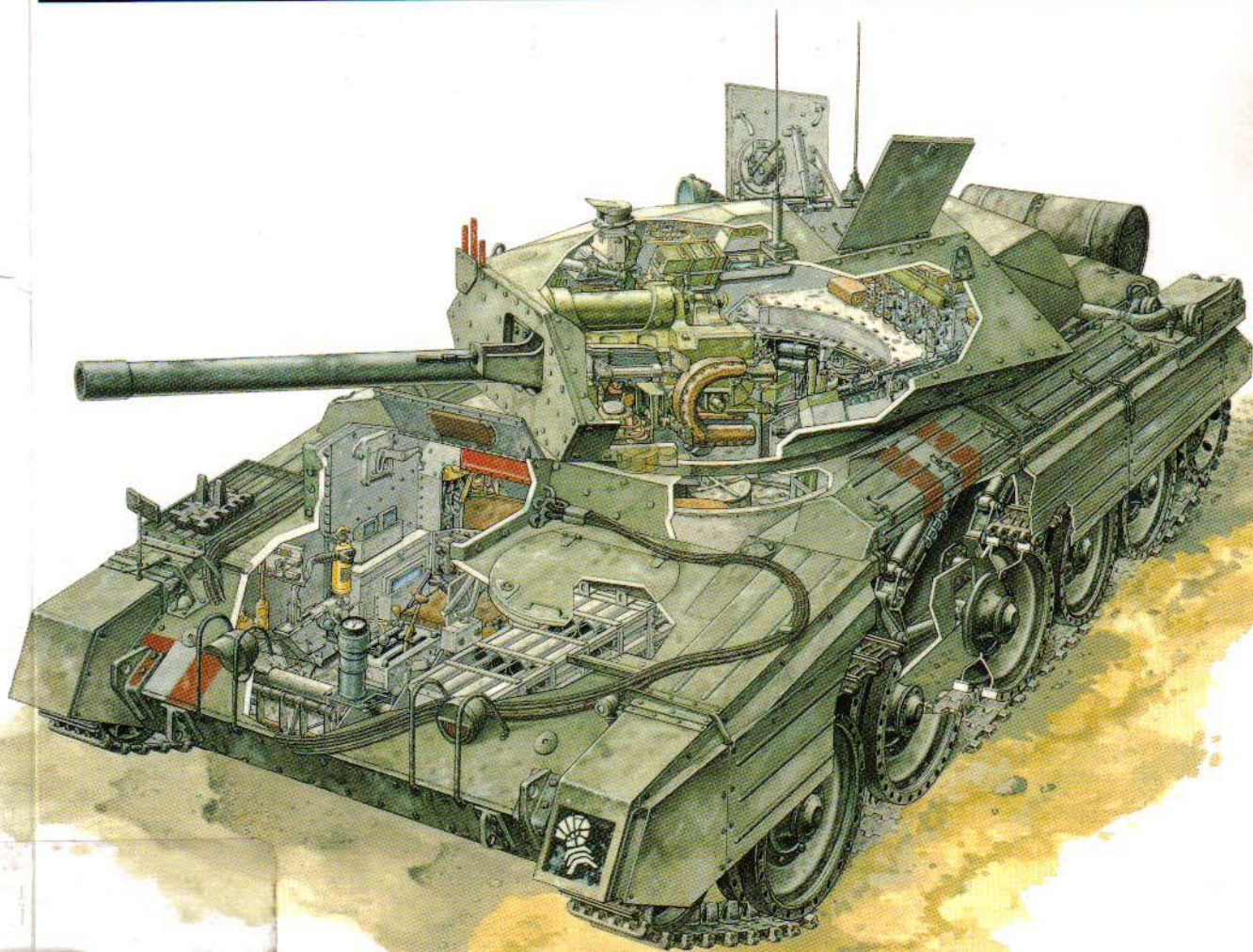


CRUSADER

CRUISER TANK
1939–1945



DAVID FLETCHER PETER SARSON

EDITOR: LEE JOHNSON

OSPREY
MILITARY

NEW VANGUARD

14

CRUSADER

CRUISER TANK 1939–1945

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DESIGN & DEVELOPMENT

The design of any new tank is affected by a number of factors, none of them simple and usually inter-related. Even when the design is apparently settled other influences can come into play which will alter the concept still further – the final result is often far removed from the original drawings. Such is the case with the Covenanter and Crusader.

The A13 Series (Covenanter)

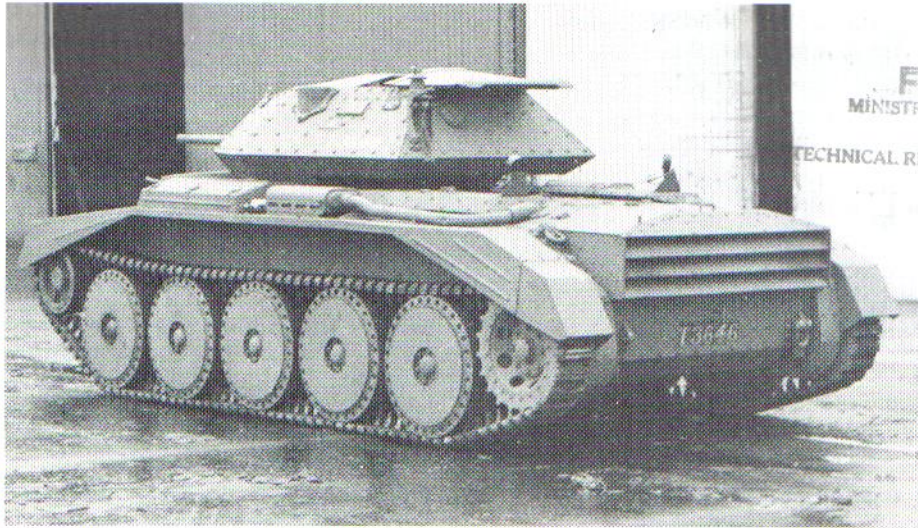
In 1937 the British Army, influenced by what a delegation under General Wavell had seen in Russia, adopted a system of tank suspension

devised by the eccentric American inventor, J. Walter Christie. This resulted in a new family of cruiser tanks, with the General Staff specification A13, which were designed and built under the parentage of Lord Nuffield's firm, Mechanization and Aero, in Birmingham. They entered service in 1939 and proved fast and well armed by the standards of the day, if somewhat poorly armoured, as mobility was considered to be more important and a form of protection in itself. Meanwhile, in 1938, the War Office had announced a requirement for a heavy cruiser tank which Nuffields met with their design A16. It also featured Christie suspension, an upgraded version of the Nuffield Liberty V12

The original Covenanter prototype, T1795, with all-welded hull and full Wilson transmission. It was subse-

quently used to test the Merritt-Brown transmission and ended its days as a recovery hulk.





The original Crusader, T3646, viewed from the rear. The air cleaners are mounted midway along the track guards and here the sunshine roof is seen in the open position.

engine and, at one stage, a complex steering system designed by the pioneer tank designer Walter Wilson.

Although promising, the new tank was clearly going to be expensive. In February 1939, the Mechanisation Board was told to investigate something lighter and cheaper. Developed as the A13 Mark III, or Cruiser Mark V, it became better known as the *Covenanter*; but it is important to stress that, despite sharing the GS designation A13 with the original Christie cruisers, the new tank was, strictly speaking, part of the heavy cruiser programme.

The official specification called for an armament of one 2-pdr. (40mm) gun and at least one machine gun (MG), Christie suspension, epicyclic steering and an armour standard of 30mm. This last factor deserves some explanation. What it meant, in simple terms, was that all vertical surfaces of hull and turret armour should be no less than 30mm thick. But it was accepted that surfaces which were not vertical need not be so thick since an angled plate of thinner material could offer protection equal to that of 30mm plate at the vertical. There are many qualifying factors but the basic principle holds good and, in the case of the *Covenanter*, it was adopted with such enthusiasm that there was hardly a vertical plate to be seen. Height, therefore, became a key factor in the design and this dictated two other features. In the first the coil springs of the suspension, instead of

acting vertically on trailing arms, as in the original Christie system, were raked back dramatically and attached to bell cranks which formed forward extensions of the suspension arms. Secondly it was decided to employ a low profile engine. Henry Meadows Ltd of Wolverhampton was commissioned to produce a horizontally opposed, 12-cylinder petrol engine rated at not less than 300 hp. It would be linked to the full Wilson transmission, a combined gear box and steering system, originally specified for A16. Finally it was decided that the tank's armour would be welded instead of riveted, a new departure in British tank construction which was regarded with suspicion in many quarters. Thus, on the eve of war, Britain was about to produce a revolutionary new tank.

From this point matters started to degenerate. The proposed design was placed before the General Staff who, while approving the layout, requested an increase in armour standard to the extent that the front of both hull and turret should be equivalent to a 40mm basis. The Tank Board accepted, but estimated that the increase in weight would bring it to the upper limit of what the suspension was designed to carry, and no move was made to strengthen the suspension. Detail design now went ahead; Henry Meadows naturally for the engine, Nuffield Mechanization and Aero for the turret and the London, Midland and Scottish Railway Company (LMSR) for the hull. Detail drawings were approved and finance

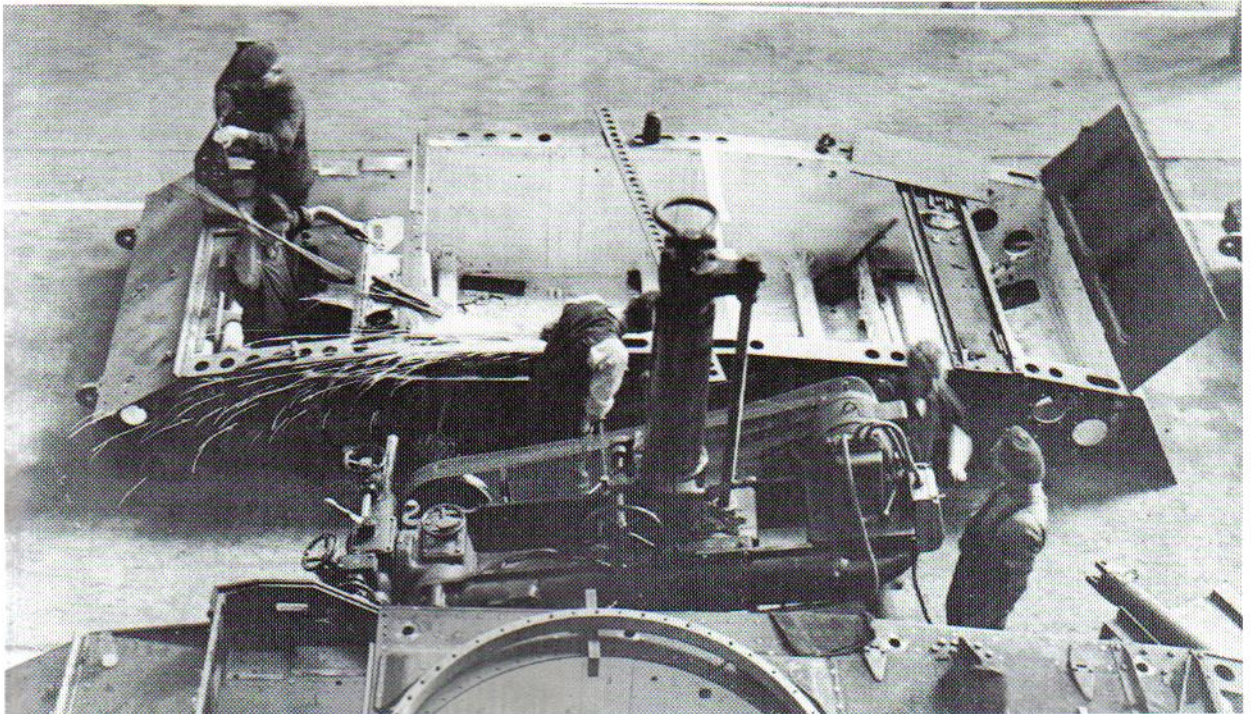
agreed for 100 tanks, to be built by the LMSR, on 17 April 1939. It is worth noting that, up to this time, no prototype existed. With war imminent, the tanks were ordered off the drawing board. The authorities believed that faults could be ironed out with the two pilot models and any modifications incorporated into production tanks. They were wrong.

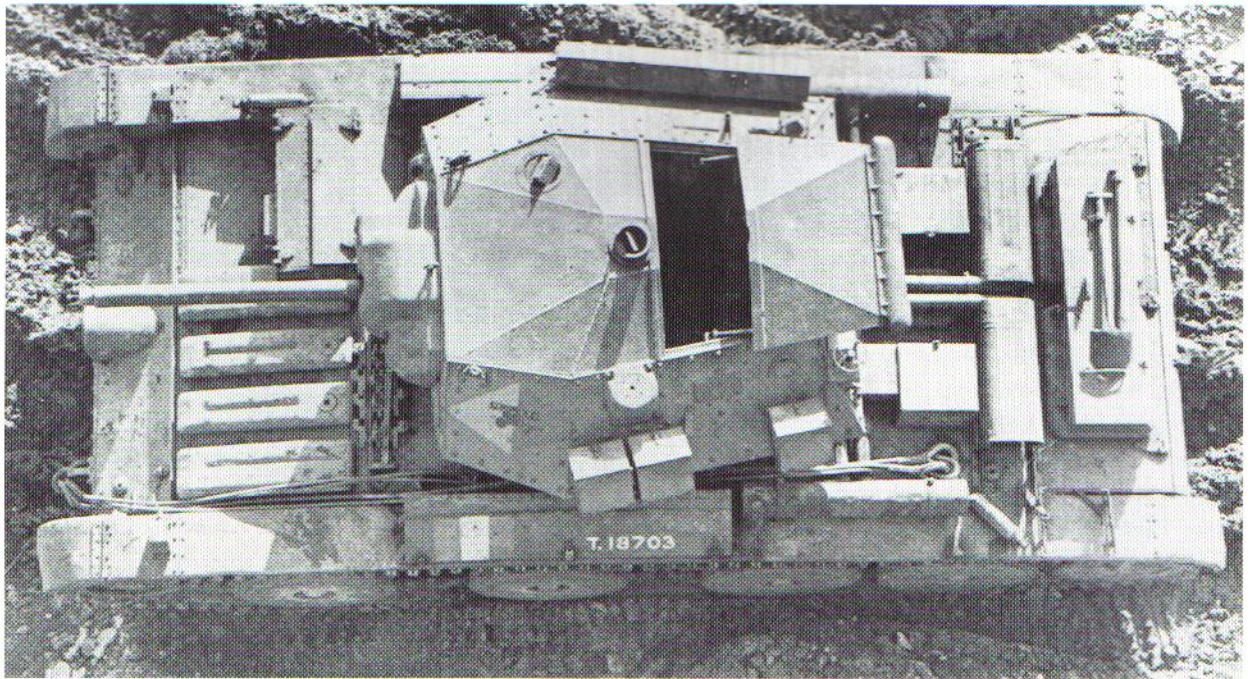
One feature which attracted much interest and caution was the proposed layout of the cooling system. The Meadows engine was certainly low enough, but what it lacked in height it more than made up for in width, to the extent that there was no room for radiators in, or close to, the engine compartment. For this reason it was decided to locate them at the front, to the left of the driver's cab. This unusual arrangement caused such concern that a mock up system was built and tested under simulated conditions at Woolwich. By September 1939 the English Electric Company

and Leyland Motors had joined the production programme and another 250 tanks were on order. A month later and the LMSR, who were already constructing the first prototype, began to express doubts as to the wisdom of welding tank hulls, adding for good measure that they could foresee a shortage of skilled welders. Their recommendation that the tank should be riveted was accepted, and the associated increase in weight was estimated at some 2 cwts.

To make welding easier composite armour (ie, two layers of plate) was employed. The inner plate was high quality steel and the outer homogeneous armour, the idea being that the inner layer would accept the weld without destroying the quality of the armour itself. When it was agreed to rivet instead extra frame members had to be provided to attach the plate to, but the use of composite armour was retained. Before production began two more important changes had to be incorporated in the design. The first concerned the road wheels. On earlier A13 series cruisers these had been made of aluminium to save weight, but as the war progressed this material – much in demand for aircraft production – was replaced by

Covenanters under construction, revealing the double thickness hull sides and cross tubes which braced the floor. The various compartments may easily be identified and a hatch has already been fitted above the transmission section at the back.





*An overhead view of a
Covenanter I. The turret
hatch is open and extra*

*storage boxes are fitted,
including a long one on the
right for a Bren LMG.*

pressed steel, increasing the weight of the tank still further. Fears were then expressed that the complex Wilson transmission and steering system would not be available in time to match tank production. It was agreed to substitute the original Meadows four-speed crash gearbox used in the A13 with Wilson epicyclic steering units mounted on each side. There was another consequence of this change. In the original layout provision had been made for a large fan to ventilate the transmission compartment. Production models would only accept a smaller one which was not so effective. The original pilot model Covenanter left the LMSR workshops at Crewe, for the Mechanization Experimental Establishment (MEE) at Farnborough on 21 May 1940. Preliminary trials, with an ungoverned engine, indicated a top speed of 37 mph and proved that with a tank weighing 16 tons the suspension was quite satisfactory. After 1,000 miles MEE was also able to report that the all-welded hull showed no signs of structural weakness. In October 1940 this tank was moved to the works of Thompson and

Taylor at Brooklands in Surrey where an experimental Merritt-Brown transmission was installed. The plan was to fit this system to later production Covenanters but in the event this was never done. The second pilot model arrived at Farnborough in September 1940, but reports indicate that cooling was far less effective than on the first machine.

Soon after the design of Covenanter had been agreed, early in 1939, the Ministry of Supply approached Nuffield Mechanization and Aero with a view to having them join the production programme. It is indicative of the influence Lord Nuffield wielded that, when he refused, his objections were accepted and an alternative design sanctioned. Nuffield reasoned that it would be better for his firm to work on an improved version of the original A13 than to adopt an entirely new design and, as things turned out, it was as well that he did. Ordered under General Staff specification A15 it was designated Cruiser Mark VI and later, more famously, as the Crusader.

Crusader Prototype

Although outwardly similar to the Covenanter the new design was based around a modified version of the 27-litre Nuffield Liberty V12 petrol engine rated at 340 hp at 1500 rpm. A similar engine had

been used in the earlier Nuffield built A13 Cruisers and, like those tanks, this first Crusader featured a compressed air starting system as an alternative to the usual method. But it is never mentioned in any subsequent description of the tank, and may have been abandoned. The space to the left of the driver was to be occupied by a subsidiary turret containing an extra Besa MG, but the main turret design was common to both tanks. Armour was to be to 40mm standard at the front and 30mm elsewhere while the contract specified that the weight should not exceed 18 tons, the limit for standard army bridging. Although the tracks on any vehicle help to spread the weight, and reduce ground pressure, the size and number of wheels bearing on the track also have an effect. In the case of A15 it was agreed to install another suspension station on each side in order to absorb some of the extra weight. In an effort to keep things as simple as possible Nuffields hoped to employ clutch and brake steering. However, they were over ruled and the system fitted to Covenanter was demanded instead, but using the A13 type constant mesh gearbox. Indeed it was agreed that, as far as possible, the two tanks should share common components. Despite its

later start the prototype Crusader arrived at MEE, Farnborough, on 9 April 1940, a full six weeks before the first Covenanter. It was criticised for poor cooling, which is normal for most new tanks, and the authorities also disliked the tiller steering arrangement which was claimed to cause the condition known as reverse steering, where a tank turns the opposite way to that desired. Levers were adopted for production Crusaders although Covenanters continued to use a form of tiller bar. In November 1940 the tank went down to Lulworth in Dorset for gunnery trials and there, under normal circumstances, its career might have ended. But it was back in the spotlight again in 1941, for a very important reason. Among new schemes in the pipeline was one by Rolls-Royce to produce a tank powerplant from their famous V12 Merlin aero engine, which was installed in the Supermarine Spitfire and many other types of British combat aircraft. The prototype Crusader was sent to Rolls-Royce to be fitted with one of

A Crusader is hoisted by an overhead crane at the Nuffield factory in Birmingham. It provides an excellent view of the suspen-

sion in the fully extended position, the short pitch tracks and double drive sprockets.



TECHNICAL ANALYSIS

these engines, now officially known as the Meteor.

Before leaving the prototypes two additional matters should be mentioned. Among the features incorporated in the Covenant design was a pneumatic system for activating the steering epicyclics and brakes. In Crusader it was proposed to use a hydraulic system. When this proved troublesome the Arens air operated equipment from Covenant was adopted, but in both tanks this resulted in a violent steering action which proved dangerous on roads. Extra valves were incorporated to give more gentle control. In both tanks the driver was housed beneath a box-shaped armoured cover and the prototypes featured an extra Besa MG, operated by the driver, in the right hand side of the cab. In practice this proved unworkable. The breech end of the gun and ammunition took up valuable space in an already tightly confined area and, when it was fired, the resulting fumes made conditions unbearable and potentially dangerous. In production tanks the mounting was replaced by a simple revolver port which the driver could use in an emergency as a last resort.

Most published sources give the impression that the Crusader was an improved version of Covenant, or at least a subsequent development, but they were of course exact contemporaries. Contracts for both models were issued at the same time, and in each case without the benefit of prototype testing. Inevitably, detail improvements on both models were subject to the vagaries of production, and may appear to be indiscriminate.

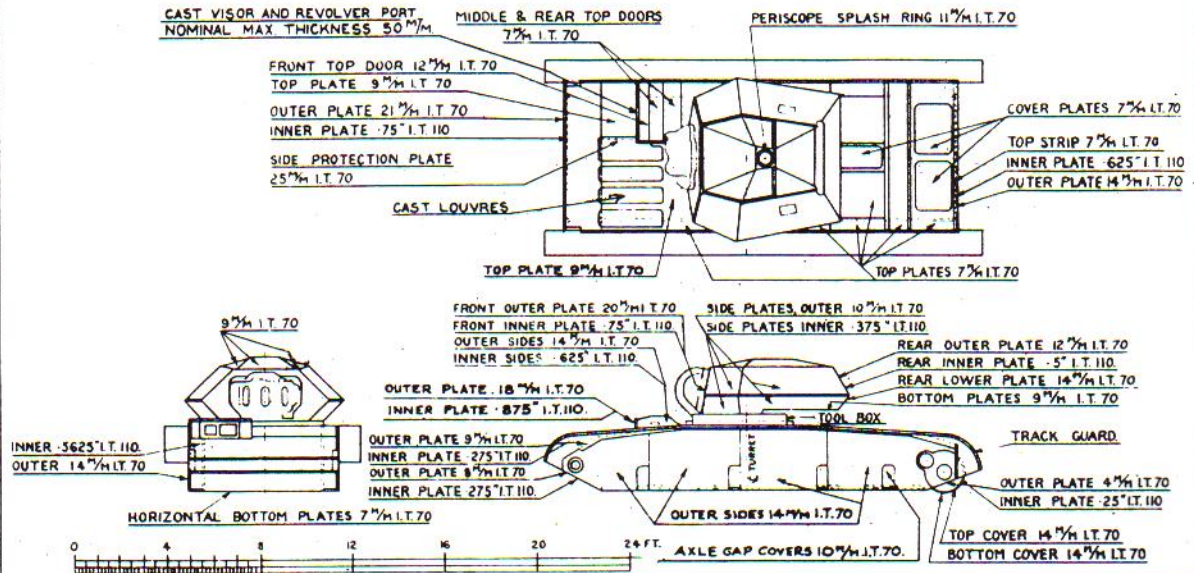
The form and structure of the hull on both tanks has already been described, except for the fact that on the sides it was formed from two spaced panels with the suspension units sandwiched in between. As with most British tanks the idler wheel was at the front, adjusted by a cam action to tension the track. The twin sets of 32in. diameter road wheels were dish shaped in pressed steel with perforated solid tyres. On some early models the wheel centres were covered by blank



Left; Three Covenants during early trials. Many turret details have yet to be fitted. Notice the two different styles of mantlet and the variations in cooling louvre layout.

Right; Comparative armour profiles for a Covenant I and Crusader III. These diagrams have been reduced from the original 1/48th scale.

NOTE: PLATE MATERIAL SPECIFICATIONS QUOTED ARE CORRECT AS LAID DOWN IN THE DESIGN STAGE. THEY ARE AMENDED FROM TIME TO TIME TO MEET PRODUCTION AND SUPPLY REQUIREMENTS.

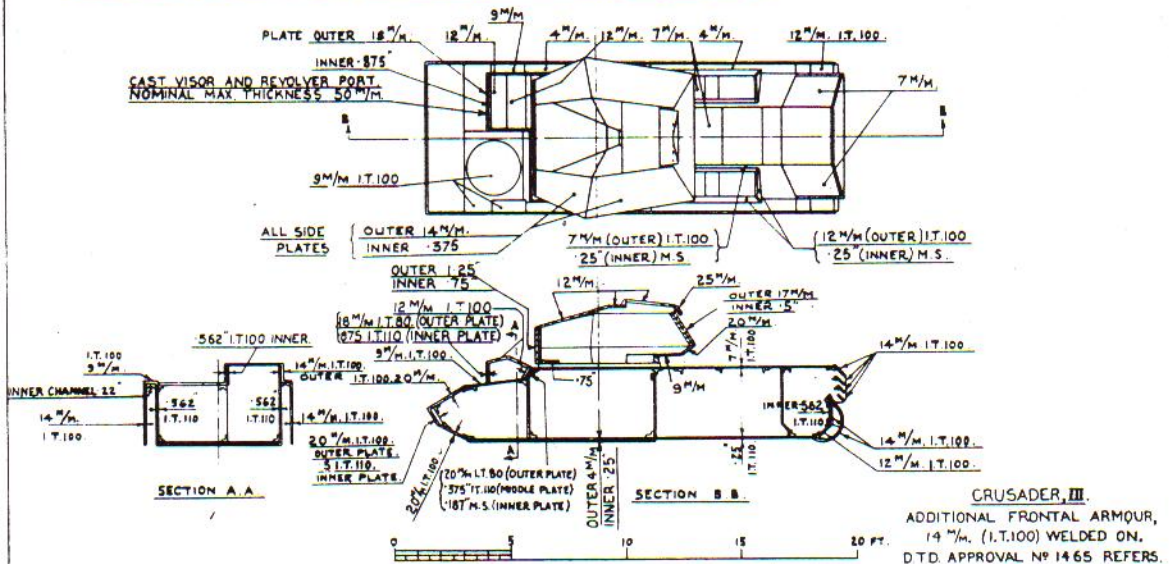


DRAWN BY: R.S. WILKINS
CHECKED BY: E.D.L. 6210
SCALE: 1/48 23/10
FOR O.T.O.

**COVENANTER I. (TYPICAL FOR II III & IV).
PLATE THICKNESS.**

T. D. 5913
8 SHEETS SHEET 2.

NOTE: PLATE MATERIAL SPECIFICATIONS QUOTED ARE CORRECT AS LAID DOWN IN THE DESIGN STAGE. THEY ARE AMENDED FROM TIME TO TIME TO MEET PRODUCTION AND SUPPLY REQUIREMENTS.



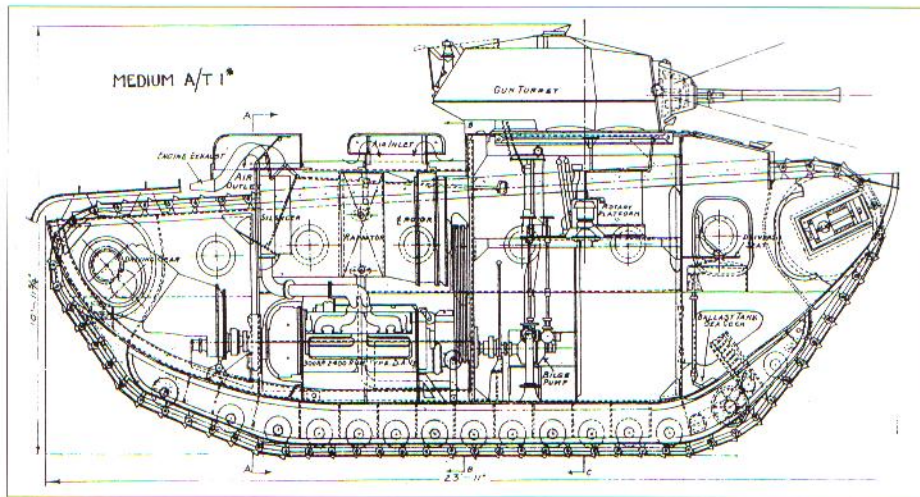
CRUSADER, III.

ADDITIONAL FRONTAL ARMOUR,
14³/₁₆" (I.T.100) WELDED ON.
D.T.O. APPROVAL NO 1465 REFERS.

DRAWN BY: N.D. BROWN
CHECKED BY: E.C. Wilson
SCALE: 1/48 H. Shaw

**CRUSADER, III.
PLATE THICKNESS.**

T.D. 5911.
9 SHEETS SHEET 4.



The anatomy of A/T I showing the amazing amount of space available within the hull. Hollow sponsons filled the area inside the tracks on each side to provide additional floatation.*

discs but this was later dispensed with. On both tanks the first and last wheel stations were fitted with Newton shock absorbers. At the rear the tanks were driven by double drive sprockets each with 20 teeth. The tracks were of short pitch with centre guide horn in malleable cast iron, dry pin connected in the multi-hinge fashion favoured by Christie.

The driver's head cover was a small, bevelled box on the right side of the hull. It had a double flap lid and a small hinged door at the front, containing a glass visor block and armoured cover; to its right was the revolver port, operated by a quick acting lever. All tanks had a narrow vision slit on the right side of the cab but, for some reason, only the Covenanter Mark II also had one on the left.

Alongside the cab, on the Covenanter, were four cast armoured covers which protected the slots through which the radiators vented. The two radiators were cooled by a suction fan driven off the turret traverse motor. On the Crusader this area was occupied by a small, drum shaped turret containing a single Besa MG in a mounting which also contained a telescopic sight. It was hand traversed over an arc of 150 degrees and fitted with a hinged lid, just large enough for a man to wriggle through.

The main turret was common to both tanks. Its distinctive shape not only reduced height but, according to one advocate, increased elbow room. Commander's cupolas were temporarily out of

favour at this time so the rear section of the roof formed one large hatch which lifted up and folded backwards on parallel link arms while the weight was balanced by torsion bars. The handbook lays great stress on ensuring that the hatch is firmly secured in the open position otherwise it was liable to swing shut of its own accord. The mantlet, on early examples, was a semi-internal casting of complex shape set in the vertical front plate, but an uparmoured type was later introduced a distinctive, bulbous shaped casting with three vertical slits in it. That on the left contained the sighting telescope, the large centre one the 2-pdr. gun (or 3in. howitzer in close support tanks) and the right slot a Besa machine gun. To the right of this again, but independent of the mantlet, was the mounting for a 2in. bomb thrower used to launch smoke canisters. There were two rotating periscopes in the turret roof, one for the commander and another for the loader, while the gunner had a vision slit in the front plate, on the left side. There were two aerial mounting points although only one was used when the old No.9 set was carried. Two small, hinged flaps, which covered Triplex glass lookout blocks, were fitted on the turret sides with a spotlight bracket on the left and a small hole in the back, covered by a plug, through which the gun barrel could be withdrawn when it was changed. Some early turrets, certainly those fitted to Covenanters, had a built-in drinking water tank at the back, filled from outside. Proving more trouble than it was worth, the tank

A Crusader I in the Middle East. It features an early form of dust guards and a rare appearance, on this type of tank, of the angular camouflage. Notice the auxiliary turret and that significant feature on the main turret, the raised lip to the gunner's vision slit, which identifies a Mark I.



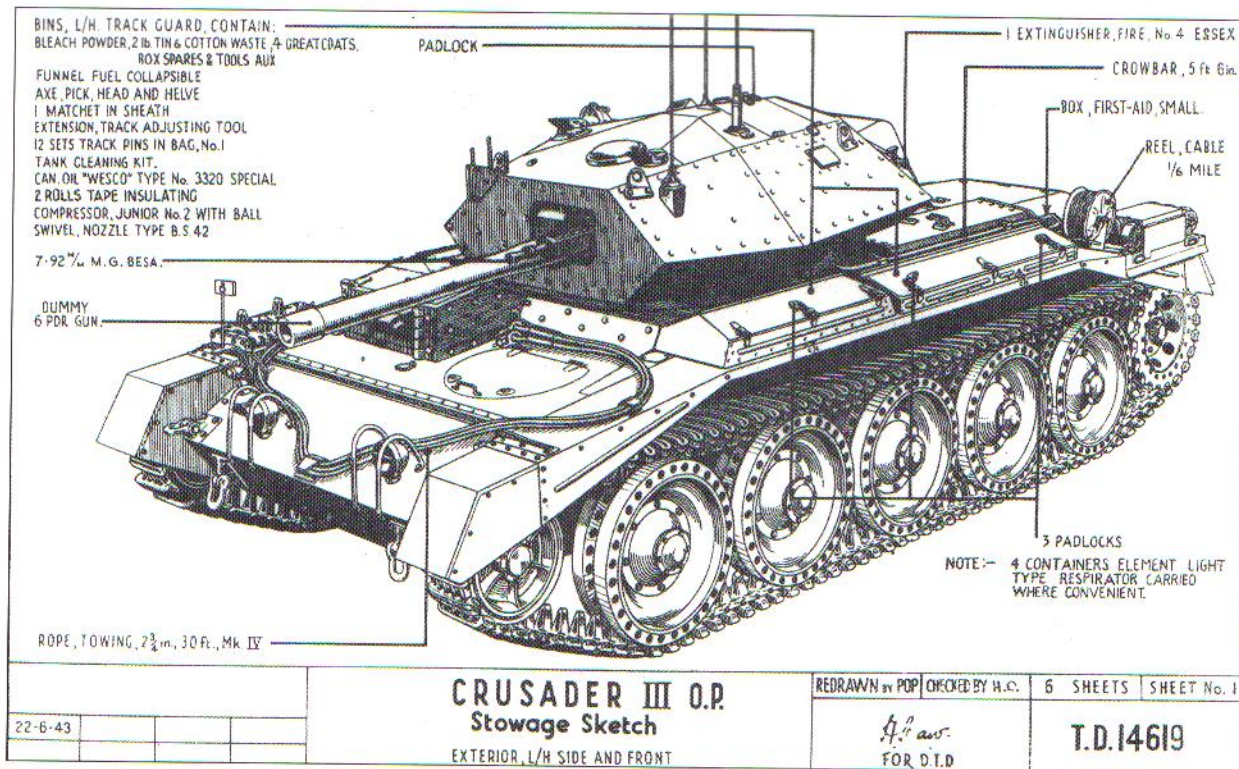
was replaced in later models by a rack of water containers stowed in the fighting compartment. In service both Covenanters and Crusaders often carried stowage lockers on the rear of the turret and other containers at the sides while many tanks were provided with a portable Lakeman mount for a Bren LMG, used by the commander in the anti-aircraft role, which could be stowed in a long box on the right side.

Engine and Fuel Systems

The Meadows model DAV engine in Covenanter was a horizontally opposed, overhead valve flat twelve, with a bore of 115mm and a stroke of 130mm giving a capacity of 16,204 cc. At a governed 2,400 rpm it delivered 300 hp, giving the tank a top road speed of 31 mph. It was linked through a Borg and Beck twin plate clutch to the Meadows four-speed and reverse crash gearbox which had Wilson two-speed epicyclics bolted to its output shafts. From these drive passed through brake drums to the final drive reduction and track sprockets. Three fuel tanks were located inside the engine compartment, one on each side and another beneath the engine. Armoured panels covering the engine and transmission compartments were in 7mm plate. Twin concertina air filters were mounted crosswise on the engine decks while the silencers were located lengthwise on the track guards.

The engine fitted to Crusader was a type

known originally as the United States Standard 12-cylinder Aviation Engine, christened the Liberty when it appeared during the First World War. As the Nuffield Liberty Mark III it was a 45-degree V12 with a bore of 127mm and stroke of 177.8mm giving a capacity of 27,040 cc. At a governed 1,500 rpm it delivered 340 hp which gave the tank a top speed of 27.5 mph. Its main drawback, as a tank engine, was the method of construction by which the individual cast iron cylinders were bolted together. The effect of this is noted later. Behind the engine a multi-plate clutch carried the drive into a Nuffield four-speed and reverse, constant mesh gearbox to Wilson steering units and final drive as in Covenanter. Fuel tanks were located either side of the engine with the radiators fitted vertically inboard of them, drawing air through louvres on the engine decks. Two cooling fans were fitted into the rear engine bulkhead, driven by exposed double roller chains from the crankshaft and geared to turn at double the normal engine speed. In the desert, especially, this caused endless trouble and on later models a form of shaft drive was introduced. The exhaust pipes were entirely hidden on Crusader. From the manifold on each side of the engine they snaked over the transmission and ended inside the rear hull louvres. On early Crusaders concertina-type air cleaners were mounted on the track guards at the rear but these were soon replaced by an oil bath-type.



A stowage diagram for the Crusader III OP (Observation Post) tank showing the dummy gun,

aerial array and extra cable reels for remote operation of the radios.

On both tanks an engine driven pump provided compressed air for the steering and braking systems while hydraulics were used for the turret power traverse. In keeping with contemporary British practice, which regarded firing on the move as the correct procedure for tank versus tank fighting, the gun was elevated manually by the gunner. Before the introduction of the No.19 wireless set, which incorporated an intercom, crew communication was one way only, from the tank commander, through Tannoy speakers at all crew stations.

Early Production Models

Obviously, when production machines followed so closely on the prototypes, a lot of work remained to be done before they were perfected. A report on one such trial throws an interesting light on contemporary attitudes. The tank in question was T15297, one of the first English Electric-built

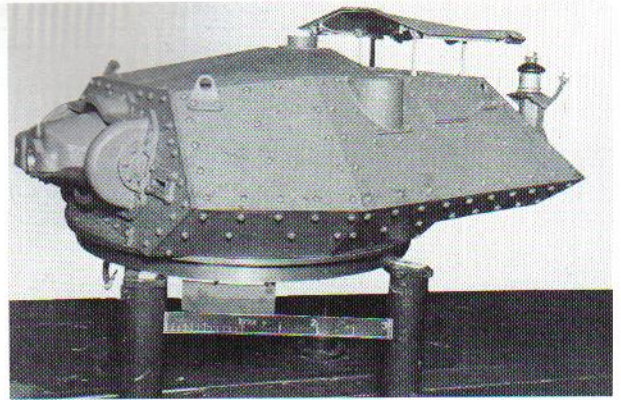
Covenanters which arrived at Wool station en route for the Gunnery School at Lulworth. The date was 2 January 1941, the weather cold and snowy, but the Experimental Officer in charge of the trial noted that it, and another Covenanter bound for the Driving and Maintenance School at Bovington, had not been sheeted over for the trip. Besides the obvious protection such cover would provide from the weather it seems amazing that a brand new tank, not yet off the Secret List, should travel openly from Staffordshire to Dorset for all to see. Even so what concerned the recipients was the fact that they were unable to start the tank because the batteries were flat and there were no instructions sent with it – the first Covenanter they had seen – to guide them. Most of the tools and equipment which the tank would normally have were also missing. Evidently Lulworth got it going in the end because they reported that, as a gun platform, the tank was excellent; as good as the Crusader they had tested earlier. But Lulworth complained that the diameter of the turret floor was much smaller than the turret ring which caused the gunner to sit in a

very uncomfortable position and the commander to run the risk of getting his legs trapped when the turret rotated. Also criticised was the variety of Triplex vision devices fitted to the tank (most of which were of different sizes), and the general problems of accessibility, remarking that maintenance was both difficult and tedious. Fears were expressed about the risk of damage to the air system, it being pointed out that one fractured pipe would cripple the tank, a weakness shared by the Crusader. Despite reports of inefficient cooling there were no problems as long as the the tank was driven carefully, although in war this was obviously an unrealistic restriction. In any case Lulworth in winter is not Egypt in summer. Finally, the external shape was judged excellent from a distance the tank looked much smaller than it actually was. But on the subject of armour Lulworth were cautious about the 40mm basis and felt that top armour was much too thin, a view influenced by reports of air attacks on tanks.

VARIANTS

Covenanter Mk.s I, II, III & IV

Covenanter production ran to four marks, with a Close Support (CS) version of each. Late editions of the Covenanter Instruction Book emphasise that all models of the tank are adequately cooled for temperate climates while later ones will be improved for use in the tropics. Other evidence suggests that this was a rather hollow claim. Photographs of the tanks in Britain reveal a bewildering variety of covers for the radiator louvres, suggesting that attempts to cure the problem were continuing. Many of the original tanks were modified in service workshops with a multi-tube oil cooler mounted on the radiator. Tanks thus reworked were designated Covenanter II. The next model, Covenanter III, was a new construction. It had oil coolers either side of the engine, a modified clutch linkage and a change in the pattern of radiator cooling louvres. But this version is most easily recognised by changes to the engine deck. New, pot shaped air cleaners were located inboard at the rear while the exhaust silencers



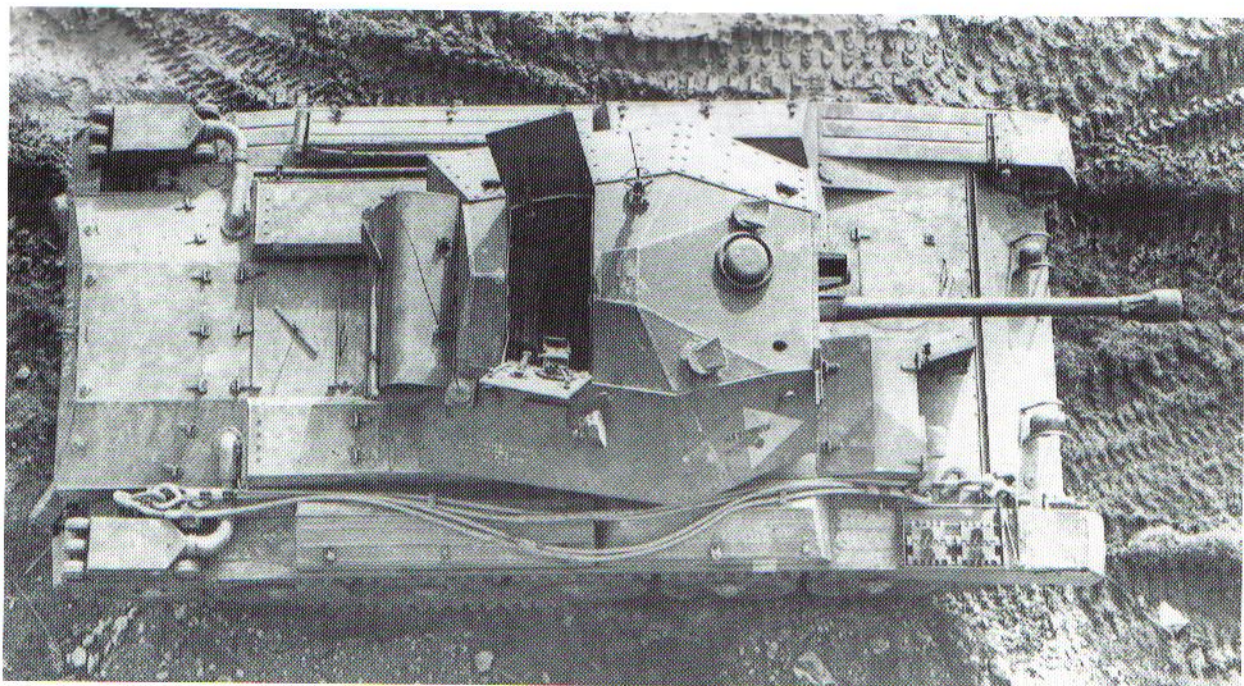
A typical turret on a stand. The cone headed bolts, which secure the outer turret plates, were designed to deflect bullets. The sunshine roof is in the half open

position and the mantlet is of the original type. The large protruberance on this side is the original aerial base mounting.

were situated on the ends of the track guards, evacuating to the back. The final production model, the Covenanter IV, was a new build to Mark II standard but with the clutch modifications and other features typical of the Mark III.

Crusader Mk.s II & III

The Cruiser Mark VIA, or Crusader II was introduced during production as an up-armoured version of the original model. Most of the changes affected the hull and turret front with thicker outer plates being applied. On the nose of the tank the increase, from the Mark I, was 6mm. On the turret front it was 10mm while the turret top and side plates were increased in proportion by about 3mm or 4mm. The change did not specifically involve removal of the auxiliary turret which may, or may not have been seen on either type. The surest way of identifying a Crusader II from a Mark I is to study the turret front. On the latter the small gunner's lookout, to the left of the mantlet, is surrounded by a coaming that stands proud from the armour. On the Mark II it is virtually flush. Also on the Mark II the lower corners of the front turret plate are slightly bevelled since the extra thickness would otherwise cause them to foul the auxiliary turret and driver's hood. In 1942 a further increase in protection was sanctioned which resulted in pre-cut panels of



Looking down on a Crusader III which bears the markings of the Gunnery School, Lulworth. The turret hatches are open

and one may see the new periscopes, round ventilator comb and the hole for the smoke bomb thrower.

14mm plate being welded to the nose, front glacis plate and other frontal surfaces. Although authorised for the Mark II this improvement was mainly seen on the final model, Crusader III.

The need to up-gun existing British tanks, in order to match German progress, had been appreciated in some circles as early as 1940. A suitable weapon was already available – the 57mm 6-pdr. The problem was finding a tank to put it in. While new machines were being designed, schemes were investigated to improve three existing types, one of which was the Crusader. An attempt to fit a Churchill turret was rejected at an early stage but progress then got bogged down because official opinion regarded the project as unworkable. Thus it was September 1941 before a mock-up installation was unveiled by the Ministry of Supply. When this was inspected by engineers from Nuffields they considered it a poor job and, six weeks later, had their own version ready for gunnery trials. In fact what they had done was to modify the original turret to accept the bigger

gun, rather than design a new one, and although it worked it was not the ideal solution.

The new turret was slightly longer, and somewhat higher than the original version but it retained the same basic shape. It was built to a 50mm armour standard. The front plate was vertical, with a rectangular opening for the gun and an internal mantlet. The new mounting had the coaxial Besa MG on its left while the smoke discharger was altered to fire through a hole in the turret roof. The single turret hatch was replaced by a pair which opened outwards from the centre. One flap included a periscope for the commander and two more were provided further forward, along with a power operated extractor fan to deal with fumes created by the machine gun. The small flaps on each side were relieved of their Triplex blocks and now functioned as revolver ports.

Firing trials soon proved that the new arrangement worked and production of what became known as the Crusader III was authorised in December 1941, with the first examples being delivered the following summer. But the modification imposed a particular burden on the crew. Not only was it now essential to remove the auxiliary turret and gunner to provide stowage space for



the new ammunition, one of the main turret crew had to go as well. This meant that the tank's commander also acted as loader, while the gunner doubled up as wireless operator. What had begun as a five-man tank now only carried three, and this reduction placed considerable extra strain on all of them.

THE CREW

The driver's cab on both *Covenanter* and *Crusader* was more or less the same, although there were detail differences. *Covenanter* used horizontal tiller bars for steering where *Crusader* used levers. Gearbox layouts were different while the accelerator pedal on *Covenanter* was between the clutch and brake pedals but over to the right on *Crusader*. Each tank had a different form of revolver port and, on *Crusader* only, a compass binnacle was provided for the driver, within easy

A Covenanter bursts out of a smoke screen, looking the very essence of power and aggression, its 2-pdr. gun aimed directly at the cam-

era. Photographs such as this, released for publication, gave this handsome tank some unwarranted publicity.

reach just ahead of the gear lever.

On early *Crusaders* the auxiliary machine gunner sat in supreme discomfort on a tiny saddle which went round with the turret. Besa ammunition boxes were stowed in front of him and he operated the traversing handle with his left hand. When closed down his view was limited to what could be seen through the sighting telescope. In the desert, particularly, conditions were so bad that many *Crusaders* which had the extra turret went into action without the gunner anyway.

In those tanks with the 2-pdr. turret the commander sat at the back, within easy reach of the wireless set but always aware of the risk of having his head knocked off by the unstable hatch. Ahead of him, to the left, sat the gunner. In action gun-



A Covenanter of 'B' Squadron, 13th/18th Hussars, 9th Armoured Division is attacked by infantry during an exercise. The yellow crosses on the tank indicate that it was taking the part of an enemy vehicle.

ners generally preferred to stand, so that they could aim the main gun more accurately, and bring all their body weight to bear on the elevating arm. Across from him the loader sat on top of an ammunition bin. He was also responsible for loading and firing the smoke discharger. Tanks armed with the 2-pdr carried about 130 rounds of ammunition while the close support version carried 65 rounds of 3in. smoke and high explosive.

On the 6-pdr Crusader the gunner was located on the left of the turret with the loader/commander on the right. The size of the turret turntable had been increased to give the loader more room to handle the larger rounds, of which stowage was provided for 73.

Approximate production figures give 17,765 as the main total for Covenanter while a minimum of 5,700 is suggested for Crusader.

OPERATIONAL HISTORY

Production of both Covenanter and Crusader ran more or less parallel. Deliveries began in the summer of 1941, but from this point their fates

differed greatly. Trials had already proved that Covenanter, with its suspect cooling system, was only suitable for employment in temperate climates. As they came off the production lines Covenanters were issued to the regiments of 1st Armoured Division, which had managed with a motley collection of machines after losing almost all of their tanks in France a year earlier. In 1941 a British armoured division consisted of two armoured brigades, in this case the 2nd and 22nd. Each comprised three armoured regiments so there was a requirement for at least 300 tanks. The division left for Egypt later in the year and the Covenanters were transferred to 9th Armoured Division. Its six regiments formed 27th and 28th Armoured Brigades. Destined to remain in Britain as a training division 9th Armoured, with its Panda's head symbol, became a familiar sight in various parts of the country. The public were treated to media eulogies about fast and powerful cruiser tanks that the unfortunate Covenanter never deserved.

Covenanter Deficiencies

Accounts of Covenanter in service are not abundant and what there is has a uniformly critical tone. The 4th/7th Dragoon Guards received

theirs in April 1941. At first the unit described them as a 'veritable deluxe model' but, having previously been in the Light Tank Mark VI, anything would seem better. They later complained of persistent mechanical failure and also remarked that the narrow tracks gave the tank an unacceptably high ground pressure, something not generally held against it. The 13th/18th Hussars were at Thetford when they received their Covenanters in August 1941. A month later the regiment took part in the five-day Exercise 'Bumper' which ranged across the English midlands, the Manoeuvre Act allowing them to go more or less where they liked. This regiment subsequently transferred from the 9th into the new 79th Armoured Division, still with their Covenanters and some Crusaders for a time, before being converted into a DD regiment. The 15th/19th Hussars claim, in their history, that the Covenanter was only produced for home defence. This sounds like a retrospective explanation, invented by an embarrassed civil servant, when it finally became clear that the tank would never be fit for active service. The tank had numerous teething troubles, each new fault requiring yet another modification. This kept the REME fitters

busy and consequently the tank crews were constantly having to keep up with developments.

There is an argument – probably based on the principle of making the best of a bad job – for providing training regiments with unreliable tanks. The theory is that they present personnel with a greater challenge and result in better trained crews, but for many of those involved it must have been a difficult philosophy to appreciate. No little skill and persistence was required to keep such tanks running, but when they were going well it was worth it for the Covenanter had a remarkable turn of speed. However, despite continued improvements it soon became clear that it would be a long time before the Covenanter could be described as battleworthy. The Guards Armoured Division, created in June 1941, was equipped with Covenanters in 1942. In the autumn of that year armoured divisions in Britain were reorganised to feature just one armoured

August 1942 and two Covenanters of Brigade Headquarters, 5th Guards Armoured Brigade, Guards Armoured Division, demonstrate the correct way to

investigate an occupied village; Stockton in Wiltshire. The next stage should be to investigate the Carriers Arms.





A Coventanter on trial in the desert. Poor though it is this picture is the only one to show the pattern of sandshields

produced for this tank and the Crusader-type turret storage bin which carried the camouflage net.



A close support Crusader, mounting the 3-in. howitzer, shown in a typical disruptive camouflage scheme. The tank alongside seems to sport another pattern altogether. These

schemes were seen on tanks of the Royal Gloucestershire Hussars.

brigade of three regiments; from 1943 an armoured reconnaissance regiment was added. By this time, particularly in the Guards, the Covenanter was gaining in reliability and earning respect for its speed, low silhouette and dashing appearance. But even this could not disguise the fact that it was now completely out of date. The Covenanter could not be up-gunned nor up-armoured since any increase in weight would have overwhelmed the suspension. Its last chance for fame had gone. Later in 1943 the Covenanter was declared obsolete and orders issued that all surviving gun tanks should be scrapped.

In the meantime a handful of Covenanters had been shipped out to the Middle East for desert trials. Whether it was a case of wishful thinking or desperation is not clear, but the result can hardly have been in doubt.

When 1st Polish Armoured Division was formed in Britain it, too, received some Covenanters. Pending the formation of their armoured division many Polish troops were serving as crews on armoured trains operating in the south and east of England. Some, based in Kent, also acquired a few tanks in 1942, mostly Covenanters with some Valentines, which were intended to operate in conjunction with the trains, but not travel on them. On the night of 31 May 1942 a Covenanter attached to Armoured Train 'H', based in the Canterbury area, was destroyed by a bomb during a German raid on the city; probably the only tank of this type to be knocked out directly by enemy action.

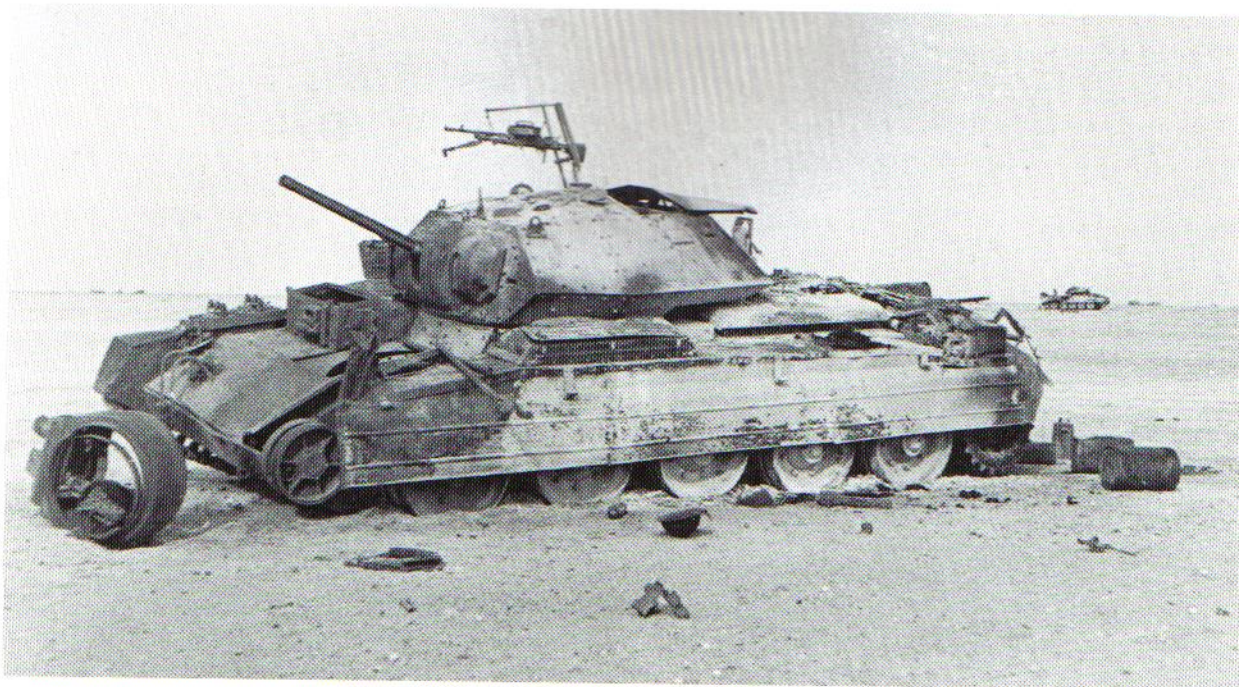
Crusader Deficiencies in North Africa

When the Crusader first entered production there were no such doubts about its reliability. By May 1941 enough were available to equip one regiment and they were hastily shipped out to the Middle East and issued to 6th Royal Tank Regiment, who employed them during the attempt to relieve Tobruk, Operation 'Battleaxe', in June. Later 22nd Armoured Brigade arrived, fully equipped with Crusaders, and they went into action in November in the aptly named Operation 'Crusader'.

There is no doubt that the Germans learned to respect the new tank for its speed, and if imitation

is the sincerest form of flattery the Italians went one better, basing the appearance of their Sahariano medium tank, outwardly at least, on the Crusader. Yet it was equally clear to British crews that their tanks were under-gunned compared with German equivalents and extremely vulnerable to enemy anti-tank guns. It was not just the result of strike and penetration; when hit, most British tanks tended to burst into flames at once, which horrified their crews. Popular opinion ascribed this to hits on petrol tanks, conveniently forgetting that German tanks used the same fuel, but a British team proved where the real trouble lay. A lengthy examination of knocked out Crusaders and firing at battle damaged tanks fully stowed for the purpose revealed that the real culprit was cordite in ammunition, stowed in unprotected racks, which ignited immediately when struck with hot fragments of metal. Crews remained sceptical and it is noticeable that those with battle experience tended to use the auxiliary fuel tank at the back as a container for extra water if they could get away with it.

The chances are that even this degree of vulnerability would have been accepted if the Crusader had at least proved reliable. That it did not was due to a variety of factors. Shipping was the first problem. Tanks were driven around the docks with no water in the cooling system, which damaged the plumbing, and poor preparation meant that sea air and spray got inside and corroded components, notably alloy castings. All of this had to be made good by base workshops in Alexandria before tanks could be issued. There was an inevitable delay waiting for spares and the majority of Crusaders required many man hours of work that could not easily be spared when large numbers of damaged tanks were coming back from the battlefield. Yet that was only the beginning. After a few months of active service complaints began to pour in. As mentioned earlier the Liberty engine was assembled from separate sets of cylinders, instead of having a single block. Under stress, in a fast moving cross-country vehicle, the engine would tend to work apart, fracturing oil galleries and causing leaks. Then there was the cooling system. Sand, working its way inevitably into the water, wore away the



Wrecked Crusaders litter the desert. The Mark II in the foreground has lost its auxiliary turret in an

explosion and fire that has buckled the front plates and burnt all the rubber off the nearside roadwheels.

white metal components of the water pump and caused it to leak. At the same time the exposed chain-driven fans suffered from excessive wear. If there is one place you can do without cooling problems it is the desert.

Performance in Action

User opinion is, once again, invariably negative but does contain some interesting comments. The Queen's Bays record that when they left the United Kingdom for Egypt in 1941 their tanks followed in separate ships. Once out of workshops the tanks were sprayed 'desert yellow'; when issued 'A' and 'B' Squadrons had Crusaders while 'C' had M3 Stuarts. The Crusader was regarded as more comfortable than the American tank and easier to fight and command, but on the march they considered themselves lucky not to lose six Crusaders each day to mechanical problems while the Stuarts just trundled on and on. At Msus, early in 1942, 2nd Armoured Brigade received such a mauling that they only had enough tanks between them to form one weak regiment. At

Gazala they were re-equipped and the Bays were dismayed to receive many battle worn Crusaders, with all their tools missing and shot holes plugged. These were later replaced by tanks which had been renovated at base workshops. The 9th Lancers, also in 2nd Armoured Brigade, describe the desert colour in interior decorator's terms as Light Stone. The unit states that 2-pdr. shot bounced off Panzer IIIs and the Germans regarded it with contempt, while their 50mm rounds would go straight through a Crusader. At Gazala, in the summer of 1942, the regiment received its first Sunshade device. This was a framework of tubular steel with canvas stretched over it which, when placed over the tank made it look like a lorry, at least from a distance. The thing was attached in two halves which, according to the 9th Lancers' historian 'in theory was dropped off by the commander pulling a quick release cord above his head. In practice it fell off all the time, except when it was required to do so'. The Royal Gloucester Hussars agree exactly.

The third regiment in 2nd Armoured Brigade was 10th Hussars. They were particularly scathing about the performance of the 2-pdr. gun, claiming that 500 yards was the maximum effective range-against a Panzer III which, with its 50mm gun,

A Crusader II of the RTR, perched on a sand ridge. The crew have added a rail to the sand shields from which they will hang some of their kit in service and attach the bivouac at night.



was effective at 1,000 yards or more. But the regiment disregarded the armour piercing performance of the short 75mm gun on the Panzer IV. The Sherwood Rangers, who refer to their Sunshade disguise as a Sun Bonnet recall 'it was a miracle if a Crusader engine functioned for 36 hours without some strange and terrible trouble developing'.

The Staffordshire Yeomanry, in August 1942, report having 'A' and 'B' Squadron in Grants while 'C' had Crusaders and, according to them, the British tank could pass over soft ground in which the American mediums would bog down. Their history contains an interesting chart showing how a regimental group formed up for a desert move. 'C' Squadron led the way with three troops abreast, followed by squadron headquarters and the forward observation officer's OP tank. They were followed by a Royal Engineers detachment and the reserve tank troop. Next came regimental headquarters with three columns in their wake. On the left was the infantry company, on the right the anti-tank battery and in the centre a Royal Horse Artillery battery. Each column was preceded by its command vehicles with a spare OP tank. The flanks were covered by 'B' squadron on the left and 'A' squadron on the

right. Each squadron arranged its troops in diamond formation with its headquarters at the centre. Behind this combat phalanx came the two transport echelons.

Another chart shows how the regimental group took up close leaguer for the night. 'A' Squadron took the right flank, its tanks in line ahead with their guns pointing outwards to front, sides and rear. Regimental headquarters formed line inside them. 'C' Squadron, on the left flank were a mirror image while the next line inboard of them was 'B' Squadron with all its tanks parked gun forward, except the very last one which had its turret reversed. The anti-tank battery covered the rear with portee vehicles while the RHA battery and infantry motor company formed four inner lines.

On the subject of Crusaders the Wiltshire Yeomanry claim that most of the trouble they experienced was with water pump failures. In October 1943 their 'A' Squadron had Shermans, 'B' Crusaders and 'C' Grants.

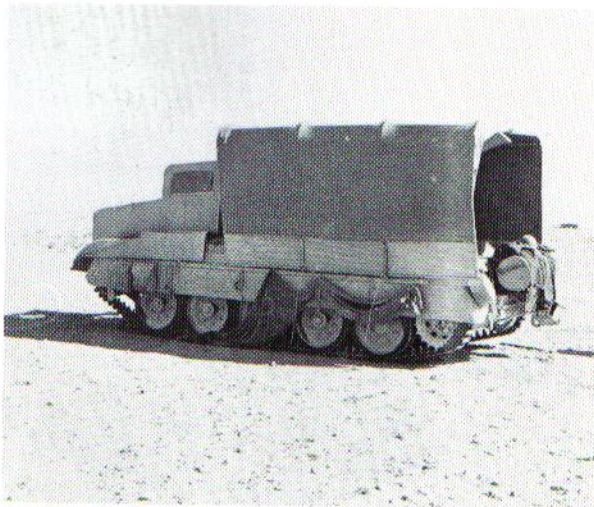
An excellent account of Crusaders in action can be found in the 9th Lancer's history. The regiment, in 2nd Armoured Brigade, 1st Armoured Division, employed Crusaders in 'A' Squadron and the action took place during the retreat to El Alamein:

'On the 16th, 'A' squadron, on the left, rang up to say that there were some suspicious-looking vehicles in front, and could these be attacked? The Colonel gave permission and the remainder of the regiment then witnessed as nice a bit of tank handling as ever was seen.

'Twelve graceful, putty-coloured cruisers were standing in a semi-circle, their guns pointing inquiringly towards the west where a column of dust rose on the still air. Behind them stood in line the close-support tanks of squadron headquarters. Suddenly all four fired, their guns elevated high and the shells making an arc of smoke trail in the sky, and there was a puff of blue smoke behind each tank as their engines were started. The 3-in. guns were firing smoke as hard as they could be loaded and after the fourth salvo the line began to move, slowly at first until, gathering speed, each tank was throwing up a plume of sand. The squadron disappeared in a cloud of dust. The watchers saw no more, but from the bank of dust could be heard the slam of tank guns and the rapid hammer of Besas. For ten minutes the curtain remained drawn and then 'A' Squadron came slowly back through the clearing smoke.

'The Colonel's cruiser nosed its way over to them and stopped as each tank swung around to face west again.'

In the extended pursuit that followed the battle of Alamein, Crusaders made some remarkably long journeys. A team of engineers from Nuffields had been flown out to the desert and shipping

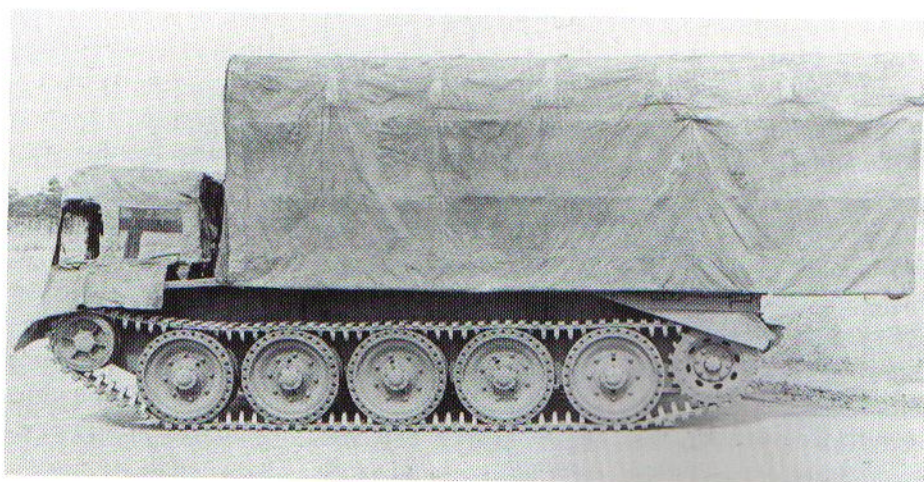


This Crusader not only has a camouflage net and packs slung from the side rail it is also disguised as a lorry with a version of the 'Sunshade' device.

practice had improved, while the crews themselves learned to anticipate and remedy problems before they became disasters. Unfortunately it was too late. The Crusader had earned such a bad reputation for reliability, especially when compared with the mass of American tanks now arriving in theatre, that no crew could visualise it as anything but second rate and everyone was anxious to get into Shermans as soon as possible.

Improved Armament

Crusaders armed with the 6-pdr. gun had started to arrive in the Middle East during that summer and, although the Germans had also



In Britain, by way of contrast, the lorry disguise, seen here on a Crusader III, was known as a 'Houseboat'.



improved the firepower of their tanks, they were heartily welcomed. Now, in terms of weapon performance at least, some Crusaders were equal to the majority of enemy tanks except the new long-barrelled Panzer IVs and, of course, the anti-tank guns. When 6th Armoured Division arrived in Tunisia as part of 1st Army in November 1942, its armoured regiments were equipped with a mixture of Crusaders and Valentines. The 16th/5th Lancers state that each of their squadrons had two troops of Crusaders and two of Valentines. The 17th/21st Lancers had six 6-pdr. Crusaders to each squadron and two Crusader close support tanks with each squadron headquarters. These they describe as invaluable, having a range of 3,000 yards firing smoke or high explosive. This is the only regiment to record the use of Rotatrailers. These unsprung two-wheeled contraptions contained extra supplies of fuel and ammunition. The idea was that the tanks would tow them up to the point of action and then drop them off by remote control. In practice they leaked, bounced and turned over regularly until they were abandoned as a nuisance.

By this time, like the Covenanter, Crusader had been declared obsolete. Before they left for Italy,

Two crew members of a Crusader III belonging to 26th Armoured Brigade, 6th Armoured Division (believed to be 17th/21st Lancers) indulge in some studied nonchalance for the

camera in the Tunisian hills. The bivouac is rigged at the side. These tanks were painted green but the significance of the symbol on the turret side is not clear.

all British regiments had handed in their Crusaders and moved into Shermans. Many of the best surviving Crusaders are said to have been passed on to the Free French forces that remained in North Africa.

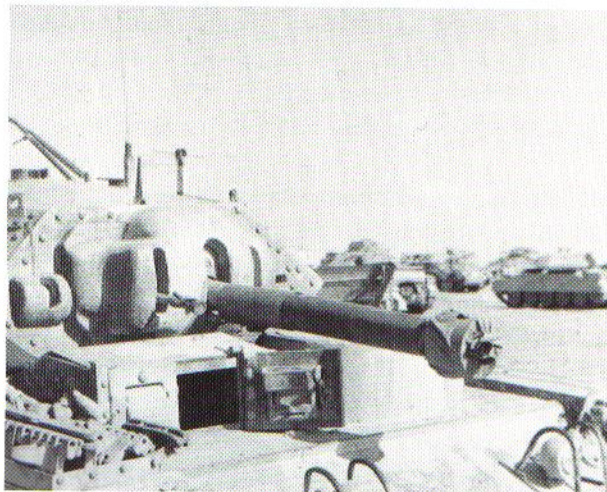
Back in Britain Crusader production soon reached the scale at which home regiments could be equipped. General Hobart's 11th Armoured Division was one of the main users, although many other regiments operated for a while with a mixture of Covenanters and Crusaders as they were available. When the 6-pdr. tanks started to enter service the 11th found that they were hard work for troop leaders who already had enough to do in a two-man turret. An extra 2-pdr. Crusader was therefore introduced into each troop for the benefit of these officers.

In June 1941 the 9th Australian Divisional Cavalry Regiment arrived in Egypt from Syria. It



The sample Crusader Mark I (T15630) supplied to Australia takes part in a recruiting parade in

Melbourne. It was evaluated at Puckapunyal where it is now displayed in the RAAC Museum.



To the left, a close-up view of a Crusader II command tank in the desert. The

dummy gun has been fitted with a sleeve to make it look more like a 6-pdr.

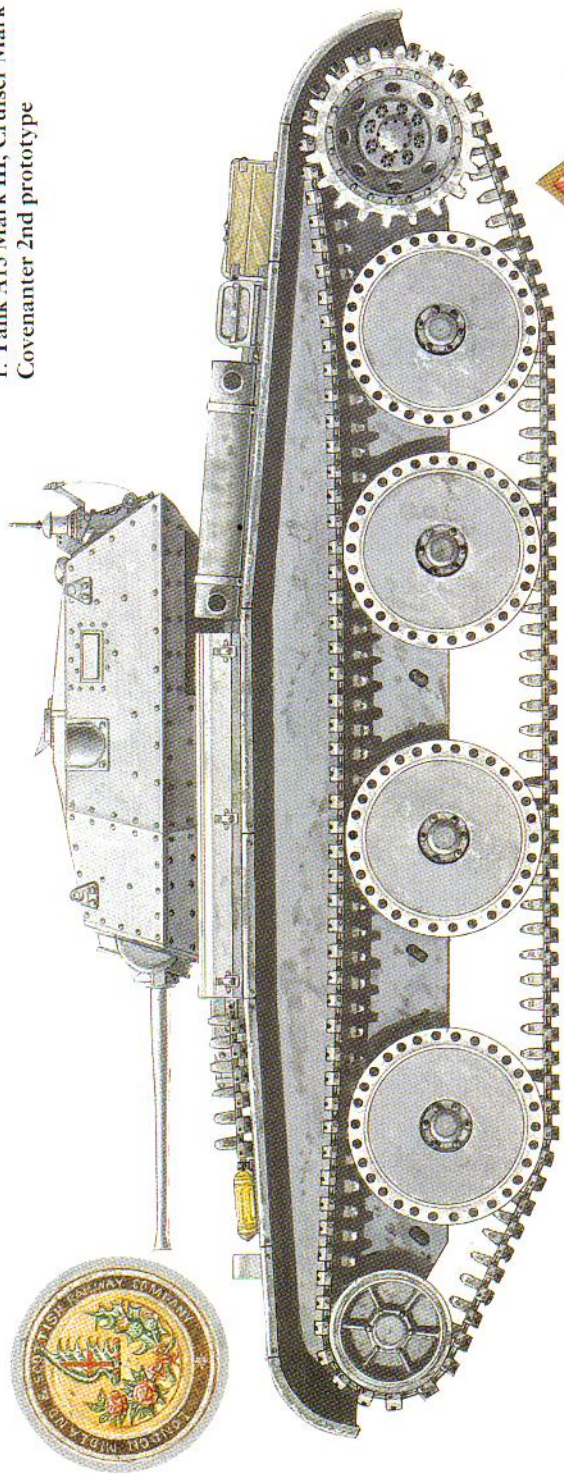
was rapidly equipped with a mixture of M3 Stuart tanks, Universal Carriers and Mark II Crusaders. It was the only Australian armoured unit to operate in the Western Hemisphere but it took part in the fighting around El Alamein before being withdrawn in preparation for its return to Australia. In

August 1941 a single Crusader I, number T15630 from an early Nuffield contract, was landed in Melbourne in response to a request for a tank placed with the War Office in London. The tank seems to have been acquired as a sample at a time when Australia was working on the design of its own tank. A comparison between the turrets of Crusader and the Australian Cruiser reveals a basic similarity in shape, even though the turret of the ACI was cast and therefore less angular.

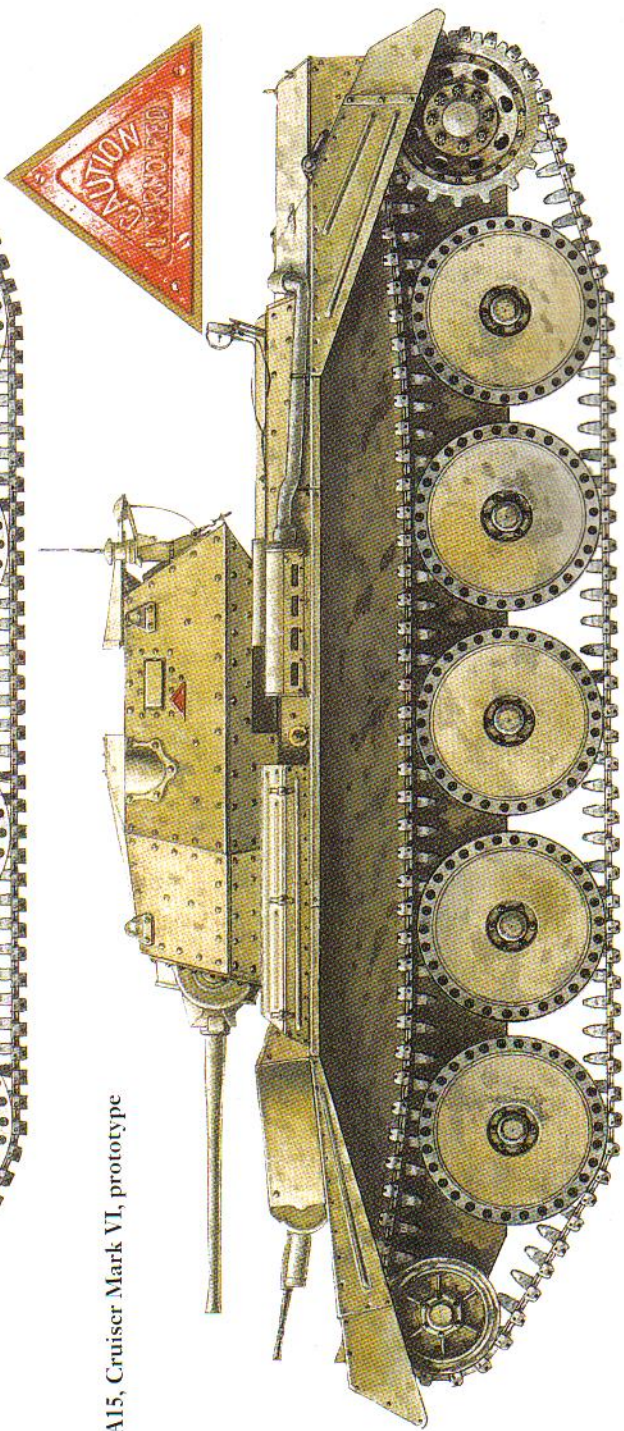
Trials In the USA

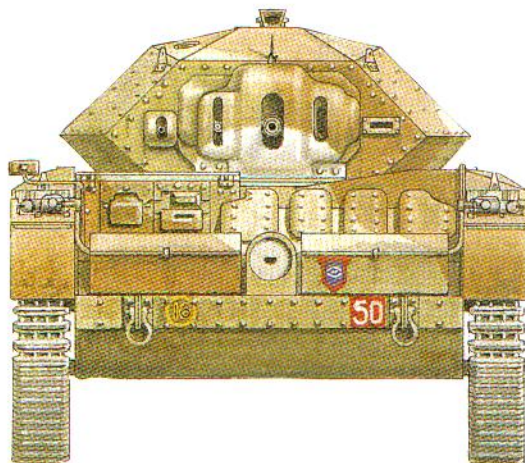
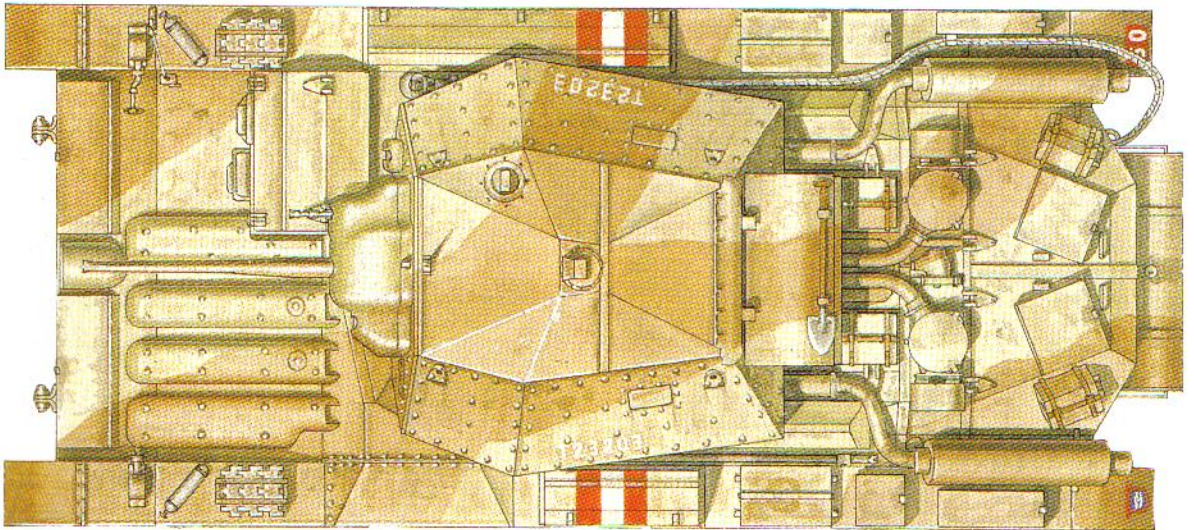
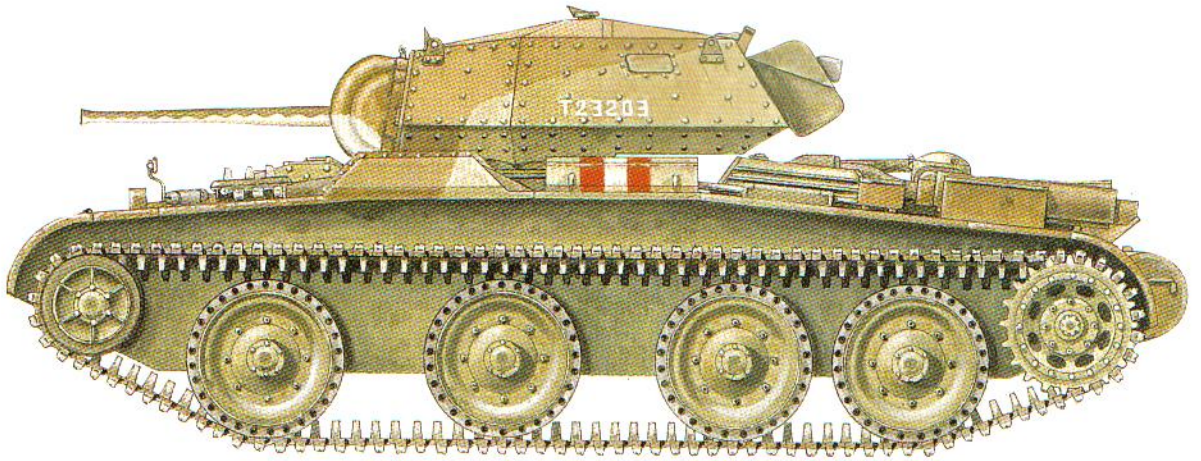
A Crusader had also been sent to the United States. Under the command of a Corporal Dixey it arrived at Aberdeen Proving Ground, Maryland, in October 1941. In April 1942 it was loaned to the Westinghouse Company for installation of their gyro-stabiliser (which implies that it must have been fitted with geared elevation) and was then taken down to Fort Knox in Kentucky. After

1: Tank A13 Mark III, Cruiser Mark V,
Covenanter 2nd prototype



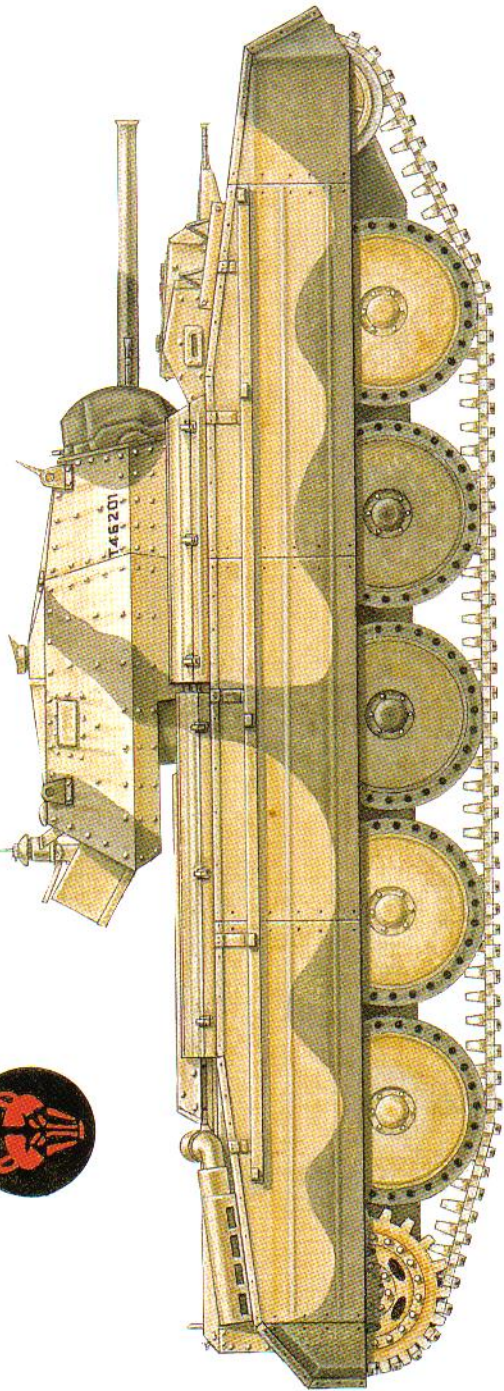
2: Tank A15, Cruiser Mark VI, prototype



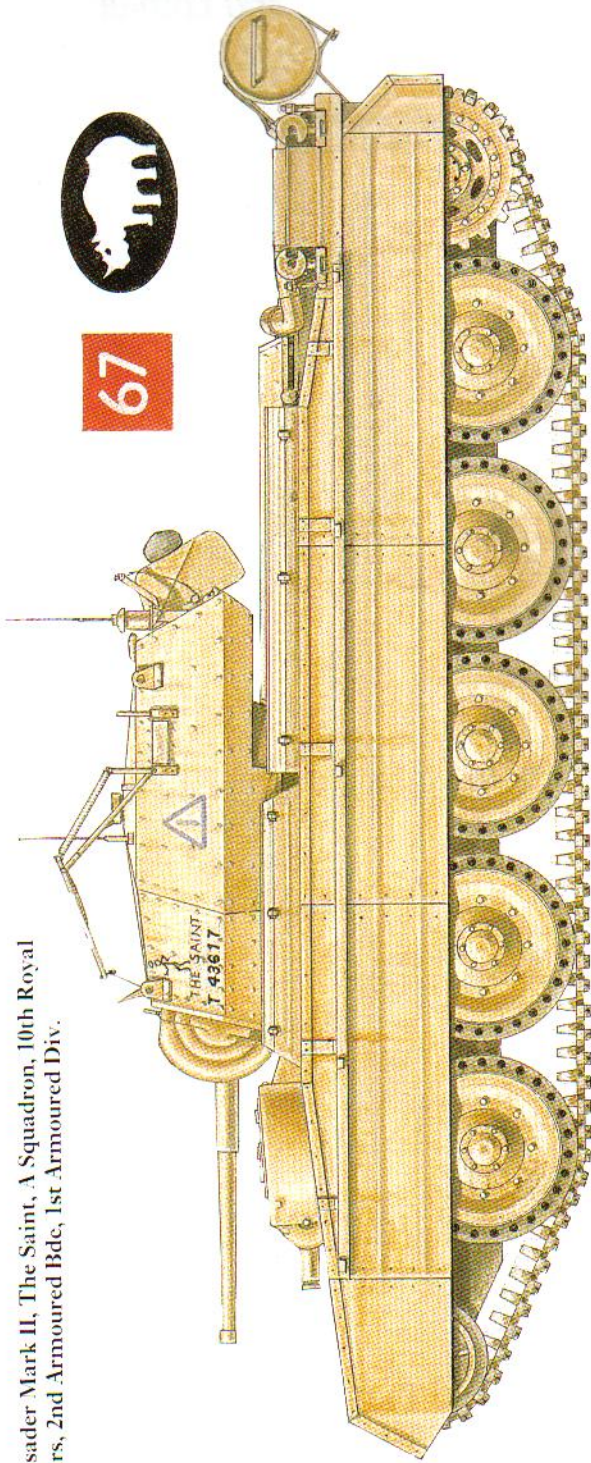


Covenanter Mark III; HQ
Guards Armoured Bde,
Guards Armoured Div.

1: Crusader Mark I, 3rd RTR, 8th Armoured Bde, 10th Armoured Div.



2: Crusader Mark II, The Saint, A Squadron, 10th Royal Hussars, 2nd Armoured Bde, 1st Armoured Div.



CRUSADER III

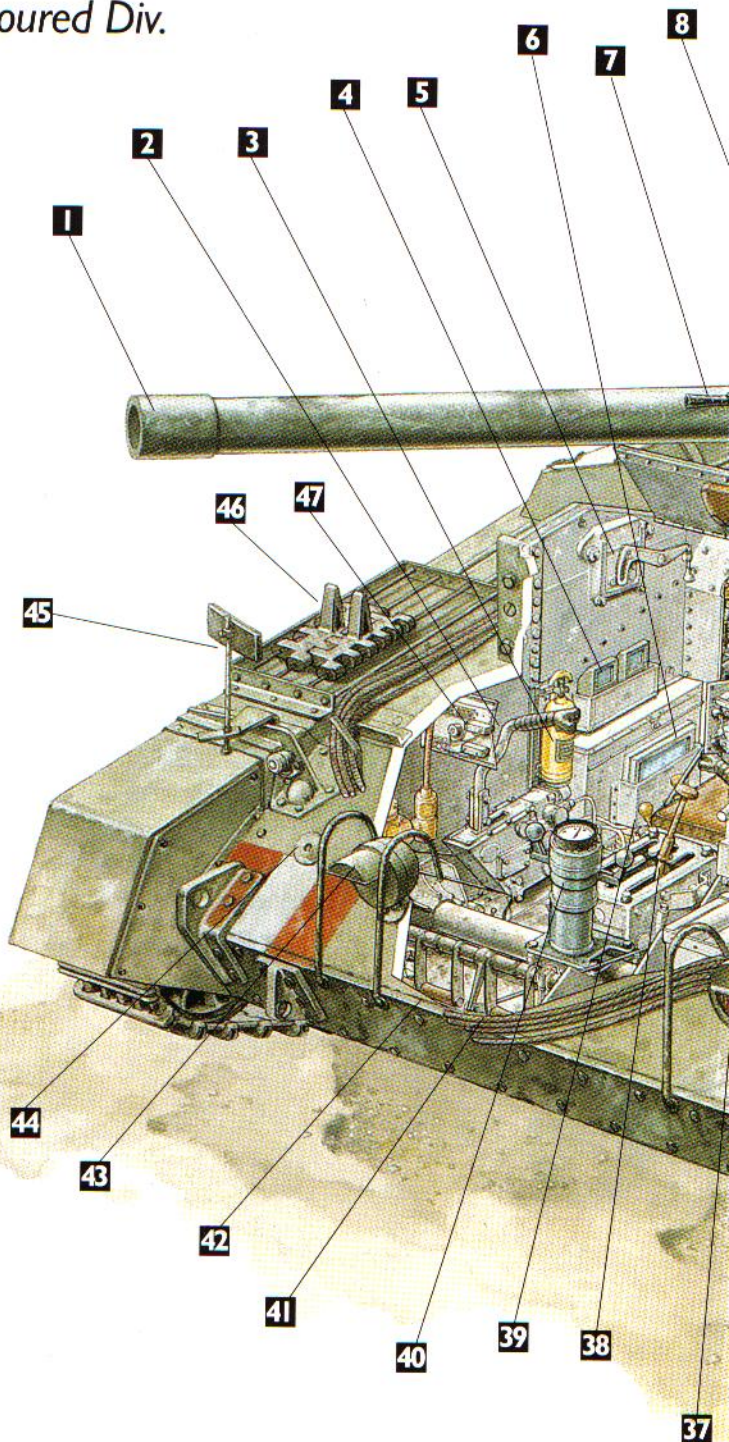
*Crusader Mark III, 2nd Lothian & Border Horse,
26th Armoured Bde, 6th Armoured Div.*

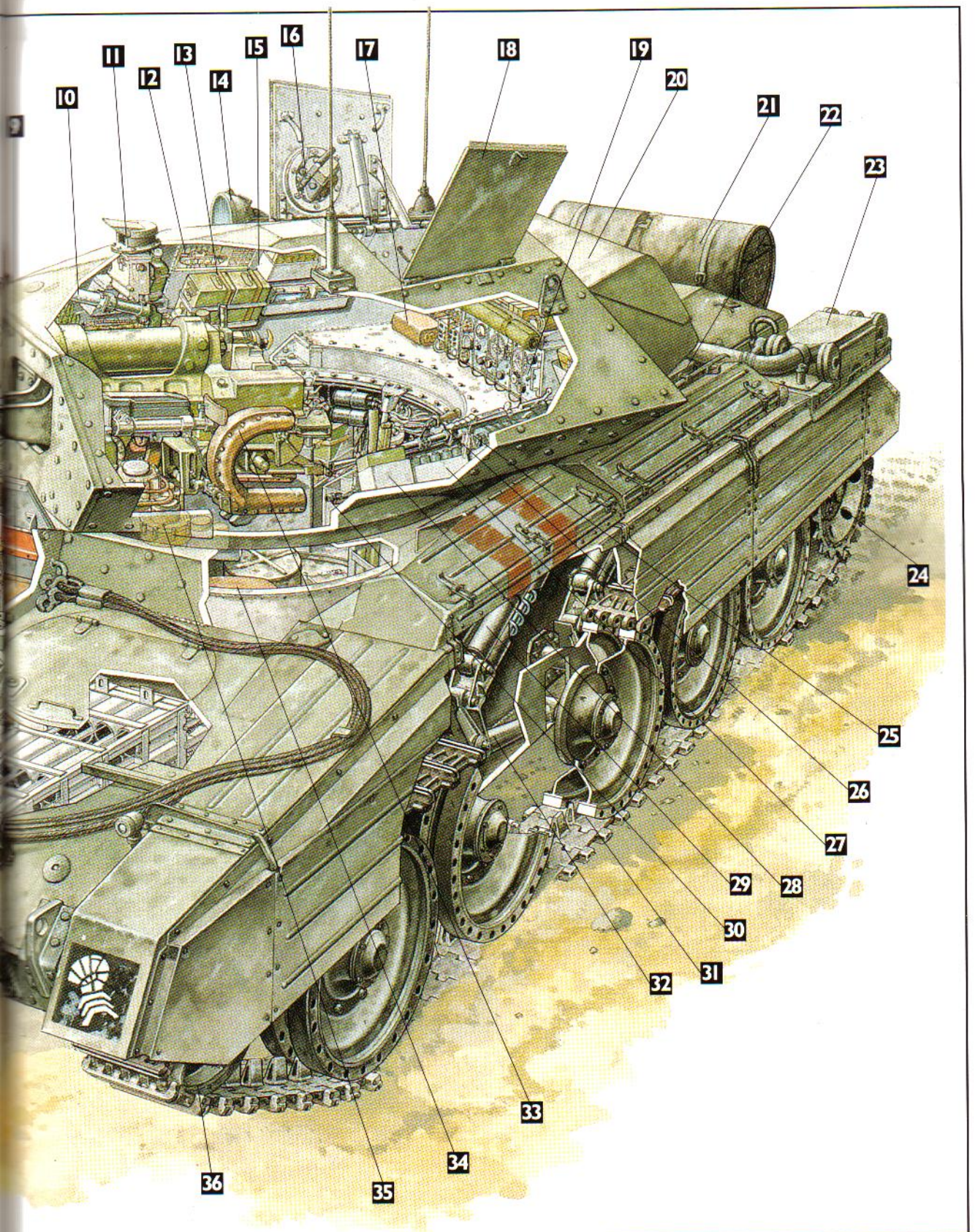
SPECIFICATIONS

Crew: Three
Combat weight: 19,812 kg
Power-to-weight ratio: 20.2 bhp/ton (Imp)
Overall length: 5.98 m
Width: 2.64 m
Height: 2.24 m
Engine: Nuffield Liberty Mark III/IV V12, watercooled, 340 Bhp at 1500 rpm
Transmission: Nuffield constant mesh four-speed gearbox and Wilson dual regenerative epicyclic steering, air operated
Fuel capacity: 500 litres plus 136 litres in auxiliary tank
Max. speed: 43 km/h
Max. range: 177 km on main tank.
Fuel consumption: 2.8 litres/km
Fording depth: .96 m
Armament: 6-pdr, 7 cwt. QF Mark III (57mm); co-axial 7.92mm Besa aircooled MG
Ammunition: AP, APC, APCBC, HE
Muzzle velocity: 853 m/sec
Max. effective range: 1830 m
Ammunition stowage: 65 rounds
Gun depression/elevation: +20/-12.5 degrees

KEY

- | | |
|--------------------------------------|---|
| 1. 6pdr.7cwt 57mm gun. | 25. Bren gun magazines. |
| 2. Steering control and lever R/H. | 26. Bren .303 Bren LMG. |
| 3. Pyrene fire extinguisher. | 27. Thompson sub-machine gun magazines. |
| 4. Replacement visor prisms. | 28. First aid box. |
| 5. Driver's side lookout. | 29. Suspension spring. |
| 6. Windscreen panels. | 30. Thompson sub-machine gun. |
| 7. 7.92mm Besa co-axial machine gun. | 31. Road wheel. |
| 8. Commander's vane sight. | 32. Suspension arm. |
| 9. Driver's seat. | 33. Gunner's shoulder pad. |
| 10. 2ins. bombthrower. | 34. Gunner's seat. |
| 11. Gunner's periscope. | 36. Idler wheel. |
| 12. Etched lubrication chart. | 35. Turret traverse gear. |
| 13. Besa ammunition. | 37. 6pdr.ammunition stowage. |
| 14. Turret spotlight. | 38. Gear lever. |
| 15. Signal cartridges. | 39. Ignition control. |
| 16. Commander's periscope. | 40. Compass binnacle. |
| 17. Signals satchel. | 41. Clutch pedal. |
| 18. Turret hatch L/H. | 42. Ignition switches. |
| 19. N°19 wireless set. | 43. Brake pedal. |
| 20. Turret stowage bin. | 44. Headlamp. |
| 21. Auxiliary fuel tank. | 45. Track adjuster socket. |
| 22. Crowbar. | 46. Driver's mirror. |
| 23. Air cleaner L/H. | 47. Spare track link stowage. |
| 24. Drive sprocket. | |







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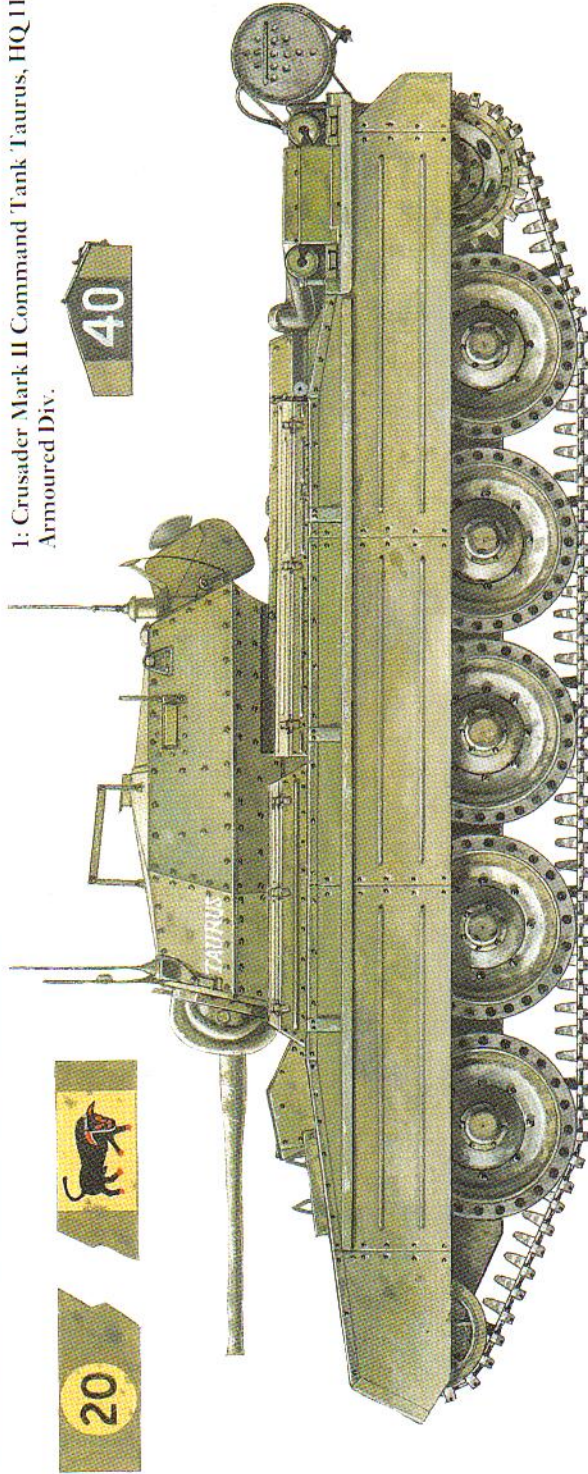


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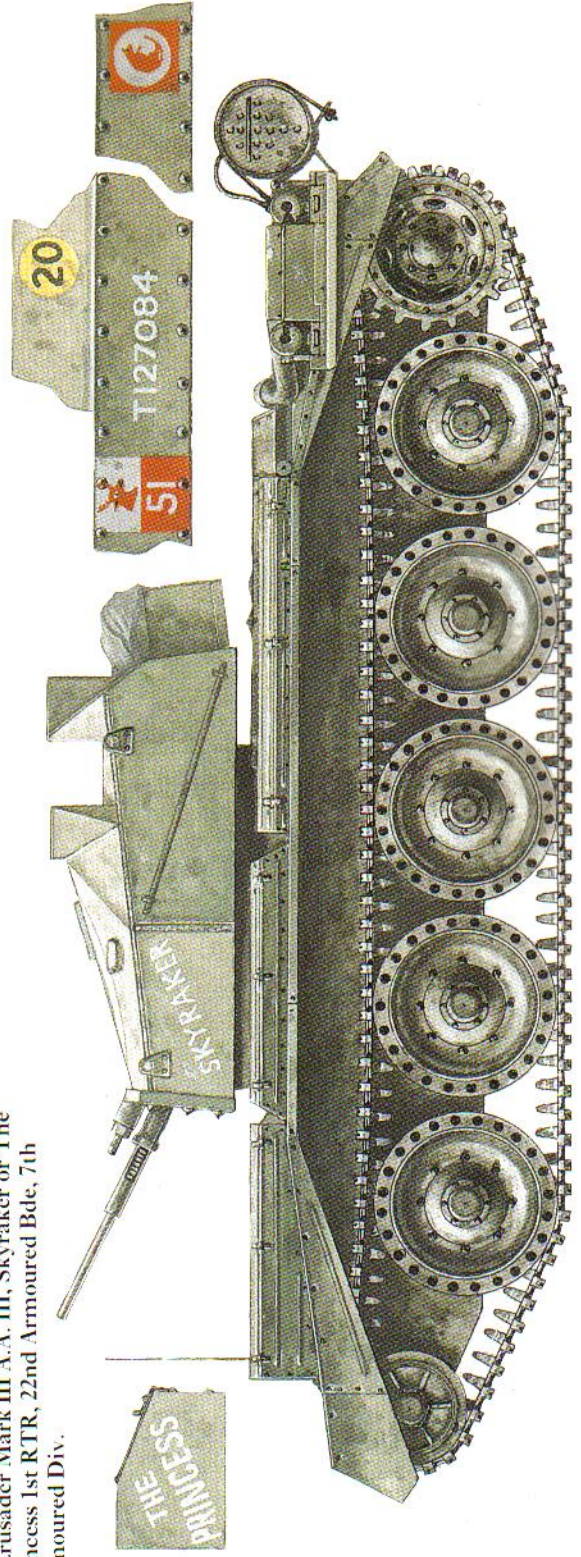
T18440



1: Crusader Mark II Command Tank Taurus, HQ 11th Armoured Div.



2: Crusader Mark III A.A. III, Skyraker or The Princess 1st RTR, 22nd Armoured Bde, 7th Armoured Div.





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B1

the eviction of British troops from mainland Europe, with the loss of a vast number of tanks, America was seen as the ideal place from which to order replacements. Examples of Crusader and Matilda were shipped across the Atlantic but, before any contracts could be agreed, Washington decided that American plants should only build American tanks and the project was dropped. But this prohibition did not extend to components and factories in the United States supplied many parts for Crusaders and other British types.

VARIANTS

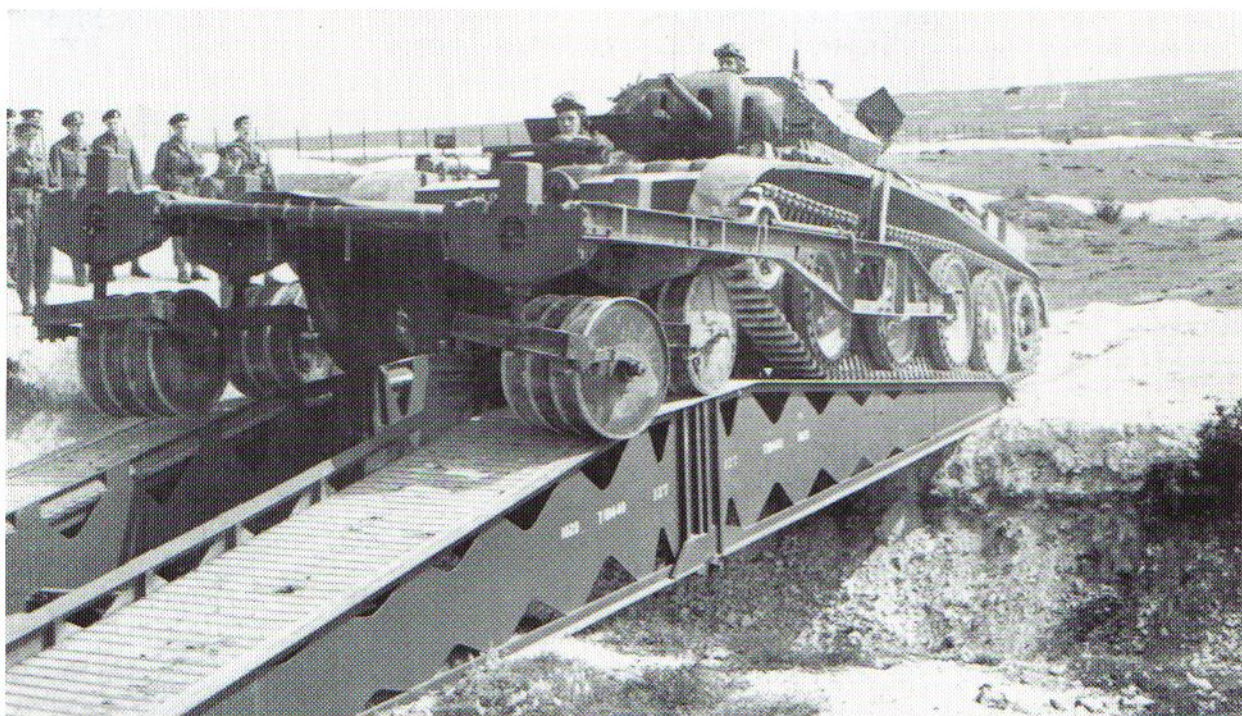
Command 'OP' Vehicles

Among special purpose variants of Covenanter and Crusader the least obvious, on purpose, were the OP (Observation Post) and Command tanks. They had to mix with the fighting tanks in action, so it was in their interests to stand out as little as possible. OP tanks were issued to Royal Artillery batteries and carried Forward Observation Officers

into the front line where they could call up rapid and effective support from the guns. The fighting space was cleared of all main armament ammunition stowage, and the gun was replaced by a convincing dummy which did not intrude into the turret space. Working surfaces were installed front and back along with two No.19 and one No.18 wireless sets. These tanks retained their turret MGs and the smoke bomb discharger while external stowage was adapted to carry reels of signal cable so that the No.19 sets could be operated by remote control some distance from the tank. There were OP versions of Covenanters Mark II and IV and the slightly roomier Crusader III. Each Royal Horse Artillery and field battery in an armoured division had two OP tanks; other field and medium gun batteries were issued with one. Command tanks, which were generally issued at regimental level, had similar internal arrangements but with two No.19 sets only, one netted to the regiment, the other to brigade. They appeared on Covenanter II and Crusader II. The observant could recognise these key vehicles by their extra

HM King George VI examines a Crusader III OP tank of 11th Armoured Division in Britain. This tank has received the final up-armouring package and the extra panels can be seen on the sloping front plate and the panel with 'Buq-Buq' painted on it.





A Covenantor with AMRA negotiates a scissors bridge during a demonstration. It does not look easy.

wireless aerials and, if one got close enough, by the silencer for the auxiliary generator. This was a single-cylinder 'Chore Horse' stowed on the turret floor of a Covenantor; in a Crusader it could be a 'Chore Horse' or 'Tiny Tim' located in the front turret space.

Recovery Vehicles

During the desert war one aspect of the Afrika Korps' technique made a considerable impression upon the British. This was their ability to recover derelict tanks from the battlefield, even while the fighting was going on. In the summer of 1942 a Recovery Committee, established by the War Office, recommended the adoption of armoured recovery vehicles (ARVs). As existing tanks were the obvious basis for such vehicles it was agreed to develop ARV versions of all current types, which included Covenantor and Crusader.

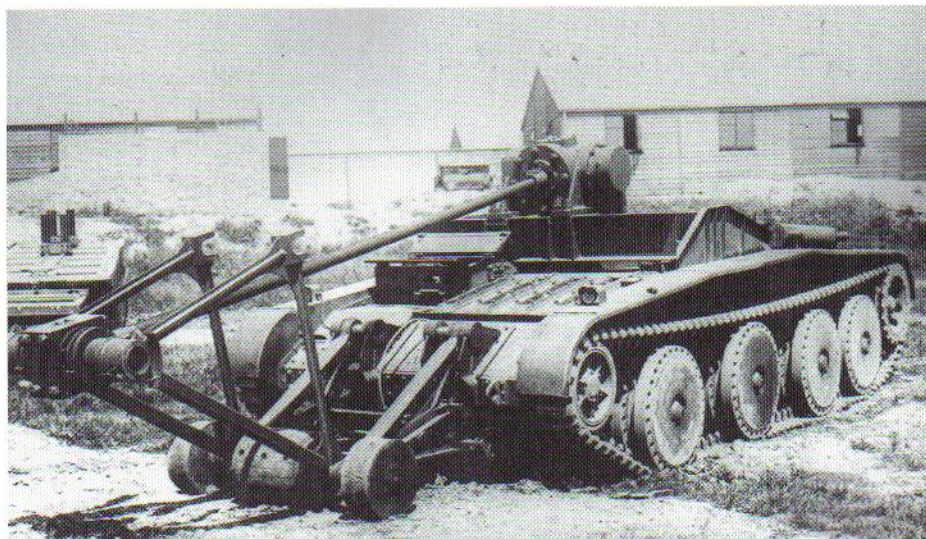
Experimental conversions were undertaken at Arborfield but, of the four types converted, an official publication describes the Covenantor as

unreliable and the Crusader as hopeless. All prototypes were classed as ARV Mark I and conformed to similar specifications. The vehicles were turretless and came equipped with various items of recovery equipment, welding and cutting gear, a 5-ton portable jib which could be erected at the front and a LMG mounting which fitted into the crew compartment when required for ground or air defence. The ARV had a crew of three and the turret ring aperture was plated over, with a large hatch for access. It was hoped to supply these vehicles with winches but nothing suitable was available at the time and they relied upon a direct pull to remove damaged tanks that could not move under their own power. There seems little doubt that there was never more than one each of the Covenantor and Crusader ARV Mark I and no illustration of the former has yet been located.

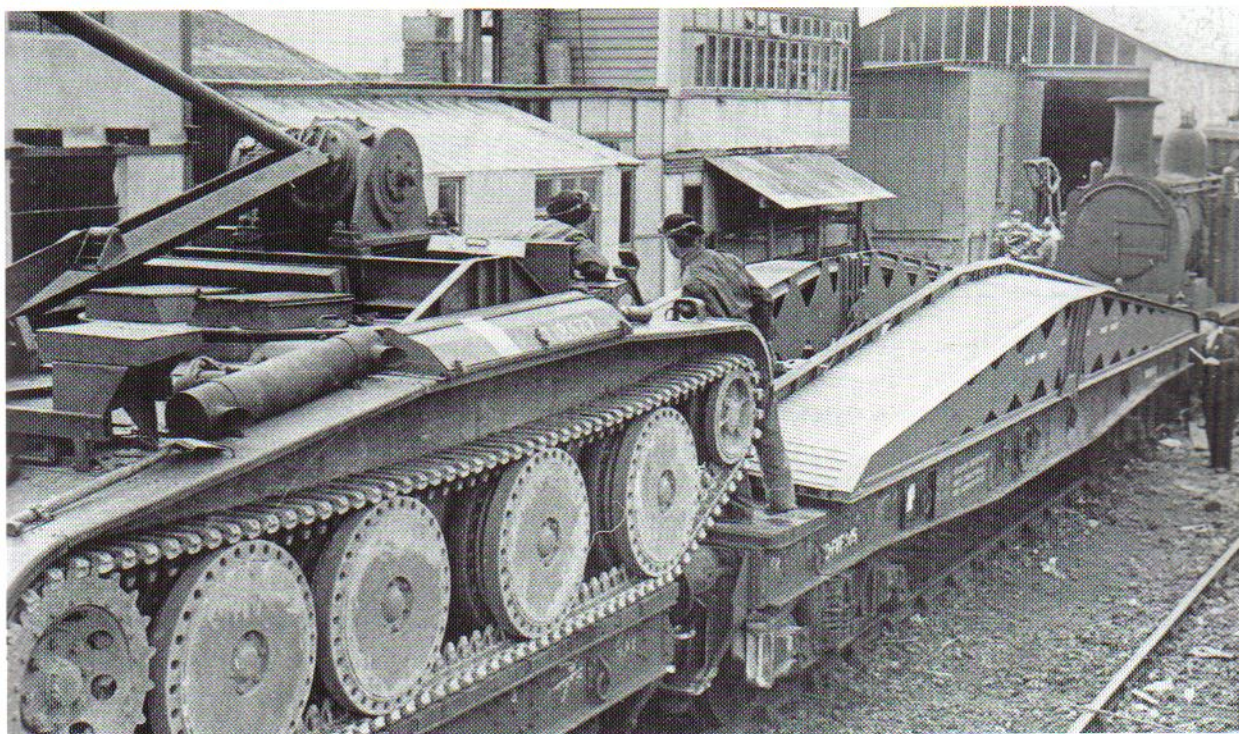
Mine Clearing

For minefield clearance the AMRA (Anti Mine Roller Attachment) was available for both tanks. The AMRAs were virtually identical and differed only where they were attached to their respective tank. The AMRA Mark IC, evolved for

*Right; The prototype
Covenanter bridgelayer at
Christchurch, showing the
launching apparatus in the
open position with the
weight bearing rollers on
the ground.*



*Below; How to move a
Covenanter bridgelayer by
rail. Two Rectank wagons
are required and the crew
match anxiously as the
bowler hatted inspector,
with his little ruler,
makes sure that it is just so.*



Covenanter, had two-piece brackets while the Mark 1D used on Crusader had a more substantial external frame. The device itself, which weighed just under 1.5 tons, consisted of four heavy duty sprung rollers, suspended from a frame ahead of the tracks, which detonated mines and were usually destroyed in the process. If the tank needed to detach itself from the device on the battlefield an electrically fired fuse would

break the connection. On sand the rollers were heavy enough to detonate the average anti-tank mine, but on harder ground, or where the mines were buried deep, the weight of the rollers had to be increased. This was done by removing a cap and half filling each roller with whatever was available, earth, sand, rubble or water. Tanks dedicated to this role carried the mounting brackets permanently, but the roller attachment itself was



The floating Crusader launches itself off the beach at Hayling Island. It has a deep wading cowl over the

cooling louvres and the engine air intakes have been extended and raised.

is not clear whether they received the new bridge or not. No bridgelaying version of the Crusader was ever developed.

carried in a lorry until required. Attempts to have the tank tow it at other times were dropped, due to handling difficulties.

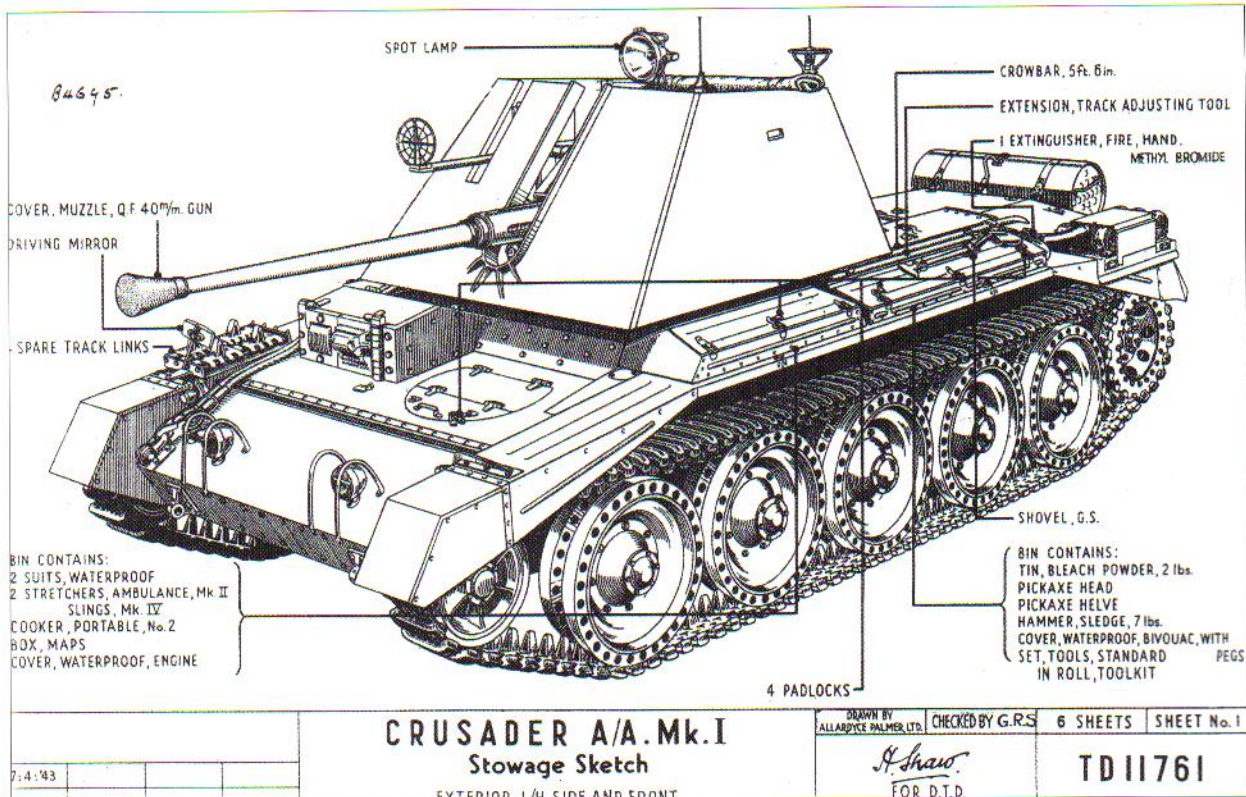
Bridge Laying

When the Experimental Bridging Establishment invented a form of portable scissors bridge for tanks the first production model was developed on a Covenant hull. Orders for 54 were placed with the Southern Railway workshops at Eastleigh and 30 more with another contractor, all of which were converted from new gun tanks, supplied turretless direct from the manufacturer. The bridge, known as the 30ft. No 1, was actually 34ft. long but opened out to cover a 30ft. gap and had a load bearing capacity of 24 tons. The laying and recovering action was entirely automatic, powered by a screw thread device driven off the tank's engine and controlled by the driver. Bridgelayers were issued on the scale of three per armoured brigade headquarters. They carried a crew of two and had no fixed defensive armament whatever. In 1944 a light alloy version of the bridge was developed, capable of handling 30 tons, but by then the only Covenant bridgelayers left in service were with the Australian and New Zealand forces and it

Amphibious Models

The alternative to a bridge, for wider water obstacles, was floatation. This was applied to the Crusader and took the form of a pair of large, flat decked pontoons which were locked onto the hull at each side. This was very much a manual exercise although a portable lifting device, known as the Atherton Jib, was fitted to the tank's turret to assist the operation. Once afloat the tank was propelled by special blades, attached to the track links, which acted as paddles.

No similar device is recorded for the Covenant although this tank formed the basis of the only fully amphibious tank developed in Britain during the war. Known as the Medium Tank A/T 1, it consisted of a Covenant turret superimposed upon a hull of enormous depth with the Meadows flat 12 engine situated deep within its bowels. Some 24ft. long, 13ft. wide and a massive 11 feet tall it looked unwieldy on dry land but seems to have performed well enough in the water. Built by Braithwaites of Newport in South Wales it was of rivetted construction with all joints caulked to make them waterproof and a maximum armour thickness of 40mm. Weight was around 31 tons. The original model, which had no



suspension at all, was replaced by A/T 1*, probably a rebuild, which featured a sprung jockey roller at the front. This was followed by A/T 1** which had Churchill type coil spring suspension on all but the first and last two rollers, it was apparently rebuilt as A/T 1*** about which little is known. Of the former two the following details are recorded. A/T1* employed the standard gearbox and Wilson steering system of Covenanter while A/T1** was fitted with the Sinclair Synchro-Self-Shifting (SSS) system which was designed to give a much smoother changing sequence. Whichever gearbox was used it was provided with an auxiliary box giving high and low ratio. The former, which gave a theoretical land speed of 20 mph, was only intended for use afloat, when the tank would make about 5 mph. On land, especially across country, only the lower range was used to avoid damage, and that gave it a top speed of about 10 mph. A fluid coupling was also built into the transmission of both tanks to avoid any serious shock to the drive train when a tank first touched down during a swim ashore. At sea the tanks had a considerable draught of 5ft. 6in. but a

The Crusader A.A.I from a stowage diagram. The canvas cover for the turret is

shown rolled up, as it would be when the weapon was in action.

modest freeboard, to deck level, of fifteen inches. The crew numbered five; driver, three-man turret crew and what was described, in true nautical parlance, as an extra hand who shared the front compartment. It was his duty, no doubt, to operate the sea cocks on the ballast tank. This was located low down in the bow and its purpose was to aid traction on landing. As the amphibious tank neared the beach, water was admitted to the ballast tank so that the nose of the machine descended and helped to press the tracks down once they bit into the sand. Cross country trials were conducted at Chobham in Surrey with sea trials taking place off Barry Island in South Wales. The testing authorities were critical of the engine location, reporting that it was very difficult to work on. This is hardly surprising. In addition to being low down at the stern of the tank it was enclosed within an engine room, closed off by a pair of steel doors in a bulkhead. Crusaders were also fitted with deep wading gear for ship to shore

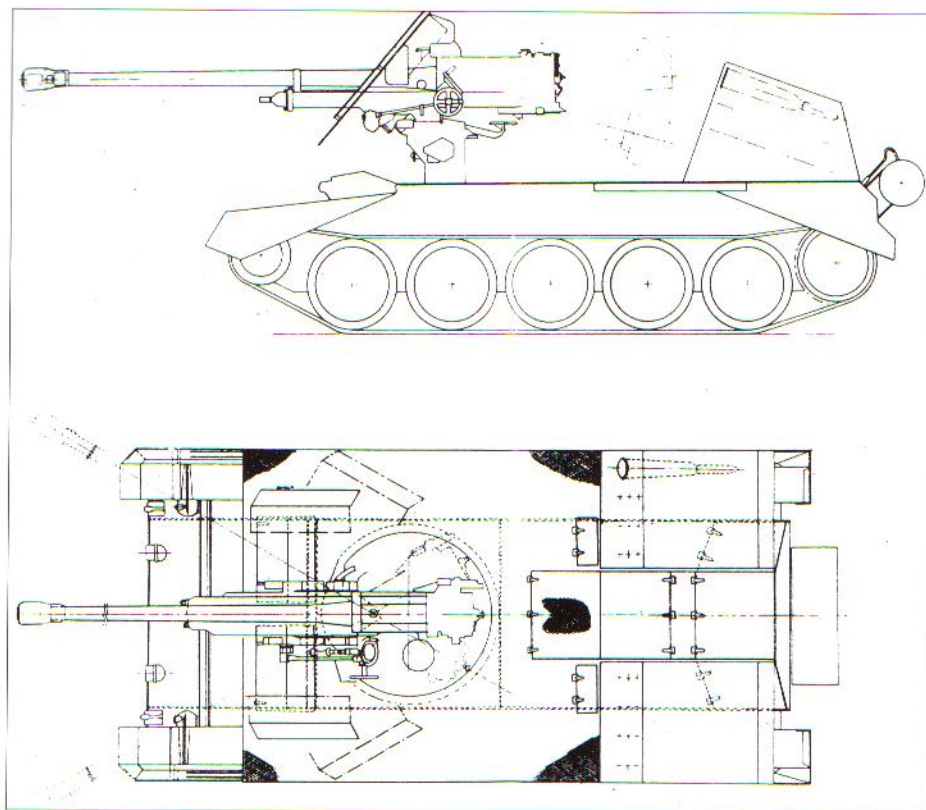
landings over open beaches, although none ever took part in such landings apart from some special models such as anti-aircraft tanks and gun tractors.

As already noted the demise of the Crusader as a front line gun tank coincided roughly with its ultimate acceptance as a reliable machine in the mechanical sense. Since large stocks were still available the type was chosen as the basis for a group of self-propelled (SP) guns created to provide anti-aircraft protection for mobile formations.

Anti-Aircraft Model

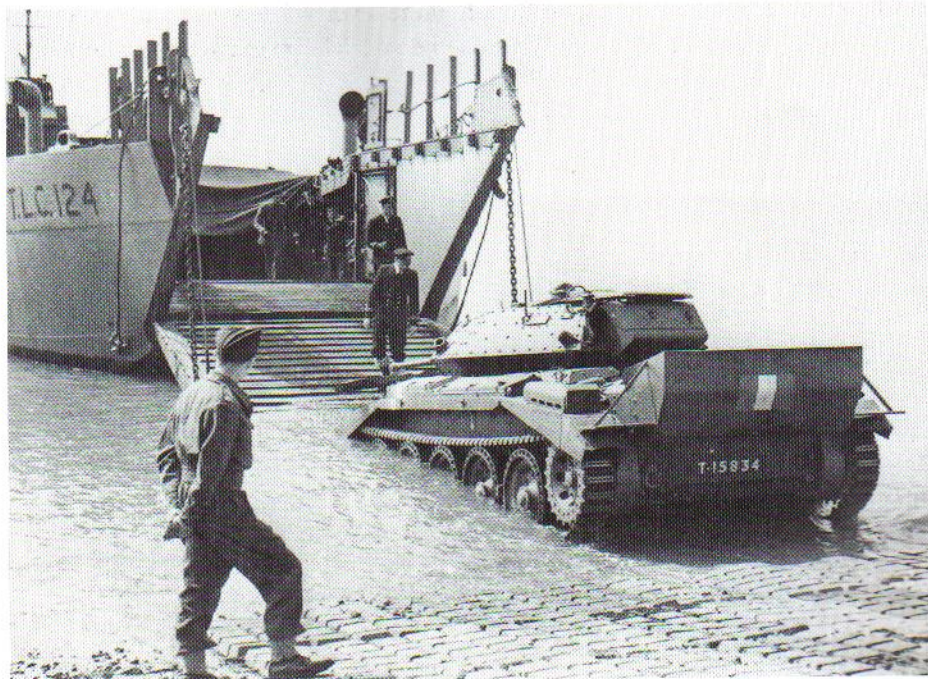
In September 1941 it was decided to develop a tank mounting for the 40mm Bofors anti-aircraft gun for the Royal Artillery. It was agreed that there could never be more than limited protection for the crew and at first it was hoped to include a predictor on the vehicle. The prototype, which appeared on an early Crusader hull (T44381), featured a complex shield which was later increased in height by panels of plywood to represent more armour. When it was tested at MEE in March

1943 the turret structure proved too weak to remain rigid on cross country trials. The Department of Tank Design sought to correct the problem on a second tank (T124559) in July 1943, which had a modified turret. They complained bitterly in the process about having to undertake remedial work on something designed elsewhere; by Morris Motors. The number of turret rollers was increased and they wished to cut down the height of the turret armour to save weight, but it never appears to have been very satisfactory. The production model, or Crusader III A.A. I, as its name implies, appeared on the Mark III hull. The gun shield was a much simplified, four-sided affair with a waterproof canvas cover for the top. The mounting was located directly above the tank's original turret ring. Traverse and elevation were controlled by a joystick, using a hydraulic system powered by an Enfield 250 cc twin-cylinder engine. In addition to the driver the tank had a gun layer and loader, who occupied the turret. The former was also tank commander while the loader operated the Number 19 set located just in



Design sketches for the Anti-Tank Crusader showing the 17-pdr. gun mounting, shield and ammunition stowage. Elevation and traverse limits are also indicated.

The same tank, T15834, with the deep wading comling, makes its way, head first for some reason, onto an LCT (2) on a remarkably calm day.



front of him. Trials revealed that the Bofors mounting was not as effective as had been hoped. Of course, being associated with the Royal Artillery it was not intended that the gun should be fired on the move, hence the importance of having an auxiliary engine. Difficulty was experienced in tracking low-flying aircraft and on anything but level ground the weapon was unable to traverse at all. Even so contracts exist for at least 215 machines.

Crusader III (A.A. Mk. II)

Meanwhile the Royal Armoured Corps was also studying the subject. Light anti-aircraft tanks, mounting multiple machine guns, already existed but they were cramped and unpopular on account of their limited range.

The use of tank-busting aircraft demanded a swifter response and a preference was now expressed for twin 20mm weapons such as the Oerlikon. The guns had a rate of fire of 450 rounds per minute and a muzzle velocity of 2,725 ft/sec. They fired high explosive, incendiary and practice rounds, with or without tracer

The Crusader III A.A. Mk II appeared from Morris Motors in the summer of 1943, the pilot model being issued for testing in June. The

weapons were housed in a low, multi-sided turret, built from single layer armour, which certainly looked more suited to the hull than the Bofors had done. The tank had a crew of four; a driver, two loaders and a gunner who also acted as tank commander and wireless operator. The tank carried 600 rounds of ammunition, some of it in 60-round magazines, but these were so bulky they had to be reloaded by hand inside the turret. Power Mountings Ltd devised the high speed traverse and elevating gear but it appears that, even in experienced hands, the turret was liable to over run the target due to inertia so the maximum traversing speed was limited to 10 deg/sec, although it could turn faster. Space was at a premium and all crew members except the driver were extremely uncomfortable. Urgently undertaken, the resultant redesign was the Crusader III A.A.III which had an improved turret with better protection for the gunner, in the form of a raised coaming. His task was made less onerous by repositioning the wireless to the left of the driver, who now became the operator. For some reason, so far unexplained, the armament was supplemented with a Vickers K, .303 MG in an armoured jacket. Unlike the Bofors version hydraulic power for the turret was taken from the tank's own engine.



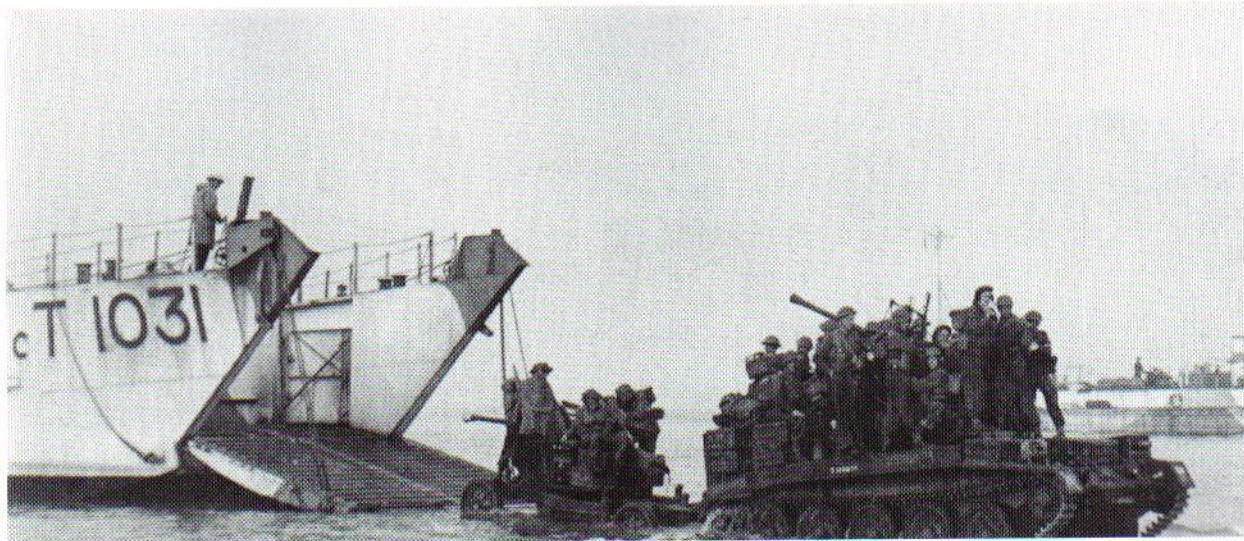
AT/1 thrashes its way through the water off Barry Island. The driver's hatch is almost obliterated by spray so he relied a lot on the turret crew for guidance.*

Since the Crusader A.A. II/III was intended for the support of armoured formations it would usually be mobile and having the main engine running was not regarded as a problem. But those who imagined these tanks were intended to move and shoot at the same time were corrected in a note, inserted into the original trials report by Colonel Messenger: 'A.A. tanks cannot fire on the move, there is no point in it'. It does not appear to have been very effective even when stationary. Trials with a tank using a camera gun – against a Hurricane on Wareham Common and a Jeep with a can on top at Chertsey – proved how difficult it was to accurately track a fast moving target and, once again, the turret only worked effectively on level ground. Records suggest that some 600 were built, although it is not possible to differentiate between Marks II and III from the available documents. It is easier with photographs for, even if the turret top is obscured, the position of the wireless aerials on a Mark II, either side of the commander's position, distinguishes it from a Mark III where they are mounted on the front

upper hull plate. The headquarters of an armoured division, in 1944, included two anti-aircraft tanks, as did the HQ of an armoured brigade. The headquarters of an armoured regiment, at the same time, was entitled to six. The majority of those photographed in North West Europe after D-Day seem to be of the Mark III type, with the extra Vickers gun, but the need for their services was kept to a minimum by the RAF and they were soon withdrawn. Even so the Crusader A.A.II/III is still shown on Establishment Tables for 1945, after which they disappear for good.

Anti-Tank 'SP' Variations

Sometime before June 1944 the Royal Artillery developed a second type of Crusader anti-aircraft tank, although very little is recorded about it and photographs are few. The mounting, which could also be found on trailers and lorries, contained three 20mm Oerlikons on parallel linkage, one above the other. The gunner sat within a small armoured housing behind the guns but the turret was otherwise totally exposed. The loaders were simply stationed nearby, since in keeping with RA practice the weapon was intended for static opera-



tion to protect gun positions. This in turn suggests that an auxiliary power unit was used, rather than the main engine, and it is not beyond the bounds of possibility that these were converted from redundant Bofors tanks. A Royal Artillery report on D-Day states that the triple 20mm performed well on the Normandy beaches, but this is the only official comment so far discovered and there is no record of a proper title for this model.

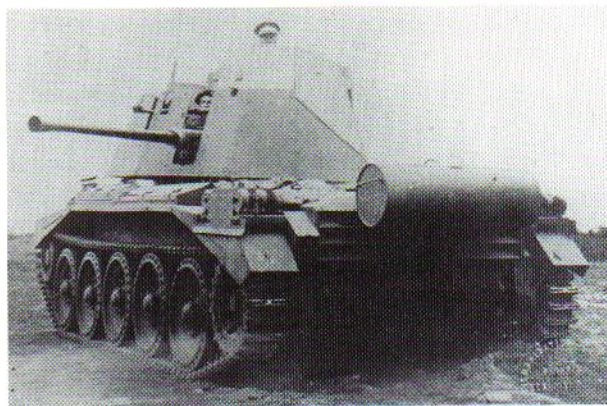
When, in the face of German experience, the British started to examine the potential of self-propelled anti-tank guns in the summer of 1942, the Crusader was one of the first to be considered. The Churchill was rejected because it was too unreliable and at this stage the Valentine does not appear to have been considered. However the Crusader was capable of handling the load, it had an adequate power to weight ratio and was available in sufficient numbers, but it was required in a hurry, and therein lay the trouble. The worst feature of the design was the gun mounting. As there was no time to modify the gun a recoil of 42in. had to be accepted, and in order to obtain suitable elevation the gun had to be mounted much higher than was ideal; indeed the trunnions were located some 7ft. 6in. above the ground. This in turn, on account of topweight, meant that protection would be limited to a frontal shield which meant that the crew would be dangerously exposed. Ready use ammunition was to be stowed in armoured bins at the rear. The conversion was

A Crusader A.A.I. coming ashore from an LCT (4) during Exercise 'Fabius', the D-Day rehearsal, in May 1944. It is towing another

Bofors gun on a wheeled carriage and affording a dry landing for its crew and a party of infantry.

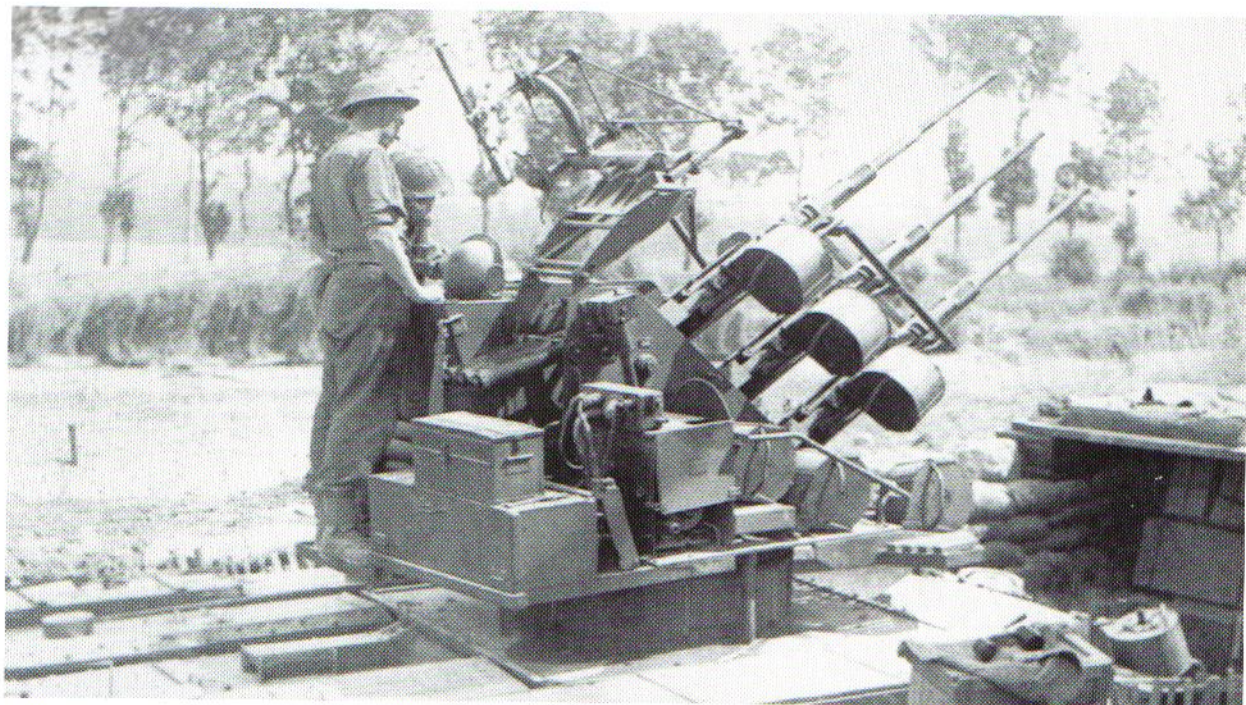
regarded as straightforward enough to suit a railway workshop but it was never adopted.

Apart from an Argentinian conversion mentioned later, the only other SP gun version of Crusader was a post-war modification to one tank which enabled it to mount the 5.5in. medium gun. The exact circumstances of the conversion are not known, but it was probably no more than a test rig, built in connection with the FV300 programme. The gun was mounted in an open well at



The prototype Crusader A.A.I. with the Bofors gun trained horizontal at 8

o'clock. Notice the plywood extensions to the original armour.



the front, facing back over the engine deck. The nose of the tank now became effectively the firing platform while the driver was moved back to a position on the offside, right up against the engine bulkhead. His view to the front was almost totally obscured by the gun itself. No doubt to protect them from blast damage the air cleaners were relocated almost amidships on each track guard.

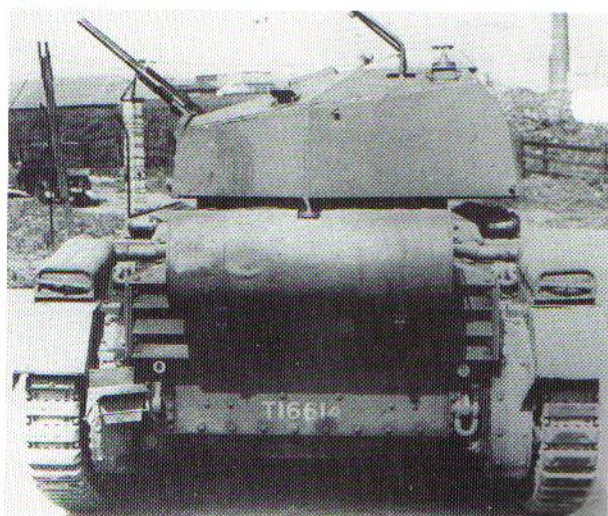
Other Variants

Experience in Tunisia indicated that the new 17-

One of the strange triple Oerlikon A.A. Crusaders in Normandy. The tank is well dug in and the crew

even have their own shelter and ammunition stock at the front.

pdr. anti-tank gun was proving quite a handful to the average four-wheel drive tractor and thoughts turned to the advantages of full or half-tracked tractors. The result of these deliberations was the Crusader Gun Tractor Mark I. Trials with six gun tanks in Britain proved that the Crusader was powerful enough for the work and a prototype tractor was built, followed by an unrecorded number of production machines. The conversion was quite drastic. The entire tank, forward of the engine bulkhead, was rebuilt to house a driver, commander and six-man gun detachment in an open topped compartment protected by 14mm of armour. Ammunition was stowed in lockers on the rear trackguards and in boxes within the crew area. A spare gun wheel was mounted over the transmission compartment. Drum shaped air cleaners were fitted, well forward on the engine



A rear view of a Crusader A.A. II with the turret traversed left and Oerlikons at partial elevation. Notice the armoured cover for the

commander's hatch, the wireless aerial alongside and the sight mounting, linked to the guns, which rises out of slots in the roof.

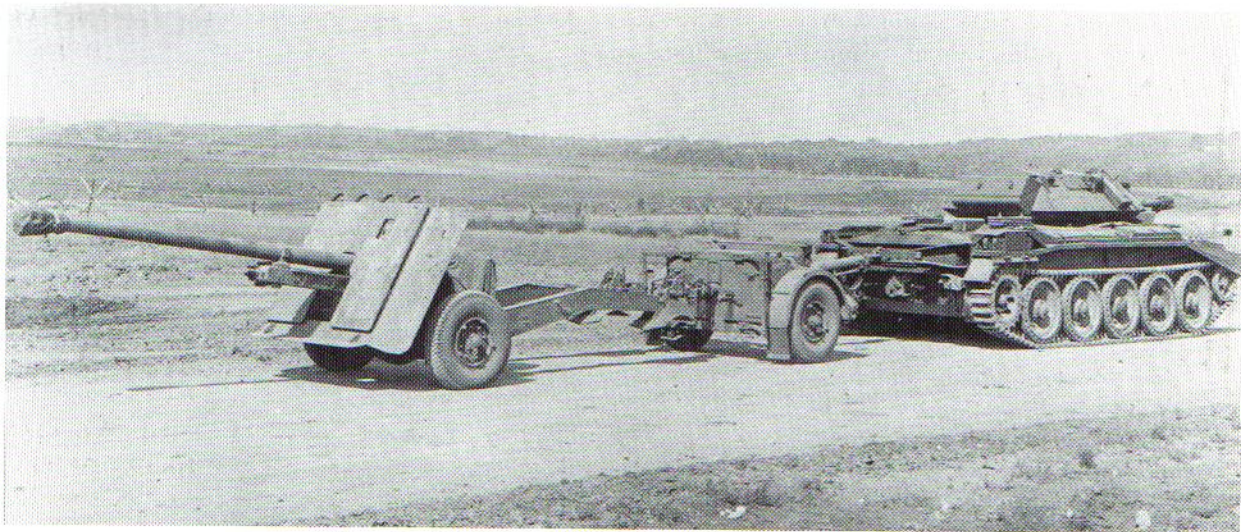


decks and a connection from the steering brake airline was used to activate trailer brakes on the gun. User opinion was very favourable although a request was made for a front mounted towing hook to make gun positioning easier. But it was soon discovered that the high cross country speed of the tractor – which was governed to 27 mph – was punishing the guns. Fully stowed, a Gun Tractor weighed no less than a Crusader tank but it was always a very lively machine. Used in Europe from D-Day onwards some of the tractors were appropriated by battery commanders as highly mobile recon-cum-battery command vehicles and the only criticism was their vulnerability to mortars.

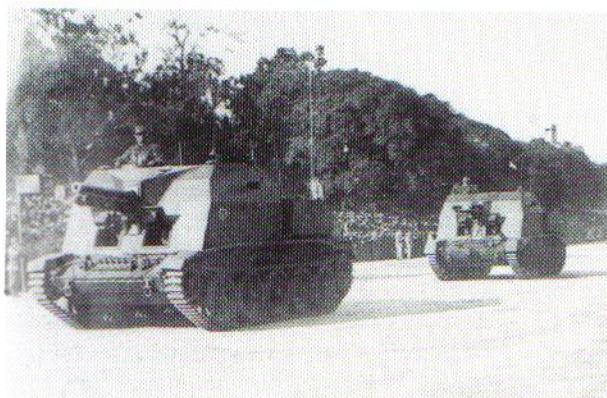
A Covenanter was used, during the early stages of development for what became known as the Armoured Vehicle Royal Engineers (AVRE), as a trial mounting for the Petard spigot mortar. But the only other connection with this branch of the service was a Crusader bulldozer tank developed

The Crusader 5.5-in. SP gun. The driver's seat and gear lever may just be seen alongside the nearest air cleaner. The gun mounting is clearly quite substantial.

by MG Motors of Abingdon. The tank was stripped to hull level and decked over the turret ring. Raised, armoured headcovers were provided for the commander and driver and the full width dozer blade was mounted on heavy duty brackets at each side. It was raised and lowered by a winch, driven off the tank's engine and located in the fighting compartment, via a short jib at the front. Following a disastrous fire at the Royal Ordnance Factory at Kirkby one of these dozer tanks was modified to remove sensitive munitions. The blade was fixed, extra armour and sandbags added to the front and an extended jib fitted with a carrier suspended well ahead of the vehicle. In an effort to produce a hydraulically operated dozer blade, one of the Crusader Gun Tractors was adapted but production ultimately centred on the cable operated system, fitted to the Centaur tank.



A Crusader III taking part in towing trials with a 17-pdr. anti-tank gun and limber.



Argentinian 'SP' guns parading in Buenos Aires. Most of the original vehicle has been retained with the gun mounted on the top of the front plate and additional cover around the crew compartment. The

nearest vehicle mounts a 105mm Schneider gun. It is being followed by one mounting the Bofors L30, 75mm weapon. (R. Fogliani)

The only countries, apart from Britain, to employ the Covenanter bridgelayer were Australia and New Zealand. The latter are recorded as having 13, and used them well into the post-war period which must have been a maintenance achievement, if nothing more. The Australians had eight, and used them operationally on two occasions as part of Special Equipment Squadrons on Bougainville and Balikpapan. This is the closest any Covenanters came to seeing active service.

The strangest fate of all awaited a batch of Crusader gun tractors which were purchased by Argentina after the war. Some were rebuilt as SP guns, mounting pre-war French weapons of 75mm and 105mm calibre along with three Madsen MGs. Information is scarce and very few pictures are known, but it would appear that the superstructure was both raised and extended with the gun mounted centrally at the front, above the driver's and commander's hatches. It seems probable that the vehicle was open at the top. Even so the weight factor was doubtless critical.

THE PLATES

Plate A1: *Tank A13 Mark III, Cruiser Mark V, Covenanter 2nd prototype*

The second Covenanter prototype shown as it first appeared from the LMSR works at Crewe. In keeping with traditional railway practice it was finished in 'photographic grey' with white rims to the wheels. Also shown is the coat of arms of the London, Midland and Scottish Railway Company.

Plate A2: *Tank A15, Cruiser Mark VI, prototype.*

The first Crusader prototype received no such treatment. It went down to the Mechanization Experimental Establishment at Farnborough, probably in the Standard Camouflage Colour

No.2, described as khaki brown, which was then becoming the predominant colour for military vehicles in Britain. Its only adornment was the War Department number T3646, painted in a rather more exotic style than normal, on a background that may have been the earlier khaki green No.3 shade. The small red triangle on the turret warns that the tank is constructed from unarmoured plate.

Plate B: *Covenanter Mark III; HQ Guards Armoured Brigade, Guards Armoured Division.*

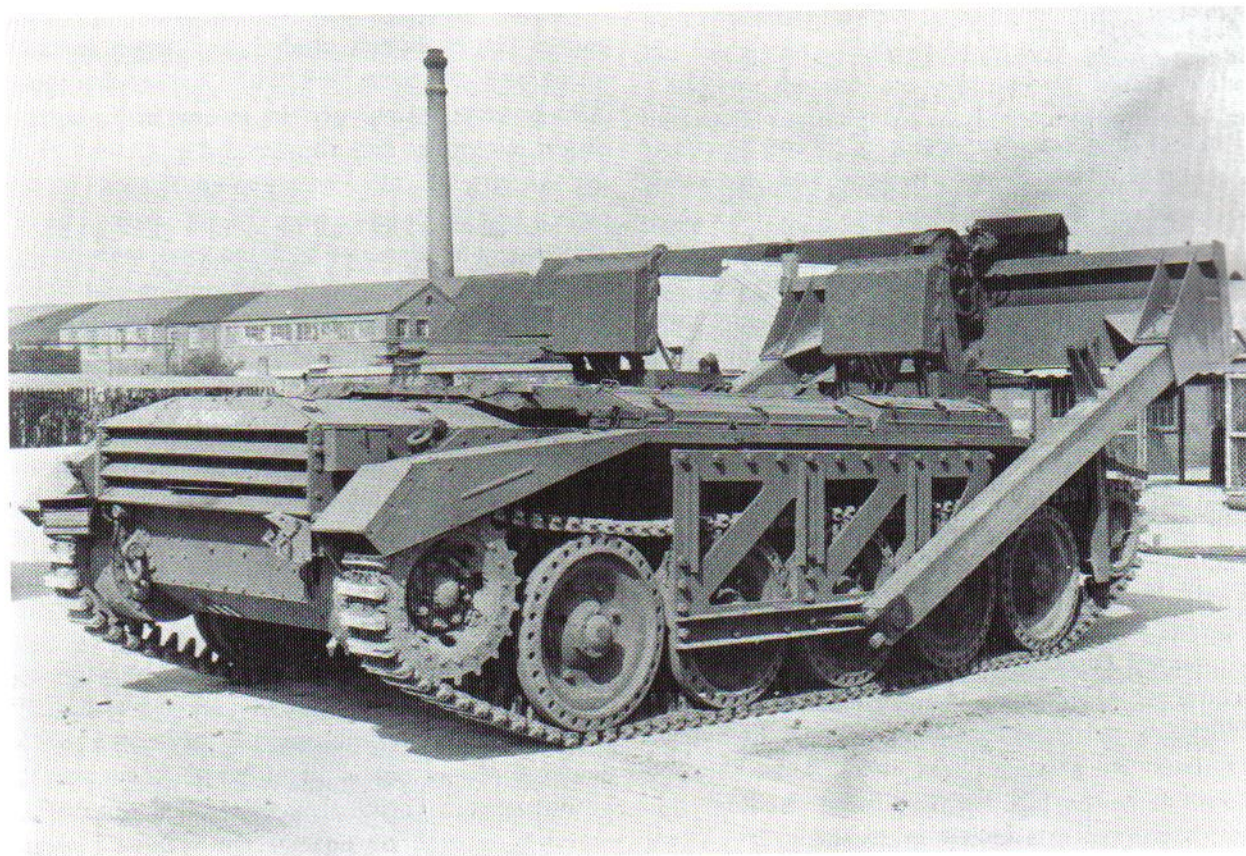
A Covenanter Mark III of Headquarters, 5th Guards Armoured Brigade, Guards Armoured Division. It displays the divisional sign of the Ever Open Eye, derived from the Guards Division sign of the Great War but reputedly restyled by the artist Rex Whistler, who served with the 2nd Battalion, Welsh Guards. Also shown is the unit identification number, bridge classification disc and red/white/red identification marking. The tank is finished in khaki brown with disruptive

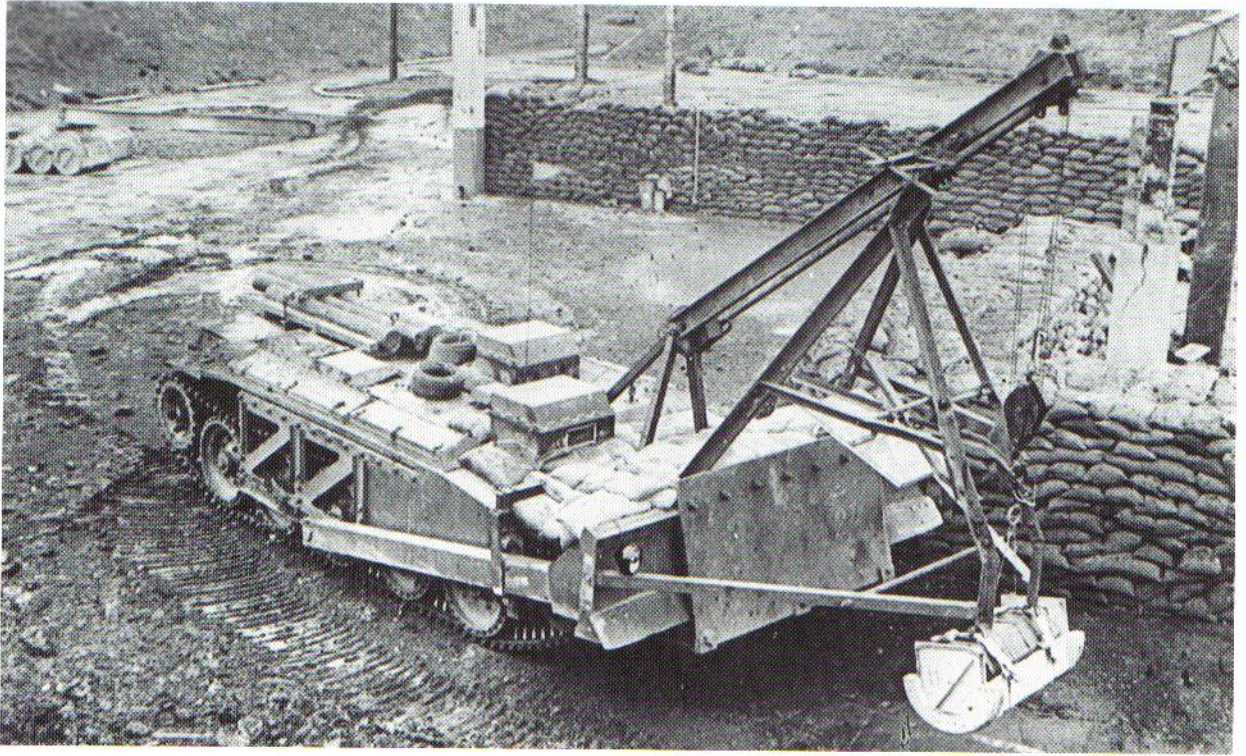
patches of very dark brown but the underside of the 2-pdr. barrel and lower mantlet are painted white to reduce the effect of shadow. Compare the plan view of this tank with the overhead photograph of a Covenanter I shown earlier and notice the different arrangement of air cleaner and exhausts that distinguished this model.

Plate C1: *Crusader Mark I, 3rd RTR, 8th Armoured Brigade, 10th Armoured Division.*

Crusader I of 2nd Royal Gloucestershire Hussars, 22nd Armoured Brigade, 7th Armoured Division, late 1942. It is finished in a base coat of the light sand colour, with an elaborate disruptive pattern, believed to be red and earth brown bordered in black and white. Markings include the divisional red jerboa and the unit identification number 40 for the senior regiment of 22nd Armoured Brigade (which used the sequence 40, 86, 67).

A Crusader dozer tank from the rear. The blade is raised and both armoured hatches are open.





The modified Crusader Dozer at ROF, Kirkby. It managed to clear the entire

site without one single fatality.

Plate C2: Crusader Mark II, The Saint, A Squadron, 10th Royal Hussars, 2nd Armoured Brigade, 1st Armoured Division.

Crusader II of 10th Royal Hussars, 2nd Armoured Brigade, 1st Armoured Division. It is finished in a plain coat of sand colour, described by some users as light stone. It sports the divisional sign of a white rhino and the unit identification number of the junior regiment in the brigade on a red square, indicating the first brigade in the division. The 'A' Squadron triangle is in blue. The Saint was commanded by Sergeant Ron Huggins.

Plate D: Crusader Mark III, 2nd Lothian & Border Horse, 26th Armoured Brigade, 6th Armoured Division.

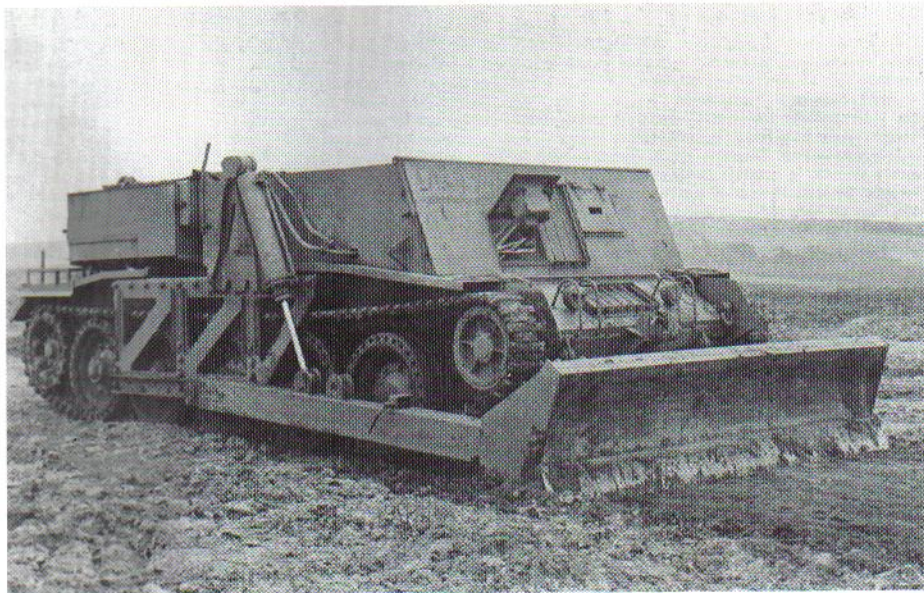
Crusader III of the 2nd Lothian and Border Horse, 26th Armoured Brigade, 6th Armoured Division in Tunisia. Like most tanks shipped direct from the UK for the 'Torch' landings this one is painted in a bronze green shade. It is silver

inside. Markings include the divisional sign of a mailed fist, squadron symbol with troop number inside and the white/red/white recognition sign. This brigade did not use the normal unit identification system at this time and the method they did employ, of different coloured flashes, is not well enough documented to be shown here. Tanks could be supported by a Tecalemit, two-wheeled Rotatrailer containing extra ammunition and a fuel pump in its body, and up to 60gal. of petrol in each of its drum shaped wheels.

Plate E: Covenantan Bridgelay, 13/18th Hussars, 22nd Armoured Brigade, 9th Armoured Division.

Covenantan Bridgelay of 13th/18th Hussars, 22nd Armoured Brigade, 9th Armoured Division in Britain. The colour scheme is khaki brown and the yellow cross indicates that it is taking the part of an enemy vehicle in an exercise. The white 52 on a red square indicates the second armoured regiment in the senior brigade while the white diamond shows that it is attached to regimental headquarters. Notice that the tank's number is repeated on each segment of the bridge. The full

A Crusader gun tractor used to test the hydraulic dozer operating gear.



operational sequence of a scissors bridgelayer is shown by the ghosted outlines.

Plates F1: *Crusader Mark II Command Tank Taurus, HQ 11th Armoured Division.*

Crusader II Command Tank Taurus of headquarters 11th Armoured Division in Britain. It has additional armour at the front and both sides of the driver's cab. The name is painted boldly on the turret while the identification colours are seen on the front and sides. The name reflects the charging bull symbol of this division which was selected by its commander, Sir Percy Hobart. The white '40' on a black square applies to tanks of divisional headquarters.

Plate F2: *Crusader Mark III A.A. III, Skyrazer or The Princess 1st RTR, 22nd Armoured Brigade, 7th Armoured Division.*

A Crusader III A.A. III anti-aircraft tank of 1st Royal Tank Regiment, 22nd Armoured Brigade, 7th Armoured Division, in June 1944. Notice the front mounted wireless aerial and extra stowage box on the nearside trackguard. The use of two names on one tank is unusual but the circled white star was used by all Allied forces in France at this time. Other markings include the bridging number, unit identification number combined with the brigade symbol and the famous divisional sign.

Plate G: *Crusader Mark III Gun Tractor, B Troop, 1st Battery, unidentified anti-tank regiment of an armoured division.*

Crusader gun tractor of the Anti-Tank regiment, Royal Artillery, of an Armoured Division. It is shown standing by to support its 17-pdr. anti-tank gun in action. Working in reverse order, '77' in white, on the red and blue square, indicates the anti-tank regiment of an armoured division in 1944. Each battery, of which there were three in the regiment, consisted of three troops and of these 'A' Troop was always self-propelled, 'B' and 'C' being towed, but all having 17-pdr. guns. The battery could be identified by the position of the red square within the blue on the tactical sign and in this case the 3rd battery is indicated. Finally, the gun within the troop is shown by the white letter and number on the tactical sign. Thus we have the first gun in 'A' troop of the third battery. Only this tactical sign was repeated on the gun shield. It should be added that these markings are somewhat speculative; it has not proved possible to confirm which batteries employed Crusader tractors. Note: the divisional insignia has purposely been omitted from this drawing since it has not been possible to establish beyond doubt which regiments actually used these vehicles in Europe.

Notes sur les planches en couleur

A1 Le second prototype de Covenanter illustré tel qu'il sortit de l'usine LMSR à Crewe. Conformément aux habitudes traditionnelles dans le secteur ferroviaire, il avait reçu une finition 'gris photographique' et les roues avaient des jantes blanches. On voit également le blason de la London, Midland and Scottish Railway Company. A2 Le premier prototype Crusader ne fut pas traité de la sorte. Il fut envoyé à l'Établissement Expérimental de Mécanisation à Farnborough, sans doute fini en Couleur Camouflage Standard No. 2, décrite comme étant marron kaki, qui allait ensuite devenir la couleur prédominante des véhicules militaires en Grande-Bretagne. Sa seule décoration était le numéro du Département de Guerre T.3646, peint dans un style plus exotique que d'ordinaire, sur un fond qui aurait pu être la teinte vert kaki No. 3 plus ancienne. Le petit triangle rouge sur la rouelle indique que ce char est construit en métal non blindé.

B Un Covenanter Mark III du Quartier Général, 5ème Brigade Blindée de Gardes, Division Blindée de Gardes. On voit également le numéro d'identification de l'unité, le disque de classification pour ponts et la marque d'identification rouge/blanc/rouge. Le char est fini en marron kaki avec des taches irrégulières de marron très foncé mais le dessous du baril de 2 livres et le pare-bales inférieur sont en blanc pour réduire l'effet d'ombre.

C1 Crusader I des 2èmes Hussards Royaux du Gloucestershire, 22ème Brigade Blindée, 7ème Division Blindée, fin 1942. Fini avec une couche d'enduit en sable clair avec un motif compliqué superposé, que l'on pense être marron bordé de noir et blanc. Parmi les marques, citons la gerboise rouge de la division et le numéro 40 d'identification de l'unité pour le régiment senior de la 22ème Brigade Blindée (qui utilisait la séquence 40, 86, 67). C2 Crusader II des 10èmes Hussards Royaux, 2ème Brigade Blindée, 1ère Division Blindée. Fini avec une couche de sable clair uni, couleur décrite par certains utilisateurs sous le nom de pierre claire. Il porte un rhinocéros blanc, signe de la division, ainsi que le numéro d'identification de l'unité du régiment junior dans la brigade, sur un carré rouge, qui indique la première brigade de la division. Le triangle d'Escadron 'A' est bleu.

D Crusader III des 2èmes Lothian et Border Horse, 26ème Brigade Blindée, 6ème Division Blindée en Tunisie. Comme la plupart des chars expédiés directement du Royaume-Uni pour les débarquements 'Torch', celui-ci est peint en vert bronze. Il est argent à l'intérieur. Parmi les marques, citons le signe de la division, une main gantée, le symbole de l'escadron avec le numéro de la troupe à l'intérieur et le signe de reconnaissance blanc/rouge/blanc.

E Covenanter Bridgelayer des 13èmes/18èmes Hussards, 22ème Brigade Blindée, 9ème Division Blindée de Grande-Bretagne. La couleur est marron kaki et la croix jaune indique qu'il remplit le rôle d'un véhicule ennemi dans un exercice. Le 52 blanc sur un carré rouge indique qu'il s'agit du second régiment blindé dans la brigade senior alors que le losange blanc indique qu'il est attaché au quartier général du régiment.

F1 Char de Commandement Taurus Crusader II du quartier général de la 11ème Division Blindée en Grande-Bretagne. Il porte un blindage supplémentaire à l'avant et des deux côtés de la cabine du pilote. Le nom reflète le symbole du taureau à la charge qui fut choisi par son commandant, Sir Percy Hobart. Le '40' blanc sur un carré noir est applicable aux chars des quartiers généraux de division. F2 Char Crusader III A.A. III anti-aérien du 1er Régiment Royal de Chars, 22ème Brigade Blindée, 7ème Division Blindée, en juin 1944. Remarquez l'antenne radio montée à l'avant et le casier à munitions supplémentaires sur le garde-chenilles gauche. L'utilisation de deux noms sur le char est inhabituel mais l'étoile blanche dans un cercle était utilisée par toutes les forces alliées en France à cette époque.

G Crusader tracteur de canons du régiment Anti-Chars, Artillerie Royale, d'une Division Blindée. En partant de la fin, '77' en blanc sur le carré rouge et bleu indique le régiment anti-chars d'une division blindée en 1944. Chaque batterie (il y en avait trois dans le régiment) était composée de trois troupes et parmi ces dernières la Troupe 'A' était toujours motorisée alors que 'B' et 'C' étaient tractées, mais toutes avec des canons de 17 livres.

Farbtafeln

A1 Der zweite Covenanter-Prototyp, wie er erstmals aus dem LMSR-Werk in Crewe lief. Im Einklang mit der herkömmlichen Vorgehensweise der Eisenbahn war er 'photographisch-grau' gestrichen und hatte weiße Ränder an den Rädern. Außerdem ist das Wappen der London, Midland and Scottish Railway Company abgebildet. A2 Der erste Crusader-Prototyp erfuhr keine derartige Sonderbehandlung. Er ging in das 'Mechanization Experimental Establishment' in Farnborough, wahrscheinlich in der Standardtarnfarbe Nr.2, die als khakibraun beschrieben wird und sich zu dieser Zeit zur vorherrschenden Farbe für Militärfahrzeuge in Großbritannien entwickelte. Sein einziger Schmuck war die Nummer des Kriegsministeriums - T3646 -, die in einem aufwendigeren Stil als üblich gezeichnet war, und zwar auf einem Hintergrund, bei dem es sich unter Umständen um den früheren Farbton khakigrün Nr.3 handelte. Das kleine rote Dreieck auf dem Panzerturm ist ein Warnzeichen, daß der Panzer aus ungepanzerten Metallplatten gebaut ist.

B Ein Covenanter Mark III des Hauptquartiers, 5th Guards Armoured Brigade, Guards Armoured Division. Außerdem ist die Kennnummer der Einheit abgebildet, die Brücken-Klassifizierungsscheibe und das rot/weiß/rote Kennzeichen. Der Panzer ist khakibraun gespritzt und weist dunkelbraune Farbflecken auf. Die Unterseite des 2-pdr.-Geschützrohres und die untere Schutzblende sind weiß gestrichen, um die Schattenwirkung zu verringern.

C1 Crusader I der 2nd Royal Gloucestershire Hussars, 22nd Armoured Brigade, 7th Armoured Division, Ende 1942. Die Grundfarbe ist hell sandfarben, darüber ein kunstvolles Tarnmuster, bei dem es sich wahrscheinlich um erdbräun mit schwarz-weißer Umrandung handelt. Zu den Kennzeichen zählen die rote Springmaus der Division sowie die Kennnummer 40 der Einheit, die ein dienstälteres Regiment der 22nd Armoured Brigade (die die Zahlenfolge 40, 86, 67 verwendete) bezeichnet. C2 Crusader II der 10th Royal Hussars, 2nd Armoured Brigade, 1st Armoured Division. Der Panzer ist schlicht sandfarben gespritzt, ein Farbton, der von einigen Benutzern als 'hell steinfarben' bezeichnet wurde. Er weist das Divisionszeichen - ein weißes Nashorn - auf sowie die Kennnummer der Einheit als untergeordnetes Regiment in der Brigade auf einem roten Quadrat, das die erste Brigade in der Division bezeichnet. Das Dreieck der Schwadron 'A' ist blau.

D Crusader III der 2nd Lothian and Border Horse, 26th Armoured Brigade, 6th Armoured Division in Tunesien. Wie die meisten Panzer, die für die 'Torch' - Landungen direkt aus Großbritannien verschifft wurden, ist auch dieser in einem bronzenen Farbton gespritzt. Innen ist er silberfarben. Aufgetragen ist das Divisionszeichen - eine eiserne Faust -, das Symbol der Schwadron mit der Kompanienummer darin und das weiß/rot/weiß Erkennungszeichen.

E Covenanter Bridgelayer der 13th/18th Hussars, 22nd Armoured Brigade, 9th Armoured Division in Großbritannien. Die Farbgebung ist khakibraun, und das gelbe Kreuz zeigt an, daß der Panzer bei einer Übung die Rolle eines feindlichen Fahrzeugs übernimmt. Die weiße Ziffer 52 auf einem roten Quadrat bezeichnet das zweite Panzerregiment in der dienstälteren Brigade, während der weiße Rhombus zeigt, daß der Panzer dem Regimentshauptquartier angehört.

F1 Crusader II Command Tank Taurus des Hauptquartiers der 11th Armoured Division in Großbritannien. Er weist zusätzliche Panzerung an der Vorderseite und an beiden Seiten der Fahrerkabine auf. Der Name spiegelt das Symbol eines angreifenden Stiers dieser Division, das von ihrem Befehlshaber, Sir Percy Hobart, gewählt worden war. Die weiße Ziffer 40 auf einem schwarzen Quadrat gilt für Panzer des Divisionshauptquartiers. F2 Ein Crusader III A.A. III, Flugabwehrpanzer des 1st Royal Tank Regiment, 22nd Armoured Brigade, 7th Armoured Division, im Juni 1944. Man beachte die Funkantenne an der Vorderseite und den zusätzlichen Stauraum an der vorderen Kettenblende. Die Verwendung von zwei Namen auf einem Panzer ist ungewöhnlich, doch benutzen alle Streitkräfte der Alliierten in Frankreich zu dieser Zeit den weißen Stern in einem Kreis.

G Crusader Geschütz-Zugfahrzeug des Jagdpanzer-Regiments, Royal Artillery, einer Panzerdivision. In rückwärtiger Reihenfolge bezeichnet die Ziffer 77 in weiß auf dem rot-blauen Quadrat das Flugabwehr-Regiment einer Panzerdivision 1944. Jede Flak-Batterie, von denen es drei im Regiment gab, bestand aus drei Kompanien, und davon verfügte die Kompanie 'A' stets über Selbstfahrlafetten, 'B' und 'C' wurden geschleppt, doch hatten alle 17-pdr.-Geschütze.