



Service

Manual

**INTERNATIONAL[®] Cadet[®]
Riding Mowers**

Models 55, 75, 85, 85 Special & 95

GSS-1417 W/Revision 3
February, 1973

INTERNATIONAL HARVESTER

NORTH AMERICA OPERATIONS

AGRICULTURAL EQUIPMENT GROUP

401 NORTH MICHIGAN AVENUE • CHICAGO, ILLINOIS, 60611, U.S.A.

Due to a continuous program of research and development, some procedures, specifications and parts may be altered in a constant effort to improve our products.

When changes and improvements are made in our products, periodic revisions may be made to this manual to keep it up-to-date. It is suggested that customers contact their dealer for information on the latest revision.

LIBRARY FILING INFORMATION

File this manual under Riding Mowers in Book 2 of your Outdoor Power Products Service Library.

IMPORTANT NOTE

Always read each step in its entirety before starting to perform it. Necessarily, some vital information may come at the middle or end of the description of a step. Much time can be saved, and damage to parts avoided, if the procedure is studied before work commences.

For service information on the engine, fuel and electrical system refer to GSS-1441.

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Models 55, 75, 85, 85 Special & 95

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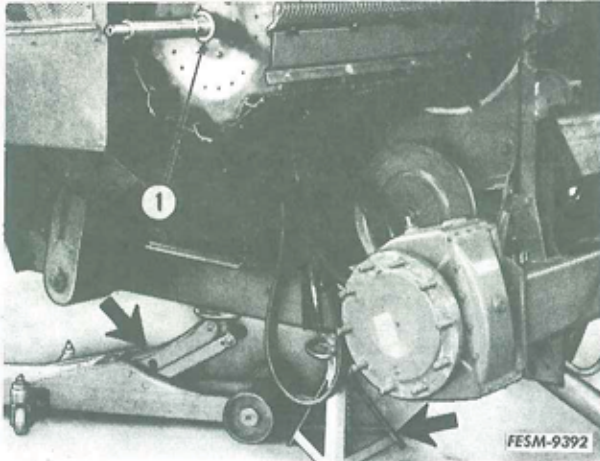
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MOWER



WORK SAFELY – FOLLOW THESE RULES

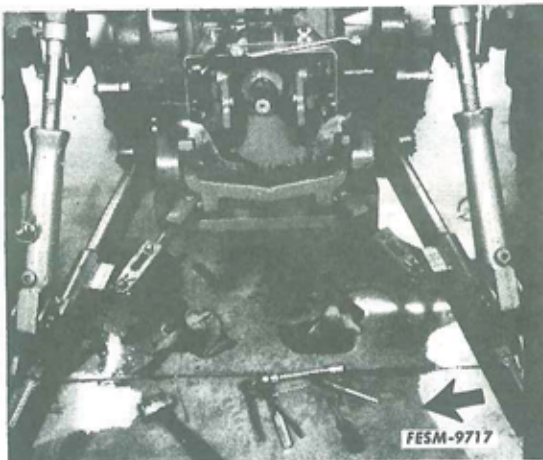
This symbol is used to call your attention to instructions concerning your personal safety. Be sure to observe and follow these instructions.



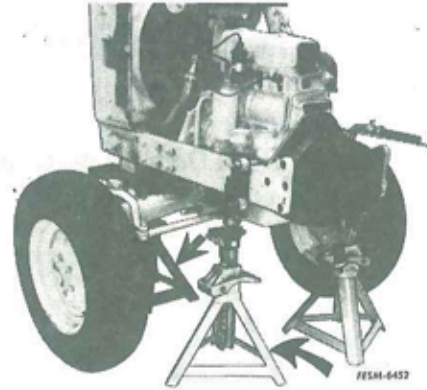
1. Always use safety stands in conjunction with hydraulic jacks or hoists. Do not rely on the jack or hoist to carry the load, they could fail.



2. Always wear safety glasses when using a hammer, chisel or other tools that may cause chips to fly.



3. Keep work area organized and clean. Wipe up oil or spills of any kind. Keep tools and parts off of the floor. Eliminate the possibility of a fall which could result in a serious injury.



4. When splitting tractors, or disassembling machines, be sure to use safety stands and adequate supports to prevent tipping or roll-over.



5. Use a safety catch on all hoist hooks. Do not take a chance, the load could slip off of the hook.



6. When using an acetylene torch always wear welding goggles and gloves. Keep a "charged" fire extinguisher within reach. Be sure the acetylene and oxygen tanks are separated by a metal shield and are chained to the cart. Do not weld or heat areas near fuel tanks or fuel lines and utilize proper shielding around hydraulic tanks or hydraulic lines.



7. Always use a safety bar to block hydraulic cylinders. Never rely on the machine hydraulic system to hold when working on loaders etc. A hydraulic line or cylinder could fail or someone could accidentally strike the control levers causing the loader to fall.

8. When reassembling subassemblies, parts, hoses, hydraulic lines, fuel lines, wiring etc., be sure they are positioned properly for alignment and clearance with related parts to their original setting and/or position.

9. Electrical storage batteries give off highly inflammable hydrogen gas when charging and continue to do so for some time after receiving a steady charge. Do not under any circumstances allow an electric spark or an open flame near the battery. Do not lay tools across battery terminals as this may result in a spark or short circuit which may cause an explosion. Be careful to avoid spilling any electrolyte on hands or clothing.

10. Hydraulic fluid escaping under pressure can have enough force to penetrate the skin. Hydraulic fluid may also infect a minor cut or opening in the skin. If injured by escaping fluid, see a doctor at once. Serious infection or reaction can result if medical treatment is not given immediately.

Do not attempt to repair or tighten hoses that are under pressure, when the boom is raised, or with the tractor engine running. Cycle all hydraulic control valves to relieve all pressure before

disconnecting the lines or performing other work on the hydraulic system. Make sure all connections are tight and hoses and lines are in good condition before applying pressure to the system. To locate a leak under pressure, use a small piece of cardboard or wood. Never use hands.

11. When refueling, keep the hose and nozzle or the funnel and container in contact with the metal of the fuel tank to avoid the possibility of an electric spark igniting the fuel. Do not overfill the fuel tank — overflow creates fire hazard. Do not smoke when refueling. Never refuel when engine is hot or running.

12. Always use a protective fixture when inflating tubeless tires that have been repaired or are loose on the rim. Do not inflate over 30 psi to seat the tire bead.

13. Use pullers to remove bearings, bushings, gears, cylinder sleeves etc. when applicable. Use hammers, punches and chisels only when absolutely necessary. Then, be sure to wear safety glasses.

14. Never use trouble lights or electric powered tools that have cut and/or damaged cords or plugs. Be sure all electric tools are properly grounded.

15. Be careful when using compressed air to dry parts. Use approved air blow guns, do not exceed 30 psi, wear safety glasses or goggles and use proper shielding to protect everyone in the work area.

16. Do not wear rings, wrist watches or loose fitting clothing when working on machinery, they could catch on moving parts causing serious injury.

17. Excessive or repeated skin contact with sealants or solvents may cause skin irritation. In case of skin contact, remove sealant or solvent promptly by washing with soap and water.

IMPORTANT: The above is only a partial list of safe work rules. In addition, always refer to the Operator's Manual for the specific machine for additional safe work rules regarding the machine operation.

STANDARD TORQUE DATA FOR NUTS AND BOLTS— FOOT POUNDS

Recommended torque for all Standard Application Nuts and Bolts, provided:

- A. All thread surfaces are clean and lubricated with SAE-30 engine oil. (See NOTE.)
- B. Joints are rigid, that is, no gaskets or compressible materials are used.
- C. When reusing nuts or bolts use minimum torque values.

NOTE: Multiply the standard torque by:







- .65 when finished jam nuts are used.
- .70 when Molykote, white lead or similar mixtures are used as lubricants.
- .75 when parkerized bolts or nuts are used.
- .85 when cadmium plated bolts or nuts and zinc bolts w/waxed zinc nuts are used.
- .90 when hardened surfaces are used under the nut or bolt head.


1 FOOT POUND = 1.355 NEWTON METERS

Bolt or Stud Diameter		Type 1 Studs Only		Type 1 Bolts 6" length or less		Type 1 Bolts longer than 6"		Type 5 (all lengths)		Type 8 (all lengths)			
										Only when used† in cast (gray) iron		All other applications	
Inches	MM	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.4	5	6	5	6	3	3	9	10	11	13	12	14
5/16	8.0	12	13	12	13	6	7	19	21	24	27	27	30
3/8	9.5	21	24	21	24	11	13	33	37	43	47	45	50
7/16	11.1	35	38	35	38	19	21	53	60	69	76	75	85
1/2	12.7	52	58	52	58	29	32	80	90	104	117	115	130
9/16	14.3	70	80	70	80	41	46	115	130	150	170	165	185
5/8	15.9	98	110	98	110	57	63	160	180	210	230	220	250
3/4	19.0	174	195	174	195	100	112	290	320	350	390	400	450
7/8	22.2	300	330	162	181	162	181	420	470	570	630	650	730
1	25.4	420	470	250	270	250	270	630	710	850	950	970	1090
1-1/8	28.6	600	660	350	380	350	380	850	950	1200	1350	1380	1550
1-1/4	31.8	840	940	490	540	490	540	1200	1350	1700	1900	1940	2180
1-3/8	34.9	1100	1230	640	710	640	710	1570	1760	2300	2500	2600	2800
1-1/2	38.1	1470	1640	850	940	850	940	2000	2300	3000	3300	3300	3700
1-3/4	44.5	2350	2450	1330	1490	1330	1490	3300	3700	4700	5200	5300	6000
2	50.8	3500	3900	2000	2200	2000	2200	5000	5500	7000	7800	8000	9000

†When bolt penetration is 1-1/2 times the diameter of the bolt.

BOLT TYPE IDENTIFICATION CHART

IH TYPE	S.A.E. GRADE	DESCRIPTION	BOLT HEAD MARKING *
1	1 or 2	WILL HAVE A  STANDARD MONOGRAM IN THE CENTER OF THE HEAD Low or Medium Carbon Steel Not Heat Treated	
5	5	WILL HAVE A  AND 3 RADIAL LINES Quenched and Tempered Medium Carbon Steel	
8	8	WILL HAVE A  AND 6 RADIAL LINES Quenched and Tempered Special Carbon or Alloy Steel	

*The center marking identifies the bolt manufacturer. The  monogram is currently used.
Some bolts may still have an IH or a raised dot which previously identified IH bolts.

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NOTE: Multiply the standard torque by:







- .65 when finished jam nuts are used.
- .70 when Molykote, white lead or similar mixtures are used as lubricants.
- .75 when parkerized bolts or nuts are used.
- .85 when cadmium plated bolts or nuts and zinc bolts w/waxed zinc nuts are used.
- .90 when hardened surfaces are used under the nut or bolt head.


1 NEWTON METER = 0.738 FOOT POUND

Bolt or Stud Diameter		Type 1 Studs Only		Type 1 Bolts 6" length or less		Type 1 Bolts longer than 6"		Type 5 (all lengths)		Type 8 (all lengths)			
										Only when used† in cast (gray) iron		All other applications	
Inches	MM	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.4	7	8	7	8	4	4	12	14	15	18	16	19
5/16	8.0	17	18	17	18	8	10	26	29	33	37	37	41
3/8	9.5	29	33	29	33	15	18	45	50	58	64	61	68
7/16	11.1	48	52	48	52	26	29	72	81	94	103	102	115
1/2	12.7	71	79	71	79	39	43	108	122	141	159	156	176
9/16	14.3	95	108	95	108	56	62	156	176	205	230	225	250
5/8	15.9	133	149	133	133	77	85	220	245	285	310	300	340
3/4	19.0	240	265	240	265	136	152	390	430	470	530	540	610
7/8	22.0	400	450	220	245	220	245	570	640	770	850	880	990
1	25.4	570	640	340	365	340	365	850	960	1150	1290	1300	1480
1-1/8	28.6	810	900	470	510	470	510	1150	1290	1630	1830	1870	2100
1-1/4	31.8	1140	1270	660	730	660	730	1600	1830	2300	2600	2600	3000
1-3/8	34.9	1490	1670	870	960	870	960	2100	2400	3100	3400	3500	3800
1-1/2	38.1	2000	2200	1150	1270	1150	1270	2700	3100	4100	4500	4500	5000
1-3/4	44.5	3200	3300	1800	2000	1800	2000	4500	5000	6400	7000	7100	8100
2	50.8	4750	5300	2700	3000	2700	3000	6800	7500	9500	10500	10800	12200

†When bolt penetration is 1-1/2 times the diameter of the bolt.

BOLT TYPE IDENTIFICATION CHART

IH TYPE	S.A.E. GRADE	DESCRIPTION	BOLT HEAD MARKING*
1	1 or 2	WILL HAVE A  STANDARD MONOGRAM IN THE CENTER OF THE HEAD Low or Medium Carbon Steel Not Heat Treated	
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*The center marking identifies the bolt manufacturer. The  monogram is currently used. Some bolts may still have an IH or a raised dot which previously identified IH bolts.

CONVERSION TABLE

—inches to millimeters—

Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
1	25.4	26	660.4	51	1295.4	76	1930.4
2	50.8	27	685.8	52	1320.8	77	1955.8
3	76.2	28	711.2	53	1346.2	78	1981.2
4	101.6	29	736.6	54	1371.6	79	2006.6
5	127.0	30	762.0	55	1397.0	80	2032.0
6	152.4	31	787.4	56	1422.4	81	2057.4
7	177.8	32	812.8	57	1447.8	82	2082.8
8	203.2	33	838.2	58	1473.2	83	2108.2
9	228.6	34	863.6	59	1498.6	84	2133.6
10	254.0	35	889.0	60	1524.0	85	2159.0
11	279.4	36	914.4	61	1549.4	86	2184.4
12	304.8	37	939.8	62	1574.8	87	2209.8
13	330.2	38	965.2	63	1600.2	88	2235.2
14	355.6	39	990.6	64	1625.6	89	2260.6
15	381.0	40	1016.0	65	1651.0	90	2286.0
16	406.4	41	1041.4	66	1676.4	91	2311.4
17	431.8	42	1066.8	67	1701.8	92	2336.8
18	457.2	43	1092.2	68	1727.2	93	2362.2
19	482.6	44	1117.6	69	1752.6	94	2387.6
20	508.0	45	1143.0	70	1778.0	95	2413.0
21	533.4	46	1168.4	71	1803.4	96	2438.4
22	558.8	47	1193.8	72	1828.8	97	2463.8
23	584.2	48	1219.2	73	1854.2	98	2489.2
24	609.6	49	1244.6	74	1879.6	99	2514.6
25	635.0	50	1270.0	75	1905.0	100	2540.0

1 inch = 25.4 millimeters

To convert inches to millimeters, the inch value to be converted should be written down, carried to as many decimal places as the desired accuracy requires. It should then be split into groups of not more than two figures each. The equivalent of each group should then be taken from the table, proper regard being given to the position of the decimal point in each case, and the equivalent of the inch value given.

For example, to convert 2.4635 inches to millimeters:

$$\begin{array}{rcl}
 2.0000 \text{ inches} & = & 50.80000 \text{ millimeters} \\
 .4600 \text{ inches} & = & 11.68400 \\
 \underline{.0035 \text{ inches}} & = & \underline{.08890} \\
 2.4635 \text{ inches} & = & 62.57290 \text{ millimeters} \\
 \text{Correct to 3 decimal places.} & & \\
 2.4635 \text{ inches} & = & 62.573 \text{ millimeters}
 \end{array}$$

CONVERSION TABLE

—millimeters to inches—

Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches
1	0.03937008	26	1.0236220	51	2.0078740	76	2.9921260
2	0.07874016	27	1.0629921	52	2.0472441	77	3.0314961
3	.11811024	28	1.1023622	53	2.0866142	78	3.0708661
4	.15748031	29	1.1417323	54	2.1259842	79	3.1102362
5	.19685039	30	1.1811024	55	2.1653543	80	3.1496063
6	.23622047	31	1.2204724	56	2.2047244	81	3.1889764
7	.27559055	32	1.2598425	57	2.2440945	82	3.2283465
8	.31496063	33	1.2992126	58	2.2834646	83	3.2677165
9	.35433071	34	1.3385827	59	2.3228346	84	3.3070866
10	.3937008	35	1.3779528	60	2.3622047	85	3.3464567
11	.4330709	36	1.4173228	61	2.4015748	86	3.3858268
12	.4724409	37	1.4566929	62	2.4409449	87	3.4251968
13	.5118110	38	1.4960630	63	2.4803150	88	3.4645669
14	.5511811	39	1.5354331	64	2.5196850	89	3.5039370
15	.5905512	40	1.5748031	65	2.5590551	90	3.5433071
16	.6299213	41	1.6141732	66	2.5984252	91	3.5826772
17	.6692913	42	1.6535433	67	2.6377953	92	3.6220472
18	.7086614	43	1.6929134	68	2.6771654	93	3.6614173
19	.7480315	44	1.7322835	69	2.7165354	94	3.7007874
20	.7874016	45	1.7716535	70	2.7559055	95	3.7401575
21	.8267717	46	1.8110236	71	2.7952756	96	3.7795276
22	.8661417	47	1.8503937	72	2.8346457	97	3.8188976
23	.9055118	48	1.8897638	73	2.8740157	98	3.8582677
24	.9448819	49	1.9291339	74	2.9133858	99	3.8976378
25	.9842520	50	1.9685039	75	2.9527559	100	3.937008

1 mm = .03937008 inches

To convert millimeters to inches the millimeter value to be converted should be written down, carried to as many decimal places as the desired accuracy requires. It should then be split up into groups of not more than two figures each. The equivalent of each group should then be taken from the table, proper regard being given to the position of the decimal point in each case, and the equivalent of the several groups found by addition. This sum will be the inch equivalent of the millimeter value given.

For example to convert 75.384 millimeters to inches:

75.000 millimeters = 2.9527559 inches

.380 millimeters = .0149606

.004 millimeters = .0001574

75.384 millimeters = 2.9678739 inches

Correct to 5 decimal places.

75.384 millimeters = 2.96787 inches

Section 1

GASOLINE ENGINE CONTENTS

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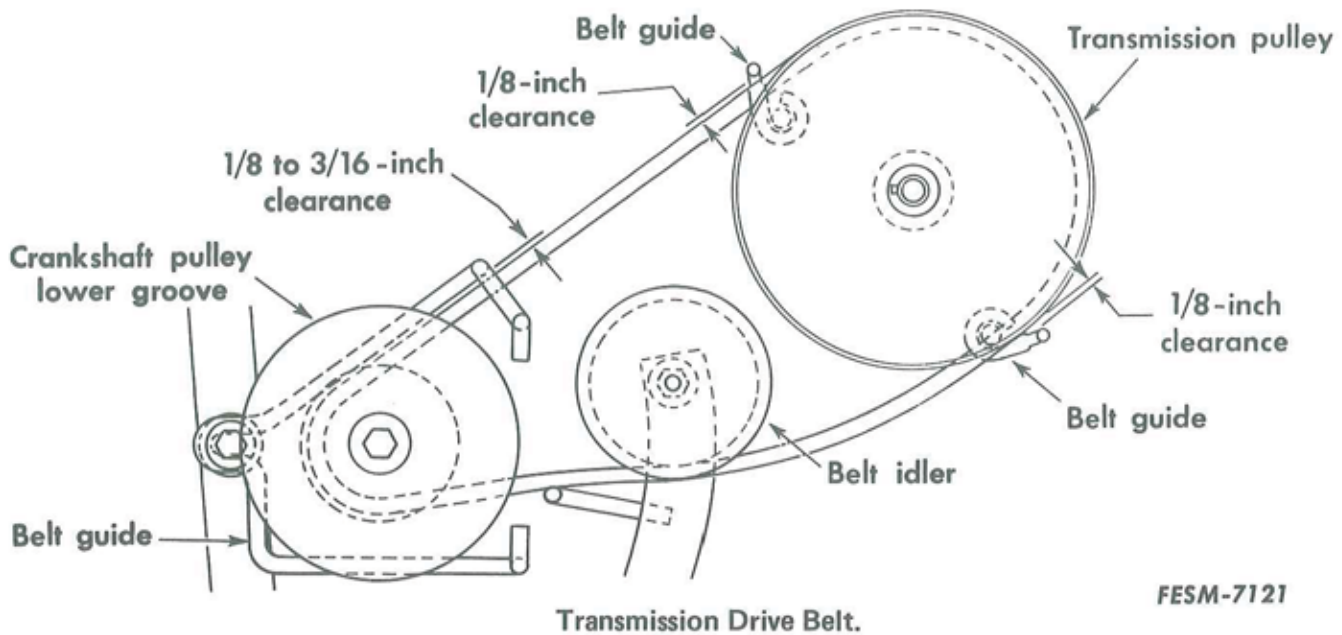
ENGINE

Removal

1. Disconnect the spark plug wire.
2. Electric Start Models:
 - a. Remove the seat.
 - b. Disconnect the battery ground wire at the battery.
 - c. Disconnect the starter wire.
 - d. Disconnect the charging lead.
3. Disconnect necessary electrical wiring.
4. Disconnect the throttle cable.
5. Lower the mower and remove the pins from the front hanger.
6. Remove the mower drive belt and main drive belt.
7. Remove the engine mounting bolts and maneuver the engine out of the chassis.

NOTE: For specifications and overhaul procedures, refer to Blue Ribbon Service Manual GSS-1441.

Installation



1. Install the engine by reversing the removal procedure.

2. Adjust the following as necessary:

- Governor linkage
- Carburetor
- Main drive belt guides

ELECTRICAL SYSTEM

Solenoid and Switches

If a solenoid, key start switch or safety starting switch malfunctions, replacement will be necessary.

Safety Starting Circuit

General Information

The safety starting circuit consists of a transmission neutral starting switch, mower disengaged safety switch, control GSS-1417 (Rev. No. 1)

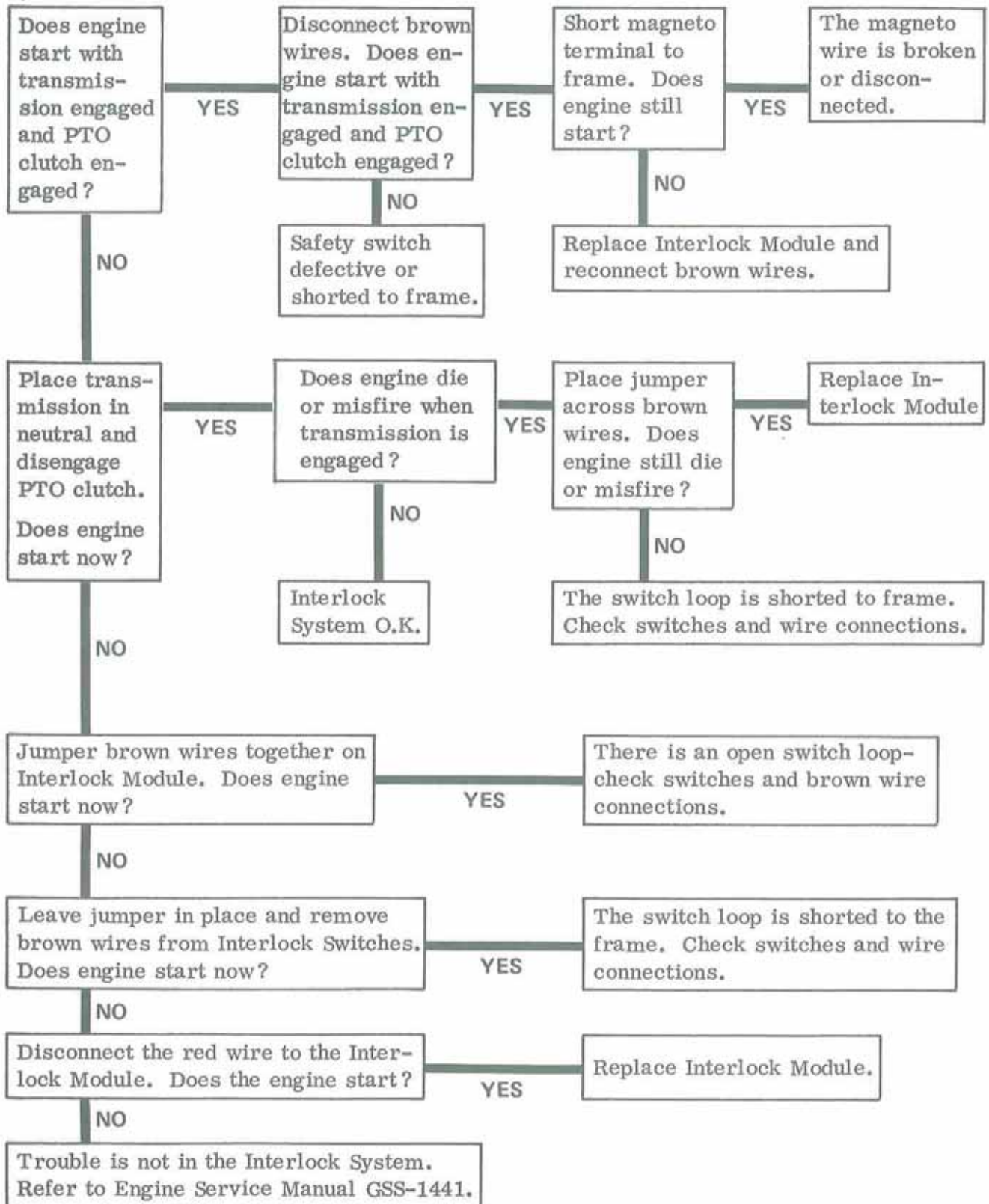
module and ignition switch. To start the engine the transmission must be in neutral, the mower drive control in the disengaged position and the ignition switch in the on position.

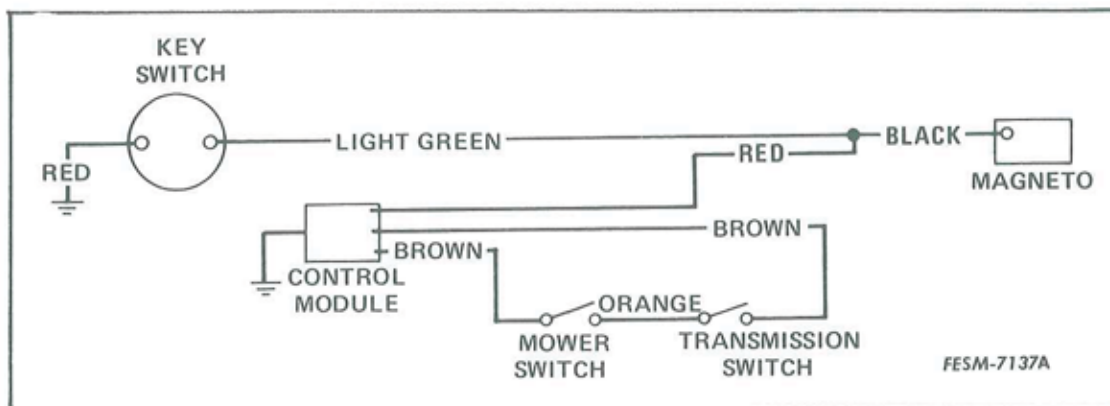
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Testing the Circuit

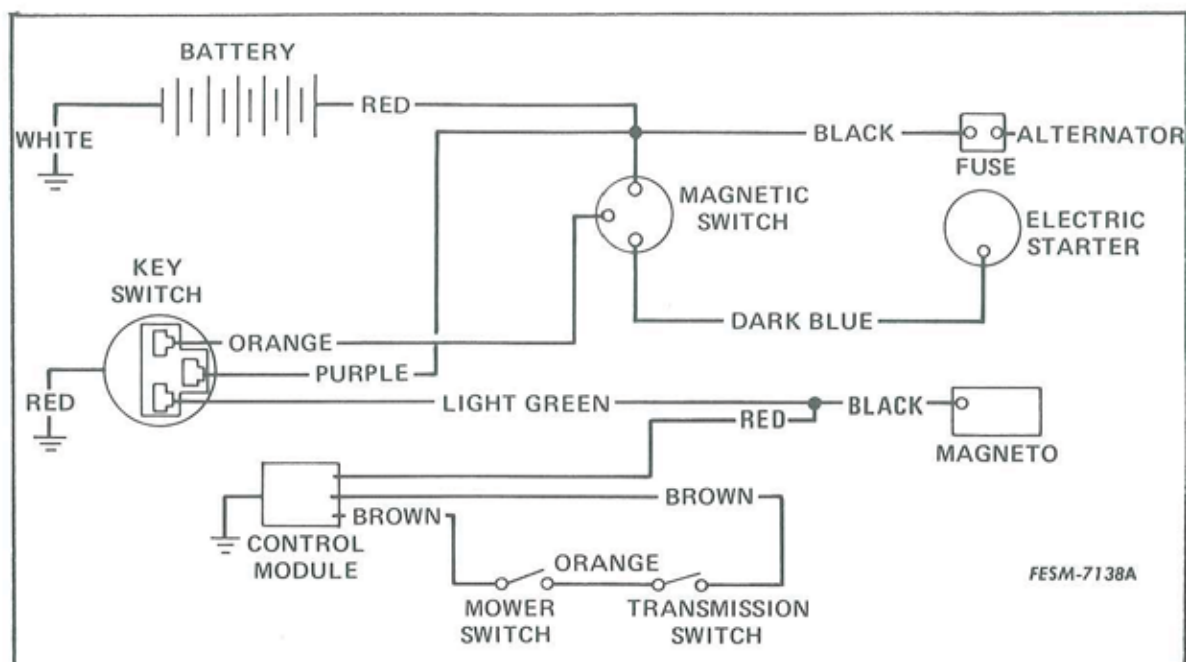


CAUTION: The following tests should be performed with care. At times the Interlock System may be by-passed. Be sure that THE VEHICLE BRAKES ARE LOCKED!

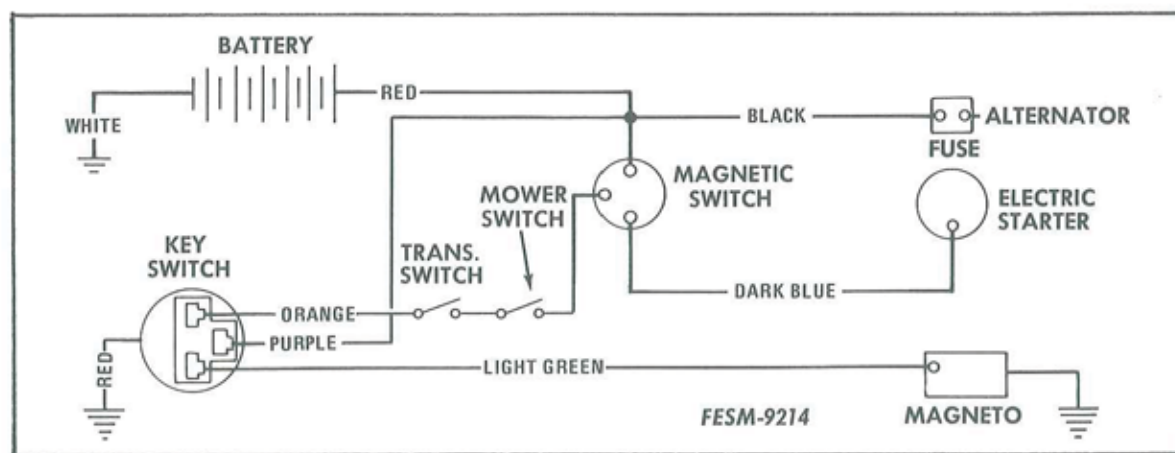




Wiring Diagram—Recoil Start



Wiring Diagram—Electric Start and Recoil Start



Wiring Diagram—Electric Start

Section 2

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SPECIFICATIONS

Power supply 36 volts DC
Power source 3-12 volt batteries
Fuse 100 amp

Traction Motor

Size 1 hp
Thermo switch setting 260°
Speed 2400 RPM

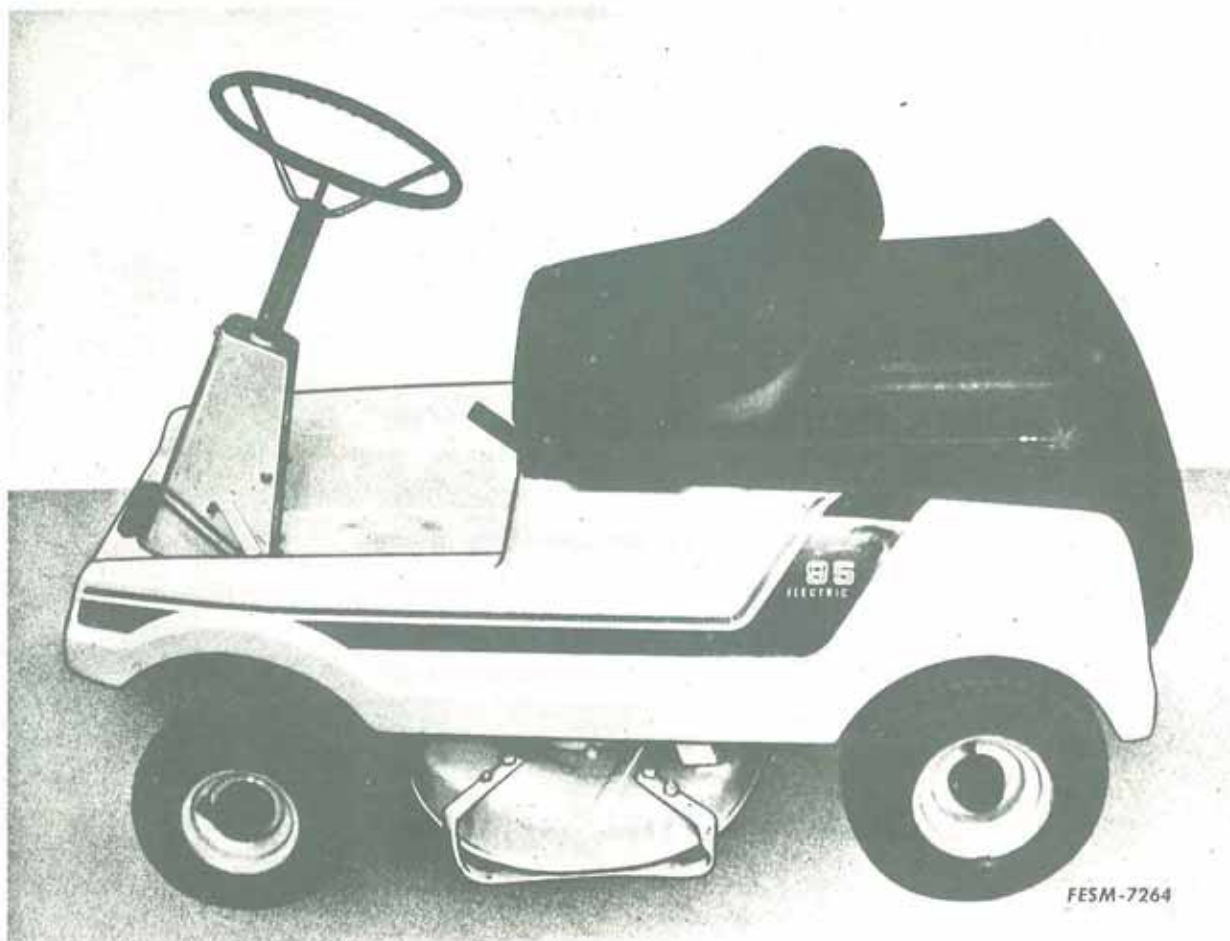
Blade Motor

Size 1/2 hp
Thermo switch setting 260°
Circuit breaker 40 amp
Speed 3550 RPM

SPECIAL TOOLS

- 1. Voltmeter capable of reading 320 volts AC
- 2. Ohmmeter

GENERAL INFORMATION



Before operating the International Cadet 95 Electric Riding Mower, read the "Safety Rules" described in the Operators Manual.

Three 12 volt batteries connected in series provide 36 volts DC for operation of the traction and blade motors. A built-in battery charger operates off of household current (115 volts) to recharge the batteries. The charger is equipped with a 12 hour electric timer run by the charger. After plugging the charger into an outlet, the timer may be set for any amount of time up to the 12 hour maximum. Setting the timer places the charger in the maximum charge condition.

The rate of charge will automatically decrease as the batteries become charged. After the timer setting has expired, the charger will go to a minimum or trickle charge position.

The batteries should be recharged after each use of the rider. The charger should remain plugged in at all times including storage. Batteries will be severely damaged if stored for prolonged periods in a discharged condition.



CAUTION: Do not use mower batteries to start other vehicles. Battery damage will result. Keep the shroud raised while charging batteries

until the timer returns to the off position. Highly combustible hydrogen gas is vented during the charging cycle. Charge the batteries in a ventilated area. Keep flames away from the batteries. Do not

smoke around the batteries during the charging cycle. The shroud may be lowered after the initial charging cycle is completed.

PRINCIPLES OF OPERATION

Refer to Foldout No. 1 at the rear of the manual.

Starting the Traction Motor

Place the transmission in neutral to close the transmission neutral start switch.

Turn the keyswitch to the "START" position. Current flow is from the battery "+" terminal through the neutral switch, across the closed contacts A and D of the key switch, through the coil winding of the traction motor magnetic switch, through the closed contacts of the thermal switch, through the fuse to the battery "-" terminal. The magnetic switch will now close connecting contacts 1 and 2. Current then flows across the contacts through the motor to the fuse and battery "-" terminal, starting the motor.

The key is spring loaded to return to the run position when released. The magnetic switch remains energized by current flow from terminal 2 to terminal 5 of the blade motor magnetic switch, to terminal E and D of the key switch.

The traction motor is protected from burning out by the thermal switch in the brush holder assembly of the motor. When the thermal switch is activated, current flow through the coil of the magnetic switch is interrupted. The magnetic switch contacts are then opened by plunger spring action.

Starting the Blade Motors

Current to operate the blade motors starts at terminal 2 of the traction motor magnetic switch. The traction motor magnetic switch must be energized before the blade motors can be operated.

Place the mower switch in the "START" position. Current flow is from terminal 2 to terminal 5 of the blade motor magnetic switch, to the blade motors switch, across contacts C and A of the switch, across contacts B and C of the key switch, through the coil windings of the magnetic switch, through the left motor thermal switch, through the right motor thermal switch and circuit breaker, to the fuse and battery "-" terminal. The magnetic switch will now close connecting contacts 5 and 6. Current will then flow across the contacts through the motors to the fuse and battery "-" terminal, starting the motors.

The blade motor switch will return to the "ON" position when released.

Current flow through the diode to terminal "B" of the blade motor switch keeps the magnetic switch closed.

The blade motors are protected by circuit breakers and thermal switches. If the circuit is overloaded by the blade striking an object, the circuit breaker will open. If the motor overheats, the thermal switch will activate. Interruption of the current flow by either the circuit breaker or thermal switch will open the blade motor magnetic switch contacts by plunger spring action.

NOTE: When the blade motor magnetic switch opens the contacts by spring action, terminal 6 is connected to the battery "-" terminal. This action short circuits the blade motors providing a braking action.

TROUBLE SHOOTING

Problem	Possible Cause	Remedy
Traction motor does not start.	Transmission is not in neutral. Batteries dead. 100 amp fuse is blown. Loose wire connections. Traction motor thermal switch is open. Traction motor circuit defective. Traction motor defective.	Place transmission in neutral. Refer to Test Procedure - Batteries. Replace fuse. Check for cause of fuse failure. Check and tighten all connections. Thermal switch will reset automatically after motor cools. Refer to Test Procedure - Traction - Motor Circuit. Refer to Traction Motor.
Traction motor starts but stops when key is released to run position.	Defective key switch.	
Blade motors do not start.	Loose wire connections. Circuit breaker open. Blade motor thermal switch open. Blade motor circuit is defective. Blade motor defective.	Check and tighten all connections. Breaker will reset automatically. Thermal switch will reset automatically after cooling. Refer to Test Procedure - Blade Motors Circuit. Refer to Section 4 - Blade Motor.
Blade motor starts but stops when switch is released to run position.	Defective diode or blade motor switch.	Refer to Test Procedure - Blade Motors Circuit.
Only one blade motor runs.	Electrical connector not properly fastened. Defective motor.	Check connectors. Refer to Section 4 - Blade Motor.

TEST PROCEDURE

Traction Motor Circuit

Refer to Foldout No. 1 at the rear of the manual.

Use the following procedure if the traction motor will not start.

1. Make a visual inspection of the 100 amp fuse. Replace it if it is defective.

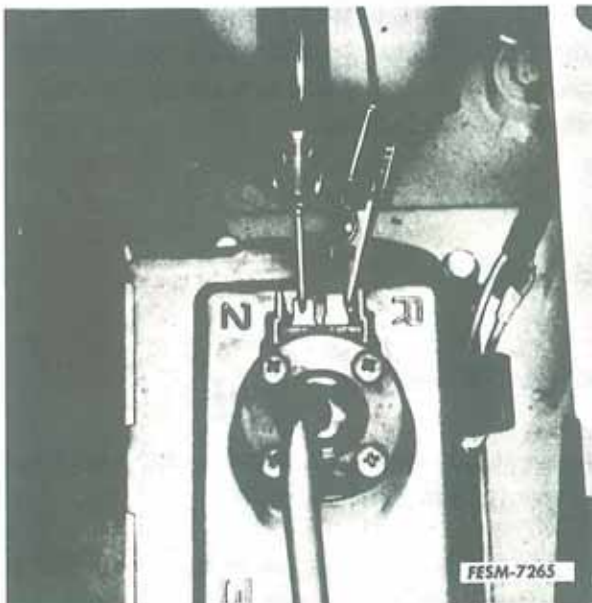
2. Check all battery connections. Make sure they are clean and tight. Make sure the batteries are fully charged.

3. Be sure the transmission is in neutral. Turn the key to the "START" position. You should be able to hear a click as the magnetic switch energizes and closes the contacts.

If the click is not heard, continue with step 4.

If the click is heard, proceed as follows:

a. Disconnect the negative (-) cable from the batteries.



b. Disconnect both red wires from terminal 2 of the traction motor magnetic switch.

c. Reconnect the negative (-) cable to the batteries.

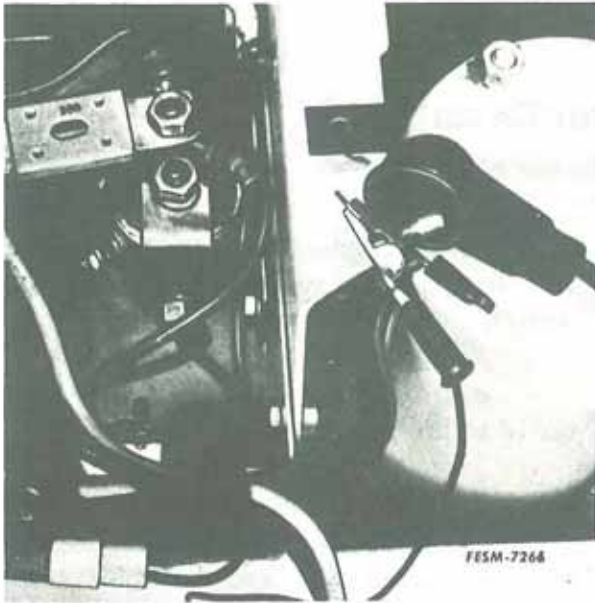
d. Place the key switch in the "START" position. Check the continuity between terminals 1 and 2 of the traction motor magnetic switch.

e. If the test lamp lights, check the motor for internal damage. If the test lamp does not light, replace the magnetic switch.

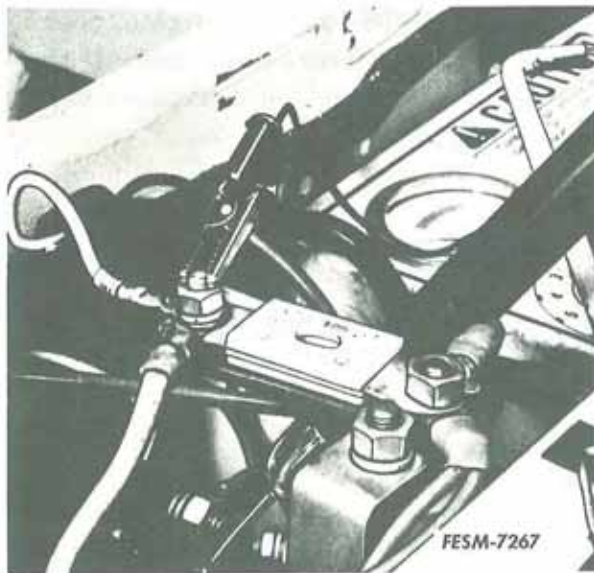
4. Remove the mower body. Refer to Section 3, Mower Body Removal - 95.

5. Remove the key switch from the body. Install it in the harness.

6. Place the transmission in neutral. Use a continuity tester to check the transmission neutral switch. If the test lamp does not light, the switch is defective. Reconnect the harness to the neutral switch before proceeding.



7. Hold the key switch in the start position. Check the continuity from the positive (+) battery connection to terminal 4 of the traction motor magnetic switch. If the tester does not light the key switch is defective.



8. Check the continuity from terminal 3 of the traction motor magnetic switch to the 100 amp fuse. If the tester does not light the traction motor thermal switch is defective.

9. If the preceding checks show no discrepancies, the traction motor magnetic switch is defective.

10. If the traction motor will start but not continue to run when the key is released to the "ON" position, the key switch is defective.

Blade Motors Circuit

Refer to Foldout No. 1 at the rear of the manual.

Use the following procedure if the blade motors will not start.

1. The traction motor circuit must be functional before the blade motors will

operate. Correct any deficiencies in that circuit before proceeding.

2. Remove the mower body. Refer to Section 3, Mower Body Removal - 95.

3. Remove the key switch and blade motor switch from the mower body. Install both switches back in the harness.

4. Reinstall the battery support plate and batteries. Connect the batteries back in the circuit.

5. Start the traction motor. Place the blade motor switch in the "START" position. You should be able to hear a click as the magnetic switch energizes and closes the contacts.

If the click is not heard, proceed with step 6.

If the click is heard, proceed as follows:

a. Disconnect the negative (-) cable from the batteries.

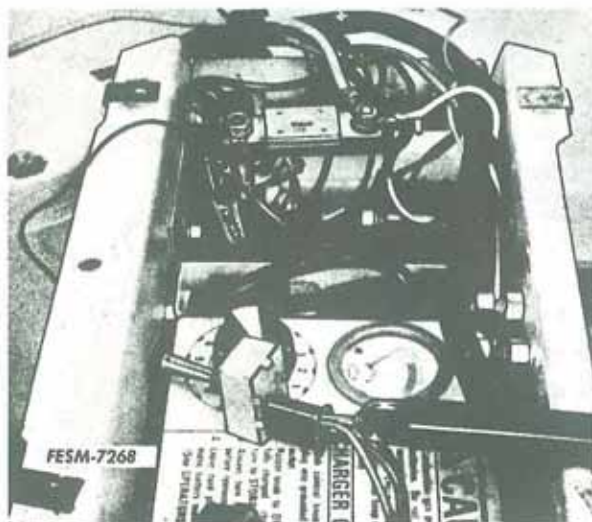
b. Disconnect the dark blue wires from terminal 6 of the blade motor magnetic switch.

c. Reconnect the negative (-) cable to the batteries.

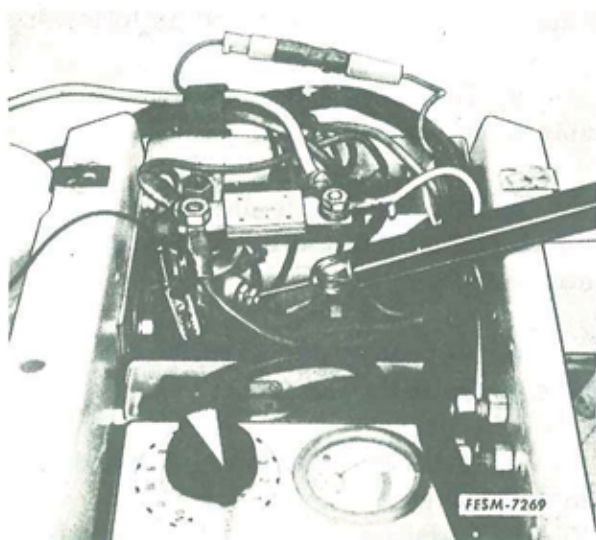
d. Start the traction motor and place the blade motor switch in the "START" position. Check the continuity between terminals 5 and 6.

e. If the test lamp lights, check the motors for internal damage. If the test lamp does not light, replace the magnetic switch.

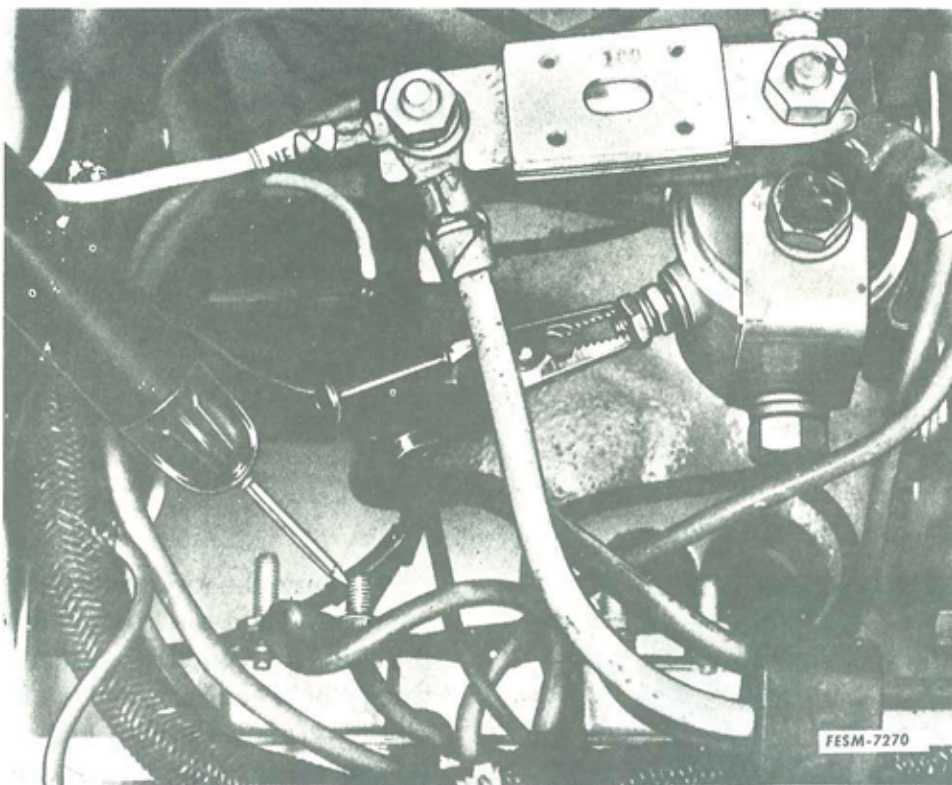
6. Disconnect the batteries from the circuit.



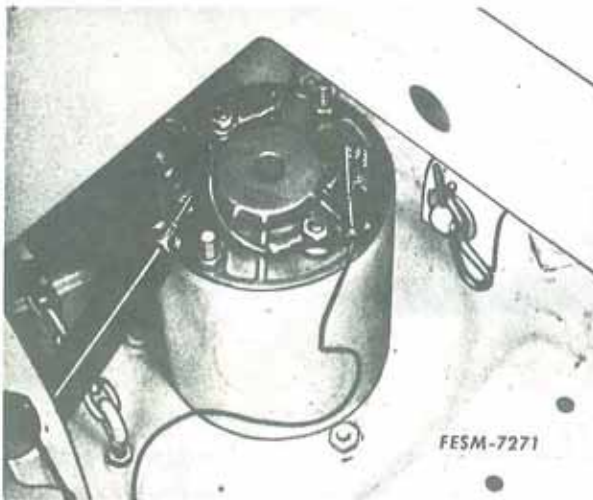
7. Turn the key switch to the "OFF" position. Hold the blade motor switch in the "START" position. Check the continuity between terminal 5 of the blade motor magnetic switch and terminal A (green wire) of the blade motor switch. If the test lamp does not light, the blade motor switch is defective.



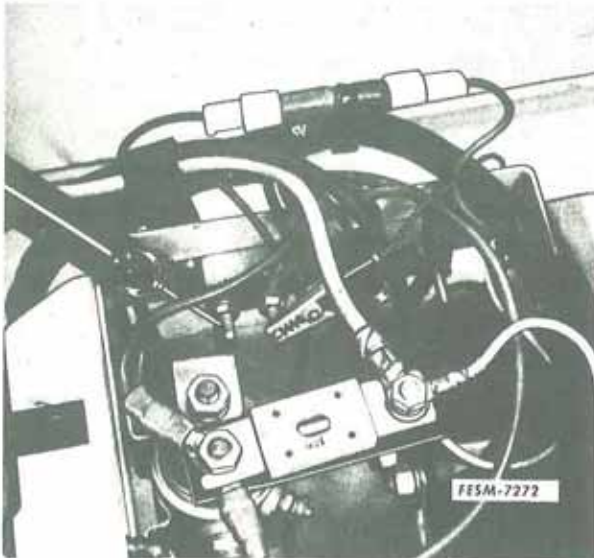
8. Turn the key switch to the "ON" position. Hold the blade motor switch in the "START" position. Check the continuity between terminal 5 and terminal 8 of the blade motor magnetic switch. If the test lamp does not light, the key switch is defective.



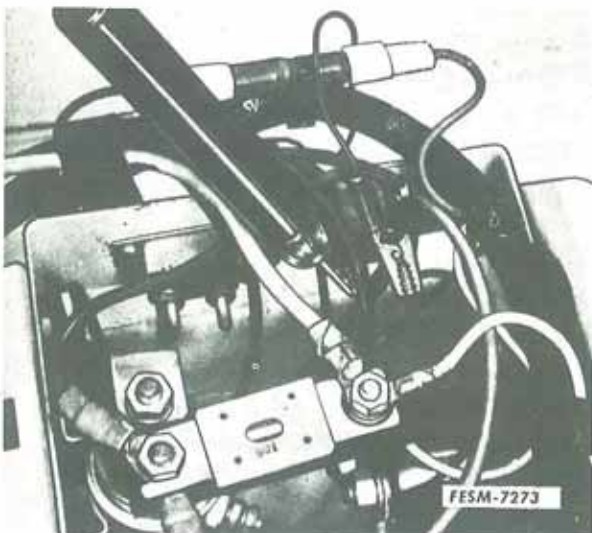
9. Check the continuity between terminal 7 of the blade motor magnetic switch and terminal 9 of the right hand blade motor circuit breaker. If the test lamp does not light, one of the blade motor thermal switches is open.



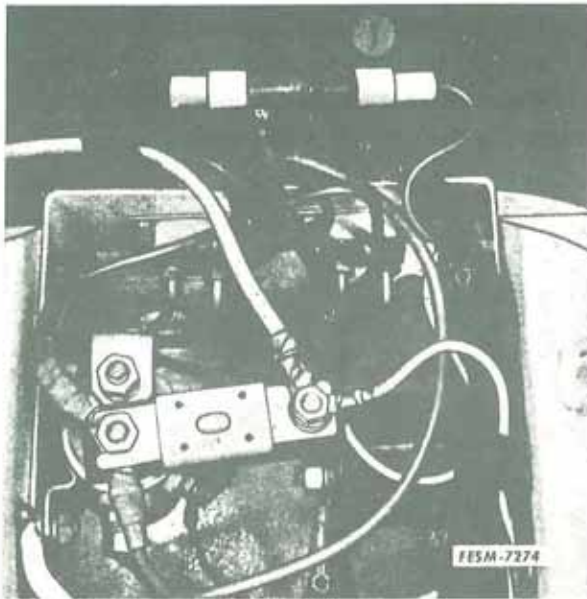
10. The thermal switch of each motor may be checked individually. Remove the motor end cover and check the continuity between the two small terminals.



11. Check the continuity between the circuit breaker terminals.

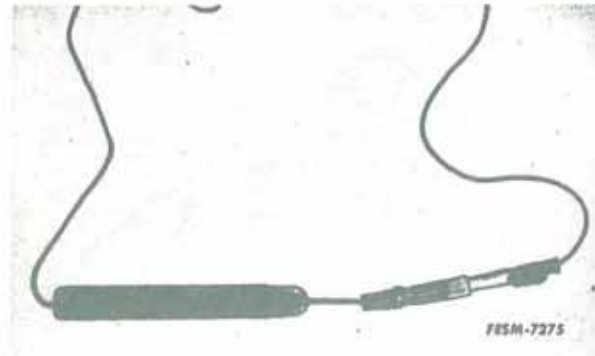


12. If the preceding checks show no discrepancies, the blade motor magnetic switch is defective and should be replaced.



1. Diode

13. If the blade motors start but do not continue to run when the switch is released to the "RUN" position, the diode is defective (open) or the blade motor switch is defective.



14. The diode may be checked with a continuity tester. Connect the tester to the terminals of the diode, then reverse the leads. The tester should light in only one of positions. If the diode does not pass current in either direction, it is open and should be replaced.

The diode prevents current flow from terminal C to B of the blade motor switch in the start position. If the diode shows current flow in both directions, it is shorted and should be replaced. The blade motor switch will probably be defective also.

BATTERIES

1. Check that all battery connections are clean and tight.

2. Check the level of the electrolyte and add distilled water as necessary.

3. Connect the charger to the AC power source. Set the timer for a 12 hour cycle. Check the ammeter to be sure the charger is functioning. Complete a full 12 hour charge cycle.

4. Check the specific gravity of each

cell with a hydrometer. The specific gravity should not be less than 1.220 at 80 degrees room temperature. Readings should not vary more than .030 points between cells.

5. Each battery may be individually load tested. Battery specific gravity should not be less than 1.220 at 80°F. Place a 300 amp load on the battery for 15 seconds. Terminal voltage should not be less than 9.0 volts at the end of the test.

BATTERY CHARGER

1. Plug the charger into a wall receptacle and turn the knob to a charge position. The ammeter of the charger should deflect. This will indicate that the charger is working. The needle may drop back after indicating full charge rate. This is normal if the batteries are already charged. It is not necessary to measure the DC voltage or amperage

produced by the charger. Both will vary with the state of charge of the batteries.

2. It is necessary for the wall receptacle to be live and all connections clean and tight in order for the charger to function. If the charger does not function it will be necessary to remove it for servicing.

Removal and Installation

1. Remove the mower body. Refer to Section 3, Mower Body Removal - 95.

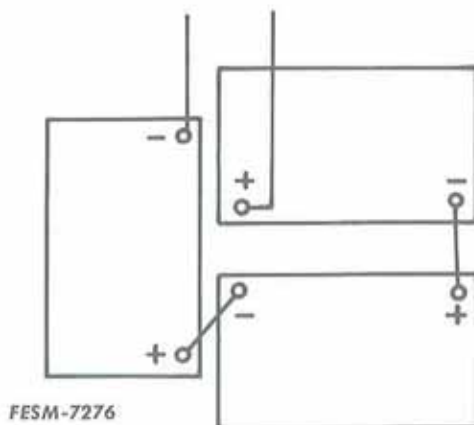
2. Disconnect the DC leads to the circuit and remove the charger.

3. Reverse steps 1 and 2 to install the charger.

Testing the Charger

Refer to Foldout No. 2 and 3 at the rear of the manual.

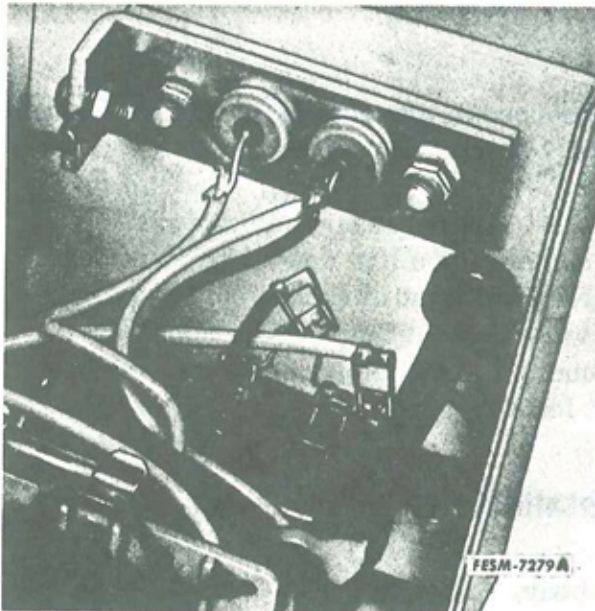
Transformer



1. Assemble and reconnect the batteries on a work bench as they are in the rider. Connect the battery charger black

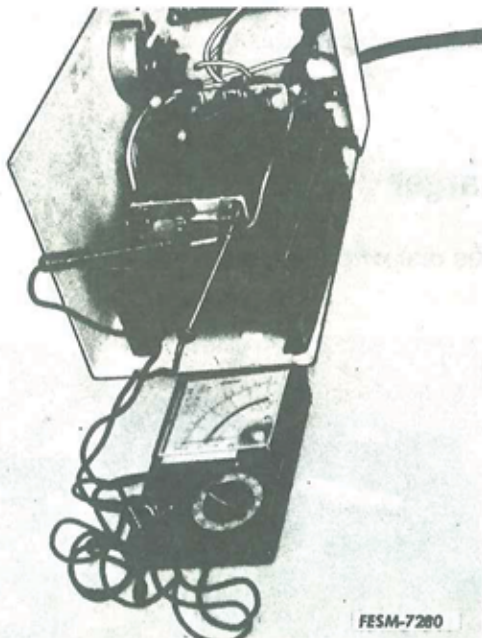


lead to the battery positive (+) terminal and the white lead to the negative (-) terminal.



2. Be sure the charger is not connected to the AC power source. Discharge the condenser by placing the switch in the "ON" or fast charge position for 30 seconds or longer, then to the "OFF" position.

3. Disconnect the leads from the condenser.



CAUTION: To prevent electrical shock use extreme caution in conducting the following tests.

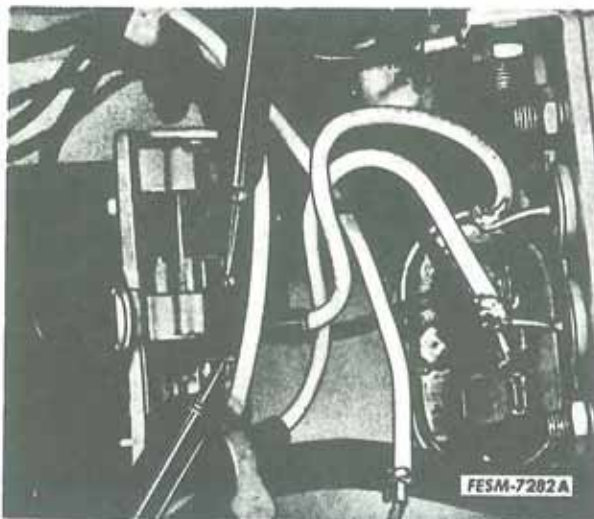
4. Connect the charger cord to a 115 volt AC power source.

5. Turn the timer to the "ON" or fast charge position.

6. Check the voltage between P_1 and P_2 with an AC voltmeter. It should indicate approximately 115 volts AC. Check the AC power source and cord if it does not.

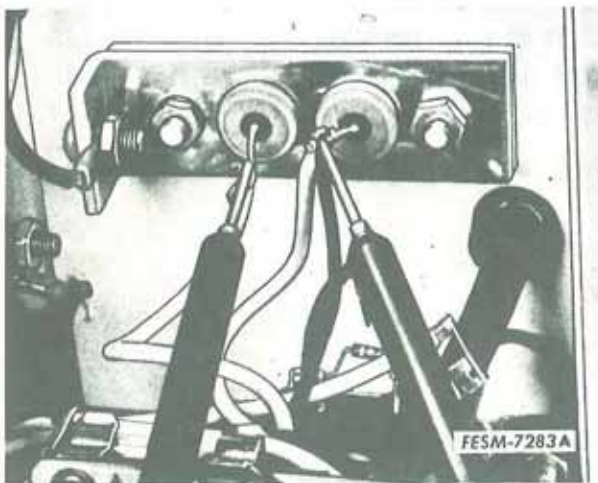


7. Check the voltage between P_1 and F. It should indicate approximately 115 volts AC. Check the AC fuse if it does not.

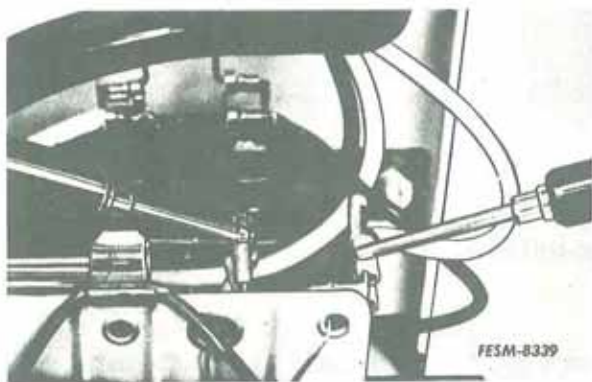


8. To check the transformer proceed as follows:

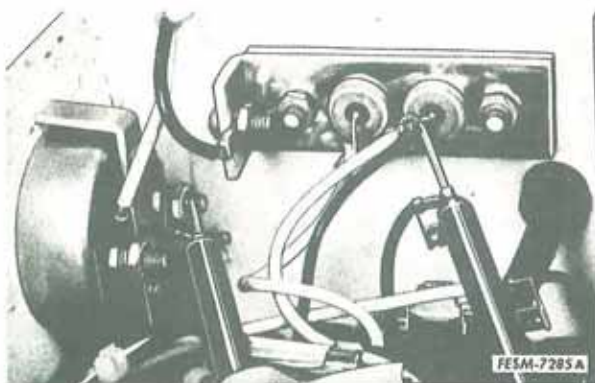
a. Check the voltage between C_1 and C_2 . Approximately 320 AC volts should be indicated.



b. Check the voltage between the two diodes. Approximately 62 volts AC should be indicated.

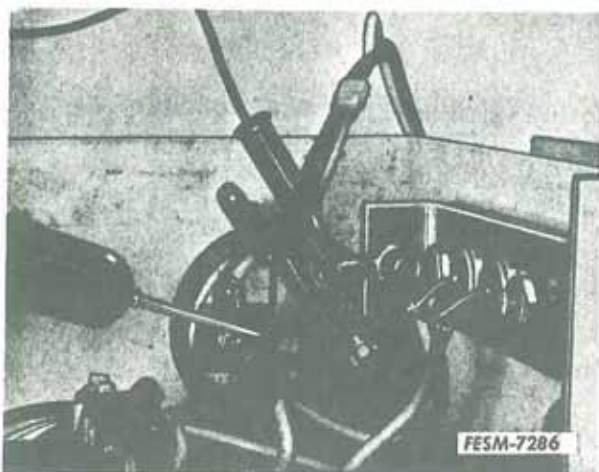


c. Check the voltage between D and the adjacent terminal leading to the ammeter. Approximately 50 volts AC should be indicated.



9. Check the voltage between the ammeter terminal (where the two leads connect) and each diode. Approximately 31 volts AC should be indicated.

If the proper voltage is not indicated, check the DC fuse (early models) and continuity between the timer switch terminals 4 to 5. If the fuse is good and contact is being made between terminals 4 and 5, replace the transformer.



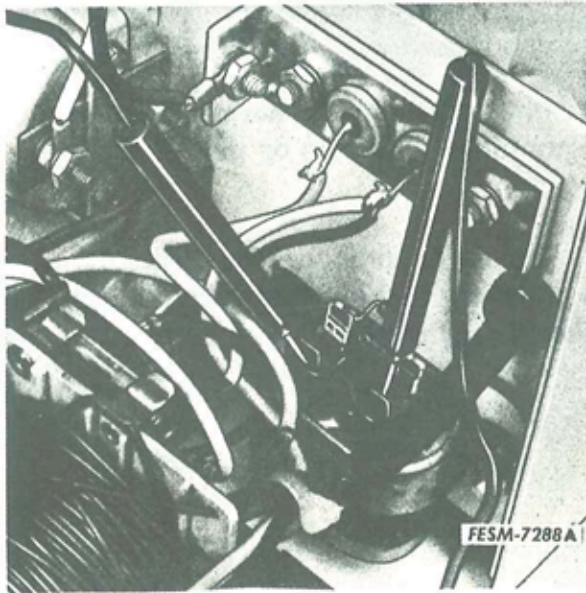
Ammeter

1. **IMPORTANT:** Do not connect the charger to the batteries or the AC power source.
2. Check the ammeter for continuity with a tester. If the tester does not light replace the ammeter.



Diodes

1. **IMPORTANT:** Do not connect the charger to the AC power source or the batteries.
2. Check each diode with a continuity tester. Place one lead of the tester on the diode lead and the other on the outer case. Reverse the leads. The tester should light in one position only.
3. If the test lamp lights in both or neither position, the diode is defective and the complete diode block must be replaced.
4. When replacing the block be sure the insulating strip is properly positioned between the block and the case. Replacement blocks are supplied with an insulating strip and nylon screws.



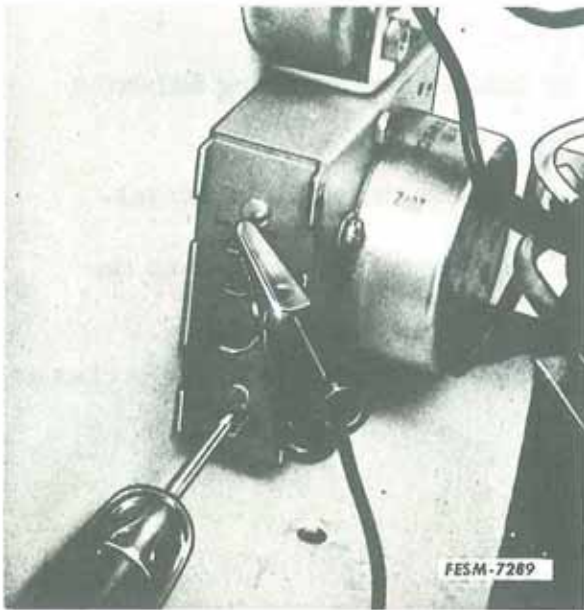
Condenser

1. **IMPORTANT:** Do not connect the charger to the AC power source or the batteries.
2. Discharge the condenser by placing the timer switch in the "ON" or fast charge position for 30 seconds or longer, then to the "OFF" position.
3. Disconnect the leads from the condenser terminals.
4. Touch the leads of an ohmmeter to the terminals. Reverse the leads. The indicating needle should deflect and return to its original position one or both times. If the needle does not deflect and return either time, the condenser is defective.

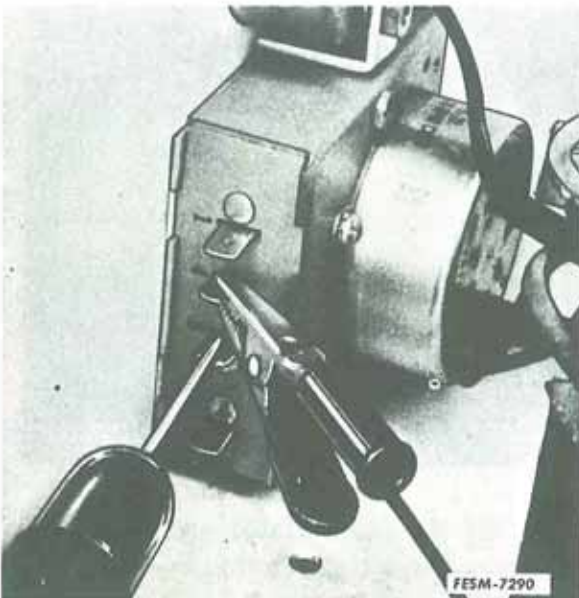
Timer

1. **IMPORTANT:** Do not connect the charger to the AC power source or the batteries.
2. It may be necessary to remove the mounting screws and slide the transformer to the side to get to the switch for testing.
3. Disconnect the leads from the timer switches. Tag or record the leads as they are removed for ease in reconnecting.

4. Turn the timer knob to the "ON" or fast charge position.



5. Use a continuity tester to check between terminals 1 and 3 and between 4 and 5. If the tester fails to light, the switch is defective and the timer should be replaced.



6. Turn the knob to the "OFF" position and repeat step 5. The tester should not light.

7. The timer motor can be checked by connecting the charger to the batteries or in the circuit and plugging it into a 115 volt AC power source. Set the knob in the fast charge position and observe if the knob moves. It should make a noticeable move at the end of an hour.

TRACTION MOTOR

Removal

1. Remove the mower. Refer to Section 4, Twin Blade Mower - Electric Drive.
2. Remove the mower body. Refer to Section 3, Mower Body Removal - 95.
3. Loosen the belt guide around the input pulley and slip the drive belt off.
4. Remove the snap ring and drive pulley.
5. Remove the motor end cover.
6. Disconnect the wires from the terminals.
7. Remove the motor from the chassis.

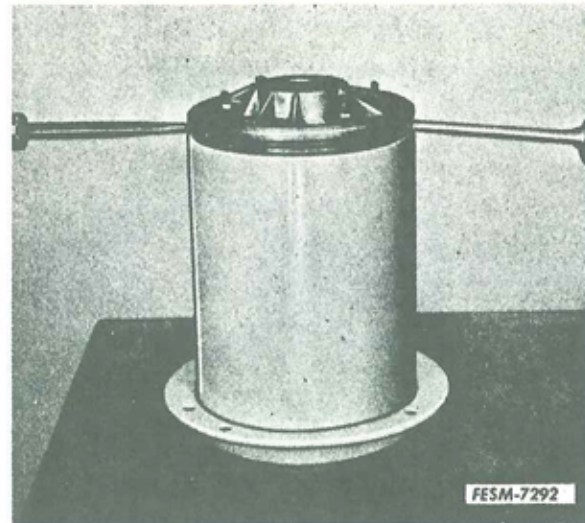
Disassembly



1. Through bolt

1. Clamp the flat portion of the armature shaft in a vise equipped with brass jaws.

2. Remove the through bolts.

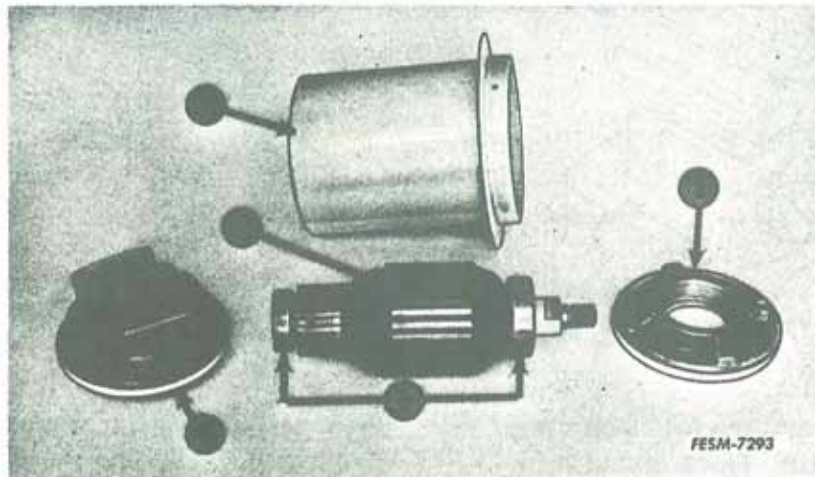


3. Pry the commutator end frame off of the armature end bearing evenly.

4. Grasp the motor housing firmly. With a quick upward thrust remove the housing. The permanent magnets exert a strong force on the armature which must be overcome.

5. Remove the armature and end frame from the vise. Press the armature from the drive end frame.

Inspection and Repair



1. Housing
2. Drive end frame
3. End bearing
4. Armature
5. Commutator end frame

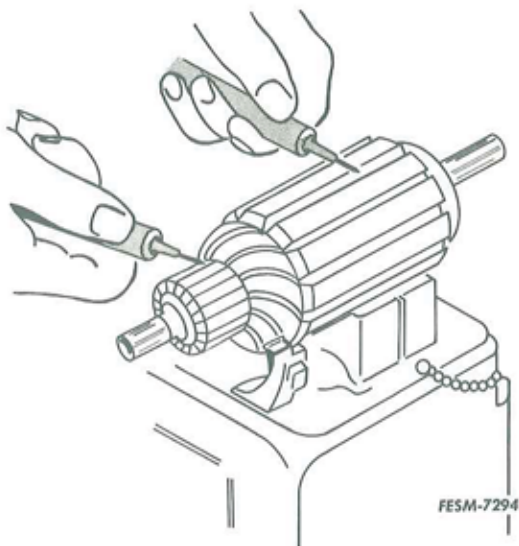
1. Check the housing and magnets for damage. Replace if necessary.

2. Check the drive end frame for cracking or damage. Replace if necessary.

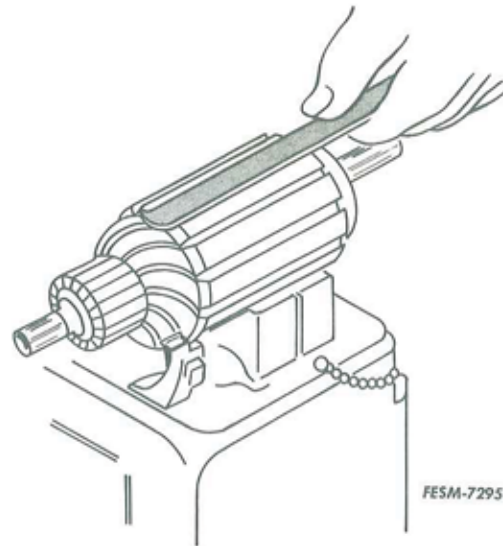
3. Check the commutator end frame for cracking or damage. Visually check the insulators for damage. A continuity tester may be used to check the circuits for openings or grounds.

4. Replace the brushes if they are worn more than one-half their original length. Check that the brushes are free in the holders.

5. Check the armature end bearings for roughness or damage. Replace the bearings as necessary. Use a suitable puller to remove the bearing. Press the new bearing in place.

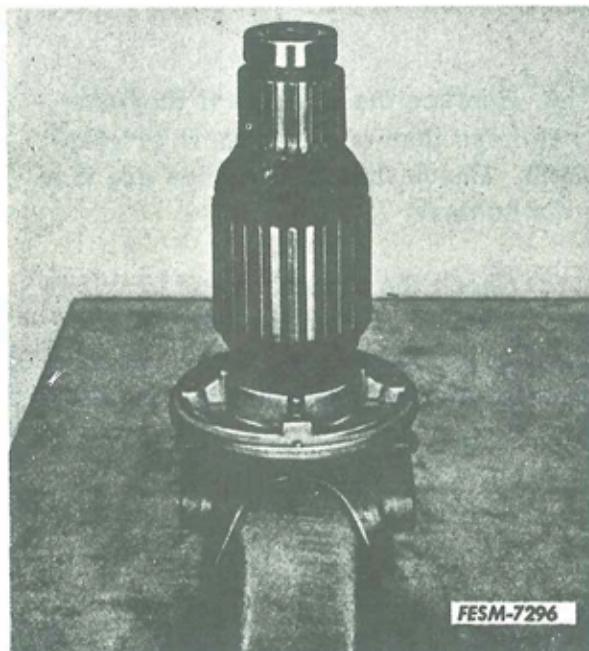


6. Check the armature for open circuit or short circuits. Open circuits in the armature are usually obvious because the open circuited commutator bars will arc each time they pass under the brushes so that they soon become burned. Use a continuity tester to check for open circuits.



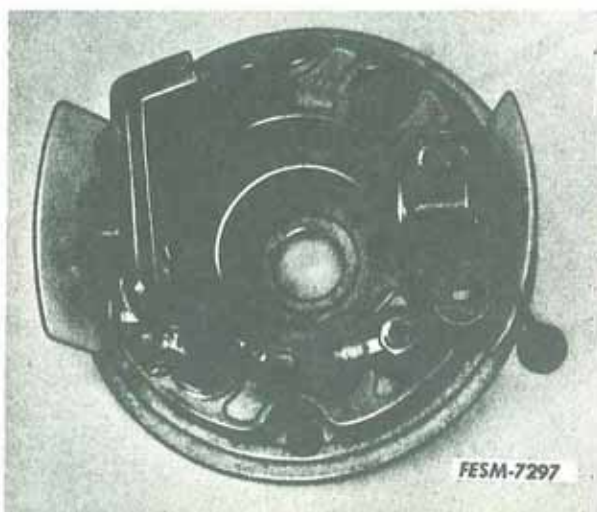
Short circuits in the armature are located with the armature tester (growler). The armature is placed in the Vee of the tester and slowly rotated. The thin strip of steel held above the armature will vibrate when the area of the armature core containing a short circuited coil is located.

Reassembly



1. Press the armature into the drive end frame.
2. Clamp the flat portion of the armature shaft in a vise equipped with brass jaws.
3. Grasp the motor housing firmly by the sides and set it in place over the armature.

CAUTION: Hold the housing by the sides only. The magnets will pull the housing down sharply against the end plate as it nears the armature.

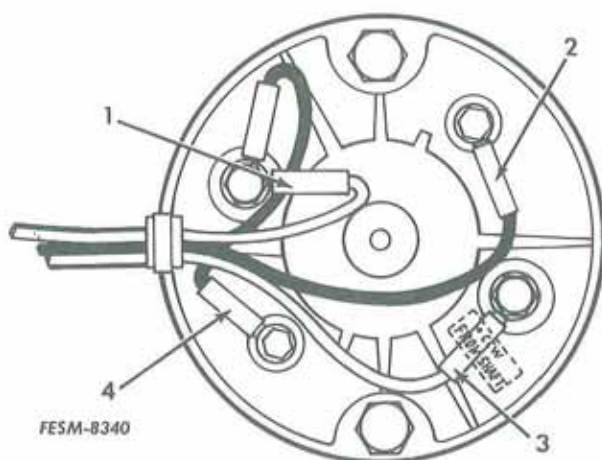


4. Push each brush back into the holder and rest the spring against the brush to hold it in position. Install the commutator end plate part way. Reach in alongside the plastic insulators with a small screwdriver and push the brushes in against the armature.

5. Align the end frames and housing. Install the through bolts.

1. Spring retaining brush in holder

Installation



1. Install the motor in the frame so that the wires may be easily attached. The positive (red wire) is attached to the post marked "+ CCW".

2. Continue the installation by reversing the removal procedure.

1. Brown wire to 100 amp fuse
2. Gray wire
3. Red wire
4. Pink wire to brown wire on 1

Section 3

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SPECIFICATIONS

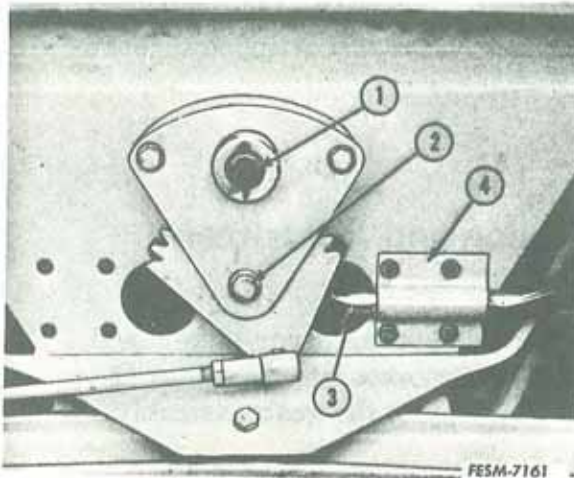
Transmission

Backlash-pinion-to-bevel gear - inch001 min. - .007 max.
Shaft assembly end play (either side) - inch001 min. - .010 max.
Clearance between clutch collar keys and gear hubs - inch001 min. - .030 max.
Clearance between bevel gear and output shaft- first gear - inch025 absolute min.
Washer thickness available for adjustments - inch020, .026, .030, .036, .040, .046, .050

Refer to standard torque chart for bolt torques.

STEERING ASSEMBLY

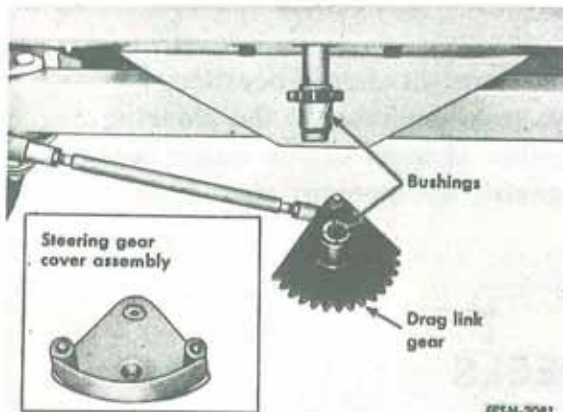
Removal and Disassembly



1. Remove the cotter pin and plain washers from the steering shaft.

2. Remove the pivot bolt.

- 1. Steering shaft
- 2. Pivot bolt
- 3. Clutch-brake pedal
- 4. Pedal pivot clamp



3. Remove the steering drag link gear cover assembly.

NOTE: The steering drag link gear assembly will disengage from the steering shaft gear as the cover is removed.

4. To replace, remove the drag link gear from the ball joint.



5. Remove the steering wheel by removing the roll pin.

6. Lower the steering shaft assembly through the support.

7. To repair or replace, remove the drag link and/or the tie rod assembly from the spindles.

A. Roll pin

Inspection and Repair

1. Wash all parts in cleaning solvent, then dry thoroughly.
2. Inspect the nylon bearing for wear or damage. Replace as necessary.
3. Check for broken teeth, bent shafts and stripped threads. Replace the damaged parts.

Reassembly, Installation and Adjustment

1. Reassemble and install in the reverse order of removal and disassembly. Apply IH 251 HEP grease or equivalent #2 multi-purpose lithium grease liberally to the gear assembly, bearings and shaft.
2. Install the drag link ball joint in the R. H. spindle, if it was removed.
3. Set the front wheels in a "straight ahead" position. Position the steering drag link gear assembly to the steering shaft gear so that an equal number of teeth are on either side of the drag link gear when engaging the steering shaft gear. Install and secure the cover.

WHEELS

Front Wheels

Removal

1. Engage the brake and block up the front wheel(s) to be removed.
2. Remove the hub cap, cotter key and flat washer from the outer end of the spindle.
3. Slide the wheel from the spindle.

Inspection and Repair

1. Disassemble and inspect the entire wheel and hub for weld separation, split tube hub and rim bending.
2. Inspect the bearings for wear or damage.

Reassembly and Installation

Reassemble the wheel. Lubricate the spindle and slide the wheel on the spindle. Using a sufficient amount of flat washers to eliminate excessive end play, secure the wheel to the spindle with a cotter pin.

Rear Wheels

Removal

1. Engage the brake and block up the wheel to be removed.

NOTE: If both rear wheels are to be removed, be sure to block the front wheels.

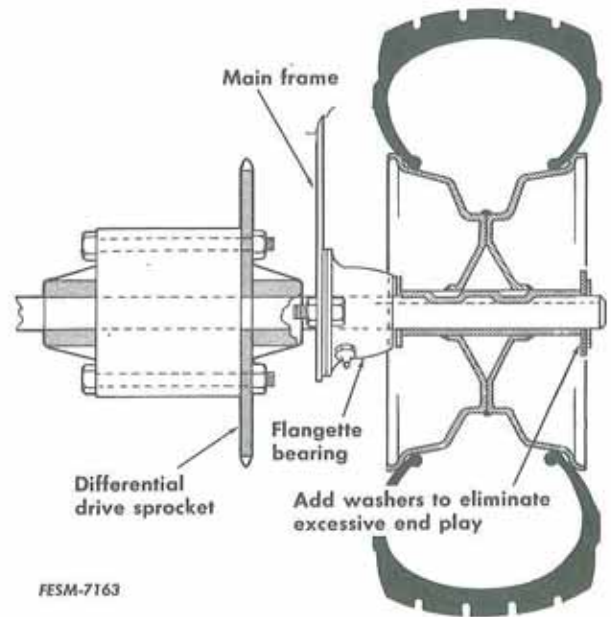
2. Remove the hub cap, cotter key and flat washer. Remove the wheel.

Inspection and Repair

1. Inspect the entire wheel for rim bending.

2. Check the axle for bends, damaged key and keyway. Remove nicks, rust and paint wherever necessary.

3. Check the axle bearing for wear. Replace if necessary.



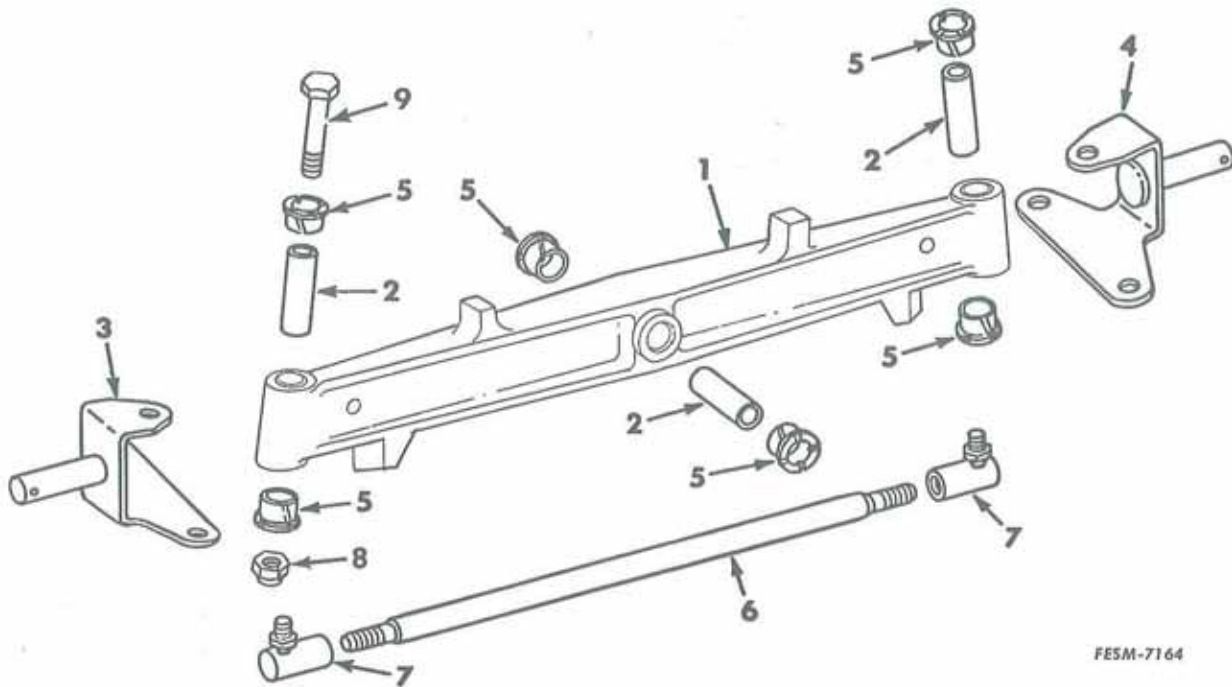
FESM-7163

Installation

Install the rear wheels in the reverse of removal.

If more than 1/8 inch end play exists, add washers as necessary to outer end of each wheel, in sequence, beginning with the right hand wheel until the end play is less than 1/8 inch.

FRONT AXLE



FESM-7164

- | | | |
|--------------------------|--------------------------|-----------------|
| 1. Axle | 4. Spindle assembly L.H. | 7. Tie rod end |
| 2. Bushing | 5. Bearing | 8. Locknut |
| 3. Spindle assembly R.H. | 6. Tie rod | 9. Spindle bolt |

Disassembly

1. Lock the brake, raise the front end of the mower and support it securely.
2. Remove the front wheels.
3. Disconnect the tie-rod ball joints. Disconnect the drag link ball joint from the right hand spindle.
4. Remove the pivot bolt securing the spindle to the axle and remove the spindle.
5. Remove the spindle bushing and nylon bearings.
6. Remove the axle pivot bolt and axle.

Inspection and Repair

1. Inspect all parts closely for wear, bending or breaks.
2. Check nylon bearings and bushing for wear. Replace as necessary.

Reassembly

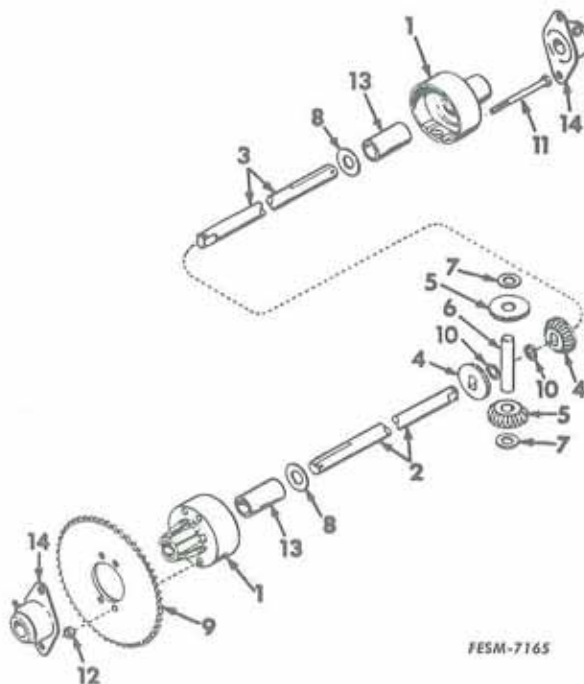
1. Reassemble the front axle and spindles in the reverse order of disassembly.
2. Thoroughly lubricate the front axle bearing, spindle bore and spindles with

IH 251 HEP grease or equivalent #2 multi-purpose lithium base grease.

3. Adjust the tie rod so that the front wheels are parallel to each other.

DIFFERENTIAL AND REAR AXLE

Removal and Disassembly



- | | |
|------------------|---------------|
| 1. Housing | 8. Washer |
| 2. Axle | 9. Sprocket |
| 3. Axle | 10. Snap ring |
| 4. Bevel gear | 11. Screw |
| 5. Pinion gear | 12. Nut |
| 6. Pin | 13. Bushing |
| 7. Thrust washer | 14. Bearing |

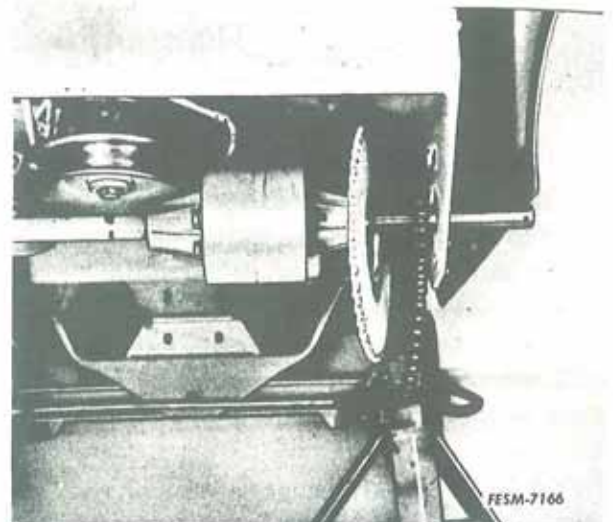
1. Raise the rear of the mower and support securely.

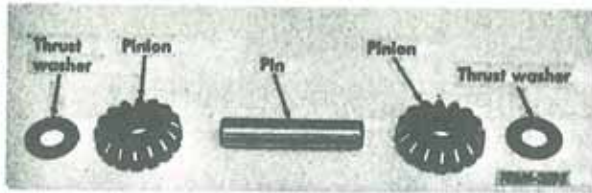
2. Remove the rear wheels.

3. Remove the rear axle flange bearings.

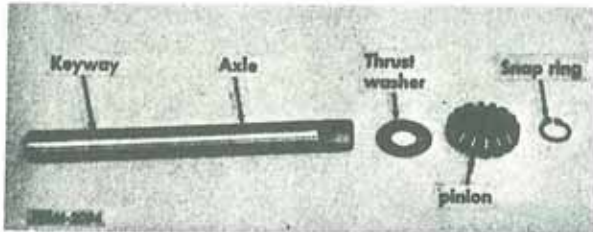
4. Slip the drive chain off of the sprocket. Remove the locknuts and slide the sprocket off the housing.

5. Remove the thru-bolts securing the carrier housing. Separate the housing and remove the two halves from the main frame.





Exploded view of drive pinion.



Exploded view of axle (one end shown).

6. Disassemble the drive pinion.

7. Remove the snap ring, bevel gear and thrust washer from the axle. Slide the axle from the differential carrier.

Inspection and Repair

1. Inspect the axle shaft for wear at the bearing location.
2. Roll the axle shaft along a flat surface to detect any warping or bending.

3. Check the differential carriers for cracks or breaks. Remove any high spots from the mating surface with a flat file.

4. Check all bearings and replace as necessary.

Reassembly and Installation

1. Reassembly and installation is the reverse of removal and disassembly. Thoroughly lubricate the axles (around bearing surfaces) and the differential housing gears.

Use 1 ounce IH 251 HEP grease or equivalent in the differential housing.

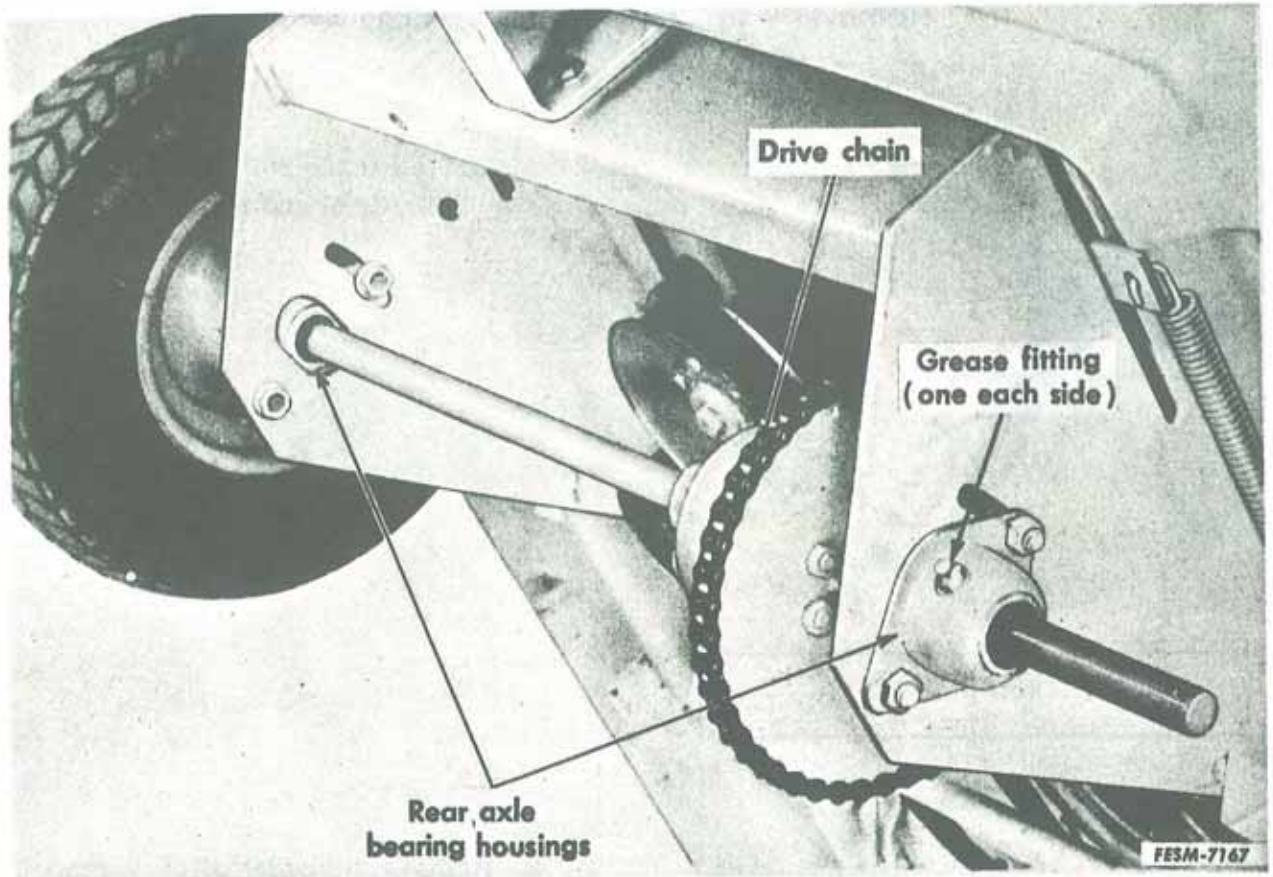
NOTE: No seals or gaskets are required with this unit.

2. Face the grease fitting on the flange bearings to the rear.

3. Check for excessive end play of the axle and adjust as necessary.

4. Adjust the drive chain tension.

DRIVE CHAIN ADJUSTMENT



The drive chain can be adjusted to compensate for stretch and wear. The rear axle bearing mounting holes are slotted at the top to move the axle back for proper adjustment.

To properly adjust the drive chain set the transmission in neutral, block the front wheels and raise the rear end of the rider.

Adjust the bearing housings until the slack is out of the chain. The chain must not be taut. If the drive chain is too tight, excessive wear and stretch will result in premature failure. Not enough tension may allow the chain to jump the sprocket, ride the teeth, break, or whip excessively. The axle must be perpendicular to side of rear frame. Adjust each side an equal amount.

MOWER BODY

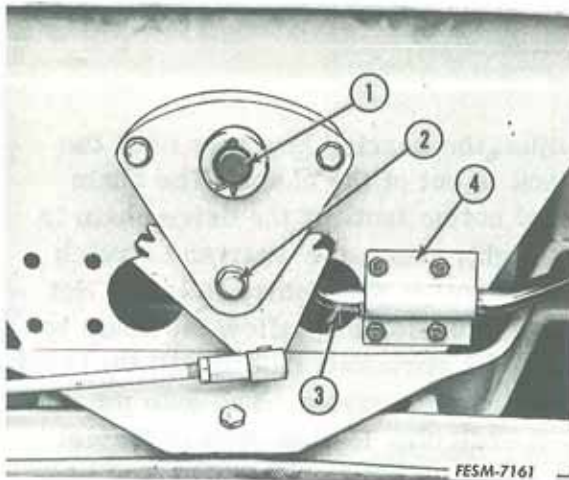
Removal — 55, 75, 85 & 85 Special

1. Drive out the roll pin and remove the steering wheel and shaft.

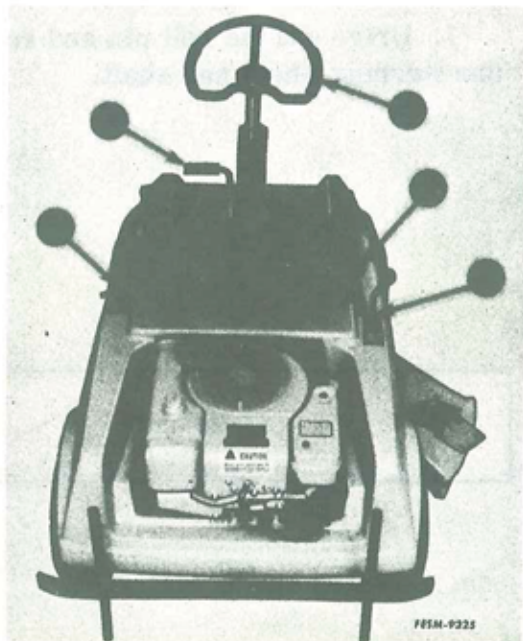


A. Roll pin

2. Remove the pedal pivot clamp, cotter key at control rod and clutch-brake pedal.



1. Steering shaft
2. Pivot bolt
3. Clutch-brake pedal
4. Pedal pivot clamp



3. Remove the seat.

4. Disconnect the ignition switch.

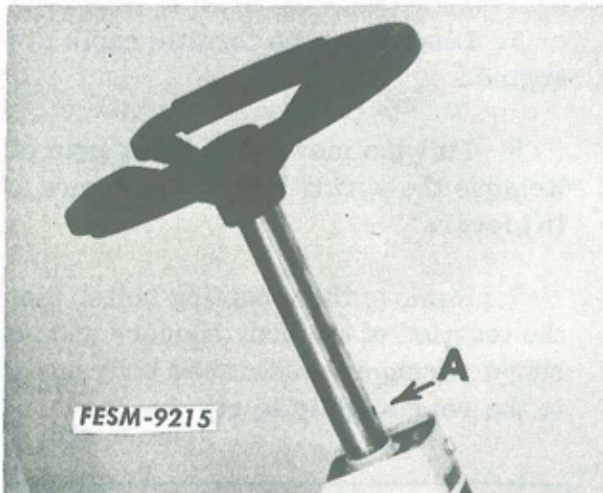
5. Disconnect the throttle cable at the engine.

6. Pull the mower lift lever grip off. Remove the spring loaded cap screw and lift lever.

7. Remove the mounting bolts. Note the location of the body spacers and seat support bumpers. Slide the body up and to the rear slightly to remove it.

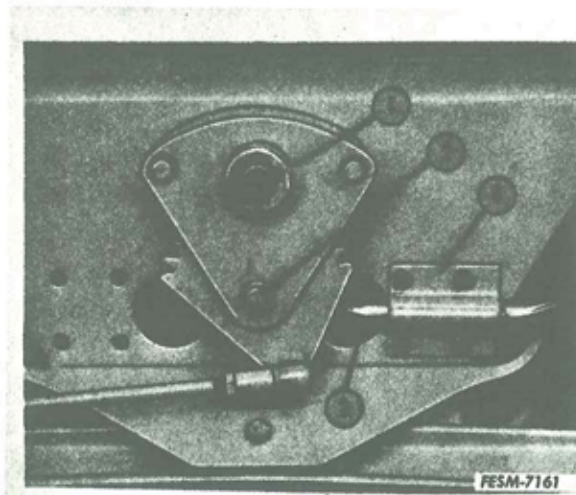
1. Clutch-brake pedal
2. Mower clutch lever
3. Steering wheel
4. Throttle control
5. Gear selector lever

Removal – 95



1. Drive out the roll pin and remove the steering wheel and shaft.

A. Roll pin



1. Steering shaft
2. Pivot bolt
3. Clutch-brake pedal
4. Pedal pivot clamp

2. Remove the pedal pivot clamp, cotter key at control rod and clutch-brake pedal.

3. Loosen the mounting nuts at the shroud hinge. Lift off the shroud assembly.

4. Disconnect and remove the batteries and mounting plate.

5. Remove the gear shift knob.

6. Remove the mounting bolts. Note the location of the body spacers and shroud support storage clamp. Raise the body and disconnect the harness from the traction motor and blade motor switches. Move the mower lift handle to the highest position and raise the body clear of the handle. Lower the handle and remove the mower body.

Installation

1. Install the mower body by reversing the removal procedure.

TRANSMISSION

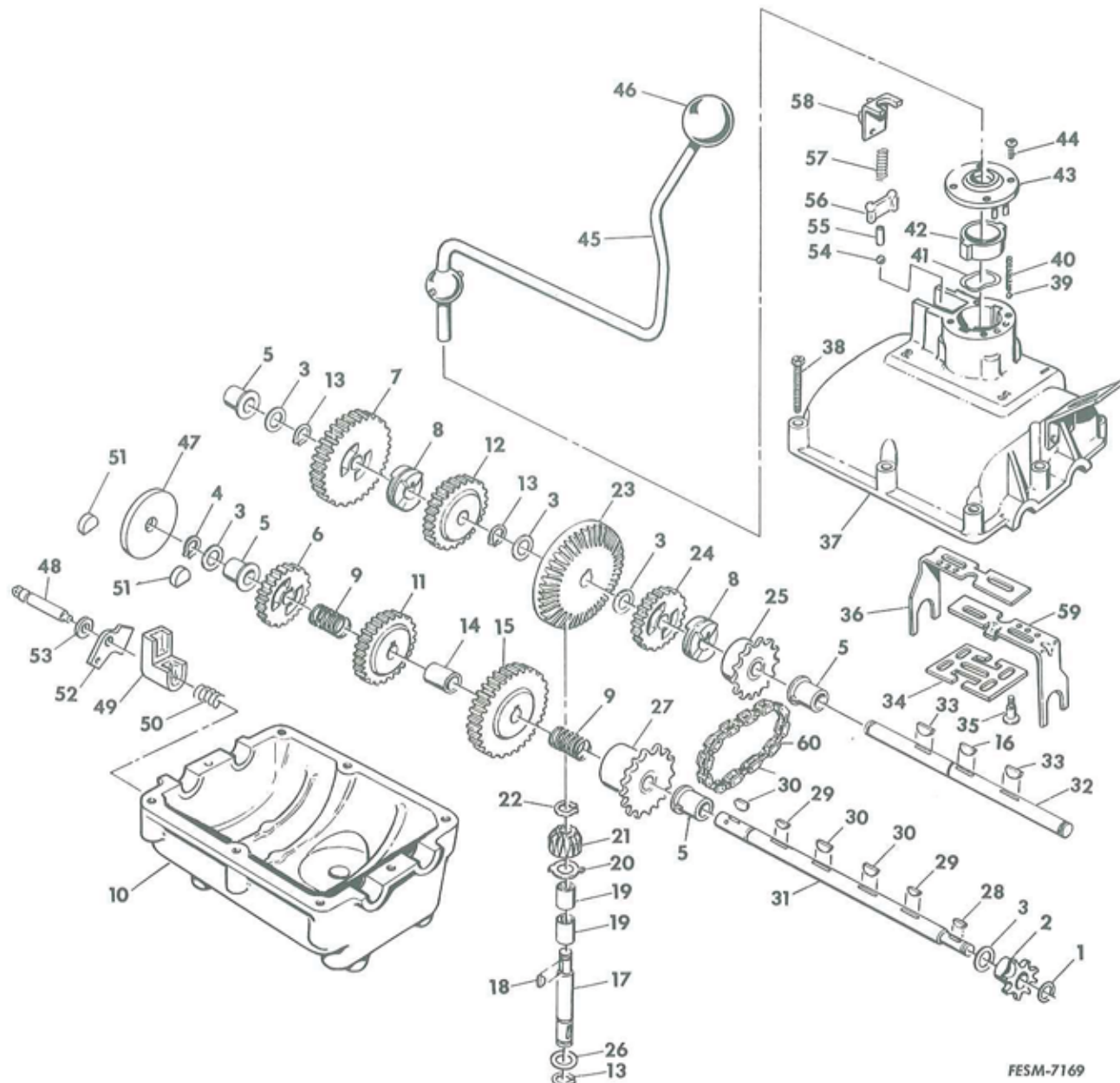
Removal

1. Remove the mower. Refer to Section 4.
2. Remove the mower body.
3. Remove the transmission drive belt. Remove the snap ring and drive pulley from the transmission input shaft.
4. Disconnect the brake rod and return spring from the brake actuating arm.
5. Disconnect the transmission neutral start switch.
6. Loosen the drive chain.
7. Remove the transmission.

Disassembly

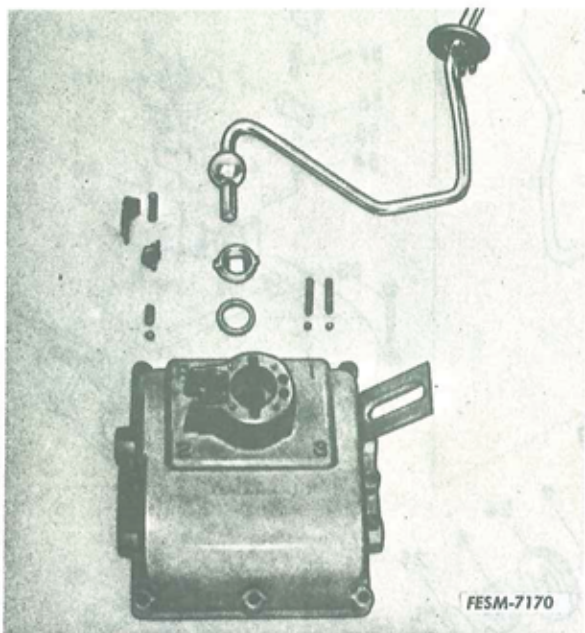
Reference numbers in the text refer to the exploded view of the transmission on page 3-15.

1. Remove the top cover (37).
2. Lift out the drive shaft and output shaft together. Slip the reverse chain (60) off the sprockets.
3. Disassemble the output shaft as follows:
 - a. Remove the brake disc (47) and key (30).
 - b. Remove the retaining ring (4) shim washer (3), bearing (5), gear (6) and key (29).
 - c. Remove the spring (9), gear (11), key (30) and spacer (14).
 - d. Remove gear (15), key (30) and spring (9).
 - e. Remove sprocket (27), key (29), bearing (5) and shim washer (3). Mark or tag the washer for reassembly.
 - f. Remove retaining ring (1), sprocket (2) and key (28).
4. Disassemble the drive shaft as follows:
 - a. Remove the bearing (5), sprocket (25), clutch collar (8), key (33), gear (24), shim washer (3), bevel gear (23) and shim washer (3). Mark or tag the washers for reassembly.
 - b. Remove the bearing (5), washer (3), retaining ring (13), gear (7), clutch collar (8), key (33) and gear (12).
5. The input shaft assembly should be removed only if the bevel pinion (21), washer (20), bearings (19) or shaft are to be replaced. The input shaft, bearings and bevel gear are removed as an assembly. Remove retaining ring (13), washer (26) and press the assembly to the inside of the case. Remove retaining ring (22) and press the shaft from the gear.



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- | | | | |
|----------------------|---------------------|--------------------|---------------------|
| 1. Retaining ring | 16. Key | 31. Output shaft | 46. Knob |
| 2. Sprocket | 17. Input shaft | 32. Drive shaft | 47. Brake disc |
| 3. Shim washer | 18. Key | 33. Key | 48. Bolt |
| 4. Retaining ring | 19. Bearing | 34. Lock-out plate | 49. Brake jaw |
| 5. Bearing | 20. Washer | 35. Screw | 50. Spring |
| 6. Driven gear, 20T | 21. Bevel pinion | 36. Shifter fork | 51. Friction puck |
| 7. Drive gear, 30T | 22. Retaining ring | 37. Upper housing | 52. Lever assembly |
| 8. Clutch collar | 23. Bevel gear | 38. Screw | 53. Washer |
| 9. Spring | 24. Drive gear, 20T | 39. Ball | 54. Ball |
| 10. Lower housing | 25. Sprocket | 40. Spring | 55. Pin |
| 11. Driven gear, 25T | 26. Washer | 41. Wave washer | 56. Carrier contact |
| 12. Drive gear, 25T | 27. Sprocket | 42. Insert | 57. Spring |
| 13. Retaining ring | 28. Key | 43. Cover | 58. Terminal |
| 14. Spacer | 29. Key | 44. Screw | 59. Fork |
| 15. Driven gear, 30T | 30. Key | 45. Handle | 60. Chain |



6. Disassemble the shifter assembly as follows:

a. Remove the four screws from the cover (43) and slide the shift lever (45) out.

b. Remove the insert (42) and wave washer (41).

c. Remove the safety start switch spring (57). Slide the terminal (58) and carrier contact (56) up and off.

d. Use a magnet or tap the housing lightly upside down on a wooden block to remove the pin (55), ball (54), springs (40) and poppet balls (39).

e. If necessary, remove the screws (35) to remove the shift forks (36 and 59) and lockout plate (34).

7. Remove the shoulder bolt (48) to remove the brake assembly.

Inspection and Repair

1. Wash all parts in a cleaning solvent and blow dry.

2. Check the bearings for loose fit on the shafts; wear, roughness and scoring.

3. Check the gears for broken teeth, wear and burrs.

4. Check the shafts for wear at the bearing locations. Remove any burr with a fine stone.

5. Check the clutch collars for nicks and burrs which may prevent smooth mesh with the gears.

6. Inspect the housings for cracks.

Reassembly

Reference numbers in the text refer to the exploded view of the transmission on page 3-15.

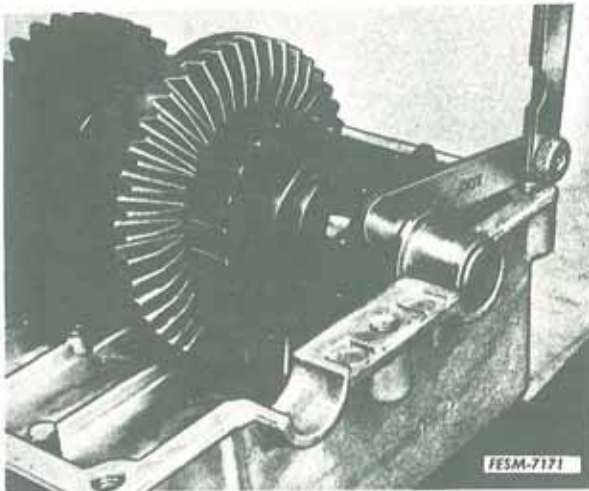
1. Press the bevel pinion bearings (19) into the lower housing (10).

2. Install the bevel pinion shaft (17), thrust washer (20) and key (18). Press the bevel pinion gear (21) on the shaft and install retaining ring (22). Install

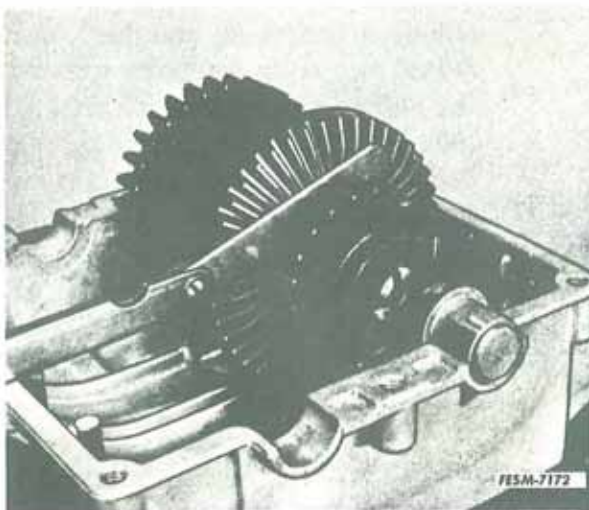
lower washer (26) and retaining ring (13). Tap the shaft lightly up and down with a brass hammer to seat the bevel pinion against the snap ring.

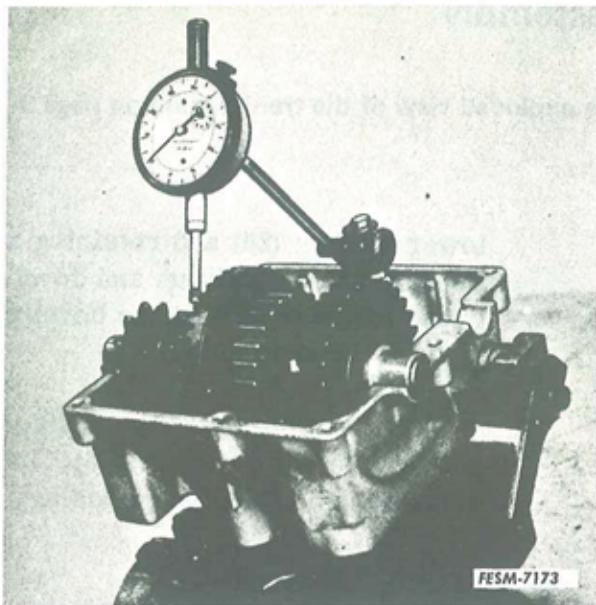
3. Assemble the drive shaft assembly without the shim washers (3). Install the drive shaft in the lower housing.

4. Measure the gap between the flange bearing (5) and sprocket (25). Select a shim washer which will allow .001-.010" end play of the shaft. Install the washer between the flange bearing (5) and snap ring (13) by third speed drive gear (7).



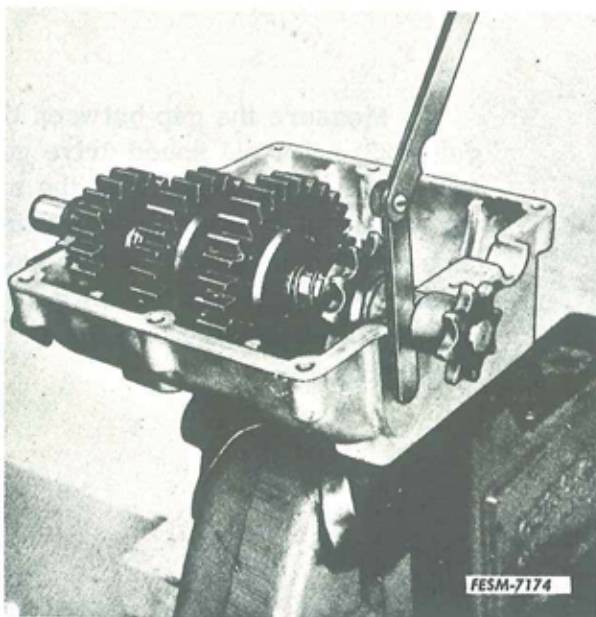
5. Measure the gap between the bevel gear (23) and first speed drive gear (24). Select two shim washers of the same size equal to or slightly less than the measured gap. Install one on each side of the bevel gear. If one shim is smaller, install it between the bevel gear (23) and snap ring (13).



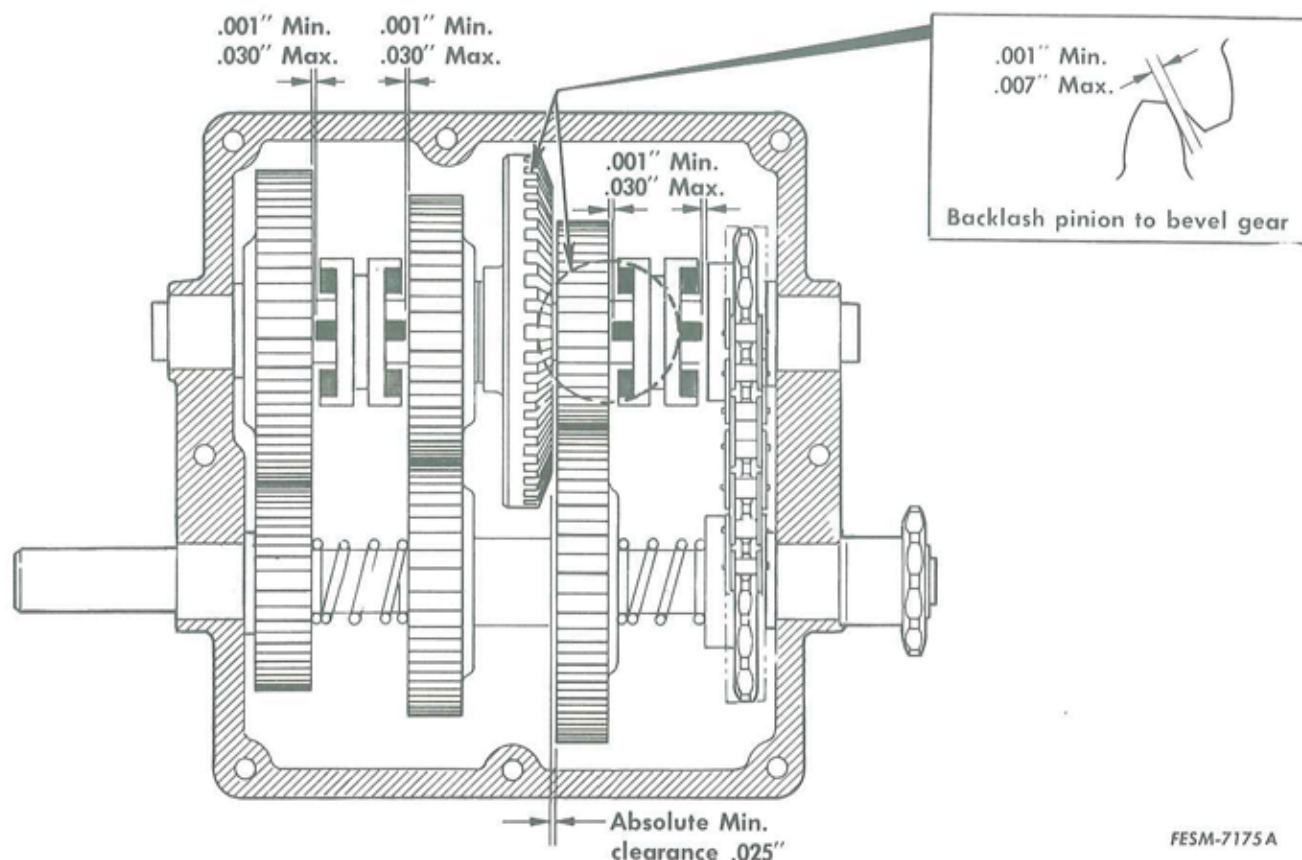


6. Clamp the input shaft in a vise equipped with brass jaws. Check the bevel gear to pinion backlash. Backlash should be from .001-.007 inch. Push the drive shaft to the loaded side (third speed side) to obtain maximum backlash. Adjust the shim sizes to move the bevel gear in or out as necessary to obtain the correct backlash.

1. FES 67



7. Assemble the output shaft without shim washers and install it in the lower housing. Measure the gap between the output sprocket (2) and the lower housing. Select two shim washers approximately the same thickness which will allow .001-.010 inch end play of the shaft. If one shim is thicker, install it on the output sprocket side.



FESM-7175A

8. There should be a minimum of $.025$ inch between the face of the bevel gear (23) and first speed driven gear (12). Adjust the shim washers on the output shaft if necessary.

9. Check the clearance between the drive keys (33) and the gears. The gears should turn freely with $.001$ -. $.030$ inch clearance between the gear face and key.

10. Remove the driveshaft and output shaft from the lower housing.

11. Fill the lower housing with $1/2$ lb. of IH 251 HEP or equivalent.

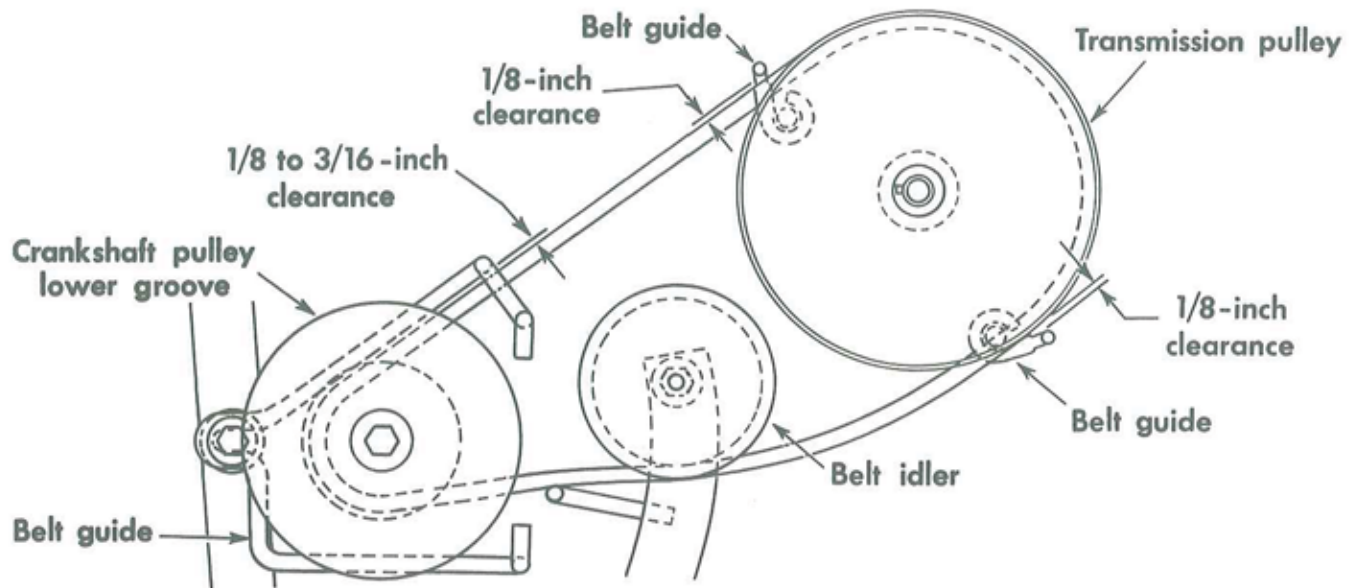
12. Assemble the drive shaft, output shaft and chain as an assembly and install it in the lower housing. Thoroughly lubricate the gear assemblies with IH 251 HEP or equivalent.

13. Assemble the shifter assembly in the upper housing by reversing the disassembly procedure. Thoroughly lubricate the mechanism with IH 251 HEP or equivalent.

14. Install the upper housing to the lower housing. Be sure the shift forks have engaged the clutch collars.

15. Install the brake assembly on the lower housing.

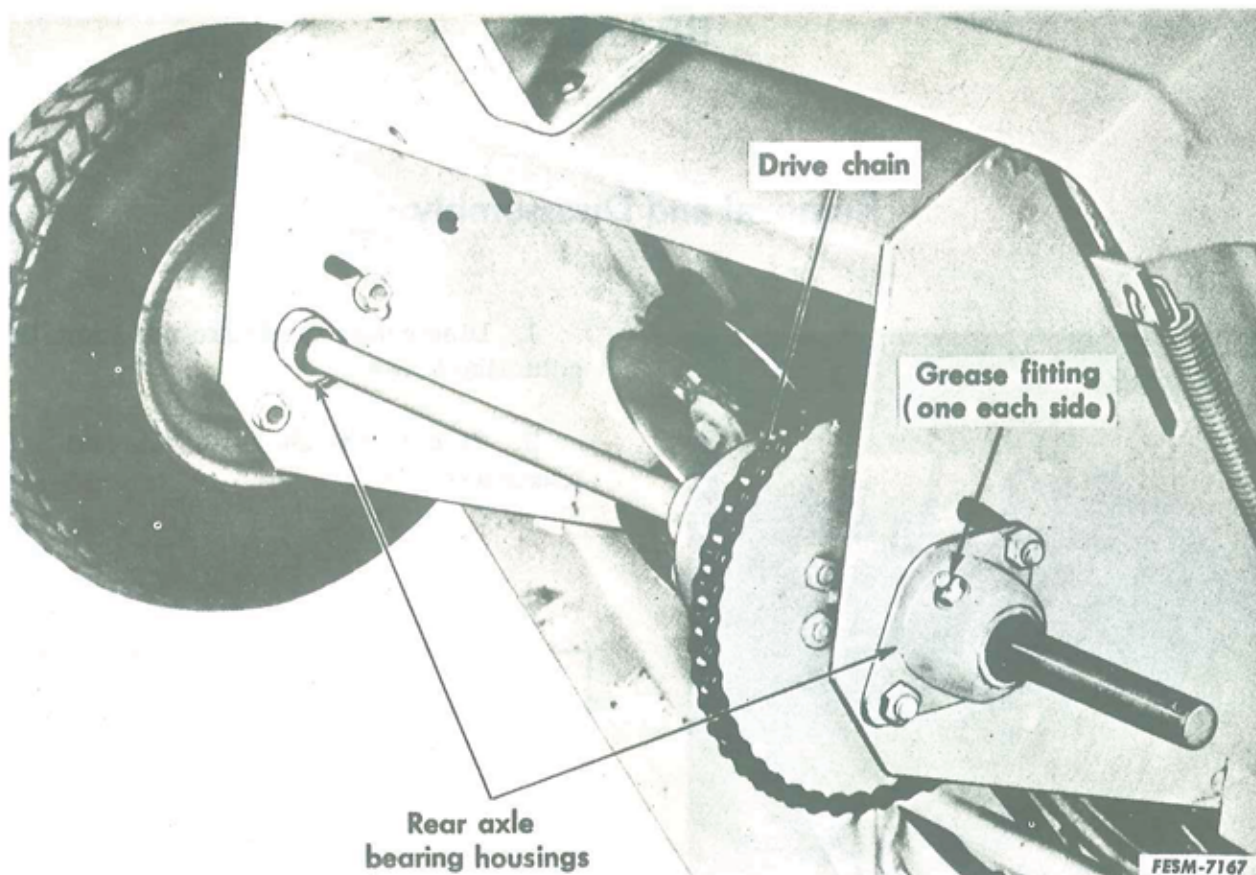
Installation



FESM-7121

Belt Guide Adjustment

1. Install the transmission by reversing the removal procedure.
2. Adjust the transmission drive belt guide clearances.



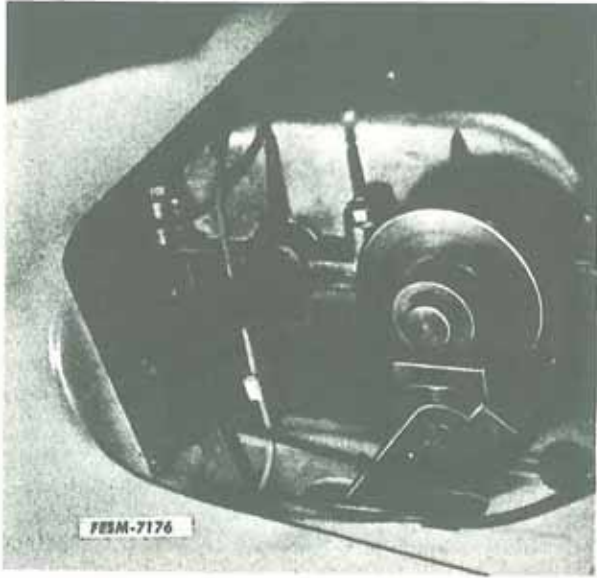
3. Adjust the drive chain tension. The drive chain can be adjusted to compensate for stretch and wear. The rear axle bearing mounting holes are slotted at the top to move the axle back for proper adjustment.

To properly adjust the drive chain, set the transmission in neutral, block the front wheels and raise the rear end of the rider.

Adjust the bearing housings until the slack is out of the chain. The chain must not be taut. If the drive chain is too tight, excessive wear and stretch will result in premature failure. Not enough tension may allow the chain to jump the sprocket, ride the teeth, break, or whip excessively. The axle must be perpendicular to side of rear frame. Adjust each side an equal amount.

BRAKE

Removal and Disassembly



1. Disconnect the brake rod from the actuating lever.

2. Remove the shoulder bolt and brake assembly.

- | |
|---|
| <ol style="list-style-type: none">1. Brake disc2. Shoulder bolt3. Actuating lever |
|---|

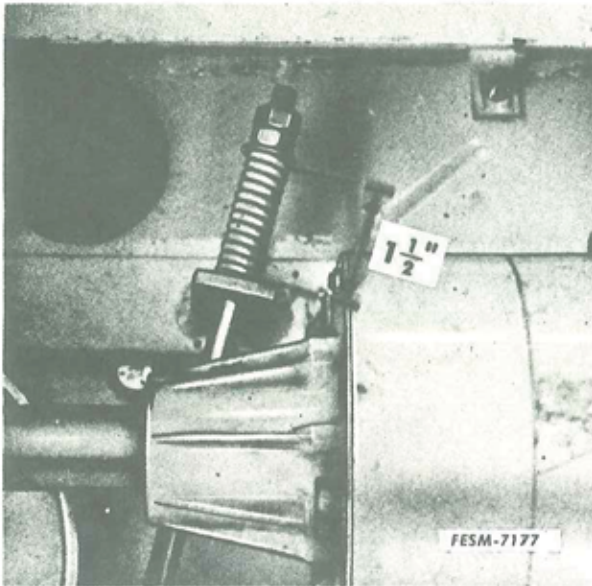
Inspection and Repair

1. Inspect all parts for wear, breakage, scoring and cracking. Replace as necessary.

Reassembly and Installation

1. Reverse the removal and disassembly procedure.
2. Adjust brake as necessary.

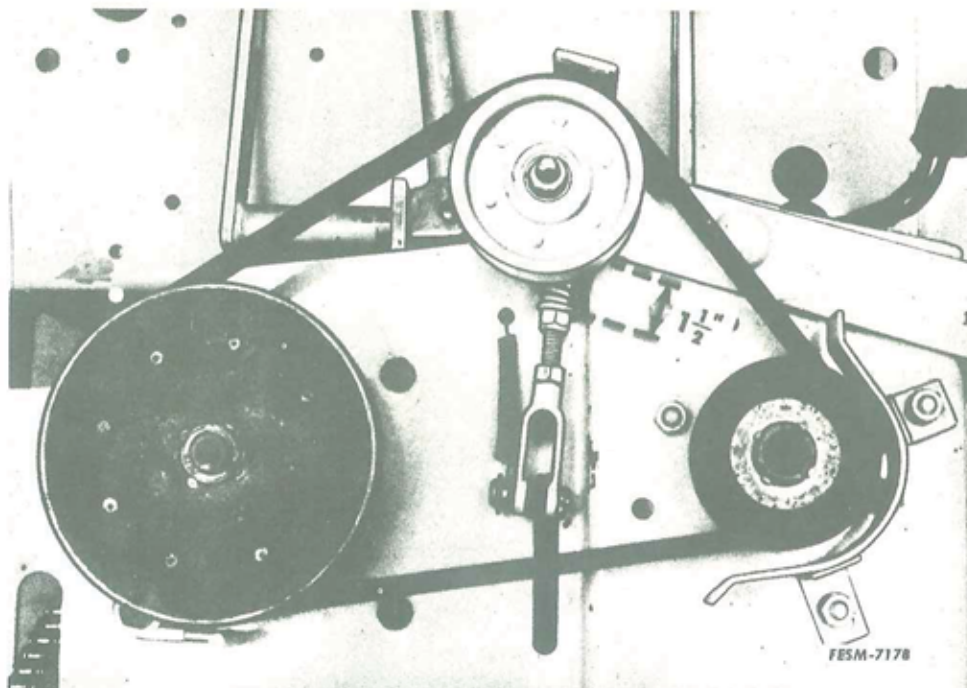
Adjustment



Gasoline engine.

1. The brake disc must turn freely in the disengaged position.

2. Lock the brake pedal in the engaged position. Adjust the brake rod spring to 1-1/2 inches and lock the nut.



Electric drive.

Section 4

MOWER CONTENTS

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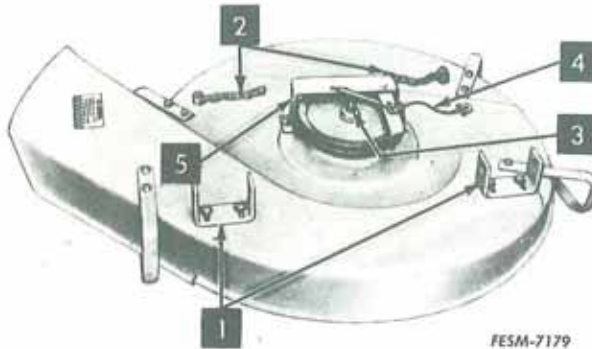
SPECIFICATIONS

MODELS	55	75 & 85	85 Special	95
Width of cut Adjustable cutting height	28 1-1/2 - 4 inches	32 1-1/2 - 4 inches	28 1-1/2 - 4 inches	32 1-1/4 - 3-3/4 inches
Center spindle jam nut torque	--	185	--	--
Blade spindle torque	55-60 ft. lbs.	55-60 ft. lbs.	55-60 ft. lbs.	45-55 ft. lbs.

Refer to standard torque chart for all other torques.

SINGLE BLADE MOWER

Removal



FESM-7179

1. Front mounting brackets
2. Rear hanger chains
3. Lubrication fitting
4. Brake cable
5. Belt guide and brake cable arm

1. Disconnect the spark plug wire and lock the parking brake.

2. Place the mower clutch control handle in the disengaged position and lower the mower.

3. Disconnect the brake cable from the mower clutch control.

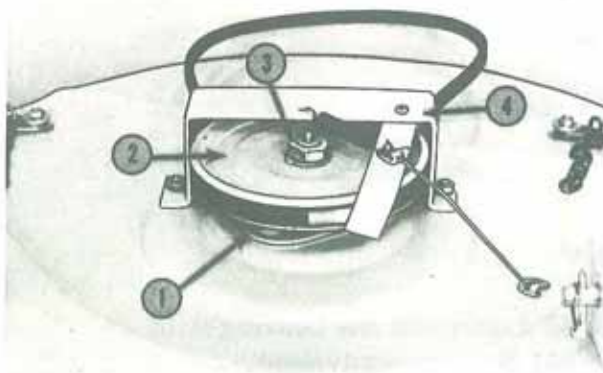
4. Remove the quick attach pins and retaining pins from the front brackets.

5. Raise the rear of the mower and disconnect the lift chains.

6. Slide the mower back and remove the drive belt from the crankshaft pulley.

7. Raise the mower lift handle. Raise the front of the rider sufficiently to slide the mower out.

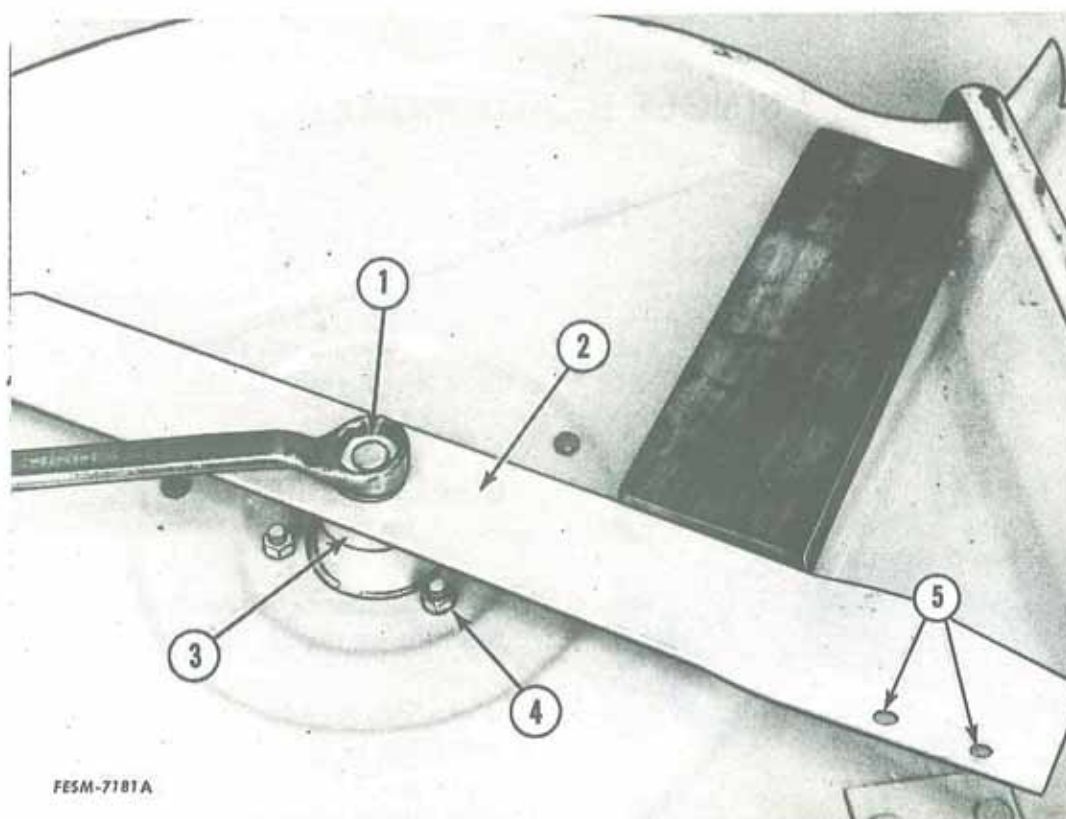
Disassembly



FESM-7180

1. Remove the belt guide and brake assembly.

1. Spindle housing
2. Pulley
3. Pulley nut
4. Belt guide and brake



FESM-7181A

1. Blade nut
2. Blade
3. Spindle cup
4. Spindle housing bolt
5. Wing mounting bolt holes

2. Block the blade as shown. Remove the pulley nut.

3. With the block in place, turn the mower over and remove the nut, blade and spindle cup.

4. Remove the spindle housing and pulley.

5. Remove the pulley from the spindle.

Inspection

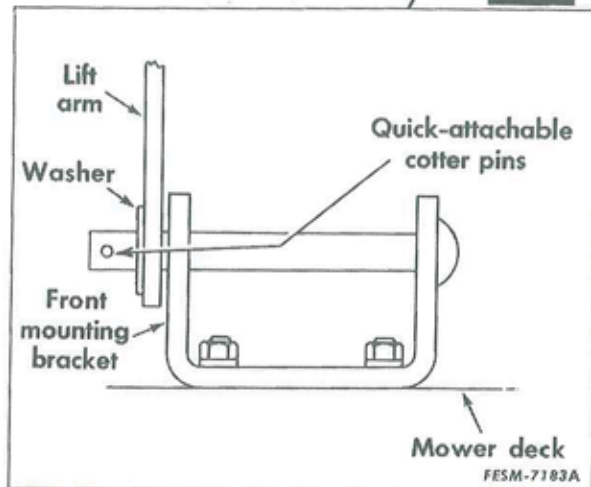
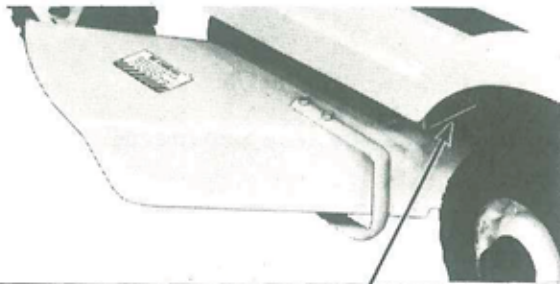
Clean and inspect all parts. Replace parts if necessary.

Reassembly

1. Reassembly is the reverse of disassembly.

2. Lubricate the bearing with IH 251 HEP or equivalent.

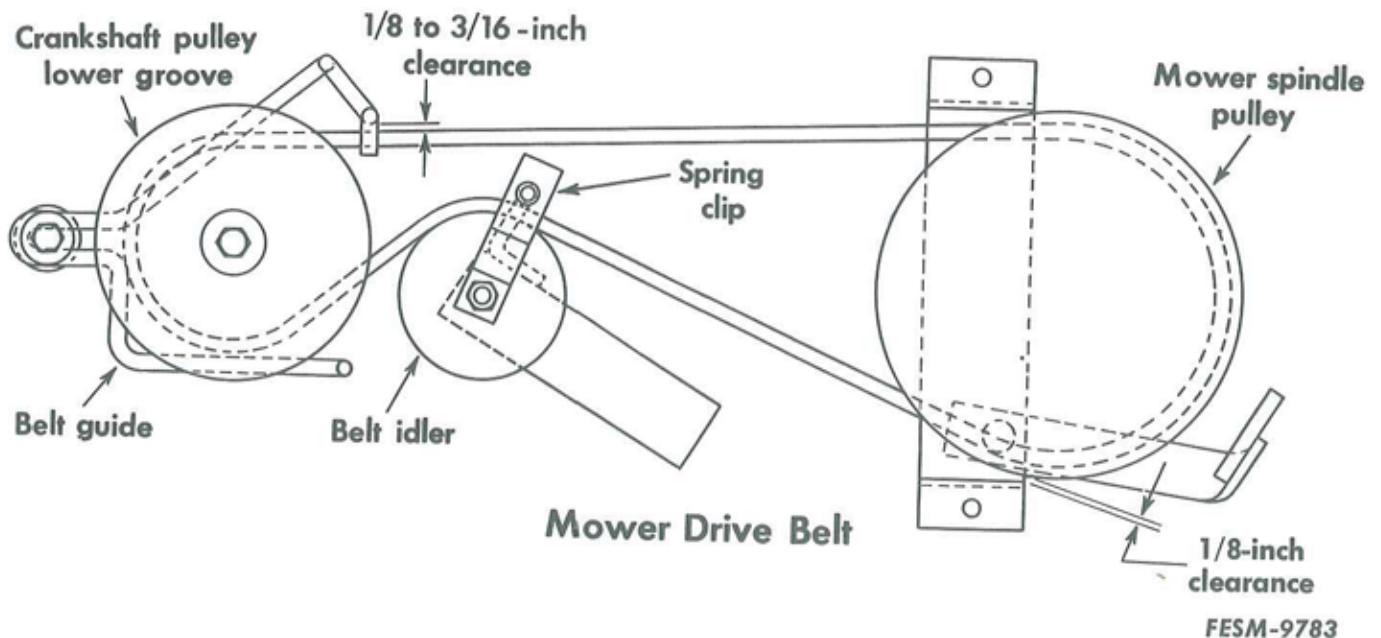
Installation



1. To install the mower, reverse the removal procedure.

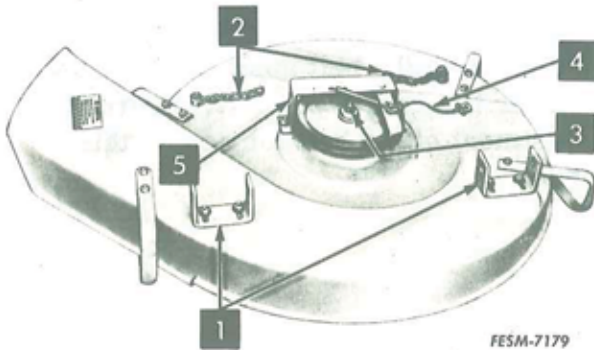
2. Position mower lift arm to the outside of the front mounting bracket.

3. Check that the belt is properly positioned in the belt guides. If the belt slips or is worn, replace it. There is no adjustment of the belt tension on this model.



Leveling the Mower

1. Place the mower on a hard flat surface. Disconnect the spark plug lead and lock the parking brake on.



FESM-7179

1. Front mounting brackets
2. Rear hanger chains
3. Lubrication fitting
4. Brake cable
5. Belt guide and brake cable arm

2. Check the tire pressure, 15 lbs. sq. /in.

3. Front to rear: Measure the distance from the ground to the blade (blade parallel to centerline of rider) front and rear in typical cutting height. If rear of mower measures low, the chain may be hooked in the second or third link depending on how much adjustment is required. If finer adjustment is required, add 11/32-inch washers between the mower deck and the rear hanger chains.

If the rear of the mower measures high, add 11/32-inch washers between mower deck and the rear hanger chains.

NOTE: For optimum efficiency the mower should be lower in front. Approximately 1/8 of an inch.

4. Side to side: Measure the distance from the ground to the blade (blade perpendicular to centerline of rider) side to side in typical cutting height. Add 11/32-inch washers between mower deck and front mounting bracket, depending on which measures high. Put an equal amount of washers under the rear hanger chain on the same side.

TWIN BLADE MOWER — CENTER BELT DRIVE

Removal

1. Disconnect the spark plug wire and lock the parking brake.

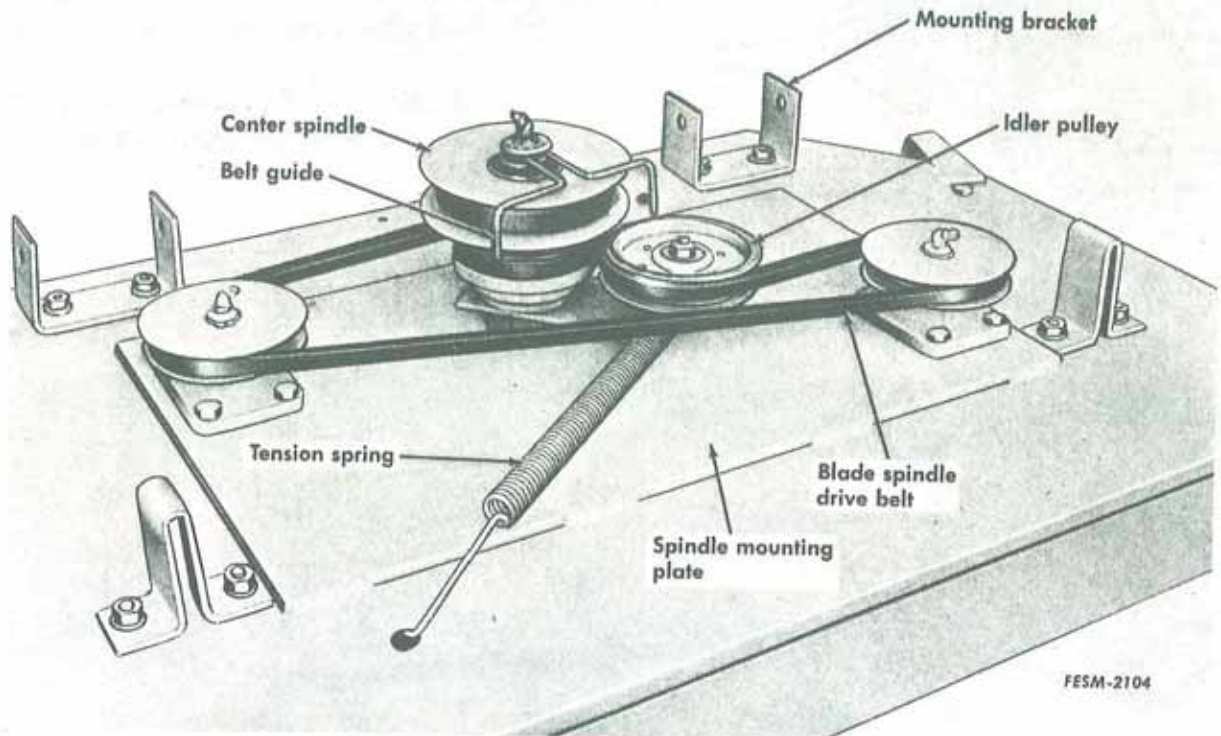
2. Place the mower clutch control in the disengaged position and lower the mower.

3. Remove the quick attach pins and retaining pins from the front brackets.

4. Slide the mower back off of the rear brackets. Work the drive belt off of the center spindle and out of the belt guides.

5. Raise the mower handle and slide the mower out from under the chassis.

Disassembly - Rear Discharge



1. Disconnect the idler spring and remove the spindle drive belt.

2. To disassemble the center pulley proceed as follows:

a. Remove the belt guide.

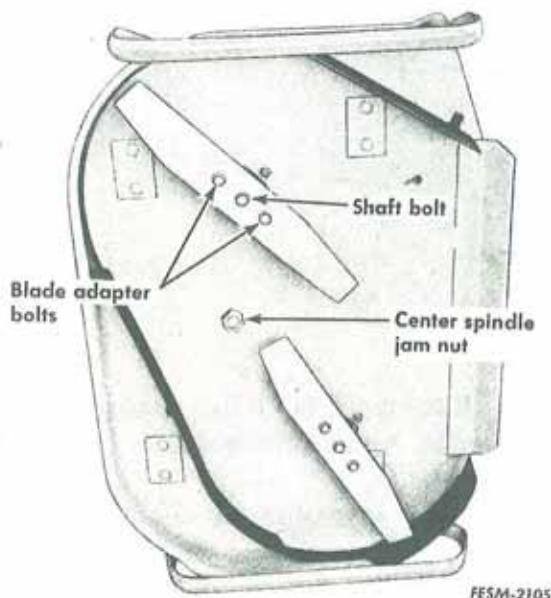
b. Remove the center spindle jam nut and lift the pulley and bearing off the mower.

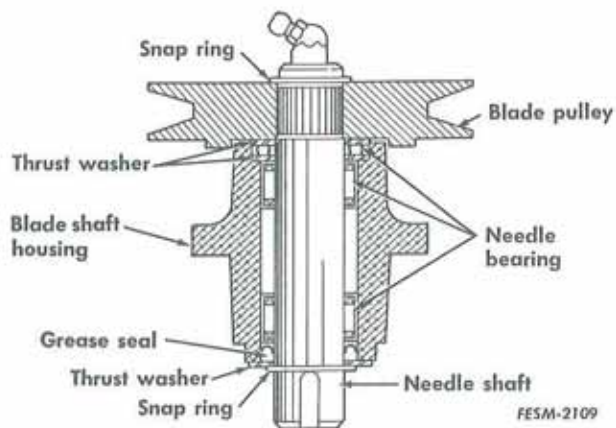
c. Remove the snap rings that position the bearing.

d. Press the bearing from the pulley. Press on the outer race to prevent damage to the bearing.

3. To disassemble a blade spindle proceed as follows:

a. Remove the shaft bolt. Remove the blade adapter and blade as an assembly.



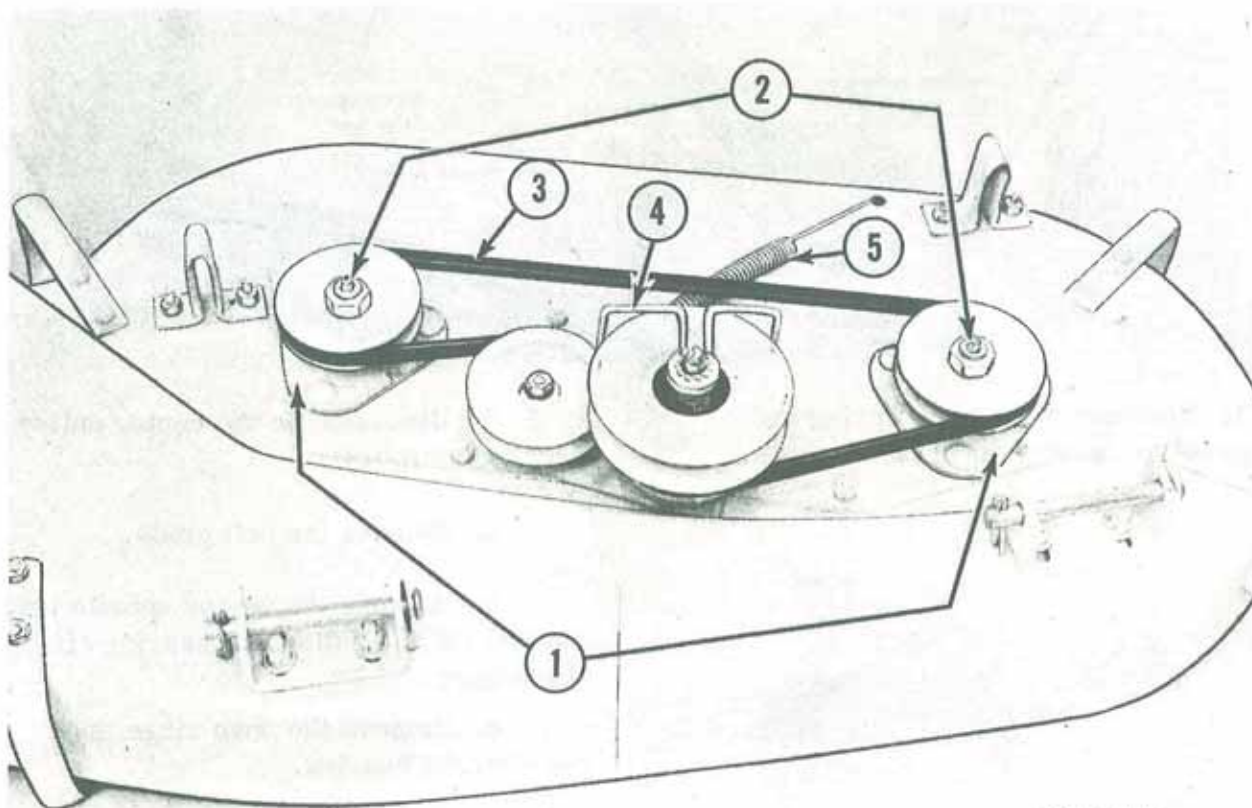


b. Remove the pulley and housing from the mower.

c. Remove the snap ring from the blade end of the housing. Slide the pulley and shaft assembly out of the housing.

d. Remove the grease fitting and snap ring. Press the shaft out of the pulley.

Disassembly - Side Discharge



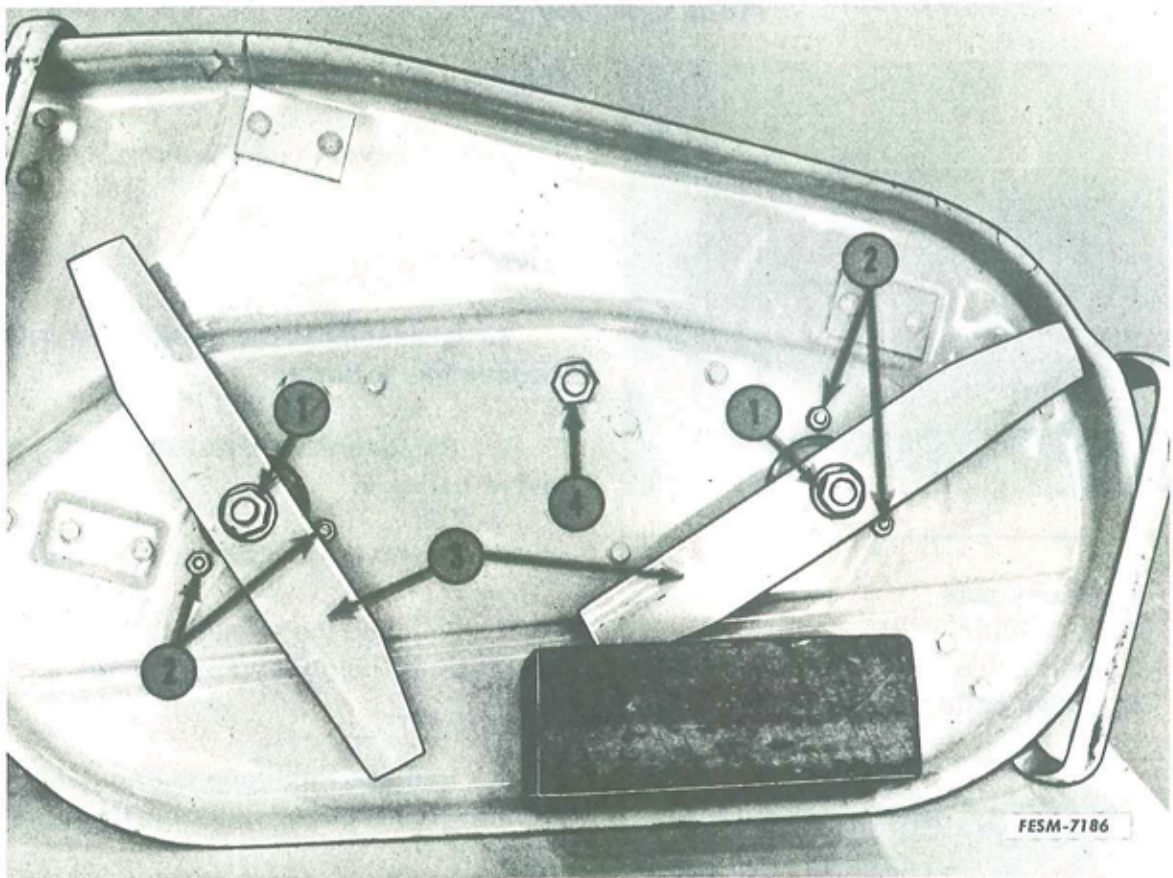
FESM-7185

1. Spindle housing
2. Pulley nut
3. Spindle drive belt
4. Belt guide
5. Idler spring

1. Disconnect the idler spring and remove the spindle drive belt.

2. To disassemble the center spindle proceed as follows:

a. Remove the belt guide.



- 1. Blade nut
- 2. Spindle housing bolt

- 3. Blade
- 4. Center spindle jam nut

b. Remove the center spindle jam nut and lift the pulley and bearing off the mower.

c. Remove the snap rings that position the bearing.

d. Press the bearing from the pulley. Press on the outer race to prevent damage to the bearing.

3. To disassemble a blade spindle proceed as follows:

a. Block the blade. Remove the pulley nut.

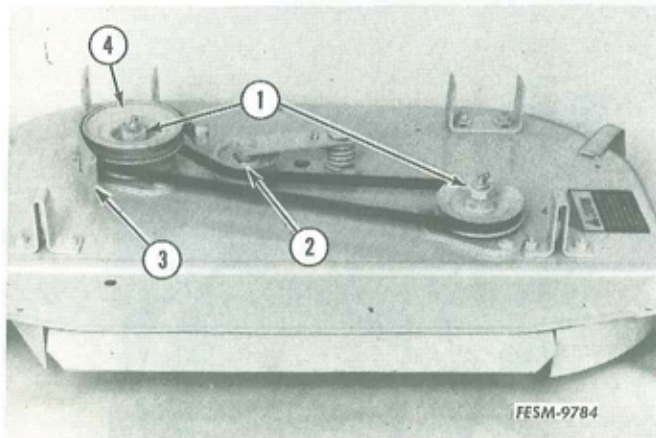
b. With the block in place, turn the mower over and remove the nut, blade and spindle cup.

c. Remove the spindle housing and pulley.

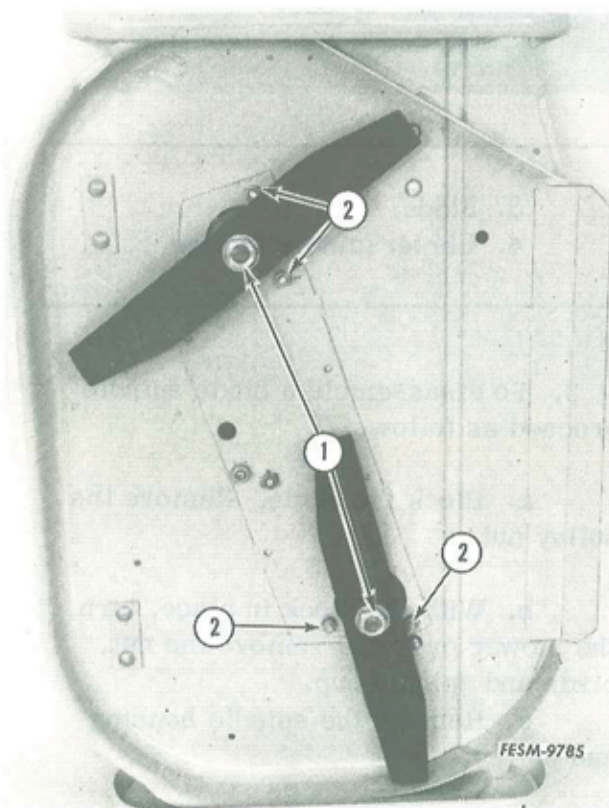
d. Remove the pulley from the spindle.

TWIN BLADE MOWER – SIDE BELT DRIVE

Rear Discharge



1. Pulley nuts
2. Belt idler
3. Belt guide
4. Drive pulley assembly



1. Blade nuts
2. Spindle nuts

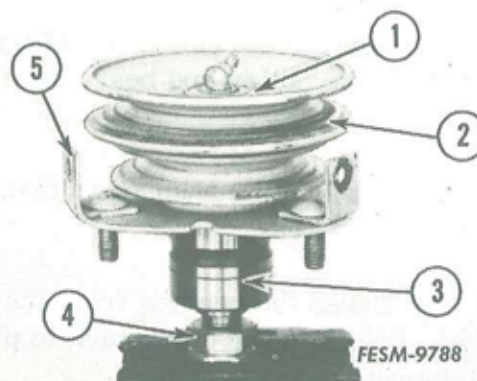
Removal

For removal procedures refer to page 4-6.

Disassembly

To disassemble the main drive pulley proceed as follows:

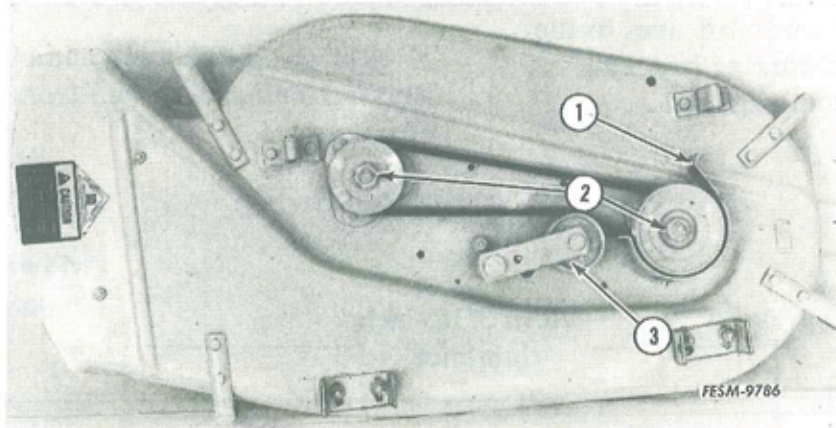
1. Remove the drive belt guide and drive belts.
2. Remove the blade nut and blade.
3. Remove the spindle housing nuts and lift out the pulley and bearing assembly.
4. Replace the blade nut on the spindle and lock in position using another like nut.
5. Place complete assembly in a vise and remove the pulley nut.
6. Remove the pulley from spindle keyway.



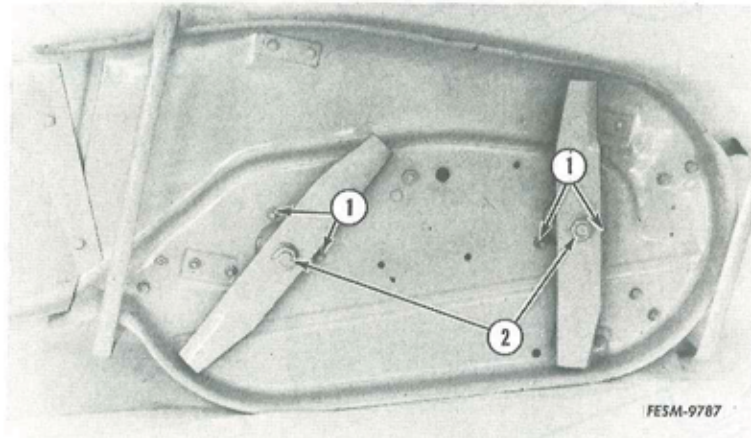
1. Pulley nut
2. Main drive pulley
3. Bearing assembly
4. Blade nut
5. Spindle housing

Disassembly - Side Discharge

1. For side discharge disassembly refer to rear discharge procedures.



1. Belt guide
2. Pulley nuts
3. Belt idler



1. Spindle nuts
2. Blade nuts

Inspection

Clean and inspect all parts. Replace parts if necessary.

Reassembly

1. Reassembly is the reversal of the disassembly procedure.

2. Lubricate the bearings with IH 251 HEP or equivalent.

Installation

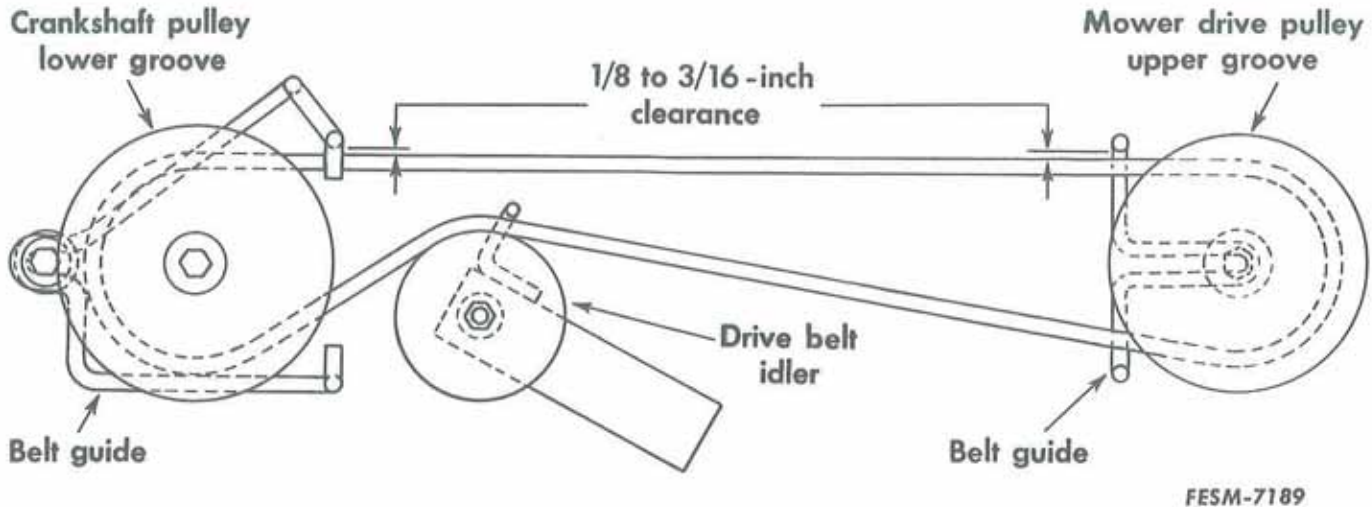
1. To install the mower, reverse the removal procedure.

2. Position the mower lift arm to the outside of the front mounting bracket. Refer to illustration on page 4-5.

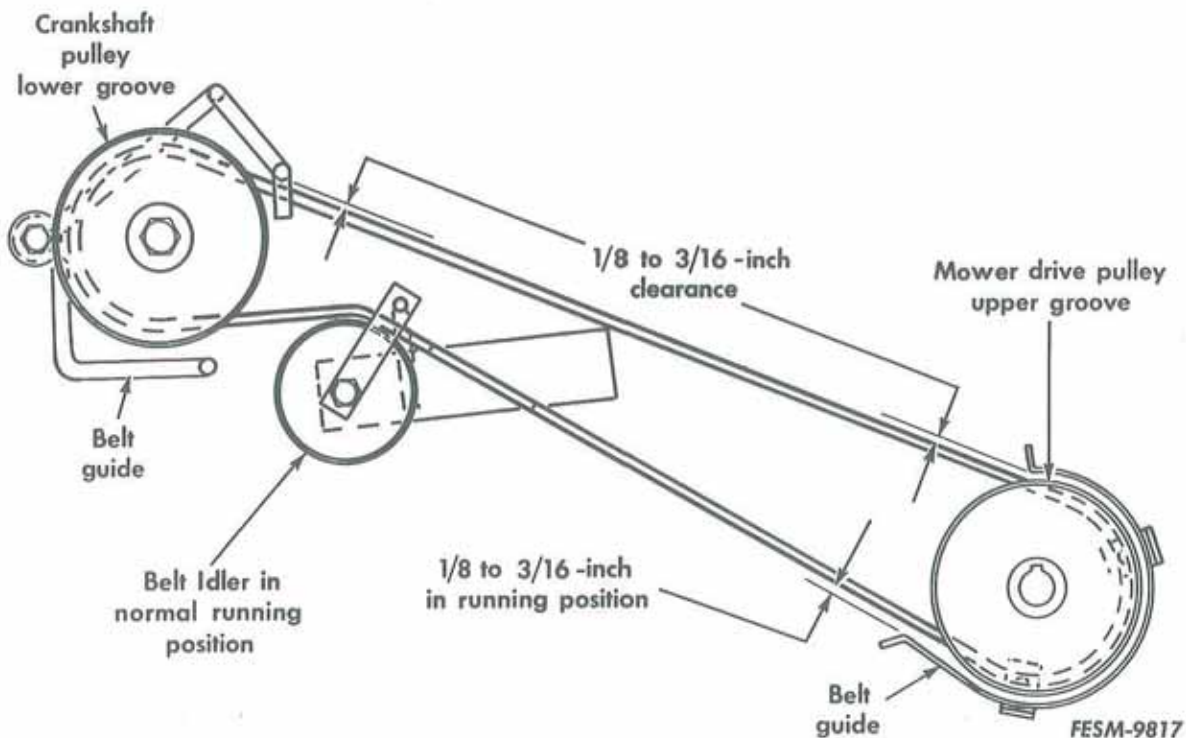
3. Check that the belt is properly positioned in the belt guides. Adjust the belt tension if necessary.

NOTE: Both center and side belt drive illustrations are viewed from the bottom of tractor.

Center Belt Drive



Side Belt Drive



Leveling the Mower

1. Drive the riding mower into a hard flat surface.

2. Turn the ignition off and disconnect the high tension wire to the spark plug. Lock the brake.

3. Check the tire pressure, 15 lbs. sq./in.

4. Front to Rear: Measure the distance from the ground to the blades (blades parallel to centerline of the rider) front and rear in typical cutting height. Add 11/32-inch washers between both

front or rear hanger brackets depending on which measures high.

NOTE: For optimum efficiency the mower should be lower in front. Approximately 1/8 of an inch.

5. Side to Side: Measure the distance from the ground to the blades (blades perpendicular to the centerline of the rider) right and left in typical cutting height. Add 11/32 inch washers between both right or left side mounting brackets depending on which measures high. Put an equal amount of washers under the rear mounting bracket on the same side.

Drive Belt Adjustment

The following drive belt adjustment procedure applies to both center and side belt drive mowers.

1. Shut off the engine and disconnect the high tension wire from the spark plug.

2. Lock the tractor brake.

3. Place the mower height control lever in the lowest position.

4. Engage the mower clutch.

5. Put a pencil line on the mower housing in front of the mower front mounting brackets.

6. Adjust the mower forward by loosening the front mounting brackets and sliding the mower forward until the distance between the backsides of the belt is 1-1/2-inch at the idler pulley.

NOTE: The mower should be moved forward an equal distance on each side (approximately 1/4-inch).

7. Tighten the front hangers.

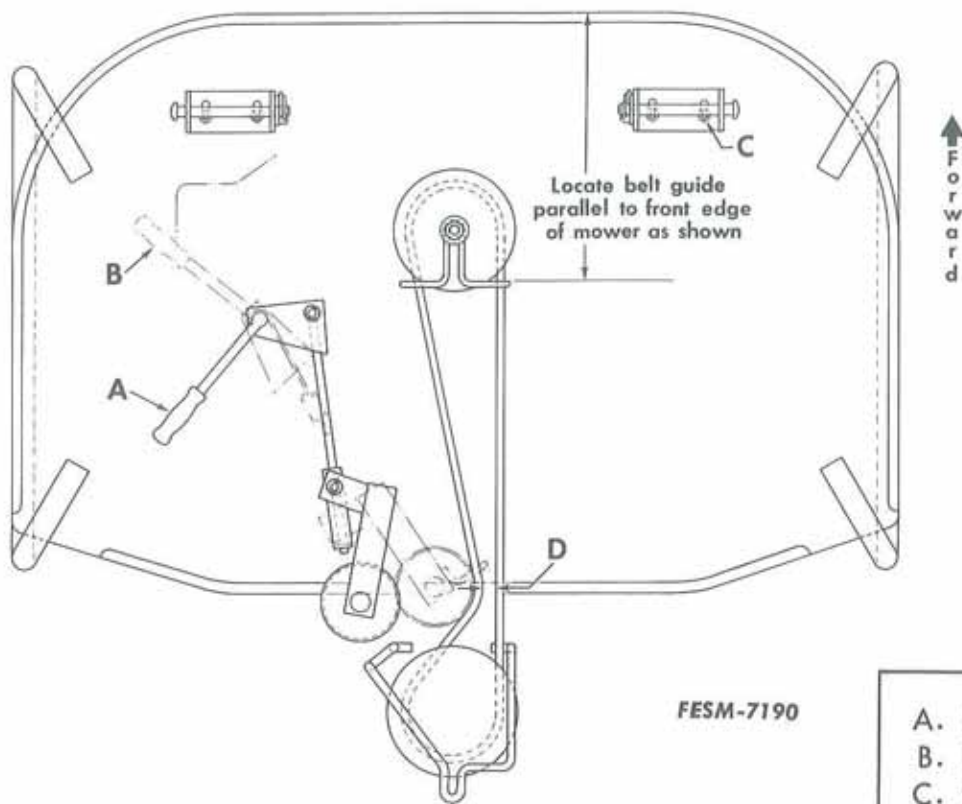
8. Reconnect the high tension wire to the spark plug.

9. Place the mower lift handle in the third position from the bottom. Start the engine and slowly engage the mower clutch control. Then, disengage and check to make sure mower declutches properly. If mower clutch control does not declutch, shut off the engine, detach the spark plug wire, and check position of belt guides. If it still will not declutch, move mower backward 1/16-inch.

10. Raise the mower to the maximum lift position and turn the wheels a full right and full left. If the clearance between the mower housing and the tires is less than 1/8-inch, the mower should be moved back slightly to give clearance.

NOTE: After adjustment, check the stopping time of the mower with mower height control set in the low, middle, and high positions. If the mower does not stop in seven seconds, repeat the adjustment procedure.

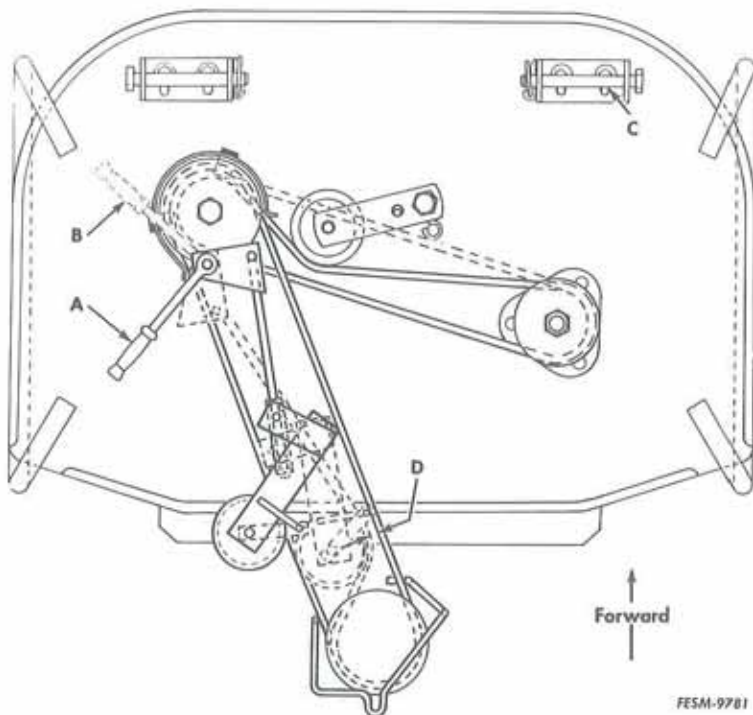
Center Belt Drive



FESM-7190

- A. Disengaged position
- B. Engaged position
- C. Front brackets
- D. 1-1/2" clearance for proper adjustment

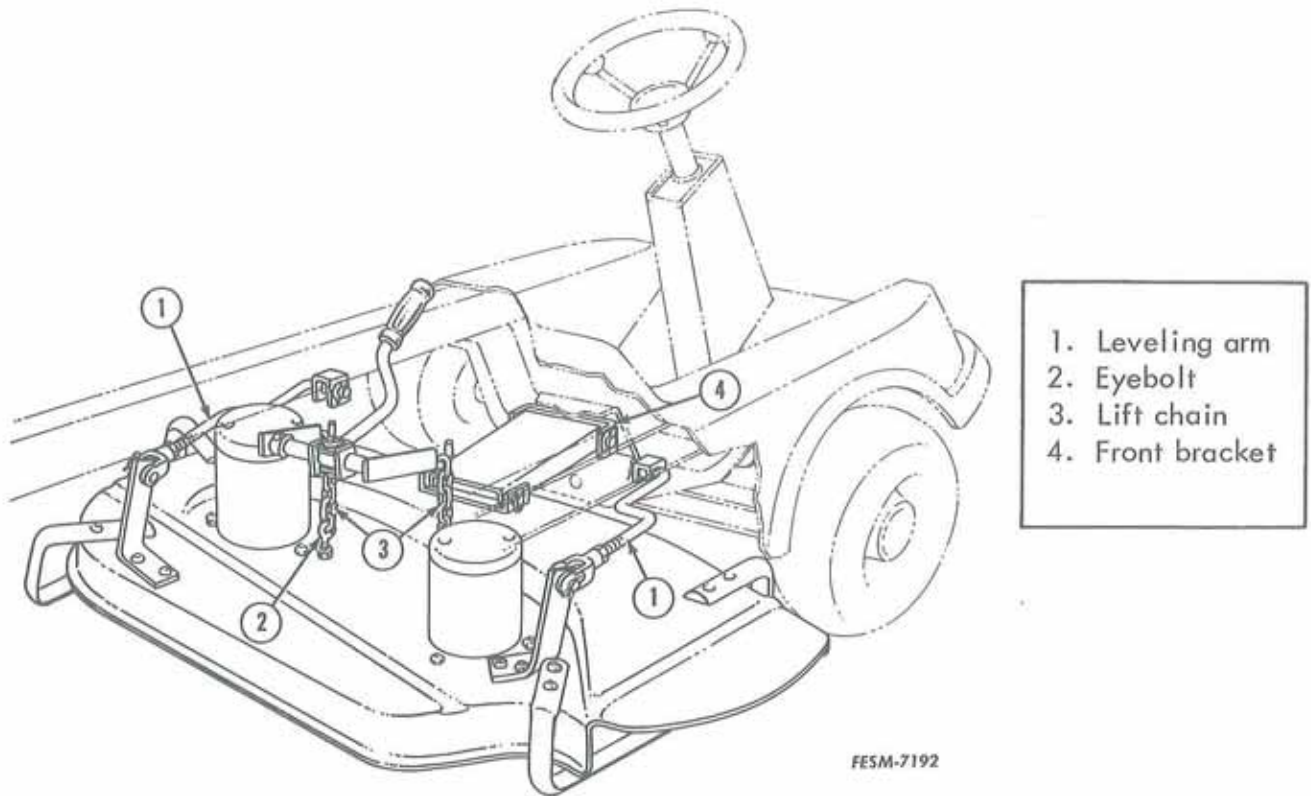
Side Belt Drive



FESM-9781

- A. Disengaged position
- B. Engaged position
- C. Front brackets
- D. 1-1/2" clearance for proper adjustment

TWIN BLADE MOWER - ELECTRIC DRIVE



Removal

1. Turn the traction and motor switches to the off position.

2. Engage and lock the brake.

3. Lower the mower to the lowest setting.

4. Disconnect the electrical connectors at each blade motor.

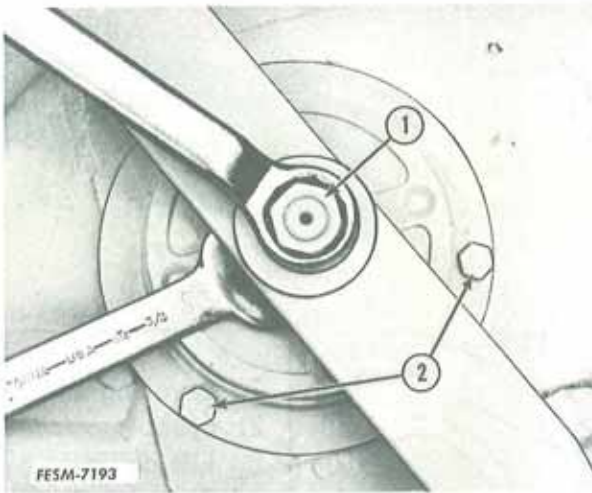
5. Disconnect the lift chains.

6. Remove the pin through the front mower bracket.

7. Remove the pin through the leveling arm clevis on both sides.

8. Raise the lift handle and slide the mower out.

Disassembly



1. Remove the blade.

2. Remove the mounting bolts and slide the motor out the bottom. Note the position of the electrical connector in relation to the mower body.

- | |
|---|
| <ul style="list-style-type: none">1. Blade nut2. Motor mounting bolt |
|---|

Inspection

Clean and inspect all parts. Replace parts if necessary.

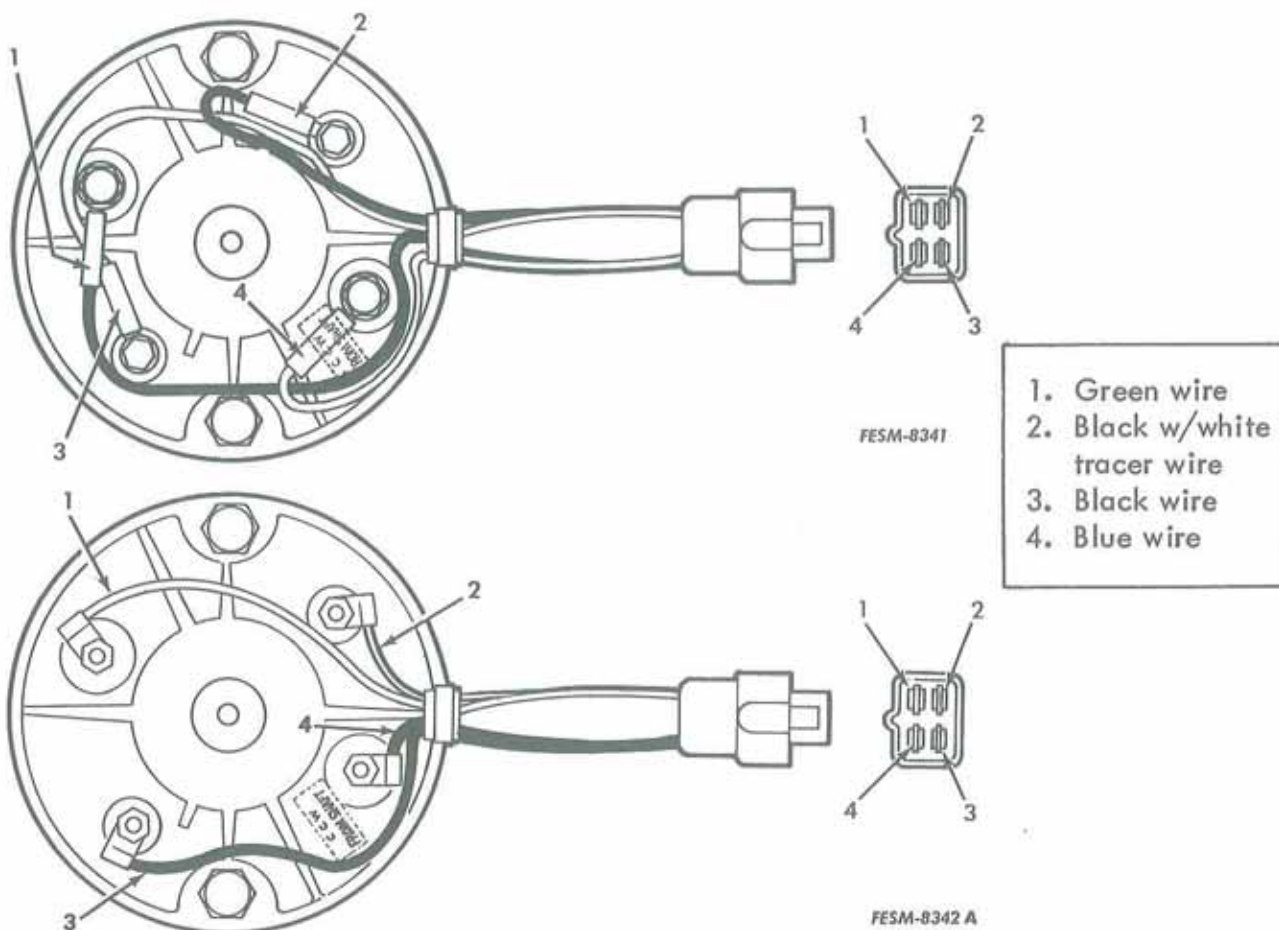
Reassembly

1. Be sure the motor is wired correctly or it will turn in the wrong direction.

2. Install the blade motors in the shroud. Position the motor so that the

electrical connectors can be easily connected.

3. Install the blade. Torque the blade nut to 45-55 ft. lbs.



Installation

Install the mower by reversing the removal procedure. Be sure the electrical connectors are properly installed or the motors will not run.

Leveling the Mower

1. Drive the mower onto a hard flat surface. Tire pressure should be the same in all tires.

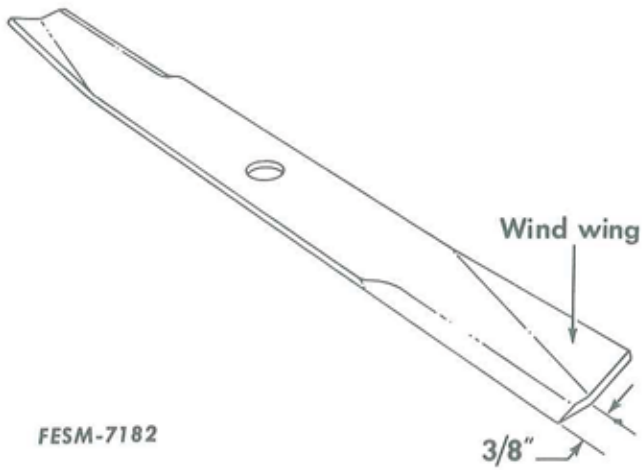
2. Turn the traction and blade motor switches to the "off" position and remove the key.

3. Front to Rear: Measure the distance from the ground to the blades (blades parallel to the centerline of the mower) front and rear. Loosen the jam nuts on the leveling arms. Remove the pin from one side at a time and adjust the clevis in or out as necessary.

4. Side to Side: Measure the distance from ground to the blades (blades perpendicular to the centerline of the mower) side to side. Loosen the nut securing the eyebolt to the deck and adjust the bolt as necessary.

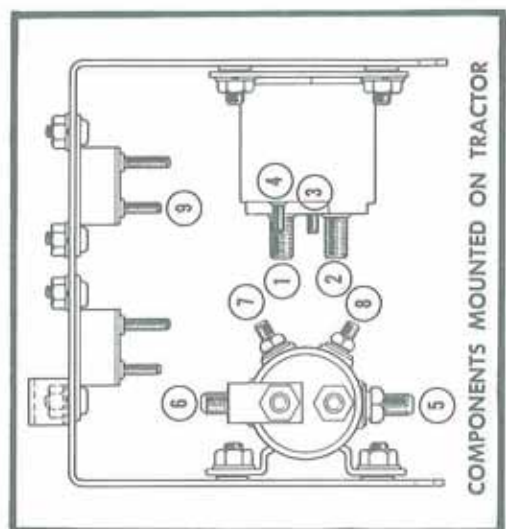
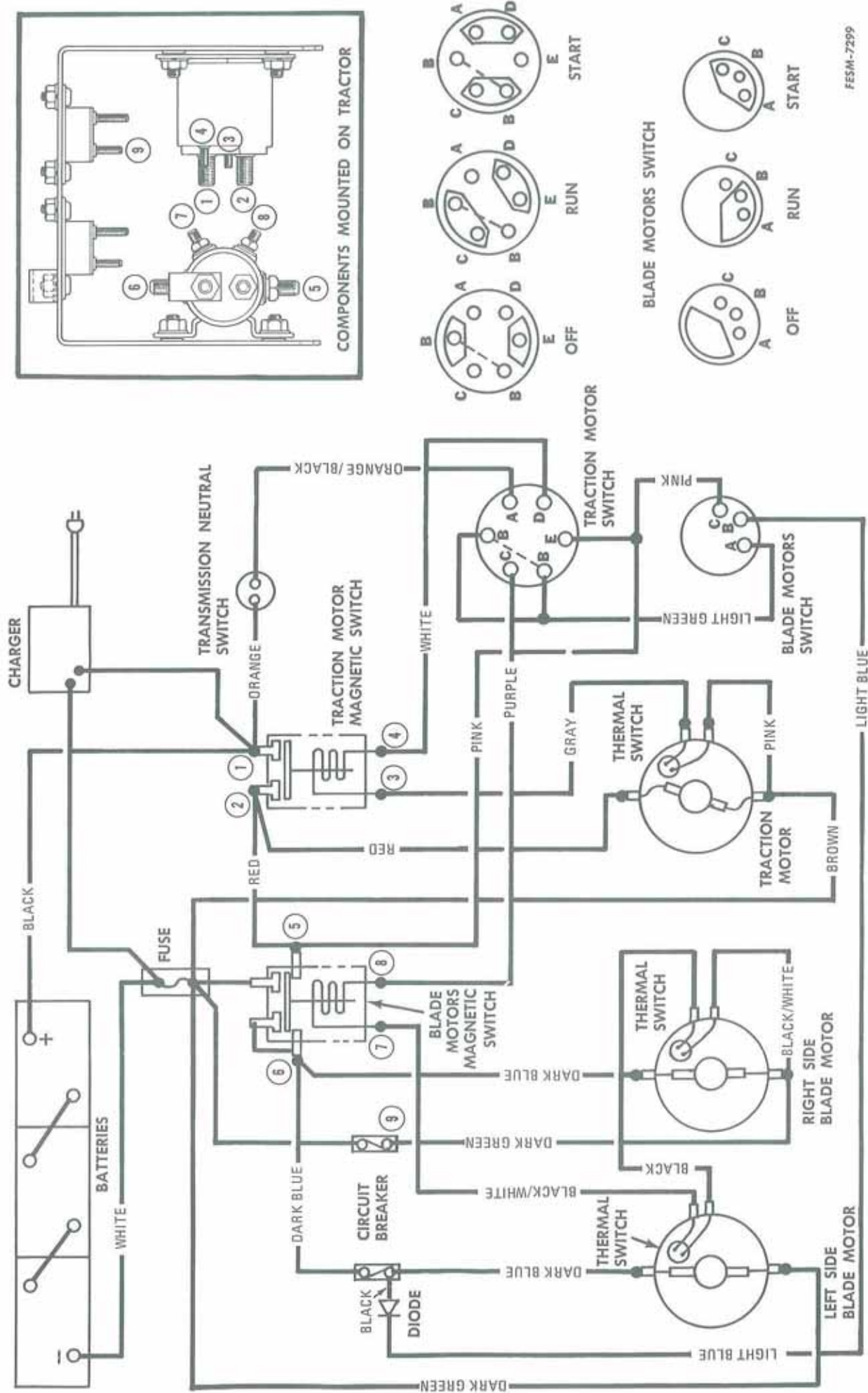
5. Check the clearance between the blade motors and the frame with the mower lift handle in the highest setting. Adjust the eyebolts an equal amount to provide some clearance between the motors and frame if there is interference.

BLADE SHARPENING

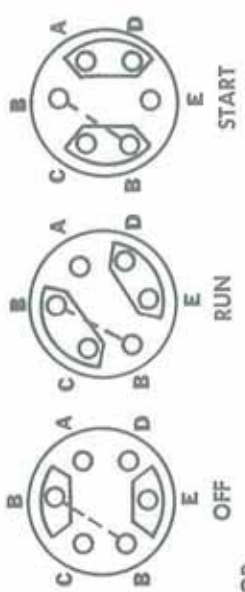


1. The cutting blades must be kept sharp at all times. The blades can be sharpened on the mower with a few strokes of a file or they can be removed from the mower and sharpened on a grinding wheel.

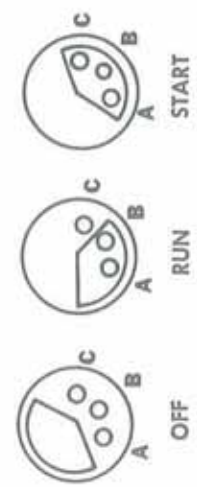
NOTE: Sharpen ends evenly so that blades remain balanced. However, if the cutting edge of the blade is within 3/8-inch of the wind wing, it is recommended that new blades be installed.



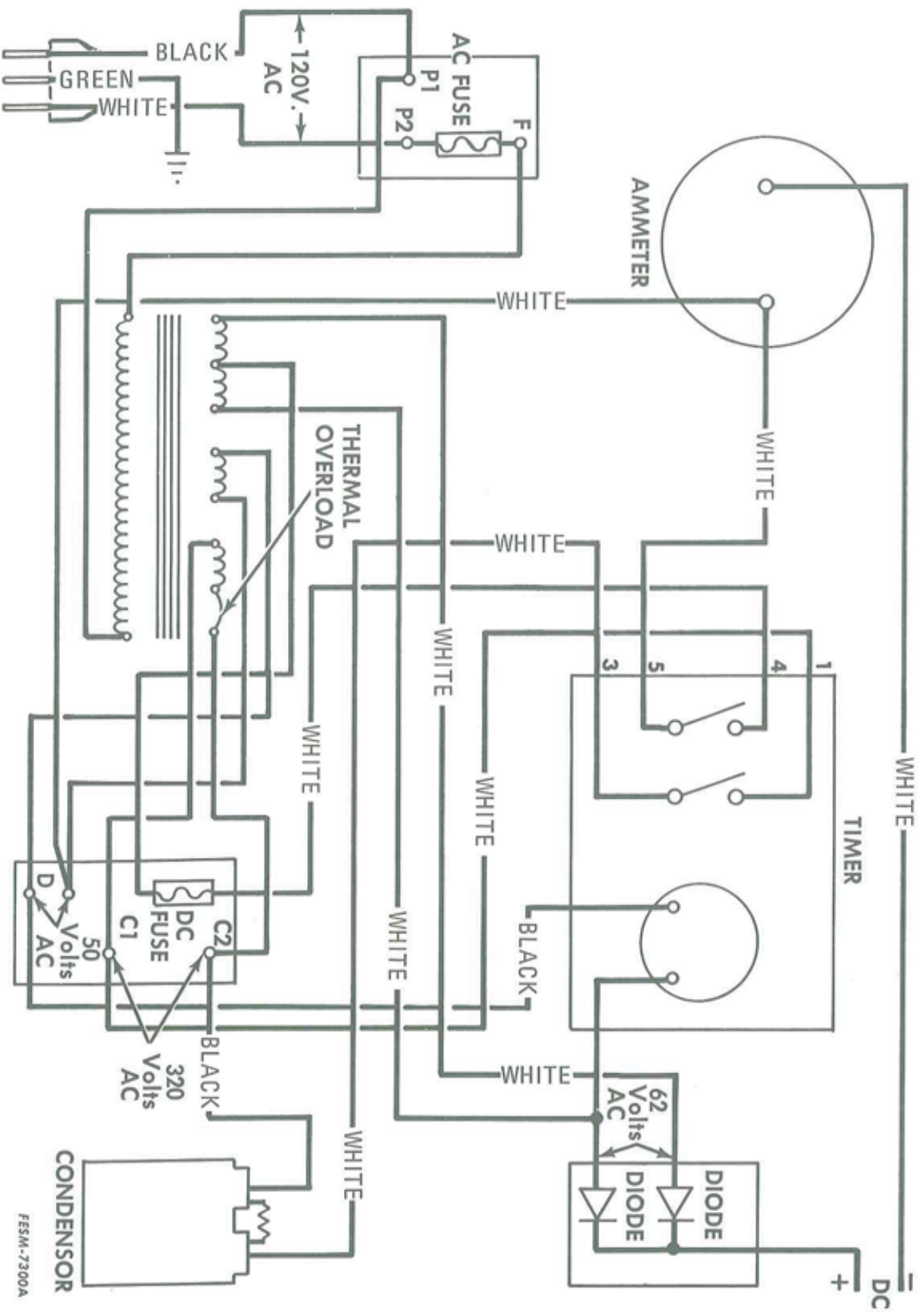
COMPONENTS MOUNTED ON TRACTOR



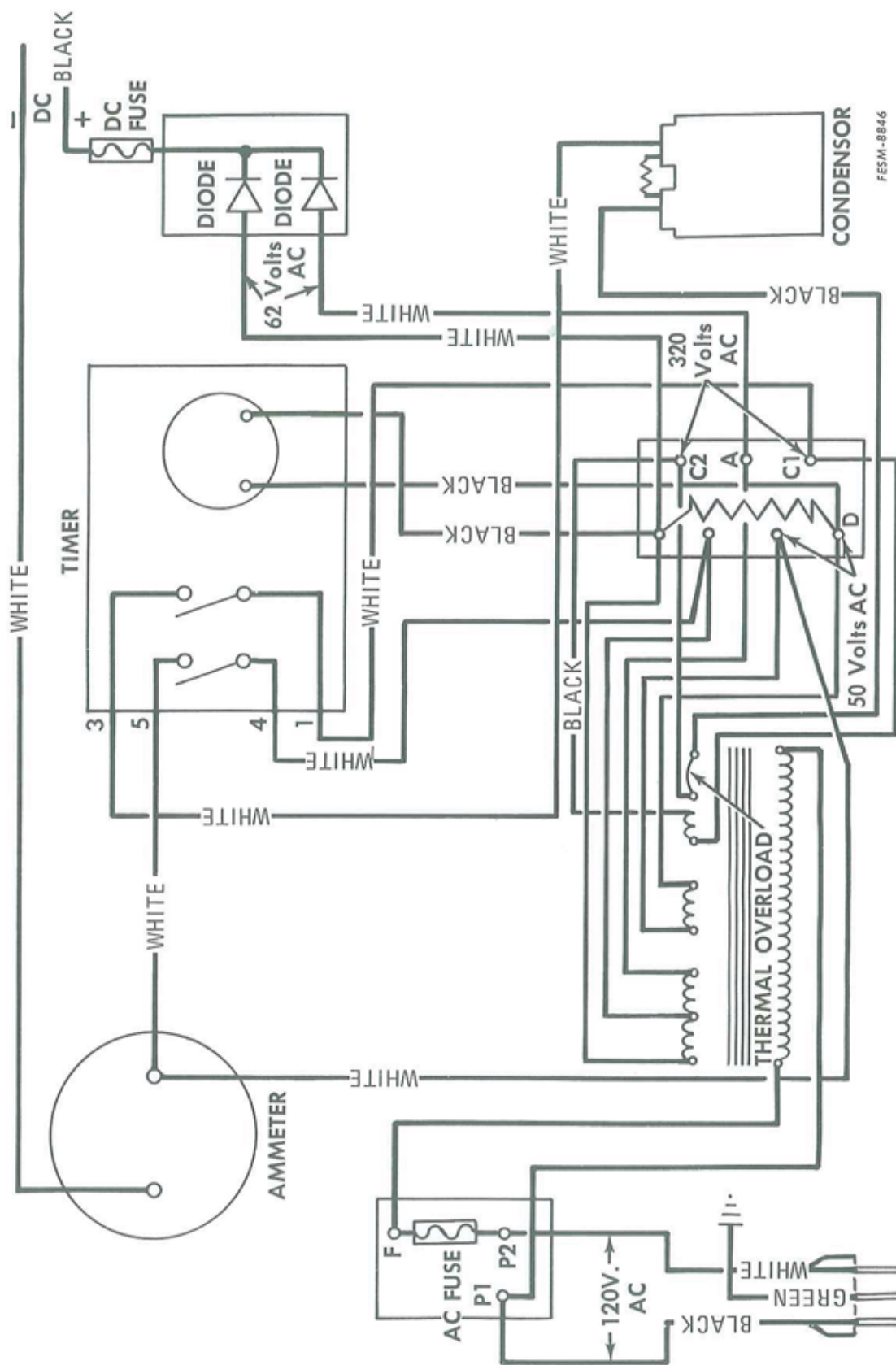
BLADE MOTORS SWITCH



CHARGER WIRING DIAGRAM SERIAL NO. 8921 AND BELOW



CHARGER WIRING DIAGRAM SERIAL NO. 8922 AND ABOVE





INTERNATIONAL HARVESTER