

MC1150E Crawler TABLE OF CONTENTS

SERIES/SECTION	SECTION NO.	FORM NO.
1 GENERAL		
Safety Rules, Service Manual Introduction, and Torque		
Specifications	1001	8-42850
General Engine Specifications - 1150E	1010	8-28720
Detailed Engine Specifications	1024	8-26061
General Machine Specifications	1210	8-42850
Maintenance and Lubrication	1212	8-42850
Power Train Specifications	1260	8-42850
Brake Specifications	1270	8-42850
Hydraulic System Specifications	1280	8-42850
2 ENGINE		
Engine and Radiator Removal and Installation	2000	8-42850
Engine Accessories	2001	8-42850
Engine Stall Tests	2002	8-42850
Cylinder Head and Valve Train - 1150E	2415	8-26071
Cylinder Block, Crankshaft, Pistons, Rods, sleeves, Camshaft, and Seals - 1150E	2425	8-26081
Lubrication System - Oil Pan, Oil Pump, Oil Cooler, and Oil Filter Housing - 1150E	2445	8-26091
Cooling System - Thermostat, Water Pump, Fan Pulley, and Belt Tensioner - 1150E	2455	8-26101
Turbocharger - 1150E	2465	8-26110
Turbocharger Failure Analysis	2565	9-78235
3 FUEL SYSTEM		
Fuel Lines, Fuel Tank, and Engine Controls	3001	8-42850
Fuel System and Filters - 1150E	3410	8-26131
Injection Pump - Pump Drive Gear, Timing Pin, Fuel Shut-Off Solenoid, Primer Pump, and Pump Timing - 1150E	3412	8-26141
Fuel Injectors - 1150E	3413	8-26150
4 ELECTRICAL SYSTEM		
Removal and Installation of Electrical Components	4000	8-42850
Electrical System Specifications and Troubleshooting	4002	8-42850
Electrical Schematics	4003	8-42850
Indicators and Gauges	4004	8-42850
Batteries	4005	8-44360
24 Volt Delco-Remy Starter and Starter Solenoid	4009	8-42850
24 Volt Alternator	4019	8-42850
5 TRACK		
Removal and Installation of Track Components	5500	8-42850
Case Lubricated Track	5504	8-42190
Track Frame and Suspension	5506	8-42850
Track Adjuster	5507	8-42850
Idler	5508	8-42850
Sprocket	5509	8-41280
Carrier Roller	5510	8-42850
Track Roller	5511	8-42850



6 POWER TRAIN

Transmission Maintenance and Troubleshooting	6002	8-42350
Transmission Diagrams and Operation	6003	8-41280
Charging Pump	6005	9-67861
Transmission Control Valve	6007	8-41280
Torque Converter	6010	8-42850
Transmission	6016	8-41280
Final Drive	6017	8-42850
Transmission Controls	6018	8-42850
Drive Shaft	6021	8-42850

7 BRAKES

Brakes	7001	8-41280
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8 HYDRAULICS

Hydraulic System Specifications, Diagrams, Maintenance, Troubleshooting, and Pressure Checks	8002	8-42850
Cleaning the Hydraulic System	8003	8-41280
Pump	8005	8-42850
Equipment Control Valve	8007	8-42850
Cylinders	8090	8-42850

9 MOUNTED EQUIPMENT

Dozer Blade	9020	8-42850
ROPS Cab	9061	8-42850
Operators Seat and Seat Belts	9064	8-42850
Suspension Seat	9065	8-42850
Winch	9300	8-41280

1001

SAFETY RULES SERVICE MANUAL INTRODUCTION AND TORQUE SPECIFICATIONS

TABLE OF CONTENTS

Safety Rules	1001-2	Illustrations and Photos	1001-4
Service Manual Introduction	1001-4	Clear and Simple English	1001-4
Right, Left, Front, and Rear	1001-4	Special Tools	1001-4
Text	1001-4	Torque Specifications - U.S. Hardware .	1001-5
Table of Contents	1001-4	Torque Specifications - Metric Hardware .	1001-6
Page Numbers	1001-4	Torque Specifications - Steel Hydraulic Fittings	1001-7

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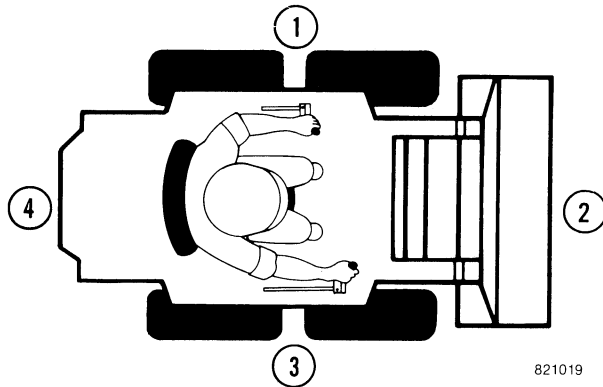
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SERVICE MANUAL INTRODUCTION

This service manual has been prepared with the latest service information available. Troubleshooting, removal, disassembly, inspection and installation procedures, and complete specifications and tightening references can be found in most sections. Some sections have drawings but no written procedure because the job is so easily done. This service manual is one of the most important tools available to the service technician.

Right, Left, Front, and Rear

The terms right-hand and left-hand and front and rear as used in this manual indicate the right and left sides, and front and rear of the machine as seen from the operator's seat for correct operation of the machine or attachment.



- | | |
|---------------------|----------------------|
| 1. <i>Left Side</i> | 3. <i>Right Side</i> |
| 2. <i>Front</i> | 4. <i>Rear</i> |

Text

If the service manual is for more than one machine or different models of components (planetary axles, gear boxes, control valves, etc.) the procedures have the steps necessary to service each model.

Table of Contents

A Table of Contents is in the front of this manual. The Table of Contents shows the main divisions and the sections that are in each division. The individual sections, where necessary, have a Table of Contents on the cover or second page of that section.

Page Numbers

All page numbers are made of two numbers separated by a dash, such as 4002-9. The number before the dash is the section number. The number following the dash is the page number in that section. Page numbers will be found at the upper right or left of each page.

Illustrations and Photos

Illustrations are put as near as possible to the text and are to be used as part of the text. Photos normally are put below the step to which they apply.

Clear and Simple English

This manual is written in C.A.S.E. (Clear and Simple English). C.A.S.E. is easier to read and understand than "regular" English because C.A.S.E. uses a small number of common words and has special rules for writing.

Special Tools

Special tools are needed to remove and install, disassemble and assemble, check, and adjust some component parts of this machine. Some special tools can be easily made locally and the necessary information to make the tool is in this service manual. Other special tools are more difficult to make locally and are available from Service Tools in the U.S. and from Jobborn Manufacturing in Canada. Use these tools according to the instructions in this service manual for your personal safety and to do the job correctly.


Order special tools from either of the following companies:


Service Tools
P.O. Box 314
Owatonna, Minnesota 55060

Jobborn Manufacturing Co.
97 Frid Street
Hamilton, Ontario L8P 4M3
Canada

TORQUE SPECIFICATIONS - U.S. HARDWARE

Use the torques in this chart when special torques are not given. These torques apply to fasteners with both UNC and UNF threads as received from suppliers, dry, or when lubricated with engine oil. Not applicable if special graphites, moly-disulfide greases, or other extreme pressure lubricants are used.


Grade 5 Bolts, Nuts, and Studs			
			
Size	Pound-Feet	Newton metres	Kilogram metres
1/4 in 6.4 mm	9-11	12-15	1.2-1.5
5/16 in 7.9 mm	17-21	23-28	2.4-2.9
3/8 in 9.5 mm	35-42	48-57	4.8-5.8
7/16 in 11.1 mm	54-64	73-87	7.5-8.8
1/2 in 12.7 mm	80-96	109-130	11.1-13.3
9/16 in 14.3 mm	110-132	149-179	15.2-18.2
5/8 in 15.9 mm	150-180	203-244	20.8-24.9
3/4 in 19.0 mm	270-324	366-439	37.3-44.8
7/8 in 22.2 mm	400-480	542-651	55.3-66.4
1.0 in 25.4 mm	580-696	787-944	80.2-96.2
1-1/8 in 28.6 mm	800-880	1085-1193	111-122
1-1/4 in 31.8 mm	1120-1240	1519-1681	155-171
1-3/8 in 34.9 mm	1460-1680	1980-2278	202-232
1-1/2 in 38.1 mm	1940-2200	2631-2983	268-304

Grade 8 Bolts, Nuts, and Studs			
			
Size	Pound-Feet	Newton metres	Kilogram metres
1/4 in 6.4 mm	12-15	16-20	1.7-2.1
5/16 in 7.9 mm	24-29	33-39	3.3-4.0
3/8 in 9.5 mm	45-54	61-73	6.2-7.5
7/16 in 11.1 mm	70-84	95-114	9.7-11.6
1/2 in 12.7 mm	110-132	149-179	15.2-18.2
9/16 in 14.3 mm	160-192	217-260	22.1-26.5
5/8 in 15.9 mm	220-264	298-358	30.4-36.5
3/4 in 19.0 mm	380-456	515-618	52.5-63.0
7/8 in 22.2 mm	600-720	814-976	83.0-99.5
1.0 in 25.4 mm	900-1080	1220-1465	124-149
1-1/8 in 28.6 mm	1280-1440	1736-1953	177-199
1-1/4 in 31.8 mm	1820-2000	2468-2712	252-277
1-3/8 in 34.9 mm	2380-2720	3227-3688	329-376
1-1/2 in 38.1 mm	3160-3560	4285-4827	437-492


TORQUE SPECIFICATIONS - METRIC HARDWARE

Use the following torques when special torques are not given.

These values apply to fasteners with coarse threads as received from supplier, plated or unplated, or when lubricated with engine oil. These values do not apply if graphite or moly-disulfide grease or oil is used.

Grade 8.8 Bolts, Nuts, and Studs 			
Size	Pound-Feet	Newton metres	Kilogram metres
M4 0.15 in	2-3	3-4	0.3-0.4
M5 0.19 in	5-6	6.5-8	0.7-0.8
M6 0.23 in	8-9	10.5-12	1.1-1.2
M8 0.31 in	19-23	26-31	2.6-3.2
M10 0.39 in	38-45	52-61	5.3-6.2
M12 0.46 in	66-79	90-107	9.1-10.9
M14 0.55 in	106-127	144-172	14.7-17.6
M16 0.62 in	160-200	217-271	22.1-27.7
M20 0.78 in	320-380	434-515	44.2-52.5
M24 0.94 in	500-600	675-815	69.1-83.0
M30 1.17 in	920-1100	1250-1500	127-152
M36 1.40 in	1600-1950	2175-2600	221-270

Grade 10.9 Bolts, Nuts, and Studs

			
Size	Pound-Feet	Newton metres	Kilogram metres
M4 0.15 in	3-4	4-5	0.4-0.5
M5 0.19 in	7-8	9.5-11	1.0-1.1
M6 0.23 in	11-13	15-17.5	1.5-1.8
M8 0.31 in	27-32	37-43	3.7-4.4
M10 0.39 in	54-64	73-87	7.5-8.8
M12 0.46 in	93-112	125-150	12.9-15.5
M14 0.55 in	149-179	200-245	20.6-24.7
M16 0.62 in	230-280	310-380	31.8-38.7
M20 0.78 in	450-540	610-730	62.2-74.7
M24 0.94 in	780-940	1050-1275	108-130
M30 1.17 in	1470-1770	2000-2400	203-245
M36 1.40 in	2580-3090	3500-4200	357-427

Grade 12.9 Bolts, Nuts, and Studs

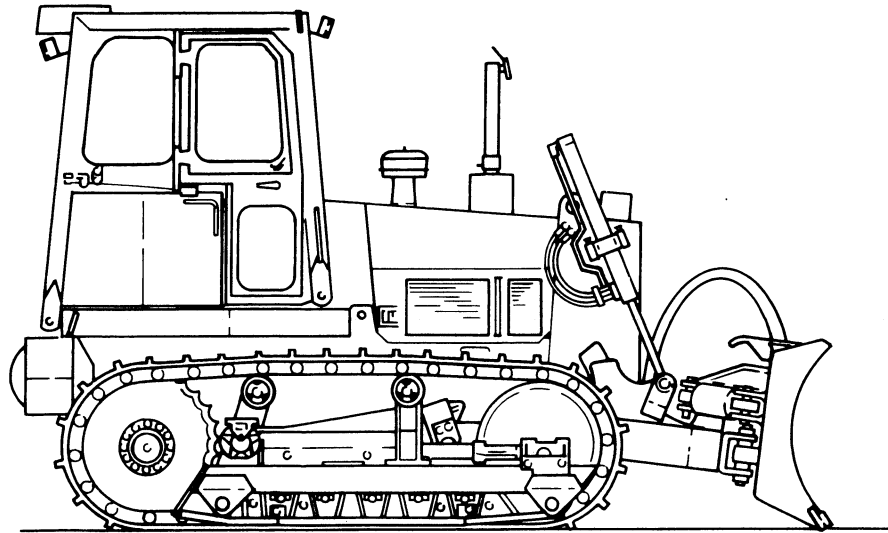
Usually the torque values specified for grade 10.9 fasteners can be used satisfactorily on grade 12.9 fasteners.

TORQUE SPECIFICATIONS - STEEL HYDRAULIC FITTINGS

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres	Kilogram metres
37 Degree Flare Fittings				
1/4 in 6.4 mm	7/16-20	6-12	8-16	0.8-1.7
5/16 in 7.9 mm	1/2-20	8-16	11-21	1.1-2.2
3/8 in 9.5 mm	9/16-18	10-25	14-33	1.4-3.5
1/2 in 12.7 mm	3/4-16	15-42	20-56	2.1-5.8
5/8 in 15.9 mm	7/8-14	25-58	34-78	3.5-8.0
3/4 in 19.0 mm	1-1/16-12	40-80	54-108	5.5-11.1
7/8 in 22.2 mm	1-3/16-12	60-100	81-135	8.3-13.9
1.0 in 25.4 mm	1-5/16-12	75-117	102-158	10.4-16.2
1-1/4 in 31.8 mm	1-5/8-12	125-165	169-223	17.3-22.8
1-1/2 in 38.1 mm	1-7/8-12	210-250	285-338	29.0-34.6

Tube OD Hose ID	Thread Size	Pound- Feet	Newton metres	Kilogram metres
Straight Threads with O-ring				
1/4 in 6.4 mm	7/16-20	12-19	16-25	1.7-2.6
5/16 in 7.9 mm	1/2-20	16-25	22-33	2.2-3.5
3/8 in 9.5 mm	9/16-18	25-40	34-54	3.5-5.5
1/2 in 12.7 mm	3/4-16	42-67	57-90	5.8-9.3
5/8 in 15.9 mm	7/8-14	58-92	79-124	8.0-12.7
3/4 in 19.0 mm	1-1/16-12	80-128	108-174	11.1-17.8
7/8 in 22.2 mm	1-3/16-12	100-160	136-216	13.8-22.1
1.0 in 25.4 mm	1-5/16-12	117-187	159-253	16.2-25.9
1-1/4 in 31.8 mm	1-5/8-12	165-264	224-357	22.8-36.5
1-1/2 in 38.1 mm	1-7/8-12	250-400	339-542	34.6-55.3

Split Flange Mounting Bolts			
Size	Pound- Feet	Newton metres	Kilogram metres
5/16-18	15-20	20-27	2.1-2.8
3/8-16	20-25	26-33	2.8-3.5
7/16-14	35-45	47-61	4.7-6.2
1/2-13	55-65	74-88	7.6-9.0
5/8-11	140-150	190-203	19.4-20.7



SPECIFICATIONS _____

DIMENSIONS

Blade width	109.6 in
Length overall	190.4 in
Width overall	109.6 in
Height overall (with cab)	116.5 in
Height overall (without cab)	91 in
Ground clearance	12.9 in
Track gauge	62 in

2000

ENGINE AND RADIATOR REMOVAL AND INSTALLATION

TABLE OF CONTENTS

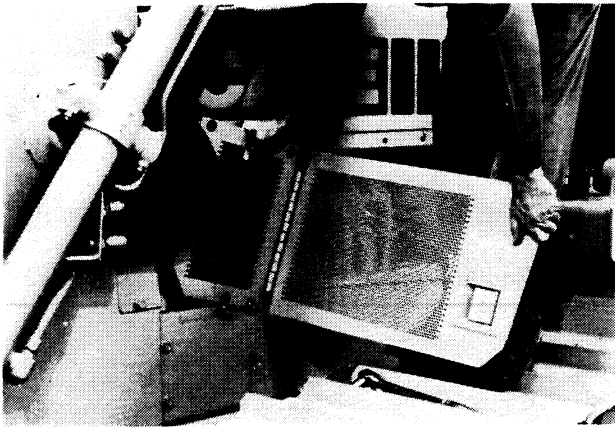
Dozer Engine Removal	2000-2
Dozer Engine Installation	2000-15
Dozer Radiator Removal	2000-27
Dozer Radiator Installation	2000-35

DOZER ENGINE REMOVAL

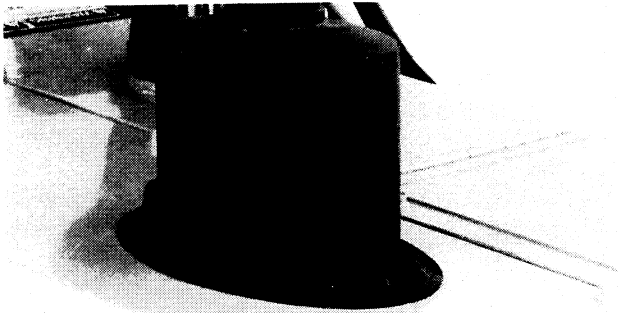
1. Remove the side panels for the engine compartment.

a. Loosen and remove the cap screws at the top of the side panel and loosen the bottom cap screws.

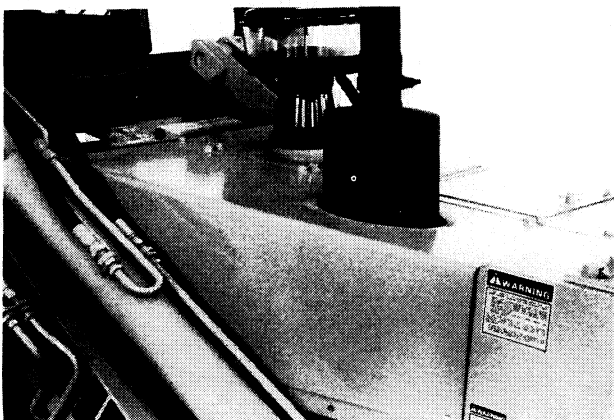
b. Remove the side panel.



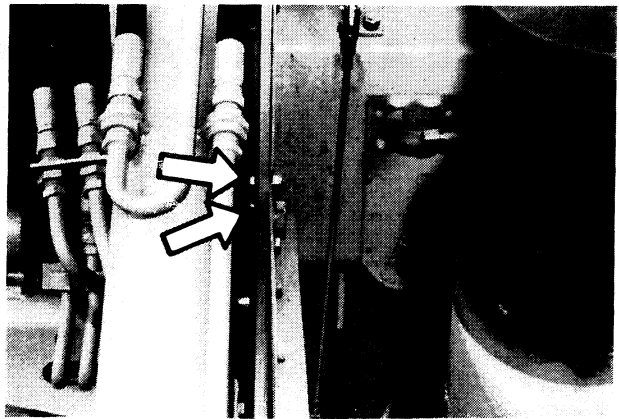
2. Loosen and remove the self-locking nuts, flat washers, and bolts that fasten the clamp around the muffler. Remove the clamp.



3. Loosen and remove the cap screws that fasten the top and sides for each half of the hood. Remove each half of the hood.



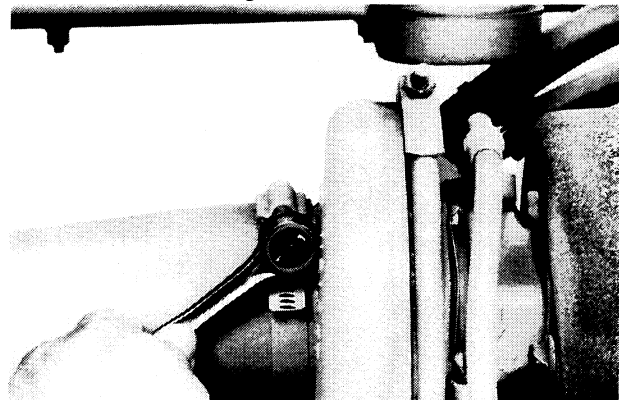
4. Loosen and remove the self-locking nuts and bolts that fasten both hood braces to the frame.



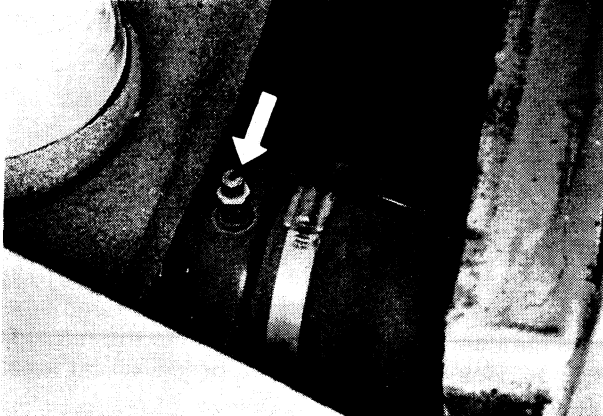
5. Loosen and remove the cap screws and spacers that fasten the right hood brace to the radiator shroud. Remove the hood brace.



6. Loosen the clamp and disconnect the hose from the turbocharger.

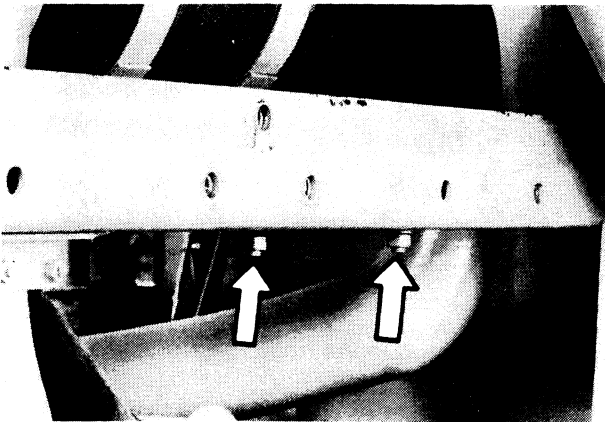


7. Cover or close the opening at the inlet of the turbocharger.
8. Cover or close the opening in the air cleaner.
9. Disconnect the line for the restriction indicator at the rear of the air cleaner and also unscrew fan disconnect air line.



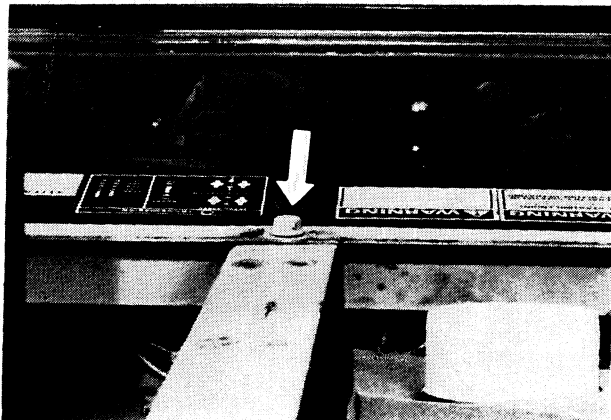
622439

10. Loosen and remove the bolts, flat washers, and self-locking nuts that fasten the mounting bracket for the air cleaner to the left hood brace.



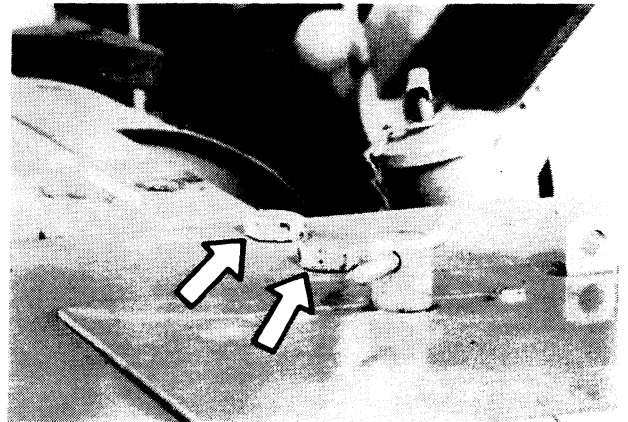
622512

11. Loosen and remove the cap screw that fastens the rear of the center hood brace.



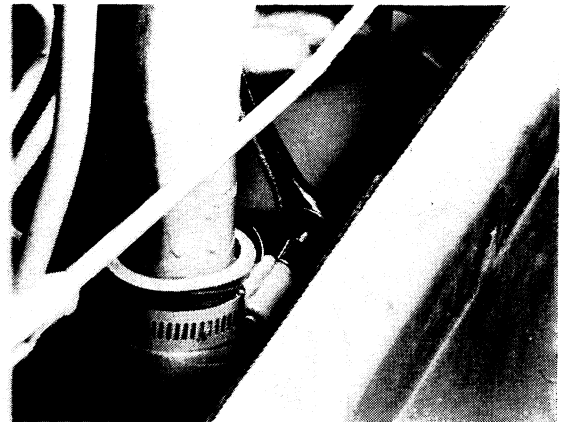
622510

12. Loosen and remove the self-locking nuts, flat washers, and bolts that fasten the center hood brace to the radiator shroud. Have another person help you remove the center hood brace and air cleaner.



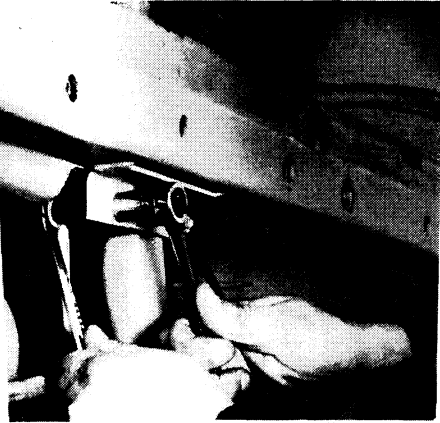
622508

13. Loosen the hose clamp for the oil fill tube.



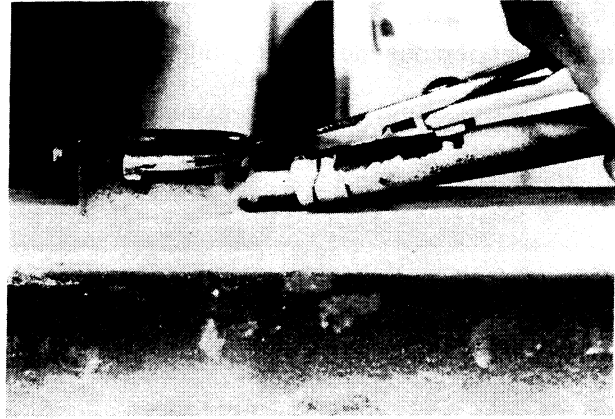
622514

14. Loosen and remove the self-locking nut, bolt, flat washer, and spacer that fasten the dipstick tube to the left hood brace.



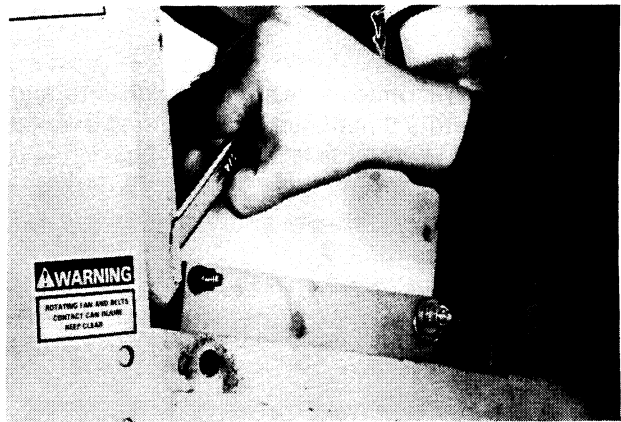
622516

16. Disconnect the drain hose from the fill neck on the radiator.

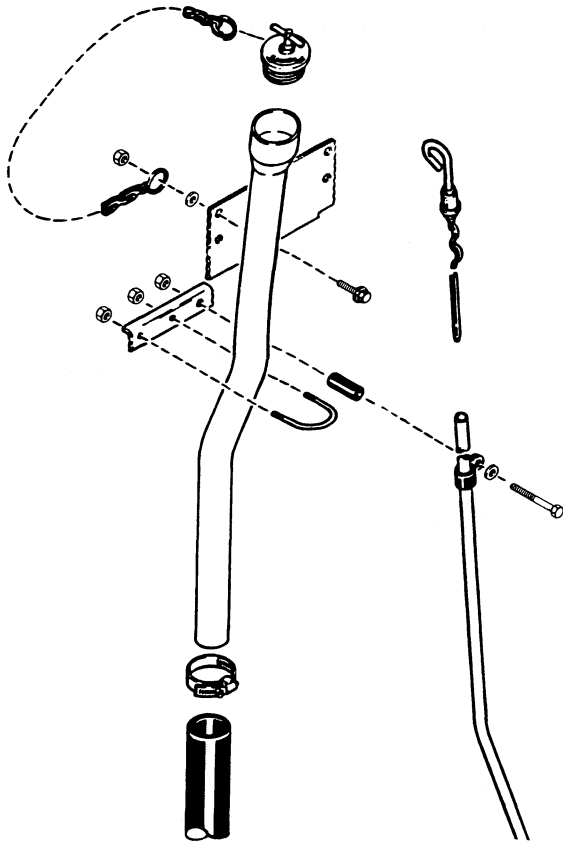


622518

17. Loosen and remove the cap screws and spacers that fasten the left hood brace to the radiator shroud. Remove the left hood brace, oil fill tube, and coolant reservoir.



622520



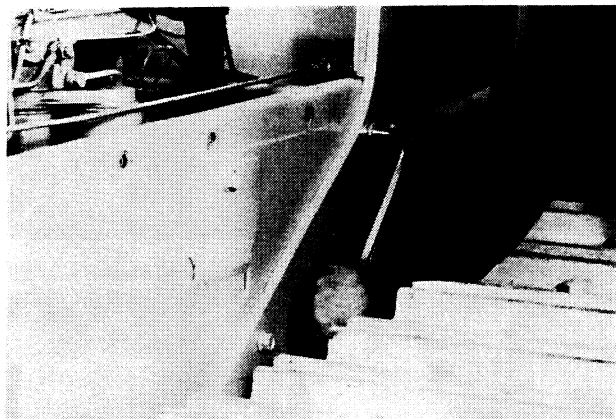
861298

15. Loosen and remove the radiator cap.

- a. Disconnect the air system that runs the fan disconnect system - tag air liner and ect. item for proper reinstallation of components.

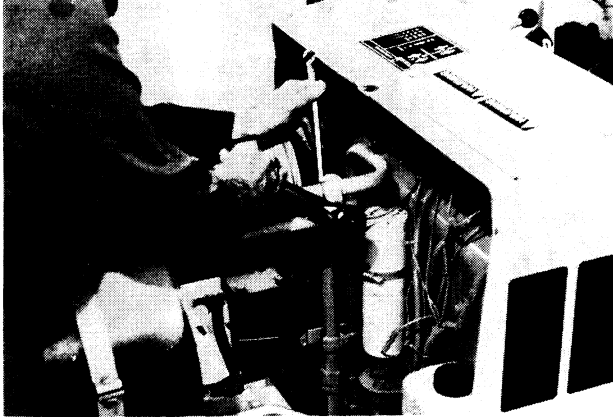
18. Install a plug in the hose for the oil fill tube.

19. Loosen and remove the cap screws that fasten the bottom panels in place. Remove the bottom panels.



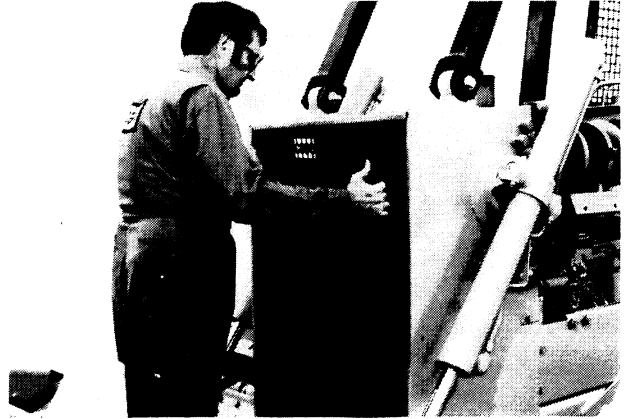
622522

20. Loosen and remove the nuts, lock washers, bolts, spacers, and clamps that hold the tubes to the lift cylinders.



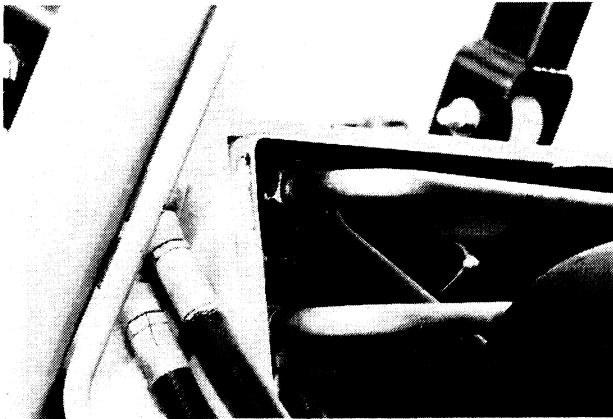
619420

24. Remove the top grille.



619430

21. Disconnect the tubes at the radiator shroud.



619422

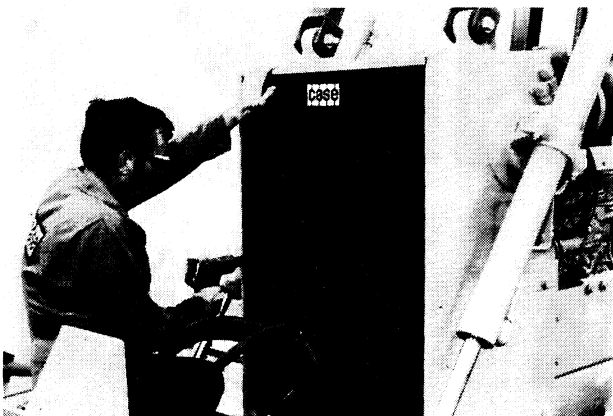
25. Loosen and remove the cap screws that hold the bottom grille.



619434

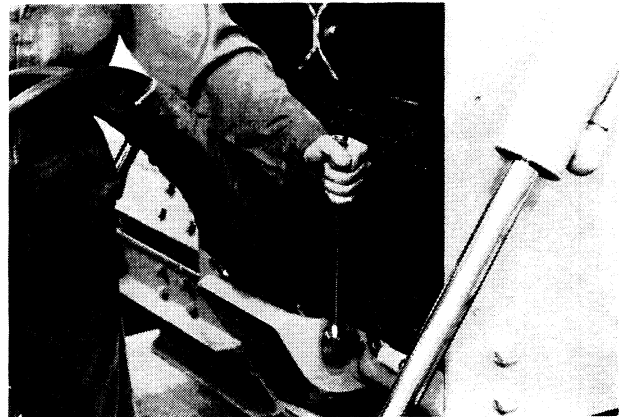
22. Install caps on the fittings and plugs in the tubes,

23. Hold the top grille in place and loosen and remove the cap screws that hold the top grille.



619428

26. Loosen and remove the cap screws next to each pivot for the bottom grille.



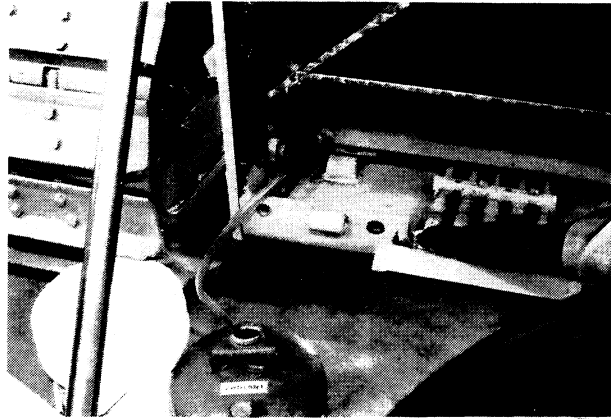
619504

27. Remove the bottom grille.



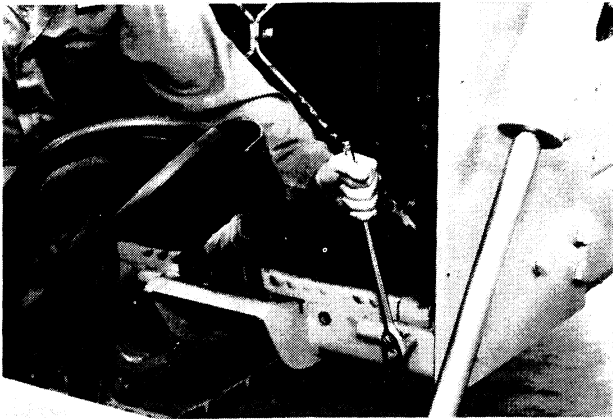
619506

30. Loosen and remove the radiator cap and drain the cooling system.



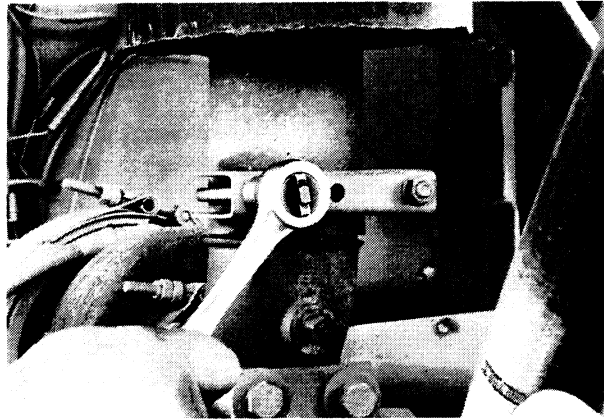
619518

28. Loosen and remove the other cap screws that hold the baffle.



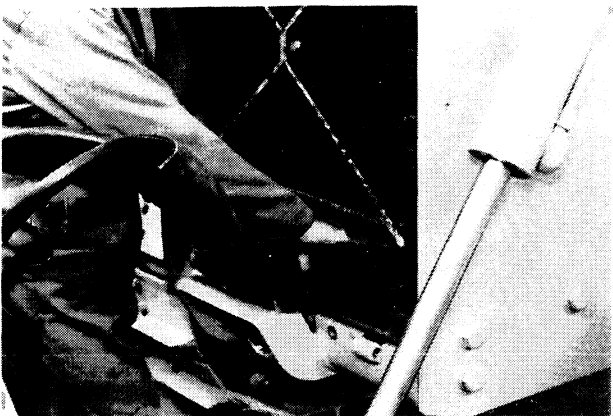
619510

31. Loosen the clamp for the muffler and remove the muffler and bracket. Cover or close the opening in the exhaust elbow.



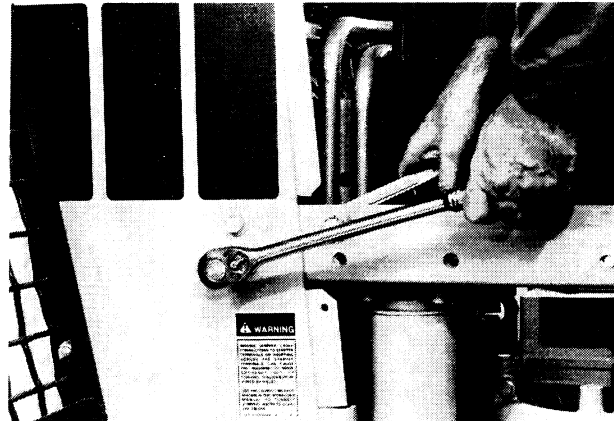
622707

29. Remove the baffle.



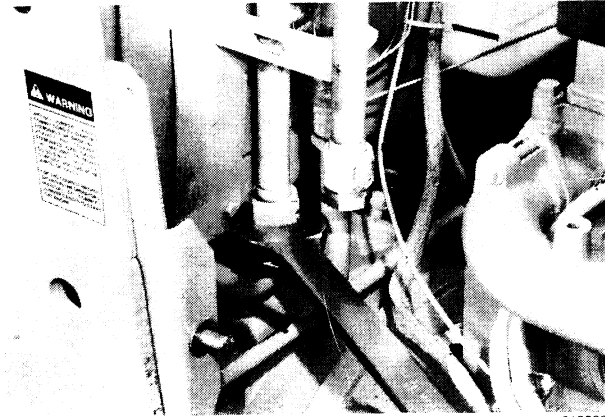
619512

32. Loosen and remove the cap screws at the rear of the support and the cap screws and spacers at the front of the support.



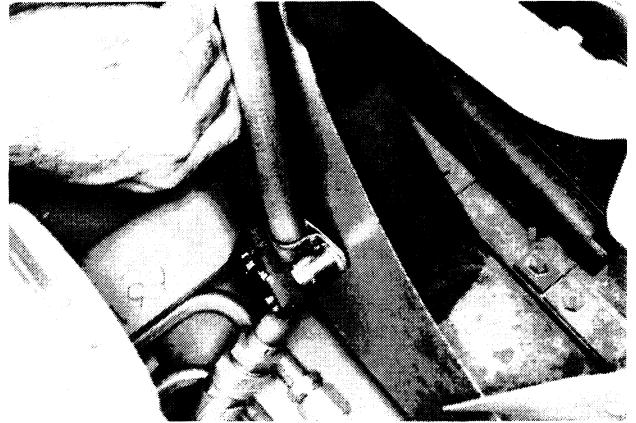
619524

33. Disconnect the tubes to the lift cylinders.



619532

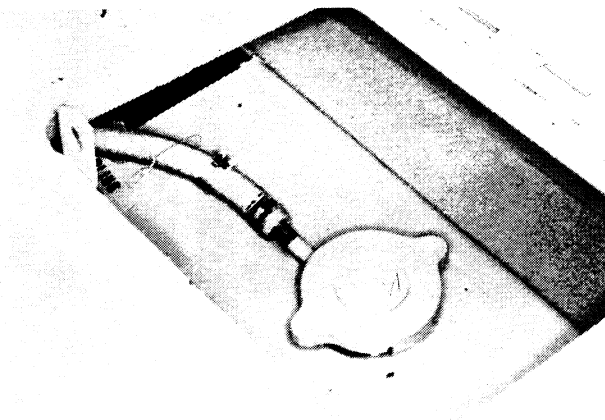
37. Loosen and remove the cap screw that holds the clamp for the tube at the rear of the fan shroud.



620534

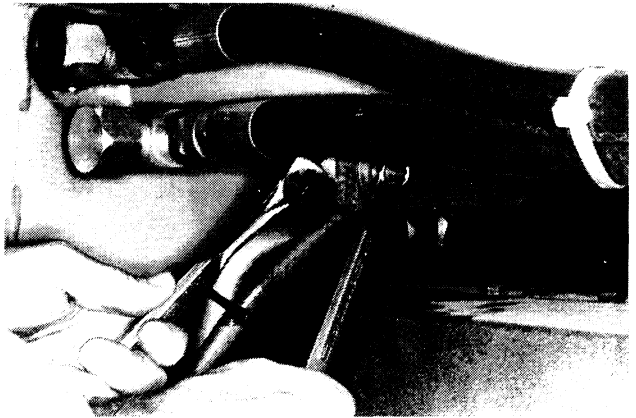
34. Install caps on the bottom tubes and plugs in the top tubes.

35. Remove the tubes from the machine.



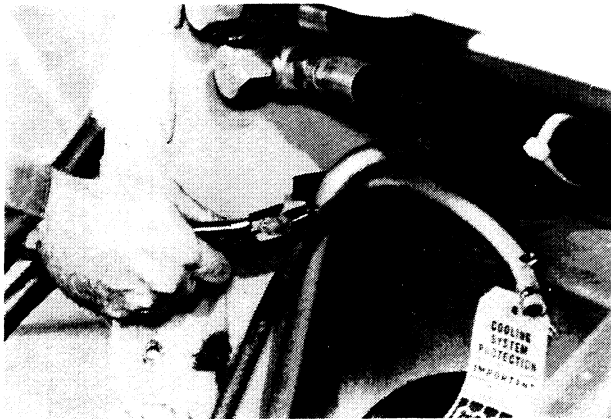
620528

38. Loosen and remove the self-locking nut, flat washer and bolt that fastens each support to the radiator shroud.



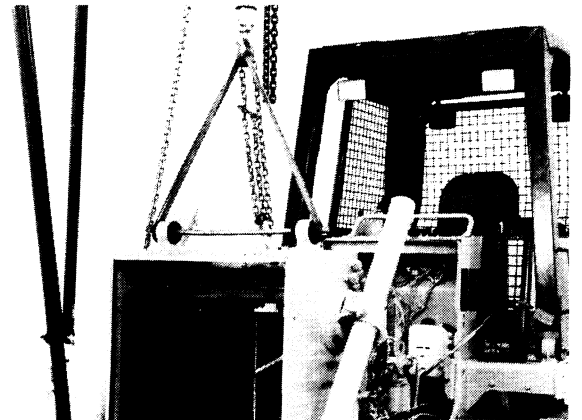
620524

36. Remove the tie strap that holds the hose and put the hose out of the way.



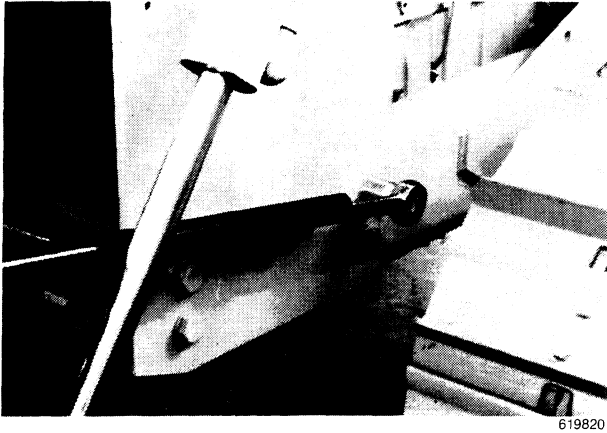
619724

39. Fasten the lifting equipment to the radiator shroud as shown.

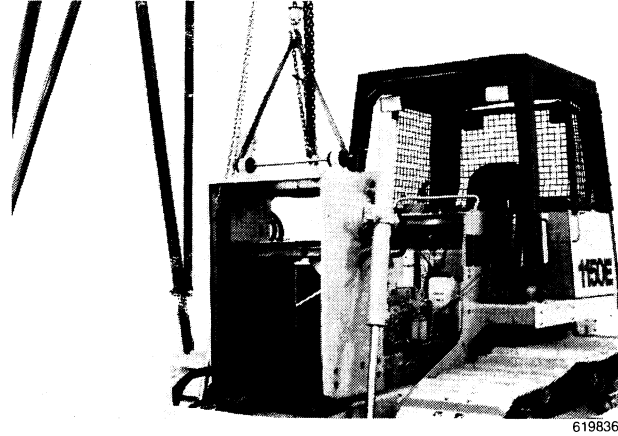


619818

40. Loosen and remove the cap screws that hold the radiator shroud.

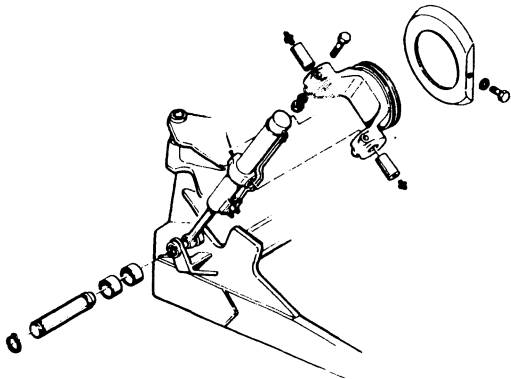


42. Carefully remove the radiator shroud.



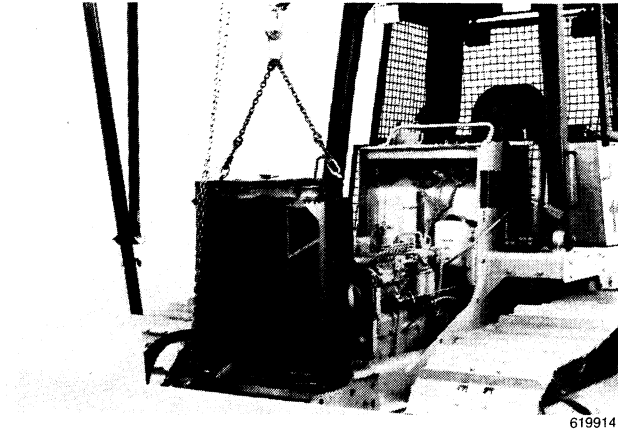
41. Remove the pivot pins that hold the piston rods. Make sure that the blade is on the floor.

a. Remove a snap ring.

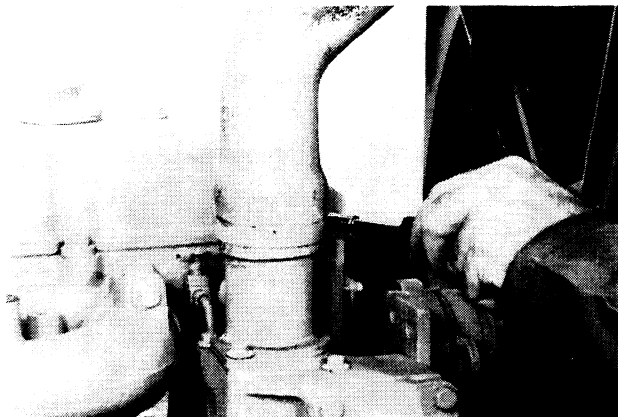


b. Drive out pins.

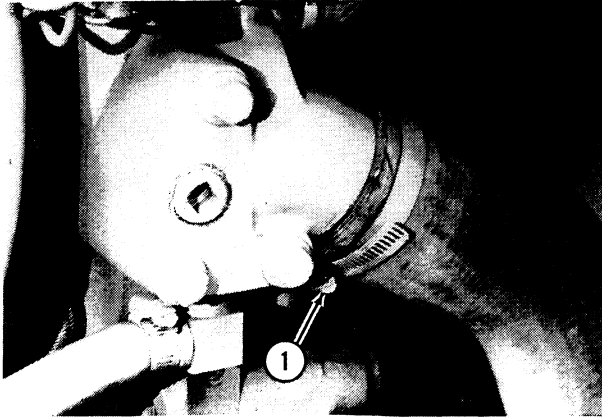
43. Fasten the lifting equipment to the radiator.



44. Loosen the clamp at the bottom of the radiator hose and disconnect the to radiator hose.



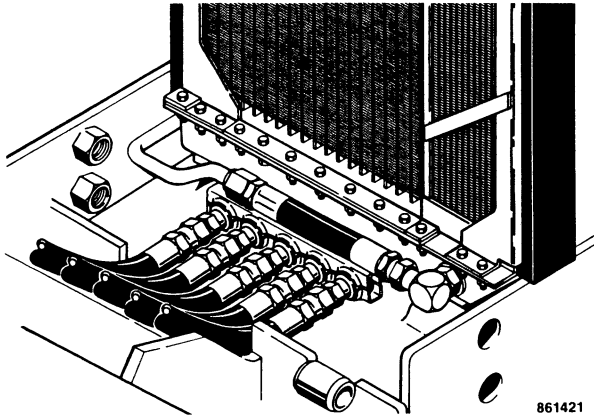
45. Loosen the clamp that fastens the bottom radiator hose to the water pump. Disconnect the hose.



1. *Clamp*

622533

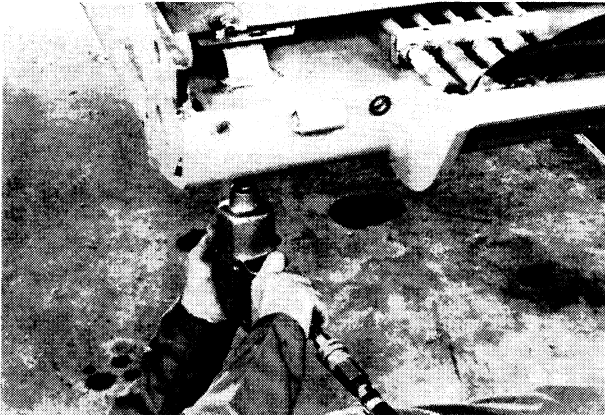
46. Disconnect the hose at the bottom of the oil cooler.



861421

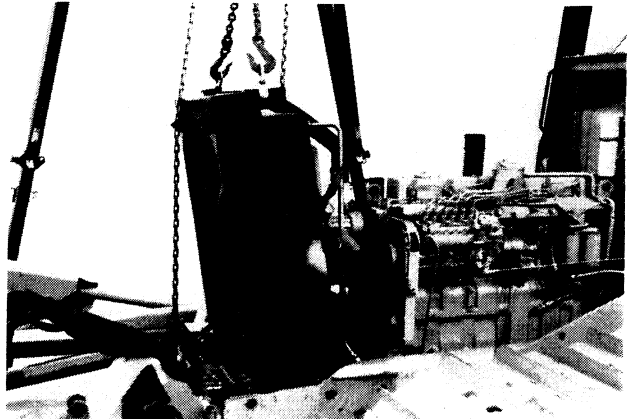
47. Quickly install a cap on the fitting and a plug in the hose.

48. Loosen and remove the cap screws and flat washers that hold the bottom of the radiator.



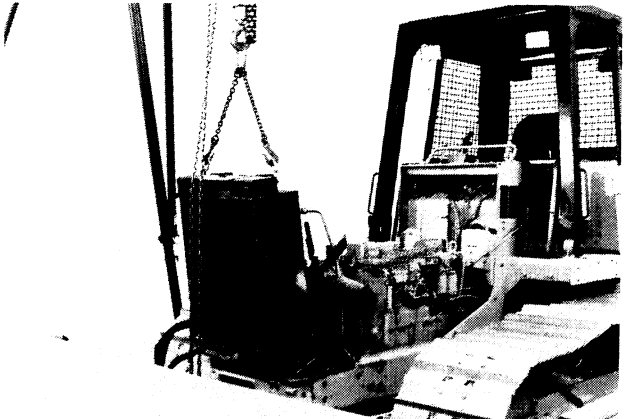
619910

49. Move the radiator forward and tilt the radiator forward until the fan is free of the fan shroud.



619918

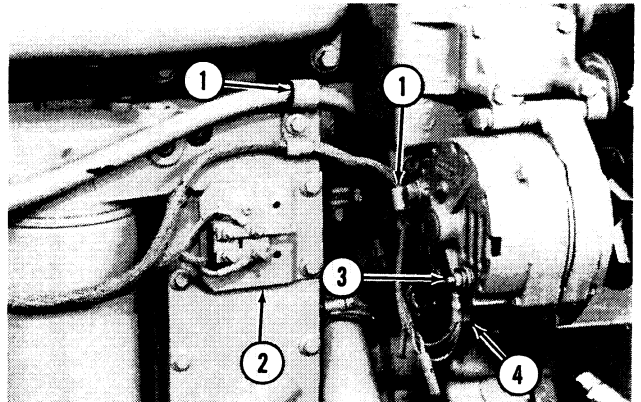
50. Remove the radiator from the machine.



619920

51. On the right side of the engine:

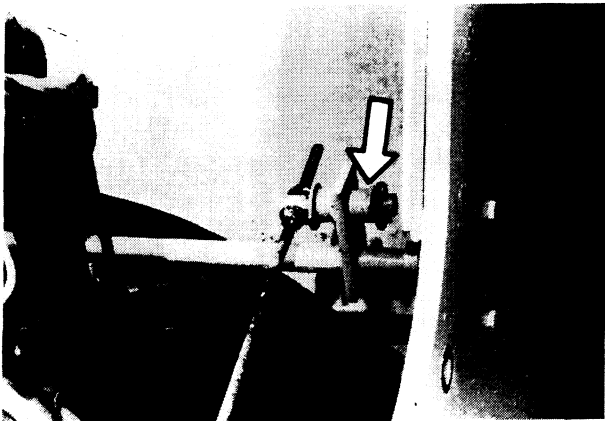
a. Loosen and remove the cap screws that hold the clamps for the wiring harness and the mounting bracket for the circuit breakers; loosen and remove the nut and wire from the output terminal of the alternator, and disconnect the wiring plug from the alternator.



- 1. *Clamp*
- 2. *Mounting Bracket*
- 3. *Output Terminal*
- 4. *Plug*

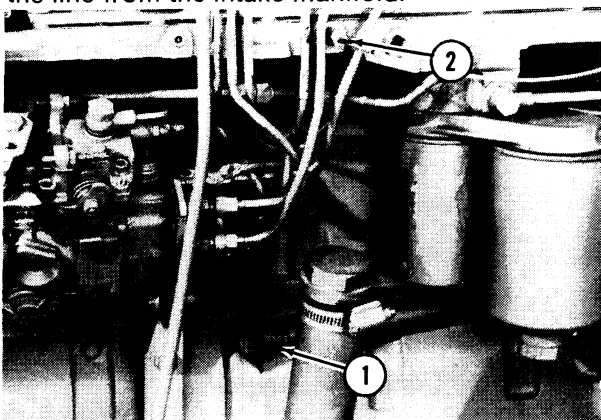
620004

52. Remove the retainer ring and remove the throttle rod.



622618

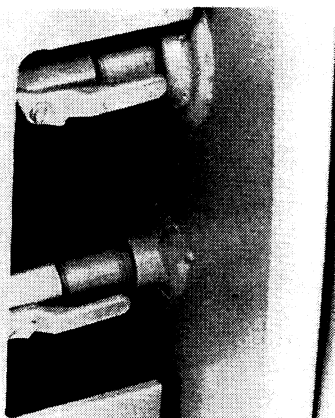
53. Disconnect the hose from the fitting in the engine. Install a plug in the hose and a cap on the fitting. If equipped with ether injection, disconnect the line from the intake manifold.



1. Hose
2. Line

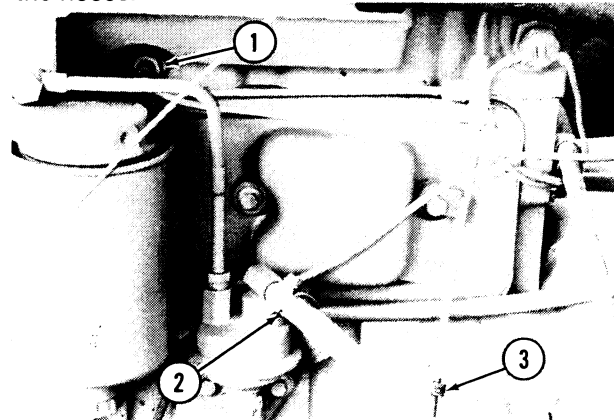
622620

54. Close the shutoff valves for the fuel return line and the fuel supply line. The shutoff valves are closed when the levers are vertical.



621322

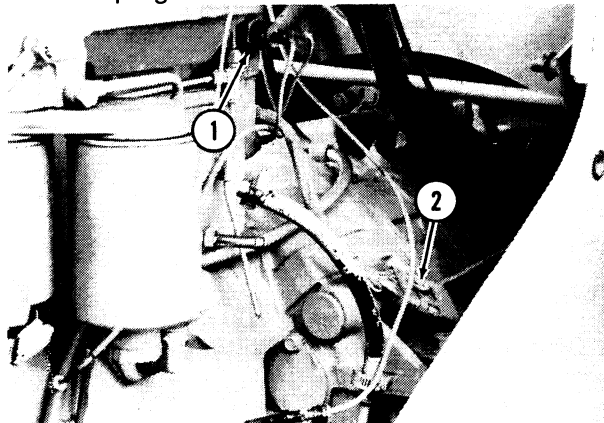
55. Loosen and remove the the sensor for the engine temperature from the water manifold. Loosen the clamp and disconnect the fuel supply hose from the hand primer pump. Loosen the clamp and disconnect the fuel return hose. Install the plugs in the hoses.



1. Sensor
2. Fuel Supply Hose
3. Fuel Return Hose

622622

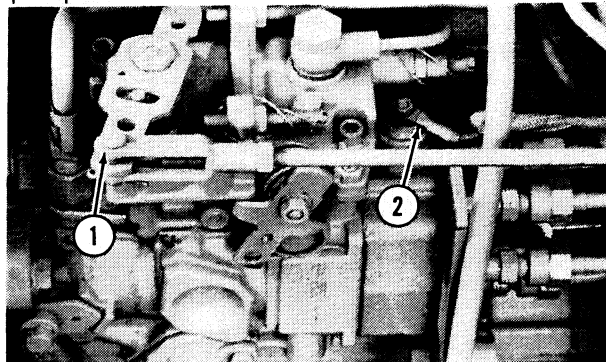
56. Disconnect the wires from the temperature switch for the ether injection, if equipped. Disconnect the plug for the wire harness.



1. Temperature Switch
2. Plug

622624

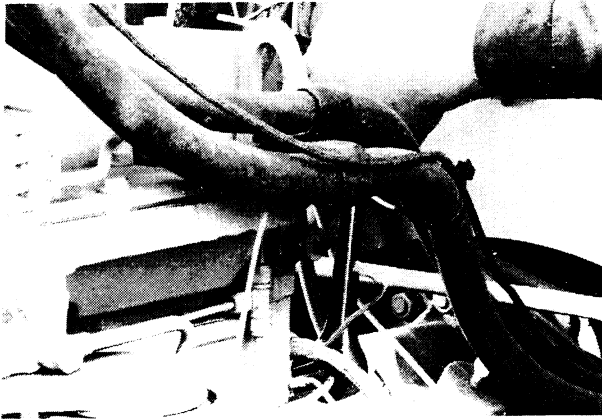
57. Remove the cotter pin and clevis pin that connects the throttle rod to the lever on the fuel injection pump. Loosen the nut and remove the wire from the shutoff solenoid on the fuel injection pump.



1. Clevis Pin
2. Wire

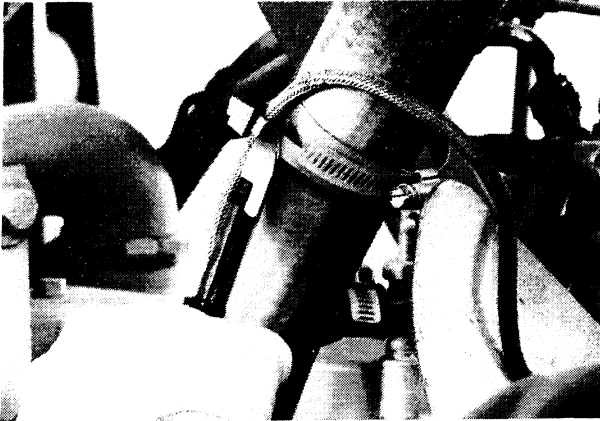
622616

58. Loosen and remove the cap screw and lock washer that fastens the clamp for the wire harness and the other wire for the temperature switch to the engine.



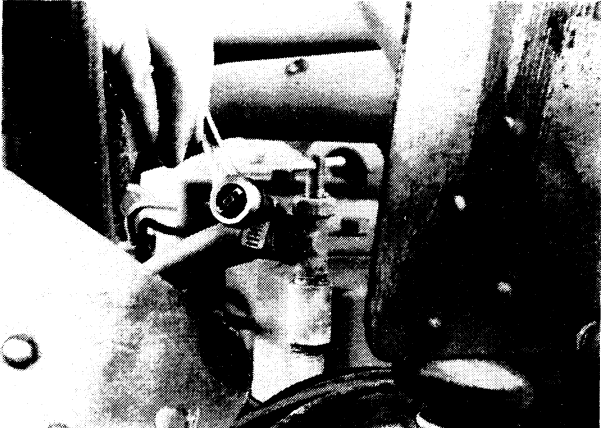
622626

59. Remove the tie straps that fasten the wire harness to the upper radiator hose.



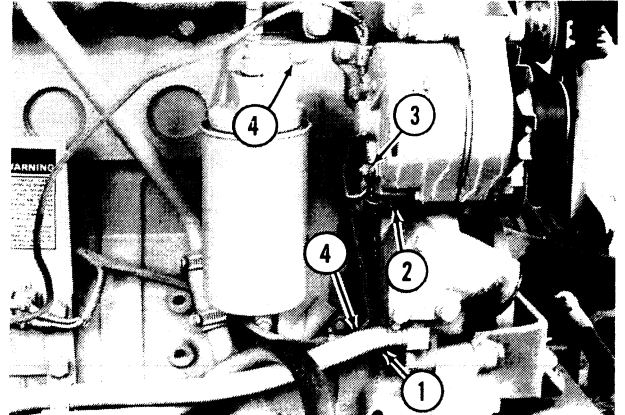
622628

60. Loosen the clamp on the heater hose and disconnect the heater hose. Install a plug in the hose.



622630

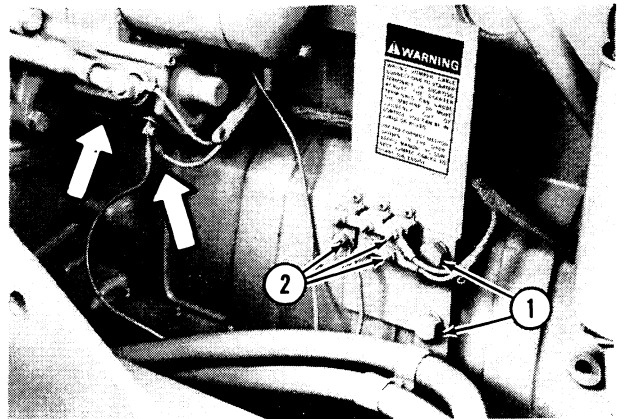
61. Loosen the clamp on the bottom heater hose and disconnect the bottom heater hose. Install a plug in the hose. Disconnect the harness plug from the alternator. Loosen and remove the nut, lock washer, and wire from the Battery terminal of the alternator. Loosen and remove the cap screws that fasten the clamps for the wire harness to the engine.



622632

1. Heater Hose
2. Harness Plug
3. Nut
4. Cap Screw

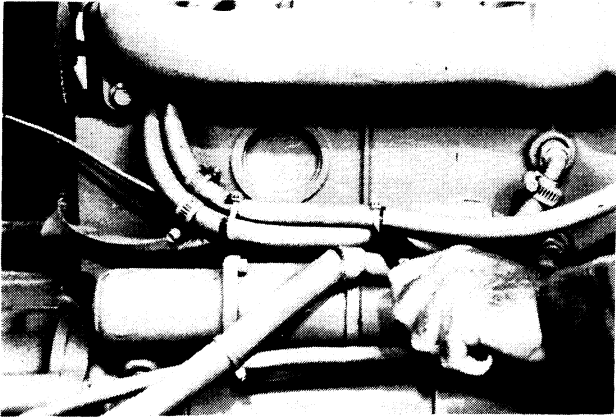
62. Loosen and remove the cap screws and lock washers that fasten the bracket for the heater hose and the bracket for the circuit breakers to the engine. Loosen and remove the nuts and the wires to the circuit breakers. Fasten identification tags to the wires. Disconnect the two wires from the bottom of the stater solenoid. Disconnect the battery cable and wire from the side of the starter solenoid.



622634

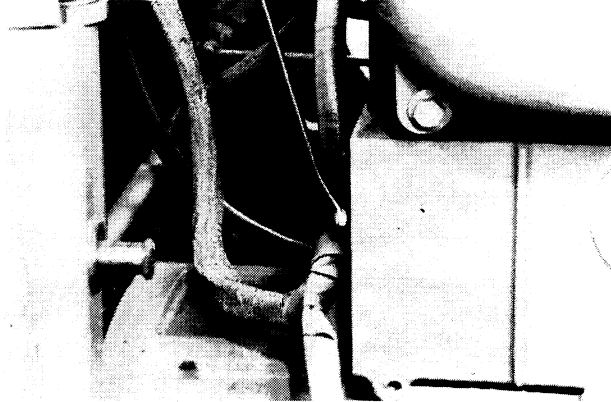
1. Cap Screw
2. Nut

63. Remove the tie straps that hold the hoses and wiring harness.



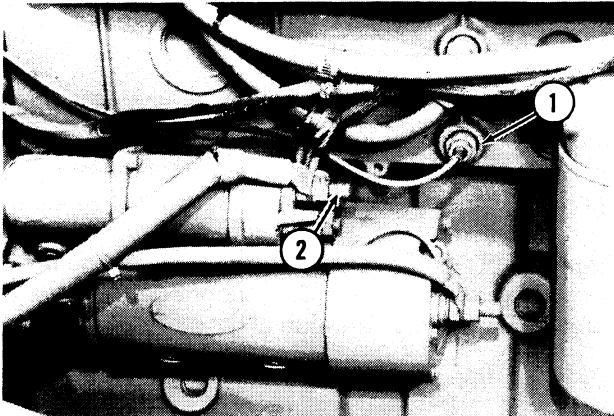
620006

65. Loosen and remove the cap screw at the rear of the engine that holds the clamp for the wiring harness.



620012

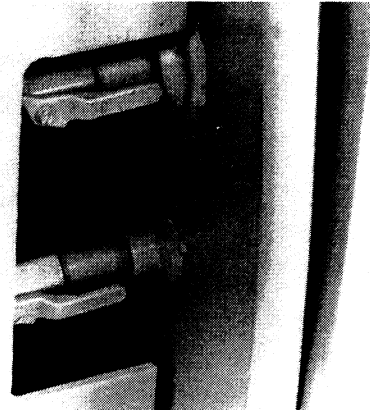
64. Loosen completely the nut that hold the temperature sender and put the temperature sender out of the way. Loosen and remove the nuts and battery cables and wire from the BAT terminal on the starter solenoid and loosen the nut on the S terminal on the starter solenoid and remove the wires from the S terminal.



620010

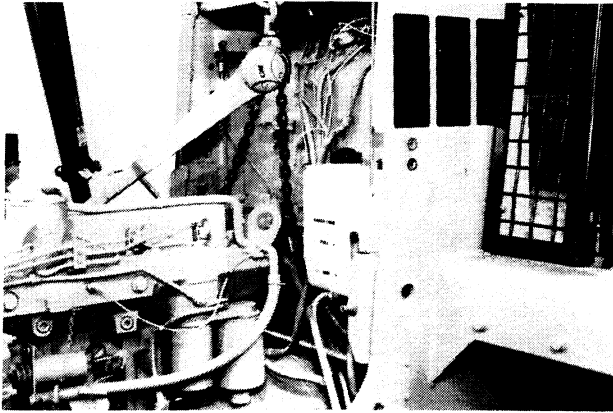
1. *Temperature Sender*
2. *Battery Terminal*

66. Close the shutoff valves at the fuel tank. Shut-off valves closed when levers are vertical.



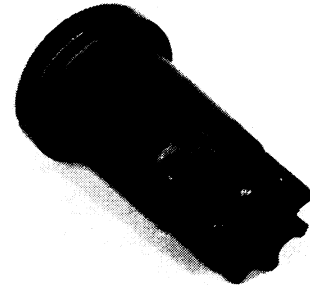
621322

67. Use acceptable lifting equipment to hold the torque converter in place.



620134

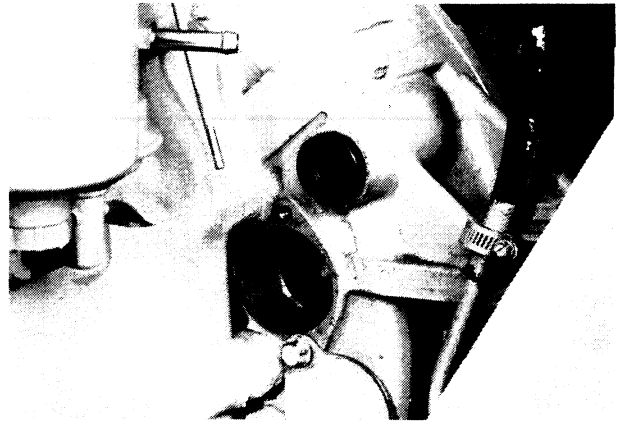
b. Install the CAS-1690 tool shown below to turn the flywheel.



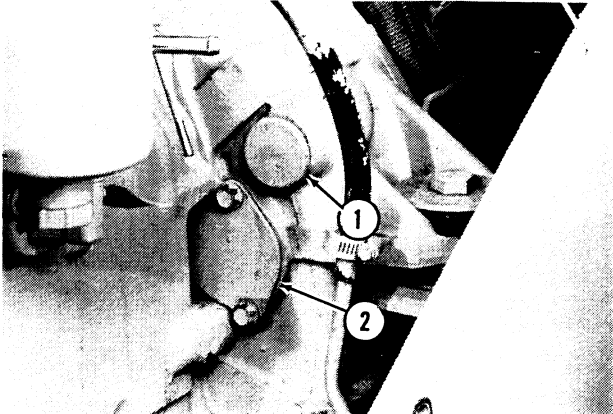
430842

68. There are twelve cap screws that fasten the flex plate to the flywheel. Only one cap screw at a time can be removed. The engine must be rotated to align each cap screw with the access hole in the flywheel housing at the LH side of the engine. Do the following steps to remove the twelve cap screws.

a. Remove the plastic plug from the flywheel housing, and remove the cover and gasket from the access hole for the cap screws.



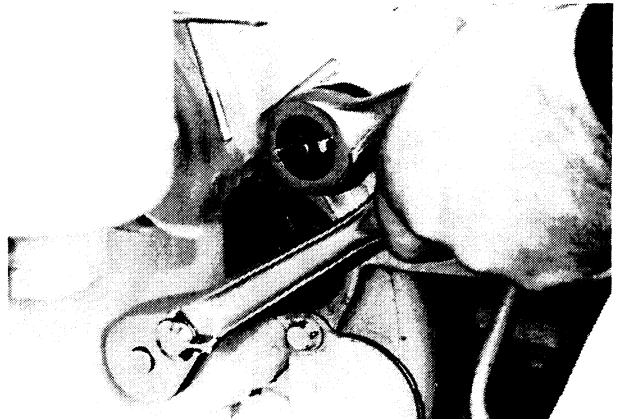
622720



- 1. Plug
- 2. Cover

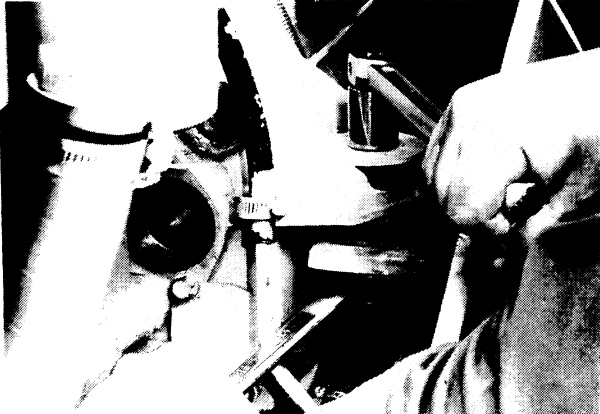
622713

c. Loosen and remove all twelve cap screws that fasten the flex plate to the flywheel.



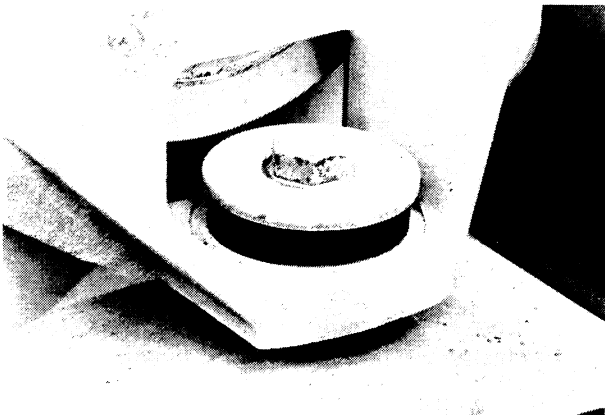
622715

69. Loosen and remove the self-locking nuts, bolts, and flat washers that hold the rear engine mounts to the frame.



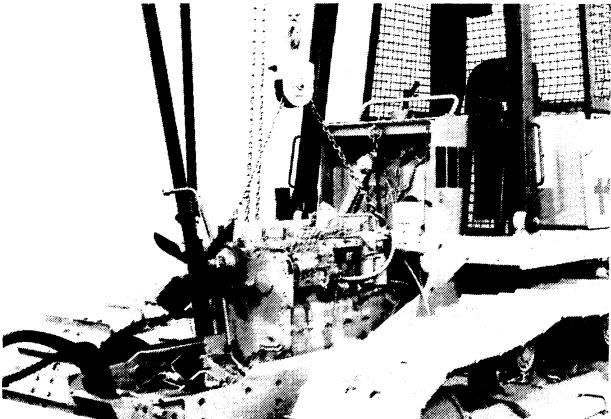
622722

70. Loosen and remove the self-locking nut, bolt, and flat washer that hold the front engine mount to the frame.



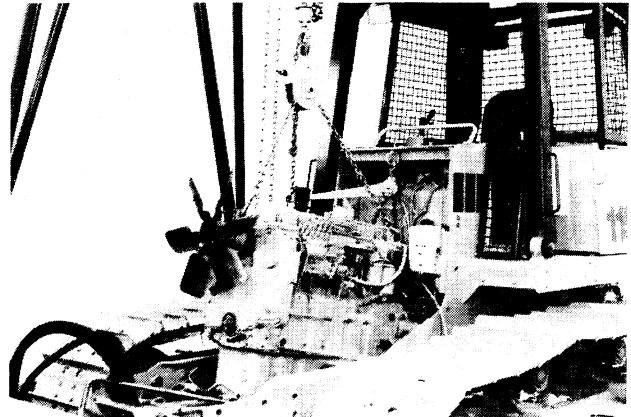
622728

71. Connect an adjustable lifting sling to the lifting eyes on the engine.



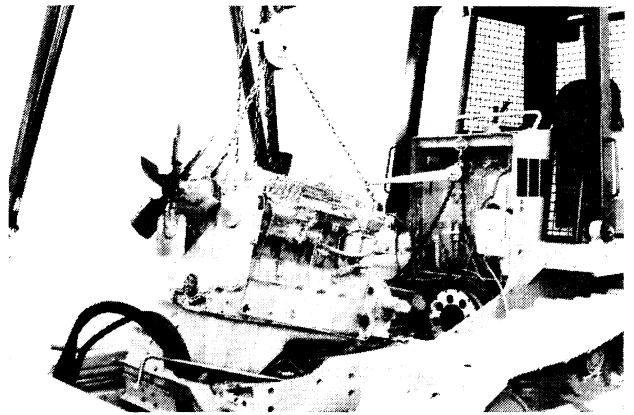
620136

72. Carefully raise and tilt the engine until the engine can be moved forward.



620220

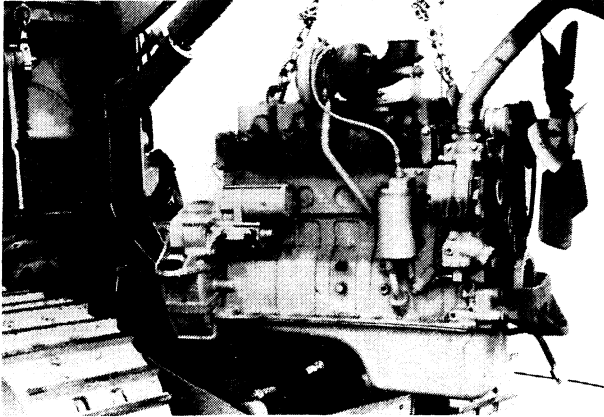
73. Remove the engine from the machine.



620222

LOADER ENGINE INSTALLATION

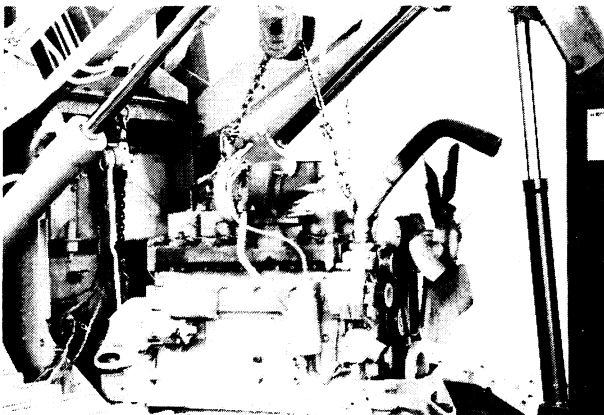
1. Carry the engine over the frame.



622737

2. **Apply 242 Loctite** to the threads in the nuts on the flex plate and in the holes in the flywheel housing.

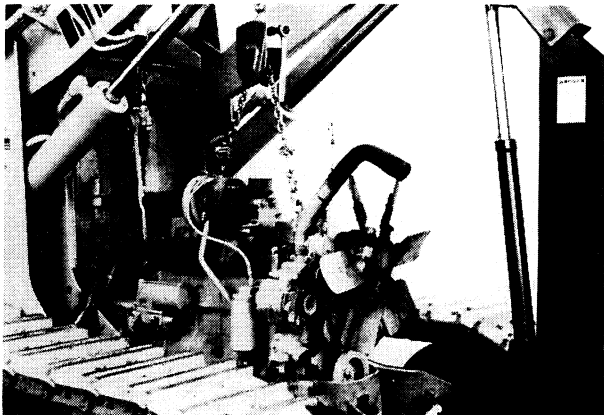
3. Move the engine toward the rear and lower the engine.



622734

4. Make sure that the spacers are in place on the frame for the rear engine mounts.

5. Lower the engine into place.



622730

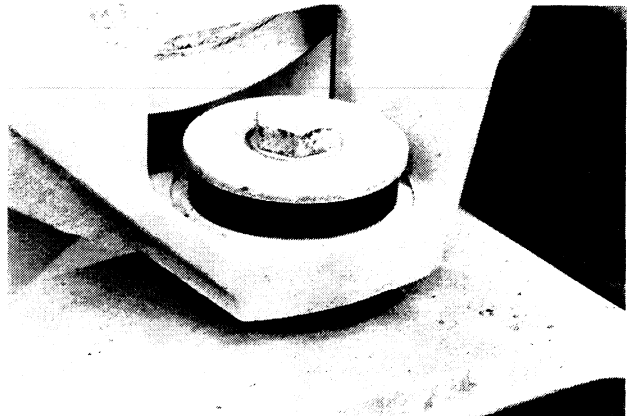
6. Install a punch in a hole in the flywheel and use CAS-1690 tool to turn the flywheel and align the flywheel with the flex plate.

NOTE: *There are extra holes in the flywheel that do not align with the flex plate.*

7. Install a cap screw in the flex plate.

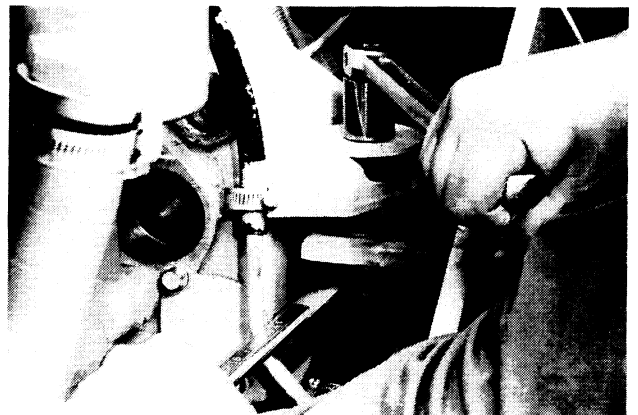
8. Install and tighten the cap screws that fasten the torque converter to the flywheel housing.

9. Install the bolt, flat washers, and self-locking nut that hold the front engine mount to the frame. Tighten the self-locking nut.



622728

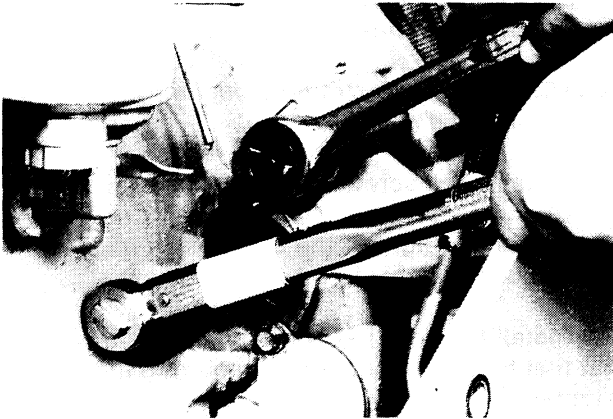
10. Install the bolts through the rear engine mounts, spacers, and frame. Install the flat washers and self-locking nuts on the bolts. Tighten the self-locking nuts.



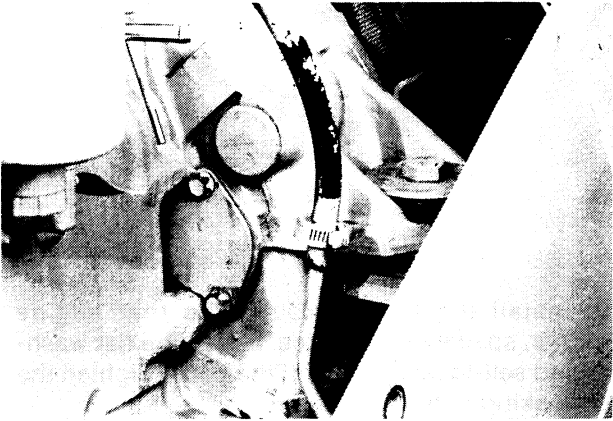
622722

11. Remove the lifting equipment from the engine.

12. Install the remainder of the cap screws for the flex plate and flywheel. Tighten the cap screws to 300 to 432 pound-inches (34 to 49 N m, 4 to 5 kg/m).



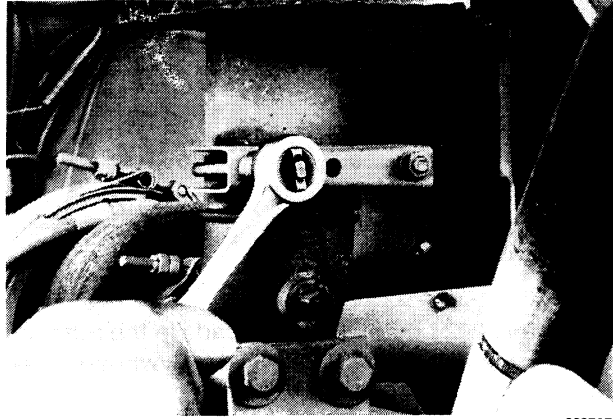
13. If necessary, install a new gasket on the cover for the access hole in the flywheel housing. Install the cover. Remove the CAS-1690 tool and install the plastic plug.



14. Remove the lifting equipment from the torque converter.

15. Remove the tape from or uncover the opening in the exhaust elbow.

16. Install the muffler and tighten the muffler clamp.





Suggest:

If the above button click is invalid.

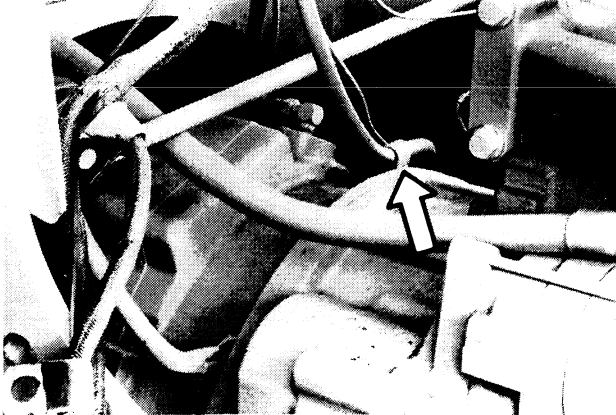
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first, and then click the above link

to download the complete manual.

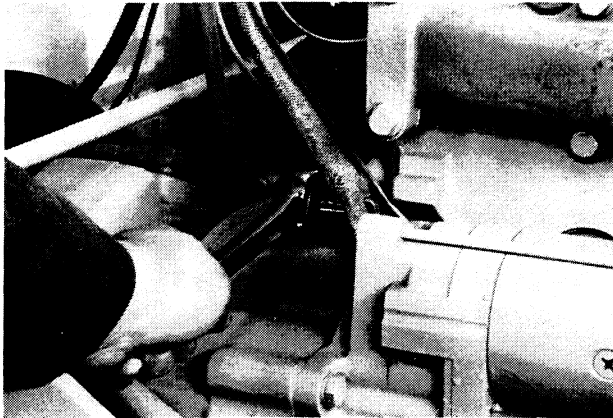
Thank you so much for reading

17. Install the cap screws that fasten the cable and the clamp for the other cable to the torque converter housing.



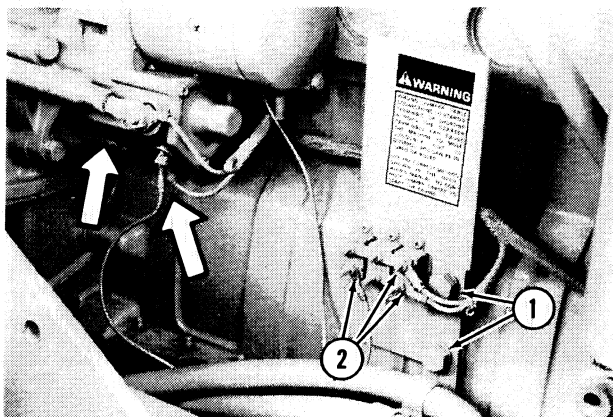
622709

18. Install the cap screw and lock washer that fasten the clamp for the wire harness to the engine.



622701

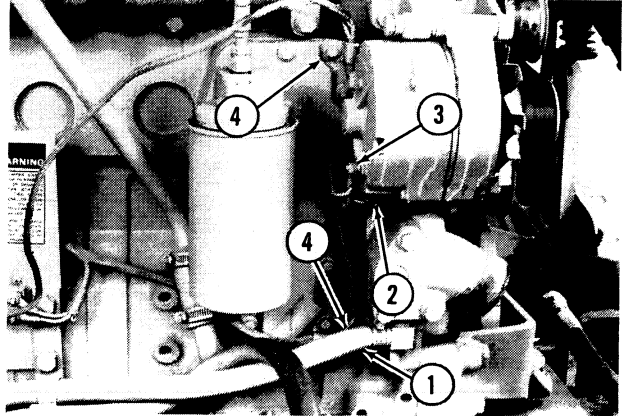
19. Install the bracket for the circuit breakers and the bracket for the heater hoses to the engine. Install and tighten the cap screws and lock washers. Connect the wires to the circuit breakers. Connect the two wires to the bottom of the starter solenoid. Connect the battery cable and wire to the side of the starter solenoid.



- 1. Cap Screw
- 2. Nut

622634

20. Remove the plug from the bottom heater hose and connect the bottom heater hose. Connect the harness plug to the alternator. Install the wire, lock washer, and nut on the battery terminal of the alternator. Tighten the nut. Install the cap screws that fasten the clamps for the wire harness to the engine. Tighten the cap screws.



- 1. Heater Hose
- 2. Harness Plug
- 3. Nut
- 4. Cap Screw

622632

21. Remove the plug from the other heater hose and connect the other heater hose.



622630

22. Install the new tie straps to fasten the wire harness to the upper radiator hose.

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