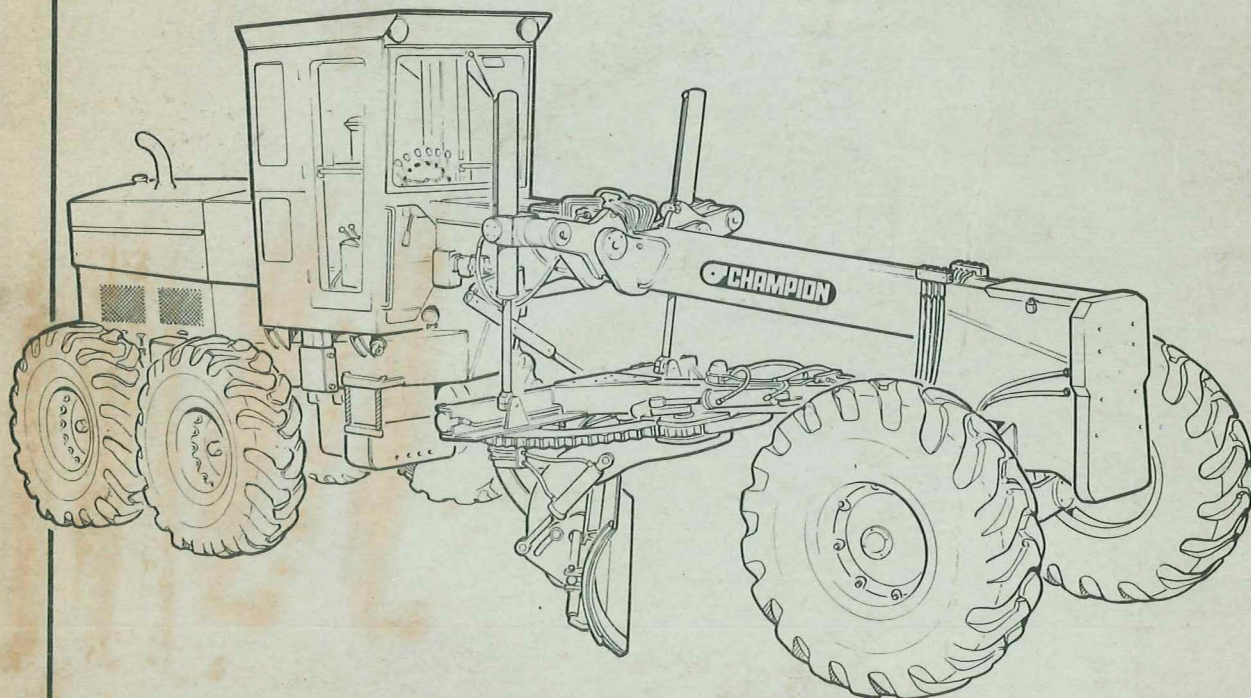


8-24-77



700 SERIES OPERATOR'S MANUAL



CHAMPION ROAD MACHINERY LIMITED
Goderich, Ontario, Canada N7A 3Y6

D 700 SERIES MOTOR GRADER

TYPE OF MODEL _____

GRADER SERIAL NUMBER _____

NAME AND ADDRESS OF CUSTOMER

700 SERIES OPERATOR'S MANUAL

INTRODUCTION

This manual has been prepared to help you become familiar with the starting, operation and maintenance of the Champion 700 Series grader.

The 700 Series grader has been designed and built to provide long, trouble-free service.

If a malfunction occurs, it should be reported as soon as possible to your service personnel to prevent further damage. An early diagnosis also prevents lengthy downtime, resulting in operating cost savings.

Your skill as an operator, regular maintenance and reasonable care will ensure the maximum service available from the 700 Series grader.

Design features of the graders described in this manual are current at the time of publication. Champion Road Machinery Limited reserves the right to improve the product by amending any specification without notice.

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Revision No. 1

700 SERIES OPERATOR'S MANUAL

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MODEL NO.	D-715	D-715A	D-720	D-720A	D-740	D-740A	D-760
FRAME TYPE	CONVENTIONAL	ARTICULATED	CONVENTIONAL	ARTICULATED	CONVENTIONAL	ARTICULATED	CONVENTIONAL
<u>WEIGHTS (9135 TRANSMISSION, G.M. 4-71 ENGINE):</u>							
WITH HALF-CAB, LESS R.O.P.S.	25,600 lb 11 612 kg	27,600 lb 12 519 kg	28,500 lb 12 936 kg	30,500 lb 13 843 kg	30,500 lb 13 843 kg	32,500 lb 14 751 kg	37,000 lb 16 783 kg
ON FRONT WHEELS	8,800 lb 3992 kg	9,300 lb 4218 kg	9,500 lb 4309 kg	9,700 lb 4400 kg	10,000 lb 4536 kg	10,500 lb 4762 kg	11,000 lb 4990 kg
ON REAR WHEELS	16,800 lb 7620 kg	18,300 lb 8301 kg	19,000 lb 8264 kg	20,800 lb 9441 kg	20,500 lb 9304 kg	22,000 lb 9985 kg	26,000 lb 11 793 kg
WITH FULL CAB, ADD	500 lb 226,8 kg	500 lb 226,8 kg	500 lb 226,8 kg	500 lb 226,8 kg	500 lb 226,8 kg	500 lb 226,8 kg	500 lb 226,8 kg
WITH R.O.P.S., ADD	850 lb 385,5 kg	850 lb 385,5 kg	850 lb 385,5 kg	850 lb 385,5 kg	850 lb 385,5 kg	850 lb 385,5 kg	850 lb 385,5 kg
<u>DIMENSIONS:</u>							
LENGTH, OVERALL	27ft 4in. 8331 mm	27ft 4in. 8331 mm	27ft 4in. 8331 mm	27ft 4in. 8331 mm	27ft 10in. 8484 mm	27ft 10in. 8484 mm	27ft 10in. 8484 mm
WIDTH OVERALL	7ft 10in. 2388 mm	7ft 10in. 2388 mm	7ft 10in. 2388 mm	7ft 10in. 2388 mm	8ft 1in. 2463 mm	8ft 1in. 2463 mm	8ft 3in. 2514 mm
HEIGHT, OVERALL, HALF-CAB	9ft 1in. 2769 mm	9ft 1in. 2769 mm	9ft 1in. 2769 mm	9ft 1in. 2769 mm	9ft 2in. 2794 mm	9ft 2in. 2794 mm	9ft 4in. 2845 mm
HEIGHT, OVERALL, FULL-CAB	10ft 8½in. 3264 mm	10ft 8½in. 3264 mm	10ft 8½in. 3264 mm	10ft 8½in. 3264 mm	10ft 9½in. 3289 mm	10ft 9½in. 3289 mm	11ft 0in. 3353 mm
WHEELBASE	19ft 6in. 5944 mm	20ft 0in. 6096 mm	19ft 6in. 5944 mm	20ft 0in. 6096 mm	20ft 0in. 6096 mm	20ft 6in. 6248 mm	20ft 0in. 6096 mm
BLADEBASE	8ft 7in. 2616 mm	8ft 7in. 2616 mm	8ft 7in. 2616 mm	8ft 7in. 2616 mm	9ft 1in. 2770 mm	9ft 1in. 2770 mm	9ft 1in. 2770 mm
TREAD, FRONT & REAR	6ft 7in. 2007 mm	6ft 7in. 2007 mm	6ft 7in. 2007 mm	6ft 7in. 2007 mm	6ft 10in. 2083 mm	6ft 10in. 2083 mm	6ft 10in. 2083 mm
TANDEM CENTRE DISTANCE	5ft 0 3/4in. 1543 mm	5ft 0 3/4in. 1543 mm	5ft 0 3/4in. 1543 mm	5ft 0 3/4in. 1543 mm	5ft 0 3/4in. 1543 mm	5ft 0 3/4in. 1543 mm	5ft 3 1/2in. 1613 mm
TURNING RADIUS	35ft 0in. 10 668 mm	24ft 0in. 7315 mm	35ft 0in. 10 668 mm	24ft 0in. 7315 mm	37ft 0in. 11 278 mm	25ft 0in. 7620 mm	38ft 0in. 11 582 mm
BLADE LENGTH, WIDTH, THICKNESS	12ftx25in.x3/4in. 3657x635x19 mm	12ftx25in.x3/4in. 3657x635x19 mm	12ftx25in.x3/4in. 3657x635x19 mm	12ftx25in.x3/4in. 3657x635x19 mm	12ftx29in.x1in. 3657x736x25 mm	12ftx29in.x1in. 3657x736x25 mm	14ftx29in.x1in. 4267x736x25 mm
REACH OUTSIDE TIRES	6ft 2in. 1880 mm	6ft 2in. 1880 mm	6ft 2in. 1880 mm	6ft 2in. 1880 mm	6ft 2in. 1880 mm	6ft 2in. 1880 mm	7ft 2in. 2184 mm

MODEL NO.	D-715	D-715A	D-720	D-720A	D-740	D-740A	D-760
FRAME TYPE	CONVENTIONAL	ARTICULATED	CONVENTIONAL	ARTICULATED	CONVENTIONAL	ARTICULATED	CONVENTIONAL
<u>CAPACITIES:</u>							
FUEL TANK	62 lmp gal 74.4 U.S. gal 281,6 litres	62 lmp gal 74.4 U.S. gal 281,6 litres	62 lmp gal 74.4 U.S. gal 281,6 litres	62 lmp gal 74.4 U.S. gal 281,6 litres	62 lmp gal 74.4 U.S. gal 281,6 litres	62 lmp gal 74.4 U.S. gal 281,6 litres	83 lmp gal 99.7 U.S. gal 377,4 litres
TRANSMISSION	4.0 lmp gal 4.8 U.S. gal 18,1 litres	4.0 lmp gal 4.8 U.S. gal 18,1 litres	4.0 lmp gal 4.8 U.S. gal 18,1 litres	4.0 lmp gal 4.8 U.S. gal 18,1 litres	4.0 lmp gal 4.8 U.S. gal 18,1 litres	4.0 lmp gal 4.8 U.S. gal 18,1 litres	4.0 lmp gal 4.8 U.S. gal 18,1 litres
FINAL DRIVE	9.0 lmp gal 10.8 U.S. gal 40,9 litres	9.0 lmp gal 10.8 U.S. gal 40,9 litres	9.0 lmp gal 10.8 U.S. gal 40,9 litres	9.0 lmp gal 10.8 U.S. gal 40,9 litres	9.0 lmp gal 10.8 U.S. gal 40,9 litres	9.0 lmp gal 10.8 U.S. gal 40,9 litres	9.0 lmp gal 10.8 U.S. gal 40,9 litres
TANDEMS, EACH	5.0 lmp gal 6.0 U.S. gal 22,7 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres
HYD. OIL TANK	10.0 lmp gal 12.0 U.S. gal 45,4 litres	10.0 lmp gal 12.0 U.S. gal 45,4 litres	10.0 lmp gal 12.0 U.S. gal 45,4 litres	10.0 lmp gal 12.0 U.S. gal 45,4 litres	10.0 lmp gal 12.0 U.S. gal 45,4 litres	10.0 lmp gal 12.0 U.S. gal 45,4 litres	10.0 lmp gal 12.0 U.S. gal 45,4 litres
<u>ENGINE OPTIONS:</u>							
MAKE & MODEL	G.M. 4-71N65	G.M. 4-71N65	G.M. 4-71N65	G.M. 4-71N65	G.M. 6-71N60	G.M. 6-71N60	G.M. 6-71N65
TYPE	2cycle, 2valve	2cycle, 2valve	2cycle, 4valve	2cycle, 4valve	2cycle, 2valve	2cycle, 2valve	2cycle, 4valve
NO. OF CYLINDERS	4	4	4	4	6	6	6
BORE & STROKE	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm
DISPLACEMENT	284 cu in. 4652 cu cm	284 cu in. 4652 cu cm	284 cu in. 4652 cu cm	284 cu in. 4652 cu cm	426 cu in. 6977 cu cm	426 cu in. 6977 cu cm	426 cu in. 6980 cu cm
RATED BRAKE H.P.	142@2100rpm	142@2100rpm	152@2100rpm	152@2100rpm	197@2100rpm	197@2100rpm	228@2100rpm
H.P. (NET FLYWHEEL)	128@2100rpm	128@2100rpm	144@2100rpm	144@2100rpm	181@2100rpm	181@2100rpm	214@2100rpm
COOLING CAPACITY	8.0 lmp gal 9.6 U.S. gal 36,4 litres	8.0 lmp gal 9.6 U.S. gal 36,4 litres	8.0 lmp gal 9.6 U.S. gal 36,4 litres	8.0 lmp gal 9.6 U.S. gal 36,4 litres	11.0 lmp gal 13.2 U.S. gal 50,0 litres	11.0 lmp gal 13.2 U.S. gal 50,0 litres	11.0 lmp gal 13.2 U.S. gal 50,0 litres
CRANKCASE CAPACITY	3.1 lmp gal 3.7 U.S. gal 14,1 litres	3.1 lmp gal 3.7 U.S. gal 14,1 litres	3.1 lmp gal 3.7 U.S. gal 14,1 litres	3.1 lmp gal 3.7 U.S. gal 14,1 litres	4.5 lmp gal 5.4 U.S. gal 20,4 litres (Clark P.S. trans. available)	4.5 lmp gal 5.4 U.S. gal 20,4 litres	4.5 lmp gal 5.4 U.S. gal 20,4 litres (Clark P.S. trans. only)

MODEL NO.	D-715	D-715A	D-720	D-720A	D-740	D-740A	D-760
FRAME TYPE	CONVENTIONAL	ARTICULATED	CONVENTIONAL	ARTICULATED	CONVENTIONAL	ARTICULATED	CONVENTIONAL
<u>ENGINE OPTIONS (cont'd):</u>							
MAKE & MODEL	--	--	AC3500MKII	AC3500MKII	G.M.6-71N65	G.M.6-71N65	G.M.6V-92N70
TYPE	--	--	4cycle turbo	4cycle turbo	2cycle, 4valve	2cycle, 4valve	2cycle, 4valve
NO. OF CYLINDERS	--	--	6	6	6	6	6
BORE & STROKE	--	--	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.25x5.0in. 108x127 mm	4.84x5.0in. 123x127 mm
DISPLACEMENT	--	--	426 cu in. 6977 cu cm	426 cu in. 6977 cu cm	426 cu in. 6977 cu cm	426 cu in. 6977 cu cm	552 cu in. 9046 cu cm
RATED BRAKE H.P.	--	--	149@2100rpm	149@2100rpm	228@2100rpm	228@2100rpm	240@2100rpm
H.P. (NET FLYWHEEL)	--	--	140@2100rpm	140@2100rpm	214@2100rpm	214@2100rpm	230@2100rpm
COOLING CAPACITY	--	--	7.75 lmp gal 9.3 U.S. gal 35,2 litres	7.75 lmp gal 9.3 U.S. gal 35,2 litres	11.0 lmp gal 13.2 U.S. gal 50,0 litres	11.0 lmp gal 13.2 U.S. gal 50,0 litres	12.0 lmp gal 14.4 U.S. gal 54,5 litres
CRANKCASE CAPACITY	--	--	4.6 lmp gal 5.52 U.S. gal 20,9 litres	4.6 lmp gal 5.52 U.S. gal 20,9 litres	4.5 lmp gal 5.4 U.S. gal 20,4 litres (Clark P.S. trans. available)	4.5 lmp gal 5.4 U.S. gal 20,4 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres (9150 P.S. trans only)
MAKE & MODEL	--	--	Deutz F6L-413	Deutz F6L-413	Deutz F8L-413	Deutz F8L-413	Cummins N-855-C220
TYPE	--	--	4 cycle	4 cycle	4 cycle	4 cycle	4 cycle
NO. OF CYLINDERS	--	--	6	6	8	8	6
BORE & STROKE	--	--	4.75x4.875in. 120x124 mm	4.75x4.875in. 120x124 mm	4.72x4.92in. 120x125 mm	4.72x4.92in. 120x125 mm	5.50x6.0in. 139x152 mm
DISPLACEMENT	--	--	517 cu in. 8472 cu cm	517 cu in. 8472 cu cm	690 cu in. 11 309 cu cm	690 cu in. 11 309 cu cm	855 cu in. 14 011 cu cm
RATED BRAKE H.P.	--	--	134@2100rpm	134@2100rpm	178@2100rpm	178@2100rpm	220@2100rpm
H.P. (NET FLYWHEEL)	--	--	132@2100rpm	132@2100rpm	176@2100rpm	176@2100rpm	193@2100rpm
COOLING CAPACITY	--	--	AIR	AIR	AIR	AIR	9.25 lmp gal 11.1 U.S. gal 41,9 litres
CRANKCASE CAPACITY	--	--	3.25 lmp gal 3.9 U.S. gal 14,8 litres	3.25 lmp gal 3.9 U.S. gal 14,8 litres	3.73 lmp gal 4.47 U.S. gal 16,9 litres	3.73 lmp gal 4.47 U.S. gal 16,9 litres	5.0 lmp gal 6.0 U.S. gal 22,7 litres (9150 P.S. trans. optional)

OPERATOR'S MANUAL

<u>MODEL NO.</u>	<u>D-740</u>
<u>FRAME TYPE</u>	<u>CONVENTIONAL</u>
<u>ENGINE OPTIONS (cont'd):</u>	
MAKE & MODEL	Cummins N-855-C220
TYPE	4 cycle
NO. OF CYLINDERS	6
BORE & STROKE	5.50x6.0in. 139x152 mm
DISPLACEMENT	855 cu in. 14 011 cu cm
RATED BRAKE H.P.	220@2100rpm
H.P. (NET FLYWHEEL)	193@2100rpm
COOLING CAPACITY	9.25 Imp gal 11.1 U.S. gal 41,9 litres
CRANKCASE CAPACITY	5.0 Imp gal 6.0 U.S. gal 22,7 litres (9150 P.S. trans. optional)

D700 SERIES GRADER SERIAL NUMBERS - EXPLANATION

A typical D 700 series serial number is shown below, followed by a detailed explanation.

740-A-23-16-9182

- 7 - designates 700 series
- 40 - is the model class indicating weight and horsepower range, and could be 15, 20, 30, 40, 60 or 80.
- A - indicates that the frame is articulated. If there is no letter "A", the frame is rigid.
- 2 - designates the engine, and could be any of the following:
 - 1 - G.M. 4-71
 - 2 - G.M. 6-71
 - 3 - G.M. 6V71
 - 4 - G.M. 6V92
 - 5 - A.C. 3500
 - 6 - Deutz F6L-413V
 - 7 - Deutz F8L-413V
 - 8 - Cummins 855-C220
- 3 - designates the transmission option, and could be any of the following:
 - 1 - 9135 8-speed constant-mesh manual shift
 - 2 - 9138 8-speed power range shift
 - 3 - 9150 DRMCO 6-speed power-shift
 - 4 - Clark 6-speed power-shift
- 16 - is the total number of the designated model built with the given engine and transmission.
- 9182 - is the total number of graders built in the current serial numbering system. This is the number by which one machine is distinguished from another, since it is given this number when released from the assembly line. The model number has no bearing on this number, and the next unit produced will be 9183.

Therefore, the above typical serial number designates the grader as a D700 series machine in the 40 class with an articulated frame. It has a G.M. 6-71 engine and a DRMCO model 9150 power-shift transmission. This unit is the sixteenth 740A with this engine and transmission option, and is the 9182nd machine built since the number system began.

APPLICATION	CAPACITIES	FILTER CHANGE	LEVEL CHECK	LUBRICANT CHANGE	RECOMMENDED SPECIFICATIONS
DRMCO 9135 TRANSMISSION AND OIL CLUTCH	4.5 Imp gal 5.4 U.S. gal 20,4 litres	500 Hours	Daily	1000 Hours	Dexron ATF (Automatic Type A, Suffix A) or equivalent ATF to General Motors specification GM 6032-M
DRMCO 9138 TRANSMISSION AND OIL CLUTCH	4.5 Imp gal 5.4 U.S. gal 20,4 litres	500 Hours	Daily	1000 Hours	Dexron ATF (Automatic Type A, Suffix A) or equivalent ATF to General Motors specification GM 6032-M
DRMCO 9150 TRANSMISSION AND ROCKFORD TORQUE CONVERTERS	15.0 Imp gal 18.0 U.S. gal 68,1 litres	250 Hours	Daily	500 Hours	Dexron ATF (Automatic Type A, Suffix A) or equivalent ATF to General Motors specification GM 6032-M
2800 SERIES CLARK P.S. TRANSMISSION AND TORQUE CONVERTERS	10.0 Imp gal 12.0 U.S. gal 45,4 litres	250 Hours	Daily	500 Hours	Dexron ATF (Automatic Type A, Suffix A) or equivalent ATF to General Motors specification GM 6032-M
FINAL DRIVE	7.5 Imp gal 9.0 U.S. gal 34,1 litres	---	Weekly	2000 Hours	GX 75/80 Gear Oil GX (E.P.) 90 Gear Oil *T
TANDEMS, EACH	5.0 Imp gal 6.0 U.S. gal 22,7 litres	---	Weekly	2000 Hours	GX 75/80 Gear Oil GX (E.P.) 90 Gear Oil *T
HYDRAULIC SYSTEM	21.0 Imp gal 25.2 U.S. gal 95,4 litres	500 Hours	60 Hours	1000-2000 Hours	Dexron ATF (Automatic Type A, Suffix A) or equivalent ATF to General Motors specification GM 6032-M
HYDRAULIC BRAKE FLUID	---	---	60 Hours	---	SAE J1703e SAE J1702e *A
FRONT WHEEL BEARING	---	---	---	500 Hours	EP 2
ALL GREASE FITTINGS	---	---	Refer to Lubrication Chart	---	Multi-purpose Grease

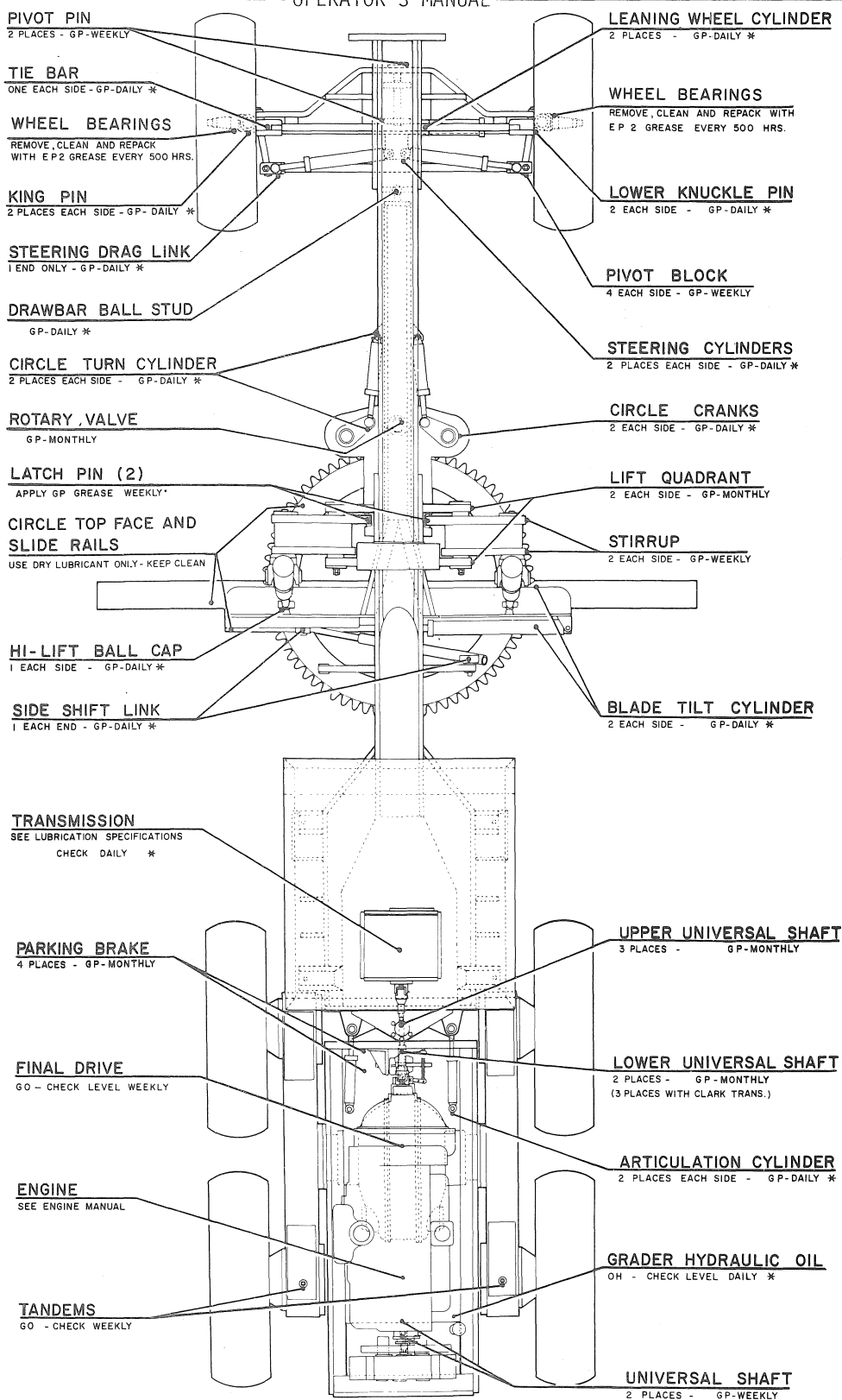
LUBRICANT	VISCOSITY					V.I.E	POUR		FLASH	
	SSU at		cP				°F	°C	°F	°C
	100° F (37,8°C)	210° F (98,9°C)	-10° F (-23,3°C)							
DEXRON	175	50	4000			182	-50	-45,6	370	187,8
GX 75/80	235	50	cS			115	-40	-40	325	162,7
			0° F	100° F	210° F					
GX(E.P.) 90	1125	90	--	245	18	90	+5	-15	350	176,7

USE ONLY RECOMMENDED OIL OR EQUIVALENT.
FOR ENGINE, SEE ENGINE MANUAL.

*T TROPICAL APPLICATION.
*A ARCTIC APPLICATION.

Table of Lubricating Oil Specifications

OPERATOR'S MANUAL



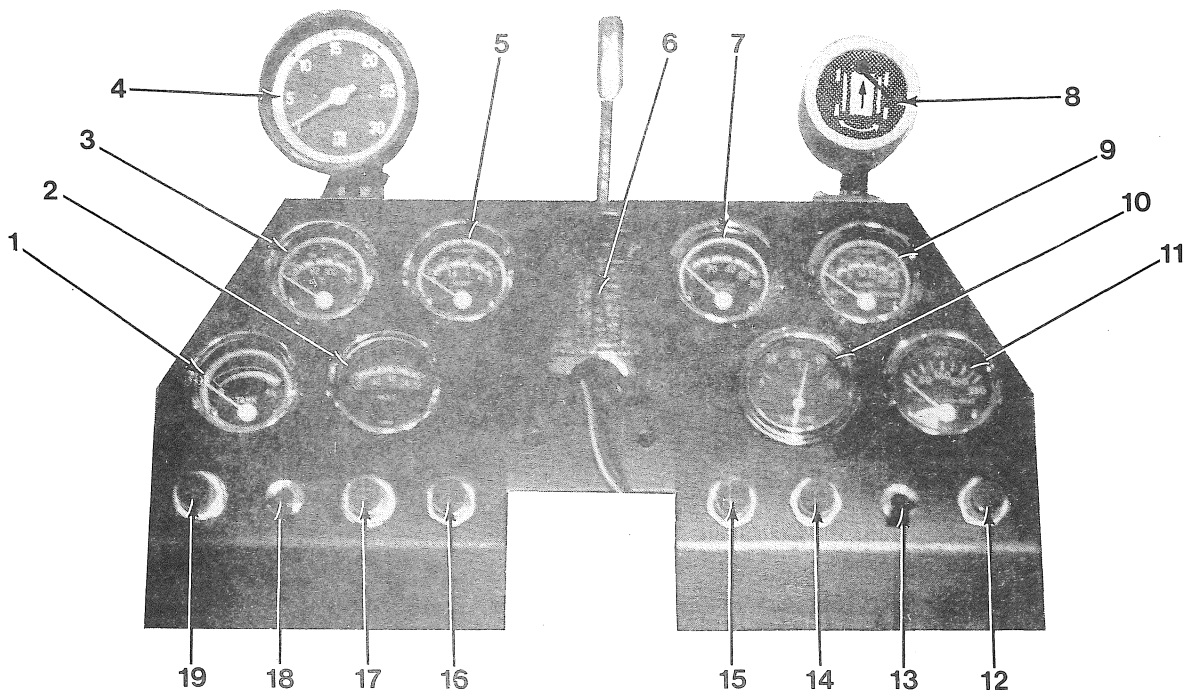
* DAILY (FROM 4 TO 24 HOURS OF OPERATION)

LUBRICANTS	SPECIFICATIONS		RECOMMENDED		
	ABOVE 0°F (-17°C)	BELOW 0°F (-17°C)	ABOVE 0°F (-17°C)	BELOW 0°F (-17°C)	ABOVE 80°F (+26°C)
GO - GEAR OIL	GX	GX	75/80	75/80	EP 90
GP - GREASE GENERAL PURPOSE	3 GP - 685 - C MIL - L - 10924 - B	3 GP - 685 - C MIL - L - 10924 - B	EP 2	EP 1	EP 2
OH - OIL HYDRAULIC	GM 6137-M	GM 6137-M	DEXRON 11	DEXRON 11	DEXRON 11

D700 SERIES

CONTROLS AND INSTRUMENTS

GAUGE PANEL



9135/9138 TRANSMISSIONS

1. FUEL GAUGE
2. VOLTMETER
3. ENGINE WATER TEMPERATURE GAUGE
4. TACHOMETER
5. ENGINE OIL PRESSURE GAUGE
6. TURN SIGNAL SWITCH
7. TRANSMISSION LUBE PRESSURE GAUGE
8. ARTICULATION ANGLE GAUGE
9. TRANSMISSION CLUTCH PRESSURE GAUGE (HIGH)*
10. FUEL PRESSURE GAUGE
11. TRANSMISSION CLUTCH PRESSURE GAUGE (LOW)*
12. TRANSMISSION OIL TEMPERATURE WARNING LIGHT
13. RIGHT HAND FLOAT VALVE SWITCH
14. ENGINE OIL PRESSURE WARNING LIGHT
15. ENGINE TEMPERATURE WARNING LIGHT
16. PARKING BRAKE WARNING LIGHT
17. HEADLIGHT HIGHBEAM WARNING LIGHT
18. LEFT HAND FLOAT VALVE SWITCH
19. ENGINE AIR FILTER WARNING LIGHT

9150/CLARK POWER-SHIFT TRANSMISSIONS

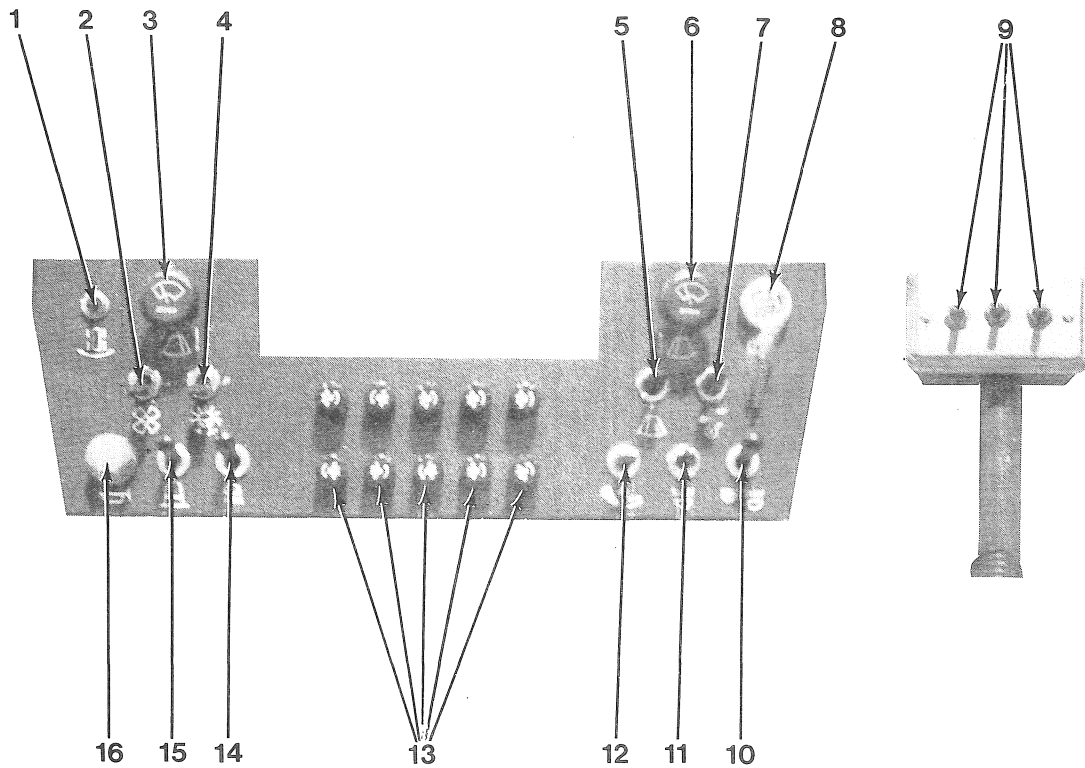
1. FUEL GAUGE
2. VOLTMETER
3. ENGINE WATER TEMPERATURE GAUGE
4. TACHOMETER
5. ENGINE OIL PRESSURE GAUGE
6. TURN SIGNAL SWITCH
7. CONVERTER OIL TEMPERATURE GAUGE
8. ARTICULATION ANGLE GAUGE
9. TRANSMISSION LUBE PRESSURE GAUGE
10. FUEL PRESSURE GAUGE
11. BLANK
12. TRANSMISSION OIL TEMPERATURE WARNING LIGHT
13. RIGHT HAND FLOAT VALVE SWITCH
14. ENGINE OIL PRESSURE WARNING LIGHT
15. ENGINE TEMPERATURE WARNING LIGHT
16. PARKING BRAKE WARNING LIGHT
17. HEADLIGHT HIGHBEAM WARNING LIGHT
18. LEFT HAND FLOAT VALVE SWITCH
19. ENGINE AIR FILTER WARNING LIGHT

* 9138 TRANSMISSION ONLY

NOTE: Some items shown are optional.

CONTROLS AND INSTRUMENTS

SWITCH PANEL

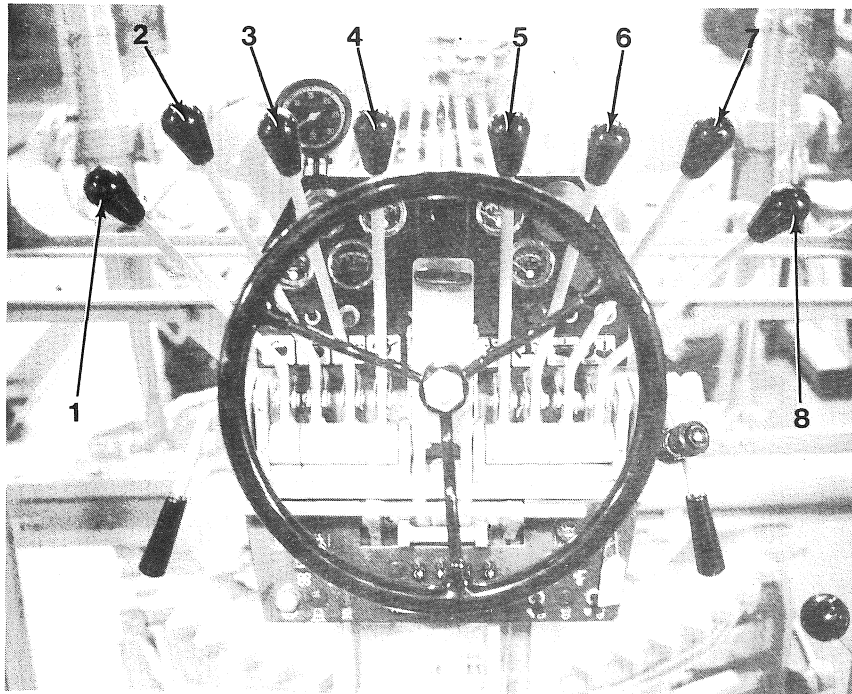


1. ARTICULATION SWITCH
2. DEFROSTER FAN SWITCH
3. REAR WINDSHIELD WIPER SWITCH
4. HEATER BLOWER SWITCH
5. WINDSHIELD WASHER SWITCH
6. FRONT WINDSHIELD WIPER SWITCH
7. ETHER COLD START SWITCH
8. IGNITION/START KEY SWITCH
9. ATTACHMENT SWITCHES
10. HEADLIGHTS/PARKING LIGHTS SWITCH
11. EXTRA LAMPS SWITCH
12. WORK LIGHTS SWITCH
13. FUSES (UP TO 10)
14. BACK-UP LIGHTS SWITCH
15. ROTATING BEACON SWITCH
16. HORN BUTTON

NOTE: Items shown vary according to model and attachments installed.

CONTROLS AND INSTRUMENTS

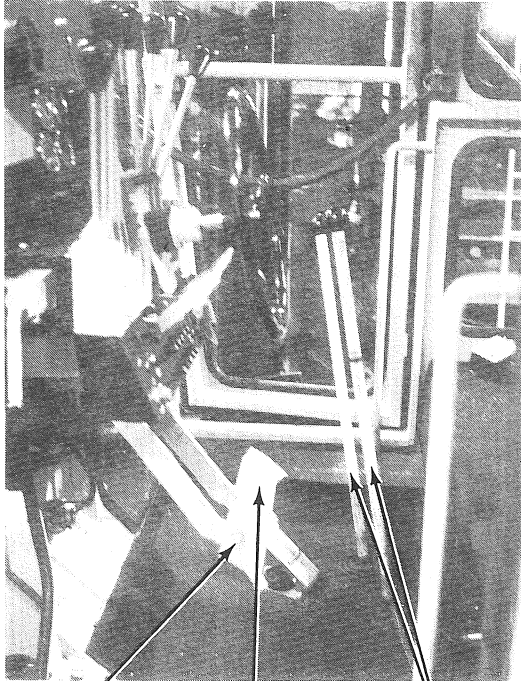
HYDRAULIC CONTROL LEVERS



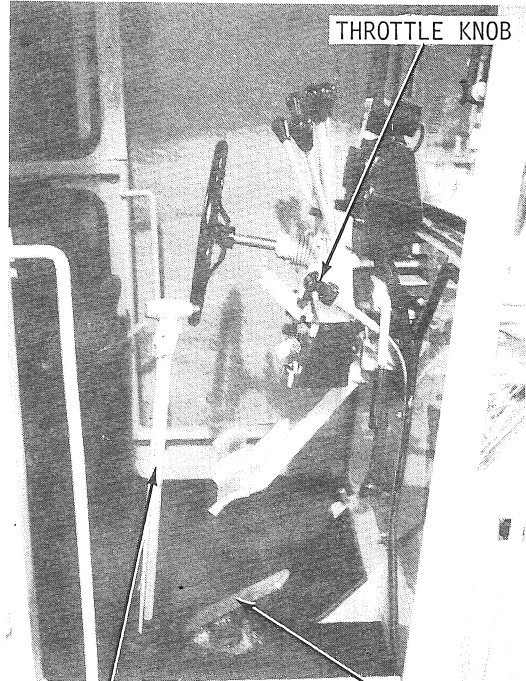
1. MOLDBOARD POWER TILT/SCARIFIER
2. LEFT HAND BLADE LIFT
3. MOLDBOARD SLIDE SHIFT
4. CIRCLE TURN
5. DRAWBAR SIDE SHIFT
6. FRONT WHEEL LEAN
7. RIGHT HAND BLADE LIFT
8. SCARIFIER/PLOW/DOZER

NOTE: On certain machines without moldboard power tilt, the No. 1 hydraulic control lever is used to operate the scarifier functions.

CONTROLS AND INSTRUMENTS



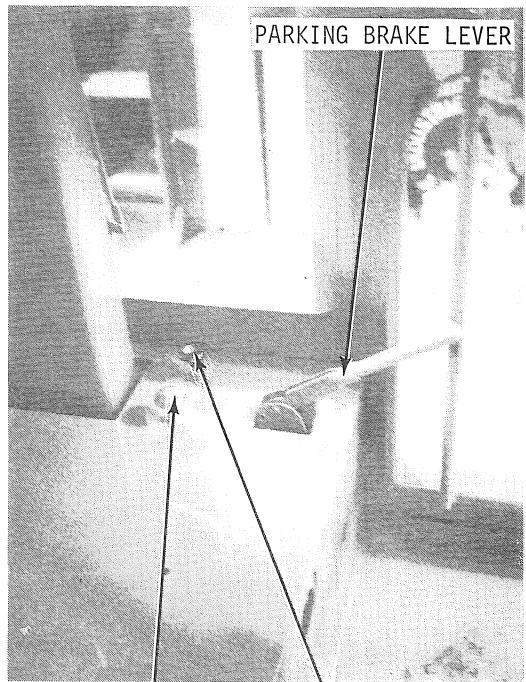
CLUTCH PEDAL
BRAKE PEDAL
9135 TRANSMISSION
SHIFT LEVERS



9138 TRANSMISSION
SHIFT LEVER
THROTTLE KNOB
ACCELERATOR PEDAL



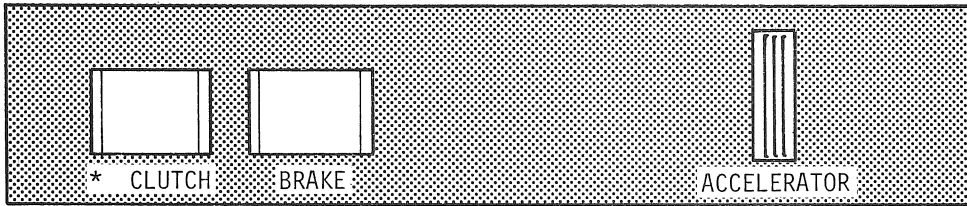
9150/CLARK TRANSMISSION
SHIFT LEVERS
BRAKE PEDAL



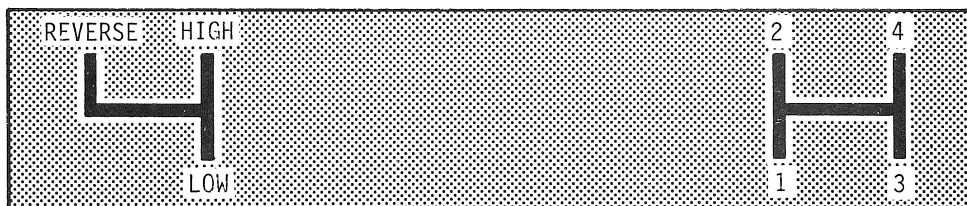
PARKING BRAKE LEVER
ENGINE SHUT-DOWN KNOB
EMERGENCY SHUT-DOWN KNOB

CONTROLS AND INSTRUMENTS

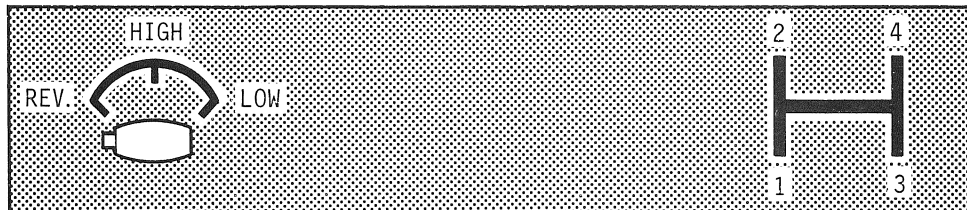
DRIVING CONTROLS



SHIFT PATTERNS

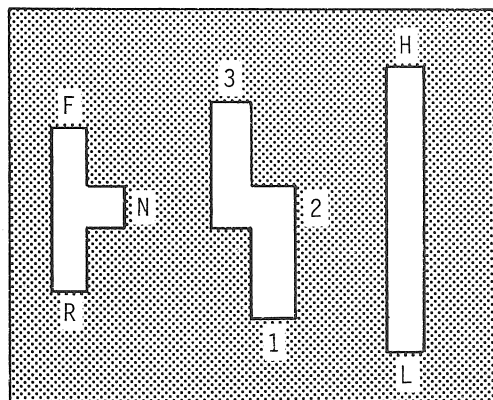


9135 TRANSMISSION




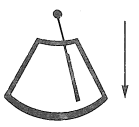
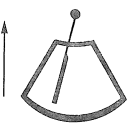
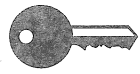



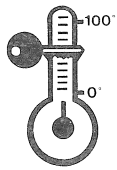



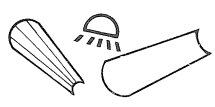






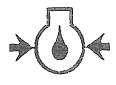



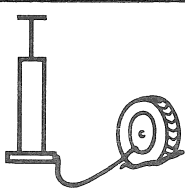
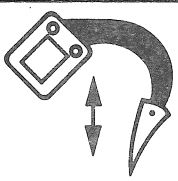
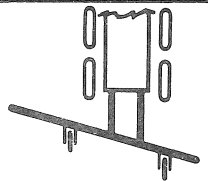
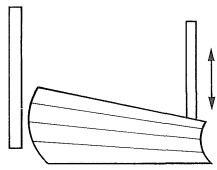
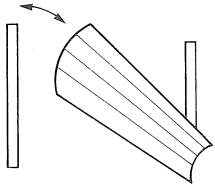
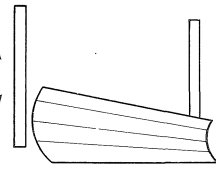
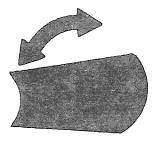
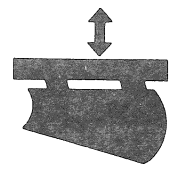
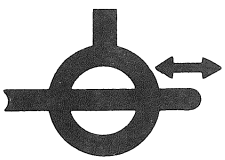


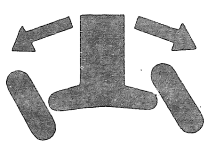
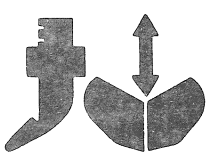
9138 TRANSMISSION

- F - FORWARD
- N - NEUTRAL
- R - REVERSE
- H - HIGH
- L - LOW



9150 AND CLARK POWER-SHIFT TRANSMISSIONS

* NOT USED WITH POWER-SHIFT TRANSMISSIONS

				
ARTICULATION	REAR WINDSHIELD WIPER	FRONT WINDSHIELD WIPER	IGNITION/ START	DEFROSTER FAN
				
HEATER	WINDSHIELD WASHER	ETHER COLD START	HORN	ROTATING BEACON
				
BACK-UP LIGHTS	WORK LIGHTS	EXTRA LAMPS	PARKING LIGHTS	HEADLIGHTS
				
WATER TEMPERATURE	AIR FILTER	TRANS/CONVERTER OIL PRESSURE	ENGINE OIL PRESSURE	TRANS/CONVERTER OIL TEMPERATURE
				
ENGINE SHUT-DOWN	FUEL SHUT-OFF	TIRE PUMP	RIPPER OPERATION	WINDROW ELIMINATOR
				
FRONT MAST OPERATION	WING TILT	REAR MAST OPERATION	MOLDBOARD TILT	MOLDBOARD LIFT
				
MOLDBOARD SLIDE SHIFT	CIRCLE TURN	DRAWBAR SIDE SHIFT	FRONT LEAN WHEEL	ACCESSORIES OPERATION

EXPLANATION OF SYMBOLS USED ON CONTROLS AND INSTRUMENTS

PRE-START CHECKSInitial and Periodic Pre-start Checks

Before operating a new grader, the following checks should be made, and repeated weekly after the grader enters service.

Fuel Tank:

Fill with high speed diesel fuel only. Ensure that the fuel cock located on the rear of the tank sump is open. A full tank will reduce corrosion and condensation, especially if the machine is idle or in storage.

Final Drive:

Remove the level plug on the lower rear face of the final drive. A light flow of gear oil should emerge to indicate that the level is correct.

Tandem Cases:

The cases have two plugs located on their lower ends (rear end right hand tandem, front end left hand tandem). Remove the upper plugs. A light flow of gear oil should emerge to indicate that the level is correct.

Transmissions:DRMCO 9135:

8-speed constant mesh. With the engine idling, check the oil level by removing the plug on the lower left hand side of the transmission casing. Oil should appear at this hole.

Summer and Winter - Dexron ATF (refer to the Table of Lubricating Oil Specifications).

DRMCO 9138:

8-speed constant mesh with power range shift. With the engine idling, check the oil level in the same manner as the DRMCO 9135 transmission, above.

Summer and Winter - Dexron ATF (refer to the Table of Lubricating Oil Specifications).

DRMCO 9150:

6-speed power-shift. Check the oil level in the sight glass on the right hand side of the transmission casing. The oil level will settle towards the bottom of the glass after the grader has been idle for 30 minutes or more. The level should be at the high level mark.

Summer and Winter - Dexron ATF (refer to the Table of Lubricating Oil Specifications).

Clark 6-Speed Power-shift:

Check the oil level by removing the upper of two small plugs on the forward right hand side of the transmission casing. With the transmission circuit at operating temperature and the engine idling, the level should be at this port.

Summer and Winter - Dexron ATF (refer to the Table of Lubricating Oil Specifications).

Hydraulic Reservoir:

Located at the rear of the grader under the radiator and pump drive gearbox. Remove the

PRE-START CHECKS

cap at the right hand side of the reservoir. The oil level should be at the top of the indicator bar visible in the filler neck.

Batteries:

Located on top of one or both tandem cases. Check for charge. Maintain proper level in the battery cells by adding distilled water only.

Grease Fittings:

Ensure that all fittings have been lubricated. Refer to the Table of Lubricating Oil Specifications for successive greasing operations.

Daily Pre-start Checks:

Before entering the grader or starting the engine, it is advisable to carry out a thorough inspection of the machine. Check the tire condition and inflation; look for oil or coolant leaks; check condition of cutting edges and security of bolts. Clean the cab glass if necessary.

Before operation, check the following fluid levels:

Brakes and Clutch:

The brake master cylinder is located on the right hand side ahead of the cab. For clutch equipped graders, the clutch master cylinder is located on the left hand side ahead of the cab. Check the fluid level(s), and add brake fluid if required (refer to the Table of Lubricating Oil Specifications).

Coolant:

The level is to be within 2 inches (50,8 mm) of the top of the radiator filler neck. Add water or permanent type anti-freeze to suit operating conditions.

DRIVING THE GRADERStarting the Engine:

Before starting the engine, check that the fuel cock under the fuel tank is turned on. Engage the transmission shift control into the neutral position, and ensure that both the engine and emergency shut-down cable handles are pushed in. Adjust the hand throttle about half way open. Turn the starter key situated on the switch panel. If the engine does not start within 30 seconds, release the key to prevent starter motor damage. When the engine starts, check for oil pressure. If no pressure registers within a few seconds after starting, shut the engine down immediately.

The above starting procedure applies to warm weather or a warm engine start. For cold weather starts, the grader can be equipped with a measured-charge ether injector situated on the left rear outside face of the cab. The actuating push button is positioned on the switch panel.

CAUTION

DO NOT KEEP THE STARTER MOTOR TURNING FOR MORE THAN 30 SECONDS CONTINUOUSLY, AND DO NOT PRESS THE ETHER INJECTOR PUSH BUTTON AFTER THE ENGINE IS RUNNING.

For cold starts, follow the initial operations specified for a warm start, but before turning the starter key, depress the ether injector push button for 2 seconds; then turn the starter key and release the push button. If the engine fails to start, wait for a short while, and repeat the procedure.

Engine Shut-down:

The shut-down procedure will vary according to the engine installed as follows:

G.M. Detroit Diesel:

At the left hand side of the cab are two handle knobs, one red and the other black. For normal shut-down, pull the black handle knob until the engine stops; then push in the knob and turn off the starter key. For emergency shut-down, pull the red handle knob next to the seat until the engine stops. As this control shuts off the intake air to the blower housing, it will be necessary to check the blower housing gaskets, etc., before attempting to re-start.

Cummins Diesel:

The Cummins engine has a shut-down solenoid installed in the fuel circuit. Therefore, a normal shut-down with these engines is accomplished by turning the starter key off. For emergency shut-down, pull the red handle knob situated on the left hand side of the cab. This will bring the engine to an idle.

Allis Chalmers Diesel:

The Allis Chalmers engine has a shut-down solenoid in the fuel circuit, and a normal shut-

DRIVING THE GRADER

down is accomplished by turning the starter key off. For emergency shut-down, pull the red handle knob situated on the left hand side of the cab.

General Information:

Before starting the engine, adjust the seat, steering wheel and hydraulic control levers as required to suit the individual operator's preference. Take sufficient time to become familiar with the location and function of all controls, gauges, switches, etc.

Motor graders have driving characteristics similar to heavy trucks, except in that top speeds will be in the 20 to 25 mph (32 to 40 kph) range. A good procedure to become familiar with handling techniques is to locate a cleared area or unused stretch of road, and practice driving, shifting up and down, braking, etc., until the machine is fully understood.

Some precautions to observe are:

1. On graders equipped with an oil clutch, DO NOT "ride" the clutch pedal, as this will lead to an early failure of the throw-out thrust bearing, and the excessive heat will warp pressure plates and wear out clutch linings prematurely.
2. All transmissions have a high-low range shift. For graders equipped with a DRMCO 9150 or Clark power-shift transmission, it is necessary to bring the machine to a full stop before attempting to make a range shift. With the DRMCO 9135 or 9138 power range shift transmission, it is possible to shift range while the grader is in motion.

WARNING

THE HAND THROTTLE IS EQUIPPED WITH AN ANTI-CREEP BRAKE. USE THIS CONTROL WITH DISCRETION, AS THE THROTTLE ADJUSTMENT FEATURES REMAIN INOPERATIVE WHEN THE BRAKE IS IN THE LOCKED POSITION.

3. Engine rpm is controlled by a vernier-type hand throttle. Increase engine rpm by turning the throttle knob in a counter-clockwise direction. Decrease engine rpm by turning the throttle knob in a clockwise direction. Instantaneous response to rpm change can be obtained by pushing in the centre button on the knob, and pushing or pulling the knob.
4. Road speeds should be obtained by selection of proper gear ratios with the throttle normally positioned at full power setting.
5. If, at idle, a momentary increase in rpm is necessary, use the foot accelerator pedal.

WARNING

1. ALWAYS BRING THE GRADER TO A FULL STOP BEFORE ENGAGING OR DISENGAGING REVERSE.

DRIVING THE GRADER**WARNING**

Continued

2. ALWAYS FULLY DEPRESS THE CLUTCH PEDAL FOR ALL MANUAL GEAR CHANGES.
3. MOMENTARILY DEPRESS THE CLUTCH PEDAL WHEN CHANGING RANGE. LOW TO HIGH, OR HIGH TO LOW.

CAUTION

DO NOT SHIFT DIRECTLY FROM REVERSE TO HIGH RANGE. IF HIGH RANGE IS REQUIRED, SHIFT FROM REVERSE TO LOW RANGE, THEN TO HIGH RANGE,

DRMCO 9135 Transmission:

Two shift levers are provided with this transmission. One lever selects the reverse and the high or low range. The second lever selects the four basic forward gear ratios. All shifting other than from forward to reverse, can be done easily while the grader is moving.

DRMCO 9138 Transmission:

High to Low Range Shift: Depress the clutch pedal. Without pressing the button on the gearshift lever knob, turn the knob fully right until the stop is reached.

Engaging Reverse: Depress the clutch pedal. Press the button on the gearshift lever knob, and turn the knob fully left until the stop is reached. Release the button to lock the transmission in reverse.

From Reverse into Low Range: Depress the clutch pedal. Press the button on the gearshift lever knob, and smartly turn the knob fully right until the stop is reached. Release the button.

From Low to High Range Shift: Depress the clutch pedal. Without pressing the button on the gearshift lever knob, turn the knob to the left until the stop is reached.

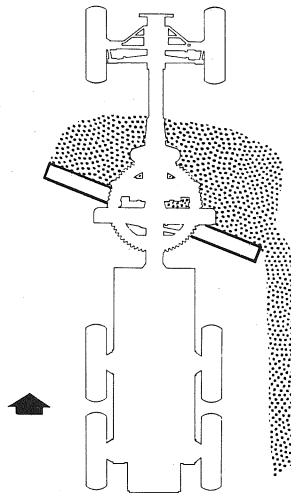
OPERATING THE GRADER

IMPORTANT

ON ALL GRADING, DITCHING AND BANK CUTTING WORK, THE MOLDBOARD SHOULD BE ADJUSTED TO DISCHARGE MATERIAL EITHER INSIDE OR OUTSIDE OF THE REAR WHEELS.

Grading

For normal grading on road or terraces, the moldboard should be centrally positioned. The pitch on the moldboard can be set by moving either the tilt adjustment links on the quadrants if the grader is equipped with manual tilt, or by operating the tilt hydraulic control lever in the cab if the grader has power tilt. With the machine moving forward at low speed, turn the circle so that the moldboard will discharge the material to the desired side. Lower the moldboard until it is taking an even cut of material. Adjust the pitch of the moldboard so that the material being graded is rolled out to the side. A vertical position, or slight forward tilt is usually best. Experiment to obtain the best rolling action off the blade, according to the type and consistency of the material being graded.



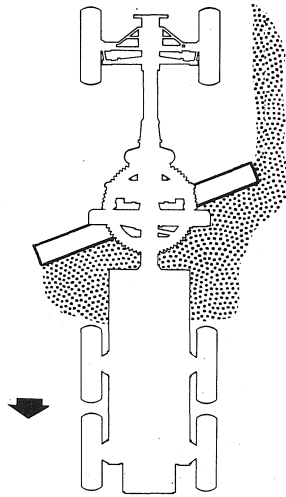
Reverse Grading

CAUTION

WHEN REVERSING THE BLADE POSITION, THE SCARIFIER TEETH MUST BE REMOVED AND THE MOLDBOARD "CENTERED" TO ENABLE THE MOLDBOARD TO CLEAR THE TRANSMISSION, FRONT AND REAR WHEELS. CAUTION MUST BE TAKEN, OR DAMAGE TO THE CAB UNDER-PARTS MAY RESULT.

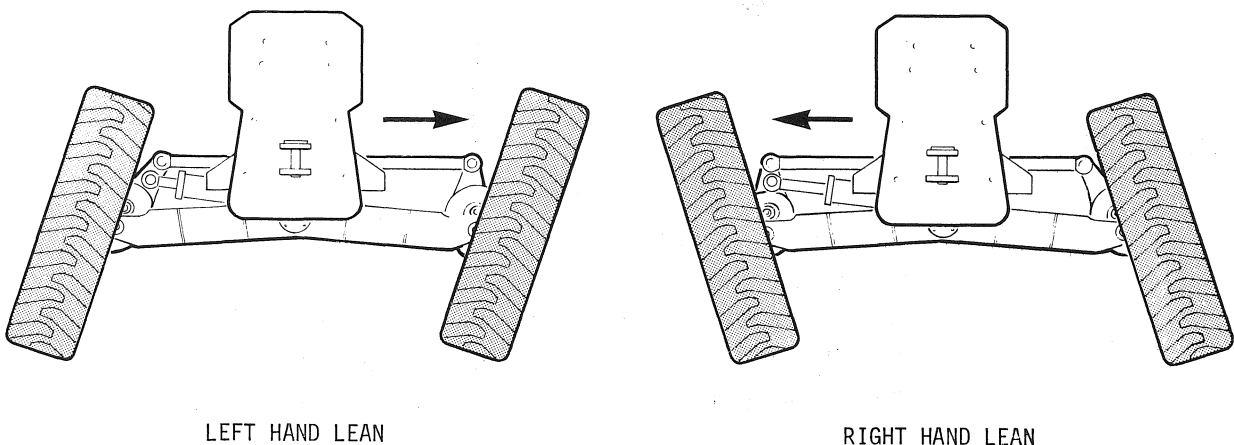
OPERATING THE GRADER

Under certain operating conditions, it is not necessary to turn the grader around. With the 360 degree circle turn, the position of the moldboard can be easily reversed, and grading resumed with the grader travelling in reverse.



Leaning Wheel Control

Great benefits will result if the leaning wheel control is properly used. Two simple rules for using the leaning wheels are: "If the front end of the grader tends to veer, drift or skid to the right, lean the wheels to the left sufficiently to overcome this tendency". "If the front end of the grader tends to veer, drift or skid to the left, lean the wheels to the right sufficiently to overcome this tendency". This rule applies on all classes of work, and the operator should always consider the benefits of the leaning wheel feature. The leaning wheel control can be used to assist steering by leaning into the turn.



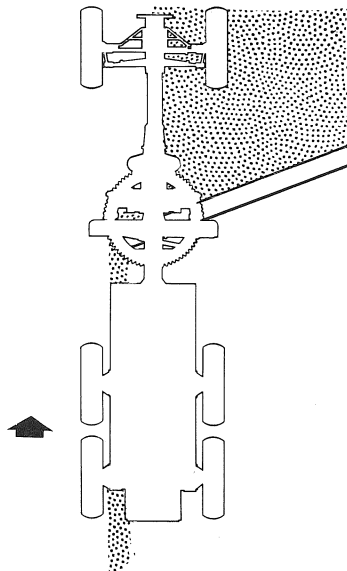
OPERATING THE GRADERShoulder Work

For finishing shoulders, it may be necessary to extend the blade to the side. Three adjustments are provided to do this:

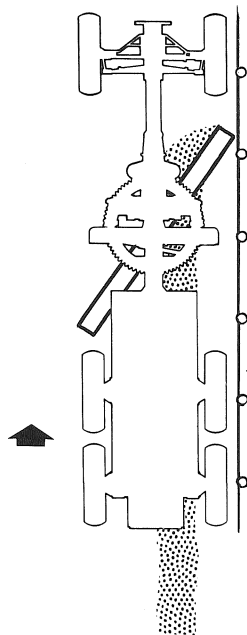
1. By operating the slide shift hydraulic control lever, the blade can be moved on the circle arms.
2. By operating the side shift hydraulic control lever, the side shift hydraulic control cylinder will place the blade approximately 15 inches (381 mm) off-centre, right or left.
3. Lengthening or shortening the side shift link between the grader main frame and the drawbar.

If a wider cut is desired, two foot (609,6 mm) extensions can be quickly attached to either end of the moldboard.

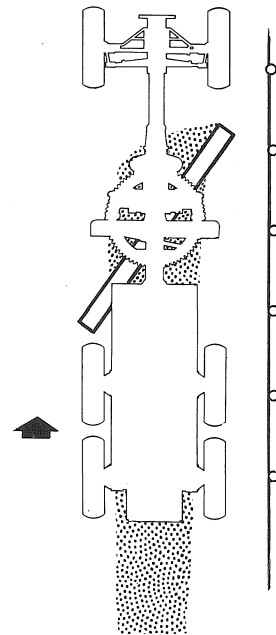
While it is often essential to side shift the blade, the central blade position produces the least side drag on the grader, and is, therefore, the most efficient working position. Study the job to be done to eliminate the need for side shifting as much as possible.

Ditching

Before starting a ditch cut, it is desirable to have a line of stakes to follow, thus ensuring a true course. To cut a right hand ditch with the grader moving forward, lower the forward section of the blade cutting edge into the ground, and raise the rear end of the blade slightly. When making subsequent cuts, the forward section of the blade must be kept behind the outside of the right hand front wheel, so that the front and rear wheels may track in the previously made cut. When the ditch has been deepened to the desired amount, the grader may "ride the slope" to finish the work. To make a left hand ditch cut, follow the above procedure, but with the forward section of the blade cutting edge kept behind the outside of the left hand front wheel.

OPERATING THE GRADER

FIRST PASS



SECOND PASS

Low Bank Sloping

Move the moldboard to the left using the hydraulic slide shift. Retract the side shift link to its shortest length. Using the hydraulic side shift control, maneuver the blade to the extreme right. With the grader moving forward, place the heel of the blade directly in front of the right hand rear wheels. Lower the blade heel into the ground and raise the forward section of the blade to the desired low bank slope angle.

Oil Mixing (Mulching)

When it is necessary to stabilize loose aggregate by mixing with oil, the D700 series grader will do this work easily and efficiently. The material being mixed may be windrowed and spread with the moldboard. It is best to have the moldboard pitched forward slightly at the top to provide a rolling action which ensures thorough mixing.

Scarifying**CAUTION**

WITH ARTICULATING FRAME GRADERS, THE FRAME MUST BE STRAIGHT WHILE SCARIFYING. DO NOT SCARIFY WHILST TURNING AS EXCESSIVE SIDE-LOADS WILL BE IMPOSED ON THE SCARIFIER DRAWBAR.

OPERATING THE GRADER

The purpose of the scarifier is to rip up material which is too hard to cut with the moldboard. The teeth can be lowered into the surface by operating the scarifier hydraulic control lever. To rework the surface of a gravel road, the material should be scarified to a sufficient depth to eliminate pot-holes. In braking up paved roads, the teeth should be lowered sufficiently to pry up the surface from below. Do not allow the teeth to skid along the surface as this will quickly dull the tips. The teeth can be adjusted in the scarifier box by following the procedure detailed in Section 8. If the grader is equipped with a selector valve controlling the scarifier/plow/dozer functions, ensure that the valve is set for scarifier operation.

Hi-lift Operation

When the operator is familiar with the operation of the hi-lift, he can place the moldboard in a high bank sloping position without leaving the cab.

Study the pictures carefully, and note the position of the circle turn cylinders and hi-lift arms when the moldboard is in a high bank sloping position.

To place the moldboard in a 90° hi-lift position on the right side, proceed as follows:

1. Adjust the side shift link to its shortest length.
2. Operate the side shift and slide shift cylinders, and extend the moldboard to the extreme right as shown in Fig. 1.
3. With the moldboard resting on the ground, operate the left hand blade lift cylinder sufficiently to take the weight off the arm latch pin. By disengaging the latch pin from the arm and retracting the left hand blade lift cylinder, position the left hand arm as shown in Fig. 2.
4. Repeat step 2 above with the right hand cylinder, but this time extend the cylinder to position the right hand arm as shown in Fig. 3.

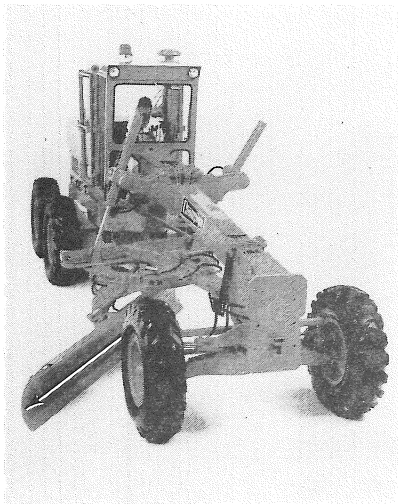


Figure 1

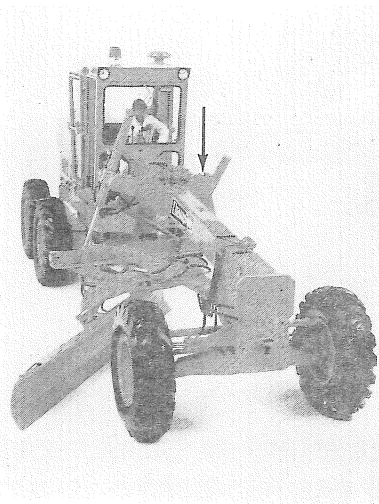


Figure 2

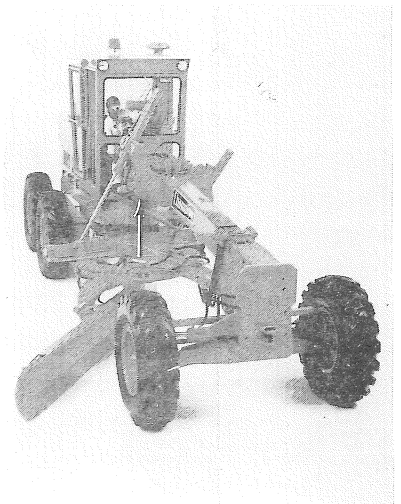


Figure 3

OPERATING THE GRADER

5. Turn the circle to place the moldboard just behind the right hand front tire.
6. Retract both blade lift cylinders until the circle approaches the right hand end of the side shift link. Extend the left hand blade lift cylinder, and, at the same time, retract the right hand blade lift cylinder. This will position the moldboard as shown in Fig. 4.
7. With the right hand blade lift cylinder completely retracted, fully extend the left hand blade lift cylinder.
8. Rotate the circle to obtain the position shown in Fig. 5. This is the 90° hi-lift position.
9. To place the moldboard back underneath the grader, follow steps 7 through 2, using the reverse procedure.
10. To place the moldboard in the 90° hi-lift position on the left hand side of the grader, proceed as follows. Detach the upper ball stud of the side shift link from the right hand frame anchor. Swing the link over to the left hand side, and insert the ball stud in the left hand frame anchor. The link is to be at its shortest length. If the grader carries a 13 foot, 14 foot or 16 foot moldboard, it will be necessary to remove the slide shift piston rod extension, and bolt the piston rod directly to the moldboard lugs. Repeat steps 2 through 8. All handing references are reversed, and the blade lift arm positions change; e.g., right hand arm goes down, and the left hand arm goes up.

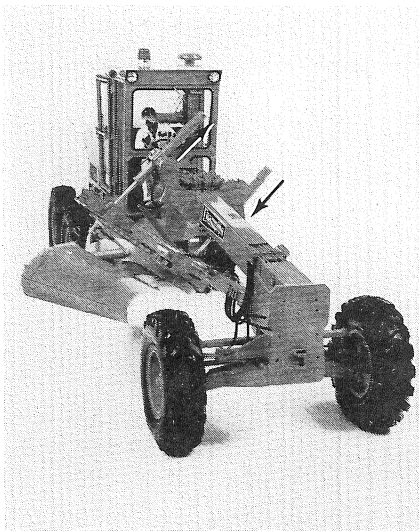


Figure 4

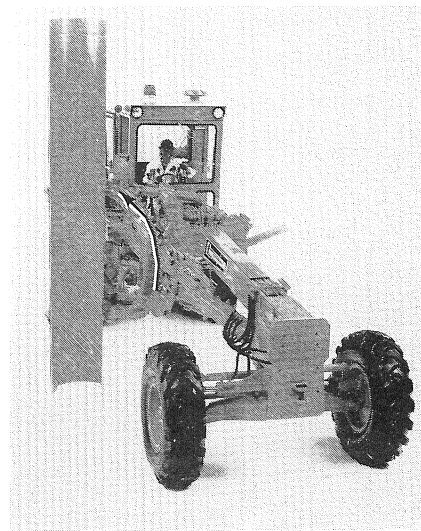


Figure 5

IMPORTANT

NEVER ATTEMPT TO RELEASE THE HI-LIFT LATCH PINS WHEN THE MOLDBOARD IS RAISED OFF THE GROUND. WHEN PLACING THE MOLDBOARD IN THE HI-LIFT POSITION, MAKE CERTAIN THAT THE

OPERATING THE GRADER**IMPORTANT** Continued

HYDRAULIC HOSES ARE FREE FROM INTERFERENCE AT ALL TIMES. IF 2 FOOT(609,6 MM) EXTENSIONS ARE INSTALLED ON THE MOLDBOARD, FOR HI-LIFTING TO THE RIGHT, A LEFT HAND EXTENSION SHOULD BE REMOVED. WHEN HI-LIFTING TO THE LEFT, A RIGHT HAND EXTENSION SHOULD BE REMOVED. WHEN HI-LIFTING, OBSERVE THE MOVING COMPONENTS CAREFULLY, AND ENSURE THAT STRUCTURE FOULING DOES NOT OCCUR.

Articulation

An articulating frame option is available on some models of Champion graders. The increased maneuverability and smaller turning radius resulting from proper use of the articulation feature, will enable the grader to operate in small or confined areas where rigid frame graders cannot be used.

The articulation hinge line is on the rear face of the cab. Articulation is provided by two hydraulic cylinders lying horizontally inside the frame side members. Stop blocks are provided to limit movement to 20° right or left. A toggle switch, moving sideways, and mounted on the switch panel beneath the hydraulic control levers, actuates operation of the cylinders. A gauge located on the gauge panel indicates the direction and amount that the frame has angled.

Following are some points to be observed when operating articulating frame graders.

1. DO NOT attempt scarifying, ripping or snow removal work with the frame in an articulated position.
2. When the frame is being angled, maintain clearance between the moldboard heel and front tandem tire to prevent damage.
3. To effect minimum turning radius, the final drive differential lock MUST be engaged.

CAUTION

DO NOT ENGAGE THE DIFFERENTIAL LOCK WITH THE REAR WHEELS DRIVING UNDER LOAD.

4. When grading on steep slopes, articulate the frame to keep the rear wheels lower than the front. Crab steering to maintain direction.
5. If heavy moldboard loads cause side slippage, articulate the frame and use crab steering with the front wheels leaning to counteract the slippage.

GRADER MAINTENANCE AND CAREGeneral Maintenance Instructions

Lack of lubrication, improper adjustment and dirty filters are the prime causes of premature wear, unnecessary breakdowns and high operating costs. Each of these conditions can be easily avoided by performing a Scheduled Maintenance Program at regular routine intervals.

Lubrication Fittings

Pressure type lubrication fittings are used throughout the grader, with the exception of the fittings under the circle control valve. These fittings should be thoroughly cleaned before applying the grease gun. A small brush dipped in a suitable cleansing solvent will be useful when removing encrusted dirt and grease. A stroke or two of the grease gun is usually all that is required, provided that the parts have been lubricated at the recommended intervals. Do not over-grease, because excess pressure exerted by the grease gun might cause failure of the grease retaining seals.

Consult the Lubrication Chart in this manual to identify the location of the fittings, and the type of grease to be used. If there is any difficulty in finding all fittings, consult the Parts Manual and Service Bulletin No. 293, which show the actual location of all grease fittings.

Other Parts Requiring Lubrication

There are several important places that require lubrication, in addition to parts having pressure grease fittings. Every 500 hours of operation, remove the front wheel hub caps and re-pack the wheel bearings with EP 2 grease (DO NOT overload). Once every 100 hours of operation, clean the circle top face and the circle teeth, and apply a coating of dry lubricant.

The grader is equipped with a hydraulic slide shift feature. Every 500 hours of operation, clean the slide rods, and apply a coating of graphite grease to the rods and the lower slide castings.

The rod end clevis and pins on the hydraulic control lever linkages, hi-lift latch pins, throttle, clutch brake, etc., should be lubricated with a heavy machine oil every 60 hours.

Diesel Fuel Oil

Fuel quality is also of great importance for satisfactory high-speed diesel performance. Fuel containing a high sulphur content forms corrosive acid in the crankcase, resulting in ruined bearings. The fuel you use should be specifically recommended by a representative of a major oil company for the engine. Use high-speed diesel fuel only, and avoid the use of stale fuel that has been stored for a long period. Fresh fuel ensures best results, and costs no more than old fuel, which produces poor performance and causes injector trouble.

Tandem Cases - Lubrication

The tandem drive chains constantly operate in a bath of oil. Check the tandem oil level every week, and use the oil recommended in the Table of Lubricating Oil Specifications.

GRADER MAINTENANCE AND CAREPower Steering

The flow of hydraulic oil serves to lubricate the power steering unit.

Engine Lubrication

Consult the engine service manual.

IMPORTANT

IMPARTIAL TESTS HAVE CONCLUSIVELY PROVEN THAT THE USE OF HEAVY DUTY DETERGENT TYPE OILS REDUCE WEAR AND ENGINE DEPOSITS. THESE OILS KEEP IMPURITIES IN SUSPENSION WITHIN THE OIL. OIL FILTERS MUST BE CLEAN TO AVOID CLOGGING AND REDUCING THE OIL FLOW. THE USE OF A HEAVY DUTY OIL ONLY IS STRONGLY RECOMMENDED, AND THIS TYPE OF OIL SHOULD NEVER BE MIXED WITH NON-DETERGENT OIL. BECAUSE HEAVY DUTY OIL ALREADY CONTAINS A CLEANING AGENT, IT IS NOT RECOMMENDED THAT EXTRA ADDITIVES BE USED, AS THESE COULD HAVE A DETRIMENTAL EFFECT ON THE BEARING METAL USED IN DIESEL ENGINES, RESULTING IN PITTING OF THE BEARINGS.

Hydraulic System

Champion graders are equipped with positive acting hydraulic controls. The three important maintenance points to remember are:

1. Use only the recommended type and grade of oil in the hydraulic system, and keep the oil at the specified level.
2. Replace the oil filter elements when necessary.
3. Keep all hose fittings and tube fittings tight.

Because of the very close manufacturing tolerances used in the construction of hydraulic valves and pumps, it is unsatisfactory to adjust and repair defective units. Arrangements are usually available to replace a complete pump on an exchange basis. The pressure in the hydraulic systems is pre-set at the factory, and maintained by relief valves in the system. No attempt should be made to alter the setting of the relief valves.

On delivery of the new grader, it is recommended that the local Champion distributor be consulted to establish where you can obtain a supply of the correct hydraulic fluid for your machine. It is advisable to have a reserve supply on hand for emergency use in case of fluid loss while operating in your district. Substitution of oils other than the types and grades recommended may result in inferior operating efficiency or failure of the system. The correct grade and type of oil for the hydraulic systems is given in the Table of Lubricating Oil Specifications in this manual.

GRADER MAINTENANCE AND CARE

The grader should be periodically examined to make sure that the hoses are not rubbing on moving parts. The hoses are made of a special construction having double wire braids embedded in neoprene to resist the high pressures and type of oil used. Ordinary rubber hose is not suitable for hydraulic use, and should never be substituted for the original hose.

Hydraulic Hose Fittings

The hydraulic system should be checked every 48 hours to see that all hose and tube connections and fittings are tight. Loose fittings allow air to enter the hydraulic system, resulting in a spongy operation of the controls.

Extreme Cold Weather Operation

When the grader is operated in very cold weather, that is, below 10⁰ F. (-12,2⁰ C.), it is advisable to use (in the hydraulic system only), an aircraft quality hydraulic oil to Canadian Government specification 3 GP-26A or U.S. military specification MIL-L-46167. The entire hydraulic system should be completely drained before changing to another type of hydraulic oil.

NOTE

Use only the type of oil recommended in the Table of Lubricating Oil Specifications.

Hydraulic Wheel Brakes

WARNING

BRAKE FLUID IS POISONOUS AND SHOULD BE HANDLED WITH CARE.

CAUTION

DO NOT USE HYDRAULIC OIL IN THE RESERVOIR, OR FAILURE OF THE RUBBER SEALS AND CUPS IN THE BRAKE SYSTEM WILL OCCUR.

The hydraulic wheel brakes require the use of brake fluid only. Use SAE J1703e specification brake fluid or equivalent.

Hi-lift Control

To adjust the latch pins, proceed as follows:

Two spring-loaded rods control the hi-lift latches. To release the latch pins, the moldboard must rest on firm ground, taking the weight off the latches. Pull back on the handles to release the latch pins. Lack of lubrication may also make it difficult to release the latch pins. Use a penetrating oil to remove rust or scale. The blade lift controls should also be used in conjunction with the control rods when releasing the latch pins.

GRADER MAINTENANCE AND CAREAdjusting "Toe-in" of the Front Wheels

To determine the toe-in, measure the distance between the inside walls of the tires, along the spindle centre line, at the front and the rear. The rear measurement must be one-half inch to five-eighths inch (12,7 to 15,8 mm) greater than the front.

The right hand yoke is adjustable. To adjust the toe-in of the wheels, place in neutral steer and lean position; then loosen the jam nut which secures the right hand yoke. Turn the drag link until the correct dimension is reached. Re-tighten the jam nut, and check the measurements.

Stirrup Nuts Must Be Tight

The nuts must be kept tight to hold the stirrup against the shank cap. Check the tightness of these nuts periodically. The nuts should be torque-tightened to 220-225 ft/lb (27,64 - 31,01 kg/m).

Grader Hydraulic Controls (All Models):Fittings Must Be Tight

The hydraulic fittings must be kept tight to avoid air leaking into the system, which can cause an erratic action of the hydraulic controls.

Hydraulic Pumps

If any hydraulic pump should become defective or worn, the old pump can usually be exchanged for a new or factory reconditioned pump through your Champion distributor. It is not recommended that individual parts be replaced; although a minor repair kit of seals, gaskets and wear plates is available.

Hydraulic Lines and Hoses

A special neoprene rubber material with double wire braids embedded in the rubber is used for the high pressure hoses. Ordinary low pressure rubber hose is unsuitable for use in the hydraulic system. When replacing hoses, avoid twisting the hose endwise, and ensure that it does not rub against a sharp edge or moving part.

The hydraulic tubes are equipped with flared fittings. Flared ends of tubing are made with a special flaring tool to ensure a good, leak-proof joint. Replace a defective tube with a new tube. Keep hydraulic connections tight to prevent leaks.

Circle Guide Plate Adjustment

The circle and moldboard assembly is supported on the drawbar by three sets of adjustable guide plates spaced around the lip of the circle. There is one set of plates at the front of the circle, and two sets of plates at the rear. The plates are adjusted by shims and square-headed bolts.

GRADER MAINTENANCE AND CARE

For new machines, the circle is adjusted for smooth running as follows:

Position the circle turn cylinders with the right hand piston rod at its shortest stroke, and the piston rod pivot pin aligned with the centres of the crank arm shaft and cylinder pivot pin.

The left hand cylinder should be half way through its travel, and the cylinder pivot pin, piston rod pivot pin and crank arm shaft describing an angle of 90 degrees.

Adjust the circle front guide plate by means of the two square-headed bolts provided, until the circle turn valve pinion and circle tooth clearance is from 1/16 inch to 1/8 inch (1,59 - 3,17 mm).

Adjust the circle rear guide plates by means of the four square-headed bolts provided. Ensure that the measurement from the side of the rotary coupling to the inside diameter of the circle on one side is the same on the opposite side.

NOTE

Only two guide plates should be touching the circle; the third guide plate should be separated from the circle by a clearance of approximately 1/16 inch (1,59 mm).

Verify that the clearance between the fully engaged teeth of the circle and both circle turn pinions is from 1/16 inch to 1/8 inch (1,59 - 3,17 mm).

NOTE

For well-used machines, it may be necessary to modify the circle turn valve pinion, because of circle turn pinion wear.

Adjust the circle turn valve spool as follows:

WARNING

NEVER TURN THE PINION SHAFT WHEN VISUAL INSPECTION IS BEING MADE AT THE VALVE PORT. TURNING THE VALVE SPOOL WILL RELEASE ANY OIL UNDER PRESSURE WHICH MAY BE LOCKED IN ONE OF THE CYLINDERS.

Remove the front left hose fitting from the circle turn valve. Plug the fitting port. Observe if the valve port is closed. Loosen the locknut retaining the valve pinion, and turn the pinion shaft sufficiently until the valve port is completely closed. Tighten the pinion locknut, and re-connect the hose.

GRADER MAINTENANCE AND CAREMoldboard Adjustments

Several arrangements are available for adjusting the pitch and position of the moldboard. The hydraulic slide shift cylinder maneuvers the moldboard so that it can be extended to one side or the other. On manual tilt machines, the pitch of the blade is altered by loosening the tilt locks, placing the blade on the ground and driving slowly ahead to tilt the blade forward, or in reverse to tilt the blade backward. Securely tighten the tilt locks. A liberal coating of graphite grease should be applied to the rods and lower slide castings every 500 hours of operation. The upper wear plates and lower slide castings can be replaced when worn.

Power Tilt

Operate the power tilt hydraulic control lever to alter the moldboard pitch. Moving the lever ahead will tilt the moldboard forward, moving the lever to the rear will tilt the moldboard back.

Electrical System

A 12 volt D.C. electrical system is standard equipment on D700 Series graders. The batteries are located on top of one or both tandem cases. The batteries should be checked for charge periodically, and refilled with distilled water when required.

The fuses are located on the switch panel beneath the hydraulic control levers.

12 volt start, 12 volt run - Detroit Diesel, Cummins and Allis Chalmers engines.

24 volt start, 12 volt run - Deutz engines.

24 volt start, 12 volt run - optional on Detroit Diesel, Cummins and Allis Chalmers engines.

Clutch Brake

The clutch brake should be "off" when the pedal is in the fully up position. As the pedal is depressed, the brake shoe should engage the drum. Pressure on the drum is controlled by adjusting the nuts retaining the spring. To adjust the clutch brake, run the engine at 1200 rpm with the transmission in neutral. Push the clutch pedal to the floor. The transmission input shaft should stop in six seconds.

Cab Adjustments:Seat Adjustments

To adjust the seat forward or back, operate the lever under the seat. Lock the seat in position by releasing the lever when the seat is in the desired position. To raise or lower the seat, move the seat fully forward, and release the lever at the rear left hand side. Engage the locking pin in the desired slot.

Windshield Adjustment

The windshield can be locked in an open position for cool air circulation. By loosening

GRADER MAINTENANCE AND CARE

the lock knobs, the windshield will swing out from the bottom. Push forward until the desired position is reached, then lock the windshield with the lock knobs.

Door Adjustment

The two doors may be locked in an open position by pushing them back against the cab side until the hold-back latch is engaged. To close the doors, release the latch and swing the door forward to the normal closed position.

Heater Water Control

The heater water valve can be regulated by moving the control lever on the right hand side of the seat. Fully forward position closes the valve, fully rearward position opens the valve.

Storing the Grader

The grader should be stored in a dry, protected place. Cover the moldboard working surface, circle teeth and all other unpainted surfaces with a coating of grease. Lubricate the machine thoroughly. Block up the wheels to take the weight off the tires. Drain the cooling system, (including the heater hoses), and leave the drain plugs open. Remove the batteries, and put them on charge at regular intervals.

Before using the grader again, re-pack the front wheel bearings with grease (see the Table of Lubricating Oil Specifications), check all lubricant levels, refill the cooling system, and replace the batteries.

Tire Pressures

Periodically check the tire pressures. The following chart details the pressures to be maintained according to the type of tires installed on the grader.

<u>SIZE</u>	<u>PLY</u>	<u>MAXIMUM PRESSURE - COLD</u>	
		<u>psi</u>	<u>kg/sq. cm.</u>
13.00 x 24	8	25	1,75
13.00 x 24	10	30	2,10
13,00 x 24	12	35	2,46
13.00 x 24	16	45	3,16
14.00 x 24	10	30	2,10
14.00 x 24	12	35	2,46
14.00 x 24	20	60	4,21
16.00 x 24	12	30	2,10
17.5 x 25	12	50	3,51
17.5 x 25	16	70	4,92
18.4 x 26	10	26	1,82

To reduce gallop, deflate the tires slightly. To balance the side load of a right hand mounted snow wing, tire pressure should be maximum on the right hand side, and 3 psi (0,21 kg/sq. cm.) less on the left hand side.

OPTIONAL ATTACHMENTSBlade Float Controls

Blade float is used primarily when the operator wishes to scrape snow with the moldboard. The procedure for setting the blade in the fully float position is as follows:

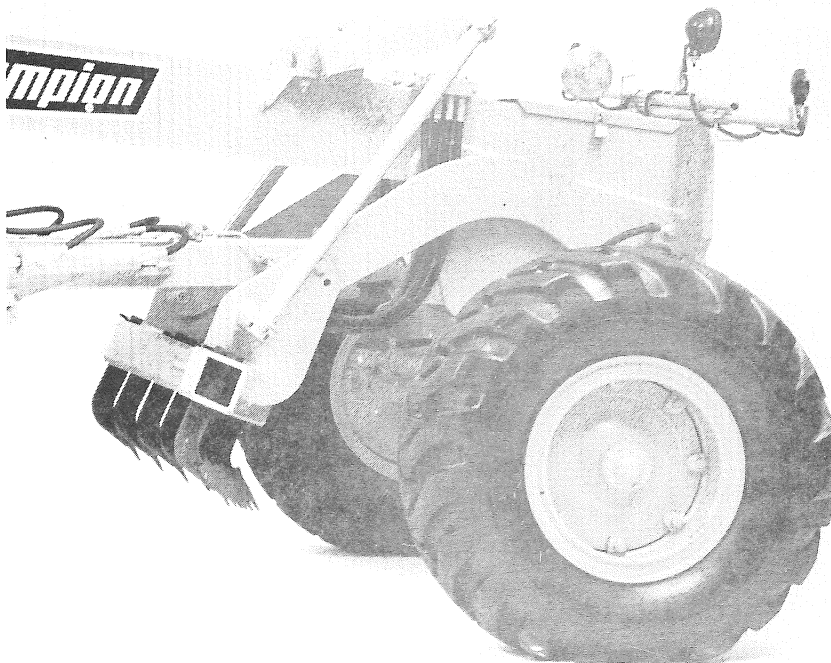
WARNING

DO NOT PLACE THE FLOAT CONTROL SWITCHES IN THE FLOAT POSITION WHEN THE MOLDBOARD IS RAISED.

1. With the blade centered on the circle, set the blade at the desired angle.
2. Set the blade pitch so that the blade edge is in a trailing position, i.e., tilt the blade to the full forward position.
3. Lower the blade onto the ground, and position as required.
4. Move the two float control switches, on the gauge panel above the hydraulic control levers, upwards.

The moldboard is now in the fully float position, and the only pressure being exerted on the blade is the weight of the drawbar assembly.

The moldboard float can be immediately disengaged by moving the two float control switches downwards.

Scarifier

OPTIONAL ATTACHMENTSOperation

The front mounted scarifier is controlled by the extreme right hand hydraulic control lever (on certain machines not equipped with power tilt, the scarifier control is effected using the extreme left hand hydraulic control lever).

To lower the scarifier, move the lever forward. To raise the scarifier, pull the lever back. To operate, place the grader in a forward low gear, and with the machine moving, lower the teeth into the ground to the desired depth. Scarify in a straight line, not while turning. An articulated frame grader must be in the straight position when scarifying. Slope scarifying should be performed on the down slope, rather than on the up slope.

Adjustments

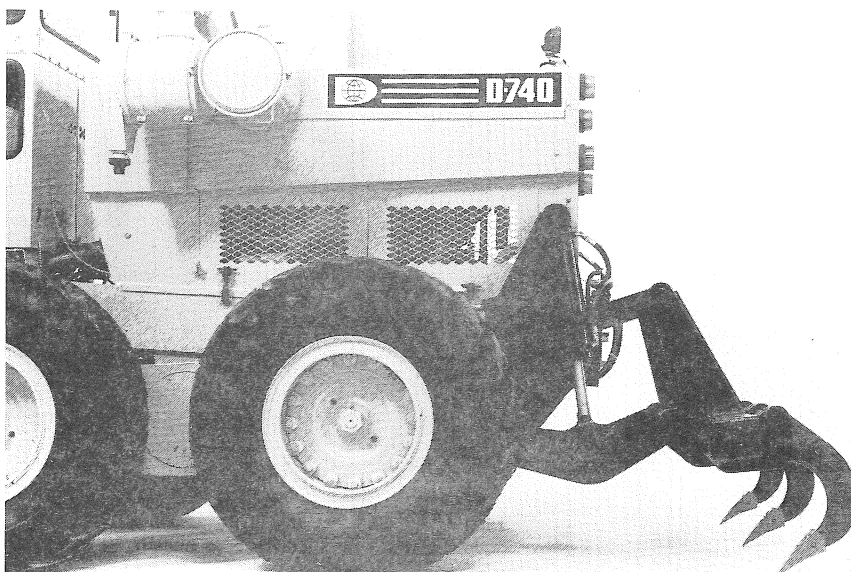
The tooth shanks are held in the scarifier box by L-shaped wedges. To remove the teeth and shanks, remove the wedges. For tooth working depth adjustment, remove the wedges, and move the shanks to an alternative notch engagement; then replace the wedges.

For pitch adjustment, the scarifier box arms have three holes at the arm top. To alter the pitch, remove the bolts securing the box arms to the drawbars, align the arms with an alternative hole; then replace the bolts.

Worn teeth can be removed by drifting on the tip rear face. Install new teeth onto the shanks, and drive into position.

To detach the scarifier assembly from the grader, first remove the teeth and shanks from the scarifier box, and lower the box onto the ground. Remove the upper lift link ball caps and the drawbar pins and pin keepers.

Reference: Parts Manual Plate #708.

Ripper

OPTIONAL ATTACHMENTS

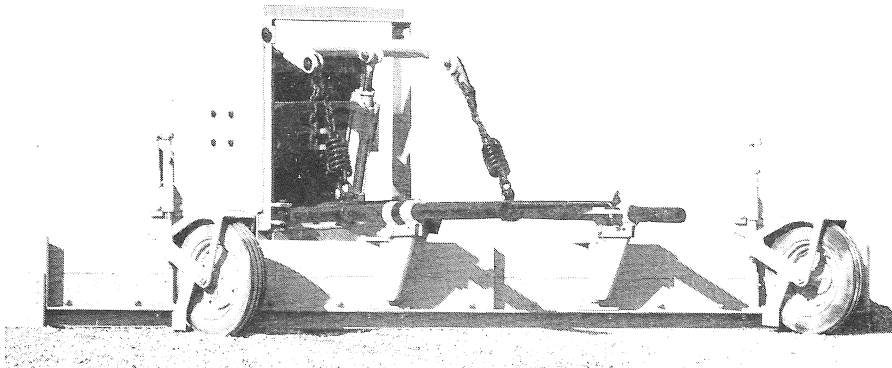
The ripper is carried on the grader frame by right hand and left hand brackets bolted to lugs welded onto the frame. It is raised and lowered by two hydraulic cylinders, controlled by operating a toggle switch mounted on the attachment switch panel on the right hand side of the cab structure.

CAUTION

DO NOT ATTEMPT SINKING THE TEETH INTO THE GROUND WHILE STATIONARY, AS THIS USUALLY RESULTS IN RAISING THE GRADER REAR END UNTIL TRACTION IS LOST. TO PREVENT SIDE LOADS, RIP IN A STRAIGHT LINE. ANY GRADE RIPPING SHOULD BE DONE DOWN GRADE, RATHER THAN UP GRADE.

To carry out ripping work, lower until the teeth contact the ground; then, with the grader moving ahead in a low gear, continue sinking the teeth to a depth that the grader can handle without slipping the tires.

The ripper box will accommodate five ripper teeth, or alternatively, nine scarifier teeth. Tooth usage will be governed by the type of material being worked. In light soil, all five teeth can be used. For severe conditions, reduce the number of teeth to suit. For pavement breaking, work the teeth under the paving; then raise the ripper.

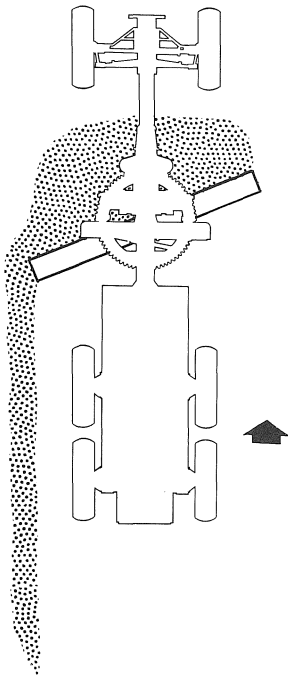
Windrow EliminatorOperation

The windrow eliminator is a 13 foot (3,96 m) blade mounted on the rear of the grader, and is used to re-spread the swath of material discharged from the moldboard. This procedure makes a one pass cut of gravel road maintenance possible. After preliminary adjustments have been made (see below), the unit can be lowered to the ground by operating a toggle switch located on the attachment switch panel on the right hand side of the cab structure.

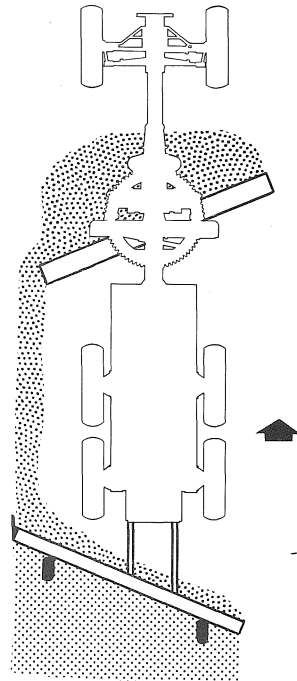
Adjustments

The blade can be set for either right or left hand discharge by varying the blade position on the pull tubes. Crank-controlled vertical adjusting spindles control spreading height by setting the wheels as desired.

OPTIONAL ATTACHMENTS

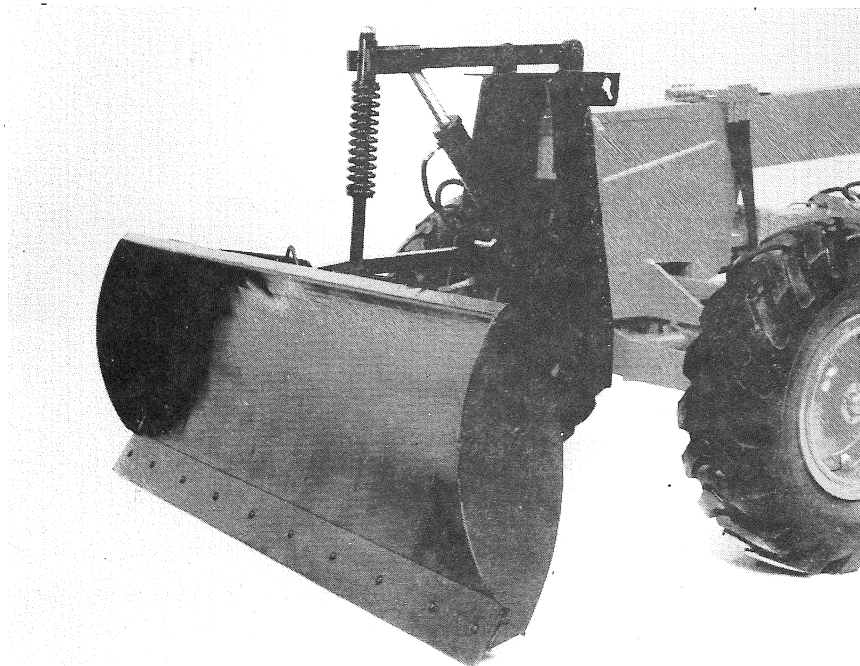


WITHOUT WINDROW ELIMINATOR



WITH WINDROW ELIMINATOR

Bulldozer



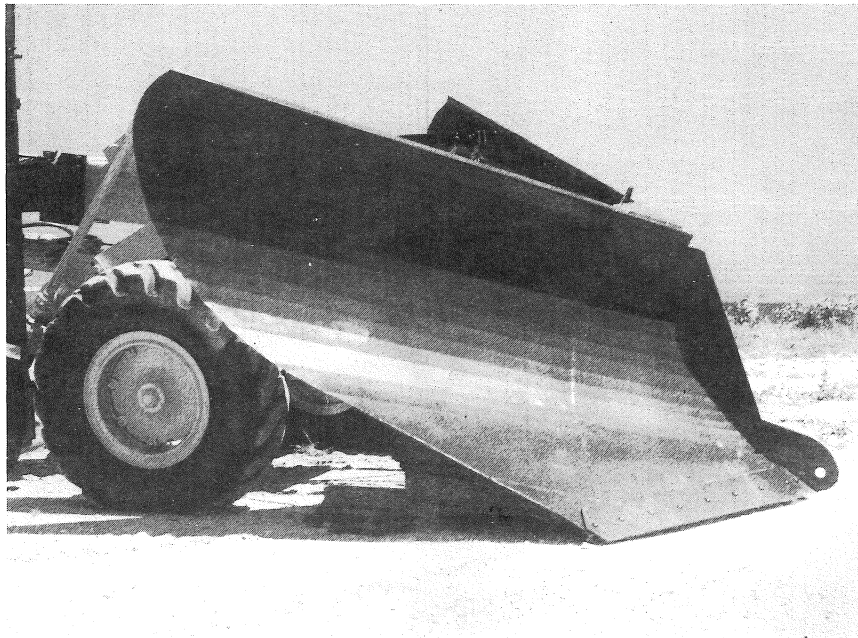
OPTIONAL ATTACHMENTSOperation

The bulldozer is mounted to the A-frame by a lower push frame and two upper push arms. A rod connects the A-frame yoke to the lower push frame for raising and lowering the blade when the extreme right hand hydraulic control lever is operated. If a selector valve is installed, it must be set to the bulldozer selection. When in use, carry the work load centered on the blade. Avoid prying or lifting with the blade corners; this will minimize twisting stresses on the push frame.

Adjustments

The blade pitch can be varied by removing the upper link arm pins, tilting the blade to the desired angle; then replacing the pins.

Reference: Parts Manual Plate #762.

Snow Plow - Standard "Vee" TypeOperation

The snow plow mounts onto the A-frame, which is bolted to the front of the grader. The snow plow push rods are attached to the lower arms on the A-frame. The heel chains lock into the outer slots at the top of the A-frame, and the lift chains lock into the spade at the outer end of the A-frame yoke. The plow rides on four shoes, which are manually adjustable for height to allow for road conditions in the area of intended use.

When mounted, the snow plow is raised and lowered by the A-frame hydraulic cylinder, which is controlled by operating the hydraulic control lever on the extreme right hand side. If a selector valve is installed, it must be set to the plow selection.

OPTIONAL ATTACHMENTSAdjustments

Proper adjustment of the heel chains is most important on this type of mounting. If the heel chains are too loose, the plow will tend to tip and "float". Proper adjustment of these chains will eliminate this problem.

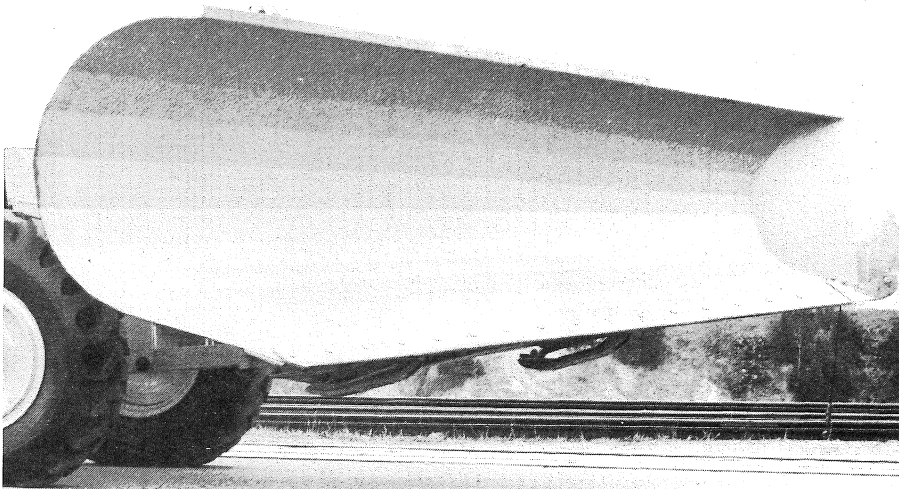
The plow shoes should be adjusted so that the edges of the plow are high enough to prevent scraping the road surface.

Reference: Parts Manual Plate #760.

Snow Plow - Down Pressure "Vee" Type

This plow is attached to the A-frame in the same manner as the bulldozer. A spring-loaded rod connecting between the A-frame yoke and the lower push frame, raises and lowers the plow when the cylinder hydraulic control lever is operated. The plow rides on four shoes, which are manually adjusted for the desired plow height setting. If a selector valve is installed, it must be set to the plow selection.

Reference: Parts Manual Plate #761.

One-way Snow PlowOperation

The plow will clear a nine foot (2,7 m) swath, discharging to the right. A spring-loaded trip mechanism provides protection when manhole covers, etc., are struck. When plowing, make use of the grader front wheel lean control to offset side slip forces resulting from plowing action.

OPTIONAL ATTACHMENTS

Raising and lowering the plow is effected by operating the extreme right hand hydraulic control lever; back to raise, forward to lower.

If a selector valve is installed, it must be set to the plow selection.

Adjustments

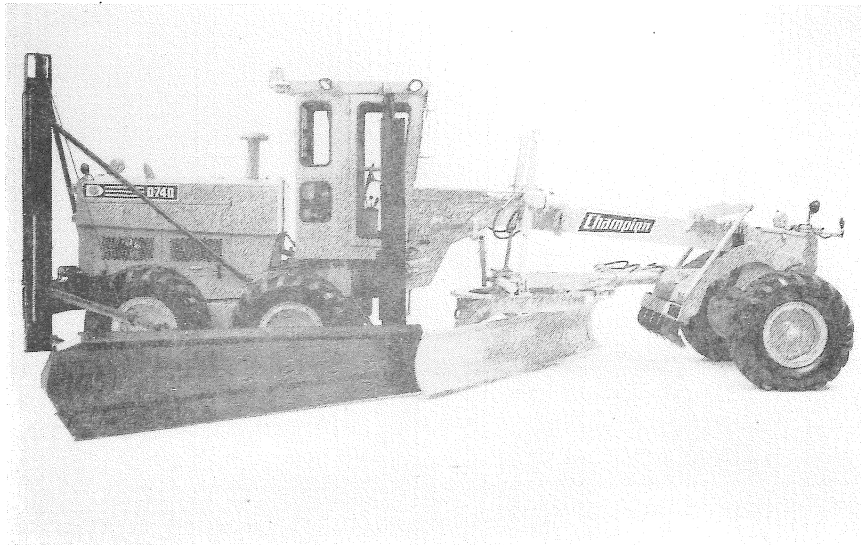
The plow can be set to different pitch positions by means of a telescopic link running from the upper lugs on the plow blade down to the push frame. Remove the link pin, adjust to the desired pitch; then replace the pin.

The push frame angle position may be regulated by selecting one of the holes in the vertical bar on the push frame; then bolting the push arm stabilizer bar through the selected hole.

Two screw-adjustable shoes mounted on the push frame provide variations in plow height. Loosen the 3/8 inch set screws near the top of the adjustment housings, turn the main screws to position the shoes; then tighten the set screws.

The safety trip action setting is controlled by varying the tension on the two springs running from the plow to the push frame. Adjust the nuts on the spring eye bolts to give the desired tension.

To lift and carry the plow, two chains attached to the push frame are adjusted in the chain slots in the spade on the yoke, until sufficient ground clearance is obtained with the plow raised.

Snow Wing - Front or Rear MountedOperation

The wing is mounted on two masts attached to the grader frame. On a front mount wing, the front mast is positioned behind the front wheels and the rear mast is positioned outside the right hand cab door.

OPTIONAL ATTACHMENTS

A rear mount wing front mast is positioned outside the right hand cab door, and the rear mast is positioned on the right rear frame corner.

The wing is hydraulically controlled by three toggle switches mounted on the attachment switch panel on the right hand side of the cab structure. One switch raises and lowers the leading edge of the wing on the front mast slide; the second switch raises and lowers the trailing edge of the wing, and the third switch raises and lowers the rear mast slide.

Adjustments

The front of the wing is attached to a swivel on the front mast slide, which is moved vertically by a cable-sheave-cylinder arrangement on the front mast.

The rear of the wing is moved vertically by a cable-sheave-cylinder arrangement on the rear mast.

The rear slide is moved vertically by a directly connected cylinder.

Two telescopic stand-off arms connect from the rear slide to the wing. These arms can be adjusted to govern winging angle and can also vary wing pitch. The wing should be pitched forward to cause the snow to be removed in a rolling action. The rear slide should be positioned so that the stand-off arms are angled downward to prevent the wing lifting and folding in.

OPERATOR'S NOTES

Keep the machine as clean as possible; especially the cab glass, and areas where accumulation of fuel, lubricants and trash could become a fire hazard.

Avoid running the engine in poorly ventilated areas.

Where the work conditions dictate, wear a hard hat, safety glasses and respirator. Loose clothing or personal ornaments may become caught in the controls. Take care to avoid this.

Ensure that all necessary lights and warning systems required by regulations or type of job are functioning.

Make any required checks or adjustments with the engine stopped, parking brake "on", moldboard and attachments resting on the ground and the wheels blocked, if necessary. When adjustments must be made to the moldboard or attachments whilst in a raised position, provide blocking under the blade or attachment.

When the grader is left parked by the roadside, lower the moldboard and attachments and apply the parking brake. At night, set out flares or reflectors. If left unattended, remove the starter key, lock the cab and all anti-vandalism security covers where installed.

Avoid overhangs, slide areas, electrical power lines, etc.

When working on slopes or banks, take precautions to ensure that the grader does not tip over or roll. If working on a hillside road, keep to the inside face of the hill and reach out with the blade when making a cut.

Before backing up, check to see if any person is behind the machine. When hitching up to pull other equipment, do not allow personnel between the machines. Maintain hitch alignment with blocks or wedges during engagement.

If working with outside personnel using hand signals, ensure that you are familiar with the signals to be used.

EXPORT PREPARATION AND RE-ASSEMBLY

In accordance with customer preference, Champion graders are prepared for overseas shipment in varying arrangements.

The preparation can range from completely assembled machines to a comprehensive knock-down unit, which minimizes shipping space.

The full knock-down unit package is as follows:

1. Blade lift cylinders disconnected from the drawbar, and inverted. Circle/drawbar/moldboard assembly supported by cables and blocks (Figs.1 and 2).

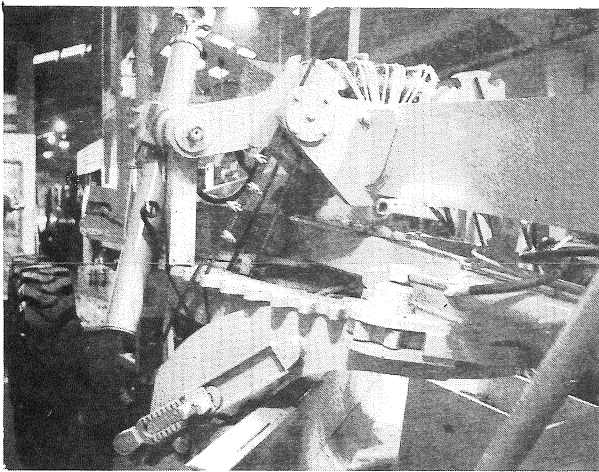


Figure 1

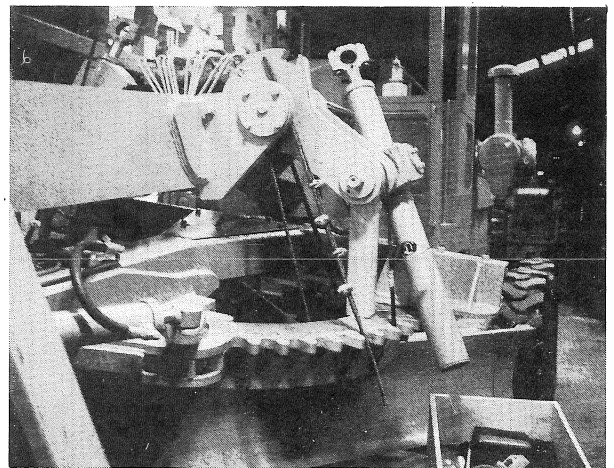


Figure 2

2. After disconnecting wiring as necessary, the upper half of the cab is removed and positioned on the forward part of the frame on a wooden support platform (Fig. 3).

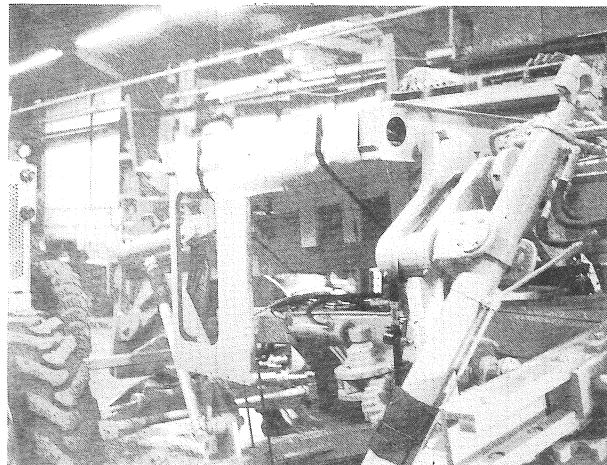


Figure 3

3. Tires and rims removed. Four are hung on carrier brackets; clamped and strapped in place.
4. Rear support provided by timbers under tandem cases. Angle clips bolted to the front wheels provide forward support.

EXPORT PREPARATION AND RE-ASSEMBLY

5. Exterior lights, flashers and gauge panel are removed and stored in a crate, which is installed in the lower cab (Fig. 4). The seat is removed and stored in a crate, which is strapped to the moldboard.

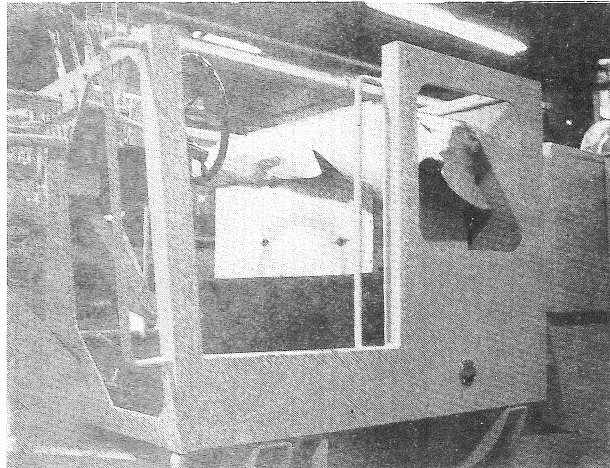


Figure 4

6. Steering wheel removed; hydraulic control levers disconnected and hung down; attachment switch panel removed (Fig. 5).
7. Muffler, exhaust extension, air cleaner and extension are removed and placed in the lower cab (Fig. 6). Exhaust and air intakes blanked off.

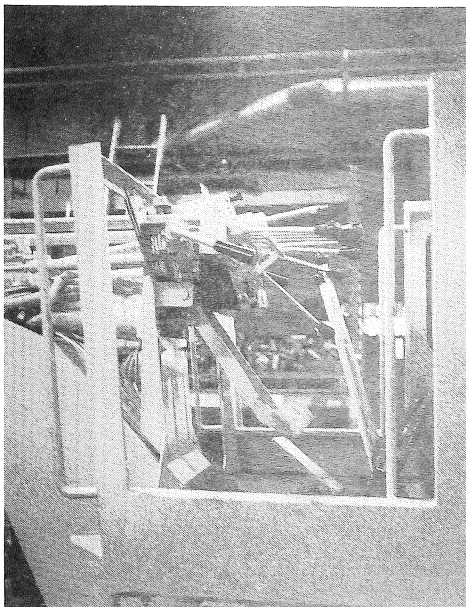


Figure 5

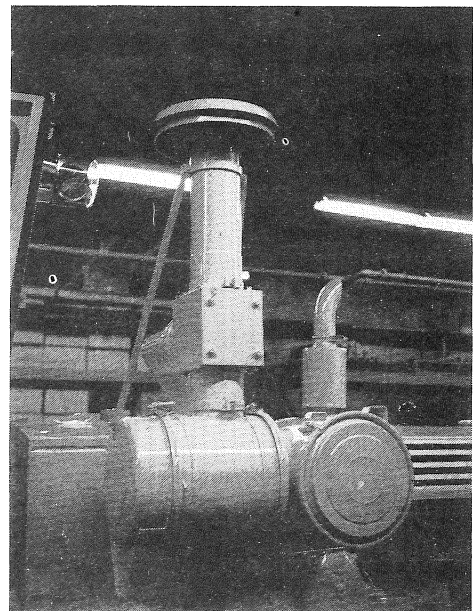


Figure 6

8. The battery box(es) is (are) secured with a metal band (Fig. 8).
9. A wooden enclosure, which covers the lower cab, fuel tank and engine, is positioned and strapped in place.

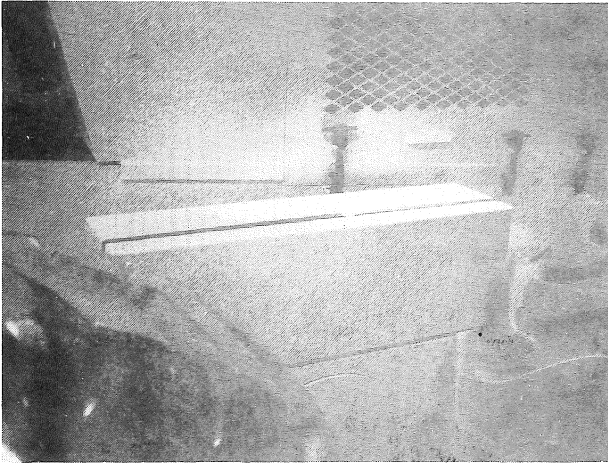
EXPORT PREPARATION AND RE-ASSEMBLY

Figure 7

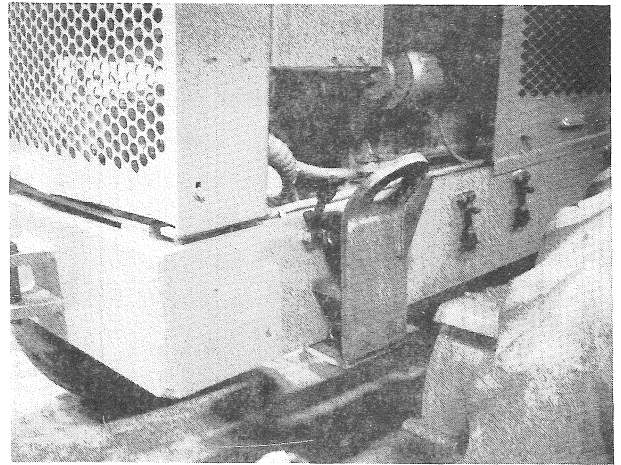


Figure 8

10. The doors, complete with glass, are crated. The front windshield, rear window and side glasses are packed in a second crate. These are positioned on the tandems and strapped in place.
11. The remaining two tires are placed on the tandem outer faces, supported by the tandem stub axles; then strapped in place.
12. If a spare tire is required, it will be carried under the circle.
13. External attachments: Scarifiers will remain mounted, and the teeth will be removed and crated. Other attachments such as bulldozers, plows, rippers, windrow eliminators and snow wings will be detached and treated separately.

Re-assembly Procedure

As the unloading facilities and circumstances will vary, the re-assembly procedure sequence will be affected. The following sequence is suggested, assuming normal facilities are available.

1. Remove tires and rims from the carriers. Remove the cab from its shipping position. Remove crates from the tandems. Remove large enclosure over the cab and engine. Remove the muffler, air cleaner, lights, etc., from the cab, and uncrate the gauge panel.
2. Lift the grader, and remove the angle clips from the front wheels. Install tire and rims; then lower the grader. Remove the lift brackets (Fig. 8).
3. In the cab, swing up and re-connect the hydraulic control levers. Install the steering wheel and seat.
4. Install the windshield frame into the lower cab sockets, and secure to the lower cab.
5. Lower the upper cab onto the lower cab, and secure together by bolting to the upper face of the windshield frame.
6. Install the rear and side windows.
7. Install the doors. Check the operation of the doors and the hold-backs.

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8. Install the gauge panel.
9. Unstrap the blade lift cylinders, and re-connect to the ball pins on the drawbar. Remove the drawbar support cables and blocks.
10. Install the air cleaner, extension and hood. Clamp all connections securely.
11. Install the muffler, exhaust extension and any braces required.
12. Carry out a pre-start inspection as detailed in Section 4 of this manual; then start and check the functions.
13. For optional attachments, refer to the Parts Manual and/or separate instructions.

NOTE

The grader can be driven, if necessary, with the drawbar cabled up, and the cab top in the shipping position on the forward part of the frame. Use the temporary button for starting. Later, when the re-assembly is complete, remove the temporary start button.