## TM5-3020

## WAR DEPARTMENT MAINTENANCE MANUAL AND PARTS CATALOG

TRACTOR, CRAWLER TYPE, GASOLINE, 20 D. B. H. P., WITH BuLLDOZER AND TOWING WINCH, MODEL CA-1 "CLARKAIR"

CLARK TRUCTRACTOR DIV.
CLARK EQUIPMENT CO.
BATTLE CREEK, MICHIGAN
APRIL 22, 1943

# TM5-3020 WAR DEPARTMENT 

> TM5-3020, Maintenance Manual and Parts Calalog. Tractor, Crawler type, Gasoline, $20^{\circ}$ D.B.H.P. with Bulldozer and Towing Winch, Model CA-1 "Clarkair," published by the Clark Tructractor Div., Clark Equipment Company, is furnished for the information and guidance of all concerned.

## AG062.11 (March 25, 1943)

G. C. MARSHALL

Cbief of Staff

## Official:

J. A. ULIO,

Major General,
Tbe Adjutant General

1st Printing — April, 1943
2nd Printing - August, 1943

# MAINTENANCE MANUAL AND PART CATALOG 

# CLARKAIR Model CA-1 

As supplied

## U. S. ENGINEERS

Contract No. W-145-A eng.-5ll
W-1088 eng. (MSP)-2460
W-1,088 eng. 2155
W-1088 eng. 2165

Tractor Serials No. CA-1431 to No. CA-143162, Incl. CA-143193 to No. CA-143228, Incl. CA-143229 to No. CA-1431015, Incl. CA-1431016 to No. CA-1431121, Incl.

Army Registration No. 953463 to 953624 , Incl. 977511 to 977546, Incl. 963300 to 964086 , Incl. 963144 to 963249 , Incl.
by
CLARK tructractor div.
CLARK EQUIPMENT CO.
BATTLE CREEK, MICH.

## INDEX

## OPERATIONS SECTION

Location of Controls and Instruments ..... I
Preparing Tractor for Storage and Procedure for Handling ..... 2
Lubrication Chart for "Clarkair" ..... 3
Instructions for Oil, Greases and Lubricants ..... 3-4-5
Erigine Oil Recommendations ..... 6
Capacities ..... 7
Condensed Instructions for Putting Tractor into Service ..... 8
To Keep Tractor in Service ..... 8
Detailed Instructions ..... 9 to 12
Putting the Tractor Into Service ..... $9-10$
Driving the "Clarkair" ..... 10
Operate Winch ..... 11
Pou : and Maintenance ..... 13-14
Engine Maintanance Instructions ..... 15 to 22
Oiling S.eem ..... 15-16.17
Cooliny System ..... 17-18
Overheating ..... 18-19-20
Fuel Sedime.it Trap ..... 20
Carburetor ..... 21-22
Care of Spark Plugs ..... 23
Forward and Reverse Clutch ..... 24
Steering Clutches and Brakes ..... 24-25
To Adjust Track ..... 25.26
Trouble Chart ..... 27 to 31
Engine ..... 27-28-29-30
Transmission ..... 30
Clutches ..... 31
Track ..... 31

## INDEX - Continued

## DETAILED REPAIR SECTION

Condensed Instructions for Dismantling the "Clarkair" ..... 1. 2
Engine Assembly ..... 3
Valve Mechanism ..... 3-4- 6-7-8
Camshaft and Bushings ..... 9.
Crankshaft and Flywheel
Bearings ..... $\therefore 3^{2+1}$
Reconditioning Cylinder Walls ..... 11
Piston, Rings and Pins ..... 12-13-14
Oil Pump ..... 14-15
Governor ..... ! ${ }^{\prime}$
Repair of the Carburetor
To Re-assemble Carburetor .....  J-21- -2
Water Pump Disassembly ..... 23
Water Pump Reassembly ..... 24
Engine Tabulated Data ..... 25-26
Repair and Maintenance of Electrical Equipment ..... 27 to 67
Tools Required for Complete Maintenance of Electrical Equipnicat ..... 27
Generator Assembly ..... 27 to 39
128 Hour General Inspection ..... 30-31
256 Hour Tune-up Inspection ..... 31-32-33-34
512 Hour Overhaul ..... 34-35-36-37-38-39
Generator Assembly Tabulated Data ..... 39
Voltage Regulator ..... 40-41
128 Hour General Inspection ..... 42
256 Hour Tune-up Inspection ..... 42-43-44
512 Hour Overhaul ..... 44-45
Voltage Regulator Tabulated Data ..... 45

INDEX - Continued

## DETAILED REPAIR SECTION

Starting Motor Assembly ..... 46
128 Hour General Inspection ..... 46-47
-56 Hour Tune-up Inspection ..... 47-48-49
$5!2$ Hour Overhaul ..... 50-5I-52-53-54
:arling Motor Assembly Tabulated Data ..... 55
Li. outor issembly ..... 56-57
iL~ a . .ur veneral Inspection ..... 57-58-59
256 Hour Tune-up Inspection ..... 60-61
':2 Hour Overhaul ..... 61-62-63-64
ing the Distributor to the Engine ..... 64
.....butor Assembly Tabulated Data ..... 65
Ignition Coil ..... 66
Ignition Coil Tabulated Dała ..... 66
Spark Plugs ..... 66
Electrical Conr ctions ..... 67
Transmission e : Forward and Reverse Unit Instructions ..... 08-69-70-7|
Forward and Reverse Unit Reassembly Instructions ..... 72-73
Instructions on Forward and Reverse Clutch Assembly ..... 74-75
Transmission Dismantling Instructions ..... 7ó-77
Transmission Reassembly Instructions ..... 77-78
Dismantling and Reassembly Instructions for Transmission Control Cover Assembly ..... 78.79
Disassembly Instructions for Final Drive Assembly ..... 80-81-82-83-84
Reassembly Instructions for Final Drive Assembly ..... 84-85-86-87-88
Repair and Overhaul of Undercarriage and Track ..... 89-90-91-92-93-94
Dismantling and Reassembling Instructions for Winch Assembly ..... 95-96-97-98

## INDEX - Continued

## PARTS CATALOG

Final Drive Assembly ..... 2
Final Drive Parts ..... 31-32-33-34-35-36-37-38
Winch Assembly ..... 2
Winch Parts ..... 40-41
Power Take-Off Parts ..... 38
Transmission Assembly (with Forward and Reverse Assembly) ..... 2
Transmission Parts
(with Forward and Reverse Parts) ..... 22-23-24-25-26-27-28-29-30
Forward and Reverse Assembly (with Transmission Assembly) ..... 2
Forward and Reverse Parts (with Transmission Parts) ..... 22-23-24-25-26-27-28-29-30
Engine Assembly ..... 2
Engine Parts ..... 9-10-11-12-13-14-15-16-17-18-19-20-21
Engine Auxiliary Parts ..... 8-9-10-11-12-14-20-21
Motor Frame ..... 3
Motor Frame Parts ..... 47
Undercarriage Assembly ..... 3
Undercarriage Parts ..... 42-43-44-45-46-47
Fenders ..... 4-5
Throttle Control ..... 5
Starter Switch ..... 5
Battery ..... 5
Cables ..... 4-5
Forward and Reverse Lever and Parts ..... 4
Seat Assembly and Parts ..... 6
Instrument Panel ..... 7
Gauges - Oil, Temperature, Ammeter ..... 7
Switches - Ignition and Light ..... 7
Air Cleaner ..... 8
Gas Tank ..... 8
Radiator ..... 8
Radiator Guard ..... 8
Hood ..... 8
Exhaust Pipe ..... 8
Side Panels ..... 8
INDEX - Continued
PARTS CATALOG
Hoses - Radiator, Air Cleaner ..... 8
Gas Line ..... 8
Oil Filler Pipe ..... 8
Flood Lamps ..... 6-8
Ignition Coil ..... 8
Starting Motor ..... 9
Generator ..... 10-11
Regulator ..... 11
Distributor ..... 12
Cil Pump and Parts ..... 13
Governor and Parts ..... 14
Water Pump and Parts ..... 15
Cylinder Block ..... 16
Cylinder Head ..... 16
Oil Pan ..... 16
Flywheel Housing ..... 16
Spark Plugs ..... 16
Cylinder Door Parts ..... 16
Engine Gaskets ..... 16.17
Camshaft . .d Parts ..... 18
Valves and 'alve Parts ..... 18
Flywheel ..... 19
Flywheel Ring Gear ..... 19
Crankshaft and Crankshaft Parts ..... 19
Pistons ..... 19
Piston Rings ..... 19
Piston Pins ..... 19
Connecting Rods ..... 19
Crankshaft Bearings ..... 19
Connecting Rod Bearings ..... 19
Carburetor and Parts ..... 20-21
Forward and Reverse Case ..... 22
Forward and Reverse Shifter Mechanism ..... 22
Forward and Reverse Case Cover ..... 22
Forward and Reverse Gears and Parts ..... 23-24-25-26

## INDEX—Continued

## PARTS CATALOG

Forward and Reverse Clutch and Parts ..... 24-25
Transmission Control Cover Assembly ..... 27
Transmission Case ..... 28
Transmission Countershaft and Parts ..... 29
Transmission Mainshaft and Parts ..... 30
Final Drive Pinion ..... 30
Final Drive Covers ..... 31
Final Drive Levers and Controls ..... 31
Final Drive Housing ..... 32
Final Drive Gears ..... 32
Final Drive Gear Covers ..... 32
Final Drive Sprockets ..... 32
Final Drive Sprocket Shafts ..... 32
Final Drive Steering Clutches ..... 33-36-37
Final Drive Steering Clutch Shifter Mechanism ..... 33-35
Final Drive Steering Brakes ..... 33-34
Final Drive Clutch Shaft ..... 33
Final Drive Drive Gear Ring ..... 33
Final Drive Steering Clutch Drum and Pinion ..... 33
Winch Chain and Cable ..... 39
Winch Drive Sprocket ..... 39
Track and Track Parts ..... 42
Track Idler Wheel and Parts ..... 43
Track Roller and Parts ..... 44
Track Frames ..... 45
Track Guards ..... 45
1 and Axle ..... 46
Siving Frames ..... 46
Trunnion Blocks ..... 46
Engine Support Springs ..... 46
Engine Crankcase Guard ..... 47
Draw Bar and Draw Bar Parts ..... 47
Tool Kit Assembly ..... 48
Numerical Parts Price List ..... 49 to 99
Miscellaneous, Engine Bulk Parts ..... $99-100-101$
Tool Kit and Parts ..... 101

