

NUMBER 8

PanzerKampfwagen IV (F2)



**ARMOUR
IN
PROFILE**

PanzerKampfwagen IV (F2)

MOST postwar publications on German armour of the Second World War tend to over-emphasise the importance of the well-known Tiger and Panther (*Profiles* 2, 38, and 68). These vehicles, while undoubtedly making quite an impression on their opponents during their somewhat limited appearance on the battlefield, should be considered above all as derivatives of the Panzerkampfwagen III and IV. It was these two tanks which established the reputation of the German armoured forces, and demonstrated the most advanced technical and tactical features of their time.

While the PzKpfw III was intended to equip three out of four German tank companies, the PzKpfw IV was originally given a limited rôle as a support vehicle equipping the fourth company of a standard tank battalion. This vehicle, conceived in 1934 but neglected through the years by inadequate production schedules, eventually became the only German tank which remained in production and troop service until the end of the war. This is an indication of its sound basic design, supplemented by remarkable foresight in the specification. Most of the other armoured vehicles originally designed during the same period progressively disappeared under the stress of war from 1939 onward.

One man most instrumental in the design of the Panzer IV was the creator of the German *Panzertruppe*, Colonel-General Heinz Guderian, who had laid down the basic prerequisites for armoured fighting vehicles as early as 1933-34. These were

mobility, fire-power, armour protection and communication, specified in that order. A five-man crew was also considered essential. The latter allowed for a distinct allocation of duties between the crew, an advantage both in training and in battle, which gave German tanks their marked tactical superiority over their Allied counterparts despite other shortcomings. Guderian's insistence on supplying the crews with communication systems, usable not only between tanks but also on intercom., was another key factor enabling these vehicles to be used as practical and effective units of the newly-created armoured force, trained in the disciplined and co-ordinated art of armoured warfare. However, despite these major advantages, most German tanks of the development period could not be considered superior in Guderian's first three requirements of mobility, fire-power and armour protection. In fact many of the French tanks opposing the German attack of 1940 had heavier armour, while the British cruisers were superior in manoeuvrability. What the Allied armour lacked most was the administrative backing of supply and maintenance required by modern mechanised forces, and the fighting efficiency afforded by well-designed crew compartments.

German armour had a further weakness which became apparent during the Russian campaign in 1941. The German General Staff had foreseen the future deployment of armoured fighting vehicles primarily in Western Europe. The capacity of European bridges and railroad profiles, and the existence of a dense

Hitler, surrounded by a ring of SS men with a single Army officer in attendance, inspects the first prototype PzKpfw IV F2, with the long-barrelled 7.5 cm. gun, at Krupp's Magdeburg factory early in 1942; note the ball-shaped, single-baffle muzzle brake of the early version.



by Walter Spielberger

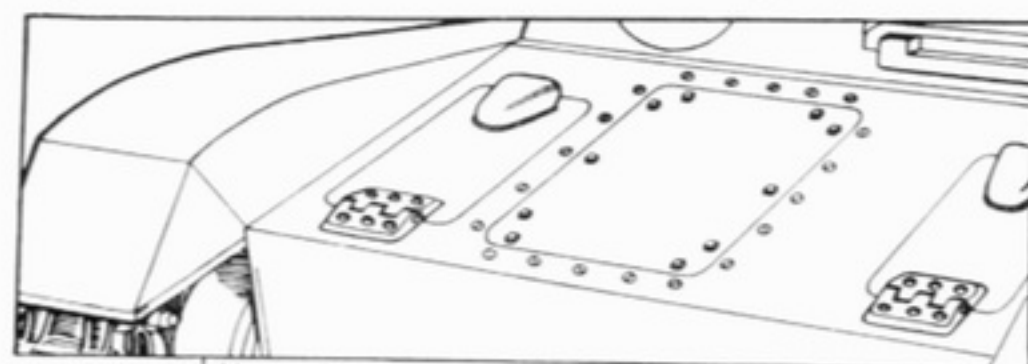
Some early examples of PzKpfw IV Ausf. F2 still mounted the short-barrelled 7.5 cm. gun.

road network determined to a large degree the specifications for ground pressure and power/weight ratio, thus limiting basic dimensions and cross-country performance. These factors became obvious handicaps among the vast plains, swamps and forests of Russia. The challenge set by the T-34 (*Profile 9*)—tailor-made for its environment with its wide tracks, high speed, effective armour and powerful gun—could only be met fully by completely new designs with their inevitably lengthy development time. But immediate solutions were found which up-dated especially the Panzer IV to such an extent that it was still a usable weapon when the war ended. Its modification was continuous, if often makeshift. Much was left to the tactical ability and determination of Panzer crews to make up for deficiencies in their vehicles. Tanks returned for overhaul were, in principle, brought up to the latest standards, considerably complicating the recognition of later marks.

The outstanding basic vehicle of this wartime development period, created to restore the balance of power in favour of German armour, was PzKpfw IV Ausf. F2.

DEVELOPMENT HISTORY

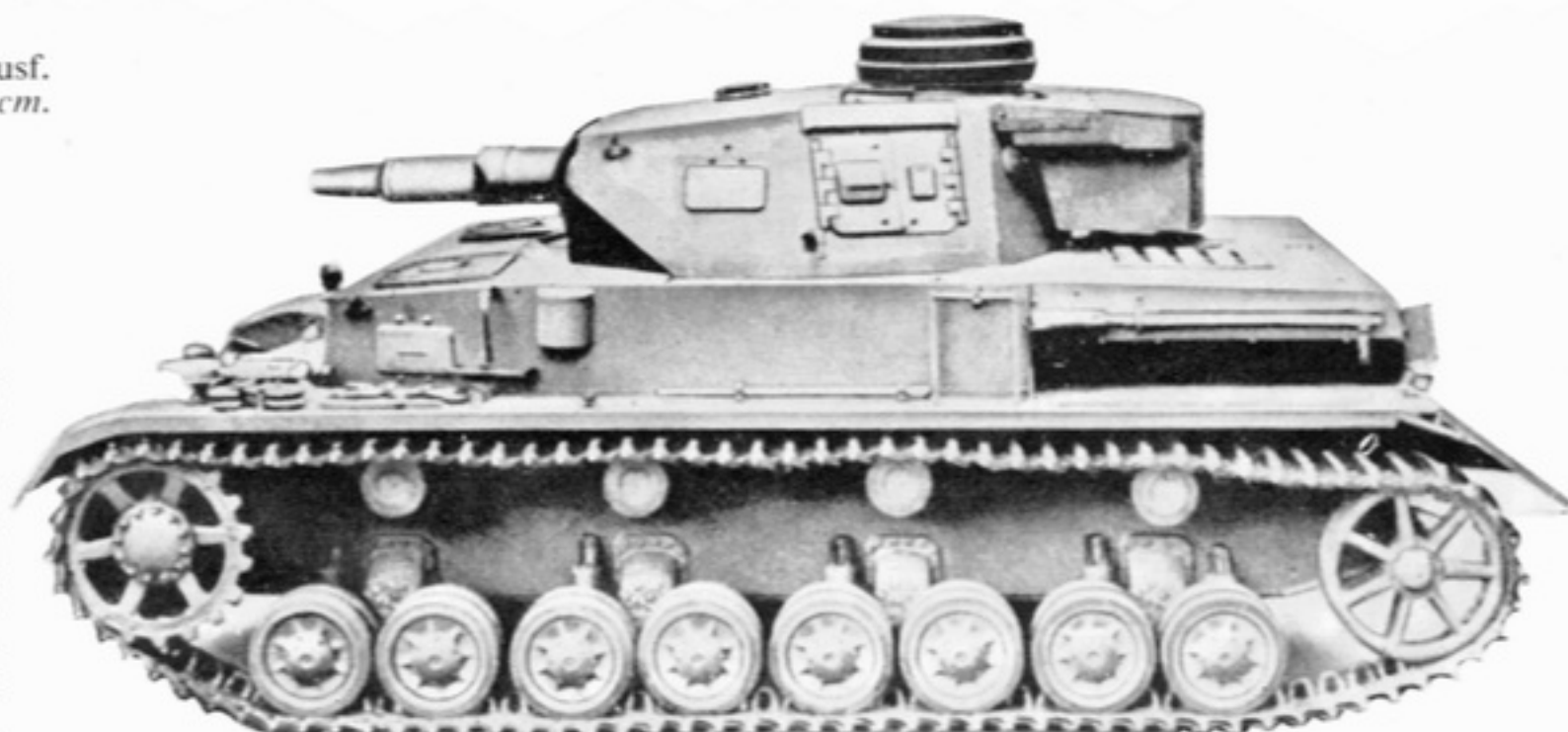
The story of Panzer IV began at a policy meeting called at the Army Ordnance Department on 11th January 1934. The agenda was to settle some final problems concerning a proper balance of armoured fighting vehicle equipment for a 63-division German Army. As a result of this discussion, final specifications for a "medium tractor" were agreed and orders for prototypes were issued to industry. The armament required was a short 7.5 cm. assault gun; this was



View of Glacis Plate showing Access Doors



ACCESS DOOR
and HINGE
SHOWING AIR INTAKE
COWL



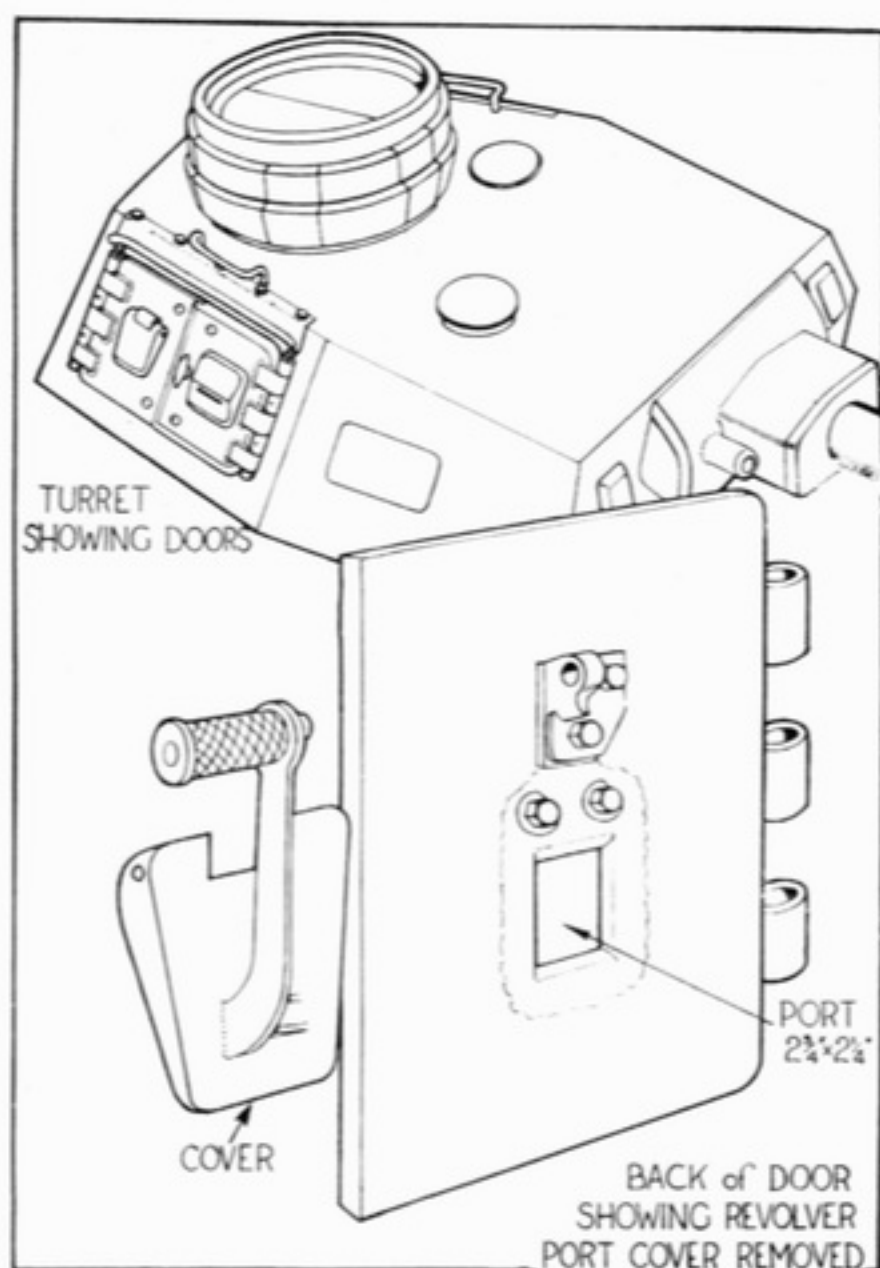
thought necessary to support the new Panzer army's standard vehicle, PzKpfw III (*Profile No. 26*) which was to be equipped with a 3.7 cm. gun. The limit for its battle weight, imposed by the capacity of standard bridges, was 24 tons. Rheinmetall-Borsig AG. immediately started their design and completed a wooden mock up by the end of the year. Their first prototype, called "VK 2001", went to Kummersdorf for trials in 1935. Both M.A.N. of Augsburg and Friedr. Krupp AG. of Essen submitted their proposals to the *Waffenamt* (War Office) during 1935. Intensive trials of all prototypes resulted in the acceptance of the Krupp design in 1936.

In order to disguise these vehicles the code name "*Bataillonsführerwagen*" or "BW" was established, a designation which served for identification throughout the entire model run. While development and construction of prototypes took place at Krupp's Essen factory, the production line was established at Krupp-Grusonwerke AG. at Magdeburg. Now called "*Versuchskraftfahrzeug 622*" (*VsKfz 622*), a few examples of the first version, or Ausführung A, came off the production line in 1936. The second, Ausf. B, appeared in 1937, again in very limited numbers. Ausf. C was produced in 1938, as was Ausf. D.

The campaign against Poland in September 1939 saw only 211 Panzer IV in action, since production had been curtailed after all existing units had received their allotted number of vehicles. Encouraged by the results of this first battle, Panzer IV was accepted as standard issue on 27th September 1939, and now received the Ordnance Number *Sonderkraftfahrzeug 161* (*SdKfz. 161*). In December 1939 production began

After the installation of the lengthened KwK 40 L/43 tank gun this version was designated Ausf. F2, and the short-gunned model Ausf. F1. Compared to the Ausf. E, both had a straight front hull plate with a new driver's visor and machine gun ball mounting. The glacis plate access doors were also changed.





The turret on both Ausf. F versions was equipped with double doors similar to those of Panzer III.

of Ausf. E, bringing the total of Panzer IV available for the impending campaign against France up to 278. In fact only 280 Panzer IV were built during 1940. It was not until a "Führerbefehl"—Hitler's order—of 20th August 1940 finally put more urgency into tank production that both Panzer III and IV were placed in production class "SS", a high priority classification.

AUSFÜHRUNG F APPEARS

The Panzer IV model profiting most from the accumulated experience of the Polish campaign was the "6/BW" or Ausf. F (As this version leads directly to the title vehicle Ausf. F2, it should be mentioned that Profile 50 will cover Panzer IV development in detail up to this point). Altogether 393 PzKpfw IV

Ausf. F were built in 1940 and 1941, with the first batch of 20 leaving the factory in February 1940. Compared to previous models, the basic armour was increased from 30 to 50 mm. The front of the superstructure was now in the form of a single plate extending straight across the tank. The front revolver port was omitted altogether and a "Kugelblende 50"* for the radio-operator/hull gunner, together with a "Fahrersehklappe 50"* for the driver were now provided. Modifications to the two hinged maintenance hatches in the glacis plate included the incorporation of air intake apertures on each door. These were protected by a cast cowl welded to the cover. Another change affected the access doors to the turret; the single door previously fitted was superseded by double doors similar to those fitted on Panzer III. The forward door on each side incorporated a vision port, while revolver ports were provided in each rear door. The additional armour increased the weight from 21 to a total of 22.3 metric tons and required a modification of the chassis. Track width was increased from 380 to 400 mm. (Track type Kgs. 61/400/120) to lower ground pressure. These new tracks also had the sole and outer webs of each shoe slotted to fit ice sprags.

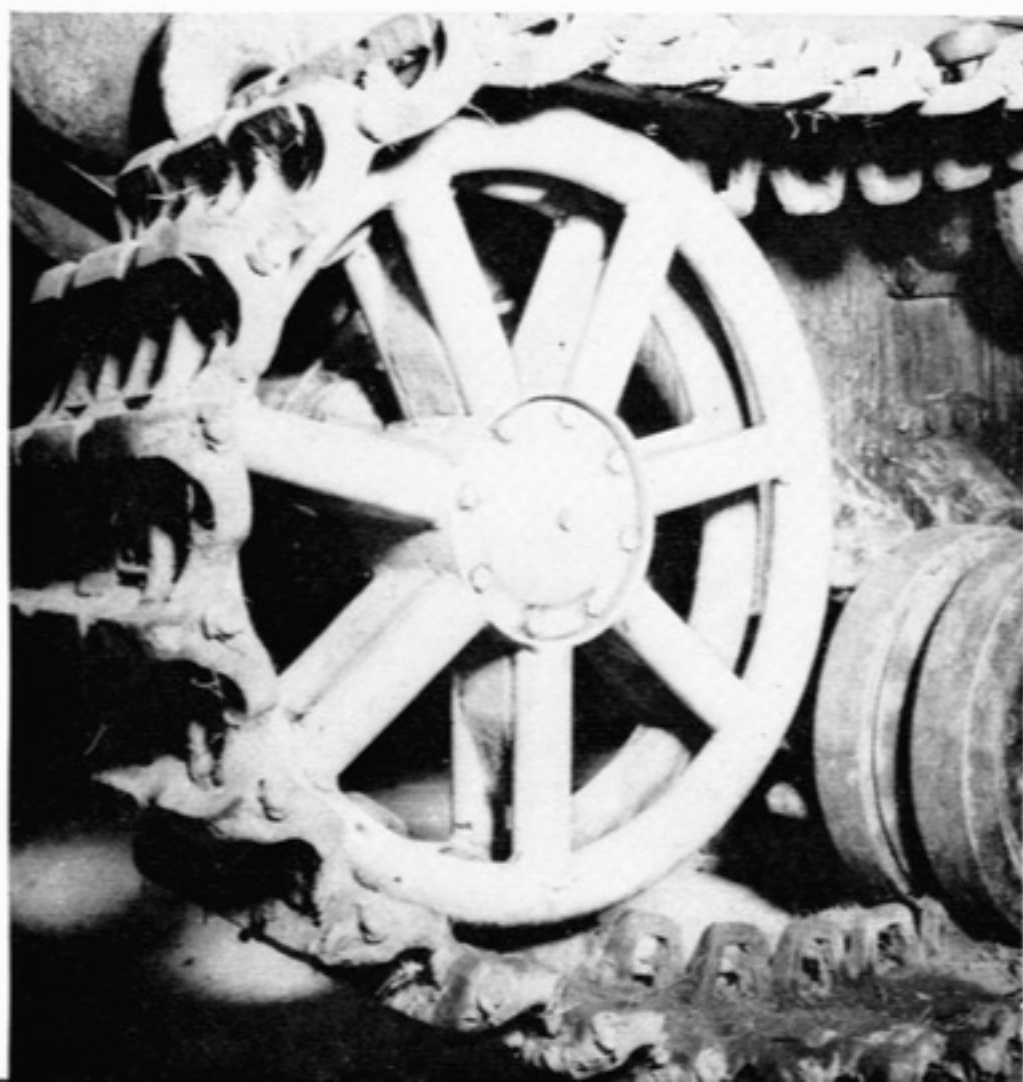
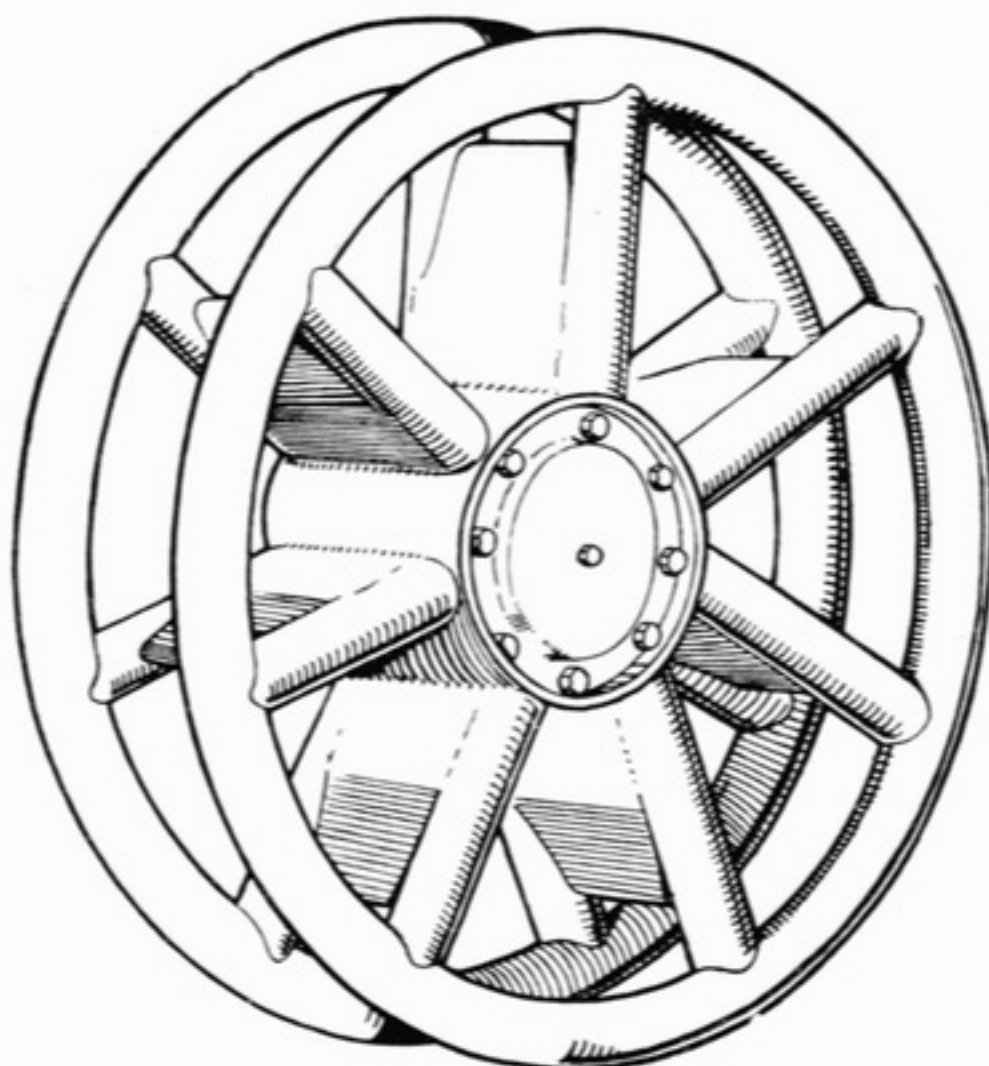
The front driving sprocket of Panzer IV Ausf. F, while similar to previous models, had its spokes bent outwards from the hub, giving the outside a dished appearance. The rear idler wheel was completely changed. Constructed of 2 1/4 in. welded tube, both outside and inside sections were secured together by flat plates welded to their respective spokes. Thus modified the vehicle was ready to accept the final major modification, which again made it an even match for the Russian T-34.

THE NEW 7.5 cm. GUN

The surprise created by the Soviet's T-34 when it was encountered for the first time at the end of July 1941 could have been avoided. Guderian indicates in his

*Trans. "Kugelblende"—armoured ball mounting;
"Fahrersehklappe"—driver's visor.

The increased track width of 400 mm. demanded new idler wheels, which were constructed of metal tube by a unique welding process.



book *"Erinnerungen eines Soldaten"* that a group of Russian officers received Hitler's personal permission to inspect German tank factories as late as the Spring of 1941. The Russians, confronted with the Panzer IV, would not believe that this was supposedly the heaviest German tank. They protested so strongly that they should be shown everything as promised by Hitler that it was deduced that they must have something much better. They actually had. In the event, no German weapon other than the 8.8 cm. gun, available only in limited numbers, was able to defeat the new Russian tanks in an open encounter. To compensate for this, the Ordnance Department issued Order No. 917/41 gKdos Wa. Pruef. 4 of 18th November 1941 to Friedrich Krupp AG. of Essen to design in co-operation with Rheinmetall-Borsig AG. a replacement for the short-barrelled 7.5 cm. Panzer IV tank gun. Originally called *Kampfwagenkanone 44* (later KwK 40), the weapon was to have a barrel length of 3,218 mm. (L/43)*. Muzzle velocity was to be increased from 450 to 990 mm./sec. and range from 6,500 m. to 8,100 m. Mass production was ordered in March 1942. Installed for the first time in the F version of the Panzer IV, it received the official nomenclature F2, while vehicles with the short-barrelled weapon were renamed Ausf. F1. Serial numbers of Ausf. F1 run from 82001 to 82393; those for F2 from 82394 to 83700. The fighting weight of the F2 version increased to 23.6 metric tons; 87 rounds of ammunition were carried. The price per unit (without weapons) amounted to RM 103,462. These vehicles remained in production until 1942 when they were succeeded by the Ausf. G.

PRODUCTION

Panzer IV production was originally intended to be on a limited scale. Only one prime contractor, Krupp-Gruson AG., was engaged, while Panzer III production was divided among eight major companies. This limited production and the effects of losses left the following numbers of Panzer IV on Army strength during the first three years of the war: end of 1939: 174; end of 1940: 386; end of 1941: 769. In fact, the total Panzer IV production during 1941 amounted to only 480 units, despite an order dated 18th July 1941 which requested production of 2,160 to equip the planned 36 armoured divisions. A monthly production goal of 40 units per month was set for 1941. In January 1942 a monthly output of 57 units was anticipated. In the event this target was exceeded and a total of 964 urgently needed Panzer IV were produced during 1942. Originally the main assembly was by Krupp-Gruson, with hulls and turrets supplied by Krupp of Essen and Eisen-und-Huettenwerke of Bochum. This picture changed considerably during 1942 under the influence of Allied air raids. The relocation of key war industry to areas not readily accessible to the bombers was begun in 1940 and established several new tank factories. One of these was "Nibelungenwerke" at St. Valentin (Lower Austria), managed by Steyr-Daimler-Puch AG. Initially intended for the production of a replacement vehicle for Panzer IV—the Porsche "Leopard" (Porsche Type 100)—it became operational just in time to take on the expanded Panzer IV production. From 1943, Panzer IV was assembled almost exclusively at this factory and remained in production there until the end of the war. Its proximity to the Hermann Goering steel mills at Linz established a new source for hulls and turrets including Gebr. Koehler



Captured in North Africa, this Panzer IV F2 was shipped to Aberdeen Proving Ground, Maryland, U.S.A., where it underwent extensive testing. Note additional track links on the turret and glacis plate.



The right-hand turret front port is eliminated on this F2 model; and track links reinforce the thinly-armoured hull sides above the road wheels.

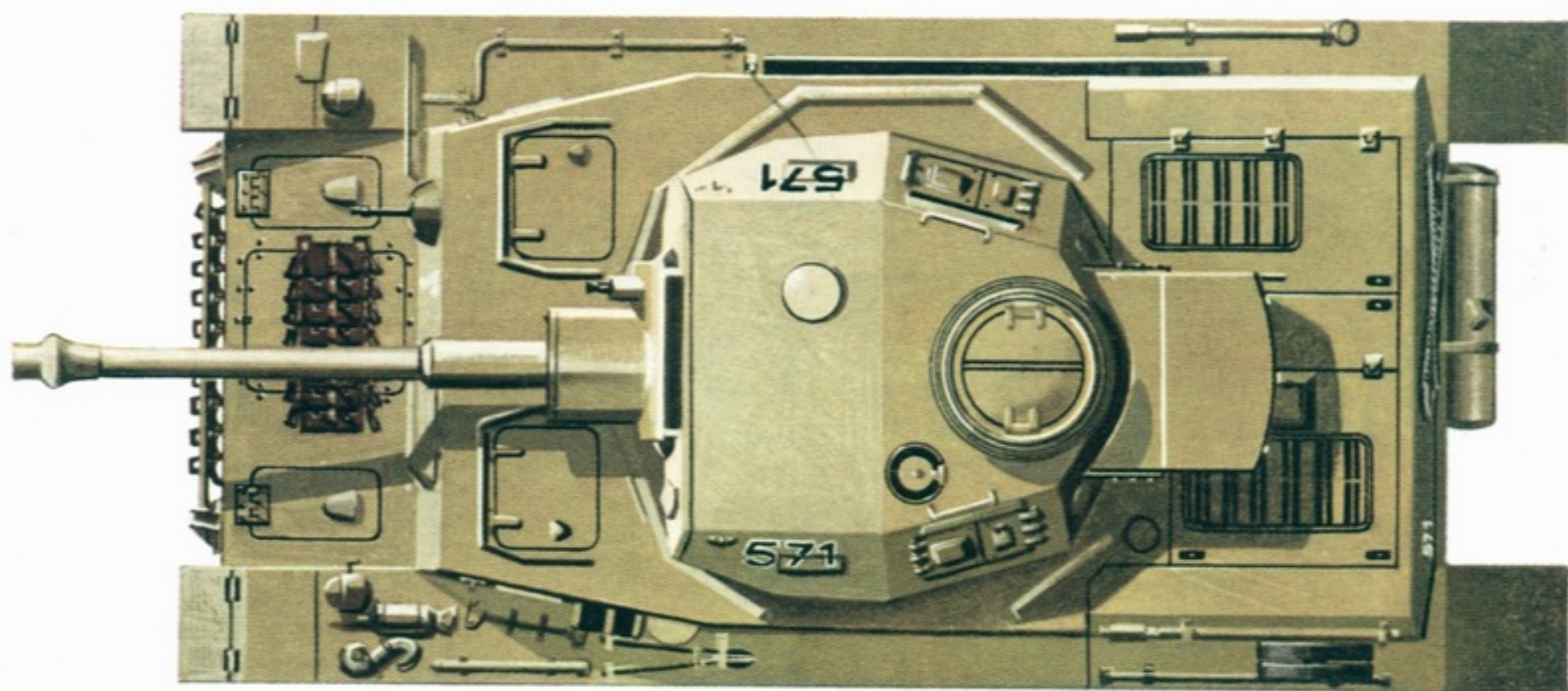


With the turret almost at the "three o'clock" position, the stowage bin mounted on the rear of the turret may be seen clearly, as can the louvres on the engine compartment decking and the auxiliary fuel tank on the hull rear vertical plate.

& Co of Kapfenberg and Eisenwerke Oberdonau of Linz. The raw material consumption of one Panzer IV (without weapons, optical instruments or radio equipment) was as follows: Steel (Fe), 39,000.00 kg.; Tin (Sn), 1.20 kg.; Copper (Cu), 195.10 kg.; Aluminium (Al), 238.00 kg.; Lead (Pb), 63.30 kg.; Zinc (Zn), 66.40 kg.; Magnesium (Mg), 0.15 kg.; Rubber, 116.30 kg. These totals illustrate the profound strain on the blockaded and stretched German industry of tank production and go far to explain its limitation even in the early days of the war and by comparison with the achievements of Allied industry in this field.

Concluding Panzer IV production were Ausf. H and J, both mounting the final version of the 7.5 cm. gun with a length of L/48†. A total of approximately 9,000 Panzer IV was produced.

*L/43—43 calibre. †L/48—48 calibre.



Left: An Oberleutnant of German Army Panzer troops in tropical dress.

B



A



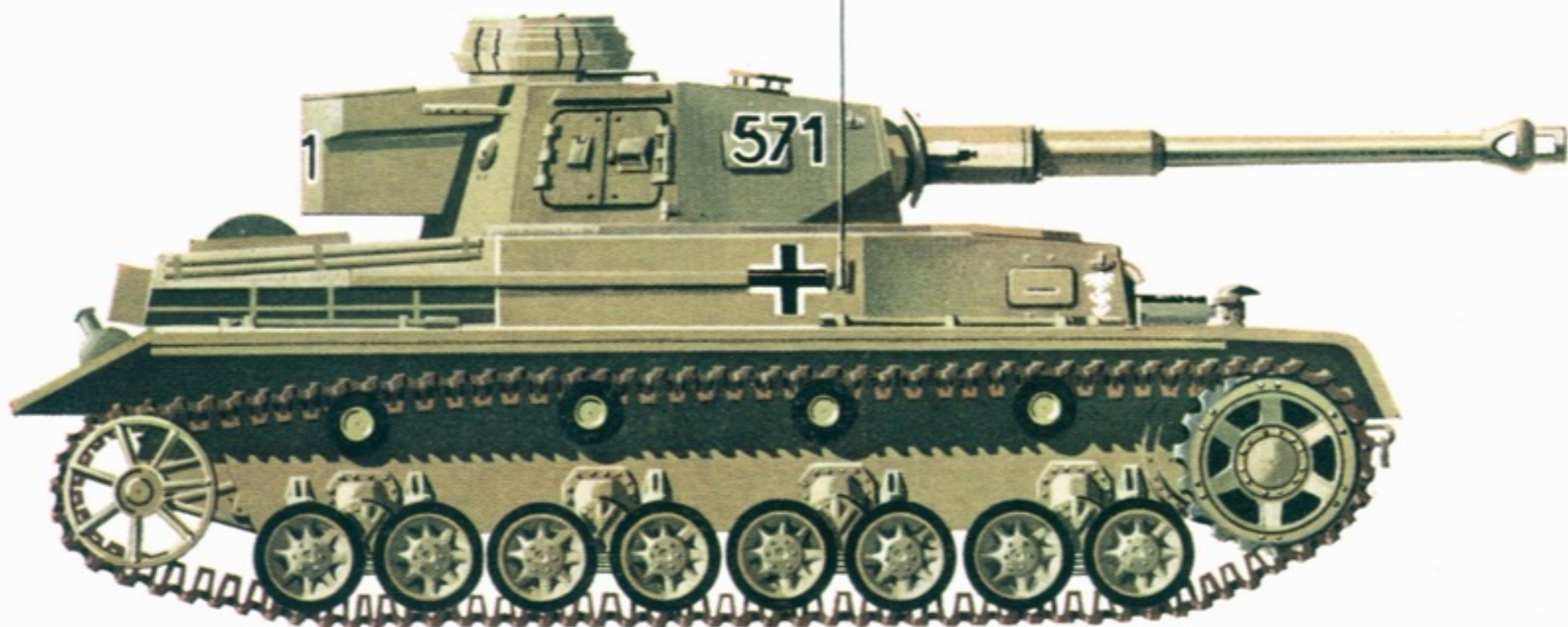
C



D



Key to insignia: A = cap badges; the Army-style eagle and swastika insignia was also worn on the right breast by all German Army personnel. B = Afrikakorps cuff title, worn on right forearm of tunic; the original style is illustrated, later replaced by brassard with word "Afrika" between two palms. C = Panzer death's-head insignia, worn on both lower lapels of tropical tunic. D = Oberleutnant's epaulette; pink underlay indicates Panzer troops.



The turret below, mounting the short 7.5 cm. gun, typifies the appearance of PzKpfw IV Ausf. F1 and the earlier Ausf. D which fought in Poland and France in 1939-40.

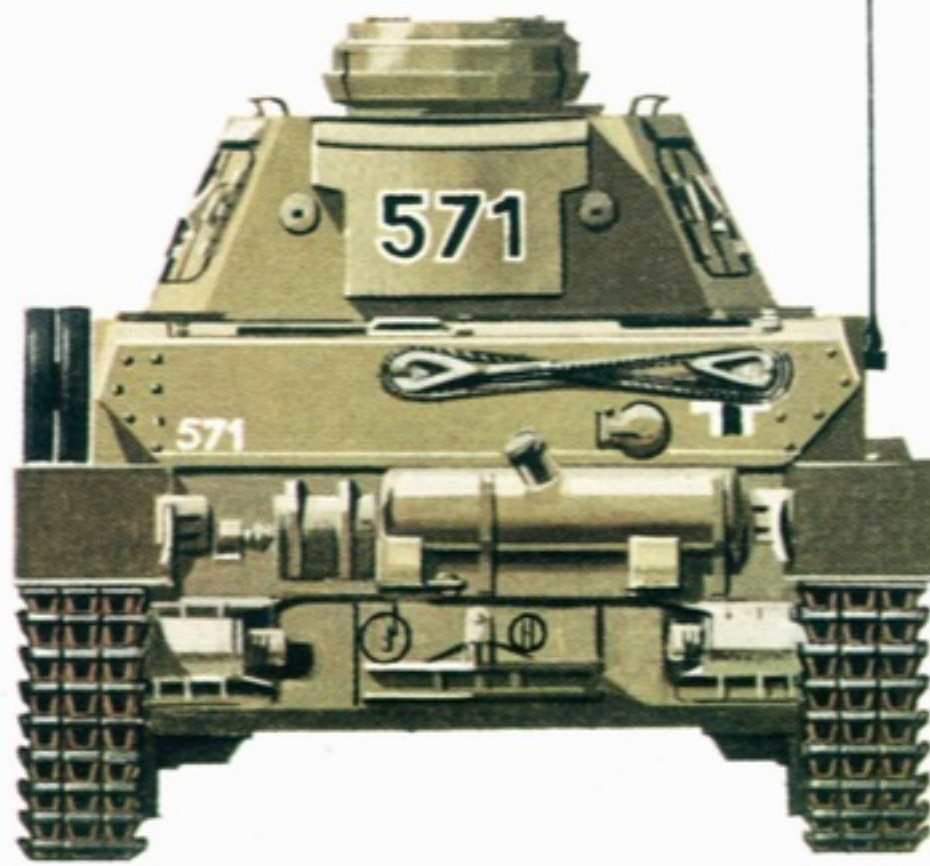
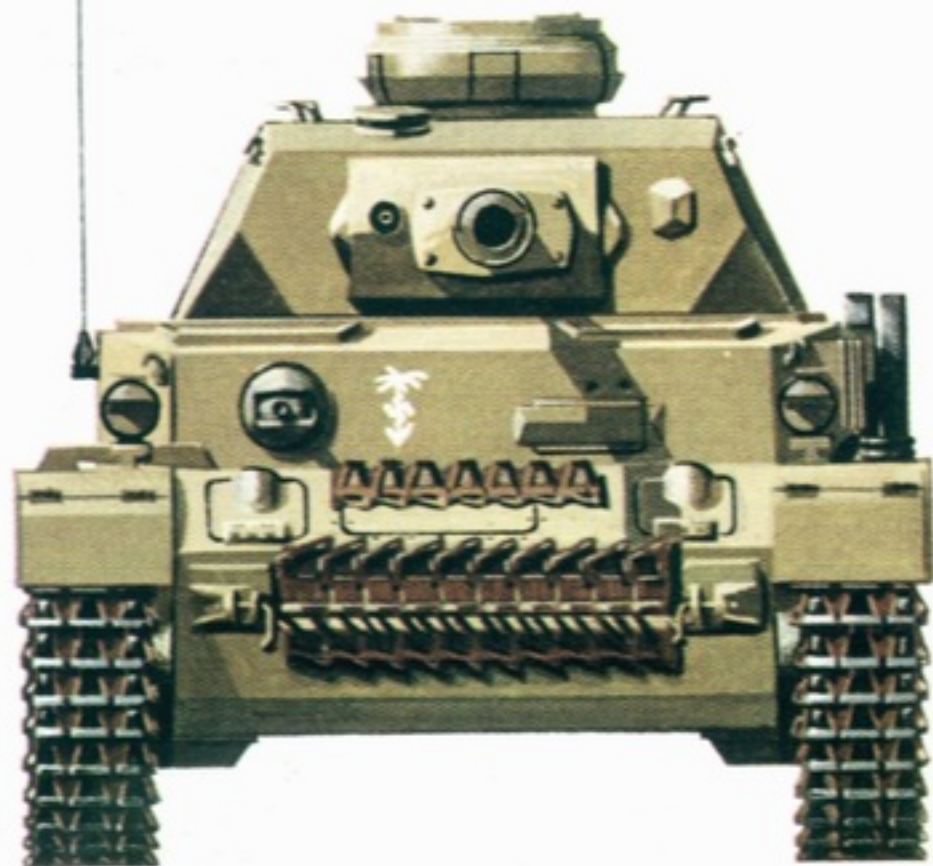


The insignia of the Afrika Korps; varying in detail, the basic palm-and-swastika motif was widely used on vehicles of all types.



PANZERKAMPFWAGEN IV Ausführung F2

This up-gunned version of Germany's famed Panzer IV, armed with the long 7.5 cm. K L/43, appeared in November 1941 as a hurried answer to the Soviet T-34. It gave the Panzer IV a new lease of life which saw it through to the end of the war; this version was known to the Allies as the "Mark IV Special". Numbers of these tanks were operated by elements of both the 15th and 21st Panzer Divisions in North Africa, and they played a large part in the German operations at Alam-el-Halfa and El Alamein in September and October 1942.





Ausf. F2 destroyed by its own crew in the Libyan desert; large numbers had to be abandoned as fuel and spare parts shortages increased under British blockade.

(Photo: Imperial War Museum)

To accommodate the rather large turret race, it projected well beyond each side wall of the hull. One bolted and two hinged maintenance hatches were provided in the front glacis plate; access hatches for driver and radio operator were provided in the roof plate.

THE TURRET

The welded turret provided seats for three crew members—commander, gunner and loader. The sides were sloped so that the overall width was appreciably greater than the internal diameter of the turret ring. The 7.5 cm. gun was mounted

PANZER IV F2 DESCRIBED

The hull was a comparatively simple design, incorporating various sizes of steel plates. All joints were austenitic steel welds and the plates were high-quality chromium-molybdenum steel made by the electric furnace process. Two bulkheads separated the hull into three compartments—driving, fighting and engine. The front driving compartment housed the transmission and final drive assemblies in addition to seats for both driver and radio operator/hull gunner. Three petrol tanks with a capacity of approximately 105 gallons were located beneath the floor of the centre fighting compartment. A most noticeable and characteristic feature of Panzer IV was the superstructure, of welded construction, bolted to the top flange of the hull.

on a trunnion axis. The forward end of the recoil mechanism projected through the mantlet to afford additional protection. The commander's cupola, set well back on the turret roof, had five observation ports equally spaced around its circumference with the front port pointing directly forward in line with the gun. It was closed by a pair of semi-circular hatch covers. An observation port was provided in each side wall of the turret, in front of the side access hatches. Additional observation ports appeared on Panzer IV turrets at either side of the gun mantlet, although official documents indicated that the right side port should be omitted on the F2 version. Not all turrets were so modified, since even the later Ausf. G sometimes carried both ports. Only one signal port appeared on the

A snow-camouflaged Panzer IV F2 in Russia during the winter of 1942-43. This was the only tank then available to the Wehrmacht capable of defeating the T-34.

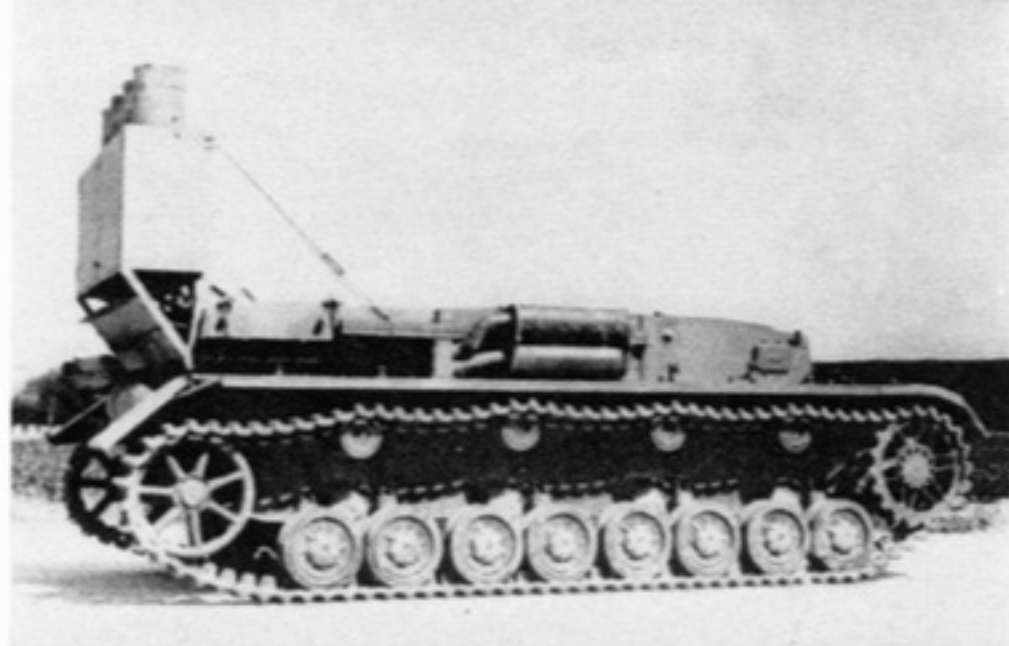


turret roof, similar to the ones mounted on both driving compartment crew access hatches. There were also two revolver and carbine ports at the rear of the turret. The fighting compartment was ventilated by a roof-mounted extractor fan.

The new gun KwK 40, of Panzer IV Ausf. F2 was easily distinguishable by its increased barrel length and muzzle brake. While the first production model was fitted with a single-baffle globular muzzle brake, later vehicles had a double brake. The gun itself was capable of penetrating homogeneous armour of 77 mm. thickness at 2,000 yards using PzGr.39 at normal impact. It could fire at least six different kinds of ammunition: *Panzergranate* 40 (A.P.C.R.), PzGr. 39 (A.P.C.B.C.), *Sprenggranate* 38A and B (H.E.A.T.), *Sprenggranate* 34 (H.E.) and *Nebelgranate* (Smoke shell). A total of 87 rounds were carried, plus 2,250 rounds of 7.92 mm. ammunition for both MG 34 machine guns, one of which was mounted co-axially on the right side of the gun. The second machine gun was mounted on the right side of the front vertical plate and operated by the radio operator. It had a ball mounting with a hemispherical fixed external mantlet, the ball being inserted from the outside. Turret traverse was affected by both hand, and electric power gears supplied from a generator, driven by a DKW two-cylinder two-cycle 10 h.p. 500 c.c. petrol engine.

POWER AND TRANSMISSION

The main power plant was the standard medium tank engine of World War II, the Maybach "HL 120 TRM", a 12-cylinder, 11,867 c.c. liquid-cooled petrol engine



Fuel shortage was also evident in Germany, where tanks were test-driven on bottled gas.

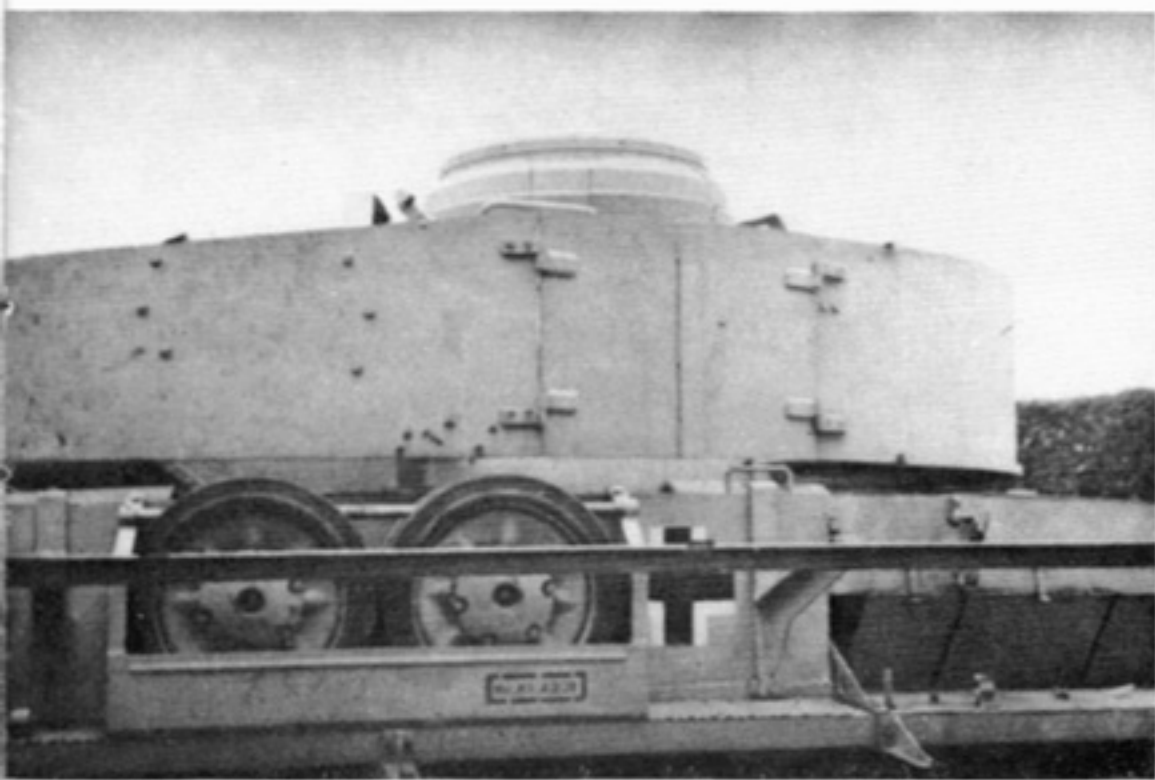
built under licence by Norddeutsche Motorenbau GmbH. of Berlin-Niederschöneweide. Normally developing an output of 300 b.h.p. at 3,000 r.p.m., the engine was in most instances restricted to 2,600 r.p.m. giving a rating of 265 b.h.p. The engine used only 74 octane petrol. Cooling air entered through louvres on the left hand side of the engine compartment, was drawn through two radiators and over the engine by two ten-bladed fans. An exceptionally large filter provided clean air for the power plant. Engine output was transmitted by a propeller shaft and a three-plate dry clutch to the Zahnradfabrik Friedrichshafen AG. synchro-mesh six-speed gearbox. Small multi-disc synchronising clutches were used for 2nd, 3rd, 4th, 5th and 6th gears. A Krupp-Wilson "Clutch-Brake" final drive and steering mechanism was used. In this, the input gear drove the annulus of an epicyclic train. The sunwheel was coupled to a steering brake drum, which was held stationary by an external band and compression spring while the vehicle was in motion. The drive from the epicyclic annulus was transmitted through the planet carrier to the spur reduction gears, which drove the track sprockets. The six-speed gearbox and the final drive units had one common oil circulation system.

Each track consisted of 98 links, each one 400 mm. wide with 120 mm. pitch. Manganese steel was used for this "skeleton" type of track which weighed approximately 1,400 lb. Track tension was adjusted by means of a large diameter idler wheel mounted on an eccentric axle at the rear of the vehicle. The suspension system consisted of four bogie units per side, each one of which was fitted with two 18½ in. diameter rubber-tyred wheels. Quarter elliptic springs were mounted on the underside of the leading axle arm of each bogie. The other end of the spring rested on a shackle pin and roller, carried on an extension of the trailing axle arm. Four support rollers per side completed the suspension.

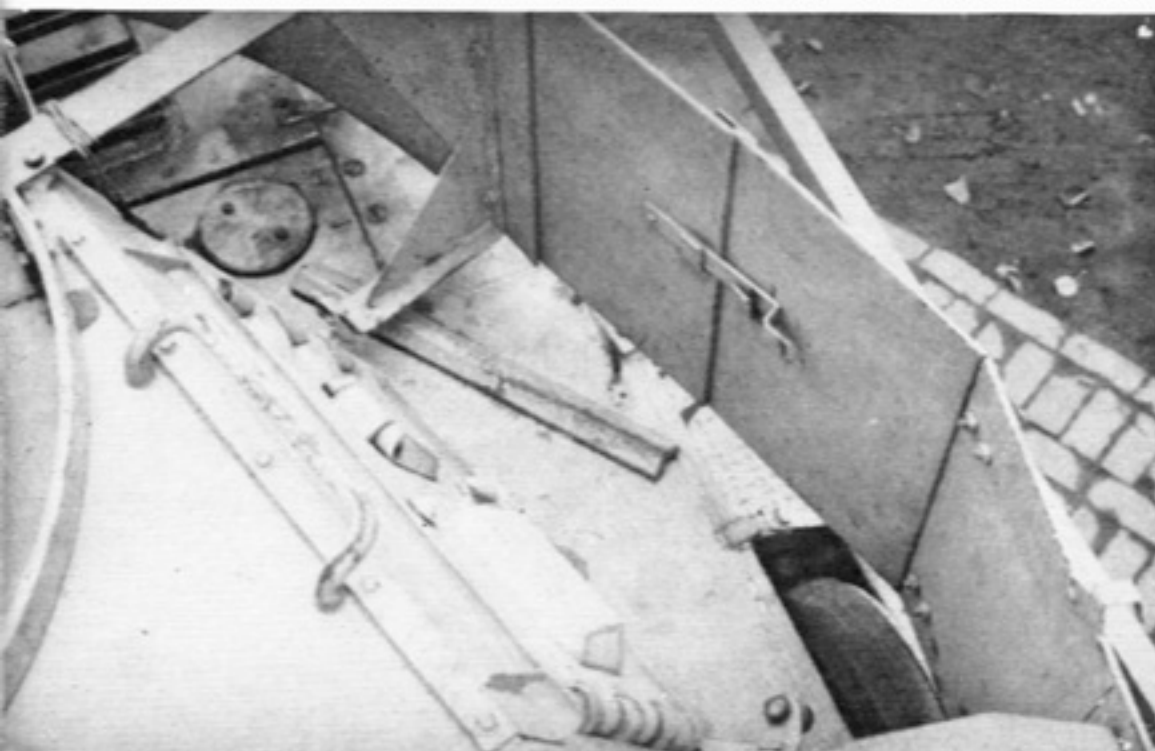
MARKS AND HYBRIDS

Before deciding to install the long-barrelled 7.5 cm. gun on the Ausf. F, Krupp carried out extensive research into utilising the 5 cm. Pak 38 for the Panzer IV. Krupp maintained that if a decision was reached by August 1941, "Nibelungenwerke" would be able to produce 80 Panzer IV with the 5 cm. Pak by the following Spring. An order was issued resulting in one prototype, which was demonstrated on 15th November 1941. Events in Russia, however, had already rendered this project obsolete, and it was dropped.

Vehicles returning to the factories or home maintenance depots for major overhaul received, after March 1943, standard armour skirts. This additional



From March 1943 onwards, all Panzer IV leaving the production lines were equipped with additional skirting armour, attached to turret and hull sides. (Photos: Chamberlain Coll.)





Chassis of Ausf. F models were converted to ammunition carriers for super-heavy artillery; the crane had a load capacity of 3 tons. (Photo: Spielberg Coll.)

5 mm. armour was loosely attached to the sides and the turret of the vehicle and provided extra protection against the very efficient Russian anti-tank rifle; it was also intended to defeat the effect of hollow-charge projectiles.

Chassis of Panzer IV Ausf. Fs were utilised for Panzerjäger IV, a tank destroyer vehicle built by

Vomag of Plauen. Shown as a wooden mock-up for the first time on 14th May 1943, the vehicle mounted the 7.5 cm. Pak 39 L/48 with limited traverse. It entered troop service in January 1944 under the designation *Jagdpanzer IV Ausf. F* (SdKfz.162). Battle weight was 24 metric tons, with 79 rounds of ammunition and a crew of four. Early versions of the 15 cm. *Sturmpanzer IV Brummbär* (SdKfz.166) were also based on PzKpfw IV Ausf. F.

The introduction of super-heavy artillery units in 1941 necessitated the conversion of several Panzer IV Ausf. F to ammunition carriers. To supply the 60 cm. "Karl" mortars with shells weighing 2,200 kg. each, Krupp created a limited number of "*Munitionsträger für Karlgerät*". Equipped with a special superstructure and a three ton crane, these vehicles supported the gigantic guns during the siege of Sevastopol.

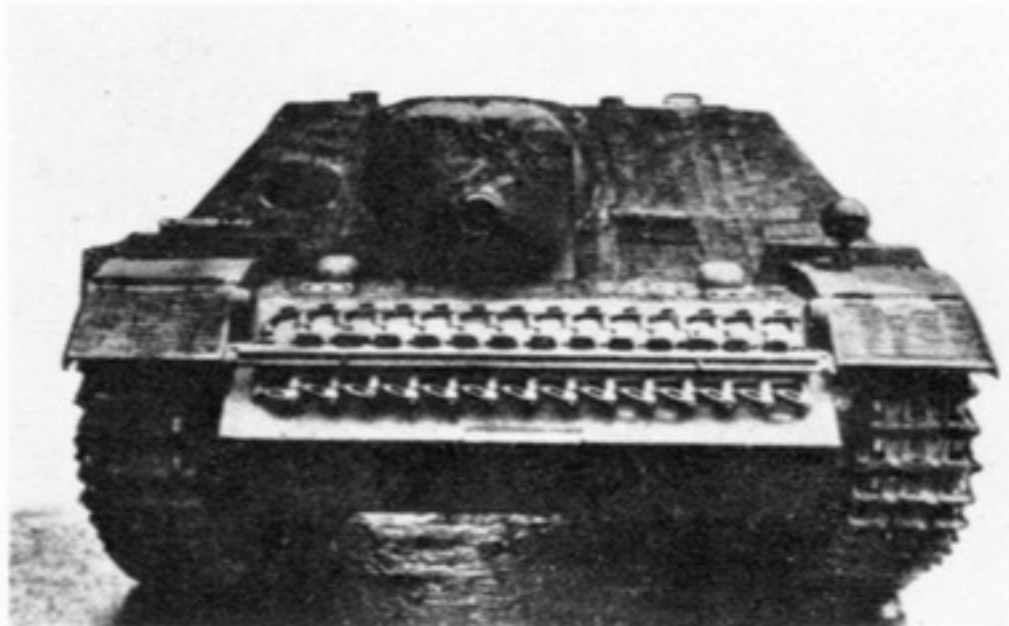
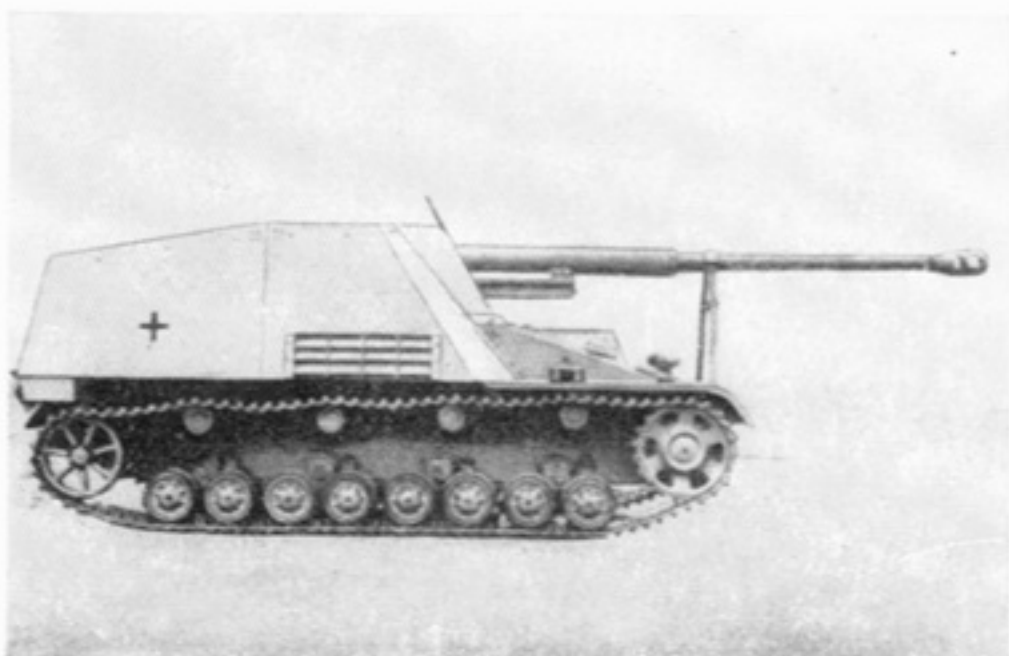
GESCHÜTZWAGEN III/IV

One of the most useful and numerous of the many makeshift chassis developed after 1940-41 was the *Geschützwagen III/IV* based on components of both Panzer III and IV by Altmaerkische Ketten-Fabrik GmbH. (ALKETT) of Berlin. The vehicle used PzKpfw IV Ausf. F bogie units, return rollers and idler wheels with PzKpfw III Ausf. J final drive assemblies, tracks and transmission components. Principle types built on this chassis were the 8.8 cm. Pak "Nashorn" (SdKfz.164) of which 473 were produced by Deutsche Eisenwerke, Teplitz-Schoenau works; and the 15 cm. heavy field howitzer 18/1 "Hummel" (SdKfz.165) of which 666 were built in 1943-44. There were also 150 ammunition carriers constructed on the chassis.



To mobilise the famous 8.8 cm. gun, chassis components of Panzer IV F were used for the "Nashorn" (Rhinoceros) tank destroyer, of which 473 were built.

Finally, Panzer IV F chassis were also used for fully enclosed, heavily armoured "Jagdpanzer IV" tank destroyers. The main armament, a 7.5 cm. Pak 39 L/48, appeared either with or without a muzzle brake. Shortage of rubber made the use of steel return rollers necessary.





Similar to the SP 8.8 cm. gun mount, this SP 15 cm. heavy howitzer "Hummel" (Bumble Bee) was standard issue to armoured units; the final drive wheel was taken from Panzer III production.

TACTICAL EMPLOYMENT

Painted in the usual dark blue-grey of the German Army, the Panzer IV backed up the occupation of Czechoslovakia in 1939 and the attack on Poland on 1st September of the same year. Equipping the heavy support companies of the tank battalions, the only opposition encountered came from Polish anti-tank guns. Losses were light here and in the invasion of France in 1940. Here the superior deployment of German armour proved decisive. Battle experience modified the tactical application of armour considerably but technical improvements were negligible. Neither the protection nor the fire power was greatly improved. The same story was repeated during the Balkan campaign of 1941 and the first appearance of the Panzer IV in North Africa. During all this time, Panzer III had replaced the obsolete Panzer I and II and fought, already up-gunned with a 5 cm. gun, most of the tank battles. The Panzer IV, still restricted by its limited availability, acted only as a back-up unit.

The reorientation in German tank design after the appearance of the Russian T-34 in 1941 resulted in a gradual phase-out of Panzer III by 1943. Therefore the only vehicle in mass production and suited for carrying improved armour and armament was Panzer IV. It had to close the gap and did so most effectively. The new designs, such as Tiger and Panther, required time to be developed and made battle-ready, and it was left to Panzer IV to carry the main load.

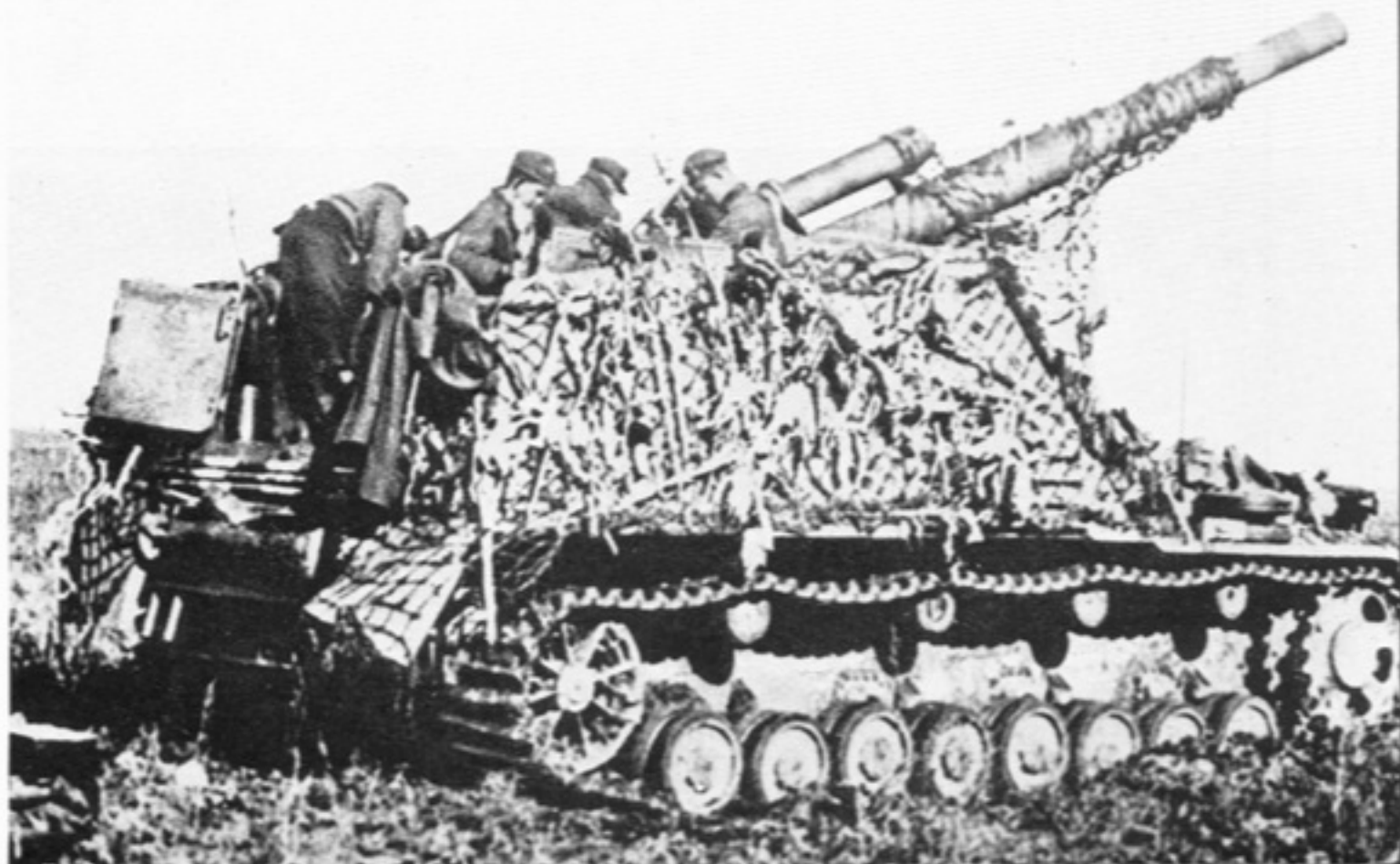
Panzer IV F2s were delivered to the Russian Front in small numbers for the Spring campaign of 1942. They also appeared in North Africa in the Summer of that year. They were identified by the British as the "Mark IV Special" and accounted the most formidable tank they had yet met. F2s led Rommel's push for Alexandria in August 1942, until they were halted by British 6-pdrs. at El Alamein. Their

Firing a 97.5 lb. shell to a maximum range of 14,550 yds., the "Hummel" was in service until the end of the war. This unit is shown under camouflage in Russia.

effect on the 8th Army far outweighed their numbers. British Intelligence was astonished to discover later from captured Deutsches Afrika Korps records that on 11th June 1942 the total number of Panzer IV on strength was only 14 of which six were "specials" and by 30th August, on the eve of the Battle of Alam el Halfa, the strengths were 37 and 27 respectively.

On 9th March 1943, General Guderian read an important paper at Hitler's HQ presenting his ideas about the future of the German armoured forces. He emphasised the fact that the basic equipment of the armoured divisions now consisted exclusively of Panzer IV. All efforts, therefore, would have to be made to ensure its continuous production throughout 1944 and 1945. His recommendation was relayed to industry in the form of an Order. Personal quarrels within the ranking hierarchy of the Ordnance Department led to constant attempts to disregard this directive and divert Panzer IV production from battle tanks to assault guns. These attempts reflected an ever-increasing tendency to adjust the thinking of the armoured forces to defensive tactics in the closing stages of the war.

In 1943, tremendous losses during the campaigns around Bjelgorod, Kursk, and Orel depleted further the already overtaxed tank units. Some armoured divisions were reduced to a strength of 12 to 18 tanks. During this time, an allocation of ten new Panzer IV to a division was considered an outstanding event. In 1942, a tank battalion still consisted of light and medium tank companies having the 5 cm. Panzer III as standard equipment. 1943 brought more and more of the up-gunned Panzer IV F2s to the forefront and by the end of that year, the Panzer III had almost disappeared. Only command and observation vehicles based on this chassis were retained in service into 1944.





Two early-model Panzer IV Ausf. F2, apparently in Russia; note early muzzle brake. The nearest vehicle carries the number 313 on the turret side; the first digit indicates the company, the second the zug or troop, and the third the individual vehicle. This is therefore the No. 3 tank in the First Troop of the Third Company of its Abteilung. (Photo: Chamberlain Coll.)

Panzer IV equipped with the long-barrelled 7.5 cm. L/43 and L/48 guns had taken over since the defence against enemy tanks was now their main task. This eliminated the necessity for light and medium tank companies. The equipment of the German tank force thus became for the first time in its history uniform in both organisation and armament.

The climax in the history of Panzer IV came in 1944 when it was continuously thrown into the battle against allied tank forces. In the East and, after the Normandy landings, also in the West and on impossible terrain in Italy, Panzer IV fought against over-

whelming odds. A proposal by the General Staff to cancel its production by the beginning of 1943 and to rely completely upon the Tiger would have had disastrous consequences. An early collapse of the German Army would have been a foregone conclusion. Panzer IV proved to be the most reliable German armoured fighting vehicle. And after the installation of the improved armament in 1942, it was equal to most of its allied counterparts.

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Armour in Profile Series Editor: Stevenson Pugh.

SPECIFICATION—PzKpfw IV (7.5 cm.) Ausf. F2 (Sd. Kfz. 161)

General

Designation and Ordnance No.: PzKpfw IV (7.5 cm.), Ausführung F2 (Sd. Kfz. 161). Krupp type: 7/BW.
Crew: Five—commander, gunner, loader, driver and radio operator.
Battle weight: 23.2 tons.
Dry weight: 22 tons.
Power/weight ratio: 13.6 b.h.p./ton.
Ground Pressure: 2.86 lb./sq. in.
Bridge classification: A.

Dimensions

Length overall, gun front: 21 ft. 9 in.
Hull length, overall: 17 ft. 9 in.
Height: 8 ft. 9½ in.
Width: 9 ft. 5½ in.
Track centres: 8 ft. ½ in.
Track width: 15½ in.

Armament

Main armament: One 7.5 cm. Tank Gun 40 (KwK 40) L/43, centre turret, 360° traverse, + 20° and — 10° elevation.
Auxiliary armament: Two 7.92 mm. 34 MG machine guns, one coaxial right of main armament, one in gun mount in front hull plate for radio operator.

Fire Control

Graduated target position indicator ring inside of cupola for commander.
Turret position indicator with two dials for gunner.

Ammunition

87 rounds for 7.5 cm. gun.
3,192 rounds for 7.92 mm. machine guns.
6 hand grenades.
24 signal cartridges.

Sighting and Vision

Commander: Five observation ports in cupola.
Gunner: Sighting telescope TZF 5 f vorl. 13 (T).
Radio Operator: Kugelblende 50 with sighting periscope KzF 2 1,8 × 18°.
Driver: Fahrerblende 50.

Communication

Two receivers, one transmitter—gunner, driver and commander connected with one intercommunication circuit.

Armour

Chromium-molybdenum homogenous steel, welded. Brinell No. 10/3000.
Hull: Front 50 mm. 10° Brinell 460–490; Glacis 25 mm. 73° Brinell 460–490; Sides 20+20 mm. 0° Brinell 500–520; Rear 20 mm. 12°; Roof 15 mm. 90°; Floor 10 mm. 90°.
Turret: Mantlet 50 mm. curved Brinell 490–510; Front 50 mm. 11° Brinell 490–510; Sides 30 mm. 26°, Rear 30 mm. 16°; Roof 10 mm. 90°.

Engine

Main: Maybach "HL 120 TRM" V-12 cyl. petrol. 11,867 cc. 300 b.h.p. at 3,000 r.p.m.
Auxiliary: DKW/Auto-Union "ZW 500" 2 cyl. inline. 497 cc. 10 b.h.p. at 2,800 r.p.m.
Fuel capacity: 105 gallons in three tanks underneath fighting compartment.

Transmission

Zahnradfabrik Friedrichshafen "ZF SSG 76 Aphon", Synchromesh, six forward and one reverse speeds. Krupp-Wilson clutch steering brakes.

Suspension

Running gear per side: One final drive wheel, one idler wheel. Four bogies with eight roadwheels (470/90–359) on quarter-elliptic springs. Four return rollers (250/65–134). Steel "skeleton" track, dry pin, type "Kgs 61/400/120", each one having 98 links. Pitch 4½ in.

Electrical System

Bosch generator, type GQL 12 volt, 300 watt. Four batteries 12 volt 105 Ah.

Performance

Max. road speed: 24.8 m.p.h.
Gradient: 30°.
Vertical: 2 ft.
Trench: 7 ft.
Wading: 3 ft. 3 in.
Range: Road—130 miles; cross country—71 miles.

Special Features

Additional 5 mm. armour skirts attached to turret and sides as retrospective modification to all vehicles returning to base maintenance after March 1943.