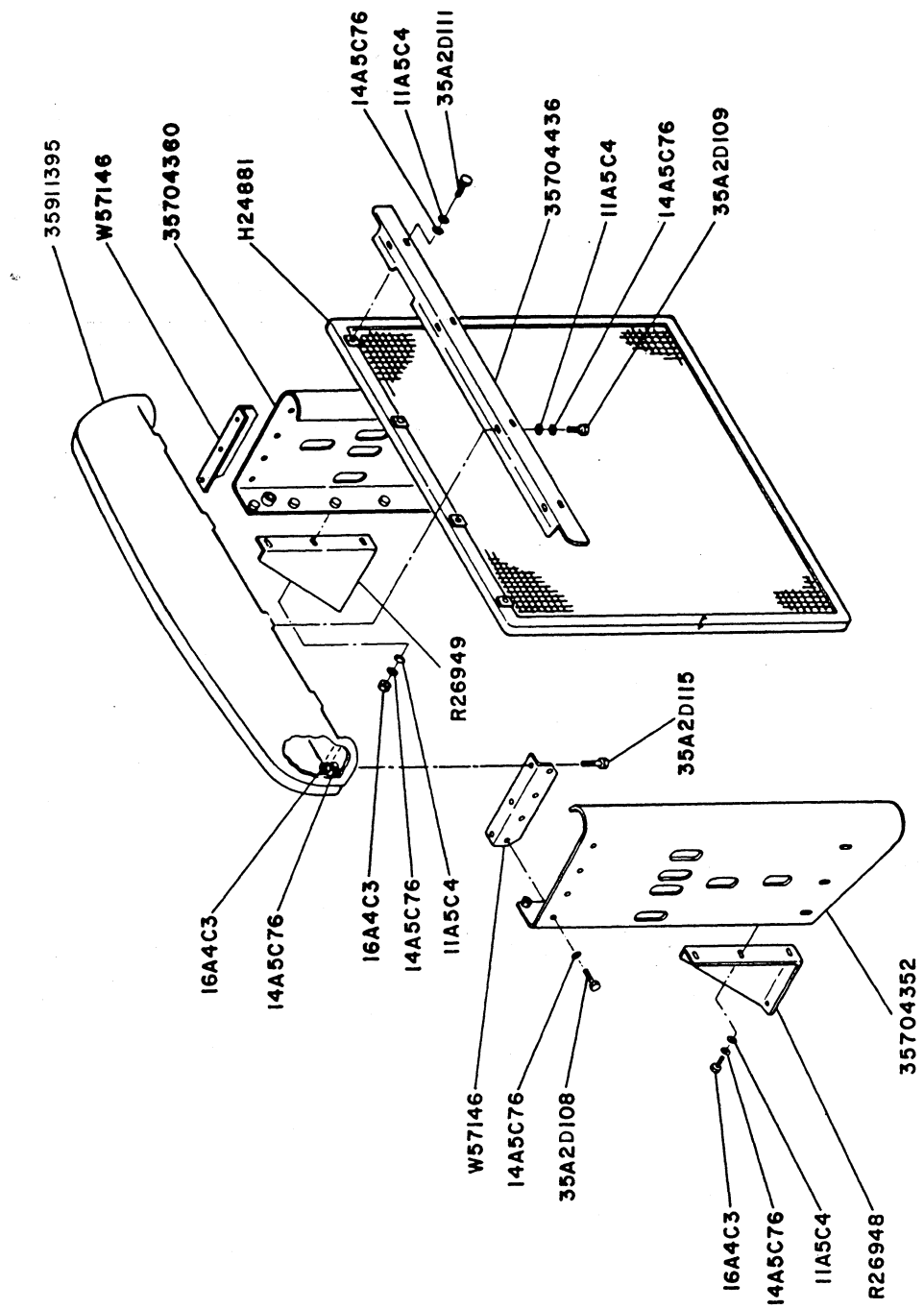

Figure 9-18. Front Housing

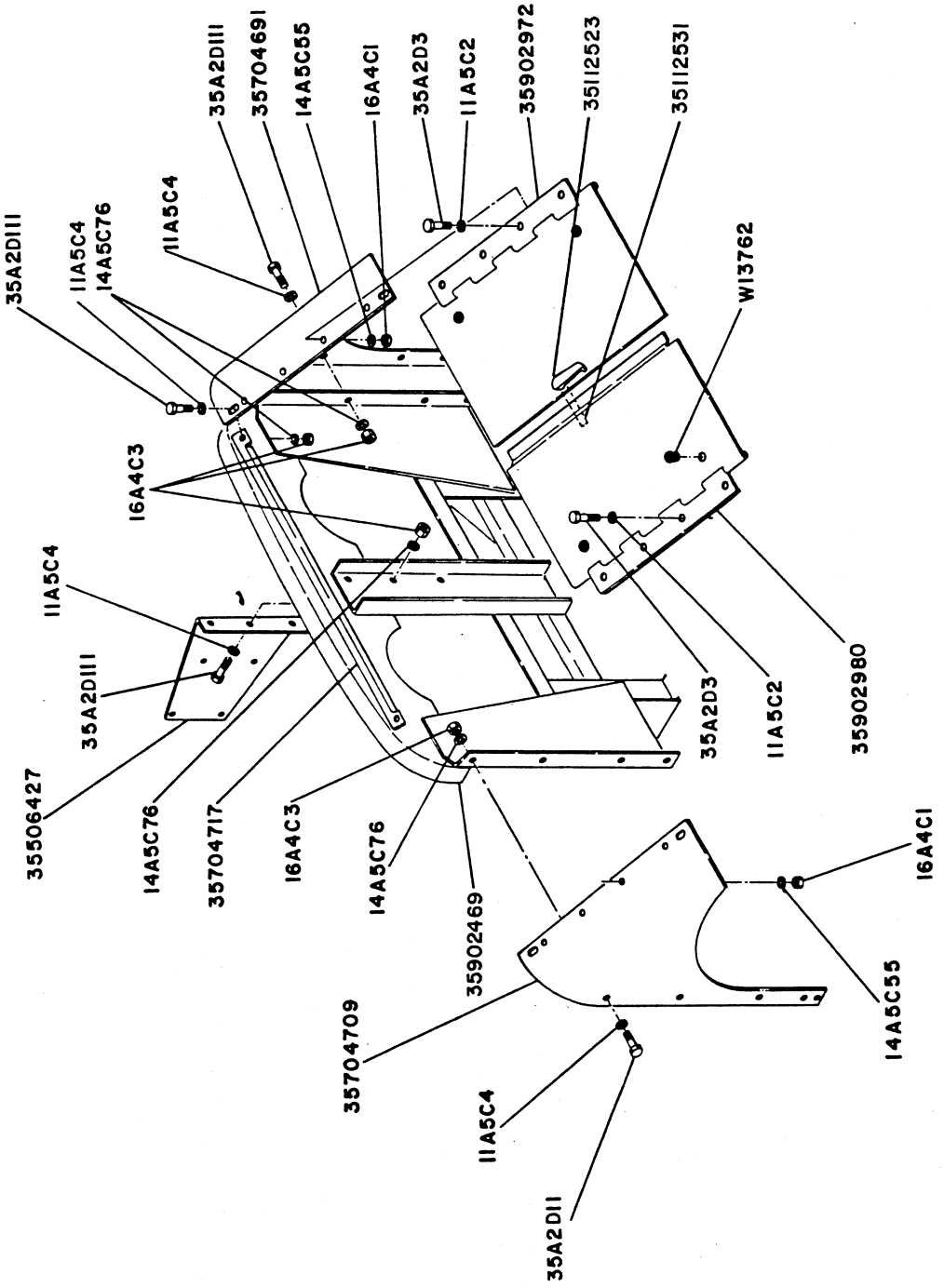

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Figure 9-19. Rear Housing

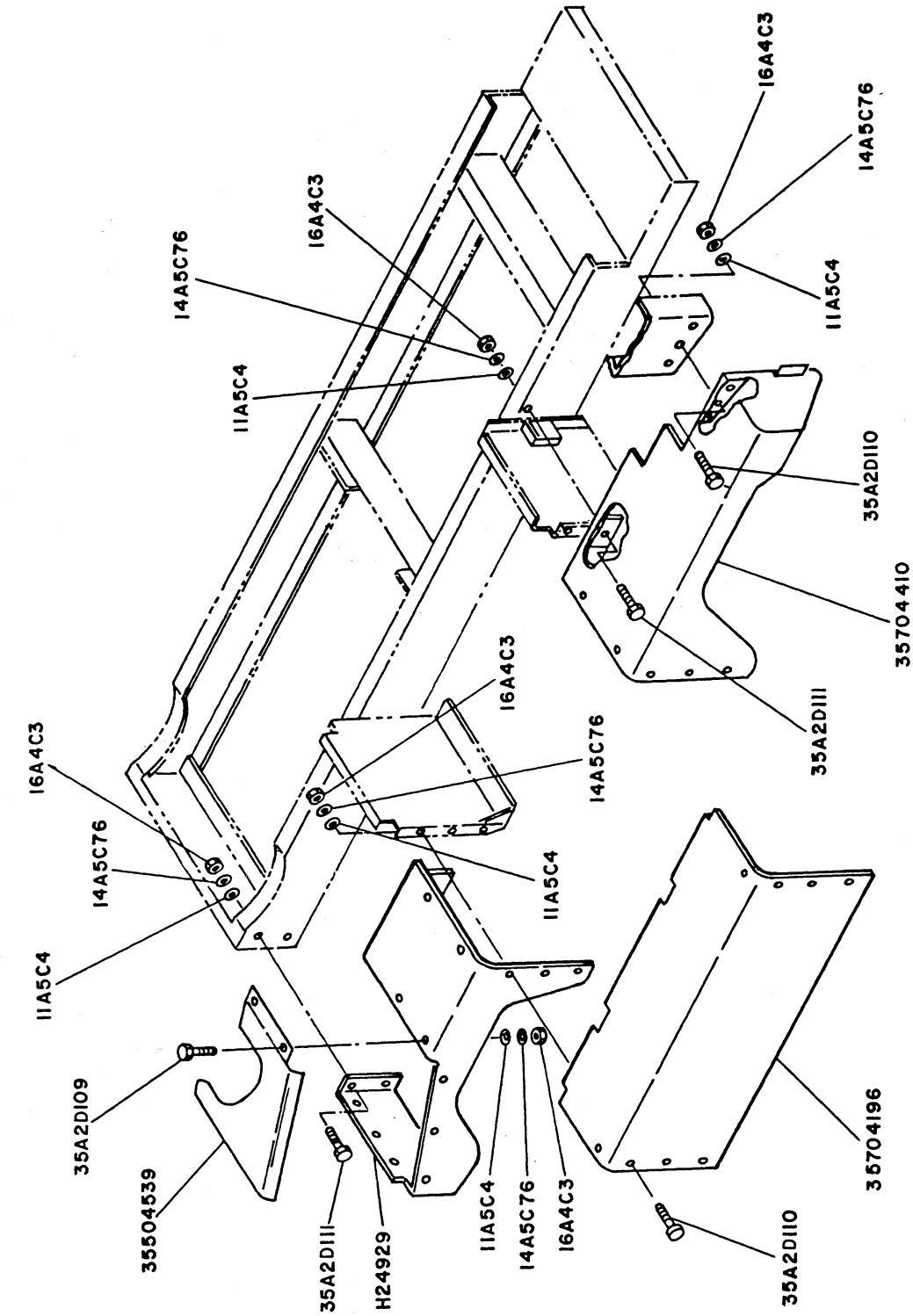

Figure 9-20. Fender, Right Hand

35713676

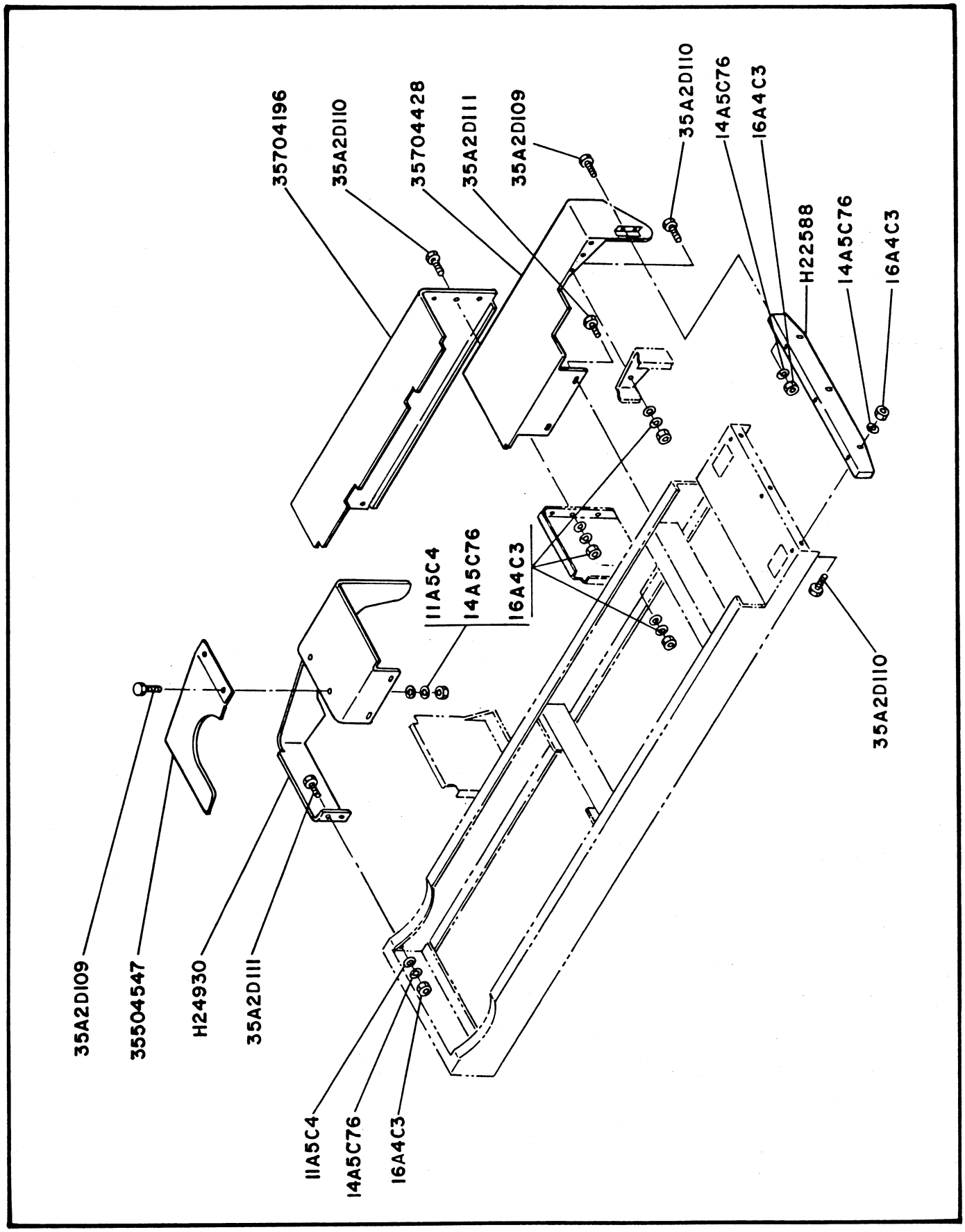

Figure 9-21. Fender, Left Hand

35713684

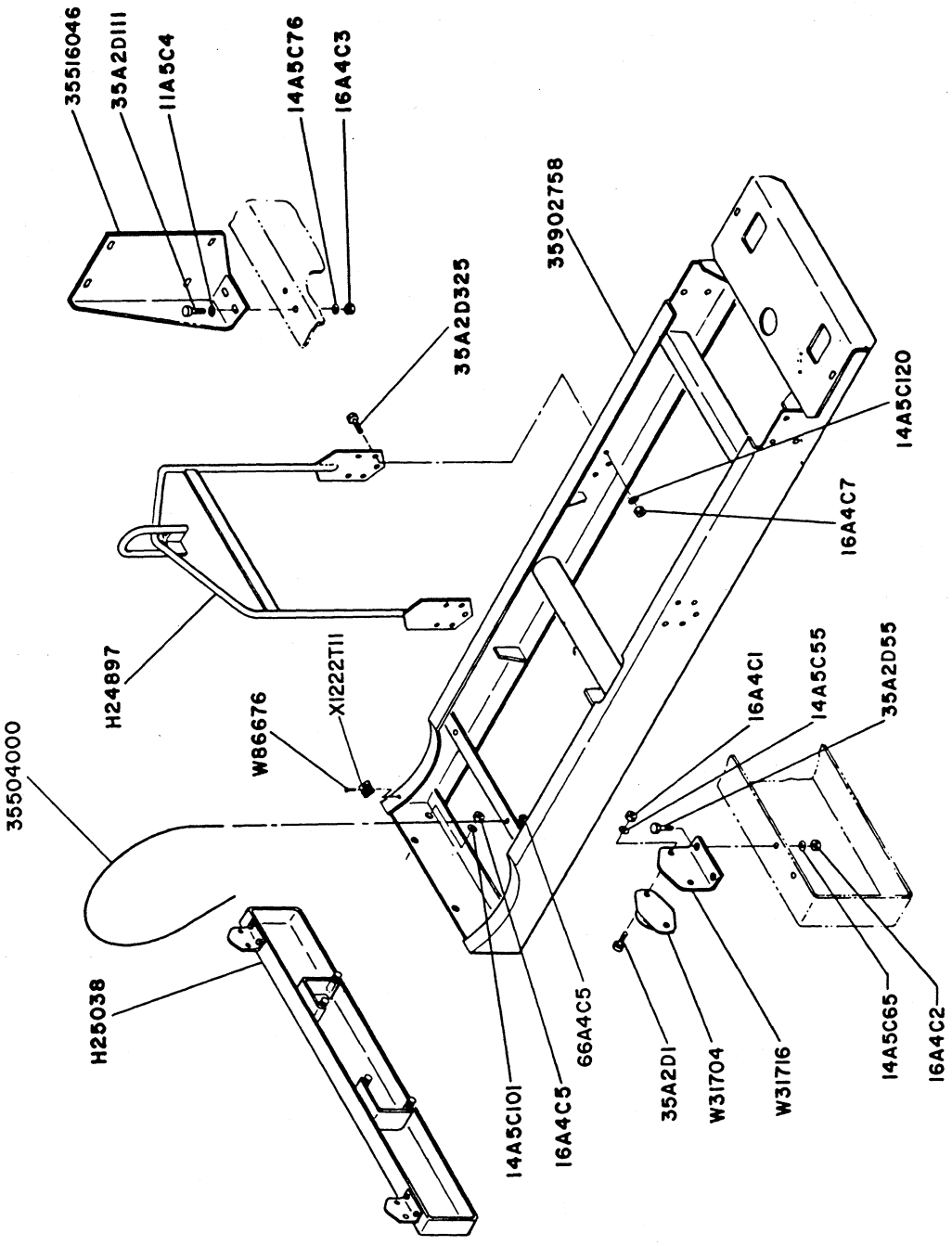

Figure 9-22. Frame and Lifting Bail

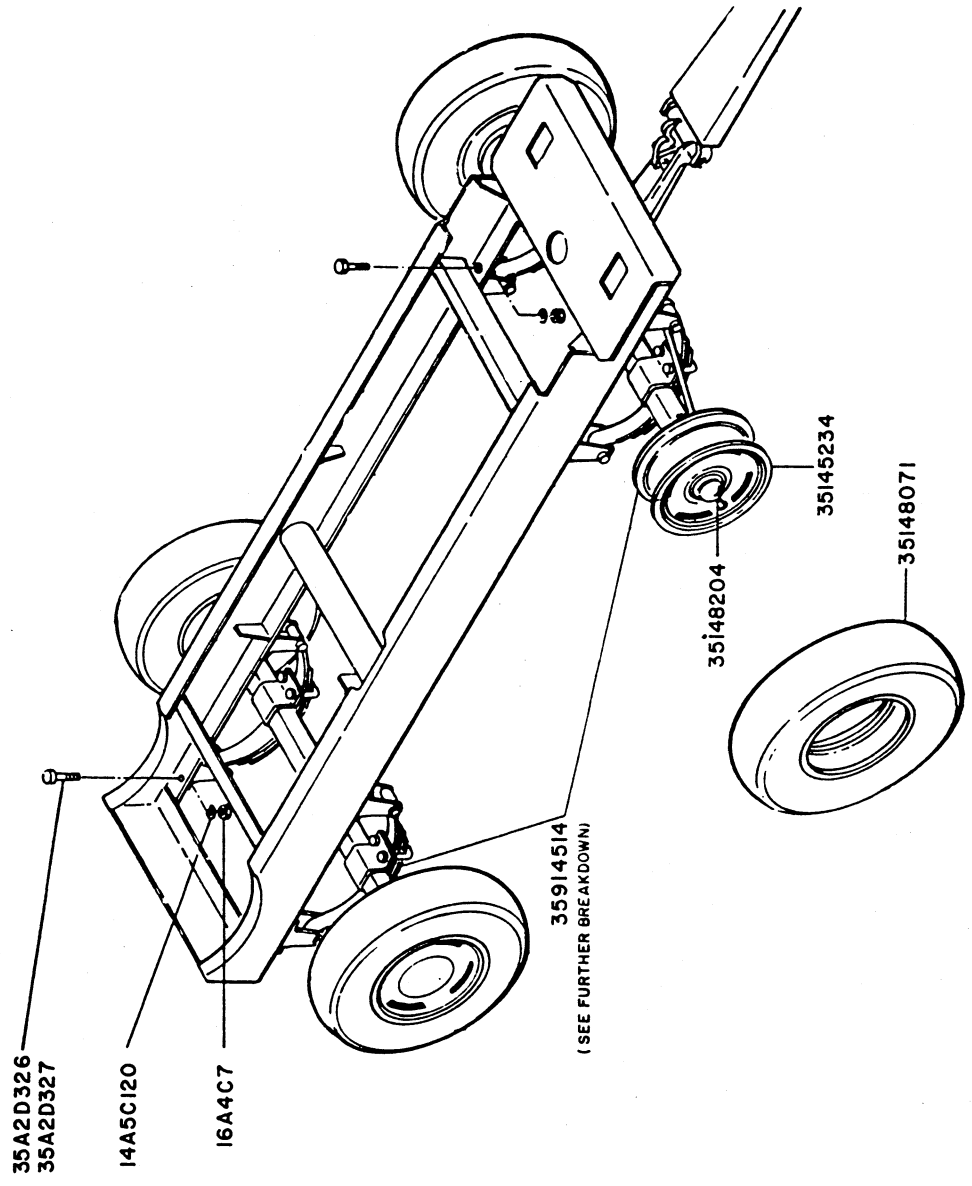

Figure 9-23. Running Gear

35781764

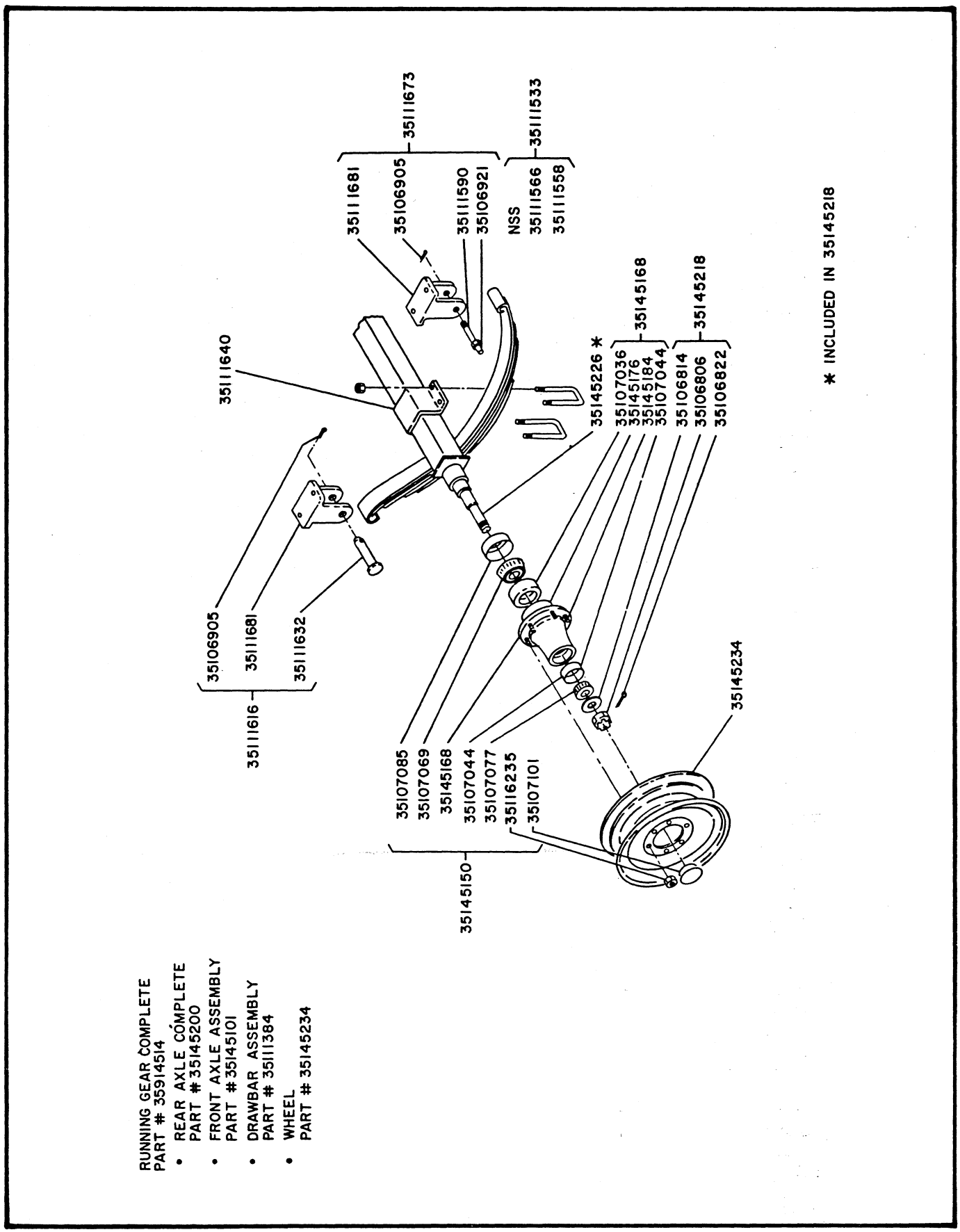

Figure 9-24. Rear Axle and Hub Assembly

35715804

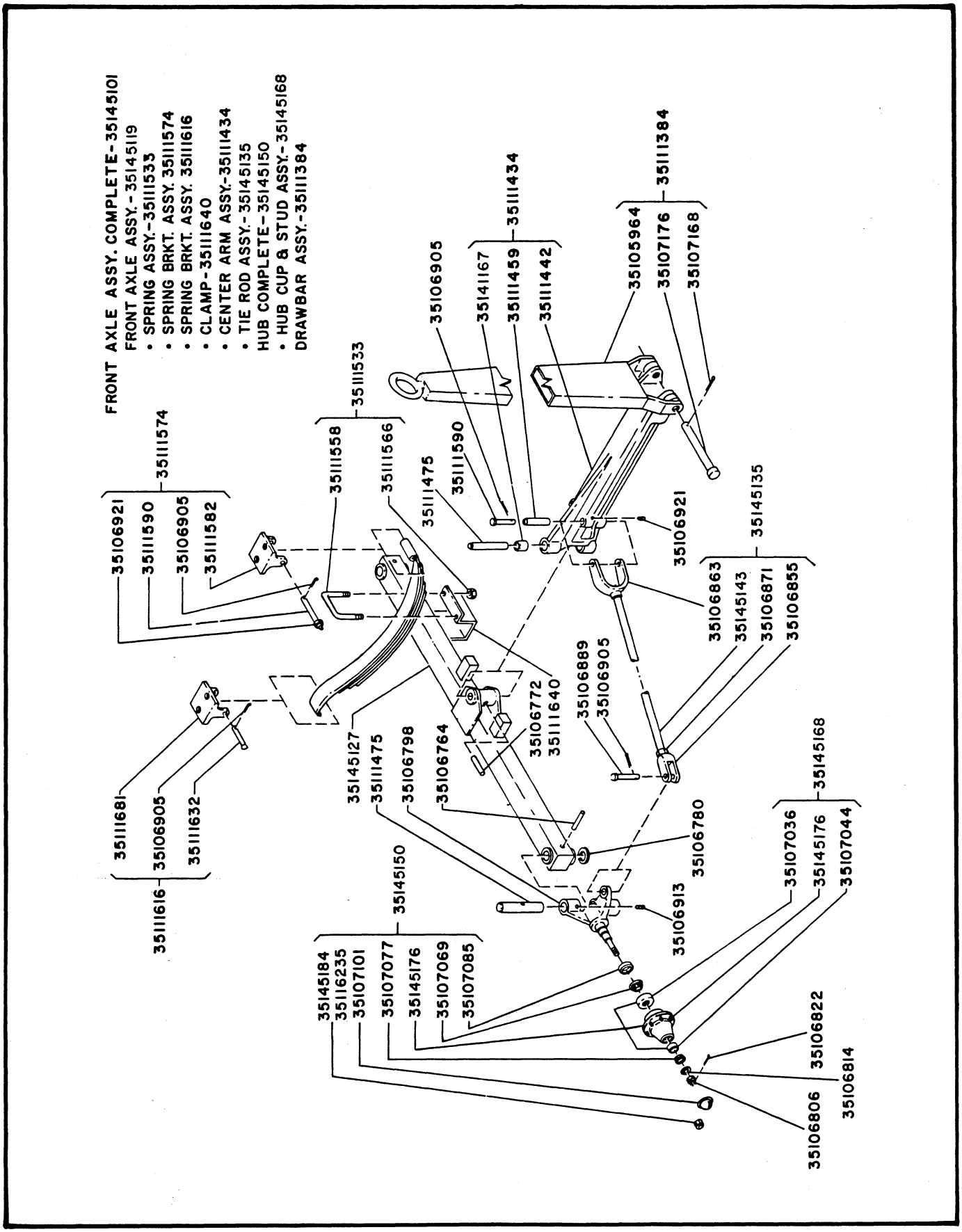

Figure 9-25. Front Axle and Drawbar

35715796

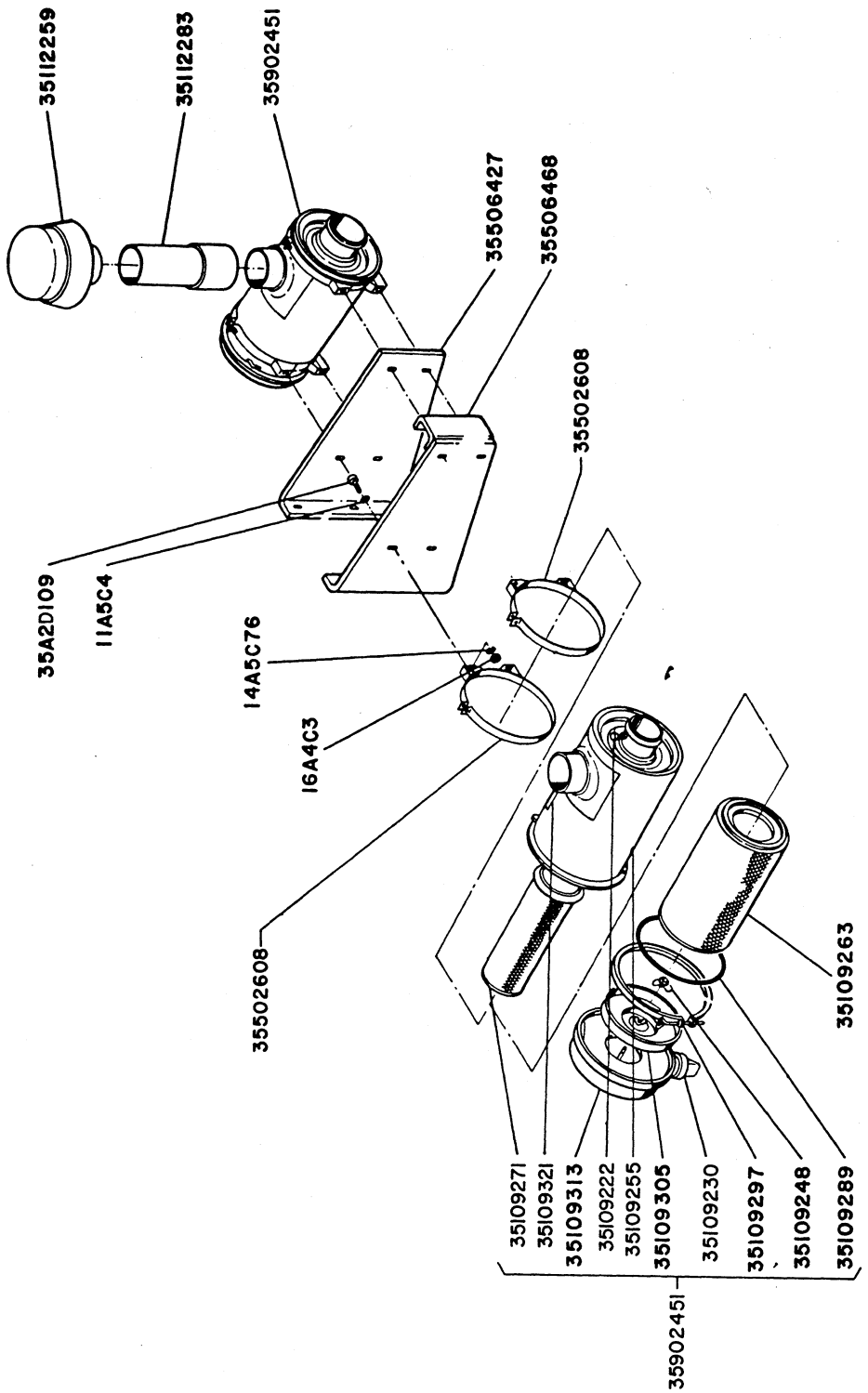

Figure 9-26. Air Intake System

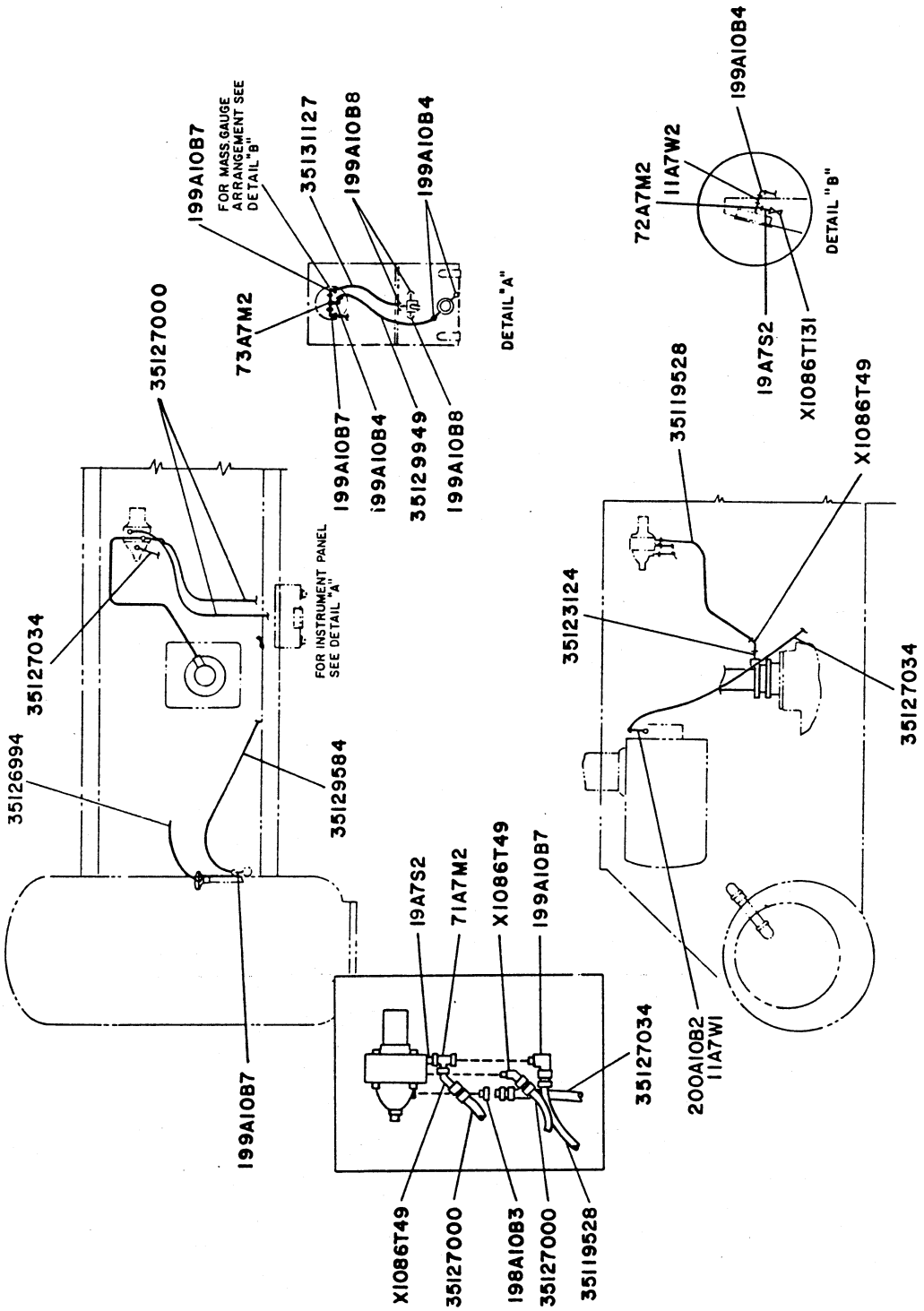

Figure 9-27. Air Line Tubing

35781772

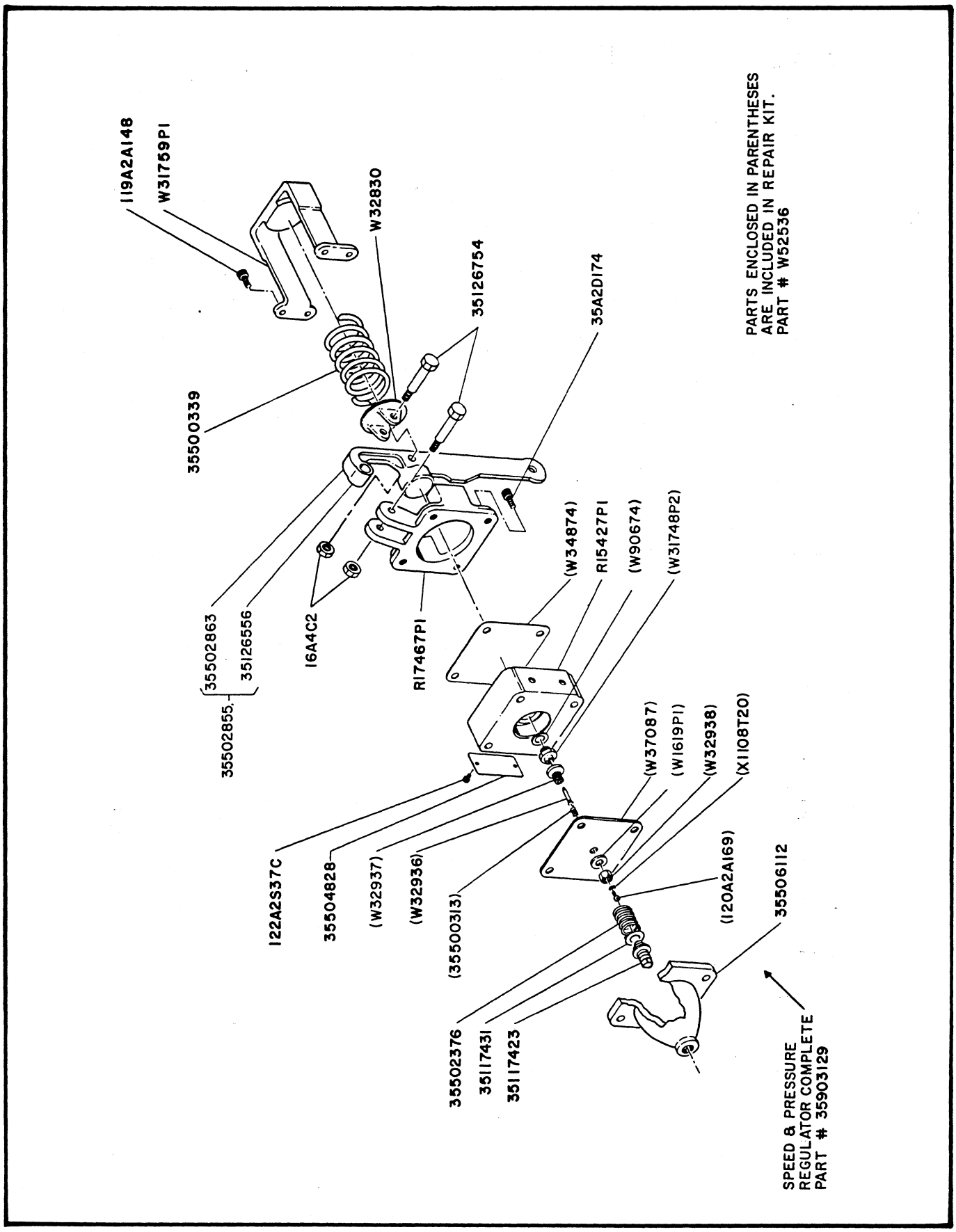

Figure 9-28. Speed and Pressure Regulator Complete

35719632.

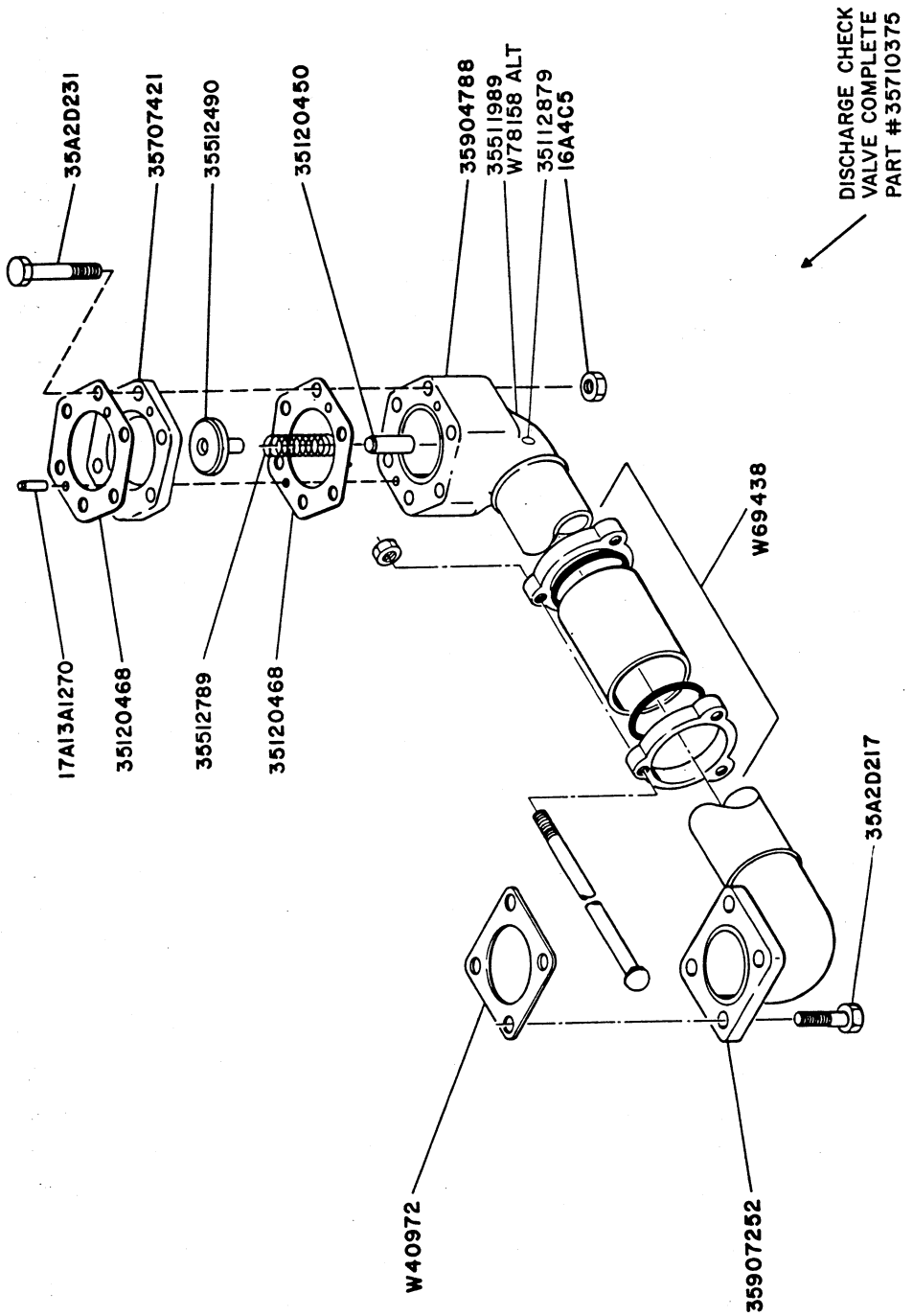

Figure 9-29. Discharge Piping

35713775

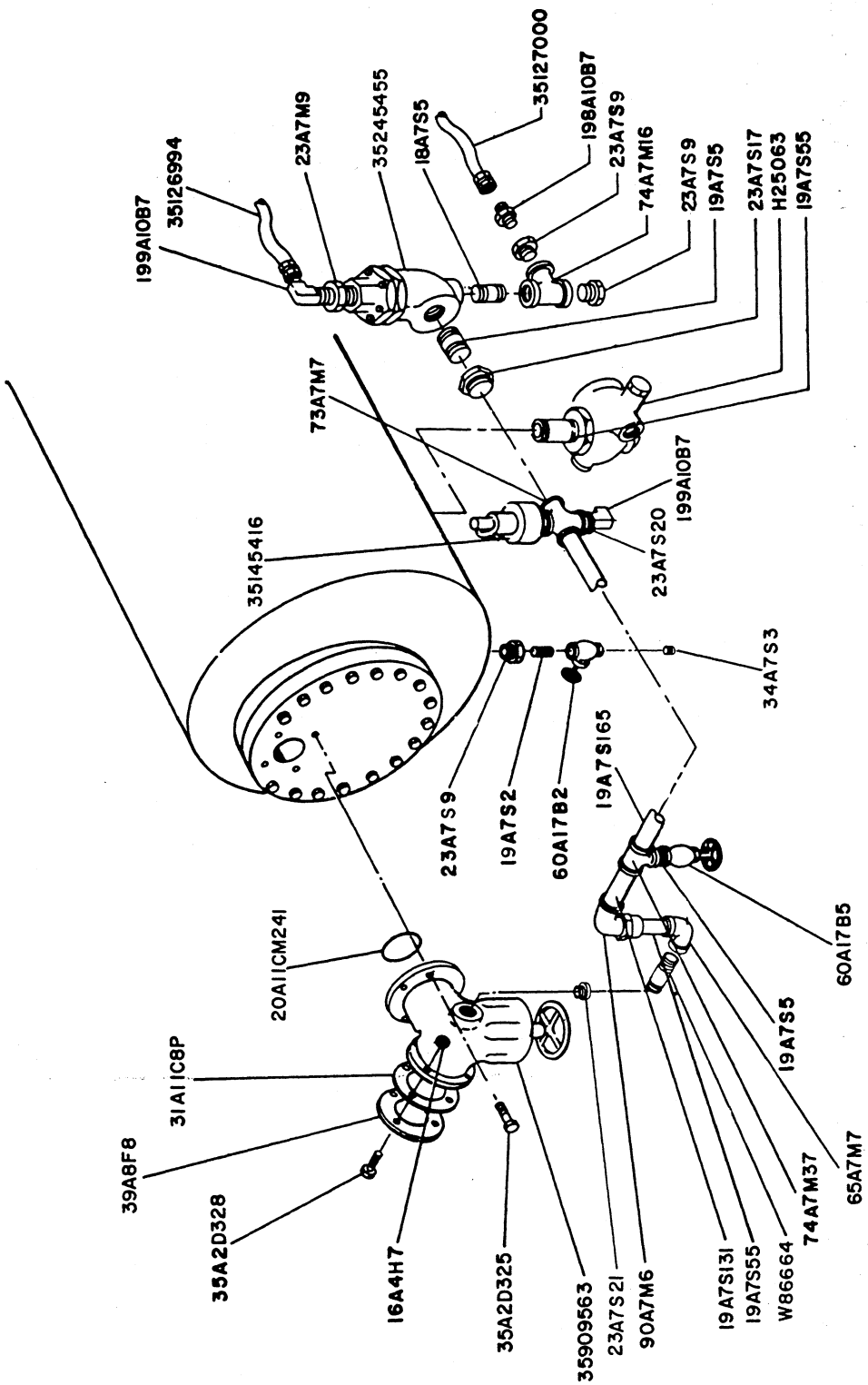

Figure 9-30. Oil Separator Piping

35781780

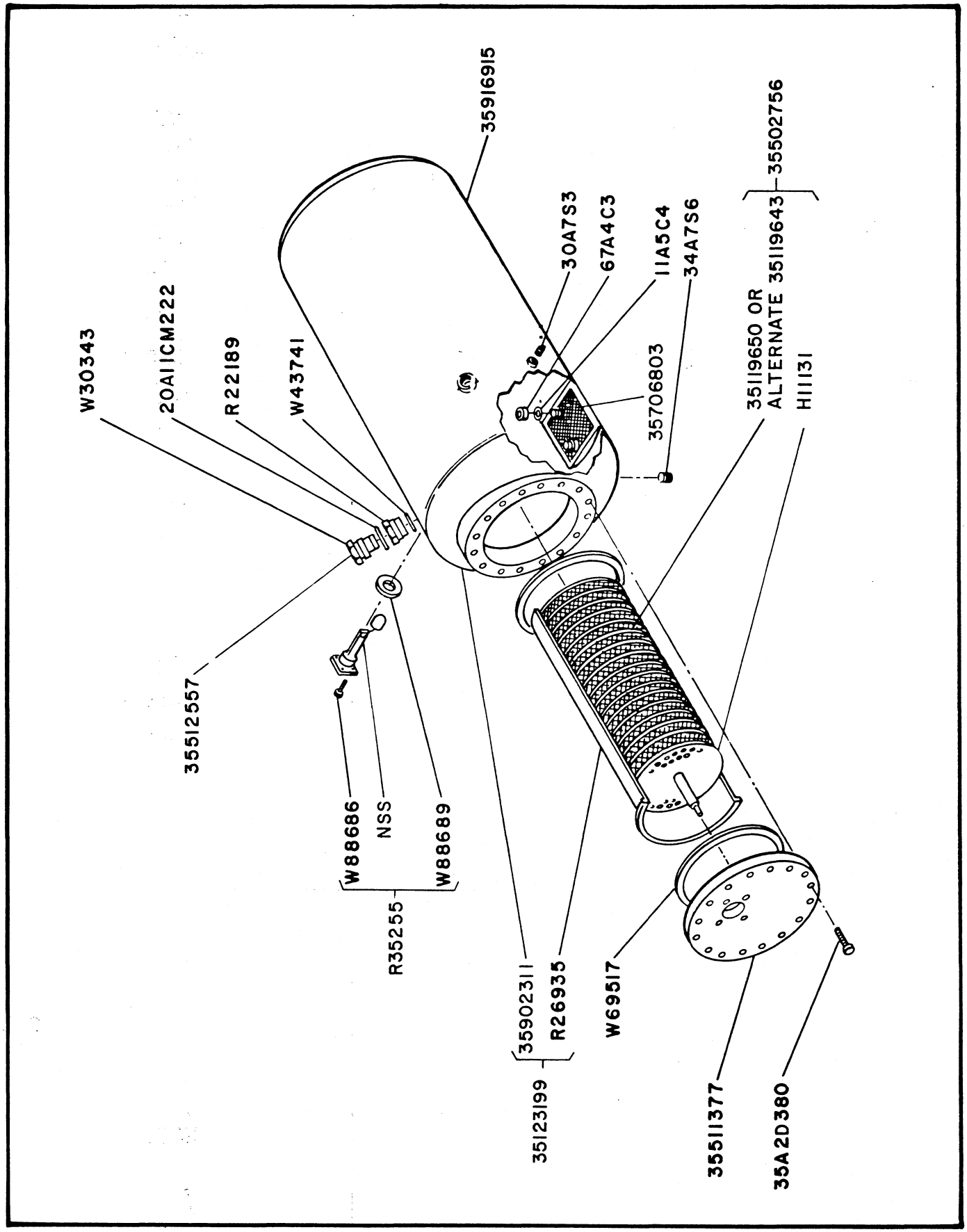

Figure 9-31. Oil Separator

35713791

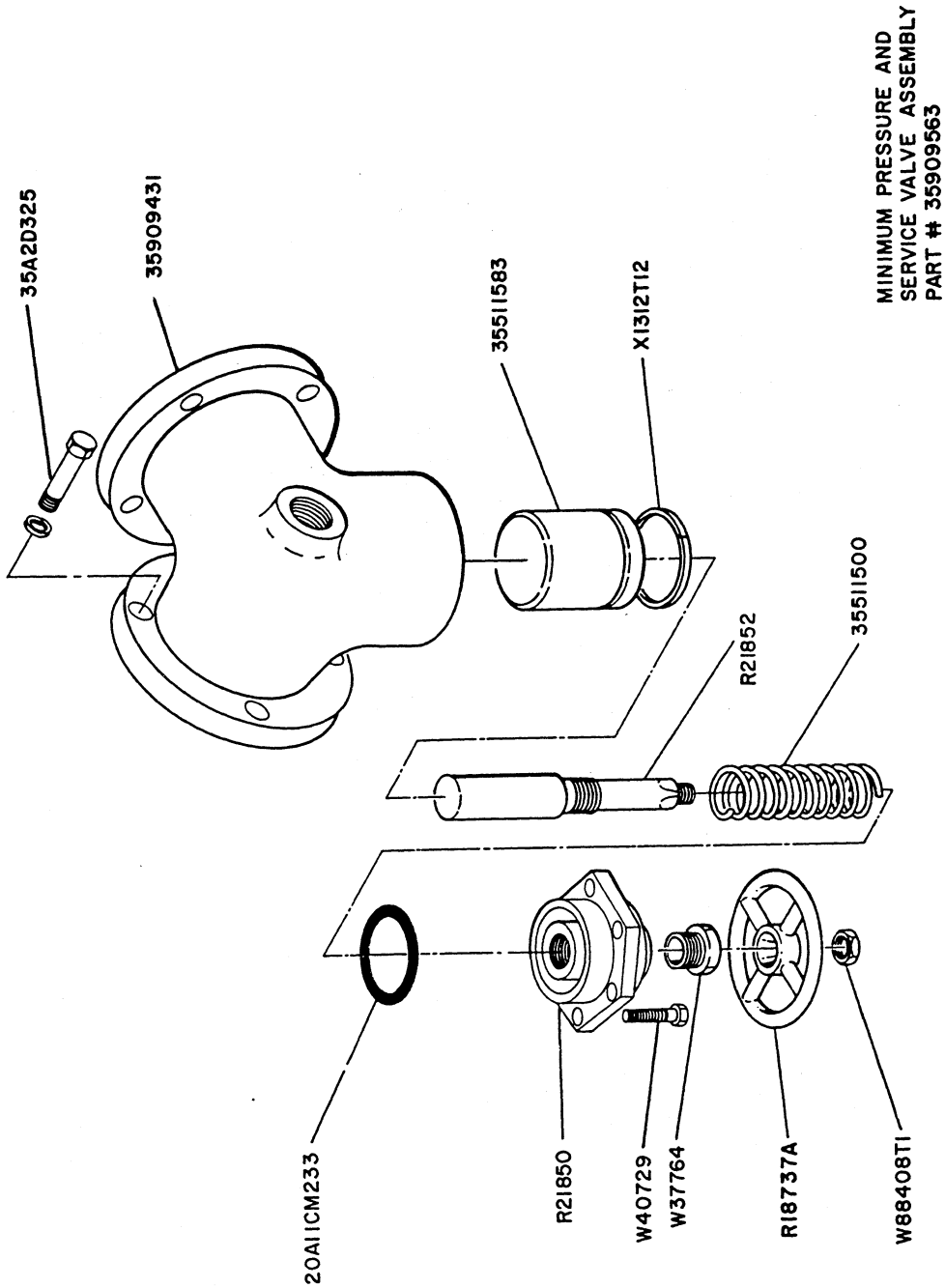

Figure 9-32. Minimum Pressure and Service Valve

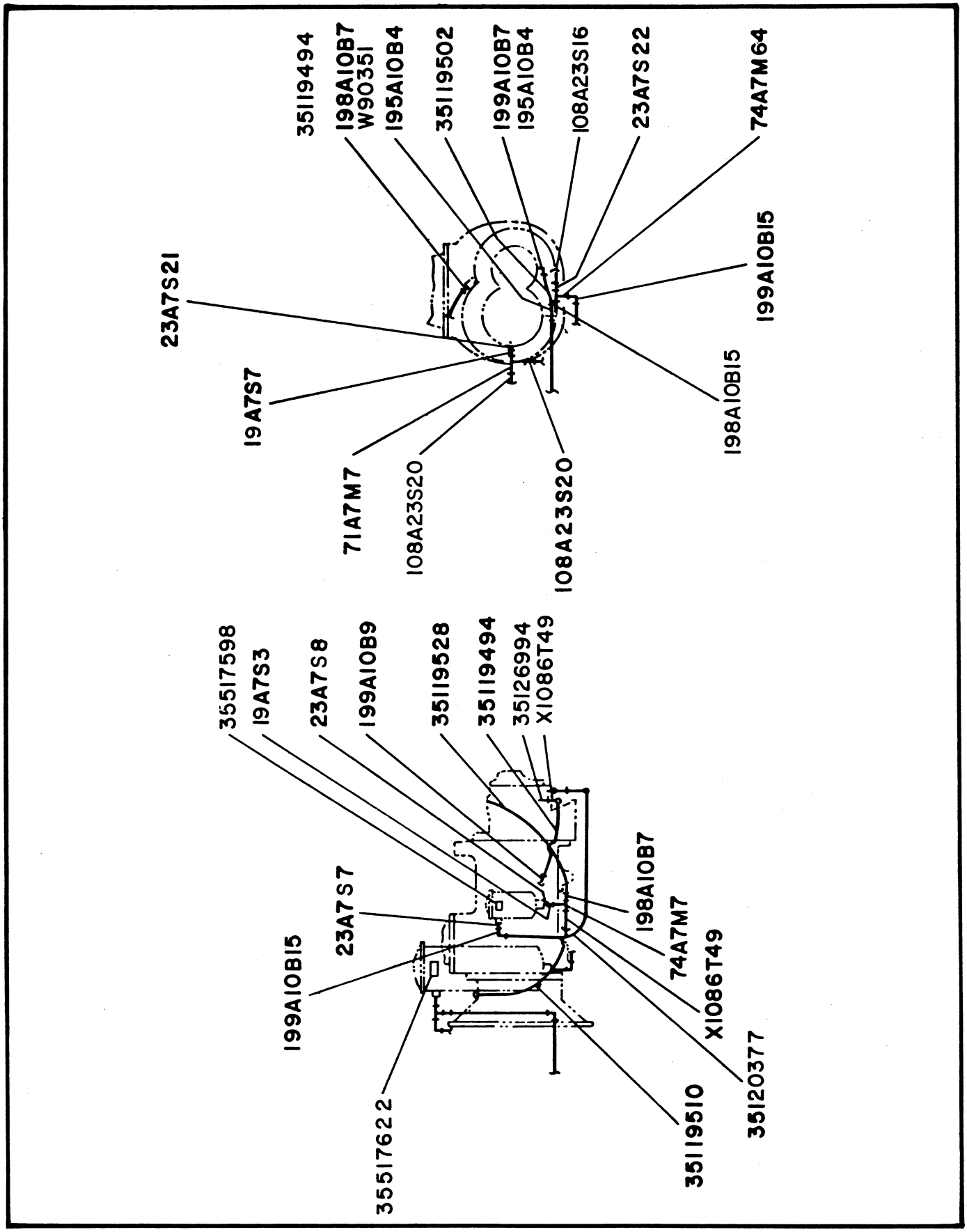

Figure 9-33. Air End Oil Piping

35781798

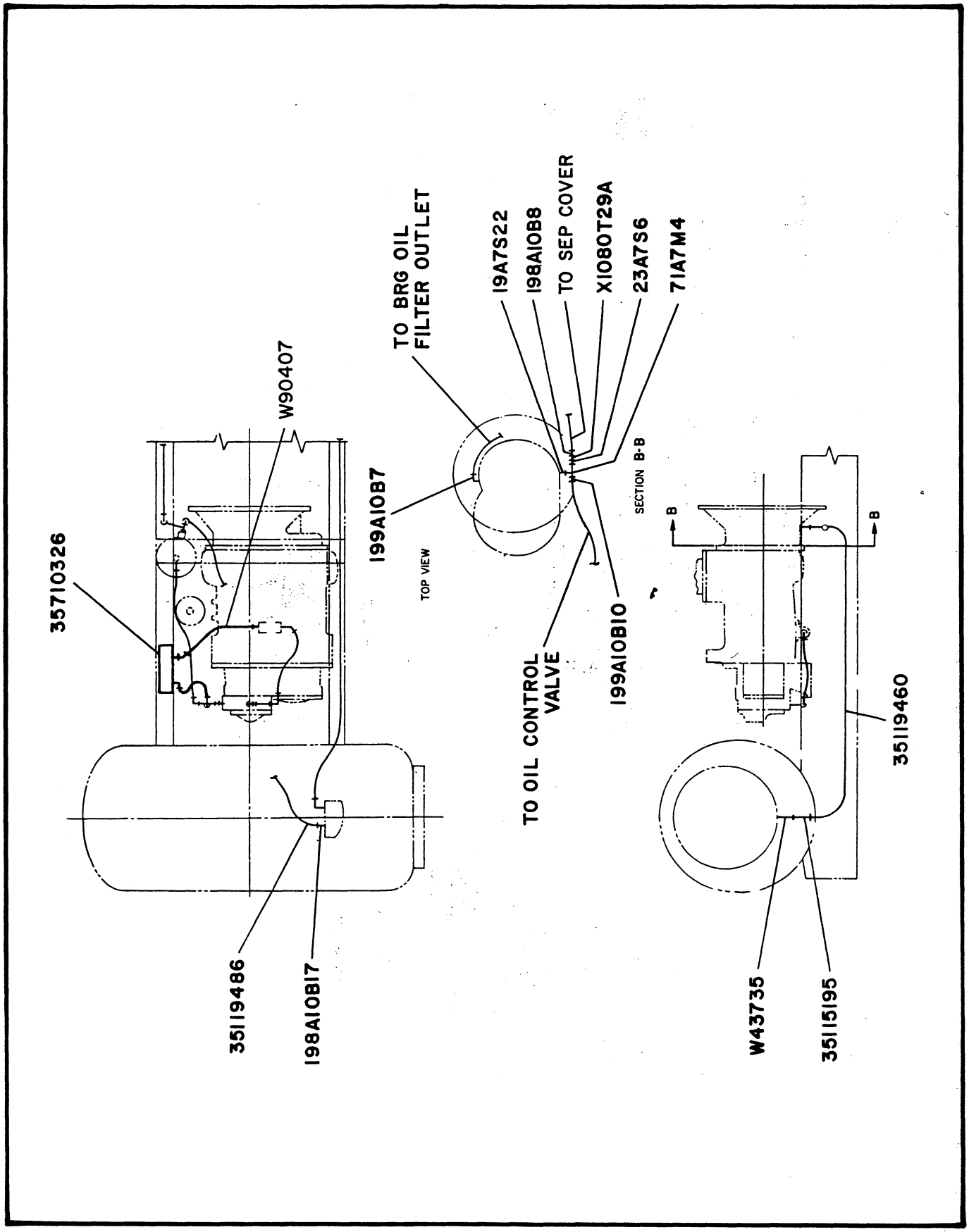

Figure 9-34. Oil Line Tubing, Plate 1

35781806

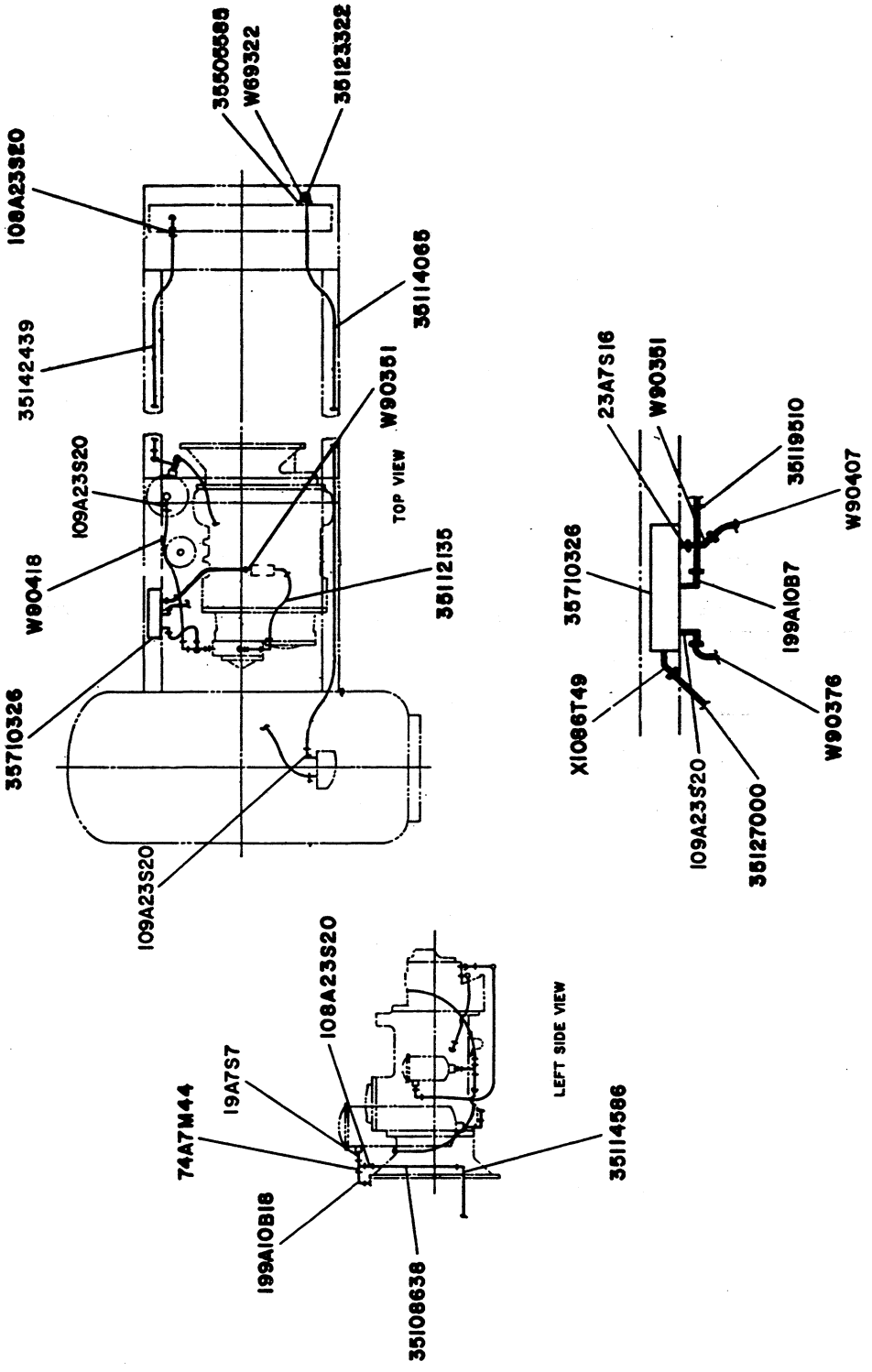

Figure 9-35. Oil Line Tubing, Plate 2

35781814

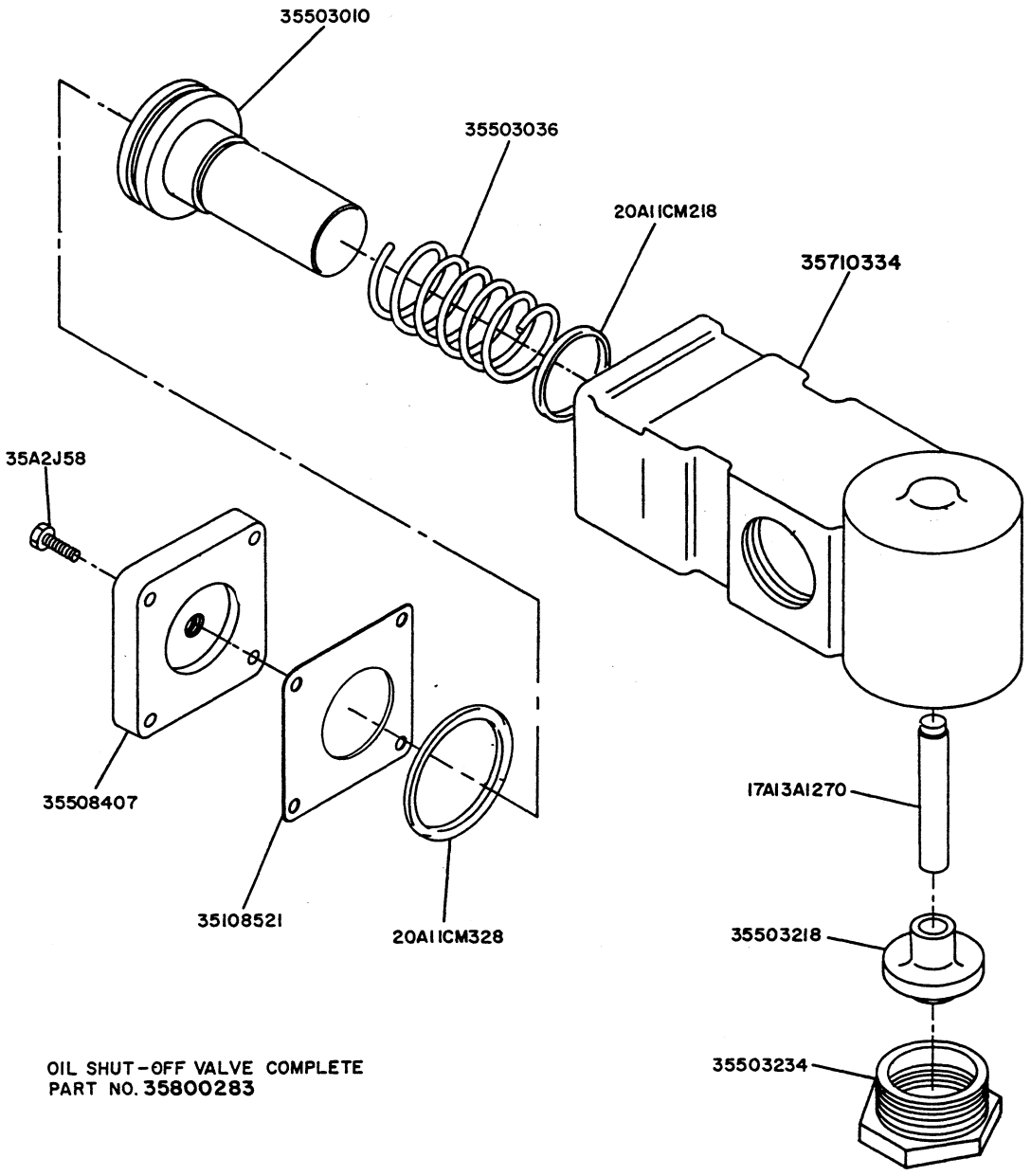

Figure 9-36. Oil Shutoff Valve

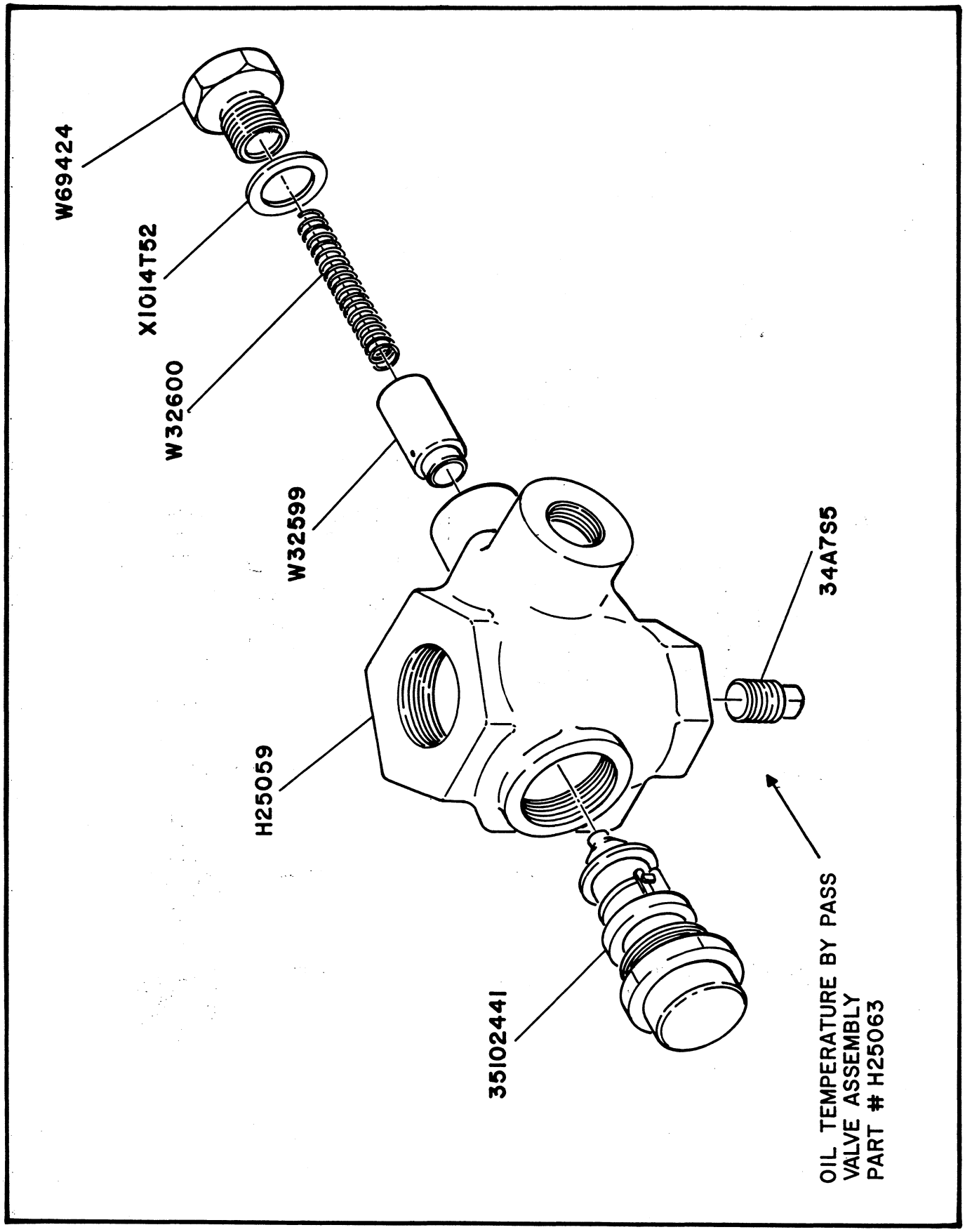

Figure 9-37. Oil Temperature Bypass Valve

35713858

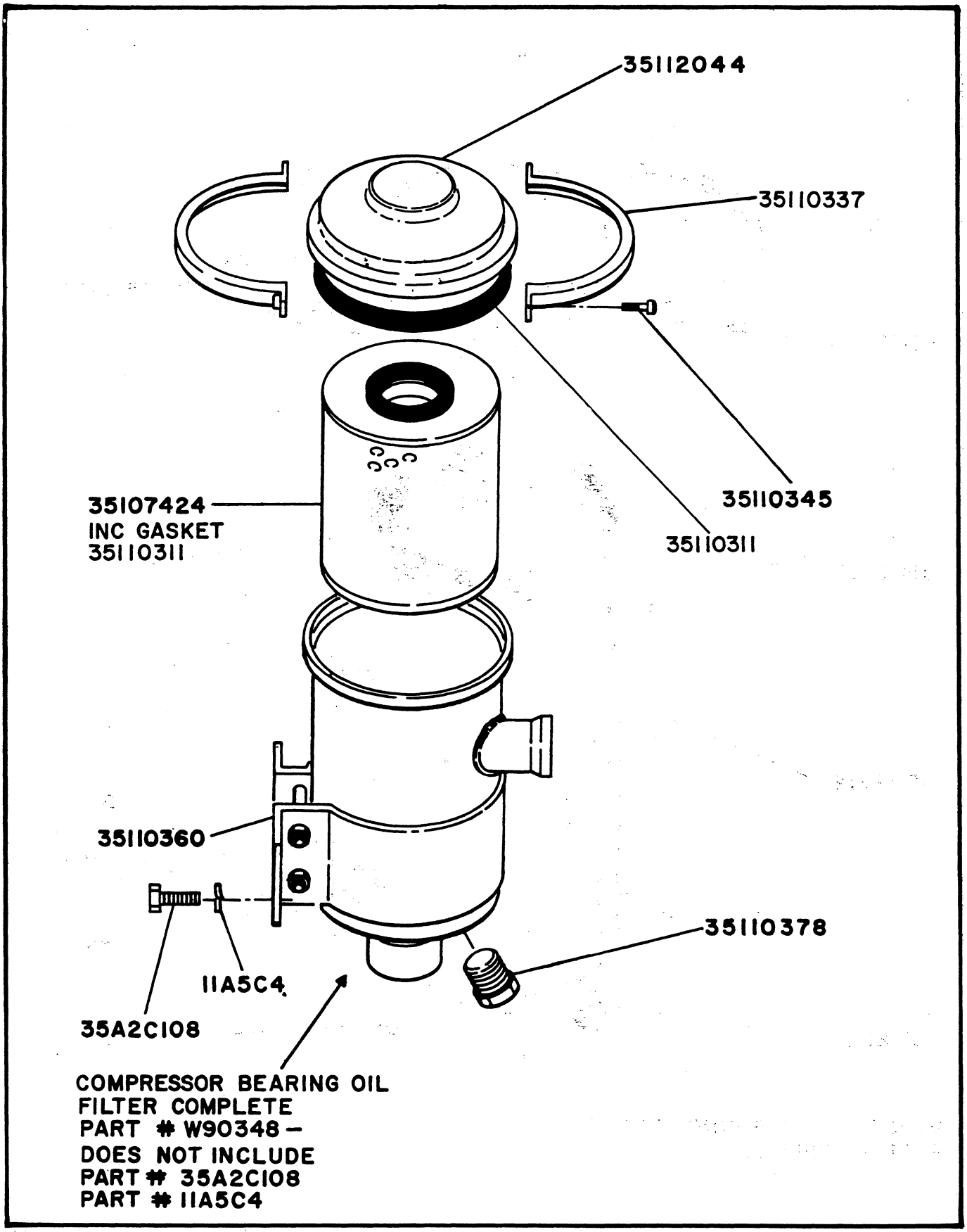

Figure 9-38. Compressor Bearing Oil Filter

35718923

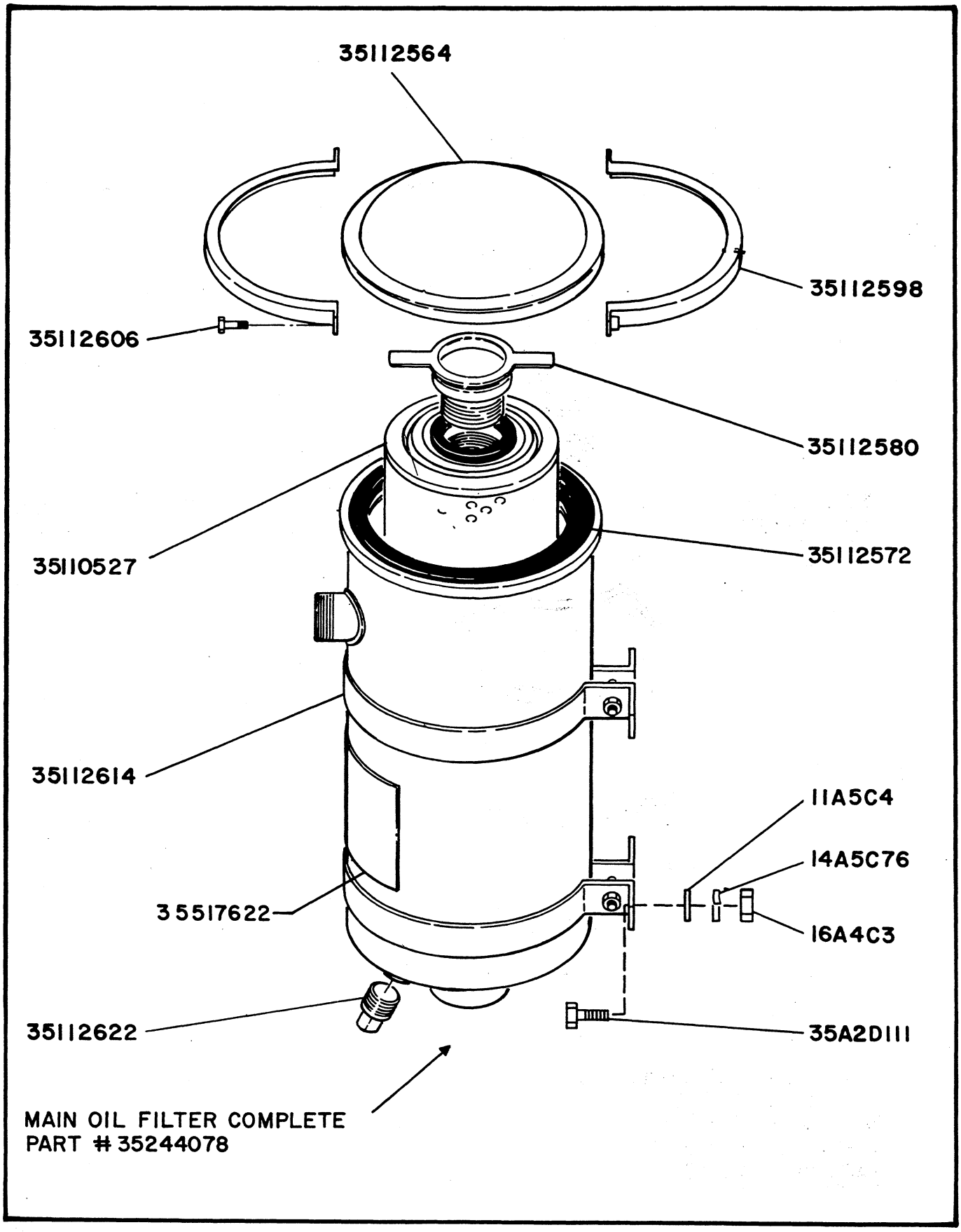

Figure 9-39. Main Oil Filter

35718683

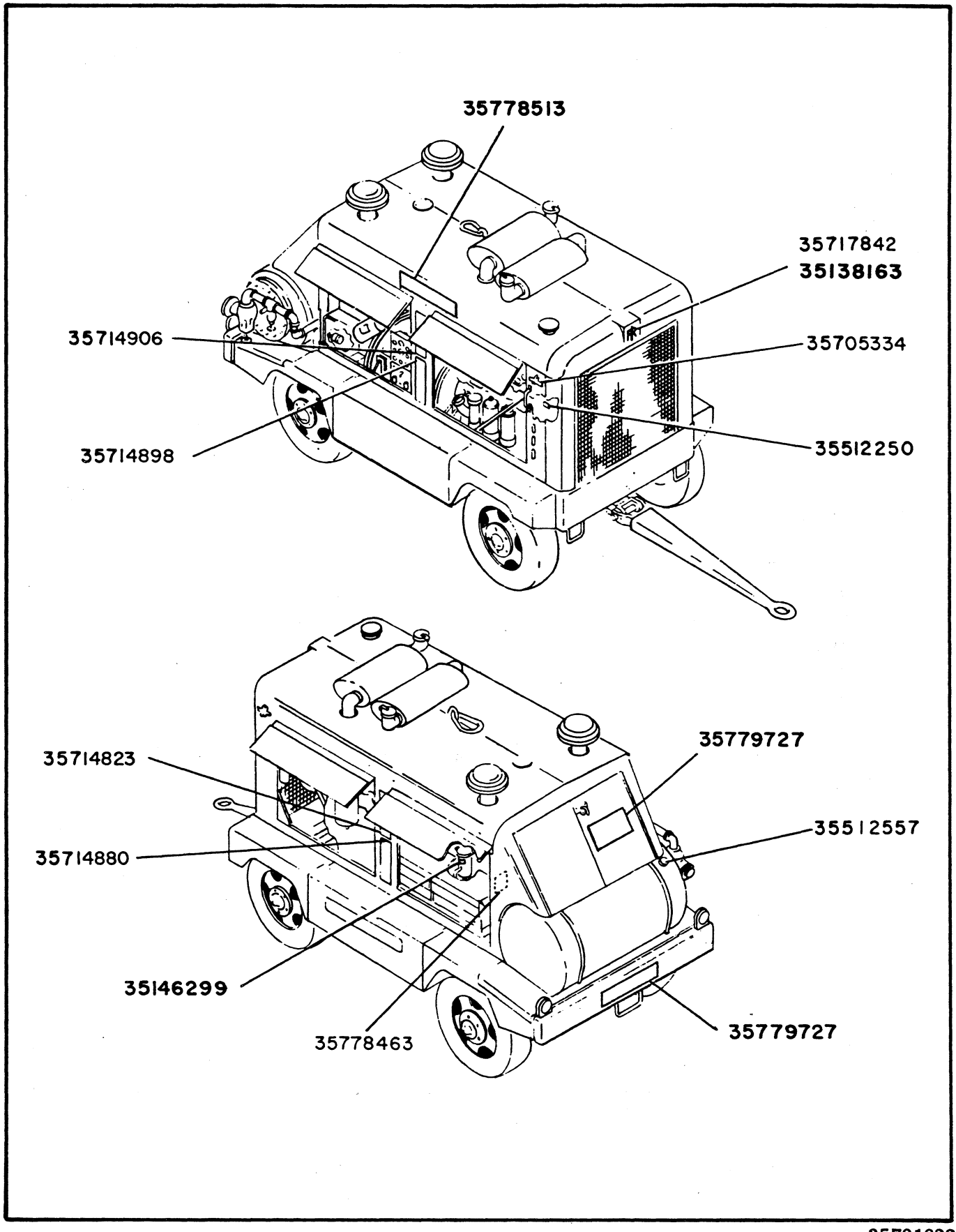

Figure 9-40. Identification Plates

35781822

Ingersoll-Rand.
PORTABLE COMPRESSOR DIVISION

PART NUMBER	QUAN.	DESCRIPTION	REMARKS	NEXT HIGHER ASSEMBLY
F19697	1	RADIATOR		35024223
H11131	1	SCREEN OIL		35502756
H20993A	1	BRG CVR FC		35018068
H22588	1	BUMPER FRONT		35001577
H24881	1	GUARD, OIL COOLER		35001395
H24897	1	ASSY LIFTING BAIL		35005297
H24921	2	BRKT FUEL TANK SUPPT	LH FRONT & RH REAR	35001494
H24922	2	BRKT FUEL TANK SUPPT	RH FRONT & LH REAR	35001494
H24923	2	BRKT RAD SUPPT		35003458
H24929	1	FENDER REAR		35001577
H24930	1	FENDER REAR		35001577
H25038	1	ASSY REAR BUMPER		35001577
H25059	1	VALVE BODY		H25063
H25063	1	ASSY OIL TEMP VALVE		35005776
H27792	4	ASSY SIDE COVER		35003458
PCD221A	1	COMP OPER MANUAL	DXL750 BFU	35115344
R15427P1	1	BODY REGULATOR	WAS UL83-2A	35903129
R17467P1	1	COVERALVE	WAS UL88-65A	35903129
R18737A	1	WHEEL HAND		35909563
R21850	1	COVER		35909563
R21852	1	STEM		35909563
R22189	1	ADAPTER FILLER HOLE		35005776
R26732	1	COVER OIL SEAL		35019611
R26754	2	PLATE RAD SIDE		35024223
R26935	1	INNER SHELL		35005776
R26948	1	SUP RAB		35003458
R26949	1	SUP RAD		35003458
R34970	1	ANGLE REINFORCING		35003458
R35255	1	GAUGE,OIL LEVEL		35005776
R35343	1	FRAME BATTERY		35001536
W13762	20	BUMPER RUBBER		35003458
W1619P1	1	WASHER		W52536

* AS REQUIRED