The Crusader (A15) was one of the ‘cruiser’ tanks produced during the early 1940’s. Originally equipped with a 2 pdr. main gun, the different Marks replaced this with either a 3in main gun for close support, or a 6pdr. main gun. In addition a coaxially mounted 7.92mm BESA machine gun was carried. Later Marks carried increased thickness of armour.

Crusader carried a crew of 4 in the early Marks, but the Crusader Mk III carried a crew of 3 because the larger gun restricted the available turret space. In each case the driver was located at the right-hand front of the hull; the remaining crew members were housed in the turret.

Well armed and with a good turn of speed the Crusader served well in North Africa. However it had limitations which eventually led to it being discontinued in favour of the Sherman. The V-12 27 litre petrol engine drove a 4 forward, and 1 reverse speed manual gearbox. The total production of gun tanks exceeded 4300 and production of the final variants did not cease until 1945.

The Crusader Instruction Book which was produced in 1942 is in English and comprises 142 pages divided into 2 sections, giving descriptions of all the major assemblies and field maintenance details. The second section covers the removal and replacement of the main assemblies. There are 59 monochrome illustrations and photographs including wiring diagrams and lubrication charts.

Contents
1. General Description and Specification
2. Starting and driving instructions
3. Turret traverse gear
4. Rotary base junction
5. Internal communication
6. Air compressor
7. Ignition system
8. Valve timing
9. Cooling system
10. Fuel system and carburetters
11. Clutch
12. Gearbox and steering units
13. Brakes
14. Final drive
15. Suspension
16. Road wheels
17. Tracks
18. Road springs
19. Shock absorbers
20. Electrical equipment
CHAPTER III

FIGHTING COMPARTMENT

The turret is multi-sided and consists of a number of heat-treated steel plates welded to form an inner shell, to which is attached, by special screws, the armour plating.

The bulge at the rear contains the wireless receiving and transmitting set.

Suspended from the turret by six tubular supports is the turntable on which is carried the commander’s, loader’s, and gunner’s seats.

Fixed to the turntable in a central position is the rotating portion of the base junction coupling the turret section of the power traverse and electrical systems to the hull.

The whole turret assembly is carried on a caged ball race and rotated by hydraulic traversing gear or manually, by gear engagement to a fixed rack ring.

Section of Turret Ring

![Diagram of Turret Ring]

FIGURE 4.

A. Turret.  B. Teeth for traverse gear.  C. Depression cam ring.
FIGURE 25.

E

Fans and Drive (Chain)

A B

C D

G

IMPORTANT
Oil Seals on idler wheels
must be assembled as shown.

F
To remove a track, slacken off the adjustment fully, select a link preferably near the sprocket, where there is sufficient room, and drive out the end plugs and connecting pins with the drift supplied. Make sure that all traces of the plugs are removed from the locating grooves.

**Joining Track Linkage**

![Diagram of Sleeve and Anvil](image)

**FIGURE 50.**

To replace the track bring the two ends together at the rear of the driving sprocket, use the drift to bring holes into alignment, and follow through with the joint pin. A new plug must be fitted at each end of the pin and forced into the grooves.

**Track Adjustment**

![Diagram of Track Adjustment](image)

**FIGURE 51.**

CRANK HANDLE SEPARATES SERRATED FACES ON AXLE AND HULL BRACKET

CORRECT TRACK TENSION.

TRACK TOO TIGHT.

TOO SLACK.

PULL SPANNER UPWARDS TO TIGHTEN TRACK

SPUDS TRAILING.
Remove radiator (see page 123).
Remove distributor cover and tie up with leads in a safe position.
Remove distributor as instructed. On no account should the engine be
turned after the camshaft has been lifted.
Disconnect oil feed pipe at rear of camshaft.
Remove twelve nuts securing camshaft housing to cylinders.
Unscrew ring nut at base of camshaft vertical drive cover.
Before lifting the housing, the position of the large camshaft gear wheel must
be carefully noted.
A line drawn through the centre of the distributor driving dog should coincide
with the centre line of the inclined drive shaft, when that ignition is fully
retarded, firing at No. 1 cylinder right bank.
The complete housing may now be removed.
In order to facilitate reassembly the bevel gears should be marked before
dismantling.
Remove rocker caps and rockers. The rocker caps are not interchangeable,
the caps and camshaft housing being numbered for correct location.
Unscrew seven dowel pins locating the bearings from the side of the housing.
Remove cover nut on rear end of housing.
Remove locking wire and four screws securing cover-plate over rear bearing.
Tap camshaft and bearings through the housing, towards the distributor
end, using a soft drift.
Reassemble in reverse order. It should be noted that the bearings are of
different outside diameters, with the largest at the distributor end. Before
the bearings are finally home in the housing check for position, so that the
dual of each dowel pin will engage with the locating recess in the bearing.
Also check the mesh of the bevel gears to bring the markings into alignment.
If the large bevel is in the marked position and correctly meshed before the
lower end of the vertical drive is engaged with the splined driving shaft, the
valve timing must be correct.
This routine covers both camshafts.

VALVE TIMING

Before attempting any timing operations the preliminary notes to "Ignition
Timing" should be carefully read.
The valve settings are as follows:—

| Inlet opens   | 10° after T.D.C. (3 mm. down stroke). |
| Exhaust closes| 8° after T.D.C. (3 mm. down stroke). |
| Inlet closes  | 45° after B.D.C. (158 mm. down stroke). |
| Exhaust opens | 48° before B.D.C. (154 mm. down stroke). |

Tappet clearance cold should be: Inlet ... .015 in., Exhaust ... .019 in.